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A New View, and a New Gateway, for Chicago

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Jeanne Gang, architect and MacArthur Fellow, is the Founding Principal and Partner of Studio Gang, an architecture and urban design practice headquartered in Chicago with offices in New York, San Francisco, and Paris. Jeanne is internationally recognized for her powerful designs that arise from a process foregrounding the relationships between individuals, communities, and environments. Drawing insight from ecological systems, her analytical and creative approach has produced some of today's most innovative architecture, including the Aqua Tower in 2010 and now Vista Tower, currently under construction in the same neighborhood in Chicago. In addition to smaller-scale cultural and community projects, Gang is leading major projects throughout the Americas and Europe, including the Richard Gilder Center for Science, Education, and Innovation at the American Museum of Natural History in New York, the United States Embassy in Brazil, the O'Hare Global Terminal in Chicago, and towers in New York, San Francisco, Toronto, and Amsterdam.

Juliane Wolf, architect, is a Design Principal and Partner at Studio Gang, where she designs and advocates for built structures that simultaneously serve communities and their environments. Wolf has brought her expertise in sustainability and low-energy structures to bear on the Studio Gang portfolio. With experience in complex visitor-serving organizations as well as tall buildings and other large-scale typologies, she has led some of the studio's most celebrated projects, including Writers Theatre, Vista Tower, and the new Global Terminal at O'Hare International Airport, the studio's largest project to date.

Abstract

Upon completion, Vista Tower will become Chicago's third tallest building, topping out the Lakeshore East development, where the Chicago River meets Lake Michigan. Occupying a highly visible site on a north-south view corridor within the city's grid, and in close proximity to the Loop, the river, and the city's renowned lakefront park system, this mixed-use supertall building with a porous base is simultaneously a distinctive landmark at the scale of the city and a welcoming connector at the ground plane. Clad in a gradient of green-blue glass and supported by a reinforced concrete structure, the tower is composed of an interconnected series of stacked, frustum-shaped volumes that move rhythmically in and out of plane and extend to various heights. The tower is lifted off the ground plane at the center, creating a key gateway for pedestrians accessing the Riverwalk from Lakeshore East Park.

Keywords: Chicago, Skyscrapers, Mixed-Use, Urban Design

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Juliane Wolf will participate in the Session 7C panel discussion *High-Rise Design Drivers: Now to 2069,* on Wednesday, 30 October. Vista Tower is the subject of the off-site program on Thursday, 31 October.

Introduction

Due to the enormity of structure necessary for tall buildings to cantilever skyward from their bases, and their economic models that tend toward exclusivity, their impenetrability at ground level is practically assured. The design of Vista Tower asks the question: What if skyscrapers can be porous connectors, rather than barriers, for the public realm? Defining a new edge of the city, Vista Tower tightly knits the downtown Lakeshore East community to its surroundings with unprecedented urban

Figure 1. The building is composed of four volumes, which allows the massing to adjust to the site's geometry, while creating a generous entry plaza on the northeast and southwest sides of the building.

connections and enhanced public access to the Chicago River. Three volumes weave in and out to create the tower, while a fourth, lower volume anchors the ensemble to the riverfront. These interconnected volumes house 396 condominiums as well as a 191-key 5-star hotel, restaurants, and amenity spaces. An innovative structural system minimizes structure in the center at ground level, creating a key pedestrian connection between the Chicago Riverwalk and the nearby community park (see Figure 1).

The essential "building block" of the architecture is a 12-story truncated pyramid called a frustum. Stacked and nested, right-side up and upside-down, the frustums form the tower's flowing volumes, which, surprisingly, are made entirely of vertical elements. The frustum geometry creates a tall building with eight corners instead of four, providing inhabitants with daylight and fresh air from multiple orientations, while also allocating green space atop the building's various heights. Reinforcing the tower's flowing appearance is a gradient of high-performance glass that has been optimized for solar performance according to the variations in floorplate size. Now under construction, Vista Tower has achieved its final height and its cladding is nearly complete. It has already become a familiar landmark for Chicagoans, who can see how the city's skyscraper legacy is being translated into a contemporary expression that embraces the public realm.

Design Brief and Inspiration

Designing Chicago's third-tallest building presented a great opportunity to create a tower that would function as a distinctive anchor at the scale of the city while also making fine-grained connections for people at the ground. Achieving this goal proved particularly challenging because Vista Tower's "ground" plane is in fact a three-level roadway (Upper Wacker Drive, Lower Wacker Drive, and Lower Lower Wacker Drive) that has limited access to Chicago's riverfront for decades (see Figure 2). From the beginning, the tower was thought of as a piece of urban

Figure 2. Vista Tower, Chicago, as seen from the north bank of the Chicago River. © Tom Harris, courtesy of Studio Gang

> “From the inside out, a geometric model—the frustum—was used to build up an assembly of volumes with multiple orientations and corners.”

infrastructure that would provide public benefit. Every iteration of the design always included a public, ground-level gateway at its center, so that people could connect between park and riverfront (see Figure 3).

The building’s overall profile is the result of prioritizing this urban connection and carefully studying the interior experience to increase daylight for inhabitants. From the inside out, a geometric model—the frustum—was used to build up an assembly of volumes with multiple orientations and corners. The tower’s distinctive appearance comes from the composition of these tapering, 12-story truncated pyramids, which are composed entirely of vertically-glazed floor levels. Together they comprise the undulating shape of each of its vertical volumes, which are referred to as “stems” (see Figures 3 and 4).

The stems rise in height from east to west, nesting together and offset in plan to align with the edge of the Chicago River. The easternmost, lowest volume is 10 stories high and anchors the ensemble to the riverfront. Next to this, the first tower stem rises to 47 stories, comprising four frustums. The second stem is two frustums higher, terminating at level 71. The third and final stem extends two frustums further, to level 95. This system was developed from the principle that a tripartite tower with a lifted center section, already displaying variation laterally across its long sides, would also benefit from variation along its height. The nested frustum geometry also allows for eight corners per floor, rather than four, as would be the case with a traditional rectangular floor plate. This improves natural daylight and ventilation and accentuates views for building inhabitants.

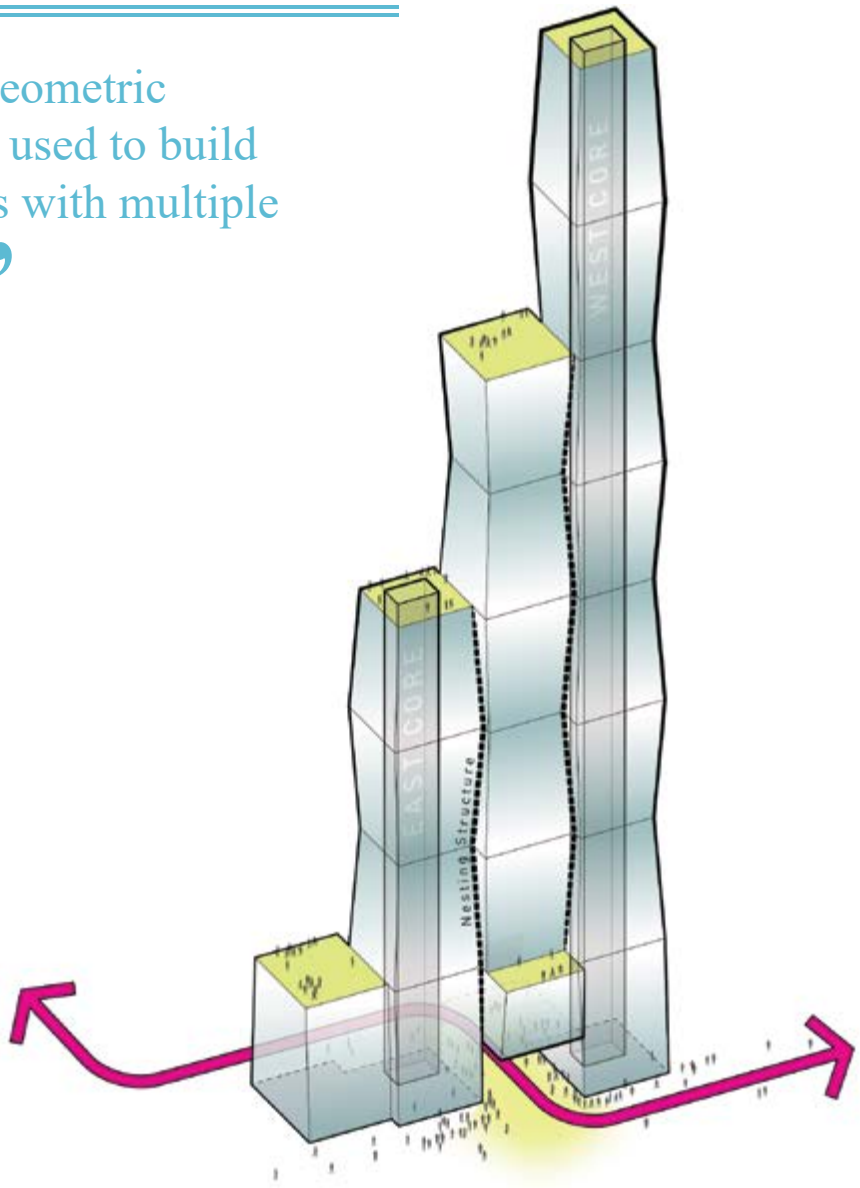

Figure 3. The perimeter volumes are supported by central cores, while the central volume does not take any of the lateral load, nor a does it contain a central core, allowing it to be raised off the street plane.

The multi-stem massing concept was driven by program and site. Nesting and interconnecting, the stems create a larger floorplate at the lower levels, supporting a double-loaded corridor for the hotel where all three stems connect, while staying in scale with the surroundings as the building negotiates the site. The footprint grows smaller as the tower rises and the residential condominiums take hold.

Both hotel and residential programs extend down to the ground, with the hotel entry and dining on one side of the public plaza at Upper Wacker and the residential entrance and lobby on the other. On level 47, where the first stem ends, a generous communal outdoor space is created for residents where club rooms adjoin an exterior terrace. Inside, the two-stem floorplate works well for the

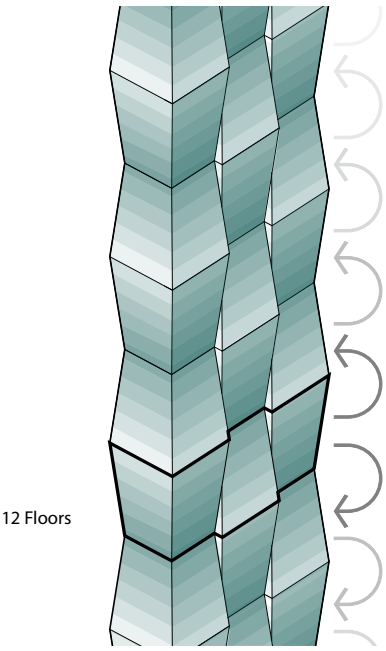

Figure 4. Iterative models demonstrate how the initial concept—three volumes with a central volume supported by perimeter volumes—was developed through studies of optimal geometries for the site.

residential condominiums, allowing light to fully penetrate each unit. Units increase in area and number of bedrooms as the tower ascends, with the highest duplex penthouse occupying an entire two floors. On Level 71, where the building reduces to a single stem, a private residential terrace will soon hold the highest private swimming pool in the city.

Like the nearby Aqua Tower, Vista Tower's amenity spaces are shared between residents and hotel guests to encourage a lively social environment where people can meet and mix outside of the usual elevator ride. These spaces include an indoor pool, gym, and restaurants, which are combined at levels 10 and 11, and an outdoor deck on level 11 where the lowest volume terminates. This area is conceived as the building's social hub. Considering how spaces like these can support community among inhabitants is a prime focus of the architects' work across all tall building projects.

Structure

The essential three-stem tapering-frustum strategy was retained throughout the design process. The design team worked closely with the structural engineers to devise a structure that could accommodate both the building's height and the opening at the ground plane, refining the massing along the way.

The initial concept called for the frustums to taper from a 90-foot (27.4-meter)-square floor plate at the widest point to a 70-foot-(21.3-meter)-square floor plate at the narrowest; this narrowest floor plate was later revised to an 81-foot (24.7 meter)-square, responding to economic demands for more floor area and less variation in apartment size. This change, however, had the impact of increasing wind pressure on the building. In response, a double-height "blow-through" floor was introduced at level 83, which allows wind to pass through the structure at a high point (see Figure 5). Tuned sloshing dampers at levels 83, 93, and 94 provide additional wind-motion accommodation.

To implement the stepped façades and variable floor plates, the team experimented with using sloping concrete perimeter columns. Instead, the final columns are set at 90 degrees to each floor plate and "walk" back or forward 5 inches (127 millimeters) from the floor below. The columns also decrease in diameter with the building's

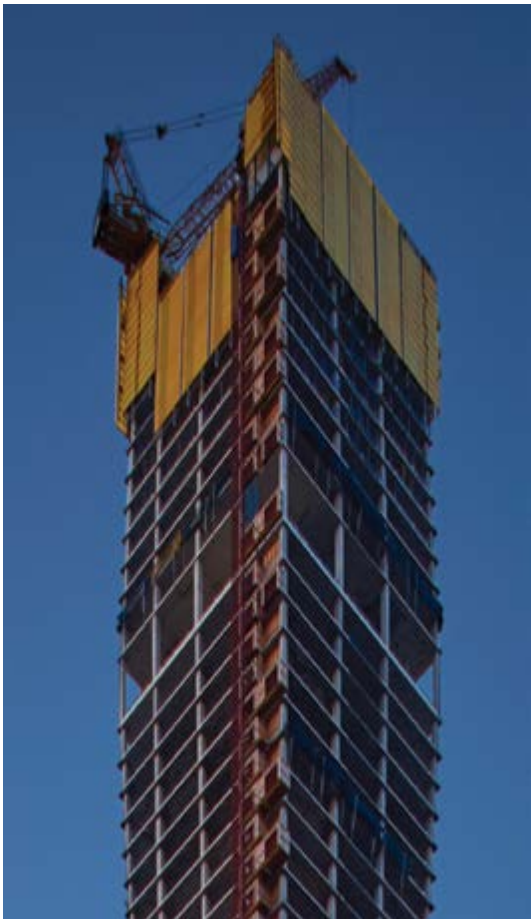

Figure 5. "Blow-through" floor at Level 83.
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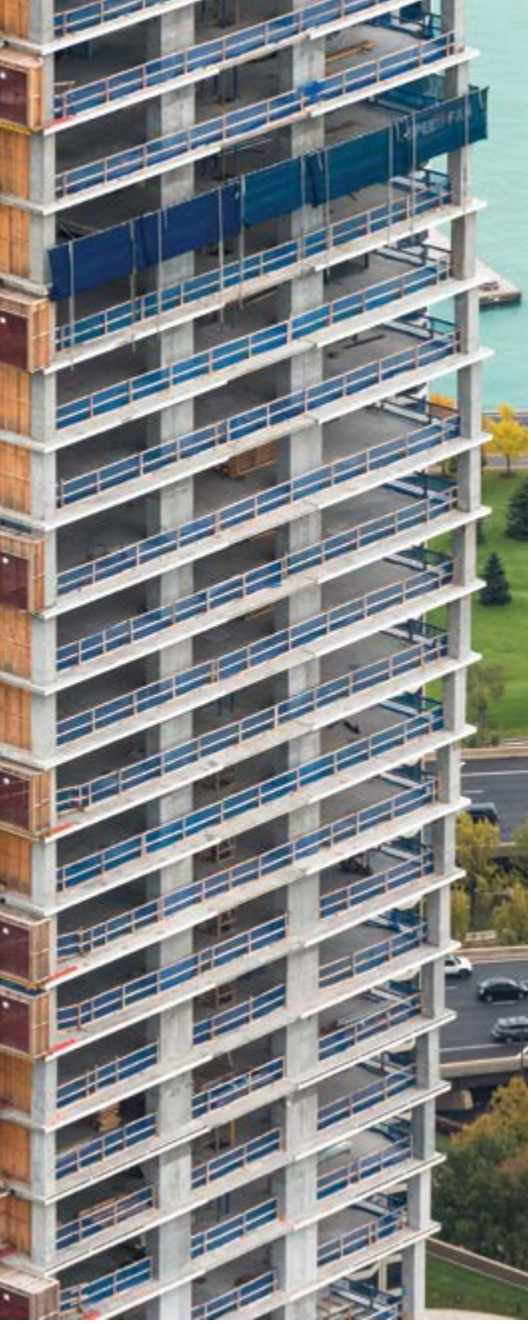

Figure 6. In order to structure the building's stepped edges, "walking columns" align to the outer corners of the floor plates as they step in and out.
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Figure 7. Angled columns support the thrust of the hotel portion of the project and carry it over the street, making for a distinctive volume with large interior spaces.

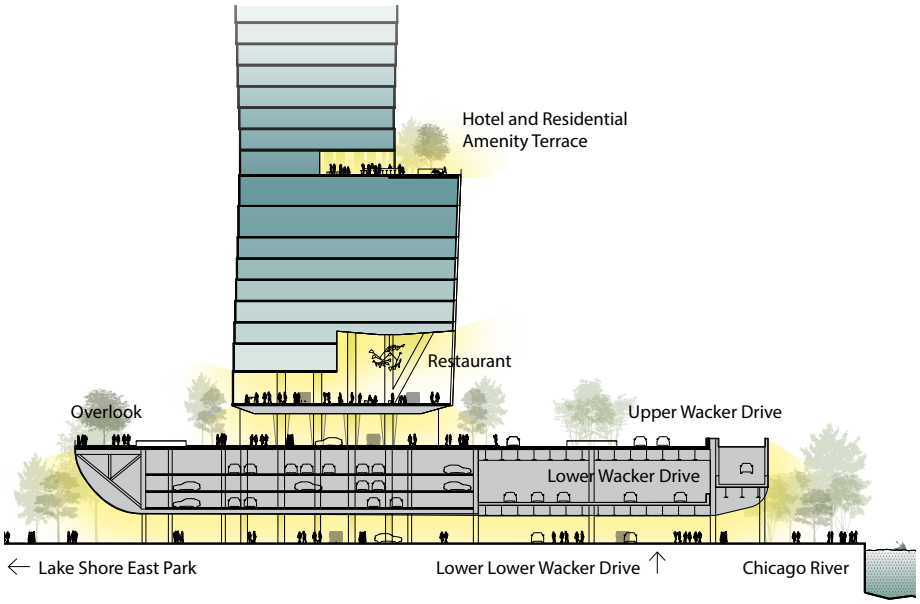

Figure 8. Resisting the fortress-like bases typical of many supertall towers, Vista enhances connections to the ground plane with new access points to Upper Wacker Drive, defining a generous connection between park and river. Additionally, publicly accessible spaces are distributed throughout the tower.

height. Together, these strategies create more efficient floor plates, especially on the hotel levels (1 to 11), and establish cleaner corners within the condominium units (see Figure 6).

To suspend the central volume, the two main gravity cores of the building are placed within the two outer stems, which carry the central stem like a bridge. Wing walls extend from the core to the perimeter at key points, adding additional stability. The wing walls slope in parallel with the outside edges of the façades. In the portion of the hotel that spans the drop-off porte-cochere and pedestrian walkway, large communal spaces such as the lobby and bar are accentuated and supported by angled concrete columns running from levels 2 to 6 (see Figures 7 and 8). These columns carry perimeter loads down to the core, allowing the volume to "float" gracefully over the void and to project outward from the north face of the building, marking the hotel common areas.

Façade

The glass is deployed using a hybrid façade system that combines the traditional curtain-wall and window-wall typologies. The panels are hung from the floor above, like a curtain-wall. However, rather than extending beyond the slab edge like a typical curtain-wall does, the columns rest firmly on the slab below, as a window-wall normally does. This allows the glass to sit vertically in the frame, while contributing to the overall rhythmic appearance of the façade.

The tower's glass façade underwent an intensive optimization process before the final format was determined. The goal was to avoid many sloping surfaces that face each direction, to ensure that the building would not project unpleasant glare at its neighbors. In addition, the team sought to lower the levels of reflectivity to reduce

undue hazard to birds who use the migratory flyway along Lake Michigan. At the same time, the glazing needed to admit plentiful but graduated daylight into the interior while also reducing solar heat gain and otherwise performing environmentally.

To offer an optimal level of low reflectivity and an ideal heat-gain-to-daylight ratio on each floor, the glass had to be higher performing on narrower floors but could become clearer and more colorless on wider floors. In response to these environmental criteria, the design team conceived of a gradient of glass types that would also visually reinforce the building's flowing geometry (see Figures 9 and 10). This gradient achieved a gradual and smooth transition between the performance as well as the color of glass on each floor. The façade thus completes the building's synthesis of form, performance, and vivid beauty.

Early trials with glass manufacturers did not achieve the desired effect. Initially, the complexity of the variables in the production processes prohibited a consistent variation in color between the six types of glass needed for the different floor depths. During the specifications and bidding process, AGC Interpane, a German manufacturer the team had contacted very early in the design process, notified the design team that their process for coating-on-demand custom glass production was ready to produce at the needed capacity (see Figure 11).

The project and client team traveled to Germany, where a few days of digital modeling, mock-up construction, and test batches in the factory ultimately resulted in the six different types of glass selected for the final iteration. Each type is a distinct shade of green-blue, tuned to performance,

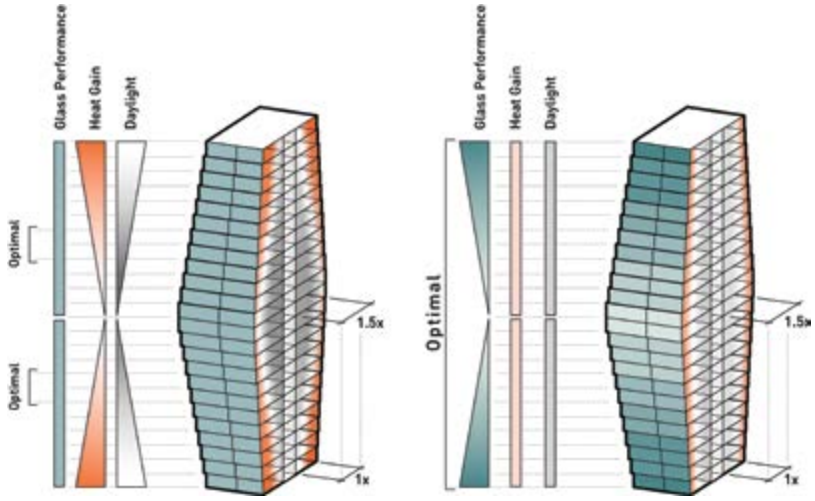

Figure 9. A gradient of colored glass allows for unique responses to the various conditions of the stepping volumes, improving the building's overall environmental performance. As floor plates become shallower, the glass becomes darker and higher-performing, keeping daylight and heat gain levels consistent across all floors.

Figure 10. The glass façade as installed.

Figure 11. Through innovative coating-on-demand technology, the building's glass was able to be completely customized for both performance and color gradient. The project team tested numerous iterations of the glass as it came out of the manufacturing line.

Figure 12. Vista Tower as seen from Lake Shore Drive, showing the blue-green gradient chosen for the final glass application.

that together create a smooth gradient. As the cladding climbs the finished structure, Chicagoans are now getting a sense of what is to come. The tower's surface appears to subtly ripple, picking up the hues of the nearby lake and the ambient textures of surrounding buildings (see Figure 12). When complete, Vista will be the largest-scale deployment of coating-on-demand glass ever undertaken.

Porosity at the Base

To fully understand Vista Tower's urban role, it is useful to place it in the context of the history of its immediate surroundings. Over the past 50 years, the portion of the south bank of the Chicago River that is located east of Michigan Avenue and west of Lake Shore Drive has undergone a transition from working port and rail yard into mixed-use, high-rise neighborhood with significant green spaces. The Illinois Center began construction in the late 1960s, cuing a round of development that generally moved from west to east and produced some of the city's better-known office buildings, including the Prudential Center and the Aon Center (originally the Standard Oil Building). These were followed by hotels, and eventually, a large residential complex called Lakeshore East.

Redeveloping the area was not simply a case of replacing one use with another. Its entire extent has an elevated ground plane that is level with the top deck of bridges on Michigan Avenue and Lake Shore Drive where these main streets cross the Chicago River. The bottom, or "true," ground level is at or near the waterline. There is also a third, intermediate street level aligned with the deck of the Columbus Drive bridge. This layered construction allows service vehicles, heavy trucks, and through traffic to pass unhindered beneath the complex and onto the lower levels of Wacker Drive, Michigan Avenue, and Lake Shore Drive. However, it has also meant that the pedestrian transition from Grant and Millennium parks to the Chicago River, where there is significant recreational development, bike paths, and water taxis, has long been confusing, if not outright hostile to navigation by foot.

Therefore, Vista Tower's design had the challenge of creating a pedestrian gateway not only at the auto drop-off level (Upper Wacker Drive), but also at the river level (Lower Lower Wacker Drive). The upper level, currently a "dead end" of a viaduct with a cul-de-sac, is being transformed into a terraced, landscaped ledge with gently descending stairs and ramps (see Figure 13). The middle level provides vehicular access to the parking garage and a subterranean pedestrian connection to the Pedway, downtown Chicago's system of below-grade walkways. The lower level had the greatest challenge because it must traverse the deepest section, from the interior of the sunken park in Lakeshore East to the

Riverwalk. In response, the design creates a wide, planted pathway that continues the strong north-south axis established by Lake Shore Drive. To heighten the welcoming feel, the passage below the building is marked with a curving surface, paneled in reflective metal that draws sunlight inward (see Figure 14). At night the passage will be brightly lit and equally welcoming.

Conclusion

Reflecting optimism for Chicago's future while acknowledging its legacy of skyscraper innovation, Vista Tower brings exciting urban energy to its site. Capitalizing on a highly-visible yet mostly inaccessible confluence of water and roadway in the heart of the city, the tower adds a distinctive silhouette to the city's skyline. Simultaneously, it creates a new gateway for the recreational and transportation possibilities of the revived Chicago River, mediating transitions at the ground and near-ground levels to provide both a portal and a street wall for a section of the city that had neither beforehand. Investing equally in urban-scale and human-scale detail, Vista Tower offers benefits that Chicagoans can enjoy for many generations to come. ■

Unless otherwise noted, all image credits in this paper are to Studio Gang.

Project Data

Completion Date: 2020
Height: 363 meters
Stories: 101
Area: 176,516 square meters
Primary Functions: Residential / Hotel
Owners/Developers: Parcel C LLC
Architects: Studio Gang (design); bKL Architecture (architect of record); Gensler (hotel architect); HBA (interior architect)
Structural Engineer: Magnusson Klemencic Associates
Main Contractor: James McHugh Construction Co.
Civil Engineer: Mackie Consultants

Figure 13. The upper-level roadway and drop-off loop are ringed by a landscaped terrace.

Figure 14. The Field Boulevard underpass connects Lakeshore East Park and the Chicago River, with illumination and curving surfaces guiding the eye to the opposite portal.

> "The upper level, currently a 'dead end' of a viaduct with a cul-de-sac, is being transformed into a terraced, landscaped ledge with gently descending stairs and ramps."