



STRUCTURES

Mixed-Use Development Mimics Terraced Cityscape

A MIXED-USE DEVELOPMENT that will have nine buildings, six of them high-rise towers, is currently under construction in the Ataşehir district of İstanbul, Turkey. When completed, one of the towers will be among the city's tallest.

The New York City and İstanbul offices of RMJM were responsible for the architectural design and master planning of the site. According to Chris Jones, a principal of RMJM and the current head of the İstanbul office, 75 percent of the site has been allocated for landscaping.

The amount of green space that will remain on the site meant that views of the parkland could be maximized and that views could be offered of the city beyond and of the Sea of Marmara and the Bosphorus. "We got to play with scale and materials and space in a very thorough way, and that was very exciting," Jones says.

Buro Happold, whose global headquarters is located in Bath, United Kingdom, completed the schematic designs for the structural

engineering and for the mechanical, electrical, and plumbing work. The design development and construction documents were prepared by the İstanbul office of Yapi Teknik Construction, Inc., and that company continues to serve as an engineering consultant on the project. TRafo-mimarlar, of İstanbul, is the landscape architect for the development.

The six planned towers range in height from 78.5 to 197.5 m; the three low-rise buildings will have heights of 20 to 25 m. The development will include commercial facilities, retail space, housing, a hotel, and offices. Each tower will have four or five subterranean parking levels for a total of approximately 2,675 parking spaces. The development will also include parking space for approximately 250 bicycles.

The buildings will cover 24,000 m² and will create 372,000 m² of interior space. According to a press release issued by the architects, the Turkish government intends to transform the Ataşehir district into a preeminent financial district and business center.

The site is located in a zone of very high seismic activity, according to Nick Nelson, CEng, the project principal and a partner in the Buro Happold office in Edinburgh, United Kingdom. "The seismic analysis was the biggest issue that we had to face, and that is quite a challenge for buildings that tall in such an area prone to earthquakes," Nelson says. "But it's one of those problems that

A mixed-use development, which will include six high-rises, is currently under construction in the Ataşehir district of İstanbul, Turkey. The curves of the buildings' silhouettes are created by rooftop terraces; 11 colors of ceramic tiles will create the gradational color palette of the exterior, which will appear reddish orange at the lower levels, blue at midheight, and white at the upper levels.

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you can solve these days with advanced analysis." The design of the structures will be confirmed through a performance-based evaluation carried out by Buro Happold.

Concrete cores with a coupled shear wall system and an ordinary waffle slab will be used in each of the towers, according to Alex Melgar, P.E., M.ASCE, a project director and an associate principal in the New York City office of Buro Happold.

The central cores and shear walls will provide the optimum stability

and strength for the concrete towers, says Jones. "It's a fairly straightforward engineering solution—concrete, like most of the towers in the city," Jones says. Each of the towers will be founded on mat foundations placed atop reinforced-concrete piles.

The terraced curves of the buildings' silhouettes are an outgrowth of the commercial requirements, Jones explains. The highest terrace will be located on the 18th floor of one of the towers, while the largest terraces will be located below the 10th floors of the towers.

The terracing of the buildings was also seen as a way to replicate characteristics of the city of İstanbul. "It's a sprawling city, and there's a carpet of buildings lying across this natural topography of seven hills," says Jones. "That starts to create a very clear kind of terracing aesthetic everywhere you look, because the buildings are built into the hillside." From a distance, Jones anticipates that the development will "almost look like the city in miniature."

To protect the building from catastrophic failures in an extreme seismic

THE NEW SOCCER stadium for the Dalian Shide Siwu Football Club, or Dalian Shide FC, a member of the Chinese Super League, was designed by the architecture firm UNStudio, which is based in the Dutch city of Amsterdam. Chosen as the winner of a limited design competition, the design draws on the colorful layering and overlapping of bamboo that characterized a soccer ball used in earlier times in China. The design adapts the effect of the wrapped bamboo to create a double layer of wall and

roof "bands" that in partially enclosing the concourse leaves spaces that will afford views into and out of the concourse. The stadium includes four structural elements: the two-layer roof and wall structure, the stadium seating structure, the concourse areas, and the function hall areas. The roof and the wall structure include steel trusses and columns, the trusses supported by the top of the inclined seating structure to reduce the cantilevered spans. The exterior wall and seat structures provide back

anchors for the cantilevered roof trusses and impart lateral stability to the roof. The 38,500 m² stadium will seat 40,000 and will have a television broadcast center, administrative areas, a luxury lounge, players' facilities, and a public concourse. Underground parking levels that will be topped with public plazas will surround the stadium, and two additional training fields will be located next to the plaza at one end of the stadium. The stadium will be located in the club's hometown city of Dalian (Dairen), which is in

northeastern China on the southern tip of the Liaodong Peninsula. The city is the largest port in that part of China, and the stadium is oriented to take full advantage of existing modes of transportation and to offer the most expansive views possible of the surrounding sea and mountains. The Shanghai office of the consulting engineering firm Arup performed the structural, mechanical, electrical, and plumbing engineering work for the design competition and also handled the building physics and fire engineering.



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