BY SCOTT STONEHEWER

SOFI SO GOOD

The NFL's latest budget-busting stadium is not only the world's most expensive but rewrites the architecture playbook with one of the most technically revolutionary designs in modern sport

Architects at HKS were challenged to create a revolutionary stadium and experience, which resulted in a first-of-its-kind design that merges indoor and outside spaces

At an estimated cost of US$5bn, SoFi stadium is the most expensive venue in NFL history and the centerpiece of a new sports and entertainment district in the heart of Inglewood, colloquially known as Southern California's City of Champions.

Built on the previous site of Hollywood Park Racetrack, the development encompasses 298 acres – more than three times the size of Disneyland, 1.5m square foot of retail and office space, 2,500 residences, a hotel and 20 acres of lakes and parkland.

At the heart of the project is the 70,240-seater football venue – expandable to 100,000, which is only the third stadium (and second in current use) – to be shared by two NFL teams, the Los Angeles Rams and Los Angeles Chargers.

It is designed to be LA's premier sporting destination having already secured Super Bowl LVI in February 2022, the College Football National Championships in 2023 and the Opening and Closing Ceremonies of the 2028 Olympic Games.

But while it shines under the weight of a dizzying array of impressive features and statistics, its owners had to tackle a number of unique challenges to get the stadium ready for its maiden game.

In the zone

The new stadium is less than five kilometers (three miles) from Los Angeles International Airport (LAX) and directly within the flight path of its air traffic.

Consequently, the Federal Aviation Administration (FAA) argued that reflective stadium walls could interrupt aircraft radar communication by confusing instruments. Stadium owner The Kroenke Group responded by paying a reported US$29m to fund the installation of a new Wide Area Multilateration aircraft-tracking device to enhance LAX's existing radar system.

In addition, the stadium was built partially underground – approximately seven stories (98ft, 30m) – to reduce its visual impact on the landscape but also to maintain safety requirements enforced by the FAA,

explains Michael Marchesano, vice president of field operations at SoFi Stadium.

"We had to plan our construction strategy very carefully to avoid the aviation ceiling as our cranes could never go above 440ft (134m)," he says.

Henderson Engineers also worked with the FAA throughout the project to ensure all parts of the stadium met federal regulations, explains Kevin Lewis, the firm's venue practice director.

"We used modeling software to understand what impacts the stadium would have on the existing environment, such as noise, light, and air quality."

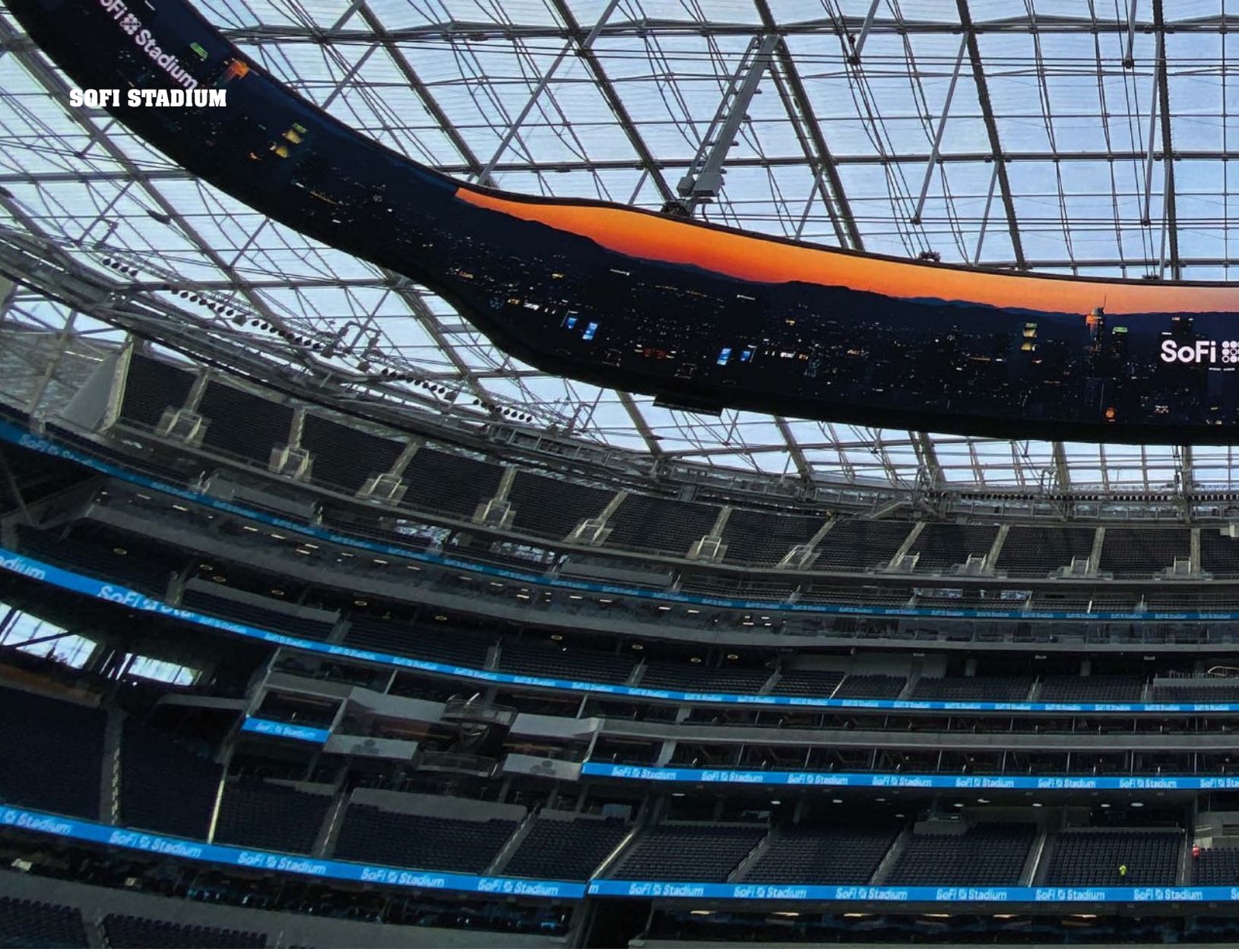
Since much of the stadium is below grade, it faced some design challenges related to getting utilities in and out of the building so they could connect to the mechanical, electrical, plumbing, and fire protection systems, explains Lewis.

"The biggest challenge involved getting outside air into the building and exhaust out. Our Henderson design team came up with a unique solution for this that used the interstitial space between the retaining wall and outside of the stadium as an area to transfer air. This required significant coordination with all partners, but ultimately reduced the overall construction cost of the project because we didn't have to run vertical shafts through the stadium."

Workers removed more than six million cubic meters of earth to accommodate a space large enough to seat the stadium, including a 11.4ft (3.5m) gap around its perimeter to allow for lateral movement in the event of an earthquake says Alvin Huang, an associate professor of architecture at University of Southern California.

"It's getting the benefits of a lot of design technologies that are a little more exotic for a project of this size and scale," he says.

The perimeter is lined with a mechanically stabilized earth wall (MSE), which is designed to withstand large deformations without the loss of structural integrity in the event of an earthquake explains Rafael Sabelli, director of seismic design at SoFi Stadium's structural engineers Walter P Moore.



The venue's display system not only includes the largest videoscreen found at any sports stadium, but also ribbon boards throughout to keep fans connected to the action

"The seismic demands at the site are quite large due to the Newport-Inglewood fault that runs behind the stadium, so it required an immense planning strategy," he describes.

To mitigate and protect the project against the high seismic demands of the area, the Henderson design team worked with the structural design team of Walter P. Moore to implement solutions.

"We coordinated the mechanical, electrical, plumbing, fire protection, and technology design from a structural perspective," says Henderson Engineers' Kevin Lewis.

"This included routing coordination through all sheer walls and understanding the amount of movement the roof would have under various seismic events. Powering the massive scoreboard and lighting system required significant cable sizes which were seismically treated to move in conjunction with the roof so that no tension or pinch points would be achieved in the event of seismic activity," he adds.

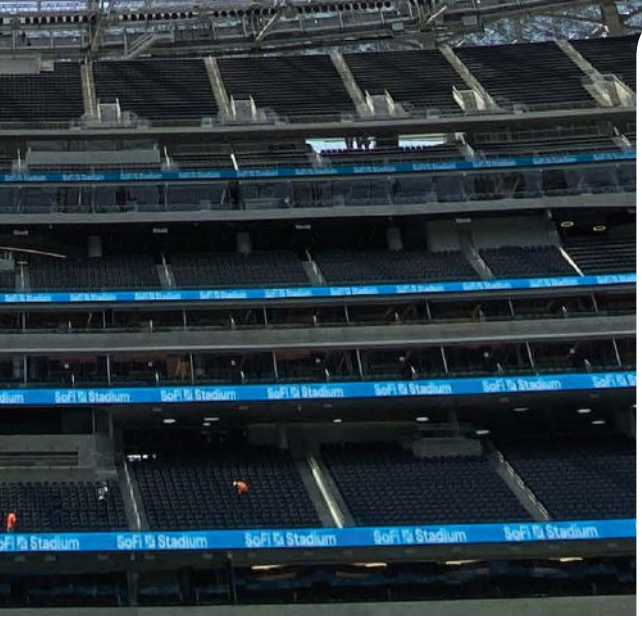
As a result, the venue is comprised of three distinct structures — the MSE retaining wall that lines the giant pit, the bowl and a vast canopy overhead, which stands on its own legs.

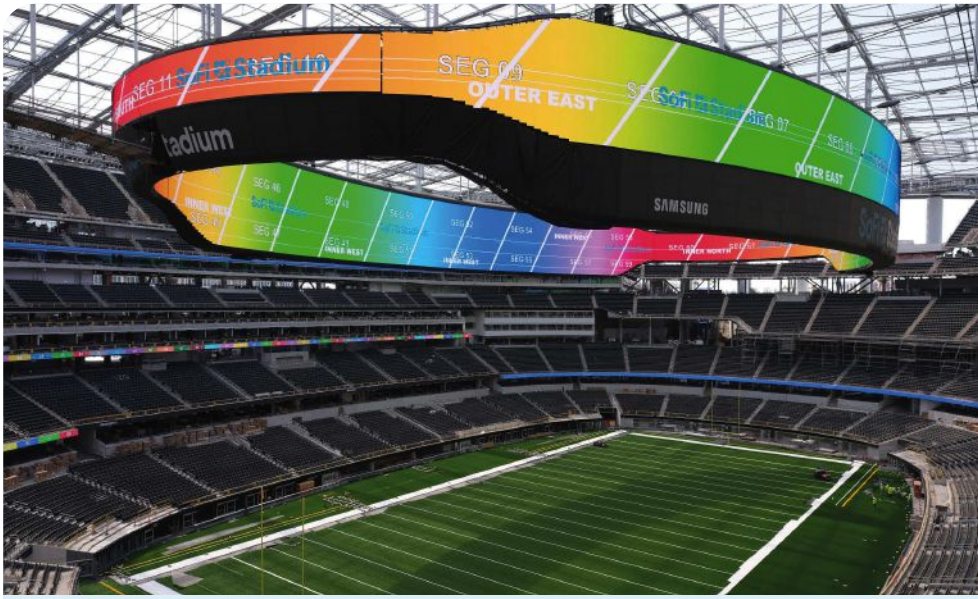
"The roof structure sits on columns that have isolators, which allows the ground to move underneath but not impart large accelerations," explains Sabelli. "In a major seismic event, we expect the isolator to move about 50in (130cm) so that the stadium can withstand an earthquake."

The bowl structure is a separate and independent element that contains steep seating arrays, which at the highest level are around 50ft (15m) closer to the field than the corresponding seats at the Los Angeles Memorial Coliseum, where the Rams were temporary tenants after relocating from St. Louis.

"We have eight concourse levels that are stacked tightly together, which is why it feels intimate and allows fans to literally get closer to the event," says SoFi's Michael Marchesano.

Developing fan engagement became the driving force behind the way the building looks and feels says Lance Evans, principal and director of sports at HKS Architects, the firm behind the stadium's design.





"Every decision and line we drew adhered to two responses; how can we build the greatest fan experience and how can we create the best piece of civic architecture for the community," he reveals.

Californication

The project is designed to reflect the diverse ecologies, landscapes and scales of the Southern California basin. As a result, each approach and elevation has a distinctive character that has been abstracted from the landscape, Evans describes.

"You will see reflections of big bear – the mountain region – the Mojave Desert sceneries of Joshua tree, palm springs and the beaches of Santa Monica. Each aspect has been inspired by the biomes and geometries of the region that finds its way into the architecture of the building."

The stadium's design is intended to seamlessly blend the inside and out, so protect fans from the elements, it features the largest roof structure of any stadium in the NFL, spanning more than 1.1 million square feet and weighing more than 20,000 tons.

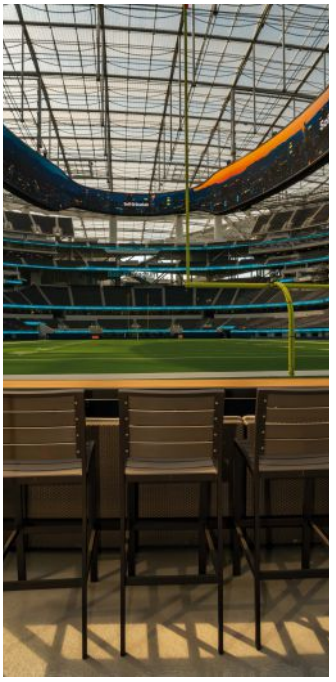
LEADER BOARD

SoFi Stadium features the world's largest and most innovative video screens in professional sports. The videoboard, developed by Samsung Display technology is a 360-degree ovular double-sided 4K HDR screen measuring 360ft (110m) long and 150ft (46m) high.

The structure weighs approximately 1,000 tons and is populated with over 80 million pixels. The Samsung videoboard will also house the stadium's 260-speaker audio system from JBL, as well as its 56 5G wireless antennas.

Chief technology officer of LA Stadium and Entertainment District at Hollywoood Park, Skarpi Hedinsson, reveals that SoFi Stadium will be the first stadium to have an end-to-end 4K video workflow. He emphasizes the challenges that the Samsung videoboard will present in producing in-game content, stating that a team had been using virtual reality to help "understand how best to present content and how do we make sure that all the seating sections are in play as we put our images and our replay frames on the board."

This is complimented by an integrated digital canvas of uniquely-shaped video walls and 3500 displays throughout the facility that are integrated and managed on a single network delivered by Cisco.



SoFi Stadium offers a wide variety of premium and suite experiences positioned from the field to the 50-yard line. Among the high-end options they include bungalows, cabanas, patio and party suites

The canopy is comprised of a vast sweeping cable-net truss system of transparent ETFE panels that are hauled up on tensile crisscrossed steel cables.

"The frame was built in 60ft by 60ft [18 x 18m] grids on the ground outside the stadium and then we loaded the diaphragm into place and pulled the ETFE system over the top," explains Marchesano.

This not only creates a transparent dome over the playing surface but also shelter for neighboring plazas and an indoor event hall that houses 6,000 people at the southern end of the stadium.

Taking commercial advantage of the giant canvas, a network of LED lights projects images across the membrane creating a vast movie screen that works for both fans in their seats and airline passengers on arrival to LAX.

"You will literally have millions of people looking at it from above, and the roof not only becomes an architectural signature, it also becomes a branding signature," says Alvin Huang.

With an average of 284 sunny days per annum in Los Angeles, many critics have questioned if such a substantial roof structure is necessary.

"To accommodate different weather and fan behaviors, SoFi Stadium was designed to blur the line between inside and outside spaces," responds Kevin Lewis. "The materiality of the spaces didn't really change the way the engineered systems needed to react. Keeping sustainability at the forefront, the design team worked collaboratively to find unique ways to deliver air to spaces that could either be open or closed depending on the ambient weather and event type. Flexibility of the systems was key, and all spaces in the stadium react in a way that promotes fan comfort while the systems themselves have been minimized aesthetically," he adds.

Go with the flow

The stadium is clad in an aluminum skin composed of 36,000 triangular panels with 20 million perforations punched into them. The panels form the sweeping structural curves that also respond to the variable Californian climate without the need for a HVAC system, which adds credence to its application for Gold standard LEED certification.

"The perforations in the panels allow for the correct amount of light, transparency and air flow, which means the majority of the stadium is passively ventilated and fans are directly connected with the energy and climate of the environment," reveals Evans.

Henderson's Lewis believes this is a design feature we may see a lot more of in the immediate future.

"The use of natural ventilation in the bowl in conjunction with the ETFE (ethylene

tetrafluoroethylene) roof is an engineering and design trend on the rise. ETFE allows the roof flexibility to do some unique things that weren't possible before and really maximizes the use of daylight while still providing a cover for inclement weather. Providing a holistic fan experience across the entire site of the venue, not just the venue itself, is a trend that is also gaining popularity."

The interior, however, is something of a blank slate, filled with digital surfaces that can be changed with a few clicks of a keyboard to accommodate the changing face of daily events.

"The stadium is a unique media platform that has the technical infrastructure to enhance every aspect of the fan's experience. Every single system is connected to the network, from the elevators to the lights in the carpark and the fryers in the kitchens," says Ken Martin, executive director, sports and entertainment solutions group at Cisco.

This allows owners to effectively monetize consumer activities and events but also accumulate a wealth of analytical data to improve their processes and offerings.

"We want to create the ultimate mobile experience so that people know exactly where everything is and what is available to them. With this system the stadium and surrounding district is essentially a smart city in the heart of LA," says Martin.

In spite of the fact its grand debut didn't see any fans when the LA Rams faced the Dallas Cowboys, it didn't take away any of the excitement and expectation. SoFi Stadium is literally a shining example of the new generation of sports venues, created to deliver the ultimate fan and player experience. When fans will actually be able to absorb this first hand is unknown, but it will, without doubt, worth the wait. ■

SOFI STADIUM IN NUMBERS

US$600m: The value of the most expensive naming rights contract in history that SoFi signed for US$30m over 20 years. The online personal finance company hopes to benefit from its brand being projected across the roof membrane, which will be viewed by approximately 87.5m airline passengers flying directly overhead annually

2,500: The number of installed access points for the next-generation Wi-Fi 6, which will be the first and the largest deployment of the technology in a sports venue. It will deliver faster speeds for immersive-experience applications, more bandwidth – four times the previous capacity – and higher reliability, all while being less taxing on a device's battery

Zero: The amount of money shouldered by the taxpayer according to Hollywood Park's senior vice president Chris Meany who stated that the entire US$5bn project "has been privately capitalized and is being privately funded."

100%: The amount of unionized labor used within the construction of the project, with 30% of that workforce being employed from within eight kilometers (five miles) of the stadium. This catchment of community inclusion was cast to benefit the local economy and also includes the commitment to retain 35% of the internal workforce from Inglewood and its surrounding boroughs

36,000: The number of anodized aluminum panels used in the façade system, which will have 20 million perforations punched into them. The triangular panels also form the structure while the perforations respond to the variable climate without the need for a HVAC system

12: The number of gigabytes per second of high definition streamed content expected to be output by Cisco's high-density Wi-Fi 6 network, which is the first time 4K uncompressed broadcasting has ever been done

PHOTOS: SOFI STADIUM