TALL buildings + URBAN habitat

Volume 2

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The projects profiled in this book are those submitted to the Council on Tall Buildings and Urban Habitat's 2019 Global Awards program. See page 302 to learn more about this program.
Contents

6 Introduction

TALL BUILDINGS

AMERICAS
16 50 West, New York City
20 181 Fremont, San Francisco
24 277 Fifth Avenue, New York City
28 325 Kent, New York City
32 888 Boylston Street, Boston
36 Forma Itaim, São Paulo
40 Harbour Plaza, Toronto
44 Salesforce Tower, San Francisco
48 Solstice on the Park, Chicago
52 The Mark, Seattle
56 The Superior Court of California, San Diego
60 Torre Manacar, Mexico City

ASIA & AUSTRALASIA
66 Amorepacific Headquarters, Seoul
70 Arte S, Penang
74 Baidu Headquarters, Shenzhen
78 Banksia Apartments, Melbourne
82 China Resources Headquarters, Shenzhen
86 CITIC Tower, Beijing
90 Crystal Laputa Towers, Chengdu
94 DUO, Singapore
98 Emblem, Sydney
102 Huaku Sky Garden, Taipei
106 Jumeirah Nanjing Hotel & International Youth Cultural Centre, Nanjing
110 Kampung Admiralty, Singapore
114 King Power MahaNakhon, Bangkok
118 Land Rover Regional Offices Shanghai, Shanghai
122 Lè Architecture, Taipei
126 Marina Tower, Melbourne
130 Morpheus, Macau
134 One Park Taipei, Taipei
138 People's Daily New Headquarters, Beijing
142 Ping An Finance Center, Shenzhen
146 Sanya Haitang Bay Mangrove Resort, Sanya
150 Shenzhen Energy Headquarters, Shenzhen
154 Wish Signature @ Midtown Siam, Bangkok

EUROPE
160 European Patent Office, Rijswijk
164 Generali Tower, Milan
168 La Marseillaise, Marseille
172 Manhattan Loft Gardens, London
176 WTC Utrecht, Utrecht

MIDDLE EAST & AFRICA
182 ADNOC Headquarters, Abu Dhabi
186 Kuwait Investment Authority Headquarters, Kuwait City
190 PWC Tower, Midrand
194 The Central Bank of Kuwait New Headquarters Building, Kuwait City
198 The Opus, Dubai

URBAN HABITAT

SINGLE-SITE SCALE
204 150 North Riverside, Chicago;
Kampung Admiralty, Singapore
206 Tanjong Pagar Centre, Singapore
207 The Pakubuwono Spring, Jakarta

DISTRICT/MASTER PLAN SCALE
210 Central Park, Sydney
211 Changsha Jinmao Meixi Lake International Plaza,
Changsha
212 One Shenzhen Bay, Shenzhen
214 UNI-Center, Shenzhen

RENOVATION & INTERIOR SPACES

RENOVATION
218 CHAO Hotel, Beijing
219 Five Manhattan West, New York City
221 Torre Europa, Madrid

INTERIOR SPACES
224 Amorepacific Headquarters, Seoul
225 Collins Square, Melbourne
227 Jumeirah Nanjing Hotel & International Youth Cultural Centre, Nanjing
CONSTRUCTION & ENGINEERING

CONSTRUCTION
234 Atira La Trobe Street, Melbourne
235 Hankong Center Tower, Shenzhen
236 Jumeirah Nanjing Hotel & International Youth Cultural Centre, Nanjing
238 Vincom Landmark 81, Ho Chi Minh City

FAÇADE ENGINEERING
240 10 Hudson Yards, New York City
241 Azrieli Sarona Tower, Tel Aviv
243 Gaia Building, Quito
244 Vanke Jierong Tower, Shenzhen

FIRE & RISK ENGINEERING
246 181 Fremont, San Francisco
247 Morpheus, Macau
248 Ping An Finance Center, Shenzhen

GEOTECHNICAL ENGINEERING
250 181 Fremont, San Francisco
251 Avalon Brooklyn Bay, New York City
252 Panorama Tower, Miami

MEP ENGINEERING
254 181 Fremont, San Francisco
255 Amorepacific Headquarters, Seoul
257 Britam Tower, Nairobi
258 Raffles City Hangzhou, Hangzhou
260 Salesforce Tower, San Francisco

STRUCTURAL ENGINEERING
262 181 Fremont, San Francisco
263 CITIC Tower, Beijing
264 Manhattan Loft Gardens, London
266 Wilshire Grand Center, Los Angeles
268 YC Condominiums, Toronto

A LOOK FORWARD

INNOVATION
272 Building Maintenance Unit and Vertical Delivery Planning at H Queen’s
273 Dezervator Automated Car Elevator
275 Parametric Digital Strategy for Morpheus
277 Robotic Installation System for Elevators (R.I.S.E.)
279 Self-Climbing Kokoon;
The Development of EFFECT: External Façade Fire Evaluation and Comparison Tool
280 Viscoelastic Coupling Damper

A LOOK BACK

10 YEARS ON
284 Bank of America Tower, New York City
285 Aqua at Lakeshore East, Chicago
286 The Pinnacle@Duxton, Singapore
287 The Met, Bangkok
288 Linked Hybrid, Beijing;
BUMPS, Beijing;
S-Trenue, Seoul
290 Broadcasting Place, Leeds;
AI Tijaria Tower, Kuwait City
292 Trump International Hotel & Tower, Chicago;
300 North LaSalle, Chicago

294 Project Overview Gallery
302 About the CTBUH and its Awards Program
306 Index of Featured Buildings
307 Index of Companies
310 Image Credits
313 CTBUH Organizational Structure & Members
The result of a limited competition, the small footprint of 50 West, in conjunction with its height, creates a dramatic and slender shape. At its base, the tower slopes inward to form a generous public plaza, which leads to a new bridge spanning West Street, a major thoroughfare that separates Manhattan neighborhoods from the Hudson River, and in the local case, Battery Park City. The site is extremely tight, flush against an existing building and located directly adjacent to the entrance of the Hugh L. Carey Tunnel and a parking garage built over the portal and adjoining Washington Street. The interface between the site and the ambitious program influenced the design of a simple, elegant tower, with a strong emphasis on connectivity. As such, 50 West is in close proximity to world-class transit and community amenities. Residents are within a five-minute walk of the Rector Street, Wall Street, and Broad Street subway stations.

The sloped top at level 64 is a unique and recognizable feature on the city’s skyline. The edge of the top is sharp and crisp, reinforced with a concrete ring beam, illuminated at night to form a glowing silhouette. The outdoor recreational area and adjoining lounge look southward through an open “sky-window,” offering spectacular views towards lower Manhattan and beyond. The “mineralized” surfaces are softened by rows of planters edged in wood strips, holding an array of trees and shrubs that sway and rustle in the high-altitude breezes.

In the lower tier, the tower’s shaft houses three to four apartments per floor, each with two-story living rooms, which bring more interest to the façade. The split-level lobby reinforces the sleek look of the overall tower through use of smooth wood paneling, glass balcony rails, and smooth concrete columns, yet it is accented by diversely colored, irregularly shaped tiles set into the stairs and upper-tier floor. The main amenity floor is on level 5, and has a film screening room, lounge, library, game room and conference facility. The health club is located directly below on level 4, and a three-lane, 20-yard (18.2-meter) swimming pool is located on the lower level, beneath the main lobby.

The integrated design approach that resulted in the final product considers a building’s architecture, structure and systems as a whole, optimizing their interaction for aesthetic, environmental and economic and social benefits. The idea of green architecture, sustainability, and integrated design strive to sensibly reduce the impact of our living, working, and built spaces on our natural environment. This method looks well beyond the traditional linear design process and simple questions of system sizing and specification, and sees the building’s design, envelope, lighting and HVAC as integral to occupant comfort, satisfaction and operating performance. This project employed operable windows installed in every unit, smart cooling/heating and lighting systems, in addition to the green terrace on the 64th floor. Through the specification of efficient HVAC systems and carefully selected glazing, 50 West Street reduced energy use by 17 percent, as compared to an ASHRAE 90.1-2007 baseline building of the same size. Iterative energy modeling was conducted throughout design to determine optimal systems and control strategies for the project.
Through the specification of efficient HVAC systems and carefully selected glazing, 50 West Street reduced energy use by 17 percent, as compared to a baseline building of the same size.

Top: The tower slopes inward to form a public plaza at its base, on a tight site next to a parking garage.
Bottom: The typical floor plan has three to four units, with living rooms on the rounded corners, maximizing views.
Opposite Top: The outdoor recreational area and adjoining lounge look southward through an open “sky-window,” offering spectacular views towards lower Manhattan and beyond.
Opposite Bottom: The split-level lobby reinforces the sleek look of the overall tower through use of smooth wood paneling, glass balcony rails, and smooth concrete columns, yet it is accented by diversely-colored, irregularly-shaped tiles set into the floors.
The new headquarters for Amorepacific, South Korea’s largest beauty company, is located in the center of Seoul, on a site which has been occupied by the company since 1956. It is situated next to a former US military zone that is being transformed into the spacious public Yongsan Park and a business district. This was part of a master plan, representing the largest high-rise development in South Korea that substantially altered the urban fabric of the Yongsan district.

The form of the building is both abstract and gestural. Focusing on a single, clear volume, the proportions of the building have been carefully developed around a central courtyard to maximize the effectiveness of natural ventilation and daylight. Three large urban openings connect this central void with the exterior surroundings, providing views over the city and the mountains in the distance, establishing a sense of orientation and belonging. As “hanging gardens,” these openings give scale and allow nature to extend from the adjacent park into all parts of the building.

The design elaborates the social, cultural and professional ambitions of the company by combining the workplace with other communal activities. By elevating the external layer of the façade, the entrance level opens up to the city and draws the public into a generous atrium. The façades, with their diaphanous brises-soleil cladding, not only facilitate the environmental performance of the building by providing shading, but also give the building a coherent and strong, yet open and light form. Where the façade is pulled up around the perimeter, a colonnade of concrete columns retains the definition of the building form, while offering an open, public face to the ground level.

The fourth-floor courtyard represents the communal center of the company workplace, with the gardens providing recreational space for those who use the building. A grid, set beneath a thin sheet of water, reinforces the orthogonal lines of the enclosure, while several green mounds, planted with small trees, provide contrast. This echoes the courtyard’s central role in the busy life of the building, but also calls attention to its balancing act as a place of serenity. Similarly, there are framed views in two directions. To the southeast, a square frame sets the tree mounds against the backdrop of Yongsan Park and the mountains in the distance, while to the northwest, a six-story bar section intercedes and casts the eye up to a second opening, in which trees stand in front of towers on the more urban Hangang-daero street side. A rich mixture of public amenities, such as an art museum, auditorium, library, restaurants and childcare facilities, ensures that the building is not only an efficient headquarters, but also the public face of a vital company embedded in the growing metropolis.

The building represents a broad and holistic approach towards sustainability. This involves all architectural, structural and technical concepts, which have driven the design in many ways. The informed exploitation of local climate conditions and the utilization of regional resources and craftsmanship connects architecture with its place, and man with nature. The built environment negotiates between protection and view, private and public. A clear form, echoing this archaic knowledge, generates identity.
The European Patent Office (EPO)’s new main building represents the organization’s largest single investment in its 40-year history in the Netherlands. The EPO has deep historical roots in Rijswijk, which remains one of the EPO’s most important sites, both in terms of staffing and operations. The new building replaces the current tower, which dates from 1973. The decision to construct a new building was the result of a firm resolution to provide EPO staff with a state-of-the-art workplace—one that would be sustainable, symbolize the EPO’s commitment to supporting innovation in Europe, and underline its close ties with the Netherlands, and The Hague region in particular. The new building enables the EPO to realize greater synergies between its operational units in Rijswijk, by bringing them together on one site.

The site in Rijswijk represents the characteristic Dutch polder, a piece of low-lying land reclaimed from the sea or a river and protected by dikes, where the horizontality of the sea seems to be turned to stone. Here, structures line up like boats on the water. The location called for a design that would represent the member states of the European Patent Organisation, and which would serve as a flagship of noble scale and proportion, but also with indistinct materiality and a high degree of geometric abstraction. The building projects calmness, taking on the color of the sky through the slightly iridescent clear glass of its façades, while the stainless steel of its horizontal lines give it rhythm.

The serenity of the structure is reinforced by its placement in a reflecting pool, from which it appears to rise. The entrance materializes as a broad stainless-steel canopy sloping down into the water. On either side of the entrance, the flags of EPO’s 38 member states float over the water, reflected at different heights in the glass along the entire length of the façade. The project was built under criteria set by the BREEAM-NL (Netherlands) and BNB (Germany) standards for ecological responsibility, energy efficiency, and sustainability, reflecting the innovative character of the EPO. Arrays of photovoltaic solar panels on the roof sky garden provide a source of renewable electric energy to the main power supply, which is then distributed throughout the building. In addition, rainwater is collected and used to supplement the conventional water supply for flushing toilets and watering plants and flowers.

Inside, a double-skin façade houses hanging gardens, containing 300 varieties of plants. The building has an aquifer thermal energy storage system (ATES), which reduces primary energy consumption and related CO₂ emissions. The building has been designed to make maximum use of natural light. Moreover, approximately 16,000 LED light fixtures will save approximately 430,000 kilowatt-hours every year. The decision to demolish and replace an existing office building was not taken lightly, and the life cycle of the materials was a key consideration. In total, 90 percent of the materials from the existing tower building and its annexes were conditioned and recycled for construction projects, such as road embankments in the Netherlands.
The new Abu Dhabi National Oil Company (ADNOC) Headquarters occupies a prominent urban site overlooking the Persian Gulf. The tower is located on the Corniche, a seaside boardwalk with park areas and beaches that stretches along Abu Dhabi’s west side. The landscape around the building is designed to offer public amenities and tie into a planted area to the east, where an underground parking garage is located. Situated next to the new building are ADNOC’s 1970s headquarters and office buildings, which remained operational through the construction of the new structure.

The new headquarters building represents this state-owned institution as a strong pillar of the economy in the United Arab Emirates. The minimalist design stands out from the extravagantly-shaped “icon” buildings in Abu Dhabi to express stability, strength and seriousness of purpose. The exterior frame of the tower is clad in granite to convey a sense of permanence. The sides rise to an architrave, free of the building mass, to create the image of a monumental arch rising next to the Persian Gulf. The classic shape serves as a recognizable focal point for people traveling to and from the city. The building was designed in the shape of a parallelogram to provide the ideal solar orientation. The north side of the tower, facing the waterfront, is fully glazed, to offer views and take advantage of indirect natural daylight. The south side, where sunlight is stronger, incorporates fritted glass and sun shades.

The project deploys an array of regionally-appropriate energy and water conservation measures. The building’s orientation and highly efficient mechanical systems are designed to consume 24 percent less energy than the baseline standard set by ASHRAE 90.1-2004. Potable water use is reduced by 40 percent from standard operating procedures through high-efficiency fixtures and reuse of mechanical condensate for flushing. More than 4,000 liters of greywater per month are harvested from cooling towers and recycled for flush fixtures. Nearly one-third of the project site is vegetated. A public park created over the underground parking garage features native plantings and utilizes the greywater irrigation system. The building design is a pilot project for Abu Dhabi’s new green building initiative, known as the Pearl Building Rating System. This system is part of Estidama (Arabic for “sustainability”), an effort begun in 2007 to define environmentally responsible strategies for the contemporary Arab capital.

The design process for the new ADNOC headquarters recognized ADNOC’s prominence as a state-owned institution and significance within Abu Dhabi’s cultural and economic heritage. The design team, including the owner, architect and engineers, developed the overall design in close communication with the Abu Dhabi Urban Planning Council and municipal authorities, while carefully considering the community and urban planning framework. Key aspects of Plan Abu Dhabi 2030 and future development plans, including new transportation networks, guided the tower’s positioning and orientation, the overall site plan and associated public realm.
Moving beyond the consideration of a single building, these projects are noted for their significant contributions to the urban realm. When evaluating these projects, consideration is given to their effect on the overall human experience of their surroundings. To fairly represent the spectrum of projects that can influence urban habitat, two scales of evaluation are used. First, the "Single-Site Scale" refers to a building or set of buildings and its immediate adjacencies, such as the streets closest to the site.

**150 North Riverside, Chicago, United States**

The narrow building footprint of 150 North Riverside (see page 294) allows for more than 75 percent of its site to be outdoor space, vastly increasing the pedestrian experience on the site (see Figure 1). The park and plaza provide more than 1,000 linear feet (305 meters) of seating, multiple assembly/event spaces and 360 feet (110 meters) of at-grade frontage along the river, which has become one of the most populated walkways for downtown commuters.

The site is composed of two main areas, an entrance and pedestrian plaza on the south and east of the site, and an elevated park on the west. The plaza is the primary entrance into the building, and is a link for pedestrians traveling along the riverfront of the Riverside Plaza right-of-way, with terraced seating overlooking the river (see Figure 2). The park is built on the roof of the parking garage structure and is accessed by three stairs and a switchback ramp.

The hardscape and circulation boundaries are curvilinear, offsetting the rigid vertical lines of the tower, to mimic the natural flow of people walking through the site. The hardscape surfaces in the plaza are the same granite used on the cladding of the building, and the park switches to a pre-cast brick paver. The landscape is a series of tall grasses and hearty shrubs that frame lawn and flowerbed zones. The park is lined with 16-foot (4.9-meter) Whitespire Birch trees, and the plaza entrance is framed with a row of 8-inch (203-millimeter)-caliper Honey Locust trees. A total of 90 percent of rainwater is recaptured on site, helping to reduce the need for potable water for the 1.5-acre (0.73-hectare) park by 63 percent.

**Kampung Admiralty, Singapore**

Located on a tight 0.9-hectare site with a height limit of 61 meters, Kampung Admiralty (see page 110) is an infill development in a mature housing estate, close to public transport, in a central, convenient location within the Woodlands district in the northern part of Singapore. As an integrated public housing development aimed at senior citizens, the objective was to create inter-generational and neighborhood connections.
Locating the project adjacent to an MTR (metro) station and providing medical, social and commercial services served the objective of making the project a one-stop hub. Its sheltered tropical plaza is a space for community events and social interaction. Its community park and urban farm provide “green relief” to the residents and neighbors from the surrounding communities—allowing people to get back in touch with nature.

The scheme is a prototype for land-use-intensification, aimed specifically at an aging society. To optimize space efficiency, a “Vertical Kampung (village)” is devised, with a community plaza in the lower stratum, a medical center in the middle stratum, and a community park with apartments for seniors in the upper stratum (see Figure 3). These three distinct strata juxtapose the various building uses to foster diversity of cross-programming and free up the ground level for activity generators (see Figure 4). Residents and neighbors come here for performances, or to join group activities like outdoor dance classes or exercise.

Perforated with breezeways, porous façades, sheltered decks, sky gardens and landscaped terraces, the building is designed to breathe, with cross-ventilation making tropical...
The “District/Master Plan Scale” refers to a project that encompasses several blocks or an entire neighborhood, and whose boundaries are less clearly defined. Ultimately, the projects described here demonstrate a positive contribution to the surrounding environment, add to the social sustainability of both their immediate and wider settings, and represent design influenced by context, both environmentally and culturally.

Central Park, Sydney, Australia

Central Park (see Figure 1), a major $2 billion master-planned development in Sydney, has injected new life into the former Carlton & United Brewery (CUB) site. The precinct extends the historic area of Chippendale and connects it to the central business district, reinstating the original grid and re-integrating the formerly closed-off land to the north with its surroundings, encouraging people to walk through the site to and from Central Station and the main bus interchange. The urban village delivers 11 buildings, 2,214 residential apartments, 1,040 student dwellings, a hotel, commercial spaces, and facilities for two 90-child day-cares. At its heart is the new 6,400-square-meter urban park, Chippendale Green, a popular lunchtime spot for students of the neighboring University of Technology Sydney, residents and locals alike (see Figure 2).

Significant sustainability initiatives have been introduced, with several buildings reaching 5-star Green Star ratings, both for design and "as-built." Central to this aspiration is the district-wide energy and water strategy, which reduces plant spatial requirements. The tri-generation plant provides heating, cooling, and low-carbon electricity to the whole master plan, reducing carbon emissions by almost 200 kilotons over its lifetime, while the on-site water recycling plant meets 100 percent of the precinct’s non-potable water demand. Green roofs throughout capture rainwater, and several buildings use vegetation as a key part of their façades.
The CUB site holds local significance as a rare surviving large industrial site on the city’s edge. The developers had to decontaminate the land before construction. After a comprehensive site survey, 33 heritage structures have been retained for adaptive re-use or preservation. Newer buildings step down from high-rise commercial blocks with strong aluminum-and-glass finishes to smaller apartment buildings. The dimensions and materials of the new buildings at ground level are in keeping with the surrounding structures, visually unifying old and the new.

**Changsha Jinmao Meixi Lake International Plaza, Changsha, China**

This project, consisting of two mixed-use gateway towers and a shopping mall, surrounded by a large green space, takes maximum advantage of its unique landscape resources and convenient transportation adjacency (see Figure 3). To the south is Meixi Lake; Yuelu Mountain is to the southeast. Its eastern boundary connects to Meixi Lake Culture and Art Center, while its northwest corner connects to Changsha Metro Line 2. A series of sunken squares, indoor atriums, and below-grade “Canal Street” add to the sense of permeability and variation.

Proximity to water is a theme throughout; the Canal Street is composed of moving channels, musical fountains, and aquatically-themed seating. Natural lighting and ventilation

Central Park extends the historic area of Chippendale and connects it to the central business district, reinstating the original grid and re-integrating the formerly closed-off land to the north with its surroundings.

**Figure 1:** Central Park repairs long-interrupted street grids in Central Sydney. **Figure 2:** The scale and materials of the newer buildings at Central Park complement the existing character of the site and make for a pleasant gathering place. **Figure 3:** The master plan and building forms of Changsha Jinmao Meixi Lake International Plaza are influenced by the currents of the adjoining river.
Renovation

Tall buildings require an incredible investment of resources and materials to construct, and demolition presents an array of daunting challenges. As the building industry takes increasing responsibility for its outsized contribution to climate change through construction-related and operational emissions, there is substantial interest in renovating dated or sub-functional buildings rather than demolishing and replacing them. Additionally, repurposing older buildings can reopen a dialogue with the surrounding urban context, capitalize on the tangible appeal of buildings with some history and texture, and on the lower return-to-market time when compared with total replacement. Three recent projects on three continents exemplify this trend.

CHAO Hotel, Beijing, China

The original Beijing City Hotel (see Figure 1) was part of the first hotel boom that occurred after the 1978 Reform and Opening of China. Built in 1990 and located in the prominent Sanlitun area, the hotel architecture had all the characters of rapid urbanization: a simple exterior form, lack of detail, and no regard for urban context. After over two decades of use, the hotel could no longer meet the requirements of a contemporary hotel located in a city center, not only in practical terms, but also in terms of urban life. In order to contrast the new CHAO Hotel with the busy and commercial urban context in the surrounding area, which is renowned for fashionable bars, shopping streets and night life, the team decided that the new architectural language of the building should be timeless, strong and calm.

The whole renovation design was based on the principle of keeping as much of the original building structure as possible. Since the original structure could not bear a heavy load, the architect chose glass-reinforced concrete (GRC) as the main façade material. To reduce construction time and environmental pollution in the neighborhood, the façade elements were pre-fabricated and mounted on site.

The resulting new “zig-zag” building envelope reflects the triangular footprint of the hotel tower (see Figure 2) and reinforces the identity of the building. Façade elements in light-grey GRC alternate with glass panels, resembling a Chinese folding fan, and creating a plastic outer skin with...
Figure 1: CHAO Hotel, in its original incarnation as the Beijing City Hotel.

Figure 2: The triangular footprint of CHAO Hotel is now complimented by a "zig-zag" building envelope.

Figure 3: The exterior of the CHAO Hotel as it appears today.

Figure 4: At CHAO Hotel a revamp of the former function hall is now a light-filled venue called "Glasshouse."

a vivid light-and-shadow juxtaposition (see Figure 3). The geometric arrangement and the story-high glazing open the formerly introverted building to the surrounding area, ensuring all the hotel rooms have better views and spatial qualities than before. A colonnade on the west and south sides of the building, consisting of 10-meter-high GRC elements, guides hotel guests intuitively from the noisy main road to the formerly recessed and hidden hotel entrance.

Reviving the old multifunctional hall, the architect created a new venue called "Glasshouse" (see Figure 4), which reflects the clear geometry of the façade design. Supported by an arched structure, a double-skin roof with an external layer of glazing and internal louvers admits daylight into the space below. The interplay of colors of the concrete arches and wooden louvers, in combination with the play of light and shadow, creates a spiritual atmosphere in the space.

Five Manhattan West, New York City, United States
Located on 10th Avenue and spanning over the Penn Station rail yards from 31st to 33rd Streets, Five Manhattan West is a 16-story, 1.7 million-square-foot (157,935 square-meter)
With the majority of Earth's population now residing in urban areas, city-makers have an obligation to forge a more viable, sustainable urban habitat, with increased urban density playing an important role. Tall buildings need to be seen as integrated pieces of urban infrastructure, dedicated to improving quality of life in the city as a whole. This requires a cohesive, multi-disciplinary response.

Providing a global overview of dense urban development, this book explores the projects, technologies, and approaches currently reshaping skylines and urban spaces worldwide. In this edition, innovations in the constituent disciplines that bring tall buildings to life, and even extend their lives—construction, the engineering of façades, fire & risk, geotechnical engineering, interior space, MEP, renovation, and structural engineering—are all explored.

The Tall Buildings + Urban Habitat book is produced annually by the Council on Tall Buildings and Urban Habitat (CTBUH), the global authority on the inception, design, construction, and operation of tall buildings and future cities.