



52ND ANNUAL CONFERENCE & TRADE SHOW

The Ripple Effect: When Action Becomes Change

April 28-30, 2024 | Whistler, BC

bcwwaconference.org

BOOK OF ABSTRACTS

2024 Annual Conference & Trade Show

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MONDAY, APRIL 29, 2024

1. ASSET MANAGEMENT | Rainbow Theatre, WCC | 8:30 – 10:00 AM

Moderator: Neal Whiteside

Time slot: 8:30 – 9:00 AM

Abstract Title: Metro Vancouver’s Experience with Extending the Life of Copper Pipes

Presenter: Inder Singh – Metro Vancouver

Metro Vancouver’s untreated drinking water supply is naturally low in pH, making it corrosive to building plumbing. Corrosion control through an increase in pH and alkalinity has been implemented over the past two decades as a way to protect copper pipes, fixtures, and hot water tanks in buildings throughout the region. In June 2021, Metro Vancouver implemented further increases along with an expanded monitoring program to help assess the effectiveness of the change. Over the past three years, monitoring included collecting samples from GVWD member jurisdiction distribution systems to assess the stability of pH and alkalinity, both prior to, and following the adjustments. At-the-tap samples collected from residences throughout the region helped determine the change in total copper concentration in drinking water. Also, a field station that utilized metal coupons was installed to monitor metal dissolution over the longer term. Study results will be presented along with considerations for next steps.

Time slot: 9:00 – 9:30 AM

Abstract Title: Strategic Advancements in Water and Sewer Utilities Asset Management for the City of Delta

Presenter: Mohammad Amini – AECOM

This presentation introduces an innovative approach to developing comprehensive Asset Management Plans (AMPs) for the Water and Sewer utilities in the City of Delta. Focused on enhancing the City's Asset Management (AM) maturity, the initiative establishes financial and technical frameworks that rely on amalgamated asset inventories for water and sewer utilities, encompassing linear and non-linear assets. Furthermore, the project defines levels of service (LoS) through customized Key Performance Indicators (KPIs), incorporating data from the Canadian Infrastructure Benchmarking Initiatives (CIBI). The LoS framework aims to meet community expectations and regulatory requirements, emphasizing sustainable service delivery. Documenting existing lifecycle management strategies provides transparency and supports continuous improvement. Integrating GIS data into risk assessment enhances efficiency and incorporates risk-based plans for long-term financial health and future challenges.

The project establishes a foundation for heightened maturity, efficiency, and sustainability in water and sewer asset management, reflecting the City of Delta's commitment to sustainable service and environmental stewardship.

Time slot: 9:30 – 10:00 AM

Abstract Title: The City of Surrey Drainage & Irrigation Pump Station Condition Assessment and Asset Management Plan

Presenter: Quincy Liu – AECOM

The 32 drainage and irrigation pump stations in the City of Surrey are vital in providing flood protection and/or a sustainable source of water for irrigation for the properties within the floodplain. Some of the existing pump stations were facing various threats ranging from aging infrastructure, obsolete pumps, potential dike failure, severe weather,

and rising water levels. AECOM undertook a detailed assessment of the 32 lift stations' physical and associated geotechnical condition, pump capacity, and developed an asset management plan incorporating capital expenditure forecasts and detailed upgrade plans.

The analytical results of the study strongly support the City to make decisions in response to sea level rise and more frequent and severe precipitation. These recommendations include upgrading and building new stations to increase the drainage pump capacity, designing new stations at elevated heights to withstand flooding risks, strengthening dikes to protect lowlands and floodplains, accommodating regional ground subsidence, and enhanced emergency responses mechanisms.

2. WATER TREATMENT PROCESS | Harmony B, WCC | 8:30 – 10:00 AM

Moderator: David Lycon

Time slot: 8:30 – 9:00 AM

Abstract Title: Future-Proofing Slow Sand Filtration: Adding Ancillary Technologies

Presenter: Robert (Bob) LeCraw – MS Filter Systems

Slow sand filtration systems are reputed to be quite narrow in the range of raw water these kinds of systems can treat. This may have been true in the past but contemporary threats like supply chain bottlenecks and rising costs make the simplicity and low operating costs of slow sand worth a second look. However, the limitations of slow sand remain unless we apply ancillary technologies on an as-needed, modular basis to augment what slow sand is capable of. We will look at 2 such technologies; pre-ozonation and ion-exchange, and how they can turn a simple and limited slow sand filtration system into a highly effective solution to solve modern drinking water challenges such as endocrine disruptors and PFAS contamination. By looking ahead at new contaminants before regulations have even caught up to the problem, we can be ready with robust solutions.

Time slot: 9:00 – 9:30 AM

Abstract Title: Meeting in the Middle – Finding the Optimum WTP Size

Presenter: Christina Saxvik – McElhanney

Appropriate sizing of new drinking water treatment plants is crucial for meeting the demands of a growing population. However, conservatively high plant capacity can be at the expense to a municipality, leading to higher capital and operating costs. This presentation explores a comprehensive approach used in a particular case study to size a treatment plant, by leveraging population and operations data from an existing facility. This approach was used to optimize the production requirement for the WTP, “meeting in the middle” between a conservatively high estimate vs. risk of under sizing. The study also emphasizes the significance of accurate data collection and interpretation to identify peak demand periods and seasonal variations.

Time slot: 9:30 – 10:00 AM

Abstract Title: Kamloops DWTP – Maximizing Membrane Life and Operational Efficiency Beyond LEED

Presenter: Elliot Wuorinen – Veolia

The Kamloops Center For Water Quality was a benchmark facility in the industry when in 2005 it was the first drinking water treatment plant in Canada to be awarded Gold LEED certification. With a current capacity of 160 MLD (expandable to 200 MLD) and utilizing multiple stages of treatment it can achieve 99% overall recovery on a regular basis. You would

think that would be good enough and the plant would churn out water for the next few decades as is but the long-term partnership between the City and Veolia has developed other ideas along the way. Over the years there have been multiple upgrades and optimizations to extend membrane life and increase energy and chemical efficiency. Using collaborative creativity over the last 18 years, the City of Kamloops and Veolia have been able to improve upon an already stellar LEED accredited design.

3. EMERGENCY & RISK MANAGEMENT | Garibaldi A, WCC | 8:30 – 10:00 AM

Moderator: Hans Seidemann

Time slot: 8:30 – 9:00 AM

Abstract Title: “Post-Disaster” What Does That Mean Anyway?

Presenter: Bryan Gallagher – Stantec Consulting

Most people that work in the water and wastewater industry are aware that water and wastewater buildings are required to meet the post-disaster importance category requirements of the British Columbia Building Code (BCBC). However, they may not be aware that these requirements vary substantially for different regions in BC. This can have major implications on a project including construction type, facility layout and construction cost.

This presentation will provide a general overview of the code post-disaster requirements including:

- What is covered and not covered by the current post-disaster requirements?
- What importance category level can be expected from existing buildings.
- History of Seismic design requirements in Canadian codes and how they have progressively increased in coastal regions.
- Increases to seismic requirements proposed in the NBC 2020 code.
- Summary of seismic irregularities – what is not allowed for post-disaster buildings.
- Cost summary of buildings designed to a post disaster category.

Time slot: 9:00 – 9:30 AM

Abstract Title: Critical Infrastructure and the Modernized Emergency and Disaster Management Act

Presenter: Michael Higgins – Colliers Project Leaders

Everywhere we look, we are seeing the effects of climate change – water always wins. It was reported that 2023 was the world’s warmest year in the last 100,000 years by Copernicus Climate Change Service. To address future impacts of extreme weather events on people and communities, the Government of BC’s Ministry of Emergency Management and Climate Readiness introduced new legislation changes. It is now imperative for critical infrastructure owners and stakeholders to address gaps and develop emergency management plans as part of – rather than separate from – business continuity plans. Join this session to learn more about emergency and disaster management legislation changes, how they’ll affect your community and how to ensure your plans meet important requirements.

Time slot: 9:30 – 10:00 AM

Abstract Title: Rapid Inspection for A Western Canadian Municipality Water Main

Presenter: Vincent Shen – Pipeline Inspection & Condition Analysis (PICA)

Collecting data to assess the condition of critical pressure pipe infrastructure creates numerous logistical challenges for asset managers. PICA developed an autonomous, free-swimming, screening tool used to detect leaks, air / gas pockets,

magnetic features, and pressure gradient. The neutrally buoyant spherical device employs multiple sensors that collect data concurrently to obtain a pre-screening inspection of an in-service pressure pipeline.

The municipality of Jasper (AB) had a suspected leak in one of its water mains. The field inspection was completed in one day. The device was inserted into a fire hydrant and retrieved from an exit hydrant. After the fieldwork was completed, the data was uploaded, and our data analyst was able to determine the same day that the leak had been detected and located. The operations team was able to identify where the leak was and repair it within 2 weeks of the fieldwork being completed.

4. CLIMATE RESILIENCE | Garibaldi B, WCC | 8:30 – 10:00 AM

Moderator: Michael Florendo

Time slot: 8:30 – 9:00 AM

Abstract Title: Net Zero Pathways Project for Small and Medium-Sized Utilities

Presenter: Nina Bader – Foresight Canada

While small and medium-sized drinking water and wastewater utilities are rarely labelled a 'high emitting sector', the Environmental Commissioner of Ontario identified that 38% of municipal energy use and 32% of municipal GHG emissions in Ontario come from water and wastewater utilities. Research indicates that existing technologies can potentially eliminate 50% of energy-based emissions in wastewater, with approximately 95% achievable at zero or negative cost. It is therefore essential for utilities to invest in net zero pathways to reduce emissions, enhance operational efficiency, and ensure long-term financial sustainability and resilience. Foresight is developing a comprehensive roadmap for small and medium-sized utilities, providing a strategic framework for the journey towards net zero and decarbonization, as well as an emissions reduction technology pilot and demonstration project with BC utilities. This session's goal is to engage BC utilities and municipalities to learn more about their net zero and emissions reduction targets and challenges.

Time slot: 9:00 – 9:30 AM

Abstract Title: Becoming Flood Resilient: Bigstone Cree Nation's Holistic Empowerment Journey

Presenter: Laura Creswell – Urban Systems

For decades, Bigstone Cree Nation faced the recurring challenge of disruptive seasonal floods and evacuations, causing community upheaval. The community embarked on a transformative journey starting in 2018 to try and change the narrative. By implementing a strategic, multi-year plan focused on flood resilience in the context of climate change, the Nation attracted funding from diverse programs, enabling the community to take decisive action. Notably, Bigstone fostered local expertise and self-reliance by undertaking all construction in-house.

The impact of the Nation's efforts extends beyond mere flood mitigation, triggering a profound shift in mindset and fostering self-reliance and expertise within the community. Their approach serves as a compelling example of how decisive action within a community can create a ripple effect of positive, sustainable change, touching every facet of community life. Discover how their collaborative, holistic strategy is effectively eradicating on-reserve flooding while simultaneously nurturing workforce independence.

Time slot: 9:30 – 10:00 AM

Abstract Title: Flood Mapping of the Bella Coola River: Overcoming Challenges

Presenter: Nicolas Abarca – Urban Systems

The Bella Coola region has multiple communities built around the river, which sprawl throughout the coastal valley. This hydrologically and hydraulically complex region experiences flooding driven primarily by rain on snow events, with effects enhanced by its many tributaries. Flood mapping was originally completed in 1988 and since then, flooding has become more prevalent. Following several large floods throughout the early 2000's, the need to update flood mapping has become a priority. Several challenges needed to be overcome for the development of updated flood inundation and flood hazard mapping in Bella Coola. These included fourteen major tributaries with limited historical hydrometric data and watersheds with varying hydrological characteristics, a downstream boundary influenced by sea level rise and other tidal processes, and a hydraulically complex river system with alluvial fans, avulsion and in-line storage. This presentation is intended to provide information on the tools used and approach taken to overcome these challenges.

5. WASTEWATER | Harmony A, WCC | 8:30 – 10:00 AM**Moderator:** Derek Lycke**Time slot:** 8:30 – 9:00 AM**Abstract Title:** City of Vernon's Brewery Wastewater Pretreatment Facility: Case Study**Presenter:** Marco Denee – AECOM

The City of Vernon's Water Reclamation Centre (VWRC) is a tertiary treatment plant with enhanced biological nutrient removal for effluent discharge to Okanagan Lake. The VWRC approached organic treatment capacity approximately fifteen years ahead of the infrastructure's design life and an investigation into the collection network found a brewery consumed approximately 30% of the available organic treatment capacity. The City pursued source separated pretreatment of the high strength waste using high-rate anaerobic reactors. The high-rate anaerobic reactors generate biogas that is recovered and used to reduce energy demand of the treatment process. The VWRC realized process efficiencies such as spare capacity, reduced biosolids management, control of effluent quality, and reduced energy demand. The presentation briefs on the assessment of industrial discharge in the collection network and focuses on lessons learned in the design and construction of a high strength waste pretreatment facility.

Time slot: 9:00 – 9:30 AM**Abstract Title:** Pilot Testing Planning – Lessons Learned from Iona Island WWTP Upgrade**Presenter:** Aaron Buckley – Jacobs

Metro Vancouver is pilot testing two secondary treatment technologies to inform the technology selection and design requirements for the 500 ML/d multi-billion-dollar Iona Island Wastewater Treatment Plant Upgrade. The planning and procurement of these demonstration-scale pilot plants involved extensive coordination between various groups within Metro Vancouver's organization and collaboration with consulting engineers, laboratories, contractors, equipment suppliers, and pilot plant vendors. Considerations were given to sustainability performance objectives, technology evaluation criteria, pilot plant size, pilot testing duration, range of desired testing conditions, sampling requirements, operating model (owner vs. vendor vs. contract-operation), control and monitoring systems, site constraints, permitting requirements, delivery schedules, procurement of long-lead electrical items, capital and operating costs, and owner's program management requirements. This presentation will provide an overview of the

pilot testing program, highlight lessons learned from the planning, procurement, and design phases, and describe how the project team worked collaboratively to resolve some of the challenges encountered.

Time slot: 9:30 – 10:00 AM

Abstract Title: Monitoring and Management Options for High Impact Influent Sources

Presenter: Don Nash – Kerr Wood Leidal

As communities grow, new commercial, institutional, and/ or industrial wastewater sources inevitably get added to sewer collection systems. These new connections can have remarkably high strength, or large flows, or have high concentrations of pollutants that may be difficult to treat or that can impact treatment plant biology. Actively working to develop an understanding of these types of sources can lead to “start of pipe” management options that defer “end of pipe” treatment upgrades. This presentation will discuss options to work with commercial, institutional, and industrial connections to develop and implement monitoring and reporting of flows and loads to the local government, and how that information can be used to make informed decisions about source management options verses end of pipe treatment upgrades.

6. ASSET MANAGEMENT | Rainbow Theatre, WCC | 10:15 – 11:45 AM

Moderator: Adrien D'Andrade

Time slot: 10:15 – 10:45 AM

Abstract Title: A Paradigm Shift in Asset Management for the City of Kelowna’s Sewer Lift Stations

Presenter: Baitao Liang – AECOM

The City of Kelowna owns and operates over 40 sewer lift stations that pump wastewater collected from the sanitary sewer collection system, and they vary in condition, capacity and operational purpose. The scope of the highlighted project was to undertake a detailed condition and capacity assessment for identified lift stations. The final deliverable included rehabilitation and upgrade options, with an estimate of expected remaining lifespan, a cost comparison of all rehabilitation and upgrade options, and recommendation of replacement priority list. With the use of technology in assisting the condition assessment process, a digital record of each lift station was created, including digital asset hierarchies and inventories with relevant asset parameters such as condition, replacement value, replacement timing, and asset photos. With this information readily available and easily updatable, the City’s O&M and capital decision-making processes for its lift stations are improved, ensuring effective allocation of resources and sustainable infrastructure management.

Time slot: 10:45 – 11:15 AM

Abstract Title: Sewer Force Mains – A Pro-active Approach to Asset Management of These Often-overlooked Buried Pipelines

Presenter: Mike Lemmen – SFE Global

Sewer Force Mains – A pro-active approach to asset management of this often-overlooked buried infrastructure. Most collection system managers and operations personnel have tried-and-true technologies, methods, and budgets for monitoring, inspecting, and cleaning our gravity sewers. (whether completed in-house or via contracted services) There are ample cost-effective solutions available to communities of all sizes. When it comes to sewer force mains and/or

siphons, however, the options become more limited and cost-effective becomes a relative term. This paper showcases three affordable sewer force main inspection and cleaning technologies being utilized today by Cities big and small.

Time slot: 11:15 – 11:45 AM

Abstract Title: The Ripple Effect of Machine Learning

Presenter: James Fitchett – Voda

Current best-practice predicting infrastructure health uses pipe age, material, and failure history. This works, but the unique environments that impact utilities are complex. Interactions of soil type, moisture, weather, land use, seismic activity, and proximity to roads and railroads are missed. These patterns challenge the best engineers.

Machine learning offers a new “best practice” in management. It can be as much as 65 times more accurate predicting problems. It can help avoid half of water main failures, predict clusters of wastewater incidents with 90% accuracy, and find lead pipes. The results inform inspections, repairs, replacements, sensor placement, valve testing, and stocking. ML uses science to find complex patterns, remove human biases, applied to an entire infrastructure to predict failures next year or twenty years. This presentation offers case studies on benefits from machine learning and compares results with traditional methods. It includes data requirements for this science-based approach to decision-making.

7. WATER QUALITY | Harmony B, WCC | 10:15 – 11:45 AM

Moderator: Inder Singh

Time slot: 10:15 – 10:45 AM

Abstract Title: Hyperboloid Flocculators for Optimizing the Flocculation Process

Presenter: Jackie Lauer – INVENT Environmental Technologies

This presentation will cover the hyperboloid flocculator design concentrating on mixing efficiency that provides process control and flexibility in both urban and rural utilities. The presentation will also cover retrofits and case studies for where the hyperboloid technology can provide process optimization and cost savings.

Time slot: 10:45 – 11:15 AM

Abstract Title: AI-Enabled Source Water Quality Forecasting

Presenter: Edison (Xiang) Li – University of British Columbia

Changes in source water quality strongly impact the efficacy of water treatment, including the cost of treatment and water quality for customers. Climate change is anticipated to alter precipitation patterns and increase the frequency of extreme rainfall events. These changes will result in pronounced short-term effects, such as spikes in turbidity and contamination from surface run-off that dictate a need for rapid operational responses. This presentation will cover our recent efforts to utilize AI to forecast changes in water quality in source waters to inform proactive treatment control and planning. Results from applying state-of-the-art time series models to historical weather and water quality data and provide short-term forecasts of turbidity and microbial concentrations will be presented. The potential use and simulated valuation for the forecasts will then be discussed. Future potential research based on this approach that considers forecasted conditions under varying climate change scenarios will also be presented.

Time slot: 11:15 – 11:45 AM

Abstract Title: Protecting our Communities – A Review of Cross Connection Control Programs in British Columbia

Presenter: Marian Hands – BCWWA

Communities throughout British Columbia have had cross connection control (CCC) programs for several decades, however how each of the programs operate and their regulatory requirements vary. In 2023, the BCWWA, with the support of the BCWWA CCC Technical Advisory committee, embarked in an information gathering exercise surveying and interviewing participants from communities around the province to better understand how they operate, their challenges and opportunities. The result is a report that will be released in May, 2024 that combines insights from this research, with recommendations for going forward. This presentation will provide a sneak peek at the report.

8. EMERGENCY & RISK MANAGEMENT | Garibaldi A, WCC | 10:15 – 11:45 AM

Moderator: Harshan Radhakrishnan

Time slot: 10:15 – 10:45 AM

Abstract Title: Planning for an Extreme Uncertain Future – Princeton

Presenter: Jonathan Welke – TRUE Consulting

The Town of Princeton continues to recover from the November 2021 event and is actively building back from the impacts of the flood. The event washed out key utility river crossing, contaminated their water supply wells, eroded dikes and access roads, and compromised their primary sanitary lift station. Current climate change predictions indicate freshet will shift earlier and decrease in magnitude along with atmospheric river events increasing both in magnitude and frequency to the extent that AR events will dictate the flood regime. Current estimates on climate impacts are significant with AR event magnitudes potentially increasing by +80% to +100% for extreme events.

Princeton is evaluating options to restore the natural river area/conveyance capacity, removing bridge constrictions, floodplain retreat, set-back dikes, and taking a “planning to get wet” approach to for their future community and associated infrastructure.

Time slot: 10:45 – 11:15 AM

Abstract Title: Driving Value and Measuring Success from Simulation Exercises

Presenter: Shawn Corrigan – Carollo Engineers

Emergency response in the water industry lacks a unified strategy, hindering crisis preparedness. This presentation emphasizes the importance of and outlines methods to integrate exercise planning, performance metrics, and knowledge indicators to enhance overall resilience. Through a real-world example, we'll explore how this integration improves response efficiency. The simulation of emergency scenarios fosters readiness and measures knowledge retention strategies. The case study utility enhances preparedness by identifying response gaps, improving plans, training, and resource preparation. Resource allocation benefits from performance indicators, optimizing asset deployment. Communication improvements, guided by exercise performance analysis, enhance coordination. The presentation highlights the positive impact on stakeholder trust through enhanced understanding of emergency response. It asserts that this comprehensive approach is an investment in preparedness, elevating water utilities' overall performance and resilience during crises. Utilizing metrics in simulated experiences continuously enhances response capabilities, fulfilling the crucial role of protecting essential public services.

Time slot: 11:15 – 11:45 AM

Abstract Title: Cache Creek 2023 – Did All this Flood Planning Help?

Presenter: Jonathan Welke – TRUE Consulting

The Village of Cache Creek experienced it's worst flooding in 2023 after a string of flooding events over the past decade. The watercourse of Cache Creek washed out bridges, utility crossings, impacted the sewer treatment plant, washed out Highway 97, and washed-out Highway 1 while damaging numerous private properties.

Come learned what happened, why it keeps happening, next steps, and lessons learned during response. Also learn about advances in 2-dimensional flood modelling, how that helped during response, and some observations relating real world flooding to the digital approximation.

9. ENERGY OPTIMIZATION | Garibaldi B, WCC | 10:15 – 11:45 AM

Moderator: David Lycon

Time slot: 10:15 – 10:45 AM

Abstract Title: The Power of Digitization: Implementing a Power Quality Monitoring System for a WWTP

Presenter: Sergio Bertani – Schneider Electric

Water & Wastewater Utilities are deploying Digital Solutions to reach Sustainability goals. In this case study, Schneider Electric will share details of the implementation of an advanced Power Quality monitoring system for a few WWTP in Metro Vancouver. The case study will present different aspects of the project, from design to implementation of a system to be used for power quality monitoring, disturbance investigation, data recording and analysis, and energy management. Schneider Electric EcoStruxure Power Monitoring Expert (PME) is designed to help power-critical and energy-intensive facilities maximize uptime and operational efficiency, as well as reducing energy use and CO2 emissions.

Time slot: 10:45 – 11:15 AM

Abstract Title: Sustainable Hydrogen Production at a Metro Vancouver Wastewater Treatment Plant

Presenter: John Roberston – GHD

Hydrogen plays a key role in achieving the goal of net-zero emissions by 2050, as it is an essential component of decarbonizing energy systems and enabling the transition to a low-carbon economy. This study explores hydrogen production at Lulu Island Wastewater Treatment Plant. Undertaken by GHD for Metro Vancouver, the study assesses two production pathways: (1) electrolysis of Final Effluent (FE) and (2) ammonia cracking from digester centrate. GHD provides conceptual designs, a hydrogen utilization plan, and regulatory insights, as well as a triple bottom line analysis and a pilot project definition. The integration of hydrogen production at wastewater treatment plants presents a circular economy solution, utilizing waste products to generate renewable energy. This strategy not only aligns with sustainability goals but also addresses carbon emissions, emphasizing the potential for WWTPs to contribute significantly to local energy resilience and sustainability.

Time slot: 11:15 – 11:45 AM

Abstract Title: Stop Throwing Away Your Hydraulic Energy!

Presenter: Jonathan Musser – Associated Engineering

Join us to learn more about Pump-as-Turbine Generating Systems. Surplus energy is regularly dissipated at pressure reducing stations within gravity-fed distribution systems. At the same time, efforts to reduce fossil fuel usage are increasing the demand for electrical energy. There is potential for pressure reducing stations to generate electricity.

This presentation will review operational experiences from The Sooke River Road Treatment Facility, a Capital Regional District facility which has been successfully generating power since 2010.

The Sooke River Road Treatment Facility includes an 11-kW pump-as-turbine generating system, which operates in parallel with pressure reducing valves to recover hydraulic energy as electricity. Join us to learn about the challenges and opportunities of implementing this technology, review maintenance needs for the system and understand the cost-benefit analysis for utilizing a pump-as-turbine generating system.

10. WASTEWATER | Harmony A, WCC | 10:15 – 11:45 AM

Moderator: Chris Howorth

Time slot: 10:15 – 10:45 AM

Abstract Title: Updating the Metro Vancouver I&I Management Template: Making I&I Reduction Programs Easier to Implement

Presenter: Chris Johnston – Kerr Wood Leidal

This presentation will summarize the template that was prepared for Metro Vancouver for managing I&I. Most municipalities perform activities associated with I&I management including flow monitoring and pipeline condition assessments. Depending on the specific issues, additional measures including intensive I&I investigations and system rehabilitation may be recommended. Partially separated sewer systems, which includes cross-connected sub-surface drainage that causes I&I to increase substantially compared to other similar fully separated systems. Partially separated sewer systems will require a different approach to I&I management that may include stormwater improvements.

The proposed I&I Management Template is based on the concept of ‘archetypal’ collection system conditions, relying on data collected about system age, material, condition, and I&I rates. Depending on the catchment age and whether the I&I rate is ‘above’ the curve, a budget for reducing I&I in that catchment can be made. This information can then be included with asset management planning to allow for sustainable funding of I&I management.

Time slot: 10:45 – 11:15 AM

Abstract Title: Climate Change and Sustainability Considerations for Wastewater Treatment Plant Design

Presenter: Graham Seggewiss – CIMA+

Climate change is causing more frequent and intense weather events that are impacting the flow quantity and quality received at wastewater treatment plants. This is challenging municipalities to improve their overall treatment plant resiliency and sustainability. Challenges of incorporating sustainability reviews into the design process include a lack of established tools and procedures in the industry. This presentation is a focused case study of the Elmira Wastewater Treatment Plant (WWTP) located in Elmira, Ontario. The plant has a rated capacity of 7,800 m³/d but has experienced peak flows approaching 10x the average flows. The conceptual design focused on cost effectively improving the robustness of treatment processes and included a sustainability-review of the proposed upgrades using publicly available resources. Sustainability of the proposed upgrades were critically evaluated by using the Envision Framework, conducting a Greenhouse Gas Mitigation Assessment, and a Climate Change Resilience assessment in alignment with current best industry practices.

Time slot: 11:15 – 11:45 AM

Abstract Title: Embracing an Auto–Wasting Narrative for Effluent Ammonia Control at the Prince Albert SK Wastewater Treatment Plant

Presenter: Randy Craig – AECOM

This control narrative for the auto–wasting process, which relies on ammonia, was crafted to maintain consistent ammonia levels in the effluent, ensuring optimal quality and adherence to regulatory standards. In traditional biological nutrient removal facilities, operators typically adjust MLSS wasting rates based on daily changes observed in grab samples, composite samples, and lab analysis. By incorporating an online effluent ammonia analyzer and employing basic PLC programming, this manual process can be streamlined and automated through a process control narrative integrated into the PLC program. It's important to note that nitrifying bacteria, constituting only 2 to 3% of the overall biomass, are just one subset of active bacteria in the biomass. When making decisions about SRT, it is advisable to rely on ammonia concentrations rather than MLSS or SRT, as nitrifying bacteria make up only a small fraction of the biomass.

11. WATER QUALITY – PFAS | Fitzsimmons, WCC | 10:15 – 10:45 AM

Moderator: Satej Kulkarni

Time slot: 10:15 – 10:45 AM

Abstract Title: What's All the Fuss About PFAS?

Presenter: Shona Robinson – Kerr Wood Leidal

PFAS (per– and polyfluoroalkyl substances) are a large group of chemicals with unusual properties that have led to their widespread use. However, PFAS persist in the environment, bioaccumulate, and some show human toxicity at very low concentrations. Recently, PFAS exposure via drinking water has captured the attention of regulators and the public. In 2023, Health Canada developed a draft objective on PFAS in drinking water, and the EPA has proposed a US regulation. With these chemicals in the news and on regulators' minds, it is important for water professionals to educate ourselves on the topic. This presentation gives an overview of PFAS sources and human health impacts. It also summarizes the current understanding of PFAS occurrence in drinking water in BC and Canada, as well as the regulatory landscape for PFAS in drinking water. Finally, it will discuss the implications for water treatment technologies and costs.

12. ASSET MANAGEMENT – CORROSION | Rainbow Theatre, WCC | 1:45 – 3:15 PM

Moderator: George Bontus

Time slot: 1:45 – 2:15 PM

Abstract Title: Mechanics of Corrosion, Strategies to Manage: Advantages and Disadvantages

Presenter: Stuart Reece – River Run Industrial

50% of below ground infrastructure is replaced due to corrosion. The cost of corrosion is about 3.1% of GDP but this can be greatly reduced by employing proactive corrosion management strategies. Common methods include cathodic protection, factory coatings, field–applied coatings, and stainless steel. There are advantages to each of these approaches and selecting the best option will serve to increase the longevity of your water distribution system and reduce asset management and life–cycle costs for generations to come.

Time slot: 2:15 – 2:45 PM

Abstract Title: Corrosion a Generational Problem

Presenter: Brent Williamson – Integrity Pipeline Products West

Corrosion in water infrastructure has been largely misunderstood by cities, designers and operators for decades. There are many ways to protect water infrastructure and those solutions can get jumbled and misunderstood. This presentation will get back to the science of what corrosion is and how it directly affects our most important resource. Corrosion is more complicated than many realize and can be confusing for professionals to find the right solutions. Microbial and galvanic corrosion have different effects and properties. Moisture content, sulfides, redox, PH value, bi-metallic connections and stray currents all have an impact on how the metal components in water systems will be affected by corrosion. Corrosion has been a challenge to water professionals for hundreds of years, how we address the problem now will affect water supply for generations to come.

Time slot: 2:45 – 3:15 PM

Abstract Title: Guidance for Using Pipe Rigs to Inform Corrosion Control Decisions

Presenter: Pierre Kwan – HDR

Plumbing corrosion, especially with respect to lead and copper, has become a serious concern in the aftermath of the Flint health crisis. The water industry has a strong drive to avoid such an issue again and to reduce overall lead exposure by customers. This drive includes increased emphasis on corrosion control pipe rig testing prior to implementing full-scale changes. This presentation covers an international Water Research Foundation project that establishes guidelines for how utilities should plan, design, and conduct pipe rig testing, as well as how to analyze the data. Partners to this project include EPCOR (Calgary), Toronto Water, Halifax Water, and several other utilities in America. The project included preparing planning flowcharts, example design documents, data recording templates, and budgeting tools to estimate a utility's construction and operational costs.

13. DRINKING WATER QUALITY | Harmony B, WCC | 1:45 – 3:15 PM

Moderator: Ghazaleh Haghghat

Time slot: 1:45 – 2:15 PM

Abstract Title: Evolving Performance Requirements for Iron and Manganese Reduction in Groundwater

Presenter: Rick Sen – Magnor

Iron and manganese are found commonly in groundwater throughout Canada and whose limits in drinking water have been governed by the Canadian Drinking Water Guidelines which have recently established lower aesthetic objectives specifically for manganese of 0.02 mg/L – a limit that is being steadily adopted on the provincial level across the country. Another challenge in groundwater is treating complex, colloidal iron. Since iron and manganese are often removed together, we would like to address the various technologies and approaches that can be used and offer a guide in selecting the appropriate treatment system for any given application, and more specifically, attaining the 0.02 mg/L limit on manganese and colloidal iron removal.

Time slot: 2:15 – 2:45 PM

Abstract Title: Take Action on Manganese Now

Presenter: Martin Earle – Carollo Engineers

Carollo is working with many clients to address their manganese challenges. In this talk we will discuss results from a remote BC community that has been experiencing dark water events related to current and legacy manganese loading into the distribution system. Manganese can cause various issues, including poor aesthetics, accumulation in distribution systems, health effects, and chlorine measurement interference. Understanding the manganese source, speciation, and trigger events are all important factors in managing concentrations above the aesthetic objective of 20 µg/L. Come learn what actions to take before problems manifest.

Time slot: 2:45 – 3:15 PM

Abstract Title: Toxic Tales: Filtering the Facts About Arsenic in Drinking Water

Presenter: Andrew Sheroubi – Delco Water

Arsenic, a toxic element found in drinking water sources, particularly groundwater, poses significant health risks. This presentation will provide an overview of arsenic contamination in water, how it got there, and focus on the different relevant treatment technologies available. Different forms of arsenic will be discussed, including arsenate, and organic compounds, and explore the health impacts and ease of removal of these different types. The presentation will then cover various treatment methods, including oxidation through catalytic media/greensand or biological filtration, coagulation–flocculation, and membrane processes. We will outline the mechanisms of these processes, their efficiency at removing various types of arsenic, and applicability in different contexts, and design considerations. These considerations include factors such as cost, ease of operation, and suitability for large–scale or point–of–use applications. We will end by examining real life applications in Western Canada that dealt with high levels of arsenic, and how those were addressed.

14. OPERATIONAL TECHNOLOGIES – SCADA | Garibaldi A, WCC | 1:45 – 3:15 PM

Moderator: David Houghton

Time slot: 1:45 – 2:15 PM

Abstract Title: Strategic Electrical Maintenance and Upgrade Planning of Operating Water Plants

Presenter: Derek Desaulniers – Associated Engineering

How often do we see strategic planning to replace/ renew equipment in an operating plant? As individuals, we may be inclined to look at the large equipment such as pumps and filters, but what about some of the smaller, more sensitive components that are pricey, but often overlooked. With the evolving landscape in the electrical industry introducing us to greater challenges obtaining materials, this introduces new implications to planning for electrical upgrades, including such items as PLC upgrades, capital spares and SCADA systems.

Time slot: 2:15 – 2:45 PM

Abstract Title: Collaborating and Designing with Operations in Mind

Presenter: Skye Patterson–Kane – Stantec Consulting

Operations and maintenance considerations are critical to enabling practical and cost–effective wastewater treatment infrastructure design that performs and provides long–lasting resiliency. Early and collaborative input from Operations and Maintenance (O&M) Teams to focus on operability and serviceability requirements, performance specifications, health and safety, and reliability are critical to ensuring success long after commissioning. Good design allows us to replace the “parts” while keeping the “whole” functioning, highlighting the importance of bypasses, double block and

bleed, and redundancy. There is a growing desire to eliminate confined spaces. A focus on performance specifications will allow better trade off analysis and value engineering. This is a call to action for design engineers to focus on O&M performance requirements from the start of design, and incorporate these factors into program delivery, budget and technical decisions. An industry shift to active leadership and early integration of O&M staff will define the legacy of wastewater treatment infrastructure projects.

Time slot: 2:45 – 3:15 PM

Abstract Title: Plant Automation Commissioning – How to Avoid the Headaches

Presenter: Joshua Becker – Delco Automation

Commissioning any greenfield or brownfield project can be a particularly stressful time. Contractors, engineers, and owners need to collaborate to prove the system's functionality and safety before handing it to operations. While everyone involved typically has good intentions, conflicts can easily arise regarding design issues, scope of work, and expectations. Without proper planning and control of the work, this can lead a project to drastically slip in both schedule and budget.

This presentation focuses on the commissioning of automated control systems and how it relates to other trades and stakeholders involved on site. A case study from a complicated commissioning project for a new facility in Saskatchewan will be presented to point out successes and lessons learned. As part of the case study analysis, aspects of proper commissioning planning, testing requirements, contractor coordination, best practices, and documentation will demonstrate how to avoid common pitfalls of the startup and testing phase.

15. ENVIRONMENTAL PROTECTION | Garibaldi B, WCC | 1:45 – 3:15 PM

Moderator: Caroline Charbonneau

Time slot: 1:45 – 2:15 PM

Abstract Title: Wetlands for Decentralized Sanitation: Evaluating Temperature, Organic Load and Vegetation

Presenter: Mario A. Salinas-Toledano – University of Northern BC

Treatment wetlands (TWs) can be used as decentralized technology by removing pollutants such as organics and nutrients from domestic wastewater; however, more research is needed under secondary treatment scenarios and cold climates. A 2x2x2 full factorial experiment investigated the impact of organic load (500 and 2,000mgCOD/L), temperature (6 and 20°C), and vegetation (planted and unplanted) on lab-scale TWs, with continuous monitoring of physicochemical parameters. COD removal efficiency was substantial at 86–96% in warm conditions but decreased to 58–76% in cold conditions, emphasizing temperature's role. Similar performance was presented between high and low organic loads, indicating TWs effectively manage high-strength organic wastewater. In systems with low input concentrations, planted, and warm climates, nutrient removal (N and P) was significantly higher. This highlights the crucial role of plant health in nutrient removal. Additionally, dissolved oxygen and redox potential were identified as key parameters to be monitored, emphasizing their importance as pollution indicators.

Time slot: 2:15 – 2:45 PM

Abstract Title: Upgrading Lagoon Based Treatment Systems to Meet More Stringent Limits for BOD, TSS and Nutrient Removal

Presenter: Tom Birkeland – Lemna Environmental Technologies

More stringent effluent requirements for BOD, TSS, ammonia and phosphorus are being mandated at lagoon facilities across Canada. Add in a cold climate that adversely affects winter treatment performance, and many lagoons struggle to stay in compliance with their current permit or meet the challenges of new regulations. Lemna Environmental Technologies (LET) will present an updated approach for lagoon-based wastewater treatment including a brief comparison of past design standards with current methods, an overview of lagoon technologies used for advanced treatment including nutrient removal, and in-depth review of several cold weather case studies demonstrating how lagoons are being successfully updated in order to meet the challenges of present and future effluent requirements. Using wastewater treatment process design modeling software, which models biological, chemical, and physical treatment processes, LET has optimized the design, performance and reliability of lagoon-based treatment systems. Using historical DMR data from an installation base of over 500 facilities, LET created a unique software model of its LemTec Biological Treatment Process, which utilizes a combination of aerated and settling lagoon cells for biochemical oxygen demand (BOD) and total suspended solids (TSS) removal, and the Lemna Polishing Reactor (LPR) for nitrification. The model enables LET to consider the effects of non-steady state factors such as peak flows, constituent loading, and ambient air and water temperatures on treatment performance, improving upon traditional steady state wastewater treatment process design methodology. The discussion will provide data and specific case studies demonstrating the predicted performance vs. actual data, using the calibrated model. Regional case studies will be used to demonstrate the benefits of modeling practices for lagoon design.

Time slot: 2:45 – 3:15 PM

Abstract Title: Enhanced Biological Treatment of Hydrothermal Liquefaction Aqueous Phase by Adsorption

Presenter: Kemal Aktas – University of British Columbia

Hydrothermal Liquefaction (HTL) is a novel thermo-chemical approach that converts wastewater solids into a liquid biofuel (biocrude), avoiding biosolids generation, unlike anaerobic digestion (AD). This biocrude holds promise for supplying renewable crude oil. Yet, HTL aqueous, the wastewater stream, challenges full-scale implementation of HTL due to its high organic and inorganic inhibitory compounds. This study centers around granular activated carbon (GAC) adsorption to remove inhibitors from HTL aqueous and allows for its downstream enhanced biological treatment. Optimal conditions yield a noteworthy 175 mg chemical oxygen demand (COD)/g GAC adsorption capacity. Remarkably, GAC removes inhibitors (e.g., phenols) but preserves volatile fatty acids, intermediate products for methane production. After adsorption, the aerobic degradability of HTL aqueous improved by up to 17%; however, methane potential was enhanced by up to 97% and 83% under mesophilic and thermophilic AD conditions, respectively. Safe on-site treatment of HTL aqueous makes HTL one step closer to implementation.

16. UTILITY MANAGEMENT/ PROJECT DELIVERY | Harmony A, WCC | 1:45 – 3:15 PM

Moderator: Stephen Horsman

Time slot: 1:45 – 2:15 PM

Abstract Title: Tofino Feels the Ripple

Presenter: Simon Kirkland – District of Tofino

The Tofino Wastewater Treatment Plant construction project stalled in 2020, with bid pricing 50% over budget through the procurement process. A significant ripple in construction project delivery was necessary or this project was in

serious danger. The District retained NAC. as Construction Manager, to work with their designer, WSP, in a Design Assist approach to identify a suitable alternative WWTP process to deliver significant cost savings and value.

We examine how that Project team worked together to find an alternative, affordable, plant design so that project planning and pre–design work could restart efficiently, and the project redesign was substantially completed in June 2022. The team that delivered this Plant design, then handed off to a construction team that continues this collaborative strategy today. Construction, which commenced in September 2022, is currently tracking very successfully.

Here is the story of a project that came back from the brink.....

Time slot: 2:15 – 2:45 PM

Abstract Title: Risk Management Across Canadian Provinces: Perspectives from Operators to Regulators

Presenter: Emma Wells – University of Colorado Boulder

Drinking water utilities work diligently to provide safe drinking water to the communities they serve. Increasingly, they are challenged by a changing regulatory and natural environment, as well as workforce and financial limitations. To understand the different risk management approaches that utilities take to adapt to these challenges, University of Colorado is conducting research with utilities across Canada. We will highlight findings from interviews with regulators and utility management on how the different approaches to regulation across Canadian provinces may influence risk management practices. Next, we will present preliminary findings from our surveys with utility staff on their perceptions of risk and actions they regularly take to manage risk (ex. checking in–line chlorine analyzer with a handheld analyzer). As part of this presentation, we will engage the audience in feedback and interpretation of how these findings can be further grounded in the experience of operators based in British Columbia.

Time slot: 2:45 – 3:15 PM

Abstract Title: Institutionalizing the One Water Approach Through an Adaptive Regulatory Approach

Presenter: Harshan Radhakrishnan – Engineers and Geoscientists

The historical approach to the regulation of water management is a compliance model focused on technical risks that does not take enterprise–level system risks into account (i.e., resourcing, financial, and climate–related). Engineers and Geoscientists BC has released an interim set of professional practice guidelines on One Water System Risk Management that address these issues and provide an effective way for organizations to identify and manage risks that require collaboration and executive decision–making.

Engineers and Geoscientists BC is also developing a public–facing Planning Guide for communities and water utilities on Applying a One Water Lens to Managing Water System Risks, that is complementary to these professional practice guidelines. This presentation will provide an overview of these documents and explore how attendees can begin integrating the One Water approach into the work that they do.

17. ASSET MANAGEMENT – CONDITION ASSESSMENT | Rainbow Theatre, WCC | 3:30 – 5:00 PM

Moderator: Sam Ghosn

Time slot: 3:30 – 4:00 PM

Abstract Title: Pressure Pipe Condition Assessment and Risk Evaluation

Presenter: Michael Higgins – HDR

Condition assessment and proactive management of pressure pipe is a topic area that is rapidly evolving in the water community. This technical paper documents best management practices for risk assessment, condition assessment and rehabilitation strategies for pressurized water and wastewater pipelines. Data from risk assessments may be qualitative or quantitative, but it is often used to determine optimal pipeline management strategies. High risk pipelines often warrant more extensive condition assessment to ensure reliability, while lower risk pipelines may warrant screening level assessments or no assessment at all. This paper reviews strategies for calculating risk and how to perform condition assessment of all pressure pipe materials.

Time slot: 4:00 – 4:30 PM

Abstract Title: I Need Divers for a Pipeline Inspection?

Presenter: William Jappy – Pure Technologies, a Xylem Brand

In September 2022 in Cornwall, Ontario Pure Technologies performed an assessment on a 1050 and 1200mm RCCP Raw Water Supply Main, which conveys water from the dike intake valve house to the Water Treatment Plant. The pipeline was installed in the 1950s with RCCP (AWWA C300) and the total distance was 3.7kms. There were 4 components of this projects:

1. Transient Pressure Monitoring for 30 days prior to inspection
2. SmartBall Leak/Air Pocket detection with Mappings
3. PipeDiver Electromagnetic Inspection
4. Structural evaluation in reference to AWWA C300

The unique part of the inspection was the insertion of the SmartBall and PipeDiver in the Water intake line via professional Divers. This presentation will highlight the safety preparation required to perform this inspection along with the results and outcomes from inspection.

Time slot: 4:30 – 5:00 PM

Abstract Title: Assessing the Condition of your Aged Buried–asset: When Piping Samples Become Available

Presenter: Henry (Hanfeng) Xu – Metro Testing & Engineering

Aged assets have been and will continue to be the challenge that Water & Wastewater sectors to face. With respect to pipelines buried, there are internal and external environments that can differ significantly and present various deterioration mechanisms that require assessment and management. Different types of materials, service conditions make it complicated from project to project.

This presentation will review degradation mechanisms of common materials (Cast Iron, Ductile Iron or Asbestos Concrete pipes) and recent advancement on technologies, approaches available for condition assessment of pipe including AWWA M27 and AMPP/NACE international. Additionally, the presentation will address “Direct Assessment (DA)” when there are opportunities owner/operators could obtain pipe segments or soil samples. Case studies are intended to showcase the merit of such DA on existing watermains, thus additional information for better decision making – rehab options or priority of replacement.

18. WATER TREATMENT – TECHNOLOGY | Harmony B, WCC | 3:30 – 5:00 PM

Moderator: Zane Spencer

Time slot: 3:30 – 4:00 PM

Abstract Title: Pore–spectives on Potability – Overview of Membrane Technologies in Drinking Water Treatment

Presenter: Andrew Sheroubi – Delco Water

The role of membrane technologies in water treatment has grown massively over the last decades. Membranes are used to remove contaminants based on properties of size and surface charge. Given the very small pore sizes used, down to less than a nanometer, membranes can remove almost everything, producing ultra-pure water. However, is that always needed? This presentation will provide an overview of membrane technologies in drinking water treatment. This will include well established processes such as reverse osmosis, nanofiltration, ultrafiltration and microfiltration, as well as newer innovations. We will explore the fundamentals of how these processes work, the different types of membranes available, and their applications in water treatment. Beyond the technical, we will also discuss other considerations such as operational complexity, maintenance considerations, and lifetime costs to allow us to determine when a membrane process is applicable, and when it isn't, using recent projects as case studies.

Time slot: 4:00 – 4:30 PM

Abstract Title: Dry Polymer Implementation at the Seymour Capilano Filtration Plant

Presenter: A. Cristina Fonseca – Stantec Consulting

Metro Vancouver has identified the need to replace emulsion polymer with dry polymer at the 1,800 MLD Seymour Capilano Filtration Plant (SCFP), where polymer is used as filter aid and in the treatment of the filter backwash residuals. The main objectives to be achieved were: i) increase allowable chemical storage times, ii) consistent polymer performance by eliminating transportation impacts, iii) improve the options for beneficial reuse of treatment residuals and iv) simplify operation and maintenance. As part of the final stages of this project we have completed bench and pilot-scale testing to select the polymer types and doses during start up and commissioning. This presentation will summarize the project with a focus on integration and start-up and commissioning.

Time slot: 4:30 – 5:00 PM

Abstract Title: Many Roads Lead to Rome: Roads to Implementing Hollow Fiber Technology in Water Treatment

Presenter: Mark Lewis – Delco Water

There are various ways to implement Hollow Fiber Technology in water treatment. From ultrafiltration membranes constructed of PVDF or ceramic material, to specialized Hollow Fiber Nanofiltration; either pressurized or submerged; each type has a unique design and operational differences. Furthermore, manufacturers within each type have their own approach to maintenance strategies. It's essential to have diverse options for addressing maintenance challenges since what succeeds in one plant may not be effective in others.

This presentation will focus on understanding those differences and how implementing distinct design, maintenance, and operational strategies can open exciting opportunities for plant efficiency and proactive maintenance utilizing Hollow Fiber Technologies. Understanding how different manufacturers approach maintenance could offer flexibility and open additional options to the community. Beyond understanding the technical considerations, this presentation will cover practical applications of these technologies, focusing on First Nation installations across Canada.

19. OPERATIONAL TECHNOLOGIES – SCADA | Garibaldi A, WCC | 3:30 – 5:00 PM

Moderator: David Houghton

Time slot: 3:30 – 4:00 PM

Abstract Title: Municipal SCADA in the Future: An Overview of ISA 112

Presenter: Steven Gillan – PBX Engineering

With the widespread use of SCADA across multiple industries, a definitive standard has not been developed, until now. In this session, Mr. Gillan who is an active editor of the ISA112 SCADA Systems Standards committee, and senior member of the ISA, will provide a brief introduction to the ISA112 SCADA Systems Management lifecycle, the rationale behind it, and how it can be applied to various types of SCADA systems across multiple industries.

The ISA112 SCADA Systems Standards committee is developing a three-part standard that comprises of detailed lifecycles that includes security and obsolescence. An overview of the ISA112 standards will be discussed for both the reference architecture and lifecycle model. This presentation will look at how well the standard applies to generations of technology trends and how this ISA112 standard can be effective looking ahead at recent SCADA technology advances.

Time slot: 4:00 – 4:30 PM

Abstract Title: Bill C26 and Control System Cybersecurity for Critical Infrastructure

Presenter: Marty Bince – EECOL Electric

Industrial Control System (ICS) and Operational Technology (OT) cybersecurity is significantly different from IT (information technology) cybersecurity. The upcoming Bill C26 could put legal liability for breaches, and has requirements for monitoring, reporting, and securing critical infrastructure. Further, data from an industrial control system can improve operations and reduce reactive maintenance but requires a cybersecure infrastructure. How do you benefit from industrial control system data?

Time slot: 4:30 – 5:00 PM

Abstract Title: CTRL-ALT-DELETE: Avoid Ransomware and Other Ugliness in your SCADA System

Presenter: Gary Brykov – PBX Engineering

Unauthorized or unwanted access to Industrial Automation and Control Systems (IACS) and SCADA networks can result in an expensive and embarrassing ransom situation, causing operational standstill with devastating financial implications, and in the worst case, catastrophic damage to the environment or to human life. Hyperconverged IT infrastructure takes the forefront in industry due to its reduced complexity and improved scalability. At the same time, the IT-OT network boundary is often abstracted or blurred, resulting in security policies taking an IT-centric approach and ends up with OT security prioritizing data confidentiality and integrity over availability in the OT environment. To counter this tendency, an IACS-focused risk assessment process is discussed, exploring how proper zone identification and definition of targeted, achieved, and capable security levels for IT-OT zones and conduits can contribute to a robust defense-in-depth IACS and SCADA cyber security policy.

20. TREATMENT TECHNOLOGY | Garibaldi B, WCC | 3:30 – 5:00 PM

Moderator: Jeff Halliday

Time slot: 3:30 – 4:00 PM

Abstract Title: Onsite Treatment of High Strength Stormwater from a Recycling Depot

Presenter: Cole Seymour – MSR Solutions

A wastewater treatment system was designed for a 2,300 m² recycling depot located in Central Saanich, Vancouver Island. Due to the high strength of the stormwater after it passes through materials on site and collects pollutants, it

requires treatment onsite before being released to the CRD sewer system. The variability of flows and materials which are on site causes a large fluctuation in the concentrations of the influence on a day-to-day basis (i.e. dry wall from demolition project one day, and fish carcasses from the grocery store the next). The limited space available on site, and the discharge cap due to the local capacity of the lift station in the area caused additional challenges. This presentation is aimed at the challenges associated with this project and the lessons learned along the way.

Time slot: 4:00 – 4:30 PM

Abstract Title: Geotextile Dewatering: Case Study of Efficient Residual Waste Management

Presenter: Dalen Crouse – DWG Process Supply

Managing process residuals and sludge can significantly impact the expenses of water and wastewater treatment plants. Whether through trucking sludge away or using energy-intensive methods to process waste, the associated costs for procurement, operation, and maintenance can be considerable.

This presentation discusses a case study of an upgrade to the Englishman River Water Services Water Treatment Plant, where an onsite system for collecting, dewatering, and consolidating process residuals and waste sludge was installed. This low-energy, cost-effective solution utilizes geotextile dewatering containers, polymer conditioning, and gravity to achieve high dry solids levels, generating low TSS filtrate. This approach notably reduces material volume, transport costs and GHG emissions from the disposal process, by reducing the required truck traffic. By producing low TSS filtrate for release into the Englishman River without any further tertiary treatment, the system also minimizes capital/operational expenses, all while preserving the surrounding environment.

Time slot: 4:30 – 5:00 PM

Abstract Title: Annacis Island: A Case Study on the Modern Trickling Filter

Presenter: Bethany Burton – WesTech Engineering

Trickling filters are an efficient technology for treating BOD and total suspended solids. They pack large biological capacity into a small footprint while maintaining simple operational requirements and minimal power requirements. Despite the many benefits of trickling filters, the rise in nutrient limits over recent decades has marked a fall in new trickling filter installations. But trickling filters can still serve modern wastewater treatment facilities. A case study of the Annacis Island Wastewater Treatment Plant in British Columbia demonstrates the scale and performance of a modern trickling filter process. This plant showcases how this biological technology typically associated with the past has evolved for the treatment requirements of the future.

21. UTILITY MANAGEMENT | Harmony A, WCC | 3:30 – 5:00 PM

Moderator: Kevin Zhang

Time slot: 3:30 – 4:00 PM

Abstract Title: Riding the Wave: Navigating Water and Sewer Challenges Amidst BC's Bill 44-Driven Urban Surge

Presenter: Werner De Schaetzen – GeoAdvice Engineering

For many communities in BC, the recent introduction of provincial Bill 44 “Housing Statutes (Residential Development) Amendment Act” will bring accelerated population growth to single-family areas. This rapid urbanization poses challenges to the management of water distribution and sanitary sewer collection systems. While water and sewer

systems are usually designed to withstand future population growth, periodic reassessment is required to ensure the systems can accommodate changing growth projections.

This presentation will discuss a case study from the District of Saanich, BC, where water and sewer systems currently service about 122,000 residents. Over the past decade, Saanich has witnessed faster-than-expected growth, with projections suggesting a 1.5-fold increase in population under a "medium" growth rate over the next 50 years. To address the challenges of such rapid development, the District decided to use their detailed hydraulic models to conduct a sensitivity analysis, specifically examining the impact of a new "high" growth scenario on water and sewer systems.

Time slot: 4:00 – 4:30 PM

Abstract Title: Adapting Infrastructure Planning to BC's Housing Strategy

Presenter: Neal Whiteside – Water Street Engineering

The Province of BC's new housing legislation requires municipalities throughout BC to adapt their infrastructure plans and design criteria for higher-density housing. The new legislation targets two key areas:

1. Small-scale, multi-unit housing (SSMUH): The legislation allows redevelopment of residential single-family lots overriding existing municipal zoning. These lots will be developable to include three or six dwelling units.
2. Transit-oriented development areas (TOA): Higher density zoning (up to 20 storeys) is mandated near major transit nodes.

Water infrastructure impacts for municipalities are potentially extensive, including:

- Updating design requirements.
- Establishing appropriate design criteria for water and sewer loading for higher density residential development.
- Water, sewer, and drainage master plan adjustments to address higher loads.
- Updating of municipal water and sewer master plans to address new loads.

The presentation will include an area case study illustrating mitigating measures, assumptions, and infrastructure impacts.

Time slot: 4:30 – 5:00 PM

Abstract Title: Enhancing Water System Resilience: Strategic Approaches in a Changing Environment

Presenter: Sandra Rodriguez – CIMA+

This presentation targets key challenges in water management with the evolving landscape of water systems. The first segment focuses on Source Water Protection – using source water as a pivotal element in decision-making for planning and finance. We will outline the risks that climate and hydrological uncertainties pose in planning and designing infrastructure, emphasizing the need for resilience in these processes. The second part discusses planning projections under uncertain population growth – The takeaway is a risk management approach that future-proofs and validates the recommendations for new infrastructure. This method ensures that growth projections are managed effectively, balancing risk and opportunity. Finally, we address the Capacity Limitations of Existing infrastructure – outlining a practical approach to assess process constraints in a water treatment plant and the unique challenges posed by aging infrastructure with unconventional design. The presentation focuses on specific, actionable strategies to equip attendees with practical knowledge for improving water system resilience.

22. WATER REUSE | Fitzsimmons, WCC | 3:30 – 5:00 PM**Moderator:** Matthew Holitzki**Time slot:** 3:30 – 4:00 PM**Abstract Title:** Advancing Non-Potable Water Use in the Metro Vancouver Region**Presenter:** Elizabeth Kee – Metro Vancouver

Adopting non-potable water systems can help address climate and population growth-related challenges by saving high quality drinking water for where it's needed most – cooking, cleaning, and drinking – helping ensure enough drinking water today and for future generations.

From 2020 to 2023 Metro Vancouver, with support from Pinna Sustainability, collaborated with subject matter experts and industry stakeholders to complete the Non-Potable Water Use Project, aiming to support the uptake of non-potable water systems in the Metro Vancouver region to reduce the use of drinking water for non-potable purposes. This work culminated in guiding documents developed to support overcoming barriers to non-potable water system adoption and to support an increase in the installation and longevity of non-potable water systems.

Join us as we explore opportunities for actionable change at the local and provincial scales and highlight the guiding documents developed to support overcoming barriers to non-potable water system adoption and longevity.

Time slot: 4:00 – 4:30 PM**Abstract Title:** Is there a Pathway to Reuse Water without Regulatory Paralysis**Presenter:** Mike Seymour – MSR Solutions

There is a grey area around water reuse, which allows for grey water (sink and shower) reclaiming and reuse for toilet flushing. This is a 25% potential water recovery and in water scarce areas can offer opportunities for development. The infrastructure requirements and regulatory approvals are creating significant costs and delays. MSR has proposed an alternative approach through a mix of treatment, discharge and reclaiming with multiple safeguards, which offers a viable solution to water scarcity, and allowing for additional water reuse for irrigation and toilet flushing.

Time slot: 4:30 – 5:00 PM**Abstract Title:** Adaptive Pathways: Developing Strategies that Respond to Under Deep Uncertainty**Presenter:** Ryan Brotchie – GHD

With increasing awareness of the profound impacts of climate change on the water cycle, the water industry is grappling with how to embed adaptation and resilience into strategic planning and decision making. A complicated issue is the need to also plan for other drivers of change and uncertainty such as growth, urban densification, societal perspectives and behavior change, political views and regulatory change, and technology change. Adaptive Pathways Planning (APP) is emerging as a leading practice framework and approach to respond to this change and uncertainty. In the past 5 years it has been used in regional and major cities across Australia for water security planning, water and wastewater system strategies, water, and wastewater treatment and biosolids masterplans, coastal adaptation, and Integrated Water Management (IWM) plans. This presentation introduces APP, its origins from the UK and Europe, applied case studies from Australia, and insights tailored for the British Columbian context.

TUESDAY, APRIL 30, 2024

23. WATER SUSTAINABILITY/ DROUGHT MANAGEMENT | Frontenac A, Fairmont Chateau | 10:00 – 11:30 AM

Moderator: Robyn Casement

Time slot: 10:00 – 10:30 AM

Abstract Title: Metro Vancouver Regional Water Innovation Landscape

Presenter: Nina Bader – Foresight Canada

This session will provide an overview of the work to date in the Metro Vancouver region to develop a water technology ecosystem. We will present specific water technology case studies and applications and showcase the work of innovators who are already working with municipalities and utilities. Examples of such collaborations include real-time water monitoring and green infrastructure management platforms.

Part of this presentation will build on the findings of the Invest Vancouver report “Water Tech: The Metro Vancouver Region’s Untapped Clean Tech Opportunity”, which shows that the strengths of the region's water technology sector are concentrated in several focus areas, such as decentralized treatment, resource recovery, and digital solutions and sensor technologies. This session will encourage participants to expand their knowledge of innovation and technology and learn about the opportunities available to them.

Time slot: 10:30 – 11:00 AM

Abstract Title: Once Through Cooling Prohibition: Lessons Learned in Program Development and Implementation

Presenter: Darren Perrett – City of Vancouver

This presentation delves into the City of Vancouver's initiative to address water consumption by prohibiting the installation of Once Through Cooling (OTC) systems, commonly found in appliances like air conditioners, refrigerators, and ice machines. The prohibition, originally set for January 1, 2020, was temporarily deferred due to the Covid-19 pandemic, with full enforcement resumed in 2022. The session provides insights into the development and challenges of the OTC enforcement program, including communication strategies, identifying existing systems, and the necessity of introducing exemptions for equitable application. Through the lens of the OTC Prohibition, the presentation offers valuable takeaways for effectively managing public expectations in water conservation programs.

Time slot: 11:00 – 11:30 AM

Abstract Title: Behavioural Insights for Drought Management

Presenter: Alan Shapiro – Shapiro & Company

While traditional communication approaches focusing on education and awareness have their strengths, research in human behaviour has produced a growing body of insights that can help us understand how people make environmental decisions. This in turn enables water managers and planners to design targeted solutions to drive behaviour change around water conservation, from reducing household and commercial water use to improving engagement with water restrictions and municipal outreach campaigns. This session will present an overview of the behavioural insights (BI) field and tools and explore several case studies on how BI has been applied to water management challenges in and outside the province, including through the BC governments recently established

Behavioural Insights Group. The goal of the session is to better equip municipalities, utilities, and water professionals to incorporate BI strategies into water conservation, demand management, and drought response planning.

24. INFRASTRUCTURE RESILIENCY | Frontenac B, Fairmont Chateau | 10:00 – 11:30 AM

Moderator: Ronan Deane

Time slot: 10:00 – 10:30 AM

Abstract Title: Quantifying Resilient Performance of Urban Water Supply Systems

Presenter: Aina Crozier – University of British Columbia

A framework for operationalizing resilience-based planning of urban water supply systems has been developed, aligning with Canada's National Adaptation Strategy's objective to apply resilience criteria in all new infrastructure investments. Conceptual performance curves will be presented to illustrate the importance of the system capabilities: withstanding, absorptive, restorative, adaptive, transformative, and anticipative (WARATA), during sudden and slowly developing disruptions. The performance-based approach requires a system-model to simulate impact on water supply at consumer nodes, where the crossing of capacity thresholds is used as key metrics to quantify resilience. The modeling framework incorporates both infrastructure and humans, and the presentation will outline how community consequences from system performance impact and collapse can be explicitly considered to ensure equitable resilience outcomes. Integrated in predictive resilience analysis tools, the framework could support emergency response planning and provide quantitative evidence for design strategies, guiding industry's shift towards integrated water resources management.

Time slot: 10:30 – 11:00 AM

Abstract Title: Building Resilience: An Operator's Journey in Replacing a Critical Healthcare Facility's Large Water connection

Presenter: Sam Anderson – Capital Regional District

The Victoria General Hospital relies on a large, metered connection provided by the Capital Regional District, drawing from two water transmission mains. Our presentation offers an in-depth exploration of our endeavor: the replacement of the hospital's outdated confined space water service with an above-ground kiosk. Throughout the entire project, our priority was to maintain uninterrupted water service to the critical facility. We'll delve into our comprehensive approach, sharing the valuable insights gained from overcoming challenges and navigating the process. Ultimately, this project signifies a gateway to change. We aim to share our knowledge to assist others in successfully executing similar upgrades, promoting resilience within systems, and embracing methodological advancements.

Time slot: 11:00 – 11:30 AM

Abstract Title: Innovative Design and Construction of Geohazard or Seismic Resistant Steel Pipe

Presenter: Richard Mielke – Northwest Pipe

This presentation offers a case study on the use of a new Geohazard Resistant Steel Pipe (GRSP) technology, as an innovative design solution to address extreme long-term soil settlement along a critical steel water transmission main. The 96" and 84" Project is part of the \$1.2B Surface Water Supply Project (SWSP) for West Harris County Regional Water Authority. The SWSP will use over 55 miles of lap welded steel water pipe. The SWSP encounters areas with significant ground subsidence caused in part by depleting aquifers, as well as naturally occurring slip faults. The resulting expected

long-term soil displacement of over 36" in these geohazard zones requires a resilient pipe design to ensure reliable water delivery.

The presentation will review the structural pipe design details, explore the development, full-scale testing, and advanced finite element analysis (FEA) that verified the InfraShield® GRSP system as the optimal design solution. The strain-based design technology of the GRSP offers greater sustainability during seismic or geohazard events. Installation of InfraShield® requires no special training and supplies a proven, cost-effective solution that lowers risk and supplies increased resiliency in areas prone to differential settlement or subsidence, fault actions, earthquakes, landslides, liquefaction, and other geohazard events.

25. UTILITY MANAGEMENT | Frontenac C, Fairmont Chateau | 10:00 – 11:30 AM

Moderator: Peggy Chen

Time slot: 10:00 – 10:30 AM

Abstract Title: 100 Years as a Water Utility: The Evolution of Our Infrastructure

Presenter: Joel Melanson – Metro Vancouver

The Metro Vancouver drinking water utility provides a reliable source of high-quality drinking water to nearly 2.8 million people, which is more than half of the population in the Province of British Columbia, Canada. The Metro Vancouver water utility function was established in 1924 to provide a long-term drinking water supply structure for the region. The regional water utility supplies drinking water, in bulk as a wholesaler, to 18 municipalities, one electoral area, and one treaty First Nation. In 2024, Metro Vancouver's drinking water service will celebrate its 100-year anniversary. This presentation will provide some overview and reflections on the inception of this service and its evolution over a century and will focus on how the utility plans on continuing to provide this uninterrupted service despite the challenges of supplying drinking water to a fast-growing region while mitigating the impacts of climate change and ensuring the water supply system is resilient to seismic events and other emergencies. Underscoring all these challenges is a public sentiment that we live in a "rainforest" and that investing in conservation is an additional cost.

Time slot: 10:30 – 11:00 AM

Abstract Title: The North Shore Conveyance Project's Successful Design-Build Collaboration with Metro Vancouver

Presenter: Gurjit Sangha – WSP

WSP was the Prime Design Consultant as part of a design build team on the North Shore Wastewater Treatment Plant Conveyance Project. The overall design-build project scope included a new 110 MLD Pump Station to convey flow from the existing Lions Gate WWTP to the new North Shore WWTP. In total, almost 6km of conveyance pipe was designed on the project ranging from 300mm to 2100mm diameter with various materials such as HOBAS, HDPE, steel, PVC, and concrete. This successful design build project included building a very complex facility directly under the Lions Gate Bridge, in poor soil conditions to a 1:2,475-year return period seismic event on an expedited schedule and coordination with key stakeholders such as the Squamish First Nations, CN Rail, West Vancouver, North Vancouver and the Vancouver Port Authority. This paper will discuss challenges and benefits experienced with the design build process.

Time slot: 11:00 – 11:30 AM

Abstract Title: Implementing Universal Metering – You Don’t Know What You Don’t Measure

Presenter: Nicholas Van Dalen – District of Lake Country

Explore Lake Country's road towards universal metering implementation over the past decade. Our initial goals focused on water conservation and reducing operational costs, evolving into a comprehensive strategy that not only contributed to reducing water consumption by 22.5% but also enhanced customer service and operator safety. We will discuss the process of selecting meters as well as installation challenges met and solutions to overcome them. The incorporation of Advanced Meter Reading (AMR) technology allowed for precise monthly data collection and quarterly billing, providing users with valuable real-time insights. The subsequent transition to Advanced Metering Infrastructure (AMI) expanded coverage to 78% of the meter population. This systematic journey, seamlessly aligned with the conference theme, underscores the efficacy of technology-driven initiatives in fostering efficient water management, well-informed decision-making, and the establishment of a secure and responsive water infrastructure.

26. PIPE REHABILITATION | Empress A, Fairmont Chateau | 10:00 – 11:30 AM

Moderator: Carlye Ip

Time slot: 10:00 – 10:30 AM

Abstract Title: Rehabilitating Non-Circular Sewers with Cured-in-Place Pipe

Presenter: George Bontus – Insituform Technologies

The Capital Regional District (CRD), headquartered in Victoria, BC, provides regional wastewater and water services, along with many others, to a large geographical area on southern Vancouver Island. A key component of the CRD's underground infrastructure includes a wastewater conveyance system in the District of Oak Bay. This system consists of circular and non-circular inverted egg-shaped pipes which are typically constructed of brick.

This presentation provides an overview of the CRD's 2023 Bowker Sewer Rehabilitation Project using Cured-in-Place pipe (CIPP) lining technology. The project included the CIPP lining of approximately 1.9 km of pipe, where the egg-shaped pipes being lined ranged from 610mm x 911mm to 910mm x 1370mm in size. Lining non-circular pipes is a unique CIPP lining application where the process must adapt to varying site conditions. The presentation describes aspects of the planning, liner design, and installation specific to inverted egg-shaped pipes.

Time slot: 10:30 – 11:00 AM

Abstract Title: Installing Otherwise Unmanageable CIPP liners Using Over the Hole Technology

Presenter: George Bontus – Insituform Technologies

ARROW Utilities (formerly Alberta Capital Region Wastewater Commission) serves a large geographical area around the City of Edmonton. It operates the 3rd largest WWTP in Alberta, with 138 km of gravity sewers and 58 km of forcemain conveying sewage to the plant. ARROW identified 3.2 km of 1350 mm diameter concrete pipe in need of repair or replacement. CIPP lining was selected as the rehabilitation method. The pipe alignment runs through an environmentally sensitive area and is close proximity to residences in other areas. The project was planned to minimize liner installations. In doing so, the weight of the required liner could not be transported once impregnated with resin. A unique process, over the hole wetout (OTHW) was required. For this process, the tube is transported to site, where a

mobile wet out facility is constructed. This presentation describes the project background, design and tendering, and installation with the OTH system.

Time slot: 11:00 – 11:30 AM

Abstract Title: AM Planning at the Sechelt Water Resource Centre

Presenter: Jaimie Sokalski – Associated Engineering

The District of Sechelt is building their asset management capacity, and recently developed their first ever Asset Management Plan (AMP) for their Water Resource Centre, a Level 4 wastewater treatment facility with tertiary treatment capacity. This initial AMP for the district is intended to act as a template and example for future AMPs across the service area and organization. In this presentation, the District and Associated Engineering will share their journey in making the most of a small budget to develop a first time AMP. Using an asset driven approach, we will share our findings around asset condition, functionality, risk and how these indicators will be used to inform future decisions. The presentation will discuss priorities in beginning your AM journey and how taking initial steps can still have immediate impact while setting you up for a more mature AM program across your facility or organization in the future.

27. WASTEWATER – ANAEROBIC DIGESTION | Empress B, Fairmont Chateau | 10:00 – 11:30 AM

Moderator: Joyce Chang

Time slot: 10:00 – 10:30 AM

Abstract Title: Organics Diversion and Anaerobic Co-Digestion to Achieve a Circular Economy

Presenter: Mohammad Shallouf – Anaergia

The B.C. Government has launched an organic infrastructure program to help increase organic waste diversion from landfills as a major step in reducing greenhouse gas emissions, accelerating circular economy solutions, and achieving the goals of sustainable development in the province. By utilizing the existing infrastructure of municipal wastewater treatment plants and upgrading them to accept food and other high strength waste from residential and various commercial sources; wastewater treatment plants can become the hub for resource recovery, generation of renewable energy, and production of nutrient rich digestate for land application. Petawawa's Net Zero Project has taken the first steps in achieving this goal by upgrading their anaerobic digestion plant to receive additional biosolids, organics, and waste byproducts from local restaurants and other commercial enterprises. Additional biogas production will be used to produce renewable energy on-site through Combined Heat and Power (CHP) Engines and achieve net zero operation.

Time slot: 10:30 – 11:00 AM

Abstract Title: Increasing Anaerobic Digestion Capacity: Different Strategies and Their Implications

Presenter: Cameron Macdonell – Associated Engineering

This presentation explores innovative approaches to enhance anaerobic digestion (AD) capacity and performance for wastewater sludge treatment, emphasizing the integration of diverse technologies. Techniques including sludge thickening, chemical hydrolysis, thermal hydrolysis, and improvements to primary clarification are investigated for their synergistic effects on optimizing AD performance. The study evaluated the implications of these strategies on biogas production and biosolids volume reduction, emphasizing the role of increased biogas yields in sustainable wastewater management. In addition, the integration of advanced technologies aims to elevate volatile solids reduction efficiency, reduce biosolids volume production, and improve final product quality (Class A), contributing to more eco-friendly and

economically viable solids treatment solutions. This presentation will provide valuable insights into the multifaceted strategies available for increasing AD capacity without necessarily building additional tanks, paving the way for more effective and sustainable wastewater treatment practices.

Time slot: 11:00 – 11:30 AM

Abstract Title: Challenging the Retention Time of Municipal Anaerobic Digestion by Using Thermal Hydrolysis Pre-treatment

Presenter: Bill Barber – Cambi

Anaerobic digestion of sewage has been practiced over 150 years, however, little of the design criteria have evolved over that time. Typically, digesters are designed to accommodate slow kinetics associated with the process and often have retention times in excess of 20 days. These retention times become textbook standards and are then taken up into regulatory requirements for enforcement. This results in large facilities which are costly and prevents the application of anaerobic digestion at smaller plants. However, with interest in production of renewable energy to help counteract the impacts of climate change, anaerobic digestion is becoming more important than ever, so it is important to challenge the original designs. By making sludge more digestible, thermal hydrolysis can be used to increase loading rates to digesters and reduce their retention time. This paper will show data looking at how low retention times can go whilst maintaining stable operation.

28. STORMWATER/ INFLOW & INFILTRATION | Empress C, Fairmont Chateau | 10:00 – 11:30 AM

Moderator: Dave Belomy

Time slot: 10:00 – 10:30 AM

Abstract Title: Balancing Flood Conveyance and Fish Habitat Design in a Steep Urban Stream: A Case Study of the Penticton Creek Restoration

Presenter: Joel Sawatzky – Stantec Consulting

Penticton Creek was channelized and lined with concrete in the 1950's in response to repeated urban flooding. The concrete negatively impacted native fish species and a restoration plan was approved in 2018. Stantec's analysis for the 320m Reach 3 restoration included 1-D and 2-D modelling, natural channel design, analysis of spawning gravel and flood resilience to design a rehabilitated riffle-pool channel with 10 riffles and 11 pools. The objectives to create fish habitat and maintain resiliency to the 200-year instantaneous flood event when considering climate change impacts on peak flows and groundwater impacts, were achieved. Aquatic habitat was improved within the Reach, with a 270% increase in pool habitat and spawning areas. Engagement and collaboration with the Creek Restoration Committee led to a successful design. Construction was completed in the fall of 2023 and fish were already seen in the creek utilizing the newly constructed spawning pools.

Time slot: 10:30 – 11:00 AM

Abstract Title: Sinkhole to Fishway: Emergency Response as a Pathway to Resilience

Presenter: Andrew Kolper – Kerr Wood Leidal

When a sinkhole formed at BCIT, the campus was faced with a choice: react or embrace an opportunity. The British Columbia Institute of Technology (BCIT) is located in an urban area, surrounded by roads, and underlain by Guichon Creek, which flows culverted underground through the campus. When the latest sinkhole formed on campus, directly

overlaying the creek, Campus Facilities took a unique approach to emergency response. Rather than continue to patch–repair the CSP, they would remove a portion of culvert and replace it with a daylight creek and fishway.

The daylighting is part of the Institute’s commitment to climate and infrastructure resiliency. The response showcases BCIT’s innovative asset management approach, utilizing natural assets to provide improved flood capacity. The design team developed a solution, working within the constraints of the campus’ urban environment, which provided a unique, integrated solution utilizing daylighting to address infrastructure failure and contribute to climate resilience.

Time slot: 11:00 – 11:30 AM

Abstract Title: Mill Creek Diversion: Flood Protection at City of Kelowna; Engineering & Construction

Presenter: Ali Malekian – CIMA+

The City of Kelowna (CoK) has been experiencing more frequent intense flood events in the past 15 yrs. The 1982 infrastructure at Mill Creek was inadequate for projected peak flows; Mill Creek 200yr flood flow has doubled since then. CoK engaged our team to propose conceptual design to increase culvert & intake capacity and divert more water toward Mission Creek. Now, after 4 years & 2 construction phases, upgrades are almost complete. The comprehensive project encompasses detailed intake upgrades, enhancements to 1.6km underground culvert, fully automation of structure, challenging permitting processes, dike & dam constructions, and significant environmental improvements. Upon completion, the structure diverts a substantial volume of water, reducing the risk of potential flood in downtown core of the city. Phase 1 of the project was presented in 2023. The objective of this presentation is to elaborate the lessons–learned, highlight challenges, showcase Phase 2, and discuss the environmental improvements.

29. WATER QUALITY | Frontenac A, Fairmont Chateau | 1:30 – 3:00 PM

Moderator: Shawn Corrigan

Time slot: 1:30 – 2:00 PM

Abstract Title: Data Science and Process Behind the Burrard Inlet Water Quality Objectives

Presenter: Jessica LeNoble – Kerr Wood Leidal

Published in 2017, the Burrard Inlet Action Plan set a goal to update the 1990 Burrard Inlet Water Quality Objectives to reflect indigenous values and more recent science. Water quality objectives are numbers or statements that represent safe levels of substances in B.C. waterbodies. The Burrard Inlet Water Quality Objectives were co–signed by the Province of B.C. and the Tsleil–Waututh Nation. This step was the start of a first of its kind Government–to–Government initiative that weaves together western science and Traditional Indigenous Values and Knowledge. Implementation of the new objectives will transform the decisions made by utilities across the lower mainland region. Developing the objectives involved a detailed review of receiving environment water quality received from industry, non–profits, and all levels of government and a comprehensive analysis procedure, which incorporated input from a roundtable of over 40 partners. This presentation will walk the audience through the procedures used to derive the numerical objectives, conclusions, and recommended management actions using complex datasets.

Time slot: 2:00 – 2:30 PM

Abstract Title: Provincial Leadership in Drinking Water and Watershed Protection

Presenter: Meghan McKee – Government of British Columbia

The Ministry of Water, Land and Resource Stewardship (WLRS) is responsible for providing leadership in water policy and science, including drinking water and watershed protection. In this session, staff will present projects underway to advance drinking water protection and watershed security, and to improve our ability to identify, assess and mitigate risks to our drinking water sources.

WLRS is currently working in partnership with the Ministry of Health and the Health Authorities on initiatives to improve the protection of drinking water sources in BC, but we aspire to expand our partnerships with other like-minded organizations to achieve our goals for improvements. In this session, we hope to engage all attendees, especially water system owners and operators on the importance of data sharing to track and visualize the status of community drinking water supplies to support drought preparedness and response. The Ministry is also leading the development of a new Watershed Security Strategy to support managing our lands and resources to ensure British Columbians have access to clean drinking water both now and in the future. Also in progress is the development of a framework to better understand risks to drinking water sources and to inform source drinking water protection across the province.

Time slot: 2:30 – 3:00 PM

Abstract Title: Safeguarding Our Water Through Cross Connection Control

Presenter: Paul Allen – BCWWA Committee Member

In the absence of a robust Cross Connection Control program, the integrity of the municipal water supply is at risk. When foreign substances are inadvertently connected to the water supply, a risk of contamination is introduced during backflow events (as witnessed in Corpus Christi in 2016) on both the private and public side. This presentation will illustrate these vulnerabilities through visual evidence and real-world examples obtained during Cross Connection Inspections, demonstrating a variety of cross connections, including construction sites, premise isolation bypasses, chemical storage and other inventive, yet incorrect, plumbing practices.

30. OPERATIONAL/ SCADA | Frontenac B, Fairmont Chateau | 1:30 – 3:00 PM

Moderator: Zane Spencer

Time slot: 1:30 – 2:00 PM

Abstract Title: It is Hard to be a "Smart" Smart City

Presenter: Dave Belomy – ADS Environmental Technologies

There has been a proliferation of IoT (Internet of Things) devices that are used by municipalities to collect data from Collections Systems, including data from Pump Stations, CCTV, Flow Meters, Level Meters and Rain Gauges. Integrating this Collection System data with data from numerous other sources is part of the desire by Municipalities to create "Smart" Cities, but that integration has proved to be a daunting task.

This presentation will therefore focus on what is available and can be done today, to collect flow/ level/ rain, pump station and CCTV data, then send it to a cloud-environment where it can be analyzed, which leads to informed decisions, whether on a near-real time basis for operational control, or for longer-term planning by engineers for infrastructure decisions.

Time slot: 2:00 – 2:30 PM

Abstract Title: Why Hydrometric Data is Critical to Managing Water in the Okanagan Water Basin

Presenter: Everett Adams – Aquatic Informatics

Our presentation will feature a case study on the Okanagan Water Basin, highlighting how to successfully leverage data management to empower the public and increase community resilience in the face of climate change. In 2021, the Okanagan Basin Water Board (OBWB) implemented a hydrometric program to support the development of new environmental flow data and hydrology models. To manage this data, OBWB uses software Aquarius to acquire, process, model and publish water information in real time. Aquarius enables OBWB to centralize this vast amount of hydrologic time series data, discrete measurement data, and complex river gauging measurements from various locations. Using reliable historic data, OBWB has become a champion of disseminating information, providing knowledge that informs zoning, infrastructure planning, water usage, and flood response. By gathering high quality hydrometric data and sharing insights, we can find practical solutions to protect our water, and the social–ecological systems that depend on it.

Time slot: 2:30 – 3:00 PM

Abstract Title: SCADA: Making Sense of the Nonsensical

Presenter: Matthew Sider – WSP

While sometimes controls and SCADA networks can seem complicated, they do not have to be. In remote regions such as the Yukon, NWT, Nunavut, and Northern Alberta it is essential that operators have systems that are reliable, accessible and that stay running even when the power goes out. Come join the discussion about possible solutions that can keep you connected to your system and how that system can be best used to provide you with better operations for tomorrow.

31. UTILITY MANAGEMENT | Frontenac C, Fairmont Chateau | 1:30 – 3:00 PM

Moderator: Donovan Klassen

Time slot: 1:30 – 2:00 PM

Abstract Title: Emergency Preparedness During Wildfires: An Operator’s Perspective

Presenter: Warren Brown – Lytton First Nation

In 2021, Warren Brown as the Operations & Maintenance Manager of Lytton First Nation, worked through the Lytton fire that consumed about 90% of the town, 39 band structures including the band office. Again in 2022, when the Nohemeen fire broke out on the West side of Lytton, consuming 6 more band homes. Warren will share his perspectives and experience on emergency preparedness in times of wildfires and other environmental emergencies focusing on protecting community infrastructure, water supplies and drinking water quality.

Time slot: 2:00 – 2:30 PM

Abstract Title: The Value of Construction Management in Project Delivery

Presenter: Thomas Bekenn – RAM Consulting

Construction Management is a discipline that is often overlooked on projects. In many scenarios, the responsibilities of a Construction Manager are often assumed by either the Owner’s project manager or the Engineer of Record, and in some instances are neglected altogether. When the Construction Management role is poorly defined, the resulting execution of the work is at higher risk of running over budget, deviating from the scope of work, and producing a lower quality product. Utilizing a Construction Management model enables a project to involve construction personnel experienced in overseeing complex construction processes including quality, stakeholder, risk, change, environmental,

and safety management. Construction Managers support effective decision making and execution by considering these factors and distilling them into clear and concise narratives. This model has been successfully implemented on projects of all sizes within the water and wastewater sectors and can provide great value to the industry when executed effectively.

Time slot: 2:30 – 3:00 PM

Abstract Title: The Use of Subsurface Utility Engineering in your Infrastructure Design

Presenter: Ophir Wainer – GeoScan Subsurface Surveys

The ASCE 38 is the standard that Engineers, Designers and Utility Owners can rely upon to plan and execute their infrastructure projects with utility risk management in mind. The standard quantifies risk regarding the presence of existing utilities and allows for understanding of current conditions allowing the engineers to make key decisions during design and not during construction when change orders and re design become schedule and cost factors. The use of SUE quantifies a common utility language that allows all to understand the quantified utility risks associated with your project.

32. GENERAL PUBLIC AWARENESS | Empress A, Fairmont Chateau | 1:30 – 3:00 PM

Moderator: Megan Kot

Time slot: 1:30 – 2:00 PM

Abstract Title: AWWA's 2030 Strategic Plan – A Worldwide Path Forward

Presenter: Keith Kohut – Associated Engineering

When the Strategic Plan was last updated in 2020, AWWA members could not have foreseen the world-changing events that were about to occur, or the rapidly increasing interest in topics such as cybersecurity, “forever chemicals”, and diversity and inclusion. During the same period, the AWWA has also initiated a proactive campaign to identify, plan for, and shape the issues and the state of the water industry in the long term via their Water2050 program.

AWWA is in the final stages of updating their strategic plan, intended to guide the organization from 2025 to 2030. This has provided an opportunity to reflect on the changes that have happened and are expected within our industry, as well as the changes that we want to make happen. Members of AWWA’s Strategic Planning committee will provide a walkthrough of AWWA’s 2030 strategic plan and its relevance for the water industry in BC.

Time slot: 2:00 – 2:30 PM

Abstract Title: Playing the EDI Long Game: Recruiting and Retaining Women Professionals

Presenter: Quinn Crosina – Associated Engineering

For 10 years, Associated Engineering has made a commitment to improving the retention of women engineers, technologists, and scientists across the company. Historically, retention of women professionals was as much as 6 percentage points lower than men in the same roles. This presentation will discuss the findings from ‘stay interviews’ completed with longer term staff and the subsequent initiatives established. These include flexible working arrangements and mentoring programs, which have helped improve retention, leading to increased representation of women in technical leadership and managerial roles across the company. We are now looking to better understand and address the challenges women professionals face in a hybrid work environment. Improving retention is particularly relevant today, in a job market in which recruiting talent and maintaining a stable workforce are challenging. By

engaging more women in the water industry, we can better represent and meet the needs of the communities we serve.

Time slot: 2:30 – 3:00 PM

Abstract Title: The EOCP: We're on Track with our Strategic Priorities!

Presenter: Kalpna Solanki – Environmental Operators Certification Program

The EOCP involved numerous stakeholders in the development of its Strategic Priorities. Find out about how the EOCP is faring in this penultimate year of its strategic plan.

33. WASTEWATER COLLECTION | Empress B, Fairmont Chateau | 1:30 – 3:00 PM

Moderator: Stuart Fretwell

Time slot: 1:30 – 2:00 PM

Abstract Title: Upgrades of Existing Wastewater Collection Facilities – A Case Study

Presenter: Alexander Jancker – Associated Engineering

The City of Maple Ridge is rapidly growing, and so are the demands on the City's wastewater conveyance systems. While new infrastructure is desirable, upgrades to existing facilities are often the approach of choice due to various constraints and financial viability. The City's largest wastewater pump station was constructed in the 1970's and all mechanical equipment had reached the end of its service life. The construction and connection to a new, larger forcemain will mitigate the pump station's hydraulic capacity limitations while larger equipment needs to be installed to convey higher flows. Major upgrades applied included the significant remodelling of the pump intake, complete replacement and remodelling of all piping components, the replacement of all HVAC and odour control components, general repairs, and improvements, as well as remodelling of the site drainage and access. Further, the upgrades significantly reduced the maintenance burden of the facility to City operation's staff.

Time slot: 2:00 – 2:30 PM

Abstract Title: Golden Ears Pump Station and Sanitary Sewage Overflow Tank – Design and Construction

Presenter: Reno Fiorante – Stantec Consulting

The new Golden Ears Pump Station (GDEPS) and Sanitary Sewage Overflow (SSO) tank will support the Northwest Langley Wastewater Treatment Plant (NLWWTP) Expansion Program. The SSO tank will temporarily store wastewater to prevent overflows during storms. The GDEPS will convey wastewater flows from Pitt Meadows and Maple Ridge to the expanded NLWWTP. The design phase of the project faced many technical challenges including a small site in a quadrant of the 113 B Avenue interchange, proximity to the existing Katzie pump station, difficult geotechnical conditions and busy roadways which required careful attention to construction traffic management. Construction started at the beginning of Covid 19 pandemic and was successfully managed through this period. The project incorporated some unique design features including First Nations public art prepared by Katzie First Nation artist Rain Pierre. The use of BIM and virtual reality through the design phase served as a useful tool for presenting the project to various stakeholders including the Metro Vancouver operations and maintenance staff. Our presentation will focus on the design and construction management of the facility.

Time slot: 2:30 – 3:00 PM

Abstract Title: Wakefield Sanitary Lift Station Upgrades

Presenter: Luc Harvey – McElhanney

The Wakefield Sanitary Lift Station, built in 1995, is a critical piece of infrastructure which services a large portion of Sechelt. The old lift station is undersized and reaching the end of its life. The new lift station was carefully designed to keep the old lift station operational while it was being constructed. The station upgrades included raising the site, relocating electrical equipment further up the hill, and improving the beach rock armouring to protect the station against future sea level rise and wave action. All of this was completed while retaining beach access and scenic views for adjacent homes. Furthermore, the existing forcemain was constructed using thin-walled piping and includes several gravity-driven pressure connections making increasing the station capacity and tying-in to the existing forcemain very challenging. This presentation showcases the key challenges that were faced throughout design and construction and the solutions that were implemented to overcome them.

34. WASTEWATER – RESIDUALS MANAGEMENT | Empress C, Fairmont Chateau | 1:30 – 3:00 PM

Moderator: Alison Chan

Time slot: 1:30 – 2:00 PM

Abstract Title: Efficient Wastewater Facility Registration Under the MWR

Presenter: Paul Markin – Kerr Wood Leidal

Municipalities, First Nations, and private businesses with wastewater discharges to water or to ground greater than 22.7 cubic meters per day must register their treatment facility with the BC Municipal Wastewater Regulation. Given the size and complexity of the application, it can be difficult for applicants who are new to the process to obtain their authorization in a timely manner. A poor application can result in delays during all phases of design, construction, and commissioning. Having a well-planned application, together with realistic expectations for review, helps to mitigate schedule slip and ensure project delivery as planned. In this presentation, we will share our experience navigating the MWR registration process for efficient applications and will include lessons learned to help others navigate the process.

Time slot: 2:00 – 2:30 PM

Abstract Title: Achieving Cold Weather Biological Nutrient Removal with Aerobic Granular Sludge

Presenter: Paula Dorn – Aqua-Aerobic System

The Aerobic Granular Sludge (AGS) technology has been successfully implemented for nearly 20 years with more than 100 plants either in operation or under construction globally. Introduced to the North American market in 2017, there are now 15 plants in the United States. A number of these plants, in addition to some pilot work, have experienced operation under cold weather conditions in temperatures less than 8 °C while still maintaining strong nitrogen removal capabilities. This session will examine such plants, including the circumstances that led them to adopt the AGS technology. It will also include a brief summary of the technology history and its operating principles.

Time slot: 2:30 – 3:00 PM

Abstract Title: The Carbon Footprint of Producing Biogas and Biomethane from Municipal Sludge Digestion

Presenter: Bill Barber – Cambi

Biogas produced from municipal sludge is a valuable source of renewable energy. It can be used directly to produce electricity and heat, or following removal of the carbon dioxide within it, be used as a substitute to natural gas, or after compression, vehicle fuel. However, the benefits of producing and using biogas are potentially becoming less clear. Globally, a shift towards cleaner forms of energy is making the displacement of energy using biogas less beneficial. Despite this, direct losses of methane are still being seen. In addition to methane emissions, to produce biogas, sludge must be processed. Processing includes biogas thickening; anaerobic digestion; biogas cleaning and management; dewatering of the digestate and treatment of the liquors produced. The aim of this work is to determine the carbon benefits afforded by biogas use and compare them to the carbon footprint generated by producing the biogas and comparing it to alternatives.

35. WASTEWATER | Frontenac A, Fairmont Chateau | 3:15 – 4:45 PM

Moderator: Leigh Borrett

Time slot: 3:15 – 3:45 PM

Abstract Title: Evaluating How Wastewater Treatment Plant Characteristics Impact Phosphorous Recovery Viability

Presenter: Jack Euclide – Evoqua, Xylem

New and tightening permit limits on effluent phosphorus have required wastewater treatment plants to implement process upgrades and develop long term plans to achieve these limits. Along with many mainstream treatment considerations, part of this evaluation includes consideration for side stream phosphorous removal to reduce the high nutrient load that is recycled to the front of the plant following dewatering of the waste activated sludge (WAS). Side stream removal also provides an opportunity to recover phosphorus and nitrogen and produce a commercially viable fertilizer product with the controlled precipitation of struvite. While this may provide an opportunity for plants to maximize their resource recovery efforts, it is often unclear what facility characteristics have an impact on the technical and financial viability of recovering the phosphorous in the post dewatering centrate stream. A variety of common equipment and process selections have been evaluated to aid in considerations of phosphorus recovery upgrades.

Time slot: 3:45 – 4:15 PM

Abstract Title: A Purer, Viable, Future: Treatment of ARD (Acid Rock Drainage) to Howe Sound

Presenter: David Griffiths – EPCOR

EPCOR's Britannia Mine Water Treatment Facility has been in operation since 2004 treating Acid Rock Drainage (ARD) or contaminated water from the abandoned Britannia Mine site, which has been flowing into Howe Sound. This has been an ongoing project to ensure the quality of treated water is compliant with regulations under the Environmental Management Act. Overall, minimize potential environmental liabilities and gain public confidence in the treatment process and its outcomes.

Time slot: 4:15 – 4:45 PM

Abstract Title: The Value of Control System Assessments

Presenter: Bart Nelissen – MPE, a division of Englobe

Control Systems age and can become obsolete over time, similar to all other equipment in water and wastewater facilities. To avoid relying your operation on equipment that is no longer supported or commercially available, a Control System Assessment can provide clarity regarding the current status of the various components that make up a control

system. This presentation will cover the ‘what, when, why and how’ of a Control System Assessment. We will cover both hardware and software platforms, what an assessment should include and its value. We will discuss some of the risks associated with relying on equipment that is becoming obsolete or can no longer be purchased, and how to plan for an upgrade path.

36. WATER DISTRIBUTION | Frontenac B, Fairmont Chateau | 3:15 – 4:45 PM

Moderator: Jeffery Phillips

Time slot: 3:15 – 3:45 PM

Abstract Title: Being Prepared, a Review of a 24–inch CCP Emergency Repair

Presenter: Dave Brewer – USC WEST

If you’re municipality that has Concrete Cylinder Pipe in its system, otherwise referred to as “Hyprescon” in some circles, you should have specific fittings and a plan laid out for executing a repair should you have a failure. This type of pipe requires special consideration when dealing with a tie–in or repair when compared to other piping materials. In this joint presentation, we will cover a recent failure within the CRD utility and some of the important considerations and preparation that were made ahead of time in order to deal with the repair in an effective and timely manner. The planning and preparation made ahead of time will help avoid what can be a difficult repair and more importantly, downtime to a utility’s customers.

Time slot: 3:45 – 4:15 PM

Abstract Title: Metro Vancouver Newton Tunneling and Reservoir Upgrades, Tunneling Under Live Reservoir

Presenter: Phil Cook – WSP Canada

Tunnel using MTBM under an existing and active water reservoir. Due to increasing demand for water resources, and the congested utility corridors of today, innovative construction methods are required to install larger utilities in increasingly difficult spaces without adversely impacting existing infrastructure. This project involved a robust construction risk assessment process, including design, construction, and operational risk mitigation considerations. Tunneling under an existing in–service cast in place concrete reservoir, with 2200mm steel casing pipe by Micro tunnel bore machine (MTBM) to install twin 900mm outlet pipes required a thorough evaluation of risk, including construction methodology, contingency planning, thorough evaluation, and analysis of tolerance of existing infrastructure to settlement and a robust monitoring and mitigation plan.

Time slot: 4:15 – 4:45 PM

Abstract Title: Water Loss Reduction Using Pressure Management and Active Leak Detection

Presenter: Jody Malo – CB Process Instrumentation & Controls

Managing Water Loss in today’s water systems is a significant challenge for all Water System Managers. The need to supply water at adequate pressures for all types/demands of customers, as well as for fire protection is an ever–changing challenge. Adding the Financial and Regulatory demands that are now requiring water managers to do even more with less money, as well as reduce the water being supplied. Pressure management and leak detection are key strategies to help achieve everyone’s goals. Managing water pressure can help save water, money, and reduce pipe bursts.

37. DRINKING WATER SOURCE & PROTECTION – ALGAE | Frontenac C, Fairmont Chateau | 3:15 – 4:15 PM

Moderator: Miles Yi

Time slot: 3:15 – 3:45 PM

Abstract Title: Some Like it Hot! Actions to Address Algae Issues

Presenter: Dorte Koster – Associated Engineering

Algae are essential to our waters but can create challenges, such as toxins, taste and odour, changes to pH, and aesthetics. Reports of algae issues in lakes, drinking water reservoirs, storm ponds and wastewater lagoons, along with available treatment options, have recently increased. But an understanding of the cause and the different types of algae that are present is key to identifying the most effective solutions. This presentation will provide an overview of the common types of algae, their biology and related issues for water and wastewater treatment. We will then discuss conditions that promote algae, such as climate, water quality and mixing patterns. Then, most importantly, we show how essential the understanding of algae is to assess risk and inform the right mitigation actions. Using case studies, we will demonstrate techniques to investigate algae issues and select the most appropriate solution for your type of algae.

Time slot: 3:45 – 4:15 PM

Abstract Title: Predictive Modeling of Harmful Algae Blooms in Source Water Reservoirs

Presenter: Donovan Klassen – Carollo Engineers

Through changing climate conditions, surface water sources are experiencing increased pressures that amplify the potential magnitude and frequency of Harmful Algae Blooms. Carollo partnered with Clearwater Analytica, in collaboration with the City of Salem, The Water Research Foundation (Water Research Foundation project #5080), and community water suppliers across the North America, to develop AI-powered predictive models to better anticipate the risk of Harmful Algae Blooms within watersheds. Using historical water quality and climate data, the models provide local water suppliers with a risk monitoring tool for Harmful Algae Bloom events, which allows for timely modification of treatment processes or source water selection to proactively manage the water quality for customers. This presentation will discuss the results of the Harmful Algae Blooms predictive modelling from multiple case studies including Oregon's Detroit Lake Watershed and several other watersheds through North America.

38. STORMWATER/ INFLOW & INFILTRATION | Empress A, Fairmont Chateau | 3:15 – 4:45 PM

Moderator: Satej Kulkarni

Time slot: 3:15 – 3:45 PM

Abstract Title: Richmond's Dike Upgrades: Climate Change Adaptation in An Urban Island

Presenter: Simon Kras – WSP Canada

The City of Richmond is home to over 215 thousand residents who depend on 49 km of dikes surrounding the City to prevent flooding. The City is in the process of upgrading the entire dike, raising it to elevations which will meet the year 2100 sea level rise forecasts. Upgrades are intended to improve flood protection primarily through improvements in the dike height to protect against higher water levels. In many cases, dike robustness is also improved through a superdike approach. Going beyond the planning stage into construction requires balancing public interests and

environmental protection. Dike improvement projects can also result in improved pedestrian safety, traffic safety and increase public park space.

Time slot: 3:45 – 4:15 PM

Abstract Title: Analysis of Sediment Depth from Inspections of Oil–Grit Separators

Presenter: Joel Garbon – Imbrium Systems

Oil–grit separators (OGS) are widely used in Canadian stormwater treatment applications and are increasingly installed upstream of green stormwater infrastructure as pretreatment measures. Depending on runoff sediment loads and maintenance frequency, the depth of accumulated sediment in the OGS device may become excessive and compromise treatment effectiveness, increase vulnerability to scour, and reduce the service life of downstream green infrastructure. Despite being a fundamental parameter, little data on sediment depth has been available. This presentation examines findings from a large database of sediment depth inspections performed on ninety OGS devices, and provides insights on installation site variability, sediment transport, treatment performance, and maintenance interval.

Time slot: 4:15 – 4:45 PM

Abstract Title: Design Storm Analysis and Climate Change Impacts

Presenter: Allyson Bingeman – GHD

Developing a detailed understanding of the relationship between the intensity of rainfall occurring over a specified period and its frequency of occurrence is essential for planning and adapting to climate change. This includes developing both current and future IDF curves. The IDF curves inform pipe size requirements and green infrastructure to convey runoff under climate change projections. Design storms should be representative of rainfall patterns in the area of application; however, published design storms have not been updated for decades and may no longer apply as climate change impacts precipitation patterns. This presentation discusses the latest development of design storm distributions to be utilized in/near Vancouver for planning and design purposes. This analysis examined historical precipitation data to identify typical storm characteristics to determine if published design storms are suitable. In addition, the storm characteristics were investigated to determine if there is any variation in time.

39. WASTEWATER CONVEYANCE | Empress B, Fairmont Chateau | 3:15 – 4:45 PM

Moderator: Michael Florendo

Time slot: 3:15 – 3:45 PM

Abstract Title: Fraser River Forcemain Crossing

Presenter: Joel McAllister – Onsite Engineering

The Cities of Mission and Abbotsford share a wastewater treatment plant (WWTP) that was constructed in 1981. A single 600 mm \emptyset forcemain conveyed all of Mission's wastewater across the Fraser River to the WWTP. Recognizing the consequences of the failure of this pipe, the City decided to construct a new 900 mm \emptyset forcemain across the Fraser to the WWTP. Onsite Engineering was retained by Mission to design, obtain approvals, and provide tender and construction administration services for a new 900 mm \emptyset forcemain crossing of the Fraser River. It was determined that the best construction methodology was to use the dredge, drag, and cover method. The required depth of the forcemain resulted in the need to dredge over 600,000 m³ of sand from the river prior to the pipe being pulled across. In early March 2022, the dredging was completed, and the pipe successfully pulled across the river.

Time slot: 3:45 – 4:15 PM

Abstract Title: Willow Trunk – A Watershed-wide Solution for CSO Management

Presenter: Mike Lam – GHD

The City of Vancouver (the 'City') is experiencing pressures of population growth, aging infrastructure, degraded ecosystem, and climate change while needing to foster economic growth and social equity. To address these growth and legacy related challenges of the major growth areas, the City has commissioned a wholistic study on the Willow Trunk sewershed. The study aims to develop a comprehensive plan to strategically separate combined trunk sewers and implement sewershed-wide green infrastructure and nature-based solutions to achieve the required performance goals. The study includes developing a 1D-2D InfoWorks ICM model for over 213 km of sewer pipes within a 985 ha sewershed. The model includes projected rainfalls and sea level rise based on climate change scenarios up to 2100. This study highlights the ability of digital planning and advanced modelling in solving multi-faceted challenges of a complex sewer system based on a variety of infrastructure solutions.

Time slot: 4:15 – 4:45 PM

Abstract Title: Eliminating Infiltration and Inflow Via Pressure Sewer Systems

Presenter: Jill Davis – Environment One Corporation

Aging gravity sewer systems are inundated with infiltration and inflow. Ground water and storm water, mixed with sewage, greatly increase the volume of fluid delivered to the wastewater treatment plant. This increased volume creates unnecessarily high costs of treatment and reduces the ability to develop new land due to occupying unnecessary capacity at the treatment plant. Pressure sewer systems originated over 50 years ago to tackle this exact challenge. Using a sealed, small diameter pipe network, the systems are easy and economical to install. Pressure sewers can be deployed quickly without causing major disruption to established neighborhoods, and new developments can use a phased approach to construction which saves costs and limits environmental disturbance. By the end of the session, attendees will understand the methods and advantages to installing pressure sewer systems, conceptualize the elimination of I & I in existing gravity sewer systems, and, through the reduction of flow to the WWTP, realize how new developments can be added without the capital costs required to expand, or replace, their existing wastewater treatment plants.

40. WASTEWATER – RESIDUALS MANAGEMENT | Empress C, Fairmont Chateau | 3:15 – 4:45 PM

Moderator: Rushat Agarwal

Time slot: 3:15 – 3:45 PM

Abstract Title: Is Hydrothermal Liquefaction a Feasible Alternative for Managing Wastewater Solids?

Presenter: Lillian Zaremba – Metro Vancouver

Metro Vancouver (MV) is facing a tripling of sludge production by 2050 due to wastewater treatment plant (WWTP) upgrades and population growth. To address that challenge, MV needs to diversify its solids management options and is considering Hydrothermal Liquefaction (HTL) as a potential solution. HTL uses temperature and pressure to convert wet biomass into biocrude, which is then refined into low-carbon transportation fuels. MV is building a continuous flow HTL demonstration facility that uses wastewater sludge as its feedstock. It will process 2 dry tonnes/day of undigested primary and secondary sludge. Design is complete and operation will begin in 2025. Project partner Parkland Refinery

will co-process the biocrude. As the first utility to implement a HTL demonstration plant at an operating wastewater treatment plant, MV has worked through technical and business risks along the scale-up journey.

Time slot: 3:45 – 4:15 PM

Abstract Title: Hydrothermal Liquefaction: A Promising Solution for Sustainable Municipal Sludge Management

Presenter: Ibrahim Alper Basar – University of British Columbia

The valorization of municipal sludge is an essential step in sustainable wastewater treatment practice. However, most wastewater treatment plants (WWTP) are not able to fully utilize municipal sludge for energy and nutrient recovery. Hydrothermal liquefaction (HTL), a thermochemical biomass conversion technology, is a promising candidate for replacing conventional municipal sludge processes for advanced resource recovery. This study investigated HTL of municipal sludge from two major treatment plants in British Columbia and the valorization of its wastewater product (HTL aqueous). Results showed that HTL could convert 70% of energy in sludge into biocrude, a liquid biofuel that can be distilled into transportation fuels, while achieving >90% solids reduction. HTL aqueous could be treated in aerobic treatment or utilized in anaerobic digestion (AD). Mesophilic AD of HTL aqueous elevates the overall energy recovery to 83%. In conclusion, HTL could help solve multiple challenges in sludge treatment and disposal while producing sustainable transportation fuels.

Time slot: 4:15 – 4:45 PM

Abstract Title: Optimizing Aerobic Digester Design and Operation for Biosolids Stabilization

Presenter: Jason Leong – Associated Engineering

Small wastewater treatment plants receiving less than 10 megaliters per day (MLD) of wastewater generate enough solids to require onsite sludge stabilization. Aerobic digestion is a suitable and cost-effective technology candidate for these smaller facilities as the process is simple and safe to operate and achieves stabilization objectives. Mixing, oxygen transfer, thickening, temperature, and pH are the most significant drivers for the proper functioning of an aerobic digestion process. Key design steps for new digesters include tank sizing based on forecasted treatment requirements and site climatic conditions, determining series versus parallel digester configuration, selection of appropriate aeration equipment (blowers and air diffusers), selection of sludge thickening equipment, and mixing effectiveness. These factors are also important in the operation of digesters and are key for Operators to understand.

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