



CANADIAN CONSULTING  
ENGINEERING AWARDS 2020

# STANTEC TOWER

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Category: A. Buildings







Canada's tallest building outside Toronto, the 69-storey Stantec Tower is an icon within Edmonton's ICE District, Canada's largest sports and entertainment hub. The 251-metre skyscraper combines 29 floors of offices, 483 luxury residential units, and below-grade parking. The building's core and shell are targeting LEED Gold 2009, and Stantec's office—LEED Silver v4 and Fitwel 2-star certification.

The building achieves the goal of revitalizing downtown—adding vibrancy and fueling business and tourism within the city.









- This new building will revolutionize the downtown landscape in Edmonton and will set expectations for future buildings in the city. This tower is being designed, engineered and project managed entirely by Stantec, showcasing their vast capabilities and experience.

—Darren Durstling, President and CEO of ONE Properties

# PROJECT HIGHLIGHTS

## Q.1 INNOVATION

What's the story behind Stantec Tower? The journey began when the Katz Group Joint Venture (JV) was looking for an anchor tenant for a mixed-use tower to complement the ICE District buildings. Stantec was looking for a new headquarters to unite its Edmonton offices.

At 69 storeys, Stantec Tower is home to Canada's highest residential address west of Toronto. With 26 floors of offices, 483 luxury residential units, and below-grade parking, the 251-metre Stantec Tower invigorates investment, business, and tourism.

Innovation lies deep at the base of Stantec Tower with its local record-breaking, 36 metres wide, 24 metres long, and 3 metres deep raft slab foundation. At more than 2,800 cubic metres (3,062 cubic yards), it was one of the largest continuous concrete pours in Edmonton taking more than 300 trucks, 4 pumps, and 10 hours to complete.

With such a large slab, the slab surface, exposed to the air, will naturally dry much faster than the core. A huge lattice of steel rebar, thickest at the top and bottom, was positioned before the concrete pour to reinforce the pad. The concrete was also a special mix that had to be monitored with temperature sensors to enable proper curing.

Edmonton's poor bedrock combined with Stantec Tower's soaring height meant that massive concrete piles had to be driven deep into the ground to provide extra stability. Stantec Tower's piles are approximately 30m deeper than those underpinning the world's tallest tower, Burj Khalifa.

The transfer slab at Stantec Tower allows the transition from the open concept office column spacing to the tighter residential column spacing and soars 122 metres (400 feet) into the sky. The 2-metre-thick transfer slab occurs at Level 30, encasing the last of the 40-foot-tall steel outriggers and allowing for flexibility on floorplate columns—an achievement never before seen in Edmonton.

How do you pour a giant concrete slab 400 feet in the air in the middle of winter? There were backup concrete trucks, concrete pumps, and even concrete batch plants standing by on pour day. Replacement parts and construction staff were on-hand during the 36 hours of continuous concrete pour.

As the slab was poured and during the curing process, the heavy pool of concrete required substantial support. The steel outriggers and trusses below Level 30 transferred the wet concrete weight directly to the concrete columns freeing up the lower levels so construction activity could continue unimpeded.





## Q.2 COMPLEXITY

Stantec Tower's record-breaking height brought challenges for the project team.

Stack effect occurs when the outside temperature of a building is significantly lower than the inside temperature. In high-rises, stack effect becomes extreme. Frigid Edmonton winters increase stack effect potential, putting the tower at risk of doors failing to close and open, as well as potential elevator issues. Mitigating the stack effect required collaboration between mechanical and architectural teams resulting in a design of a well-sealed envelope, strategic use of interior partitions, door vestibules, and revolving doors.

For tall towers, conventional concrete core walls are not stiff enough to withstand wind. Our engineering team implemented a steel outrigger solution that, to date, has not been used in the Edmonton market. This innovative risk management solution provides support and prevents the top floors from swaying beyond human comfort levels.



The design team used structural steel versus a concrete structure on the tower podium to accommodate the opening of the adjacent \$500-million Rogers Place entertainment hub. The use of steel enabled movement between the steel structure and concrete tower above. The team engineered special joint details to allow for movement in both axes, both during and after construction. To allow for larger spans and greater floor-to-floor heights, we also used composite steel in the floor plates of the podium structure west of the tower footprint.

Composite steel construction isn't widely used for Edmonton's buildings; extra attention was paid to the construction methods and leveraging specialty skills to ensure floor flatness and suitability.



## Q.3 SOCIAL AND/OR ECONOMIC BENEFITS

At the turn of the 20th century, the average city street was a kaleidoscope of homes, businesses, and civic buildings. But by the end of the Second World War, rapid population growth and new transportation technology began to erode the core of North American cities. Edmonton's city centre struggled as populations migrated out to the suburbs crippling the sense of place and vibrancy required to sustain a healthy community.

Enter ICE District, strategically combining residences, office spaces, a world class arena, public plaza, and retail spaces to revitalize downtown Edmonton, becoming a catalyst for investment, business, and tourism. Built right into the design of ICE District is the notion that the plaza is part of the public domain. A place that brings families and friends together. A venue for celebrations. And standing tall in the centre: Stantec Tower.

While Stantec Tower stretches toward the sky, its true impact is at street level. The podium design adds to the vibrancy of Edmonton's downtown, drawing people into a central location to work, socialize, and call home. The podium is composed of commercial retail spaces on the first two levels with a large office plate on the third. The curved, undulating façade creates a soft interphase with the plaza, creating an organic backdrop for public festivals, events, and celebrations, inviting all to stick around. The area is built not for passersby and passers-through, but for lingerers and loiterers. Stantec Tower is a destination and a place for conversation, connection, and culture.



## Q.4 ENVIRONMENTAL BENEFITS

From day 1, Stantec Tower was envisioned as a sustainable building. Designed to showcase the sustainability best practices that Stantec offers our clients and provide a foundation of environmental responsibility for future tenants, the building's core and shell are targeting LEED Gold 2009, and Stantec's office space is targeting LEED Silver v4 and Fitwel certification.

High-performance systems drive energy conservation. Stantec Tower's energy-efficient design includes low flow fixtures that reduce water usage by 35% compared to standard building fixtures, and an 81-cubic-metre cistern tank that captures rainwater runoff from the roof—meeting 100% of the tower's irrigation needs. Additional features include flexible workspaces that can evolve with tenants over time, bicycle storage, and shower/ changing facilities to encourage sustainable modes of transportation.

The electrical design of the tower minimizes energy use through occupancy sensors, multi-level lighting switching, and daylight sensors used for LED lighting sources. Daylight sensors are installed around the perimeter of the space near the exterior curtain wall. These sensors dim perimeter lights during bright daytime hours providing a cost-effective and efficient lighting solution. Most meeting rooms feature occupancy sensors with manual overrides and dimming switches. In addition, staff can control their individual light levels within their workspaces.

Stantec Tower was designed using health and wellbeing strategies to help employees and visitors lead better lives. The tower incorporates many wellness features: collaboration spaces, daycare, parents' room, gender-neutral washrooms, quiet areas for individual work, outside views, natural light, internal staircases, sit-to-stand desks, access to fitness facilities, and rooftop gardens.







## Q.5 MEETING CLIENT'S NEEDS

Edmonton ICE District needed an iconic building to anchor and catalyze the broader downtown revitalization creating a landmark that would symbolize community engagement and transparency. This was an opportunity to create a signature building informed by an evolving dialogue about scale and concept amongst the design and client team. The initial request was for an office tower, which transitioned into a mixed-use development at its final scale and form. This was achieved by combining two major occupancies: office space and high-rise residential.

The Stantec Tower podium maintains a flexible design for the tenant mixes: retail, food hall, restaurants, personal service. The tower's office space is composed of large floor plates with floor-to-ceiling windows that maximize natural daylight to promote energy performance and efficiency and create a flexible work environment. Crowning the office floors, the residential portion hosts one- to three-bedroom, mid- to high-level suites that have access to building amenities and common patio area.

A key engineering challenge was to find pathways for multiple arteries throughout the building—to knit the building elements together. The residential and office layouts are dramatically different—both structurally and functionally—so a traditional uniform top-to-bottom design was out. Sculpting a space for multiple purposes meant less flexibility—the needs of each building section dictated the building form.

Stantec Tower is a striking mix of two glass rectangles: one short and wide, one soaring and slender. With Stantec Tower, the developer wanted to ensure the design was informed entirely by client occupancy and facility requirements.





