

Associated Engineering receives prestigious international structural engineering award



Whitemud Creek Arch Pedestrian Bridge design receives IStructE Award

Associated Engineering received the Institution of Structural Engineers (IStructE)'s prestigious Commendation Award for our design of the pedestrian bridge for the Whitemud Creek Arch on Edmonton's Anthony Henday Southwest Ring Road. The Whitemud Creek Arch Pedestrian Bridge was one of two Associated Engineering designs that IStructE shortlisted for awards; the Blackmud Creek Bridge was chosen as a finalist in the Transportation Structures category.

IStructE is the world's leading professional body for structural engineering. The annual IStructE Structural Awards recognize the work of the world's most talented structural designers and their contribution to our communities. Associated Engineering's success demonstrates that Canadian structural engineers are among the world's very best.

Associated Engineering's David Harvey, P.Eng., Struct.Eng., current President of IStructE, presided over the 2006 Awards, and was delighted to present the Commendation award to Steve Croxford, his colleague at Associated Engineering. David commented, "The 2006 Awards were the most successful ever held by the Institution. The number of entries increased three-fold, and the quality was outstanding. The winners are to be congratulated on their remarkable achievement."

Anthony Henday Drive forms Edmonton's Outer Ring Road, a key portion of the North-South Trade Corridor linking Canada, the United States, and Mexico. The southwest leg of the ring road was a \$220 million project that extended the existing Anthony Henday Drive at 87 Avenue to Calgary Trail. In collaboration with UMA, AMEC Infrastructure, and AMEC Earth and Environmental, Associated Engineering completed design and construction inspection services for the structures, drainage, utilities, signals, and lighting from Calgary Trail to 156 Street. Anthony Henday Drive was opened to traffic in the fall of 2006.

In addition to the IStructE awards, the Whitemud Arch also won an Award of Excellence from the Alberta Chapter of the American Concrete Institute.



IStructE President, David Harvey, presents Steve Croxford with Commendation Award.

Special thanks to our clients, Bill vander Meer and Kip Hritzuk of Alberta Infrastructure & Transportation. Congratulations to our project team, including Project Manager, Steve Croxford P.Eng., Structural Lead, Dr. Bala Balakrishnan P.Eng., Tara Alexander, P.Eng., Dusanka Stevanovic, P.Eng., Peter Grant, Leo Panciroli, Adam Rees, Michelle Dufurat-Jarvis, Raymond Yu, Alan Miller, P.Eng., Susana Maki, Frank Bosso, Bill Wong, Dean Reidt, P.Eng., John Grylls, P.Eng., Doug Falkins, Eng.L., Mark Willson, Harold Bens, and Roger Nelson.

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Golden Ears Bridge P3 Project receives international award



Artist's rendering of Golden Ears Bridge

Infrastructure Journal in the UK has selected the Golden Ears Bridge project in BC as the recipient of the "Global Deal of the Year". This is the highest award given annually by Infrastructure Journal and considers projects in all sectors around the world.

The award recognized the project's complexity, the innovative financing, and the speed with which the project reached financial close. Bilfinger Berger BOT is providing design, construction, financing, operation, maintenance, and rehabilitation services to TransLink (the Greater Vancouver Transportation Authority) for the bridge and its associated road network. Under the direction of the Implementation Manager, Collings-Johnston Inc., Associated Engineering is providing technical consultation services to TransLink for this project.

Associated Engineering's team, led by Project Manager, Norm D'Andrea, P.Eng., developed the conceptual design of the bridge and road-

works for the Design-Build-Finance-Operate (DBFO) project, and is now assisting TransLink with technical review of the implementation phase of the DBFO project. The Associated Engineering technical review team includes Don Kennedy, P. Eng., Jack Jiao, Chris Cheng, P.Eng., Grant Harder, and Audrey Lin.

Located in the Lower Mainland of BC, the Golden Ears Bridge will be a new six-lane crossing of the Fraser River, connecting the communities of Pitt Meadows and Maple Ridge in the north to Surrey and Langley in the south. Construction of the bridge and 14 kilometres of associated roadworks is currently underway and completion is expected in 2009.

The Golden Ears Bridge project has already received a number of awards including the 2006 Consulting Engineers of BC Award of Excellence and the 2006 North American Deal of the Year from Project Finance International magazine.

Mill Creek Roper Pond sustains and enhances the natural environment while providing flood management

During major storms, the City of Edmonton's Argyll Tunnel, a major stormwater sewer that discharges to the North Saskatchewan River, can become overloaded and cause flooding in the Mill Creek drainage basin. The City sought a sustainable stormwater management solution to address potential flooding, and retained Associated Engineering to develop the design, oversee construction, and provide overall project management.



Aerial view of Mill Creek Roper Pond

The Mill Creek drainage basin covers an area of about 10,000 hectares in central and southeastern Edmonton and the County of Strathcona. About 25% of the area has been developed, most of which is commercial and industrial.

Working with the City, Associated Engineering developed a stormwater management pond and wetlands to reduce surcharging on the tunnel, reduce flooding potential, improve stormwater quality of the discharge to the North Saskatchewan River, and enhance the natural environment.

The site selected for Mill Creek Roper Pond was an industrial area along Mill Creek that, over the years, had become overrun by abandoned and rundown buildings, farmhouse, and barns, as well as industrial and domestic waste. Thus, a major site clean up was required.

Removing debris and contaminated soils from the area was the first step in restoring the ecological balance of the area. In total, 6,500 tonnes of general waste, concrete, and steel and 5,600 tonnes of contaminated soil were removed from the area. As soil conservation was a critical component of the ecological restoration, all useable soils were salvaged and reused.

Mill Creek Roper Pond provides storage for a 1 in 100 year storm event and controls the release of stormwater downstream. The wetlands improve the water quality of the stormwater discharged to Mill Creek and the North Saskatchewan River. The dual cell wetland design incorporates deep pool inlets and outlets for removing

sediments and contaminants such as hydrocarbons and heavy metals. Natural vegetation in the low marsh area provides filtering to further improve the water quality. A treed area in the middle of the pond was left to create an island refuge for wildlife, which presently is the nesting home for a red-tail hawk. Habitats were created to attract new wildlife and waterfowl to the area. Other habitat enhancements include bat boxes, birdhouses, and dragonfly boulder perches.

A trail system was constructed around the pond for light recreational use, including walking, jogging, and cycling. The trails were set back from the natural areas to minimize impact on wildlife and habitat. Along the trail, nature view points, seating, and interpretive signage were constructed to provide public education on the natural environment, stormwater management, wetlands, and ecological restoration. The information on the signage was based on the public school science curriculum to encourage public school tours, as well as use of the facility by people who work and live in the area. The City hopes that through this process, they will encourage environmental stewardship.

Herb Kuehne, P.Eng., Project Manager, states, "Mill Creek Roper Pond provides a naturalized wetland area for waterfowl nesting, birds, and wildlife, serves as a multi-use recreational facility, improves the quality of stormwater, and reduces the risk of flooding overloading the storm tunnel downstream. The work helps to restore the ecological balance in the Mill Creek ravine and provides benefits to the community for years to come."

This project received the Consulting Engineers of Alberta's 2007 Award of Excellence for sustainable design, and an award of Merit for Community Development. Congratulations to the project team!

Alberta Highway Design and Construction Team

Our Transportation Group in the Edmonton office has broadened its services to include highway design and construction. The team is led by Des Kernahan, P. Eng. who joined AE in October 2006. Des graduated from the University of Alberta in 1998 and has worked in the highway design and construction industry throughout his career. Warran McKay, E.I.T., Ryan Batty, E.I.T., and Dave Kirkpatrick, E.I.T. also joined AE in late 2006. Warren, Ryan, and Dave are all graduates of the University of Alberta with experience in the highway industry.



Above left to right are Ryan Batty, Bryan Petzold, Des Kernahan, Dave Kirkpatrick, and Warren McKay

The experience and capabilities of our highway engineering team has generated a significant volume of new work for our Transportation Group. This includes seven highway design and construction projects encompassing pavement rehabilitation, grade widening, intersection improvements, and access management. The projects, with a total length of 150 kilometres, are located throughout Alberta. Total construction value is \$55 million.

David Harvey, IStructE President, reports from UK and Asia

by David Harvey, M.Sc., P.Eng., StructEng, FIStructE

In the last issue of AE Today, I reported on my inauguration and initial branch visits. Much has happened since then.

I presided over the IStructE Structural Awards, and was especially pleased that two entries from Associated Engineering had been short-listed for the Awards. The Whitemud Creek Pedestrian Arch Bridge won a Commendation Award. Many congratulations to Steve Croxford and our team in the Edmonton office for their splendid work!

My partner, Cecilia, and I have subsequently been extremely busy completing our tour of IStructE's domestic branches. We were especially thrilled to follow up our trip to Scotland with visits to Northern Ireland, Wales, and the Irish Republic. In Northern Ireland, I was very fortunate to get to see the River Foyle Bridge in Londonderry. This elegant, 866 m long, steel box girder structure, with its massive 234 m main span, is one of my favourite bridge designs.

South of the border in the Irish Republic, Cecilia and I visited the new Dublin Port Tunnel followed by a visit to an international rugby match – quite an amazing experience, and a first for both of us.

The most breathtaking building I visited was the Terminal 5 project at London's Heathrow Airport. This project is the largest construction project in Europe, with a total value of around CAD\$10 billion. The 440 m by 180 m by 40 m high terminal building features a massive clear-span roof weighing 20,000 tons! Perhaps the most unusual feature of the project is the delivery method, wherein the owner, the British Airports Authority, accepts all project risks. This novel concept allows all participants to act as a team and focus on problem solving.

A major bridge that I was able to visit was the Tamar Bridge, in Plymouth, Devon. Five years ago this major road link between the counties of Devon and Cornwall was widened by adding



Cecilia Bernabe and David Harvey (middle) visit Tamar Bridge

cantilevered lanes on each side of the existing deck. To avoid major rebuilding of the suspension bridge, which dates back to 1961, the original concrete deck was removed and replaced with a much lighter steel deck. Work was carried out with the vital link remaining operational - a world's first. Cecilia and I greatly enjoyed our bridge tour which included close inspection of the modified superstructure components using the under-deck maintenance catwalks.

After Christmas, we toured Southeast Asia. Starting in Singapore, we signed a new IES- IStructE Co-operation Agreement with the Institution of Engineers, Singapore (IES), and I gave a lecture on "Engineering for Extreme Conditions" to students at the National University of Singapore. We then flew to

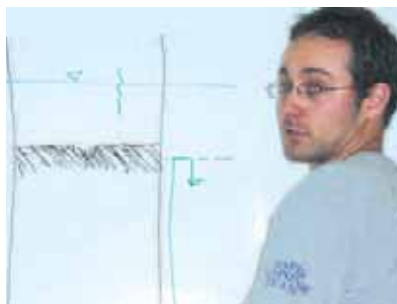
Hong Kong to tackle a hectic program of events. We met with the People's Republic of China Liaison Office, the British Consulate General, two local universities, the Hong Kong Government's Building and Highways departments, and the Hong Kong Institution of Engineers (HKIE). Some outstanding site visits were arranged, notably the massive International Commerce Centre building. Currently under construction, this 118 storey, 490 m high, signature building will be the third tallest in the world.

This dazzling building was only matched by an iconic bridge, currently being built adjacent to the busiest container port in the world. The \$500 million, 1.6 kilometre long Stonecutters Bridge is a world-class, cable-stayed structure with a massive span of 1,018 metres. Upon completion in 2008, this will be the second longest cable-stayed span in the world. During my visit I was able to view construction progress from the towers which had reached the 160 metres elevation, and see steel box girder segments for the main span being off-loaded from barges and welded into larger strings prior to erection. This tour was a fitting end to the presidential tour of Southeast Asia. Cecilia and I are much looking forward to more exciting events planned for 2007.

Shawn Cleary's vision of rebuilding through capacity building in Indonesia

Shawn Cleary of Associated Engineering's Toronto office recently returned from a two-week mission to Indonesia to teach locals how to build simple household-scale drinking water filters to curb the transmission of waterborne disease in rural communities.

Shawn volunteered with GlobalMedic (www.dmfg.org), a Canadian aid agency, to conduct two workshops on the biosand water filter for over 30 individuals representing 20 aid organizations and academics. The workshops were held in Yogyakarta, an area that was devastated by last year's earthquake, which left 6,000 dead and 200,000 homeless. Participants attended from as far away as



Shawn Cleary provides instruction on biosand filter operation

Papua, Kalimantan, Sumatra, and Aceh, which is still rebuilding after the tsunami in 2004.

Shawn advises, "The biosand filter is a simple to use, household-scale, slow sand filter that can be constructed from local materials. Its implementation has proved successful in many cultures and communities throughout the world, and has resulted in significant health improvements in families that rely mostly on surface water sources. The filter removes 99% of fecal bacteria, 100% of parasites, and meets world health standards of drinking water quality. More importantly, it's sustainable, 98% of past filter installations are still in use today."

Colebrook Road Overpass provides critical north-south link across City of Surrey

The Colebrook Road Overpass in Surrey, BC provides a critical north-south link across the city. Part of the Greater Vancouver Transportation Authority (TransLink)'s Major Road Network (MRN), the structure was built in 1974 with a 50 year service life. However, in less than 30 years, the structure had begun to exhibit signs of accelerated concrete deterioration in the deck, deck joints, and concrete components below, resulting from elevated chloride ion (salt) concentrations. In addition to the need for rehabilitation, the bridge was identified as a priority for seismic assessment and retrofit. The City of Surrey retained Associated Engineering to complete a detailed bridge assessment and seismic analysis, develop a rehabilitation strategy, and design seismic upgrades.



Colebrook Road overpass

The two, parallel, two-lane bridges consist of eighteen precast, pre-stressed concrete girder spans supporting a cast-in-place concrete deck for each bridge span, a total of ten girders support the deck, five carrying the northbound traffic and five carrying the southbound traffic. Each span is approximately 21.3 metres long with a total bridge length of 384 metres.

The key components of the rehabilitation and retrofit program included:

- Completing the critical deck rehabilitation and improving seismic performance
- Retrofitting shear keys on the 17 four-column bents
- Retrofitting tie beams between columns
- Enhancing column shear capacity near the cast-in-place concrete pile cap
- Enhancing sliding resistance of the north end cast-in-place concrete abutment.

The seismic assessment and retrofit adopted a displacement-based design approach. Two and three-dimensional models were developed for the structure. Response Spectrum Analysis was used to assess the displacement demands on the structure. Non-linear pushover analysis was used to assess the displacement capacity of the various bridge components. Each retrofit option was modeled, allowing the effects of the retrofits to be assessed and refined to maximize the benefits.

The deck joints were replaced with cast-in-place concrete link slabs. The bearings were replaced with laminated rubber bearings, some of which incorporated transverse shear keys. Link slabs provided an effective waterproof joint at each pier, and provided robust structural continuity to the bridge deck, allowing the deck to better distribute the seismic loads. The new bearings incorporating the shear keys replaced the rubber bearings and provide a durable bearing and a positive load path for seismic loads into the piers. The new bearings were also designed to accommodate the accumulated longitudinal thermal deformations that result from the link slab continuity.

The new concrete pedestals for the bearings and shear keys were incorporated into the concrete repairs to the pier caps. The concrete work required to install the bearings and shear keys did double duty by addressing some of the concrete rehabilitation requirements, providing an efficient, cost-effective solution.

"We developed the rehabilitation and retrofit strategy to fit with the City of Surrey's asset management program," advises Project Manager, Shane Cook, P.Eng. "This involved designing repairs and rehabilitation to suit staged construction and availability of funding from the City and TransLink."

Completed on time and on budget, the project also incorporated sustainable features such as a new bicycle path and recycling of milled concrete for use on a neighbouring farmer's lanes.

Associated Engineering receives BC Deputy Minister's Award

The BC Ministry of Transportation presented Associated Engineering with the Deputy Minister's Finalist Award for the Beaton Canyon Bridge and Road Widening project. Presented by Kevin Falcon, Minister of Transportation and John Dyble, Deputy Minister of Transportation, the award recognizes excellence in design and contract preparation for structures.

Beaton is located in southwestern BC. The community's only access is along a winding gravel road on a steep mountain slope. A section of the access road had eroded away. The resulting road narrowing made driving difficult, particularly for truck traffic.

The BC Ministry of Transportation retained Associated Engineering to develop a design for the road widening, including a bridge structure. The terms of reference for this challenging assignment stipulated a

short construction window, and required that access to Beaton could only be disrupted for short periods of time. In addition, the steep mountain slopes limited construction activities.

Led by Project Manager, Leslie Mihalik, P.Eng., Associated Engineering developed a precast bridge design, including precast abutment cap-beams and wing-walls. "The precast elements facilitated rapid construction," Leslie advises. "We designed mini-piles to support the bridge and spaced the piles widely apart, which helped to accommodate traffic during construction." Rock anchors, drilled into the mountain slope, provide lateral stability.

Congratulations to the team including Leslie Mihalik, Alfred Kao, P.Eng., and Stephen Pienaar.

Ed Salenieks leads Water and Wastewater Team in Toronto

As a child, Ed Salenieks grew up in an area of Toronto that was experiencing rapid urban growth. Construction sites were a great playground for Ed, introducing him to the possibilities of how buildings transform landscapes.

With a civil engineering degree under his belt, Ed focused on environmental engineering after graduation in the late 1970's when protection of our natural environment became recognized as an important public issue.

After graduation, Ed worked for a few firms before joining a large Ontario-based, multi-disciplinary consulting engineering firm. Here he worked on a number of First Nation projects in Northwestern Ontario, mostly remote fly-in communities which lacked basic water and sewage services. "Community consensus and acceptance was always essential to project success," relates Ed, and this understanding laid a solid foundation for his approach to other work. "The consulting engineering business is ultimately about building something that serves your client's needs, be it for public or private enterprise. Being involved from concept development through design and construction helps you understand all aspects of this business, and makes you a better engineer."

While Ed had a successful career at another large consulting firm, he wanted the opportunity to work on larger, more complex projects for a company recognized as one of Canada's leading water and wastewater design firms: Associated Engineering. Since joining Associated Engineering in 2005, Ed has worked in our Toronto office providing high quality services to current clients as well as expanding services to new clients.

Some of the highlights since joining Associated Engineering include managing design and construction services for the new \$28 million state-of-the-art Belle River Water Treatment Plant for the Town of Lakeshore and the new \$15 million Schomberg Water Pollution Control Plant for York Region.

"Every project has its unique challenges," says Ed. "My philosophy is 'On time and on budget, while fully meeting the client's expectations.' Sounds simple, but it is not always easy to do. Water and wastewater treatment facilities are always multi-disciplinary undertakings and getting everyone to understand their scope and deliverables are key tasks for the project manager."



View of Belle River Water Treatment Plant from tower cam

With 27 years of consulting experience, Ed understands that we never know it all, "but experience does teach us to know the right questions to ask. Much of what we do, we learn on the job and not in the classroom. Mentoring our young staff by partnering them with senior staff on project teams is key to helping their development."

Complementing his work life is Ed's personal love of the outdoors and his family. "I enjoy sharing time with family and friends either at the cottage or boating."



Ed (left) relaxing with his family David, Michael, Therese and Mary

Happy Retirement to Art Poisson and John Dagenais

In February, Associated Engineering bid Happy Retirement to two long-serving employees, Art Poisson and John Dagenais.

Art Poisson joined Associated Engineering in 1971 as a Junior Engineer. Since then, Art has quietly and devotedly provided sound engineering and dedicated service to clients throughout the Vancouver Lower Mainland and overseas.



Art Poisson

At Associated Engineering, Art is best known as "Mr. Langley", for his work as the City of Langley's engineering consultant for more than 20 years. Senior Engineer Ed Bird remarked at Art's retirement reception, "Where some clients move from consultant to consultant looking for a better deal, the City of Langley looked exclusively to Art to provide their engineering expertise."

Art has a long list of career accomplishments, including municipal infrastructure throughout the Lower Mainland, the Expo 86 site development, many large shopping centres, fisheries enhancements, First Nations community developments, and airport projects. Art also spent time in Addis Ababa, Ethiopia on the design of a sanitary sewer system. In recent years, Art was involved in developing the BC Municipalities' Master Municipal Contract Documents Municipal Infrastructure Design Guidelines Manual, Residential Site Planning and Engineering Standards, and the City of Surrey's Low Pressure Sanitary Sewer System Design Guidelines. The common theme that Art has brought to his projects is integrity, thoroughness, and sound engineering judgement and advice.

Land development booming in Saskatchewan

Commercial and residential land development in Saskatchewan is at near record highs, especially in Saskatoon and Regina. The industry is experiencing unprecedented growth. In Regina alone, the value of building permits in 2005 was \$242 million and \$277 million in 2006. 2007 is already ahead of 2006's pace. This is a big achievement for a relatively small city of 200,000.

Associated Engineering continues to be an integral part of this development. Our involvement in projects such as the University of Regina Lab Building, Regina Research Park Provincial Health Lab, the RCMP Heritage Museum, the Regina Provincial Correctional Centre, and subdivision developments in Regina, Martensville, Langham, and Nipawin helped us to become established as one of the leading engineering firms in Saskatchewan.

Our Infrastructure Group Manager in Regina, and the Project Manager responsible for much of this work, Tom Williams, P.Eng., states, "We are at the forefront of a wave of development that is beginning to be seen outside our borders. Saskatchewan is in the beginning of a boom."

Residential subdivision development is a very critical part of this work. In 2007, Associated Engineering will provide design for over 1800 lots in Regina and the surrounding area, of which 300 are scheduled for servicing this year. The total construction value for this year's work alone is approximately \$12 million.

Associated Engineering has prepared conceptual studies,

Art's dedication to his projects was exemplified in his work ethic. At his retirement party, daughter, Connie, advised that many weekend family outings encompassed site inspections of Art's current projects. Along the way, Connie said, both she and her brother learned how to read engineering drawings, a skill she still uses today!

John Dagenais joined Associated Engineering as a Surveyor in 1969. Over almost 40 years of service to the company, John has provided world-class service on many world-class projects. John was a Surveyor and Construction Inspector on the Fraser River Flood Control Program. This multi-million dollar program included dyking, flood boxes, pump stations, and ditch construction in Delta, Pitt Meadows, Coquitlam, and New Westminster. From this project, John moved onto survey and inspection on major projects such as the Annacis and Lulu Island Wastewater Treatment Plants Upgrades, SkyTrain Operations and Maintenance Centre Expansion, Deltaport Container Terminal, and Vancouver International Airport Runway Overlay and Electrical Upgrading. In between, John oversaw the construction of many roads and highways in the Lower Mainland and across BC.



John Dagenais

John's work allowed him to indulge in his passion: collecting bottles and rocks. Over the years, John accumulated many treasures during his surveys and inspections. Advised his wife, Maxine, he also found a few trinkets along the way as well!

We wish John and Maxine and Art and Myrna happy treasure hunting and a long and happy retirement.

pre-design, and detailed design, and has provided general engineering and resident inspection services during construction for several developers in Saskatchewan. There is currently a lot shortage in both Regina and Saskatoon with little or no inventory. In fact, most of the lots approved for development this year have already been sold. The City of Regina, currently sold out of industrial property, is planning to develop 35 acres this year and 65 acres in 2008.



University of Regina Lab Building

Tom, a long time Land Development Engineer, notes that he is very proud of the working relationships we have developed with this group of clients and the work that we have accomplished over the past few years. "We have built a strong team and have a good reputation in the industry." Tom's land development team in Regina includes Ken Galt, Rod Benroth, Dolores Picard, Darin Schindel, Brad Panko, Victoria Ritco, Jon Schneider, Lisa Hastings, Toni Ivan, and Esther Vennard. Also providing valuable input as part of the land development team in traffic studies and road network analysis is the Transportation Group in Regina with Monique Kealey and Marina Melchiorre.

Transparent and defensible Assessment Management Strategy prepared for Saskatchewan Association of Rural Municipalities

In the last issue of AE Today, we reported that the Saskatchewan Association of Rural Municipalities in conjunction with Saskatchewan Highways and Transportation (SHT) had retained Associated Engineering to complete a bridge and culvert strategic asset management study on their behalf. The Saskatchewan Association of Rural Municipalities owns and maintains 3900 bridges and culverts located throughout Saskatchewan.



Structure on Saskatchewan Bridge Inventory

SHT required a strategic asset management plan for managing and maintaining the structures. A key objective of the study was to develop a unified service level and performance objectives for the structures. In addition, SHT wanted to be able to establish a methodology for prioritizing structural repairs or rehabilitation so that appropriate funding could be determined.

Data Management

To establish an asset management strategy, Associated Engineering first had to assess and document the available structures inventory. SHT maintains one database for each class of structure with a structures inventory and a rehabilitation history for each structure. Information contained in the database included location for some of the structures, condition, and rehabilitation and repair history. In addition to SHT information, AE also needed to cross reference the following data:

- Saskatchewan Highways and Rural Municipal Road Network
- Provincial Hydrology such as creeks and rivers
- Populations by Area and R.M.
- Truck and Blended Average Annual Daily Traffic, (A.A.D.T.) values
- Road Classes
- Posted Grain Haul Routes
- R.M. and Populated Area Boundaries
- Additional Data for Bridge and Culvert Locations
- Rural Section, Township and Range Delineators
- Modeled Grain Haul Routes
- Primary Haul Corridors.

The above information was joined to information on the bridge and culvert structures using advanced spatial Structure Query Language programming. Adjacent information was snapped to each structure based on its proximity to known values. These values were then written back to the project database for evaluation.

In addition, structure value, expected lifespan and depreciated value for each structure were developed using industry standard, Saskatchewan-specific replacement costs. This allowed for the construction of a life-cycle-based sustainability analysis of all structures. Values generated were then compared to the relative risk and liability associated with each structure.

Due to the volume of information, SHT also sought an improved method for data management. With expertise

from Asset Management Specialist, David Watt and GIS Specialist, James Burn, the AE team developed a secure, web-based GIS tool to allow all project partners to view and query the bridge and culvert inventory during the project. This WEB GIS is a purpose-built, non-proprietary database and decision-making system which Saskatchewan Highways and Transportation can integrate into its asset management system.

System Verification

To test the accuracy of the bridge inventory database, AE staff conducted six bridge assessments. The bridge inspections also allowed us to determine the current condition of the structures compared to information in the database, as well as load ratings. Bridges were selected based on diversity of structural type, age, and geographical location.

The inspections identified some inconsistencies between the repair history and condition of the existing structures and the documented condition in SHT's database. Maintenance and repairs were also identified.

Risk and Priority Assessment

The next step in the study involved developing an objective rating system for structures to allow SHT to assess the risk and assign priorities for a structures inspection, maintenance, and replacement program. A secondary consideration at the outset of the study was the examination of the feasibility of the elimination of structures on Class 7 roads based on their respective demands.

AE staff in conjunction with the project team developed weighted criteria, as shown in the table on page 9, for evaluating the structures in relation to public risk and service.

(continued on page 9)

Saskatchewan Highways and Transportation

(Continued from Page 8)

Criteria	Weighting
Primary Haul Corridor	30
Grain Haul Route	20
Truck / Commercial Average Annual Daily Traffic	15
Annual Average Daily Traffic	15
Road Class	20

The criteria were used to develop a unified service level and performance objectives for the structures, prioritize repairs and rehabilitation needs, and identify funding needs for operations, maintenance, and repair of structures to maintain structures at a prescribed standard.

Recommendations



Structure on Saskatchewan Bridge Inventory

Due to inconsistencies between documented and actual bridge conditions, the major recommendation from the study was to conduct a full network inspection. The inspection would identify any unsafe structures and recommend repairs or replacement to mitigate the potential for liability due to a structure failure. A full inspection would

also help to establish the definitive location of each structure, uniform standards across municipal boundaries, and allow for subsequent inspections to be undertaken on a priority basis. By inspecting all structures, SHT would have a base line condition for each bridge that would enable SHT to determine deterioration rates and associated inspection frequencies in the future. This inspection process would also identify those structures in immediate need of attention in contrast to those requiring a less stringent or frequent inspection frequency. Bridge repairs could be prioritized depending on bridge condition, risk and the metrics identified above. Thus, a documented

and defensible bridge inspection frequency program would be developed. With estimated bridge replacement costs of \$565 million and culvert replacement costs of \$58 million, a bridge inspection, repair and rehabilitation program would likely lead to long term savings.

Other recommendations included:

1. Establishing uniform standards to determine the need for any given bridge or culvert
2. Establish a formal communication protocol between SHT, SARM and all funding agencies to ensure that inventory, inspection and financial information is kept up to date in one central place.
3. Accurately define locations of the structures to assign ownership and maintenance responsibility.
4. Document any structure failure rates to better refine the useful life values used in this analysis.

Asset Management Specialist, David Watt, advises, "While Saskatchewan Highways and Transportation has an extensive asset inventory and history of repairs and maintenance, some of the information was not functional from a management perspective as the existing structure of the information source did not allow for comparative analysis across the network. The web-based GIS provided a unique method to distribute information to SHT, SARM and its 240 members across the province. Moreover, the recommendations from this study will allow SHT to formulate a capital plan for bridge asset management that is transparent and defensible." AE staff added significant value to this project by providing all 240 rural municipalities with depreciated values for all of their bridge structures via the WEB GIS in advance of Public Sector Accounting Board requirements which require municipalities to report on the depreciated / historical value of all of their tangible capital assets by January 1, 2009.

New cable-stayed bridge will reduce congestion in the BC Lower Mainland

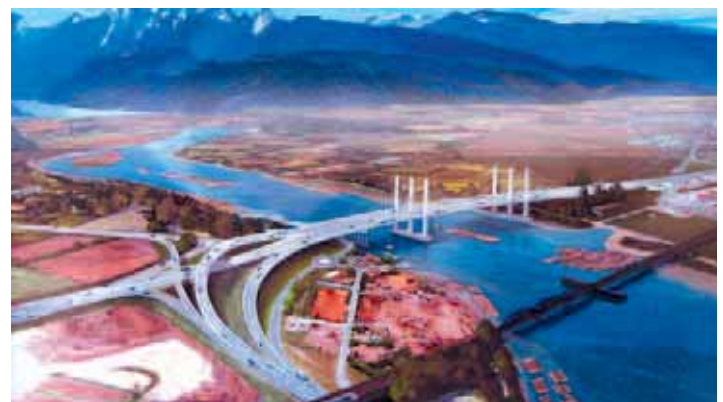
Associated Engineering, as part of a design-build team with Peter Kiewit Sons (PKS) and ND Lea, was selected as the preferred proponent for the new Pitt River Bridge in Coquitlam, BC. The new seven-lane, \$200 million bridge across Pitt River will replace the two existing swing bridges that have been in operation since 1985, during which time vehicle traffic has tripled. The project also includes design and construction of a new grade-separated interchange at Lougheed Highway and Mary Hill Bypass.

The design and construction of the Pitt River Bridge is the first contract in BC's Gateway Program, which will improve infrastructure, reduce congestion, and improve the movement of traffic and goods in the Lower Mainland of BC.

Working with International Bridge Technologies (IBT) of California, Associated Engineering developed an innovative and cost-effective bridge concept using a cable-stayed design. "This design offers significant benefits and advantages," advises Associated Engineering's Project Manager Don Kennedy, M.Eng., P.Eng. "The cable-stayed bridge design reduces interference with marine traffic. Also, with a cable-stayed design, there are fewer piers in the river,

which will reduce impacts to the environment and marine users."

Work has already begun on the project, which is expected to be completed by November 2009.



Artist's rendering of Pitt River Bridge

BC Capital Regional District develops a \$1.2 billion strategy for wastewater treatment

The BC Capital Regional District has retained Associated Engineering with CH2M Hill and Kerr Wood Leidal to develop a plan for improved wastewater treatment for the District's Core Area. The Associated Engineering team will prepare a "Decision Information Report", which will provide recommendations for cost effective, innovative, and environmentally responsible wastewater treatment for residents in the Capital Regional District.

The Capital Regional District currently provides preliminary wastewater treatment for about 300,000 residents in its Core Area and West Shore Area, which includes Victoria, Saanich, Esquimalt, Langford, Sooke, Oak Bay, View Royal, and Colwood. Treatment comprises fine screening at two treatment plants at Clover Point in Victoria and Macaulay Point in Esquimalt.

The consultant team will investigate wastewater treatment options including enhanced primary treatment and secondary treatment, as well as siting options for treatment plants. The Decision Information Report will provide recommendations for the number and siting of treatment plants as well as treatment technologies. Major issues include siting and large flows due to inflow and infiltration into the

wastewater collection system.

"We have proposed a collaborative process with the District to develop the Decision Information Report," reports Project Manager, Rick Corbett, M.A.Sc., P.Eng. "Our team will prepare a series of discussion papers and then conduct workshops with the District's Steering Committee and Advisory Committee to assist with decision making."

Topics for the discussion papers include wastewater treatment design criteria, triple bottom line criteria, wastewater treatment technology options, resource recovery, odour control, biosolids management, cost estimates, and implementation schedule. The Steering Committee has agreed with the proposed Triple Bottom Line approach, which considers social, economic, and environmental criteria. Using this approach, the lowest-cost alternative may not necessarily be the selected solution.

Key members of the Associated Engineering team include wastewater process specialists, Pat Coleman, Ph.D., P.Eng., Dave Forgie, Ph.D., P.Eng., Dean Shiskowski, Ph.D., P.Eng., and Michelle Maynard, M.Sc., C.Eng., MICE.

Congratulations to Associated Engineering's 2006 Service Award recipients!

Associated Engineering is pleased to recognize the following individuals who reached service milestones with the company in 2006. The success of the company can be attributed to the dedication and hard work of all our staff. Congratulations and thank you all!



Tazim Hunter



Bonnie McGuire



Blair Birch



Marvin Akister

BRITISH COLUMBIA

35 YEAR

Arthur Poisson

30 YEAR

John Dagenais

25 YEAR

Peter DeGroot

Dale Harrison

20 Year

Larry Martin

15 YEAR

Marie Chandler

Oscar David

Cheuk Leung

Bonnie McGuire

10 YEAR

James Fitzgerald

John Fussell

Julien Henley

John Tait

Sean Towers

5 YEAR

Cecilia Bernabe

Shaun Bidulka

Dieter Diedericks

Michael MacLatchy

Guillermo Quijano

ALBERTA

35 YEAR

Blair Birch

30 YEAR

Rod Karius

25 YEAR

Barry Vallance

Dave Winter

20 YEAR

Greg Kaupp

10 YEAR

Chris Bredo

Michelle Dufurat-Jarvis

Patrick Given

Nancy Green

Dale Loewen

Sutha Suthaker

5 YEAR

Christopher Albinati

Ernesto Amante

Judy Arychuk

Louis DeLange

Jeff Fetter

Ryan Foulston

Peter Grant

Sarah Huber

Chad Maki

Susana Maki

Alan Miller

Denys Plamondon

Louise Scaife

SASKATCHEWAN

10 YEAR

Marvin Akister

Angela Hickie-Miller

5 YEAR

Yvonne Fortin

Mark Samborn

Kvetoslava Tuma

Joseph Wyszomirski

ONTARIO

10 YEAR

Geoff Burn

Tazim Hunter

5 YEAR

Frank Dolling

Susan Noble

Jeremy Stortz

Employee News



Paul Dufault, M.Eng., P.Eng. has been appointed as the Manager of our Water and Environmental group in our Burnaby office. Paul is a Project Manager and Environmental Engineer with 19 years of experience encompassing water, wastewater, and solid waste management projects. His experience includes traditional delivery as well as design-build projects.

Bill Heywood, P.Eng. has been appointed as the Manager of our Water and Environmental group in our Regina office. Bill is a Project Manager and Environmental Engineer with 13 years experience in the design of pipelines, pump stations, and water and wastewater treatment plants. Bill is currently President Elect of the Western Canada Water and Waste Association.



Larry Martin, P.Eng. has been appointed as the Manager of our Infrastructure group in our Burnaby office. In this role, he is responsible for business development and project delivery for roads, stormwater, water, and wastewater infrastructure projects. Larry brings to this role 32 years of experience in drainage, water, and wastewater infrastructure projects.

Alan Pentney, P.Eng. has joined our Calgary office as a Senior Water Specialist. He has more than 28 years experience in water, wastewater, and landfill engineering, as well as water allocation licensing. Alan joins the company after a long and distinguished career with Alberta Environment where he provided leadership and guidance in environmental regulation.



Edmonton Field Services Group

Andy Bielecki, C.E.T. has been appointed as supervisor of the Field Services Group in our Edmonton office. The Field Services group provides geomatics and construction inspection services to clients across Alberta. The new group consists of a core team of seven surveyors



and inspectors, which include (left to right in photo), Terry Mitchell, Ryan Krausher, Larry Papke, and Andy Bielecki. Also included in this group, but not in photo, are Katherine Bobbitt, William Shalewa, Jim McKinnon, and Mike Kelly.

Red Deer office moves

To accommodate our growing staff and better serve our clients, our Red Deer office has moved to larger offices. Our new address is:

#303, 5913 - 50 Avenue
Red Deer, AB T4N 4C4

Our telephone and fax numbers remain the same.

AE Today is published for employees and friends of the Associated Engineering group of companies. Visit our Web Page at www.ae.ca for past issues of AE Today.

If you have any comments or suggestions for future issues, contact your local Associated Engineering office or:



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Upgrades to Calgary's Water Treatment Plants will improve drinking water quality and environmental sustainability



Aerial view of the Bears paw Water Treatment Plant upgrade showing new Residuals Treatment Facility (building next to overflow lagoon) and the new Pretreatment Facility under construction (at back).

In anticipation of the new Alberta Environment Standards for potable water treatment systems, the City of Calgary embarked on comprehensive upgrade studies and piloting at its two water treatment plants in early 2000. As a result of these studies, a number of process upgrades were identified. Due to the size of the water treatment upgrade program, the City decided to adopt a partnership approach with PCL Construction Management Inc. as the Construction Manager and Associated Engineering as the Prime Consultant. Our involvement includes studies, predesign, detailed design, and construction management of upgrades to the Glenmore and Bears paw Water Treatment Plants.

The \$346 million Glenmore and Bears paw Water Treatment Plants Upgrades Program was initiated to address three key areas:

- 1) Treated water quality improvements to meet existing and future regulations
- 2) Environmental protection from emissions and plant residuals from the water treatment process
- 3) Capacity upgrade.

Upon completion of the upgrade program, each water treatment plant will have a firm production capacity of 550 million litres per day. The improvements and upgrades at each plant will include the following:

- Pretreatment process upgrade with a new sand ballasted flocculation system
- Filtration system upgrade with new media and stainless steel underdrain system

- New chemical systems for taste and odour control
- Residuals Treatment Facility
- Chlorination system upgrade by replacing gaseous chlorine with sodium hypochlorite (on-site generation)
- Ultraviolet disinfection system.

The completed projects to date include the first phase of the Glenmore Filter Upgrade and Chemical Systems Upgrade.

The Bears paw Pretreatment Facility will be completed in the summer 2007 and the Bears paw Stage I Filter Upgrade will be completed in the fall. The Glenmore Sodium Hypochlorite Facility is under construction and scheduled to be completed in December 2007.

The Residuals Treatment Facility is the first of its kind in Western Canada, and the on-site generation of sodium hypochlorite is also the first system to replace gaseous chlorine in Western Canada.

"The Residuals Treatment Facility construction at Bears paw has been completed and commissioning is in progress," advises Associated Engineering's Project Leader Hugh Savage, P.Eng. "When completed the Bears paw plant will have zero discharge of process waste streams to the Bow River. The plant residuals from water treatment will be treated, dewatered, and the solids sent to a landfill. The supernatant from the treatment process will be recycled."

The Residuals Treatment Project received the Consulting Engineers of Alberta's 2007 Award of Merit for Sustainable Design. Congratulations to the project team!