

DEFYING THE IMPOSSIBLE

✦ The Trump International Hotel and Tower Toronto project is exceeding expectations as it moves toward its January 2012 opening. *By Ward Sellars*



Hidi Rae Consulting Engineers helped bring the Trump International Hotel and Tower Toronto to life.

Hidi Rae Consulting Engineers Inc. – Trump International Hotel and Tower Toronto

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Location: Toronto

Employees: 200

Project budget: \$500 million

➤ **On a small parking lot in downtown Toronto**, in the shadow of more than 60 storey office towers, there appeared in 2004 a sleek sales centre for a proposed hotel and condominium development – Trump International Hotel & Tower. Walking past the site one day while on the way to a project meeting, I looked at the sales centre and it looked different from most of the condominium sales centres that are ubiquitous in Toronto, North America's largest condo market.

I could not figure out why the sales centre was located on this tiny parking lot at the corner of Bay and Adelaide streets. The parking lot only held 40 cars and the total site was about 45 by 25 metres, just one quarter the size of a football field. I walked into the sales centre and had a look at the renderings of a 70-storey tower to be built on this tiny plot of land. Like many people, I felt this project would never start, let alone be finished. Little did I realize on that day in 2004 how much my firm and I would get involved in this seemingly impossible project.

The story begins with a Russian-Canadian metals magnate, Alex Shnaider, and his friend and partner, another Russian-Canadian, Val Levitan.

Together, these men own Talon International Development Inc. Shnaider is one of the youngest billionaires in Canada, having made a fortune in steel in Russia after the breakup of the Soviet Union in 1990.

Shnaider has owned a professional soccer team, a Formula One team, a Global Express Jet and has a 205-foot-long yacht. In 2004, as the youngest billionaire in Canada at the age of 34, Shnaider purchased the small parking lot at the corner of Bay and Adelaide in downtown Toronto, surrounded by the biggest banks in Canada, with the intention of developing a hotel there.

Eberhard Zeidler and his architectural firm were tasked with designing the hotel/condo property at the Bay and

The project was built on a very narrow and tight footprint in downtown Toronto.



Adelaide site, and to present these preliminary plans to the city for rezoning of the site. Lyndon Devaney of Zeidler Architects was the principal in charge of the project, with Robert Eley appointed as principal in charge of design.

Zeidler Partnership Architects appointed Hidi Rae Consulting Engineers as the MEP Engineers and Yolles (now Halcrow Yolles) as the structural consultant. Initially, the property was to be a Ritz-Carlton Hotel on the site (inherited from a previous developer), and the early stages of the design were focused on meeting the Ritz-Carlton requirements.

However, a number of key requirements for Ritz-Carlton could not be achieved on the small site and the whole

Ritz-Carlton connection unravelled. Ritz-Carlton eventually found another developer partner for another site in Toronto. Meanwhile, Shnaider and Levitan took over the project from the previous developer and searched for another suitable luxury brand for the site. Enter Donald Trump, who was interested in having a Trump Organization property in Toronto.

In 2003, Talon and Trump agreed to develop the site at Bay and Adelaide, with Trump becoming the operator of the hotel and residences. Also, in 2003, the city granted planning approval for the project and the design moved forward.

From late 2004 to 2007, the aforementioned sales centre at the site was drum-

ming up business and making sales of hotel and residential condominium units. At more than \$1,000 per square foot, an unheard of price at the time, there was doubt that the project would be successful. Some real estate people in town criticized the development, saying unkind things about the players in the project, and especially at the pricing, which they said was unsustainable in the Toronto market. The word on the street in Toronto was that the property would never be built.

But those same real estate people did not account for the unparalleled passion and commitment from Levitan and Shnaider in getting the project built. Between September 2004 and September 2005, more than \$150 million in real estate was sold at Trump Toronto. And by early 2007, more than \$250 million in sales was achieved.

Because of the success of Trump Toronto, plans for other luxury hotel/condominium developments in downtown Toronto from Ritz-Carlton, Four Seasons and Shangri-La were announced in late 2006 and 2007, whom together validated the pricing of \$1,000



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The building's unique construction allowed for open spaces throughout.

per square foot and higher (Trump Toronto is currently selling remaining suites at over \$1,650 a square foot).

In March 2007, the development threshold was reached, and Levitan was able to secure construction financing from an Austrian bank. Lewis Builds Corp. was engaged as the general contractor during this period, and the architectural work progressed out of design development into construction documents. A well-publicized ground breaking event with Donald Trump and the Talon partners was held in October of that same year and construction began soon after.

After a few revisions, the height was finally fixed to 65 floors, although the high ceilings of each floor make the building much taller than that single numerical floor value. The completed building will be the tallest residential building in Toronto and the second-tallest building in Canada, at more than 900 feet tall, including the python head spire on the top.

The spire on the roof echoes a similar more elaborate structure that Eberhard Zeidler had previously used on his BNI City Tower in Jakarta, Indonesia. The site is so constrained that the requisite public art mandated by the city of Toronto could not be accommodated in any traditional manner, so Zeidler and Talon ingeniously enlisted Jonathon Speirs of Edinburgh, Scotland, to design an LED light sculpture that extends the full height of the building, culminating in a riotous explosion of light at the python head spire at the top.

Talon interviewed a number of hotel interior designers, but eventually selected Toronto-based II By IV Design, well respected for its edgy nightclubs and restaurants. Val's wife, Inna Levitan, was appointed as the director of design, working closely with II By IV on the design palette and the specifics of various specialty spaces such as the Vodka Bar, Restaurant and Spa.

"The theme is champagne and caviar, classical and European," comments

Mickael Damelin court, general manager of the hotel. "People ask me where is the gold, but that is not our way. The design is elegant, but youthful, reflecting in part the tastes of the second generation of Trumps – Donald Jr. and Ivanka."

Starting in early 2007, the entire design and engineering team was in place and the full team began regular design meetings, led by Lyndon Devaney at Zeidler Partnership Architects.

One unique aspect of the project is the fact that the hotel will open in January 2012 while construction work continues on the residential floors above. The building was designed to have multiple occupancy permits and multiple systems segregated between the hotel and the residences. For example, the hotel's generator, originally located at the top of the building, was relocated to the 32nd floor so that the hotel could operate independently of the residences, which are located from floors 33 to 59.

Roger Cannon, the mechanical designer at Hidi Rae, says placing the large hotel generator in the centre of the building between the spa and the residence floors created some serious challenges from a mechanical, electrical and acoustical perspective. "We managed to overcome those to get to the hotel opening," he asserts.

Cannon also notes that a key enabler of the project was the availability of municipal chilled water and steam, both supplied via deep underground pipes from Enwave Corp., the city's district heating and cooling supplier for the downtown core.

The chilled water is pumped directly out of the cold depths of Lake Ontario, just six blocks to the south. "We didn't have space in the building for chillers, cooling towers and boilers, so the Enwave solution allowed the project to move forward," Cannon concludes.

Amgad Mikhael, principal electrical engineer for the project at Hidi Rae, adds that there were no electrical and low-voltage risers in the traditional sense of a

high-rise building. "Instead, there just wasn't room for them and the convoluted structural elements didn't allow them," he says. "We embedded electrical ducts into structural shear walls as one solution, and we have incorporated aggressive energy management systems to reduce the demand load in the building. LED lighting is used extensively throughout the building."

In early September 2011, the project was topped out and the last concrete poured for the roof of the mass dampers at the top of the building. By October 2011, the exterior structural work for the building was completely in place, including the "python-head" spire.

Lyndon Devaney attributes the success of the project to a number of factors, not least the incredible team effort by all of the design and construction professionals in overcoming the constraints of the site. He also lavishes praise on the neighbours to the site, Scotia Plaza to the east and National Club to the south.

"We could not have built this building without their assistance," he says. "Scotia Bank allowed us to build a roof deck to their car parking ramp, on their property, so that we could use it for a staging platform for materials while the National Club allowed us to close the laneway on the north side of their building for a five-year period."

Lyndon also praises the city of Toronto. "The city has been very cooperative, especially in their agreeing to the closure of streets for deliveries and the closing of two out of four lanes on Adelaide Street for an extended period of time," he says. "This is the heart of the Toronto Financial District, so the street closures are not without consequences, but the city has been fantastic."

As for the architecture of the building, "The building materials are referential and respectful of adjacent buildings," Lyndon says. "The modulated elements, the exterior granite and the canopies, all are in keeping with the character of the city and the neighbourhood. Few

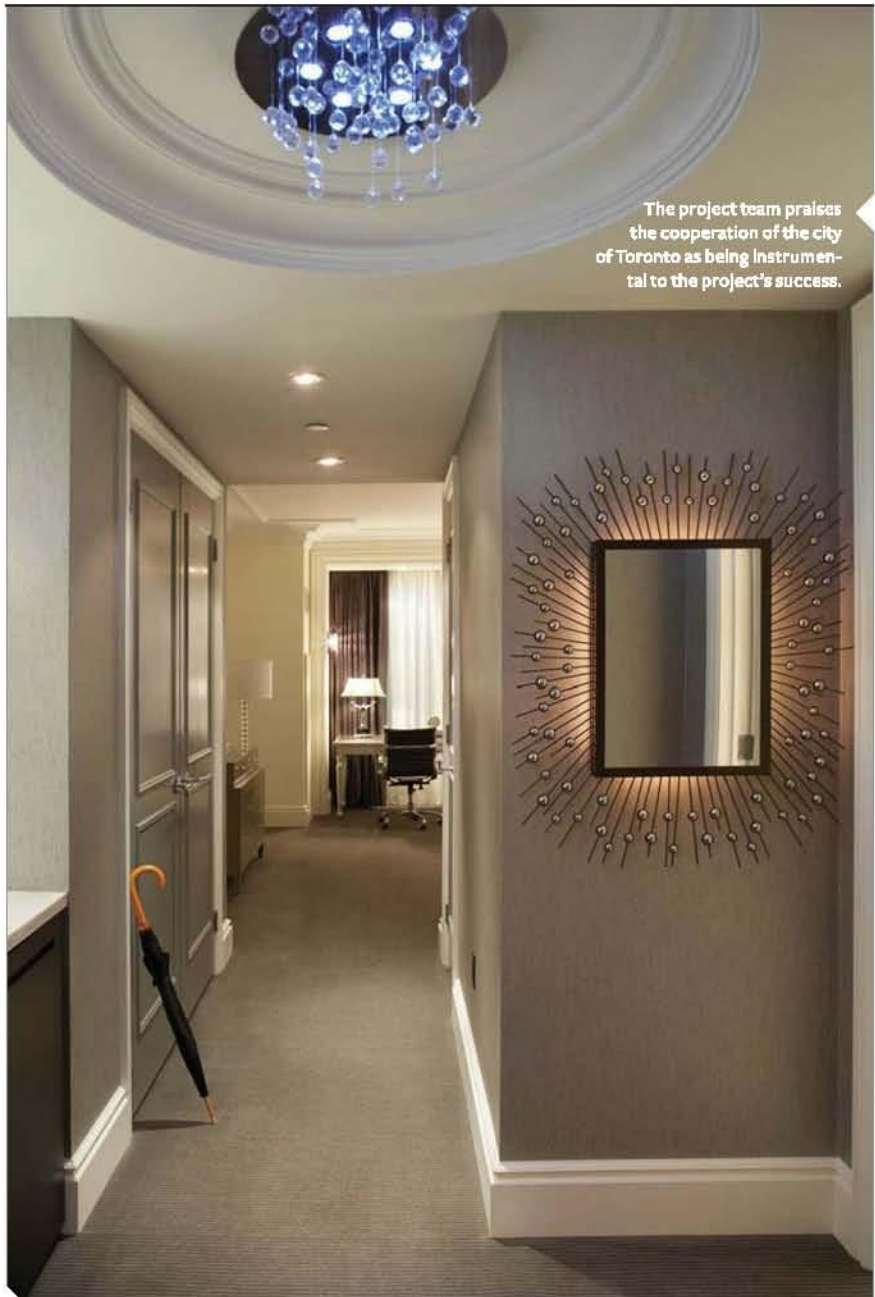
passers-by will be aware that there are seven levels of valet parking above grade – the parking floors are disguised as office or hotel floors, surrounded in granite and glass.

"We could not have done this building without the skill of specialist suppliers, such as the curtain wall contractor, Far East Aluminum of China," he adds. "Every piece of glass, metal and granite was constructed in Far East's factory in Shenzhen, China, and shipped to Toronto in 550 containers. The containers are staged in a marshalling yard off

site, and the panels and units needed for each day's erection are delivered in small batches and installed immediately.

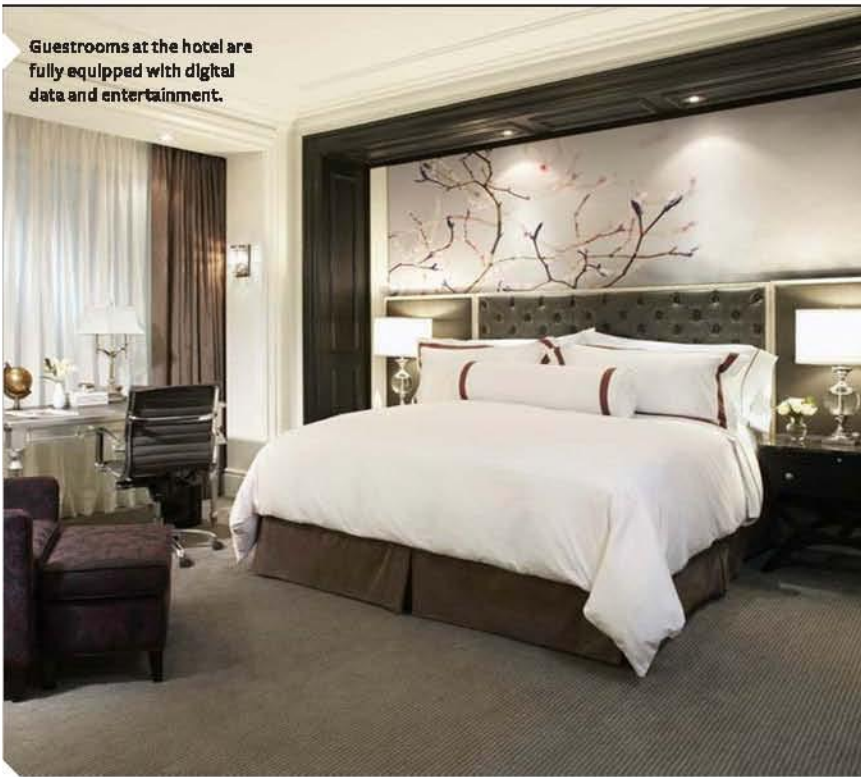
"Everything fits together beautifully," he continues. "Since this is a 24-hour-per-day, seven-day-a-week construction site, with very limited on-site storage, our suppliers need to deliver to us in a just-in-time manner."

Tony Greco, construction consultant with Talon, noted that only one crane is available on the site. "Due to the severe space constraints on the site, we could not fit in more than one tower crane on



The project team praises the cooperation of the city of Toronto as being instrumental to the project's success.

Guestrooms at the hotel are fully equipped with digital data and entertainment.



the building, and the city would not let us 'fly' concrete in buckets," he says. "We are therefore pumping concrete from the ground up to the very top.

"The guys at Pumpcrete worked out the logistics for us," he continues. "Although this slowed down some aspects of the construction work, we have kept to our schedule through shift working and just-in-time deliveries to the site at all hours of the day. Cooperation by our major trades – Lisi Mechanical, Ozz Electric, Otis Elevator, Vipond Sprinklers and Associated Structures to name a few – has been key to this scheduling dance to keep the project on track."

There were also numerous innovations in the structural realm. According to Barry Charnish, a former partner at Halcrow Yolles and now a partner with Entuitive, the constrained site and five-star nature of the hotel demanded a series of solutions unique in Toronto. "This project was decidedly different," Charnish says. "We were looking at a

structure as tall as First Canadian Place but sitting on about a third of the footprint. It is very tall and very slender.

"There was also the need for those sweeping, unobstructed interior spaces," Charnish says. "Talon wanted complete flexibility when it came to creating interior spaces on the hotel and residential floors at the top of the building. The absence of walls, pillars and posts would allow the creation of sweeping great rooms of better than 700 square feet."

Charnish and his team met these challenges in a few unique ways. They have constructed a very stiff reinforced concrete structure; used post-tensioned slabs to reduce slab thickness and weight that allows spanning between the core and exterior walls without interior columns; and designed water-filled damper tanks at the top of the building to reduce wind-induced sway.

The low-voltage "intelligent systems" are also a principal contributor to the success of the project. Hidi Rae's

Communications group is responsible for all communications systems. The communications engineering group has a scope of work that includes all of the technology needed for a complex hotel project, including a dedicated structured cabling infrastructure, digital phone system, wired and wireless data network, audio/visual and security systems.

Alan Osz, the security designer at Hidi Rae, performed a security threat risk and vulnerability assessment on the property at the beginning of the design phase, walking the streets around the site with the Toronto Police Department to identify risk elements. The audio/visual systems include digital audio, paging and meeting support infrastructure in the ballrooms, restaurants, spa and lounges. Data networking includes a complete Cisco infrastructure with 10-gigabit Ethernet backbone and multiple incoming services from Rogers Communications at 100 megabits per second. Guestrooms are served by Internet Protocol TV and video on demand.

The design of the Trump Tower provides these capabilities not only over both wired and wireless connectivity, but also over a neutral-host cellular amplification system in the building, supporting four competing cellular networks, up to and including the latest 4G wireless networks.

To summarize, we want to quote from Val Levitan, speaking about the A/E/C team on the project. "This is probably one of the most complicated projects in the country, probably close to a thousand people," he said. "Everybody is putting their sheer will power on a daily basis to make it happen. I am emotionally consumed by this project, but the credit has to be distributed equally to everybody." Levitan has shown that his passion and unflagging persistence have overcome the naysayers to get this project to the finishing line. ☉

Ward Sellars is the senior vice president at Hidi Rae Consulting Engineers in Toronto.