



Title: **The Future of Sustainable Cities and How Tall Building Urbanism has Evolved**

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Subjects: Sustainability/Green/Energy
Urban Design

Keyword: Urban Planning

Publication Date: 2019

Original Publication: 2019 Chicago 10th World Congress Proceedings - 50 Forward | 50 Back

Paper Type:

1. **Book chapter/Part chapter**
2. Journal paper
3. Conference proceeding
4. Unpublished conference paper
5. Magazine article
6. Unpublished

The Future of Sustainable Cities and How Tall Building Urbanism has Evolved



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Abstract

In the past 50 years, tall buildings and their relationship to streets and open spaces has evolved through various scales and typologies. As place-makers, how do they contribute to a successful public realm? Case studies from Battery Park City, Roppongi Hills Tokyo, downtown Dubai, One Shenzhen Bay, and a new master plan for Toronto's East Harbour all explore a return to an urbanism that re-focuses the tall building neighborhood back to the pedestrian scale. Towers that were well set back from the street and surrounded with amorphous open spaces have evolved to a better street relationship. Always important to the urban habitat, open spaces have also evolved to be thoughtfully carved out from the urban fabric, framed by active uses and taking on a spatial character and typology that best serves its function. Existing heritage buildings should always be retained and restored as elements of our history that make the urban habitat richer, giving the tall building a sense of place. A mix of uses helps create complete communities, adding vibrancy and increasing walkability. Lastly, considering climate change and sustainability are essential to any successful tall building urban design.

Keywords: City Planning, Heritage, Urban Design

Introduction

Tall Building Urbanism has evolved in the last 50 years. The 2019 CTBUH Urban Habitat / Urban Design (UH/UD) Committee's Global Walking Tour, with the theme "50 Forward 50 Back: The Recent History and Essential Future of Sustainable Cities" (#CTBUHwalks), is intended to study different eras of urban thinking. Over 25 cities from six continents participated. Topics such as how open space was conceived, how streets are animated and how tall building positioning effects micro-climate and pedestrian comfort were explored. The walking tours also discussed future themes in urban design by visiting sites of proposed buildings, demonstrating the next few generations of urban thinking. The CTBUH UH/UD Committee has previously explored how tall building environments become successful places based on their related public realm and the open spaces which support them. These themes were explored in the Committee's first book, *The Space Between: Urban Places Public Spaces & Tall Buildings*, published in collaboration with CTBUH staff.

In the past 50 years tall buildings and their relationship to the streets and open spaces has evolved through various scales and typologies: as place-makers, how they meet the street as well as how they contribute to a successful public realm.

One of the key ways that Tall Buildings contribute to the public realm is by framing and creating opens spaces. These spaces can range from pocket parks, like Paley Park in New York to the grandiose spaces such as the Burj Khalifa Lake and the Dubai Fountain in Downtown Dubai. Intelligent tall building urbanism contributes to the success of a city and impacts the quality of life for those that live and work there.

The Seagram Building and the Rise of the Urban Plaza

A significant milestone in Tall Building Urbanism was the design and construction of the Seagram Building in New York City, an appropriate place to begin a review of the evolution of tall building urbanism in the last 50 years (see Figure 1).

More than 50 years ago, architect Ludwig Mies van der Rohe, in his design for the Seagram Building, broke with the tradition of buildings that frame the street and build to their permitted lot lines. Situated at 375 Park Avenue in midtown Manhattan, the integral plaza, building, stone faced lobby, and distinctive glass and bronze exterior were completed in 1958. The building stands 157 meters (515 feet) tall with 38 stories, and is one of the most notable examples of the International Style aesthetic. It was designed as the headquarters for the Canadian distillers Joseph E. Seagram & Sons; Jahn & Jacobs were associate architects. The structure, and the style in which it was built, had an enormous influence on future North American architecture. One of the style's characteristic traits was to express or articulate the structure of buildings externally.

The building was also ground-breaking for its urban design. Unlike normal tall buildings of the day which were built to the street edge, the Seagram building was well set back from the street, creating an urban plaza. In 1961, when New York City enacted a major revision to its 1916 zoning regulation—the nation's first comprehensive Zoning Resolution—it offered incentives for developers to install Plaza's meant to emulate that of the Seagram Building. However, what resulted was less successful from an urban design perspective. While Meis created a plaza framed by his tower and neighboring buildings that were built to the street edge, the resulting zoning changes created a series of these spaces, pushing buildings back from the street. Streets that were previously lined with retail and animated uses became sterile and wind swept as a series of plazas created a discontinuous public realm.

The decade of the 1970s created some notable tall buildings which define the skylines of the cities in which they were built. These including the Sears (now Willis) Tower in Chicago, as well as the US Steel Building in Pittsburgh, First Canadian Place in Toronto and The Aon Centre in Los Angeles.

While these buildings were truly spectacular for their architectural and structural design, the tall buildings of this decade are not well regarded for creating successful tall building urban design. Generally landmark buildings of this decade were well set back from the street and disregarded the human scale in how they met grade.

Battery Park City and the Return to Pedestrian Scale

The return to an urbanism that refocused the tall building neighborhood back to the pedestrian scale was created in the Master Plan for Battery Park City in the early 1980s (see Figure 2). The Battery Park City plan was based on a series of streets and blocks where the tall buildings became secondary to the streetwall buildings that they rested on. This created a typology of tall building that refocused on the public realm. Battery Park City was master planned by the firm of Cooper Eckstut Associates.



Figure 1. Seagram Building, New York—unlike tall buildings of the day which were built to the street edge, the Seagram building is set back from the street, creating an urban plaza. © John W. Cahill

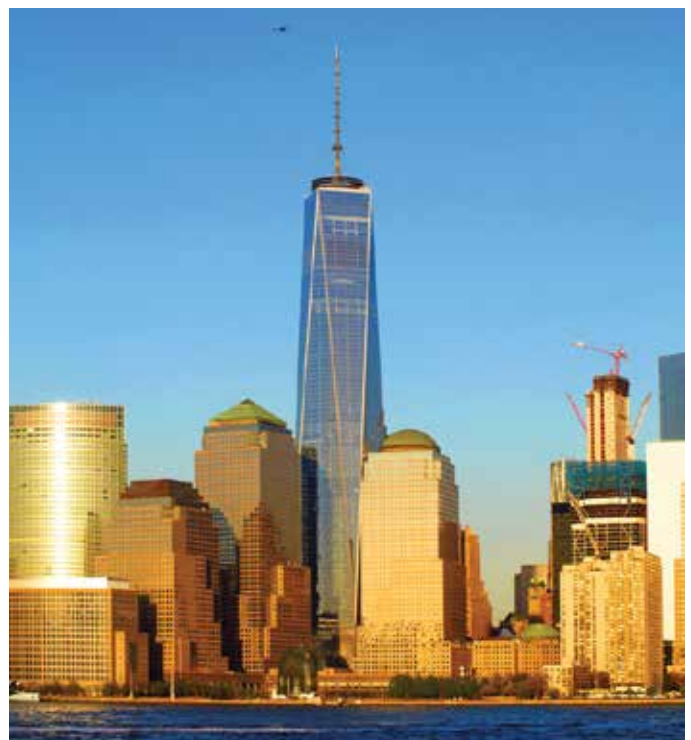


Figure 2. Battery Park City, New York—a typology of tall building development that re-focused on the public realm. © Marshall Gerometta

Battery Park City is a mixed use commercial and residential 92-acre (37-hectare) master planned community on the west side of the southern tip of the island of Manhattan. It is bounded by the Hudson River on the west, and the West Side Highway on the east. More than one-third of the development is parkland. The neighborhood, which is the site of Brookfield Place (formerly the World Financial Center), along with numerous buildings designed for housing, commercial, and retail, is named for adjacent Battery Park.

Battery Park City is bounded on the east by West Street, which separates the area from the Financial District of Lower Manhattan. The master plan reconnected the waters edge with lower Manhattan by extending the street grid and creating a series of streets and blocks and open spaces which refocused the development on the public realm.

Current residential neighborhoods of Battery Park City are divided into northern and southern sections, separated by Brookfield Place. The northern section consists entirely of large, 20 to 45-story buildings, all various shades of orange brick. The southern section, extending down from the Winter Garden, which is located in Brookfield Place, contains

residential apartment buildings. These neighborhoods also contain, supermarkets, restaurants, and movie theaters. Those ingredients necessary to have a high quality of life.

Construction began on the first residential building began in the early 1980s. Upon completion of the first few phases of development Battery Park City was lauded by The New York Times as “a triumph of urban design,” with the World Financial Center being deemed “a symbol of change.” Battery Park City became the new home of the Stuyvesant High School, furthering the neighborhood’s role as a “complete” community.

Roppongi Hills: A Unified Central Community in Tokyo

After the year 2000, the volume of new tall building construction around the world shifted greatly to the Middle East and Asia. In this context, developments in these regions had advanced tall building urbanism in the early part of this century.

Another master plan notable for its urban design is Tokyo’s Roppongi Hills. Planned in the 1990s Roppongi Hills demonstrates how a new urban precinct can learn from its surrounding context and bring together a variety of distinct precincts and spaces creating, as a result, a unified central community “hub”. The largest private-sector urban redevelopment project in Japan’s history, Roppongi Hills is the centerpiece of a 110,000 square-meter mixed-use development at the heart of the Tokyo Metropolitan area. It offers a unique composite of functions closely linked with lifestyles, working environments, entertainment, leisure, education, and creativity.

Roppongi Hills is designed to be a “city within a city” and as a result features a wide variety of amenities. The immense density of services and programming on site naturally draws a large volume of visitors. Weekdays see an average of 100,000 visitors per day in addition to approximately 20,000 employees of the office and commercial establishments and 2,000 residents.

Visitors, both locals and tourists, are most likely to come to Roppongi Hills for the retail and dining options. However, a number of cultural amenities also draw people to the precinct, including the Mori Art Museum, located on levels 52 and 53 of Mori Tower, and the observatory at the top of the building (see Figure 3). Academy Hills, also on site, has a school, library, and forum, which provide educational uses.

The focal tall building in the complex of Roppongi Hills is the Mori Tower, completed in 2003, features over 40 floors of office space, with approximately 4,500-square-meter floor plates.

Several uniquely defined, publicly accessible spaces at grade are present throughout the development, with more than 40 percent of the site devoted to gardens, outdoor pavilions, and open space. Major areas include the Metro “Hat”—a cylindrical pavilion sheltering the escalator from the Tokyo Metro; Roku-



Figure 3. Roppongi Hills, Tokyo, offers a unique composite of functions closely linked with lifestyles, working environments, entertainment, leisure, education, and creativity.

© Terri Meyer Boake



Figure 4. Burj Khalifa, Dubai—the mixed-use development is the home of some of the city's most important landmarks. © James Parakh



Figure 5. The Dubai Fountain is the world's largest choreographed fountain system set on the 30-acre man-made Burj Khalifa Lake. © GeoEyeSatellite

Roku Plaza, a bow-shaped plaza with a surrounding canopied walkway, containing as its focus the Louise Bourgeois sculpture "Maman." Other spaces include the curving West Walk indoor pedestrian mall; the Hillside section, which includes an elevated terrace and canopied amphitheater, and the Roppongi Hills Arena.

The landscaping at Roppongi Hills blends hard elements such as entryways, sidewalks and patios, with soft elements such as grass lawns and planters. Several uniquely defined park spaces are present throughout the development, with nearly half of the site devoted to gardens, outdoor pavilions, and open spaces that invite the public to, and through, the site at the ground and rooftop (one floor above street grade) levels. At ground level on the northeast edge of the site is Mohri Garden, a 4,300-square-meter classical Japanese garden, whose history traces back nearly 350 years to the Edo period.

Tokyo has a generally mild climate, located in the center of the country's archipelago. As a result, Roppongi Hills blends indoor and outdoor space to provide ample interaction with the environment. Many totally enclosed spaces give the impression of being outside, through the extensive use of natural sky lighting. This is particularly evident along the West Walk, a multi-level retail lined corridor that runs through the development.

With its commitment to the mixed-use model, blending private and public spaces that not only drive business, but also education, commerce, and culture, Roppongi Hills represents an innovative model for living and working in what is already an intense urban center.

Strategic programming and thoughtful design have established the project at the center of the Tokyo experience, fulfilling the goal of becoming a "city within a city."

Mixed-Use Development in Downtown Dubai

Downtown Dubai, UAE has a large-scale, mixed-use complex, master planned in the early 2000s and currently under development. It is the home of some of the city's most important landmarks including Burj Khalifa, Dubai Mall, and Dubai Fountain and covers an area of two square kilometers (0.77 square miles) (see Figures 4 and 5).

The complex is situated along Sheikh Zayed Road. It is connected to the Dubai Metro via the Burj Khalifa/Dubai Mall Metro Station. The First Interchange, which is in its last phases of construction, will guarantee the free flow of traffic to and from the area.



Figure 6. One Shenzhen Bay, Shenzhen—aerial site plan view. © Vivian Liu, courtesy of KPF



Figure 7. Rather than stacking the towers upon a podium, the design pushes all the retail functions to the perimeter, and brings the towers down to the ground.

© Vivian Liu, courtesy of KPF

The focal point of the master plan is the Burj tower along with the Dubai Fountain. The Dubai Fountain is the world's largest choreographed fountain system set on the 30-acre man-made Burj Khalifa Lake, at the center of the downtown development in Dubai. It was designed by WET Design of California. Illuminated by 6,600 lights and 25 colored projectors, it is 275 meters (902 feet) long and shoots water up to 152.4 meters (500 feet) into the air accompanied by a range of classical to contemporary Arabic and world music. It was built at a cost of AED 800 million (US\$218 million). The surrounding residential and office towers have been designed to offer view corridors to this central feature. A continuous water's edge public realm creates a sense of walkability. The Dubai Mall is designed with an animated exterior of shops and cafés which overlook the fountain.

Linear Connections at One Shenzhen Bay

One Shenzhen Bay is a recently completed vibrant, mixed-use development that integrates with the fabric of the district of Houhai, reflecting its natural beauty and favorable climate through a mix of indoor and outdoor spaces. Winner of a CTBUH Urban Habitat Award of Excellence in 2019, the complex includes six high-end residential towers, one office tower and a 338-meter central tower comprising offices, serviced apartments and a Raffles Hotel. Although distinct in program, the eight towers are designed to appear and function as a singular, cohesive entity.



Figure 8. One Shenzhen Bay, reflecting its natural beauty and favorable climate through a mix of indoor and outdoor spaces. © Vivian Liu, courtesy of KPF

The layout and appearance of the One Shenzhen Bay complex provides residents with a modern living environment in close proximity to work, shopping, and recreational opportunities. The most notable aspect of the project is its publicly accessible ground plane and linear connections (see Figure 6). Mandated by the City of Shenzhen, the design team collaborated with the municipality to achieve a development that was innovative in its approach to public accessibility. The eight towers rise above three levels of retail. The master plans most notable aspect—Rather than stacking the towers upon a podium, the design pushes all the retail functions to the perimeter, and brings the towers down to the ground (see Figures 7 and 8). The resulting effect is of a community of buildings, instead of a singular, overwhelming gesture. Through-block circulation and cross ventilation are encouraged through a series of openings that punctuate the site perimeter and invite pedestrians into the public plazas and gardens that lie within the center of the site.

Plants are used as a vital part of the material palette. All public and private functions at One Shenzhen Bay are linked directly or visually to green spaces. Extensive soft, green surfaces replace hardscape. Over a third of the open space is permeable and 85 percent of the project's roof space is used, much of it as green roofs. Where hardscape is inevitable, paving is used to define program zones. Through pattern and material change, larger areas of paving are broken down into more digestible segments. Water features, public art, and seating add points of interest throughout the site. Retail promenades are directly connected to the streetscape and internal plazas. The community can enjoy courtyard gardens, view gardens

on the podium roof, and the active south plaza. Visitors can walk along an elevated, landscaped promenade that links to adjacent blocks, public transportation, and the waterfront park. The elevated publicly accessible promenade promotes a new urbanism to the development and offers views of the lushly landscaped courtyards.

East Harbour, Toronto: Inspired by its Industrial Heritage

East Harbour is a new master plan proposed for Toronto, just east of the Financial District. The Plan is rooted within the city and inspired by the industrial heritage landscape of the precinct (see Figure 9).

As we look to the next 50 years it is important to not forget the lessons from the past. In the case of East Harbour, this includes creating a progressive new master plan that uses its industrial past to develop the DNA of the master plan. The plan is not based on elaborate geometries or pattern making that looks visually interesting from 1,000 feet in the air. This plan is noteworthy however, for how it introduces to the city of Toronto a new contemporary commercial precinct which is fully integrated within the city. In designing the master plan for First Gulf's East Harbour project the design teams developed a plan that was rooted in the site itself.

The site's unique location and context present a number of challenges and opportunities which were explored through the master planning process.



Figure 9. East Harbour development aerial view—the master plan seeks to reintegrate East Harbour into the surrounding urban fabric. © Norm Li, courtesy of Urban Strategies

- Overcoming access constraints and limited street infrastructure, which isolates the area from its surroundings
- Addressing the relationship to the Don River, flood protection was needed to facilitate redevelopment
- Recognizing the site's relationship to the broader Port Land's area and waterfront
- Leveraging the adjacency to the planned Transit Hub at the north edge of the site to create a truly integrated, transit-oriented place
- Exploring ways to celebrate the site's industrial legacy and repurposing historical elements which exist today

The Master Plan seeks to reintegrate East Harbour into the surrounding urban fabric, supporting access to and from the surrounding neighborhoods and districts. Located along the edge of Toronto's Don River, the site was the historical location of the original Unilever Soap Factory Building. Previously slated for demolition, the master planners saw an opportunity to retain and rehabilitate this former industrial factory as the first phase of the redevelopment. This will be the outward expression of the development, signaling the site's industrial heritage in perpetuity. Lower in scale, the Soap Factory Building will create an appropriately scaled transition to the Don River edge and linear park while bringing the towers in the future phases of the development into a more coherent composition. The public realm will be framed by the Soap Factory Building, with the potential for ancillary industrial structures such as the Water Tower, Boiler House, and Glycerin Building to become integrated into the plaza design.

A network of pedestrian connections and privately owned publicly-accessible open spaces (POPS) will connect buildings together and enhance the quality of place within the district (see Figure 10). These spaces will interact with the climate-controlled shopping concourses to put in place a pedestrian-priority framework which will provide for connectivity throughout the precinct. The western edge of the precinct is defined by Toronto's Don River, which flows into Lake Ontario, will feature retail and animated frontages, along with connections to the continuous Don River cycling and pedestrian trail and parks system, creating social connections and further emphasizing how the development plan is rooted within the city.

New streets have been designed as important connectors offering views of Toronto's landmarks. The Broadview Avenue extension will be the civic spine through the district, connecting to neighborhoods to the north and south. The Broadview extension has been strategically oriented to align with the 215-meter-tall smoke stack of the decommissioned Hearn power plant a few blocks away within the city's Port Lands. That area too has the potential to become a significant industrial landmark and destination in the future.

The main east-west street, known as East Harbour Boulevard, offers views of Toronto's skyline and the famous CN Tower, reminding visitors that the City's Financial District is only two kilometers away. The cross-section and built form along all streets have been carefully designed to enhance the public realm and improve sunlight access (see Figure 11). A series



Figure 10. A pedestrian-priority framework for East Harbour public realm. © Henning Larsen courtesy of Urban Strategies Inc.



Figure 11. East Harbour Plaza is a leading-edge sustainable development. © Callison RTKL Courtesy of Urban Strategies Inc.

of built form parameters were put in place to respond to the human scale and pedestrian experience. Thinking about the urban habitat of the precinct was important in driving the proportionality of the street walls and podiums. While this is a tall building precinct, the taller elements will be considerably stepped back, placing an emphasis on the first six floors as the frame for new streets and open spaces.

East Harbour has been registered as an Eco District, which is a formal framework to guide the process of establishing East Harbour as a leading-edge sustainable development. An Imperatives Commitment is being developed to address key district-wide sustainability imperatives and objectives.

In many ways, East Harbour demonstrates the evolution of Tall Building Urbanism over the last 50 years and begins to provide a direction for the next 50 years. The Plan offers programmatic elements of complete communities, a built form that focuses on the public realm, a variety of parks, POPS and publicly accessible spaces (both interior and exterior), retention of heritage buildings and places a priority on sustainable design.

The Last 50 Years Will Inform the Next 50 Years

Tall building urbanism has advanced in the last 50 years. Towers that were well set back from the street surrounded with amorphous open spaces have evolved to a better street relationship. Always important to the urban habitat, open spaces have also evolved to be spaces that are carved out from the urban fabric, framed by active uses and take on a spatial character and typology that best serves its function. Existing heritage buildings as a first resort should always be retained and restored. These elements of our history always make the urban design richer, giving the tall building a sense of place.

We have also learned that a mix of uses helps create complete communities adding vibrancy and increasing walkability of a plan. Lastly, thinking about climate change and sustainability are essential ingredients and building blocks in any successful tall building urban design.

Tall Building Urban Design in the next 50 years will seek to exemplify excellence in urban sustainability and resilience, ensuring that as cities grow and evolve, they do so over the long term as a strong, healthy and adaptable communities. A comprehensive approach to sustainability will ensure that city's become a vibrant, complete community that supports a high quality of life, and is resilient to long-term climate change.