Municipal Utility Management, continued

8:30-9:00  
**How-To Guide for Completing a Climate Lens Assessment**

**Presenter:** Michal Simhon, Associated Engineering

Infrastructure Canada’s Climate Lens Assessment comprises of a Greenhouse Gas (GHG) Mitigation Assessment and a Climate Resilience Assessment. The GHG mitigation assessment is developed for a proposed project in comparison to a baseline scenario (‘business-as-usual’). The climate risk assessment may be conducted using the PIEVC Protocol, a procedure used to develop the risks to the City’s CWWTP infrastructure due to climate change.

This presentation will present the approach and methodology for completing a Climate Lens Assessment. The presentation will highlight the Climate Lens Assessment completed for the City of Powell River’s new Consolidated Wastewater Treatment Plant (CWWTP). Undertaking this assessment was required to secure grant funding contributions for the City of Powell River.

9:00-9:30  
**Drinking Water Infrastructure – Local Government Capital Project Planning and Management**

**Presenter:** Lori Berndt, B.A., M.Ed., Auditor General for Local Government

The office of the Auditor General for Local Government has conducted several performance audits on local government drinking water management in B.C. Most recently, we have examined capital project management related to drinking water and other local government infrastructure. We will review and discuss our audit findings and good practices gathered during our recent audits and through the development of our AGLG Perspectives Series booklets on this topic.

The AGLG’s goal is to help local governments fulfil their responsibilities to be accountable to their communities for how well they take care of public assets and achieve value for money in their operations. The AGLG Perspectives Series booklets are designed to help local governments improve their performance.

These booklets complement the AGLG’s performance audit reports by providing local governments across the province with tools and more detailed information relating to the topics we examine.
TUESDAY

Risk & Resilience

**Moderator:** Jessica LeNoble, EIT, Kerr Wood Leidal

**Location:** The Penticton Lakeside Resort

**Room:** Salon B

**8:00-8:30**

**Optimizing Large Multi-Feed Pressure Zones with the City of Maple Ridge**

**Presenters:** Werner de Schaetzen, Ph.D., P.Eng. & Andrea d’Andrade, GeoAdvice Engineering

The City of Maple Ridge water distribution system contains 13 pressure zones and 29 PRV stations, in addition to many storage and pump station facilities. Of the 13 pressure zones, the City’s 84 m Zone is, by far, the largest and encompasses the greatest water demand in the City system, servicing approximately 70,000 people. The 84 m Zone is fed by 16 PRV stations, most of which distribute flow from the Metro Vancouver Haney Main No. 2, which runs along Dewdney Trunk Road (DTR). Given the large geographic area and elevation range (roughly 70 m) covered by the 84 m Zone, there exists a noticeable variation in HGL and pressure throughout the zone. Furthermore, the City seeks to optimize pressure, water quality, and PRV operation. The City wished to review the PRV stations feeding the 84 m Zone to identify which PRVs, if any, can be safely decommissioned without affecting hydraulic and water quality performance within the 84 m Zone. Following on the decommissioning recommendations, the City also requested an optimization of set points for the 84 m Zone PRV stations that would minimize water age while also meeting target service levels for flow and pressure.
**TUESDAY**

**Risk & Resilience, continued**

**8:30-9:00**  
How Environmental Risk Identification Helped Victoria Prioritize Action

*Presenter: Josie Gilson, RBTech, Morrison Hershfield*

Ageing infrastructure, changing climate, and threatened natural areas are a few of the many hazards municipal governments are faced with as they deliver services. Indeed, municipalities have shared experiences of the “long emergency” of unmanaged environmental hazards, and have seen the fall out when things go wrong.

Knowing environmental hazards and risks is good practice. But how are hazards identified? What are the risks? And most importantly, how do municipalities prioritize actions to lower risk?

Answering these questions using an Environmental Risk Management Process is the theme of this session. Morrison Hershfield recently completed this process for the City of Victoria’s Engineering and Public Works Department and will discuss how their comprehensive and systematic approach to identify and assess environmental risks is helping prioritize resource allocation across multiple sections of the department.

This session is particularly relevant for asset and risk managers, public works/utility managers, engineers, and emergency services.

**9:00-9:30**  
How to Maintain Critical Water Services Without Disrupting Your Customer

*Presenter: Dave Brewer, USC Utility Supply (West) Corp.*

The failure of a critical water transmission or distribution line can be catastrophic and very disruptive to a utility. Recent watermain failure scenarios in parts of Western Canada has seen some utilities able to maintain water service where it is imperative to do so, while at the same time repair the damaged watermain in a safe and timely manner. Emergency Encapsulation fittings are now available, which in some cases allow a utility to isolate and seal the damaged pipe without the service being disrupted. Some of the repairs covered include Bell/Spigot joints, Large Diameter pipe failures, failures at bends or fittings and pipe that hasn’t failed but has been badly damaged. In all cases, having the knowledge of the options available and preparing for such an emergency can go a long way to having a successful repair.
TUESDAY

Safety

Moderator: Shona Robinson, EIT, Ph.D., Kerr Wood Leidal

Location: The Penticton Lakeside Resort

Room: Salon C

8:00-8:30
Maintenance of Sewage Wet Wells: Confined Space Entry and Safety

Presenter: Stuart Fretwell, P.Eng., Water Street Engineering Ltd.

Maintenance and inspection of sewage wet wells are common elements of pump station operation. At some point over the life of a station, all wet wells require entry by workers. As these stations age, repairs and replacement of components within wet wells can become more frequent and the risks to workers health and safety increases when entry to a wet well is required.

This presentation will provide a summary of discussions with industry professionals including regulators, owners, operators, and contractors on the current practices and policies for implementation of safety procedures and the execution of work in confined spaces as they relate to sewage wet wells. Minimizing hazards during design, to the extent practical, will also be discussed from recent project experience in the City of Vancouver.

8:30-9:00
Eliminating Confined Space Entry in Air Release Valve Chambers

Presenter: Dave Brewer, USC Utility Supply (West) Corp.

Western Canada Public Works departments face a constant struggle with managing operations budgets, time, and safety throughout the province. One of the most prevalent conditions that need to be addressed in both these aspects are confined space entry requirements and procedures – specifically in air release valve chambers. Costly and time-consuming operations to perform maintenance on these valves has led manufacturers to look at methods of increasing operator safety while alleviating budget costs.

The purpose of this White Paper is to review the results in terms of monetary cost to the municipality – as determined by comparing capital costs as well as maintenance costs; as well as time and safety factors for municipal operators. In addition to a technical review, we will present a recent install as a case study to provide an in-depth discussion covering all aspects of the installation and maintenance of this project.
TUESDAY

Safety, continued

9:00-9:30
Understanding Trench / Excavation Safety & Engineering Documentation

Presenter: Ronald Enns, Kwantlen Polytechnic University

This presentation explains the do's and don'ts of working around trenches and excavations. In this presentation, learn how to follow the excavation regulations, engineering documentation, and work around challenging issues to be compliant with today's designs. You will gain a better understanding of Geotechnical Documentation and how it is used in the industry.

TUESDAY

Energy Optimization

Moderator: Eric Pettit, P.Eng., FEC, WSP

Location: The Penticton Lakeside Resort

Room: Merlot

8:30-9:00
District Energy Systems in British Columbia – Update 2020

Presenter: Ron Monk, M.Eng., P.Eng., Kerr Wood Leidal

District Energy Systems (DES) have been used for many years as a method of efficiently transferring heat and/or waste heat from a central source to consumers along a distribution grid. The business case for DES can be made on the merits of its efficient heat distribution, and more communities could consider using this utility to connect renewable heat sources such as geo-exchange, sewage heat, and biomass to contribute to their overall sustainability and specific low carbon emission objectives. This presentation reviews several local examples of KWL’s DES work, including a long-term DE feasibility study for New Westminster, the ongoing expansion of Surrey’s City Centre system, the City of Richmond’s Alexandra District Energy Utility, Lulu Island Energy Company’s sewer heat recovery and interim servicing strategy (for the City of Richmond), and the Southeast False Creek Neighbourhood Energy Utility in Vancouver.
Energy Optimization, continued

9:00-9:30
How to Cut Mixer Power Without Risking a Process Upset

Presenter: Coenraad Pretorius, P.E., GHD

Traditional design criteria for mixing unaerated zones in activated sludge reactors suggest power levels in the range of 6 – 8 W/m³. However, published experimental data for flocculation of mixed liquor translate to power levels two orders of magnitude lower, suggesting that lower mixing power would improve flocculation. Some published data suggest that power levels much below the traditional design criteria (as low as 0.1 – 0.2 W/m³) can maintain adequate mixing. At one facility, the mixers are operated only 30 minutes every day, saving almost 98% of the mixer power consumption, resulting in savings of about US$24,000 per year, with no adverse impact on the process and a positive impact on performance. This presentation will discuss how to identify opportunities for reducing mixer power, the factors to consider, and how to implement such strategies while tracking the variability in mixed liquor suspended solids concentration to ensure that treatment is not affected.

Operator Programming

Moderator: Stacy Bell, Neptune Terminals

Location: The Penticton Lakeside Resort

Room: Zinfandel

8:00-8:30
Can Bioaugmentation Really Improve BNR?

Presenter: Pierre Nader Fanfan, Ph.D., Actizyme

This study presents lab and large scale investigations of bioaugmentation effect upon biological nutrients removal. The case of nitrogen is investigated in lab experiments and one real case study is presented. While lab scale experiments allow easy interpretation of the results, real case studies ask for more statistics tools in order to really appreciate the effects. The case of phosphorous is quickly assessed in the light of A2O processes.
TUESDAY

Operator Programming, continued

8:30-9:30
Sewer Cleaning 101: The Science of Pipe Cleaning

Presenters: Kenneth Billingham, KEG Technologies Inc. & Troy Whitton, Vimar Equipment

This presentation will be beneficial to operator, supervisor, manager and business owners alike as we will explore the relationship between flow and pressure and how they affect each other. Nozzle designs will be discussed, as well as how matching a nozzle to the task can help improve efficiency. We will talk about nozzle tiers and what that means, as well as a close look at “The Blown Toilet Syndrome” and ways to reduce or even eliminate this unpleasant side effect of pipe cleaning. Finally, we will examine cleaning methods and how it is possible to increase productivity and reduce maintenance and costs with a few simple changes to the way we approach the task.
TUESDAY

Municipal Utility Management

Moderator: Sean Trainor, P.Eng., C.Eng., MIChemE, Evoqua Water Technologies

Location: The Penticton Lakeside Resort

Room: Salon A

9:45-10:15
Large Diameter Watermain Repair – Diving into the Project!

Presenters: Chris Newcomb, P.Eng., McElhanney Ltd. & Mike Herschmiller, Comox Valley Regional District

Only four months before the beginning of peak water demand season, the Comox Valley Regional District found it had a major leak in the transmission main that supplies 83% of the potable water and fire protection for a population of 45,000 people. The leak was in an inaccessible location under a river with high fisheries values, and the client was faced with a range of virtually impossible solutions, including building an expensive bypass, digging up the river, or defying the law of gravity to drain the pipe. Instead, by bringing together the “Shared Perspectives” of a diverse group of experts, McElhanney was able to develop a previously unforeseen “Clear Vision” to employ divers to repair the pipe internally while full of water. After overcoming a series of extraordinary delays, and designing a unique safety program for this dangerous operation, the pipe was successfully repaired 24 hours ahead of schedule.

10:15-10:45
New BC Ground Disturbance 201 Standard: How It Applies to You?

Presenter: Ronald Enns, Kwantlen Polytechnic University

This presentation explains what the BCCGA BC Ground Disturbance 201 Standard is, why it is here, who is involved in this standard, when it came it to effect and how it applies to the underground utility infrastructure industry both Public & Private. If you work near pipelines in BC, you need to know what this BC 201 standard is all about!

10:45-11:15
Design and Construction of the New Outfall for the Annacis Wastewater Treatment Plant

Presenter: Ken Masse, B.Sc., P.Eng., Metro Vancouver

Metro Vancouver’s Annacis Island Wastewater Treatment plant is being expanded to meet the needs of a growing population, and a new outfall to the Fraser River is needed due to increased flows. The new outfall will be comprised of 775 m of 4.2 m ID tunnel at 35m depth; two on-land shafts; an in-river riser shaft; and 265m of 2.5 m diameter diffuser manifold buried in the river bed. In addition to enhanced seismic resiliency, the creation of a new outfall presented an opportunity to improve the dilution of the effluent as it disperses into the river. This presentation addresses these design opportunities as well as key constructability challenges and constraints in this dynamic and busy river. Construction, which will span 5 years, started in the fall of 2019.
**TUESDAY**

**Risk & Resilience**

**Moderator:** Mike Homenuke, P.Eng., Kerr Wood Leidal

**Location:** The Penticton Lakeside Resort

**Room:** Salon B

**9:45-10:15**

**How to Maintain Potable Water Supply After a Major Catastrophe**

**Presenter:** A. Cristina Fonseca, Ph.D., P.Eng., Stantec Consulting Ltd.

What would happen if Metro Vancouver’s water supply to Maple Ridge gets fully disrupted? How can the City if Maple Ridge supplement Provincial Emergency Response capabilities to improve its resiliency and emergency readiness? We looked at: i) alternative water supplies, both surface and groundwater, ii) current and future population distribution across the City, iii) service level options, and iv) approaches to treat and distribute potable water across the City.

We identified that a mix between newly identified groundwater and surface water sources could potentially be used to meet demands of 2.5 and 4 L/ca/day, that water distribution as a critical challenge in the aftermath of a major catastrophe, and that great collaboration between City departments need to happen to develop an adequate Drinking Water Emergency Distribution Plan.

Our study also looked at a conceptual level prioritization of water needs, given population distribution, and proximity of alternative ground and surface water sources.

**10:15-10:45**

**Thames Tideway Tunnel, UK – Major Asset Potential Damage Assessment**

**Presenter:** Eric Wu, C.Eng., Ph.D., WSP Canada

The Thames Tideway Tunnel project in London, UK, is a CAD $8 billion scheme which will greatly increase the capacity of the 150-year-old sewer system in London. The 25 km, 7.2 m diameter, up to 70m deep Tunnel will be driven through central London beneath the River Thames, broadly following the path of the river across 24 construction sites.

One of the construction sites is the Blackfriars Bridge Foreshore scheme. This scheme aims to intercept the Fleet Main CSO that discharges combined storm water and untreated sewage into the River Thames through flap valves. At this location, there have been up to 21 discharge incidences and approximately 520,000 tonnes of effluent per year.

This presentation will describe the project challenges and the use of a 3D Plaxis model to undertake a potential damage assessment (PDA) for major assets due to the construction works for this scheme.
TUESDAY

Risk & Resilience, continued

10:45-11:15
Building Climate Resilience in the Okanagan – A Homeowner’s Resource Guide

Presenters: Zoe Kirk, Public Works Special Projects, Regional District of Okanagan Similkameen & Eva Antonijevic

Recently, Local Governments have been slammed with floods, droughts and wildfires. How do we provide timely information to the public, to encourage change behaviour, modify landscapes and motivate property owners to embrace efforts to adapt to the changing climate? How can messaging empower rather than exacerbate climate crisis anxiety? How does this message translate to infrastructure management? And, why should Water and Wastewater professionals care?

Because, prepared homeowners become allies not liabilities in the infrastructure management chain, reducing water use, storm water run-off and water quality issues. Building ‘resilience’ was the impetus behind the concept and creation of the guidebook.

Since publication, to widespread accolades, the RDOS obtained additional funding to ‘unpack’ the guide conducting public workshops region-wide. Working side-by-side with other stakeholders like LG’s, conservation groups, FireSmart, First Nations, guidebook inspired workshops build awareness and provide important information in a beautifully crafted coffee table style compendium.
TUESDAY

Drinking Water

Moderator: Anthony Greville, B.Sc., Waterhouse Environmental Services

Location: The Penticton Lakeside Resort

Room: Salon C

9:45-10:15
Chlorine Disinfection Transition – Gas to Liquid

Presenter: Patricia De Leon, EIT, WSP Consultants

The water industry has seen a trend in transition from gas chlorine disinfection systems to liquid sodium hypochlorite systems at treatment facilities in BC. This has been driven by operator health and safety, training requirements, and municipal risk management associated with the use of chlorine gas.

This presentation will present lessons learned, design considerations and applied best practices from several projects completed in the BC Interior ranging from small irrigation systems to large municipal water purveyors. Consideration of injection systems, storage sizing, chemical unloading and delivery, equipment and material selections, and secondary containment will be discussed, along with operational controls and safety. The audiences will walk away with best practices, brown versus greenfield considerations, and operational requirements for converting to liquid hypochlorite.

10:15-10:45
The Kamloops Experience with On-Site Generation of Hypochlorite

Presenters: Wade Archambault, B.Sc., P.Chem., WT IV, City of Kamloops & Laith Furatian, Ph.D., Stantec

On-site generation (OSG) of hypochlorite is considered an established technology by some, having been successfully deployed in very small to large municipal water supplies. The electrolytic conversion of sodium chloride (i.e. salt) to sodium hypochlorite allows the practice of chlorine disinfection to be conducted with greater safety and operational simplicity. Commissioned in 2005, the Kamloops Centre for Water Quality (KCWQ) has a rated capacity of 160 ML/d and currently serves approximately 90,000 people. Equipped with a fully redundant chlorine equivalent generation capacity of 340 kg/d, the KCWQ is home to the largest on-site hypochlorite generation system in British Columbia. This presentation reviews the basic principles, design and operation of OSG systems, recent issues with the supply of raw materials in Western Canada, and overcoming operational difficulties.
**TUESDAY**

**Drinking Water, continued**

**10:45-11:15**

UV Disinfection Conundrum – 3-Log Cryptosporidium or Virus Inactivation

**Presenters:** Gaurav Ahuja, M.Eng. & Stephen Horsman, WSP Consultants

UV disinfection has become a “go-to” technology for providing inactivation on filtered and unfiltered sources of potable water. A scientific and engineered approach is required to design a Future Ready UV treatment system which includes parameters such as source water variability, risk associated with pathogenic microorganisms including bacteria and viruses, and current and future demands, to name a few.

This presentation will include the risk assessment of the parameters for a dose selection based on the surrogate microorganisms including T1, T7, MS2 and others. It will also showcase the application of UV inactivation for viral organisms such as poliovirus.

The presentation will also discuss various reactor technologies, including LED, medium pressure and low pressure-high output UV systems, and their financial and operational costs.

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**TUESDAY**

**Operational Technologies**

**Moderator:** Mahmoudreza Mivehchi, Ph.D., P.Eng., BMP Engineering & Inspection Inc.

**Location:** The Penticton Lakeside Resort

**Room:** Merlot

**9:45-10:15**

**Autonomous Water System Optimization Through Smart Water Systems**

**Presenter:** Steven Conrad, Ph.D., University of British Columbia

Water supply and demand data - which was once confined to centralized supervisory control and data acquisition systems - is now appearing or being found everywhere. Internet of things applications, cloud connect sensors, as well as distributed meters are creating an environment of ubiquitous data and smart water systems. Smart water systems utilize connected networks of sensors and citizen data with machine learning and data processing to allow the management and monitoring of water systems in near real-time response. This presentation will review the potential of smart water approaches for optimizing pump operations, predictive maintenance of pumps, leak detection, water demand forecasting, and as a disruptive force in driving consumer behaviour while supporting efficient monitoring and management of water assets. This presentation will present examples of smart water approaches and a case study on utilizing autonomous water system operations aimed at optimizing pumping and predicting water demand.
TUESDAY

Operational Technologies, continued

10:15-10:45
Smart Water and Sewer Cities – The Foundation and The Future

Presenter: Kingsley Blease, P.Eng., C.Eng., Xylem Inc.

The water industry has been grappling with ageing infrastructure, watermain leakage, and sewer collection system inflow and infiltration, coupled with combined sewer overflows.

In addition, hydro use to treating and pump water to feed water distribution system leaks, has contributed to CO2 emissions. More severe precipitation has resulted in increased overflows to rivers and streams from combined sewers.

With today’s technology there are ways to face these challenges with Smart Data, and minimize the traditional and expensive infrastructure projects, while at the same time meeting statutory requirements.

Deployment of sensors at key locations within the water and sewer systems, coupled with analytics, results in the ability to take timely decisions to find unreported leaks, and prevent sewer overflows.

The presenter will describe the historical developments in the water industry, from his own experience, and demonstrate how that foundation has led to future opportunities. Examples of Smart Water and Sewer Cities implementation will be provided.

10:45-11:15
Prescriptive Cleaning Can Be a Bitter Pill to Swallow

Presenter: Dave Belomy, M.B.A., ADS Environmental Services

Decades old aggressive O&M cleaning practices have reduced SSOs but are severely impacting operating costs. High-frequency, “hot-spot” cleaning is an accepted practice and has shown to reduce SSOs. Yet, it’s labor-intensive and dependent upon exaggerated overcleaning thus straining utilities’ budgets, bringing into question long-term sustainability.

Utilities are seeking alternatives, turning to smart technology and realizing benefits of lower costs and SSO mitigation. Implementing a collection system sensor network, utilities acquire continuous feedback on actual site conditions. Sensor data is automatically delivered to machine learning software where analytics drive the decision to clean based on actual site conditions.

Three case studies reveal how this approach eliminates overcleaning resulting in reductions of operating costs, excessive wear on pipes and SSO threats. A financial analysis demonstrates a definitive, fast return-on-investment. An added benefit is that this same data is leveraged for other purposes such as scouting I&I, hydraulic model calibration and more.
TUESDAY

Operator Programming

**Moderator:** David Main, AECOM

**Location:** The Penticton Lakeside Resort

**Room:** Zinfandel

9:45-10:15

**Operator Peer Network - For Shared Perspective, and a Clear Vision for the Future**

**Presenter:** Kalpna Solanki, Environmental Operators Certification Program (EOCP)

In 2019, the EOCP initiated work on its ‘Operator Peer Mentor’ program in response to interest expressed by Operators who responded to a survey conducted by the EOCP.

The EOCP believes that mentoring is more than the transfer of advice, knowledge, and insights. The relationship should offer reciprocal benefits for mentors willing to invest their time in developing another professional. As well as the personal satisfaction of sharing their skills and experience with a willing learner, being involved in mentoring also provides some tangible benefits that can reward mentors professionally.

For mentees, being mentored is one of the most valuable and effective development opportunities you can offer employees. Having the guidance, encouragement and support of a trusted an experienced mentor can provide a mentee with a broad range of personal and professional benefits, which ultimately lead to improved performance in the workplace.

This presentation provides information on the structure of the EOCP’s Operator Peer Mentor program, the benefits to mentors, the benefits to mentees, and why the program is successful.

10:15-10:45

**Navigating the EOCP’s Customer Relationship Manager**

**Presenter:** Jenni Green, P.Eng., Environmental Operators Certification Program (EOCP)

This will be a live demonstration of the EOCP’s CRM system: the one stop-shop for Operators, facility owners, consulting engineers, training providers and government officials in the water and wastewater industry. We will highlight how the system works, give examples of how to classify a facility, apply for an exam, find a training course, upload CEU’s, etc. We will also have laptops on hand to assist operators (and others) with specific questions.
**TUESDAY**

**Operator Programming, continued**

**10:45-11:15**

Infiltration and Inflow Fundamentals

**Presenter:** Lorelei Baratto, AScT, ADS Environmental Technologies Inc.

Infiltration and Inflow (I&I) are common problems in sanitary sewer systems. While inflow typically gets most of the attention in wet weather, groundwater infiltration can also be a big problem in dry weather, silently stealing sewer capacity 24 hours per day, 7 days per week, 365 days per year. Groundwater infiltration cannot be measured directly, but is often estimated from sewer flow monitor data using a variety of empirical methods.

The authors provide an overview and comparison of four methods, including the % Minimum Method, the Wastewater Production Method, the Stevens-Schutzbach Method, and the Mitchell Method. Examples of each method are provided from flow monitor locations throughout the United States to further explore the performance of these methods and provide guidelines for proper applications.

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**TUESDAY**

**Municipal Utility Management**

**Moderator:** Ron Weismiller, P.Eng., City of Burnaby

**Location:** The Penticton Lakeside Resort

**Room:** Salon A

**1:15-1:45**


**Presenters:** Mahdi Bazri, Ph.D., P.Eng. & Melodie McKnight, Jacobs Engineering Group

The Englishman River Water Services is a joint venture between the City of Parksville (CoP) and the Regional District of Nanaimo (RDN). To provide a safe and reliable year-round drinking water source for both the CoP and RDN, construction of a new treatment plant (16 ML/day) was started in 2017. The plant has recently been commissioned and includes a new intake from the Englishman River and a treatment train consisting of coagulation and Ultrafiltration followed by UV disinfection.

Introduction of the new water source augments the current water supply for both the CoP and RDN. Regulatory and practical considerations such as Drinking Water “Act” and “Regulation” and blending of multiple water sources were necessary prior to the full-scale integration of the plant into the existing water infrastructure. This presentation reviews the commissioning and facility startup test period and highlights key messages and learnings that are beneficial for smooth WTP commissioning.
TUESDAY

Municipal Utility Management, continued

1:45-2:15
Success Through Collaboration - Mangawhai Water Treatment Plant

Presenter: Jonathan Lowe, P.Eng., WSP Canada

The Township of Mangawhai water system consisted of a single shallow well with no treatment and did comply with the Drinking Water Standards of New Zealand. Highly regarded for its outstanding coastal environment, Mangawhai has a permanent population of 200 people; however, over the Christmas period, the population can increase overnight to 900 people as summer vacationers flock to the area. Due to the public health risk, a new water treatment plant was required prior to the following Christmas, requiring concept design through to commissioning within just three months.

The timeframe was not possible following a traditional design-bid-build method; this lead to a tailored procurement method, coined design-collaborate-refine-build. Specialist consultants and contractors with local working history were engaged in a hands-on collaborative environment. The innovative approach exceeded community expectations and achieved the aggressive construction schedule. The project was awarded the 2017 Best Public Works Project <$5 Million in New Zealand.

2:15-2:45
Pilot-Scale Ceramic Media Filtration at City of Saskatoon WTP

Presenters: Sandeep Raja Dangeti, DelcoWater – A Division of Delco Automation Inc. & Trevor Johnson, Sapphire Water – A Division of DelcoWater

Ceramic filter media - porous media with high surface area - was evaluated as a replacement to the existing anthracite/sand media filtration process at City of Saskatoon WTP with an intent to increase production while minimizing capital expansion and operating costs. Pilot-scale study was conducted on multiple (parallel) filter columns with varying bed depths of ceramic filter media and anthracite/sand media, and were operated at flux rates of 3.2 USGPM/ft² up to 5.3 USGPM /ft².

Ceramic filter media was consistent in reducing turbidity to less than 0.1 NTU compared to anthracite/sand media. Ceramic filter media has indicated reduced head loss development per run time (0.25 PSI/day) compared to anthracite/sand media (0.6 PSI/day), where head loss development was reduced with filter aging. Longer filter run times are achieved, 180% increase in volume/run times with ceramic filter media. The performance was consistent under all seasons; at influent water temperatures of 0.8 °C to 17.8 °C.
TUESDAY

Asset Management

**Moderator:** Elise Pare, P.Eng., WSP Canada Ltd.

**Location:** The Penticton Lakeside Resort

**Room:** Salon B

1:15-1:45

**Acoustic-Based Underground Utility Mapping at the Annacis Island WWTP**

**Presenters:** Michael Metcalf, Ph.D. & Gary Skipper, Brown and Caldwell

Accurate subsurface data is critical for Subsurface Utility Engineering (SUE) of design or asset management programs. Electromagnetic technologies are typically used for locating subsurface utilities, but performance is environment dependent – high conductivity soils severely degrade performance.

We present an acoustic-based system for locating subsurface utilities that is independent of soil conditions. Reflection of sound off subsurface objects is the detection mechanism. By moving the sound source and receivers over the field area, a 3D representation of underground utilities can be generated. Metallic or non-metallic objects, plus voids or other subsurface features, are detected to range of 10m.

Results from the Annacis Island WWTP are presented, showing acoustic results strongly correlating with the existing plant Building Information Model (BIM) and field observations. We also observed position deviations in some pipe locations plus apparent “debris fields” thought to be buried construction materials from the earliest days of the plant.

1:45-2:15

**Application of Pipe Penetrating Radar in Critical Large Diameter Pipes**

**Presenter:** Nicholas Goertz, SewerVUE Technology

Pipe Penetrating Radar (PPR) is the underground in-pipe application of ground penetrating radar (GPR). This technology has been used extensively to inspect the condition of concrete and brick-lined tunnels and sewers.

This paper demonstrates the useful application of the technology through recent case studies.

The North Surrey interceptor is a 250mm diameter reinforce concrete pipe. Never have concrete thickness measurements been made on a large diameter sanitary sewer pipe during live flow conditions. Considering the methodology and conditions of the survey, having accurate wall thickness measurements provides significantly more information about the condition of the pipe than CCTV alone. In critical sections of pipe where the poor condition may not be evident from CCTV alone, PPR can provide exact measurement of the remaining wall thickness. Accurate remaining wall thickness can be used to inform rehabilitation or replacement decisions for these critical sanitary sewer assets.
TUESDAY

Asset Management, continued

2:15-2:45
Fast-Tracking Your Asset Management Program Through Facility Condition Assessment

Presenter: Chris Lombard, P.Eng., MBA, AECOM

How does a municipal utility make the leap from asset data to asset wisdom for its facility assets? In other words, how do you combine the significant amounts of information in GIS, consultant reports, as-built drawings and other sources to translate it into meaningful and actionable asset management information? This presentation will highlight the methodology and lessons learnt in performing facility assessments (FCAs) on utility assets such as water and wastewater treatment plants, pump stations, reservoirs and offices. The work typically includes creating a digital twin of the asset in advance of the FCA, performing the FCA using digital tools and procedures, and then when back in the office creating a detailed asset inventory with necessary asset attributes combined with financial planning and prioritization of future expenditures. FCAs have the potential to be a game-changer for utilities that want to take its asset management capabilities to the next level.

TUESDAY

Drinking Water / Source Water

Moderator: Emily Kenny, P.Eng., PMP, Black & Veatch

Location: The Penticton Lakeside Resort

Room: Salon C

1:15-1:45
Walkerton Twenty Years On - Inquiry Recommendations Relevant in BC Today

Presenter: Laith Furatian, Ph.D., Stantec & Len Clarkson (Retired)

In May of 2000, drinking water contamination devastated the community of Walkerton, Ontario, resulting in acute illness for 2,300 residents, debilitating long-term health effects for many, and seven deaths. The tangible economic impact was estimated to be over $64.5 million. The subsequent inquiry lead by Justice O’Connor examined the events and their causes and conducted a comprehensive review of drinking water provision across the province. That review included the examination of statutory, regulatory, technological, management and operational systems and processes for Ontario drinking water. A total of 93 recommendations were made to address identified weaknesses. The Inquiry revelations had a profound impact throughout Canada and beyond, influencing the modernization of drinking water legislation, including the BC Drinking Water Protection Act. We revisit those recommendations from the British Columbia perspective to identify those most relevant to our province and how they may have been implemented elsewhere.
TUESDAY

Drinking Water / Source Water, continued

1:45-2:15
Opportunities to Improve Source Water Protection in BC

Presenters: Rebecca Mersereau, MPA, M.Sc., RPBio, Econics & Natasha Overduin, M.A., Compass Resource Management

In response to recommendations from the Auditor General of BC’s 2019 Report ‘Protecting Drinking Water’, the BC Ministry of Health launched a review of the regulatory framework related to drinking water source protection. The objectives of the project are to identify opportunities to strengthen legislation, policies, and practices related to drinking water source protection. It is a rare opportunity to identify significant and lasting opportunities to improve the safety and security of drinking water for BC residents.

Due the complexity of jurisdiction over source protection in BC, in addition to traditional policy review, the project involves extensive consultation with stakeholders from provincial and local regulatory agencies. Preliminary findings from the project will be presented to conference delegates, followed by plenary or break-out group discussions to enable participants to provide feedback and identify other ideas to improve drinking source protection in BC.

2:15-2:45
Water Supply Agreements

Presenter: Olga Rivkin, J.D., Lidstone & Company Law Corporation

The presentation will discuss and review bulk water supply agreements between two or more water suppliers. In particular, what a bulk water supply agreement is (a sale of commodity), what this type of agreement commonly includes, and the issues it commonly raises (and how to prevent these). The presentation will also compare bulk water supply agreements with other types of agreements - for instance, joint works agreements, where two or more water suppliers jointly use works. The presentation will assist attendees to determine the nature of their relationship and what that relationship entails.
TUESDAY

Risk & Resilience Workshop

Location: The Penticton Lakeside Resort

Room: Salon D

1:45-4:30

Unravelling the Entanglements of Defining Water System Resilience

Facilitators: Steven Conrad, Ph.D., University of British Columbia; Shona Robinson, EIT, Ph.D., Kerr Wood Leidal; and Negin Tousi, B.A.Sc., WSP Canada

Unravelling the entanglements of defining water system resilience will address defining “What is resilience and how does it apply to water systems?” The session will provide an overview of contemporary perspectives on resilience, in terms of how it might be defined and what that means for water system performance. Session participants will learn about best-practices and measures for adapting to climate change and enhancing system resiliency across the water sector. Session participants will also participate in an immersive 2030 serious game-play exercise whereby they will ‘jump’ to a future where existing constraints and enablers are swapped out for alternative ones. Participants will respond to scenarios in each ‘presented future’ to define what resilience might look like in 2030.
TUESDAY

Operational Technologies

Moderator: Paige Cullingworth, EIT, Kerr Wood Leidal

Location: The Penticton Lakeside Resort

Room: Merlot

1:15-1:45
The History of Valve Insertion & Its Future

Presenter: Brandon Pater, A.Sc.T, Pacific Flow Control Ltd.

With aging infrastructure, there are inoperable valves located in key municipal infrastructure. Live valve insertions to avoid shutdown and minimize risk is becoming a necessity throughout North America.

Deciding which valve insert is right for your system can be a daunting task. With four valve insertion manufacturers on the market and within them offering different methodologies, and another one coming this spring, there will be up to ten very different valve inserts to choose from.

We would like to take you on a guided tour through all the different valve inserts available. We’ll discuss the differences between the installation methods, the valves themselves and discuss the pros and cons of each one.

At the end of the presentation, you will have a good understanding of what a valve insert is, as well as be able to make your own informed decision on which valve insert is right for your infrastructure needs.

1:45-2:15
Everything You Wanted to Know About Air Valves....

Presenter: Kim Sorensen, P.E., ARI USA

Do I need an air valve? What do air valves really do for our pipelines? Should I use an air release valve, an air/vac valve or a combination valve? Where should they be placed? I only need them at high points, right? What size do I need, 2 inch should be fine, right?

There always seems to be a lot of questions regarding air valves. This presentation discusses the different types of air valves, why we need them, where to place them and how to size them based on location. The AWWA M51 air valve sizing and placement guidelines will be discussed and how these apply to our pipe systems. System issues that can impact air valve functions such as low pressure, partial pipe flow and constant filling/draining of wastewater lines. The difference between air valves for clean water systems and air valves for wastewater systems will be presented as well as items to consider regarding air valve maintenance.

The presentation will help attendees to understand why they need air valves in their pipe systems, the different types of air valves, and the difference between WW air valves and clean water valves. They will also learn how to correctly size air valves and why maintenance is critical to properly functioning air valves. In addition, they will learn important design and installation procedures for air valves in order to increase valve efficiency.
TUESDAY

Operational Technologies, continued

2:15-2:45
Why Are Actuators Important and Are They Making Your Life Easier?

Presenters: Hua Aun Tan & Justin Graham, Spartan Controls

Valve actuators that are not specified correctly can cause significant performance issues to pipelines or plants. An emergency valve that does not shut can cause pipe rupture or flooding. It is important to have a good understanding of valve actuation to prevent failures, decrease environmental emissions, save cost, or increase functionality. We will cover the important considerations when selecting an actuator in terms of performance, functionality and cost. We will also look at how to navigate the many actuator technologies and options available in today's market.

Finally, we'll look at new technologies - including smart diagnostics - and integrating into a connected world. This presentation is for anyone who is involved with the operation, planning, maintenance, selection, buying or engineering around Valve Actuation.

TUESDAY

Operator Programming

Moderator: Pat Miller, Sun Peaks Mountain Resort Municipality

Location: The Penticton Lakeside Resort

Room: Zinfandel

1:15-2:15
Latest in Sampling and Analysis Equipment

Presenter: Jeff Spencer, BI Pure Water

An opportunity to look at equipment that can be used for Sampling and Analysis of raw and treated water and/or wastewater. Sampling and Analysis can be used to improve the performance and efficiency of a treatment process and design. Process data, obtained from continuous monitoring and analysis, can be used to confirm consumption rates of process inputs (consumables) to better establish budgetary forecasting.
TUESDAY

Operator Programming, continued

2:15-2:45
Dealing with the Maximum Acceptable Guidelines for Manganese

Presenter: Deanne Mould, BI Pure Water

A look at a current case study of a community using a test skid to pilot test for Manganese removal to meet recent increased Canadian Guidelines for Drinking Water Quality. We also look at how Greensand systems are performing in the communities of Powell River, Mill Bay, Vancouver Island, and Watson Lake, Yukon. We review sampling Greensand media to see if it’s exhausted, and how and when to replace media.

In addition, we will look at how Greensand vessel systems are working for the communities of Powell River and Mill Bay in BC, and Watson Lake in the Yukon.

TUESDAY

Climate Change

Moderator: Elise Pare, P.Eng., WSP Canada Ltd.

Location: The Penticton Lakeside Resort

Room: Salon A

3:00-3:30
Beyond the Flood Zone: Managing Cascading Impacts on Vancouver’s North Shore

Presenters: Amir Taleghnai, P.Eng., Kerr Wood Leidal & Stephen Bridger, District of North Vancouver

Sea level rise is a significant concern for Vancouver’s North Shore region, which is home to over 180,000 people, the Port of Vancouver, and vast natural and cultural assets. As a local ‘first’ for sea level rise adaptation, three municipalities, the Squamish Nation, the Port of Vancouver, and North Shore Emergency Management have partnered to develop the North Shore Sea Level Rise Adaptive Management Strategy.

The project used a combination of quantitative and qualitative approaches to estimate consequences and risk of flooding, including building damage costs, business disruption, and the extent of power outages. Findings from this assessment show that critical infrastructure assets are within the flood zone and at risk of causing cascading impacts and service disruption extending beyond flood zones. This presentation, by the project consultant team from Kerr Wood Leidal (KWL), will share out on the project approach, results, and strategies to manage impacts to critical assets.
TUESDAY

Climate Change, continued

3:30-4:00
Extreme Rain, Urban Flood and I/I: Development and Mobilization of Resources

Presenter: Dan Sandink, Institute for Catastrophic Loss Reduction

Recent projects focused on mitigation of the potential impacts of climate change on Canada’s built environment have significantly raised the profile of I&I and basement flood risk within Canada's code and standards development agencies. These projects include the National Research Council’s Climate Resilient Buildings and Core Public Infrastructure project, and the Standards Council of Canada’s Infrastructure Program.

Projects funded through these programs have focused on private-side mitigation of I&I and basement flood, including development of a new national guideline on private-side basement flood protection (CSA Z800-18), development of supplemental guidelines on lot-side basement flood protection, and resources concerning I/I in new and existing construction.

The presentation will review recent projects commissioned by federal agencies, and upcoming activities associated with mobilizing resources. Mobilization will include work with multiple stakeholders to develop tools, including costing tools, websites, and other resources, targeted at specific technical and non-technical users of the above-mentioned resources.

4:00-4:30
Inflow and Infiltration: Effects of Aging Infrastructure and Climate Change

Presenter: Joanne Slazyk, P.Eng., PMP, District of North Vancouver

Inflow and Infiltration (I&I) has become an important issue for District of North Vancouver (district) operations due to combined effects of aging infrastructure and climate change. Seventy percent of the district’s sanitary sewers were installed between 1943 and 1970. Conditions and locations of these sewers, including many installed in backyard easements downgrade of rock pits, exacerbate I&I. Large rainfall events in the district have become more frequent and intense and significantly increase I&I rates. As of November 25, the district has experienced two 5-year return period rainfall events in 2019.

In March 2018, the district received $3.6 million in grant funding from Canada’s Clean Water and Wastewater Fund for I&I reduction. With this funding, the district enhanced the Reduction of Inflow and Infiltration (I&I) Program. The program successfully reduced I&I rates in the target catchment. Unfortunately, funding and human resource constraints limit our ability to execute a large multi-year program.
TUESDAY

Asset Management

**Moderator:** Jonathan Lowe, WSP Canada Ltd.

**Location:** The Penticton Lakeside Resort

**Room:** Salon B

**3:00 – 3:30**

**Condition Assessment and Proactive Management Practices**

**Presenter:** Mike Higgins, P.E., HDR Inc.

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.

**3:30 – 4:00**

**Documenting O&M Asset Preferences to Improve Reliability of Engineering Designs**

**Presenters:** Jamal Awad, Ph.D., P.E. & Brandon Walker, GHD

For many public agencies/utilities, significant project deliverables lack the valuable input of both positive and negative lessons learned from previous designs and operations experiences. The type of valve, equipment, pump, compatibility of material, maintenance requirements, and ease of operability are frequent examples of such information. Standard specifications have been considered as the solution to address these problems, but updating these documents has become increasingly more difficult because of dilution of knowledge and information silos. In fact, many consulting engineers have stopped using standard specification templates as the starting documents for their designs. Faced with conflicting requirements in bid documents for similar facilities, the Inland Empire Utilities Agency (IEUA or Agency) started the development of Engineering Design Guidelines to communicate design preferences of the Agency to its consulting engineers to improve consistency and efficiency to project deliveries. This has resulted in significant maintainability, operability, procurement, and fiscal advantages. A number of workshops and staff interactions were utilized to build consensus regarding Guidelines’ format. A tabular form was utilized to make the Guidelines easy to interpret and modify in the future. Additional updates have made the Guidelines even more reader friendly. The level of completeness and usefulness of these Guidelines has improved with their use and updates. The Guidelines have significant attributes/benefits including:

- Use for establishing significant design requirements at much higher efficiency
- Innovative tabulated format for ease of use and quick updates/reference
- Address technical areas that are common sources of inconsistencies
- Serve as a checklist for QC reviews during design

Future updates of the Guidelines will include digital hyperlinks to sources of supply, technical references and key items that are commonly updated or changed by third parties (such as vendors).
TUESDAY

Asset Management, continued

4:00 – 4:30
Understanding and Applying the Different Levels of Machinery Condition Monitoring

Presenter: Carl Sheehan, P.Eng., Spartan Controls

The technology involved with Machinery Condition Monitoring has evolved dramatically over the years. From route-based vibration monitoring using a hand-held analyzer to modern on-line sensing with Machine Learning algorithms, maintenance personnel can choose from a variety of technologies to apply to their critical assets. This presentation will discuss the various levels of Machinery Condition Monitoring and provide some guidelines to choosing the appropriate level for various assets.

TUESDAY

Source Water

Moderator: Robyn Sherstobitoff, P.Eng., Associated Engineering

Location: The Penticton Lakeside Resort

Room: Salon C

3:00 – 3:30
Real-Time Prediction of Microbial Water Quality

Presenters: Atefeh Aliashrafi Zagi, M.Sc. & Nicolas Peleato, University of British Columbia Okanagan

Fecal Indicator Bacteria (FIB), including E. coli, are essential indicators of fecal contamination in water and are critical parameters for the microbial assessment of drinking and recreational water. However, their measurement takes over 24 hours, which critically delays response to changes in water quality. During this time, microbial contamination may exceed permitted standards and threaten public health.

We will present our recent work that looks to fill this time gap by estimating FIB and E. coli concentrations using real-time weather and water quality data. The focus of the work was on the application of an Artificial Intelligence-based method, Bayesian Belief Networks (BNNs), which were able to predict E. coli and FIB levels with greater than 75% accuracy at seven monitoring sites in BC. We believe the proposed method offers a great opportunity for real-time prediction of microbial quality that contributes to improving risk-based management of water in a timely manner.
Source Water, continued

3:30 – 4:00

Practical Examples of Technical Assessments for Groundwater Use Applications


A person completing an application for an authorization to divert and use groundwater may be required by the Province to complete a desktop - and where necessary, a field-based, technical assessment - to provide sufficient information to support the application and to better inform the statutory decision maker on water availability, the potential for impacts to licensed water users, and environmental flow needs. The level of detail of the technical assessment will depend on a number of factors, including proposed quantity of water use, allocation pressure on the groundwater resource, and the proximity of the groundwater source to other groundwater users, surface waters and saline waters. Golder has prepared this presentation to provide real-world examples of technical assessments conducted at various levels to support groundwater use applications. The presentation will consider recent (2019) updates to the provincial guidance document for technical assessment requirements in support of groundwater use applications.

4:00 – 4:30

Planning Source Water Protection on Forest and Range Lands


Source water protection is a big deal to British Columbians. Threats to water quality is in the news frequently including how it is regulated by the BC government and delivered by local government. Over the past 25 years, impacts of forest and range practices to water has consistently been a leading subject of concerns and complaints investigated by the BC Forest Practices Board.

Providing safe drinking water is challenging and complex and there are many factors outside the control of those legally charged with doing so. Climate change is expected to make it even more complicated.

But we can’t start effectively protecting water until there is a unified plan amongst all land users and interests within a watershed. This presentation will share some of the Board’s experiences and perspectives on source water protection on Crown forest and range land, and provide some suggestions to enable more effective planning and management.
TUESDAY

Stormwater

Moderator: Ron Enns, Kwantlen Polytechnic University

Location: The Penticton Lakeside Resort

Room: Merlot

3:00 – 3:30
Integrated Rainwater and Groundwater Management for Urban Townhouse Development: A Case Study

Presenter: Jessica LeNoble, M.A.Sc., Kerr Wood Leidal Associates Ltd.

Can the City of Vancouver’s ambitious rainwater management requirements be met in a densifying area where single family homes are being replaced with townhouses? A theoretical case study looked at using a range of LID options and combinations of options, to meet volume targets, rate control targets, and water quality requirements, all within the property boundary. Types of LID considered included bioretention, filter strips, pervious pavers, rainwater harvesting, and green roofs. LID options for the sites were evaluated using continuous simulation water balance modelling with rainfall and potential evapotranspiration to evaluate and compare the performance of the LID options. A detailed life cycle cost comparison for the selected LID options looked at the costs and relative benefits of the different options for two different zoning density scenarios.

3:30 – 4:00
Creek Health Improves With LID: A Case Study

Presenters: Chris Johnston, B.A.Sc., P.Eng. (BC & AB), Kerr Wood Leidal Associates Ltd. & Dave Matsubara, City of North Vancouver

Wagg Creek in the City of North Vancouver demonstrates the effects of Urban Stream Syndrome, when development in a watershed impacts the hydrology of the creek and the overall health of the creek. Like most of Metro Vancouver, the Wagg Creek watershed has undergone extensive development over the past several decades, where native forest has been removed for development, as well as older neighbourhoods re-developed with increasing impervious coverage.

Since 2003, LID measures have been implemented on both private and public property. The City began with a voluntary volumetric capture target in 2005 and made it mandatory in 2016. Wagg Creek has an extensive data record including flow monitoring data, water quality data, and stream bed sampling for benthic invertebrates (used to calculate an index representing stream health). Data collected in the Wagg Creek watershed show the impacts to the creek, but also indicate that the creek is recently showing signs of recovery which may be attributed to improvements in stormwater management and development planning in the watershed. A new method of calculating effective impervious area (EIA) is demonstrated to show the changes that have happened over time in the watershed. This work shows how understanding the causes of impacts to the receiving water is critical to finding effective urban water management solutions, and how the implementation of these measures is beginning to address the impacts of development.
TUESDAY

Operator Programming

Moderator: Ben Bowker, District of Saanich

Location: The Penticton Lakeside Resort

Room: Zinfandel

3:00-3:30
Working with Service Tubing

Presenter: Lindsay Roper, BA, MBA, REHAU Industries Inc.

This seminar provides a fundamental understanding of cross-linked polyethylene piping systems for underground water service applications. The learning objectives include:

1. Understanding the performance capabilities of PEXa pipe vs other materials
2. Discussing the technical advantages and cost savings of PEXa pipe
3. Describing installation techniques unique to PEXa pipe
4. Explaining freeze protection systems using pre-insulated PEXa coils
5. Discussing specific projects and installation conditions across Canada
6. Listing manuals, publications and other resources for using PEXa water service line

3:30-4:30
Repair of Clamps and Pipe Couplings

Presenter: Dave Brewer, USC Utility Supply (West) Corp.

Abstract TBD