

# SUSTAINABILITY REPORT 2016

STRENGTHENING  
PROFESSIONAL  
PRACTICE



*Down to Earth.*  
Up to the Challenge.



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*Len M. Murray*

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

## FROM THE PRESIDENT

I am proud to introduce Klohn Crippen Berger's (KCB's) fifth annual Sustainability Report, where we report on the economic, social and environmental impacts of our business in 2016, and highlight our role in strengthening the professional practice of the engineering, geoscience and environmental consulting industry.

We started reporting on our sustainable practices in 2012 to formalize our principle of "Doing Things Right". By doing things right for our stakeholders, such as our clients, employees, shareholders, local communities and business partners, we are not only the effective stewards of our Company - we are helping our clients to responsibly manage the world's resources. This report communicates our performance to our stakeholders because they demand a high level of accountability for environmental stewardship and social responsibility.

### Industry Trends

Our business is directly impacted by political and market uncertainties, and so our primary challenge is to continually adapt our strategies as external influences change.

In late 2016, the price of commodities started to pick up again after a few years of volatility, prompting a cautious return to investment in the mining sector, and we are seeing a direct impact with additional project awards. At the same time, the lens has turned on how to do things better with a special focus on the safety of tailings dams.

With KCB's help, British Columbia is leading the way by recently revising its [Health, Safety and Reclamation Code for Mines in B.C.](#), laying out clear regulations for the safe management of tailings dams. Other jurisdictions and professional associations across the world are taking notice and adopting revised codes and guidelines for both mine owners and engineers.

After a difficult two-year adjustment in Alberta due to the collapse in oil prices, we have seen a shift in market players, and a gradual

return to capital spending and exploration. KCB adapted by diversifying and improving our services, while retaining key energy and infrastructure clients through the downturn. We are cautiously optimistic about the energy sector, even though it faces public resistance to transporting bitumen from Alberta to the west coast.

Infrastructure spending by governments has steadily increased primarily through debt-financing, as a stimulus to offset the economic downturn in the western world. Because governments are indebted, we expect to see more design-build-operate projects for infrastructure improvements, and KCB is adapting by partnering with industry peers to bid on infrastructure work.

### Company Update for 2016

**Economic Impacts:** KCB was once again recognized as a Platinum member of Canada's Best Managed Companies, and we continue to be in PSMJ's Circle of Excellence, representing the top 20% of surveyed engineering consulting companies based on a basket of financial metrics. Our strong economic performance means we can invest in our people, make donations to local communities and help fund applied scientific research.

**Social Impacts:** Our business relies on a diverse group of talented employees, our duty of care for their health and safety, and continued employee training and skills upgrading. We continue to welcome and recognize diversity in all areas of the Company, from the Board of Directors to each project team. Our safety culture is strong and our safety record in 2016 was outstanding. Our technical excellence is founded on a wealth of education, training and experience, and in 2016, we invested \$600,000 in training.

**Environmental Impacts:** Our greatest impact on the environment is helping our clients further their projects in a sustainable way, and we include three project examples in this report. We also measure the environmental impacts of our operations by the amount of paper we use and energy we consume for heating and lighting our offices. Over the past three years, we have significantly reduced our paper use per employee as we continue to produce electronic-only deliverables and adopt

electronic workflows. We will continue to monitor how we consume materials and energy to identify trends and define practical targets.

### Company Outlook

To continue our success, we need to manage our risks and opportunities without stifling the entrepreneurial spirit of our people. Part of our strategy is to clearly identify our goals and improvement plans, along with our challenges, and share them company-wide in an annual business plan. In this plan, we challenge our people to meet identified goals, recruit talented people to KCB, and encourage our engineers and scientists to participate in the regulatory and scientific arenas to strengthen our professional practice and contribute to a sustainable economy.





# 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 26.

## REPORT SCOPE

This annual report is for KCB's stakeholders, including our employees, clients, shareholders and industry peers. The scope of this report includes material information from our global operations in 2016 and up to the date of publication in June 2017.

Where available, we include comparative historical data to demonstrate trends, following on from our previous report published in June 2016.

## REPORT FOCUS

In this report, we focus on the sustainability of our operations and highlight the sustainable attributes of three of our recent projects located in Australia and Canada.

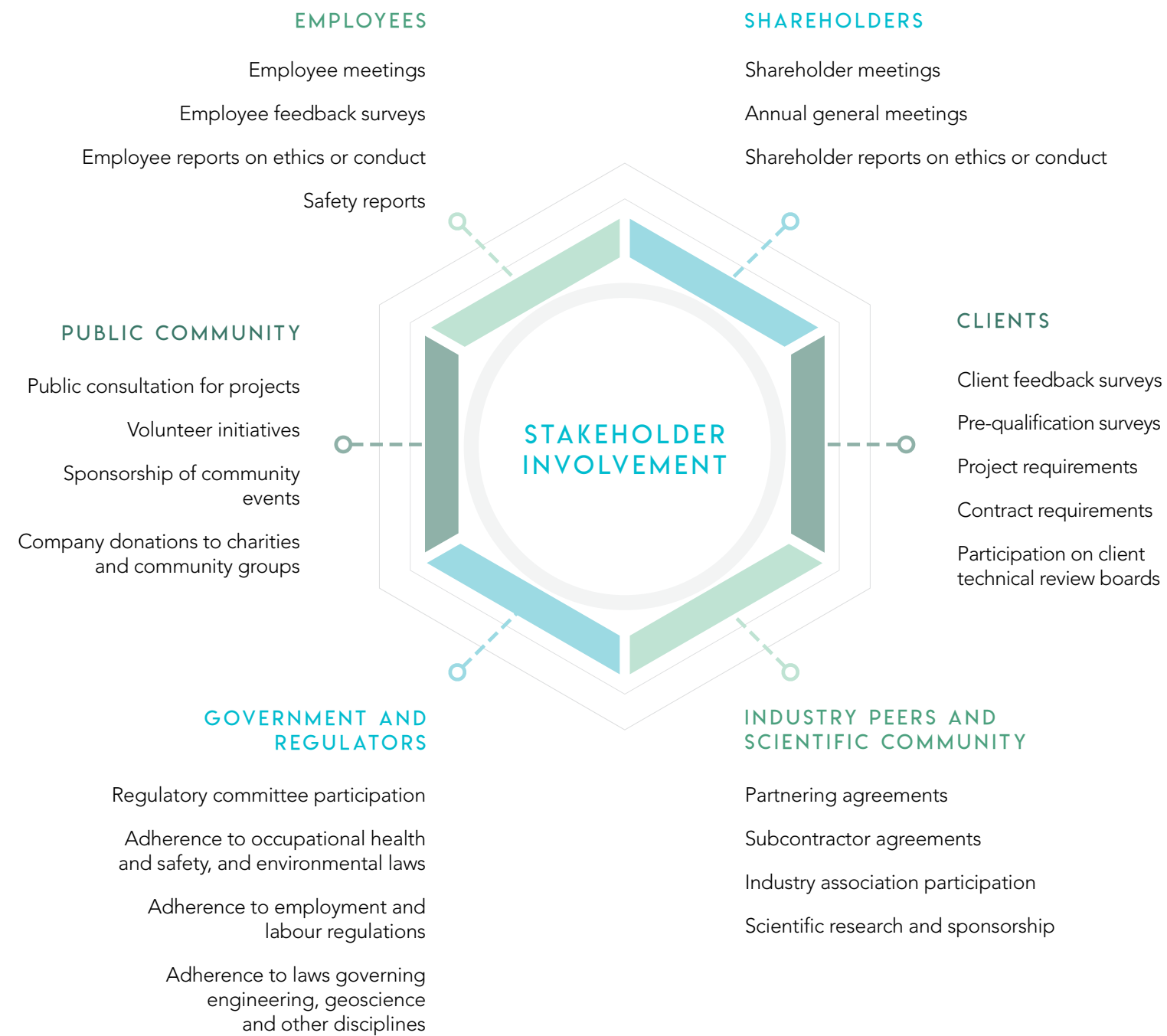
We report on the progress of our operations under the following categories:

- ▶ About KCB
- ▶ Performance Summary
- ▶ Strengthening Professional Practice
- ▶ Our Projects
- ▶ Our Community
- ▶ Our Offices

If you have any questions or comments, please contact us at [info@klohn.com](mailto:info@klohn.com).

## STAKEHOLDER INVOLVEMENT

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. Our stakeholder involvement is illustrated below.





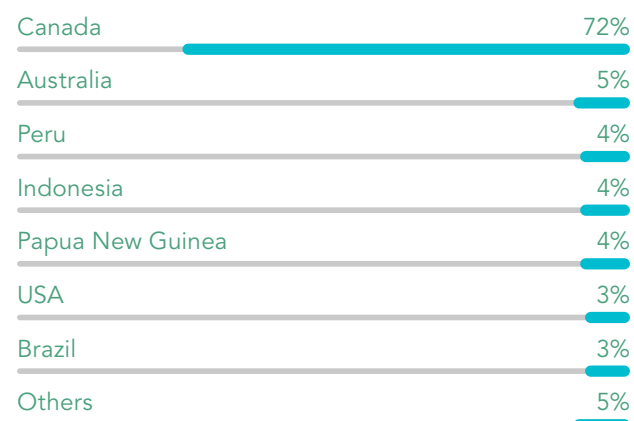


## ABOUT KCB

KCB is an international engineering, geoscience and environmental consulting firm with offices in Canada, Australia, Peru, and Brazil. Since 1951, 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.

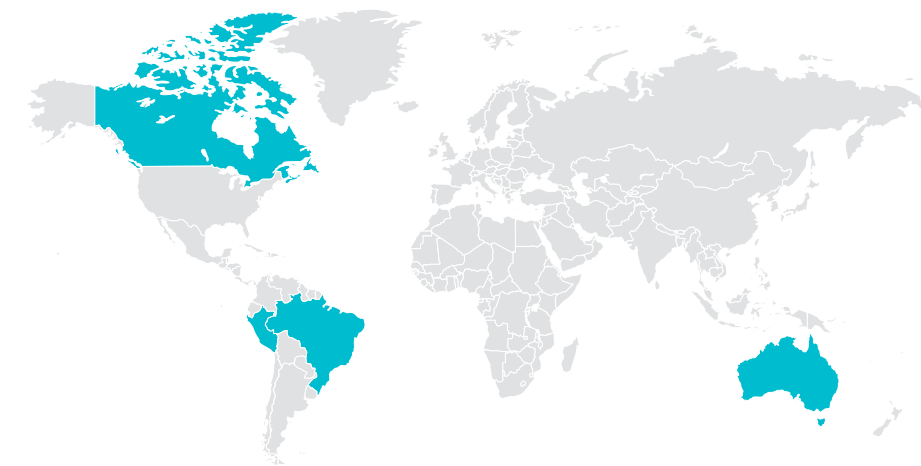
We are affiliated with Louis Berger, a global infrastructure and development firm, and work on energy, hydropower, infrastructure, mining and transportation projects in over 20 countries.

### FEE REVENUE BY COUNTRY



### OFFICE LOCATIONS

- Vancouver
- Calgary
- Edmonton
- Saskatoon
- Sudbury
- Toronto
- Brisbane
- Perth
- Lima
- Belo Horizonte



### CORPORATE GOVERNANCE

KCB's Board of Directors consists of three members nominated by the employee shareholders and three members nominated by Louis Berger. 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) Group
- ▶ Pension Committee
- ▶ Donations Committee

#### Volunteer Committees

- ▶ Joint Health and Safety Committee
- ▶ Sustainability / Environmental Committee
- ▶ Employee Engagement Committee
- ▶ Women-in-Klohn Committee
- ▶ Young Professionals Committee

### 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.

### 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, ISO 14001 and OHSAS 18001 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 of 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.







# 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 of these legal requirements.

## ECONOMIC IMPACTS

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



9 YRS

### CANADA'S BEST MANAGED COMPANIES

For the 9<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.



TOP 20% OF COMPANIES

### PSMJ'S CIRCLE OF EXCELLENCE

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.

### EMPLOYER OF CHOICE

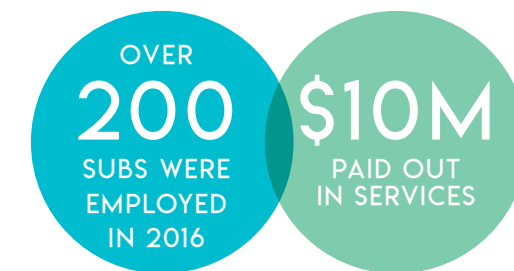
For the 2<sup>nd</sup> year in a row, KCB's Australasia group was recognized as an Employer of Choice at the Australia Business Awards. This award is given to organizations that maximize the full potential of their workforce through effective employee recruitment, engagement and retention.



### STRONG CLIENT SATISFACTION

We carefully choose our clients and the projects we work on, so that our strengths and talents align with our clients' project requirements.

### SUBCONSULTANT ENGAGEMENT



### COMMUNITY INVESTMENTS



United Way

IN 2016, KCB DONATED  
**\$63,000**  
TO THE UNITED WAY

SINCE 1992, EMPLOYEES HAVE DONATED \$400,000 TO THE UNITED WAY, MATCHED DOLLAR-FOR-DOLLAR BY THE COMPANY

# SOCIAL IMPACTS

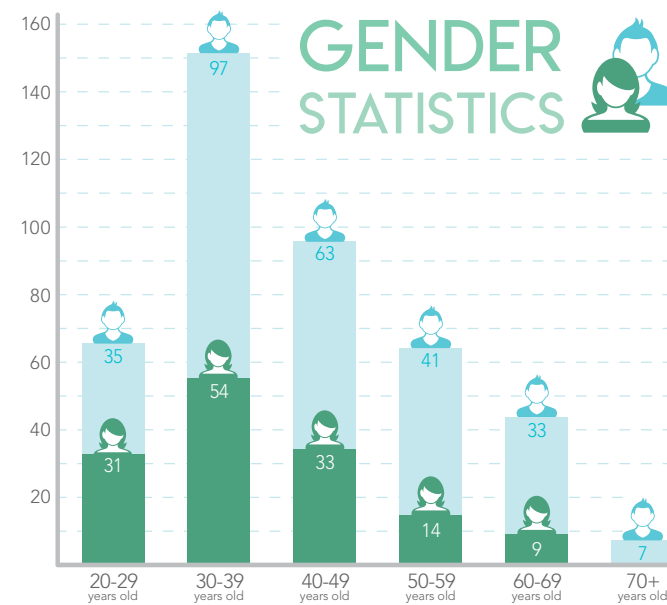
Disclosure on our impact on the social systems within which we operate, including the composition of our employees, our duty of care for health and safety, and the training, education and skills upgrading of our employees.

## OUR PEOPLE

STAFF COUNT	Full-time	Part-time	Total
417	302	33	335
Canada	36	3	39
Peru	32	6	38
Australia	5	0	5
Brazil			

- board of directors: 1 of 6 members is a woman
- management team: 3 of 16 members are women
- principals and associates: 6 of 62 members are women

AVERAGE YEARS OF SERVICE IS 7  
AVERAGE AGE IS 42 YEARS

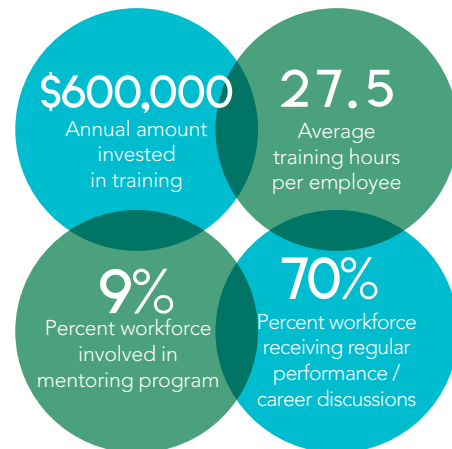


## HEALTH & SAFETY

KCB promotes a proactive safety culture by encouraging employees to report safety observations, near miss incidents and incidents resulting in injury, illness or property damage (minor losses).



## TRAINING & EDUCATION



## SKILLS UPGRADING

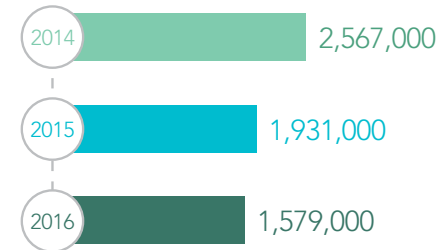
**Klohn PM** Following suggestions for improvement from our employees and in light of lessons learned on recent projects, we wanted to better support and train our Project Managers (PMs), while giving them more time to craft their skills. We developed a formal Project Coordinator role for project managers-in-training, and developed the KlohnPM Advanced program for re-training existing PMs on business financials and project lessons learned.

# ENVIRONMENTAL IMPACTS

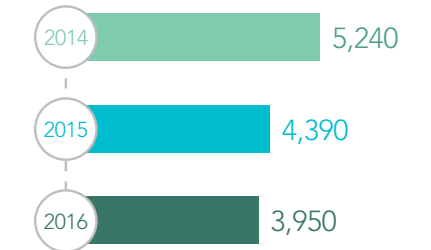
Disclosure on our impact on natural systems, including our paper and energy consumption, and our move to use less paper. Per-person data is based on full-time equivalent employees at year end.

## MATERIALS USED BY WEIGHT / VOLUME

### NUMBER OF PAPER SHEETS PURCHASED



### NUMBER OF SHEETS / PERSON



### Reducing Paper by Going Digital

In 2016, several paper-based processes were converted to electronic workflows. The benefits were noticed immediately, including faster workflow approvals, and the ability to view and analyze data in a single location, while making it easier for employees to follow our IMS. This initiative, combined with electronic invoice routing and increased electronic payments to our suppliers, helped reduce the amount of paper we use year over year.

## ENERGY CONSUMPTION

Consumption amounts in our major offices reported by office building owner, based on the proportion of KCB's office area.





# STRENGTHENING PROFESSIONAL PRACTICE

## IMPROVING TAILINGS DAM SAFETY

Based on lessons learned from the investigations of the recent Mount Polley and Fundão tailings dam failures in British Columbia, Canada and Minas Gerais, Brazil respectively, government agencies, regulatory bodies and industry are improving how tailings dams are designed, built and maintained. KCB not only supported the B.C. government's inquiry into the Mount Polley tailings dam failure ([www.mountpolleyreviewpanel.ca](http://www.mountpolleyreviewpanel.ca)), and the forensic investigation of the cause of the Fundão tailings dam failure ([www.fundaoinvestigation.com](http://www.fundaoinvestigation.com)), but is working to develop the new standard of care for tailings engineering.

With KCB's help, British Columbia is leading the way by recently revising its **Health, Safety and Reclamation Code for Mines in B.C.** KCB's Harvey McLeod, P.Eng., P.Geo., Principal and Vice President, Strategic Marketing, chaired the Tailings Technical Review sub-committee, tasked with incorporating recommendations from the Independent Expert Engineering Panel's investigation into the Mount Polley tailings dam breach in August 2014. The sub-committee included representatives from regulators, dam owners, First Nations, and

consultants, along with input from the public.

Now enforceable by law, the revised mining code lays out clear regulations for the safe management of tailings dams, including revised design requirements for engineers, and revised operational and management requirements for mine owners. The code is designed to protect the public and the environment from activities throughout the lifecycle of a mine operating in B.C.

In tandem with B.C.'s new mining code, the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC), with input from KCB and other stakeholders, published their practice guideline **Site Characterization for Dam Foundations in B.C.** in 2016, to improve the state of practice of tailings engineering.

The Canadian Dam Association (CDA) and the International Commission on Large Dams (ICOLD), representing the Canadian and global scientific community and industry respectively, are also taking notice by revising their state of practice guidelines and the ICOLD bulletin on **Tailings Dam Technology Updates**, to be published in 2018. KCB is helping to draft both documents.



"The revised Mining Code sets an international standard for regulators and dam owners to assure the safety of tailings ponds for protection of the public and the environment," said Harvey McLeod, Chair of the Tailings Technical Review sub-committee.

"... with representation from regulators, dam owners, First Nations, and consultants, and with public input, the sub-committee has set a new standard for the safe management of tailings ponds."



## SUPPORTING APPLIED SCIENTIFIC RESEARCH

### Embankment Dam Lifecycle Optimization Research Laval University, Quebec, Canada

In this multi-year research project, KCB is partially funding the development of analytical tools for predicting the behaviour of dams under normal and exceptional conditions, such as during an earthquake. The result of this research will improve data interpretation methods, the selection criteria for dam-building materials, and dam inspection criteria.

### Tailings Impoundment Liner Research Queen's University, Ontario, Canada

This three-year research project first looked at seepage volumes through tailings impoundment liner defects, and is now investigating if tailings can be transported through liner defects. The results will impact the design, installation and maintenance of geomembrane liners used at tailings facilities.

### Understanding the Long-term Behaviour of Mine Tailings University of Queensland, Queensland, Australia

In 2015, KCB started a multi-year agreement with the Environment Centres of the Sustainable Minerals Institute (SMI) to advance our understanding of the long-term behaviour of mine tailings. Lead SMI researchers are measuring the impacts of weathering and consolidation on the chemical and physical characteristics of mine tailings.

### Soil-specific Cone Penetration Test Interpretation for Tailings University of Toronto, Ontario, Canada

KCB is supporting research on improving the assessment of tailings liquefaction using soil-specific cone penetration tests. By modelling and testing tailings liquefaction in the laboratory, we can improve our understanding of how tailings liquefy.



## SUPPORTING FURTHER EDUCATION

Recipients of KCB-funded scholarships are selected based on recommendations from their respective university departments, and based on high academic standing, participation in extra-curricular activities and leadership potential.

### The Klohn Crippen Berger Scholarship in Memory of Walter Shukin

This scholarship at the University of British Columbia is awarded annually to an undergraduate student entering fourth year in Civil Engineering.

### Earle Klohn Graduate Scholarship in Geotechnical Engineering

This endowed scholarship at the University of Alberta is awarded annually to an outstanding student pursuing graduate research in geotechnical engineering, specializing in mine tailings.

### KCB Undergraduate Scholarship in Civil Engineering or Geology

This University of Calgary scholarship is awarded annually to an undergraduate student entering third year in Civil Engineering or Geology.

### The Sheri Plewes Scholarship for Women in Engineering

The Sheri Plewes Scholarship was established by the APEGBC Foundation, in memory of our friend and colleague Sheri Plewes who passed away in 2014. Sheri was an inspiring role model recognized for her many personal and professional achievements. KCB contributed to the scholarship which is awarded to a woman in full-time undergraduate engineering studies in an accredited engineering program at a B.C. university.

### W. A. Gorman Teaching Assistant Award

KCB proudly supported this Queen's University award, given to a teaching assistant in the Department of Geological Sciences and Geological Engineering to recognize their exceptional commitment to the education of undergraduate students.



## SUPPORTING INDUSTRY ASSOCIATIONS

We encourage our engineers and scientists to participate in both regulatory and scientific arenas. Our industry association activities are listed below.

- Alberta Chamber of Resources, Dam Integrity Advisory Committee ▶ Pam Fines, Member
- Alberta Institute of Agrologists, Alberta Soils Network ▶ Stephanie Hannem, Executive Member
- Alberta Native Plant Council ▶ Kim MacKenzie, Board Member
- Association of Consulting Engineers of British Columbia
  - ▶ Sharon Batchelor, Human Resources Council Member
  - ▶ Mike Chin, Translink Liaison Committee Member
- British Columbia Ministry of Energy and Mines, Health, Safety and Reclamation Code Review Committee
  - ▶ Harvey McLeod, Chair of Tailings Technical Review Sub-committee
- Canada Mining Innovation Council, Environmental Stewardship Initiative ▶ Mohammed Ali, Executive Director
- Canadian Dam Association, International Committee ▶ Harvey McLeod, Member
- Canadian Dam Association, Mining Dams Committee
  - ▶ Greg Noack, Chair
  - ▶ Joanna Chen, Member
  - ▶ Harvey McLeod, Member
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM), Toronto and GTA West Branches ▶ Mohammed Ali, Executive Committee Member
- CIM Diversity and Inclusion Advisory Committee ▶ Mohammed Ali, Member
- Consulting Engineers of Alberta, Private Sector Committee ▶ Brian Rogers, Member
- International Commission on Large Dams ▶ Harvey McLeod, Canadian Representative and Chair of Tailings Subcommittee
- International Mine Water Association ▶ Len Murray, Associate Editor for Mine Water and Environment Magazine
- Mining Association of Canada, Environment and Science Committee ▶ Lindsay Robertson, Member
- Nature Alberta ▶ Kim MacKenzie, Board Member
- Ontario Mining Association, Environmental Committee
  - ▶ Lindsay Robertson, Member
  - ▶ Lyne Thompson, Member
- Women in Mining British Columbia ▶ Sahar Pakzad, Events Committee Chair





# OUR PROJECTS

KCB has a significant role to play in the sustainable development of energy, hydropower, infrastructure, mining and transportation projects on behalf of our clients. In this report, we describe three recent examples of our work in relation to KCB's sustainable project attributes.

## 2016 PROJECT LOCATIONS



## KCB'S SUSTAINABLE PROJECT ATTRIBUTES

<b>ENVIRONMENTAL</b>	<ul style="list-style-type: none"> <li>E1 Responsible water management</li> <li>E2 Special consideration for flora and fauna</li> <li>E3 Rehabilitation</li> </ul>
<b>SOCIAL</b>	<ul style="list-style-type: none"> <li>S1 Mentoring local people</li> <li>S2 Design or service to improve social conditions</li> <li>S3 Transfer of technology</li> <li>S4 First Nations integration and application of traditional knowledge</li> </ul>
<b>INNOVATION</b>	<ul style="list-style-type: none"> <li>I1 Advancement in research and technology</li> </ul>
<b>DESIGN</b>	<ul style="list-style-type: none"> <li>D1 Responsible land use</li> <li>D2 Design to reduce, repurpose or reuse remaining materials</li> <li>D3 Design to improve safety conditions</li> </ul>





## MAYERTHORPE BRIDGE REPLACEMENT

### KCB'S SUSTAINABLE PROJECT ATTRIBUTES

- E2 Special consideration for flora and fauna
- S2 Design or service to improve social conditions
- D2 Design to reduce, repurpose or reuse remaining materials
- D3 Design to improve safety conditions

On April 26, 2016, the wooden railway trestle bridge over the Little Paddle River, near the community of Mayerthorpe about 120 km northwest of Edmonton, Alberta, was vandalized and deliberately set on fire. The bridge was destroyed within a few hours, crippling the railway network owned by Canadian National Railway (CN).

### Restoring Rail Service

CN committed to restoring rail service, used mainly by the oil and lumber industries, within three weeks of the fire. They decided to repurpose an existing steel bridge salvaged from an abandoned CN site in British Columbia. The new bridge layout consisted of a 50 m long steel bridge and two new 150 m long earthen approach embankments on either side of the Little Paddle River - entirely replacing the former 335 m long wooden trestle bridge. CN employed KCB to design piles for the new bridge, design the earthen approach embankments, and monitor the construction.



APRIL 26

The Mayerthorpe wooden railway trestle bridge is destroyed by fire, causing several million dollars in damage and severing CN's railway between Edmonton and Whitecourt in northern Alberta.



APRIL 27

The fire is extinguished and the area cleared for safe access. Teams are mobilized to remove debris and prepare for rebuilding a new railway bridge.



APRIL 30

To meet CN's three-week schedule, earth moving activities, pile and bridge pier installations, and bridge span fabrication activities occur simultaneously on site.



### Innovative Design

To meet CN's three-week schedule, crews immediately mobilized to clear the site of debris and contaminated soils resulting from the fire. Construction of the approach embankments also started, with an initial 2:1 slope configuration. KCB's test drill program to determine the physical properties of the approach embankment foundation revealed a series of thick alluvial deposits alongside the Little Paddle River.

The design incorporated rows of piles from the former trestle bridge and new piles for the replacement bridge, while maintaining an adequate set back distance to minimize the environmental impact of construction on the river. KCB's designers added a granular shear key to the toe of the eastern approach embankment and a 5 m high berm to both embankments, to stabilize the alluvial deposits.

We also recommended using locally-sourced earthfill for constructing the approach embankments, and reusing organic material stripped from the former bridge footprint for building the stabilizing berms at the toe of each embankment.

### Observational Method

As construction of the approach embankments progressed, KCB's field engineers monitored the stability of their foundations by installing and taking readings from vibrating wire piezometers and taking slope inclinometer measurements. By incorporating field observations from round-the-clock construction, we continued to test our design assumptions and criteria for the effective and safe rebuild of this important rail link, which was back in service only 20 days after the original bridge was destroyed by fire.



MAY 9

Nearing completion, final monitoring instruments are installed, new bridge piers are welded and approach embankments backfilled.



MAY 13

Final earthfill is placed around the bridge piers, and the concrete bridge deck is installed. Site clean-up begins in preparation for restoring rail service.



MAY 15

The first train crosses the new bridge 20 days after the original bridge was destroyed by fire. The completed structure is about 335 m long and 14 m high above the Little Paddle River.





# SEA TO SKY TRAIL SUSPENSION BRIDGES

### KCB'S SUSTAINABLE PROJECT ATTRIBUTES

- E2 Special consideration for flora and fauna
- S2 Design or service to improve social conditions
- D1 Responsible land use
- D2 Designs to reduce, repurpose or reuse remaining materials
- D3 Design to improve safety conditions

The "train wreck" site near the Cheakamus River south of Whistler, British Columbia, is the location of several abandoned rail boxcars following a train derailment in 1956. Over the years, the rail boxcars were painted in vibrant graffiti art, attracting visitors who had to cross an active railway track to access the site, putting themselves in harm's way.

The Resort Municipality of Whistler engaged KCB to design and manage the construction of two new pedestrian bridges – the Sea to Sky Bridge and the Train Wreck Bridge – over the Cheakamus River to link the train wreck site to other trails in the area, eliminating the need for unauthorized and dangerous railway crossings by visitors on foot.

### Sustainable Bridge Design

KCB's engineers designed the two new bridges with sustainability in mind. They designed to minimize the amount of forest clearing required for construction, set back the bridge abutments from the river channel to prevent erosion, and minimized materials for bridge construction. By using locally-sourced cedar for the bridge decks and durable galvanized steel for the bridge structures, the creative design team combined engineering efficiency with aesthetic design.

The Sea to Sky pedestrian suspension bridge is supported by two galvanized steel towers set at an incline to avoid encroaching on an adjacent forestry road, and the cables on the Train Wreck Bridge are anchored at each end by frames that look like locomotive wheels, as a tribute to the nearby train wreck graffiti art gallery.

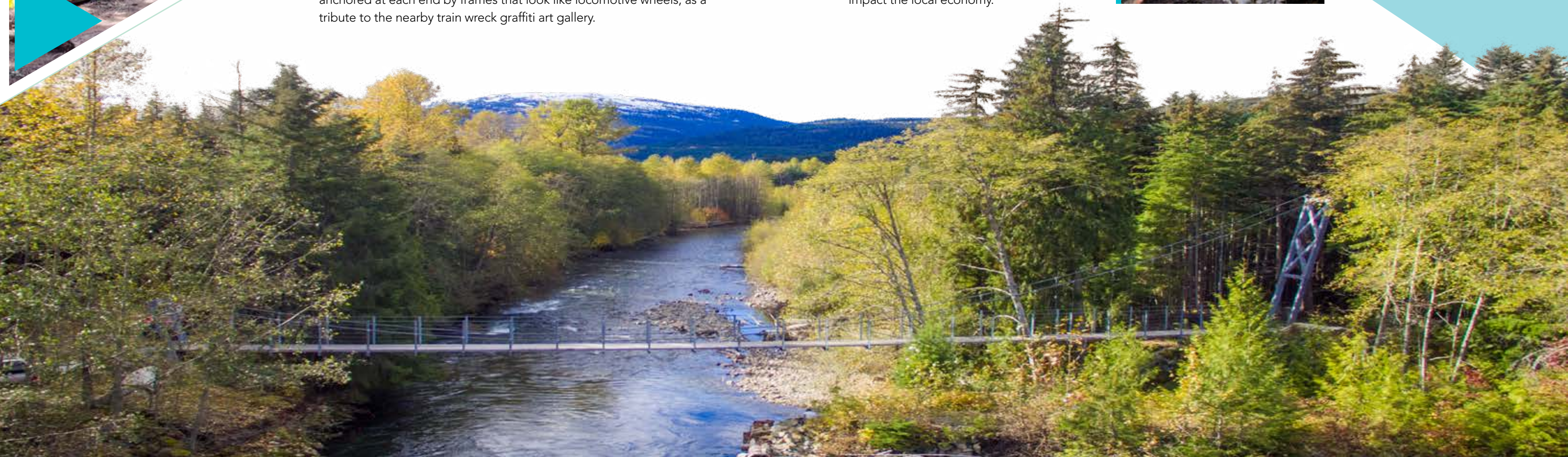
### Small-Footprint Construction

The bridge construction sites alongside the Cheakamus River were only accessible by foot and wheelbarrow, with helicopter support to fly-in materials and equipment. Trees cleared from the sites were reused to build the new trail approaches to the bridges, and the bridge tower foundations were built with rock anchors and built-up steel abutments, rather than transporting in heavy equipment to pour concrete.

With minimal impact to the river and surrounding forest and trails, the Sea to Sky and Train Wreck bridges were each constructed within eight weeks, and the new connection between the train wreck site and the Sea to Sky Trail network was officially opened to the public in July 2016.

### Recreational Benefits

The Sea to Sky Trail has rapidly become a popular destination for residents and tourists in one of British Columbia's most picturesque wilderness locations, while providing safe access to the train wreck site. The Train Wreck Bridge with its playful locomotive wheel design has become a tourist attraction and a favourite photo-opportunity for photographers, school children on field trips, artists and tourists alike, helping to positively impact the local economy.







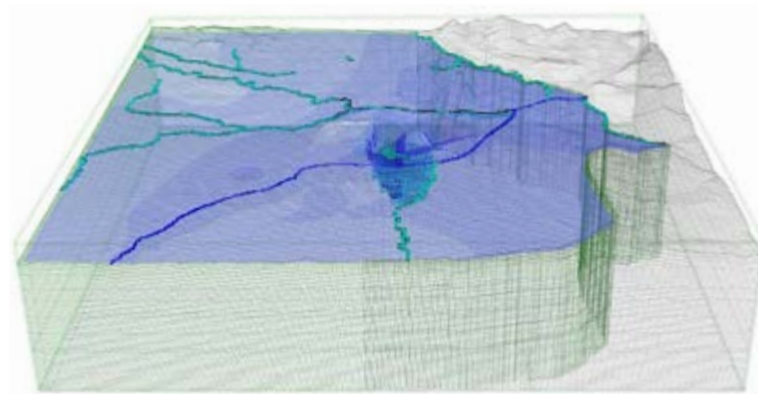
## MCARTHUR RIVER MINE

### KCB'S SUSTAINABLE PROJECT ATTRIBUTES

- E1 Responsible water management
- E2 Special consideration for flora and fauna
- E3 Rehabilitation
- S2 Design or service to improve social conditions
- S3 Transfer of technology
- I1 Advancement in research and technology
- D1 Responsible land use
- D2 Design to reduce, repurpose or reuse remaining materials
- D3 Design to improve safety condition

The McArthur River Mine (MRM) is a zinc-lead mine owned and operated by Glencore in the Northern Territory, Australia, about 120 km from the Gulf of Carpentaria. The mine consists of an open pit, an ore-processing plant, and mine waste storage facilities including a waste rock facility and tailings impoundment.

Working on this project since 2012, KCB is helping to improve how mine waste is treated and stored. Our team is actively working with MRM to develop mine waste management and mine closure plans required by regulators, for the safe and effective closure of the mine, with minimal impact on communities and the environment.



3D Modelling: Simulated groundwater levels

### Understanding the Mine Waste Landscape

Our geochemists first set out to analyze and re-characterize the geochemical properties of mine waste materials from the MRM, and developed a revised mine waste rock classification for improving construction and storage techniques. Based on the new classification, mine waste facilities have been designed to limit oxidation, reducing the potential for acid rock drainage and metal leaching.

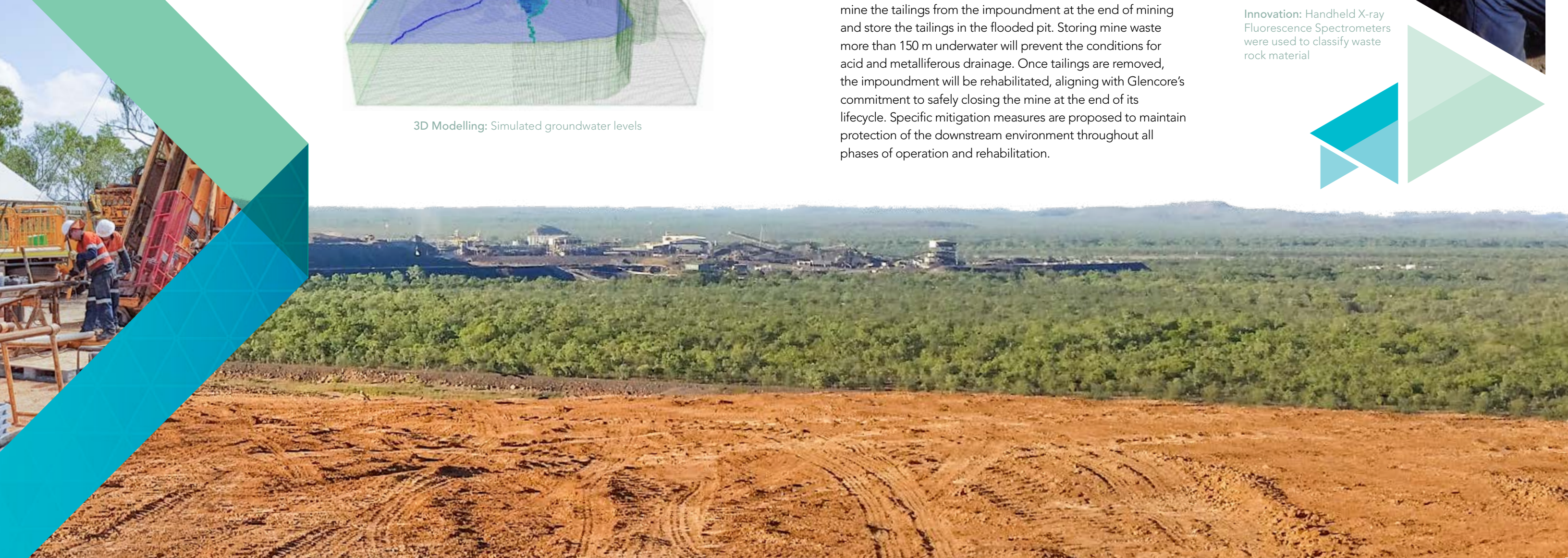
KCB's team also modelled how groundwater moves through the mine waste and the mine operation, forming part of Glencore's Environmental Impact Statement submission to regulators, and leading to the design of effective control measures to limit impacts on downstream water quality.

### Effective Mine Closure Planning

A key focus of the mine closure plan is limiting impacts on water quality in the region. The plan proposes that MRM will mine the tailings from the impoundment at the end of mining and store the tailings in the flooded pit. Storing mine waste more than 150 m underwater will prevent the conditions for acid and metalliferous drainage. Once tailings are removed, the impoundment will be rehabilitated, aligning with Glencore's commitment to safely closing the mine at the end of its lifecycle. Specific mitigation measures are proposed to maintain protection of the downstream environment throughout all phases of operation and rehabilitation.



Innovation: Handheld X-ray Fluorescence Spectrometers were used to classify waste rock material





## OUR COMMUNITY

We are committed to giving back to the communities where we operate through charitable donations, scholarships and investment in research. KCB and its employees have a long-term affiliation with several charitable groups including the United Way, B.C. Children's Hospital, Australia's Biggest Morning Tea and the Calgary Corporate Challenge.

### United Way Campaign

KCB's Canadian offices commit to raising funds every year for the United Way. KCB matches every dollar raised by staff. United Way builds strong communities, provides nutritious foods for children and their families, and helps people move from poverty to possibility.

### Supporting Local Shelters on International Women's Day

Women-in-Klohn groups organized drives for donations of toiletries, cosmetics, treats, new or gently-used handbags and small backpacks for local women's shelters.

### Lima Staff Raise Funds for Syrian Refugees

Employees of our Lima, Peru office supported Syrian refugees and migrants by purchasing Christmas cards for friends and family through the non-governmental organization CESAL. This program supports refugee families, in particular children, women and the elderly, by giving them food, clothing, shelter, medicine and psychological care.

### BC Children's Hospital Fundraisers

Our Vancouver office participates in various events throughout the year to raise funds for the B.C. Children's Hospital. We participated in Mining for Miracles fundraisers, including Jeans Day and the Slo-Pitch tournament.

### Sponsor of the APEGBC Games

KCB was proud to again sponsor and volunteer at the Science Games, an interschool event organized by the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) as part of National Engineering and Geoscience Month. Teams of students from Grade 1 - 6 explored the principles and theories of science first hand at the APEGBC Science Games, held at Science World in Vancouver, B.C.

### Volunteering at Made by Momma

Our Alberta Women-in-Klohn team volunteered to cook meals at Made by Momma, a charitable organization in Calgary that supports families facing situations of adversity and crisis, by providing healthy prepared meals and wholesome baked goods.

### River and Pathway Cleanup

Staff from our Calgary office once again participated in the annual Pathway and River Cleanup event. This annual event helps clean up the city's pathways and river banks, while promoting environmental stewardship among its citizens.

### Support for the Royal Society for the Prevention of Cruelty to Animals (RSPCA)

KCB staff in Brisbane participated in Cupcake Day to raise funds for abandoned, injured, neglected and sick animals who need the RSPCA's help every year. The RSPCA prevents cruelty to animals by actively promoting their care and protection.



### Support for the Calgary Wildlife Rehabilitation Society

Staff in our Calgary office collected bottles and cans as part of a donation program established with the Calgary Wildlife Rehabilitation Society. The society is dedicated to treating injured and orphaned wildlife, providing valuable outreach and education services to the community, and engaging volunteers with motivational work and skill-building experiences.

### Support for Cancer Council Australia

KCB staff in Brisbane participated in Australia's Biggest Morning Tea. Staff hosted a morning tea to help fund vital cancer research, prevention programs, and advocacy and support services for those affected by cancer.

### Participating in R U OK? Day in Support of Suicide Prevention

In 2016, KCB staff in Brisbane participated in a national day of action encouraging everyone to meaningfully connect with people around them and support anyone struggling with life. Staff were reminded to ask family, friends and colleagues the question, "R U OK?", and to take time to listen and support as necessary.







# OUR OFFICES

We encourage greener choices in each of our offices, through sustainable purchasing practices, recycling and energy conservation.

## Sustainable Purchasing Guidelines

Purchasing with sustainability in mind means that we consider the best value of a product or service, including the cost and quality of a good or service, and its environmental and social impacts. Our Sustainable Purchasing Guideline describes how to consider sustainability when purchasing goods or services for KCB.

Before purchasing on behalf of KCB, our offices are asked to first consider if the purchase is necessary and if the need for the product or service can be met another way. We also consider if we can use or refurbish existing materials or products, or if we can use in-house services.

If a purchase is necessary, we consider:

- ▶ What is the product made of?
- ▶ How was it made or harvested?
- ▶ Who made it and how were they treated?
- ▶ How will it get here?
- ▶ How long will it last?
- ▶ How is it packaged?
- ▶ How will we dispose of it?

## Intercontinental Commuter Challenge

The Intercontinental Commuter Challenge is a week-long, friendly competition between cities and workplaces, to encourage everyone to leave their cars at home. It raises awareness about active and sustainable transportation, while enhancing people's physical, mental and emotional health. This was the third year of KCB's Intercontinental Commuter Challenge. A total of seven offices participated in 2016 and 101 participants logged their alternate commuting choices, including transit, walking, cycling and carpooling. Many of our staff already commit to alternate commuting choices, and this event inspired others to try another way to get to work.

## Take the Stairs Challenge

In October 2016, staff in our Alberta offices participated in the Take the Stairs Challenge as part of Healthy Workplace Month. Staff took the stairs rather than using the elevators, logging thousands of extra steps and increasing their daily activity.

## Battery Recycling Program

Our Alberta offices started a battery recycling program with Call2Recycle to keep batteries out of landfills. Staff can now recycle cellphone and rechargeable batteries, including alkaline, lithium ion, nickel cadmium and nickel zinc batteries.

## Encouraging Greener Choices at the Office

Our Calgary office held several "You Have the Power" campaigns to raise awareness of energy conservation. Staff were reminded to turn off their computer monitors at the end of the day, and to turn off lights in empty meeting rooms.

# G4 COMPLIANCE MATRIX

G4 CONTENT INDEX	TITLE	PAGE(S)
G4-1	Message from the President	1, 2
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	14
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, 4
G4-24	List of stakeholder groups engaged by the organization	4
G4-26	Organization's approach to stakeholder engagement	4, 6, 8, 9, 11, 12, 13, 14
G4-28 to G4-31	Report profile	3
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	10
G4-EN3	Energy consumption	10
G4-EN29, G4-S08, G4-PR9	Compliance with laws and regulations	4, 7
G4-LA6	Health & safety performance	9
G4-LA9	Training and education	9
G4-LA10	Skills upgrading	9
G4-LA11	Percentage of employees receiving regular performance and career development reviews	9
G4-LA12	Percentage of employees by age category and gender	9

# KCB'S SUSTAINABLE PROJECT ATTRIBUTES

	CATEGORY	PAGE(S)
ENVIRONMENTAL	E1 Responsible water management	21
	E2 Special consideration for flora and fauna	17, 19, 21
	E3 Rehabilitation	21
SOCIAL	S1 Mentoring local people	Not profiled
	S2 Design or service to improve social conditions	17, 19, 21
	S3 Transfer of technology	21
	S4 First Nations integration and application of Traditional Knowledge	Not profiled
INNOVATION	I1 Advancement in research and technology	21
DESIGN	D1 Responsible land use	19, 21
	D2 Design to reduce, repurpose or reuse remaining materials	17, 19, 21
	D3 Design to improve safety conditions	17, 19, 21



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