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A BIG-SCALE APPLICATION OF SUSTAINABLE IDEAS

Calgary Court Centre



Bridges connect the towers across the light-filled atrium at every level

by *Bill Chomik*

Located in the heart of Calgary, the new court centre serves both federal and provincial jurisdictions with a total of 73 courtrooms - one configured specifically for aboriginal hearings - making it the largest court facility in Canada. The design for the 1 million SF complex was driven by concerns for transparency, public space, sustainability, circulation, and flexibility.

The building takes the form of two towers of 20 and 24 storeys respectively, connected by a soaring atrium, which contains public gathering spaces at every level. Elevator lobbies connect the towers across the atrium, in which openness, accessibility and light are designed to communicate the transparency of the judicial system. The extensive use of windows and natural light throughout the complex reinforces this theme.

Unusually for Calgary, and particularly in a building of this size, triple glazed windows were used in both towers for improved thermal performance and glare control, while the atrium - a transitional space - uses clear double glazed units.

Other sustainable design strategies in keeping with the desire to achieve LEED Silver certification include:

- Conservation of the existing courthouse structure which was used as a site office during construction of Phase 1, eliminating the need for temporary trailers,
- Recycling of almost 70% of construction waste - the introduction of LEED to Canada in 2004, and the scale of this project which was underway at the time helped establish a recycling infrastructure in Calgary,
- Recycled materials [16% of total] including steel and rebar,
- Water conservation including low-flow fixtures, sensors, and rainwater harvesting for irrigation of adjacent parkland,
- High efficiency mechanical system, with performance more than 50% better than MNEBC, and
- Proximity to transit and provision of an end of trip facility for cyclists.

As the only courthouse of its kind in Canada, the Calgary Courts Centre is designed so that the public benefits from housing both the Provincial Court and Queen's Bench courtrooms, as well as spaces to serve a variety of other legal and civic functions, in the same complex.

The sustainable design approach is underpinned by the strategic decision to locate the complex in the heart of downtown, within easy access of four LRT lines, and more than 50 regularly scheduled bus routes, and to densify a previously developed site.

Difficult to quantify, yet significant in its impact is the efficiency in space planning, and the flexibility in use that comes from providing facilities for two court systems together in a high-rise configuration.

Typically, provincial and federal courts would be housed in separate facilities - a situation that has led historically to inefficiencies and delays due to the fluctuating demand for court space and uncertainty in the duration of trials. While the Calgary Court Centre has designated spaces for the two systems, each courtroom can serve the needs of either, improving the overall efficiency of building use, and speeding up the justice system.

A major consideration in courtroom design is the need to separate the three user groups: employees, visitors and those on trial. The vertical configuration enables the secure holding rooms to be located at the base of the building, and dedicated, high security elevators used to deliver the accused to the appropriate floor, where there is a direct and secure connection to the prisoner dock in each courtroom.

This 3-dimensional solution to the security problem has the added benefit of increasing the accessibility of the remainder of the building to the public. Way finding and orientation is easier than in a traditional deep floor plan arrangement, as all floors are visible from the public atrium, and each floor plate is small enough to be navigated easily by those using the building for the first time.

In addition to the standard courtrooms, the building includes a multi-purpose room that is designed to fulfill the needs of Aboriginal legal ceremonies. Designed in collaboration with representatives of the Tsuu T'ina First nation, the room will serve a number of cultural purposes, such as conflict resolution, and its design incorporates culturally significant features including the presence of natural light and an open fireplace.

Bill Chomik is a partner with Kasian Architecture, Interior Design and Planning Ltd in Calgary.

Credits:

- **Client:** Government of Alberta
- **Principal Architect:** Kasian Architecture Interior Design and Planning Ltd, Calgary
- **Principal Interior Design Consultant:** Kasian Architecture Interior Design and Planning Ltd, Calgary
- **Associate Architect:** NORR Limited, Architects and Engineers, Toronto
- **Design Consultant:** Carlos Ott, Toronto
- **Courthouse Consultant:** Spillis Candela DMJM, Coral Gables, FL
- **Structural Engineer:** Stantec, Calgary Mechanical Engineer Hemisphere Engineering, Calgary
- **Electrical Engineer:** Stebnicki and Partners, Calgary
- **General Contractor:** CANA Construction Ltd., Calgary
- **Photo:** Robert Lermeyer, Calgary

Materials :

- **Envelope:** Roofing [exterior to interior]: 60 mil poly vinyl chloride membrane by Sarnafil, R20 Sarnatherm polyisocyanurate rigid insulation, Bakor Blueskin vapour barrier, concrete or 1/2in. Densdeck, a fiberglass-reinforced product by Georgia Pacific.
- **Glazing:** Office towers: triple glazed - 6mm Caribia HS/ 1/2-in. AS / 6mm clear PPG Solarban 60 HS 1/2-in. AS / 6mm clear PPG Solarban 60 annealed. Atrium: Double glazed - 6mm clear PPG Solarban 60 tempered, 1/2-in. air space, 6mm clear tempered. All units with silicone seal, argon filled and stainless steel spacer. Flynn siding and exterior envelope system, Roxul Insulation, Dow Corning 123 Strip air seal.
- **Interior:** T8 and T5 linear light fixtures, and 2x2 pure FX fixtures by Ledalite, T8 fixtures equipped with "daylight harvesting" dimming ballast; lighting controls in court rooms [fully dimmable] by Lutron; lighting controls in main building by Douglas; American Standard plumbing fixtures, Delta commercial faucets; raised floor areas by TateASP.

HVAC, controls: Air handling systems and high-energy efficiency chillers supplied by Trane, terminal control units supplied by Nailor Industries, high-efficiency exhaust air heat reclaim systems provided by **bkm Reverse-Flow Technology**, condensing boilers by Aerco; building controls and automation system supplied by Trane.

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HVAC Brief

by Paul Elfner

Mechanical heating, ventilation, air conditioning installations were designed for a reduced life cycle cost, which translates into a high level of energy efficiency, extended useful life, simplified operations, and reduced maintenance cost. Computer simulations indicate energy performance at 55% below MNECB.

The high performance building envelope and superior triple pane glazing contributed to a significant reduction in heating and cooling demand.

In order to satisfy prescribed space air circulation rate capability and ventilation requirements with highly variable occupancies, while also achieving a highest level of energy efficiency, a central variable volume dual-fan-dual-duct system was selected. The air handling systems incorporated larger, direct drive, and customized size fans operating at lower speed. This improved energy efficiency and improved acoustic performance. Terminal control units were also selected with acoustic performance in mind.

Other features of the system include, high efficiency exhaust air heat recovery, high energy efficiency chillers designed for 0.5 kW/ton performance, condensing boilers and sophisticated electronic building control and automation systems.

A significant design challenge was the incorporation of a glazed open atrium of over 150 metres in height - the tallest that we know of in such a cold climate. This required a very tight building envelope to restrict air leakage and a sophisticated controls strategy for pressurization against stack effect in cold weather. Excellent results into a second winter testify to an appropriate technical resolution.

Paul Elfner, P.Eng is a principal at Hemisphere Engineering in Calgary.