ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA

MAY/JUNE 2021

INNOVATION

2020 | 2021 Project Highlights

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COVER STORY

PROJECT HIGHLIGHTS 2020 | 2021

What do a marine facility in Chile, the design and installation of a 32-metre skywalk on Vancouver Island, a mushroom-harvesting robot, and the piece-by-piece rehabilitation of a heritage trestle near Sooke all have in common? They are all work of BC engineers and geoscientists, found in every corner of the province and around the world. This month, in our annual Project Highlights edition, we share 53 photos and project descriptions from Engineers and Geoscientists BC registrants.

ON THE COVER

City of Surrey's Clayton Community Centre, a facility that integrates several of the City's community services, opened in 2021. Photo: EMA PETER PHOTOGRAPHY.

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CHANGE IS INEVITABLE, BUT NOT ALWAYS EASY

This is a time of change for all registrants, and for Engineers and Geoscientists BC.

First, our CEO and Registrar, Ann English, P.Eng., FEC, FCSSE, will soon retire. On behalf of Council, I would like to recognize her incredible accomplishments and wish her the best in her retirement and special new chapter of life as a grandparent.

I would also like to acknowledge our new CEO, Heidi Yang, P.Eng., FEC, FGC (Hon.), who will lead us as we grow as a regulator under the *Professional Governance Act* (PGA) and establish a "new normal". Through a lengthy and detailed recruitment effort, Council was ecstatic to find someone as capable and personable as Heidi, who brings with her previous regulatory experience from her many years with the Association of Professional Engineers and Geoscientists of Alberta (APEGA) as both Councilor and senior staff member. Heidi's experience with regulation of firms will also benefit us all as BC-based companies begin their journey toward registration. Firm regulation is an important new tool to help us protect the public—a tool that Engineers and Geoscientists BC has been working actively towards since 2015 and aligns us with most of the other engineering and geoscience regulators in Canada.

Individual registrants must also now verify contact information by June 30 of each year. This PGA requirement is intended to gather accurate information from registrants, which will facilitate registration renewals at year end, provide relevant information to the public about a registrant's area of practice; it may also, over time, help to inform the development of our regulatory resources. Please take time to ensure your contact information is complete and current.

It is understandable that registrants are adjusting to the PGA at differing rates. Council and staff have been on this journey of change for over three years now and recognize that registrants are still adapting to the new PGA requirements. Please refer to *egbc.ca/pga* to better understand these new requirements and the rationale behind them.

If we all embrace change, and support one another as we collectively adapt, I am certain that all BC residents will benefit.

Larr y Spence, P.Eng., President president@egbc.ca

INNOVATION

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ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA

Suite 200 - 4010 Regent Street, Burnaby, BC Canada V5C 6N2 Tel: 604.430.8035 Fax: 604.430.8085 Email: info@egbc.ca Web: egbc.ca Toll free: 1.888.430.8035

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UPDATE YOUR INFORMATION BEFORE JUNE 30

The *Professional Governance Act* (PGA) requires registrants to verify their practice-related and contact information each year. Providing updated and accurate contact information will allow Engineers and Geoscientists BC to contact registrants about important regulatory information.

Annual reporting can be completed online through each registrant's Engineers and Geoscientists BC account (at *egbc.ca/app/Account/Annual-Information-Reporting*) and is a four-step process that takes only a few minutes to complete. This year, the deadline to complete annual reporting is June 30, 2021. Registrants who fail to complete their reporting requirements by the deadline may be subject to late fees, suspension, or cancellation. Registrants must update or verify their employer (if applicable), mailing address, business contact information, and email address.

Beginning in 2022, registrants will also be required to declare their Continuing Education hours using the same annual reporting process.

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UNIQUE EMAIL ADDRESS

Under the PGA, registrants are also required to keep a unique and personal email address on file with Engineers and Geoscientists BC, to ensure that Engineers and Geoscientists BC can reach registrants with important regulatory information and updates.

UPDATING INFORMATION WITHIN 30 DAYS OF A CHANGE

Finally, the PGA requires that registrants keep their contact information current with Engineers and Geoscientists BC. If registrant contact information or practice-related information changes, registrants must log into their account and update their information within 30 days of the change. Registrants that update their contact information outside of the annual reporting period will still be required to verify their contact information each year.

For questions about your annual reporting requirements, visit *egbc.ca/Annual-Reporting*, or email *AnnualDeclarations@egbc.ca*.



Group photos taken pre-COVID pandemic

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ASSOCIATION

ENGINEERS AND GEOSCIENTISTS BC WELCOMES HEIDI YANG, P.ENG., AS ITS NEW CEO

Engineers and Geoscientists BC is pleased to announce the appointment of Heidi Yang, P.Eng., FEC, FGC (Hon.) as the organization's next Chief Executive Officer, effective June 1, 2021.

Heidi has broad-based experience in the regulatory, forestry, and manufacturing sectors. Throughout her 26-year career, she has provided strategic leadership that has enabled her teams to implement effective systems to support innovative and sustainable operations—experience that will be an asset to Engineers and Geoscientists BC as it begins to implement new regulatory processes and obligations introduced by the *Professional Governance Act.*

"I feel very honoured to be given this opportunity to serve the public in this capacity," Heidi said. "Engineers and Geoscientists BC is embarking on an exciting and important journey towards stronger regulation for a safer British Columbia, and I look forward to continuing to build on its successes in the future."

Prior to joining Engineers and Geoscientists BC, Heidi led engineering operations—including research, project management, product engineering, manufacturing process engineering, and facilities and maintenance engineering for one of the largest privately-owned window and door manufacturers in Canada. She also held several senior executive roles with the Association of Professional Engineers and Geoscientists of Alberta (APEGA), including one year as their interim CEO, where she led a rigorous business planning



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process that enhanced APEGA's ability to deliver on its regulatory mandate and strengthened internal operations. Prior to her time with APEGA, Heidi spent 20 years at Weyerhaeuser, providing leadership for the quality management, customer strategies, and operations processes at the Grande Prairie, Alberta plant.

"On behalf of Council, we're extremely pleased to be welcoming Heidi to our organization," said Larry Spence, P.Eng., Engineers and Geoscientists BC's President. "She is a collaborative leader with a record of building positive workplaces, developing value-added programs, engaging stakeholders, and leading organizations through times of change. I know she will bring forward a strong vision for the future of engineering and geoscience regulation and our collective goal of enhanced public protection."

Heidi graduated with a Bachelor of Applied Science in Chemical Engineering from the University of British Columbia. She is committed to lifelong learning, with recent certifications through the Executive Program at the Smith School of Business at Queen's University and Lean Six Sigma. She is also a dedicated volunteer who has held several academic and community board roles, including with the Glenora Rotary Club—the first rotary club in North America to be chartered by professional women.

Heidi succeeds Ann English, P.Eng., FEC, FCSSE, who is retiring following eight years with the organization. Engineers and Geoscientists BC sincerely thanks Ann for her dedication of time and energy to the organization and wishes her a wellearned, healthy, and happy retirement.



A REGISTRANT'S GUIDE TO THE NEW CODE OF ETHICS

The *Professional Governance Act* (PGA) recently came into force on February 5, 2021. This new legislation replaces the *Engineers and Geoscientists Act* and establishes new regulatory tools, processes, and requirements for Engineers and Geoscientists BC and its registrants, including an updated Code of Ethics that aligns with mandatory ethical principles required by the PGA.

The changes are modest and generally consistent with our previous Code of Ethics and reiterate principles and standards already accepted as responsible engineering and geoscience practice.

THE GUIDE TO THE CODE OF ETHICS

To assist registrants in interpreting the updated ethical principles, Engineers and Geoscientists BC recently published the *Guide to the Code of Ethics*. The Guide is intended to help registrants understand and apply the principles of the Code of Ethics and addresses some of the key questions we heard from registrants about the updated Code. The Guide offers interpretation and context on each of the thirteen principles to assist registrants in complying with the Code of Ethics and provides guidance to support ethical judgment. It includes commentary on each ethical principle, key points on how each principle should be considered, and examples based on real disciplinary cases.

The guide also describes the compliance procedures Engineers and Geoscientists BC apply to ensure registrants are meeting the requirements of the Code of Ethics—including a complaints process, an audit program, practice reviews, and legal enforcement.

The Guide to Code of Ethics, and the updated Code of Ethics itself, are available at *egbc.ca/Code-of-Ethics*, along with a previously recorded webinar about understanding the new Code of Ethics.

For questions about the new legislation, email *professionalgovernance@egbc.ca*, or visit *egbc.ca/pga*.



ASSOCIATION

PREPARING FOR REGULATION

Beginning July 2, new legislation will require the regulation of firms engaged in engineering and geoscience practice. This change will bring BC in line with other jurisdictions across Canada, enhance public safety and environmental protections, and codify and enforce the responsible level of practice most firms already have in place.

Firms that engage in the practice of professional engineering or professional geoscience must register for a Permit to Practice with Engineers and Geoscientists BC. Firms can apply beginning July 2, 2021, and must submit their application before September 30, 2021. A Permit to Practice grants firms the legal authority to engage in the practice of professional engineering or geoscience in BC.

DO I NEED A PERMIT TO PRACTICE?

Any public or private entity that practices engineering or geoscience as part of their operations—including firms that provide service or advice internally—falls under the regulation and must acquire a Permit to Practice. This includes sole practitioners (both incorporated and unincorporated), and municipalities.

If you are unsure whether your firm should register, visit *egbc.ca/Firms*, and use the "Permit to Practice Assessment Tool" to determine if your firm requires a Permit to Practice.



BEFORE JULY 2, 2021

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PREPARING TO APPLY FOR A PERMIT TO PRACTICE

To apply for a Permit to Practice, a firm must:

• Identify a Responsible Registrant.

The firm's Responsible Registrant will acknowledge responsibility for the firm and complete the application on the firm's behalf. The Responsible Registrant must be an engineering or geoscience professional who will be responsible for ensuring that the firm's practice meets ethical, quality management, and continuing education requirements. They will also serve as a point of contact for practice reviews, audits, and investigations. Firms can identify more than one Responsible Registrant if needed.

• Identify a Responsible Officer.

The Responsible Officer is the executive lead for their firm, and may be the same person as the Responsible Registrant. This person does not need to be a registered engineering or geoscience professional but must have the authority to make binding decisions on behalf of the firm.

 Build the firm's employee roster. Identify all staff (including contract staff) who are registered with Engineers and Geoscientists BC and other regulators under the *Professional Governance Act*, including P.Eng., P.Geo., P.L.Eng, P.L.Geo, EIT, and GIT. Registrant names, and ID numbers or License numbers are required.

• Identify all areas of practice relevant to the firm. To view a full list of industries and areas of practice visit eqbc.ca/Industries-Areas-of-Practice.

The Responsible Registrant can apply for a Permit to Practice through our website beginning July 2, 2021. Once declarations of responsibility have been signed by the Responsible Registrant(s) and Responsible Officer and the fees are paid, a Permit to Practice will be issued.

WHAT HAPPENS THEN?

Within 12 months of being issued a Permit to Practice, the firm must develop a

Professional Practice Management Plan (PPMP), the Responsible Registrant must complete mandatory training, and the firm must prepare for its first audit. The firm must update its contact information and its PPMP each year and comply with mandatory audits every three-to-five years.

LEARN MORE

Engineers and Geoscientists BC has tools and materials available, at *egbc.ca/Firms*, that provide guidance to firms on completing the requirements of a Permit to Practice. These resources include Professional Practice Management Plan templates, the Regulation of Firms Manual, online training (comprising six courses through 15 self-paced modules), and the webinar "Understanding the Regulation of Firms".

For questions about the Regulation of Firms, email *firms@egbc.ca*.

ASSOCIATION

MARK YOUR CALENDARS: PLANNING FOR VIRTUAL ANNUAL CONFERENCE OCTOBER 27-28, IS UNDERWAY

Engineers and Geoscientists BC's Annual Conference will be held virtually again this year, on October 27–28, 2021. The virtual annual conference will include many of the features registrants have come to expect and value—Continuing Education sessions, topical streams, keynote speakers, and networking opportunities. The virtual nature of the annual conference is ideal for professionals working remotely and will provide flexibility for registrants across the province.

The two-day conference is expected to include up to 25 Continuing Education sessions across 11 streams, on subjects such as regulatory and



ethical issues, better business, diversity and inclusion, environmental engineering and geoscience, municipal engineering, and communications and leadership. This year's conference will also include keynote speakers, enhanced virtual networking opportunities, and a virtual trade show with exhibitors.

More information as it becomes available will be provided at *egbc.ca/Conference*. Registration for the conference is expected to launch in late June.

For questions, email conference@egbc.ca.



WE'RE READY TO CELEBRATE ENGINEERING HEROES

Did you know that heroes are all around us?

Join us this June as we celebrate International Women in Engineering Day (INWED) through a social media campaign that will feature our own engineering heroes that live and work across British Columbia.

Follow us on Twitter and LinkedIn.

twitter.com/EngGeoBC linkedin.com/company/EngineersAndGeoscientistsBC



COUNCIL REPOR<mark>t</mark>

APRIL 23, 2021

Engineers and Geoscientists BC's Council of elected registrants and government representatives meets throughout the year to conduct the business of organizational governance. The following are the highlights of its April 23, 2021 meeting.

2021/2022 DRAFT BUDGET APPROVED

Council reviewed and approved its draft budget for the 2021/2022 fiscal year, proceeding with a budget scenario that will account for the additional pressures placed on the organization by several major changes including the ongoing pandemic, the implementation of the *Professional Governance Act* and new legislative requirements, and an increased number of investigations and disciplinary hearings.

Despite these added pressures, registrant fee increases will be limited to inflation, and a decrease to fees for non-practising registrants will also be implemented. Effective January 1, 2022, the annual fee for practising registrants will increase by \$10. In addition, the fee for non-practising and retired registrants will also be reduced, from 50 percent to 25 percent of the annual fee for practising registrants.

EQUITY, DIVERSITY, AND INCLUSION STATEMENT APPROVED; FIVE KEY AREAS IDENTIFIED

As part of its strategy to foster diversity and inclusion, Council approved an Equity, Diversity, and Inclusion (EDI) statement that communicates the organization's values and commitment to EDI and provides the foundation for the development of EDI initiatives and policies for Engineers and Geoscientists BC, its volunteers, and its employees. To advance the goals of this statement, Engineers and Geoscientists BC will target five key action areas focusing on volunteer recruitment, training for volunteers and registrants, addressing EDI issues through a framework that reflects stakeholder input, supporting EDI within the professions, and internal strategies and initiatives to support an inclusive work culture.

REMUNERATION POLICY TO BE DEVELOPED

Following research by Watson Advisors, a leading governance consultancy, Council discussed and approved the development of a remuneration policy for its President, Vice President, and elected Councilors. The policy is intended to recognize the significant time commitment associated with these roles, and the need to continue to attract qualified candidates to support the expanded regulatory role of the organization.

Council assigned a subcommittee to review the options presented by Watson Advisors and establish Engineers and Geoscientists BC's compensation approach. To remove any perception of conflict, the subcommittee will comprise Engineers and Geoscientists BC's publicly appointed Council members and the 2020/2021 President (an outgoing Council member).

COUNCIL CODE OF CONDUCT APPROVED

Council approved a comprehensive Code of Conduct for Council members, designed to provide a practical framework for communicating and upholding the expected behaviour Councilors should embody and the practices they should follow. The Code also aims to increase transparency by setting out clear processes for identifying and managing conflicts of interest and sets out the basis for redress in cases of non-compliance.

PROFESSIONAL PRACTICE GUIDELINES APPROVED

Council approved four professional practice guidelines, to be published following legal and editorial review, and endorsed the application of Engineers and Geoscientists BC's *Seismic Retrofit Guidelines* to the assessment and retrofit of all low-rise buildings in BC. Council also endorsed the BC Building and Safety Standards Branch's updated *Guide to Letters of Assurance*, as well as a document published by the Municipal Natural Assets Initiative that guides registrants in integrating natural assets into local government asset management practices.

Professional practice resources are provided at *egbc.ca/Guidelines*.



ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

SAVE THE DATE FOR OUR VIRTUAL ANNUAL CONFERENCE

OCTOBER 27-28, 2021

Join us for two days of continuing education sessions, topical streams, keynote speakers, networking, and an exhibitor hall. Our virtual conference is ideal for professionals working remotely or for those working across the province.

egbc.ca/conference

2021 SCIENCE GAMES GOES VIRTUAL AND ATTRACTS PROVINCE-WIDE PARTICIPATION

Throughout the month of March, Engineers and Geoscientists BC hosted its 10th annual Science Games. This year, Science Games transitioned from a single-day event to a month-long online science program for school-age students. Over 130 students from across the province explored various science principles through this year's virtual program.

The goal of Science Games is to provide a fun environment where students can explore different science principles and for Engineers and Geoscientists BC to promote an interest in science education and careers in scientific fields.

Division 1 participants (comprising students from grades one, two, and three) participated in eight activities over the four weeks; Division 2 participants (comprising students from grades four, five, and six) students, participated in 6 activities over the four weeks. Activity topics for this included compaction and erosion, the water cycle, cross-linked polymers, coding, heat transfer, the rock cycle, subsurface geology, and electricity.

New to this year's Science Games program were "Meet an Expert" sessions—lecture-style sessions with topics like wastewater management, satellites, geoscience, and sorting technology.

Engineers and Geoscientists BC would like to thank its sponsors and supporters, BC Hydro, SLR Consulting, Stantec and TRUE Consulting. We also thank the registrants who volunteered their time to lead the Saturday Activity Sessions, provide their expertise for the Meet an Expert Sessions, and serve on the Science Games Steering Committee.

The Science Games KudoBoard (at *egbc.kudoboard.com/boards/ science-games*) shows many photos and videos of students participating in various challenges as a part of this program.



As a professional engineer, I'm so proud to have five girls in my pod who are considering to be future engineers and geoscientists! We had a blast making colourful glittery slime! Many of them made more than the two minimum batch requirement. Excellent work Division 1, Pod 2! See you Saturday for our final session!

> From Floria Lee 1 month ago



Special shout out to Emily and Hasan from out pod who delivered an engaging session, full of fun and encouraging instructions

From Faiha Raza



We found the gold!





From Luca Ilea

PROFESSIONAL PRACTICE



MASS TIMBER GUIDELINES ADVANCE PUBLIC SAFETY AND INFRASTRUCTURE INNOVATION IN BC

In recognition of the growth in innovative wood engineering and architecture in British Columbia, and to support the safe design and construction of larger mass timber buildings, Engineers and Geoscientists BC and the Architectural Institute of British Columbia (AIBC) have published new guidelines to clarify the expectations for professional practice for architects and engineers designing mass timber buildings up to 12 storeys.

The Joint Professional Practice Guidelines - Encapsulated Mass Timber Construction up to 12 Storeys cover minimum qualifications, professional practice, roles and responsibilities, and quality assurance for encapsulated mass timber construction projects. They also identify issues to be taken into consideration, provide sources of information, and, in some instances, design options when providing architectural, building enclosure, fire protection, acoustical, structural, mechanical, and electrical design services.

"BC's engineers are leading the way in wood innovation, and these joint guidelines outline the necessary standards of professional practice to ensure that engineers working in masstimber construction are doing so in a way that keeps the public safe, while also demonstrating the social, economic, and environmental benefits of wood infrastructure in creating a more resilient province for future generations." Ann English, P.Eng., FEC, FCSSE, CEO, Engineers and Geoscientists BC.

"The public expects that architects remain current with contemporary technology, materials, methods, and business practices. The *Joint Professional Practice Guidelines – Encapsulated Mass* *Timber Construction up to 12 Storeys* will allow registered architects in British Columbia to apply new practices in a manner that is consistent with legislation and puts public-safety first." Mark Vernon, CPA, CA, CPA (Illinois), CEO of the Architectural Institute of British Columbia.

"Our government is moving the mass timber sector forward as part of our approach to building a strong economic recovery. This means aligning all aspects, from building codes to skills training, to using more mass timber in governmentfunded buildings. Expanding the use of sustainably harvested wood in buildings is good for the climate and it supports jobs from harvesting to engineering." Hon. Ravi Kahlon, Minister of Jobs, Economic Recovery and Innovation.

The new guidelines were developed in response to BC Government changes to the BC Building and Fire Codes to allow construction of mass timber buildings up to 12 storeys based on the new classifications of building size and construction relative to occupancy: Article 3.2.2.48EMTC. Group C, up to 12 storeys, Sprinklered, and Article 3.2.2.57EMTC. Group D, up to 12 storeys, Sprinklered. The guidelines provide guidance on architectural and engineering considerations relating to these significant changes to the 2018 BC Building Code (BCBC), the 2019 Vancouver Building By-law (VBBL), and the 2018 BC Fire Code (BCFC).

The development of the guidelines was made possible with the funding and support of Forestry Innovation Investment, National Research Council – Construction Research Centre, Engineers and Geoscientists BC, and the AIBC.

These guidelines, and other professional practice guidelines and practice-related resources, are provided at *egbc.ca/Guidelines*.

ADJUSTMENT TO DRINKING WATER PH REDUCING COPPER PIPE CORROSION

Metro Vancouver, which provides drinking water to 2.7 million residents across the region, is increasing the pH of the region's drinking water through the use of natural minerals, from the current 7.7 to a target 8.3-8.5 and doubling the alkalinity to approximately 20 milligrams per litre (as calcium carbonate).

The change, effective June 7, 2021, won't impact the taste or smell of water but is expected to reduce the release of copper from building pipes caused by low pH levels in the region's source water, which will help preserve the lifespan of copper pipes and hot water tanks, reduce leaks caused by copper corrosion, and reduce green stains on tubs, sinks, and grout. The change is well within Health Canada's guidelines for pH levels of treated drinking water.

Engineers and Geoscientists BC recommends that professionals assess how this change may affect their professional practice and their recommendations to end users.



For more information on this change, view Metro Vancouver's Corrosion Control Program at www.metrovancouver.org/services/ water/engagement/projects-and-initiatives/corrosion-controlprogram/Pages/default.aspx.

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PROFESSIONAL PRACTICE



NEW PRACTICE ADVISORY FOR CONTRACTUAL PROVISIONS REGARDING RETENTION AND DISCLOSURE OF PROJECT DOCUMENTATION

Engineers and Geoscientists BC has issued a practice advisory, titled *Contractual Provisions Regarding Retention and Disclosure of Project* Documentation, to inform registrants of their obligations when entering into professional service agreements that contain provisions which aim to prohibit or restrict the retention and disclosure of project documents. This practice advisory also clarifies the obligations of registrants who negotiate and approve these professional service agreements.



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Full details and the current standard of practice are described in the practice advisory.

This and other practice advisories and resources are available at *egbc.ca/ Guidelines*. For additional interpretation and guidance regarding standards of professional and ethical practice, contact an Engineers and Geoscientists BC Practice Advisor at *practiceadvisor@ egbc.ca*, or call 1.888.430.8035 or 604.430.8035.

GUIDE TO DOCUMENTED INDEPENDENT REVIEW OF HIGH-RISK PROFESSIONAL ACTIVITIES OR WORK NOW AVAILABLE

The *Professional Governance Act* requires Engineers and Geoscientists BC to establish standards of practice, conduct, and competence that all registrants must comply with. These standards are established in Engineers and Geoscientists BC's Bylaws.

To support registrants in understanding these standards, Engineers and Geoscientists BC publishes Quality Management Guides. These guides explain the standards for quality management in professional activities and are based on the former Quality Management Guidelines.

Engineers and Geoscientists BC has recently published the *Guide to the Standard for Independent Review of High-Risk Professional Activities* (version 1.0, April 27, 2021). This new guide, based on the new Bylaw requirement, was introduced to clarify requirements that were previously embedded in other Quality Management Guidelines.

The guide outlines how registrants should uphold their professional obligations while involved in high-risk professional activities or work (HRPAW) and while conducting independent reviews of HRPAW. It also formalizes the existing requirement for registrants to use a riskbased approach to documented checks. Under this standard, a professional activity or work that has been identified by a Professional of Record as high-risk through a documented risk assessment must undergo a documented independent review(s) before the professional activity or work is submitted to those who will be relying on it.

The guide also provides a common approach applicable to all registrants who engage in HRPAW or the independent



review of HRPAW as part of their professional activities.

All Quality Management Guides can be found at *egbc.ca/Quality-Management-Guides*; all Professional Practice Guidelines can be found at *egbc.ca/ Guidelines*. Questions about standards of practice can be directed to *practiceadvisor@egbc.ca*.



Each year, in our Project Highlights edition, *Innovation* showcases the engineering and geoscience work of our registrants here in BC and around the world. *Innovation* and the Engineers and Geoscientists BC Editorial Advisory Committee thank all who submitted project photographs and descriptions.

SECOND NARROWS WATER SUPPLY TUNNEL ►

The Second Narrows Water Supply Tunnel will increase Metro Vancouver's capacity to accommodate future regional growth while also improving the overall seismic resiliency of its existing potable water distribution infrastructure. This project is one of five new regional water supply tunnels that are being constructed to meet current seismic standards to ensure the reliable delivery of drinking water in the region in the event of a major earthquake. The new water supply tunnel is approximately 6.5 metres in diameter and 1,100 metres long. It is being excavated using a pressurized face tunnel-boring machine designed to excavate through soils and bedrock under high groundwater pressure, from the north shaft in the District of North Vancouver to the south shaft in the City of Burnaby.

Owner: Metro Vancouver.

Participants: McMillen Jacobs: Andrew McGlenn, P.Eng., Fred Marquis, P.Eng., Greg Emslie, P.Eng., Michelle van der Pouw Kraan, P.Eng., Nicky Erdle, P.Eng. Contractor: Traylor-Aecon General Partnership.



INNOVATION MAY/JUNE 2021 19

-1-1

UBCO SKEENA STUDENT RESIDENCES ►

The new Skeena Student Residence is the University of British Columbia Okanagan's first Passive House certified project. Constructed over a single-storey concrete podium, this efficient six-storey Passive House designed student residence will provide 220 beds and support amenities, including lounges, informal study spaces, an activity room, and laundry facilities while achieving a 90 percent reduction in energy use. Extensive insulation was used on all exterior elements and all below-grade foundation walls and columns thus encapsulating the structure from the foundations to the roof. This included careful detailing of the anchorage of the exterior cladding to maintain the high level of thermal performance.

Participants: Mike Mariotto, P.Eng., Struct.Eng., Clint Low, P.Eng., Struct.Eng.



DOUBLE-HULL DECK OIL/CARGO BARGES 🔻

In August 2020, Robert Allan Ltd. designed shallow draft, double-hull oil/deck cargo barges MTS 3501, 3502, 3503, and 3504 were delivered to the Northwest Territories. The barges were constructed at Jinling Shipyards in Nanjing China, towed down the Yangtse River to Shanghai, loaded onto a semi-submersible heavy lift ship and then transported to Tuktoyaktuk, Northwest Territories. The barges will be operated by Marine Transportation Services, owned by the Government of the Northwest Territories. The barges will deliver resupply goods to communities along the Mackenzie River (at a shallow draft of 1.5 metres) and along the Beaufort Sea coastline. Each barge has a deadweight cargo capacity of 3,370 tonnes, a liquid cargo capacity of 3.0 million litres (Arctic diesel, gasoline, and aviation fuel), and a deck cargo capacity of 112 twenty-foot equivalent unit (TEU).

Participants: James McCarthy, P.Eng.; Allan Turner, P.Eng.; Dmitry Kapiturov, P.Eng.; Jianbo Zhang, P.Eng. Photo: GNWT.



ANNACIS ISLAND WASTEWATER TREATMENT PLANT NEW OUTFALL SYSTEM PROJECT ►

Situated in Delta, BC, Metro Vancouver's Annacis Island Wastewater Treatment Plant is the third-largest plant of its kind in Canada. Serving a population of over one million, the region is preparing to welcome an additional million people by 2040, necessitating a major facility upgrade. Metro Vancouver awarded Pomerleau-Bessac General Partnership a \$185 million contract for constructing an upgraded outfall system. The upgraded system includes 800 metres of machine-bored tunnel, two 40-metre-deep shafts, and a 270-metre-long diffuser manifold structure in the Fraser River. Hatch is engaged as the Construction Manager with CDM Smith retained as the Engineer. A key project challenge is launching a 5.0-metre-diameter tunnel boring machine under high pressure ground conditions while minimizing impact to critical surface infrastructure. Furthermore, managing risks associated with seasonal work windows, shipping traffic, and variable flow conditions are critical for the success of the marine construction.

Participants: Tim Langmaid, P.Eng., Martina Riessner, P.Eng.

BROADWAY SUBWAY PROJECT: BURIED RAVINES LOCATED USING GEOPHYSICS

The Broadway Subway Project extends the Millennium Line SkyTrain to Arbutus with most of the five-kilometre underground portion beneath Broadway. Beyond the 101 boreholes, 7 cone penetrometer tests, and in-situ testing, key locations required 2-D bedrock profiles, including finding buried ravines cut into bedrock. Urban geophysical profiling is challenged by infrastructure interference and urban activities. Most effective methods were seismic multichannel-analysisof-surface-waves (MASW) and micro-gravity. Innovatively designed MASW surveys minimized public impact to a few hours with traffic crossing the cable-array and also as seismic source. Micro-gravity is rarely uses in cities due to interference, including decreased gravity from near-by parkades/basements. Novel parkade-corrections shifted the gravity-bedrock model as much as four metres, into agreement with borehole logs.

Participants: Golder Associates: Rob Luzitano, P.Geo., Trevor Fitzell, P.Eng., Ministry of Transportation and Infrastructure: Raymond Louie, P.Eng., Transportation Investment Corp.: Alexander Malyuk, P.Eng., Stantec: Sarv Jahankhani, P.Eng. ▶



SKINS LAKE SPILLWAY PLUNGE POOL REHABILITATION ►

Aluminum smelting is a way of life for the people of Kitimat, BC, providing employment and economic opportunities for the small town. Kitimat's main employer is an aluminum plant owned by Rio Tinto. Aluminum smelting is energy-extensive and relies on power generated by the city's Kemano 890- Megawatt Hydroelectric Generating Station with water supplied to the station by Nechako Reservoir. The Skins Lake gated spillway regulates the 90,000-hectare Nechako reservoir for generation and is its only flood discharge control structure. Continuing erosion concerns of the spillway's plunge pools presented a growing threat to the economy and downstream communities. Klohn Crippen Berger applied creative design and construction planning to complete a plunge pool rehabilitation within a small construction window and within downstream flow requirements.

Project Owner: Rio Tinto. Klohn Crippen Berger Participants: Bruno Bagneres, P.Eng., Garry Stevenson, P.Eng., Sam Sisodraker, P.Eng., Jay Johnson, P.Eng., Lawrence Chiu, P.Eng., Niel Jacobsen.

<image>

GRANVILLE STREET BRIDGE PIER M6 AND M7 BEARING REPLACEMENT ►

The City of Vancouver engaged Associated Engineering to improve the seismic resiliency of the iconic Granville Street Bridge, namely replacing the existing bearings with leadcore seismic isolation bearings. With insufficient space to raise the bridge for the bearing replacements, Associated Engineering devised a solution to encase the truss nodes at the piers with a heavily reinforced, post-tensioned concrete lifting block. This provided the necessary jacking platform to transfer the weight of the bridge to the

48-200 tonne jacks, allowing the bridge to be lifted for the safe installation of the bearings. Additionally, the existing joints on the deck were replaced, and hardware installed to facilitate future seismic monitoring programs.

Participants: City of Vancouver: Farhan Rafique, P.Eng., Helena Trajic, P.Eng., Colin Ryan, P.Eng.; Associated Engineering: Katrin Habel, P.Eng., Nikola Cuperlovic, P.Eng., David Harvey, P.Eng., Grant Fraser, P.Eng., Shane Cook, P.Eng., Jason Dowling, P.Eng., Doug Falkins, Eng. L., Matteo Agnoloni, P.Eng.





VANCOUVER AIRPORT ______ AUTHORITY PIER D EXPANSION A

Vancouver Airport Authority's Pier D Expansion is an eight-gate addition to the international terminal. It continues YVR's renowned sense of place, celebrating BC's coast with a glassedin outdoor island forest, an immersive digital experience and laminated timber columns. Behind the scenes, solar hot water heating, dynamic lighting controls, charging for airside equipment, high-performance triple-glazed windows, passive cooling, and an on-site composter contribute to an environmentallyfriendly building. Engineering expertise was critical, including project management and construction on an airside site surrounded by active taxiways and aircraft gate stands. Nearly 100 Engineers and Geoscientists BC registrants contributed to the project, the largest terminal expansion at YVR since 1996. Although opening the facility is postponed due to COVID-19, it represents a strong investment for when air traffic rebounds to pre-pandemic levels.

Owner/project manager: Vancouver Airport Authority (Alan Grossert, P.Eng., Tracy Nihei, P.Eng., Heather Hansen, P.Eng.); lead designers: Kasian, Bush Bohlman, Hatch, Integral, WSP; Construction manager: PCL.

CARBON ENGINEERING INNOVATION CENTRE

Carbon Engineering is constructing an Innovation Centre in Squamish, BC. This centre will be CE's permanent advanced development headquarters where the company will optimize and innovate its groundbreaking carbon removal and clean energy solutions. Carbon Engineering's Direct Air Capture technology removes CO_2 directly from the atmosphere using modified versions of standard industrial equipment such as cooling towers, pellet reactors, and calciners, yielding a pure CO_2 stream for either carbon-neutral fuel synthesis or permanent sequestration. Due to be operational in August 2021, the Innovation Centre includes a 1,250 square-metres operations and laboratory space, and a fully integrated Direct Air Capture plant. This project will deliver a world-class research and development facility for this critical new technology and will be a model for how this clean infrastructure can be deployed both nationally and around the world.

Owner: Carbon Engineering. Engineering, procurement and construction management: BBA Engineering Consultants.





STUART RIVER BRIDGE

The 235-metre Stuart River bridge is a single-lane, 4.9-metre-wide temporary bridge installed in support of the Coastal Gaslink project, across Stuart River in northeast BC. The nine-span bridge consists of an 85-metre main span, a 30.5-metre jump span, and seven 15-metre approach spans supported on driven piles. The main and jump span girders were incrementally launched across the Stuart River to minimize instream works. This project was designed with sustainability in mind, as all the bridge components were designed to be reused following removal of the bridge. The bridge construction started in April 2020 and was completed in June 2020 by Surespan Construction and the Nak'azdli Whut'en First Nation.

Participants: Onsite Engineering Ltd.: Paul Mysak, P.Eng.; Associated Engineering: Julien Henley, P.Eng., Helen Du, P.Eng., Jack Jiao, P.Eng.; Thurber Engineering: David Tara, P.Eng., Steven Coulter, P.Eng.; Coastal Gaslink, SA Energy Group, Surespan Construction, Nak'azdli Whut'en First Nation.

CLAYTON COMMUNITY CENTRE

This 53,800 square-foot, two-storey Passive House building features a dazzling double-height space at the main entry and a unique mix of community spaces. Working together, our engineering teams capture the architectural vision using intricate geometric shapes in a creative and environmentally conscious way. The aesthetic goal of establishing a "lattice-like" roof structure resembling tree canopies native to the area is achieved using an assembly of reciprocating "pinwheel" shaped modules. The two-way wood system allows the structure to span to discrete column locations without the need for dropped beams, a truly innovative approach. Fifteen custom-made 1'x1' LED panels, developed through expert coordination across various disciplines, illuminate architectural triangles scattered across the building's interior with diffused lighting to create an inviting and playful atmosphere. Sustainability and Passive House targets are central to the project and formed a guide to the centre's design and layout early on, driving us to maximize energy efficiency across all elements.

Participants: City of Surrey; HCMA Architecture + Design; RJC Engineers: CC Yao, P.Eng., Struct.Eng., Meredith Anderson, P.Eng., Struct.Eng.; AES Engineering: Andy Su, Sunny Ghataurah, P.Eng.





ROGERS PASS HIGHWAY 1 SNOWSHEDS LIGHTING

Motorists travelling the Trans-Canada Highway through Glacier National Park navigate through a series of five snowshed structures protecting the highway from a stretch of Rogers Pass avalanches. In 2015, Parks Canada engaged McElhanney Ltd. and PBX Engineering Ltd. to provide complete engineering planning and design, project, and construction management services for the installation of a new LED lighting systems in each snowshed. The LED lighting replaced existing high-pressure sodium lighting in the snowsheds and brought extensive upgrades to the power distribution system, including a 25-kilovolt substation and three avalanche-proof bunkers located adjacent to the snowsheds. Construction was challenged by the remote location and limited construction windows.

Participants: Alex Cosovanu, P.Eng., Principal and Senior Design Engineer; Annie Beauvillier, P.Eng., Design Engineer; Naginder Jabbal, P. Eng.; Richard Singer, P. Eng., Senior Construction Manager; Simon Armstrong-Bayliss, P. Eng., Project Manager.

KLUSKUS DOMESTIC WATER SYSTEM IMPROVEMENTS

Lhoosk'uz Dene Nation, located on Kluskus Lake, approximately 130 kilometres west of Quesnel, BC, have relied on bottled water since the early 2000s. Collaborating closely with the Nation, Indigenous Services Canada, First Nations Health Authority, and Reseau CMI, Associated Engineering worked to provide safe and reliable drinking water for the community. A Community Circle approach was adopted for this project, in response to the *Truth and Reconciliation Commission of Canada: Calls to Action.* This approach involved open dialogue and idea-sharing from all Community Circle members to encourage and facilitate full, honest, and respectful engagement with the Lhoosk'uz Dene Nation. In 2020, the team completed the construction of two new water supply wells; a new water treatment plant with UV and chlorine disinfection, and a new transmission main connecting to the existing water storage reservoir.

Participants: Freda Leong, P.Eng., Michael Owen, P.Eng., Robyn Casement, P.Eng., Kyle Shaw, P.Eng., Luc Blanchette, P.Eng. (APEGA).



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HIGHWAY 407 — EAST PHASE 2 🔻

In 2015, Klohn Crippen Berger led the design team for the Highway 407 East Phase 2 Project in the Durham region of Ontario, Canada. Our team was responsible for structural, highway, traffic staging, drainage and electrical design; and construction services for approximately 50 percent of the project, which extends Highway 407 about 22 kilometres east from Oshawa to Highway 35/115 in Clarington, and construction of the new Highway 418. The second phase of the project was completed in 2020 and has resulted in improved safety, reduced delays, eased traffic, and economic benefits for Durham Region and the Province of Ontario. Revenue generated from the Highway 407 toll road will help fund a variety of programs, and infrastructure and transit projects for years to come.

Project Owner: Ministry of Transportation of Ontario; Klohn Crippen Berger Participants: Rick Ghag, Keith Mitchell, P.Eng., Kristin Greinacher, P.Eng., Jay Johnson, P.Eng., Michael Bridden, Tenson Joseph. Subconsultants: The Ainley Group, GNEC, Urban Systems.



QUEBRADA BLANCA PHASE 2 MARINE FACILITIES 🔺

The Quebrada Blanca Phase 2 Marine Facilities (QB2) are parts of the port facility designed by Ausenco's multi-disciplinary team in Vancouver. QB2, one of the largest copper projects in Chile, features the first large-scale use of desalinated seawater for mining in the Tarapacá Region. This export facility (1.1 millions tonnes per year throughput) includes a desalination plant, a filter plant, material handling systems, concentrate and water pipelines, and utilities. Situated in a region with challenging seismic and metocean conditions, and rigorous regulatory and environmental requirements, the marine structures extend over 360 metres offshore and support a shiploader, a pipe conveyor, subsea pipelines, and seawater intake and brine outfall structures. The design includes a multi-buoy mooring system for mooring and warping of vessels up to 60,000 deadweight tonnes.

Current participants: Lily Louie, P.Eng., Ryan Leung, P.Eng., Albert Low, Graham Hirst, P.Eng., C.P. Tang, P.Eng., Rob Gardner, P.Eng., Dennis Hughes, Helen Ambrose, Neil Mathers, Mohammad Jannatpour, P.Eng.





ENERGY SAVINGS AT PACIFIC ENVIRONMENTAL

testing laboratory which includes some very energy intensive

equipment. Prism conducted various energy studies to identify

GHG saving opportunities. The mechanical upgrades conducted

and hydronic system upgrades for optimizing efficiency.

Prism Engineering: Stephen Kooiman, P.Eng.

The Pacific Environmental Sciences Centre houses an environmental

include the replacement of hydronic heating boilers with dual return

An automated controls strategy using demand-based controls as well as lab

user engagement strategy also contributed to significant energy savings.

A chiller system upgrade with air sourced heat pump is in final stages of construction to further reduce carbon emissions. Combined project savings

of 33 percent in natural gas was observed in the 2018/2019 year compared

Participants: Environment and Climate Change Canada: Nikolas Fehr, P.Eng.;

to the baseline. An additional 13% in savings is projected for the 2020/2021.

condensing boilers, new condensing water heaters and ventilation

SCIENCES CENTRE



AVALANCHE MITIGATION

In 2015, Parks Canada engaged McElhanney and Dynamic Avalanche to improve reliability of a narrow, 44-kilometre corridor (Highway 1, CP Railway, Illecillewaet River, and National Historic Site), threatened by 134 avalanche paths, and responsible for an average of 74 hours of winter closure per year. McElhanney developed and analyzed a complex program, established reliable power and communication with new technology facing extreme environmental conditions and remote mountainous terrain. Successful solutions included the world's largest avalanche detection network (comprising 13 infrasound arrays and four radar systems), 2,222 metres of snow nets, and 13 remote avalanche control systems.

Participants: Naginder Jabbal, P.Eng., Transportation Leader; Jaime Sanderson, P.Eng., Project Engineer; Alan Jones, P.Eng., Avalanche Engineer; Chris Argue, Avalanche Modeller.

30% the national goal of raising the percentage of newly licensed engineers who are women

Through its project — 'ADVANCING WOMEN IN ENGINEERING & TECHNOLOGY', ASTTBC is **committed to increasing the participation of women** in the engineering, geoscience, technology & technician occupations through the implementation of diversity and inclusion strategies!



For resources and guides, please visit www.womeninengtech.ca





BLATCHFORD DISTRICT ENERGY CENTRE ONE

Energy Centre One provides low-carbon heating and cooling for Edmonton's new Blatchford community using a District Energy Sharing System (DESS). Located near Edmonton's core, Blatchford will be the largest carbon-neutral neighbourhood in Canada, encompassing over 200 hectares on the former City Centre Airport site. Energy Centre One includes a 570 borehole geoexchange system for heating or cooling the DESS. Ambient temperature water circulates to connected buildings where heat pumps extract heat for space and domestic water heating. In warmer months, heat pumps return waste heat from air conditioning into the DESS loop. The low operating temperature of the DESS facilitates integrating renewables, waste heat recovery, and energy sharing. District Energy is a cornerstone of the City's vision to provide 100 percent renewable energy for the eventual community of 30,000.

Participants: Ruben Arellano, P.Eng., Andrew Byrnes, P.Eng., Richard Marier, P.Eng., Aaron McCartie, P.Eng., Jermyn Wong, P.Eng.

SULPHUR BURNER AND SULPHUR DIOXIDE PURIFICATION SYSTEM

A.H. Lundberg Systems Limited of Vancouver, BC, designed and supplied an 84 tonnes per day Sulphur Burner System to Borregaard AS in Sarpsborg, Norway. The combustion energy is recovered in a waste heat boiler producing 12 BAR (gauge) steam with the cooled 18 percent SO₂ gas delivered to various users around the pulp mill. An SO₂ purification system was also supplied to upgrade a portion of the gas to greater than 96 percent purity. This gas is produced on demand, replacing purchased liquid SO₂ and allowing for removal of the large SO₂ storage tanks, which were problematic as they were located near a population centre. The systems were supplied in multiple modules to facilitate installation, with commissioning in early 2021.

Participants: Owner: Borregaard AS, Sarpsborg, Norway; A.H. Lundberg Systems: Bruce Der, P.Eng.; Allan Jensen, P.Eng.; Alex Lisnevskiy, P.Eng.; Rick Vandergriendt, P.Eng.; Ben Lin, P.Eng.; Amin Manji, P.Eng.; Murray Pourbakhth, P.Eng.

LONSDALE QUAY EXCHANGE 🕨

DIALOG provided architectural, structural, mechanical, and landscape architecture services for the Lonsdale Quay Exchange upgrade. Project ambitions included enhancing the passenger experience, improving wayfinding and safety, mitigating bus entry and loading challenges, and a sense of arrival befitting the Exchange's strategic waterfront location. Structural work encompassed an assessment of the upgrade's impacts on existing foundations, grade beams, and walls, and the design of an employee kiosk free of visually-intrusive lateral braces. This maximized the building's lightness and transparency, contributing to a significantly more pleasant public realm. Mechanical design involved an assessment of ventilation requirements, including air-quality testing, modifications to drainage systems, and integration of an overhead drysprinkler system into new architectural ceiling assemblies. On project completion, TransLink noted that the upgrade significantly enhanced the overall experience for their customers.

Participants: Vance Harris, Fadi Ghorayeb, P.Eng., Struct.Eng., FEC., Amir Lorzadeh, EIT, Rod Yeoh, P.Eng., Keith McDonnell.

MALAHAT SKYWALK 🕨

An new tourism project on southern Vancouver Island, this project is envisioned to be an accessible outdoor recreation structure. The single-storey Visitor Centre contains a café and features mass timber and light wood frame. From there, an accessible 650-metre-long treetop walk leads the visitor through the forest to a 32-metre-tall sightseeing lookout with stunning views of the Finlayson Arm and the distant Coast Mountains. The primary structural system consists of glulam columns with steel X-bracing all around the perimeter. Outriggers from these columns create a 600-metrelong spiral walkway transporting visitors to the top of the structure and access to the viewing platform. A galvanized steel central spiral staircase provides emergency egress.

Owner: Malahat Skywalk Corp.; Participants: Aspect Structural Engineers: Adam Gerber, P.Eng., Jamie Connolly, EIT; Geotechnical: Richard Moser, P.Eng., Cam Schellenberg, EIT; Contractor: Kinsol Timber Systems.







FAST + EPP HOME OFFICE 🔻 -

Fast + Epp's four-storey home office building serves as a "living laboratory" for new ideas, sustainable design strategies and technologies being tested during construction and throughout the life of the building. The superstructure was erected in only four weeks through pre-fabrication, allowing for rapid installation on a site with limited access. Cross-laminated timber is utilized for the floor plates, stair, and elevator cores, as well as the demising firewall, while steel columns provide floor and façade support. To control glare and solar heat gain, dynamic electrochromatic glass optimizes the tint of each window pane, while maximizing natural light. Additionally, the lateral design of the structure utilizes Tectonus devices installed at the base of cross-laminated timber shear walls—acting as shock absorbers during an earthquake. The connectors undergo no damage, allowing immediate return to occupancy after a significant earthquake.

Participants: Fast + Epp: Paul Fast, P.Eng.; Architect: f2a architecture.

PHASE 1 OF KELOWNA INTEGRATED WATER PROJECT ◀

As a first major step to integrating the City of Kelowna's many water purveyors, the South East Kelowna Irrigation District has joined the City system. A dual water system has been created for the area to retain the existing system for irrigation and fire protection, and extend the City network to provide clean, treated water to more than 2,000 new customers. The project had a total budget of close to \$100 million, with federal/provincial grant funding of \$55.9 million. The overall project is nearing completion and includes 85 kilometres of new watermain, upgrades to 4 existing pump stations, 1 new pump station, 3 new reservoirs, 17 new pressure-reducing stations, 815 new water services and 2,100 new meters. The majority of work was completed in two years as a designbuild contract worth \$74 million by Emil Anderson Construction, Maple Reinders, Urban Systems and Stantec Consulting. AECOM served as the City's consultant.

Participants: City Project Manager: Patrick Aylard, P.L.Eng.



TODD CREEK TRESTLE ► REHABILITATION

The Todd Creek Trestle in Sooke, BC, was originally constructed in 1917. The trestle is part of the Galloping Goose trail that sees numerous users. By 2017, significant degradation of the wooden timbers resulted in a closure. Various options were considered and it was decided to pursue a unique repair to protect the heritage features of the trestle. This rehabilitation removed one "bent" at a time, which was inspected, and then and rebuilt on rebuilt footings. A 30-tonne crane was used to advance across the trestle on the rebuilt sections for work on successive bents. The project replaced approximately 80 percent of the members; each reused member was inspected by a timber specialist to confirm its integrity. This rehabilitation has returned the trestle to its original load capacity while staying true to its heritage features.

Structural Engineer of Record: Andrew Rushforth, P.Eng., (Stantec); Contractor: Seismic 2000 Construction Ltd.

HALFWAY RIVER BRIDGE DESIGN >

Sections of Highway 29 between Fort St. John and Hudson's Hope will be inundated by the Site C reservoir. BC Hydro engaged Binnie as prime consultant to deliver detailed designs of Highway 29 realignments; WSP Canada was responsible for the design of four new bridge crossings. Halfway River Bridge is the longest of the new bridges, measuring 1,042 metres and supported on by 12 piers, 47 metres above the valley floor. Once the reservoir is filled, over half of the bridge pier height will be below water, offering a visually striking view against the backdrop of the Peace River Valley.

Project Owner: Ministry of Transportation and Infrastructure, BC Hydro. Participants: Binnie: Bill Eisbrenner, P.Eng., James Norris, P.Eng., Amanda Rust, P.Eng.; WSP: Jacek Doniec, P.Eng., Sean O'Hagan, P.Eng., Jianping Jiang, P.Eng.; Wood: Nicolas Polysou, P.Eng., Dixie Ann Simon, P.Eng.; NHC: Des Goold, P.Eng.



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COVID-19 MEDICAL DEVICE DEMAND 🔺

Verathon Medical manufactures video laryngoscopes to assist doctors while putting patients on ventilators. Demand for our devices rose tenfold in March 2020, in response to the COVID-19 pandemic. The manufacturing engineering team reviewed current state and demand increase, and developed a gap analysis. Reusable product cycle times and takt times were reviewed. Once bottlenecks were highlighted, the team went rebalanced the production lines and create additional fixturing needed to meet increased output. The single-use product capacity expansion originally had a 24-month timeline. The project was condensed into six months. Production was re-imagined from a single development cell into multiple high-volume production lines. Reusable Laryngoscope volumes increased within a week. Single-use bronchoscope capacity expansion was completed in five months.

Participants: Tobin Lock, P.Eng., Jason Lee, Alex Glimm-Houtstra, Sabian Chiu.

BLEACHED WHEAT STRAW PULPING FACILITY

Essity is an industry leader in the production of consumer tissue and professional care products. At its production facility in Mannheim, Germany, Essity identified an opportunity to reduce costs and increase the sustainable fiber content of its products by supplementing existing pulp supply with that derived from agricultural-based by-products. To capitalize on the opportunity, Essity obtained the rights to Sustainable Fiber Technologies' Phoenix Process to develop a 100 tonnes-per-day bleached wheat straw production facility and engaged Allnorth to support the project's engineering effort. Lead by Allnorth's Nanaimo-based pulp and paper team, the project was supported by team members in Vancouver, Prince George, Calgary, and Atlanta. Using wheat straw to produce high-quality pulp for tissue products is one of the ways Essity supports sustainability and contributes to a circular economy.

Participants: Allnorth Consultants Limited: Ryan Sinclair, P.Eng., Kevin Peterson, P.Eng., Doug McKenzie, P.Eng., Billy Tran, P.Eng., Paul Jacobsen, P.Eng., Chris Mathie, P.Eng., Mark Skovmose, P.Eng., Brandi Heisterman, P.Eng.



EWOS CANADA WASTEWATER TREATMENT PLANT >

Vancouver based ECOfluid Systems Inc. was selected by EWOS Canada to design and build an onsite wastewater treatment plant (WWTP) at its Surrey facility. In the past, the company discharged its manufacturing process wastewater directly into the city sewer, and high flows and levels of organic pollutants, such as Carbonaceous Biochemical Oxygen Demand and ammonia, would trigger surcharges. ECOfluid provided a packaged WWTP utilizing Upflow Sludge Blanket Filtration (USBF) technology to significantly reduce pollutant levels in the discharged wastewater and create the potential of water reuse. This small footprint packaged plant can treat up to 80 square metres per day. ECOfluid's scope included process water assessment (with NORAM Engineering and Constructors), package plant design, and supply.

Participants: ECOfluid: Brian Chan, P.Eng., Zhidong Li; NORAM: Carl Finlay, P.Eng, Rachael Mutsaerts, EIT.

ROMAINE-4 SNOWPACK SUPPORTING STRUCTURES 🔻

The largest single-point-anchor snowpack-supporting structure system in North America was recently installed at the Romaine-4 Hydroelectric Project in eastern Quebec, to mitigate avalanche risk to a powerhouse and tailrace. The design included 43 Maccaferri Erdox Neve snowpacksupporting structures. There were several project constrains and challenges, including significant time limitations for on-site layout and installation. These "umbrella"-type panel systems were used due to the relative ease of layout on the convoluted slope, and to minimize anchoring and installation time. In order to further reduce on-site time, advanced GIS techniques and high-resolution drone-based LiDAR data was used to analyse snow distribution patterns, and complete much of the layout and design with desktop-based analysis.

Participants: Owner: Hydro-Quebec; Alpine Solutions Avalanche Services: Cam Campbell, P.L.Eng., Brian Gould, P.Eng.; Englobe: Geneviève Landry, Eng. (Ordre des ingénieurs du Québec).





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AUTONOMOUS UNDERWATER/SURFACE ► VEHICLE FOR OCEAN MAPPING

Cellula Robotics developed the Solus-Lite Autonomous Underwater Vehicle for Terradepth LLC to enable exploration and collection of deep ocean data. Solus-Lite's design is based on Cellula's proven Solus-LR architecture. The team successfully completed sea trials in the Burrard Inlet in November 2020. Cellula continues to provide support to Terradepth as they begin their own integrated set of sea trials. Terradepth plans to mobilize a fleet of these vehicles to support their ocean mapping operations, with the goal of building a multi-dimensional seafloor dataset.

Participants: Eric (James) Jackson, P. Eng., Melanie Devaux, P.Eng., Alexander Johnson, P.Eng., Don Clarke, P.Eng.; Charles van Aert, EIT, Elizabeth Hunter, EIT, Keira Lane, EIT.



RIO TINTO ALCAN TERMINAL, LNG CANADA 🔺

The Rio Tinto Alcan wharf is being extended by 250 metres. With a diameter of 42 inches and a length of 250 feet, the foundation elements were installed full-length, eliminating splices. Challenging soil conditions of the piles in shallow waters, 6-metre tidal ranges, wind gusts, and impact loads from piling equipment, triggered the use of an in-house designed "tipper frame" allowing the piles to cantilever out of the barge, counteracting the sagging moment caused by the lifting motion and reducing the element's steel stresses. The piles were raised 7 metres over the deck to overcome shallow waters. The tilting vibro-hammer was adapted from the offshore industry for smaller diameter piles eliminating the risk of hammer impact during installation. Given the first-time application, a full-scale friction test was conducted of the hammer's jaws, verifying the desired factor of safety was met.

Participants: BAM/JJM/Manson Joint Venture: Paolo Gatta P.Eng., J. Lekkerkerk, P. Sundararaman, D. Edghill; JJM: J. Handley, C. Longmuir.



MUSHROOM-HARVESTING ROBOT 🔻

TechBrew has developed a vision-guided robot capable of picking, trimming, and placing mushrooms in boxes. The robot attaches to the farm's existing shelving, eliminating the need for changes to infrastructure. They are transportable, moving easily between growing rooms when needed. To date, two limited-scope demonstrations have been completed on two farms. Both went exceptionally well, achieving the goal of 95 percent successful pick rate. The next step, in March 2021, is to harvest a two-flush growth cycle on our partner farm, to demonstrate complete autonomous operation of the harvesting system including thinning, stem trimming, packaging, and conveyance out of the growing room. Further development includes the use of artificial intelligence. With the vast amount of data being collected, the robots will use AI to make smarter decisions over time. Decisions about which mushrooms to separate, which mushrooms to harvest, and when to harvest.

Participants: Mike Boudreau, P.Eng., Jonny Van Dyck, P.Eng., Kyran Findlater, Jeremy Green, Jeremiah McCarthy, P.Eng., Nate Tomlinson, David Lonneberg, P.Eng.





VANCOUVER LANDFILL SIDESLOPE GAS COLLECTORS

To continue to increase early landfill gas collection, in December 2020 the City of Vancouver installed five sideslope collectors as part of the Phase 4 North Landfill Gas System Expansion at the Vancouver Landfill. In addition to horizontal collectors installed on every other lift, sideslope collectors were installed in the active filling area and sloped at 33 percent on the 3H:1V side-slope of the active landfill cell. The side-slope collectors are less expensive to install and just as efficient as the horizontal collectors.

Owner: City of Vancouver: Lynn Belanger, P.Eng., Jerry Sobejko, P.Eng., Rod Zedan, P.Eng., Chikezie (Kezi) Nwaoha, Ph.D., EIT, Javier Nava Avendano, P.Eng., Hanna Musslick, Sarah Wilson, P.Eng.; Owner's Engineer: Sperling Hansen Associates: Cris Ciuperca, P.Eng. SCS Engineers: Ted Massart; Project Management Consultant: R.F. Binnie: Adam Stubbs.



ICE MONITORING SOLUTION

Rapid winter river ice formation is known to be problematic along the Kananaskis River with dam regulated flows and frigid temperatures. SweetTech was requested to develop a monitoring system and Trigger-Action-Response-Plan (TARP) to mitigate and respond to winter flooding risks/events. The monitoring system utilizes a semi-permanent overhead tensioned cable and indicator rods inspired by white-water slalom gates. The colour-coded monitoring rods are cut to different lengths corresponding to the amount of freeboard remaining prior to overland flooding occurring. Each coloured rod corresponds to a TARP response level and action. This innovative solution is relatively low-cost, can be easily setup and taken down each season, and is not prone to many of the pitfalls experienced by other higher technology solutions in remote, harsh, and heavy snowfall conditions prevalent at this site.

Participants: SweetTech Engineering Consultants, Eric Sweet, P.Eng., Thomas Schaepsmeyer, EIT (APEGA).

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MACAULAY POINT PUMP STATION

Currently in the final stages of completion, the Macaulay Point Pump Station challenges the paradigm by designing for flow scenarios in the 99th percentile while still being primed for peak flow events. Built as part of the Capital Regional District's Wastewater Treatment Project, it is one of two stations sending 108 megalitres of wastewater daily to the McLoughlin Wastewater Treatment Plant. Macaulay features eight pumps optimized to produce a continuous, consistent operating cycle. Previously an industrial work yard, the area is now an illustration of a harmonious blend between form and function. This pump station showcases sustainable building materials, a green roof, and landscaping geared towards the natural habitat along with improved community access to the adjacent coastline.

Owner: Capital Regional District; Design Lead: Kerr Wood Leidal Associates Ltd.; Design-Build Contractor: Kenaidan Contracting Ltd.; Sub-Consultants: Stephane Laroye Associates, Thurber, Gygax Engineering Associates, Northwest Hydraulics, Hemmera, BAP Acoustics, LADR Landscape Architects.



LOON LAKE FLOATING DOCK REPLACEMENT

The Canadian Cancer Society (CCS)'s floating dock at Loon Lake is an important part of the recreational infrastructure that supports CCS's summer programs for children. An above and below water condition assessment of the old floating dock had determined that it was at the end of its service life. To assist CCS in selecting a cost-effective solution for replacing the old dock, several replacement options were evaluated. Following a detailed review of functional requirements and project economics, a new timber dock was chosen as the preferred replacement option. The new dock supports up to 80 people and incorporates features for users with limited swimming ability and mobility. The dock structure was fabricated using locally sourced yellow cedar and is clad with composite decking to increase serviceability. The new facility was successfully installed in the late spring of 2020.

Participants: Vignesh Ramadhas, P.Eng., Hong Liang, P.Eng.



RISK ASSESSMENT OF ORPHAN DIKES 🔺

The Fraser Basin Council retained Kerr Wood Leidal Associates and subconsultant Ebbwater Consulting to assess orphaned flood protection structures throughout BC. The Inspector of Dikes' Office provided critical direction and support for the project. The project informed the province and local authorities about the benefits and implications of these structures. The project will support future decision-making about how to best manage the works. The project helped determine the condition of the 105 assessed structures, the requirement bring them to an acceptable level of service, and the overall flood risk. The project produced sitespecific reports for each structure and a summary roll up report.

Participants: Kerr Wood Leidal Associates: Dwayne Meredith, Mike Currie, P.Eng., David Roche, P.Eng., Jason Miller, P.Eng., Don Nash, P.Eng., Craig Sutherland, P.Eng., Stefan Joyce, P.Eng., Ron Monk, P.Eng.; Ebbwater: Tamsin Lyle, P.Eng., Silja Hund, Robert Larson, Jessica Cochran, Dickon Wells.



RAW WATER TREATMENT PLANT 🔻

Located on the Nechako River, on the unceded traditional territory of the Lheidli T'enneh Nation in Prince George, BC, Canfor Pulp's Raw Water Treatment Plant was designed to mitigate the high turbidity of the river water, which causes operational upsets and inefficient use of water and chemicals. It will provide Canfor's Prince George and Intercontinental pulp mills, and other nearby operations, with 215,000,000 litres of clean water daily, and is expected to yield significant positive impacts on efficiency and the environment. Estimates target a five percent reduction in water and effluent flows, and reduced chemical use. Cleaner water will improve equipment reliability and operational efficiencies expected to enhance the mills' surplus green energy generation. Completed in February 2021, the structure uses 13.6 million kilograms of water-retaining reinforced concrete. It was designed by professionals in Prince George, Calgary, and Montreal.

Canfor Project Manager: Michael Jacques, P.Eng.; Canfor Owner's Representative: Kelly Parfitt, P.Eng.



NEPTUNE BULK TERMINALS' BERTH NO. 1 MARINE STRUCTURES <

Neptune Terminals upgraded its steelmaking coal shipping marine structures to increase capacity, by replacing the existing west shiploader with a new shiploader on a new pile supported quadrant beam. Other structures included a gangway landing platform, underwater sheet pile wall, dredging, and dolphins. Ruskin Construction was awarded the construction contract and successfully carried out the work between February 2019 and November 2020. Advisian was retained for detailed design, contract administration, and field services. CWA Engineers, Golder, and LEX Engineering were responsible for the quadrant beam detailed design and field services. A significant milestone for the project was placing the new shiploader on the rails in October 2020 highlighting the successful collaboration of all consultants and contractors involved.

Participants: Neptune: Jurgen Franke, P.Eng.; Advisian: Atelka Turney, P.Eng., Gary Lu, P.Eng., Lauren Tagg, G.I.T; CWA: Hamidreza Baktash, P.Eng.; Golder: Yannick Wittwer, P.Eng., Upul Atukorala, P.Eng.; LEX: Gagan Deep, P.Eng.; Ruskin: Josh Caulfield.



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BASE 10 SANITARY PUMP STATION PROJECT >

This new sanitary pump station in Chilliwack, BC, built for a development project for the Tzeachten First Nation, will service a population of approximately 2,100 and an area of 20.1 hectares. This station has two 20-horsepower Flygt NP 3153 pumps and a design flow of 35 litres per second. The wet well has a diameter of 3.66 metres and a depth of 6.6 metres. The forcemain is 700 metres of 200-millimetres diameter HDPE pipe, connected to a shared 250-millimetre-diamater, 560-metre-long forcemain. The valve chamber for this station was constructed in a fibreglass kiosk formed on the lid of the wet-well, as opposed to an in-ground concrete chamber. This eliminates a confined space and simplifies valve maintenance in comparison to an in-ground chamber.

Participants: Wedler Engineering: Glen Darychuck, Glenn Royea, Andre Boissonnault, P.Eng., Jonathan Funk, P.Eng.; Watanabe Engineering: Ted Watanabe, P.Eng., Geowest Engineering: Michael Gutwein, P.Eng., Ryan Kroeker, EIT.





SKYTRAIN CUSTOMER COMMUNICATIONS UPGRADE PROJECT 4

TransLink completed a two-year project to improve passenger communications in 33 SkyTrain stations. TransLink updated the PA system, CCTV cameras, and three types of information displays, through the installation of over 2,800 devices. As the 33 stations were active during this project, contractors had to work safely around the travelling public. The new electronic displays provide real-time service information, improving the customer experience with new features like live train departure times, system-wide alerts, and more. The upgraded PA system improves the clarity of in-station announcements. The improved CCTV cameras enhance station security. Since installation began in 2018, TransLink has received overwhelmingly positive feedback from customers.

Participants: Sarah Rocchi, P.Eng., TransLink/BCRTC (Owner); Craig Louie P.Eng., Sysene and ICT (Project Management); Graham Construction, Pomerleau and Western Pacific Enterprises (Implementation); Ausenco, RJC Engineers, SNC-Lavalin Group and AES Engineering (Owner's Engineers).

RECOVERY BOILER WALL PANEL LIFT >

To rebuild a recovery boiler required the replacement of the bottom 100 feet of boiler walls. Historic practice was to lift two 50-foot sections, requiring twice the welding during the outage and overlapping safety hazards. I/O Design and Engineering and CIMS Ltd. simultaneously improved safety, quality, and shutdown duration by welding upper and lower panels together, creating 100-foot panels, prior to taking the boiler offline. The key to execution was the engineering of a cradle system capable of supporting the 34,000-pound panels within a constricted design envelope. Using 3-D scanning, modelling and engineering analysis allowed an interchangeable cradle system that engages with seven unique panel geometries. I/O Design and Engineering was responsible for engineering and supply of 11 cradles, and created an animated virtual reality digital twin to train installation crews.

Owner: CIMS Ltd. Participants: Graham Watts, P.Eng., Isaac Saban, P.Eng., Mallory Wiens, EIT.





NEPTUNE BULK TERMINALS' UPGRADE: WATER MANAGEMENT 🔺

As part of Neptune Bulk Terminals' upgrade, Envirochem and Aqua-Solve designed a robust water treatment system to support dewatering of a 80 feet of deep excavation over 24 months. The project required ongoing dewatering of 1,000 gallons per minute, with a number of specific events where discharge rates over 5,000 gallons per minute were necessary. Through inline monitoring of flow rate and other key parameters, the system was able to continuously adjust to efficiently respond to changes in flow and water quality. In consideration of the sensitive uses, cultural values, and future goals for the health of Burrard Inlet, stringent water quality criteria were set for the project, raising the standard for construction water management. Over 750,000,000 litres of water was treated (to meet provincial and federal guidelines for marine aquatic life) and discharged to Burrard Inlet.

Participants: Nora Badreldin, P.Eng., Envirochem; Tim Smiley, P.Eng., Aqua-Solve.



DISTRICT 56 TERMINUS OFFICE BUILDING 🔺

The District 56 Terminus Office Building is a five-storey mass timber post and beam building that contains the firstever steel buckling-restrained braces housed within a timber frame. Terminus is located in Langford, BC, one of the highest seismic regions of North America. As such, the lateral system needed to be highly ductile while allowing the wood to be exposed. Rather than mix steel beams and columns with wood, the design team elected to develop a glulam frame that provided the overstrength and drift compatibility needed for a buckling-restrained braces system. The final result is an attractive, first-of-its-kind ductile hybrid lateral system.

Owner/contractor: Design Build Services; Participants: Aspect Structural Engineers: Mehrdad Jahangiri, P.Eng., Ilana Danzig, Struct. Eng., P.Eng., Jackson Pelling, EIT, Brendan Fitzgerald, EIT; Architect: Jack James Architect.



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In partnership with the City of Chilliwack, PCL Constructors Westcoast Inc. was awarded the contract to build a turnkey solution to treat brewery wastewater for Molson Coors's new brewery in the City. This capital expenditure would mean the ability to process high strength wastewater based on the brewery's investment in the community. The plant now provides wastewater with the ability to travel from the brewery through four kilometres of underground piping to the new facility, where it is pre-treated (digested) before being released to Chilliwack's main municipal facility. The pre-treatment facility treats 75,000 litres of brewery effluent water per hour (211,258 cans of beer) or 1,800,000 litres (5,000,000 cans of beer) per day. At full capacity, all the on-site tanks hold 3,751 cubic metres of water, equal to to 1.5 Olympic-sized swimming pools.

Participants: PCL Constructors Westcoast Inc., Kelly Illerbrun, P.Eng., Construction Manager.



PEACE ARCH HOSPITAL'S ACUTE SOUTH ELECTRICAL SWITCHGEAR UPGRADE ◀

As part of the electrical distribution project and Fraser Health Authority sustainability initiative, Status Electrical has constructed a new main electrical room with fire rated walls. Supplied and installed the indoor vital, delayed vital, normal 600 volt automatic transfer switches and transformers along with dedicated, redundant cooling systems, including all associated power, controls, refrigerant piping, and drainage. The new electrical room steps down transmission voltage from 600 volt to a 120/208 volt level, suitable for both emergency and non-emergency power distribution inside the hospital. In six months, 10 work plans and lockouts were prepared, submitted, approved, and executed under the direction of PAH Facilities Maintenance Office, without disruption to daily hospital operations. PAH is a critical-care health facility and, in light of COVID-19, Status Electrical had to schedule shutdowns during non-standard times to minimize the impact and outages.

Participants: Keith Falardeau, Yadvirender Rana, P.Eng., Anil Chand.



NORTH RESERVOIR AND WATERMAIN EXTENSION

Tk'emlúps te Secwépemc made history as the first First Nation in Canada to fund a major capital infrastructure project utilizing Development Cost Charges. The North Reservoir, a two-cell six-millionlitre water storage project, provides 365 hectares of underserved and unserviced reserve lands with increased access to domestic water and fire protection. The reservoir was constructed by Big Rock Construction Ltd., and the pipe works utilized a blended crew of band forces and Extreme Excavating Ltd. Tk'emlúps financed the project without having to borrow from an external lender. The build took place over three construction seasons at a cost of \$4.8 million, utilizing reserve funds collected under the band's Development Cost Charges Law and a \$1.2 million grant from Indigenous Services Canada.

Owner: Tk'emlúps te Secwépemc. Project Team: Watson Engineering Ltd.: John Watson, P.Eng. (reservoir), Urban Systems Ltd.: Jarret Grant, P.Eng., Mark Hall; Underwood Electrical Engineering Ltd.



FORT CHIPEWYAN OFF-GRID SOLAR AND STORAGE >

Local Indigenous communities in Fort Chipewyan long had a vision of transitioning into a cleaner, selfsustaining community with respect to their energy generation. The remote community of approximately 1,000 people has traditionally relied on carbon-intensive diesel generation for its electricity needs. In November 2020, project partners ATCO and Three Nations Energy (3NE) announced the completion of Canada's largest off-grid solar and storage microgrid project, providing the remote northern Alberta community with clean energy, and significantly reducing reliance on diesel for electricity generation. The project partners are proud to have developed this innovative distributed energy solution, giving Fort Chipewyan increased energy autonomy and improved access to renewable energy. This outstanding project showcases how industry and Indigenous communities can work together to successfully transition remote communities to lower emitting, safer, sustainable energy systems.

Participants: Hesam Yazdanpanahi, P.Eng., Phil Bogel, P.Eng.

ROUTINE Ac-225 TARGET PROCESSING CAPABILITIES

The global radiopharmaceutical community is seeking additional sources of key isotopes such as Ac-225, coined the "rarest drug on earth", an alpha-emitter that has shown promise as a metastatic prostate cancer treatment. The Life Sciences team at TRIUMF has developed the capability to symbiotically produce Ac-225 by irradiating thorium targets and applying a novel purification process developed in-house. Through a combination of chemistry and engineering ingenuity the team was successful in isolating a batch of Ac-225 and shipping it to Ontario in late 2020, securing a partnership with Fusion Pharmaceuticals. The team is now ramping up to routinely irradiate thicker targets for increased production, with the ultimate goal of commercially distributing Ac-225 to the global cancer research (and eventually therapy) community.

Participants: Ellard Portman, EIT; Stuart McDiarmid, EIT; Geoff Hodgson, P.Eng.; Sam Varah, P.Eng.; Isabel Rodrigo; Neil Weatherall; Dr. Andrew Robertson; Dr. Paul Schaffer; Dr. Conny Hoehr; Dr. Hua Yang; Dr. Qing Miao.



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GREEN STREET PEDESTRIAN AND BICYCLE BRIDGE

A tied arch incorporating two sets of unbraced-inclined arch ribs and spanning the improved I-40 Business highway corridor, the Green Street Bridge is a unique new signature structure for the City of Winston-Salem built to reconnect and help re-invigorate the community by improving bicycle and pedestrian access between adjacent communities. Leveraging powerful parametric bridge design tools throughout this structure's design lifecycle contributed to a precedent-setting approach to signature bridge design and delivery. HDR worked closely with the client and numerous stakeholders to design an innovative structure meeting the aesthetics and functionality objectives from initial concept to commissioning. This collaboration advanced construction activity, allowing the highway to be reopened to traffic ten months ahead of schedule.

Owner: City of Winston-Salem & North Carolina DOT; Consultant: HDR Inc.; Contractor: Flatiron Constructors, Inc./Blythe Development Co. Joint Venture; Michael Roberts, P.Eng., Designer.





FUTURE CLIMATE ANALYSIS OF 1ST · AND CLARK HOUSING AND CLINIC A

The development at 1st and Clark is a mixed-use affordable residential and clinic facility underway in Vancouver, that will incorporate community-centred addictions and Indigenous social enterprise/jobs programs. The project is designed for resilience, including assessing performance against a warming climate. The building therefore underwent a Step Code overheating analysis, using future climate conditions developed by the Pacific Climate Impacts Consortium for the 2020s, 2050s and 2080s decades. Passive and active cooling strategies were evaluated. While operable windows were found to be sufficient under current climate conditions, the future analysis showed that passive strategies alone would become less effective as the climate warmed, until partial or full mechanical cooling would eventually be necessary.

Participants: City of Vancouver; Vancouver Coastal Health; BC Housing: Sadia Afrin; Pacific Climate Impacts Consortium: Trevor Murdock; HDR Architecture: Stu Julien; AME Group: Alex Chou, P.Eng.; RJC Engineers: Maddie Reid, EIT; Focal Engineering: Susan MacDougall, P.Eng., Danny Taylor

KEMESS SELEN-IX PLANT FOR SELENIUM REMOVAL ◀

Located in northern BC, the Kemess Selen-IX plant is the first fullscale water treatment plant in the world to use a non-biological treatment system for selenium removal. The plant utilizes the Selen-IX process which combines ion exchange and electro-reduction to selectively remove selenium while producing a small amount of stable and non-toxic residue with offtake potential. The process can effectively manage large volumes of water, operate intermittently/ seasonally and respond to rapid fluctuations in feed flow and mass load. With a capacity of 5,600 cubic metres per day, the plant treats mine wastewater to achieve end-of-pipe selenium concentrations of less of two micrograms per litre which corresponds to the BC Water Quality Guideline limit for the protection of aquatic life.

Participants: BQE Water: David Kratochvil, P.Eng., Jon Reynolds, P.Eng., Farzad Mohamm, P.Eng., Brent Baker, P.Eng., Veneil Sundar, P.Eng. Engineers and Geoscientists BC's website contains information on the complaint, investigation, and discipline processes. You can contact us at 604.558.6647 or toll-free at 1.888.430.8035 ext. 6647, or by email at *complaints@egbc.ca*.

DISCIPLINARY NOTICE: RICHARD (DICK) BARTEL, P.ENG., COLDSTREAM, BC

Engineers and Geoscientists BC issued a Notice of Inquiry to Mr. Richard (Dick) Bartel, P.Eng., in January 2021. The Notice of Inquiry alleged that Mr. Bartel failed to attend an interview with the Investigation Subcommittee of the Investigation Committee of Engineers and Geoscientists BC, regarding an investigation related to engineering services Mr. Bartel providing for a recreational vehicle resort in Celista, BC. Specifically, the Notice of Inquiry alleged that Mr. Bartel failed to attend an interview, despite three separate formal requests made by an Engineers and Geoscientists BC investigator.

In lieu of a disciplinary inquiry, Mr. Bartel admitted to these allegations in a Consent Order dated March 26, 2021. Mr. Bartel also acknowledged that, in doing so, he contravened the *Engineers and Geoscientists Act* (repealed and replaced by the *Professional Governance Act*).

In the Consent Order, Mr. Bartel agreed to attend an interview with the Investigation Subcommittee of the Investigation Committee within 30 days of the date of the Consent Order, pay a fine of \$1,000, and pay \$2,500 towards Engineers and Geoscientists BC legal costs. Mr. Bartel also agreed that if he fails to comply with the terms of the Consent Order, his registration with Engineers and Geoscientists BC will be suspended until he does.

The full text of the Consent Order can be found in the Disciplinary Notices section of our website, at *egbc.ca/Discipline-Notices*.

DISCIPLINARY NOTICE: EDWARD (TED) NUNN, NELSON, BC

Engineers and Geoscientists BC issued a Notice of Inquiry to Mr. Edward (Ted) Nunn, in September 2020, alleging that he failed to provide his entire file after multiple requests, and failed to attend an interview with the Investigation Subcommittee of the Investigation Committee of Engineers and Geoscientists BC. Both requests related to a continuing investigation regarding structural engineering services Mr. Nunn provided for a building in South Slocan, BC. A disciplinary inquiry was held virtually on October 7, 2020.

On December 18, 2020, a panel of the Discipline Committee (the Panel) issued its determination. The Panel concluded that the allegation regarding Mr. Nunn's failure to provide his entire file is not proven to the required standard. The Panel concluded that Mr. Nunn provided some documents; even though Engineers and Geoscientists BC alleged that the documents did not appear to be a complete engineering file, Mr. Nunn indicated the documents were the "entire package". With regards to the allegation that Mr. Nunn failed to attend an interview with the Investigation Subcommittee, the Panel concluded Mr. Nunn contravened the *Engineers and Geoscientists Act* (repealed and replaced by the *Professional Governance Act*). The Panel stated that the *Engineers and Geoscientists Act* is clear and unequivocal and that a registrant must appear, when requested to do so, before a committee or a subcommittee when under investigation. The Panel considers this to be a very important professional obligation.

On April 21, 2021, the Panel issued their Decision on Penalty and Costs. The Panel ordered Mr. Nunn's registration suspended until he has attended an interview with the Investigation Subcommittee of the Investigation Committee, completes and passes the Engineers and Geoscientists BC Professional Practice Examination, and pays a fine of \$3,000, and \$14,896.63 towards Engineers and Geoscientists BC legal costs.

The full text of the Consent Order can be found in the Disciplinary Notices section of our website, at *egbc.ca/Discipline-Notices*.

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N MEMORIAM

Engineers and Geoscientists BC announces with regret the passing of the following registrants:

Garston Hugh Blackwell, P.Eng. Andrew John Carmichael, P.Eng. (Non-Practising) Dick Wong Chao, P.Eng. (Non-Practising) Lionel Henry James Cook, P.Eng. Michael Edward Giegerich, P.Eng. (Non-Practising) Roy Charles Hopland, P.Eng. (Non-Practising) Leonard John Johnson, P.Eng. (Non-Practising) Alan Farquharson Millard, P.Eng. (Non-Practising) Donald Livingstone Mills, P.Eng. (Non-Practising) Marvin Alford Mitchell, P.Eng. (Non-Practising) Takashi Negoro, P.Eng. (Retired) Bruce Ernest O'Neill, P.Eng. (Non-Practising) Cesar Layno Parayno, P.Eng. Anna Olena Paturova, P.Eng. (Non-Practising) Duncan John Pennington, P.Eng. John Campbell Spencer, P.Eng. (Non-Practising) Paul Richard Steffens, P.Eng.

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UPCOMING WEBINARS

GEOTECHNICAL EARTHQUAKE ENGINEERING *June 14-16, 2021*

The course provides participants with the fundamental concepts in geotechnical earthquake engineering, and expands those to understanding the key issues related to dynamic soil properties, local site effects and seismic site response analysis, soil liquefaction during earthquakes and the related assessments, seismic slope stability, basics of seismic soil-structure interaction, and seismic design of retaining structures.

PROFESSIONAL PRACTICE GUIDELINES: STRUCTURAL CONDITION ASSESSMENT OF EXISTING BUILDINGS

June 24, 2021

This webinar is intended to introduce topics within the recently published *Professional Practice Guidelines – Structural Condition Assessment of Existing Buildings*. These guidelines specify tasks that should be performed by Engineers and Geoscientists BC registrants so as to meet an appropriate level of practice that fulfills the registrant's professional obligations under the Act and Engineers and Geoscientists BC Bylaws. These obligations include the registrant's primary duty to protect the safety, health, and welfare of the public and the environment.

BUSINESS DEVELOPMENT AND SALES SKILLS FOR ENGINEERS AND GEOSCIENTISTS

July 2–September 30, 2021

This program provides registrants with the skills and confidence to effectively address issues relating to sales and business development. Course topics include: presenting your firm's value proposition; discovering your client's requirements; conducting professional sales presentations; and securing commitment while selling.

WRITING EFFECTIVE PROPOSALS AND REPORTS

July 5, 2021

This seminar is for engineers and geoscientists who wish to develop the confidence and writing skills necessary to write effective proposals and reports. Through a series of hands-on workshops, you will learn the key elements of writing and submitting winning proposals and reports, and how to tailor your content for both technical and nontechnical audiences. In addition, you will learn to determine what your clients (internal and external) are looking for and how they will evaluate your proposal or review your report.

PROFESSIONAL PRACTICE GUIDELINES: ENCAPSULATED MASS TIMBER CONSTRUCTION UP TO 12 STOREYS July 20, 2021

The Joint Professional Practice Guidelines – Encapsulated Mass Timber Construction Up to 12 Storeys were developed jointly by Engineers and Geoscientists BC and Architectural Institute of BC in response to BC Government changes to the BC Building and Fire Codes, which allow construction of mass timber buildings up to 12 storeys based on the new classifications of building size and construction relative to occupancy. Topics include Article 3.2.2.48EMTC. Group C, up to 12 storeys, Sprinklered, and Article 3.2.2.57EMTC. Group D, up to 12 storeys, Sprinklered. The guidelines cover minimum qualifications, professional practice, roles and responsibilities, and quality assurance for encapsulated mass timber construction projects.

WEBINAR RECORDINGS

2020 ANNUAL CONFERENCE ON-DEMAND PACKAGE NOW AVAILABLE

On-demand recordings from the 2020 Annual Conference are now available. The package includes unlimited on-demand access to high-quality session recordings that can be viewed from anywhere, and anytime—and up to 40 hours of Continuing Education. For more information, please visit the conference website, at *eqbc.eventsair.com/ac20*.

CONTINUING EDUCATION REQUIREMENTS

The regulatory landscape in BC is changing and the upcoming implementation of the *Professional Governance Act* will introduce a mandatory Continuing Education Program for professional engineers and geoscientists. In this webinar, we will be discussing the Continuing Education Program requirements and timeline, information on tools and resources, and allowing time for your comments and questions about the new program.

PROFESSIONAL GOVERNANCE ACT OVERVIEW

The Professional Governance Act came into force in February 2021, representing a shift in how the professions of engineering and geoscience are regulated, and introducing new obligations and requirements for professional engineers and geoscientists. This new legislation establishes a consolidated framework for professional regulators in the natural and built environment, including Engineers and Geoscientists BC and the regulators for forestry, agrology, biology, and applied science. This webinar will provide an overview of the key changes under the Professional Governance Act, including information on the Code of Ethics, Continuing Education Program, Annual Information Reporting, the regulation of engineering and geoscience firms, and other changes that may affect registrants.

THE VALUE OF INDIGENOUS ENGAGEMENT ON ENGINEERING AND GEOSCIENCE PROJECTS

This session will teach best practices for collaboration with Indigenous communities when working on engineering and geoscience projects on Indigenous land. The session will take a practical approach by assessing a hypothetical project from both the technical and First Nation's perspective, and finish with a panel of experts sharing their experiences.

We encourage you to take advantage of the Online Learning Centre, at egbc.ca/Online-Learning, which provides remote educational opportunities. The Centre hosts more than 50 online learning opportunities on a variety of topics.

For a complete listing of online learning opportunities, or for more information, visit egbc.ca/Online-Offerings, or contact us at 604.430.8035 or 1.888.430.8035.

CALL FOR PRESENTERS

Are you an expert in your field who would like to contribute to engineering and geoscience practice? Engineers and Geoscientists BC is actively seeking members to present on a variety of topics. For more information, please visit *egbc.ca/Practice-Resources/Professional-development*.





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