

Roger is the Owner and Principal Engineer at Austin Engineering Ltd. in Trail, BC. Roger holds a B.ASc. in Civil-Structural Engineering from the University of British Columbia and has more than 20 years of experience in the industry. Roger's collaborative approach to engineering projects is key to the success of Austin Engineering's work on dams of all sizes and complexities. By customizing the project deliverables to meet the client's needs, Roger helps dam owners operate and maintain their dams as safely and efficiently as possible. Prior to founding Austin Engineering, Roger worked with FortisBC Inc. as Manager of Generation Engineering, where he oversaw all engineering for their Columbia River generating stations, including all mechanical, electrical, civil, and dam safety projects.

## Experience

### Principal Engineer - 2014-Present Austin Engineering Ltd., Trail, BC

As the Dam Safety Engineer at Austin Engineering, Roger has been involved in all dam safety projects, performing duties including dam inspections, technical reviews, quality assurance, dam design and engineering, and project management. Roger also spearheads the firm's research into seismic impacts on dam performance and design. Below is an outline of some of the key dam safety projects that Roger has been involved in:

- Prince Rupert - Eiffage Canada - Woodworth Diversion Dam Replacement Phase 1
- Regional District of Kootenay Boundary - Kelly Creek Dam 2018 Annual Inspection
- Regional District of Kootenay Boundary - Saddle Lake Dam 2018 Annual Inspection
- Prince Rupert- PRP Technical Review Woodworth Dam Bids
- BC Hydro - Walter Hardman Weir Repairs
- District of Summerland - Summerland Garnet Dam Bridge
- City of Cranbrook - Design Removable Stoplogs Idlewild Dam
- BC Hydro - Revelstoke Penstock Review
- FortisBC - Waterline Pipe Support Waneta Dam
- Nelson Hydro - Forebay Deck Replacement



## Education

- **B.ASc. Civil Engineering**  
University of British Columbia, Vancouver, BC, Canada
- **Executive Management Program**  
Massachusetts Institute of Technology, Cambridge, MA, USA

## Research

- **2019** - Comparative Seismic Performance of Dams in Canada and China Using Numerical Analysis and Shake Table Testing
- **2018** - Experimental and Numerical Investigation of a Reduced Scale Dam Utilizing 3D Printing & Shake Table Analysis

- HMI - Menihek Dam Concrete Details
- District of Summerland - Garnett Dam Spillway
- BC Hydro - Walter Hardman 2017 Dam Safety Investigation Scope of Work
- FortisBC - 2017 Annual Inspections for Corra Linn Dam, South Slokan Dam, Rover Creek Dam, Lower Bonnington Dam, Brilliant Dam, Waneta Dam, Upper Bonnington Dam, and Falls Creek Dam
- Regional District of Kootenay Boundary - Saddle Lake Dam Safety Upgrades
- Regional District of Kootenay Boundary - Saddle Dam Annual Inspection Report 2017
- District of Summerland - Summerland Thirsk & Garnet Dam Safety Review 2017
- Nelson Hydro - Forebay Concrete Work Details
- BC Hydro - Mica Floor Analysis
- Town of Ladysmith - Holland Lake Dams Dam Emergency Plan, Operation Maintenance and Surveillance Manual, & Mapping
- Nelson Hydro - Seepage Monitoring
- FortisBC - Falls Creek Operation Maintenance and Surveillance Manual and Dam Emergency Plan
- FortisBC - Rover Creek Operation Maintenance and Surveillance Manual and Dam Emergency Plan
- BC Hydro - Gordon M. Shrum Dam Seismic Review
- FortisBC - Waneta Operation Maintenance and Surveillance Manual Update
- City of Cranbrook - Idlewild Dam Safety Upgrades
- City of Kimberly - Mark Creek Dam Safety Review
- Regional District of Kootenay Boundary - Saddle Dam Spillway Design
- FortisBC - Quarterly Dam Safety Inspections for Walden North, Brilliant Dam, Corra Linn Dam, South Slokan Dam, Upper Bonnington Dam, and Lower Bonnington Dam

## Skills Highlights

- Design of dams, spillways, channels, dykes and hydraulic structures
- Dam Safety Reviews (DSR)
- Dam Emergency Plans (DEP)
- Operation, Maintenance and Surveillance (OMS) Manuals
- Stability analysis of concrete gravity dams
- Design of distribution, transmission and substations
- Project management, planning, design, cost estimation and construction
- Seismic design and retrofits
- Spillway and head gate design and analysis
- Fatigue and failure analysis
- Design review of steel, concrete and timber structures

- FortisBC – Brilliant Dam - Public Safety Management Plan
- FortisBC – Arrow Lakes Hydro- Operation Maintenance and Surveillance Manual Review
- FortisBC – 2014 Annual Dam Safety Reports for South Slocan Dam, Upper Bonnington Dam, Corra Linn Dam, Lower Bonnington Dam, Waneta Dam and Brilliant Dam
- Fortis Generation East - Battersea Dam Emergency Spillway Repairs
- FortisBC – Waneta Expansion - Operation Maintenance and Surveillance Manual
- FortisBC – Waneta - Dam Stabilization

#### **Supervisor of Generation Engineering – 2013-2014**

##### **FortisBC Inc., Trail, BC**

- Oversaw all FortisBC, Fortis Generation East, Fortis Ontario and Fortis US dam safety and civil requirements
- Managed all mechanical, electrical and civil projects
- Responsible for developing strategic objectives and ensuring they became a part of operational and business plans
- Integrated operational resources to extend current business capabilities
- Developed and managed relationships with 3rd party providers, area customers, community and business leaders and key community organizations
- Recommended and implemented effective risk management strategies to ensure safety standards were upheld within the generating plants
- Managed generation operating budgets with a focus on cost efficiencies and improved work methods
- Recommended strategic solutions, new ideas, approaches and performance improvements.
- Responsible for all Generation Capital and Operations Planning throughout FortisBC generating stations
- Distribution Structure Analysis for the design of distribution structures, including guyed targets, overhead guys, and foundation soil conditions

#### **Professional Associations**

- Canadian Dam Association
- Engineers and Geoscientists British Columbia
- Association of Professional Engineers and Geoscientists of Alberta
- Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists
- Professional Engineers and Geoscientists Newfoundland & Labrador

**Civil Engineer – 2010-2012**

**FortisBC Inc., Trail, BC**

- Responsible for the design of transmission structures, substations, access roads, containment systems and many civil items as the sole Civil Design Engineer for FortisBC
- Responsible for Generation planning and writing of the Generation Integrated System Plan for Generation for BCUC Submission
- Responsible for Dam Safety Management at the FortisBC generating stations and 3rd party plants.
- Provided Generation operation crews with engineering technical support in routine daily jobs at nine FortisBC operating plants
- Generation Capital project planning with FortisBC clients such as Columbia Power Corporation and Teck Metals Ltd.
- Provided engineering support to T&D Benvoulin office engineering team in Osoyoos line expansion project
- Prepared tender documents for various projects such as spillway gate rehabilitation project in Waneta Dam
- Conducted quality control in rehabilitation projects accomplished by contractors at Lower Bonnington and Brilliant Dams
- Conducted engineering designs in structural modifications in Upper Bonnington Dam unit no. 2 major overhaul project
- Conducted feasibility study for proposed Similkameen Dam project
- Analyzed and interpreted data from piezometers installed in power houses and spillway sections in FortisBC dams
- Provided engineering designs for crane lifting devices and hoisting systems in accordance with WorkSafeBC guidelines
- Contributed to spillway gate and head gate rehabilitation projects at Brilliant Dam

**Project Engineer and Superintendent – 2008-2011**

**Peter Kiewit Sons, Revelstoke, BC**

- Completed approximately \$40 million of civil works and penstock installation for the Revelstoke Unit 5 Hydro Project which added 530MW of installed capacity to the Revelstoke Dam
- Managed more than 150 people including engineers, trades people and contractors onsite; project involved welding and fabrication to CSA standards, proper execution of multiple critical lifts, and management of high-hazard confined spaces
- Managed the installation of a traveling platform capable of rolling 400ft up and down the interior of the penstock

- Responsible for project planning, quality control, scheduling, procurement, contracts, engineering and safety
- Successfully managed unique safety considerations and was the authority to effectively oversee major project components, meeting budgets and timelines
- Completed construction of the above-ground process facilities including conveyor systems, utilities buildings, mine dry buildings, ore transfer stations and process facilities for a diamond mine in the Northwest Territories
- Supervised a group of approximately twelve engineering coordinators covering the disciplines of civil, geotechnical, structural, mechanical, piping, electrical and instrumentation
- Member of the group responsible for construction planning, quality control, scheduling and cost control, management of information requests, engineering design changes, procurement of materials, and creation of drawing packages

## Research and Publications

- Li, S., Issa, A.S., Alam, T., Austin, R., & Alam, M. S. 2019. "Comparative Seismic Performance of Dams in Canada and China Using Numerical Analysis and Shake Table Testing", presented at the International Commission on Large Dams (ICOLD) 2019 Annual Meeting/Symposium.
- Issa, A., Alam, T., Austin, R., Alam, M. S., Tyler, J. & Seethaler, R. 2018. "Experimental and Numerical Investigation of a Reduced Scale Dam Utilizing 3D Printing & Shake Table Analysis", presented at the Canadian Dam Association (CDA) 2018 Conference and Exhibition.

Ruth holds a Bachelor of Engineering in Civil and Environmental Engineering and specializes in hydrology, hydraulic design, earthworks, and surface and ground water management projects. She has more than 10 years of experience as a consulting engineer working on a variety of hydrology, environmental, and dam safety projects. Ruth's focus is always our clients' success, leading the Austin Engineering team in optimizing designs to minimize capital and operating costs, while maximizing operational efficiency and design life.

### Employment Experience

**Senior Hydrotechnical Engineer – 2015-2016, 2019-Present**  
**Austin Engineering Ltd., Trail, BC**

In her leadership position, Ruth provides senior advisory services throughout many dam safety and environmental projects. She utilizes her extensive experience in the inspection, design, analysis and testing of hydraulic and water-retaining structures to provide our clients with customized dam safety deliverables, including dam safety reviews, emergency response plans, maintenance and surveillance manuals, and inflow design flood modeling. Some of the key projects Ruth has worked on include:

- Eiffage Canada – City of Prince Rupert Woodworth Dam Value Engineering Design
- City of Nelson – Nelson Hydro Powerplant Emergency Response Plan and Operation, Maintenance and Surveillance Manual
- Regional District of Kootenay Boundary – Saddle Lake Dam Spillway Design and Construction Support
- Regional District of Kootenay Boundary – Saddle Lake Dam Annual Inspection
- Regional District of Kootenay Boundary – Kelly Creek Dam Annual Dam Inspection
- City of Cranbrook – Idlewild Dam Inflow Design Flood Hydrological Modeling and Spillway Design
- City of Kimberley – Mark Creek Dam: Dam Safety Review; Dam Emergency Plan; and Operation, Maintenance and Surveillance Manual
- City of Kimberley – Mark Creek Dam Inundation Mapping



### Education

- **B.E. Civil/Environmental Engineering and B.Sc. (Math/Computer Science)**  
Adelaide University,  
Adelaide, Australia

### Professional Associations

- Engineers and Geoscientists British Columbia

- City of Trail – Cambridge Reservoir Dam Inflow Design Flood Hydrological Modeling
- City of Trail – Cambridge Reservoir Dam: Dam Safety Review; Emergency Planning Guide; and Operation, Maintenance and Surveillance Manual
- City of Trail – Water System Emergency Response Plan and Contingency Plan
- FortisBC – Quarterly Dam Inspections for Corra Linn, Upper Bonnington, Lower Bonnington, South Slokan & Brilliant Dams

#### **Environmental Coordinator – 2016-2019**

##### **Mercer Celgar, Castlegar, BC**

Some of the key projects Ruth worked on as the Environmental Coordinator at Mercer Celgar include:

- Colby Crane Piling Repair Project – Management, permit services, and environmental monitoring during piling work
- Landfill Expansion Project - Technical review and oversight during the excavation of two additional cells and installation of the liner and leachate collection system
- Landfill Management – Design and implementation of drainage improvements for existing landfills; reviewing and coordination of operation guidelines
- Soil Amendment Program – Undertaking site visits, soil sampling, and analysis and the development of land application plans
- Dolphin Piling Replacement Project – Development of scope of work, environmental management plan, permit application packages, and training leader for environmental team

#### **Project Engineer – 2014**

##### **WSA Engineering, Castlegar, BC**

- Robson Raspberry Water System Capital Expenditure Charge Study – model of the Robson Raspberry water system with projected demands for 2020 and 2040 to identify water system improvements to meet hydraulic design criteria
- Sunshine Estate Water Utility Society – water well and pump capacity review and recommendations

#### **Skills Highlights**

- Reporting hydraulic system analysis and design
- Erosion control
- Dam and channel remediation
- Flood assessment and mitigation
- Drainage system analysis and design
- Wastewater and sewerage system design
- Environmental assessments

**Project Engineer – 2014**

**Pennco Engineering, Nelson, BC**

- Yahk Manufactured Home Park Flood Hazard Assessment – hydraulic modelling of 200-year annual exceedance probability flood in Moyie River adjacent to proposed manufactured home park required for Regional District of Central Kootenay development and building applications

**Drainage Design Engineer – 2013**

**City of Port Adelaide Enfield, Adelaide, South Australia**

- Analyzed stormwater drainage systems requiring upgrades due to flooding
- Assisted with preparation work for upcoming drainage construction projects
- Reviewed and provided comments or approval for development applications in regards to drainage, access and traffic management
- Assisted with the management of projects under the Stormwater Ten Year Capital Works Program

**Project Engineer – 2008-2012**

**Water Resources Specialist – 2006-2008**

**Golder Associates, Calgary, AB**

- Shell Jackpine Mine – Khahago Creek Diversion Channel – Lead Design Engineer during detailed design and construction phases
- Shell Muskeg River Mine – Sharkbite Dewatering – 2012 Diversion Channel, Sharkbite Disposal Area ditch 2, Sedimentation Pond expansion - Lead Design Engineer during detailed design and construction phases
- Shell Muskeg River Mine – Sharkbite Dewatering – Groundwater management system / cut-off wall Project Engineer during conceptual and detailed design phases
- De Beers Snap Lake Mine – submerged outfall pipeline and diffuser redesign and replacement – Project Engineer from conceptual design to completed construction
- Canadian Natural Resources Limited – Horizon Mine – Tar River Diversion – Quality Control Inspector during construction of diversion ditch 4. Project Engineer during detailed design of remediation works required on Horizon Lake Dam and diversion ditches 1, 2 and 3

**Project Engineer – 2005-2008**

**Optimatics (Adelaide, South Australia)**

- Designed system upgrades for pressurized water distribution networks in the US, UK and Australia
- Assisted in optimization software development including user interface functionality review and training



*Forsyth County Master Plan:*

- Project Engineer during conceptual design of capital improvements to the existing Forsyth County potable water distribution system, including sizing capacity of new storages and pump stations. Operations of pump stations and storages were optimized in conjunction with capital improvements

*Arkley Mains Renewal Design, UK:*

- Project Engineer for the conceptual design phases of pipeline replacement projects in the East and South Arkley District Metered Areas for Three Valleys Water

*Irrigation System Design, Shepparton, Victoria:*

- Project Engineer for the conceptual design of pressurized irrigation systems in rural Victoria to replace existing open channel networks drawing water from the River Murray. A hydraulic model of the system was created using GIS data. Pipe diameters were chosen to minimize capital costs whilst meeting irrigator's demands and design criteria (pressure and velocity)

With more than 20 years of extensive experience in civil and geotechnical engineering, Kevin provides the Austin Engineering team with expert guidance and effective project management. Kevin's engineering expertise includes geotechnical investigation and analysis, foundation design, soil improvement, and civil engineering for dams, highways, mines, and pipelines. Along with his practical experience, Kevin holds a M.Eng. in Geotechnical Engineering, a M.Sc. in Geotechnical Engineering, a B.Sc. in Civil Engineering, and a Minor degree in Construction Management from the University of British Columbia. As Engineering Manager, Kevin leverages his attention to detail and organized approach to project management to deliver effective engineering solutions on time and on budget and ensure client success.

## Experience

### Engineering Manager – 2020 - Present Austin Engineering Ltd., Trail, BC

In his role as Engineering Manager, Kevin provides senior oversight for all engineering projects, working closely with our engineers and clients to manage project scopes, budgets, and schedules. Kevin also applies his vast experience and training to provide geotechnical investigations and analysis on a variety of engineering projects. Kevin's key competencies include:

- Project management
- Construction estimation and scheduling
- Geotechnical site investigation and review
- Geohazard assessment and mitigation design
- Slope stability analysis
- Design of deep and shallow foundations
- Design of earthworks and MSE walls
- Provision of Geotechnical Schedule B and C-B
- Dam safety inspections
- Dam safety documentation development, including Dam Emergency Plans (DEP) and Operations, Maintenance and Safety Manuals (OMS)
- Design of roads and civil works, including site drainage



## Education

- **M.Eng. Geotechnical Engineering**  
University of British Columbia, Vancouver, BC, Canada
- **M.Sc. Geotechnical Engineering**  
University of British Columbia, Vancouver, BC, Canada
- **B.Sc. Civil Engineering**  
University of Technology, Building & Construction Engineering Dept., Baghdad, Iraq.
- **Minor Degree, Construction Management**  
University of British Columbia, Vancouver, BC, Canada

**Senior Geotechnical Engineer – 2017-2018**

**Conuma Coal Resources Ltd., Tumbler Ridge, BC**

- Responsible for all geotechnical and civil tasks for three mining sites (Wolverine, Brule, and Willow Creek)
- Provided technical advice, analyses, design and plans for operations to ensure stability of pit walls, dumps, and mining excavations
- Participated in blasting operations to limit blasting impact on the stability of slopes of dumps
- Supervised the construction and repairs of dams and haul roads
- Monitored, analyzed, and evaluated instrumentation data (slope inclinometers, settlement monuments, extensometers, and wire line piezometers)
- Performed geotechnical inspections for tailing storage facility dams, sedimentation ponds, pit slopes, diversion ditches, and waste rock dumps; reported on the inspections; and provided recommendations to the Mine Operations group

**Geotechnical-Civil Engineer – 2017**

**Self-Employed Consultant**

- Performed consulting work for TLA Consulting Services Canada Inc. and Integrus Engineering
- Delivered geotechnical and civil engineering services, such as stormwater system design and management, culvert design, earthwork services, and project proposal writing

**Project Engineer – 2016**

**Armada Group, Dubai, United Arab Emirates**

- Supervised construction of high rise residential towers
- Managed project schedule and budget, and all site issues related to construction and construction materials
- Responsible for scheduling of projects, quantity take offs, site measurements and approved payments, and contractor and sub contractor activities
- Successfully managed site procedures to achieve zero losses on construction sites

**Skills Highlights**

- Project management
- Project scope and budget review
- Construction estimating and scheduling
- Quality assurance and control
- Team supervision and training
- Geotechnical site investigations
- Slope stability analysis
- Dam safety inspections
- Dam stability analysis
- Foundation design
- Evaluation of instrumentation data
- Road and earthwork design
- Culvert and stormwater system design and management
- Supervision of field and laboratory sampling and testing

### **Senior Geotechnical Pipeline Engineer – 2013-2015**

#### **Worley Parsons, Calgary, AB**

- Provided technical guidance and supervision for team, mentored intermediate and junior geotechnical staff, and provided in-house technical expertise to other disciplines
- Maintained the quality and timelines for deliverables (drawings, calculations, reports, etc.) and provided professional stamping
- Selected construction methods for pipeline crossings for highways and water crossings (such as HDD and open trench methods)
- Wrote technical reports, proposals, and scope of works, estimated quantities, and performed squad check for deliverables
- Planned and conducted geophysical and geotechnical site investigations for HDDs and glaciomarine clays, including budget estimation
- Managed clients and business development plans: prepared PowerPoint presentations and discussed technical issues and future tasks

### **Civil Lead and Geotechnical Engineer – 2011-2012**

#### **Klohn Crippen Berger, Calgary, AB**

- Reviewed scope and design of projects and developed civil design drawings
- Conducted QA/QC and maintained documentation requirements
- Calculated / checked the material take off (MTO) for projects using Civil 3D software
- Acted as a liaison between consultants, suppliers, and contractors
- Designed roads and intersections, side ditches, berms, culverts, and MSE retaining walls
- Inspected seepage pond dam and conducted slope stability analyses
- Wrote geotechnical reports and Design Base Memorandums

### **Professional Associations**

- Engineers and Geoscientists British Columbia
- Canadian Dam Association
- Former member of the Association of Professional Engineers and Geoscientists of Alberta

**Civil Engineering Guest Lecturer – 2009-2010**  
**University of British Columbia, Vancouver, BC**

- Delivered lectures for CIVL235 – Plain Surveying

**Geotechnical-Civil Engineer – 2009-2010**  
**MEG Consulting Limited, Richmond, BC**

- Provided geotechnical and civil engineering for the Port Mann Bridge project
- Provided earthwork services and evaluation for the surcharging program for soil improvement
- Supervised site investigation, logging for drilling activities, and soil verification according to ASTM Standards
- Responsible for supervision of the installation and analyzed data for Burros anchors, settlement gauges, piezometers, and inclinometers with respect to surcharging program
- Analyzed and drew vibration monitoring data and inspected piles, caissons, and subgrades
- Supervised the construction for soil nailing for slope stability and stone columns for soil improvement against earthquake events
- Planned, scheduled, and inspected construction work as per specifications and resolved project's construction and design issues
- Coordinated with project stakeholders (BC Hydro and Metro Vancouver) representatives

**Project Engineer / Structural Detailing Engineer – 2008-2009**  
**Condor Rebar Consultants Inc., Vancouver, BC**

- Conducted full structural rebar detailing for Athabasca River Bridge and for many other big industrial and residential projects (high rise buildings)
- Developed and implemented changes in design to ensure efficient fabrication and installation of rebar
- Calculated accurate rebar quantities and dimensions according to the specifications and standards of the ACI and the Canadian code

**Project Manager and Civil-Geotechnical Engineer – 1998-2007**  
**University Engineering Consulting Center, Omar Al-Mukhtar University, Al Bayda, Libya**

- Designed deep and shallow foundations for infrastructures and wrote technical design reports
- Conducted geotechnical site investigation and soil verification (according to ASTM), performed laboratory and field tests with assessments and evaluated monitored data
- Involved in the application and design of soil and rock mechanics to solve engineering problems such as retaining walls, slope stability analysis, and excavations



**Professor – 1998-2007**

**Civil Engineering Department, Omar Al-Mukhtar University, Al Bayda, Libya**

- Soil Improvement Techniques
- Mechanics of Soil Theory
- Foundation Design
- Structural Drafting
- Descriptive Geometry
- Programming with Fortran

**Head of Civil Design Department – 1996-1998**

**Baghdad Municipal Office, Soil and Materials Laboratories & Design Office, Baghdad, Iraq**

- Supervised a group with more than 20 engineering staff
- Managed and administrated projects: implemented different work procedures and technologies, assisted in building effective teamwork and budget, and provided technical advice
- Maintained heritage buildings, roads, bridges, and other municipal assets, such as pumping stations
- Baghdad Tunnels Services Project
- Bab Al Shake Residential Project

**Municipal Engineer – 1984-1993**

**Baghdad Municipal Office, Soil and Materials Laboratories & Design Office. Baghdad, Iraq**

- Prepared study plans for infrastructures of new developments, the scope of work, and estimated time and cost for construction
- Prepared proposals and was responsible for projects implementation, technical accuracy, and timely completion
- Maintained heritage buildings, roads, bridges, and other municipal assets, such as pumping stations
- Performed and reviewed results of field and laboratory tests for construction materials and soils in accordance with the project specifications, and wrote technical reports

**Publications**

Khalid (Kevin) Fattah, M.Sc., M.Eng., P.Eng. 2007. "Soil Improvement". Textbook published by the University of Omer Al-Mukhtar.

Khalid (Kevin) Fattah, M.Sc., M.Eng., P.Eng. 2007. "Reinforced Concrete Design II", Chapter 3. Textbook published in the University of Omer Al-Mukhtar.

Michael is a versatile engineer who specializes in structural engineering, with experience in environmental and geotechnical as well. He has extensive experience in structural inspections and design, having worked at several industrial facilities. Mike uses his impressive technical aptitude to deliver comprehensive structural analysis and to develop responsive structural designs and repair details.

### Employment Experience

#### Civil-Structural Engineer – 2019-Present

##### Austin Engineering Ltd., Trail, BC

Mike performs structural inspections and analysis on a variety of structures, including industrial buildings, retaining structures, and support structures. Mike also conducts reviews of structures and components to ensure they meet applicable building codes and safety requirements. Mike's recent projects include:

- FortisBC – Brilliant Dam Guardrails Review
- FortisBC – Brilliant Dam Spillway Gantry Assessment
- FortisBC – Brilliant Dam Tailrace Gate Support
- FortisBC – Upper Bonnington Dam Floor Penetration Inspection and Analysis
- FortisBC – Lee Terminal Station Upgrades Design
- HMI Construction – BC Hydro GMS Spillway Upgrades Seismic Design
- Houle Electric – BC Hydro Mica Dam Backup Generator

#### Civil-Structural Engineer – 2014-2019

##### Redwood Engineering Ltd., Trail, BC

- Performed crane way inspections and structural inspections in several industrial facilities and produced detailed reports, hazard/risk analysis, detailed deficiency analysis, remediation strategies, and cost analysis
- Performed structural engineering and design that included: industrial steel platforms and walkways, crawl beams, concrete retaining walls, suspended concrete slabs, concrete slabs on grade, steel frame structures, and wood frame structures



### Education

- **B.Sc. Civil Engineering** with specialization in Structural and Geotechnical studies University of Alberta, Edmonton, AB, Canada
- **Instrumentation Engineering Technology Diploma and Honours** Northern Alberta Institute of Technology, Edmonton, AB, Canada

### Professional Associations

- Engineers and Geoscientists British Columbia
- Association of Professional Engineers and Geoscientists of Alberta

- Performed construction support and quality control for industrial and residential projects
- Engineered structural repair plans that involved restoring structural capacity to deteriorated or damaged steel, concrete, and wood structures and elements
- Industrial storage rack assessments and structural analysis including seismic effects. Expertise in determining measures to achieve compliance with new WorkSafeBC/Occupational Health and Safety Regulations
- Performed fire code compliance assessment for industrial occupancy and prepared detailed report. Familiar with British Columbia Building Code fire regulations and National Fire Protection Association codes and standards

#### **Project Engineer Co-op – 2013**

##### **Teck Coal Ltd. Fording River Operations, Elkford, BC**

- Project manager for site-wide pressure vessel inspection program; work included acquisition and review of applicable regulations and codes, preparation of proposal, bid review and cost analysis, contract management, and completion of summary report and recommendations
- Completed preliminary evaluation and design of proposed long-term tailings storage facility and clarified water reclamation system; work included data acquisition and evaluation, site surveys and modeling with AutoCAD and MineSight software, effluent flow measurements and calculations, tailings properties evaluation, cost analysis, risk analysis, completion of comprehensive report and formal presentations
- Assisted in contract management for major construction projects
- Drafting for various projects including pipeline right-of-ways, site survey and contour maps, piping and instrumentation, structural, and electrical portal

#### **Geotechnical Engineer Co-op – 2012**

##### **LWL Engineering Ltd., Edmonton, AB**

- Completed a structural assessment and detailed report of concrete damage on a high-rise building

#### **Skills Highlights**

- Construction quality control
- Engineering drafting
- Reporting
- Structural assessments and inspections
- Structural design
- Seismic assessments
- Seismic design
- Regulatory compliance
- Material testing
- Foundation design
- Structural steel rehabilitation
- Concrete rehabilitation



- Established set back distances for residential projects near slope, designs for retaining walls, slope stability strategies, and groundwater level monitoring
- Assisted professional engineers to prepare proposals, geotechnical design reports, cost estimates, geotechnical analyses, site plans, and stratigraphic drawings.
- Performed site investigations, site surveying, borehole logging and subsurface geotechnical reports, slope stability analyses, and soil classifications.

**Structural Engineer Co-op – 2011**

**Stantec Consulting Ltd., Red Deer, AB**

- Drafting for bridge design projects including the North Highway Connector (Red Deer, AB), Fort MacKay River Bridge Replacement (Fort MacKay, AB). Other drafting assignments included projects for structural, transportation, instrumentation and electrical, and urban development
- Assisted professional engineers to complete and/or prepare detailed design reports, tender documents, and maintenance reports and cost estimates
- Performed bridge inspections and construction supervision

Hanna holds an M.Sc. and Ph.D. in Civil Engineering, with a focus in Environmental Engineering. She specializes in water quality, water and wastewater treatment, sustainability and life cycle analyses of treatment technologies, and emerging contaminants. In her role as Hydrotechnical Engineer-in-Training at Austin Engineering, Hanna has worked on many dam safety projects and has performed a variety of engineering tasks, including hydrological modelling, flood mapping, and technical reviews. Hanna consistently utilizes her expertise, strong work ethic, and attention to detail to produce outstanding deliverables that help drive the success of every project she works on.

## Employment Experience

### Hydrotechnical Engineer-in-Training – September 2020-Present Austin Engineering Ltd., Trail, BC

Hanna leverages her extensive knowledge of hydrology and hydraulics to assist our senior hydrotechnical engineer in completing analyses and assessments for our dam safety projects. Hanna has worked on the following recent projects:

#### *City of Prince Rupert – Woodworth Dam Design and Construction*

- Reviewing and providing feedback on testing and quality plan
- Conducting a technical background review

#### *City of Cranbrook – Gold Creek Dam Preliminary Design*

- Assisting with development of hydrological model

#### *Regional District of Kootenay Boundary – Kelly Dam Annual Inspection*

- Conducting a literature review of the catchment hydrologic assessment
- Assisting with report writing

#### *Krestova Improvement District – McDermid and Langill Reservoir Dam Safety Inspection*

- Developing channel sections for hydrological model
- Preparing flood maps



## Education

- **Ph.D. Civil Engineering**  
University of British Columbia, Vancouver, BC, Canada
- **M.Sc. Civil Engineering**  
UBC Okanagan, Kelowna, BC, Canada
- **B.Sc. Civil Engineering**  
Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

## Professional Associations

- Engineers and Geoscientists British Columbia
- BC Water and Waste Association
- International Water Association

### **Mitacs Accelerate Intern – August 2020-Present** **Civil Engineering Department, UBC, Vancouver, BC**

Through the Mitacs Accelerate Intern program, Hanna is working with KWL Associates Ltd. to develop a low-cost adsorptive material from sewage sludge for water treatment applications. Her work on this project includes:

- Preparing research proposals for funding agencies, outlining project scope, timeline, task breakdown, and cost estimation
- Conducting Life Cycle Analysis (LCA) and Life Cycle Cost Analysis (LCAA) of sludge-based activated carbon production for water treatment
- Performing lab-scale experiments to test sludge-based activated carbons for contaminant removal from water
- Characterizing water quality in terms of physical, chemical, and biological parameters
- Analyzing experimental data and writing technical reports communicating the results

### **Civil Engineer Engineer-in-Training – February 2017-July 2020** **CMO Consultants Ltd., Vancouver, BC**

During her time at CMO, Hanna gained a wealth of experience while working on a wide variety of water resource projects:

#### *Fraser River Hydrodynamic Modelling*

- Developed a 2D model of the Fraser River
- Conducted a literature review and historical water flow data analysis

#### *Fortis BC – Right of Way Waterlogging Mitigation*

- Developed culvert design for stormwater drainage
- Completed technical report writing

#### *Bow River Hydrodynamic and Water Quality Modelling*

- Conducted analysis of historical water quality data for model calibration
- Completed extreme event analysis of historical weather and water level
- Wrote technical reports

### **Skills Highlights**

- Water and wastewater treatment
- Life Cycle Analysis (LCA) and Life Cycle Cost Analysis (LCAA) of treatment technologies
- Water quality assessment
- Hydraulic analysis of channels
- Stormwater drainage design
- Hydrological modelling
- Flood mapping
- Extreme event analysis
- Technical reporting

*Fortis BC – Scour Mitigation Design of Bonaparte River Pipeline Crossing*

- Conducted terrain analysis of site LIDAR data
- Completed hydrodynamic analysis of the stream to simulate flow velocity and depth
- Completed technical reports

*Coastal Vulnerability Assessment for BC Communities in Northern and Central Coast*

- Conducted terrain analysis to produce bathymetry data for flood modelling
- Completed extreme event analysis of historical weather and water level data
- Performed literature reviews and report writing

*Arctic Bay Harbour Concept Development*

- Conducted extreme event analysis for historical weather data

Tanzim has worked extensively on structural assessments and seismic evaluations of municipal and industrial projects throughout British Columbia, as well as internationally. He has his Masters in Structural and Earthquake Engineering from the University of British Columbia and brings his in-depth knowledge of structural and seismic engineering to Austin Engineering. Tanzim has worked on multiple dam safety projects and is experienced with the structural and seismic analysis of dams and related structures. His diligent and responsive approach ensures that clients receive excellent engineering solutions tailored to their needs.

## Experience

### **Civil-Structural Engineer-in-Training – 2016-Present** Austin Engineering Ltd., Trail, BC

On dam safety projects, Tanzim performs structural and seismic analysis of the dam and related structures. In the Austin Engineering lab, Tanzim also conducts research on the impacts of earthquakes on the performance and design of dams. Below is an outline of some of the key dam safety projects Tanzim has worked on at Austin Engineering:

- Nelson Hydro Galvanized Deck Replacement
- Nelson Hydro Platform Design
- Nelson Hydro Bridge Deck Replacement
- Regional District of Kootenay Boundary – Saddle Dam Annual Inspection
- HMI Construction – Hugh L. Keenleyside Dam Cable Tray Seismic Analysis and Retrofit Design
- HMI Construction – Hugh L. Keenleyside Dam PAM, MCC and CS Panels Seismic Review
- HMI Construction – Corra Linn Dam Pier Repair and Designs
- Struthers Tech – Site C Sea Can Support
- FortisBC – Waneta Dam Head Gate Refurbishment
- FortisBC – Waneta Dam Head Gate and Tailrace Gates Single Device Isolation Review
- FortisBC – Corra Linn Dam Semi Gantry Endtruck and Control Cabinet Seismic Analysis and Certification



## Education

- **M.Eng. Civil Engineering**  
University of British Columbia, Vancouver, BC, Canada (2017)
- **B.Sc. Civil Engineering**  
Islamic University of Technology, Bangladesh (2012)

## Research

- **2019** – Comparative Seismic Performance of Dams in Canada and China Using Numerical Analysis and Shake Table Testing
- **2018** – Experimental and Numerical Investigation of a Reduced Scale Dam Utilizing 3D Printing & Shake Table Analysis

- FortisBC – Lower Bonnington Dam Stoplog Single Device Isolation Review
- FortisBC – Upper Bonnington Dam Rail Bridge Study
- BC Hydro – Sugar Lake Dam Repair
- BC Hydro – Seven Mile Dam Scaffold Review

**Consultant EIT – September - November 2016**  
**CMO, Vancouver, BC**

- Coordinated and onducted streamflow measurements and water quality testing
- Performed hydrologic analysis and numerical analysis

**Design Engineer – June - December 2015**  
**McDonald Steel Building Products Limited, Bangladesh**

- Analyzed school building models
- Provided structural systems for school buildings with minimum construction costs
- Created 3D models for an Air Force hangar to analyze the behavior of the structure
- Optimized structures by assigning different types of sections
- Calculated gravity loads
- Designed base plates

**Civil Engineer (Co-op) – May - November 2014**  
**AMEC Foster Wheeler, Lloydminster, AB**

- Analyzed school building models
- Inspected material and construction quality
- Performed site inspections
- Performed analysis and compression testing

**Design Engineer - December 2012 – August 2013**  
**Development Design Management, Bangladesh**

- Analyzed and designed structural models, including earthquake and wind loading

## Skills Highlights

- Seismic analysis
- Seismic design
- Structural assessments
- Structural design
- Foundation design
- Regulatory compliance
- Construction quality control
- Engineering drafting
- Repair detail
- Material testing
- Reporting

- Prepared beam designs, foundation layouts, footing design and floor framing plans
- Coordinated with clients on designs, reports and documents
- Analyzed bearing capacity of existing structures
- Developed ETABS models of large buildings
- Assessed additional load carrying capacity

### Research and Publications

Li, S., Issa, A.S., Alam, T., Austin, R., & Alam, M. S. 2019. "Comparative Seismic Performance of Dams in Canada and China Using Numerical Analysis and Shake Table Testing", presented at the International Commission on Large Dams (ICOLD) 2019 Annual Meeting/Symposium.

Issa, A., Alam, T., Austin, R., Alam, M. S., Tyler, J. & Seethaler, R. 2018. "Experimental and Numerical Investigation of a Reduced Scale Dam Utilizing 3D Printing & Shake Table Analysis", presented at the Canadian Dam Association (CDA) 2018 Conference and Exhibition.

### Professional Associations

- Engineers and Geoscientists British Columbia