Session Number	Session Title
TECHNICAL SESSIONS - TECHNICAL SESSIONS - TECHNICA	
OGS	Opening General Session
201	Navigating the Entropy of Innovation: WEF/AEESP/AAEES Master Lecturer Charles Bott
202	Managing Upsets at Petroleum Refinery Wastewater Treatment Plants
203	Secondary Clarifiers: Old School vs. New School
204	Understanding the Benefits of Low DO Operation
205	Monitoring and Mitigation of Nitrous Oxide Emissions From WRRFs
206	Sewer Process and Ventilation Modeling: The Underground Menace
207	Optimizing Post Aerobic Digestion
208	Co-Digestion of High-Strength Wastes

209	Biosolids Planning and Management
210	The Great UV Dose Debate
211	Digital Water Tools To Evaluate and Optimize Collection Systems
212	Solving Stormwater Mysteries Through Modeling
213	New Tools for Planning and Executing Effective Stormwater O&M
214	Current Topics in Equipment Procurement
215	Fundamentals of Planning for Potable Reuse
216	PFAS From Coast to Coast: Five Perspectives on Strategies and Next Steps
217	The Drive to Net Water Positivity for Industry

218	Low DO Case Studies
219	FUNdamentals of Sludge Densification
220	Making MBR More Cost Effective
221	Thermal and Energy Opportunities
222	Wastewater-Based Disease Surveillance Part I: Paving the Path Forward
223	Collection Systems Design and Construction Challenges
224	Building Better Communities Through Green Infrastructure
225	Uptake Your Nutrients!
226	Alternative Project Delivery Methods
227	Non-Traditional Stakeholder Coordination For Public Engagement
228	Transforming Data Into Insight and Knowledge

229	Using Federal Infrastructure Funding To Advance Water Reuse
230	Building DE&I Within the Water Sector
231	Water Policy Update 1: The Federal Partners Perspective
232	Water Policy Update 2: The Water Sector Leadership Perspective
301	PdNA Research Highlights: Does The Carbon Source Matter?
302	Industrial Pretreatment: Utility and Industry Perspectives
303	Advanced Aeration: The Whole Package
304	Knowledge Development Forum: Designing for Emerging and Innovative Technologies
305	Digital Twins I: Introduction to Process Improvement

306	Pyrolysis and Gasification
307	The Ultimate Collections Systems Fundamentals Trivia Challenge!
308	Real-Time Control and Modeling For Design and Operation Of Stormwater and Wetland Restoration Systems
309	What Makes Integrated Planning and One Water Approaches Beautiful?
310	Small Communities I: Wastewater Treatment Options
311	Energy Reliability Is Core To Business
312	DE&I Aspects of Resource Planning
313	Regulations for Direct Potable Reuse in the United States
314	Microconstituents Removal in Potable Water Biofiltration Systems

315	Case Studies in Climate Change Impacts and Adaptability
400	Utility Leaders Round Table
401	Application of Process Modeling for Intensification of Secondary Treatment
402	Refinery Wastewater Technology Advances
403	Industrial Water Reuse for Sustainability
404	Internally Stored Carbon for Intensifying BNR
405	Guidelines for Optimizing Nutrient Removal Performance
406	PFAS In Biosolids: New Approaches To Removal
407	Wastewater-Based Disease Surveillance Part II: Improving Sampling and Interpretation of Results
408	Microplastics: Everything You Want To Know

409	Buzzword Bingo: Digital Solution Applications in the Collection System
410	MS4s and The Clean Water Act
411	Innovative Stormwater Research Beyond Green Infrastructure
412	Where Could Your Funding Be Hiding?
413	Data Analytics and Performance Reporting
414	Innovative Approaches to Increase Your Potable Water Supply
415	Defining Environmental Justice For The Water Sector
417	PFAS: Sources and Occurrence in Water and Wastewater
418	Innovative Solutions for Treatment of Petrochemical Wastewaters
419	Solutions and Ideas From Award Winning Industrial Experts

420	Process Aeration Modeling and Optimization
421	Intensification Intersection: Comparing Process Intensification Technologies
422	Progress of Carbon Diversion Using Advanced Primary Treatment
423	Digital Twins II: Process Improvement Case Studies
424	Enhancing Anaerobic Digestion With Pretreatment
425	Using Technology for I/I Identification
426	Stakeholder Engagement and Design for Adapting to Climate-Driven Rainfall Changes
427	Muddied Waters, Managed by Many Models
428	Small Communities II: Wastewater Management Options
429	Communicating the Importance of Biosolids With the Public

430	Environmental Justice in Practice: Stories From Around the United States
501	Latest Sensor Developments for Solids Management
502	Removal of Perchlorate and 1,4-Dioxane From Industrial Wastewater
503	Pharmaceutical Wastewater Best Practices
504	Comprehensive Wet Weather Solutions
505	Evolution of Biologically-Enhanced Carbon Diversion
506	New Adventures in Shortcut Nitrogen Removal
507	Clearing The Air With Sustainable Odor Control
508	How To Improve EBPR Through RAS Fermentation
509	Anaerobic Digestion Optimization
510	UVC-LED From Lab to Full Scale Operating Facilities

511	Inflow and Infiltration (I/I): Get Off My Property!
512	Stormwater Finance Needs
513	Minimize Flood Risk: Mapping and Solutions in Dense Urban Areas
514	Delivering the Goods Through Program Management, P3, and PDB
515	Ozone/BAC in CBAT Operations: It's Time For Optimization
516	Control and Monitoring For Improved EBPR
517	Applied Metagenomic Testing For Treatment Plant Operators and Engineers
518	Innovative Approaches and Considerations for Industrial Pretreatment Compliance
519	Carbon Generation For BNR
520	Knowledge Development Forum: PdNA Prime Time - Moving Into Practice

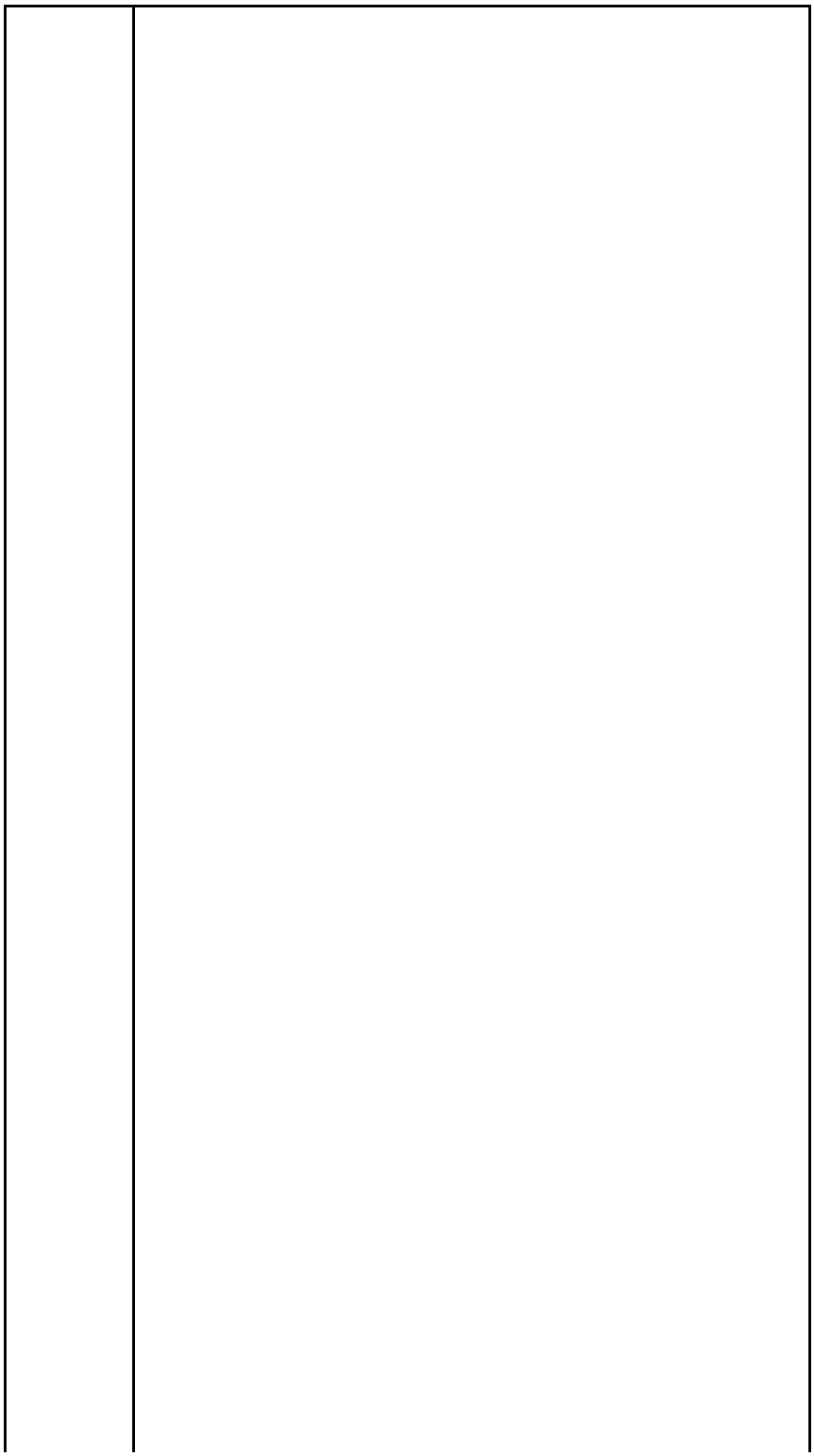
521	Updates to ASCE's Clean Water and In-Process Oxygen Transfer Standards
522	Creating Value From Wet Organic Wastes: How The DOE Is Helping
523	Peracid Progress: Using On-Site Generated PAA, Delivered PAA, and Performic Acid
524	Mitigating Flood Risk in Urban Areas
525	TMDLs... 'Loading' on the River!
526	Future Visualization Tools For Utilities
527	Incorporating Risk Evaluation in Design and Modeling for Utility Management
528	Cybersecurity Strategy and Tactics
529	MBR LRV Credits I: Can You Prove It?

530	Decarbonization Status and Global Trends
601	Treatment of PFAS in Liquid Phase
602	Biological Technology Applications in Dairy and Meat Processing Wastewater Treatment
603	Fundamentals of Greenhouse Gas Accounting of Wastewater Utilities
604	Advances In The MABR For Nutrient Removal
605	Sludge Granulation in Continuous Flow Systems
606	Cross Process Performance Enhancements Involving Thickening and Dewatering
607	Advanced Digestion Topics
608	Digital Process Evaluation and Optimization for Public Health Protection
609	Internal and External Factors on Force Main Construction and Rehabilitation

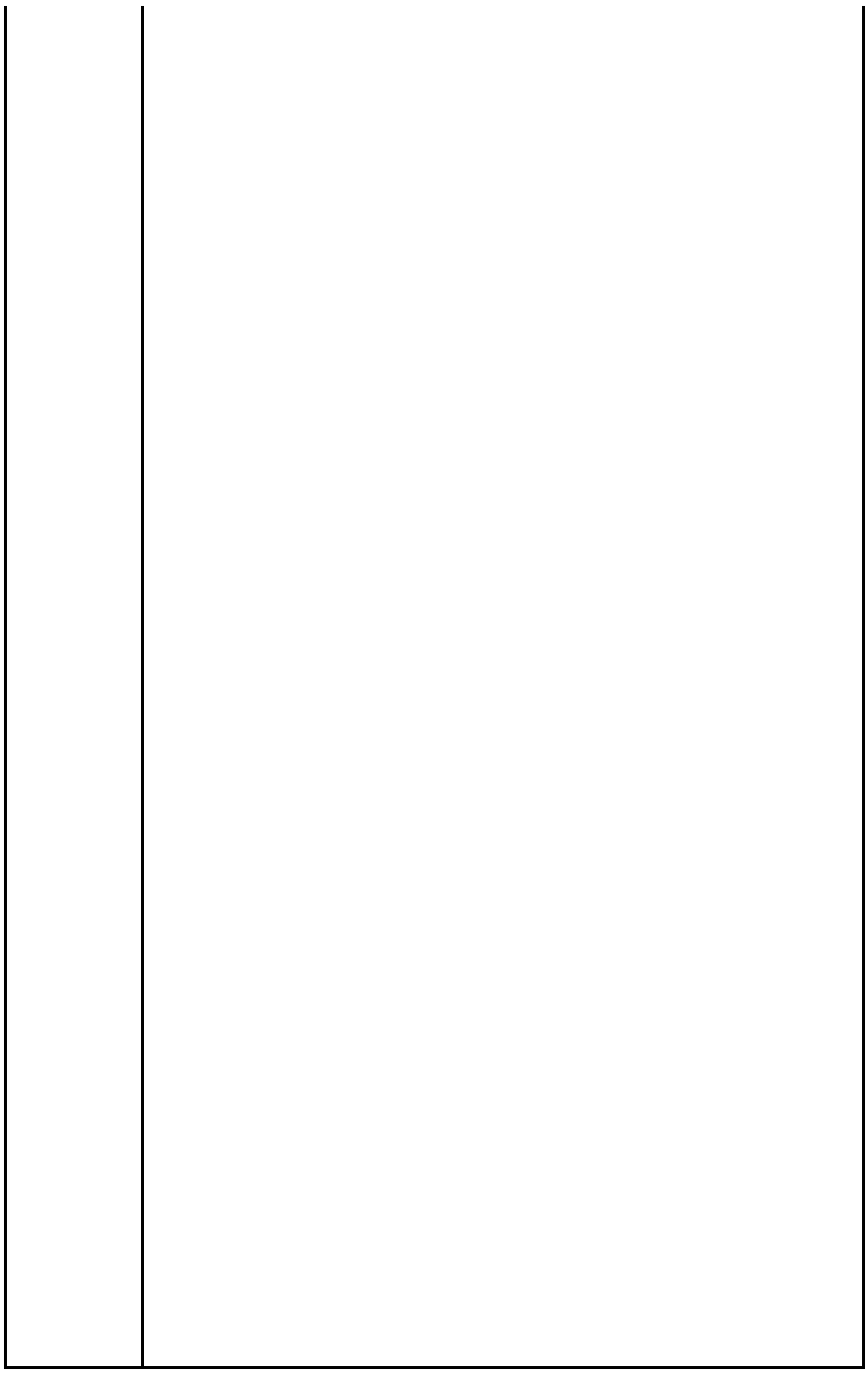
610	Blue, Green, or Grey Infrastructure: Which Colors Are Best For Your Community?
611	Rates, Complaints, and Floodgates: Examples of Successful Stakeholder Engagement
612	Positive Impacts of Business Process Improvements
613	Leveraging Artificial Intelligence for Asset Management
614	MBR LRV Credits II: Can You Prove It?
615	The Project Funding Journey For Small and At-Risk Communities
WORKSHOPS - WORKSHOPS - WORKSHOPS - WORKSHO	
W01	Making Resource Recovery Concepts Come To Life: Operator Education Through Interactive Simulation
W02	Wastewater Microbiology

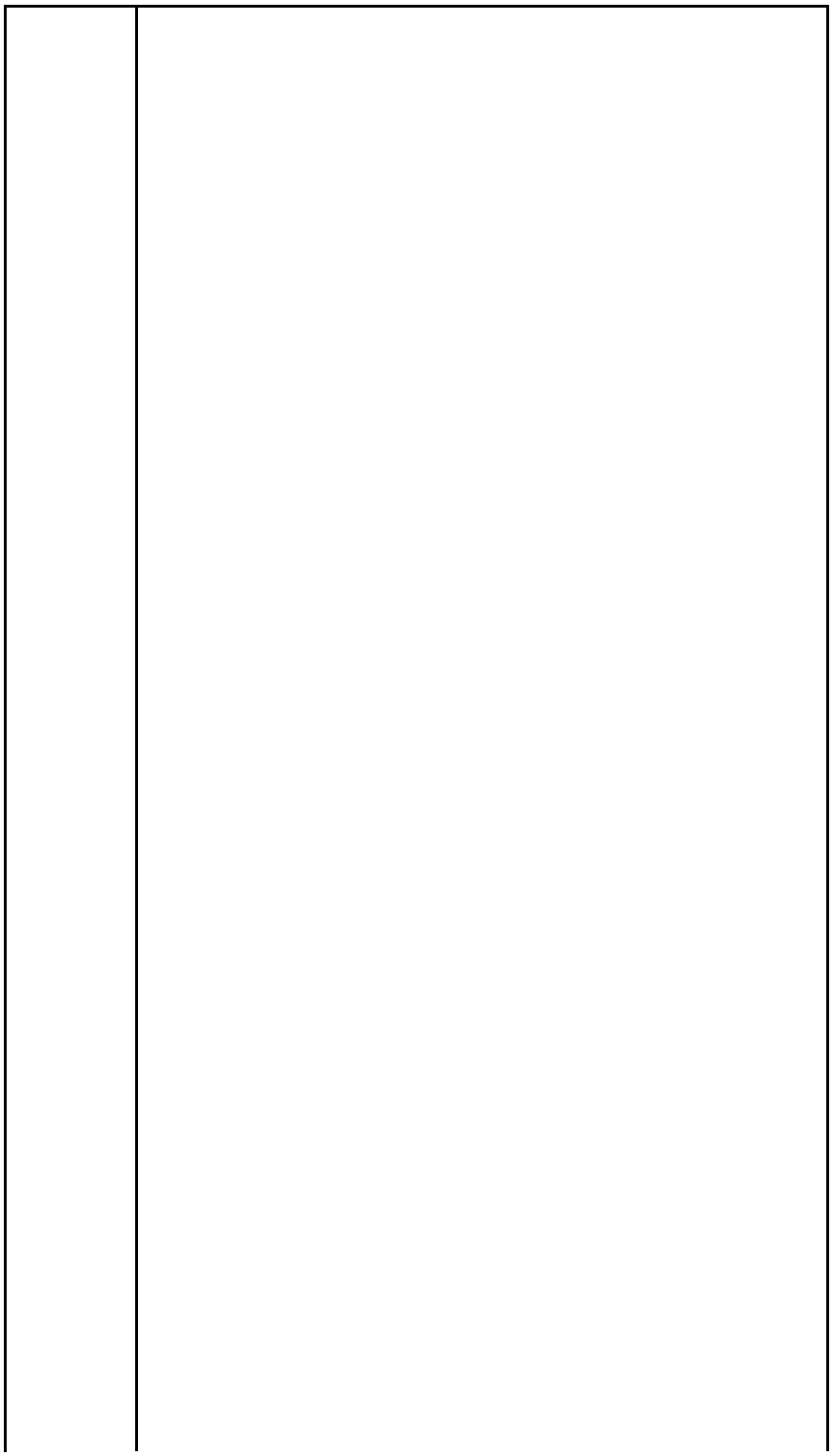
W03	Refinery and Petrochemical Wastewater Treatment: Concepts, Operation, and Troubleshooting
W04	Game-Based Modeling
W05	Wastewater Microbiology
W06	Activated Sludge and BNR Process Control: Hands-On in the Real World (Off-Site)
W07	Current Status of Co-Digestion and the Journey to Energy Neutrality
W08	Overcoming Uncertainty: Confident Decisions in the Face of Climate Change
W09	So You Thought You Were Done? Finding the End Point of Wet Weather Control Programs
W10	Emerging Pathogens and Microconstituents in Wastewater/Water Reuse: Challenges and Opportunities

W11	Equipping Your Utility to Address PFAS in Water Reuse: State of the Science, Emerging Trends, and Navigating the Regulatory Pathway
W12	Transformative Opportunities in Stormwater: Elevating Resilience, Equity, and Workforce Development
W13	Successful Commissioning of Capital Projects by Understanding Commissioning Failure Modes and Engaging Stakeholders
W14	Brainstorming HOW to Prioritize Equity and GHG Benefits in CIP and Services Decisions
W15	Reimagining the Water Sector Through Equity and Justice
W16	Are You Talkin' To Me? Learning How to Communicate with Your Audience
WLI	Water Leadership Institute
OPERATIONS CHALLENGE - OPERATIONS CHALLENGE - C	
OC1	Operations Challenge Day 1
OC2	Operations Challenge Day 2
STUDENT DESIGN COMPETITION - STUDENT DESIGN CO	



SDC1	Student Design Competition Wastewater - Room 1





SDC2	Student Design Competition Water Environment - Room 2	

LEARNING EXCHANGES - LEARNING EXCHANGES - LEARI	
LE1	Best Practices in Community Outreach and Engagement
LE2	Operations Roundtable
LE3	Equity in Asset Planning and Management
LE4	Manufacturing Roundtable

LE5	Women in Water
LE6	Construction Roundtable
LE7	Funding, Financing, and Grants
LE8	Public Officials Roundtable
LE9	Cybersecurity: New Legislative and Regulatory Impacts
LE10	Conducting and Utilizing Facility Condition Assessments
LE11	Rainbow Advocates - LGBTQ+ Community
LE12	Workforce - How do we engage the next generation?
LE13	Community of Color

Session Description
AL SESSIONS - TECHNICAL SESSIONS - TECHNICAL SESSIONS - TECHNICAL SESSIONS - TECH
The Main Stage features impactful speakers, special sessions, and events that celebrate the ingenuity, the achievements, and the resilience of our water family.
TBD
Wastewater treatment systems at petroleum refineries must continually adapt to highly variable and sometimes inhibitory influents, all while meeting stringent effluent objectives every day. So what happens when wasteloads increase due to production changes and the treatment plant experiences an upset? The presentations in this session will illustrate a number of practical approaches that refiners have employed to maintain throughout and stay in compliance when faced with organic overloads, loss of nitrification and reduced oxygen transfer capacity. Interactive Session | Facilitated Discussion
Is there value to CFD analysis of secondary clarifiers? Does CFD analysis offer advantages over traditional analysis? Traditional analysis provides valuable hands-on observable analysis of clarifier performance. Is CFD a blackbox? This session sparks the debate of differing viewpoints. Interactive Session | Conversations and Input
The participants of this session will get to explore the benefits of low dissolved oxygen (DO) operation for nutrient removal. Benefits go beyond the energy savings associated with the aeration process and presentations will focus on stability of enhanced biological phosphorus removal, reduced chemical (supplemental carbon) requirements, increased treatment capacity, and smaller footprint. Interactive Session | Case Study Analysis
Nitrous oxide (N2O) emissions can account for up to 78 percent of the total greenhouse gas (GHG) footprint of a WRRF (Daelman et al., 2013). As utilities seek to decarbonize their operations, process emissions of N2O are likely to be the most substantial contributor for facility level, and utility-level carbon reporting and significant work is ongoing around the world to better understand these emissions and to implement mitigation strategies. This session will include short ted-talk style presentations, followed by a panel discussion where the audience will be able to interact with the presenters. Interactive Session | Panel Discussion
Efficient odor and corrosion control starts with understanding the problem, then optimizing a solution for performance and cost. This session will present novel approaches for sewer process and ventilation modeling to develop comprehensive understanding of systems and wrap-ups with the use of artificial intelligence to optimize odor and corrosion solutions. Attendees will get to observe the theory and real-world examples of these concepts in practice.
Several full-scale post aerobic digestion (PAD) installations are now operations and this session will explore the impacts of operating parameters such as temperature, solids retention time (SRT), loading rates, and pH on nitrogen and phosphorus removal and volatile solids reduction (VSR). Nitrogen phosphorus removal pathways will be discussed as well as strategies to optimize the PAD process.
Co-digestion, including laboratory research results on fats, oils, and grease (FOD) co-digestion will be the focus of this highly engaging panel discussion. This session will also look at research results on organic feedstock pretreatment and management practices and lessons learned from a recent co-digestion and cogeneration projects. Attendees will get the most from attending the full session. Interactive Session | Panel Discussion

Various types of planning and management strategies important for utilities and engineers to deal with all of the new potential changes in disposal regulations will be discussing during this session. Adaptive Pathways Planning can be used in conjunction with more traditional Asset Management strategies such as technological screenings using LOS and risk analysis to provide a more robust plan for the future of biosolids planning and management. In this Session, attendees will become familiar with methods which account for increased risk associated with changing regulatory standards and allow for organizations to be better equipped to stay in alignment with their required Levels of Service and organizational goals. Interactive Session | Case Study Analysis
Many questions arise when selecting the UV dose for design of a wastewater UV system. Why does my new UV system have a lower or higher UV does than my old system? Why is my design UV dose different from the laboratory UV dose test results? How much safety factor do we need? Will future permit limits require higher UV doses? Right-sizing the UV design dose assures disinfection with reasonable safety factors while avoiding unnecessarily oversized UV systems. Each presentation during this session, will display different approaches for establishing the design UV dose, and compare design assumptions to reality by startup test data, spot check bioassay results, and full-scale operational data. After each presentation, attendees will be able to participate in the great debate with presenters and other attendees. Interactive Session | Facilitated Discussion
'Digital Water' is a term that has gained currency over the past decade. It has become an umbrella term for wide ranging tools and applications, from hydraulic models to artificial intelligence and machine learning, flow monitoring to real-time decision support. This curated session will explore the facets of digital water and through structure presentations and discussions will provide context for the application of digital water tools and describe case studies that illustrate the real-world application of digital tools for utilities. Interactive Session | Facilitated Discussion
How do you prioritize flood mitigation projects? What's polluting our urban streams? What treatment strategy works best to remove phosphorus from stormwater? The stormwater detectives in this session will show how stormwater modeling can be used to answer these challenging mysteries.
New strategies and resources for addressing the perennial stormwater 'hot topic' and challenge of operation and maintenance are the focus of this session. Participants will explore the new WEF Stormwater O&M Manual of Practice, see how maintenance of the SCMs in Chesapeake Bay is going, and learn how to blend their green infrastructure into their grey infrastructure asset management systems. This is a must see for those looking for ideas on how to keep their systems going. Interactive Session | Facilitated Discussion
TBD
Take a journey into the fundamentals of planning for potable reuse from the collection system to advanced treatment. Starting in the collection system, together we will examine the details of enhanced source control measures required for potable reuse systems. Then, we will take a look at treatment and planning technologies required for a potable reuse facility. Lastly, we will explore the impacts of plant operations on the performance of advanced treatment systems for potable reuse. We will use buzz moments between presentations to discuss initial attendee responses on issues raised and speaker questions.
Our exciting panel discussion assembles a lineup of PFAS experts from across the United States, representing the federal government, state agencies, a large metropolitan water provider, and the private sector. They will provide insights on current topics such as upcoming federal PFAS regulations, pre-treatment efforts taken to prevent PFAS from entering wastewater systems, removing PFAS from contaminated drinking water sources from a utility, and solutions for PFAS destruction and disposal. After remarks from each, you will have the opportunity to engage in a lively panel discussion around the subject of PFAS. Interactive Session | Panel Discussion
Water is a critical resource for industrial operations. Many leading companies are evaluating, managing, and capitalizing on water risks and opportunities across their entire value chain and the watersheds in which they operate, driving the rise of 'Net Water Positive' strategies. While there are some similarities across different industrial sectors including food and beverage, energy, and technology; there are enough differences to result in different metrics, terminology, boundaries, etc. In this session, we will hear from global industrial thought leaders who will review their corporate 'Net Water Positive' strategies and specific solutions being implemented. This session will include 'talk show' moments, interviewing each speaker, allowing open learning on a topic that will impact all industrial companies in the future. Interactive Session | Talk Show

Two case studies on the application of low DO operation in full-scale BNR facilities will be presented during this session. The first study will describe a side-by-side comparison of low vs. normal DO (1mg/L vs. 2 mg/L) operation. The low DO operation improved biological phosphorus and denitrification performance. The second study will describe a full-scale test of the Ntensify process, which includes advanced aeration control, metabolic selection, and gravimetric sludge selection via hydrocyclones. Interactive Session | Case Study Analysis
Sludge densification is a hot topic at WEFTEC 2022 and this session is for those who are looking to explore the FUNdamentals of densification. Attendees will be able to identify the key factors that can improve sludge settleability and enhance nutrient removal performance in full-scale continuous flow applications. Interactive Session | Conversations and Input
Strategies to enhance the economic viability of MBRs will be covered during this session. Presenting these strategies will allow the attendees to dive deep with the speakers and discover the available options used for mitigating fouling and reducing operational costs.
Our session's focus is the exploration of thermal and energy management at municipal treatment plants. Presentations will span energy management planning efforts with specific case studies related to thermal modeling. Energy management planning incorporates energy goals related to source power reliability and resilience combined with energy reductions (biosolids, operations, etc.) Energy management is further advanced through thermal heat recovery systems. Thermal modeling includes capture for energy reduction purposes and source water protection.
Recent wastewater-based surveillance (WBS) programs implemented to improve public health decision making, implications of these lessons for future WBS efforts, and the potential path forward after the current COVID-19 pandemic ends will be highlighted during this session. These studies will explore surveillance programs at both the community level and in industrial closed systems and will present a framework for assessing the risks and value of WBS in future outbreaks. The session will wrap up with the CDC's vision for WBS and the application of the National Wastewater Surveillance System to issues beyond COVID-19.
A variety of construction projects across the United States and Canada have encountered constructability issues. This interactive session will focus on the lessons learned during these projects by allowing the audience to ask detailed questions related to resolution of issues encountered in the field. Focus of the presentations will be on what went wrong and how those issues were resolved. We never learn from the 'perfect project'. Interactive Session | Case Study Analysis
A variety of methods, used by three cities in the United States, to take green infrastructure to the next level will be reviewed during this session. Green infrastructure has been a common tool for stormwater management for years. This session will highlight key issues that arise when implementing green infrastructure and provide practical and usable solutions on how to overcome the issues. The approaches described range from incorporating green infrastructure into site features, working with non-profits to better engage diverse and underserved communities, and providing targeted incentives.
Several case studies demonstrating the successful use of adaptive management approaches to address nutrient impairment in watersheds will be presented in this session. The attendees will be included in facilitated discussion breaks to provide a interactive conversation with the speakers and other audience members on the case studies presented in the session. Interactive Session | Facilitated Discussion
Design-build is the fastest growing construction method in the nation. Traditional design-bid-build methods have proven methodology for renewing our infrastructure. However, the water industry is pressed to renew infrastructure, address more stringent regulatory requirements, and increase level of service at an aggressive pace. To meet the demanding infrastructure needs in our industry, innovative and evolving project delivery methods can harness the expertise of the designer and the builder to develop the best project solutions delivered under the most efficient schedule. In addition, alternative delivery projects have flexibility to address a project's unique needs.
TBD
The water and wastewater sector is at the cross-roads between massive influx and ownership of data and the need to leverage data into meaningful insights. Topics within this session include an introduction of the future of digital solutions in the water sector, developing a technology master plan, and a bird's-eye view of how organizations can leverage data and develop robust digital twins. Interactive Session | Facilitated Discussion

Introducing recent legislation that provides federal funding for infrastructure and the programs that are being implemented as a result of this legislation will be the focus of this session. As part of this highly engaging panel discussion, you will have the opportunity to interact with two utilities who have had recent experiences with federal funding. Come prepared to share your experiences and ask your questions! Interactive Session | Panel Discussion
A WEF Member Association, a public utility, and a private company will present their lessons learned while building and implementing Diversity, Equity, and Inclusion (DE&I) programs. During the session, attendees will be able to engage in dialogue with the speakers, share what has worked, learn what can be improved, and discover tactics they can take back to their own organizations. Interactive Session | Facilitated Discussion
This session will address the key priorities from the Biden Administration related to water and will provide the federal partners' perspectives. The federal senior managers speakers will address regulatory and policy topics such as resilience, PFAS issues, cybersecurity, affordability, infrastructure funding and implementation as well as Buy America Build America Act compliance.
This session will be a water sector leadership response to the federal partners' perspectives. Experts, utilities' leaders and practitioners from the water sector will react and provide their perspective to the federal partners' discussions in the earlier session. They will discuss their priorities as it relates to the federal partners' priorities as well as their own, and provide input on implementation and other aspects of policy and regulatory issues.
Research into partial denitrification anammox (PdNA) for mainstream nitrogen treatment continues to advance and uncover new insights into the operation of these exciting process technologies. One key benefit of PdNA is the ability to reduce the need for carbon addition, although vital to the process, and studies have demonstrated PdNA to be flexible with a variety of carbon sources including fermentate, methanol, glycerol, and acetate. This session will explore specific PdNA applications using different carbon sources. Among the questions to be explored; What carbon sources are best in terms of PdN efficiency and for which applications? Which can provide the lowest costs? Which can provide the best performance?
USEPA's industrial pretreatment regulations date back to 1978 and provide guidance for the development of industrial pretreatment limits at the utility level. Industrial facilities that discharge wastewater to utility-owned wastewater collection and treatment systems often must comply with federal pretreatment standards for their industry sector, as well as utility pretreatment requirements which can vary significantly among various utilities Utilities are faced with challenges to regulate industrial discharges for new and emerging contaminants to protect water quality or potential potable reuse opportunities. Industries are faced with increasing challenges to reduce water use, often resulting in more concentrated wastewater discharges at lower flow rates. This session will explore the competing challenges of utilities and industries to protect water quality while also providing flexibility to encourage industrial water use reduction and reuse. Interactive Session | Panel Discussion
We will explore the three major components of aeration systems; blowers, diffusers, and advanced control. The blower discussion identifies factors that determine minimum to maximum airflow rates for sizing blowers; influent loading characteristics, varying alpha, ambient inlet air temperature, and minimum mixing. The diffusers evaluation includes a comparison of SOTE and discharge pressure vs. head loss, as well as interchangeability of diffuser types. Lastly, the control discussion describes full-scale implementation of a feed-forward/feedback ammonia based airflow control system identifying challenges.
Implementation of emerging technologies that have reached technology readiness levels of 7 or 8, having been pilot-tested and demonstrated at full-scale, but which do not yet have wide adoption will be the focus of this session. Attendees will also participate in the discussions on technologies that have been in operation for a number of years, but recent work has suggested an alternative approach that could yield significant benefits. Participants will discuss methods to evaluate emerging technologies and logistical barriers to selection, design, permitting, bidding, and operation. Interactive Session | Knowledge Development Forum
Have you heard of digital twins but you are not sure what the buzz is all about? Maybe you are new to the concept and want to understand how it applies to your challenges? Then, this session is for you! Come learn about digital twins for process improvement in a relaxed, interactive format from industry experts who distill the topics into simple, easy to understand concepts. Interactive Session | Facilitated Discussion

Thermal processes such as pyrolysis and gasification have been proposed as potential solutions to deal with biosolids, with PFAS, or other emerging contaminants as concerns regarding these issues continue to grow. While these technologies are not new, application of these processes to treatment of biosolids have not been widely applied. As the biosolids communities begin to consider these processes more seriously, a better understanding of these processes, their impacts on the treatment plant and environment, as well as the potential use of the products and byproducts is needed. This session is meant to provide an introduction of the technologies available, the state of their development, the challenges regarding these processes, and the potential benefits and drawbacks of their implementation.
If you have an appetite for fun and are not afraid of a quiz, this is the session for you! Come and test your knowledge on the collection systems basics. Including design considerations, flow monitoring, modeling, pumps, and pump stations. You may even learn (and earn) something new. Interactive Session | Trivia Challenge
As technology applications and data integration systems become more widespread and accessible, more stormwater management systems are incorporating available GIS data, real-time or continuous monitoring, and automated controls to achieve water quality, flood mitigation, and environmental restoration objectives. This session will present three different, creative applications of geographic information systems. The systems will consist of 1 and 2D, water quality modeling, real-time continuous monitoring to design and operate stormwater management systems in different cities around the United States. Each study involves the integration of data, urban stormwater management, and natural systems; illustrating how stormwater design can respond to the interaction of natural and built systems, as well as supporting ecosystem restoration objectives.
Understanding the interconnectedness of water, wastewater, and stormwater is essential to watershed management. Using One Water and integrated planning approaches, utilities can holistically address how resources are managed, data is collected and analyzed, and programs can be improved to better serve and protect their communities. In this session, learn and appreciate the beauty of One Water and integrated planning through case studies that demonstrate best practices for successful watershed management. Hear from industry experts on how to utilize data for better decision-making on managing water, how to integrate pretreatment programs into One Water frameworks, and how to implement integrated watershed planning to meet TMDL requirements. Interactive Session | Conversations and Input
Management options for small systems and decentralized wastewater management options will be described during this session. Planning and management issues associated with small and decentralized systems must be addressed and as increasingly stringent water quality limits are imposed, management becomes more critical. Further, water reuse is emerging as an option to address these limits. This session describes both management approaches to reuse and decentralized technologies that can be utilized on an individual basis and in a decentralized setting.
With bullet-proof compliance as a wastewater utility's core misison, reliable energy supply and supporting infrastructure is a requirement to consistently answer the call. WEF's new Energy Management task force has over 50 members representing over 20 wastewater utilities. The group identified energy reliability as their single most-pressing issue. This session explores recent efforts by Chicago MWRD, Great Lakes Water Authority, Houston Water, and New York City DEP to respond to recent energy interruptions, assess the causes and possible solutions, and move to enhanced energy resiliency. Interactive Session | Panel Discussion
The necessity and urgency of integrating DEI into the organization vision and strategy will be explored during this session. Â It is not only the right thing to do for our organization, but is the path forward to a more sustainable, resilient, and equitable future in the water sector and the communities we serve.
Direct Potable Reuse (DPR) represents the intersection of highly treated wastewater with drinking water. Understandably, regulations play a critical role in defining what can and cannot be done so human health is protected at every step. Join us as we take a deeper dive into the current state of the DPR regulations in the United States including its history, what some states are already doing, and where we are headed. This single speaker presentation allows more time to explore concepts, added time for questions, and greater interaction with the speaker.
Biofiltration systems have become popular for potable water reuse applications when combined with ozonation. Biofiltration is not a new technology and has been used for many years in drinking water operations, however, turbidity is usually the main indicator to determine if a biofilter is performing as expected. This session will dive into new and different technologies to remove specific microconstituents while recognizing the importance of microbial ecology impact on operations performance and how this can provide insights for future optimization. Interactive Session | Conversations and Input

Our infrastructure is facing a future with impacts from sea level rise, erosion, flooding and extreme events. Resiliency planning in the face of climate change requires the right data and the right risk assessment methodology. Attendees will have the opportunity to examine case studies in resiliency planning that can be applied to other facilities and agencies. Interactive Session | Case Study Anaylsis
TBD
Intensification of wastewater treatment processes is a major driver for infrastructure improvements. Process models are a key tool for assessing the ability of a secondary process to either achieve densified sludge, implement control strategies, or incorporate new biofilm processes. This session will provide the audience with examples of how process models can be effectively utilized for process design and operations.
Petroleum refineries face a wide variety of wastewater treatment challenges, including oil and grease, dissolved organics, selenium, and other constituents. This session will explore several of these challenges through studies and full-scale applications of advances in refinery wastewater treatment technology. Session topics include low-cost selenium removal and impacts of unconventional crude slates to existing wastewater treatment performance.
Industrial water reuse projects will be presented during this session covering the technical aspects on the water treatment processes used, their long-term performance, the drivers for implementing reuse projects, and techno-economic analysis of implemented water sustainability projects. Interactive Session | Conversations and Input
Carbon is a valuable resource for energy recovery and biological nutrient removal (BNR). Recently, engineers have focused on carbon redirection and the generation of readily biodegradable COD for biological phosphorus removal. In this knowledge development forum, we will discuss how plants can be designed and operated to encourage substrate uptake in anaerobic zones (selectors) as internally-stored carbon. This carbon can then drive denitrification without supplemental carbon addiction. It will begin with an overview of what we know and what we do not know of carbon uptake in activated sludge models, followed by two case studies of full-scale operation.
The findings and outcome of the Water Research Foundation project WRF 4973 Guidelines for Optimizing Nutrient Removal Plant Performance will be presented during this session. The objective of WRF 4973 is to investigate approaches used to optimize existing WRRFs for nutrient removal, utilize full-scale examples for how it is done and to produce a guide on how to optimize WRRFs for nutrient management. The goal of this session is that the participants learn different optimization approaches, understand how to optimize a WRRF to reduce nutrient discharged from a WRRF, and reduce the cost to operate the nutrient removal WRRF. Interactive Session | Panel Discussion
PFAS in biosolids have the potential to derail beneficial reuse via land application due to the potential impacts to groundwater and transfer into agricultural crops. This session will compare different PFAS removal technologies in biosolids in terms of their development and implementation, and further summarize the lessons learned from different case studies employing these technologies. A detailed summary on the fate of PFAS through pyrolysis systems and optimum analytical methods for establishing a PFAS mass balance across solids treatment process will also be presented during this session. Interactive Session | Facilitated Discussion
Throughout the COVID-19 pandemic, wastewater-based surveillance (WBS) repeatedly demonstrated the ability to supplement clinical data for public health decision-making, in some cases providing days or even weeks of advanced warning on trends or the presence of variants. This session presents research with the potential to further advance WBS: an analysis of the impacts of sampling location on WBS results; use of passive samplers that could simplify and reduce the costs of composite sampling; and modeling to go beyond trends and estimate infection rates.
Microplastics are emerging microconstituents which continue to gain attention through different sectors of the water industry from source waters to drinking water to wastewater. During this technical session, experts who have been investigating microplastics in the water industry will share updates on the latest findings, and attendees will have the opportunity to participate in interactive discussion in a variety of research areas. Interactive Session | Facilitated Discussion

How do we actually implement this 'digital water' stuff? The utilities managers and operators featured during this session will describe their implementation and selection process, identify the best practices for these applications, evaluate the pros and cons of their selected technology or software, and recommend practices to provide the most user-friendly environment. During this session, attendees will need to listen carefully to the speaker presentations. Each time a presenter uses one of their designated buzzwords, attendees will have the chance to mark their bingo card. Come play for a chance to win a prize! Interactive Session | Buzzword Bingo
How can the current MS4 stormwater program be improved to meet the goals of the Clean Water Act? This panel discussion session is dedicated to advancing this question. In other words, what aspects of the program should be changed or eliminated and what new elements need to be introduced to create a practical model to implement and meets the goals of the act. We will explore these questions along with the audience to see if the MS4 Stormwater Program can comply with the Clean Water Act. Interactive Session | Panel Discussion
The interesting findings of three green infrastructure research projects in New York City, Minnesota, and Ohio will be featured during this session. Attendees will learn how the New York City Department of Environmental Protection has been piloting and modeling the effectiveness of porous precast concrete panels for CSO reduction in Queens and the Bronx, how partnerships among Minnesota communities and the University of California at Los Angeles piloted the use of biochar as a potential filter media amendment for removing bacteria from stormwater runoff, and how the Ohio Department of Transportation and the United States Geological Survey completed research to determine the effectiveness of soil amendment to reduce stormwater runoff.
Come to this session to begin thinking outside the box when it comes to identifying ways to fund your capital program. You will learn how one utility looked internally to find funding through reduced costs and increased revenue. These presentations will present one utility's combined special legislation, betterments, and local taxes to fully fund its wastewater capital program and share two studies of a corporation that provided funding for utility capital projects that help it meet is water stewardship commitments.
Dashboard creation allows employees continually monitor costs, view trends, identify potential issues, and reduce the amount of manual work needed to compile information. Using this technology enables the volume of data generated at a utility to be organized, analyzed, and manipulated to provide relevant information to the user in real, or near real-time. This session presents examples of tools that combine multiple datasets while simultaneously empowering users to leverage the data to obtain useful, actionable insights for their facility.
Our presentations will provide attendees with three alternatives for increasing their potable water supplies for Potable Reuse. One approach involved blending reclaimed water with source water ahead of a surface water treatment plant for direct potable reuse. Another is an emerging multi-barrier technology for direct potable reuse that not only produces potable water but recovers waste heat in the process. Finally, the last presentation is a novel microbial fuel cell technology for water desalination and reuse that includes energy recovery.
Since the creation of the EPA, United States citizens have been fighting for environmental justice to protect our health by preserving the quality of our air, water, and soil. Today this work continues with added urgency as we face the early impacts of climate change. Join this session to hear how different community leaders define environmental justice for the water sector and the role we each play in addressing these injustices. Interactive Session | Conversations and Input
Recent developments on PFAS source identification and occurrence of PFAS through wastewater systems from raw wastewater to final effluent will be highlighted during this session. Through presentations and peer-to-peer discussion, this session will elucidate the fate of PFAS through wastewater collection and treatment systems and exemplify monitoring programs for PFAS in wastewater. The session will be suitable for broad audiences in different wastewater sectors particularly utility personnel. Interactive Session | Facilitated Discussion
The presenters in this session will focus on the challenges faced by the petrochemical industry in dealing with water and wastewater as part of their operations, along with potential solutions to overcome these challenges. While the presentations are specific to petrochemical plants, the solutions have application in other industries as well. Polling questions will be included throughout the session to reinforce the messages shared.
We will hear from and honor this year's recipients of the distinguished Wes Eckenfelder Award, as well as the Industrial Water Quality Achievement Award. The topics and featured project will be of interest to those in the industrial wastewater community. At the conclusion of this featured session, we invite you to join us at the annual industrial reception for recognition of each of our industrial awards recipients and to enjoy some refreshments with our colleagues and friends. Interactive Session | Panel Discussion

Modeling and optimization of process aeration and oxygen supply to activated sludge treatment systems will be explored during this session. Improvements to oxygen supply and aeration systems lead to better process performance and energy efficiency.
The past decade has seen numerous advancements in secondary treatment intensification processes including densification, ballasted activated sludge (e.g. BioMagÂ®), and mobile organic biofilm (e.g. MOBâ„¢). This session will provide attendees with a comparison of these technologies, a deep dive in the development of the MOBâ„¢ technology, and the underlying mechanisms that allow for biological selection of granular sludge.
Opening with an overview presentation on advancement of primary clarifier applications with and without chemicals (CEPT), this session will inform the audience of the advancements in primary clarifier and primary filtration process for carbon diversion of wastewater. Other presentations will highlight how biologically enhanced primary treatment can also enhance nutrient removal by creating selector zones and compare physical and biological-based primary filtration at pilot-and-full scale.
Digital Twins are becoming easier to use with more practical value for operations. This session will use real-life case studies that solve complex concerns at WRRFs, including helping operators transition their process to both nitrogen and phosphorus removal, monitoring and scenario analysis, and optimizing process performance. Attendees will get to participate in a group analysis of each of the presented case studies and put their problem solving skills to the test. Interactive Session | Case Study Analysis
Sludge pre-treatment is a proven method to accelerate hydrolysis, the rate limiting step of anaerobic digestion. Pretreatment technologies maximize the resource recovery opportunities of anaerobic digestion and provide both capital and operational cost savings. This session starts with the economic considerations for implementing thermal hydrolysis, followed by the findings of a study for intermediate THP. Finally, the benefits of hydrothermal pretreatment and its enhancement of maximizing VFA recovery and biogas production for beneficial use will be presented. Interactive Session | Facilitated Discussion
Three different innovative technologies to identify inflow and infiltration sources throughout collection systems will be presented during this session. The new technologies include a temperature measurement to locate and quantify I/I, multifunctional manhole covers from Japan to counter I/I and alternative use of hydraulic modeling in the absence of condition assessment. Attendees will also witness how each technology benefitted their respective projects. Interactive Session | Conversations and Input
Climate change driven changes in rainfall patterns require new approaches not only to design storm identification and the design of stormwater controls, but active engagement by many different types of stakeholders in public agencies, regulatory roles, science, and system management. Flooding from intense rainfall is often the catalyst for local efforts to tackle design storm updates and the subsequent changes to design criteria and approach. Hear from stormwater modeling and design practitioners in the Pacific Northwest, Southeast Michigan, and metro Atlanta who have engaged multiple stakeholders in defining new design approaches that incorporate updated climate and rainfall projections. Interactive Session | Conversations and Input
Welcome to the world of modeling! This session will walk you through different aspects of watershed modeling from simple spreadsheets to your traditional hydraulic models to more detailed overland flow models that take into account future conditions and forecasted climate change impacts. With these different approaches, a watershed management plan will be in your future.
Both management options for small systems and decentralized wastewater management options will be described during this session. Planning and management issues associated with small and decentralized systems must be addressed and as increasingly stringent water quality limits are imposed, management becomes more critical. Further, water reuse is emerging as an option to address these limits. Management approaches to reuse and decentralized technologies that can be utilized on an individual basis in a decentralized setting will be covered.
What happens beyond the flush is a mystery to the general public. Yet with environmental issues garnering more attention, the mystery of how we handle our wastes has become a hot topic riddled by misinformation and can generate negative public relations nightmares for utilities. In this session, we will present and distribute examples of communications pieces that can be used to help communicate and educate the public on the topics of biosolids. We will cover the WEF Biosolids Toolkit, a teacher curricula used in middle and high schools in Florida, and crisis communications in this practical interactive session. Interactive Session | Facilitated Discussion

We have described the issues. Pledges have been made. Now, how do we address and solve them? Hear from activists, community organizers, non-profits, and for-profits who are taking different approaches to addressing environmental injustices in their communities. Interactive Session | Conversations and Input
Better data leads to better decisions. Accurate measurement of key parameters solids processing can improve your process performance and increase efficiency. Join us to learn and interact about new developments in sensors for solids management. Interactive Session | Facilitated Discussion
The removal of microconstituents will be addressed during this session, including perchlorate and 1,4-dioxane from industrial and other wastewaters. Specific presentations will cover topics such as an innovative anoxic granular activated sludge process for simultaneous denitrification and perchlorate reduction, and evaluations of different advanced oxidation processes (AOPs) for removal of 1,4-dioxane from textile wastewater.
Pharmaceutical wastewaters containing active pharmaceutical ingredients (APIs) require advanced treatment technologies often requiring several unit processes to meet discharge criteria. Reuse or zero liquid discharge can offer a competitive or less costly approach or could be required by regulating entities. This session will examine three pharmaceutical wastewater evaluations providing attendees with a technical approach to the management of these complex wastewater streams. Interactive Session | Conversations and Input
Three holistic solutions to wet weather management, addressing challenges throughout different steps of the treatment process within water reclamation and recovery facilities (WRRFs) will be compared during this session. Conventional and advanced technologies are discussed with each creative solution providing resiliency for the utility during wet weather events. Full-scale challenges will be discussed and participants will be able to apply lessons learned to their own facilities. Interactive Session | Facilitated Discussion
The development of high-rate activated sludge (HRAS) technologies (A-stage, AAA, contact-stabilization), which can help a facility reduce energy/aeration demand and promote energy recovery, by diverting carbon away from secondary treatment to anaerobic digestion will be reviewed during the kickoff presentation. The session will include a deep dive into the full-scale implementation and operation of the AAA process in Europe and will focus on rehabilitating existing rectangular and circular primary clarifiers to the AAA process. The last presentation will highlight the impact of operational parameters of A-stage on carbon diversion performance as well as the impact of A-stage effluent on selecting downstream nutrient removal process.
Innovative advancements in short-cut nitrogen removal will be the focus of this session. The presentations will include discussion on NOB inhibition at low DO operation, monitoring and controlling partial nitrification using sensor-based technology for long term operations, and testing partial denitrification anammox in a low DO application.
Solving a problem starts with a definition, what follows is applying sustainable approaches, and this is true for odor control as well. This session will cover several important issues relating to odor control including demonstrating a sustainable method for sulfide analysis, an odor solution using operational adjustments in lieu of chemicals or equipment, and a sustainable implementation of technology. Throughout this session, participants will share and learn from the presenters and each other. Interactive Session | Conversations and Input
Fermentation of mixed liquor or return activated sludge has been shown to significantly improve and stabilize enhanced biological phosphorus removal (EBPR). This session explores conditions to encourage fermentation, including sidestream EBPR (S2EBPR). Interactive Session | Facilitated Discussion
Operating an anaerobic digester can sometimes feel like it is more of an art than a science. Changes to feed substrates and co-digestion of received wastes can provide opportunities and challenges to stable operation. This session will discuss methods for evaluating digester operational changes, characterizing biogas generation potential, and considerations for cogeneration implementation. Interactive Session | Conversations and Input
The most recent advances in UVC-LED from bench scale to full-scale deployment will be presented in this session. UVC-LED has a wide range of applications from point of use systems to delivering disinfected water at a full-scale water production facility. UVC-LED holds the potential of providing more energy-efficient systems with lower operating costs making them more sustainable than traditional UV systems. The presentations review disinfection efficiency with UVC-LEDs in point of use devices, in potable drinking water treatment, and for reduction of MS2 bacteriophage and Legionella, illustrating how fast the technology is moving and being successfully implemented.

Traditional and innovative technologies used to identify and quantify Private Property Inflow and Infiltration (I/I) as well as cost-benefit analysis of I/I reduction on the private side will be explored during this session. The technologies will center on flow monitoring, dye water flooding, rainfall simulation calculations, and private lateral rehab/replacement methods. Furthermore, this session will cover public relations, homeowners' engagement programs and plumber pre-qualifications requirements which play a critical role for the project success.
In an ideal world, we would all have access to an endless supply of project financing for stormwater projects. Additionally, prior to design, we would understand project costs, public goals, and public opinions. As we know, we do not live in an ideal world. Understanding the stormwater needs of a community, funding opportunities, and implementation aspects present a constant challenge to community planners, engineers, and public officials as we strive to address water quality and quantity needs. This session will educate individuals on the financial and public outreach opportunities associated with stormwater programs.
Dense urban areas with aging infrastructure can feel especially vulnerable to flooding. This session will describe two approaches to identifying the depths and extents of the flooding and the end with a case study of how one area reduced their flood risk. Solutions to the added complexities of the density of development and age of infrastructure create unique challenges will be provided to attendees as they participate in discussion with the session speakers. Interactive Session | Conversations and Input
Utilities are facing infrastructure removal, increasing costs, and increasing stakeholder demands at a relentless pace. To meet the critical infrastructure needs in our industry, this session will explore three innovative and proven project delivery programs. Session presenters will summarize Program Management, P3, and Progressive Design-Build programs including the various project drivers and differing programmatic methods. Attendees will be encouraged to participate in group analysis of the case studies presented. Interactive Session | Case Study Analysis
Ozone/Biofiltration systems are identified as the heart of carbon-based advanced treatment (CBAT) operations not only in drinking water systems but also in potable reuse projects. While water reuse projects are becoming a great alternative for a better water management in the future, there are a lot of concerns related with safety, cost, and optimization. This session will focus on the identification and removal of health and performance-based indicators, will talk about the importance of piloting efforts (including a new virtual model), and will discuss a holistic biofiltration optimization approach and associated potential cost benefits. Interactive Session | Conversations and Input
Stable biological phosphorus removal without process upsets is the key to meeting effluent phosphorus limits. However, upsets related to seasonal changes, plant recycle loads and carbon management are prevalent. This session covers the tools and techniques for controlling and improving the performance of enhanced biological phosphorus removal processes.
For the practitioners - this session will provide a basic introduction to some of the more common advanced molecular biology tools available in the marketplace today, along with guidance on what to specify and expect when a biomass sample is sent to an off-site laboratory for evaluation. Presentations will show how these techniques have been used to resolve operating problems at a municipal treatment plant and an industrial treatment plant. The goal of this session is to develop a greater understanding of metagenomic tools on the part of operators and engineers, ultimately leading to better use of these tools in practice. Interactive Session | Facilitated Discussion
Pollutants in industrial wastewater are regulated to protect the municipal treatment plant process and prevent pass-through of pollutants to surface waters. The Pretreatment Program requires industrial dischargers to use treatment techniques and management practices to reduce or eliminate the discharge of harmful pollutants to sanitary sewers. This session will describe two unique pretreatment technology applications, revolving algal biofilm (RAB) and aerobic granular sludge. It will also explore the role of the Industrial Pretreatment Program in controlling discharges of PFAS to municipal treatment plants.
Influent carbon management is crucial for the removal of nutrients from water resource recovery facilities. This session explores processes and reactions for creating and recovering readily biodegradable substrate via hydrolysis of influent particulate substrate at different operating conditions and fermentation processes for creating and recovering VFAs.
During this knowledge development forum, attendees will discuss the latest information related to partial denitrification-anammox (PdNA) applications for integrated approaches, including IFAS, tertiary MBBR, and filtration process. This interactive session will encourage participants to engage with experts in the field to address value proposition, design considerations, reliability, and implementation opportunities of PdNA to achieve nitrogen removal goals. This will be of interest to utilities, engineers, operators, and applied researchers. Interactive Session | Knowledge Development Forum

To obtain a consensus standard for the evaluation of aeration devices, the American Society of Civil Engineers (ASCE) established a Subcommittee on Oxygen Transfer Standards under the Committee on Environmental Standards. The Oxygen Transfer Standards Committee (OTSC) developed and is responsible for updating standards realted to Measurement of Oxygen Transfer in Clean Water, Guidelines for In-Process Oxygen Transfer Testing and Quality Assurance of Installed Fine-Pore Aeration Equipment. These standards are the subject of this technical session.
The U.S. Department of Energy (DOE) has been investing in various aspect of wastewater treatment for the last several years, awarding well over $100 million in research grants. Some primary areas of focus have been more cost-effective production of renewable natural gas from wet organic wastes, energy recovery via conversion of sludge (and other organics) to liquid transportation fuels, and energy efficiency in water resource recovery facilities (WRRFs). While the primary flow of dollars has been to research and development of next-generation technologies, the Department has also made a significant commitment to providing various forms of technical assistance to municipalities and regional governmental entities. This session will provide a snapshot of four different DOE projects/programs of relevance to the wastewater community. Interactive Session | Panel Discussion
Peracids such as Peracetic Acid (PAA) and Performic Acid (PFA) continue to see increased use and interest for wastewater disinfection due to their ability to take advantage of existing chlorine contact tanks for retrofits and their flexibility in use alone as a primary disinfectant or in combination with chlorine or UV. This session will present three recent experiences with peracids: delivered PAA as a temporary disinfectant during construction and in combination with chlorine for reclaimed water production; experience with on-site generated PAA at bench scale and pilot scale; and validation of online and manual measurements of residual PFA using on-site generated PFA at bench scale and pilot scale.
In this interactive session, facilitated peer-to-peer sharing will be the focus as urban stormwater managers address large scale flood mitigation studies rooted in public safety, asset management, and economic connectivity. Each speaker will include consideration of climate change and social equity within the greater context of flood risk, as well as prioritization of projects for implementation. Interactive Session | Facilitated Discussion
Come and join this session to learn about stakeholder engagement involving TMDL development. Hear about case studies from the Maumee watershed in Ohio, hypoxic areas in Puget Sounds and TSS problems in the mighty Mississippi. Interactive Session | Conversations and Input
Building Information Models (BIM) are becoming the normal way for creating design drawings for pumps stations and treatment plant facilities, but are we getting the most out of these models that we can? This session will display ways the BIM can be used to improve the quality of design before construction, along with techniques for using the model after construction for asset management and creation of digital twins. By implementation of the standards discussed, owners will be able to see cost saving with reduced change orders during construction and time savings in transferring data to their asset management software. Interactive Session | Conversations and Input
Risk and uncertainty will be the two main focuses of this session. Methodological aspects of risk modeling will be discussed in more detail and application examples ranging from risk-based utility planning to risk-based contracting will be provided as this session expands on topics discussed during WEFTEC 2021. The aim is to bring together those who work in the resource recovery field to discuss the applications and benefits of uncertainty-based approaches. Interactive Session | Panel Discussion
WaterISAC, the water and wastewater sector's security information provider, will lead an interactive panel discussion among subject matter experts and attendees on cybersecurity risks and best practices. Utilities, large and small, will share their experiences with cyber incidents, recovery, and discuss in practical terms the best practices water and wastewater systems can affordably adopt to reduce the risks of cyber attacks. Attendees will be encouraged to tell their own stories, engage with the panel, and help shed light on challenges and solutions. Interactive Session | Panel Discussion
Four technical presentations on the latest developments in defining log removal credits for MBR systems will be provided during this session, followed by a panel discussion. All presentations are focused on identifying suitable approaches for setting LRV credits for MBRs. From a review of the international approaches, through case studies, practical means to measure membrane integrity in operating systems, and the latest pilot testing results for a potable reuse project. Participants will be guided through the most recent developments in this field and are encouraged to attend part II immediately following this session. Interactive Session | Panel Discussion

Attendees will receive an introduction to the concept of decarbonization, defining what it means for the water industry, and the industry's role in GHG emissions in the context of climate change and resilience planning. We will also take a look from the utility perspective on the benefits and challenges of GHG accounting and reduction. By participating in this session, attendees will gain a new perspective on national policy and the potential shifts in regulation and market-based incentives for carbon reduction.
Recent advances in treatment of PFAS in raw and reclaimed water will be the focus of this session. It will highlight PFAS treatment by adsorption and touches on associated costs and will unveil the fate of PFAS through water reclamation and reuse systems. This session will be appropriate for researchers and practitioners that deal with emerging contaminants in raw and reclaimed water. Interactive Session | Facilitated Discussion
Many food and beverage industries face increasing pressure to reduce wastewater discharges of BOD5 and nutrients to utility-owned wastewater treatment systems, surface waters and groundwater. As effluent discharge regulatory pressures mount, alternative technologies are being applied to reduce energy use and improve effluent quality. This session will explore three presentations of technology application in the dairy and meat processing industries, including membrane bioreactor, vortex aeration, and sand/gravel biological filter to meet the treatment requirements for each unique wastewater discharge. Drivers, regulatory considerations, treatment technologies, and performance data will be discussed in an interactive format. Interactive Session | Conversations and Input
The focus of this fundamental session will be to identify the sources and tools used to assess greenhouse gas (GHG) emissions in wastewater collection, treatment, and biosolids disposal. Beginning with an introduction to the sources of and avoided GHG emissions to be accounted for in wastewater utilities, and the available evidence of the role of collection systems in these emissions. The session continues with a presentation on the tools including process modeling that are used to estimate GHG for various nutrient removal processes. The final speaker will address GHG emissions from biosolids treatment and disposal, and the potential for new GHG reductions through resource recovery.
Membrane Aerated Biofilm Reactors (MABRs) use membranes to directly deliver oxygen to a biofilm, making it both a biofilm technology and an aeration device. This session provides an overview of MABR technology while presenting the latest research and modeling advances. Session topics will include research that demonstrates the unique structure and function of MABR biofilms, pilot scale MABR results used to determine its value propositions, and the use of MABR modeling for design control. Interactive Session | Panel Discussion
As part of the densification/intensification series, this session will contain three presentations focusing on the application of densification or granular sludge in full-scale continuous flow systems. These case studies utilize both biological and/or physical selection to improve sludge settleability. Attendees will learn how plants can be reconfigured to improve SVIs, with ultimate benefits to increase the hydraulic capacity of clarifiers while allowing for higher MLSS concentrations.
Sludge thickening and dewatering systems can have significant impacts on the performance of upstream and downstream processes. The solids and nutrients in filtrate or centrate recycle streams impact the sizing and performance of liquid treatment processes. Thickener performance impacts digester residence time and capacity, and dewatering performance impacts energy recovery potential, end use costs and more. This session provides interaction discussion following the presentation on process performance enhancements involving thickening and dewatering. Interactive Session | Facilitated Discussion
Emerging topics in the field of anaerobic digestion will be covered during this session. Including innovative operations and new technologies that result in enhanced digestion, improved biogas quality and reduced energy costs. As this is an interactive session, we recommend attendees remain for all three presentations to effectively participate in discussion breaks with speakers. Interactive Session | Facilitated Discussion
The application of Computational Fluid Dynamics (CFD) and digital twins for more effective design and operation of disinfection and water reuse treatment processes will be showcased during this session. Recent developments will be emphasized, including new and emerging software and computations, model calibration and verification, and use of CFD and digital twins for optimizing treatment performance. Real-world case studies will be presented to highlight the benefits and challenges of using CFD modeling and digital twins for various applications.
From the challenges facing new construction in a delicate environment to the information collected during assessment, this session will cover the life cycle of a force main. Attendees will hear how the challenges for new construction can be navigated and how to use the information from assessment to extend the life of their force mains.

Across the United States, numerous case studies are highlighting the application and optimization of blue, green, and grey infrastructure control measures. Benefits illustrated in the studies include flooding and CSO reductions, water quality improvements, groundwater recharge, climate resiliency, and social benefits (job creation, improved urban aesthetics, increased property values, improved pedestrian safety, and enhanced recreational/green spaces). Through speaker presentations and discussion breaks, we will assist attendees with assessing which colors of infrastructure are best for their community! Interactive Session | Facilitated Discussion

Engaging stakeholders is paramount to the success of publicly acceptable rate increases, construction projects, or community-based art and education programs. This session will cover three examples of how two utilities and a WEF student chapter engaged their communities successfully on issues that might otherwise have received public pushback. Interactive Session | Panel Discussion

If you are searching for a solution to a problem, there is probably a software of digital tool advertised that can do the job. It seems so easy, but can a technology solution be successful without going 'back to basics?' This session will highlight research and case studies of utilities that have successfully implemented business process changes to improve organizational performance.

Artificial intelligence is currently used in water utilities for intelligent control, process optimization, asset monitoring and proactive management, event detection, and infrastructure planning. Predictive modeling and prescriptive suggestions enables a shift from reactive and static to proactive and dynamic management. This session's presentations will provide studies of utilities leveraging AI to make more informed decisions.

MBRs are seeing more applications in Water Resource and Recovery Facilities. They are also seen as a viable pretreatment step ahead of RO in advanced treatment (AWT) systems for potable reuse. However, a potential limitation to MBRs in AWT systems is the current lack of regulatory approval for demonstrating pathogen removal credits. Following MBR LRV Part I, this session continues to explore the latest developments regarding practical approaches to monitor and measure membrane integrity and performance results for pathogen log removal to demonstrate MBR capabilities. Interactive Session | Conversations and Input

Are you thinking of funding strategies to support a small or at-risk community's water infrastructure projects? This session will include case studies that demonstrate important and relevant steps taken within different small/disadvantage communities in order to access SRF and other governmental funding. Additionally, small and rural communities face a dilemma when making decisions about what centralized and/or decentralized infrastructure is required. Challenges associated with these kinds of decisions will be shared throughout this session including characteristics of the receiving environment, the ability to pay, technology needs and management needs.

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Process simulators are a valuable operator teaching tool because they allow operators to explore the consequences of operational decisions across a resource recovery facility in an interactive, risk-free way. This workshop will demonstrate the strength of simulators to illustrate fundamental resource recovery concepts to operators by offering simulator-based training on operating a nitrifying activated sludge system to achieve year-round nitrification and assessing the effects of secondary clarifier operation on process performance. Workshop Pricing: Member $240 | Non-Member $270

Facility operators, managers and engineers will use staining techniques and phase-contrast microscopes to analyze floc and will identify protozoa, metazoan, and filaments to develop practical information to help them control their processes. Lecture will discuss types of microorganisms involved, environmental factors affecting them, and metabolism and growth characteristics that may affect participant's processes. This combination of learning styles should enable participants to immediately help with related process control problems at their facilities. Workshop Pricing: Member $240 | Non-Member $270

This workshop will focus on the operational elements of major unit operations of a typical refinery wastewater treatment system. First, participants will receive a general overview of treatment processes and its function. Second, a facilitator will present an operational issue for that unit process. The workshop attendees will separate into groups and identify how the issue could be resolved. Once the groups have presented possible solutions, the facilitator will then provide an example on how the issue was resolved at a specific facility. A panel of experts will be available to answer any broader questions from participants on related and relevant issues. Workshop Pricing: Member $210/Non-Member $240
Teams of five to six wastewater professionals will compete for prizes and glory in a process modeling competition at the Game-Based Modeling workshop. Teams will work together to optimize, strategize, and execute operation techniques in five different simulation platforms. Each platform (BioWin, GPS-X, SIMBA#, Sumo, and WEST) will present an existing facility process model with unique objectives and restrictions. New modelers will be exposed to the capabilities of process simulators with a focus on problem-solving during this very interactive workshop. Workshop Pricing: Member $240 | Non-Member $270
Facility operators, managers and engineers will use staining techniques and phase-contrast microscopes to analyze floc and will identify protozoa, metazoan, and filaments to develop practical information to help them control their processes. Lecture will discuss types of microorganisms involved, environmental factors affecting them, and metabolism and growth characteristics that may affect participant's processes. This combination of learning styles should enable participants to immediately help with related process control problems at their facilities. Workshop Pricing: Member $240 | Non-Member $270
Leading practitioners will present this comprehensive workshop and share their experiences in an interactive environment. The all-star cast of presenters first will cover the basics of activated sludge and biological nutrient removal (BNR). Then, they will focus on overcoming practical design problems that have plagued many systems. Process control parameters, side-stream considerations, and tips for identifying microorganisms and establishing a healthy biomass all will be part of the day's demonstrations. The format is informal and real-life examples and questions are welcomed. Note: This workshop is not held at the Convention Center but at a water resource recovery facility. The bus will board at 6:45am and depart promptly at 7:00am! Workshop Pricing: Member $250 | Non-Member $280
This workshop will give participants a holistic understanding of the effects of co-digestion. Topics will range from feedstock handling to liquid sidestream and downstream effects and all the way to energy neutrality. Through interactive hands-on activities, participants will learn the operational considerations needed to harness maximum benefits of co-digestion while mitigating negative effects. The morning session of the workshop will focus on the effects of co-digestion and the afternoon session will focus on practical paths to achieving energy neutrality. Workshop Pricing: Member $210 | Non-Member $240
Although advances in climate science have dramatically enhanced our understanding of changes in extreme weather and sea level rise, long-term projections are widely divergent due to natural variability, model uncertainty, and unknown future emissions. We must plan and make decisions without accurately predicting future conditions using new approaches to engineering and planning. This workshop explores the latest science, trends, data interpretation, and practical applications for adaptation and risk management that support confident decisions under uncertainty. Workshop Pricing: Member $240 | Non-Member $270
Regulatory and utility leaders from across the United States representing decades of implementation experience will discuss current challenges with wet weather programs. Combined sewer overflow (CSO) program leaders will discuss regulatory and technology trends. Workshop participants will work collaboratively to consider the challenges that are facing these programs and propose solutions which will then be compared with the utility's planned direction. Participants will gain insights into critical issues facing these municipalities under current regulatory structures. Workshop Pricing: Member $210 | Non-Member $240
The wastewater and water reuse sector continues to advance the scientific understanding of the risks, fate, and control of pathogens and constituents of emerging concern. Topics examined will include the latest information on risks, fate, and control of pathogens; antibiotic resistant genes and bacteria; hormonally active substances; pharmaceuticals; microplastics; personal care products; and per- and poly-fluorinated alkyl compounds (PFAS) (including fire-fighting foams). These factors will be examined in various water sources â€”wastewater, non-potable reclaimed water, and purified reclaimed water for potable water reuse. Workshop Pricing: Member $240 | Non-Member $270

This workshop aims to highlight the far-reaching impacts of PFAS in the water/wastewater/reuse sector. Topics covered will include chemical and physical properties of PFAS with an emphasis on their health effects, federal regulations and anticipated timeline for the development of MCLs, best practices in field sampling and lab analysis for all water, established and emerging technologies to treat/remediate PFAS in water reuse projects, and lessons learned from case studies of successful PFAS treatment on One Water projects. Workshop Pricing: Member $210 | Non-Member $240

Join an inspired discussion about municipal-led innovation to manage stormwater in a manner that advances social equity. Listen to remarkable stories exploring critical challenges and offering insights. Explore the newly published Equity Guide for Green Stormwater Infrastructure Practitioners, which identifies equity best practices and metrics. The session will feature engaging activities related to preventing green displacement and centering community. Attendees will gain tangible strategies and next steps to advance equity in their communities. Workshop Pricing: Member $210 | Non-Member $240

Successful commissioning of capital projects requires that operations and maintenance (O&M) related downstream costs, which represent 80% of the life cycle cost of any capital project, are safeguarded. The workshop is designed to highlight the role that all stakeholders play in ensuring successful commissioning. These include the utility management and engineering staff, design consultants, contractors, equipment suppliers, O&M specialists, construction managers and O&M staff. The workshop will explain the failure modes in a commissioning effort and demonstrate how strategic engagement of stakeholders can ensure smooth commissioning for all parties. Workshop Pricing: Member $210 | Non-Member $240

Thought leaders will convene to brainstorm how environmental justice and greenhouse gas (GHG) reduction can be more accurately valued and considered when evaluating where to invest a utility's limited capital or which new services to offer for underserved segments of their communities. The workshop hopes to create new decision templates that better account for triple-bottom-line effects. Workshop Pricing: Member $210 | Non-Member $240

This workshop will focus on understanding existing dynamics and considering innovative approaches and partnerships to transforming into communities of the future through a water equity mission. The workshop will seek to maximize community benefits from water infrastructure investment through possibilities of community and utility partnerships/outreach, expanding collaboration and supplier diversity, affordability programs for vulnerable communities, facilitating community resilience in the face of climate change, policy/legislation, and integrating these environmental/social/governmental (ESG) factors into long-term watershed management and planning. Workshop Pricing: Member $210 | Non-Member $240

Expert water communicators will lead this workshop on how to effectively present on water through storytelling and connection with audiences. Participants will learn best practices directly from subject matter experts through interactive activities. Throughout the workshop participants will prepare presentation materials using the lessons and takeaways from the speakers to improve their skills. This workshop is recommended for anyone looking to improve their skills in preparing technical presentations and delivering them to diverse audiences. Workshop Pricing: Member $105 | Non-Member $135 | Student Member $25

The Water Leadership Institute program is aimed at educating and training emerging leaders and providing them with opportunities to build strong, lasting relationships within the water sector. The intensive program allows participants to engage in management training and leadership development through a blended learning approach that includes examining complex challenges facing the water and wastewater industries and networking with public and private sector practitioners.

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Wastewater's elite specialists compete at the 35th annual Operations Challenge in a series of tests demonstrating the best combination of p

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MPETITION - STUDENT DESIGN COMPETITION - STUDENT DESIGN COMPETITION - STUDE

Village of Raymond Sanitary Sewer Main Design
Panther Creek Water Resource Recovery Facility Expansion Project
Integral Wastewater Treatment Design for Montezuma, Cóbano, Costa Rica

Preliminary Design, Analysis, and Implication of Upgrading the Golden Gate Wastewater Treatment Plant in Naples, FL to High-Level Disinfection
Panther Creek Wastewater Treatment Plant Expansion Project
A Comprehensive Assessment of the Akron Water Reclamation Facility

Plant Expansion & Biological Treatment Improvements - King William Treatment Plant
New Biosolids Management Strategy for the Regional District of Nanaimo | BCWWA
Preliminary Design of the New Parish Water Resource Recovery Facility

Graham County Wastewater Treatment Plant Expansion
Malawi Sanitation Solutions
Global Water Stewardship Montezuma, Costa Rica
TBD

Water Quality Improvements for Residential Area in Harvey, IL
Developing a Phosphorus Recovery System for WSSC Water
Southeast Wastewater Treatment Plant Wetlands Design

Larchmont Pump Station Site Redevelopment: Hanover Avenue
Identification and quantification of garbage in Las Vegas Valley stormwater channels and improvement of stormwater management
Daylighting Harbor Brook
A Hydrological Analysis of the Ballona Creek Watershed - Striving for Environmental Prosperity

Design of an Anaerobic Digester for Food Waste in Wake County, NC
Water Reuse Design at It Takes a Village Farm
Climate Change Resiliency Plan Across the Charles River Watershed

Laramie Wastewater Treatment Plant Energy Upgrade

Stormwater Retrofit of MacMorrison Park in the City of Barrie, Ontario

Hydroelectric Microgrid Design in Nazarét, Panama

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As water professionals, we interact with a lot of different types of people: public officials, news media, school students, stakeholders, utilities and the public at large. Ever wanted to hear how others do outreach and engage with their communities- both the successes and the not so successful attempts? Or perhaps you are looking for some inspiration or just want to meet others facing the same challenges? Join your peers and some esteemed experts for an informal discussion of community engagement and outreach in the water industry. Experts in crisis communications, educational programming, video production and more will lead conversations about best practices and lessons learned. Anyone who interacts with the public will benefit from this session, not just communications professionals.

Women are an important and growing part of the water workforce. This Learning Exchange is not just for women - everyone is welcome! New issues have surfaced over the last few years, such as women leaving the workforce. How can we deal with these new issues? What can we do to support women in the water sector? Come to this lively Learning Exchange to meet others who want to do better for the women in the water community.
Capital Plans are just that…plans. Plans are good, but executed plans are better. Come to this learning exchange to talk with peers about making capital plans a reality through a variety of approaches for funding, financing, and grants. We will be discussing avenues of cashflow from traditional revenue bond financing and state-revolving loan programs, recently enhanced thanks to the Infrastructure Investment and Jobs Act to regionalization efforts for cost-sharing benefits or new fees for existing services, such as stormwater management. In addition to discussing sources of funds, we will dig into challenges of different sources, such as Buy American provisions, packaging projects strategically and successfully for grant opportunities, and discussing the latest on rating agencies criteria on revenue and fiscal stability, environmental, social and governance, (ESG) and affordability. This is a one-stop location to discuss the issues and share lessons learned…all in the pursuit of funding, financing, and grants for executing projects, protecting public health, and providing your customers with the best possible service.
Money - Pink Floyd may have gotten it right in their song from the year after the CWA was enacted - 1973 - "Money, It's a crime, Share it fairly, but don't take a slice of my pie. Money, So they say, Is the root of all evil today.. It's no surprise that they're giving none away." The Bipartisan Infrastructure Law (BIL) or Infrastructure Investment and Jobs Act pumps needed federal dollars into water infrastructure over the next 5-years to the tune of $43.426 Billion. These funds are flowing through existing state revolving loan programs (SRFs) with significant state match requirements as well as a host of "strings attached" including a significant set-aside for disadvantaged communities in the form of mandated additional subsidy (i.e., grants to those not in the SRF finance world). This learning exchange will give you the chance to talk to SRF experts from several states as well as from the Council of Infrastructure Financing Authorities (CIFA) to provide a national perspective. You will have the chance to learn what other communities are doing to ensure they get their fair share of this unprecedented federal investment from other elected and appointed utility leaders in small group discussions.
New U.S. laws aimed at providing additional cybersecurity have been enacted. There are now mandates that are required if cyber disaster hits your utility. Join us to learn how legislative and regulatory updates will impact the Water and Wastewater Systems Sector. This Learning Exchange can help you connect the dots and assist in providing useful detail for improving your water infrastructure security posture.
The Facility Management and Plant Operations and Maintenance Committees invite utilities to a learning exchange to discuss condition assessments within wastewater facilities. We will help participants explore a number of questions related to assessment of vertical infrastructure such as: Why are you performing facility condition assessments? How do you plan to use the data? What are you collecting? Are you leveraging any technology to support your assessments? What do you know about these assessments now that you wish you knew when you started? How have your ratings aged? Come share what you've learned and collaborate with other utility leaders on best practices related to this critical infrastructure planning process!
The water professionals reflect the communities we serve, which includes those in the LGBTQ+ communities. This learning exchange is for those in the LGBTQ+ community and those seeking to support their colleagues as fellow Rainbow Advocates. All are welcome to this lively Learning Exchange.
Initiatives to increase representation, equity, and advancement of people of color in the water workplace, as well as to address water equity issues within our communities have increased substantially in recent years. In this Learning Exchange we talk about what has been done so far, sharing what has been effective, what has not, and lessons learned. We will also discuss what is being overlooked and the critical investments and initiatives needed to move the needle.

Learning Objectives	Date	Start Time
INICAL SESSIONS - TECHNICAL SESSIONS - TECHNICAL SESSIONS - TECHNICAL SESSION		
	10/10/22	8:30 AM
TBD	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) develop a structured approach to quickly assess options for managing organically overloaded petroleum refinery wastewater treatment plants, (2) describe the use of metagenomic techniques and ATP to provide early warning of nitrification inhibition, understand the root causes of nitrification loss, and allow time for operator interventions to prevent discharge exceedances, and (3) identify the potential causes of reduced oxygen transfer in petroleum refinery activated sludge treatment systems.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) describe traditional secondary clarifier evaluation, (2) list three advantages of CFD-based analysis of secondary clarifiers, and (3) provide an educated opinion on when a utility or project may benefit from CFD analysis.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) define what is low DO operation, (2) provide a contrast to conventional biological nutrient removal, and (3) identify the benefits associated with low DO operation.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) explain how and where N2O is produced in biological wastewater treatment and how we can quantify M20 emissions, (2) list tools available for identifying site-specific N2O mitigation strategies, (3) discuss the success and lessons learned in quantifying, mitigating and monitoring N2O from multiple case studies, and (4) identify best practices shared among a growing global community of practice addressing N2O process emissions and striving for net zero water.	10/10/22	1:30 PM
At the end of the session, attendees will be able to (1) recognize opportunities for system modeling, (2) identify areas for artificial intelligence-enhanced control measures, and (3) plan for using models and artificial intelligence in their odor and corrosion control programs.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) establish the benefits an optimize PAD process can provide, (2) summarize the operating parameters necessary to successfully implement and operate PAD, and (3) evaluate PAD performance and operational strategies to optimize a PAD process.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) interpret the findings of the Water Environment Research 2022 project on source separated organic (SSO) feedstock pretreatment and management practices, (2) evaluate the specific conditions which allowed a utility to triple their biogas production after initiating co-digestion, and (3) demonstrate how laboratory research used 16s rRNA sequencing analysis of the microbial community to understand the role of microorganisms involved in fat, oils, and grease (FOG) co-digestion.	10/10/22	1:30 PM

At the end of this session, attendees will be able to (1) understand how an asset management framework can be used to build a business case, (2) recognize robust, advanced planning techniques to add flexibility to the decision-making process, and (3) identify future utility reputation changes and new technologies.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) explain the purpose of a collimated beam test as part of the design process for a UV system for wastewater disinfection, (2) describe some of the safety factors that should be considered when using laboratory UV dose data to select a full-scale design UV dose, and (3) list the benefits of the full-scale spot-check bioassay as part of the startup process for a new UV facility.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) define water terminology, (2) describe available analytical tools and their application to collection system planning and operations, and (3) distinguish the benefits and challenges of implementing digital water tools both project-specific and 'at-scale.'	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) identify and differentiate modeling and condition assessment tools used to prioritize flood mitigation projects, (2) recognize how modeling can be used to determine sources of stormwater pollution in an urban environment, and (3) differentiate between various treatment strategies for the control of phosphorus in stormwater.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) describe the approaches and tools needed to conduct stormwater control measure inspections and maintenance operations, (2) identify the core components of an asset management approach to maintenance, and (3) formulate effective survey questions for assessing maintenance needs among stormwater managers.	10/10/22	1:30 PM
TBD	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) recognize industrial contaminates present a high risk to the public assuming different potable reuse treatment trains, (2) describe the shift in requirements and what is expected from the facility planning design and operations team in terms of achieving pathogen (V, G, C) log reductions, CEC removals, and performance reliability, and (3) define the WRRF parameters that will appear to influence AWT performance.	10/10/22	1:30 PM
At the end of this session, attendees will be able to (1) identify what to expect from EPA roadmap and timelines for upcoming legislations for water wastewater and biosolids management, (2) develop best practices for integrating PFAS into a utility's pretreatment program, (3) identify solutions to the challenges of selecting PFAS treatment system, permitting process, constructability, and operation, (4) develop approaches for successful public engagement to build buy-in among stakeholders, (5) identify strategies to fund the capital and operational costs of PFAS treatment systems including federal and state sources, as well as legal strategies for putting the costs of PFAS treatment on polluters, rather than ratepayers and (6) describe options for PFAS destruction technologies that are under development through EPA-funded research.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) identify drivers for implementing net water positive strategies in different industry sectors, (2) compare different metrics, terminology and boundaries for implementing net water positive strategies, and (3) give examples of successful net water positive strategies.	10/10/22	3:30 PM

At the end of this session, attendees will be able to (1) describe potential benefits of operating BNR activated sludge with low DO, (2) recognize issues associated with low DO operation and time scale of adaptation, and (3) develop testing approach to evaluate low DO operation at their facilities.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) describe key factors that influence sludge densification in full-scale continuous flow applications, (2) identify selector design characteristics that enhance settleability and improve nutrient removal performance, and (3) use selective wasting to enhance settleability.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) understand how to modify operations to extend membrane life, (2) propose strategies to reduce pumping costs through the use of gravity siphons, and (3) explain how to limit membrane fouling in anaerobic MBR systems.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) determine approaches and drivers for a facility energy management plan, (2) identify heat recovery program drivers and challenges, and (3) recognize thermal reduction of effluent and forecast modeling.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) define wastewater surveillance and wastewater-based epidemiology, (2) describe their use at different scales to inform public health decision-making, (3) assess the practical and ethical risks associated with the use of WBS at different scales, especially in closed systems to support utility resource allocation and communication plans, and (4) identify and describe the elements of a successful wastewater surveillance program that are most likely to produce actionable data to support public health decision-making.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) conceptualize solutions to unforeseen issues encountered during collection system design and construction, (2) recognize the unique challenges associated with large diameter pipe installation and tunneling, and (3) manage a number of contractors, engineers, and operators for efficient collection system design and construction.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) evaluate ways to fill in infrastructure delivery gaps with community stakeholders, (2) incorporate racial equity and shift engagement and outreach to be community-driven and led, and (3) develop a basis for incentivizing green stormwater infrastructure through partners.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) discuss case studies for permitting approaches to reduce nutrient watershed impairment, (2) provide examples of the environmental benefits of adaptive management approaches to controlling nutrients, and (3) describe various approaches to watershed management to reduce watershed nutrients input.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) define alternative delivery methods and describe benefits and challenges of each, (2) evolve their capital improvement program to incorporate alternative delivery methods and assess how program needs are different than traditional design-bid-build project delivery, and (3) determine how critical project aspects align with different alternative delivery methods.	10/10/22	3:30 PM
TBD	10/10/22	3:30 PM
At the end of this session, attendee will be able to (1) identify various applications for data visualizations, (2) apply concepts from the session to develop dashboards to address their individual requirements, and (3) participants should be able to determine the requirements to enable data visualizations in their organizations.	10/10/22	3:30 PM

At the end of this session, attendees will be able to (1) identify opportunities available in federal funding for water reuse and recycling programs, (2) discuss the experience of communities actively navigating federal funding programs and the benefits actualized in their communities, and (3) implement plans for distribution of funds in the infrastructure investment and jobs act.	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) identify DE&I efforts that can be applied in their own organization, (2) utilize resources and frameworks for managing or creating a DE&I task force/committee at a local WEF Member Association (MA), and (3) assess outcomes and impacts to both personnel (hiring and retention) and business (success and environmental justice strategies).	10/10/22	3:30 PM
TBD	10/10/22	1:30 PM
TBD	10/10/22	3:30 PM
At the end of this session, attendees will be able to (1) identify the potential carbon sources to support PdNA, (2) compare performance based on type of carbon source, and (3) identify different applications of PdNA.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) identify alternate methods and approaches for developing industrial discharge limits, (2) calculate industrial discharge permit limits for new and emerging contaminants, and (3) recognize the differing objectives of utilities and industry, especially when industrial water reuse is applied.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) list the driving factors impacting sizing aeration blowers, (2) identify the impact of diffuser type and configuration on life cycle costs for diffuser selection, and (3) summarize the issues associated with implementing ammonia based airflow control at a full-scale operating facility.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) identify emerging wastewater treatment technologies, (2) determine approaches for selecting and applying innovative technologies, and (3) discuss information gaps and logistical barriers to selection, design, permitting, bidding, and operation of emerging technologies.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) determine the basic concepts that make digital twins at a fundamental level, (2) recognize the value proposition for digital twins, and (3) translate the value of digital twins to their day-to-day concerns.	10/11/22	8:30 AM

At the end of this session, attendees will be able to (1) develop knowledge of the various technologies, (2) identify potential benefits and drawbacks of these technologies, and (3) describe products and byproducts management options depending on technology and operating conditions.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) summarize the components of a collection system and (2) determine the tools used to design, build, and operate a collection system efficiently.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) list the types and sources of data that are integrated into a system of continuous monitoring and adaptive control (CMAC) or real-time control (RTC), (2) compare and contrast two different applications of adaptive/real-time control for managing inundation and hydrologic conditions in wetlands and basins, and (3) distinguish among different modeling and software approaches used to design systems with a natural resource restoration component.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) determine how to effectively collect, manage, and analyze data from water, wastewater, and stormwater systems to improve utility planning and decision-making, (2) demonstrate how to utilize integrated planning best practices and engagement with stakeholders to reduce pollutants and meet TMDL requirements, and (3) compare different One Water and integrated planning strategies for successful watershed management by a variety of utilities and counties.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) describe technologies and management approaches appropriate for reuse and decentralized options, (2) provide management assessments for examining management approaches for small systems, and (3) discuss planning and management alternatives associated with options assessments for small systems.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) identify causes of failures experienced by utility peers for consideration in bolstering their own operations, (2) adopt programmatic investments/procedures or perform engineering assessments that are relevant to their own local conditions, and (3) interpret how to protect themselves from catastrophic implication of energy supply failures.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) explore partnering opportunities to influence resource selection, (2) establish DE&I elements into future contracts, and (3) identify opportunities to use partnering to further DE&I concepts.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) recognize the challenges associated with setting regulations for potable reuse, (2) articulate the status quo with respect to where the United States stands in developing regulations for potable reuse, and (3) give examples of the approaches some states have adopted and where others are heading in development of regulations for potable reuse.	10/11/22	8:30 AM
At the end of this session, attendees will be able to (1) identify different control strategies for the removal of microconstituents in biofiltration systems for water reuse applications, (2) determine how microbial ecology impacts operations performance and how it provides insights for future optimization, and (3) distinguish between different approaches used in biofiltration to remove specific microconstituents.	10/11/22	8:30 AM

At the end of this session, attendees will be able to (1) identify the right data and apply it appropriately to climate risk assessment, (2) summarize methodology for conducting climate change vulnerability risk assessments at their facility, and (3) describe solutions to mitigate climate change and the framework for selecting the most appropriate solutions.	10/11/22	8:30 AM
TBD	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) apply modeling concepts for intensification processes, (2) use process models to analyze the potential impacts of intensification processes on secondary treatment, and (3) establish criteria for adjustments to process models for intensification processes.	10/11/22	1:30 PM
At the end of this session, participants will be able to (1) identify and discuss refinery wastewater constituents that can stress the treatment plant, (2) relate issues to their wastewater plant where applicable, and (3) diagnose problems and develop their own solutions.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) compare different industrial water reuse projects based on operational performance, effectiveness at reducing water consumption, and cost savings, (2) evaluate the costs and benefits of implementing water reuse projects, and (3) discuss different approaches to achieve industrial water reuse as well as its environmental and business drivers.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) discuss how activated sludge models account for carbon storage, (2) communicate how internally-stored carbon can improve denitrification and nitrogen removal, and (3) draw a process schematic that encourages carbon storage and improves nitrogen removal.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) identify ways to reduce nutrient discharges from a WRRF, (2) identify opportunities to reduce the operating costs in a nutrient removal facility, and (3) identify strategies to improve phosphorus removal reliability in a tertiary nutrient removal WRRF.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) recognize the readiness and effectiveness of different PFAS removal technologies, (2) summarize the fate of PFAS through pyrolysis systems, and (3) present optimum analytical methods for establishing PFAS mass balance across solids treatment processes.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) explain the impacts of sampling location on WBS results, (2) identify the advantages and limitations of using passive samplers for WBS, and (3) describe the conditions under which modeling might be used to estimate infection rates.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) recognize the potential toxicological impacts of microplastics to human health and in the environment, (2) identify sources of microplastics and recognize their occurrence in different matrices to allow for comparison of concentration, polymer type, and size, and (3) determine microplastic data gaps, potential sources and/or pathways of concern, and state of the science regarding the development of treatment processes to remove these contaminants.	10/11/22	1:30 PM

At the end of this session, attendees will be able to (1) interpret the 'hype' around digital solutions by establishing real world applications, (2) give examples of where digital tools and technologies have helped utility operations and where there have been shortcomings, and (3) differentiate between planning optimization and operational optimization.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) explain correlation between the MS4 program and the Clean Water Act and (2) identify ways in which the program should be changed or modified and/or elements introduced to create a model that is both practical to implement and meets the goals of the act.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) assess the effectiveness of porous precast concrete panels for CSO reduction, (2) conclude whether the use of biochar as a filter media amendment is effective for removing bacteria from stormwater runoff, and (3) evaluate the impact of soil amendment on stormwater runoff reduction.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) determine improvements that can be made internally to reduce costs and increase revenue, (2) identify non-traditional funding sources to consider for capital projects, and (3) recognize projects that may meet corporate water stewardship objectives.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) identify various applications for data visualizations, (2) apply concepts from the session to develop dashboards to address their individual requirements, and (3) determine the requirements to enable data visualizations in their organizations.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) evaluate alternative approaches to increase their potable water supply and (2) discuss alternative approaches for producing water that can be used for direct potable reuse.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) define environmental justice, its impact and importance, (2) evaluate their role in addressing environmental injustices present within the water sector, and (3) recognize how it relates to industry wide polices and programs.	10/11/22	1:30 PM
At the end of this session, attendees will be able to (1) identify sources of PFAS in water and wastewater, (2) predict fate of PFAS through wastewater treatment systems, and (3) develop a PFAS monitoring program.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) identify opportunities for water reuse in industrial operations and the application of reverse osmosis as a potential solution, (2) assess the potential viability of biosolids treatment using a mobile wetland treatment systems to reduce the amount of waste hauled to landfills, and (3) recognize the impact analytical methods can have on industrial wastewater treatment efficiency.	10/11/22	3:30 PM
At the end of the session, attendees will be able to (1) apply career advice from distinguished industrial award winners, (2) recognize attributes of award winning industrial project execution, and (3) compare career and project highlights as related by industrial award winners.	10/11/22	3:30 PM

At the end of this session, attendees will be able to (1) obtain a better understanding of high purity oxygen (HPO) systems oxygen mass transfer, (2) understand how to optimize process aeration control systems, and (3) learn metrics to measure performance of process aeration control systems.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) differentiate between the various secondary treatment intensification technologies available in the marketplace, (2) recognize the importance of targeted and focused pilot and full-scale research in the rapid adoption of process intensification alternatives, and (3) express the key factors in biological selection mechanisms in granule development.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) summarize the advancements in primary clarifier application (physical and biological based), (2) describe how conventional primary clarifiers can be converted into biologically-enhanced primary clarifiers for better settling and nutrient removal, and (3) justify the difference in performance between conventional primary clarifier, physical primary filtration and biologically-active filters at the pilot and full-scale level.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) assess the use of digital twins in new applications, (2) recognize the value of using digital twins to solve complex questions, and (3) predict the input requirements for a successful digital twin implementation.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) recognize the importance of including financial components in the evaluation for implementing thermal hydrolysis, (2) determine the impact of intermediate THP(iTHP) on digestion and downstream processes as well as the EPA VAR requirements, and (3) identify how hydrothermal pretreatment can enhance resource recovery from biosolids.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) interpret different I/I technologies and applications, (2) determine if the technology presented is applicable to their own project, and (3) recognize new and innovative technology for the I/I field.	10/11/22	3:30 PM
At the end of the session, attendees will be able to (1) explain how to use hydrologic and hyrdaulic modeling results to understand the implications of projected changes in precipitation on infrastructure design and performance, (2) create an organizational map identifying stakeholders who are affected by changing design storms and standards, and (3) evaluate the relationship of basin-level results in Atlanta's Stormwater Forecast model to the sizing and design of individual control measures.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) determine what models are available, what the differences between models are, and how they can be used, (2) recognize each model and which approach can be used to develop a watershed management plan, and (3) identify what other data is available, climate change data, sea level rise predictions and how that could be applied to your watershed.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) describe technologies and management approaches appropriate for reuse and decentralized options, (2) provide management assessments for examining management approaches appropriate for small systems, and (3) discuss planning and management alternatives associated with options assessments for small systems.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) recognize approaches to biosolids from a communications/public relations standpoint, (2) determine best practices for combatting misinformation and/or public fear, concerns, etc. and (3) build or create their own biosolids communication toolkit.	10/11/22	3:30 PM

At the end of this session, attendees will be able to (1) identify methods used by organizations and community leaders to address environmental injustice and (2) determine how policymakers and water stakeholders can garner input and participation from all water stakeholders.	10/11/22	3:30 PM
At the end of this session, attendees will be able to (1) identify the concepts of latest sensor technologies for process optimization, (2) evaluate the potential applicability of the latest sensor developments, and (3) comprehend the use of data-driven approaches for sensors.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) recognize the application of innovative anoxic granular activated sludge process for perchlorate reduction, (2) interpret the roles of granules for simultaneous denitrification process with perchlorate reduction, and (3) evaluate the applications of different advanced oxidation processes (AOPs) for removal of 1,4-dioxane.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) recognize the complexities of treating pharmaceutical wastewaters to surface water discharge standards, (2) explain the advantages of reuse/ZLD as an alternative to treating or discharging pharmaceutical wastewaters, and (3) apply approaches to pharmaceutical wastewater management evaluations.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) give examples of common challenges with wet weather treatment including technical and regulatory issues, (2) discuss holistic solutions to wet weather management, and (3) apply what they have learned to guide long-term planning.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) highlight history and evolution of high-rate activated sludge technologies and their advancements in wastewater treatment processes for carbon diversion, (2) describe how a full-scale primary clarifier can be rehabilitated to AAA process for better settling, carbon diversion and enhanced primary treatment process, and (3) summarize different operational parameters for A-stage technology that has significant impact on downstream nutrient removal process.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) describe how to operate the short-cut nitrogen by nitrite inhibition at very low DO conditions, (2) assess the performance of partial nitrification efficiency at low C/N ration, and (3) evaluate sensors technology to reliability monitor and control the partial nitrification process.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) use an innovative digital means for wastewater sulfide measurement, (2) evaluate process adjustments to solve odor and corrosion challenges, (3) identify opportunities to eliminate chemicals and reduce water consumption in wastewater odor control, and (4) practice sustainable odor and corrosion control.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) model fermentation using existing process modeling software, (2) estimate soluble biodegradable COD production in fermentation zones, and (3) calculate the impact of effluent nitrate and low DO operations on RAS fermentation.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) analyze existing digester operations, (2) interpret results of operational analysis, and (3) determine optimal digester operational parameters.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) identify the technology associated with UVC-LED, its promise, and limitations for use in water and wastewater applications, (2) list the benefits of UVC-LED for protecting public health in a variety of applications, and (3) assess test results from the various applications showing deployment of the technology.	10/12/22	8:30 AM

At the end of this session, attendees will be able to (1) interpret different I/I results while using different types of technologies and methods, (2) express why private I/I should not be ignored on sewer rehab programs, and (3) summarize how private property programs work or function.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) interpret the financial and public outreach needs associated with stormwater programs and (2) identify funding opportunities and challenges within stormwater programs.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) recognize increased flooding risk from extreme rainfall events and sea level rise, (2) evaluate actionable steps to mitigate increased risk of flooding, and (3) identify how Quincy, MA used public-private partnerships to resolve longtime flooding and revitalize downtown development.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) compare delivery methods including conventional program management, P3, and progressive design-build for three completed utility programs, (2) assess how and where P3 can benefit a utility capital project delivery program, and (3) determine if progressive design-build is a fit for your capital delivery project/program.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) identify the difference and importance between health and performance-based indicators in potable reuse systems, (2) determine if an ozone model can potentially reduce (eliminate) piloting efforts when looking at the removal of micropollutants, and (3) apply different strategies that can optimize ozone and biofiltration systems and will recognize the potential cost benefits.	10/12/22	8:30 AM
At the end of this session, attendees will be able to (1) apply techniques to improve enhanced biological phosphorus removal EBPR processes, (2) apply new laboratory methods for tracking EBPR processes, and (3) use data analytics to predict EBPR process upsets.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) describe the general principles underlying commercially available DNA sequencing tools, (2) asses how DNA sequencing tools can be applied to anticipate treatment plant upsets, (3) identify appropriate responses to avoid operating problems such as biomass bulking or loss of nitrification, and (4) recommend the DNA sequencing tools to incorporate into routine process control testing their facilities as well as the frequency with which these tools should be used.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) apply methods to help resolve pretreatment program challenges between industries and municipalities, (2) define the purpose of a pretreatment program, and (3) examine innovative solutions for pretreatment issues.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) understand the hydrolysis processes at different operating conditions, (2) assess the impact of food waste fermentation on BNR performance, and (3) explore innovative approaches for recovering VFAs using vacuum-extraction methods.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) list the design requirements for PdNA polishing systems [MBBR and Filters], (2) compare successful PdNA implementation of IFAS and post-polishing MBBR systems, and (3) discuss the benefits and risks associated with operating post-polishing PdNA systems.	10/12/22	10:30 AM

At the end of this session, attendees will be able to (1) compare aeration devices on a common basis and provide a well-established method for compliance testing - ASCE Standard 2, (2) evaluate the performance of aeration devices using in-process oxygen transfer testing to assess the effects of diffuser fouling, effectiveness of cleaning methods, and developing design criteria (alpha) - ASCE Standard 18, and (3) provide an overview of the revisions to the Guidelines for Quality Assurance of Installed Fine-Pore Aeration Equipment - ASCE Standard 35.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) identify opportunities for technical assistance to municipalities, (2) describe sequencing of CO2 and its use as a biogenic carbon source, and (3) describe the hydrothermal liquefaction process and its applicability to energy recovery from biosolids.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) identify the types of peracids used at wastewater plants, (2) compare the pros and cons of each type of peracid, and (3) determine whether peracid is suitable for their treatment plants.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) discuss different methods applied to address large scale flood mitigation in urban settings, (2) provide examples of strategies for identifying high risk flooding areas and prioritizing investments to address them, and (3) list different flood mitigation alternatives that increase resilience to flooding and climate change.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) discuss stakeholder engagement and review as part of the TMDL process, (2) identify alternatives to traditional point source control management to improve water quality improvement, and (3) summarize adaptive management based TMDL strategy.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) implement BIM standards allowing utilities to see cost savings with reduced change orders during construction and time savings in transferring data to their asset management software, (2) determine the core concepts in defining their path to implementing a digital twin, and (3) recognize the fundamentals and practical applications for digital twins.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) distinguish between uncertainty and sensitivity analysis, (2) identify opportunities with WRRF evaluations in which uncertainty and sensitivity analysis can be implemented, and (3) recognize the role of uncertainty and sensitivity analysis in environmental impact bonds.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) summarize the risks poor cybersecurity practices may present to water and wastewater systems, (2) recognize basic and advanced cybersecurity practices applicable to their own personal lives and workplaces, and (3) determine where to find cybersecurity services and knowledge.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) recognize pathogen removal mechanisms by MBR systems and approaches other countries are taking, (2) apply their knowledge regrading available and developing monitoring capabilities for MBR systems for pathogen removal, and (3) identify relevant future research needs of the industry for defining MBR LRV credits.	10/12/22	10:30 AM

At the end of this session, attendees will be able to (1) define what decarbonization means for the water industry, (2) recognize relevant policies and drivers for GHG reduction in the water sector, and (3) identify sources of GHG in the water industry and potential methods for reducing GHG emissions at the utility level.	10/12/22	10:30 AM
At the end of this session, attendees will be able to (1) predict treatability of PFAS by adsorption and treatment cost, (2) predict fate of PFAS through water reclamation and reuse systems, and (3) identify treatment solutions for PFAS in raw and reclaimed water.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) identify potential challenges in treating high-strength meat processing and dairy wastewater, (2) compare benefits of various technologies for removal of organic constituents, fats, oil and grease, and nutrients, and (3) develop strategies to upgrade existing meat processing and dairy wastewater treatment plants for improved performance and reduced operating costs.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) identify sources of greenhouse gas emissions from collection and treatment of wastewater and disposal of biosolids, (2) recognize tools used to estimate greenhouse gas emissions in the wastewater industry, and (3) compare greenhouse gas emissions for different nutrient removal and biosolids treatment processes.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) describe the differences between co-and-counter diffusional biofilm structure, (2) name the KPIs for the MABR, and (3) critique the usefulness of MABR models for design and control.	10/12/22	1:30 PM
At the end of the session, attendees will be able to (1) explain how high F/M zones or Feast-Famine are achieved in continuous flow systems, (2) distinguish between biological and physical selection mechanisms for granular sludge, and (3) discuss how secondary clarifier modeling can demonstrate that densified activated sludge increases the MLSS and hydraulic capacity of a plant.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) identify several significant impacts of thickening and dewatering performance on other processes and (2) recognize options for enhancing thickening and dewatering performance that improve upstream or downstream processes.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) describe the importance of inherent biogas production on over-all digester mixing and under what conditions biogas production mixing is most effective, (2) determine what micro-aeration is and how it may improve the digestion process, and (3) explain the microbial hydrolysis process and how it can be implemented to improve digestion.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) describe the state of the art and applicability of digital twins for optimization of micropollutant removal, (2) interpret CFD results to optimize hydraulics for ultraviolet disinfection for wastewater, and (3) evaluate hydraulic impacts on chemical disinfection and implement optimization strategies through the use of CFD.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) navigate the challenges associated with HHDD of force main near an artesian groundwater aquifer on a small site with unsuitable existing ground material, (2) identify the process and technics for assessing large diameter prestressed concrete cylinder pipe (PCP), and (3) recognize how to use calibrated hydraulic transient models to recommend alternative that considered both of the risks.	10/12/22	1:30 PM

At the end of this discussion, attendees will be able to (1) identify green, grey, and blue infrastructure control measures which minimize flooding and CSOs and provide water quality benefits, (2) identify site location characteristics impacting the performance of blue, green, and grey infrastructure control measures, and (3) list numerous community benefits of blue, green, and grey infrastructure control measures.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) plan an awareness campaign keeping both its objectives and the audience in mind, (2) identify different strategies for engaging stakeholders in their communities, and (3) recognize how to combat water issues locally through art and education.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) recognize the significance of defined business processes in improving organizational performance, (2) apply change management and design thinking tactics for building collaboration across organizational silos, and (3) distinguish between data warehouse systems and dynamic data hub applications and recognize the importance of data governance policies.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) leverage technology to make data driven decisions to mitigate risks for wastewater collections systems and water distribution systems, (2) evaluate project benefits and risks provides quantifiable and equitable basis for justifying decisions to governing bodies, regulatory agencies, funding entities, and customers using mathematical model, and (3) recognize the importance of implementing predictive maintenance to manage the assets more efficiently.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) recognize challenges associated with determining log removal credits for MBR systems, (2) examine methodologies and potential solutions to establishing regulatory credits for MBRs, and (3) demonstrate what they have learned with peers.	10/12/22	1:30 PM
At the end of this session, attendees will be able to (1) determine methods for capturing funding for small community wastewater infrastructure, (2) recognize steps to engage communities in funding opportunities for their water management infrastructure and (3) identify potential challenges and lessons learned from different case studies regarding project funding for small and at-risk communities.	10/12/22	1:30 PM
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At the conclusion of this workshop, participants will be able to (1) demonstrate the value of process models to teach fundamental concepts for resource recovery, (2) use process simulators to teach the two fundamental resource recovery concepts including operation of a nitrifying activated sludge system to achieve year-round full nitrification and secondary clarifier operational impacts on process performance, and (3) recognize simulator-based training exercises that can supplement other forms of operator training.	10/8/22	8:30 AM
Please see Onsite Program for more information	10/8/22	8:30 AM

At the conclusion of the workshop, participants will be able to identify performance challenges and develop solutions unique to refinery wastewater treatment plant unit operations. Operational troubleshooting and practices will be applied such that the attendees will be able to (1) determine if a new waste should be accepted at the wastewater treatment plant, (2) evaluate non-routine discharges, determine potential for causing treatment plant upsets, and plan for mitigation measures, (3) identify challenges with refinery oil/water separators and impacts on performance and more.	10/9/22	8:30 AM
At the conclusion of this workshop, participants will be able to (1) run a process simulation of an existing plant model in five different software platforms, (2) produce and interpret the outputs from a simulation, (3) manipulate operational inputs on various process units, and (4) identify where to find information and help for troubleshooting process models.	10/9/22	8:30 AM
	10/9/22	8:30 AM
At the conclusion of this workshop, participants will be able to (1) describe the activated sludge process and how to conduct field measurement techniques for its process control, (2) perform measurement and troubleshooting techniques associated with BNR Treatment Processes, and (3) describe and perform troubleshooting techniques through hands-on practice with operations tools.	10/9/22	6:45 AM
At the conclusion of the workshop, participants will be able to (1) describe the existing technologies for depackaging and handling feedstock, (2) recognize the operational considerations needed for screening/evaluating different feedstocks prior to co-digestion, and (3) assess and manage the impact of co-digestion on liquid sidestream as well as downstream dewatering processes.	10/9/22	8:30 AM
At the conclusion of this workshop, participants will be able to (1) interpret interpret climate data, trends, and projections within the context of deep uncertainty, (2) examine actionable science and apply new technical methods through hands-on interactive sessions, and (3) explore innovative approaches to adaptation planning and decision-making in the face of climate uncertainty.	10/9/22	8:30 AM
At the conclusion of this workshop, participants will be able to (1) identify current regulatory trends for wet weather communities, (2) describe the challenges with completing a wet weather program, (3) compare various CSO control technologies based on application, and (4) recognize the variability of conditions that are present in each community.	10/9/22	8:30 AM
Please see Onsite Program for more information	10/9/22	8:30 AM

Please see Onsite Program for more information	10/9/22	8:30 AM
At the conclusion of this workshop, participants will be able to (1) identify relevant and specific challenges faced by municipal leaders who are responsible for stormwater infrastructure planning, implementation and management, (2) recognize the inter-relationships between stormwater management, climate resilience, health, and equity, and (3) describe how stormwater and green infrastructure solutions influence equity and identify what levers practitioners can use to advance equity in their day-to-day practice.	10/9/22	8:30 AM
Please see Onsite Program for more information	10/9/22	8:30 AM
At the conclusion of the workshop, participants will be able to (1) identify opportunities in the water-resource-recovery space to positively affect environmental justice (Equity) and reduce GHG emissions, (2) explore and develop techniques for measuring (and possibly funding) associated Equity and GHG-reduction benefits, (3) evaluate tools that could be applied when considering new service offerings or CIP project selections that more fully consider triple-bottom-line social, environmental, economic, and GHG improvements, and (4) contribute to the industry's thinking on Equity and GHG as reasons for doing things differently and changing the status quo, leading to a more sustainable future for all.	10/9/22	8:30 AM
At the end of this conclusion of this workshop, participants will be able to (1) distinguish between the key distinctions between Justice, Equity, Diversity and Inclusion (JEDI) and how each play a role in their organizations, (2) recognize the significance and impact of inequitable systems within the water and wastewater sector, and (3) develop equity roadmaps with action items for their organizations or utilities.	10/9/22	8:30 AM
At the conclusion of this workshop, participants will be able to (1) identify and avoid common pitfalls typically encountered when building technical presentations, (2) improve skills in forming a skeleton of a presentation by converting preliminary ideas into a tangible, logically organized outline, and (3) create rich, concise presentations on highly-technical topics that an unfamiliar and diverse audience can relate to and easily digest;	10/11/22	12:30 PM
Please see Onsite Program for more information	10/9/22	8:30 AM

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Please see attachments for full event description and objectives	10/10/22	8:30 AM
Please see attachments for full event description and objectives	10/11/22	8:30 AM

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Affiliation - Milwaukee School of Engineering - The Village of Raymond is located just off Interstate 94 and approximately 20 miles south of the City of Milwaukee, WI. The current wastewater treatment systems within the Village limits are all individual septic and holding tanks. The Village is the only municipality in Southeastern Wisconsin without a centralized sanitary sewer system in place, which the Village Board believes puts the municipality at a competitive disadvantage. This project aims to determine the best wastewater treatment design to address the client's objectives and use the best treatment alternative. The most ideal option used a decision matrix that ranked each alternative on the categories of expansion potential, operation and maintenance simplicity, construction simplicity, and level of environmental protection. The best alternative was determined to be the pump-assisted sanitary sewer with flow to an MMSD connection point. The preliminary design of the sanitary sewer used existing topographical data and land use maps to determine a profile and calculate flow along the length of the main. Afterward, the sanitary sewer line was sized, and six lift stations were designed. The Village's best wastewater treatment option is a pump-assisted system with six lift stations to accommodate the elevation changes and flow of the region.		8:05 AM
Affiliation - Universidad de Monterrey (UDEM) - The Panther Creek WWTP, located in Frisco, Texas, is an activated sludge plant that will increase its capacity from 10 mgd to 15 mgd AADF and the wet weather peaking factor from 3.0 to 3.5, resulting in a P2H capacity increase from 30 to 52.5 mgd. Our proposal is to conduct this expansion with a minimal footprint increment and to include a biosolids treatment since the plant currently only dewaters and thickens. Thus, we evaluated different alternatives on each process. For primary treatment we considered adding an additional clarifier or installing a Drum Screen instead, considering the necessary civil work. On the biological treatment, we evaluated two alternatives which would increase the treatment capacity of the existing basins: the MBBR system and a similar one using polypropylene fibers. For secondary clarification and disinfection we considered different configurations for expanding the existing clarifiers and UV system. On the sludges train we considered building a thermophilic digestion system, considering THP and HTC as alternatives for energy recovery and producing fertilizer or biochar. Our aim is to comply with the new requirements and to improve the operational efficiency of the plant while keeping it operational during the construction/renovation process.		8:35 AM
Affiliation - Costa Rica Institute of Technology - Based on the problem statement provided by the 501(c)(3) non-profit organization, Global Water Stewardship, a Wastewater Treatment design was proposed for the community of Montezuma, Costa Rica. Tourism is the main economic income in the region due to it being among the five most visited destinations in Costa Rica. Currently, most users are connected to private septic tanks, however, recent studies suggest that there is evidence of malfunction, leading to contamination of superficial and underground waters. Due to its proximity to the sea, this is a concerning issue for the community. In this project, five different wastewater treatment designs were proposed. The recommended treatment was a Sequencing Batch Reactor, according to a decision matrix based on the community's priorities. The proposed design, determined to meet the established effluent limits of the Costa Rican law and the problem statement, includes preliminary treatment, one equalization tank, two sequencing batch reactors, a subsequent disinfection tank, and two sludge drying beds. For a design flow and period of 14.3 gal/s and 24 years, respectively, the estimated cost for this project is $376,128.60. The annual operation and maintenance cost is of $28,800 which results in a user fee of $7.57 per month.		9:05 AM

Affiliation - Florida Gulf Coast University - Wastewater treatment plants (WWTP) are a necessity for human existence. As time persists and research builds, there is always a need to improve these treatment systems. Consistent with technological advancements, policies are continuously updated to reflect the improvements in treatment methods. Recently, the FDEP raised the standards regarding wastewater effluent. The Golden Gate WWTP located in Naples, Florida is governed by the regulations set by the FDEP. Currently, the WWTP discards the effluent water through deep well injection. To comply with the new regulations set forth by the FDEP and to better serve the growing needs of the community, the existing WWTP must undergo improvements to meet the higher quality effluent standards prior to deep well injection. The plant will be upgraded to a high-level disinfection which will consist of the addition of a chlorine contact chamber, rotating disk filters, sodium hypochlorite feed and storage facilities, and a pump station The purpose of this project is to optimize the performance of these new additions by minimizing energy consumption, cost, and environmental impacts. Through research and data analysis, the additions will be designed to achieve maximum efficiency, meet the FDEP requirements, and serve the needs of the community		9:35 AM
Affiliation - The University of Texas at Austin - The Panther Creek Wastewater Treatment Plant (PCWWTP) is a 10 MGD Annual Average Daily Flow (AADF) plant with a peak two-hour flow capacity of 30 MGD (peaking factor of 3). The report proposes a design to expand the capacity of the plant to 15 MGD AADF and a peak two-hour flow capacity of 52.5 MGD (peaking factor of 3.5). The key factors that have been addressed in the report are dampening the increased peaking factor, improving secondary treatment to meet the nitrogen and phosphorus permits completely through biological treatment, a better infrastructure and process for handling of biosolids, and prevention of foul odors. Since the plant is located near a golf course and a residential neighborhood, aesthetic improvements have also been a focus of the design. An Opinion of Probable Construction Costs (OPCC) for the design with the analysis of capital and operational costs is provided in the report. In addition to the current expansion, the report also provides a high-level layout for expansion to 35 MGD AADF. The proposed alternative will enable PCWWTP to comply with the discharge permits of the Texas Pollutant Discharge Elimination System (TPDES) and Texas Commission on Environmental Quality (TCEQ).		10:05 AM
Affiliation - University of Akron - The Great Lakes are an essential freshwater resource that have led the nation in developing effective nutrient removal in efforts to improve water quality. Some water body quality issues are caused by excess nutrients entering waterways from agricultural runoff and combined sewer overflows. In the City of Akron, Ohio, this is a concern regarding the Cuyahoga River – a major tributary to Lake Erie. Stormwater retention projects and the expansion of the Akron Water Reclamation Facility (AWRF) have helped to manage flows while maintaining EPA (Environmental Protection Agency) compliance. The AWRF was interested in improving their aeration treatment. With the use of a BIOWIN model of the AWRF, the team ran an analysis and evaluated potential alkalinity adjustments, supplemental carbon sources, and new step feed flow splits. The model showed that there is enough BOD in the raw wastewater to provide a carbon source. Micro C, a sustainable byproduct of the biodiesel industry, is recommended as an additional source. Any improvements found were negligible and did not warrant additional capital improvement. The AWRF will not have to make changes as the current process is working efficiently while ensuring the quality of the effluent is safe to enter the Cuyahoga River.	10/9/22	10:45 AM

Affiliation - George Mason University - The King William Treatment Plant (KWTP), operated by Hampton Roads Sanitation District (HRSD), serves King William County's current wastewater demands. Located on a 5.5-acre lot surrounded by five adjoining farms, the KWTP is designed to treat and discharge an average of 100,000 gallons per day (GPD) to the Moncuin Creek. Based on the expected growth in population and development within the county, HRSD seeks upgrades to address treatment performance and capacity needs to accommodate future development. An increase in the facility's wastewater treatment capacity from 100,000 GPD to 300,000 GPD is required, alongside a new biological treatment system to replace the existing MBR process. George Mason University's design team has assessed the existing treatment system, daily plant operations and performance data to prepare a preliminary engineering report (PER). The PER addresses the recommended improvements to the KWTP in accordance with Federal, State, and Local requirements alongside HRSD Design and Construction Standards. The proposed strategies considered future growth and expansion, while providing rendered final design documentation to facilitate expansion and manufacturer cost estimates. The final recommendation was determined by a decision matrix analyzing life cycle costs (NPV), expansion capabilities, space requirements, operator favorability and safety, while also incorporating ISI Envision practices.	11:15 AM
Affiliation - The University of British Columbia - The Regional District of Nanaimo (RDN) in British Columbia, Canada is investigating options for a new biosolids management strategy. This study aims to propose a solution to the RDN that consists of a thermal hydrolysis unit, a biogas upgrade and a composting system. All three units are to be erected at the Greater Nanaimo Pollution Control Center (GNPCC). Thermal hydrolysis is to be placed prior to anaerobic digestion at GNPCC and modifies the sludge properties. It decreases the required digester volume by 70% and increases anaerobic digestion rate by a factor of 2.3. The GNPCC anaerobic digester biogas undergoes water scrubbing to be upgraded to biomethane. A compost and curing facility is proposed to treat Class A and Class B biosolids from GNPCC and FCPCC to produce Class A compost. The proposed solution has an estimated capital cost of 31.2 million USD and an annual operating cost of 3.2 million USD. The products of the operation include about 10,500 yards of compost and over 27,000,000 kWh annually. The proposed solution has an annual revenue of 2.3 million USD.	11:45 AM
Affiliation - SUNY Environmental Science and Forestry College - The Village of Parish owns an activated sludge wastewater treatment facility in Oswego County, New York that has not had any upgrades in over 40 years. The facility is permitted to treat a monthly average of 140,000 gallons per day. Parish regularly exceeds this limit due to significant inflow and infiltration, which results in peak hourly flow of 425,000 GPD. The WWTF is operated by Camden Group Inc., a private contract operations company. In 2020 and 2021, they reported numerous exceedances of their State Pollutant Discharge Elimination System permit due to failing equipment. The New York State Department of Environmental Conservation is preparing an Order on Consent to the Village for violations. The project scope focused on preliminary design of a new water resource recovery facility. The design objectives were to repurpose existing infrastructure; evaluate new efficient technologies for solids and grit removal, biological treatment, and disinfection; and use automation where possible to lower operation and maintenance requirements. Recommended unit processes include a new headworks building; biological treatment using SBR; UV disinfection; expanded sludge drying capacity; and re-use of existing treatment tanks for flow equalization and sludge holding. The capital cost of the project is estimated to be $5.6 million.	12:45 PM

Affiliation - North Carolina State School 1 - This project is an expansion of the Graham Wastewater Treatment Plantfrom 3.5MGD to 5MGD and aims to enhance the plant's current equipment and processes from primary treatment through tertiary treatment with an emphasis on the biological nutrient removal processes, which include the implementation of three 1.67MGD5-stage Barden phosystems. The NPDES permit limits have become more stringent upon expansion; therefore, upgraded processes must treat the wastewater to meet the new standards to protect human health and the surrounding environment. The city of Graham is facing an annual 3.46% population growth rate and maybe taking on an additional flow of 0.75 MGD from the city of Mebane. Thus, this project addresses the challenges that come with the increasing influent flow and loading concentrations at the plant. Wastewater treatment is a crucial component of the protection of human and environmental health as it removes pollutants and bacteria from sources such as homes, industries, and agriculture. Removing these pollutants and bacteria allows for the plant to discharge the treated water back into the Haw River. The expansion of this plant is imperative to mitigate the risk contaminated water would bring to the surrounding area.		1:15 PM
Affiliation - Georgia Institute of Technology - The aim of the Malawi Sanitation Solutions project is to the improve sanitation infrastructure at Mpitilira Primary School in rural Malawi. The school is burdened with dilapidated latrines, a lack of menstrual hygiene facilities, an immensely high student-to-latrine ratio of 100 to 1. There has been an increase in the spread of diseases such as dysentery and cholera and a decrease in student attendance and pass rates even as enrollment grows. To address these challenges and the needs expressed by the school community, the Engineers Without Borders - Georgia Tech Team designed a set of double-pit, VIP latrine blocks to expand capacity and enhance sanitation to reduce the spread of disease. A set of 2 blocks (1 for girls and one for boys) of 4 latrine stalls, complete with handwashing stations, urinals, and menstrual changing rooms, have been constructed through a local contractor and are now in-use. Designs for additional latrines are now underway as the team monitors and evaluates the current blocks and raises funds for implementation. This project has and will continue to keep sight of the UN Sustainable Development Goals including that of good health and wellbeing.		1:45 PM
Affiliation - University of Monterrey - Costa Rica has just a few centralized wastewater treatment systems. Commonly, septic tanks are used for treating wastewater, while greywater is poured directly overland. Besides, shallow bedrock, poor soils, poor cleaning practices, and poor designs contribute to improper treatment of the septic tanks effluent. Furthermore, it is common that sludge cisterns dump the collected material in rural areas, polluting in consequence. Due to the above, Montezuma, a mainly residential zone but one of the five most visited tourist destinations in Costa Rica, located in the Puntarenas canton, in Puntarenas province of the Nicoya Peninsula, is seeking for a centralized sanitary wastewater solution as well as a reliable collection system.		2:15 PM
TBD		3:00 PM

Affiliation - Illinois Institute of Technology - As areas become more densely populated, water quality concerns increase. A report by the Illinois EPA indicates that the main stream of the Little Calumet River is impaired (water quality standards are not being met) and is one of the most polluted rivers in the United States. One of the major sources of pollution associated with the impairments is stormwater runoff. The City of Harvey has a desire to create a Central Park which will include a wet extended detention pond that will eventually discharge water to the Little Calumet River. This project will focus on adding BMP components to the proposed Central Park that will act as a treatment train for stormwater runoff before it is discharged into the downstream sewer system and then to the Little Calumet River. The proposed solution will treat and detain the stormwater captured by the City of Harvey's proposed storm sewer system. These BMP additions to the Central Park will improve water quality by a minimum reduction of 50% of the nitrogen, phosphorus, and metal pollutant levels. Through the reduction of pollutants, the Central Park will achieve a water quality that is safe for aquatic life to live in.		8:05 AM
Affiliation - Johns Hopkins University - WSSC (Washington Suburban Sanitary Commission) Water is designing a biogas facility in Piscataway, Maryland to generate renewable electricity from the waste streams of five treatment plants. As part of this project, our team has been tasked with investigating methods to control the buildup of struvite—a tough mineral formed of magnesium, ammonium, and phosphorus. Reducing struvite through the process of wastewater recovery increases the efficiency of the process and prevents costly blockages. As a result, there is a potential for less phosphorus released into the environment and a reduced carbon footprint. Phosphorus recovery can also yield fertilizer, which can be sold at a profit. The addition of this system to the treatment plant at one facility will hopefully encourage the addition to other facilities primarily within WSSC, but has the potential to influence national and worldwide outcomes. Throughout this project, our team has determined that Centrisys's MagPrex reactor would be best for WSSC. This reactor uses the pH control and the addition of magnesium chloride to precipitate struvite in a controlled environment. This report details the decision process, preliminary design calculations, and lifecycle cost analysis in order to provide a complete picture for WSSC in moving forward with implementation.		8:35 AM
Affiliation - University of South Florida - Rocky's Waterworks has designed a free water surface wetland system to treat effluent from the Southeast Wastewater Treatment Plant in Pasco County, FL to reclaim water standards. The design objective is to meet the Weeki Wachee Basin Management Plan's annual average effluent concentrations for Total Nitrogen and Total Phosphorus of 3 mg/L and 1 mg/L, respectively. The plant currently operates at a 3 MGD capacity but will expand to 6 MGD in Summer 2022. Design constraints include existing natural wetlands and wildlife as well as a proposed road extension west of the facility. Rocky's Waterworks proposes a 73.2-ac lined wetland system to treat a 2 MGD flow via the P-k-C* model, utilizing plant effluent data from 2019-2021. The design consists of two parallel trains. Given the presence of natural wetlands and the proposed road extension, Rocky's Waterworks recommends acquiring an additional 95-ac of land west of the plant for development. The design also includes opportunities for recreational and educational activities to serve Pasco County residents. In addition to the P-k-C* model and recreational design, a hydraulic analysis, evaluation of permitting requirements, earthwork calculations, and a cost analysis have been performed.		9:05 AM

Affiliation - Old Dominion University - This project redevelops an abandoned wastewater pump station site at the end of Hanover Avenue in the Larchmont community adjacent to the Lafayette River. The goal of the project is to create a solution to naturally treat and manage the runoff coming from the Larchmont community so that it doe not negatively affect the Lafayette River and its connecting water bodies. Before the discharge of stormwater runoff to Lafayette River, our team implemented a design of a swale and living shoreline. The stormwater runoff coming from the Larchmont community is treated in an environmentally conscious way. The cost of construction is kept to a minimum. In addition, the design decreases flooding on the site by absorbing some of the runoff and decreasing the environmental pollution. Although the design cannot eliminate stormwater runoff on-site, it improves the state of the environment and surrounding community. The execution of this project has a positive environmental impact on the community because visitors will observe the design as they use the site as a kayak launch. The design of this project is sustainable and will have an impact on the Lafayette River and its connecting water bodies for years to come.		9:35 AM
Affiliation - University of Nevada, Las Vegas - Las Vegas Valley (LVV) is in a desert, and while the rain events in LVV are rare, they come pouring, filling our stormwater channels. The stormwater channels are designed to collect water from the Southwest and Northwest sides of the Valley, redirect the water flow to Las Vegas Wash on the East side of the Valley, and eventually discharge to Lake Mead. The 100-Year flow rates in LVV's stormwater channels range between 6,000 to 14,000 cubic feet per second (cfs). The 100-Year flow rate at Flamingo wash at Nellis boulevard is 11,800 cfs with a gage height of 11.32 feet. For comparison, Clark County Water Reclamation District, Nevada's largest wastewater treatment facility, discharges approximately 162 cfs. Large and small debris and direct littering may block the stormwater channel and prevent the water from flowing to the Las Vegas Wash, causing various health concerns, odor, and overflowing the pavements. In addition, stormwater channels near homeless encampments receive human fecal matter and urine from the homeless. During flash floods or heavy rain events, keeping an eye on the many stormwater channels for any potential blockade is difficult.		10:05 AM
Affiliation - SUNY Environmental Science and Forestry College - Harbor Brook is a stream in Syracuse, NY that is culverted for flood control. It is heavily impacted during wet weather events from combined sewer outflows (CSOs). The burial of the stream restricts public access, recreation, and habitat. A daylighting opportunity for Harbor Brook has been presented at Frazer Park, which is adjacent to an elementary school. This location allows for significant educational and community recreation opportunities. This project delves into the flood control analysis of daylighting and evaluates alternatives for channel design and stormwater and bioengineering techniques. It will also serve as a demonstration project for future daylighting opportunities in Syracuse.		10:45 AM
Affiliation - Cal Poly Pamona - To evaluate the effects of climate change and sea-level rise, a two-dimensional rainfall on mesh hydrologic/hydraulic model of the 130 square mile Ballona Creek Watershed was developed to assess what flooding may look like in a future storm event. Flood mitigation was the focus of determining strategies/solutions and how those strategies may impact the watershed economically, socially, and environmentally. Recent studies have found that Ballona Creek is prone to flooding during a 100-year or larger storm event, which is becoming less rare of an event. The tools used for the analysis included pre-processing using ArcGIS, hydrologic modeling using the Hydrologic Engineering Centers Hydrologic Modeling System (HEC-HMS) and hydraulic modeling using the Hydrologic Engineering Center's River Analysis System (HEC-RAS) software platforms. The analysis was based on the Federal Emergency Management Agency 2D Base Level Engineering program for floodplain modeling and mapping. Design proposals and analyses for flood mitigation include low impact development coupled with green streets and regional best management practices structural controls as defined in the Enhanced Watershed Management Plan for Ballona Creek Watershed, classical flood mitigation solutions such as, floodwalls and the placement of pump stations.	10/9/22	11:15 AM

Affiliation - North Carolina State School 2 - The goal for this project is to create a Preliminary Engineering Design for a proposed anaerobic digester for food waste in Wake County, North Carolina by optimizing cost-effectiveness, sustainability, and feasibility for both the collection and digestion processes. As there is not an existing food waste collection and digestion system currently being utilized by the Wake County Solid Waste Management Division (WCSWMD), we designed and sized the reactor based on food waste generated in Wake County and considered the entire process flow, which includes waste collection, gas cleaning and utilization, biosolids treatment, and odor control. First, we examined the feasibility of collecting both commercial and residential waste, and determined that our system would benefit from co-digestion with grease interceptor waste. We also performed a siting evaluation using geospatial tools and existing information from WCSWMD regarding current facilities. Based on our design decisions, we performed a cost estimation for the final design iteration and determined if the system design will be cost-effective while also meeting performance standards and considering social and environmental sustainability. Finally, to consider social and environmental sustainability, we performed an ENVISION rating for the facility and used EPA's EJScreen tool to include environmental justice impacts in our report.	11:45 AM
Affiliation - Illinois Institute of Technology - This project is a collaboration between students at the Illinois Institute of Technology and Just Roots, a Chicago-based non-profit organization that owns and operates community gardens. The design takes place at the It Takes a Village Farm in Sauk Village, Illinois which is a 2.7-acre plot that once complete will yield 25 tons of annual fresh produce and space for community gatherings. Throughout the farm, there are issues with long-term standing water and oversaturated soil that must be remediated before planting and harvesting. The Sauk Village farm also has goals of sustainability through runoff mitigation and reuse combined with increased community involvement. Through these developed problems the design team's goals are to develop a water management and reuse system on the farm while maintaining low costs and easy implementation of the design. Three alternative solutions were created that were evaluated based on water reuse abilities, cost, ease of implementation, and factors with the organization's culture. The chosen solution encompasses a drainage ditch with a series of cisterns that would be used to collect, store, and redistribute water for the farm. The students also designed a community space for each alternative to better work within the organization's needs and culture.	12:15 PM
Affiliation - Northeastern University - Planning for more intense precipitation based flooding in the Upper Charles River watershed will contribute increase climate resiliency for the 23 communities the Charles River impacts. Our team from Northeastern University in Boston, in collaboration with the Charles River Watershed Association, have created a model for mitigating flooding at the watershed scale using green stormwater infrastructure in preparation for the consequences of climate change. This was accomplished first by creating a site selection prioritization method to choose sites within the watershed that have the greatest potential to store runoff at the sub-watershed scale. Sites were chosen from a list of potential sites brought forth by towns in the upper Charles River Watershed. Using this selection method, the highest priority sites chosen were designed with green stormwater infrastructure that could store differences in current and expected stormwater flows. Three sites were designed to 25% and the technologies placed on the sites can be used as examples for how similar sites across the watershed can also store large quantities of stormwater. All sites have been designed to store their parcel's climate change predicted runoff volume, as well as exhibit co-benefits that will aid in the project construction feasibility.	1:15 PM

Affiliation - Colorado State - Ram Wastewater Solutions (RWS) has developed 15% design for an energy efficiency upgrade at the Laramie Wastewater Treatment Plant (LWWTP) to reduce monthly energy consumption by a minimum of 20%. The design report herein presents the methodology in developing three design alternatives to investigate the multiple ways in which energy could be conserved at the LWWTP. The RWS team evaluated the design alternatives based on the following criterion: capital cost, practicality of implementation, and total energy savings for selecting the highest ranked alternative for the LWWTP. The final design incorporates both equipment upgrades and process changes by replacing two of the blowers feeding air to the aerobic digester tanks, installing two new top-entry mechanical mixers in the digester tanks, and replacing the coarse-bubble diffusers with fine-bubble diffusers. These changes were intended to significantly reduce aeration time while maintaining digester efficiency to reduce energy consumption at the plant up to a projected 27%. This design has been developed with the intention for submission to the 2022 RMWEA/WEFTEC Student Design Competition in conjunction with Senior Design at Colorado State University.		1:45 PM
Affiliation - University of Waterloo - Creating and maintaining sustainable stormwater management infrastructure is imperative to building a climate-resilient society. The City of Barrie (located in Ontario, Canada) has identified MacMorrison Park as a potential site for a stormwater retrofit. The park receives water from over 250 hectares of urbanized land via Sophia creek and a stormwater channel. As a result, downstream and surrounding residences of MacMorrison Park experience flash flooding after major rain events. Barrie Good Consulting is proposing to construct two stormwater management ponds in the park to attenuate high volume storm flows, maximize on-site detention and improve water quality downstream.		2:15 PM
Affiliation - University of Tennessee Knoxville - The University of Tennessee senior design group was tasked with providing civil engineering services to design two hydroelectric power production options and a local, independent electrical grid to produce 10 kW of power for the community in Nazarét, Panama. The in-river turbine system was developed to harness the velocity of the nearby Rio Chico. Feasibility, potential power production, and capacity analyses were used to determine a suitable hydroelectric turbine. Two structural design options were developed using site characteristics to anchor the turbine with flexibility to move the platform offshore during flood events. Construction engineering services were also performed. The penstock system was designed to divert water from the nearby Rio Torcana to a turbine. Hydrologic services were performed to design the infrastructure needed to transport the water to the selected turbine. Structural engineering services included design of an intake pipe anchor, concrete transition tank, and powerhouse. The electrical grid was designed to supply the community with the power produced by the hydroelectric system options. Alternate energy sources were evaluated, and an energy storage system was developed to connect the community to the grid in the future. Possibilities for distribution, monitoring, and metering were evaluated along with financial feasibility.		3:00 PM

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5:00 PM	**CEU**	**0.6**		0.6		0.60												
5:00 PM	**PDH**	**0.4**		0.4		0.40							x					
5:00 PM	**PDH?**	**6**		6	1.00	1.00	1.00	1.00	1.00	1.00								
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5:00 PM	**CEU**	**0.6**		0.6		0.60												
5:00 PM	**CEU**	**0.6**		0.6		0.60												
MPETITION - STUDENT DESIGN COMPETITION																		

8:35 AM				6		6.00					
9:05 AM				6		6.00					
9:35 AM				6		6.00					

10:05 AM				6		6.00					
10:45 AM				6		6.00					
11:15 AM				6		6.00					
	PDH	**6.0**									

11:45 AM			6		6.00				
12:15 PM			6		6.00				
1:15 PM			6		6.00				

1:45 PM				6		6.00					
2:15 PM				6		6.00					
3:00 PM				6		6.00					
4:00 PM				6		6.00					

8:35 AM				6		2.00		2.00	2.00			
9:05 AM				6		2.00		2.00	2.00			
9:35 AM				6		2.00		2.00	2.00			

10:05 AM				6		2.00		2.00	2.00		
10:45 AM				6		2.00		2.00	2.00		
11:15 AM				6		2.00		2.00	2.00		
11:45 AM	**PDH**	**6.0**		6		2.00		2.00	2.00		

12:15 PM			6		2.00		2.00	2.00	
12:45 PM			6		2.00		2.00	2.00	
1:45 PM			6		2.00		2.00	2.00	

2:15 PM				6		2.00		2.00	2.00		
3:00 PM				6		2.00		2.00	2.00		
4:00 PM				6		2.00		2.00	2.00		
3:00 PM	**GCH**	**1.5**	1.5								1.5
3:00 PM	**GCH**	**1.5**	1.5								1.5
3:00 PM	**GCH**	**1.5**	1.5								1.5
5:00 PM	**GCH**	**1.5**	1.5								1.5

10:00 AM	**GCH**	**1.5**	1.5								1.5
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10:00 AM	**GCH**	**1.5**	1.5								1.5
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3:00 PM	**GCH**	**1.5**	1.5								1.5
3:00 PM	**GCH**	**1.5**	1.5								1.5
5:00 PM	**GCH**	**1.5**	1.5								1.5
10:00 AM	**GCH**	**1.5**	1.5								1.5
12:00 PM	**GCH**	**1.5**	1.5								1.5

									Focus Areas	Diversity, Equity, & Inclusion
×				×						Energy Production, Conservation, and Management
	×	×	×	×	×	×				Facility Operations and Maintenance
						×				Industrial Issues and Treatment Technologies
		×								Intelligent Water
										Laboratory Practices
										Microconstituents and Contaminants of Emerging Concern (Non-PFAS)
	×		×	×	×					Municipal Wastewater Treatment Design
				×		×				Nutrients
		×								Odors and Air Quality
										PFAS
										Policy and Regulation
										Potable Reuse
										Public Communication and Outreach
×			×							Research and Innovation
										Resiliency, Disaster Planning and Recovery
										Small Communities and Decentralized Systems
										Stormwater and Green Infrastructure
			×							Sustainability and Climate Change
										Utility Management and Leadership

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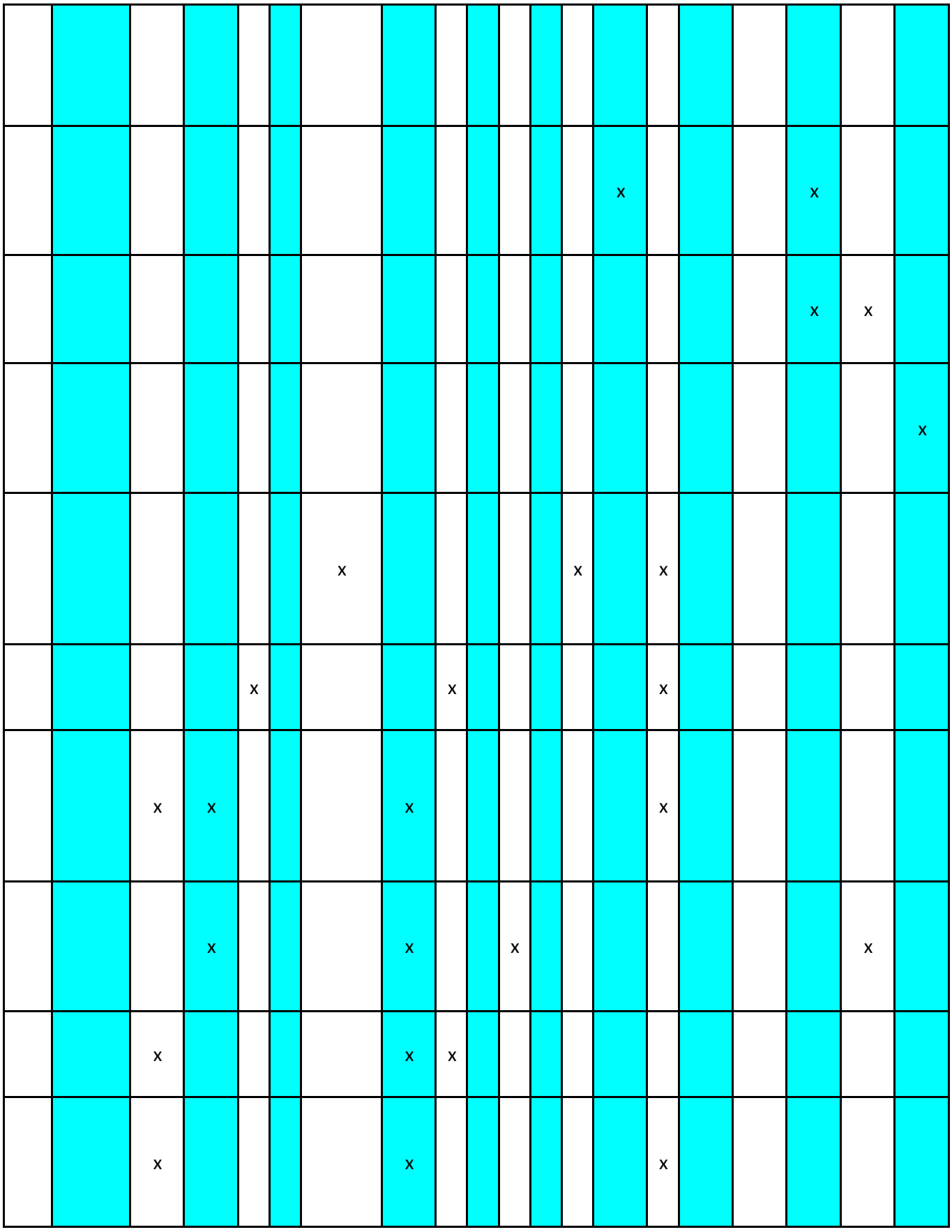

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Focus Area & Symposia Affiliations

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Focus Area & Symposia Affiliations

Focus Area & Symposia Affiliations

Focus Area & Symposia Affiliations

									Water Reuse and Reclamation
									Watershed Management, Water Quality, and Groundwater
									Wet Weather

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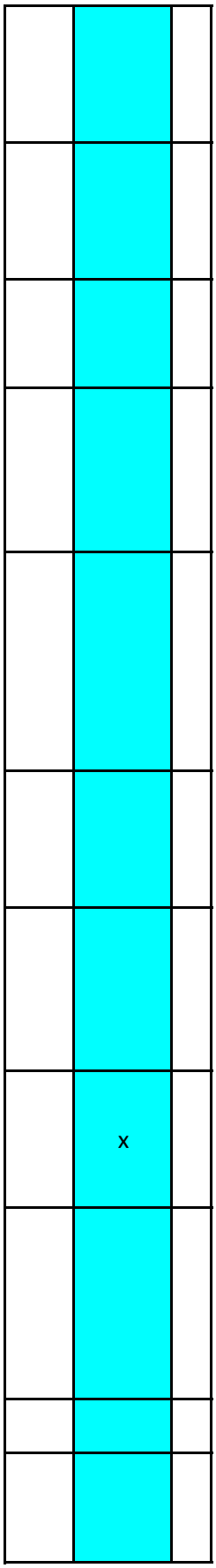
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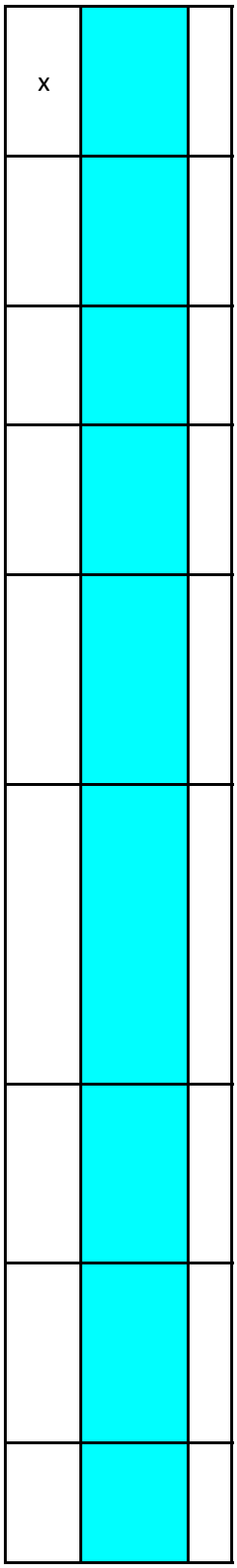
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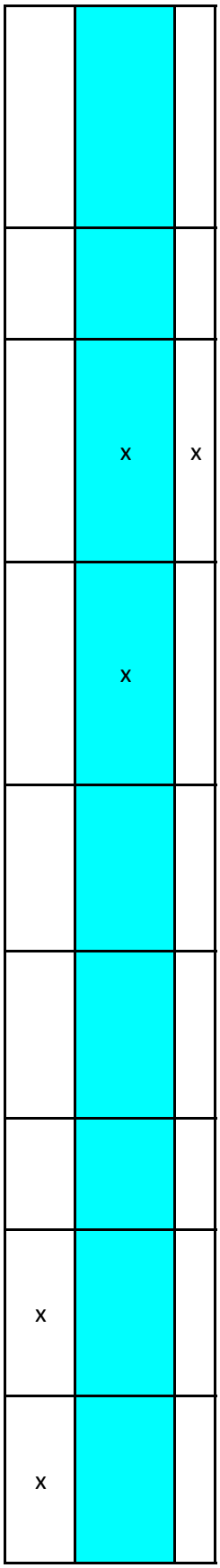
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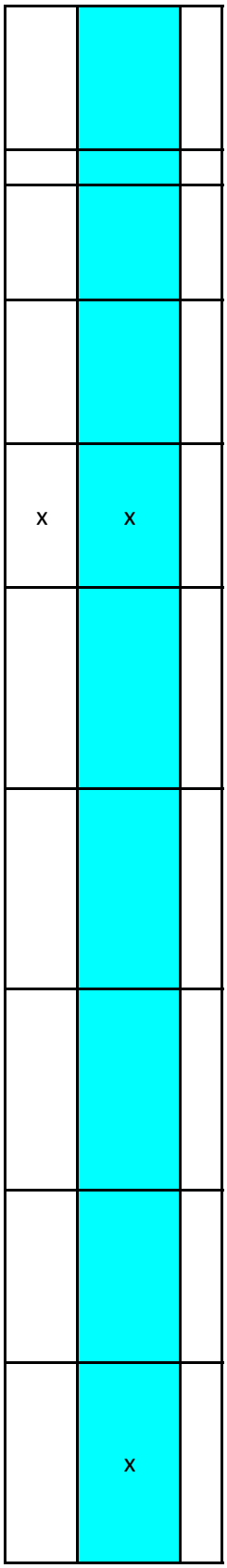
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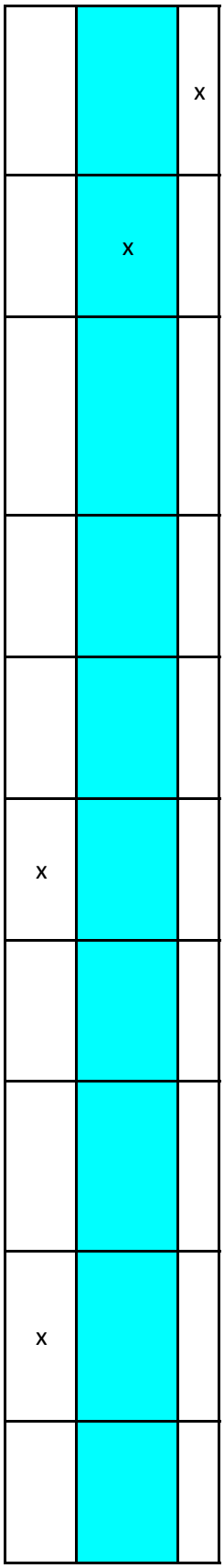
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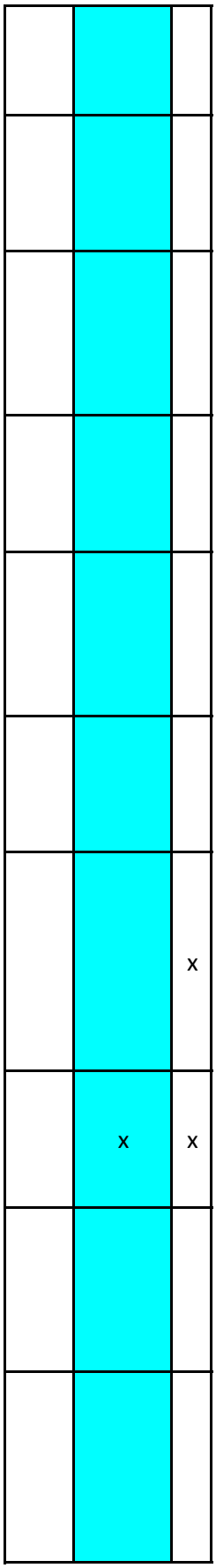
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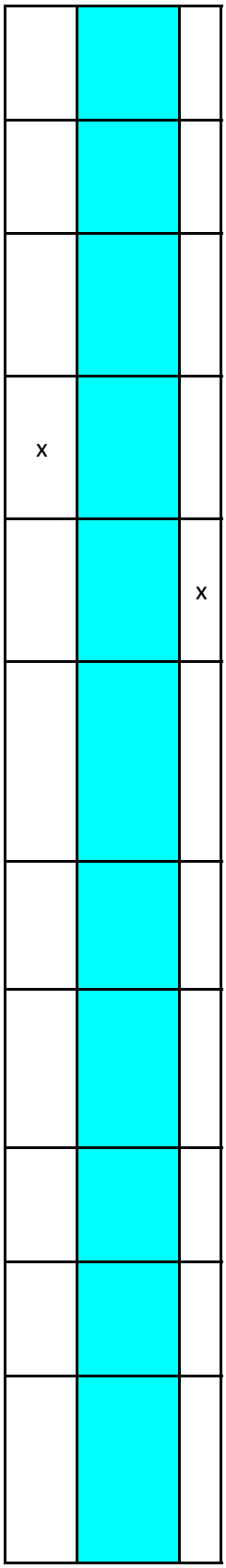
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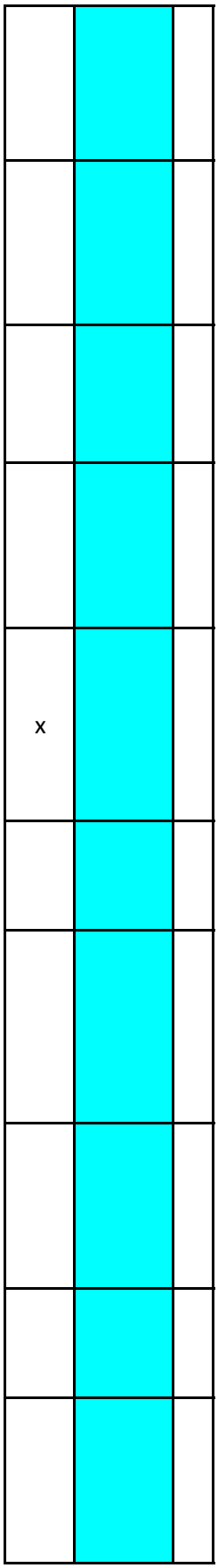
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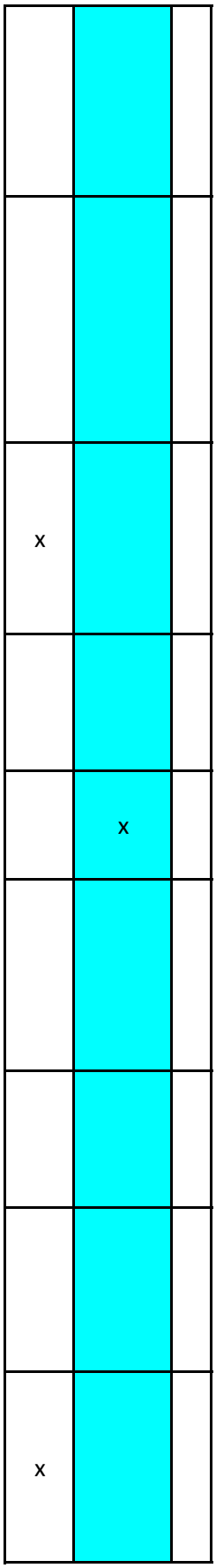
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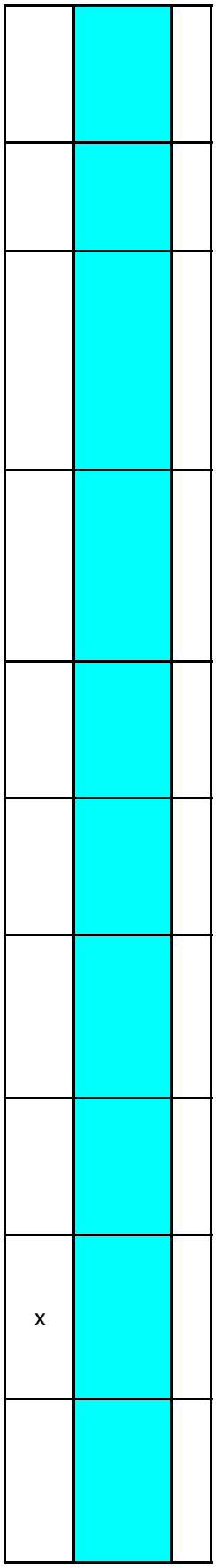
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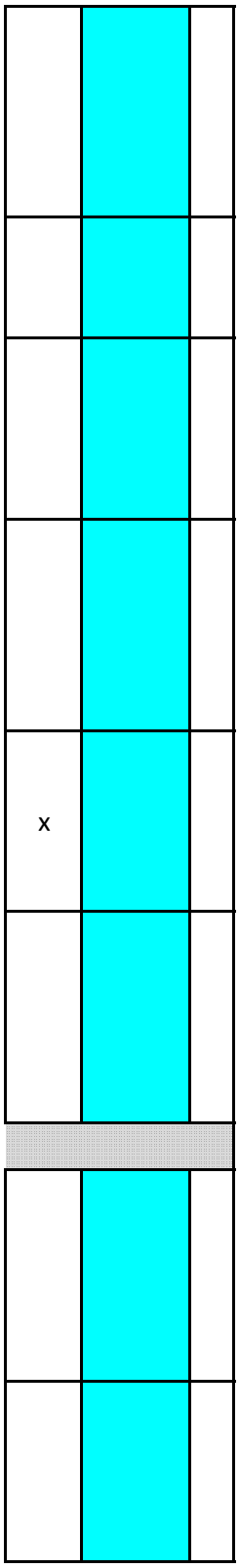
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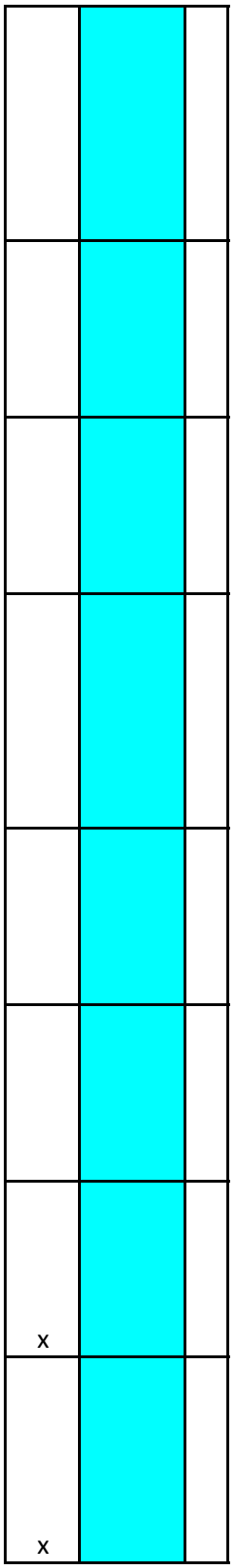
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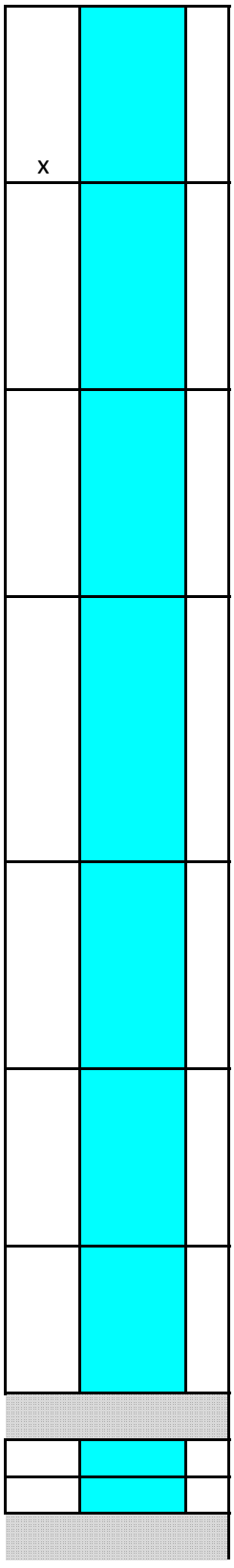
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