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ARCHITECTURAL TECHNOLOGY

THIS PAGE: MUNICIPAL OFFICES AND TRAIN STATION, BY MECANOO ARCHITECTEN. PHOTO BY MECANOO.

COVER: MANHATTAN DISTRICTS 1/2/5 GARAGE SALT SHED, BY DATTNER ARCHITECTS AND WXY ARCHITECTURE + URBAN DESIGN. PHOTO BY ALBERT VECERKA/ESTO.

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SEE ADDITIONAL IMAGES OF THE PORTO CRUISE TERMINAL, DESIGNED BY LUÍS PEDRO SILVA [BUILDING TYPE STUDY].

HIGHLIGHTS

SERPENTINE SUMMER
See examples of past work by the architects selected to build four summer houses—supporting structures inspired by Queen Caroline's Temple—on the Serpentine Gallery's lawn. [NEWS]

FEATURED HOUSES
Find photos, credits, and specifications of three new residential projects in this monthly online-only feature. [HOUSES]

TOP 300 FIRMS SURVEY
Every year, RECORD publishes a list of companies ranked by revenue for architectural services performed. Participate in this year's survey, conducted by our sister publication *Engineering News-Record*, by March 7. If qualified, your firm could appear in the Top 300 of 2016. [CALL FOR ENTRIES]

GUESS THE ARCHITECT
Scroll through recent clues and answers in our new and improved gallery of past winners. While you're there, submit your entry to this month's contest! [CALL FOR ENTRIES]

ARCHITECTURAL RECORD 125 years

VIDEO
As a motion-picture accompaniment to our February essay "Modernity and the Monument," RECORD visits the Ford Foundation building to interview president Darren Walker and architect Kevin Roche.

PHOTOS FROM TALIESIN WEST
Click through photos of Frank Lloyd Wright at Taliesin West, taken in 1958 by former RECORD editor Mildred F. Schmertz.

VINTAGE COVER GALLERY
This month, view covers from the magazine's first four decades—1891 through 1931. Tweet us your favorites with the hashtag #AR125Years.

FROM THE VAULT
Read Gelett Burgess's landmark essay "The Wild Men of Paris" (RECORD, May 1910), which included the first reproduction of Pablo Picasso's *Les Demoiselles d'Avignon*.

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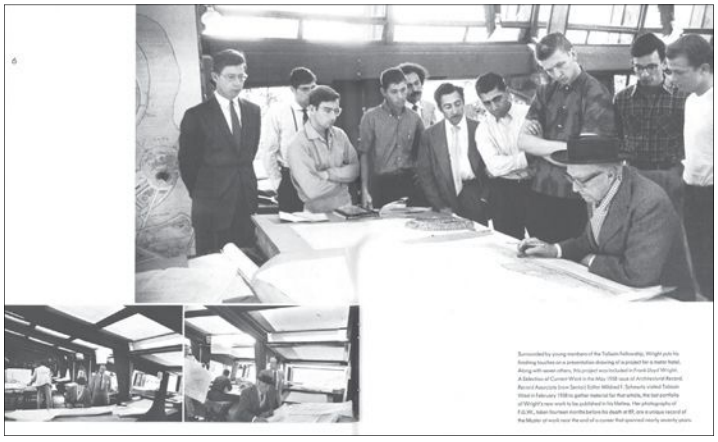

FRANK LLOYD WRIGHT AT AGE 89, WITH MEMBERS OF THE TALIESIN FELLOWSHIP

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INDUSTRIAL BUILDINGS and infrastructure aren't sexy. Too many workhorses of the built environment—transportation hubs and factories, power plants and warehouses—are built to get the job done, not to win beauty contests. But as we all know, much of the industrial architecture that emerged in the late 19th and early 20th centuries expressed the most powerful and innovative ideas of modernism—exposing structural systems; pushing the limits of technology in steel, concrete, and glass; bringing in daylight—as their immense, dramatic forms muscled their way into rapidly changing cities and beyond.

The early editors of ARCHITECTURAL RECORD, going back nearly 125 years to the magazine's founding, frequently covered this building type. At the turn of the 20th century, RECORD explored the new, improved methods of reinforced-concrete construction in factory buildings; in 1914, the critic Montgomery Schuyler extolled what may be the first corporate park in the U.S., General Electric's sprawling headquarters in Cleveland, with its factorylike laboratory building and its own power plant with towering chimney. Schuyler called the Georgian-style architecture "a shining success" that had "the best brickwork this side of the water." Into the 1920s, RECORD regularly visited new industrial structures by such giants as Albert Kahn, with his work for Ford, Goodrich, and other manufacturers. The editors also looked to the other side of the water for influential industrial architecture in Europe, including the Van Nelle Factory by Brinkman and Van der Vlugt in Rotterdam and the Boots factory in England, by Sir E. Owen Williams.

In this issue of RECORD, the critic Kenneth Frampton takes a fresh look at the significance of those two archetypal structures, which both employed bold concrete mushroom-column construction and floor-to-ceiling glazed curtain walls with cleaning tracks (page 48). Both buildings are standing, and the Boots factory is still in use by the British drugstore company. But the Van Nelle, which once packaged tea, coffee, and tobacco, now, like so many former factories and warehouses, has been accommodated for a new use. Indeed, many industrial behemoths that haven't been razed or left to deteriorate are being adapted into tech incubators, spaces for artists, or developed as condos. In Berlin, the legendary Tempelhof airport, with its immense modernist main terminal, has most recently become temporary housing for Middle East refugees.

But what about the infrastructure and industrial architecture of today? Though manufacturing jobs are slightly on the rise in the U.S., there's no appetite to build facilities at the scale of last century's sprawling complexes—apart from such vast digital-technology workplaces as Facebook's new home in Menlo Park, California, by Frank Gehry (RECORD, August 2015, page 86) or Apple's humongous doughnut-shaped headquarters, also in Silicon Valley, by Foster + Partners, still under construction.

And while some presidential candidates are decrying America's crumbling infrastructure, we can point to a few exemplary exceptions, particularly in urban transit, including New York's newest subway station (page 112).

In addition, recent initiatives in sustainability are creating a demand for new kinds of infrastructure. In this issue, for example, we look at the handsome chiller plant on the Ohio State University campus by Leers Weinzapfel Associates (page 80), as well as the green energy facility at Stanford by ZGF, which has become a campus amenity (page 106). A stunning sanitation building and sculptural salt shed in New York by Dattner Architects and WXY (page 90) demonstrate that the most mundane municipal infrastructure can enrich the cityscape. And looking to the other side of the water once more, we could not resist publishing the curvaceous cruise-ship terminal in Porto, Portugal, by Luís Pedro Silva—so elegant that passengers may never want to leave shore (page 74). It's a work of infrastructure, dare we say it, that *could* actually be called sexy.

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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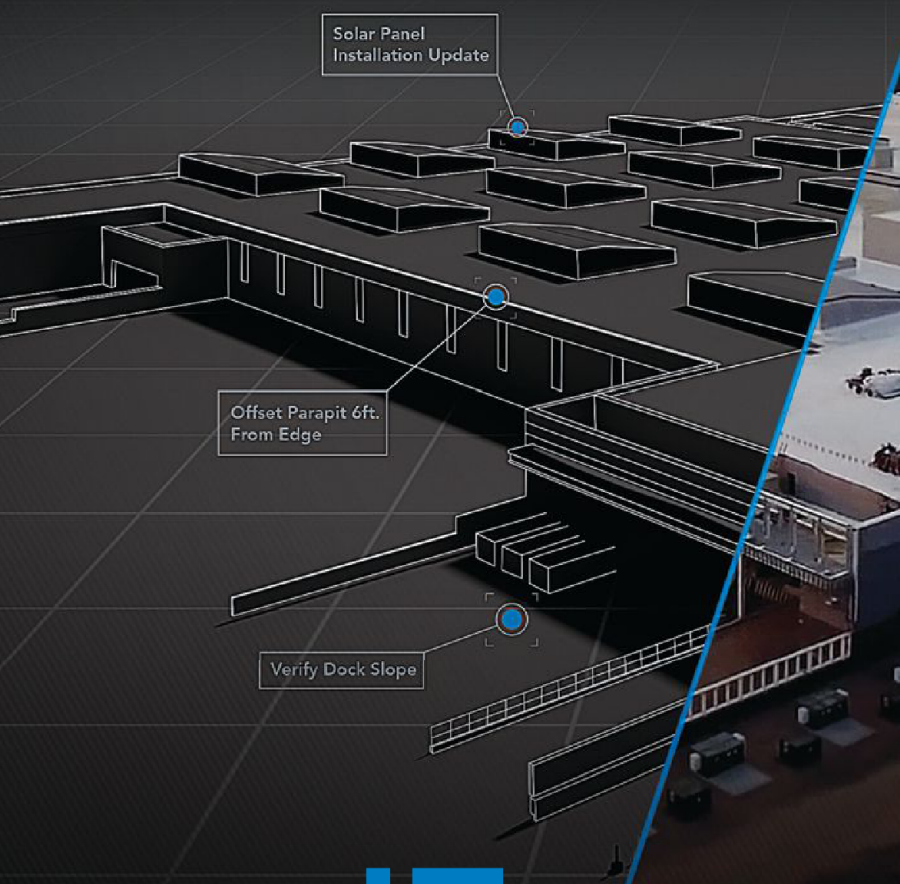

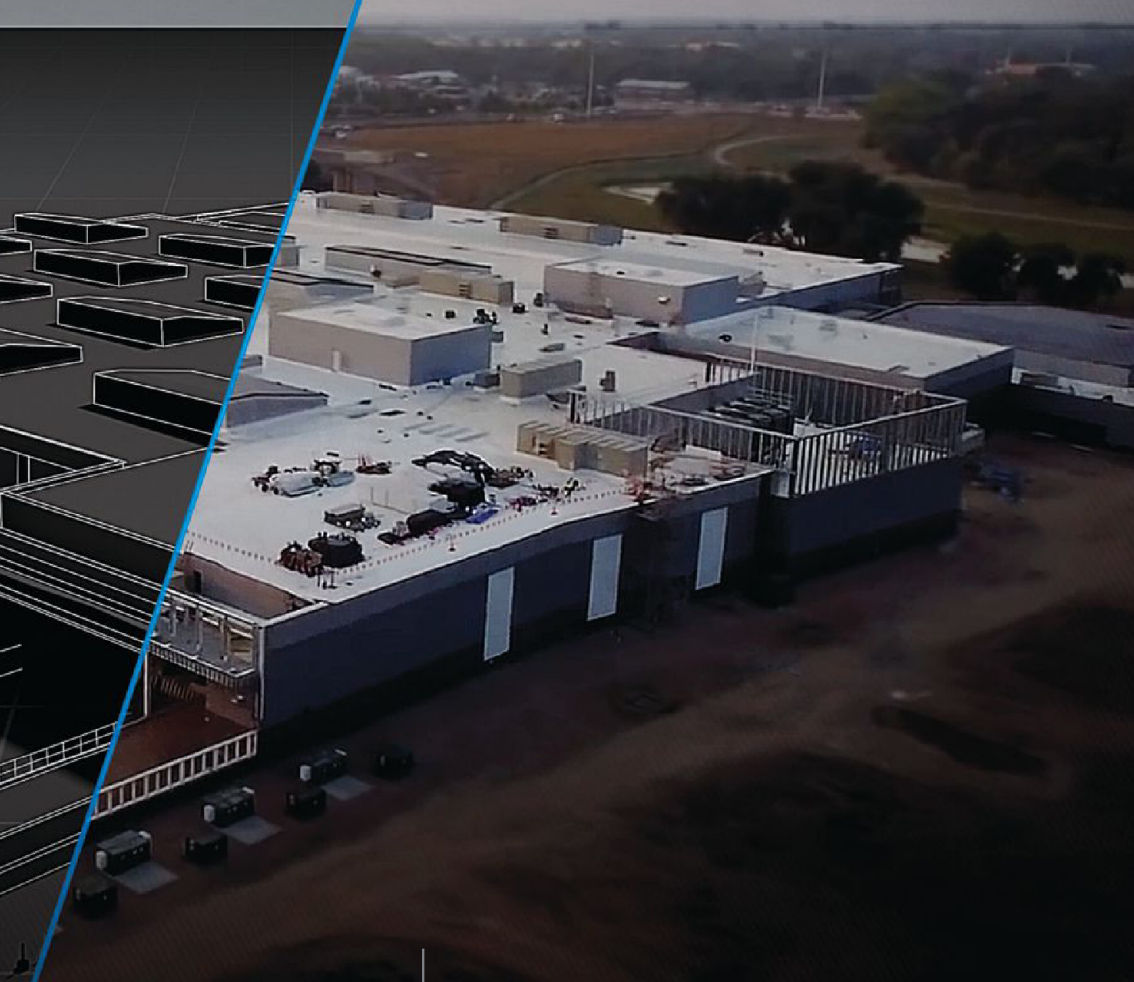

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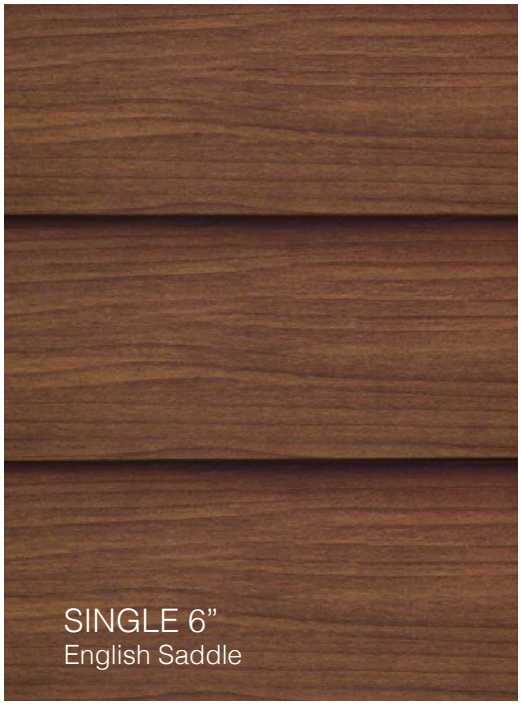

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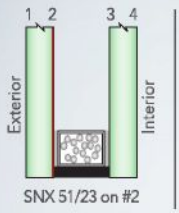

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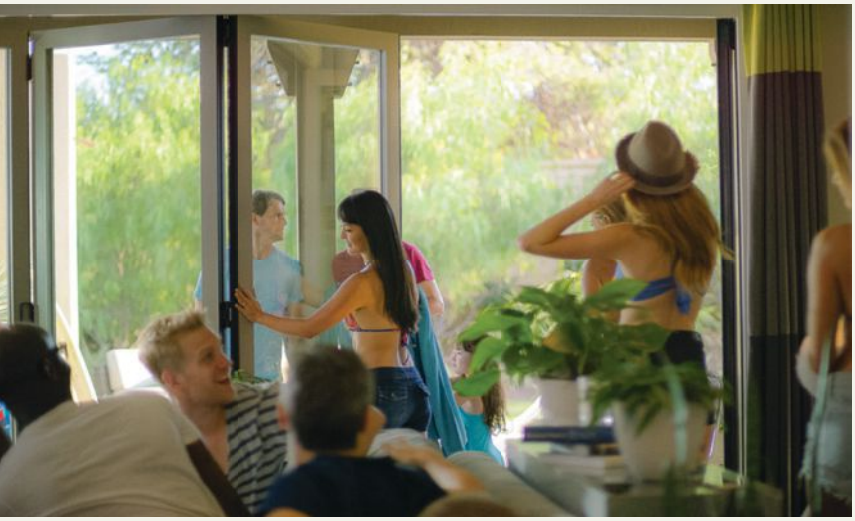

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perspective

Like people in all art forms, I go toward the things that haven't been explored, not whether it's right or wrong–that's for historians. –*David Adjaye, speaking at the Cooper Hewitt, Smithsonian Design Museum, where he recently curated an exhibition of African textiles.*

The Met on the Move

BY LAURA RASKIN

ON MARCH 18, when the Metropolitan Museum of Art opens an annex at Madison Avenue and 75th Street in Manhattan, it will be attempting to shrug off the ghost of a museum past.

The specter is the Whitney Museum of American Art, which called the iconic Marcel Breuer building on that corner home for nearly five decades. In an eight-year deal, the Met is leasing the Breuer building from the Whitney–which relocated to its dazzling new Renzo Piano–designed home last year–in an attempt to expand its Modern and contemporary-art presence.

It's not a simple real-estate leap, because of how inextricably linked Breuer's granite-clad inverted pyramid was with the Whitney's identity.

"It is, along with the Guggenheim, a truly bespoke museum building that was commissioned to house a changing series of exhibitions, and, to some degree, a collection," says Sheena Wagstaff, the Met's chairwoman of Modern and contemporary art, who is overseeing an international contemporary program at what will now be called the Met Breuer.

Founded in 1914, the Whitney bounced from home to home until its trustees decided, in 1963, that it should have a permanent one. Breuer, the Hungarian-born, Bauhaus-trained émigré, was at the height of his career. "It was that moment when New York became the center of the art world in the '50s and '60s," says Wagstaff. "There was a concerted effort on the part of the artists represented in the Whitney to create a truly American idiom."

Breuer and the Whitney were riding the same wave of post-war American triumphalism. But Breuer's building was misunderstood as brutalist–uninviting, bunker-like, and out of context with the neighborhood's brownstones–though he never allied himself with the movement.

Part of the Met's goal is to continue to chip away at those misreadings and celebrate Breuer's egalitarian approach to engaging visitors. "We want to cleave to the architect's original intentions," says Wagstaff, and remove the accretions of decades to accommodate changing technology and bigger crowds.

This month, the Metropolitan Museum of Art is moving into the iconic Marcel Breuer–designed building that housed the Whitney Museum's collections, in attempts to expand its curation of contemporary and Modern art. Beyer Blinder Belle is restoring the museum in keeping with Breuer's original vision.

On an early February tour, while workers buzzed about, Wagstaff gushed: "I cannot emphasize enough how bloody amazing this building is." Yes, she is British, and the former chief curator of the Tate Modern. "There is this brilliant tension between the sensuality and colors of the materials he uses and the way he deals with the ceilings and the austerity of what the building is meant to represent." She points to Breuer's bush-hammered concrete walls in the lobby, which are framed by smooth board-formed edges. "I mean, look! He frames the concrete. It's kind of a fetishist's delight."

Wagstaff and the Met worked closely with preservation architects Beyer Blinder Belle (BBB)–the Met's master planner since 2013–to study Breuer's life and the building, and then determine what to restore and how. They declined to disclose the project cost.

"Breuer called the materials in this building materials of the earth. And he championed and specified the fact that natural materials age beautifully. They take on a patina," says John Beyer, a BBB founding partner. "A challenge for any architect dealing with a masterpiece is knowing what not to do as much as what to do."

On the museum's five gallery floors, Beyer and his team simply vacuumed Breuer's famous precast-concrete coffered ceiling. They carefully restored granite and plaster walls where needed. It was Breuer's cleft-bluestone floors that took the most beating over the years, and the architects patched them in certain places, replacing only about six stones in the entire building, says Beyer. They finished the floor with a wax that is neither shiny nor dusty-looking.

The lobby received the most attention. Here Beyer's team removed all evidence of the retail

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One of the Met Breuer's inaugural exhibitions, *Unfinished: Thoughts Left Visible,* examines the idea of when an artwork is considered complete. The show will feature paintings by masters such as Jan van Eyck and Leonardo da Vinci, as well as 20th-century works including (left) Andy Warhol's *Do it Yourself (Violin).*

shop that the Whitney had inserted. This left holes in the bush-hammered walls that competed with the round indents from the original snap ties, so they were selectively patched. The sculptural overhead light array was repaired, and each bulb was replaced with an LED, giving all the bulbs the same value. The architects also created a new ticketing desk in walnut, which, in color, matches Breuer's teak stair railings. Breuer's original concrete and granite "book bar" at the back of the lobby remains in place and will be the only retail element in the space. Behind the book bar, a new 6-foot-tall, 23-foot-long LED media wall (in a black as matte as cloth) displays exhibition and museum information. This aligns with another of the Met's big goals—to establish the Met presence.

Astonishingly, Breuer's structure is not landmarked, but it is a contributing building to the Upper East Side Historic District and it is protected. The Met and the BBB architects want to dispel the erroneous notion that Breuer meant for the building to be a fortress. He also didn't mean for its street-fronting "sunken garden" to be perceived as a moat.

In order to emphasize that this open courtyard underneath the building's cantilevered entry portal was meant to be an urban retreat, the architects removed unsightly dangling cables—part of systems that included now-defunct cameras—that hung down into the below-grade space. Nodding to Breuer's plans for a green space to soften the area between the sidewalk and the museum door, they commissioned landscape architect Günther Vogt to plant a row of Quaking Aspens that will grow to varied heights and be uplit at night. This lighting will, says Beyer, be a dramatic sight from the double-height glazing that extends from the sunken garden up to the ceiling of the lobby.

The Met Breuer will open with a show of the contemporary Indian artist Nasreem Mohamedi's drawings and photography (which Wagstaff organized to align with the waffle ceiling, since Mohamedi plays with and subverts the grid in her work), as well as a 500-year survey of unfinished pieces by artists from Renaissance masters to Lygia Clark. A restaurant will open in July on the lower level where the Whitney had a café.

Beyer says that working on the building has been a highlight of his career—and a lesson in careful handwork. "We are thrilled that the Met had the vision to see the way to do it right," he says. ■

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KPF Proposes Mile-High Skyscraper

BY ANNA FIXSEN

"HE IS not dreaming," the *Chicago Tribune* confirmed in 1956 after an 87-year-old Frank Lloyd Wright declared that he could build a mile-high skyscraper near the city's Adler Planetarium. "If we are going to have centralization, why not quit fooling around and have it," Wright, reclining at home in Spring Green, Wisconsin, told the reporter briskly.

Decades later, the mile race is still under way—and heating up: according to data released by the Council for Tall Buildings and Urban Habitat (CTBUH), 2015 was the highest year on record for tall buildings, with 106 new skyscrapers reaching completion. In just two years' time, Adrian Smith + Gordon Gill Architecture's Jeddah Tower will soar more than a kilometer over Saudi Arabia.

Now Kohn Pedersen Fox Associates is upping the ante with its proposal for Next Tokyo, a conceptual Japanese megacity for a half million residents, with a mile-high tower at its center. According to the architects, such a building could be achieved in the near future.

"Part of the vision we proposed is what the world might look like in 2045. It's meant to be a plausible vision," says KPF principal David Malott, who led the project.

Strangely, a television show kicked off KPF's investigation. The firm—responsible for some of the world's tallest buildings, including the 600-meter Ping An Financial Centre in Shenzhen, China (to be completed this year), and three towers that will soon fill New York's Hudson Yards—was approached by Japanese broadcasting organization NHK to design a tower for its series *Next World* (think *Nova*, but flashier).

"Originally it started as just a tower, but we didn't want to do something high for its own sake," explains Malott. "So we needed a story that would justify the height."

That narrative is grounded in the environmental and societal pressures facing Japan, including rapid urbanization and natural extremes. For Japan, the latter is particularly resonant given the earthquake and tsunami that killed more than 16,000 people just five years ago. The Japanese government has proposed a multibillion-dollar concrete seawall to shield 250 miles of coastline, disparagingly nicknamed "the Great Wall of Japan." As an alternative, KPF, in collaboration with structural engineers Leslie E. Robertson Associates, decided to devise a proposal that melds architecture with infrastructure.

The future city would occupy a five-square-mile landfill district spanning a narrow point in Tokyo Bay (a nod to an unbuilt plan architect Kenzo Tange formulated 50 years ago) to create both a protective barrier and integrate the metropolitan area.

A mile-high tower cannot exist in isolation, Malott says: "It needs to be a part of a community, with a supporting cast of towers."

In renderings, the lower skyscrapers that would comprise Next Tokyo look like a cluster of reeds rising from the bay. When designing the central Sky Mile Tower, the team conducted a series of wind tunnel tests, which showed that a tapered, slotted design had the best aerodynamic performance. "A lot of people think when you build a tower in Japan, earthquakes will create the most difficulty," Malott explains.

Next Tokyo (below) would bridge Tokyo Bay, allowing for easy transportation and storm protection. The Sky Mile Tower, KPF's ambitious proposal, features slots to increase aerodynamic performance (above, right).

"It's actually the wind."

To mitigate the effects of high winds, the design for Sky Mile Tower consists of sequences of three legs, rotated in plan as they move up the tower, allowing for large vertical slots through the building. Megabracing and concrete shear walls provide the basic lateral system. For vertical transportation throughout the building, the architects consulted ThyssenKrupp, which is developing self-propelled elevators that would run in a loop. To address the challenge of pumping water to such dizzying heights, the building's skin would capture water from clouds. What appear to be hexagonal lily pads at the tower's base are actually atoll-like arrangements of terraced, mid-rise residential buildings, with reservoirs of desalinated bay water at the center. The configuration would buffer the higher-density zones from sea waves. The plan also calls for other infrastructure, including Hyperloop, a pneumatic transport system.

KPF's television episode aired in Japan last year, and the firm went on to publish its findings in the *CTBUH Journal* soon after. The design was greeted with relative silence until last month, when the proposal ricocheted through the western mainstream media with sensationalistic declarations including "Developers plan to build a futuristic megacity" and "Move over, Burj Khalifa."

The architects caution there are no current plans to execute the project, but with technology progressing as it has, the sky's the limit for towers. Says Malott, "It's certainly far-reaching and forward-thinking, but grounded in what could be practically achieved." ■

IMAGES: © KPF

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Bjarke Ingels Group to Design 2016 Serpentine Pavilion

BY MIRIAM SITZ

From one perspective, the pavilion's profile is undulating and opaque; viewed from the other side, its silhouette appears rectangular and transparent. Inside, wood floors provide warm contrast to the fiberglass shell.

IMAGE: COURTESY BJARKE INGELS GROUP

FRESH OFF a string of high-profile commissions, Danish architect Bjarke Ingels and his firm, BIG, have been selected to design the 2016 Serpentine Pavilion in London this summer. And, for the first time, four other architects—Kunlé Adeyemi/NLÉ, Barkow Leibinger, Yona Friedman, and Asif Khan—will each create a summer house to accompany it.

"We have studied the footsteps in which we follow," says Ingels, whose ethereal plan evokes the airy framework of Sou Fujimoto's 2013 pavilion.

The concept, based on the simple manipulation of a traditional garden wall, calls for a stack of extruded-fiberglass modules that seem to unzip toward the ground, forming a cavity to accommodate the gallery's programs.

The design, the architect says, "embodies multiple aspects that are often perceived as opposites—free-form yet rigorous, modular yet sculptural, both transparent and opaque, both box and blob."

For this year's commission, timing was key. As a prerequisite, the chosen architect must have no built work in England, so for BIG, with a plaza in the works at London's redeveloped Battersea Power Station, the eligibility window was narrowing.

The annual competition, established by the Serpentine Gallery's co-director Julia Peyton-Jones in 2000, began with a tentlike structure by Zaha Hadid, and has since showcased work by top architects including Oscar Niemeyer (2003), Frank Gehry (2008), Jean Nouvel (2010), and, most recently, the Spanish firm selgascano. Peyton-Jones announced plans to step down after 25 years with the gallery, which could account for her wish to expand this year's program.

"All projects have been thrilling to commission and will be equally exciting to realize," said Peyton-Jones. "We cannot wait to unveil them all this summer."

Bjarke Ingels founded his practice in 2005, with offices in Copenhagen and New York. Ingels recently revealed plans for the Spiral, a new tower alongside New York's High Line. ■

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CIRCLE 248

[NEWSMAKER]

Daniel Libeskind

BY ANNA FIXSEN

BEFORE DANIEL Libeskind was known as the architect of the Jewish Museum in Berlin and the master planner for the World Trade Center site, he was considered a musical prodigy. His instrument? The accordion. Growing up in Communist Poland, the young Libeskind had to painstakingly transcribe songs from the classical canon (Bach, mostly) to sate his musical appetite, establishing himself as a virtuoso and winning competitions. In 1953, at the age of 7, he performed "Flight of the Bumblebee" on Polish television.

The architect is flexing his musical muscles again, curating a 24-hour cycle of performances with Frankfurt's Alter Oper on May 21. Called *One Day in Life*, Libeskind has personally curated more than 75 of the consecutive musical performances that will take place in 18 venues across the city.

The event's locations are themed according to "dimensions of existence" and include a tram (themed as "Movement"), Oskar Schindler's apartment ("Secret"), a 51,500-seat arena ("Will"), and an operating room ("Body"). Each concert will be staged multiple times through the day.

Libeskind, who has also just launched a new line of seating for Italian furniture maker Moroso (see page 67), spoke with RECORD over the phone from his home in New York.

How did the idea for *One Day in Life* come about?

I was lecturing in Heidelberg and talked about architecture and a bit about music. After my talk, Dr. Stephan Paul, the head of Alte Oper, said, "Mr. Libeskind, what could you do in Frankfurt?"

I thought about it, and wanted to rediscover Frankfurt in a very particular way, creating a labyrinth through the city where music is played in unexpected places, like a hospital or a railway station. The director said, "Wow, what an amazing idea. We will try to make this happen, but we don't know how."

Lo and behold, it's coming to life in May!

Is this the first time you have ever done anything like this?

Absolutely! I don't think it's just my first time—I don't know of a systematic exploration of a city with a particular connection between architecture and music.

How did you choose these crazy venues?

They are not crazy, they are very calculated. Nothing is arbitrary here.

I don't think I have ever been to a concert in a hospital operating room.

One of my favorite composers is Marin Marais, who created a fantastic composition about a gallbladder surgery. I thought it shouldn't be heard in a concert hall but in a surgical room, where that pain and experience can come alive in the music, and the music can be a device to unlock architecture.

Are the compositions you selected personal favorites?

It was personal. I didn't go on the internet, believe me; I didn't go to my collection of CDs at home. I wanted to couple contemporary and classical music, because you can go from the year 1000 AD to the year 2016 within a few minutes of performance in a space that connects them.

Did acoustics factor into your scheme?

Of course, because music should be acoustically fantastic. But it's not only about acoustics: You can hear a piece of music through a crack of a door, and it might be more powerful for you than music you hear at Lincoln Center.

Can you give us a taste of what some of the music and architectural pairings will be?

Oh my God, there are so many of them.

What are your favorites?

One of my favorites is in a boxing arena. I have programmed a transcription of Beethoven's entire Fifth Symphony for a solo pianist. A single instrument—just as a boxer has to put his entire vision of life into his hands to knock out his opponent. You will feel it when you are sitting next to the ring. Also, the composer Peter Ablinger took the voices of famous people—Bertolt Brecht, Gertrude Stein, Marcel Duchamp—and transcribed them into music. How appropriate to listen to that in the archives of the national library where every book that has ever been printed in Germany is stored.

So that's the kind of exercise of madness that will bring this music into something tangible and something enjoyable. That's what music is, and what architecture is. ■

Frank Gehry Named Recipient of Harvard Arts Medal

Harvard University announced February 1 that architect Frank Gehry will receive the 23rd Harvard Arts Medal. The medal is awarded annually to a Harvard graduate or faculty member who has contributed to education or the public good through the arts. Harvard president Drew Gilpin Faust will present the medal to Gehry April 28.

John L. Tishman Dies at 90

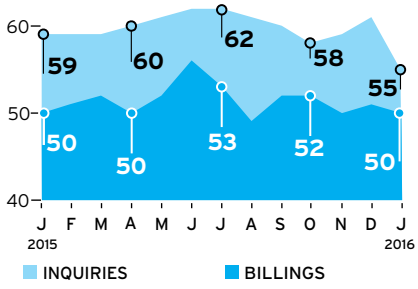
John L. Tishman, whose construction company reshaped the skylines of New York, Chicago, Detroit, and Los Angeles, died on February 6 in Bedford, New York. He was 90. At the helm of Tishman Realty and Construction Company, he oversaw the construction of Chicago's John Hancock Center and New York's Twin Towers.

Renzo Piano's London Skyscraper Scrapped

Sellar Property Group and Great Western Developments dropped plans for a 72-story skyscraper in London designed by Italian architect Renzo Piano. Conservation groups had protested that the 830-foot cylindrical tower, nicknamed the "Paddington Pole," would disrupt the skyline.

Fatal Manhattan Crane Collapse Under Investigation

The New York City Police Department and Buildings Department are investigating a crane collapse in lower Manhattan that killed one person and injured three February 5. The 565-foot crane was being used to install generators and air-conditioning units. High winds, human error, mechanical failure, or a combination of all three factors are being considered as possible causes.



ABI Dips in January

The American Institute of Architects (AIA) reported a slight decrease in its monthly Architectural Billings Index (ABI) in January, which scored 49.6 points, down 1.3 points from December. The new projects index was also down, scoring 55.3. "January was a rocky month throughout the economy," says AIA economist Kermit Baker. "This uncertainty may have affected progress on design projects."

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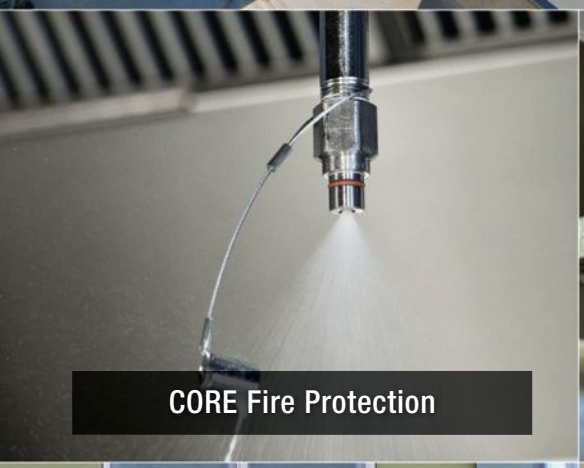

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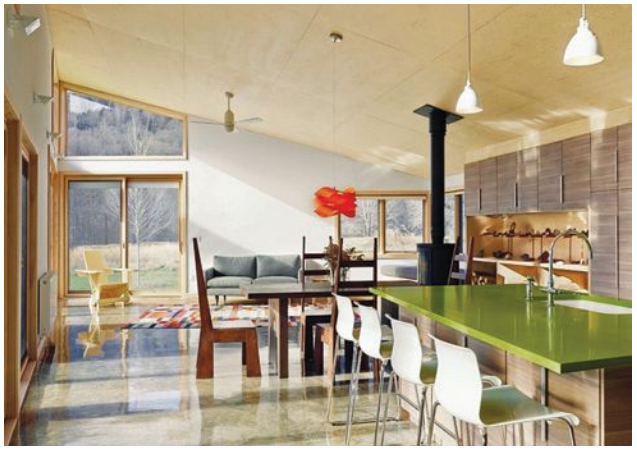
CIRCLE 235

house of the month

A LOW-SLUNG RETREAT IN UPSTATE NEW YORK SCRAPES THE EARTH AND RISES TO TAKE IN ITS SURROUNDINGS. **BY SARAH AMELAR**

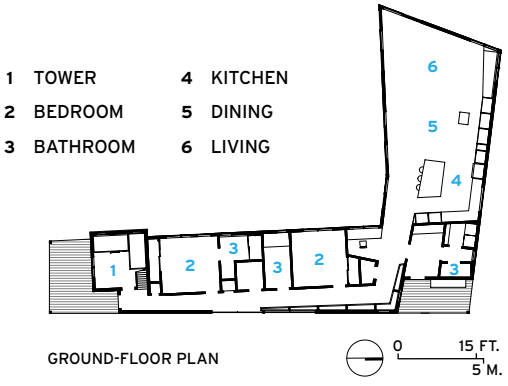


The exterior is clad in low-maintenance fiber cement board in an off-the-shelf color (above). The tower houses three stories of bunks and, at the top, provides a small study from which to view the valley (far left). Exposed wood ceilings and window frames play against the stony concrete floors (left).

THE DELAWARE River's East Branch, meandering through New York's Catskills region, is famous for fly fishing. So, when Gad Soffer—a passionate amateur fly fisherman—got the chance to purchase a pristine nine-acre parcel there, he and his wife, Katie Donnelly, leapt for it. But several years would pass before the couple built on this land in a long, narrow valley. Instead, they enjoyed weekends camping there, amid eagles, wild turkeys, bobcats, deer, and raccoons.

By the time they were ready to replace the tents with a more permanent vacation home, they knew they wanted an architect who could let them retain that sense of immersion in nature. Their search led them to Turner Brooks. As Soffer recalls, "I loved the way his houses engage the landscape."

To create a 2,000-square-foot cottage for the owners and their two young children, Brooks tapped into geological themes in certain details relating to the couple's own lives. Soffer and Donnelly originally met in a graduate geology program, and, though he now focuses on biomedical work, and she's currently a homemaker, they remain avid rock collectors. So, Soffer remembers, "we asked Turner for display and storage for thousands of our specimens—even ones I found when I was 7 years old."



GROUND-FLOOR PLAN

Brooks responded with a jagged, slate-gray house whose L-shaped plan provides privacy from the road while capturing views of an abandoned gravel pit-turned-pond. The low-slung building, in a clearing amid tall grasses, rises to a small tower with 360-degree vistas. Lining that turret are three levels of ladder-accessed bunks: "the children's own lair," says Soffer. Above the bunk-bed zone, a separate, more adult aerie, or office, is reached by its own steep, narrow stair.

Throughout the house are concrete floors, cured, ground, and polished, "to bring out the gravel aggregate's colors and textures," says Brooks. Rock- and mineral-display cabinets with custom-designed stands extend across a living room wall and a corridor to the bedrooms.

Since the main level is almost continuous with the ground plane, interior space flows out to meadow and pond. "I'm repeatedly struck by how Turner oriented the building and worked out the fenestration to take in the entire landscape," muses Soffer. "Even through smaller, seemingly random windows, you see a whole mountain face. You're constantly reconnected to the surroundings." ■

IMAGES COURTESY TURNER BROOKS ARCHITECT

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The answer to the February issue's Guess the Architect is **GAE AULENTI**. In 1986, her Milan-based firm, working with the French office of A.C.T. Architecture, transformed the palatial Quai d'Orsay train station in Paris, designed by Victor Laloux in 1900, into the Musée d'Orsay, which exhibits art from 1848 to 1915.

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CIRCLE 190

Cosmetic Appeal

Australian skin-care line Aesop unveils its latest one-of-a-kind shop, in Milan.

BY JOSEPHINE MINUTILLO

AESOP HAS built a reputation not just for the quality of its products but the design of its stores, each highlighting local materials and culture. On the heels of a successful collaboration for a Paris boutique, Aesop fittingly selected Milan-based Dimore Studio to design another one, in the designers' home city, their office walking distance from the shop's Corso Magenta address in the historic center.

"We found inspiration in the butler pantries of the old bourgeois homes of Milan, particularly Piero Portaluppi's Villa Necchi," explains Britt Moran, who, along with Emiliano Salci founded Dimore in 2003. They have since completed a number of high-end retail and hospitality projects in the fashion capital and elsewhere. "Aesop's packaging has that apothecary feel, so we wanted to do something more domestic—a mix of sterile and cozy."

Two hovering 4-foot-diameter brass-rimmed pendants with patterned fiberglass shades illuminate the 375-square-foot space like surgery lights, while adding a decorative touch. Midcentury chairs, freshly upholstered in pink velvet, define a small seating area, and vintage globes of varying sizes top display cases at the front of the store to add height and shape to the boxy elements.

The design of those cases—methodically organized and meticulously detailed to adhere to Aesop's stringent presentation specifications—is the star of the show. Dimore tapped local artisans to craft the pastel-colored units. According to Moran, "It's in our DNA to experiment with color."

In a nod to the old shops of Milan, many still lining this neighborhood's streets, dark wood and rich draperies frame the arched storefront windows, with just a small neon sign calling attention to the dramatic interior beyond. ■

The store is lined with display cabinets surfaced in a blue-green plastic laminate with aluminum surrounds. Similarly colored glossy tiles cover the walls, ceiling, and arches above those cases, while floors feature a subtle grayish green linoleum. Lemon yellow shelving adds contrast.

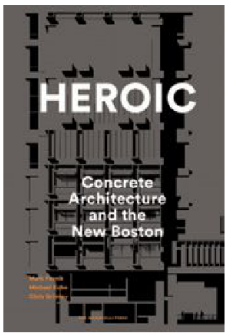
PHOTOGRAPHY: © PAOLA PANSINI

View additional content at architecturalrecord.com.

Bold, Brutal, and Beautiful

Heroic: Concrete Architecture and the New Boston, *by Mark Pasnik, Chris Grimley, and Michael Kubo. Monacelli Press, October 2015, 336 pages, $50.*

Reviewed by John King



"WE HAD a shared preference for a monolithic architecture," Henry N. Cobb, principal of Pei Cobb Freed & Partners, tells the authors of *Heroic: Concrete Architecture and the New Boston.* "We were enchanted by the idea that once the concrete was poured, the building was essentially finished because the architecture was already all there."

At once history lesson and labor of love, *Heroic* explores how 1960s Boston came to be a showcase of unapologetic, often superscaled masonry modernism–from the rugged yet triumphant Boston City Hall to the machinelike efficiency of such projects by Cobb's firm (then called I.M. Pei & Partners) as the vast Christian Science Center. There are interpretive essays, interviews with seven of the architects, and individual chapters on 25 of the era's buildings; the selection goes beyond the obvious icons to include such discreet gems as Tad Stahl's 70 Federal Street, a seven-story grid of glass and concrete that is more intuitively contextual than anything built during the faux-historic 1980s.

The book's editors and principal authors–Mark Pasnik, Michael Kubo, and Chris Grimley–run the Boston design firm over,under. They began what they call their "Heroic Project" in 2007, when then-mayor Thomas Menino proposed demolishing City Hall and selling the land to developers. That absurd threat receded, but the trio has continued its quest to raise public appreciation of built artifacts from an era when architects "sought to imagine a stronger civic society."

If you're at all susceptible to the sculptural power of a structure like Kallman, McKinnell & Knowles's Boston City Hall of 1968 (I plead guilty), *Heroic* will resonate. The contemporary photographs are startling, and the narratives persuasively capture the spirit of an era when power brokers like Mayor John Collins and Boston Redevelopment Authority director Edward Logue poured resources and creative ambitions into reviving the metropolis.

But like anyone in love, the trio is blind to its loved one's flaws. While Grimley, Kubo, and Pasnik excel at conveying the deft touches in these large buildings, such as the notched interconnections for the girders and beams of Kallman and McKinnell's 1,850-car garage at Government Center, they barely acknowledge the underlying reasons for the backlash to urban-renewal-scaled "heroism"—it felt alien and destructive in a city with a heritage of small blocks and fine-grain building materials. Fortunately, some of the essayists are more discerning: City Hall might have captivated Ada Louise Huxtable, but Joan Ockman points out that "to a significant portion of the general public, what it flagrantly represented was the hubris of governmental power and an assault on humanistic conceptions of urban life."

In retrospect, architects interviewed see this too. As Cobb noted, "The era reflected a moment of willingness to undertake the reshaping of the city at a scale which today would be absolutely unthinkable. Maybe it should have been unthinkable back then, but it wasn't." ■

John King is Urban Design Critic of the San Francisco Chronicle, *a former Boston resident, and the author of* Cityscapes 2: Reading the Architecture of San Francisco, *published in 2015.*

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Tag Team

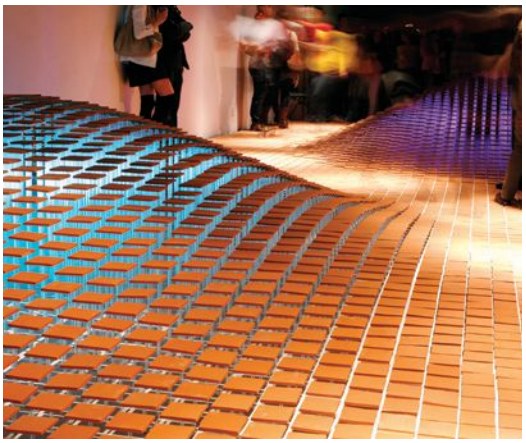
An Interdisciplinary design duo named SPORTS makes for a winning combination.

BY REBECCA SEIDEL

SHUNNING CONVENTIONAL terms like principal and firm, Greg Corso and Molly Hunker consider themselves cocaptains of their emerging design team. It's fitting, then, that the duo decided to name their collaboration SPORTS. "Sports involve rules and parameters," Corso explains, "yet there is room in which they can be quite beautiful and kind of extraordinary"—just like architecture.

The metaphor goes further: sports have the potential to engage audiences from all walks of life, Corso and Hunker say, and they want their work to be just as accessible. SPORTS has pursued this goal by tapping into an unconventional yet recognizable arsenal of materials—from zip ties to prayer candles. Now the pair, both assistant professors at Syracuse University School of Architecture, hope to get more skin in the game.

Corso and Hunker met at UCLA, where they each received an M.Arch. in 2010. As graduate students, they collaborated on *Life Will Kill You*, a temporary installation at the Revolve Clothing showroom in West Hollywood, California. They crafted a canopy of electrical lamp cord and more than 100,000 zip ties that contrasted with the store's staid interior. This commission kicked off their design partnership. They immersed themselves in Los Angeles' creative scene; industries like fashion and film blended into their work. "There's a fluidity to the design culture there," Hunker says.



Both designers have artistic backgrounds—Hunker studied painting and drawing as an undergraduate at Dartmouth College, and Corso was initially a cartoonist, winning a grant to publish a graphic novel in 2006—so they were already inclined to reach into adjacent fields. They were also eager to engage directly with materials. "We like to situate our designs within the history of materials' craft and find ways we can tweak these components, play with them, and make them strange," Hunker says.

In several cases, this approach has translated into projects that juxtapose unpolished craftsmanship with the precision of digital form-making. For *Stay Down, Champion, Stay Down*, a 2011 installation at the Woodbury University Hollywood Gallery, Corso and Hunker got their hands on 8,000 terra-cotta tiles from a local artisan and used digital software to arrange them in undulating planes across the floor.

Not long after making a name for themselves in Hollywood, SPORTS ventured eastward. Both designers taught at the University of Illinois at Chicago, where Hunker served as the inaugural Douglas A. Garofalo Fellow in 2013. Hunker's research explored vernacular aesthetics like "kitsch," with a focus on the home shrine. "Home shrines are often read as gaudy," Hunker says. "But that gaudiness is extremely important to the creator. The more ostentatious, the more powerful the devotion."

That spring, she worked with Corso and a team of students to melt hundreds of decorative prayer candles into shapes that ranged from smooth circles to gloppy mounds. In doing so, they explored perceptions of beauty and ugliness alongside notions of kitsch. This interest echoed in *Little Joy*, SPORTS' proposal for the Architectural League of New York's Folly competition last year. Their project, which was not built but was deemed a Notable Entry, explored how the sensibilities behind ornamental knickknacks could be translated into functional architecture. Their proposed installation leveraged the typical iconography of a house—a square base topped with a triangular roof—but its exaggerated proportions and glossy finish drew from ornamental objects.

Now that the pair are teaching undergraduate studios at Syracuse, they are adjusting to an academic culture that is highly focused on theory, as opposed to that of UCLA, which encouraged designers to "make something first and talk about it after," says Corso. On top of a university-funded research project, exploring folk-art environments and outsider-art constructs across the United States, they are developing two building proposals for rural areas of New York. They look forward to refining their interdisciplinary aesthetic at this new scale. ■

Greg Corso and Molly Hunker (top, left) first collaborated on *Life Will Kill You* (above), a swooping cloud of zip ties and electrical cord in a West Hollywood, California, clothing store. Also in Hollywood, they installed a glowing landscape of tiles (bottom) that bulged from a gallery floor. Their proposal for the Architectural League of New York's 2015 Folly competition (left) explored what an architectural knickknack might look like.

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CIRCLE 238

The Broad Museum – Los Angeles, CA
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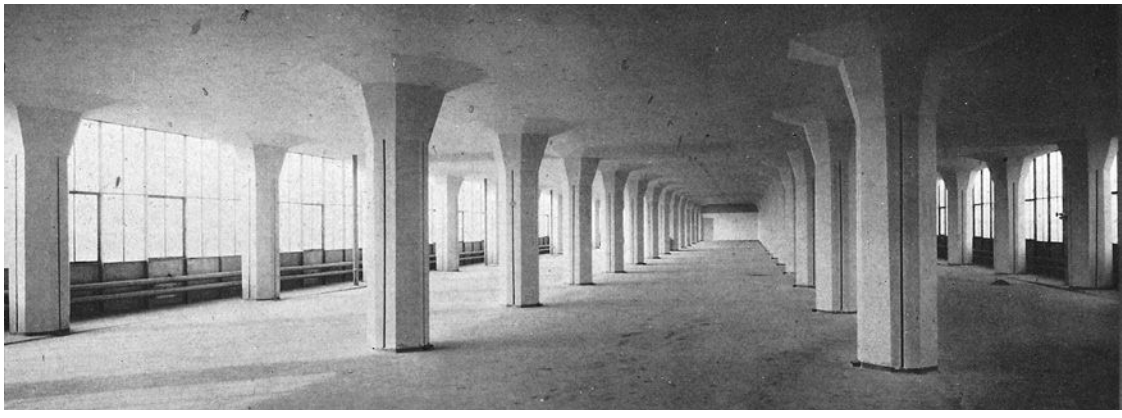
When Modernism Was Young

Historian Kenneth Frampton points to the architectural significance of two early 20th-century industrial buildings.

BY SUZANNE STEPHENS



TWO STRIKING factory buildings, one in England and the other in the Netherlands, have long served as exemplars of the abstract purity that design solutions based on technology and function brought to industrial architecture in the early 20th century. When the Van Nelle Factory in Rotterdam by architects Brinkman and Van der Vlugt and the Boots factory in Beeston, England, by the engineer Sir E. Owen Williams were completed, RECORD published each in its pages, in 1931 and '33, plus a feature on the Van Nelle Factory under construction in 1929. In honor of its 125th anniversary, the magazine has turned to the eminent architecture historian Kenneth Frampton to discuss the two influential structures he has long admired and written about. In comparing the still extant landmarks, Frampton takes an approach similar to one he exploited in *A Genealogy of Modern Architecture: Comparative Critical Analysis of Built Forms*, published by Lars Müller in 2015. In that book, Frampton closely scrutinizes the similarities and differences in pairs of selected examples according to: building type and context; the disposition of public and private areas in plan and section; the treatment of circulation and spatial procession; and the structure of the buildings and their enclosing walls. *Genealogy* provides a salient starting point for examining these two early modernist structures.

What makes the Boots factory (now known as Building D10) and the Van Nelle Factory so significant in the history of modern architecture?

In the Boots factory, Williams was able to employ structure in an expressive way that was essentially rational; it was the generation of engineering form out of combining poured-

in-place concrete and glass with plastic effect. At the same time, the Boots building is not as compositional, nor as expressive as Van Nelle, even though they both employed mushroom column construction. The two buildings also made a pioneering use of floor-to-ceiling curtain walls. Nevertheless, the Van Nelle building was more compositional—above all for its sweeping, curved form at the entrance to the complex, which served to terminate the long, multistory structure.

What about their reliance on poured-in-place concrete?

Although both plants are predicated on mushroom column construction, the sheer size of the columns in Boots totally outclasses those of the Van Nelle structure. In both instances, the mushroom columns support a flat slab system first developed by Ernest Ransome in a factory in Greensburg, Pennsylvania, in 1902 and by Robert Maillart in a grain warehouse at Altdorf, Switzerland, in 1912.

How does this framework compare with the early reinforced-concrete system developed by François Hennebique for integrating column-and-beam construction?

The Hennebique concrete system is monolithic and consists of flat slabs bearing on concrete beams, which in turn are connected to piers.

Could you comment on the innovation with glass?

The Boots is interesting for its circular glass lenses held in place by a thin, wire-reinforced concrete network. This was very audacious, and you find much the same in Pierre Chareau's Maison de Verre in Paris (1932). The sad fact is that we have virtually lost the technique of combining glass lenses with concrete in this way.

Both buildings have expansive curtain walls with cleaning tracks, but Williams treats them as an architectural element—as a dematerialized cornice with the edge of the track floating free of the building.

Both Van Nelle and Boots had similar programs: how well do the functional solutions represent new industrial methods of production?

The Van Nelle factory packed tea, coffee, and tobacco, and Boots did the same for drugs. What is interesting is that they are both quite literally machines. The central packing hall of Boots has chutes that deliver pharmaceuticals to various points on the packing floor. In Van Nelle, a continuous chain of hanging platforms runs through the building and eventually goes from the packing plant to canal-side storage across the road. It is telling about each country's geography that the Van Nelle relies on a canal system of transport, while Boots feeds

The Van Nelle Factory in Rotterdam by Brinkman and Van der Vlugt (1930) was published in RECORD in 1929 and 1931 (opposite, top). It is known for the sweeping arc of its expansive glass curtain wall facade. Inside, poured-in-place concrete mushroom columns support floor slabs (opposite, bottom). The Boots factory in Beeston, England, by engineer Sir E. Owen Wiliams (1932; in RECORD 1933) was designed to expand when needed (above). It too has a concrete mushroom column frame and glass curtain walls (left).

The interior of the Boots factory (RECORD 1933) features a dramatic translucent roof (left) with circular glass discs embedded in wire-reinforced concrete. The general offices of the Van Nelle Factory (left, below) contained glazed conversation booths that allowed daylight to penetrate while still affording privacy to the employees; today the factory is an incubator for arts organizations.

into the universal rail system. Incidentally, you might note, there was no insulation in the Boots factory, only a continuous ring of heating pipes—entailing, by today's standards, a profligate consumption of energy.

The historian Henry-Russell Hitchcock wrote two essays in the April and May 1928 issues of RECORD, when he was a contributing editor. In the first, "The New Traditionalists," he discussed those architects (Eliel Saarinen, H.P. Berlage, August Perret, Willem Dudok) who adhered to Wrightean or humanist principles, and in "The New Pioneers," he focused on those who owed more to engineering developments and to cubism (Le Corbusier, Gropius, and J.J.P. Oud). While the two articles formed the basis of his book *Modern Architecture: Romanticism and Reintegration* (1929), Hitchcock only mentions Van der Vlugt (and not Brinkman) in passing in "The New Pioneers." Yet this firm, because of Van Nelle and other modernist works, would seem to merit particular attention for its pioneering architecture.

It is interesting that for the piece on "The New Pioneers," Hitchcock includes a photo of Karl Schneider's Ceramic Factory in Meimersdorf, Germany, which is little-known even now. However, as the essay reveals, he was very fond of J.J.P. Oud. If you look at Oud, he was a rather conservative architect compared to L.C. Van der Vlugt.

Furthermore, Schneider's tautly planar Ceramic Factory seems quite modest in comparison with the more structurally innovative and expressive Van Nelle and Boots factories. Certainly these factories now dominate the reputations of their architects. What happened to Brinkman and Van der Vlugt and to Owen Willams after designing such architecturally influential works?

At the end of his career, Williams was confined to building bridges and aircraft hangars, but throughout most of his life, he designed remarkable works—including other industrial structures for Boots, plus the Empire Pool, now known as the Wembley Arena (1934), and the Peckham Health Center in south London (1935). In all of these, he continued to explore the integration of engineering and plastic concrete form.

After Van Nelle, Brinkman and Van der Vlugt also had promising careers but designed mainly houses. In 1927, they also completed a meeting place in Ommen, the Netherlands, for the Indian mystic and Theosophist leader Jiddu Krishnamurti. [Later, the Nazis incorporated it as part of a concentration camp.]

As with many leading Dutch intellectuals of the time, the client of the Van Nelle, Cornelis (Cees) Hendrik van der Leeuw, was a Theosophist, and he, like others, saw a connection between this spiritual, cosmic philosophy and the abstraction of modernist architecture and art. Even now, there is an exhilarating spirit about both buildings that transcends their functional programs. ■

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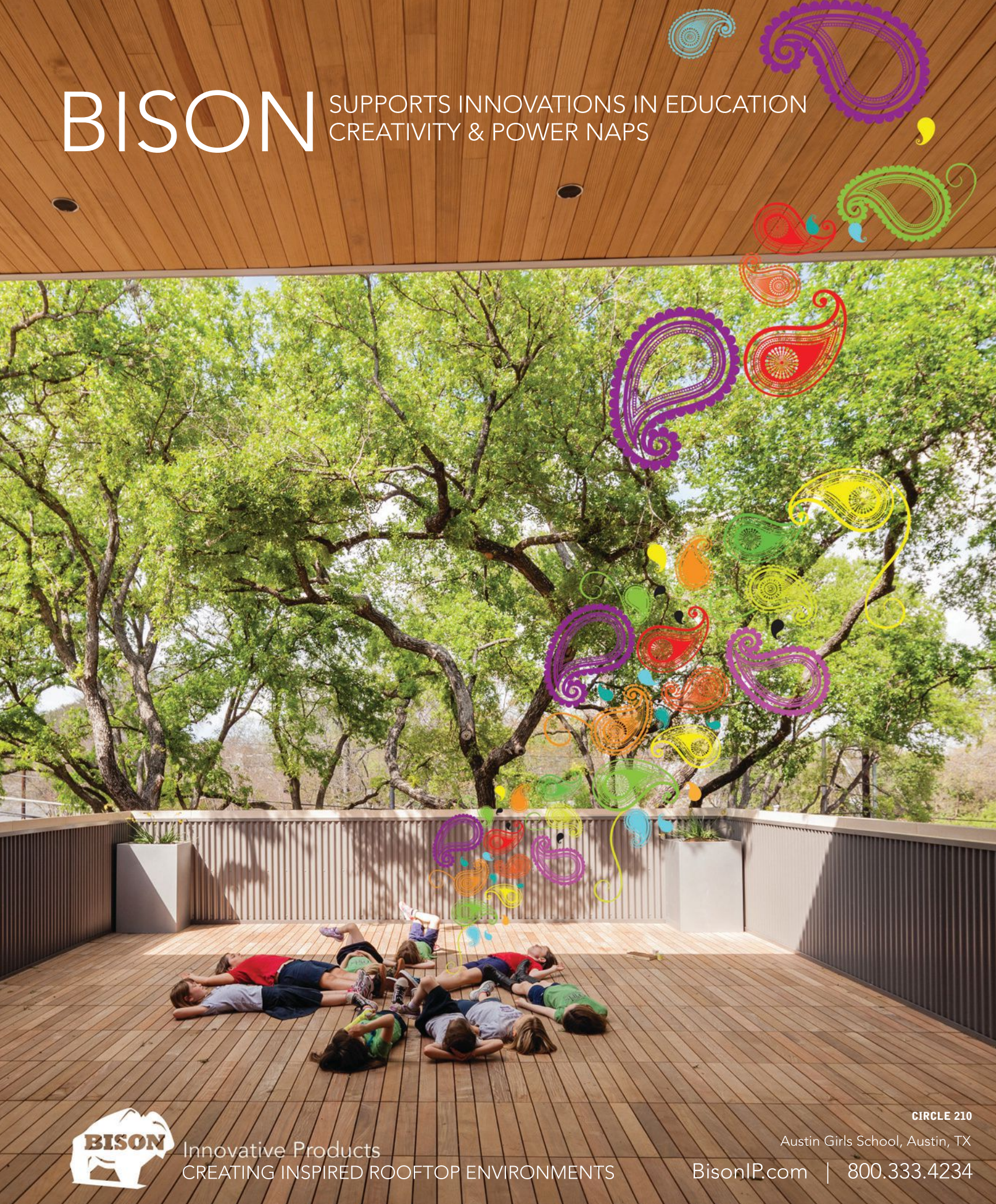
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Finely Tuned

Fernando Menis's idiosyncratic forms and rugged surfaces belie a polished concert-hall experience in northern Poland.

BY CHRIS FOGES
PHOTOGRAPHY BY IWAN BAAN

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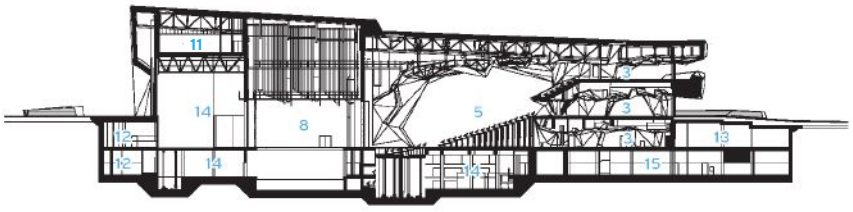
THE CKK JORDANKI concert hall emerges like an outcrop of weathered rock from an urban park in Toruń, in northern Poland. Its Spanish architect, Fernando Menis, has yoked such imagery to local architectural references and technical ingenuity to establish a strong character for the building while deferring to its sensitive setting on the edge of the medieval Old Town. While the form is intended to suggest a "natural object" in the landscape, facades are accented with the red brick of the city's celebrated gothic architecture, which finds more dramatic expression here as an innovative lining to two cavernous—and acoustically refined—auditoria.

Half buried to minimize intrusion on the skyline, the building comprises four visually separate concrete forms linked above ground by glazed enclosures and below grade by a shared basement. Approaching from the Old Town, the first volume contains offices and a café, while the second and third blocks house the chamber music and main concert halls. The fourth, containing technical equipment, is set into an embankment.

Inclined walls and cranked rooflines are crisply articulated in white board-formed concrete scored with angled control joints. Menis's treatment of these massive, almost blank forms begins a tectonic game that is further developed inside, offering multiple readings and subverting a visitor's understanding of the building's construction. On the face of each block, patches of béton brut are neatly excised to reveal a lumpy subcutaneous layer of broken red brick. This was created using Menis's own "picado" technique, in which masonry fragments are cast in concrete and the surface then chiseled with pneumatic drills to give a flush but undulating texture. The abraded aggregate is immediately familiar, resembling the predominant material of Toruń's gothic Old Town but made strange by its contemporary reinterpretation. The brickwork is a "tribute to the history of Toruń," says Menis, "but demonstrates that it is possible to be innovative while respecting the past."

Rugged picado lines deep angular openings in the facade. A cut into the base of the largest block marks the main entrance, while another creates a balcony in the overhang above. Beyond glazed entrance screens, the irregular planes of picado continue inside, forming foyers with crazily canted walls and emphatic bends and bulges in the ceiling. The red brick of the exterior, speckled with purples and burnt blacks, is here replaced by dark stone, reversing the chromatic balance. This porous volcanic tufa, characteristic of Menis's home, Tenerife, Spain, in the Canary Islands, provides acoustic absorption in noisy public areas.

Red "picado" brickwork in the facade (opposite) recurs in the chamber hall and the main concert hall (below). This space can be tuned by lowering five large white concrete shells, known as cupolas, to vary the reverberation times between 1.85 and 1.2 seconds.



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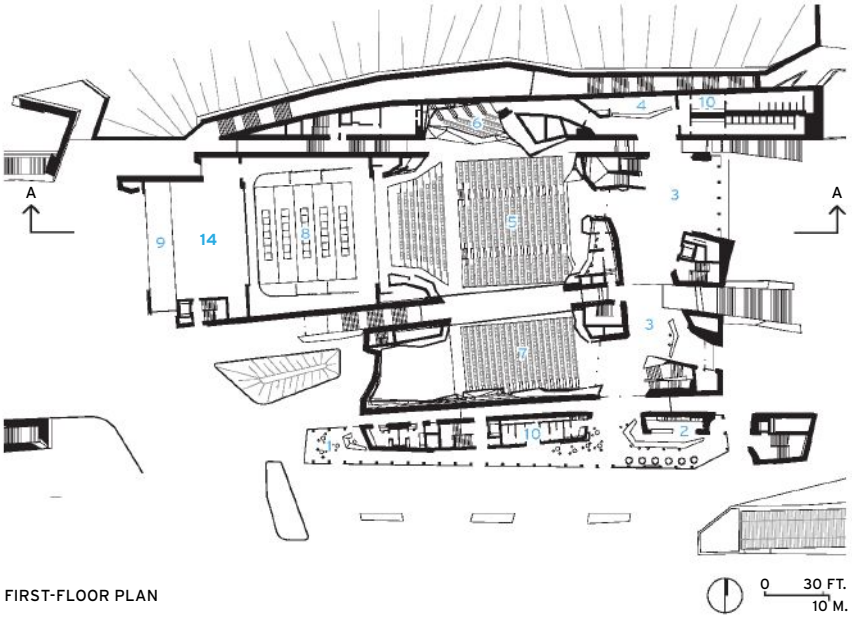

FIRST-FLOOR PLAN

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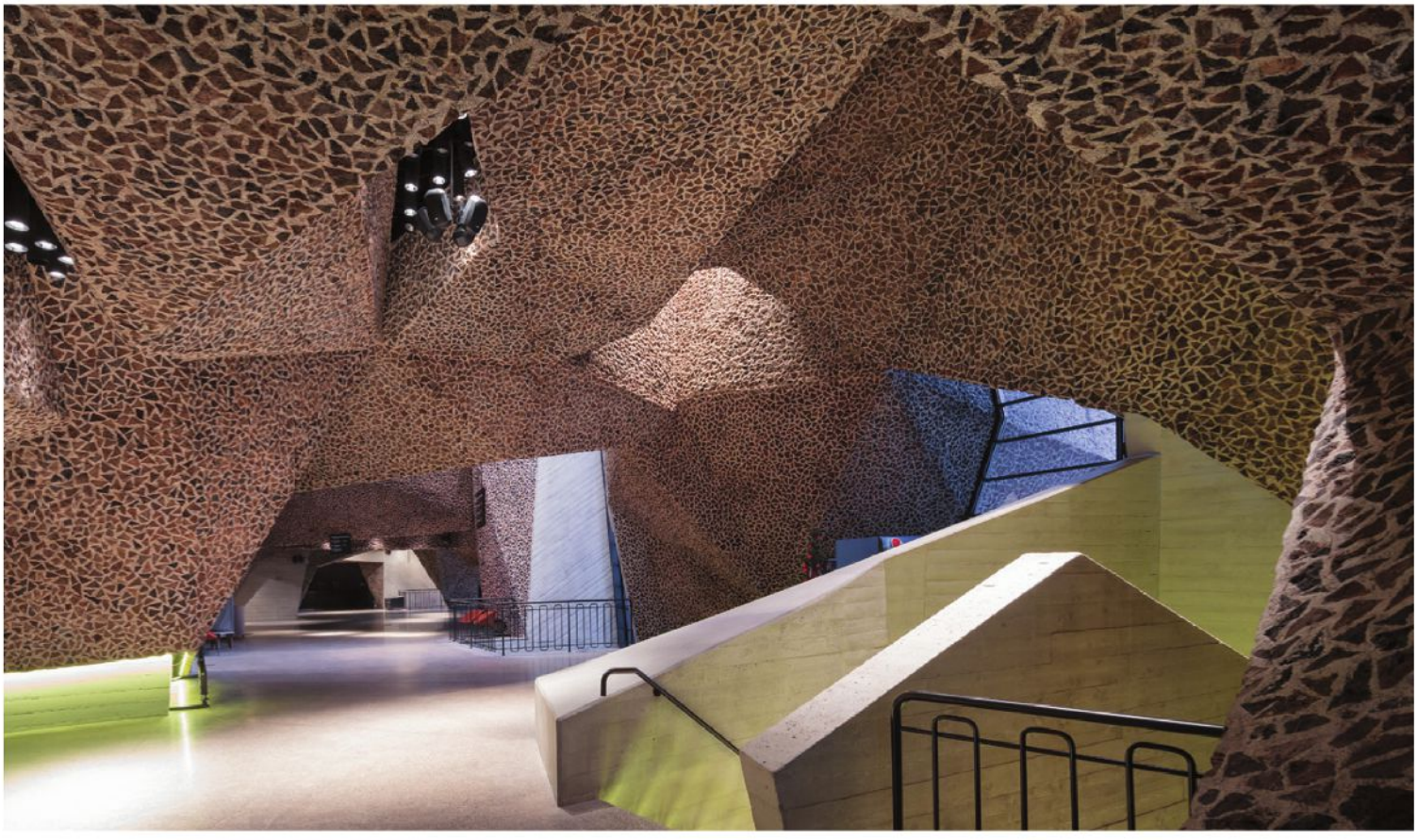
10 M.

1 RECEPTION
2 CAFÉ
3 HALL
4 COAT CHECK
5 MAIN CONCERT HALL
6 BALCONY
7 CHAMBER HALL
8 STAGE
9 EXTERIOR STAGE
10 RESTROOM
11 REHEARSAL
12 DRESSING ROOM
13 TECHNICAL
14 STORAGE
15 PARKING

While the evident weight of the material and the eccentric volumes of the foyers suggest that the spaces have been carved from solid matter, occasional cuts in the picado reveal the walls to be lined with precast panels, which are supported on steel brackets attached to the poured-in-place concrete structure. Concealed lighting casts a warm glow that seeps from the gaps.

Walking from the intimate, compressed foyers into the 882-seat main concert hall feels like entering a vast subterranean cave. Seating and stairs are set into buttresses, fissures, and boulders formed by folds in the walls. Shafts of daylight penetrate the rocky ribs and vaults of the roof through skylights, which can be covered during performances.

The angularity of the asymmetric, sloping planes of picado is softened by the material's bumpy texture and the surface's sinuous form. This provides metaphorical support to the architect's vision of "fluidity" in the building's circulation and use. The suggestion of flow in the interior "brings together the different functions and elements of the build-



ing so that they combine and play off each other," says Menis. Moreover, the open and intuitive circulation, with public routes running under the first block and over the fourth, and stairs descending directly to the auditoria from the park and the street, creates a close connection between the building and its setting.

Though the brief only called for a performance venue, Menis was determined to accommodate diverse events and exhibitions. Seating is fully retractable, and a metal screen separating the two halls can be opened to create a single large volume for up to 3,000 people (with standing room). Another metal screen at the back of the stage moves to allow performances for audiences in the park, where berms form an outdoor auditorium.

Adaptability is intrinsic to the operation of the concert hall itself, which can be acoustically tuned for either orchestral or theatrical performance. Five faceted concrete shells suspended from the ceiling are mechanically raised or lowered to alter reverberation times. Their dimpled surfaces visually echo the brickwork, whose own acoustic properties are the product of intense study. Broken masonry was laid according to a given ratio of triangles to other shapes, and in the "picking" process, a concave face was worked into each fragment to form thousands of fist-sized acoustic reflectors. When a pop band rehearsed in the chamber hall recently, the sound was clear, even, and as warm as the pink tones of the brick.

Variations on the material themes of brick and concrete occur in all secondary spaces—basement back-of-house areas for over 100 performers are robustly utilitarian, with exposed concrete masonry walls; poured-in-place concrete lines the rehearsal room; and office ceilings are formed of gabion cages with loose bricks. While geological imagery and picado are both features of Menis's work elsewhere—notably the Magma Art & Congress center on Tenerife (2005)—their application here is a distinct response to the particularities of Toruń. Visiting for the first time to prepare for the competition entry, Menis "fell in love with the city—its churches and the red brick." The care for both context and content evident in the concert hall is a powerful testament to that affection. ■

Stairs descending to the basement level from the street and park form a top-lit route through the building (opposite). The halls share foyers (ground level, above), where "picado" stonework peels away from the poured-in-place concrete structure, whose thermal mass regulates temperature.

credits

ARCHITECT: Fernando Menis Architect – Fernando Menis, principal; Karolina Mysiak, Jaume Cassanyer, Javier Espílez, team

DESIGN-PHASE CONSULTANTS: Martínez Segovia – José Antonio Franco (structure); José Luis Tamayo (stage equipment)

ON-SITE TEAM: STUDIO A4 Spólka Projektowa – Jacek Lenart, architectural supervisor; Fort Polska – Tomasz Pulajew, structure; Pedro Cerdá, acoustics

ON-SITE CONSULTANTS: ELSECO (electrical); Iskierski Mariusz, Biuro Inzynierskie (m/e/p); Pracownia Architektury i Urbanistyki SEMI (urban planning)

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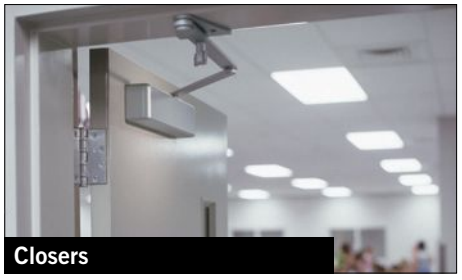

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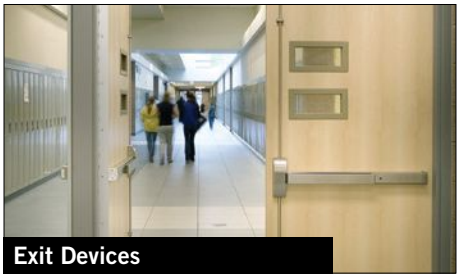

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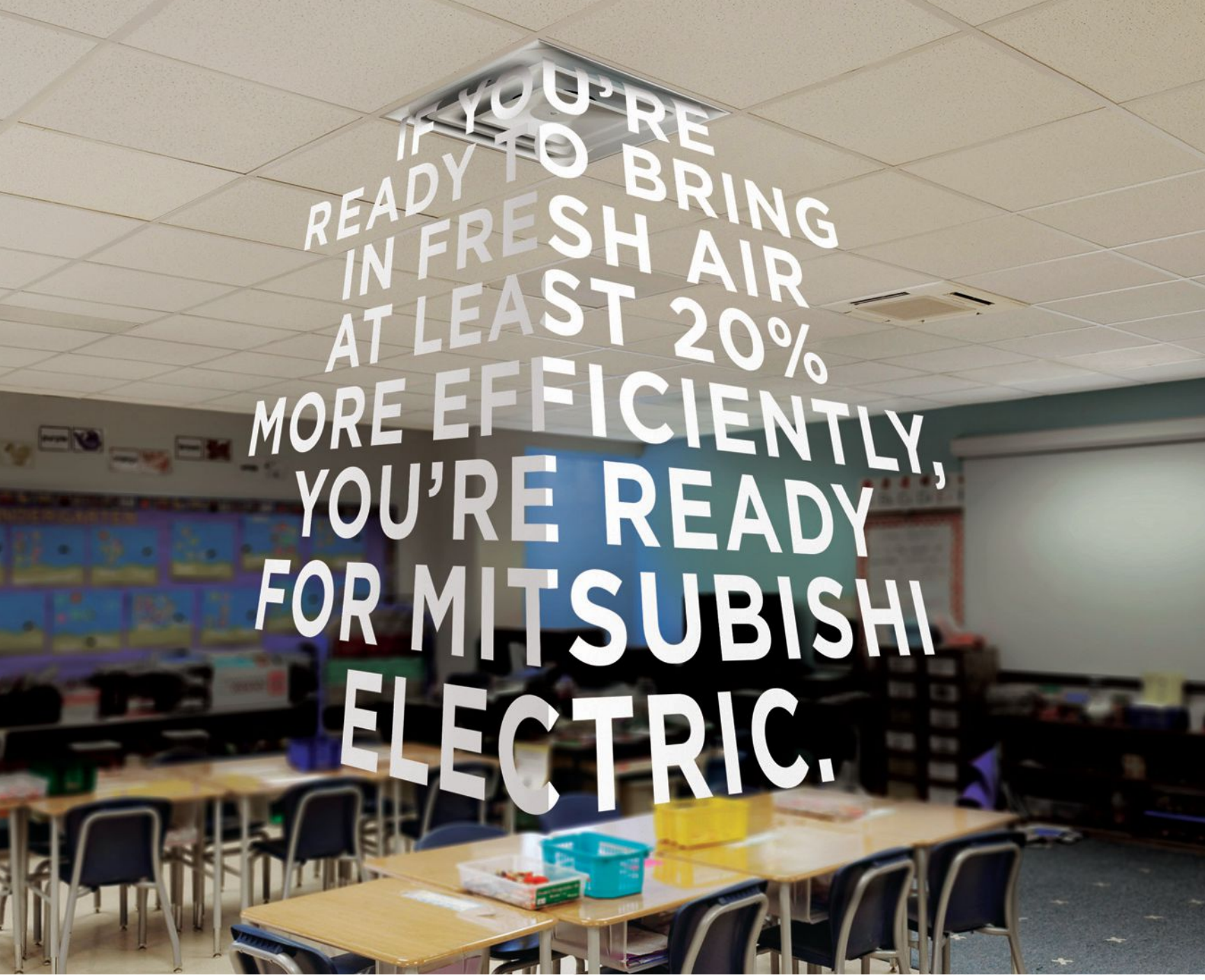

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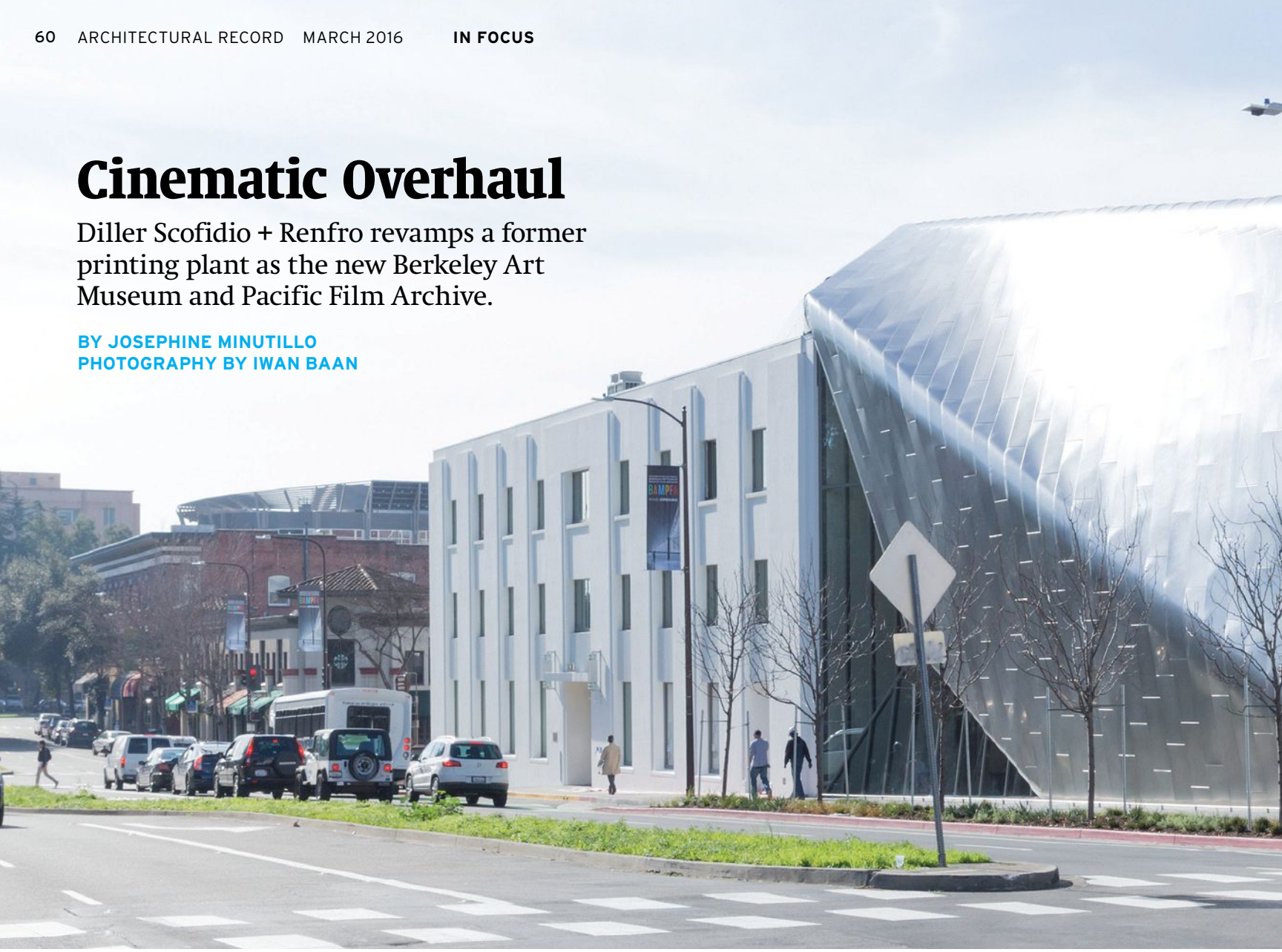
CIRCLE 244

Cinematic Overhaul

Diller Scofidio + Renfro revamps a former printing plant as the new Berkeley Art Museum and Pacific Film Archive.

BY JOSEPHINE MINUTILLO
PHOTOGRAPHY BY IWAN BAAN



A torqued-steel-clad addition is the centerpiece of the museum's new home within a restored 1939 printing plant, cantilevering over the museum entry (bottom) and culminating in a 16½-foot-by-28-foot LED screen at the back of the building (above).

A DECADES-LONG dilemma had plagued the University of California, Berkeley, over what to do about its art museum. The persistent problem—involving whether to tear down and what to build—ultimately involved not one but three buildings, and as many architects.

Through no fault of its own, the new Berkeley Art Museum and Pacific Film Archive (BAMPFA), designed by Diller Scofidio + Renfro (DS+R) and opened to the public on January 31, bears the burden of that history.

The old museum—a concrete bunker with terraced, spiraling galleries by Bay Area architect Mario Ciampi—is a rare example of a Brutalist structure that grew to be admired by the public after opening in 1970. A mere 27 years later, however, a campus survey found it noncompliant with current earthquake-safety standards.

Since the Ciampi building's gallery spaces would have been severely compromised by seismic upgrades, according to curators, the university sought an alternative space. The former museum faced talk of demolition and was fitted with exterior bracing, but eventually closed to the public. Now designated a landmark, it sits today without any clear plan for its future.

In the meantime, the university struggled to find an appropriate home elsewhere for its art collection—which includes 19,000 works, from Neolithic ceramics to contemporary photography—and film program. A stunning 2008 proposal by Toyo Ito for a three-story edifice of bent-steel plate with provocatively contoured galleries—and a reported construction cost of $143 million—fell victim to the great recession after years of design development. The university decided to pursue less expensive plans that would retain an industrial building, destined for the wrecking ball in Ito's scheme, on the same site.

According to DS+R partner-in-charge Charles Renfro, the repurposed printing plant, built in 1939, was "the perfect space for art." Behind the nondescript stark-white concrete exterior hid an industrial sawtooth roof with north-facing vertical skylights over the high-single-story portion of the building. (The three-story pile at the corner contains offices.)

Keeping that roof, however, precluded any possibility of constructing above it, save for one bay that was removed at the bend of the L-shaped building to insert DS+R's main intervention, a torqued behemoth, neatly tailored in strips of 18-gauge 316L stainless steel, that cantilevers like a marquee over the entry and lands behind the original building, to house a large

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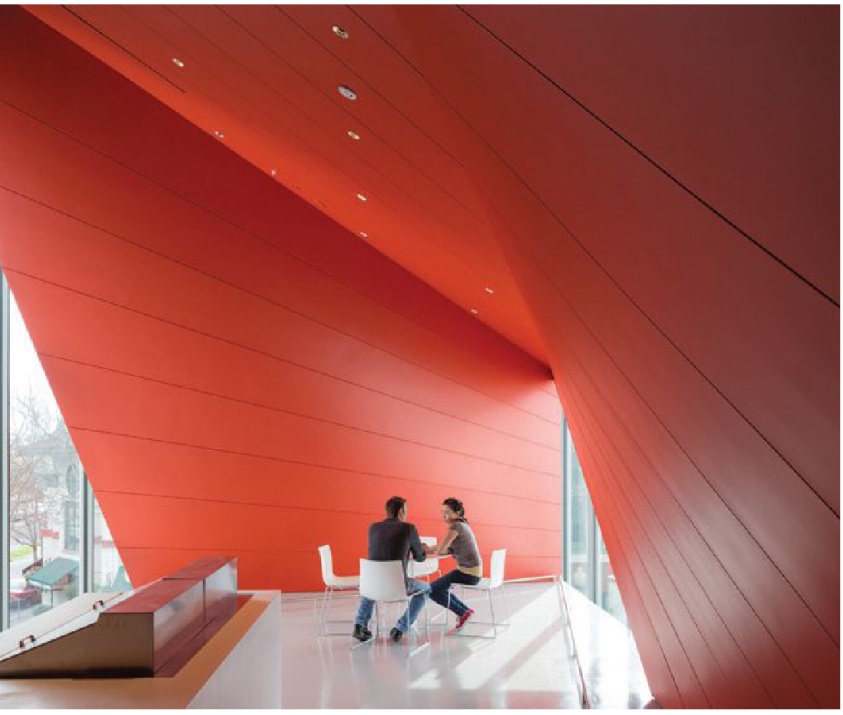
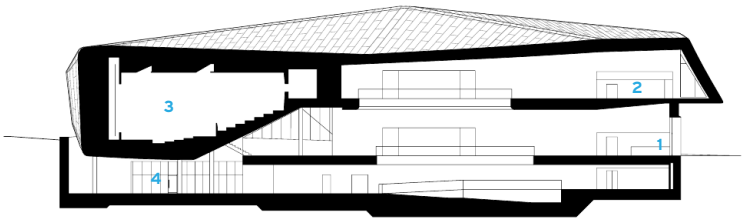
theater on the inside and an LED screen on the outside. Its upper-level café, the new building's most dynamic space, with twisting walls painted blood red, offers panoptic views of the breadth of the museum.

To provide additional galleries, the architects were forced to excavate below the building, which had previously only contained a small basement—what is now the forum. That stepped gathering and performance space sits below the Art Wall, a 60-by-25-foot surface for temporary murals. Both are visible from the generous street-facing windows, which DS+R enlarged from existing glass-block-filled openings to engage passersby at this heavily trafficked intersection, where the bucolic campus meets the grittier downtown part of Berkeley.

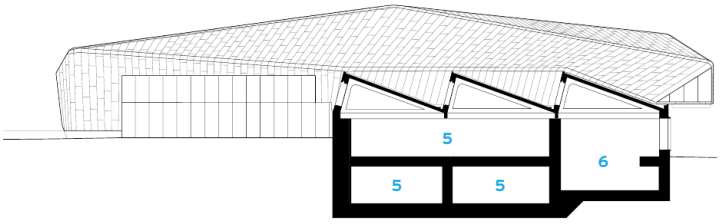
DS+R avoided what could easily have been dreary basement spaces by ramping





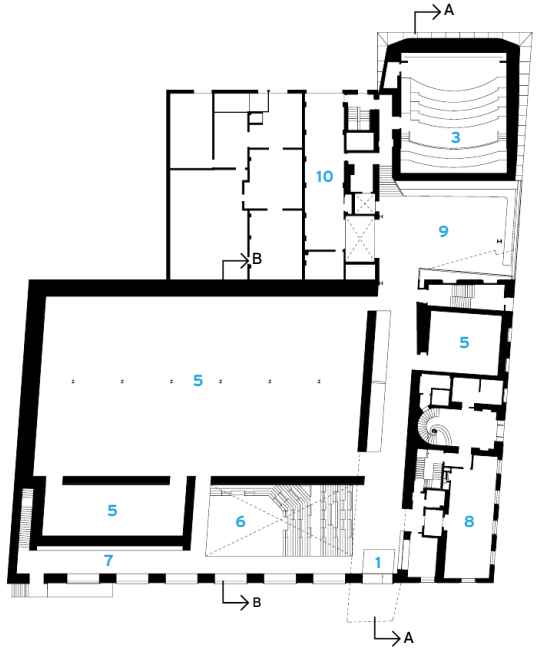
SECTION A - A

0 30 F
10



SECTION B - B
(THROUGH LOWER LEVEL)

0 30 FT.
10 M.



GROUND-LEVEL PLAN

0 30 FT.
10 M.

1 ENTRANCE
2 CAFÉ
3 LARGE THEATER
4 STUDY CENTER
5 EXHIBITION GALLERY
6 FORUM
7 STORE
8 OFFICE
9 ATRIUM
10 LOADING/ SHIPPING/ RECEIVING

the galleries and allowing ample daylight to stream into the study center from glass ceilings where the steel-clad addition meets the sidewalk. To get enough height there, though, and to protect against the apparently toxic ink-stained end-grain wood floor of the first story, the slab on grade had to be removed. The cracked concrete roof above it was also discarded—replaced with an insulated acoustical-steel deck—along with the party wall and rear exterior wall.

In fact, not much of the original printing press structure remains. Construction crews salvaged the steel bents of the roof truss, shipping them off-site to be restored. The glass skylights were replaced with insulated glazing units. The desired effect of that translucent clerestory, ideal as it might be for a gallery, was not evident at the opening exhibit, where light-sensitive pieces required most of the skylights' blackout shades to be drawn. In general, the small and subtle works get lost within the grandeur of the 18- to 28-foot-high space.

Of course, it's not DS+R's fault that the galleries are too grandiose for the art on display, or, perhaps, that the total project cost crept up to $112 million. (The museum is unable to specify how much of that went toward construction.) Contrary to popular belief, restoring a building, even one as straightforward as the 1939 structure, can get much more expensive than building from scratch. And satisfying the client's desire to maintain the original building required the design team to jump through many hoops. Ironically, another of DS+R's clients, the Museum of Modern Art (MoMA) in New York, infamously deemed those sorts of hoops impractical to save the more architecturally significant American Folk Art Museum building, now razed, for MoMA's expansion—plans for which have since been dramatically scaled back.

Though the intention was to pursue an economically viable building post Ito, pound for pound, the university may have come up short. At 83,000 square feet—more than half of which were existing—the new BAMPFA is only about two-thirds the size of Ito's building and 20,000 square feet smaller than even Ciampi's. And in taking on the renovation of a building that the university didn't regard highly enough to preserve in the first place, DS+R could not help but find itself behind the eight ball, its modest but still costly intervention certainly unable to live up to the memory of the now beloved Ciampi building or to the excitement over Ito's bold proposal, which would have been the Pritzker Prize–winning Tokyo architect's one and only building in the U.S. In the end, after a nearly 20-year saga, we're left wondering if the choices made for each of these buildings were the right ones and, as DS+R founding partner Elizabeth Diller herself asked in the wake of the Folk Art Museum controversy, "In preservation, what are the limits of adaptive reuse?" ■

The museum's café is prominently perched, the apex of a sweeping vertical space (opposite, bottom) with views over the busy street (opposite, top). The main galleries soar to 28 feet at the top of the sawtooth roof truss (this page).

credits

ARCHITECT: Diller Scofidio + Renfro

ARCHITECT OF RECORD: EHDD Architecture

ENGINEERS: BKF Engineers (civil); Forell/Elsesser Engineering (structural); Stantec (mechanical); Degenkolb (shoring)

CONSULTANTS: Simpson Gumpertz & Heger (facade); Hargreaves Associates (landscape); Tillotson Design Associates (lighting); Jaffe Holden (acoustical); Fisher Dachs Associates, Boyce Nemec (theatrical/AV)

GENERAL CONTRACTOR: Plant Construction Company

SOURCES

METAL PANELS: MG McGrath

FURNITURE: Arper, Herman Miller

PAINT: Benjamin Moore, Glidden

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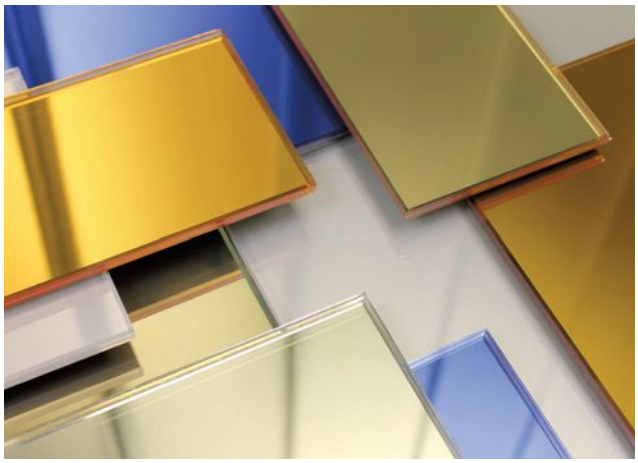
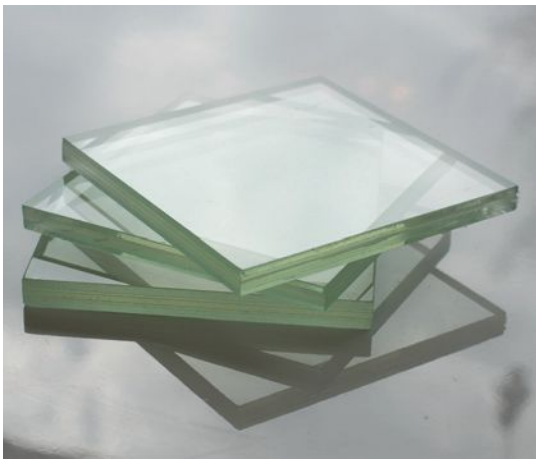
CIRCLE 227

products glass and glazing

PLAYING WITH COLOR AND TEXTURE, THESE TRANSPARENT ITEMS OFFER MORE THAN WHAT MEETS THE EYE. **BY JULIE TARASKA**





Glamir

Bendheim bendheim.com

Produced using specialty low-iron glass, this collection of luminous architectural mirrors comes in jewel-like tones until now thought unachievable, such as champagne, pale gold, and ocean blue. Options include custom colors, surface textures, and sizes up to 47" x 120". Able to withstand daily cleanings, the mirrored glass also suits hospitality projects and high-traffic areas.

CIRCLE 101

Childgard

Global Security Glazing security-glazing.com

Designed for use in schools and childcare facilities, this 5/16"-thick laminated safety glass meets ASTM F1233-08 security-glazing standards for ballistic impact and forced entry. It is ideal for new windows and retrofits, as well as interior and exterior applications. It also may be manufactured with PPG Solarban and Guardian SunGuard products, incorporating various tints and low-E coatings.

CIRCLE 102

Riserva

Therma-Tru thermatru.com

Comprising Oceana glass embedded with decorative wrought-iron elements, these door panels offer privacy while admitting natural light. The dozen shapes and sizes—including a 21" x 15" option—fit doors 6'8", 7', and 8' in height. The various designs harmonize with a range of building styles, among them Old World, Mediterranean, and Southwest.

CIRCLE 103

True Fade

Walker Glass walkerglass.com

The newest entry in the Textures line offers an etched finish that subtly transitions from opaque to transparent, balancing privacy and light penetration. This custom solution for interiors and exteriors may be applied to glass up to 142" long and ¾" thick. The fade effect may stretch from 4" to 15', with horizontal or vertical orientations possible.

CIRCLE 104

Solarban 90

PPG ppgideascapes.com

This clear, low-E glass offers a solar-heat-gain coefficient of 0.23—a 15% improvement over sister product Solarban 70XL. It also boasts a 51% visible-light transmittance and impressive 2.22 light-to-solar-gain ratio. Taken together, these qualities can reduce up-front HVAC costs, increase energy efficiency, and allow for more extensive daylighting.

CIRCLE 105

1K Fulton

Skyline Design skydesign.com

To complement Hartshorne Plunkard Architects' transformation of a Chicago cold-storage facility, which the firm remade into the 1K Fulton office and retail space, Skyline Design reproduced photos of icicle formations in the building's old refrigeration system. LEDs backlight the images on the glass panels, which were created via a four-color AST I/Etch printing process.

CIRCLE 106

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The Tower at PNC Plaza includes special perimeter spaces that are designed to promote circulation and collaboration between floors. These double-height “neighborhoods” promise variety and a strong connection to the surrounding environment.

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CIRCLE 211

The Tower at PNC Plaza: Roller shade and louvered blind automation by SolarTrac® from MechoSystems.

Blurred Lines

The distinction between contract and residential furniture continues to fade.

By Julie Taraska

Gemma

Designed by Daniel Libeskind, Gemma comprises a chair, sofa, and sofa system (prototype shown) for private and public spaces. Gemstones inspired the pieces' multifaceted geometry, but don't fear: the asymmetric angles are not only padded but also covered in a choice of leather or ombre Blur upholstery.

moroso.com

CIRCLE 107

Shapeshifter

Users can mix this contract carpeting's colors and sizes as well as install it in a range of patterns, including herringbone, parquet, and brick. Made from Antron Lumena Type 6,6 nylon, this NSF 140– and Cradle-to-Cradle–certified covering comes in 14 hues, two tile formats, and one broadloom option.

bentleymills.com

CIRCLE 108

Ode

This family of 36W LED table, floor, and surface-integrated lamps use touch technology to turn on, off, and switch between two light settings. Diffusers beneath the spun-steel shade soften the pools of illumination, rendering it suitable for task and ambient use. The fixtures, designed by Sam Hecht and Kim Colin, are available in two colors and five heights.

hermanmiller.com

CIRCLE 109

Puzzle Seat

Taking a cue from the company's own Puzzle tables, which can be combined in numerous ways based on need and preference, these curvilinear perches offer users a choice of seating height and direction. The upholstered pieces are available in 35 fabrics and three sizes. They come with three base options, including four solid-wood feet, shown.

vs-network.com

CIRCLE 110

Parallel

This soft-seating and table collection may have been designed for reception areas, but the pieces can be used far beyond meet-and-greet spaces—the sofa's wide arms double as work surfaces for laptops, for example, as well as seats for impromptu team sessions. Available with HBF Textile upholstery and four base finishes.

allsteel.com

CIRCLE 111

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products contract furnishings

MCD

With its high tufted sides and enveloping interior, Marie Christine Dorner's eponymous sofa offers users privacy and comfort. It is available in two- and three-seat versions and as an armchair. Upholstery may be custom or one of six standard options.

ligneroset.com

CIRCLE 112

Ology

This series of standing desks can be specified with antimicrobial protection molded into its parts—an ingenious way to protect workers' health in both communal and private spaces. Available in electric and manual versions, the wood-and-steel Ology also boasts an integrated rail that supports lighting and adjustable computer monitors.

steelcase.com

CIRCLE 113

Designtex + West Elm

Combining the performance of contract textiles with the tactile appeal of residential upholstery, these 12 fabrics debuted at NeoCon on West Elm's Workspace line of office furniture. Now available to all, each utilizes yarn made from recycled panels; offered patterns include hemstitch, herringbone, and bouclé.

designtex.com

CIRCLE 114

Cochran

Named after its designer, landscape architect Andrea Cochran, this trio of outdoor pieces features minimal lines and sculpted aluminum frames. The armchair and chaise have mesh seats made from Phifertex Plus, a stain- and mildew-resistant Greenguard Gold–certified textile. MeldStone ultra-high-performance concrete tops the collection's low side table.

landscapeforms.com

CIRCLE 115

Series 430

Designed by Vernon Panton in 1967, this multipurpose stacking chair never went into production—until now. Its slim, powder-coated stainless-steel frame holds a generous seat, which is in turn supported with elastic webbing. It comes in a choice of wool or velvet Kvadrat upholstery.

verpan.com

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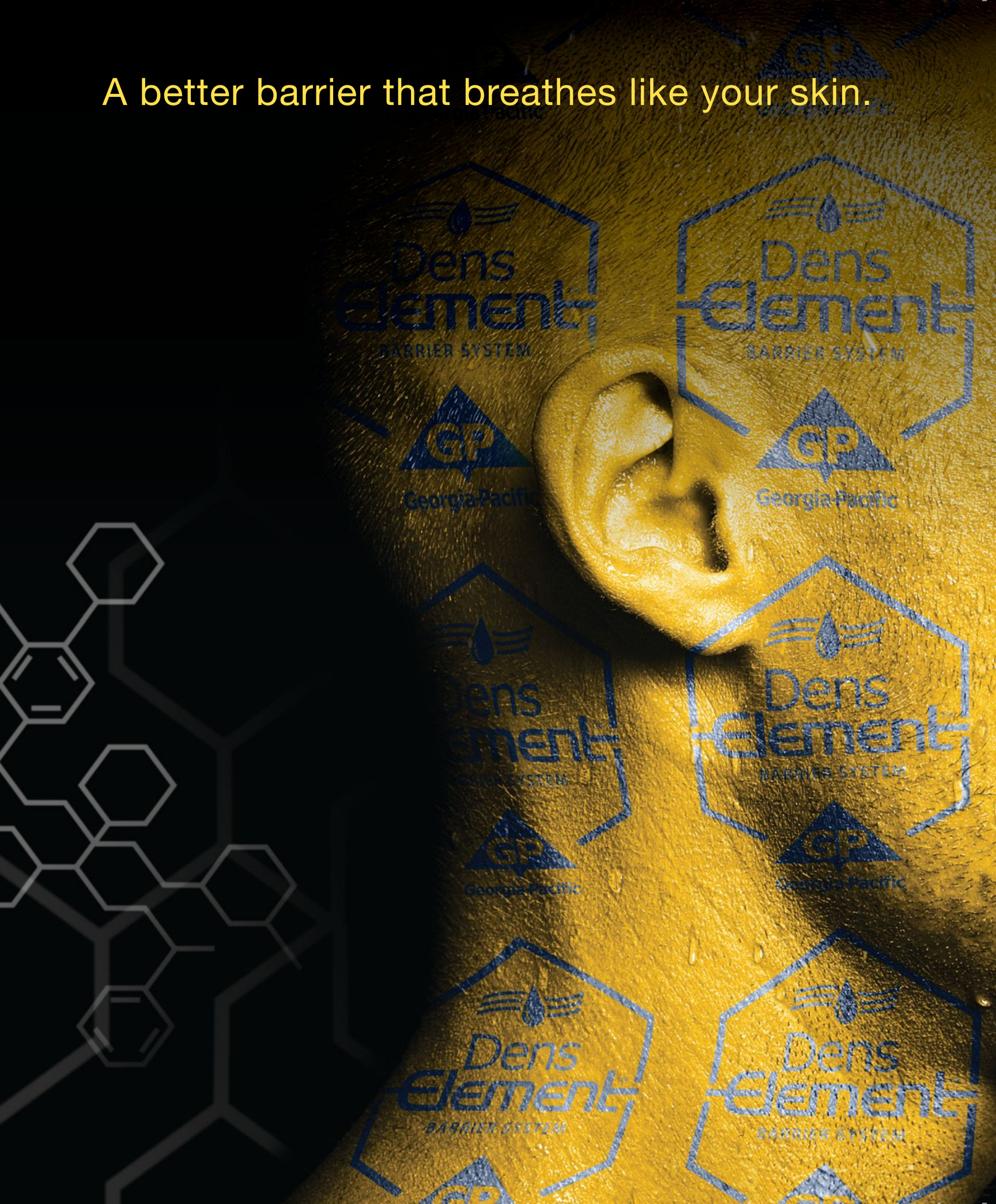

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INDUSTRIAL STRENGTH

Although generally not the most glamorous building type, industrial and infrastructure commissions have long been a draw for architects. These quotidian projects present opportunities to enrich workaday structures with unexpected programmatic elements and surprising qualities. In the following pages, we look at several such examples, including a university energy center that offers educational opportunities for students and the community, a manufacturing facility that promotes the brand and improves working conditions for employees, and a water-filtration plant that doubles as a recreation amenity. These new ways of thinking about utilitarian buildings make for good neighbors and result in exceptional design.

PHOTOGRAPHY: © TIM GRIFFITH

STANFORD UNIVERSITY ENERGY FACILITY, PALO ALTO, CALIFORNIA, ZGF ARCHITECTS

Porto Cruise Terminal | Porto, Portugal | Luís Pedro Silva

HIGH-WATER MARK

A cruise-ship terminal's exuberant form connects passengers and is a destination in its own right.

BY DAVID COHN

PHOTOGRAPHY BY FERNANDO GUERRA

STEP UP Set on a pier reaching 2,500 feet into the Atlantic to accommodate larger boats, Porto's Cruise Ship Terminal attracts local visitors from nearby beaches with its striking oval profile and tiered rooftop lookout, reached via spiraling ramps from the ground.

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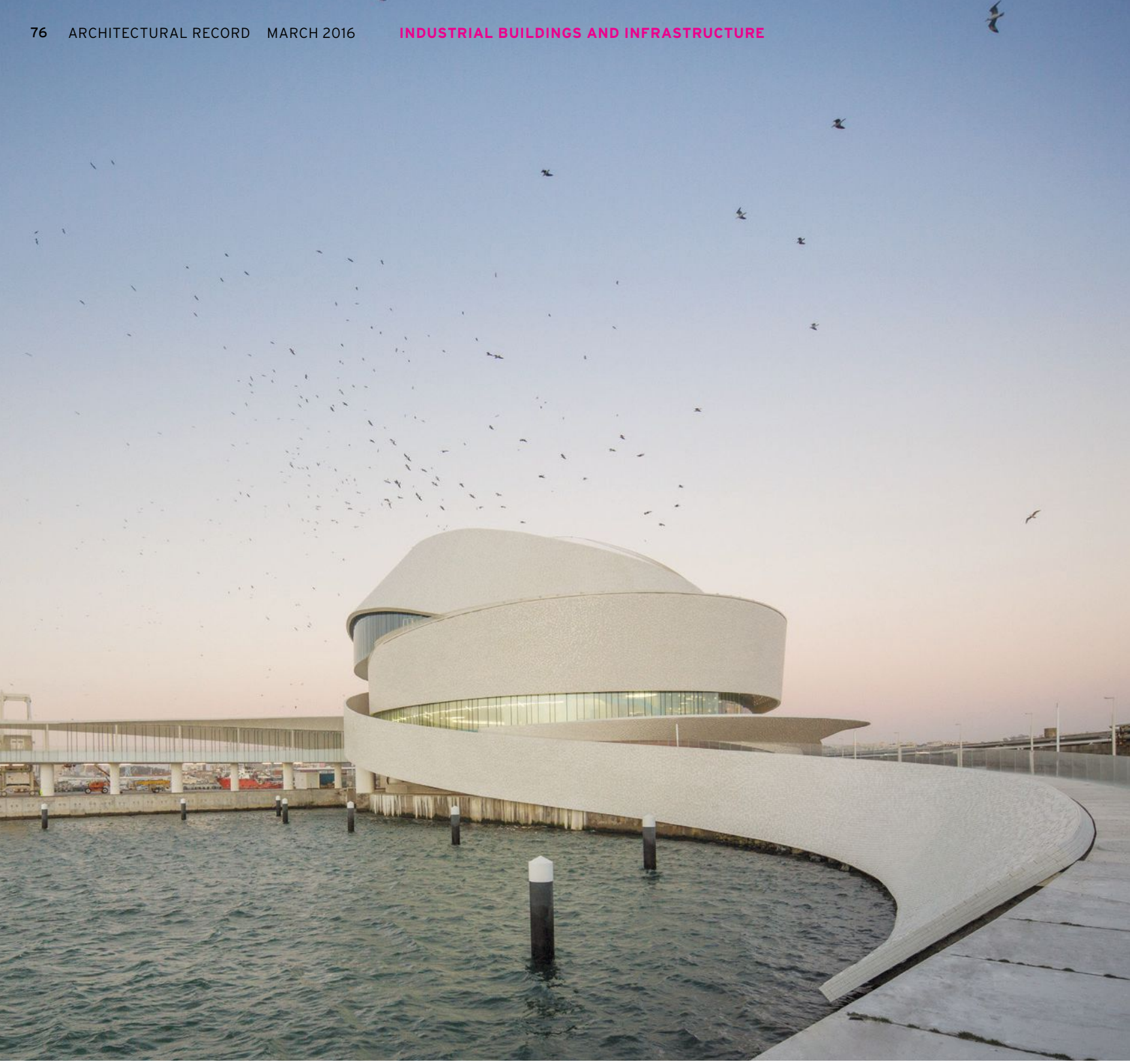


To create the iconic curving forms of the cruise-ship terminal in Porto, Portugal, architect Luís Pedro Silva began working from the project's territorial context rather than simply seeking a display of formal prowess. The powerful oval drum of its main volume, with its spiraling central atrium and exterior ramps, is charged with both centripetal and centrifugal force, gathering all the vectors of movement that come together in the terminal from sea and land, and spinning them back out again to their various destinations.

Before receiving the commission, Silva, who has degrees in architecture and urban planning from Porto University, worked on a strategic plan for the entire port as a member of a team of economists, engineers, and other specialists. The building and its new dock bring together the group's ideas for increasing the port's efficiency, promoting a growing tourist industry, and improving connections to the area's attractions.

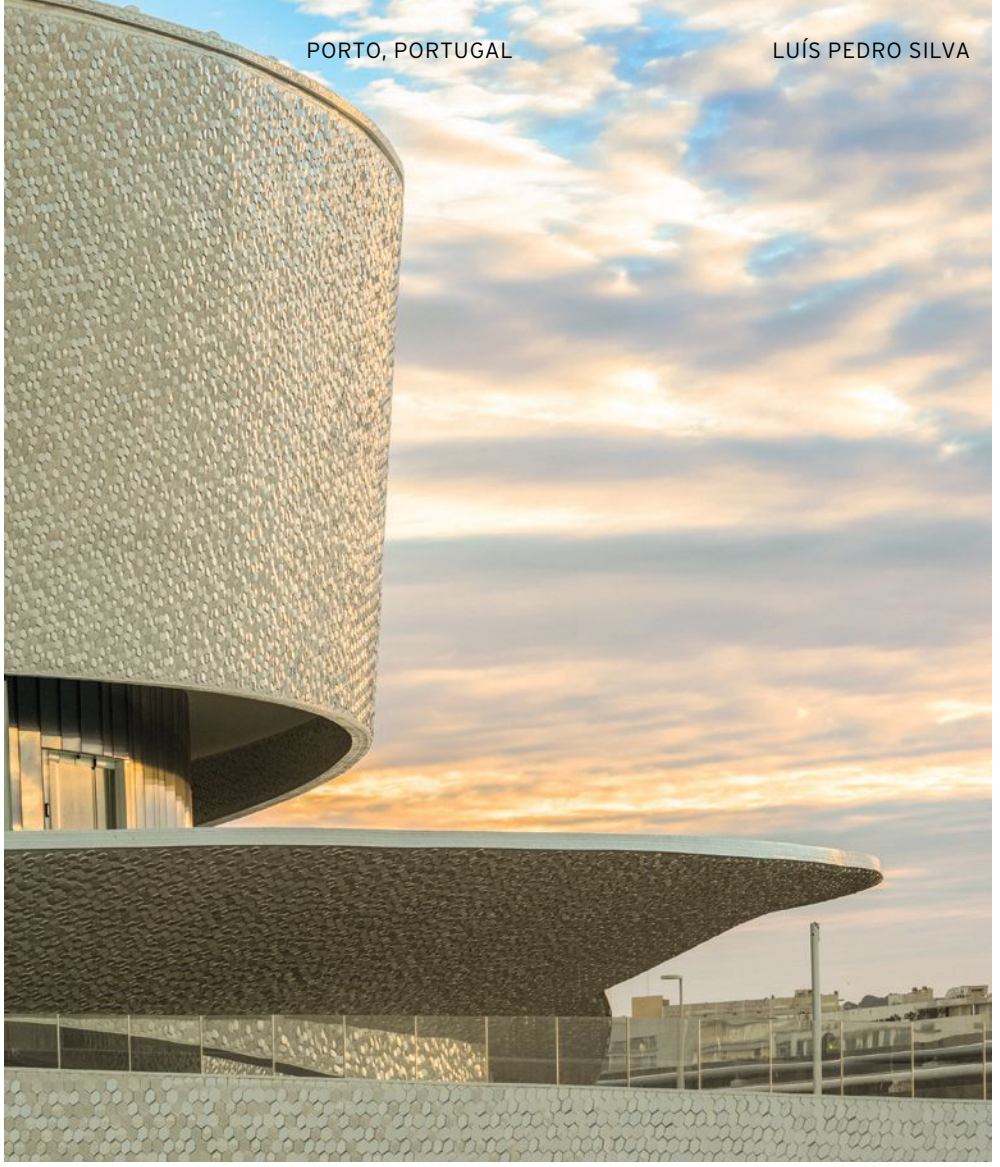
Leixões, the port, occupies a small inlet on the Atlantic Ocean 6 miles north of the historic city center of Porto. It is

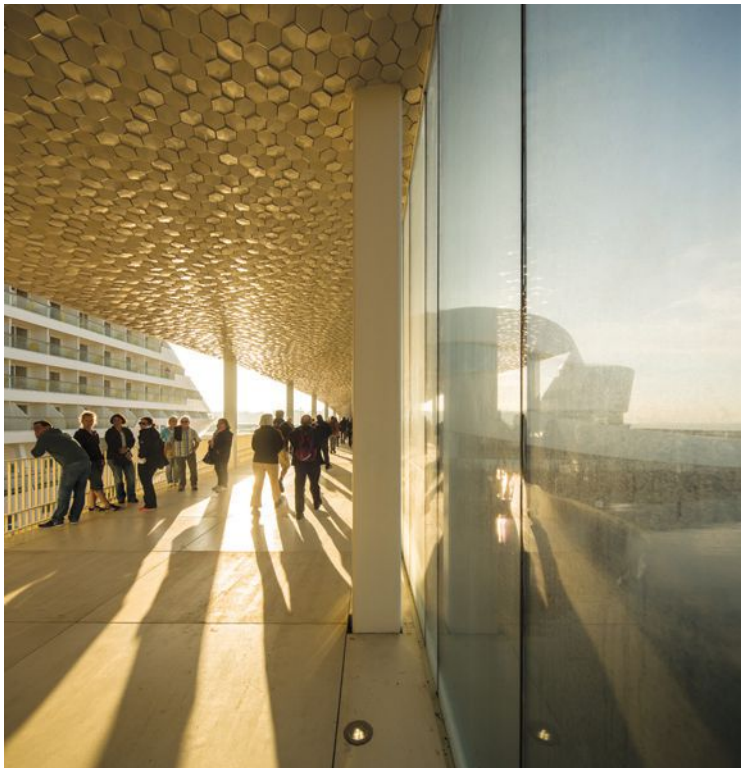
protected by two breakwaters that reach more than 2,500 feet into the sea, each with a dock on its harbor side. The tightly confined waterway houses facilities for container ships, oil tankers, a fishing fleet, and a recreational marina. It's a node of heavy industry that interrupts the rocky beaches of the coast, separating seaside promenades designed by Portugal's two Pritzker Prize winners: Eduardo Souto de Moura to the south, in Matosinhos, and Álvaro Siza to the north, in Leça da Palmera, where his outdoor swimming pools and Tea House are nestled into the rocks (RECORD, February 2015, page 84).

In the first phase of the plan, finished in 2011, Silva and his team moved the cruise-ship dock from the inner harbor to a new pier at the end of the southern breakwater, for more direct access to the city and to accommodate ships up to 1,000 feet long. The terminal was completed in a second phase last year. In the near future, the pier and terminal will open to the general public, allowing the building, with its rooftop viewing deck, to truly function as a destination rather than just a curiosity when seen from Souto de Moura's seaside promenade, where its dramatic forms stand out against the horizon.

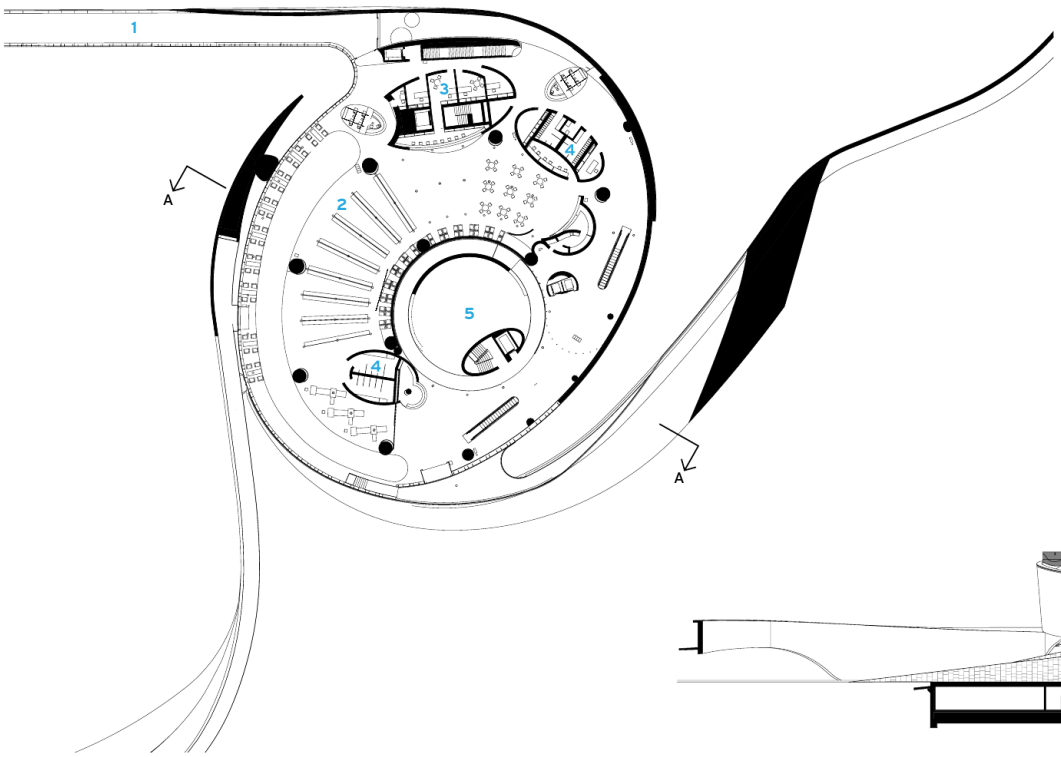
Silva set the terminal in the elbow of the angled breakwater, and in plan it resembles a hinge or spring, with ramps and arms curving out in different directions toward the marina, the new pier, and the shore. Inside, these pedestrian paths come together in a spiraling oval ramp around the central atrium. The uncoiling arms diagram the different systems of movement through the building. From a cruise ship, for example, a breezeway carries passengers over the service areas of the dock to the terminal. Ramps and escalators bring them down to the ground level, where they pass through customs and baggage handling (or vice-versa), to connect to tour buses or smaller boats for trips to the city and the Douro wine region, or eventually to a tram line that is planned to run along the coast.

In the original program, the upper section of the terminal was meant to house a shopping concourse and a restaurant, but Portugal's ongoing financial slump made investors hard to find. While Silva was developing the design, these floors were taken on by the University of Porto's Marine Science and Technology Research Park. The architect rather awkwardly converted the commercial spaces into laboratories, with floor-to-ceiling glazed storefronts facing the atrium but with no exterior windows, and with offices on mezzanines accessed via spiral stairs. He installed a research aquarium in the base-

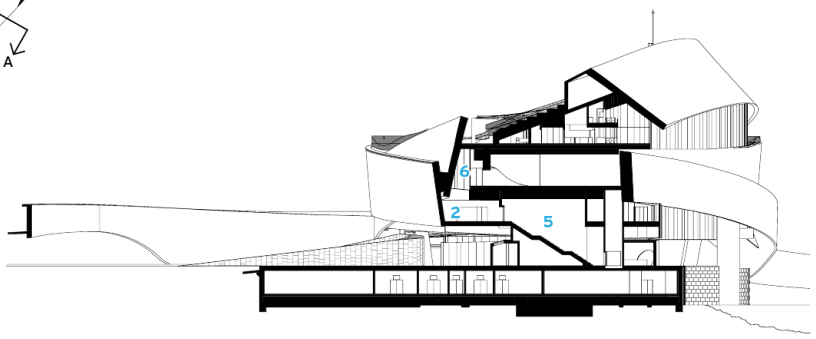




WRAPAROUND
The terminal's massing is like a looping ribbon, with ramps uncoiling from the central drum toward a marina and the shore (opposite). Curved walls are finished in hexagonal tiles with tilted faces, scattering natural light (above). A covered breezeway connects ships to the terminal (left).

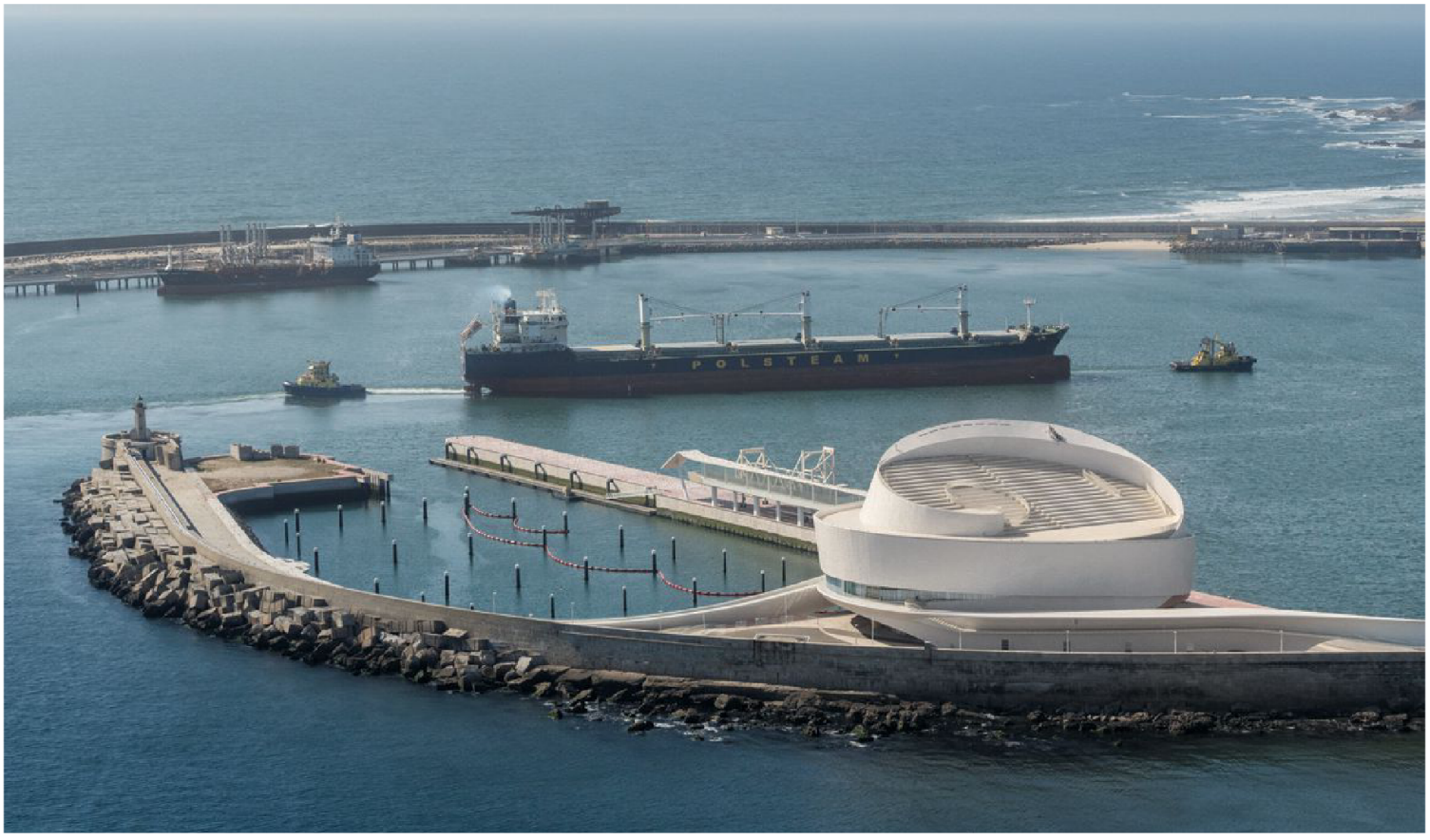


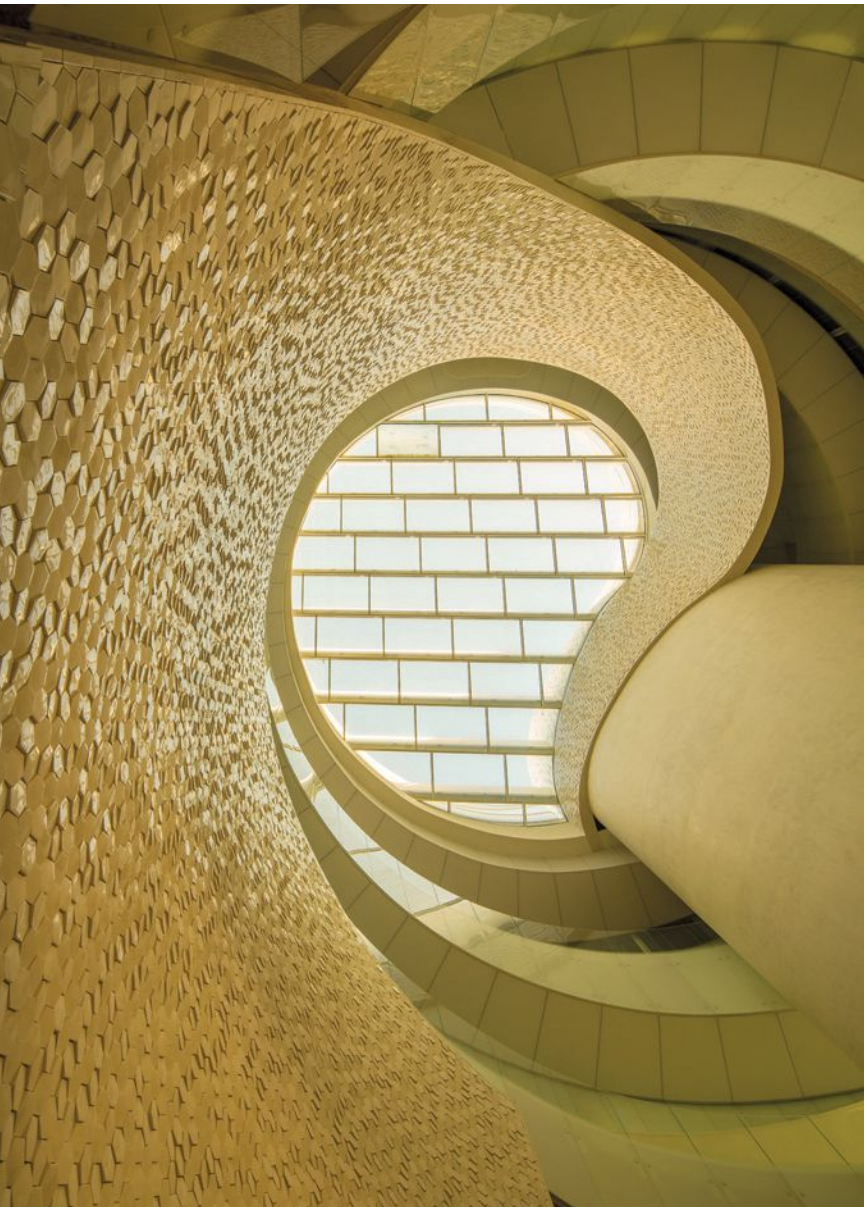
1 CRUISE-SHIP QUAY
2 BOARDING AREA
3 OFFICE
4 RESTROOM
5 ATRIUM
6 LAB



LEVEL-ONE PLAN 0 50 FT. 15 M.

SECTION A - A 0 50 FT. 15 M.





INNER CIRCLE The building's forms diagram movement through it and connections to sea and land (opposite). The central atrium is a whorl of curving ramps and structural walls around a vertical circulation shaft (left). The main concourse includes ample spaces for waiting passengers (below).

ment, and converted the top-floor restaurant into a multiuse event space. Yet this unlikely partnership with the university does bring life to the building, as well as steady revenue, and allows the center's scientists to be close to the sea.

Silva worked with local manufacturers to develop a hexagonal ceramic tile with a tilted face to clad the building, updating the Portuguese tradition of painted-tile facades. He rotated the tiles, placing them in varying relations to each other, like barnacles or shells, to create an uneven surface. "They give the building a human scale," he says.

Glistening in the light, the curving walls of the building read like ribbons looping around themselves in an irregular tangle. Echoes of two Guggenheims are evident—Wright's in New York and Gehry's in Bilbao. Silva affirms, however, that Siza is his most important reference: "The way our bodies move in a space, and the way a space invites you forward." Like Souto de Moura, whose early buildings were very Miesian, Silva may be using Wright and Gehry to mitigate the influence of Siza's eccentric, rectilinear forms. Whatever the case, he develops the terminal's looping ramps and drum with an elegant economy of means, and makes this formal repertoire his own. ■

credits

ARCHITECT: Luís Pedro Silva, Arquitecto

ENGINEERS: GM Engenharia (mechanical); Rodrigues Gomes & Associados (electrical); Newton Consultores de Engenharia (structural)

CONSULTANT: dBwave.i (acoustics)

GENERAL CONTRACTOR: ACE

CLIENT: Administração dos Portos do Douro, Leixões e Viana do Castelo

SIZE: 188,000 square feet

COMPLETION DATE: March 2015

SOURCES

ROOFING: Sika

CURTAIN WALL: Jofebar, Metaloviana

RESILIENT FLOORING: Forbo

CONVEYANCE: Orona

DAYLIGHTING: Solatube

CONTROLS: Sisint, Bose

ABOUT-FACE
At once a piece of infrastructure and a campus gateway, OSU's East Regional chiller is composed of two airy volumes. The glazed lower level is covered in a translucent frit to conceal the hulking machinery inside. An aluminum screen, meanwhile, shields a series of rooftop cooling towers.

The Ohio State East Regional Chilled Water Plant
Columbus | Leers Weinzapfel Associates

CHILLING OUT

A new chiller facility at Ohio State University satisfies rigorous infrastructure demands while maintaining a delicate presence on campus.

BY ANNA FIXSEN

PHOTOGRAPHY BY BRAD FEINKNOPF

In 1908, Estelle Clark Thompson, the wife of Ohio State University's fifth president, stood on the Columbus campus's new football field and, with a flask only of water, christened it in the name of "clean athletics and manly sport." The benediction worked all too well: less than two decades later—with five conference championships and crowds exceeding 50,000 spectators—OSU football was compelled to relocate to a roomier stadium alongside the Olentangy River.

The old football field may be long gone, but Mrs. Clark Thompson's temperance-era rite was oddly prophetic. More than a century later, on the footprint of its grandstands, Ohio Field has been reincarnated as a new chilled-water facility. And counter to its cumbersome name and heavy-duty program, the East Regional Chilled Water Plant, designed by Boston-based firm Leers Weinzapfel Associates and completed last April, is an exercise in both elegance and efficiency.

"On a campus, there is a place for electrifying buildings that have to do with the campus mission," says firm principal Jane Weinzapfel. "This kind of building is often a supporting player. It's quieter."

With 58,663 students on its main campus, OSU is one of the nation's largest universities—and growing. Six years ago, administrators launched a 100-year campus plan that called for, among other directives, increased investment in infrastructure. The university identified the need for two new chiller plants, facilities whose water is used to cool and dehumidify air supplied to campus buildings. One of the chillers, completed by Ross Barney Architects in 2013, accommodates a medical district on the south end of campus; the other, on the east side, would serve a new chemistry building, residence halls, and a future arts district. The university ultimately brought on Leers Weinzapfel for the new project because it was impressed by other plants in the firm's portfolio, including a massive curved facility at the University of Pennsylvania (RECORD, October 2001, page 106).

The new 23,000-square-foot building sits among others in a range of architectural styles—including a concrete parking garage and a Beaux Arts brick structure—along North High Street, the easternmost edge of campus and a major commercial corridor connecting the University with downtown Columbus. The architects were faced with the challenge of preserving green space, creating a hospitable environment for technicians, and pleasing the university's board, which was wary of putting an industrial plant on a rapidly developing thoroughfare.

Rather than placing a bulky structure along the sidewalk, the architects wanted to make the building as compact as possible, so,

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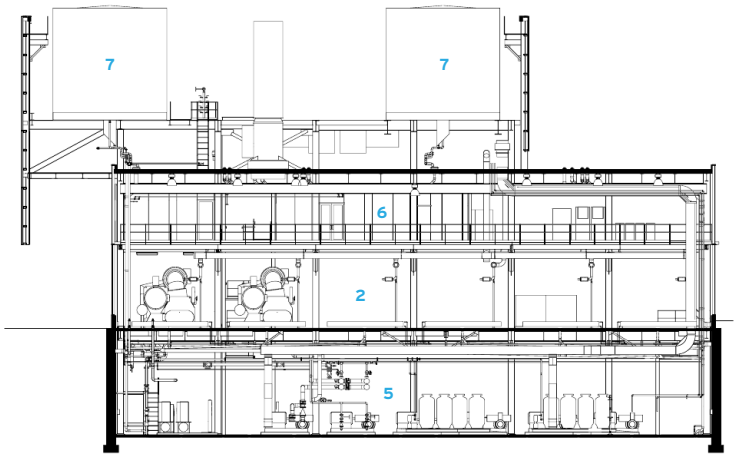

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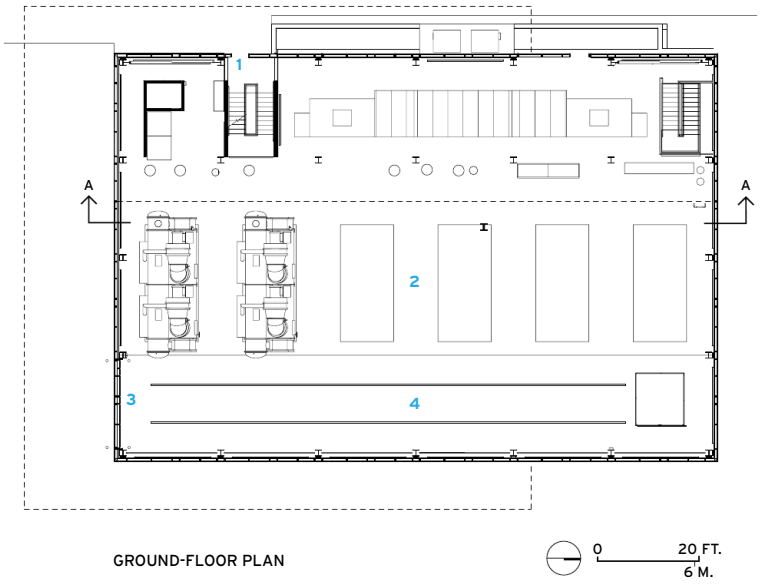
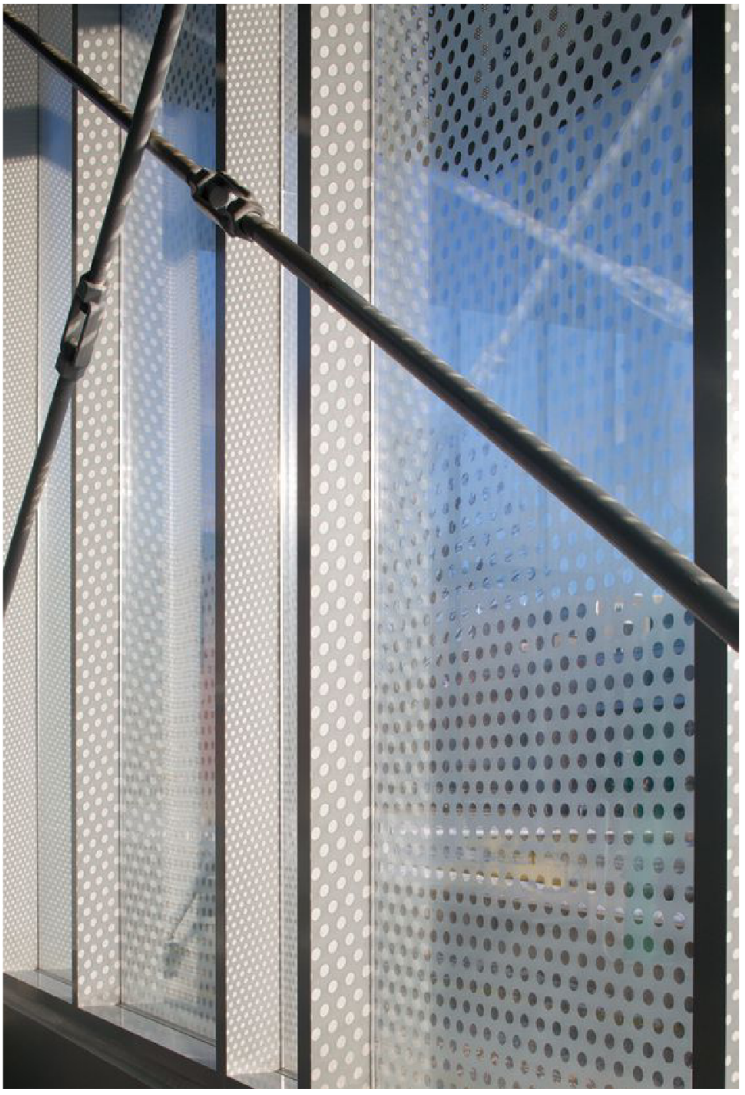


GROUND-FLOOR PLAN

1 ENTRANCE
2 CHILLER HALL
3 TRUCK/EQUIPMENT ENTRANCE
4 EQUIPMENT LANE
5 PUMP LEVEL
6 MEZZANINE
7 COOLING TOWERS

working with Baltimore-based RMF Engineering, they opted to locate pumps and water filters in a basement level. They also chose to contain unsightly rooftop cooling towers in an open-air second level.

The result is an interplay of volume, materials, and light. The plant is a composition of two stacked rectilinear forms; the glazed ground floor, measuring 120 by 80 feet, contains the chillers, while the 100-by-100-foot upper story is enmeshed in a graceful screen of anodized and coated aluminum panels to conceal the cooling towers. This veil, colored bronze to match the surrounding campus buildings and perforated with a rhythmic pattern, cantilevers dramatically over the lower level.



Unlike other chillers on college campuses, which can be monumental and otherworldly (take Helmut Jahn's futuristic facility at the University of Chicago, or Ross Barney's OSU plant, decked out in prismatic fins), Leers Weinzapfel's is discreet. A translucent polka dot frit on the glazing conceals the equipment from the outside, allows plenty of daylight for maintenance crews, and reduces glare and heat gain. LEDs are embedded in the floors so that at night the entire facility glows. "You don't see everything going on inside, yet it isn't gloomy or forbidding," Weinzapfel says. "It's delicate, like a lampshade."

Inside, however, the chiller is anything but delicate. On a recent afternoon, Weinzapfel, along with campus architect Bernard Costantino, passed a row of five roaring centrifugal chillers on the ground level lined up like a row of locomotives across a polished concrete floor. Each is approximately 100,000 pounds. The architects left a generous lane in front, to allow trucks and forklifts to pass by for repairs. A mezzanine overlooking this array accommodates electrical equipment and a control room (although much of the monitoring is conducted remotely).

The plant may appear weightless but, according to the engineers, one of the trickiest design elements was the upper-level cantilever, which hangs approximately 20 feet off the south end of the building. "This plant is unusual because we had to locate all of this enormous

rotating, vibrating equipment on a ledge," explains RMF vice president Robert Smith. In order to support six cooling towers and thousands of pounds' worth of piping, they transferred the load onto the building's main steel structure through braces and a horizontal truss system.

The plant has a 15,000-ton cooling capacity at full strength; to put that into perspective, a typical home requires between 2 and 3 tons. When the cooling cycle is complete, the water flows toward a myriad of university buildings at a chilly 42 degrees.

Back at the plant, the sleek glazed facade reflects the campus activities around it. It also mirrors an acre patch of green in front, striated with thin paved lines every 10 yards, a separate project intended to memorialize the old OSU football field. "It's sacred land now," Costantino, the campus architect, joked. Weinzapfel laughed: "Genuflect as you walk by." ■

CREDITS

ARCHITECT: Leers Weinzapfel Associates – Jane Weinzapfel, Andrea P. Leers, principals; Joseph Raia, project manager; Chien Hung-Yang, Juliet Chun, designers

ARCHITECT OF RECORD: GBBN Architects

ENGINEERS: RMF Engineering (structural, m/e/p); Korda (civil)

CONSULTANTS: Reed Hilderbrand (landscape); Francis Krahe & Associates (lighting)

CLIENT: Ohio State University

SIZE: 23,160 square feet

COST: $39 million

COMPLETION DATE: April 2015

SOURCES

GLASS CURTAIN WALL: American Architectural Glass

UPSWINGING DOOR: Schweiss Door

IN-SLAB LIGHT FIXTURES: EcoSense

CHILLERS: Trane Commercial

HALL OF FAME
Rather than thunderous crowds, OSU's former football field now hosts five booming chillers (above); a sixth will be added later. The architects included an overhead crane to assist maintenance crews. Steel braces support the facility's dramatic cantilever (opposite). The dotted ceramic frit shields the glass, except where it meets the columns.

Municipal Offices and Train Station | Delft, the Netherlands | Mecanoo Architecten

BLUE STREAK

A transit hub creates a center for both the local government and the people of the city.

BY HATTIE HARTMAN

View additional content at architecturalrecord.com.

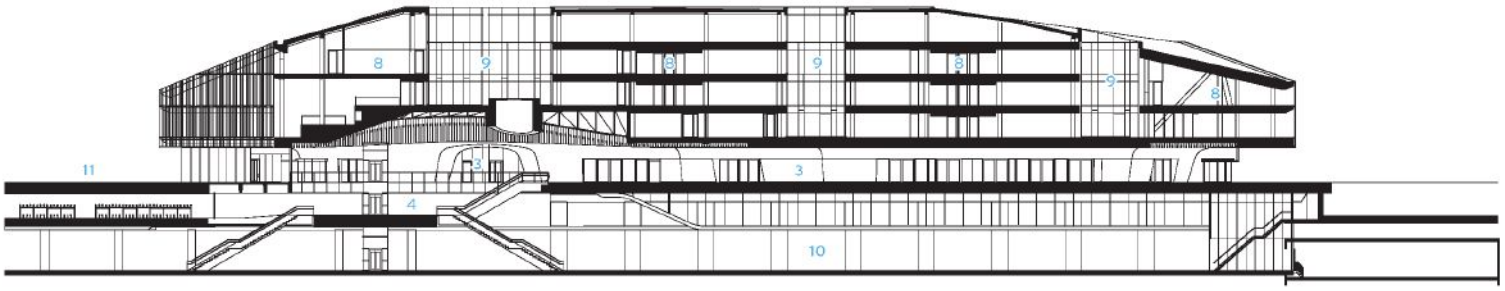
LINKED IN
With municipal offices for 1,000 on its upper floors, the station is the showpiece of a 59-acre redevelopment project that is transforming Delft. The building straddles a new tunnel linking Rotterdam and the Hague, which replaces a viaduct that divided the city for 50 years.

PHOTOGRAPHY: © HARRY COCK; MECANOO (RIGHT)

Modesty is rare amongst global architectural practices, yet Dutch firm Mecanoo is an exception. With major projects under way from New York to Taiwan, Mecanoo has recently completed a surprisingly understated railway station and municipal offices in its hometown of Delft that also helps repair a torn urban fabric. But the project's most memorable feature, a soaring railway hall, is discreetly concealed beyond its unassuming exterior.

Mecanoo founding partner Francine Houben maintains that the practice eschews trophy buildings and seeks inspiration in each specific context. What commission could be more apt for designing a project that is "of its place" than a major civic building for Delft? This picturesque city of 100,000, where the 160-strong practice occupies an 18th-century canal house, is best known as home to Johannes Vermeer and Royal Delft blue-and-white ceramics.

With the station, Mecanoo interprets "local" literally, incorporating an enlarged map of the city into the undulating ceiling of its welcoming railway hall (a device they used at the new headquarters for the Boston Public Schools [RECORD, August 2015, page 94]). The building also creates a much needed crossroads for the city. As the centerpiece of a $1.1 billion, 59-acre master plan by Barcelona urban planner (and Harvard professor) Joan Busquets, the station spans a new four-track 1.4-mile-long tunnel, which replaced a 1960s viaduct that fractured Delft for half a century. Bridging the historic core to the



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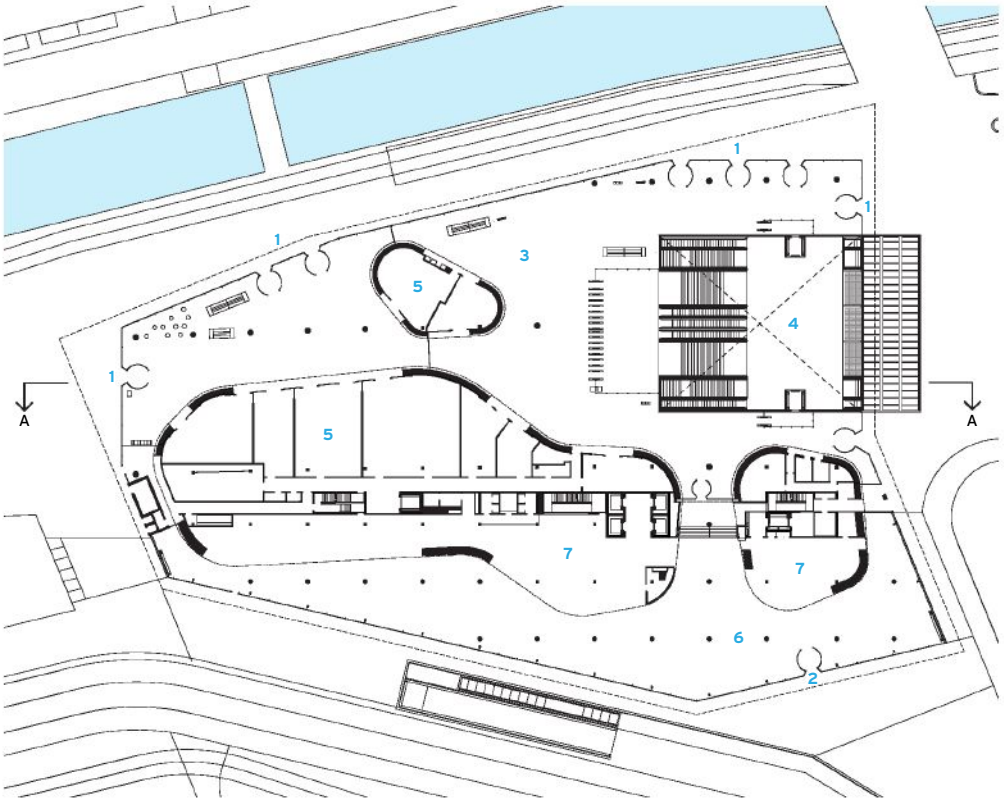


GROUND-FLOOR PLAN

0 50 FT. 15 M.

1 STATION ENTRANCE
2 MUNICIPAL OFFICE ENTRANCE
3 STATION HALL
4 MEZZANINE
5 RETAIL
6 MUNICIPAL OFFICE LOBBY
7 FRONT OFFICE
8 OFFICES
9 TERRACES
10 PLATFORM
11 BUS DEPOT

credits

ARCHITECT: Mecanoo Architecten – Francine Houben, partner in charge/project architect; Francesco Veenstra, partner in charge/project architect

ENGINEERS: ABT (structural); Deerns (mechanical)

CLIENT: ProRail and Gemeente Delft

OWNER: NS (station); Gemeente Delft (offices)

SIZE: 305,000 square feet

COST: $17 million (station hall); $92 million (offices)

COMPLETION DATE: February 2015 (station); December 2015 (offices phase I); December 2016 (expected, offices phase II)

SOURCES

CURTAIN WALL, WINDOWS, DOORS: Schüco, Stabalux

GLAZING: Scheuten Glas, Saint-Gobain

WALL COVERINGS: PPG

northeast, recent residential zones to the west, and a new bus terminal and canal-side public park to the south, the building forms part of an ambitious plan to stitch the city back together.

"Connectivity is what this building is all about," says partner and project architect Francesco Veenstra. "The building will be a new beating heart for Delft's municipal government and will provide offices for about a thousand civil servants and local politicians." Underscoring its democratic role, the building does not have a prominent main entrance; instead, it can be entered on four sides.

Generous stairs and escalators bring travelers arriving by train to the street-level concourse, deftly sandwiched between the platforms below and municipal offices above. The ceiling is formed by almost 2,000 aluminum baffles, individually printed to replicate a historic map of 1877 Delft over a length of 425 feet. The pixelated effect is mesmerizing and creates a sense of arrival, harkening back to the grand stations of the 19th century. Bold mushroom columns, clad in a Gaudi-like treatment of hand-cracked tiles in white and three shades of blue, nod to the city's Royal Delft heritage. A playful circular lightwell illuminates the elegant black basalt floor.

PHOTOGRAPHY: © MECANOO

Given all this, it is somewhat surprising that the building's glazed exterior does not communicate the civic stature that is so apparent inside.

With the footprint and envelope determined by the master plan, Mecanoo has downplayed the mass of the required 178,000 square feet of office space by carving away upper floors and introducing deep terraces at the second level. According to the architects, these terraces replicate the dimensions of Delft's historic alleyways. Unfortunately, despite their herringbone brick paving, the spaces smack more of corporate anonymity than of inviting outdoor amenity. The scale and irregular rhythm of the cladding—a mix of high-performance transparent glazing and opaque glass panels punctuated by lens-like spheres that resemble the bottom of wine bottles (a reference to a local glazing vernacular)—relate well to neighboring buildings. Yet there is no escaping that this is a very large office building.

The architects were uniquely poised to tackle Delft's railway-infrastructure challenge. Houben curated Rotterdam's first architecture biennale on urban mobility in 2003. "As architects, we learn in school how to make a

SENSITIVE SKIN
The building exterior (above and left), a mix of high-performance transparent glazing and opaque panels of fused glass, reflects the nearby 19th-century station and changing weather conditions throughout the day.

PHOTOGRAPHY: © MECANOO

GRAND ENTRY
The light-filled railway hall (above and right) reproduces a historic map of 1877 Delft on its sweeping ceiling. Cracked blue-and-white tiles reinterpret the city's heritage of Royal Delft ceramics.

street or a square or a neighborhood," she says, "but we never deal with the experience of people's daily travel, such as the trip from Delft to Rotterdam—we have no vision for that."

The Netherlands is undergoing a spurt of railway station redevelopment, with eight major stations currently in transformation. Complex phasing meant that the country's busiest train route, between Rotterdam and the Hague, was closed for only one week over the course of construction. Houben explains that the building's full impact will only be apparent once the municipal offices are completed next year and the master plan, which allows for 800 apartments and hundreds of thousands of feet of commercial and other space, is built out, largely in brick. Then the civic building will stand out as a gleaming "pearl," she says.

Despite Houben's vision, the reserved exterior of Delft's new station and municipal offices is difficult to distinguish from a well-designed office building. In contrast with the exuberance of the adjacent 1875 railway station (a proposal is afoot to convert the now-empty building, by Rijksmuseum architect Christiaan Posthumus Meyjes Sr., into a restaurant), with its stone-trimmed brick pavilions and onion cupola, or Mecanoo's own bold library nearby at the Delft University of Technology, the true delight of this building is mostly inside. ■

Hattie Hartman is an editor at The Architects' Journal, *London.*


BLOEM!


SPEED LIMIT 35
sanitation
ONE WAY
CANAL
STOP HERE ON RED SIGNAL
ONE WAY

Manhattan Districts 1/2/5 Garage | New York City | Dattner Architects and WXY Architecture + Urban Design

SALINE SOLUTION

A sleek rectilinear garage and sculptural salt shed brighten the city.

BY FRED A. BERNSTEIN

PHOTOGRAPHY BY ALBERT VECERKA/ESTO

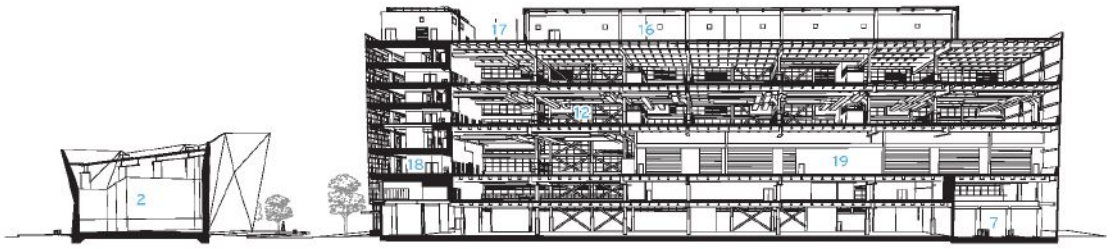
It's no surprise that, when New York chose to build a garage for 150 garbage trucks in an upscale residential neighborhood, the community rebelled. But the 425,000-square-foot facility now standing just north of TriBeCa, beside expensive condo buildings, is sheathed in fritted glass and aluminum louvers that pixilate its long facades. And it is accompanied by a one-of-a-kind salt-storage shed—a poured-in-place concrete, 6,300-square-foot structure worthy of Tadao Ando that draws the eye away from the larger building. Residents who once sued to block the sanitation-department facility now seem happy with the gentle giant.

The project was the result of a decision by the Bloomberg administration not to relegate the garage to a blighted neighborhood, which could have been the path of least resistance. Cities, after all, often place noxious facilities in places where land values and residents' political influence are low. "But there's a question of equity," says Feniosky Peña-Mora, the city's Commissioner of the Department of Design and Construction, who believes every neighborhood should bear its weight in infrastructure. (A Columbia engineering professor who has written more than 200 scholarly articles, Peña-Mora became commissioner while the building was already under way.)

The success of the garage and salt shed is a tribute to two firms that have a history of choosing public projects over better-paying, and almost certainly less taxing, commissions: Dattner Architects and WXY Architecture + Urban Design. Dattner's civic improvements include a spectacular new subway station near the Hudson Yards development (2015; see page 112), two sections of the Hudson River Park (2007), and the Bronx Library Center (2006); WXY's credits include recreation buildings in the Hudson River park (2014), security booths for Brooklyn's Metrotech Center (2010), and post-Sandy boardwalks in Rockaway (2015). Its experience with the city's Uniform Land Use Review Procedure (ULURP), and other bureaucratic minefields, prepared the firm for a decade-long process that would probably have been the undoing of other firms, notes WXY principal Claire Weisz.

That process began when the Department of Sanitation agreed to close an existing garage on the Gansevoort Peninsula in the West Village, slated to become part of the Hudson River Park. It chose a site on the far west edge of Soho for a new garage that would be shared by three sanita-

SHIMMER AND SHAKE A sculptural concrete salt shed (opposite) stands guard in front of the rectilinear garage for trucks. The building's west facade is pixilated by hundreds of aluminum fins (below).



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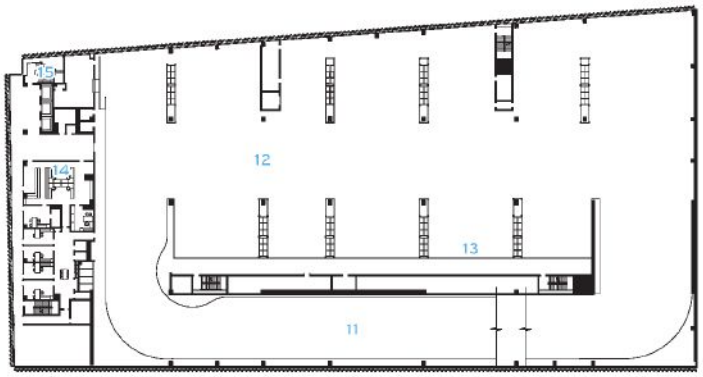
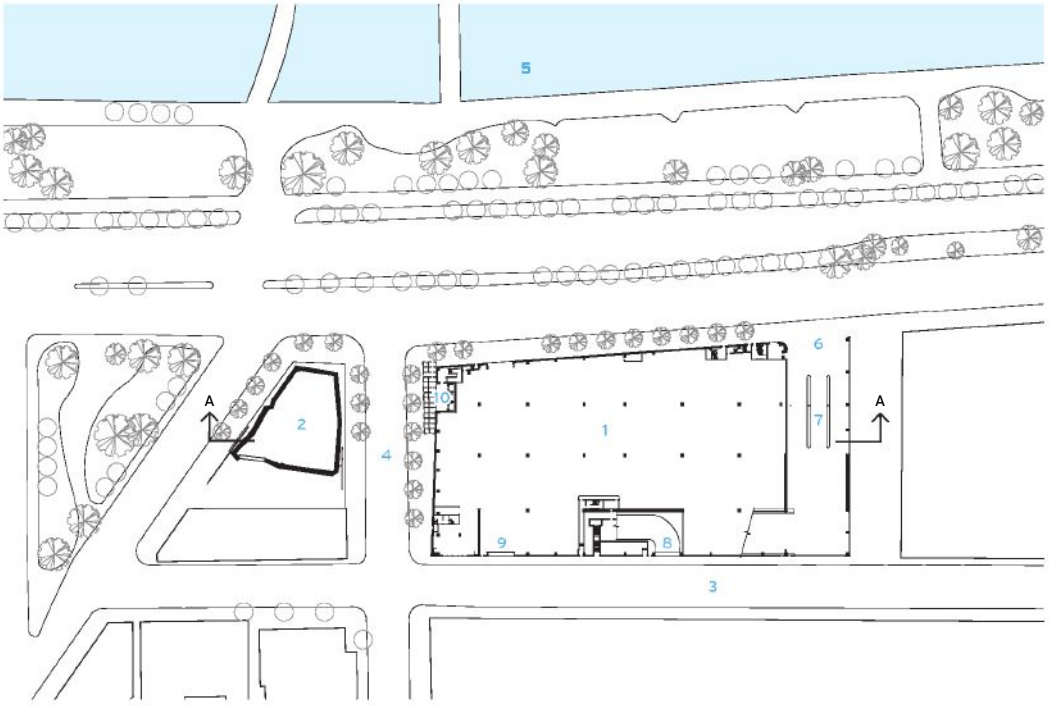


FOURTH-FLOOR PLAN

0 50 FT. 15 M.

1 SANITATION GARAGE
2 SALT SHED
3 WASHINGTON STREET
4 SPRING STREET
5 HUDSON RIVER
6 TRUCK ENTRANCE
7 FUELING STATION
8 SMALL-VEHICLE ENTRANCE
9 UPS ENTRANCE
10 LOBBY
11 TRUCK RAMP
12 DRIVING AISLE
13 PARKING
14 OPERATIONS OFFICE
15 STAIR
16 MECHANICAL PENTHOUSE
17 GREEN ROOF
18 PERSONNEL AREAS
19 DISTRICT 1 GARAGE



GROUND-FLOOR PLAN

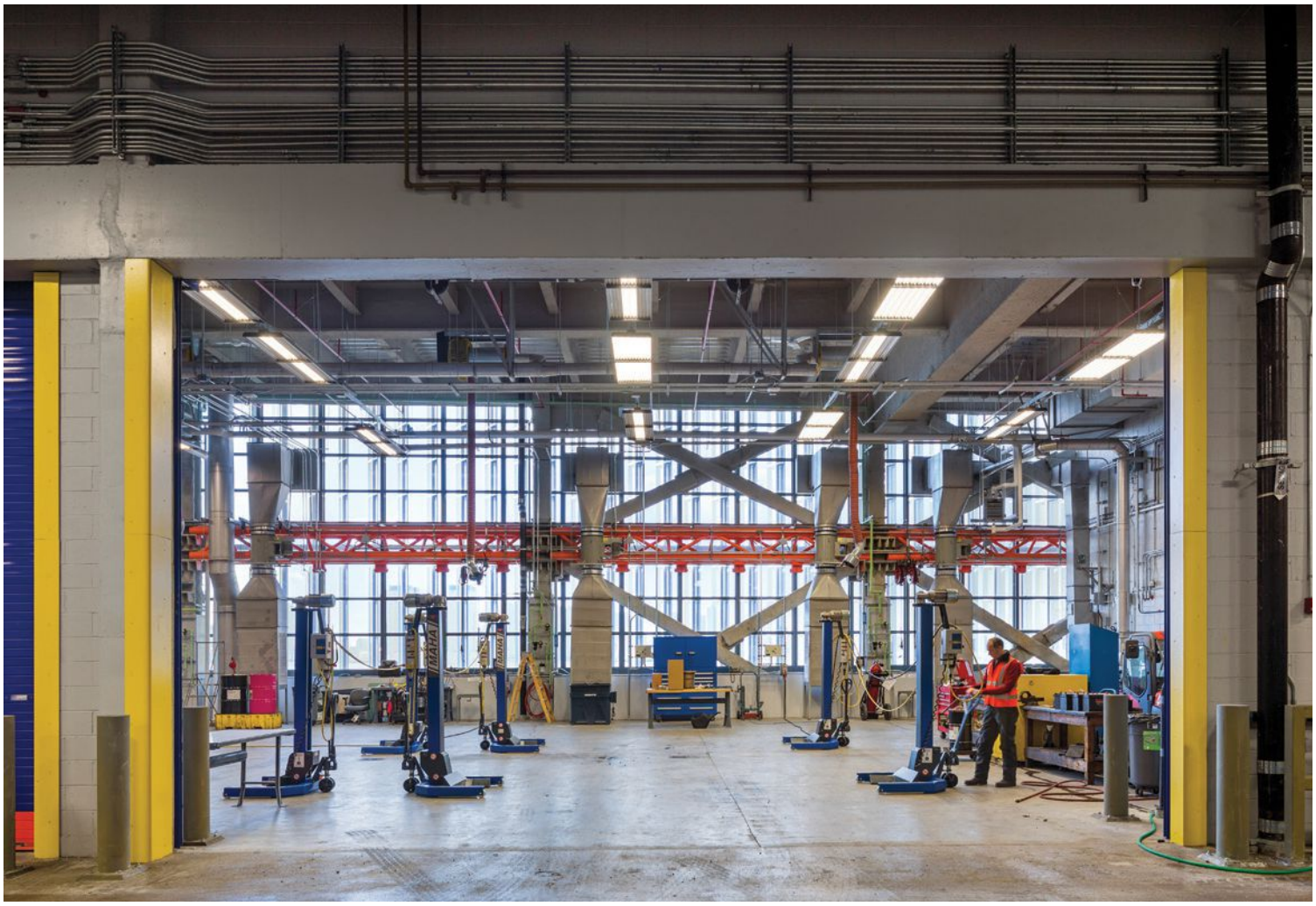
0 100 FT. 30 M.

HOLD THE SALT
The concrete shed (above), for 5,000 tons of salt to de-ice the roads during storms, occupies the site of an earlier sanitation-department garage. Trucks picking up salt use an alley between the new shed and the Holland Tunnel air vent.

tion districts (1, 2, and 5), each of which wanted a space to call its own. The building also needed to accommodate 5,000 tons of salt, used for de-icing roadways. In 2005, the department issued a Request For Proposal that emphasized design. Given the size of the project, Dattner and WXY decided to associate as a team to compete for the job.

During design development, the program shifted several times, says Dattner's principal in charge, Paul Bauer. First, the city agreed to sell part of the ground floor of the planned building to UPS as an industrial condominium. Second, a site just south of the building, large enough for a stand-alone salt shed, became available. And then, during value engineering, the height of the garage was reduced, to 120 feet, prompting redesigns of its facades. As the plans evolved, they were reviewed by the city's Public Design Commission, whose members, including architect James Stewart Polshek and engineer Guy Nordenson, challenged them to make the salt shed sculptural and to soften the look of the garage.

As built, the garage contains five levels—the first for UPS truck parking and sanitation-department ingress and egress; the second for small-vehicle parking; the third, with 30-foot ceilings, for truck-washing and repair facilities and one garage; and the fourth and fifth, with 24-foot ceilings, for the remaining garages. ("Front-of-house" functions—lobby, meeting rooms, locker rooms, etc., totaling about 55,000 square feet—are grouped at the south end of the building, facing TriBeCa and the salt shed.) The cavernous garages and the 40-foot-wide ramps that serve them are bright, following a lighting plan by Domingo Gonzalez Associates, and odor-free, thanks to a powerful HVAC system. The building was awarded LEED Gold status.



RAKING IT IN A truck-repair facility occupies the third floor (above). Inside the shed (right), the interior is dehumidified to keep salt flowing. Asymmetry and concrete given texture by plywood formwork make the building as compelling as many pieces of public art in Manhattan (opposite).

From the outside, the interior functions are obscured by metal louvers, 30 inches on center and 28 inches deep. As a result, the industrial-scale structure doesn't look industrial to passing motorists. Indeed, it seems of a piece with Renzo Piano's Whitney Museum a mile north, and even more so with Piano's massive Jerome L. Greene Science Center for Columbia University, nearing completion at 125th Street and Broadway, with its glass facades and repeating metal fins. All told, the garage cost the city $250 million and the salt shed $21 million.

Success has 1,000 parents, and this building, seen as a model for future public projects, is no exception. Which ideas came from which firm, and which were suggested by the Public Design Commission, or by the client, may remain a mystery. But that's the nature of collaboration. What matters is that, as Bauer says, "If either office had worked on it alone, the result would have been very different." ■

credits

ARCHITECT: The Dattner Partnership with WXY Architecture + Urban Design – Paul Bauer, principal in charge; Dattner – Richard Dattner, principal; Gia Mainiero, project manager; WXY – Claire Weisz, Mark Yoes, principals in charge; Layng Pew, principal

ENGINEERS: Burns Group (structural); Greeley and Hansen (civil, m/e/p)

CONSULTANTS: Front (curtain wall); Domingo Gonzalez Associates (lighting)

CLIENT: New York City Department of Sanitation, New York City Department of Design & Construction

SIZE: 425,000 square feet (garage); 6,300 square feet (salt shed)

COST: $250 million (garage); $21 million (salt shed)

COMPLETION DATE: December 2015

SOURCES

IRONSPOT BRICK: Endicott

METAL PANELS: Centria

METAL-FRAME WINDOWS AND STOREFRONT ENTRANCE: Kawneer

GLASS: Viracon

CURTAIN WALL: Gamma USA

ALUMINUM LOUVERS: Construction Specialties

Croton Water Filtration Plant | Bronx, New York
Grimshaw Architects

WHAT LIES BENEATH

One of New York's largest construction projects unites public space and essential urban infrastructure.

BY JOANN GONCHAR, AIA

If you take the New York subway to the Bronx end of the No. 4 train line, make sure you turn and look west before descending from the elevated platform. From that vantage point, against the urban backdrop, you will see an oval-shaped swath of manicured turf with small sculpted hills, shallow valleys, and perfectly outlined patches of sand. This enigmatic landscape looks like burial mounds created by an ancient civilization or land art worthy of Robert Smithson.

But the mysterious terrain is neither. It is a 290-million-gallon-per-day water-filtration plant that extends 100 feet into the earth and is topped by a nine-acre golf driving range. The plant treats water coming from the Croton watershed—one of three reservoir systems supplying New York with its drinking water—while the driving range is part of a public golf course that sits on the edge of a large city park. Although the ongoing project might seem to combine an incongruous mix of uses, its disparate programs actually are complementary, points out David Burke, an associate principal at Grimshaw, the architects leading the design of the landscape and aboveground structures. "It brings together recreation and civic space and provides essential urban infrastructure," he says.

The $3.2 billion plant, which came online last May, has a decades-long history fraught with delays and an escalating price tag. It was deemed necessary because the increasing density and development in the areas surrounding that watershed (which stretches across three New York State counties) had gradually degraded the quality of its water. The treatment process now in place includes filtration, aeration, and exposure to ultraviolet light to remove impurities and potentially harmful microorganisms.

Although local community opposition to the plant in the Bronx was intense, the authorities decided against leaving the city limits, and eventually settled on the current location. Grimshaw won the contract to design the replacement for golf course facilities that were to be demolished, including the driving range and a clubhouse, as well as the few above-grade parts of the plant. However, the firm was not selected until 2006—well after the layout of the underground facility, by engineers Hazen & Sawyer and Metcalf & Eddy, had already been set.

But Grimshaw's scheme, devised in collaboration with landscape architect Ken Smith and others, doesn't look like an afterthought. The team deftly handled restrictions, such as the bearing capacity of the plant's roof, devising a lightweight solution for the rolling topography with the help of Rana Creek, the firm behind the hilly landscape on the roof of Renzo Piano's California Academy of Sciences in San Francisco. The driving

PHOTOGRAPHY: © ALEX MACLEAN

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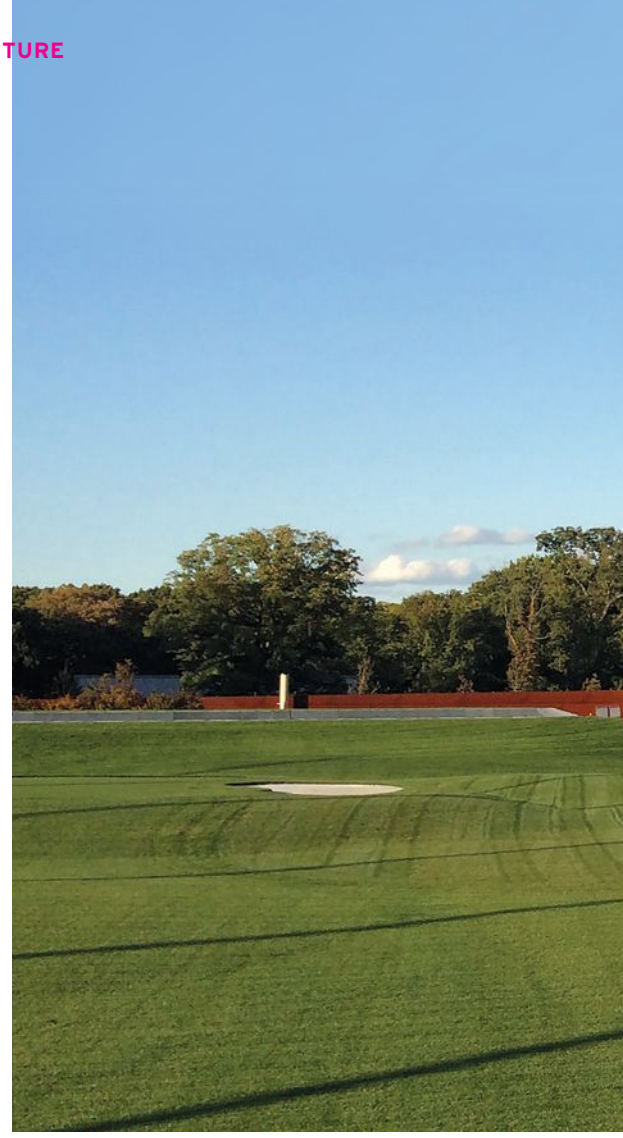
CLEVER CAMOUFLAGE
New York's new filtration plant, which treats the water supplied from the Croton watershed, descends 100 feet into the earth, below a sculptural, nine-acre driving range.

WETLAND CELL 7 - AXONOMETRIC



1 DRIVING RANGE
2 TEE BOX
3 CELL 7
4 TENSILE CANOPY
5 PAINTED STEEL SUPPORT
6 STONE-VENEER WALL
7 WET MEADOW GARDEN
8 GABION WALL

DRIVING RANGE – BIRD'S EYE VIEW

1 DRIVING RANGE
2 ARRIVALS AND RECEIVING BUILDING
3 SECURE ENTRANCE
4 CLUBHOUSE
5 TEE BOXES
6 WETLAND CELL SYSTEM
7 ELEVATED TRAIN LINE
8 GOLF COURSE

PHOTOGRAPHY: © PHILLIP KUEHNE/GRIMSHAW

HILLS AND VALLEYS
The plant's arrivals and receiving building seems to have grown out of one edge of the driving range, appearing to peek out from behind a ribbon of weathering steel.

range's contours are created with structural polystyrene—as deep as 12 feet in some spots—with 8 to 10 inches of engineered soil on top.

The resulting three-dimensional carpet, which includes four types of turf mowed at varying heights, is circumscribed by handsome bluestone retaining walls. Some of these are veneer over concrete while others are more rustic, constructed of rocks and gabion cages.

The buildings have been designed to appear to grow out of these walls. The arrivals and receiving building (the plant's primary staff access point), for example, seems to emerge from the northern edge of the driving range. The structure, which is off-limits to the public, has a flat roof with deep overhangs that emphasizes the ground plane; it looks as though it is peeking out from behind a ribbon of weathering steel that helps "protect and disguise" it, says Burke.

The clubhouse, which will serve the whole golf course and is slated to start construction in 2017, will rely on a similar language and materials. With a crescent-shaped footprint defined by curving bluestone walls, it will hug the driving range's eastern edge and be covered with an accessible green roof that slopes up from the surrounding landscape. The facility will house a restaurant and pro shop and will incorporate tee boxes under a tensile fabric canopy.

Also still to come is a constructed wetland encircling the driving range. The system will consist of a series of planted cells that will naturally treat stormwater, as well as groundwater, and store it in underground tanks for irrigation. This strategy will provide multiple benefits: in addition to reducing the golf course's demand for potable water by 40 percent, it should keep runoff out of the city's overtaxed combined sewer system and provide habitat for birds and small mammals. It will also enhance security by providing an added physical barrier at the perimeter of the treatment plant.

This wetland, with its multiplicity of roles, is a microcosm of the multifunctional nature of the larger project and its marriage of community amenities and infrastructure. Burke predicts that, as available land diminishes and property values climb, there will be many more such seemingly improbable unions. Let's hope these future endeavors follow the project's lead and its creation of a dynamic, if unexpected, amalgam. ■

credits

ARCHITECT: Grimshaw Architects – Mark Husser, managing partner; David Burke, associate principal; David Cook, Eric Johnson, associates; Max Wolf, architect; Phillip Kuehne, architectural designer

CONSULTANTS: BuroHappold (m/e/p); Ammann & Whitney (structural, civil); Ken Smith Workshop (landscape); Rana Creek (green roof); Arup (lighting); Atelier Ten (sustainability)

GENERAL CONTRACTOR: Skanska Civil

CLIENT: New York City Department of Environmental Protection

SIZE: 1.7 million square feet (plant, above-grade structures, landscape)

COST: $3.2 billion (plant, above-grade structures, landscape)

COMPLETION DATE: ongoing

SOURCES

MASONRY: New York Quarries, Berardi Stone Setting

WEATHERING STEEL: Mariani Metals

CURTAIN WALL: Norshield

GLASS: Viracon, Cristacurva

BUILT-UP ROOFING: Hydrotech

Kaspar Schulz Beer Tank Factory | Bamberg, Germany | Christian Rübbert, Johannes Schulz-Hess

PRECISION CRAFTED

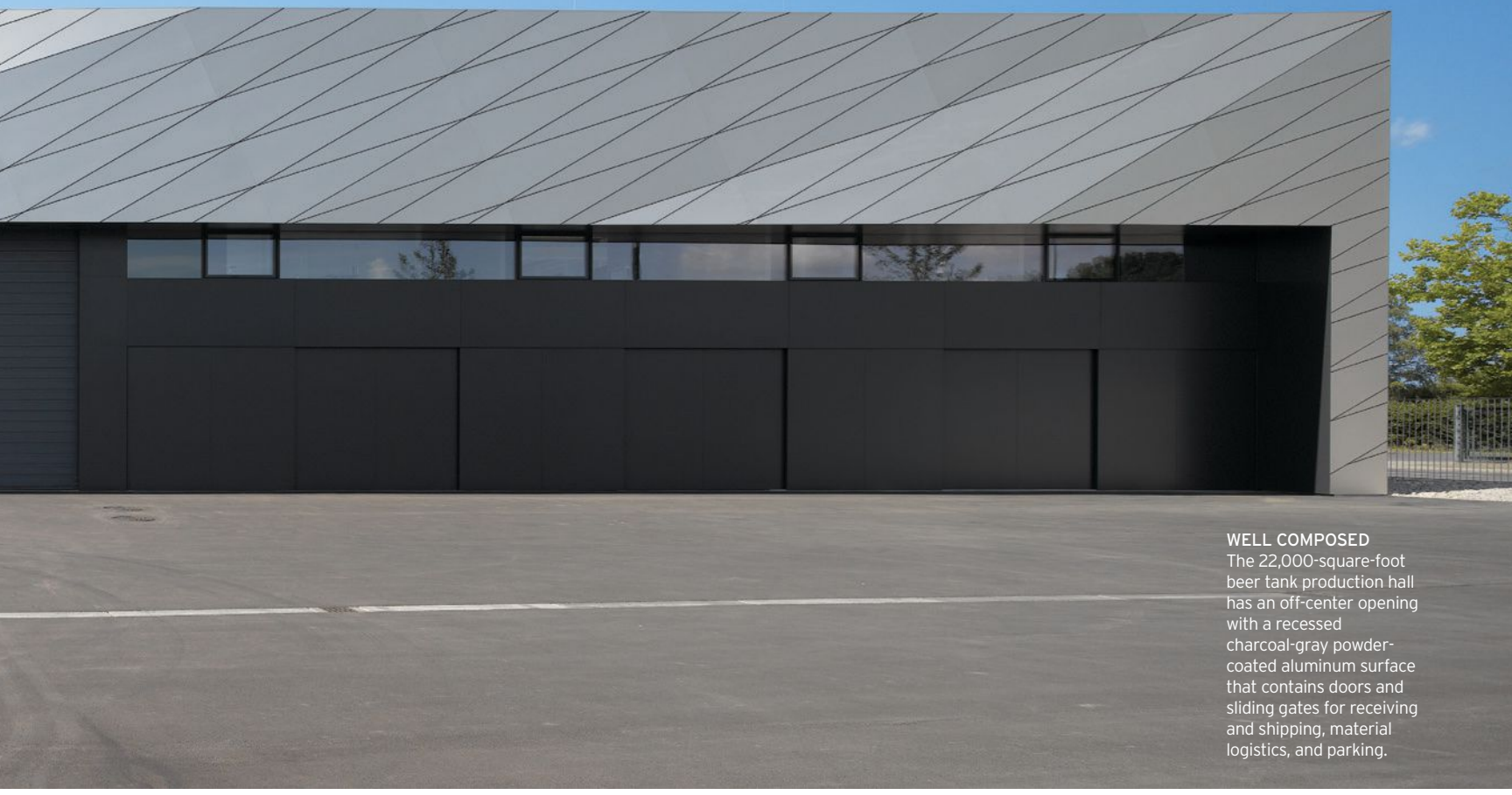
A storied manufacturer of beer tanks wraps its new production facilities in a pristinely fabricated skin.

BY MARY PEPCHINSKI

PHOTOGRAPHY BY ROLAND HALBE

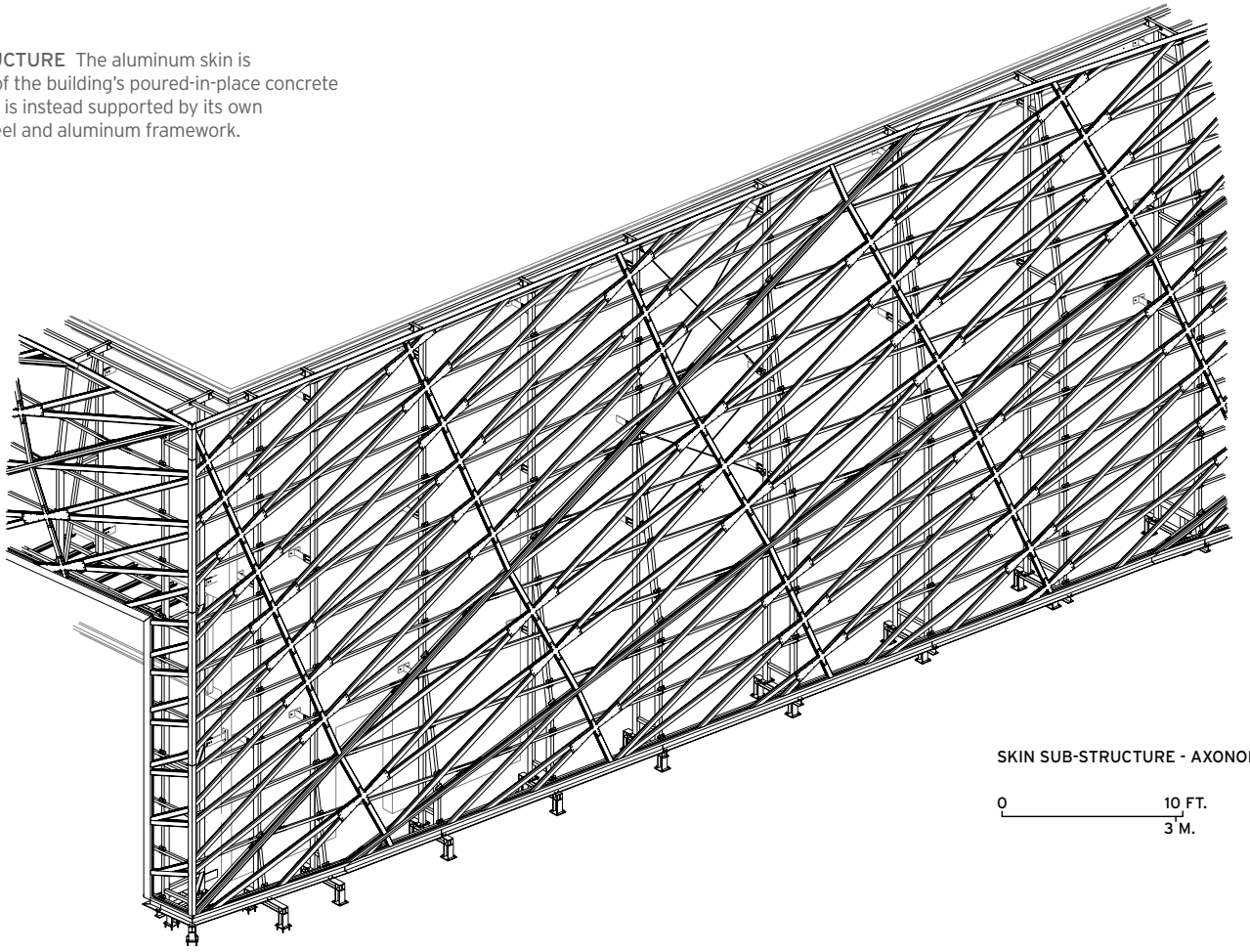
Johannes Schulz-Hess is the 10th-generation owner of the oldest manufacturer of beer brewing tanks in the world. When he assumed control of Kaspar Schulz in 2007, he doubled the workforce to 150 employees and restructured the operations. And, because he is also an architect, he decided—not surprisingly—that an upgrade to the premises was in order.

The factory occupies a deep 240,000-square-foot plot in an industrial zone on the outskirts of the Bavarian city of Bamberg, and is easily glimpsed from the Autobahn and the train. Having occupied the current site for the past half century, it had grown into a nondescript jumble of production halls and supporting buildings. Although the makeover was necessary to increase manufacturing space from 38,000 to 60,000 square feet, Schulz-Hess also wanted to improve workplace conditions and rebrand the company's identity: "We needed an expressive exterior to stand out from the surroundings," he says, "and a quiet, introverted interior for the staff to focus on their tasks."



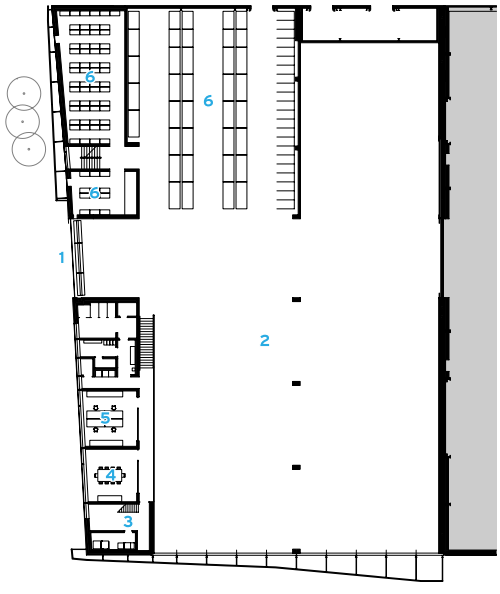
WELL COMPOSED
The 22,000-square-foot beer tank production hall has an off-center opening with a recessed charcoal-gray powder-coated aluminum surface that contains doors and sliding gates for receiving and shipping, material logistics, and parking.

FACIAL STRUCTURE The aluminum skin is independent of the building's poured-in-place concrete structure, and is instead supported by its own underlying steel and aluminum framework.



SKIN SUB-STRUCTURE - AXONOMETRIC

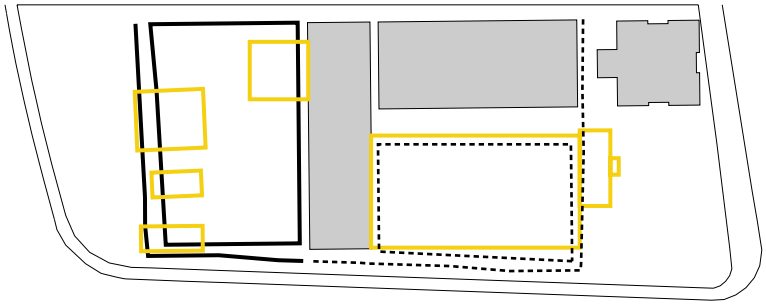
0 10 FT. 3 M.



SECOND FLOOR

0 16 FT. 5 M.

PHASE I
PHASE II
DEMOLITION
EXISTING



SITE PLAN

0 60 FT. 20 M.

1 MAIN GATE
2 PRODUCTION FLOOR BELOW
3 MECHANICAL
4 MEETING
5 OFFICE
6 STORAGE

Schulz-Hess had recently designed a brewery with fellow architect Christian Rübbert, so the architect-owner again turned to him as a collaborator. They devised a two-phase project that required some demolition in addition to the construction of two new production halls and the introduction of an east-west axis through the site, to allow materials and products to be more easily moved around the complex. For the exterior, Schulz-Hess not only wanted the premises to have a more unified appearance, but also he felt it should reference the fabrication that takes place within.

To call attention to Kaspar Schulz's products, the architects designed a 32-foot-tall aluminum facade, made of elongated diamond-shaped panels, to surround the poured-in-place concrete structure of the factory halls on the eastern, western, and northern exposures. Like a billboard, the facade is an independent construction that is supported by an underlying steel and aluminum framework. On the site's long, northern exposure, this surface was designed as folded, wedge-shape sections. When sunlit, the angled planes either shine or lie in shade, to evoke the reflection of light on a stainless-steel tank. Grids of lens-shaped perforations, like screens, interrupt the facade to allow workers to look out at their surroundings yet shield them from outside scrutiny.

FACETED FACADE

The 32-foot-tall aluminum facade is folded into wedge-shape sections. When sunlit, the planes either shine or lie in shade to evoke the reflection of light on a stainless-steel beer tank. Lens-shaped perforations allow workers to glimpse their surroundings yet offer privacy.

For the first phase, a 22,000-square-foot production hall, situated along the eastern frontage, was completed in May 2015 (the second building is due to start construction in 2017). Resembling an oversize gateway, the building's off-center opening, with its recessed charcoal-gray powder-coated aluminum surface, contains a series of doors and sliding gates providing access to spaces for receiving and shipping, material logistics, and parking. Immediately behind the facade, a 30-foot-deep zone stretches across the hall, enclosing offices, storage, and meeting rooms on the ground and second floors, and technical spaces in a mezzanine.

Because customers often observe production when placing orders or while their tanks are being assembled, Schulz-Hess sought "a museum-like space" where the steel and copper objects, like art, "occupy the foreground, and the architecture recedes." Elaborate finishes are kept to minimum. Instead, the reinforced-concrete structure has been left exposed but whitewashed, and the floor has been coated in a dove-gray epoxy resin. Because bright, even light was necessary to maintain the workers' concentration, skylights are supplemented by daylight-controlled LEDs to illuminate the 30-foot-high interior.

To allow for flexibility and keep the floor area free, the architects placed the supporting technology—radiant panels, perforated for sound attenuation, and media cables—on the ceiling. Perforated metal acoustic sheets on the upper half of the shorter northern and southern walls also dampen the manufacturing din.

Other aspects of the renovation, like the energy-saving strategies, are not immediately apparent. In tandem with the daylight-controlled LEDs, which reduce electrical consumption, a combined heat and power plant (in the new hall) and photovoltaic panels on existing buildings satisfy more than 50 percent of the complex's energy requirements.

Make no mistake: high-precision metal processing is loud and gritty. In Kaspar Schulz's older production halls, the sour smell of processed

MUSEUM QUALITY The reinforced-concrete structure has been left exposed but whitewashed, and a dove-gray epoxy resin coats the floor. Daylight-controlled LEDs supplement skylights to illuminate the 30-foot-high interior. Radiant panels and media cables have been placed on the ceiling to keep the floor area free (opposite). A spare stair (below) leads to second-floor offices and meeting rooms.

metal hangs in the air, and a light patina of steel dust coats the walls and floors. But the new hall has an intensely brilliant interior, even on an overcast winter day. The noise seems muted, and it feels like an almost sacred place, where labor is valued. "The workers act differently here," says Schulz-Hess. "They are able to see the grime and dirt they produce and readily clean it up."

The evocative exterior and state-of-the-art interior succeed in repackaging this centuries-old business and providing its employees with a finely tuned workplace. At the close of a recent visit, although he was reflecting on the challenges of staff acquisition, the still-youthful architect-owner seemed to be speaking about himself: "It is important for young people to think that this could be a cool place to work." ■

Berlin-based Mary Pepchinski is an author and architect who teaches at the University of Applied Sciences in Dresden, Germany.

credits

ARCHITECTS: Christian Rübbert Arkitekt, Schulz-Hess Architektur – Christian Rübbert, Johannes Schulz-Hess, Joachim Kaiser, Irene Bonente, design team

ENGINEERS: Klaus Schulz (civil); Thomas Klug (equipment)

CLIENT: Kaspar Schulz

SIZE: 22,000 square feet

COST: withheld

COMPLETION DATE: May 2015

SOURCES

FACADE METAL FRAME: Schüco, Jansen

METAL DOORS: Hörmann

LOCKSETS: FSB

CLOSERS: Dorma

CONCRETE STAIN: Keim

FLOOR COATING: STO

INTERIOR LIGHTING: Zumtobel

EXTERIOR LIGHTING: Hess

COMBINED HEAT AND POWER PLANT: Viesssman

RADIANT PANELS: Zehnder

FURNITURE: Sedus, Vitra, Werner Works

FLOOR AND WALL TILE: Marazzi

SECURITY DEVICES: Winkhaus

Stanford University Central Energy Facility | Palo Alto, California | ZGF Architects

POWER PLAY

PUBLIC WORKS
A trellis of solar panels shades the building and supplies more than enough electricity for the center's offices. The lightweight arcade is also a nod to Stanford's historical quadrangle. Three monumental water tanks (opposite) help store energy that would otherwise be lost.

PHOTOGRAPHY: © MATTHEW ANDERSON; STEVE PROEHL (OPPOSITE)

A state-of-the-art complex fuels a campus while serving as a teaching tool.

BY LYDIA LEE

Stanford University's Central Energy Facility has a lot of serious technology, but much of it is presented in the lively hues more typical of a children's museum. Doubling as a teaching tool, the low-slung building showcases the university's innovative new heating and cooling system with ample glazing and equipment painted in vibrant shades, like orange and aqua, so that visitors can clearly see which parts carry hot water and which ones cold. At night, the bright red surface of a hot-water storage tank is lit so it glows like a giant ember at the heart of the complex.

"We worked to make architecture out of something that, at first glance, didn't have a lot of potential," says ZGF principal Toby Hasselgren. "Stanford has an obligation to be efficient and sustainable in its operations, but it also has a mission to educate. Why not do both?" adds Joe Collins, partner at ZGF.

In 2009, the school began considering alternatives to its aging gas-fired power plant. An earlier technology for conserving energy, its cogeneration plant generated electricity and used the by-product heat to warm its buildings. However, a careful analysis revealed that yet more efficiencies could be gained. During much of the year, the campus needed nearly as much heating as it did cooling (since incoming air had to be cooled first to remove humidity and then reheated to comfortable temperatures, particularly at night). This meant that excess heat discharged during evaporative cooling could be reused, instead of lost to the atmosphere. So the school designed an extensive heat-recovery loop, which they say is the first such system on this scale. Reducing the campus's total energy use by a third, the nearly $500 million system in-

cludes a 22-mile network of pipes and three giant holding tanks for hot and cold water. (The university also switched to an off-site solar farm as its primary source of energy.)

Of course, the tanks, related machinery, and offices could have been housed in a nondescript facility. But, given the radical switch in energy use that the project represented, campus architect David Lenox saw the benefit in highlighting it rather than hiding it from view. ZGF, which had previously designed a stem-cell research building at Stanford, was hired to create an appropriately outward-facing design.

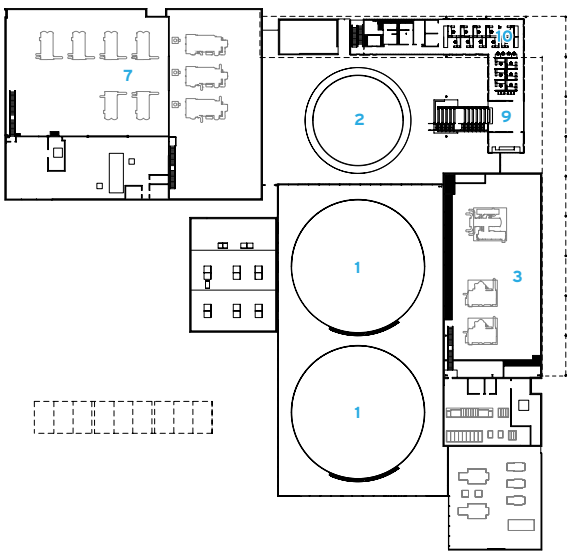
On the nearly three-acre site, the architects designed a surprisingly grand complex of buildings organized around the water tanks. The Central Energy Facility faces the main campus to the east and is aligned with its grid. Its centerpiece is the hot-water tank, nearly 70 feet in diameter and protected by a 64-foot-tall screen whose stainless steel and aluminum perforated panels shimmer in the sun. Meanwhile, the two larger cold-water tanks have been lowered 25 feet below grade to reduce their visual impact.

The two main volumes that house the heat-recovery equipment are simple steel-framed structures with cast-in-place concrete walls, integrally colored as a nod to the university's historic sandstone buildings. A welcoming canopy of solar panels, supported by steel pipe columns, unifies the front and wraps around the corner. To the northeast is a two-story, 10,000-square-foot L-shaped building for staff and visitors. On its ground level, a large conference room, which often serves as the starting point for tours of the facility, doubles as an extra classroom. A courtyard offers another prime spot to congregate, with its bleacher seating looking out onto the hot-water tank. At the top of this stair, a spacious breezeway provides a protected outdoor space for small gatherings and leads to the offices for the 16-person staff, in a narrow, 25-foot-wide bar with daylight flooding through its glass curtain walls.

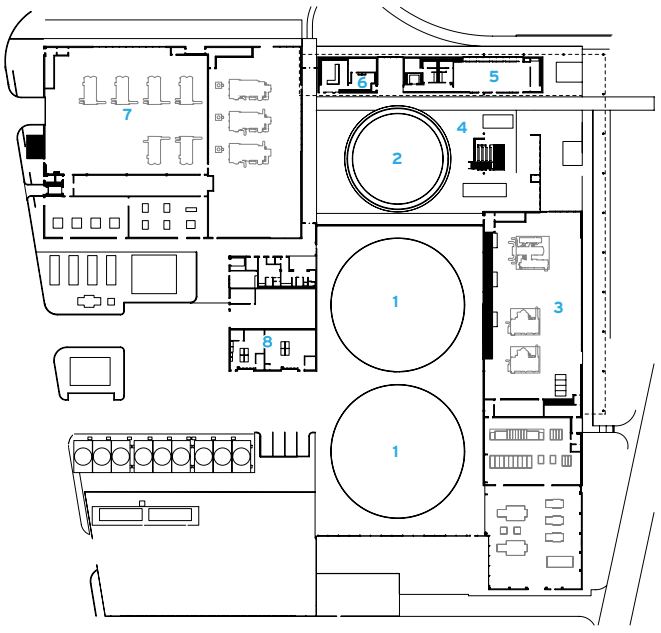
The architects' creative material palette lends the complex a visual richness. The "people" building is clad in weathering steel, a nod to the site's former agrarian life. The use of maple on the soffits, as well as the cross-laminated timber underpinning the solar panels, provides a warmth and subtly suggests that this is a safe place to be, with no threat of combustible gases. Fine-grained metal screening adds a sense of lightness. The two larger cold-water tanks are delicately masked by perforated box-

PHOTOGRAPHY: © TIM GRIFFITH; ROBERT CANFIELD (OPPOSITE)

GRAND GESTURES
The courtyard features a central stair (above) that can be used for gatherings; the wide landing on the second floor serves as an outdoor meeting area (left). To protect the hot-water tank (opposite), the architects interspersed stainless-steel perforated panels with aluminum ones to create a glittering screen.

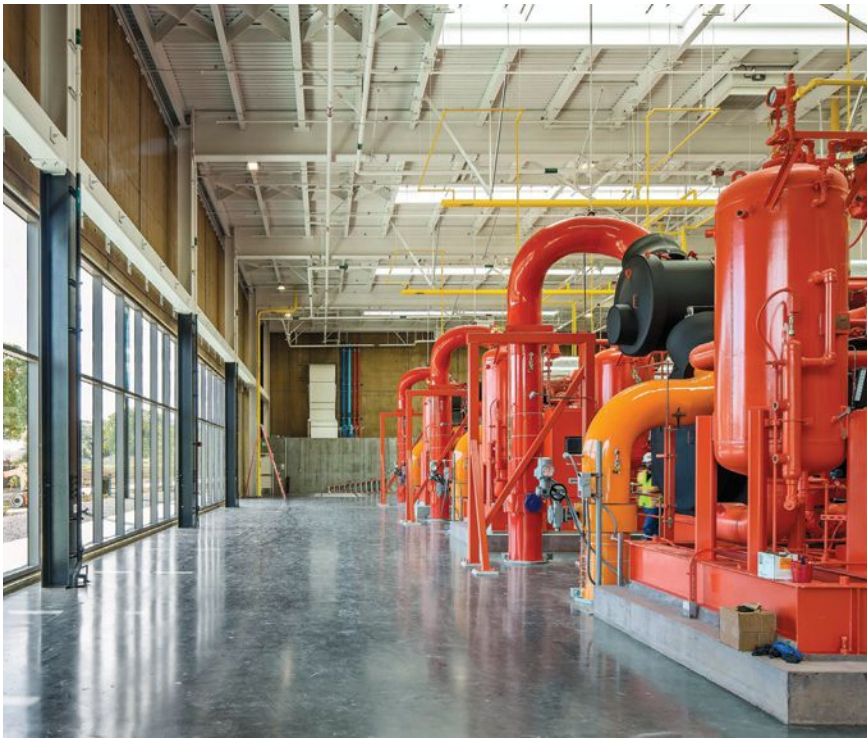


SECOND-FLOOR PLAN



GROUND-FLOOR PLAN

1 CHILLED-WATER STORAGE TANK
2 HOT-WATER STORAGE TANK
3 HEAT-RECOVERY CHILLERS
4 ENTRY COURTYARD
5 CONFERENCE ROOM
6 CONTROL ROOM
7 CHILLERS AND HOT-WATER GENERATORS
8 WORKSHOPS
9 BALCONY
10 OFFICE



COLOR-CODED Visitors can peer through the glazing at the enormous heat-recovery chillers, painted orange and red to show the change in water temperature.

ribbed aluminum, while the courtyard is shielded from the sun by a trellis topped with steel grating.

"Power plants are typically the worst part of a campus—they're ugly and smelly," says Joe Stagner, executive director of Stanford's department of sustainability and energy management. "When people come here, they are immediately disarmed. As with the rest of campus, the investment in architecture has helped to make a good impression; it helps to open minds and excite the imagination." ■

Lydia Lee writes about architecture and design from the San Francisco Bay Area.

credits

ARCHITECT: ZGF Architects – Joseph Collins, partner in charge; Toby Hasselgren, senior designer; Renee Kajimoto, project architect; Bradley Lest, Glen Justice, Curtis Williams, Sienna Hill, Christopher Flint Chatto, Kelvin Ono, Michael McGale, Nicholas Robertson, design team

ENGINEERS: Affiliated Engineers (prime contractor, lead m/e/p); Rutherford & Chekene (structural); BKF (civil)

GENERAL CONTRACTOR: Whiting-Turner Contracting Company

SIZE: 125,600 square feet (gross)

PROJECT COST: $485 million

CONSTRUCTION COST: $120 million

COMPLETION DATE: March 2015

SOURCES

METAL PANELS: Morin Corp

METAL/GLASS CURTAIN WALL & WINDOWS: Walters & Wolf

ROOFING: Firestone

GLASS: Viracon

SKYLIGHTS: Metcoe

CEILINGS: Armstrong

CARPET: Bentley Mills

OFFICE FURNITURE: Knoll

BUILDING AUTOMATION SYSTEM: Johnson Controls

PHOTOGRAPHY: © ROBERT CANFIELD

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Level Playing Field

A group of recent projects demonstrates that true universal design goes beyond mere accessibility.

By Katharine Logan

IN 2015, the New York transit system opened its first new subway station in 25 years; the city of Toronto hosted the Pan Am and Parapan Am Games; the YMCA opened a new facility in Grand Rapids, Michigan; and a San Antonio school for deaf children won a design award for redefining what a learning place can be. What united these disparate events was an underlying commitment to including as wide a range of users as possible: in other words, to universal design.

In the United States, one out of every five adults lives with a disability, according to the Centers for Disease Control and Prevention. The most common disability is a mobility limitation (defined as serious difficulty walking or climbing stairs) reported by one in eight adults, followed by disability in thinking or memory, independent living, vision, and self-care.

Over the course of our lives, we are all likely to experience some limitation of our abilities, whether due to injury or illness, frailty in body or mind as we age, or just trying to get around with a child in a stroller. Throughout these changes of circumstance, universal design—which the not-for-profit research and advocacy group Global Universal Design Commission (GUDC) defines as "a process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation"—goes beyond mere accessibility. Its aim is to improve the quality of life.

"When universal design really works," says Susan Ruptash, a principal at Toronto-based Quadrangle Architects, "people don't say, 'Wow! This is accessible.' They say, 'Wow! This is fabulous.'"

Both people with disabilities and those without are appreciating the new 34th Street/Hudson Yards subway station, a centerpiece of New York's redevelopment plan for Manhattan's far west side. The city's subway system is more than a century old, and many of its stations are notoriously difficult to navigate. But here, ease of use and inclusive design were key planning concepts. "With this new station in the system, we had the opportunity to integrate all users," says Beth Greenberg, principal with Dattner Architects, design architects for the project.

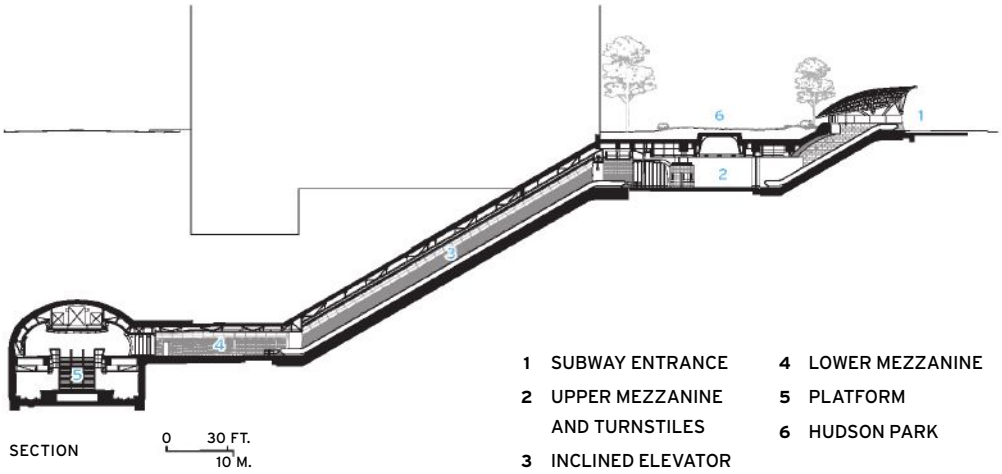
The station, designed for a peak hourly capacity of 30,000 commuters, is 125 feet below street level, and the configuration of the descent showcases the inclusive concept. A pair of glass-enclosed inclined elevators, a first in New York's transit system, travel parallel to the station's banks of escalators down the long slope from upper to lower mezzanines, enabling passengers with a disability (or stroller, or large load) to experience what Greenberg describes as "a shared quality of movement."

"Equitable use," in which an environment provides the same means of use for all users—identical whenever possible; equivalent when not—is one of the primary principles of univer-

PHOTOGRAPHY: © DAVID SUNDBERG/ESTO

DEEP DESCENT
New York's newest subway station (this page and opposite) is 125 feet underground. However, the trip from the street to the platform is broken into a series of gradual descents.

CROWD PLEASER The new 34th Street/Hudson Yards station has a 35-foot-wide platform, the roomiest in the city's subway system, improving maneuverability for all users.



sal design, according to the Center for Universal Design at North Carolina State University. The idea is that a well-designed environment avoids isolating or stigmatizing any group of users, or privileging one group over another. In fact, the Hudson Yards elevators are so unlike the secondary paths to which less thoughtful design often directs disabled users that the elevators' speed is set low to deter people who don't need them from riding just for fun.

Prioritizing universal design from the outset of a project maximizes the chance of garnering the greatest benefit. The inclined elevators, for example, not only foster equity, they also provide an economical solution to a construction challenge: by using the same tunnel as the escalators, the inclined elevators eliminate the need to drill out the separate—and in this case expensive—vertical and horizontal tunnels that would have been needed for a conventional elevator.

Other examples of compound benefits at the station include clarity of way-finding, in which spatial form makes clear which way passengers should go, so that signage becomes supplementary. A 35-foot-wide central platform, the widest in the New York subway system, provides enhanced safety and ease of maneuverability for passengers with and without mobility challenges.

While New York's new subway station demonstrates the compound advantages of universal design for mobility and inclusion in everyday life, facilities for the Pan Am and Parapan Am Games held last summer in Toronto demonstrated the ability of universal design not just to accommodate thousands of spectators, athletes, volunteers, and officials at a once-in-a-lifetime event, but also to leave a lasting legacy of awareness and inclusion. "People are seeing the Parapan athletes as incredible athletes first and foremost," says Quadrangle's Ruptash, who acted as universal design consultant for the planning, design, and compliance of the Games' four new-build facilities. "The beauty of these high-profile events is that they really raise the bar."

The largest of the Games' new facilities, the CIBC Pan Am and Parapan Am Aquatics Centre and Field House (the Pan Am Sports Centre), designed by NORR, includes a multilevel fitness center, two 50-meter-long swimming pools, a dive tank, four competition-size gymnasiums, and a 41-foot climbing wall. The facility is also home to an institute dedicated to the training of high-performance athletes and para-athletes.

Inclusion at the Pan Am Sports Centre begins from the moment of arrival, with a choice of accessible parking spots: larger ones to accommodate mobility-aided passengers who need extra room to transfer from their vehicle, and standard-sized spaces for distance-limited passengers using a cane or walker. The welcome continues with a main reception desk integrating counters of different heights. High-contrast and tactile signage, wide corridors and doors, elongated power controls for doors permitting operation with an elbow or foot, contrasting and glow-in-the-dark strips for a clearer view of stair edges, and double handrails for visitors of all heights promote ease of movement throughout the building.

Flexibility and choice are fundamental tenets of universal design. At the Pan Am Sports Centre, athletics facilities offer gender-specific and family changing rooms. Roll-in showers (both communal and private), accessible fixtures, and good lighting design ensure that the facilities are easy to use and navigate. Ramps, lifts, and transfer benches provide options for entering a pool independently. Spectators with a disability can enjoy seating locations at all ticket rates without having their views blocked when excited fans jump to their feet

Most architects would agree that universal design is important. But resources and incentives for creating inclusive environments haven't always been widely available. To remedy that, the GUDC has developed a universal

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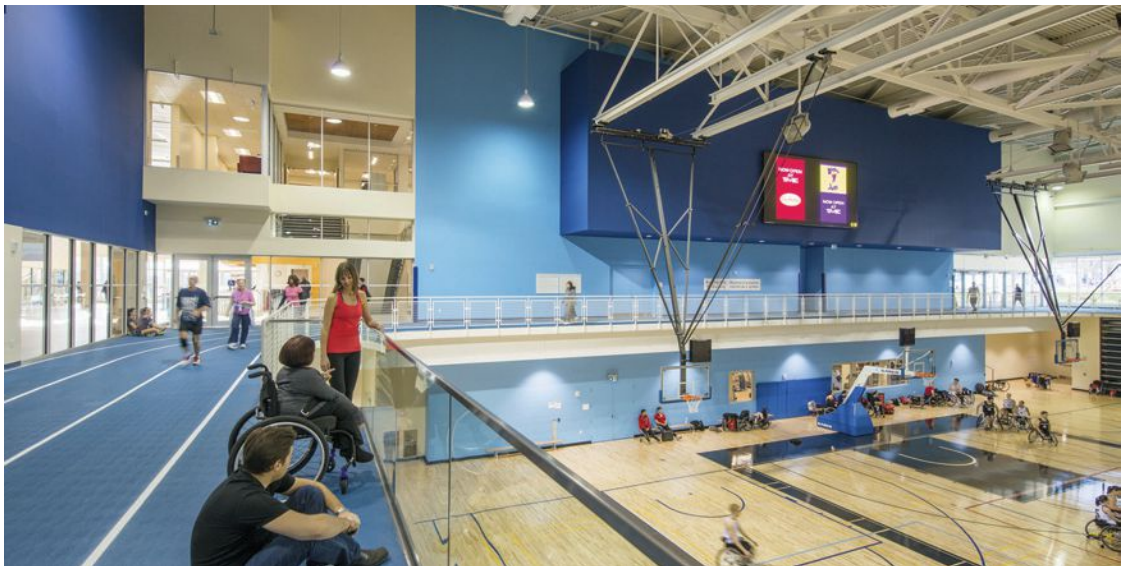
design certification standard. Based on a decade of research, stakeholder consultation, and testing, the certification standard is scheduled to launch later this year. "Our goal was to create a set of universal design standards which exceeded minimum compliance, could be voluntarily adopted, and would spur innovation," says Peter Blanck, GUDC chairman.

The performance-based standard will comprise over 600 flexible and interactive strategies from which designers select the ones relevant to their project's goals. Each strategy will be linked to design resources, including supporting research and best practices. Project teams will have the option to certify their achievement by self-certification or third-party audit.

In December 2015, the Mary Free Bed YMCA became the first project to achieve certification in the pilot for GUDC guidelines. "The concept wasn't so much about designing a facility for persons with disabilities," says Michael Perry, executive vice president at Progressive AE, architects for the project. "It was really to change the mindset: to design focused on everybody."

The 116,000-square-foot, $31 million LEED-certified facility in Grand Rapids, Michigan, includes two gymnasiums, two pools, two group fitness and indoor-cycling studios, an indoor track, climbing wall, tennis courts, playing fields, a greenhouse, teaching kitchen, learning farm, and access to a rapid bus line. In the Y's central, clerestory-lit volume, a bright yellow ramp forms a promenade between the building's two floors. There are no stairs. "Often, when you walk into a building, the vertical circulation creates an immediate separation," says Perry. "Here, we don't segregate."

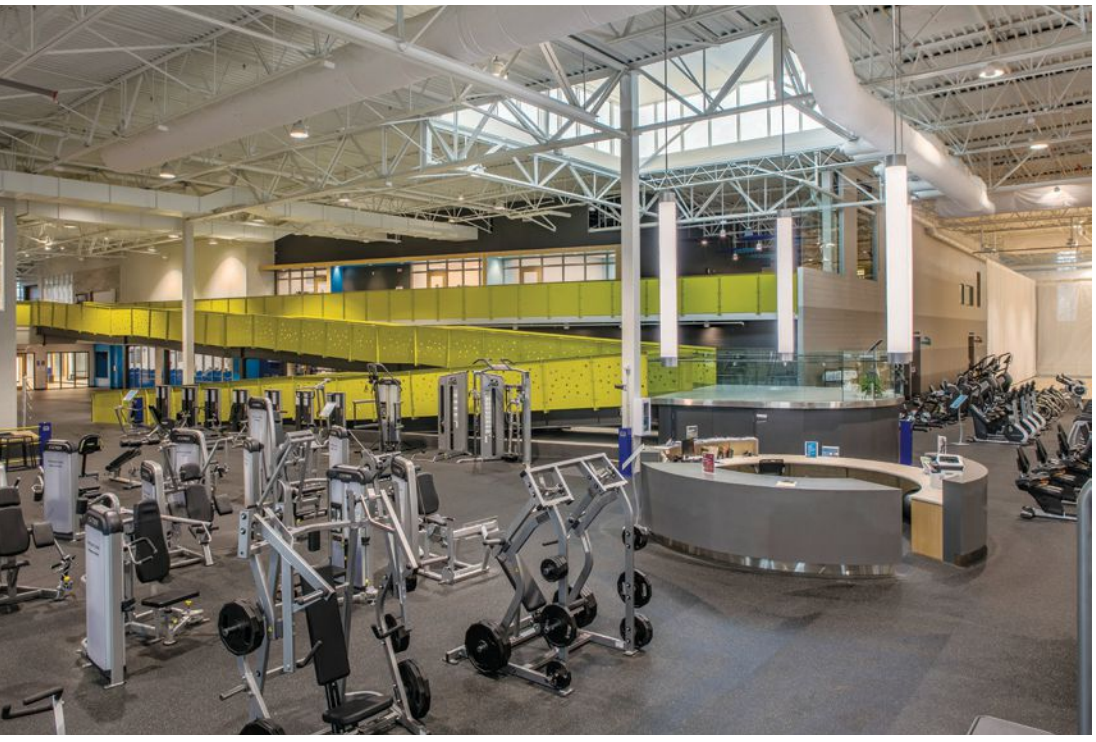


Following up on this initial gesture of inclusion, the building provides a way-finding system designed for multiple age groups and cultures, color schemes and lighting conditions to provide cues to people with all types of visual ability, and hearing loops to enhance functionality for hearing aids and cochlear implants. In pool areas (which often have poor acoustics), acoustic wall panels make a comfortable environment for people with and without hearing aids. Indoor and outdoor spaces accommodate diverse needs with fitness equipment specially designed for wheelchair users, ergonomic and barrier-free changing facilities, self-operated transfer stations for entering and exiting the swimming pools, hard-surface trails, and a wheelchair softball field.

Perhaps no group has more to gain from inclusive environments than children, particularly children with a disability. At the Sunshine Cottage School for Deaf Children, in San Antonio, winner of a 2015 AIA chapter design award, primary school children learn in an environment in which every design decision was considered for its impact on their ability to hear.

Sunshine Cottage has occupied its new building since 2010, but it has been helping hearing-impaired kids since 1947. "Can you succeed without a building like this? You can," says Belinda Pustka, the school's executive director. "But it's so much easier now—we aren't always fighting with the building to be successful. After more than five years here, I can say, 'the facility facilitates.'"

The school's new campus comprises five structures: one for administration, one for elementary classes, another for parents and infants, and two for early-childhood education. Facilities include 20 classrooms, dedicated rooms for music and art, kitchen space and science labs, a gymnasium with a full-size basketball court, an occupational-therapy room for speech therapists, and three age-appropriate playgrounds. The campus also



GAME PLAN The Mary Free Bed YMCA has no stairs. Instead, a colorful ramp (left) connects its two levels. At the Pan Am Sports Centre (above), good lighting is one of many features that makes the facility easy to use and navigate.

PHOTOGRAPHY: © BOB GUNDU, 10 FRAME HANDLES (TOP); BILL LINDHOUT (BOTTOM)

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CIRCLE 225

SOOTHING THE SENSES At the Sunshine Cottage School for Deaf Children (left and bottom), the architects eschewed primary colors in favor of a muted palette that would harmonize with the surrounding landscape.

includes an amphitheater, outdoor classrooms, a nature trail, and playing fields.

Children with impaired hearing concentrate a huge amount of mental energy on listening. To make learning easier for them, the architects' primary objective was to increase the environment's signal-to-noise ratio—in other words, to amplify sounds that mean something (signals), and to eliminate those that don't (noise).

Strategies included siting the building to minimize traffic noise, designing an acoustically tight building envelope, locating mechanical rooms so that they don't introduce ambient noise into the occupied spaces, and designing the HVAC system with large ducts so that the air would move slowly and quietly inside them. Light fixtures that wouldn't hum were selected. Electrical rooms were painted with electromagnetic shielding paint to prevent silent frequencies' affecting hearing implants. And to get the most—or rather the least—bang for the acoustic buck, panels were applied to walls rather than ceilings. The resulting quiet, says Greg Papay, a partner at Lake Flato, the project's architects, "makes us understand how valuable a great acoustical environment is to everyone."

With the signal-to-noise ratio optimized, the architects' next objective was to give the children's hardworking senses some rest. Textures, colors, and materials were selected to harmonize with the adjacent landscape. Ample daylight, views to the outdoors, and settings for outdoor learning were designed to engage the senses in ways that would be restorative.

"Schools often edge designers toward primary colors and a cacophony of shapes and sizes, but focusing on the needs of hearing-impaired kids required us to eliminate the extraneous," says Papay. "We found that a lot of universal design overlaps with what we would do to make a really great learning environment anyway." ■

Katharine Logan is an architectural designer and a writer focusing on design, sustainability, and well-being.

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Learning Objectives

1 Define the term "universal design."

2 Outline strategies for designing for people with diverse disabilities, including those with limited mobility or impaired sight or hearing.

3 Discuss the benefits of universal design for nondisabled users.

4 Describe the recently launched certification system for universal-design projects.

AIA/CES Course #K1603A

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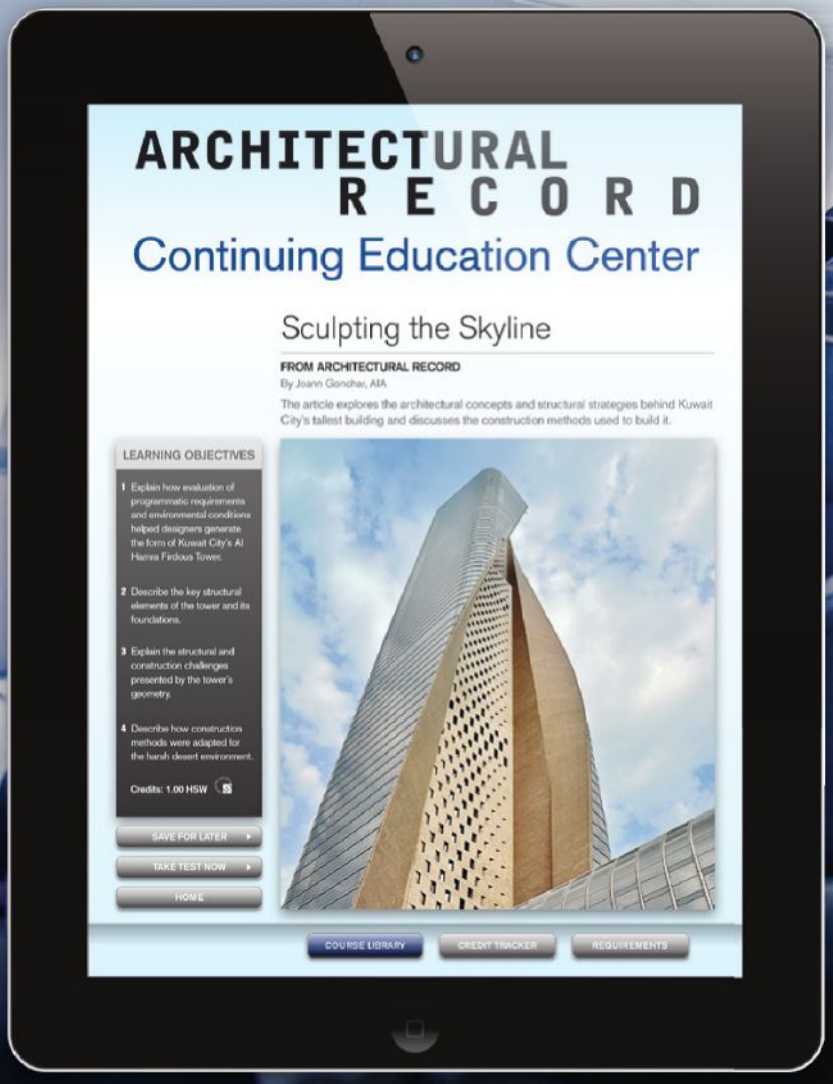

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Image courtesy of Smart Vent Products, Inc.

Designing for Extreme Environments

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Extreme weather conditions, such as flooding, can cause significant problems for buildings unless they are designed and constructed to withstand them.

Designing for Extreme Environments

Incorporating resiliency into buildings that are subjected to harsh or damaging conditions

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Image courtesy of Smart Vent Products, Inc.

The weather is always a popular topic of conversation, but it is also an important focus of researchers and government agencies. The National Weather Service (NWS), which is part of the National Oceanic and Atmospheric Administration (NOAA), has kept records for decades on weather events across the United States. In particular, it has tracked severe weather events, such as tornados, hurricanes, floods, storms of all sorts, and other things we commonly refer to as natural disasters. Its records seem to indicate a disturbing trend of an increase in severe weather events over the past several decades.[1] Further, the impacts from these events related to the cost of damage or losses seems to be increasing. A report titled "U.S. Billion-Dollar Weather and Climate Disasters: Data Sources, Trends, Accuracy and Biases" by Adam B. Smith of the NOAA National Climatic Data Center and Richard W. Katz of the National Center for Atmospheric Research is quite telling.[2] They have found that "an increasing trend in annual aggregate losses is shown to be primarily attributable to a statistically significant increasing trend of about 5 percent per year in the frequency of billion-dollar disasters." They further indicate that inherent uncertainties and biases in the data collection suggests an underestimation of average loss of roughly 10 to 15 percent, meaning the actual loss due to weather-related damage is likely 10 to 15 percent more than reported. Fortunately, there is one positive statistic from the National Weather Service: the number of fatalities from severe weather appears to be decreasing, suggesting that we are getting better at protecting people, if not property. That is likely attributable to better communication and buildings designed to provide safer environments for people who can experience any number of these natural disasters.

STANDARDS OF DESIGN FOR SAFETY

Building codes establish a baseline for safety in buildings covering a variety of issues, including weather resistance. In areas that have been identified as being prone to a higher risk of such things as tornadoes, floods, or hurricanes, there are often localized requirements that are more stringent than national codes. Miami Dade County in Florida, for example, is well known for establishing and enforcing higher standards to protect people and property in the event of hurricanes, wind, and flooding.

CONTINUING EDUCATION

1 AIA LU/HSW

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Learning Objectives

After reading this article, you should be able to:

1. Define the building codes and federal standards that identify requirements for structures that are resistant to extreme weather.
2. Discuss the design issues related to creating buildings that can withstand a flooding event.
3. Assess design strategies related to wind and projectile resistance during hurricanes and tornadoes.
4. Specify and design effective, required signage that is durable and long lasting in buildings subject to extreme conditions.

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Images courtesy of FEMA

FEMA Publications P-361 and P-320 provide detailed requirements for safe rooms and shelters to withstand tornadoes, hurricanes, and flooding—some more stringent than the ICC-500 code.

In some cases, a proactive approach to providing safe shelter has been adopted. Specifically, ICC 500-2014: ICC/NSSA Standard for the Design and Construction of Storm Shelters, published jointly by the International Code Council (ICC) and the National Storm Shelter Association (NSSA), has been developed. This standard is referenced in the newest building safety codes and provides minimum design and construction requirements for shelters to provide a safe refuge from storms that produce high winds, hurricanes, and tornadoes. The premise here is that the magnitude of wind speeds associated with these events require occupants of standard buildings to evacuate the area or seek protection in a shelter designed for resistance to extraordinary wind loads and flying debris. This approach isn't limited to stand-alone shelters either since the latest ICC Codes now require storm shelters in educational occupancies and critical emergency operation centers located in areas prone to extreme tornadoes. That means such shelters, or rooms and facilities that can serve as those shelters, must be included in the design and renovation of many buildings. The ICC-500 standard provides architects and other design professionals with minimum code requirements for the main wind-resisting structural system, openings, and cladding of these shelters. It also provides basic occupant life-safety and health requirements for shelters, including means of egress, lighting, sanitation, ventilation, fire safety, and minimum required floor space for occupants.

Beyond codes, the federal government can influence local building design and construction too, particularly through programs and requirements of the Federal Emergency Management Agency (FEMA). It also issues standards for keeping people safe and sheltered in severe storms, and it relies on those standards to establish rates for things like flood insurance and other programs. In particular, FEMA P-361, "Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms" (Third Edition, 2015) addresses many of the same things that ICC-500 does, but it is more stringent in some cases. A companion publication, FEMA P-320 titled "Taking Shelter from the Storm, Building a Safe Room For Your Home or Small Business" now in its fourth edition, helps designers, homeowners, or small business owners assess their risk and determine the best type of safe room for their needs. FEMA P-320 also includes safe room design drawings with details geared to both FEMA P-361 and ICC-500. Design options include safe rooms located inside or outside of a home or small business. For safe rooms intended for more than 16 occupants, additional requirements kick in for the design.

Like ICC-500, FEMA P-361 presents important information about the design and construction of community and residential safe rooms to provide protection during tornado and hurricane events. FEMA defines "safe rooms" as buildings or portions thereof that comply with the criteria described in P-361. ICC 500 defines "storm shelters" as buildings or portions thereof that comply with ICC 500. Though similar, there are important differences. All safe room criteria in FEMA P-361 meet the storm shelter requirements of the ICC 500, but FEMA P-361 includes a few design and performance criteria that are more conservative than those in the ICC 500. In particular, FEMA requires safe rooms that are designed specifically to provide near-absolute protection per FEMA P-361 criteria, including operational and emergency planning criteria.[3]

While tornados and hurricanes may grab the most media attention, flooding is actually more prevalent and more of a problem in the United States. Buildings that are designed and constructed in a known flood zone need to rely on the latest available information and standards in order to remain safe and be structurally sound. The best source of such information is a FEMA Flood Map Service Center, where the flood insurance rate map (FIRM) for a municipality can be found. This is typically the map used by municipalities to enforce their local floodplain management regulations, but it's also used by the FEMA-administered National Flood Insurance Program (NFIP) for flood insurance rating purposes. The identified flood zone of the building along with other factors play directly into the ultimate cost of flood insurance.

In addition to FEMA, The American Society of Civil Engineers (ASCE) has published "Flood Resistant Design and Construction" (ASCE 24-14). This standard, which is also adopted by reference in the model building codes, provides minimum requirements for the design and construction of structures located in flood hazard areas. It applies to new structures, including subsequent work, and to work classified as substantial improvement of existing structures that are not historic. As a professional resource, it provides essential guidance on design and construction to structural engineers, design professionals, code officials, floodplain managers, and building owners.

COMMON DESIGN CONSIDERATIONS

All extreme weather conditions have the potential to create damage to buildings, increase risk to people, or both. Not all do it in the same way, however, nor do they all pose the same types of threats. The key, from a design standpoint, is to understand the differences between various weather conditions and the ways to help assess, quantify, and address the potential concerns.

Flooding

As mentioned, flooding is one of the most frequent and potentially most damaging events related to extreme weather that people and buildings need protection from. The National Flood Insurance Program (NFIP) managed by FEMA is the only place that most properties can get flood insurance, therefore, it is a significant source of information and data on flood events. Of particular interest to NFIP are the specific costs of flooding which can help to identify where to focus ways to reduce damage and hence cost. One of the best known recent flooding events occurred when Hurricane Sandy battered the northeastern United States in October of 2012. Statistics have shown that NFIP claims filed within the four months following that storm were 93 percent for building damage as opposed to 7 percent for contents damage. That may be different from what a lot of people think when they see streets piled with ruined furniture, refrigerators, etc. after a flood. The reality is that building and structural damage claims were the predominant issue in Hurricane Sandy, with claims in the range of $10,000–$100,000 each. The bottom line is that such structural damage from flooding can add up quickly, making it extremely worthwhile to design for reducing building damage in known flood zone areas.

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Designing to mitigate flood damage starts by consulting the FEMA Floodplain Maps for the location where a building is sited. There you can determine the Base Flood Elevation (BFE), which is the calculated level that floodwaters will rise to during a base flood event. The maps may also show Special Flood Hazard Areas (SFHA), which are high-risk floodplain areas. If the building site is located in any area on the map that shows a BFE or a SFHA then building designs need to meet local, state, and federal floodplain construction requirements. The degree of flood mitigation required may depend on identified zones in SFHAs. Type A zones (AE and A1-30 zones) are areas with established BFEs and a perceived low impact from waves. For example, in a coastal area, these zones are typically found about two to three blocks inland from the coastline. Type V zones (VE and V1-30 zones) have a greater risk due to impact from storm-induced waves. Typically, these zones are right along the coastline as in "beachfront property."

Using the maps to determine the BFE and zoned degree of risk, the first mitigation step is to focus on keeping occupied space above the flood level. The term used to describe this is "freeboard," which is defined as the elevation of a building's lowest occupied floor above the base flood elevation. Many municipalities may have freeboard provisions already incorporated into their floodplain management ordinance, indicating, for example, +1 or +2 or +3, meaning that the lowest occupied floor for a home or building must be 1 foot, 2 feet or 3 feet higher than the established base flood elevation on the map. This approach does two things. First, it provides a bit of a safety factor, allowing for the underside of the structure of the lowest floor to remain above floodwaters or to guard against occasions when floodwaters may exceed the calculated BFE. Secondly, the actual floor elevation compared to the freeboard elevation is used as a basis to calculate flood insurance premiums. If the built floor elevation is at or above the freeboard elevation, then damage is expected to be less, meaning flood insurance premiums can be less. If the floor is below the freeboard elevation, then damage can be expected to be higher and premiums can go up drastically as a result.

This freeboard approach is good and certainly helps protect building contents and the building structure from the floor up, but we all know that something has to hold up that lowest occupied floor. In some cases it is a crawl space, while in others it could be a full-height car port or other non-habitable space under the building. The available height between grade and the first floor level will certainly influence how that space is used, but so will the building type. A residential building will create different opportunities and limitations compared to a commercial (non-residential) building. One thing that is similar, however, is the need to protect the structure in all cases from the forces of floodwater. Damage to the lower or foundation level is never good for any building since it can telegraph upward and impact the entire building above it. Hence, proper mitigation of the effects of flooding at the lowest level is critically needed.

Photos courtesy of Smart Vent Products, Inc.

Commercial and residential buildings located in flood plains need to have proper flood mitigation as part of their design, such as the flood vents shown at the base of each of these buildings.

Tornadoes and Hurricanes

Residential and commercial buildings that incorporate safe rooms or shelters following ICC-500 or FEMA guidelines are becoming more popular, particularly among increasing urban populations seeking protection from violent tornadoes or hurricanes. The engineered construction of the walls, roof, and floor are fairly straightforward in terms of using substantial, reinforced materials (i.e. concrete, CMU, etc.) following the standards. However, the room or building will only be as strong as its weakest part, which in some cases has proven to be the door leading into it. Just as the walls and roof of a safe room are designed and built to protect against extreme winds and wind-borne debris, so too, the whole door assembly (door, frame, and hardware) must be designed together to do the same. When careful selection and installation of the safe room door assembly is not part of the overall design, then the safe room door opening can leave occupants at great risk of injury or even death during high-wind events.

Contrary to some perceptions, ordinary steel doors used in residential and commercial construction are not appropriate for safe rooms. There is a common misconception that a steel door marketed for storm protection with three locks and three hinges can provide the needed protection in tornadoes, but testing has demonstrated that they cannot. While they might remain in place and closed in some high-wind conditions, they cannot withstand the impact of the wind-borne debris, or "missiles," that a tornado can propel. Dramatic failures have occurred when such wind-borne debris (wood studs, metal posts, sign supports, etc.) have struck steel doors. In some cases, the missile-like projectile can hit the door, penetrate all the way through, and either harm people inside or allow high winds to enter. In other cases, the hardware can be damaged and fail, allowing the door to swing open and/or shut in the wind and bringing the unwanted weather inside the safe room.

Photos courtesy of FEMA Federal Insurance and Mitigation Administration Fact Sheet, September 2014

Impact test results on safe room doors show failure at the latch/lock (left), failure by full penetration (center), and a passing condition that withstood both penetration and latch/lock failure (right).

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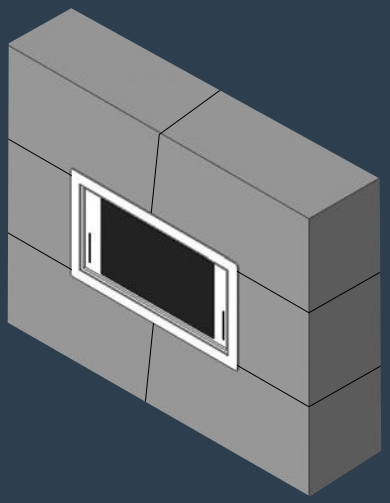

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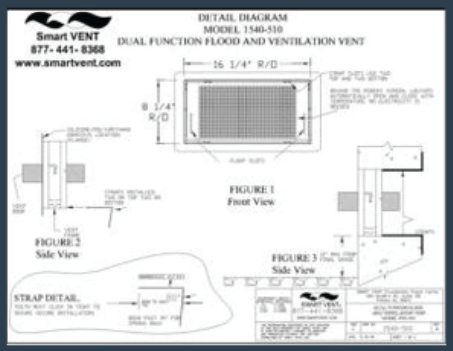

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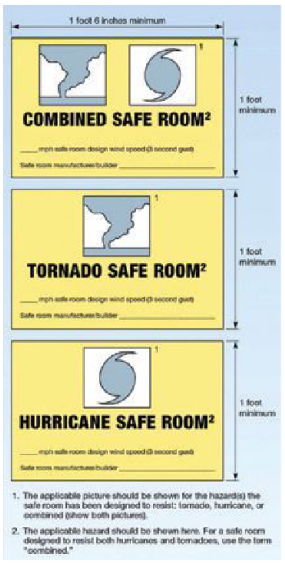
FEMA points out that only door assemblies designed and tested to resist tornadoes can provide the needed life-safety protection for a safe room or shelter. In this case, the door assembly includes the door, hardware (locks and hinges), frame, and attachment devices used to anchor the door frame to the surrounding safe room wall. When selecting and specifying such assemblies, architects need to be sure that components have been tested together specifically for a tornado safe room. FEMA is not the entity that tests and certifies products, rather, the manufacturers of safe room door assemblies must obtain independent certification. The commonly accepted practice is through labeling by third parties, such as Underwriters Laboratories (UL), Intertek Testing Services (ITS), or others. Such labels specified for occupant protection should be issued by the agency that approved them to show basic information, including the name of the manufacturer plus performance characteristics, such as the test missile size and speed or test pressure.

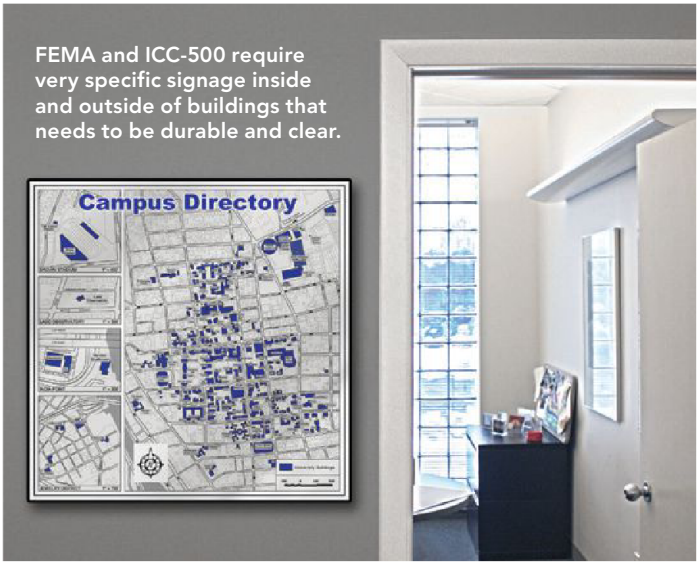
Recognizing this testing and labeling, specifications can request documentation certifying that the door assembly is compliant with the most current versions of FEMA's safe room publications (FEMA P-361 and FEMA P-320) or ICC-500 for a tornado wind speed of 250 mph. The entire safe room door assembly must have passed the required testing exactly as it is to be installed in the safe room to make sure it will withstand the required tornado wind pressures and debris impacts. This includes the door frame, the anchoring method, the door itself, and the hardware. Note that some suppliers may offer the door and frame without the tested hardware; if substitutions are made, the door may fail during a tornado. Installation instructions, whether in the specifications or from a manufacturer, should be specific to the actual safe room wall type of the building (e.g. wood frame, concrete masonry units (CMUs), etc.).

Photo courtesy of AMBICO Limited and Securitech Group, Inc.

Tornado safe room doors need to be tested and certified based on the specific assembly of the door panel, the door frame, and the hardware used, even when used in rooms that double for other uses.

Images courtesy of FEMA and Metalphoto® Photosensitive Anodized Aluminum





Communication

During any extreme weather or emergency condition, effective communication between people is critically important. The FEMA and ICC-500 standards recognize this importance and include requirements for signage for Community Safe Rooms in particular (ICC 500 Sec 504). These requirements include a sign at every entrance to the safe room, indicating "Tornado Safe Room" or "Hurricane Safe Room," plus the name of the manufacturer or builder of the safe room, its purpose (i.e. the storm type: tornado or hurricane), and the design wind speed. This information lets people know first of all that the room exists, and secondly what it is designed and constructed to withstand. Additionally, ICC-500 goes on to require an identifying sign, different from the entrance sign, depicting the general location of the safe room(s) and access ways. Such identifying signs should be posted in prominent locations 60 inches above the finished floor to the centerline of the sign. An identifying sign is required adjacent to access doors on the inside of the safe room, in the office of the facility manager, if present, and in the designated safe room manager's area within the safe room, if present.

Where community safe rooms are located, the community should alert its citizens to their presence and indicate that they are open to the public by installing signs and publishing building manager contact information. The interior or exterior of the community safe room should have a sign that clearly identifies the building as a community safe room, indicating whether it is a tornado, hurricane, or combined community safe room. These information signs need to be placed in clearly visible locations, indoors or outdoors, to alert communities to the presence of the safe room, the intended occupants, the maximum number of occupants, the travel routes to the safe room, the location of the safe room entrance door, and other pertinent details. Depending on the population served, it may be necessary to include signs in languages other than English.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP *is an architect and green building consultant who has authored more than 120 continuing education and technical publications as part of a nationwide practice.* ***www.linkedin.com/in/pjaarch***

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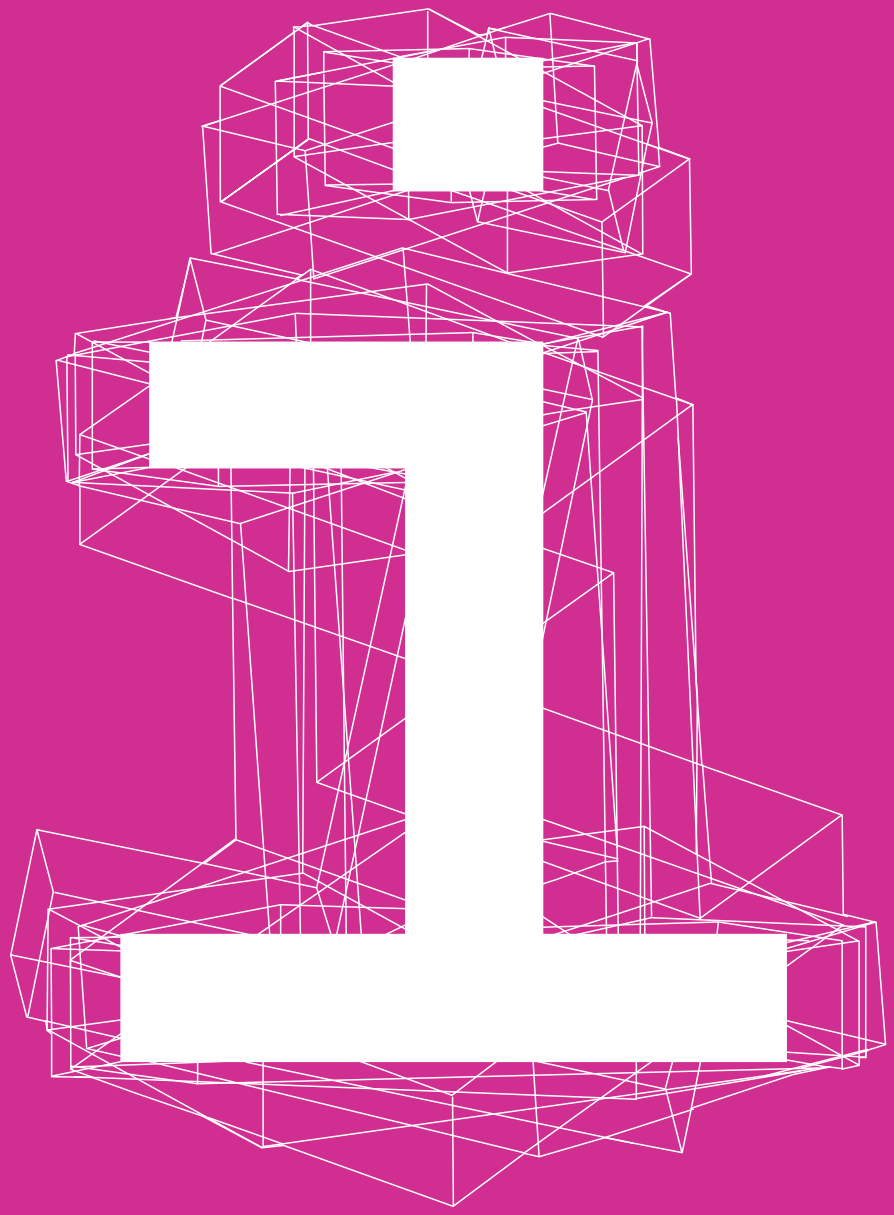

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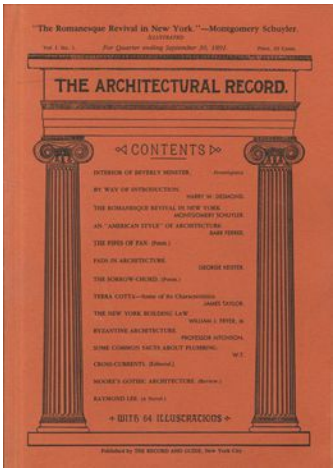

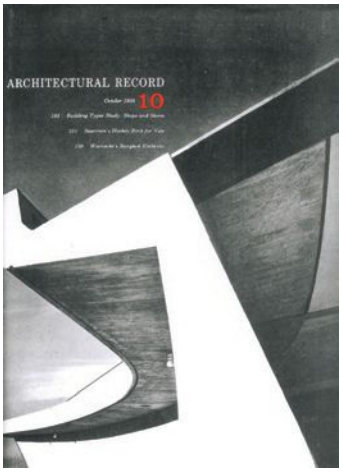

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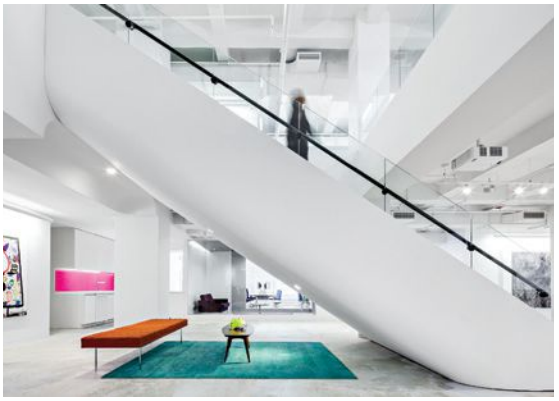
Circle 20

2016 CALL FOR ENTRIES
Record Kitchen & Bath

The editors of ARCHITECTURAL RECORD are currently accepting submissions for the **2016 Record Kitchen & Bath** competition. Entry is open to any registered architect, as well as any designer working in collaboration with architects, who has completed an innovative residential and/or commercial kitchen or bath project in the last year. We are looking for projects that feature unexpected materials, address unique client needs, or are designed in a manner that allows these utilitarian spaces to be functional, sustainable, and beautiful. Winning projects will be featured in the October 2016 issue.

The fee is US$50 per entry. To enter, visit: kandb.architecturalrecord.com. E-mail questions to ARCallForEntries@bnpmedia.com. (Please indicate **Record Kitchen & Bath** as the subject of the e-mail.) **Submissions are due June 1, 2016.**

2016 CALL FOR ENTRIES
Record Interiors



The editors of ARCHITECTURAL RECORD are currently inviting submissions for the **2016 Record Interiors** issue. All architects registered in the United States or abroad, as well as interior designers working in collaboration with architects, are welcome to submit interiors-only projects that have been completed in the last year. The projects may be new construction, renovation, or adaptive reuse; commercial or residential; domestic or international. Special consideration will be given to works that incorporate innovation in design, program, building technology, sustainability, and/or materials. The winning projects will be featured in the October 2016 issue.

The fee is US$75 per entry. To enter, visit: recordinteriors.architecturalrecord.com. E-mail questions to ARCallForEntries@bnpmedia.com. (Please indicate **Record Interiors** as the subject of the e-mail.) **Submissions are due June 1, 2016.**

New and Upcoming Exhibitions

Thom Browne Selects
New York City
March 4—October 2, 2016
For the next installment of Cooper Hewitt's Selects series, fashion designer Thom Browne explores ideas of reflection and individuality with an installation that includes more than 50 of the museum's historic and contemporary mirrors and frames. The exhibition is the 13th in an ongoing series in which prominent designers, artists, and architects are invited to mine and interpret the museum's collection. For more information, visit cooperhewitt.org.

Close-up
Los Angeles
March 11—May 29, 2016
An often overlooked condition of digital design technologies is the ability to design objects through continuous degrees of magnification. This exhibition at SCI-Arc proposes that technological advances have resulted in a transformation of how architectural ideas are formed, giving new meaning to the idea of tectonics. For more information, visit sciarc.edu.

A Japanese Constellation: Toyo Ito, SANAA, and Beyond
New York City
March 13—July 4, 2016
A *Japanese Constellation* focuses on the network of architects and designers that has developed around Pritzker Prize winners Toyo Ito and SANAA. Providing an overview of Ito's career and his influence as a mentor to a new generation of Japanese architects, the exhibition presents recent works by internationally acclaimed designers including Kazuyo Sejima, Ryue Nishizawa, Sou Fujimoto, Akihisa Hirata, and Junya Ishigami. At the Museum of Modern Art. For more information, visit moma.org.

workSHoP
Santa Fe, New Mexico
March 19—May 22, 2016
The New York–based firm SHoP has a staff of 180 people and projects completed or under way on five continents. SHoP presents an immersive look at their upcoming expansion of SITE Santa Fe, a contemporary-arts center. For more information, visit sitesantafe.org.

Ongoing Exhibitions

Endless House: Intersections of Art and Architecture
New York City
Through March 6, 2016
This exhibition at the Museum of Modern Art considers the single-family home and archetypes of dwelling as themes for the creative endeavors of architects and artists. Through drawings, photographs, video, installations, and architectural models drawn from MoMA's collection, *Endless House* highlights how artists have used the house as a means to delve into universal topics and explores how architects have expanded their discipline through residence design. For more information, visit moma.org.

Frank Gehry
Los Angeles
Through March 20, 2016
Frank Gehry's buildings have altered architecture's relationship to the city, and his pioneering in digital technologies set in motion the practices employed by the construction industry today. This Los Angeles County Museum of Art exhibition is a comprehensive overview of Gehry's body of work. The show begins in the early 1960s—Gehry established his firm in Los Angeles in 1962—and runs to the present. Many of the 200 drawings have never before been seen publicly, and 65 models illuminate the evolution of Gehry's thinking. For more information, visit lacma.org.

Chinese Style: Rediscovering the Architecture of Poy Gum Lee, 1923–1968
New York City
Through March 27, 2016
In this survey exhibition at the Museum of Chinese in America, architectural historian Kerri Culhane documents and explores Poy Gum Lee's (1900–68) nearly 50-year-long career in both China and New York and examines Lee's modernist influence on New York's Chinatown. This project has resulted in the first-ever comprehensive list of Lee's projects in New York. Lee's hand is visible in the major civic architecture of Chinatown post-1945, which blends Chinese stylistic details with modern technologies and materials. For more information, visit mocanyc.org.

Silver to Steel: The Modern Designs of Peter Muller-Munk
Pittsburgh
Through April 11, 2016
A German émigré to the U.S. who moved to Pittsburgh in 1935, Peter Muller-Munk (1904–67) was a brilliant silversmith, a pioneering industrial designer and educator, and a visionary spokesperson for his profession. *Silver to Steel* is the first retrospective of his four-decade career, and it situates Muller-Munk among the most influential designers of his generation. The exhibition features more than 120 works of hand-wrought silver and popular midcentury products, supported by drawings, multimedia interviews, and period advertising. At the Carnegie Museum of Art. For more information, visit cmoa.org.

Case Work
Denver
Through April 17, 2016
This is the first comprehensive exhibition to present artworks created during architecture firm Allied Works' investigative process, which is at the heart of their practice. *Case Work* displays the explorations of material, form, and spatial experience that have guided the firm's architectural designs over the last 15 years, including both realized buildings and projects that have yet to take shape. At the Denver Art Museum. For more information, visit denverartmuseum.org.

Creation from Catastrophe: How Architecture Rebuilds Communities
London
Through April 24, 2016
Destruction and devastation present us with unique opportunities to radically rethink our environment. *Creation from Catastrophe: How Architecture Rebuilds Communities*, at the RIBA Architecture Gallery, explores the varying ways that cities and communities have been reimagined in the aftermath of natural or man-made disasters. From master plans to reconfigure London after the Great Fire of 1666 to contemporary responses to earthquakes and tsunamis, *Creation from Catastrophe* poses questions about the fragility of architecture, our relationship to nature, and the power of architects to instigate change. For more information, visit architecture.com/riba.

Lectures, Conferences, and Symposia

Copenhagen Architecture Festival (CAFx)
Copenhagen
March 10—20, 2016
Founded in 2014, this festival aims to promote rethinking the presentation of architecture. CAFx provides a platform to discuss and display architectural ideas through a public program of talks, films, performances, workshops, seminars, and exhibitions. For more information, visit copenhagenarchitecturefestival.com.

International Green City Conference
Vancouver
March 14—18, 2016
Open to anyone with an interest in improving cities and experiencing the fusion of green and urban, the International Green City Conference hopes to offer insights into global innovations in urban green infrastructure and planning. International speakers will share practical examples and strategies of existing green cities. Topics will include the rise of green roofs in North America, Holland's green solutions to societal challenges, and a green response to an expanding neighborhood. For more information, visit cnla-acpp.ca.

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CIRCLE 5

LEDucation
New York City
March 29—30, 2016
The 10th annual LEDucation expo is dedicated to the marketing of LED technology. LEDucation will offer a broad selection of informative sessions that cover various aspects of LED lighting, design, controls, and technology integration and application. The event will feature two full days of more than 30 educational sessions and a trade-show expo of more than 250 leading manufacturers, showcasing the latest innovations in SSL products and technologies. At the New York Hilton in Midtown. For more information, visit leducation.org.

SAH 2016 Annual International Conference
Los Angeles
April 6–10, 2016
The SAH 2016 Annual International Conference will engage participants from around the world with the rich, evolving legacy of the Pasadena/Los Angeles region's built environment. With the scheduled completion of the Metro Expo Light-Rail Line west to Santa Monica in early 2016, Pasadena will be connected to downtown L.A. and the rest of Los Angeles County. This infrastructure, building on historic rights-of-way, will provide new methods to see the broad range of the region's architecture and urbanism. At the Pasadena Convention Center. For more information, visit sah.org.

Drawing and the Brain
Columbus, Indiana
April 7—10, 2016
This symposium will gather artists, architects, and scientists from around the world to discuss the primacy of the sketch as a creative tool in architecture. The symposium will address questions of authorship and mark-making, drawing and the human voice, the relationship between hand and brain, and the potential for creation of "digital/tactile machines" that are able to emulate touch and mark-making. Supported by data from scientists and engineers, Drawing and the Brain will seek to redefine the role of drawing as a primary expression of creativity in architecture without ignoring technology. At the Indiana University Center for Art+Design. For more information, visit drawingandthebrain.org.

Coverings
Chicago
April 18–21, 2016
Coverings is the largest trade show and expo in North America of global tile and stone. This year's conference at Chicago's McCormick Place will feature exhibitors from more than 40 countries and will round up thousands of distributors, retailers, fabricators, contractors and specifiers, architectural and design professionals, builders, and real-estate developers. On top of a robust program of speakers and panels, more than 60 continuing-education sessions will be available to attendees and exhibitors. For more information, visit coverings.com.

AIA Convention 2016
Philadelphia
May 19—21, 2016
The AIA Convention is one of the largest annual gatherings of architects and design professionals in the United States. This year's iteration will take place at the Pennsylvania Convention Center. For more information, visit convention.aia.org.

NeoCon 2016
Chicago
June 13–15, 2016
NeoCon, the largest commercial interiors show in North America, has been held at the Merchandise Mart in Chicago since 1969. The three-day event attracts nearly 50,000 design professionals and showcases more than 700 companies. With more than 1 million square feet of exhibition space, the show launches thousands of new products and covers a spectrum of vertical markets including workplace, health care, hospitality, retail, education, public spaces, and government. For more information, visit neocon.com.

Competitions

Charlie Hebdo Portable Pavilion
Registration deadline: March 9, 2016
Many see freedom of speech as the most fundamental of human rights. Meanwhile, governments around the world deny people this right on a daily basis. This competition calls for designs for a traveling structure that will deconstruct the idea of free speech, reminding visitors that not all can enjoy this luxury.For more information, visit charliehebdoportable pavilion.beebreeders.com.

ASA Competition 2016
Submission deadline: March 15, 2016
What does the word basic mean? Architecturally, the term is often associated with the primitive, the vernacular, or even the banal. However, the relative and temporal nature of the term is often forgotten. This competition asks participants to redefine the word basic through an architectural intervention, leaving the choice open for the program, site, and scale. For more information, visit asacompetition.com.

Robert A.M. Stern Architects Fellowship
Submission deadline: April 8, 2016
The RAMSA Travel Fellowship is a $10,000 prize awarded yearly by Robert A.M. Stern Architects for the purpose of travel and research. This fellowship seeks to promote the perpetuation of tradition through invention, key to the firm's own work. Established to nurture emerging talent, the prize is awarded to an individual who has proven insight and interest in the profession and its future, as well as the ability to conduct in-depth research. For more information, visit ramsa.com.

Ugandan LGBT Youth Asylum International Competition
Registration deadline: April 20, 2016
Since the Republic of Uganda gained independence from the U.K. in 1962, it has retained many of its anti-gay laws and even gone so far as to institute newer, harsher penalties for homosexual acts. This competition asks for visions of a Ugandan LGBT youth center that will act as an asylum for young people who are no longer welcome in their own homes. It will be a place where LGBT youth can go if they have been hurt or abused in any way, are looking for help, or just need a place to meet other similarly affected individuals. For more information, visit ugandanlgbtyouthasylum.beebreeders.com.

Call for Proposals: The Deborah J. Norden Fund
Submission deadline: April 22, 2016
The Deborah J. Norden Fund awards up to $5,000 annually in travel grants to students and recent graduates in the fields of architecture, architectural history, and urban studies. Established in 1995 in memory of architect and arts administrator Deborah Norden, the fund has supported a wide array of projects over the past two decades, from a study of the Cambodian modernist Vann Molyvann to the insertion of built forms into fragile Australian ecosystems. The intention of the fund is to support genuinely independent projects that require travel. For more information, visit archleague.org.

Syria: Post-War Housing Competition
Registration deadline: April 23, 2016
The Syrian civil war, which began in 2011, has created a refugee crisis. As more and more cities of the war-torn country are freed, and refugees start to come back, housing scarcity will escalate. This competition invites architecture students and young architects to research new housing concepts for postwar Syria. For more information, visit matterbetter.com.

E-mail information two months in advance to recordevents@bnpmedia.com.

snapshot

PROJECT LE TOISON D'OR
LOCATION BRUSSELS
ARTIST UNSTUDIO WITH JASPERS-EYERS ARCHITECTS

A CURVING ladder of sculptural balconies rises above the double-height display windows of UNStudio's first project in Brussels—a mixed-use block on the high-end Avenue de la Toison d'Or. Situated between the historic gates Porte Louise and Port de Namur, the structure's organic lines "echo a quality we find in Victor Horta's work and other Art Nouveau architects from the turn of the century," says principal Ben van Berkel. But, belying its vintage influences, the building, clad in glass-fiber reinforced concrete panels, is thoroughly modern in construction and amenities, with an elevated garden, triple glazing for the windows, and a cogeneration system that supplies heating, cooling, and warm water to the 72 apartments and to 130,000 square feet of retail space, while also sending electricity to the grid. UNStudio aimed to make the street-level boutiques open and light, contrasting with "the apparent solidity of the upper floors," van Berkel says, "to create the illusion that the vertical, balloon-like frames were carrying the building." *Miriam Sitz*

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