Horizons

Vancouver’s coastal treasure

A project of Olympic proportions
The 2010 Olympic Winter Games are less than a year away from capturing the imagination of the world from Canada’s breathtaking west coast. One of the sights surely to impress even the most seasoned traveler will be the magnificent Vancouver Convention Centre, set against a stunning mountain backdrop and pushing out into the glistening sea.

Vancouver Convention Centre

Vancouver’s newest coastal treasure illustrates how our PCL Constructors Westcoast Inc. team worked with others to solve complex construction challenges on this massive high-profile project.

A tight construction zone managed effectively
The downtown waterfront location with the ocean on three sides of the structure and a comparatively narrow city street along the fourth side meant that access, supply of materials, and how the construction zone affected the neighborhood aesthetics were tremendous challenges. Added was that two other construction projects, a residential tower and a combined hotel/residential tower, were being built by others at the same time across the street and next to this site.

The placement of the cranes, the focal point of large building construction, could not be typical. Since the platform constructed was a structural slab, PCL helped devise a plan to design and build three parallel crane runways in the platform to allow a very large tower crane and mobile cranes to be used to erect the structural steel.

To minimize the visual impact of construction on downtown aesthetics, the protective fencing and site work trailers were arranged such that the huge construction site was almost unnoticeable to passersby.

Construction over water challenges solved
An even larger construction challenge was working out from the waterfront into a harbor setting that was far from predictable. (The convention centre is almost two-thirds over water.) Construction teams had to deal with tides that varied up and down by fifteen feet, forcing workers to work at different times throughout the day and night to catch the water at a low enough elevation to allow tasks to be completed.

“It became increasingly more amazing what we had to overcome within the ocean bed to get the almost 900 piles in,” says Robert Smith, PCL’s project director on the Vancouver Convention Centre Expansion Project (VCCEP). “This waterfront location was created many years ago by dumping excavated and demolished materials from downtown construction sites. It was then used for industrial development prior to the VCCEP start.”

Smith went on to say that despite the challenges during piling and densification, it was remarkable that the subcontractor had only a small number of piles and stone columns to relocate.

Another challenge was the erection of the foundation concrete/ precast structure in the unpredictable harbor. Workers building the exterior sea wall wore life vests in the area for safety purposes in case the waves and seawater became even more difficult to deal with.

Once the piles were in and the platform completed, erection of the complicated steel structure began.

Intricate steel work planned and communicated with BIM
What was a very complex steel job would have been even more difficult if it wasn’t for the use of building information modeling (BIM). A three-dimensional model was put together by engineering firm Glotman Simpson and shared with the fabricators and other parties involved. Design changes then led to a live model, which eventually morphed into an engineer’s model and a fabricator’s model.

Although the challenge of using BIM effectively among stakeholders remains, there is little doubt that this steel job would have been more difficult without it. With more than 19,000 unique steel pieces fabricated for the structure, some of an enormous size, it was imperative that the owners, engineers, and fabricators could see what was being built and where conflicts may occur. In the end, communication lines were open and BIM was instrumental in understanding the geometry, minimizing the amount of steel required, and solving problems before they happened.

“This project presented the PCL team in Vancouver with a number of complex and unique construction challenges. In the spirit of the upcoming 2010 Olympic and Paralympic Winter Games, their work in solving and delivering on these challenging issues in this high-visibility, waterfront location earned them their own gold medals for personal bests in construction excellence.” —David Podmore, Chair, Board of Directors, BC Pavilion Corporation

Table of contents
Expansion in Vancouver ... 2
Building education ... 4
Roads, bridges, and transit ... 6
The Foreman Plant in Arkansas ... 8
PCL’s Charlotte office ... 9
Gaming projects win big ... 10
Meet PCL’s Quarter Century Club ... 11
Expansion Project

Unique curtain wall and interiors added
With the steel erected, it was time to add the 150,000 square feet of structural glass curtain wall (offering brilliant views for visitors, and lighting up the night like perhaps no other building of its nature). This unique curtain wall is supported by wind trusses hung from the roof structure above. The super clear low-iron glass was supplied by St. Gobain, an Austrian firm founded in 1665.

Similar on the unique spectrum are the convention center’s interiors. They are unlike any other convention center in that the pre-function spaces surrounding the meeting rooms offer a brilliant view of Vancouver, the Pacific Ocean, and the Coast Mountains.

With the successful completion of VCCEP, PCL’s builders have proven once again that there is no project too complex or too unique for them. It was always more than just another building project for our people; it was their chance to shine and be part of something truly special.

“It’s all about following through for our clients. We knew we had a huge challenge on our hands with this project being in the global spotlight and situated on Vancouver’s waterfront with some very complex constructability issues. Our people love nothing more than helping find a way to make it work and demonstrating we truly are construction leaders.”
—Paul Douglas, chief operating officer for Canadian Operations, PCL Constructors Inc.

SUSTAINABLE CONSTRUCTION TECHNIQUES INCORPORATED
Also central to the success and acceptance of the convention center was its lack of infringement on the environment. The building is striving for a Leadership in Energy and Environmental Design (LEED®) Gold rating from the United States and Canadian Green Building Councils – a momentous feat considering it would be one of the only convention centers in North America to hold this rating. Some of its unique sustainable construction features are:

- Lighting controls and natural ventilation – lighting controls maximize the use of daylight, and natural ventilation maximizes the use of fresh air. Both features help reduce energy costs.
- Marine habitat apron – a perimeter habitat skirt was constructed to ensure the project did not have a large impact on the marine life in the area. This 1,300-foot-long structure resembles a seating area jutting out into the sea. Design, environmental, and marine biology experts contributed to determining how this unique structure would function.
Building educational institutions all about life-long learning

The many long lasting relationships PCL operations have developed with their educational institution customers provide testament to the fact that successful business relationships have many of the same characteristics of personal relationships. The steps our people have taken to fully understand our customers’ business and their goals plus listen and react to their needs have proven that these relationships are really about life-long learning.

Starting with red brick schoolhouses
The PCL story with building educational institutions really goes back to the turn of the 20th century under the name Poole Construction Ltd. It was then that Poole, now PCL, started in the business building red brick schoolhouses.

This humble start in construction eventually led to the establishment of a sixty-year-plus relationship with the University of Alberta in Edmonton; a relationship that began with a campus hockey arena in the 1940s.

Ernest Poole understood what his customers needed in the first decade of the 20th century; and John and George Poole, Ernest’s sons, understood the University of Alberta’s Governors’ vision starting in the 1940s. We are now following in their footsteps in understanding what our clients need far beyond building red brick schoolhouses.

Building trusting relationships
Customer feedback tells us that our operations staff really take the time to understand our customers’ business models, their challenges with funding approval processes, and their goals for the future of their campuses. Our people understand the process from a customer point-of-view. We ask what we can do to help, and what we may need to know to help – all in the spirit of getting our customers where they need to be to meet student needs through their building programs.

This approach has proven to be extremely valuable in the long run, as our customers trust that we have their best interests in mind. These same customers are now coming to us for help, knowing they can count on us to provide our expertise, long before a shovel hits the dirt.

“The passion and commitment of our PCL people to take the time to get out there and truly understand what our education customers need is very gratifying,” remarks Colin Terras, vice president and district manager for PCL Construction Services, Inc. in Los Angeles.

“The state funding process in California for educational institutions needs to be understood and worked with. Our people have been proactive in approaching our customers about this process.”

In the end, we remain committed to building relationships with our educational institution customers – relationships that are founded in learning how our customers’ building processes work. It all started with red brick schoolhouses one hundred years ago and continues today with some of North America’s most recognizable educational facilities.
Two examples of areas where PCL companies have built lasting relationships with educational institution customers are the city of Edmonton in Alberta, Canada and the state of California. Below is a snapshot of our work with these customers.

UNIVERSITY OF ALBERTA (U of A) Edmonton, Alberta
Countless projects built since 1944. PCL will have more than ten tower cranes in the campus and University Hospital area by the summer of 2009.
In 1944, we were first contracted by the Governors of the University of Alberta to build the campus hockey arena. More than sixty years later, the PCL family of companies is proud to have built more than half of the major buildings and facilities on the University of Alberta Edmonton campus. Projects include the Rutherford Library (1950), Electrical Computer and Engineering Research Facility (2002), Markin/CNRL Natural Resources Engineering Facility (2004), National Institute of Nanotechnology (2006), Health Research and Innovation Facility (2007), and currently under construction are the Centennial Centre for Interdisciplinary Sciences and Edmonton Clinic – North.

UNIVERSITY OF CALIFORNIA, LOS ANGELES (UCLA) Los Angeles, California
Nine projects, with the first in 1992 (four currently under construction). The PCL relationship with UCLA, our longest educational institutional relationship in California, is a good example of working with the customer to understand their process.
Projects include the Anderson Graduate School of Management (1992), and the Rieber North and West Residence Halls and First Floor Renovation (2006). Currently under construction are the UCLA Life Sciences Replacement Building (an application to the United States Green Building Council for a LEED® Certified Level will be submitted), CNSI BSL-3 Laboratory, and Spieker Aquatic Center.

UNIVERSITY OF CALIFORNIA, IRVINE (UCI) Irvine, California
Eleven projects, with the first in 1996 (one currently under construction). Projects include the Arroyo Vista Infill Student Housing (2004), the California Institute for Telecommunications and Information Technology (2005), Student Center Expansion, Phase 4 (2007)(in the process of being certified LEED® Gold by the USGBC), and currently under construction is the Law School Library.

CALIFORNIA STATE UNIVERSITY, CHANNEL ISLANDS (Cal State Channel Islands) Camarillo, California
Five projects, with the first in 2004 (one under construction). Projects include the John Spoor Broome Library (2008), Martin V. Smith Decision Center (2009), and currently under construction is the Construction Management@Risk Infrastructure Improvements Project.

LOS ANGELES UNIFIED SCHOOL DISTRICT (LAUSD) Los Angeles, California
Three projects, with the first in 1996.
Working with LAUSD is an example of the customer coming to PCL and other contractors, asking for feedback on their process. The results are a better understanding within the contracting community of LAUSD’s goals, thereby leading to more successful construction projects. The project completed this past fall was the Central Los Angeles High School #9 (2008). The other projects were the East Valley High School #1B (2007) and King/Drew Medical Magnet High School (1998).

UNIVERSITY OF CALIFORNIA, SAN DIEGO (UCSD) San Diego, California
Eight projects, with the first in 2005.
This customer relationship helped establish the PCL Construction Services, Inc. office as a permanent fixture in the San Diego and area construction market. Projects include the Rady School of Management (2007), the Conrad Prebys Music Center (2009), and currently under construction is the Theodore Gildred Facility Renovation.

SAN DIEGO STATE UNIVERSITY (SDSU) San Diego, California
One project completed: The Aztec Aquaplex (2005).

CALIFORNIA STATE UNIVERSITY, SAN MARCOS (CSUSM) San Marcos, California
One project currently under construction: Parking Structure 1, Phase 2.

*The people I have worked with from PCL own the goals of the client and incorporate a focus on success from that perspective. PCL staff is proactive in planning, review, coordination, and communication, identifying and resolving issues up front so they do not encumber project progress. They truly understand what it takes to get to success at the end of the project.” —Stephanie Tollenaere, Director, Project Management Services, Design and Construction, University of California, Los Angeles.
Talent pool and more than seventy years of experience

The PCL family of companies, known as Poole Construction until the late 1970s, built its first road project way back in the 1930s, and has grown our civil infrastructure portfolio to include roads, bridges, and transit that span across North America.

Our talent pool of civil builders is able to provide our clients with “one-stop shop” service in North American construction. “Whether it’s through our civil offices in Florida or Arizona, our new civil office in Seattle, or through our coast-to-coast Canadian operations offices, we have this remarkable group of builders who have ventured across many states and provinces to get it done for our clients,” says Jerry Harder, president of PCL Civil Constructors, Inc. in Tampa. “Furthermore, our civil builders provide a single point of contact from pursuit to close-out as we have the resources throughout North America to tackle any transportation construction challenge.”

Truly a North America-wide portfolio

Our roads, bridges, and transit portfolio takes us across many US states and most Canadian provinces. Our civil operation out of Tampa has built projects in Florida, Tennessee, Georgia, South Carolina, Arizona, and Washington, and is pursuing projects today that will take them to more states. In fact, the recently completed PCL-built Sound Transit Central Link Light Rail Project Section C755 in Seattle was so successful that a permanent PCL civil operations office was opened there. Our civil operation out of Phoenix has performed work for the Arizona Department of Transportation, the most recent project being the Town Lake Bridge in Tempe. Considering PCL has been operating in Canada since 1906, we’ve touched most Canadian provinces with some type of road, bridge, and/or transit project.

Our unique roads, bridges, and transit expertise

Knowing there are numerous construction techniques used to put together transportation projects, our PCL family of civil builders is carving out some specialized niches. “It would be impossible to be all things to all customers in the transportation construction world, so we really have concentrated on serving our customers with the type of work we excel at,” says Tom Beck, vice president, Civil Initiatives, Western Canadian Buildings for PCL Constructors Inc. “Some good examples of that are when our civil builders from Tampa brought their segmental bridge construction expertise north to build the Sound Transit Link Light Rail Project Section C755 in Seattle, or when Canadian operations people call on each other to help with construction challenges.”
For more information on PCL’s roads, bridges, and transit construction services, please contact the PCL company in your area or visit PCL.com

Flexible contract delivery on time and on budget

Another benefit to our clients is PCL’s ability to create a contract delivery solution that suits each particular contracting challenge. Some examples of our work in different delivery methods are:

**Design-Build**
- Ernest F. Lyons High Level Bridge (Stuart, Florida): $46-million bridge replacement completed nine months ahead of schedule.
- I-95 Widening, Blue Heron to PGA Boulevard (Palm Beach County, Florida): $69-million interstate widening project.
- Anthony Henday Drive Stony Plain Road Interchange (Edmonton, Alberta): $168.5-million joint venture roads and bridges project with Kiewit Management Co. This is Alberta Transportation’s first pure design-build project (scheduled for completion in 2011).

**Public-Private Partnership**
- Anthony Henday Southeast Leg Ring Road (Edmonton, Alberta): this $493-million roads and bridges project was the largest contract granted by Alberta Infrastructure and Transportation (INFTRA) at the time of award and the first by INFTRA to use the public-private partnership model.

**Construction Management (at-risk)**
- Parker and Atlantic Bascule Bridges (Broward and Palm Beach Counties, Florida): $11.5-million rehabilitation of two bascule bridges is currently in the preconstruction stage.
- Light Rail Transit Southgate and Century Park transit stations; and Light Rail DL MacDonald Transit Maintenance Facility (Edmonton, Alberta): $79.5-million worth of contracts for transit projects.
- Crowfoot Light Rail Transit Station (Calgary, Alberta): $17-million “flagship” transit station.

**Bid-Build (lump sum)**
- Sound Transit Central Link Light Rail C755 (Seattle, Washington): $280-million light rail transit project.
- Stoney Trail/Trans-Canada Interchange (Calgary, Alberta): $41-million roads and bridges project.
- South Light Rail Transit (LRT) Extensions (Edmonton, Alberta): $150-million worth of light rail projects that included complex tunneling.

Although the PCL family of civil builders is in the business of looking at all types of transportation projects to serve our customers, here’s a snapshot of some of the types of work that bear the PCL construction stamp across the continent:

**Bridges**
- Major and complex bridges like segmental and cable-stayed; moveable bridges like bascule and lift; and bridge repair and rehabilitation.
- Interchanges and fly-over bridges of all types.

**Roads**
- Concrete and asphalt roadways.

**Transit**
- Light rail transit guideways on-grade, underground, and elevated.
- Transit stations.

Poised to help bolster the economy
Teton Industrial Construction, Inc., PCL’s industrial construction company based out of Atlanta, Georgia, is providing construction and balance of plant engineering services on a state-of-the-art 4,650 standard tons per day cement plant modernization for Ash Grove Cement Company at its existing Foreman Plant in Arkansas.

Committed to quality
On a project as large and complex as this one, quality is more important than ever, and the Teton team is coming through with flying colors. A dedicated team of Teton quality assurance and control professionals are on the ground at Foreman making sure all goes to plan.

“We appreciate that our client is continually commenting about the top-notch quality program we have going on at this project,” says Kent Free, senior construction manager for Teton Industrial Construction, Inc. on the Foreman project. “The extensive concrete and weld testing programs and the precision equipment placement are just three examples of the work our people are performing here to ensure delivery of a high-quality plant.”

Building it safely
The Teton team has expended more than 2,000,000 manhours to date with no lost-time incidents at the time of printing of this article: an amazing feat considering an at-peak construction workforce of 1,200.

It’s TRUE! This cement plant will be one of the tallest structures in Arkansas when complete. The structural steel pre-heater structure, containing massive ductwork and five stages of cyclones, will be 434 feet tall. The large ductwork components and process cyclones were preassembled on the ground and welded within tight tolerances before being lifted and installed in the pre-heater tower. Teton’s builders developed an ingenious fabrication area onsite to accurately preassemble the large duct pieces. This minimized the time to install each piece in the pre-heater structure.

Managing massive amounts of MATERIALS!
A 100-acre lay down area was required to receive and warehouse massive quantities of materials required for this project. The scope of work included:
- 13,000 tons of structural steel
- 50,000 cubic yards of concrete
- 7.5 million pounds of rebar
- More than 4.5 million pounds of platework
- More than 1,000 pieces of equipment
- 80,000 linear feet of pipe

"Ash Grove Cement Company takes tremendous pride in operating our businesses with the highest regard for the safety of our people. We appreciate that the Teton team has run their construction operations in a similar manner at our Foreman Plant project; in fact due to the effectiveness of the safety program Teton has lowered the insurance costs by 80% over expectations based on actuary run out projections.” — Fran Streitman, Vice President, Manufacturing Services and Environmental Affairs, Ash Grove Cement Company

Going GREEN! This project is being built to state-of-the-art emissions control standards including a 5.5-acre pre-engineered building for raw material handling and dust emission reduction; and a dry kiln process replacing three wet kilns, which will significantly reduce the plant’s carbon footprint. This work is being undertaken while the existing cement plant remains in production and will increase capacity from 700,000 tons per year to more than 1.5 million tons per year!
The idea for a Charlotte office began when PCL's board members gathered for a strategic planning session that included a discussion on how to expand our markets geographically and better serve our customers. Our research indicated a strong potential existed in the mid-Atlantic states.

Although PCL civil operations had been in Florida since 1987, in 1995 a PCL buildings operation first moved to the eastern US when the Orlando district office was opened. Over the last fourteen years, the Orlando district has worked up and down the east coast, building not only an impressive construction portfolio, but a reputation for on-time, on-budget, and quality construction. To continue to grow, however, another office would be necessary. Charlotte, North Carolina was chosen due to factors such as economic strength, size and type of workforce, the city’s business affinity, overall demographics, and access to a world-class airport.

Strategically positioned between uptown Charlotte and the Charlotte Douglas International Airport, PCL’s newest office will pursue construction opportunities in both the public and private sectors. "We believe our strengths mirror the type of construction work planned for North Carolina and other southeastern markets," says Deron Brown, vice president and district manager. "A central location like Charlotte will help us manage our operations in the area."

The Charlotte office’s focus will include commercial, industrial, healthcare, education, and military. Clients and the community as a whole have already recognized that the Charlotte district office and the PCL family have plenty to offer, especially during preconstruction when projects are shaped and dreams turn into reality.

Charlotte’s first project part of American history
PCL's Charlotte operations started 2009 off by being awarded the Biltmore Antler Hill Village project in Asheville, North Carolina. This $18.6-million, six-building project, will be located on eighteen acres next to the existing winery on the Biltmore property. The buildings, which are designed by PGAV, will house high-end, themed restaurants; retail; specialty shops; and a theater/exhibit hall. Originally the home of George Vanderbilt, Biltmore is recognized as the largest private home in America and hosts more than a million visitors annually.
Creating multiple winners with gaming projects

Multiple winning opportunities

PCL’s Minneapolis district office approaches its Native American clients, in particular, with a view to creating opportunities far beyond casino construction. Working directly with tribal communities, PCL’s goal is to develop real construction capacity through direct hiring, training, and mentoring of Native American workers as well as Native American-owned subcontractors and suppliers.

“These construction projects are not only an opportunity for a tribal community to build revenue, they create tremendous employment opportunities and also develop life-long construction skills,” says Don Fromme, district manager of PCL Construction Services, Inc. in Minneapolis. “This has been a win/win as we continue to employ and promote PCL-trained Native American construction personnel on projects beyond the reservation.”

Building trusting relationships

Listening and adapting to cultural business practices are keys to success on these projects. PCL has completed projects for more than twenty tribes across North America, each with a unique and culturally significant decision-making process. Effective listening is a key to success on tribal projects, according to John Jensvold, director of project development at the Minneapolis office of PCL Construction Services, Inc.

“What we may ordinarily see as a hierarchy of command in a typical business may or may not be the case with a tribe,” notes Jensvold. “Leadership can be provided from multiple angles, depending on the requirements at hand. There is also a strong undercurrent of respect in all directions, and a subtle expectation for humility in business dealings.”

Out of all of the PCL independent operating companies working across North America, PCL Construction Services, Inc. in Minneapolis has built the most extensive list of Native American gaming projects including multiple major projects for Mystic Lake Casino Hotel in Prior, Minnesota, and Turtle Creek Casino and Hotel in Williamsburg, Michigan, as well as remodeling work at Black Bear Casino Hotel in Cloquet, Minnesota.

Other gaming projects completed by PCL companies include the Lodge Hotel and Casino in Black Hawk, Colorado; the Stoney Nakoda Resort Casino in Morley, Alberta; the Northern Lights Casino in Prince Albert, Saskatchewan; the Niagara Fallsview Casino Resort in Niagara Falls, Ontario; the Grand Villa Casino in Burnaby, British Columbia; the Starlight Casino in New Westminster, British Columbia; and the Atlantis Hotel Casino in Nassau, The Bahamas.

For more details on PCL’s gaming facility expertise, look under Projects on PCL.com
Our diverse and experienced group of construction professionals is pleased to be of service to you across Canada, the continental United States, Alaska, the Hawaiian Islands, and the Caribbean. The tradition continues as we introduce you to our 2008 PCL Quarter Century Club inductees, celebrating twenty-five years of service with PCL. There are now 463 members in PCL’s Quarter Century Club.
PCL FAMILY OF COMPANIES

Our operations are carried out by a number of independent companies which operate in different construction markets or geographic areas.

Buildings

Our full-service buildings operations support the work of project sites across North America. This network of construction professionals rises to the challenges associated with our extensive buildings portfolio, bringing added value to every commercial, institutional, educational, and residential project. While we’re better known for our larger projects such as airports, sports facilities, and office towers, we also excel at smaller unique projects such as renovations, restorations, and repairs.

Heavy Industrial

Our industrial companies, which are located strategically throughout North America, respond to the unique construction needs of our clients in the petrochemical, oil and gas, refining and oil sands, mining, and power and cogeneration industries. In addition to offering Construction Management services, we offer a full range of general contracting services, specializing in mechanical, civil, and electrical construction; pipe and vessel fabrication and module assembly; and piping and plant shutdowns/turnarounds.

Civil Infrastructure

By nature, civil work is geographically diverse and extremely demanding. This has made us versatile civil builders — equally at home, building on land or over water, in busy cities, or in remote areas. Our civil teams possess the ingenuity and the experience needed to undertake any civil structure imaginable — from bridges, overpasses, tunnels, and interchanges to water and wastewater facilities, pipelines, and light-rail transportation projects.