



A collage of images showing various professionals, including engineers and construction workers, in both historical and modern settings. In the background, a large dam structure is visible, symbolizing the company's focus on infrastructure.

# STRONGER TOGETHER

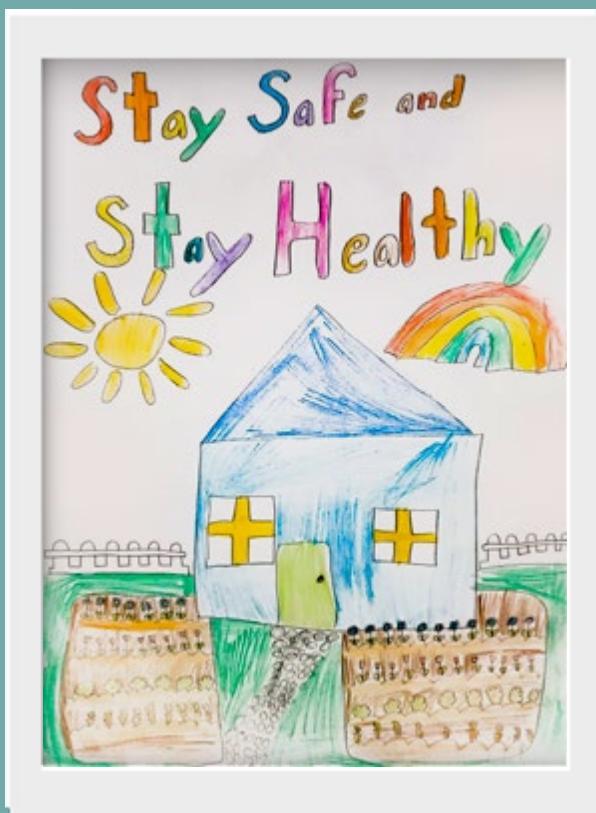
CELEBRATING **70** YEARS  
of service and innovation



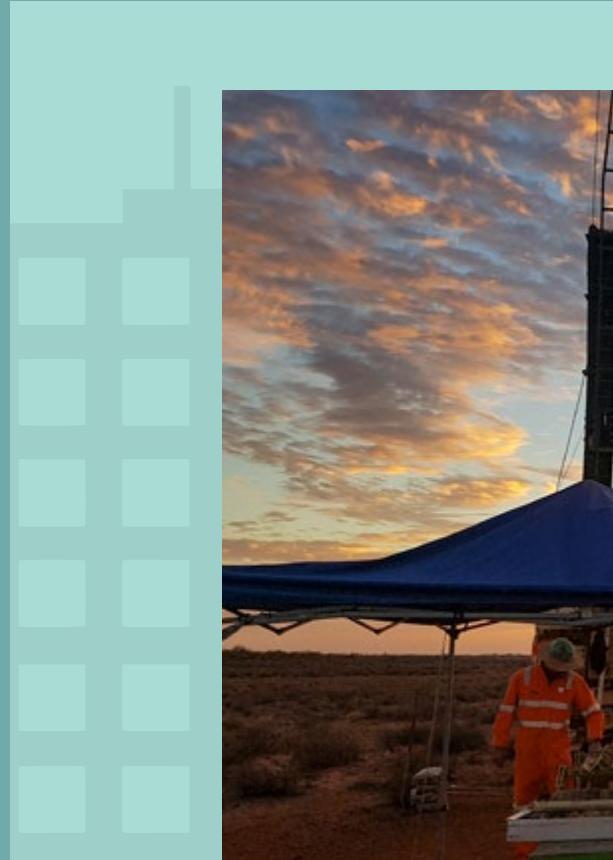
2019  
2020

SUSTAINABILITY REPORT

The outbreak of the coronavirus disease COVID-19 has created a global health crisis that continues to have a deep impact on the way we perceive our world and how we live our everyday lives. First identified in late 2019, it was declared a global pandemic by the World Health Organization in March 2020. In May 2020, in celebration of Safety and Health Week, KCB's kids showed their creativity in our drawing competition *Staying safe during COVID-19*. They showed us adults how it's done!



LAUREN | AGE 8





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# FROM THE PRESIDENT



*Len Murray*

Len M. Murray, P.Eng., P.E.  
President and CEO



In last year's Sustainability Report, I introduced our legacy book *Strong Foundations: The Klohn Crippen Berger Story*. I'm proud to report that we published the book in May 2020, during the early weeks of the COVID-19 pandemic, and while almost all the company was suddenly working from home.

When I wrote the book's epilogue in August 2019, I summed it up by saying: "We have adapted for seventy years, and we will continue to do so, now and into the future." Little did I or the world know what was coming, and how people, businesses, governments and society have had to adapt since December 2019, when the new coronavirus was first publicly announced.

Our founders never faced what we at Klohn Crippen Berger (KCB) face today. This is new and at the time of writing, will continue for many months, if not years. During this pandemic we have all become much more aware of inequality and racism in our society. I want to take this opportunity to stress that our company provides equal opportunities for all - irrespective of race, gender or other differences. In fact, we celebrate and value our differences. With this in mind, our theme for this report is "Stronger Together" as we celebrate 70 years of service and innovation in 2020.

#### Company Update for 2019-2020

**Economic Impacts:** One of the benefits of being a sustainable, successful company is the ability to offer our employees new opportunities and help them adapt during difficult times. In situations where we face multiple challenges, we're adapting by offering employees assignments to new projects and locations, to the benefit of our clients. So far, our headcount has not been impacted by the COVID-19 pandemic; in fact, we're continuing to hire talented people. I take great pride in giving people rewarding opportunities to grow their career, especially through tumultuous times like these.

**Social Impacts:** The impact of the sudden change of every aspect of everyone's lives, all at once, cannot be

underestimated. At the beginning, people worked from home, if they could, and celebrated frontline workers each evening by banging pots and pans, ringing bells or clapping. Several months later, we face the reality of a multi-year pandemic where we continue to wear masks, keep our distance and travel less. We've adapted by listening to our people, by being flexible in our working arrangements and adapting with care when things change. I'm very aware of the potential for our people burning out and we're taking steps to assess employee mental health; and just like many companies hire a corporate lawyer, we've hired a corporate doctor who is on call to guide us through the pandemic.

**Environmental Impacts:** On page 12 you'll read how in late 2019 I decided to offset our carbon emissions from the company's predicted air travel in 2020. Now our air travel is practically zero! We haven't waivered though – and I'm proud that we've invested in climate and sustainable development experts ClimateCare and Carbon Neutral. Read more about it in the report.

#### Company Outlook

I've learned that continuous communication about our safety measures and our progress during the COVID-19 pandemic is vital for instilling trust in our employees. I'm doing my part by holding global town hall meetings each month. I'm confident that we'll maneuver through the pandemic with a clear plan, constant communication and being measured in our approach. When I think about it, we've used this approach many times before, in dealing with our challenges and our clients' challenges over the years. Described this way, perhaps nothing much has changed after all!

I wish all readers of this report good health and welcome your feedback on our 2019-2020 Sustainability Report at [lmurray@klohn.com](mailto:lmurray@klohn.com).

# ABOUT THE REPORT



This report follows the Global Reporting Initiative's (GRI's) Sustainability Reporting Guidelines – the international reference for sustainability reporting – and is the disclosure of KCB's performance related to selected environmental, social and economic topics (or "Standard Disclosures"). Each report section is mapped to the corresponding GRI Standard Disclosure listed on page 35.



# STAKEHOLDER ENGAGEMENT



Topics included in this report are selected based on interactions with our invested stakeholders: our employees, clients, shareholders and industry peers. Report content is also influenced by third-party stakeholders such as industry associations, the scientific community, government and regulatory agencies, and the communities where we work.

## EMPLOYEES



- Employee meetings
- Employee feedback surveys
- Employee reports on ethics or conduct
- Safety reports
- Whistleblower reports

## INDUSTRY PEERS AND SCIENTIFIC COMMUNITY



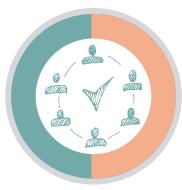
- Partnering agreements
- Subcontractor agreements
- Industry association participation
- Scientific research and sponsorship

## SHAREHOLDERS



- Shareholder meetings
- Annual general meetings
- Shareholder reports on ethics or conduct

## PUBLIC COMMUNITY



- Public consultation for projects
- Volunteer initiatives
- Sponsorship of community events
- Company donations to charities and community groups

## GOVERNMENT AND REGULATORS



- Regulatory committee participation
- Adherence to occupational health and safety, and environmental laws
- Adherence to employment and labour regulations
- Adherence to laws governing engineering, geoscience and other disciplines

## CLIENTS



- Client feedback surveys
- Pre-qualification surveys
- Project requirements
- Contract requirements
- Participation on client technical review boards

# ABOUT KCB

KCB is an award-winning engineering, geoscience and environmental consulting firm with offices in Canada, USA, Australia, Peru, Brazil, and the UK. Since 1950, we have helped to sustainably develop resources, reclaim landscapes, build communities and stimulate economies by participating in some of the largest and most challenging projects in the world. We have a strong reputation for quality work and technical experience. Our commitment to excellence is the driving force behind everything we do.



KINSEY | AGE 5



## OFFICE LOCATIONS



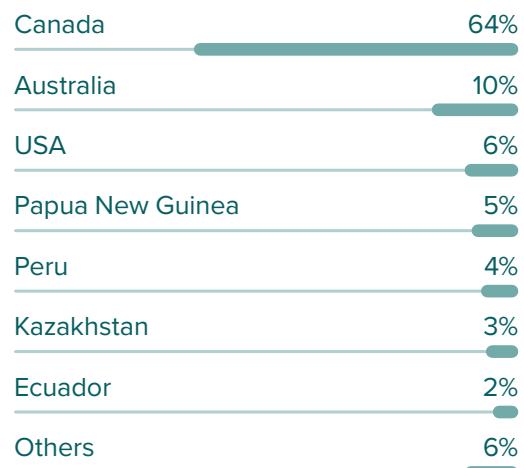
Vancouver (Head Office)  
 - Calgary  
 - Edmonton  
 - Fredericton  
 - Montreal  
 - Nanaimo  
 - Saskatoon  
 - Sudbury  
 - Toronto

Phoenix  
 Belo Horizonte  
 Lima  
 Belo Horizonte

York  
 Brisbane  
 Perth



## FEE REVENUE BY COUNTRY





## CORPORATE GOVERNANCE

KCB's Board of Directors consists of three members nominated by the employee shareholders and three members nominated by WSP Global. The Board of Directors appoints the President, who in turn appoints the Operating Committee, an advisory group which meets quarterly to review company performance.



### CORPORATE GOVERNANCE COMMITTEES

- Operating Committee
- Audit Committee
- Risk Assessment Committee
- Project and Proposal Monitoring Committee
- Global Quality, Health & Safety and Environment (QHSE) Team
- Pension Committee
- Donations Committee



### VOLUNTEER COMMITTEES

- Joint Health and Safety Committee
- Social Media Committee
- Sustainability Committee
- Women-in-Klohn Committee
- Young Professionals Committee

## INTEGRATED MANAGEMENT SYSTEM

KCB's business is governed using an integrated management system (IMS) consisting of quality, health and safety, and environment procedures. This system steers our business conduct, the way we undertake our projects, and how we interact with our clients, the community and the environment.

Our IMS meets the requirements of the ISO 9001, 14001 and 45001 standards, which promote good behaviour, while keeping us honest through regular audits. We regularly assess the effectiveness of our IMS by carefully listening to client feedback, seeking input from employees and others we work with, conducting audits and inspections of our activities, and reviewing progress on all our active projects each month. We believe that this approach leads to strong client satisfaction, high employee engagement, and the continued success of KCB.

## BUSINESS CONDUCT AND ETHICS

KCB's success, including our ability to positively impact invested stakeholders, depends upon the integrity of our employees, the quality of our services, and on the trust and confidence of the people we work with. We are guided by KCB's Charter, a moral compass for our daily work.

We conduct our business ethically, with integrity and honesty, and reinforce this expectation in our Code of Business Conduct and Ethics for employees, and for subconsultants, subcontractors and suppliers. Violations of our Charter or Code of Conduct may be reported to our Ethics Officer who reports directly to KCB's Board of Directors.



# PERFORMANCE SUMMARY



KCB's performance and impact on our stakeholders is reported in terms of selected economic, social and environmental metrics and results.

## LEGAL COMPLIANCE

In this report, we confirm that KCB continues to comply with applicable employment, occupational health and safety, and environmental laws and regulations, including regulations related to professional engineering, geoscience and environmental services. KCB has no pending court orders or fines related to non-compliance with these legal requirements.





# ECONOMIC IMPACTS

Disclosure on our economic impact on clients, employees, shareholders, local communities, and business partners, including subconsultants, subcontractors and suppliers.

## COMMUNITY INVESTMENTS



In 2019, KCB employees donated over **\$38,000** to the United Way, which was matched by the company, for a total donation of over **\$77,000**.

Since 1992, employees have donated **\$1 million** to the United Way, matched dollar-for-dollar by the company.

Across our offices in 2019, we donated over **\$88,000** to various charitable organizations and fundraising events.



Platinum member

For the 12<sup>th</sup> consecutive year, KCB is one of Canada's Best Managed Companies, recognizing our continued financial success, effective strategic planning and commitment to improvement.



For the 5<sup>th</sup> year in a row, KCB's Australasia group was recognized as an Employer of Choice at the Australian Business Awards. This award is given to organizations that maximize the full potential of their workforce through effective employee recruitment, engagement and retention.



PSMJ'S Circle of Excellence  
Top 20% of Companies

Each year we compare our performance to about 300 industry peers in North America by participating in PSMJ's Financial Performance Survey. Based on 13 metrics, KCB continues to be in the top 20% of companies and is the only company to achieve this result every year since 2009.



Canadian Occupational Safety awarded KCB a Silver award at the 2019 Canada's Safest Employers Awards in the Mining and Natural Resources category. This is the 2<sup>nd</sup> year in a row that KCB has won this award.

164

subconsultants were employed in 2019

\$11.6M

(CAD) paid out in services to subconsultants

## SOCIAL IMPACTS

Disclosure on our impact on the social systems within which we operate, including the composition of our employees, our duty of care for health and safety, and the training, education and skills upgrading of our employees.

### OUR PEOPLE

STAFF COUNT  
**549**

482 FULL TIME STAFF  
67 PART TIME STAFF

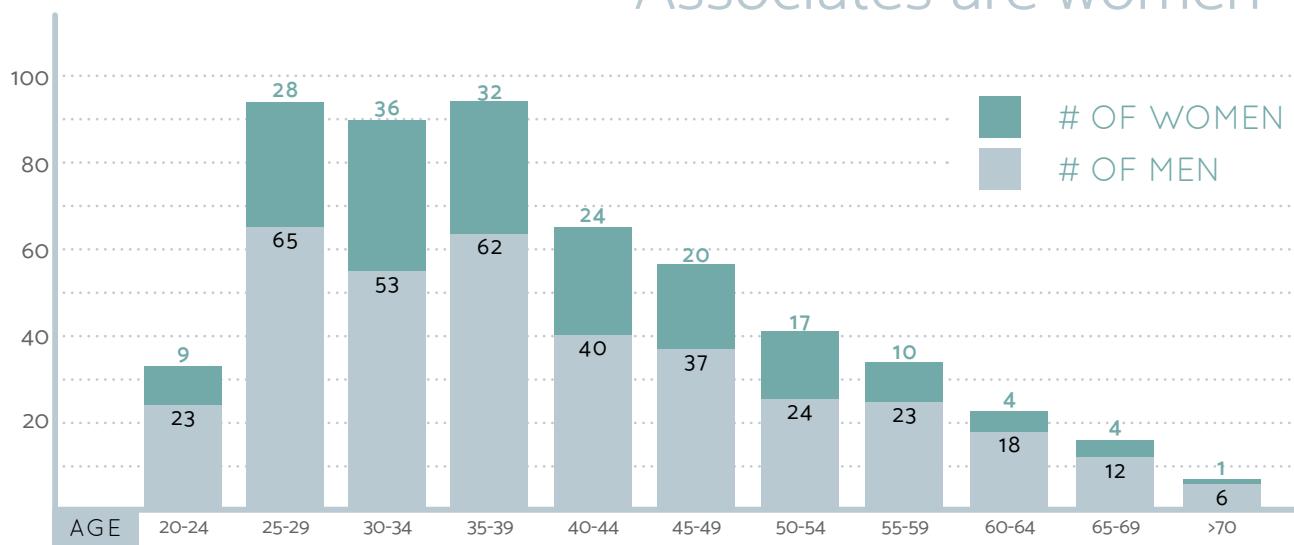
AVERAGE YEARS OF SERVICE IS **6**

AVERAGE AGE IS **40 YEARS**

## GENDER STATISTICS

**34%** of staff are women

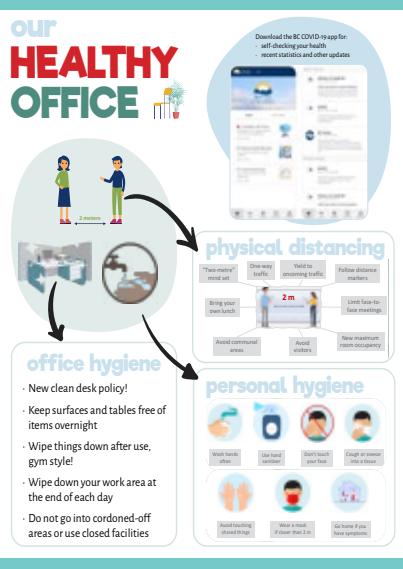
**15 of 83** Principals and Associates are women



### HEALTH AND SAFETY

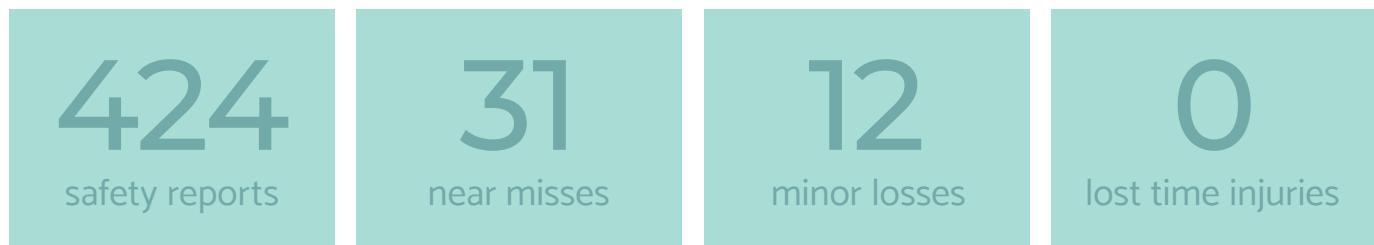
#### COVID-19 CORONAVIRUS

In January 2020, we convened a COVID-19 Response Team to monitor what was happening in China and elsewhere. In mid-March, in response to the World Health Organization's declaration of a pandemic and local states of emergency at our office locations, we met daily to support our employees as they transitioned to working from home. Although we were deemed an essential service in most jurisdictions, we wanted to do our part to limit the spread of COVID-19.



For the first time in our 70-year history almost every one of us was working remotely! We soon realized that returning safely to our offices would take careful preparation and time. In mid-April, the COVID-19 Response Team started detailed “walkthroughs” of each office to determine the necessary measures to make our workplaces safe by applying a hierarchy of controls.

We laid out a “healthy office” plan for each office using the three pillars of physical distancing, enhanced personal hygiene, and enhanced office hygiene. By surveying our employees, we determined who could return to the office in phases, while adhering to local government re-opening plans. Before returning to each office, we met with employees remotely to explain the new office protocols and to answer questions and address any concerns. At the time of publication, most of our offices are open with reduced occupancy to permit physical distancing, and we continue to survey employees for feedback to improve our healthy office plans.



## TRAINING & EDUCATION

**\$1,424,000**  
invested in training

Annual amount invested  
in training per employee      **\$2,600**

Average annual training  
hours per employee      **36**

## FIRST NATIONS SUPPORT

In 2018, KCB established a scholarship fund of \$2,000 per year at the University of Northern British Columbia (UNBC). This scholarship encourages Indigenous residents of British Columbia to enroll in engineering, environmental or mining services studies at UNBC.

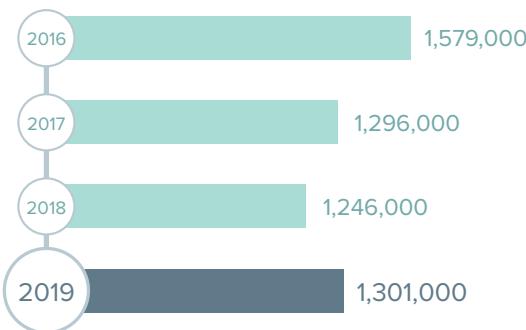
We also collaborated with Engineers and Geoscientists of British Columbia to develop a one-day training session for its members and the public, titled “The Value of Indigenous Engagement on Engineering and Geoscience Projects”. This session shared best practices for collaboration with Indigenous communities when working on engineering and geoscience projects on Indigenous land. The session took a practical approach by assessing a hypothetical project from both the technical and First Nation’s perspective, and included a panel of experts who shared their experiences.

# ENVIRONMENTAL IMPACTS

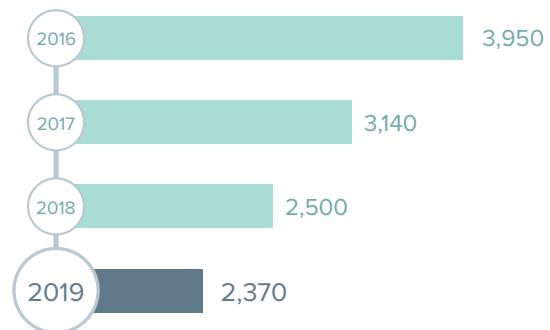
Disclosure on our impact on natural systems, including our paper and energy consumption, and our move to use less paper. Per-person data is based on full-time equivalent employees at year end.

MATERIALS USED BY WEIGHT / VOLUME

## PAPER SHEETS PURCHASED

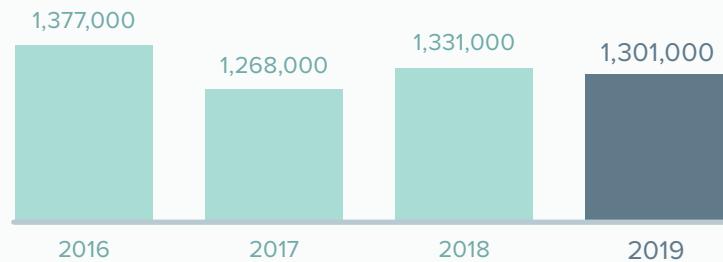


## SHEETS / PERSON



ENERGY CONSUMPTION

## ELECTRICITY (KWH)



## NATURAL GAS (GJ)





## CARBON OFFSETS

Before the COVID-19 pandemic was confirmed in March 2020, KCB invested in offsetting its carbon emissions from its predicted 2020 air travel with projects that cut carbon and improve lives. Then our air travel literally dropped to zero overnight!

Nevertheless, we haven't waivered in our approach to take responsibility for our impact on the environment, and so we partnered with climate and sustainable development experts ClimateCare and Carbon Neutral.

Our predicted emissions this year were offset through a portfolio of projects, including ClimateCare's award-winning Aqua Clara water purification project. This project makes affordable water filters for households in rural Kenya, so that families have access to clean water without having to boil it. The project team trains people to check and maintain the filters while reinforcing the importance of hand washing, and cleaning fruits and vegetables.

Through the Carbon Neutral organization, we are offsetting our predicted emissions through deforestation prevention projects, protecting forests as significant carbon sinks. Len Murray, KCB's President & CEO, explained it this way: "Carbon offset provider Carbon Neutral caught our attention because they include projects for preventing deforestation in areas where we work, including Papua New Guinea, Peru and Brazil".







# STRONGER TOGETHER

Over the last 70 years, KCB has overcome many challenges, including challenges triggered by worldwide events, challenges that rocked the best-laid plans, and challenges of ownership through the good and bad times. We continue to adapt to new challenges, including the COVID-19 pandemic.

KCB has also experienced many successes, achieved a global reputation for technical excellence, and built a roll call of engineers and scientists that includes some of the world's pre-eminent professionals in their fields. Together we have built a company that has stood the test of time. Our expansion throughout Canada and into Peru, Australia and other countries shows how we are successfully moving forward together.

Together we have adapted for 70 years, and we will continue to do so, now and into the future.

Reading through the pages of our history in our recently published book *Strong Foundations: The Klohn Crippen Berger Story* will show that nothing is impossible for a group of people working together with shared values.



# PRINCIPALS APPOINTED IN 2020



**MARY-JANE PIGGOTT**  
P.Eng., MBA

Since joining KCB in 2011, Mary-Jane has held a series of increasingly responsible positions and is currently serving as North America Regional Manager of KCB's Mining Environmental Group based in Vancouver. She has over 20 years of experience in the investigation, design and project management of mining, civil and water resource projects throughout North America, South America and Australia.



**JOSEPH QUINN**  
Ph.D., P.Geo., P.Eng.

Joe obtained his M.Sc. and Ph.D. in engineering geology from the University of Leeds in the UK and joined our Calgary office in 2009. As an engineering geologist/geotechnical engineer, he developed and led our advanced geotechnics and numerical modelling group and became an Associate in 2013. In 2018, Joe returned to York to establish and manage our UK branch office and pursue opportunities with international clients.



**CHRIS STRACHOTTA**  
RPGeo

Chris joined KCB in 2005, has worked in three KCB offices, and opened the office in Perth, Western Australia. In addition to being an internationally recognized hydrogeologist, Chris manages the marketing and business development initiatives for KCB's global operations. Chris has over 20 years of experience in the mining and oil and gas industries across Australia, Asia, the Pacific, the Americas and Europe.



**BRENT USHER**  
Ph.D., RPGeo

Brent joined the Brisbane office in 2009 and since then has developed a strong professional reputation in the mining industry. Through his career to date, Brent has authored or contributed to over 60 technical papers, contributed chapters to published books, and participated on international technical panels. Brent has more than 20 years of experience in the fields of mine waste geochemistry, aqueous geochemistry and hydrogeology. Brent also manages the Geoscience group in Brisbane.

# ASSOCIATES APPOINTED IN 2020



**JORDAN BRANDENBURG**  
P.Eng.

Jordan received her degree from the Royal Military College of Canada and joined our Calgary office in 2010. Jordan has extensive experience in the civil engineering and water resources fields, including surface water and stormwater management, dam breach inundation mapping, flood and erosion protection works, and hydrotechnical modeling. She has excelled at leading and managing project teams and was awarded our Alberta Business Unit's Emerging Leader Award in 2017, and the Harold L. Morrison Rising Young Professional Award from the Consulting Engineers of Alberta in 2018.



**JIM CASEY**  
P.Eng., P.E.

Jim is a geological engineer with over 10 years of experience in dam design, mine waste management, construction and site investigation. He has returned to our Vancouver office after spending the last two years opening and managing KCB Consultants' Phoenix, Arizona office where he has built a strong foundation for growth and development in the US. Jim started with KCB as a co-op student in 2007 and has since worked on mining projects ranging from concept to closure in several countries.



**BETTY CELIS**  
M.Sc., Eng.

Betty started with KCB in 2011 as a civil engineer, acting as a water resources specialist on a massive mine construction project in northern Peru. While working for KCB full-time, Betty obtained her M.Sc. in hydrogeology. She currently manages Lima's water resources team, leading the hydrotechnical engineers and groundwater specialists. Betty has earned respect from both clients and staff, and continues to be awarded new projects from key clients.



**MICHAEL CYR**  
P.Eng.

Since joining KCB in 2018, Mike has quickly demonstrated a high level of understanding of our business and team culture. He has over 14 years of experience in geotechnical and environmental engineering. Mike has been involved in dam safety reviews and dam safety inspections, dyke/dam design, geotechnical investigations, construction supervision, dam safety and operational risk assessments. Mike manages our Fredericton office, the hub of KCB's Maritimes group. Mike serves on the board of the Canadian Dam Association as a Director-at-Large.



**MAHMOUD ELBANNA**  
M.Sc., P.Eng.

Following his tenure as a lead geotechnical engineer in the oil sands industry, Mahmoud, a Queen's University graduate, rejoined KCB in 2018 and brings with him more than 15 years of experience leading and managing engineering teams responsible for the design and construction of major earth structures, geotechnical site investigations and characterizations, liquefaction and deformation analyses, and dam safety inspections and performance evaluations. He has also served as the lead design engineer, dam safety assessor, and Engineer of Record for several major earth dams in Canada and internationally.



**CLAIRE KENT**  
M.Sc., RPGeo

Claire joined the Brisbane office in 2013. Claire has a master's degree in hydrogeology and 10 years of experience working on projects for mining, coal seam gas and government clients in Australia, Papua New Guinea and the UK. Claire has led several successful regulatory applications for coal seam gas projects in Queensland, and has completed projects for Queensland regulators, including management of the Great Artesian Basin in Australia. Claire is the Executive Secretary of the International Association of Hydrogeologists, Australian National Chapter and was on the organizing committee for the 2019 IAH Groundwater Conference held in Brisbane. Claire has recently taken on the role of business development lead in our Australasia Business Unit.



**JAMES PENMAN**  
CPEng

Based in Perth, James is a senior geotechnical engineer with over 11 years of experience in mining infrastructure and civil consulting across Australia, the Pacific, and the Americas. James has worked on mine waste facility designs, from concept to closure planning. He joined KCB in 2008 and managed our Perth office from 2014 to 2019.



**ANDY SMALL**  
M.Sc., P.Eng.

Based in our Fredericton office, Andy is a senior geotechnical engineer with over 30 years of experience in embankment dam design, dam safety, water management, construction and inspection, and project management. Andy has a legendary interest in dam safety, and is internationally recognized for his commitment to the practice. Andy has been a leader in the Canadian Dam Association for over 20 years and instrumental in developing their guidance documents on dam safety in the Mining Dams Committee. Andy rejoined KCB in 2018.



**PABLO URRUTIA**  
M.A.Sc., P.Eng.

Pablo is a senior geotechnical engineer with over 15 years of experience in geotechnical engineering projects related to mining activities, with a focus on the design and safe operation of tailings storage facilities. He has worked on a wide variety of projects throughout North America, South America and Russia. Pablo joined KCB's Mining Environmental Group in 2018. Pablo's experience also includes: site characterization based on in-situ testing and laboratory data, tailings planning and operational management, reclamation planning for tailings storage facilities, slope stability analysis, and project management.



**CARLY WATERHOUSE**  
M.Sc., RPGeo

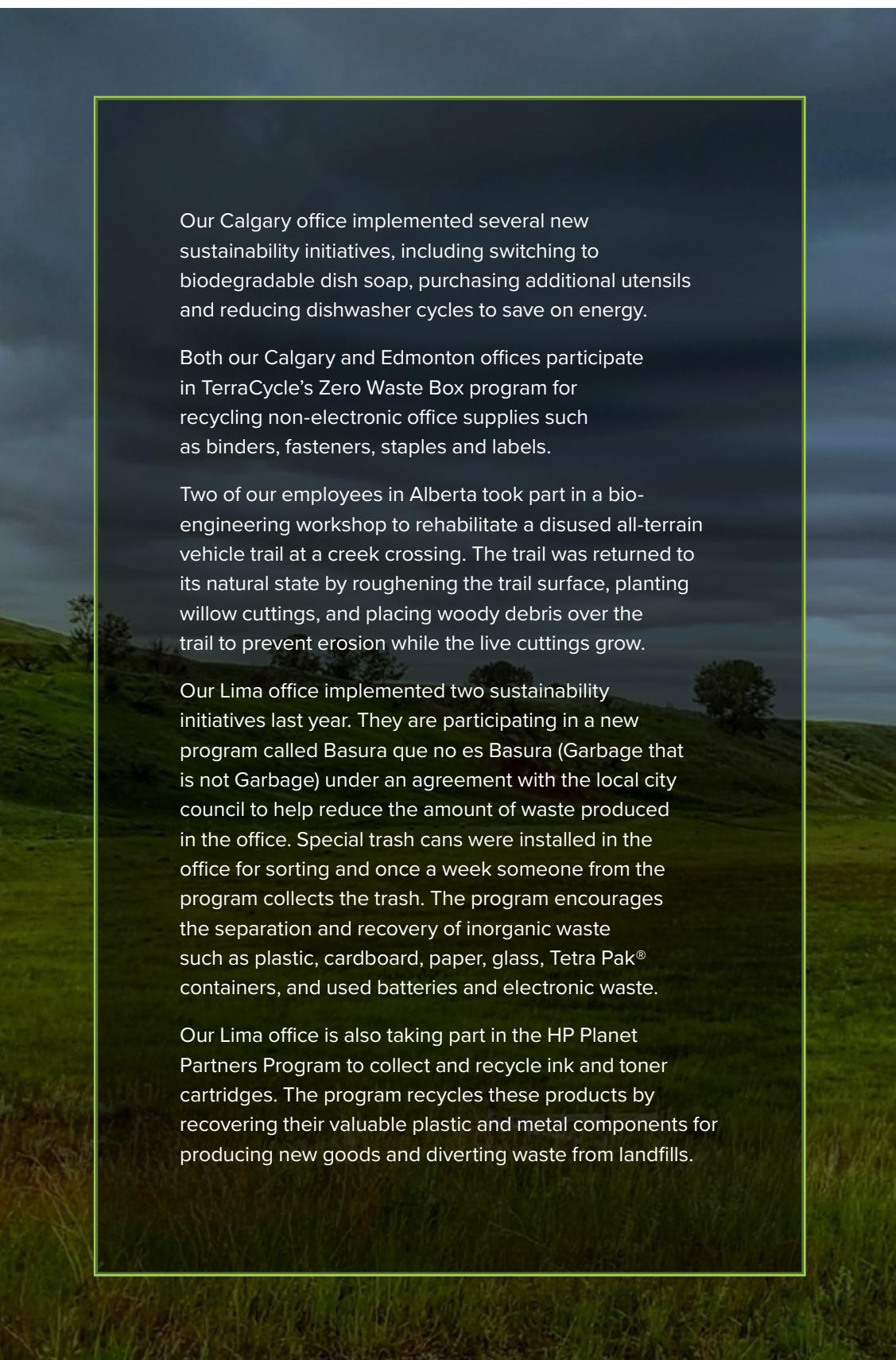
Carly joined KCB in 2017. She is a senior hydrogeologist with over 13 years of professional experience in Australia and the UK and holds a masters degree in hydrogeology. Carly has experience in designing bauxite tailings facilities, including seepage assessment and interception designs. She is currently assigned to a multi-disciplinary team for the design, development and permitting of a major new dry stack facility. Carly is experienced in large-scale fieldwork programs, environmental assessments, and water resource assessments. Carly has been a team lead in our Geoscience group in Brisbane since 2019.



CASSIA | AGE 9



# GREENER CHOICES IN OUR OFFICES



Our Calgary office implemented several new sustainability initiatives, including switching to biodegradable dish soap, purchasing additional utensils and reducing dishwasher cycles to save on energy.

Both our Calgary and Edmonton offices participate in TerraCycle's Zero Waste Box program for recycling non-electronic office supplies such as binders, fasteners, staples and labels.

Two of our employees in Alberta took part in a bio-engineering workshop to rehabilitate a disused all-terrain vehicle trail at a creek crossing. The trail was returned to its natural state by roughening the trail surface, planting willow cuttings, and placing woody debris over the trail to prevent erosion while the live cuttings grow.

Our Lima office implemented two sustainability initiatives last year. They are participating in a new program called Basura que no es Basura (Garbage that is not Garbage) under an agreement with the local city council to help reduce the amount of waste produced in the office. Special trash cans were installed in the office for sorting and once a week someone from the program collects the trash. The program encourages the separation and recovery of inorganic waste such as plastic, cardboard, paper, glass, Tetra Pak® containers, and used batteries and electronic waste.

Our Lima office is also taking part in the HP Planet Partners Program to collect and recycle ink and toner cartridges. The program recycles these products by recovering their valuable plastic and metal components for producing new goods and diverting waste from landfills.



## —◦ WOMEN IN KLOHN



Eight years ago, KCB established a Women in Klohn (WiK) group to attract, retain, engage and support women working at KCB. Since 2012, the group has participated in over 30 events, including community support activities, networking sessions and mentoring initiatives. Women at KCB continue to take on increasing leadership roles at the Principal and Associate level, and team lead or manager level.

Every year WiK hosts a global workshop and networking event and all employees are invited to attend. In 2019, the workshop topic was the impact of body language and communication styles in a business setting.

## —◦ HEALTH & SAFETY

### Healthy Workplace Month

Every October we participate in Canada's Healthy Workplace Month. Last year we invited a certified Holistic Nutritionist to our Vancouver office for a lunch-time presentation, "Beating Stress & Boosting Happiness". Attendees learned how to recognize the signs and symptoms of stress-related health concerns, foods that improve or reduce the ability to handle stress, and daily habits to boost your mood. We also had an interactive demonstration on how to prepare healthy smoothies.

On World Mental Health Day on October 10, 2019, we hosted a guest speaker from the Canadian Mental Health Association on workplace mental health.

### Safety and Health Week

KCB participates every year in North American Safety and Health Week, an important annual celebration focusing on preventing injury and illness and advocating for safer workplaces. Despite everyone working remotely during this year's event due to the COVID-19 pandemic, we organized a drawing competition for employees and their families with the theme "staying safe during COVID-19", a Kahoot! safety trivia contest, and an online panel discussion on the impacts of COVID-19 on fieldwork.



## RESEARCH AND DEVELOPMENT

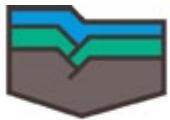
KCB has partnered with several universities in Canada and around the world to support research and innovation in engineering and geoscience that helps solve industry challenges.

INSTITUTION	RESEARCH PROJECT
Imperial College UK	Geotechnics M.Sc. industrial bursary scheme
Laval University	Life cycle optimization for embankment dams
Queen's University	Geosynthetics for arctic development
UK Space Agency / HR Wallingford	Minimizing the risk of tailings dam failures through remote sensing data
The University of Alberta	New monitoring approaches for geohazard-risk management in Canada
The University of British Columbia/ The University of Waterloo/ Queen's University	Canadian tailings dam breach research (CanBreach)
The University of British Columbia, Okanagan	Seismic rocking performance of bridge piers
The University of Queensland	Geotechnical Engineering Centre 4-year sponsorship
The University of Toronto	Assessment of residual strength of tailings using the cone penetration test and simplified numerical modelling
The University of Western Australia / The Australian Centre for Geomechanics (ACG)	ACG Mini Calibration Chamber

KCB also supports scholarship programs at several universities, including: The University of British Columbia, University of Northern British Columbia, University of Alberta, University of Calgary, Queen's University, and Imperial College London.



## SUPPORTING INDUSTRY ASSOCIATIONS



ALBERTA CHAMBER  
OF RESOURCES

PAM FINES

Dam Integrity Advisory  
Committee Member



ALBERTA INSTITUTE  
OF AGROLOGISTS

STEPHANIE HANNEM

Alberta Soils Network  
Executive Member



ALBERTA  
Native Plant  
COUNCIL

KIM MACKENZIE

Board Member



JIM CASEY

Tailings Dam Regulatory  
Committee Member



ASSOCIATION OF CONSULTING  
ENGINEERING COMPANIES  
BRITISH COLUMBIA

BOB CHAMBERS

Resource Subcommittee  
Member

MIKE CHIN

Director and TransLink Liaison  
Committee Member



The Canadian Institute  
of Mining, Metallurgy  
and Petroleum

MARY-JANE PIGGOTT

Vancouver Branch, Technical  
Committee Co-Chair



BOB CHAMBERS

Industry Advisory  
Council Member



Geotechnical Society  
of Edmonton

COURTNEY MULHALL

Program Chair



BRIAN ROGERS

Private Sector  
Committee Member



Canadian Dam Association

MICHAEL CYR

Director-at-Large

BILL CHIN

Professional Development  
Committee Member

HARVEY MCLEOD

International Committee Member,  
Mining Dams Committee Member

GREG NOACK

Mining Dams Committee Chair

JOANNA CHEN

Mining Dams Committee Member Mining Dams Committee Member

ANDY SMALL



COMMISSION INTERNATIONALE  
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Tailings Working  
Group Member



**GeoCalgary**  
2020  
September  
13-16  
Reflection on Resources



**GeoVirtual**  
2020  
September  
14-16  
Resilience and Innovation

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# // OUR PROJECTS



## KCB'S SUSTAINABLE PROJECT ATTRIBUTES

DESIGN	D1 Responsible land use D2 Design to reduce, repurpose or reuse remaining materials D3 Design to improve safety conditions
ENVIRONMENTAL	E1 Responsible water management E2 Special consideration for flora and fauna E3 Rehabilitation
INNOVATION	I1 Advancement in research and technology
SOCIAL	S1 Mentoring local people S2 Design or service to improve social conditions S3 Transfer of technology S4 First Nations integration and application of traditional knowledge



# ADVANCES IN THE HYDROGEOLOGIC UNDERSTANDING OF AUSTRALIA'S GREAT ARTESIAN BASIN

## KCB'S SUSTAINABLE PROJECT ATTRIBUTES

- D1 Responsible land use
- D2 Design to reduce, repurpose or reuse remaining materials
- D3 Design to improve safety conditions
- E1 Responsible water management
- H1 Advancement in research and technology

## // QUEENSLAND, AUSTRALIA

Understanding groundwater use, both current and historical, is important for understanding the hydrogeology of groundwater systems, and for water planning. The Queensland portion of Australia's Great Artesian Basin (GAB) is managed under the Water Plan (Great Artesian Basin and Other Regional Aquifers) 2017.

KCB was involved in developing methods to estimate current and historical abstractions from the different hydrostratigraphic units of the basin. The team estimated current groundwater use for all bores sourcing water from the GAB and historic groundwater-use trends, covering the 115-year period between 1900 and 2015. These estimates took account of periods of inactivity at the bore, the aquifer condition (sub-artesian, artesian), and the nature of discharge (controlled or uncontrolled). The process used publicly available datasets.

The project team from KCB, with contributions from clients involved in the project, published the work in the Hydrogeology Journal in January 2020. The paper presents an overview of the methodology and how the estimates were used to support water planning. The current groundwater use from the GAB in Queensland was estimated to be 322 gigalitres per year, which is lower than previous estimates, partly because of improved estimation techniques, bore capping and piping programs that have been in progress since 1989, and naturally reducing discharge rates from uncontrolled artesian bores.





# BEAR CREEK INTAKE TOWER REMOVAL

## KCB'S SUSTAINABLE PROJECT ATTRIBUTES

- D3** Design to improve safety conditions
- E3** Rehabilitation
- S2** Design or service to improve social conditions
- S4** First Nations integration and application of traditional knowledge

## // VANCOUVER ISLAND, BC, CANADA

The Bear Creek Dam impounds an upstream water reservoir on the Jordan River on Vancouver Island, Canada. Its intake tower, which stands in the reservoir, had deteriorated, posing a potential safety risk to boaters and the public who liked to climb the tower to jump in the water. KCB and Hatch (KCB+H) were engaged by BC Hydro to evaluate whether to remove the upper portion of the tower (above water level) and install a lower and safer platform for the public to climb and jump, or to install structures to prevent people from climbing the tower, or to remove the intake tower completely.

The KCB+H team evaluated the options for safety and environmental aspects, while considering the cost for immediate risk mitigation and ongoing maintenance, ultimately deciding to remove the intake tower from the reservoir completely. The plan was to demolish sections of the intake tower in sequence, using carefully designed rigging attachments to safely remove each section by helicopter. The plan worked seamlessly, and once the intake tower was removed, the underwater intake structure was permanently sealed with concrete, preventing uncontrolled releases of water downstream.

Before demolition started, a silt curtain was installed around the intake tower to contain lake-bottom sediments and concrete plumes during the work, and during demolition, a BC Hydro and Pacheedaht First Nation team monitored the pH and turbidity levels of the water to check they were within regulatory limits.





# HARVIE PASSAGE REHABILITATION

## KCB'S SUSTAINABLE PROJECT ATTRIBUTES

- D3** Design to improve safety conditions
- E1** Responsible water management
- E2** Special consideration for flora and fauna
- E3** Rehabilitation



## // CALGARY, ALBERTA, CANADA

KCB was engaged by provincial agency Alberta Transportation to rehabilitate Harvie Passage on the Bow River in the City of Calgary, following a 1-in-100 year flood in June 2013.

The “pre-2013 flood” Harvie Passage was originally designed by KCB and built in 2011 garnering multiple engineering awards. Harvie Passage was designed to make a dangerous section of the Bow River, a notorious drowning hazard, safer for fishing and recreational use. The 2013 flood of the Bow and Elbow Rivers flowed through Harvie Passage, damaging its channels and abutments.

Following the flood emergency response, KCB assembled a team of consultants to rehabilitate Harvie Passage: SG1 Water Consulting, Recreation Engineering and Planning, Northwest Hydraulic Consultants and O2 Planning + Design.

The team specified natural construction materials, such as boulders, gravels, riparian vegetation, and bio-engineering erosion control techniques to blend the rehabilitation works with the natural surroundings of the Bow River. The hydraulic drop and recreational hydraulic features were constructed from boulders with fibre-reinforced concrete between them to prevent trapping people or animals.



In this setting, using synthetic fibre-reinforced concrete was better than conventional steel fibre-reinforced concrete, because it is less prone to thermal cracking and cures faster. It is also safer for bare-footed traffic and prevents people from getting trapped between the boulders as they clamber or float over them. The final touch was to install several bio-engineering erosion control measures including willow and balsam poplar soil wraps, vegetated riprap, and willow, balsam and poplar trees.



The rehabilitated Harvie Passage was re-opened to the public in 2018, adding new tree-lined walkways and beach areas to the Pearce Estate Park. The weir is safe once again for boaters and other watercraft, and draws thousands of visitors to this valued community recreational area.



# HIGHWAY 407 EAST

## PHASE 2

### KCB'S SUSTAINABLE PROJECT ATTRIBUTES

- D1** Responsible land use
- D2** Design to reduce, repurpose or reuse remaining materials
- D3** Design to improve safety conditions
- E3** Rehabilitation



### // DURHAM REGION, ONTARIO, CANADA

Highway 407 is a tolled highway that runs parallel to the Trans Canada Highway through the Greater Toronto Area, beginning in the City of Burlington and terminating in the municipality of Clarington. The Highway 407 East Phase 2 Project extends Highway 407 from Oshawa to Clarington. The project was delivered using the Design-Build process and was designed and constructed in two phases using two design teams. Phase 2A opened to traffic in January 2018 and Phase 2B opened to traffic in December 2019. This project is the first “design, build, finance and maintain” project in Ontario to be completed on schedule.

Blackbird Constructors retained KCB as prime consultant to design Phase 2B. The KCB design team, including Urban Systems Ltd., Great Northern Electrical Consultants and the Ainley Group, was responsible for detailed design of the roadway and its associated bridges and drainage structures, including electrical design, traffic staging and construction services. The design-build team’s goal was to deliver a cost-effective design, on schedule, without compromising quality or safety.



The design team included innovative technical solutions for the bridge, roadway and drainage designs, minimizing disruption to the surrounding environment, community and road network. By reducing bridge lengths, adjusting highway alignments and profiles, and optimizing the drainage design, the team was able to reduce the amount of new construction materials, reduce earthworks, and eliminate several planned and significant drainage ponds.

The design-build team adopted a “safety by design” approach to the project by mitigating potential hazards to the public. This included maximizing sightlines for drivers and implementing a barrier-free design wherever possible, reducing the risk of collisions.



Protecting the environment was a top project priority. The contractor’s environmental team worked with the design team to minimize impacts of the work to the environment and to compensate for habitat loss during construction. These measures included designing new wetlands to help manage stormwater, building nesting boxes for bats and native bird species, installing wildlife exclusion fencing, constructing bridges and culverts that allow wildlife to pass safely, and replanting native species such as butternut trees. Noise pollution from the highway was mitigated by installing sound walls, and light pollution from its lighting systems was controlled using focused LED lighting.

The project created thousands of direct and indirect jobs, including approximately 750 workers during peak construction. With Highway 407 East Phase 2 now open to traffic, the project has improved safety, reduced delays, eased traffic congestion, and will generate revenue for the Province of Ontario for years to come.

A team of enthusiastic KCB hikers participated in the annual United Way Tech Grind on Grouse Mountain in Vancouver. Funds raised help provide local kids with access to safe, educational after-school activities through United Way's School's Out Programs.



# OUR COMMUNITIES



Soup Sisters is a non-profit charitable social enterprise dedicated to providing comfort to women, children and youth by making, sharing and donating soup. Several staff from our Vancouver office volunteered at one of their soup-making events, helping prepare hundreds of servings of delicious soup to benefit Serena's House, a resident support program in Vancouver's Downtown Eastside.

## // CALGARY PATHWAY AND RIVER CLEANUP

Several staff from our Calgary office and their guests participated in the City of Calgary's Annual Pathway and River Cleanup for the 6th year in a row. Each year, KCB staff along with thousands of other volunteers help remove litter in Calgary's parks and along the city's pathways and riverbanks.



Staff in our Edmonton office volunteered with the Mustard Seed, lending a hand to prepare meals for the city's homeless.



KCB participated in and was a sponsor of Go ENG Girl, a cross-Canada event organized by several universities that encourage girls in Grades 7 - 10 to get interested in engineering. Pamela Fines, P.Eng., one of KCB's Associates and the manager of our Edmonton office, gave a keynote presentation about her career as a geotechnical engineer. The girls then did a "build" which involved designing a zip line for a rubber duck! The girls had lots of great questions and we hope they will consider engineering as a career.



In 2019, our Brisbane office took part in this annual initiative to raise funds for cancer research, prevention, and support programs in Australia.

## // AUSTRALIA'S BIGGEST MORNING TEA

## // AUSTRALIA BUSHFIRES SUPPORT

In 2019 Australia declared a state of emergency due to severe bushfires. KCB supported the affected communities and wildlife rehabilitation efforts through the Red Cross and WIRES (NSW Wildlife Information, Rescue and Education Service), whose mission is to actively rehabilitate and preserve Australian wildlife.

## // QUEENSLAND CORPORATE GAMES

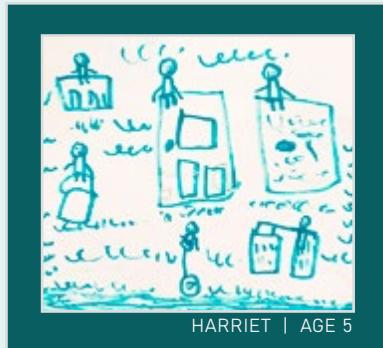
Our Brisbane office participated in the 2019 Queensland Corporate Games, an opportunity for organizations to support and encourage their employee's health, active lifestyle and team building through sporting events between organizations. The Corporate Games support Beyond Blue, a charitable organization that provides information and support to help everyone in Australia achieve their best possible mental health.

## G4 COMPLIANCE MATRIX

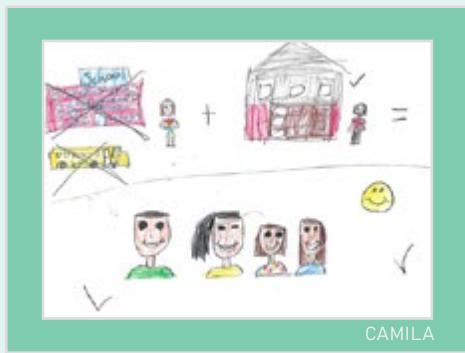
G4 CONTENT INDEX	TITLE	PAGE(S)
G4–1	Message from the President	1
G4–3 to G4–10	Organizational profile	5, 6
G4–16	List memberships of associations in which the organization holds a position on the governance body, participates in committees	22, 23
G4–18	Explain the process of defining the report and aspect boundaries	3
G4–19	List all the material aspects identified in the process for defining report content	3
G4–24	List of stakeholder groups engaged by the organization	4
G4–26	Organization's approach to stakeholder engagement	4-12, 14-23
G4–28 to G4–31	Report profile	3, 4
G4–34	Report the governance structure of the organization, including committees of the highest governance body. Identify any committees responsible for decision-making on economic, environmental and social impacts	6
G4–35	Process for delegating authority for economic, environmental and social topics from the highest governance body to senior executives and other employees	6
G4–56	Organization's values, principles, standards and norms of behavior such as codes of conduct and codes of ethics	6
G4–EC1	Direct economic value generated and distributed	8
G4–EN1	Materials used by weight and volume	11
G4–EN3	Energy consumption	11
G4–EN29, G4–S08, G4–PR9	Compliance with laws and regulations	7
G4–LA6	Health & safety performance	9, 10
G4–LA9	Training and education	10
G4–LA12	Percentage of employees by age category and gender	9

## KCB'S SUSTAINABLE PROJECT ATTRIBUTES

CATEGORY			PAGE(S)
DESIGN	D1	Responsible land use	25, 31
	D2	Design to reduce, repurpose or reuse remaining materials	25, 31
	D3	Design to improve safety conditions	25, 27, 29, 31
ENVIRONMENTAL	E1	Responsible water management	25, 29
	E2	Special consideration for flora and fauna	29
	E3	Rehabilitation	27, 29, 31
INNOVATION	I1	Advancement in research and technology	25
SOCIAL	S1	Mentoring local people	27
	S2	Design or service to improve social conditions	
	S3	Transfer of technology	
	S4	First Nations integration and application of traditional knowledge	27



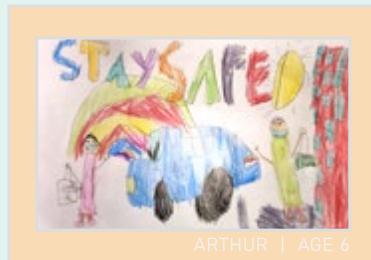
HARRIET | AGE 5



CAMILA



CECILIA | AGE 7



ARTHUR | AGE 6





// 2019-2020 SUSTAINABILITY REPORT  
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