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The base (left) and slender, record-breaking Legends Tower as envisioned for the Boardwalk at Bricktown multiuse development in Oklahoma City.

Renderings courtesy of AO

Oklahoma City Council OKs Plan for North America's Tallest Tower

A performance-based structural design will be used on the project

Richard Korman and Nadine M. Post
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The Oklahoma City Council approved a zoning change June 4 allowing a developer to build what is planned to be a 1,907-ft tower—and North America's tallest structure—in a mixed-use development.

The rezoning, which passed by am 8-to-1 vote, removes the height restriction originally placed on the site. Further approvals from the council will be needed as the plan moves ahead.

The project as currently envisioned consists of a base with three mid-rise towers and a fourth, the Legends Tower, that if built would set a height record for the U.S. and North America.

Mark Zitzow, a principal of civil engineer Johnson & Associates, said that in the three years since the project was first proposed to the council "the vision has changed and the project has become much more exciting."

If the plan by developer Matteson Capital goes forward, work on the slender tower would be part of a second phase that would begin in about two years, Rob Budetti, managing partner of AO, the architectural consultant to the project, told the council.

The base and smaller towers would be built first, he said.

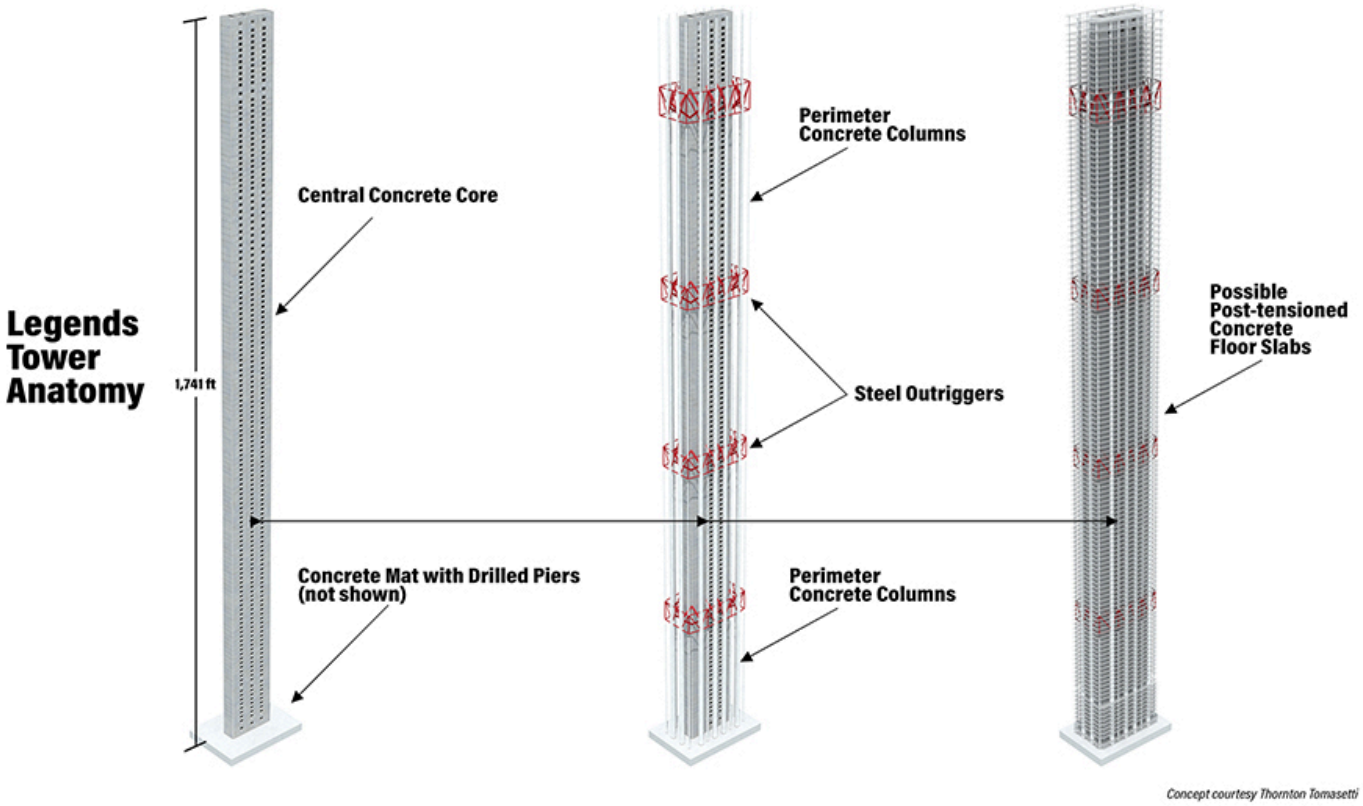
Officials of Matteson Capital, who have been working with construction consultant Hensel Phelps, could not immediately be reached for comment for more details of their business plans.

Structural System Details

Structural consultant Thornton Tomasetti has developed concepts for the planned Legends Tower. It would have 134 floors and would contain about 2.5 million sq ft of space for residences topped by a hotel, according to Thornton Tomasetti.

In the current design, the height to the roof is 1,707 ft. That means an aspect ratio of about 16:1, which is considered slender, says Ola Johansson, Thornton Tomasetti's senior principal on the project. The structural system has yet to be set but Thornton Tomasetti is using a sophisticated performance-based structural design approach (PBSD), which typically exceeds building code requirements. PBSD provides a higher level of performance with a higher predictability, Johansson says.

Thornton Tomasetti is also trying to minimize embodied carbon in the structure by balancing "brute-force engineering" for stiffness and "a more-sophisticated approach using outriggers and dampers," Johansson says.



The tower structure and foundation will also be designed to withstand wind loads—including tornadoes—and seismic loads expected to occur at the site.

Wind and tornado forces will be established via wind tunnel testing, considering the local wind climate and the geometry and height of the tower. Similarly, seismic design forces will be established via site-specific testing and studies. In part because of the slender aspect ratio, the conceptual design calls for a high-strength reinforced concrete primary structure with a central core, with 3 ft or 4 ft thick walls, connected to perimeter columns by structural steel outrigger braces at three or four tower elevations, says Johansson.

Because outriggers add stiffness and strength to the core, the system has "provided excellent structural performance for other towers of similar or greater height," says Johansson. Thornton Tomasetti also has engineered the 2,073-ft-tall Shanghai Tower, the 1,670-ft-tall Taipei 101 and the 1,483-ft-tall Petronas Towers, among its stock of supertall buildings.

It is likely there also will be a wind damping system for serviceability and creature comfort.

There are no column lines envisioned between the core and the perimeter. Floor slabs spanning from the core to perimeter columns may be post-tensioned concrete or composite—metal decking with a concrete topping. "We are looking into a composite system as well as concrete systems," says Johansson.

According to the preliminary design, the reinforced concrete foundation mat is about 20-ft thick and bears on a grid of drilled concrete piers extending about 60 ft below grade to bedrock. "Soil conditions are favorable," says Johansson.

Deputy Editor Richard Korman helps run ENR's business and legal news and investigations, selects ENR's commentary and oversees editorial content on ENR.com. In 2023 the American Society of Business Publication Editors awarded Richard the Stephen Barr Award, the highest honor for a single feature story or investigation, for his story on the aftermath of a terrible auto crash in Kentucky in 2019, and in 2015 the American Business Media awarded him the Timothy White Award for investigations of surety fraud and workplace bullying. A member of Investigative Reporters and Editors, Richard has been a fellow on drone safety with the McGraw Center for Business Journalism at the Craig Newmark Graduate School of Journalism at CUNY. Richard's freelance writing has appeared in the Seattle Times, the New York Times, Business Week and the websites of The Atlantic and Salon.com. He admires construction projects that finish on time and budget, compensate all team members fairly and record zero fatalities or serious injuries.

Nadine M. Post, *ENR's* editor-at-large for buildings, is an award-winning journalist with 45 years of experience covering trends, issues, innovations, controversies and challenging projects. Post has written about many industry giants, including 10 ENR Award of Excellence winners. And she has covered disasters, failures and attacks, including the 1993 bombing and the 2001 destruction of the World Trade Center. Project stories include the redevelopment of the World Trade Center; the 828-meter-tall Burj Khalifa; Los Angeles' Disney Concert Hall; and Seattle's Bullitt Center and Rainier Square Tower. In 1985, Post wrote McGraw-Hill's book *Restoring the Statue of Liberty* (1986) for the restoration's architects—Richard S. Hayden and Thierry W. Despont.