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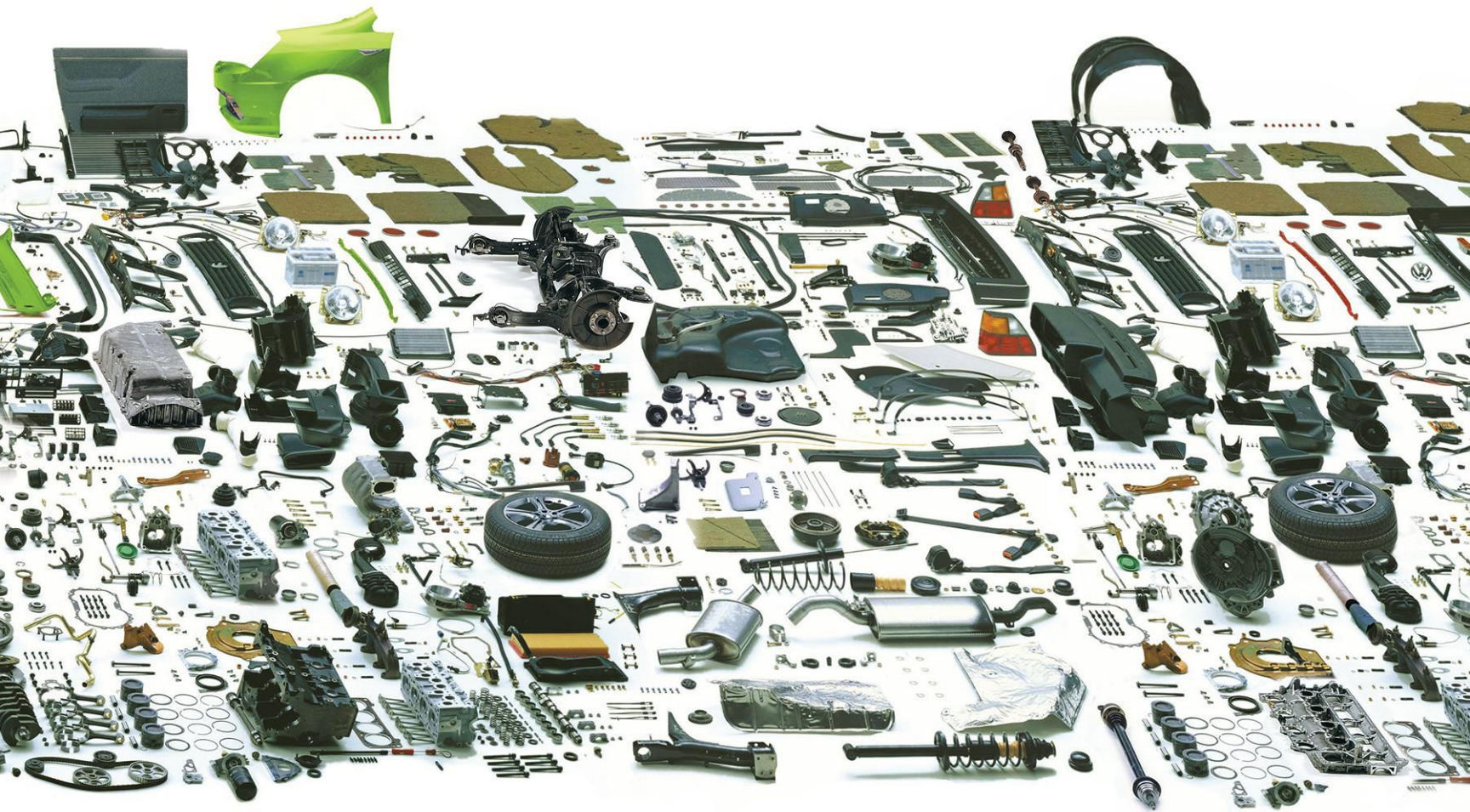
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COVER: DRIVELINES, JOHANNESBURG, BY LOT-EK. PHOTO BY DAVE SOUTHWOOD.

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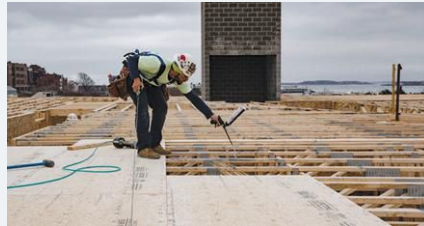
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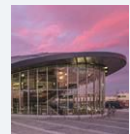


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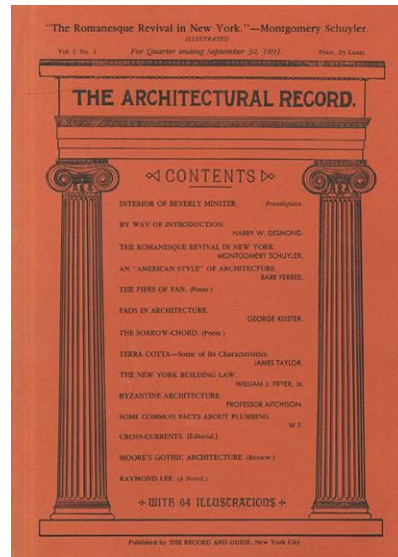
INSIDE THE ACE

Take a virtual tour of the Ace Hotel in Chicago by watching our exclusive video. The project, by GREC Architects and COMMUNE Design, appeared in the April 2018 issue.



COVER-STORY CELEBRATIONS

Staff of the Rome-based architecture firm Alvisi Kirimoto celebrated their project's appearance on the September cover of the magazine. Read more about their work with CannonDesign on a private office in Chicago in the 2018 Record Interiors issue.



RECORD ARCHIVES

Thanks to a new partnership with USModernist, most issues of *Architectural Record* dating back to 1891 are now available to be viewed online.



DINING BY DESIGN

Contributor Wendy Moonan (at left in photo) and features editor Josephine Minutillo (at right) visited the new Four Seasons, which left its storied location in the Seagram building in 2016. Read about the Isay Weinfeld renovation of the New York restaurant's new space on our website.



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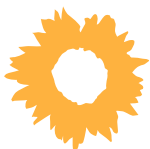
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The Housing Crisis

The economy is booming, but the widening gap between what people earn and what they must pay for a home is a severe and growing problem.

IN OUR current national housing crisis, there are occasionally lotteries to select tenants for new or renovated affordable multifamily buildings. For example, last year, nearly 94,000 people applied to rent 104 moderately priced units in an apartment house on the Lower East Side of Manhattan in New York City. You figure the odds on that one.

In a way, many of us have won—or lost—a kind of housing lottery. Did you inherit your house? Did you buy at the low end of the market a while back so your mortgage has remained a reasonable, fixed cost—and you've been deducting the interest from your income tax? Has your home gained significant value so you can borrow against it to renovate your kitchen or help send your child to college? Do you live in an apartment you don't own, but in a city with regulations that keep your monthly rent fairly stable?

Or are you one of the unlucky people who lost the lottery? Your home ended up underwater when the housing bubble burst 10 years ago. You're a young adult trying to make your way in the big city, but all you can afford is an illegal basement apartment with four roommates. You're working two jobs at minimum wage and still spending more than half your earnings on housing. Your urban neighborhood is gentrifying, and your landlord is jacking up the rent to force you out. You or a family member had a health emergency or other unexpected expense that caused you to miss a couple months' rent, and now you're facing eviction.

The lack of adequate affordable housing is a vast, complex conundrum that touches tens of millions of American lives across a socio-economic spectrum that begins with the chronically homeless—up by 12 percent since 2016, despite low unemployment and a thriving economy—and stretches into the middle class. Under a new city government plan to create more affordable housing in New York, 20 percent of the units in the initiative would be set aside for families making, astonishingly, as much as \$142,000 a year.

Of course, what that really means is that in cities like New York and San Francisco, with soaring housing markets, you can make a good salary and still be paying more than 30 percent of your income—the national recommended benchmark—to put a roof over your head. When the average price to buy an apartment in Manhattan is \$2 million, or the median cost of a house in San Francisco is \$1.6 million, you probably need to win the real Lotto just to live in either place.

But in smaller, non-coastal cities, residents are also feeling a big pinch. The obvious reasons: the median home price rose 41 percent faster than overall inflation between 1990 and 2016. And the supply of housing is nowhere near meeting demand: according to the National Low Income Housing Coalition, the U.S. is short 7.2 million affordable rental units, 1 million of them in California, which has more of the



highest housing markets than any other state. The ever-widening gap between what people earn—whether low-income or middle-class—and what decent housing costs is one of the most acute and poorly addressed problems our country is facing.

We do not pretend to know the answers. But we know that architects, with their design, construction, and problem-solving skills—and often deep knowledge about how cities work—can assist policymakers, developers, community leaders, and other stakeholders in grappling with a crisis that is largely being confronted on the local, not the federal, level.

In this issue of RECORD, we have begun to explore the severity of the affordable-housing shortage, with close-up views of three very different urban markets: Oakland, New York, and Orlando. We've also delved into the vexing question of gentrification, to ask the question, can low-income neighborhoods be improved, as they should be, without threatening the displacement of longtime residents? We have talked with one of the nation's leaders on homelessness, Rosanne Haggerty, about new strategies that can help families, veterans, and others deeply in need of obtaining permanent homes. And, lastly, we've looked at the wider world to find models of innovative architecture for housing a broad range of communities.

Cathleen McGuigan

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Nevada was decimated a decade ago by the housing crisis . . .

I have this fear that it's all going to happen again . . . it feels like nobody learned their lesson.

—Leo Murrieta, director of a nonprofit, Make the Road Nevada, that protects the rights of immigrants and working families, speaking on NPR's On Point.

Architects Respond to Rising Interest in Accessory Dwellings

BY MIRIAM SITZ

GRANNY FLATS, carriage houses, garage apartments: while accessory dwelling units (ADUs) go by many names and come in many forms, they've long been heralded for their ability to increase density without disrupting the existing fabric of a neighborhood and to mitigate gentrification by providing original homeowners steady rental income, with the added social benefit of accommodating multigenerational families whose members wish to live together.

As many urban and suburban areas grapple with rising demand (and rising costs) for housing, interest in building ADUs is resurgent. Architects are partnering with officials, academics, developers, and nonprofits to pioneer new models for designing, funding, and delivering these compact homes.

Even so, there are many barriers to the large-scale development of ADUs—not least of which is legislative in nature. Dana Cuff has studied accessory units for more than 10 years as the cofounder and director of cityLAB, a think tank within the Department of Architecture and Urban Design at UCLA. She found that secondary dwellings were being built informally across Los Angeles—on as many as 60 percent of properties, in some communities. “But because of a couple of really arcane laws, it was almost impossible to do legally,” she says.

In 2016, armed with a decade of research, Cuff and cityLAB fellow Jane Blumenfeld, working in concert with colleagues at UC Berkeley, coauthored a bill that removed a city's ability to enforce regulations (such as the required addition of parking spaces, and high fees to connect to utilities) that were inhibiting the development of ADUs in California. The bill went into effect in January 2017, opening the floodgates for the construction of new units and permitting of existing ones in the state, making it one of the friendliest in the country to this type of housing.

Beyond legal hurdles, which still cripple the widespread use of secondary dwellings in many municipalities and states, the building type presents an interesting design challenge to architects. Many have pursued modular or prefabricated solutions, but the unique context



United Dwelling aims to convert attached garages into small residential units (above). The core of Rice Construct's +House consolidates the kitchen, bathroom, and essential systems into one compact unit (left).

is the line of research we've been conducting for a number of years,” says Danny Samuels, Rice University architecture professor, who codirects the school's design-build studio, Rice Architecture Construct, with assistant professor Andrew Colopy. “The idea we eventually hit on is that you prefabricate a core,” says Samuels, consolidating the kitchen, bathroom, and air-conditioning, heating, and electrical systems into one compact unit.

This vision came to fruition in +House, an ADU with a 3,000-pound prefabricated core, designed and built over the last four semesters by Construct students. Situated in the backyard of a house in Houston's Third Ward, the 360-square-foot dwelling will accommodate live-in counselors who work for Agape Development, which provides supportive housing (including the primary structure on the +House site) to at-risk young adults.

The prefabricated-core model preserves the ability to customize a structure but offers the efficiencies of prefabrication—a crucial factor in making ADUs an attractive, viable option for homeowners. “There are already economic forces pushing people toward this solution,”

of each project typically necessitates some degree of customization. Existing infrastructure—such as the primary house, neighboring buildings, driveways, and city utility hookups—means “each one of those things interrupts scaling up production,” says Cuff.

So how far can prefabrication extend? “This



LA-Más designed this affordably built ADU for a pilot program with the city.

says Colopy, “so we want to find more ways to encourage individual property owners to make this decision.”

Architect Derek Leavitt, who cofounded the Los Angeles-based design-build firm Modative with contractor Christian Nívar in 2006, is exploring a developer model to quickly deliver units. “We’re trying to get costs down by eliminating the custom-design portion of architecture”—which, he admits, “sounds very counterintuitive to say as an architect.” This

approach led Leavitt and Nívar to partner in May with venture capitalist Steven Dietz, whose new company, United Dwelling, is one of several in the country aiming to flip the grassroots model of ADU development on its head.

The startup will handle all aspects and costs of converting a detached garage into a living space, then split the rental income with homeowners for a set number of years under a land-lease agreement.

Modative designed a standardized unit that works within that specific context. “By coming into each project knowing that we’re doing the exact same thing every time, we can get the cost way down,” says the architect. United Dwelling expects to sign their first lease this fall.

Elsewhere in Los Angeles, LA-Más is pioneering another model: the urban-design studio recently developed a program that leverages a novel loan product and the federal

Housing Choice Vouchers program (also known as Section 8, which helps very low-income families and individuals afford private rental housing) to bring ADUs to people who are “asset-rich but cash-poor,” says architect Elizabeth Timme. She founded the firm in 2013 and serves as co-executive director with policy wonk and planner Helen Leung.

Working with collaborators in the finance, community-development, and nonprofit sectors, LA-Más launched the Backyard Homes Project in July, which recruits homeowners to become Section 8 landlords, offering pro bono project management, discounted design and construction services, and flexible financing (a loan, rather than a second mortgage) in exchange for their five-year commitment to rent to Section 8 tenants. Construction is slated to begin mid-2019 on the first cohort of 10 homeowners’ accessory dwellings.

“It’s really meaningful to apply our formal agenda to these alternative living spaces, to use history and precedent to make them something more,” says Timme. “What we really care about doing is supporting the most vulnerable populations in any community. Here, that’s renters, and the ADU was a clear mechanism for maintaining neighborhood stability.” ■

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The Forum Opens at Columbia's Manhattanville Campus

BY HEATHER CORCORAN

A NEW CITYSCAPE, 17 years in the making, is rising at the corner of 125th Street and Broadway in the West Harlem neighborhood of Manhattan. Just beyond a century-old viaduct, on a sliver of a block—where, not long ago, a sign reading “Dear Columbia: No Forced Displacement” hung above a gas station—stands a gleaming structure of metal, glass, and concrete panels.

The Forum, as it's called, is the third component to open at Columbia University's new Manhattanville campus. A massive uptown expansion of the school, the \$6.3 billion project will transform more than 17 acres, or about 7 percent, of West Harlem into a multidisciplinary academic hub, complete with a master plan by Renzo Piano Building Workshop (RPBW) and SOM that achieved LEED Platinum certification for neighborhood development. Situated at the site's southeastern-most corner, the Forum—which will host conferences and events and house Columbia World Projects, an initiative to address global issues—may prove a case study of how one of the city's largest landowners can coexist with a community.

“The Forum is the entry point to the new campus in every way,” says university president Lee Bollinger. Together with two completed structures just to the north—the Jerome L. Greene Science Center and the Lenfest Center for the Arts—the Forum makes a trio of “modern yet classical” RPBW designs that set the tone for this new type of open, collaborative campus. With their activated street frontages and glazed facades, the structures provide a public-facing alternative to the cloistered academic environments of the past.

Unlike the university's historic McKim,



Generous glazing at the street level is meant to give the impression that the Forum is floating. To underscore that idea during the design, Renzo Piano did not include a ground floor in any of his sketches of the building.

Mead & White campus less than a mile south, in Manhattan's Morningside Heights neighborhood, where heavy iron gates emblazoned with the words “May All Who Enter Find Peace And Welcome” mark the boundaries, there's no such announcement of Columbia's new turf. Instead, there's a shift from the surrounding brick to RPBW's variations on glass, metal, and concrete. The materials recall the area's “industrial soul,” says RPBW partner in charge, Antoine Chaaya, and seamlessly blend the “urban layer” with public amenities like the café and lobby, as sidewalk transitions to radiant-heated polished-concrete interior floor.

“Manhattanville expresses the values of this century: tolerance, openness, permeability, transparency, and sharing space with others,” ex-

plains Chaaya, who sought to give these values form in the latest building. At street level, 10-foot setbacks create wide, welcoming sidewalks, while on the slightly larger, cantilevered upper floors, expanses of glass offer a glimpse of the work taking place inside. According to Chaaya, the building's massing, material, and varying degrees of transparency offer hints of its function: open workspaces at one end and a 437-seat auditorium at the other.

The building's shape responds to the constraints of the site, including zoning changes that came with the creation of the Special Manhattanville Mixed Use District, which was approved in 2007 and allows for new commercial and residential spaces in the former manufacturing district. Since the master plan's proposal, some community members raised serious concerns that the school would overwhelm the neighborhood, displacing residents and jobs in an area that's 56.5 percent Latino and 27.2 percent black, and where the mean income is about 44 percent below the city average. When Columbia responded with plans to engage the community, it did little to quell fears that the campus would hasten large-scale gentrification—remnants of the distrust seeded in 1968, when the school proposed an athletic facility with a separate



Clustered around a public plaza called the Small Square (left), the Forum (the triangular building) joins the Lenfest Center for the Arts (at left in photo) and the Jerome L. Greene Science Center (in the middle).



Flooded with natural light, the ground floor of the Forum is open to the public.

entrance for members of the local Harlem community. (That center, which was never built, came to be known as “Gym Crow.”)

Though such large-scale development inevitably draws staunch criticism from some quarters (the campus was cited as a harbinger

of New York’s demise in the recent *Harper’s* magazine essay, “The Death of a Once Great City”), initiatives like a Community Benefit Agreement, to support local businesses and quality-of-life efforts, as well as a Clean Construction Plan that mitigated noise, air

pollution, and interruption, have helped dampen protests.

Columbia spokespeople point out that the neighborhood has benefited from infrastructure improvements (including updates to the sewer system, water and gas lines, and electric conduits), wider sidewalks, and Wi-Fi-enabled public plazas, along with an influx of new jobs. And beyond the new cafés, galleries, and rock-climbing gym, there’s a community Education Lab and Wellness Center already operating in the Jerome L. Green Science Center.

“In my view, this is still an unrealized vision,” says Bollinger, who looks at the development in century-long terms. “I don’t for a second think we have figured out how to connect Manhattanville with the other parts of Columbia University, or with the surrounding communities and New York City in all the ways that we should. But on every level, in every dimension, our people are thinking about this all the time.”

And, now, there’s a Forum to further that conversation. ■

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New Tallest Passive Tower Performs on a Budget

BY KATHARINE LOGAN

PASSIVE HOUSE construction has reached new heights. At 289 feet, Bolueta, a 28-story residential high-rise in Bilbao, Spain, has become the world's tallest building certified under the standard. Named for the district in which it is located, the \$14.5 million, 171-unit development (including a nine-story companion to the high-rise) consists entirely of social housing.

"There are no excuses anymore," says Germán Velázquez, a partner at Varquitectos, the project's Pamplona-based architect. "It is possible to realize such a project in Bolueta, and it is just as possible to realize one almost anywhere out there."

The Passive House standard mandates an airtight, highly insulated weather envelope with triple-glazed windows and heat-recovery ventilation. Bolueta's heating demand of just 5.7 kWh/m²a represents an 80 percent reduction compared to a baseline building. To achieve this within budget, the architect relied on careful detailing of basic materials rather than proprietary assemblies. Airtightness, the main challenge,

[Bolueta is the world's new tallest Passive House-certified building, surpassing a residential tower by Handel Architects called The House, which opened last year on the campus of Cornell Tech in New York.](#)

was monitored with a blower door test for each apartment during construction and a final test on completion.

Because Passive House energy standards discourage irregular building forms and extensive glazing, buildings attaining the standard risk coming off as banal. Bolueta bucks this trend with a dramatic black facade of gleaming, large-format, composite aluminum panels applied in vertical bands of inclined planes. The color refers to the city's 250-year-old heritage of coal-based industrial activity. (The shorter building will be clad in a gray version of the material, in a nod to the steel produced in the area's foundries.) The reflective, dynamic nature of the panels gives Bolueta "a significantly lighter effect," says Velázquez, than its large, simple volume might otherwise have achieved.

The project is being developed by the Basque government's public-housing company, Visesa. The owner's goals are two-fold: to provide residents with maximum comfort for minimum energy costs, and to serve as an example for private-sector developers. Next door to Bolueta, Visesa continues to lead by example: another Passive House high-rise is now under construction. ■

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Architects Tackle “Bridge” Housing

BY ALEX KLIMOSKI



LAST MONTH in downtown Los Angeles, the El Pueblo emergency homeless shelter opened on a city-owned parking lot near Union Station. Composed of three trailers arranged around a central outdoor deck, El Pueblo is the first of 15 planned “pop-up” shelters to open (one in each city council district), funded through Mayor Eric Garcetti’s “A Bridge Home” program.

Launched in April, the initiative will implement recommendations outlined in a December 2017 report by the nonprofit Urban Land Institute (ULI) to fast-track the construction of “bridge” housing, which provides immediate provisions for homeless individuals until more permanent options become available. According to the mayor’s office, over 25,000 people are now living on the streets of Los Angeles.

In July, the ULI selected three pairings of architecture and landscape architecture firms—DLR Group with EPT Design, SWA with Studio One Eleven, and Realm with JFAK Architects—to develop design prototypes with the mayor’s office. The teams participated in an intensive half-day charrette to create models for 50-, 100-, and 150-bed facilities that could be easily adapted to a number of sites. Although the 45-bed El Pueblo shelter was designed—by Gensler—before the prototypes were developed, it includes many of the same features: outdoor areas, shared resources such as food trucks or community gardens, and modular structures containing beds as well as social services.

The charrette teams worked from a sprung tent typology, along the lines of IKEA’s Better Shelter design for refugees, but “we didn’t want the facilities to look like relief housing,” says ULI’s Los Angeles executive director, Marty Borko. “The goal was to have a modular



A prototype by Studio One Eleven and SWA features amenities, like a dog park, that can be used by the larger community (top). The El Pueblo shelter (bottom), which opened last month, includes shared recreation spaces.

system that could be arranged to have open space.” According to architect Michael Bohn of Studio One Eleven, who worked with SWA on the 100-bed model, a primary concern was how to integrate the facilities into existing neighborhoods. “We were interested in the mixing zone—the sidewalk where the site meets the street,” says Bohn. One way they aimed to foster a sense of community was by placing a widely appealing amenity at the edge of the project area: a dog park.

Currently, the remaining sites are being identified, with the goal of having all locations at least under construction by July 2019. While the bridge-housing units will not solve the issue of homelessness, Garcetti’s program is a necessary effort to minimize human suffering, says John Maceri, CEO of the People Concern, the nonprofit that operates El Pueblo. “This isn’t about just 45 beds—it’s about the first 45 people and the next 45 people and the next after that, multiplied by dozens of sites around the city,” he says. “It will have a positive impact.” ■

RIBA Announces 2018 International Prize Shortlist

Finalists for the biennial prize include Phase 1 of Central European University in Budapest by O’Donnell + Tuomey; the Children Village dormitory in Tocantins, Brazil, by Rosenbaum + Aleph Zero; the Toho Gakuen School of Music in Tokyo by Nikken Sekkei; and the Bosco Verticale tower in Milan by Boeri Studio.

Brad Pitt’s “Make It Right” Faces Legal Action from Homeowners

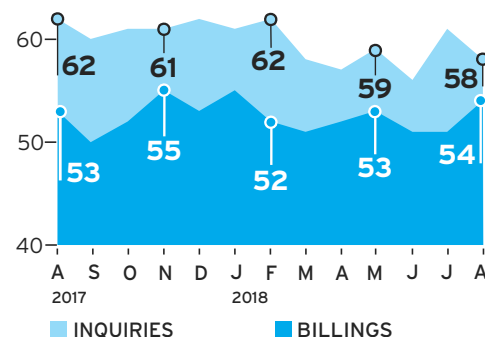
In the aftermath of Hurricane Katrina, the actor’s nonprofit housing foundation built more than 100 homes in New Orleans’s Lower Ninth Ward. Now Make It Right is facing lawsuits and complaints from residents over alleged construction flaws and the organization’s failure to make repairs.

AIA Adopts Changes to Professional Code of Ethics

In response to resolutions presented at the 2018 AIA Conference, the Board of Directors has approved changes to the organization’s Code of Ethics and Professional Conduct, to explicitly address sexual harassment, equity in the profession, and sustainability.

Apartment Complex by Rudolph Schindler Listed for \$10 Million

A 19,000-square-foot multifamily residential building on Laurelwood Drive in Los Angeles’ Studio City neighborhood hit the market in mid-September. Designed by the noted American Modernist and built in the late 1940s, the 20-unit complex received landmark designation in 1980.



Billings Rise for 11th Month

The AIA’s latest data show that the Architectural Billings Index jumped from 50.7 in July to 54.2 in August. (Scores over 50 indicate an increase in billings.) The projects inquiries index and the design contracts index both fell, by 2.5 points and 4.2 points respectively.



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THE RESIDENTIAL ARCHITECTURE of Atherton, California, is nothing if not eclectic. Peeking out from behind the town's ubiquitous fences are modernist glass boxes, French chateaux, and Italianate villas. But a just-finished house in this leafy Silicon Valley suburb, by San Francisco-based architect Craig Steely, defies stylistic categorization. The enigmatic one-story structure on a long and skinny lot is defined by a sinuous, almost windowless wall clad in vertical cedar planks. Although about half of the 5,900 square feet behind the curving enclosure are sheltered under flat roofs, the architect has dubbed the residence the Roofless House, since the remaining space is devoted to courtyards and is open to the sky.

Steely's aim was to create an "escape pod" for his software-engineer client, who hoped to take advantage of the temperate Bay Area climate through as much outdoor area as possible, but who also wanted to limit her views of the surrounding architectural hodgepodge. The solution was to replace the typical Atherton perimeter fence with the 14½-foot-tall wood wall, but pull it well inside the boundaries of the half-acre property.

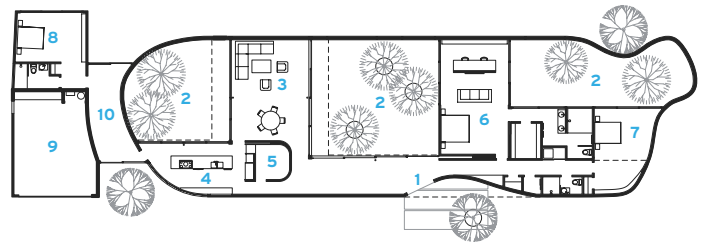
The gracefully snaking element, supported by a steel frame with wood-stud infill, defines a house entered through a 7-foot-square glass pivot door into a foyer and approximately 100-foot-long circulation spine. The living areas open off this



From the street (top), the Roofless House appears to be windowless. But behind the curvilinear, 14½-foot-tall cedar-clad enclosure are living spaces that open up onto courtyards through generously sized sliding glass doors (above).



The house is entered through a 7-foot-square glass pivot door into the foyer (left). The living and dining room (above, left) has courtyards on two sides and, at one end, the kitchen pantry (above). It is enclosed within a U-shaped, freestanding volume made of cedar planks, like the wall that surrounds the house.



FLOOR PLAN

0 15 FT.
5 M.

- | | |
|-----------------|------------------|
| 1 ENTRY | 6 MASTER BEDROOM |
| 2 COURTYARD | 7 BEDROOM |
| 3 LIVING/DINING | 8 GUEST BEDROOM |
| 4 KITCHEN | 9 GARAGE |
| 5 PANTRY | 10 BREEZEWAY |

space, with three generous courtyards interspersed among them. Steely introduced the curves to the otherwise “conventional” plan, he says, as a means of selectively editing out undesirable views and instead directing attention upward, toward the clouds and the tops of nearby mature oaks and redwoods.

The result is a house that is insular but not hermetic. The rooms are light and airy, and flow easily into the courtyards through oversized sliding glass doors. The white-painted drywall ceilings seemingly float above the wood planks that clad not only the curving enclosure’s outward-facing facade but also serve as the wall surface for the courtyards

and interior living spaces. The travertine floors, meanwhile, continue into the courtyards, although there the pavers are supported on pedestals and are ungrouted, so that rainwater readily drains. These outdoor spaces include drought-resistant river birch trees, whose slender trunks extend through circular openings in the stone, creating the impression, says Steely, that the trees are growing indoors.

With such combinations of nature and architecture, curving and rectilinear, and spaces that are open and closed, Steely has created an inventive house that ingeniously screens out its less remarkable neighbors, while framing the sky and inviting the sun and breezes inside. ■

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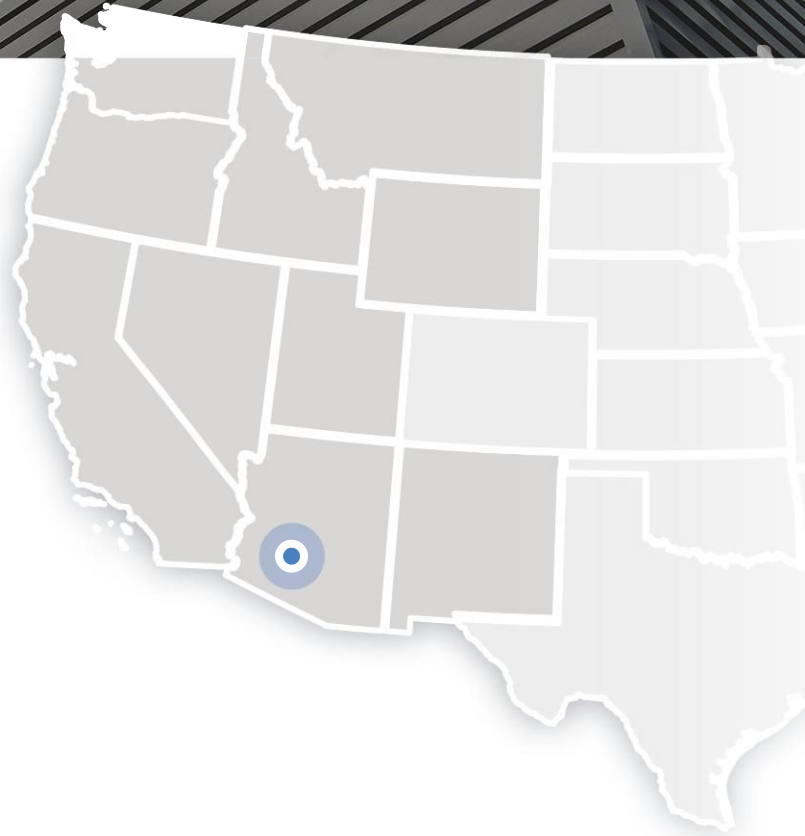


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The architect for the September issue contest's Sagrada Família Basilica in Barcelona was **Antoni Gaudí**, who started working on its Gothic-organic design in 1915. By his death in 1926, only part of the church was completed. Over the last century, others have tried to finish the task, with completion expected in 2026, the centenary of Gaudí's death.

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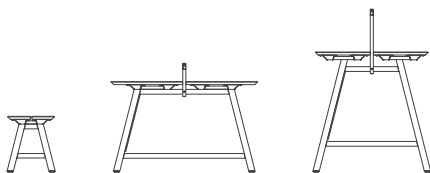
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SANDWICHED BETWEEN TWO TOWERS IN PHILADELPHIA, A PLANTED ROOF DECK SERVES AS A NEW PUBLIC SQUARE. BY JOSEPHINE MINUTILLO



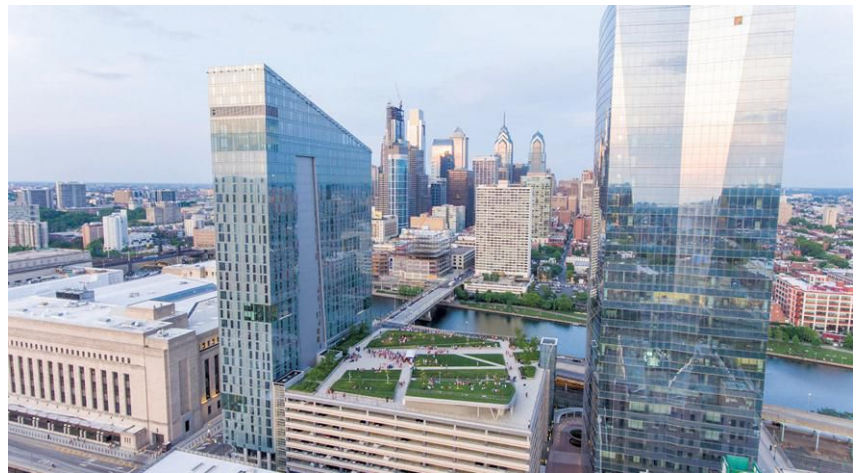
WHEN LOCAL ARCHITECTS Erdy McHenry were asked to design Evo, a 34-story mixed-use tower on a narrow lot by the banks of the Schuylkill River, straddling University City and the Central Business District in Philadelphia, the commission from developer Brandywine Realty Trust came with an added assignment—to create a public gathering space atop the existing 11-tier parking structure adjacent to their vacant site.

Known as CiraGreen, the roof connects to resident amenity spaces in Evo, but is also accessible to the public from the ground level via dedicated elevators connected to the garage. (The garage itself had been designed to include several more levels that were never built, so it was able to support the green roof without additional structure.)

Though much of the 52,000-square-foot roof is planted, the paved walkways and plaza space are designed as a blue roof for enhanced stormwater retention. A 5-inch-thick cellular membrane beneath the pervious paving acts as a horizontal cistern, capturing rainfall and releasing it gradually to the planted portions, which include areas of soil up to 2½ feet deep for trees.

In a couple of spots, the grassy deck is lifted to provide inclined seating areas for viewing events, which have included musical performances and, more recently, film screenings. The larger of the two tilted areas rises 17 feet, offering views of the Philadelphia skyline just across the river and concealing public toilets and storage space beneath it.

CiraGreen has hosted numerous events and gatherings, from athletic boot camps and political fundraisers to a seasonal beer garden. It proves that, when you're looking for a place to relax or party, the sky's the limit. ■



Much of the acre-plus roof, including tilted portions that act as inclined seating for events, is covered in lawn, though some parts are planted with small trees, shrubs, and flowers (top). The roof offers views of downtown (above) and has become the scene for a range of events and activities, including outdoor yoga classes (left).

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London's Forgotten Legacy

Cook's Camden: The Making of Modern Housing, by Mark Swenarton.
Lund Humphries, 327 pages, \$89.99.

Reviewed by Hugh Pearman

CAMDEN, one of the 32 boroughs making up Greater London, lies just northwest of the city's center. It is famed in British architecture for a very high standard of public-housing projects of a unique kind, designed and built in the 1960s and '70s. The borough architect was Sydney Cook (1910–79), whose great achievement at the very end of his career was to reject tower blocks in favor of low-rise high-density developments, and to assemble a team of ambitious young architects to design them.



What Cook reestablished during his eight-year tenure from 1965 to '73 was the London tradition of a front door onto a street. Whereas in the past this had meant conventional row housing, the Camden architects experimented with a variety of newer forms. One of these was the “stepped section,” whereby each floor was set back from the one below, allowing garden terraces and walkways. In this manner, even upper-floor apartments were connected to the public realm.

The most fully realized version of this approach is the Alexandra Road Estate (1977), a human-scale concrete megastructure perched alongside the tracks of one of the main rail lines into central London. In form like a curving shallow valley, it is intensely social. This was designed by Cook's key protégé and effective second in command, American-born Neave Brown. Indeed it was Brown rather than the eventually ailing Cook whose name came to be most closely connected with the Camden projects. Shortly before his death in January 2018, Brown was awarded the highest honor of the Royal Institute of British Architects, the Royal Gold Medal, in recognition of his intensely important contribution to the history of housing. Brown's relatively small lifetime output is all now officially protected as important architecturally and historically. Many other architects contributed projects at this time in Camden, particularly Gordon Benson and Alan Forsyth (later to establish a successful private practice), and Hungarian-born Peter Tabori.

Architectural historian Mark Swenarton's book is thorough—he has spoken to many of the key architects and politicians involved, Brown included. Cook had recruited his designers mostly from the Architectural Association School, the ideas hothouse, which itself had largely rejected high-rise solutions for housing. Cook himself disliked big housing projects, preferring to perform urban repair with a greater number of smaller ones. A key example—taking up a substantial section of this book—is Benson & Forsyth's Branch Hill Estate (1976) in upmarket Hampstead, highly controversial politically and very expensive to build. The pairs of 21 attached houses step down the hill, intersected by alleys. The multi-level interiors are sophisticated. This is social housing of a quality equal to many luxury housing developments.

That project was a high-water mark. By then Cook had retired, and he died the year Margaret Thatcher became prime minister and dismantled much of the official apparatus of public-sector work of this nature. But Cook left an extraordinary legacy. Swenarton notes, citing a famous earlier architect of garden cities and suburbs, “not since Raymond Unwin in 1902 had a British architect offered so clear-cut and coherent an alternative to the prevailing orthodoxy in housing design.” ■

Hugh Pearman is a London-based architecture critic and editor of the RIBA Journal.

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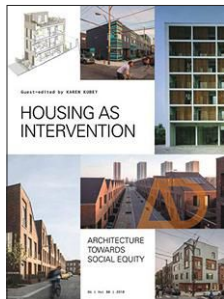
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Seeking Shelter

Housing As Intervention: Architecture Towards Social Equity, Karen Kubey, guest editor. Architectural Design/Wiley, 144 pages, \$45.

Reviewed by Alexander Gorlin, FAIA

THIS COMPENDIUM makes an important contribution to the discussion of the many strategies architects are using to help deal with the global housing crisis. Edited by housing specialist Karen Kubey, who trained as an architect and teaches at Pratt Institute in Brooklyn, it brings together 16 essays on housing in the U.S., UK, and Europe with excursions to Africa and China. (Because of the time lag in book publishing, none address new housing policy under the Trump administration.)



But what it reveals, despite architects' noble intentions, are the limitations on what they can actually do to solve the housing crisis. The architect is often called upon to fix problems in the realm of public policy, politics, and finance. This expectation gives short shrift to what they do best, which is to design.

Some essays are remarkable and insightful, but others not. For example, while Matthew Lasner thankfully does not rehash the disillusionment with such modern housing schemes as Le Corbusier's towers in the park or Jane Jacobs's radical return to low-rise, he does not present a convincing narrative in their place. To commend José Luis Sert for his dreary Roosevelt Island housing—and for "reinvigorating the field"—is very odd.

Robert Fishman outlines the housing crisis in the west from the time of the withdrawal of big government, after building much housing following World War II, until the 1980s. Now it is up to private developers, often in public-private partnerships, to build housing with government subsidies or tax credits, so the quantity cannot keep up with the demand. While Fishman does wax on about small nonprofit developers who hire talented architects, he does not give enough credit to for-profit developers who have created quality affordable housing at a greater scale—for example, L&M Development Partners, who commissioned FX Collaborative to create mixed-income (including supportive) housing at Navy Green, in Brooklyn.

Also missing throughout the book is any mention of the role of the great community-organizing group the Metro Industrial Areas Foundation (Metro IAF), started up in 1940 by Saul Alinsky. In Brooklyn and the Bronx, it has built over 6,000 units of affordable housing since 1983. (Full disclosure: my firm designed 500 units for its Nehemiah program in Brooklyn.)

The best essays demonstrate changing policies that will advance the cause of more affordable housing. Dana Cuff, director of cityLAB, a think tank at UCLA, has successfully pushed to change the law to allow Accessory Dwelling Units on every home in California. That is an astounding 8 million lots, a tremendous sea change in permitting people to add a backyard rental or granny flat to provide more housing.

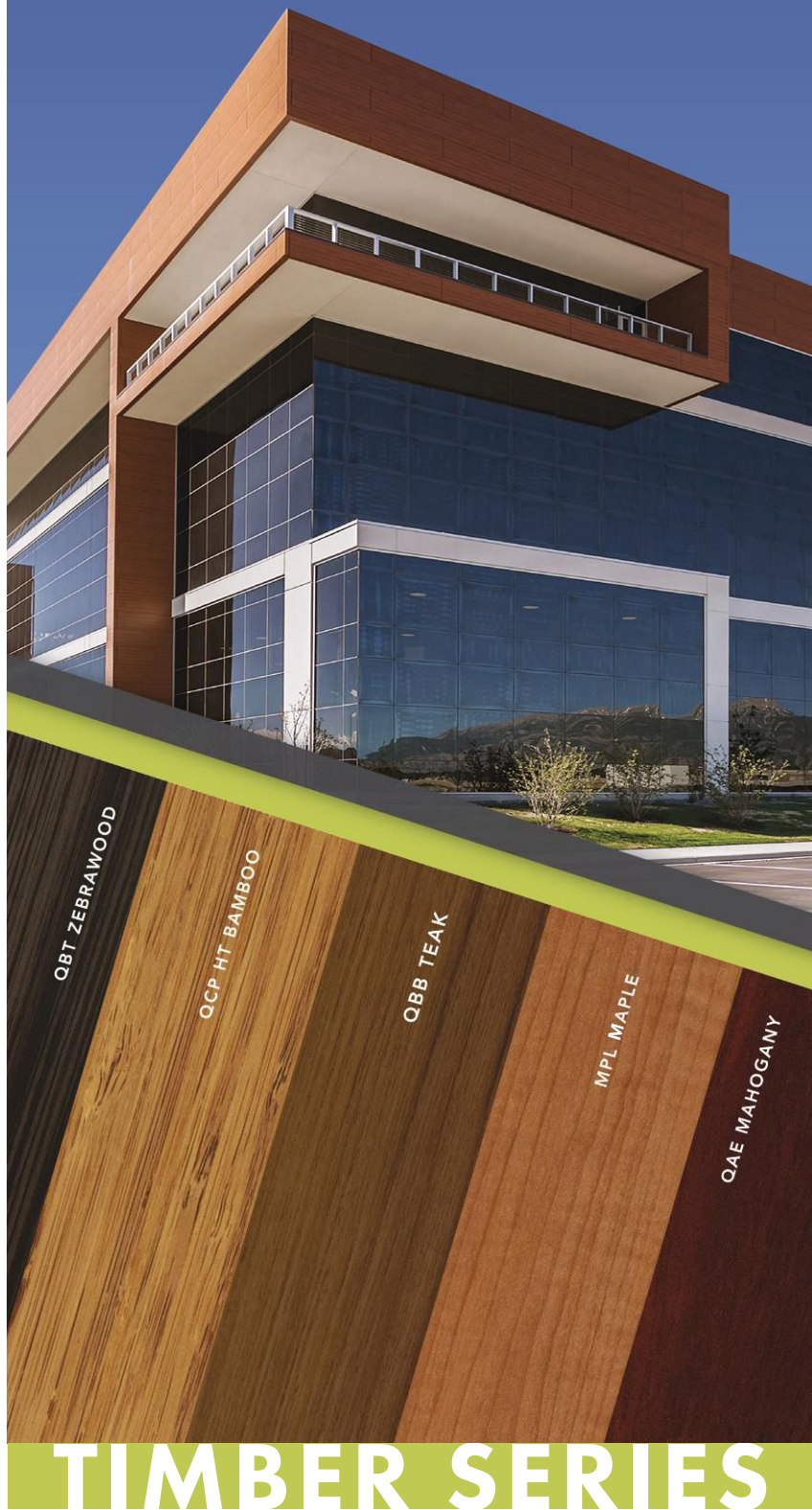
All in all, this vast and intractable problem needs more than a 144-page AD catalogue. (Unfortunately, the book's graphics don't help the case: bold type is often printed over the images, and tiny drawings and captions are set in a font more suitable to the bottom row of an eye chart.) But, that said, this is worth a spot on your bookshelf as an introduction to one of the acute global crises of our time. ■

Alexander Gorlin, FAIA, has his own practice in New York.

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The Bearable Heaviness of Being

Marcel Breuer: Building Global Institutions, edited by Barry Bergdoll and Jonathan Massey. Lars Müller Publishers, 368 pages, \$40.

Reviewed by George Baird

WHILE MARCEL BREUER'S reputation suffered a decline after his death in 1981, it has picked up in recent years. In this collection of essays, Columbia University architecture historian Barry Bergdoll, and Jonathan Massey, dean of the University of Michigan's architecture school, argue that the revival started in 1985 with the Whitney Museum's commission of Michael Graves to design a major expansion of Breuer's 1966 New York building, which proved to be extremely controversial. Twenty years later, when the Metropolitan Museum of Art took over and restored the Whitney as the Met Breuer, his reputation was further elevated.

Two recent events spurred this publication: first, Syracuse University's digitization of its Breuer archive and, second, a Breuer seminar that Bergdoll conducted at Syracuse's architecture school in 2010, when Massey was teaching there.

In their book, Bergdoll and Massey argue that Breuer's seminal commissions for UNESCO House in Paris (1958) and for Saint John's Abbey, in Collegeville, Minnesota (1961), turned him into the designer *par excellence* for high-profile buildings during the following decade and a half. In his essay on Saint John's Abbey, Bergdoll cites a formal characteristic he calls "heavy lightness," which differs from the generic lightness typifying Breuer's previous work, such as the Bauhaus furniture he designed in the 1920s.

A contributor, Timothy M. Rohan, an architecture historian, examines a motif he calls Breuer's "ancillary strategy." This phrase refers to freestanding elements adjacent to the designer's major buildings, such as the entry canopy of UNESCO House. Rohan compares this approach to Venturi and Scott Brown's "signs" appended to "sheds" in their projects.

Three additional essays are surprising in the way they stretch the definition of what we think of as architectural historiography, typically reliant on biography and building analysis. Architecture historian Lucia Allais, an adventurous researcher, attempts not so much to dissect the design of UNESCO House as to reveal the complex and protracted bureaucratic process by which it came into being. There Breuer was part of a design



troika with Pier Luigi Nervi (structural engineer) and Bernard Zehrfuss (project manager) reporting to an assertive "advisory committee" of prominent international architects.

Elsewhere in the book, structural engineer Guy Nordenson provides an account of how Breuer learned about structure from Nervi—and the subsequent problems stemming from Breuer's only partial understand-

ing of the principles at stake. Massey addresses the series of projects Breuer's firm undertook for New York University at its Bronx campus, focusing on how demographic changes affected its economics. The institution, designed to serve the largely middle-class Jewish population inhabiting the area, saw its exodus to the suburbs during the upheavals of the late '60s. The private campus closed and in 1973 was sold to the publicly owned City University of New York.

Bergdoll and Massey sidestep the issue of the ultimate cultural significance of Breuer's work, a question that deeply preoccupied the authors of two previous monographs on the pioneer architect: Isabelle Hyman's *Marcel Breuer, Architect: The Career and the Buildings* (2001) and Robert McCarter's *Breuer* (2016). I find myself thinking that, despite the strengths of Breuer's late work—for example, the Robert C. Weaver Federal Building in Washington, D.C. (1968)—it's a little formalist and formulaic. Indeed, one of the purposes of Breuer's ubiquitous pilotis seems to be to turn the building masses above into objects to be contemplated as art, and leaves their relationship to the ground plane often unresolved.

Bergdoll and Massey do acknowledge that they have raised as many questions as they've answered. In spite of this, the handsome collection of essays, extensively illustrated with photographs and drawings, bolsters their thesis regarding the important political and professional role Breuer assumed late in his career, as architect to an emerging global power structure. The cultural significance of his design, however, remains up in the air. ■

George Baird is an architect, author, and educator based in Toronto.



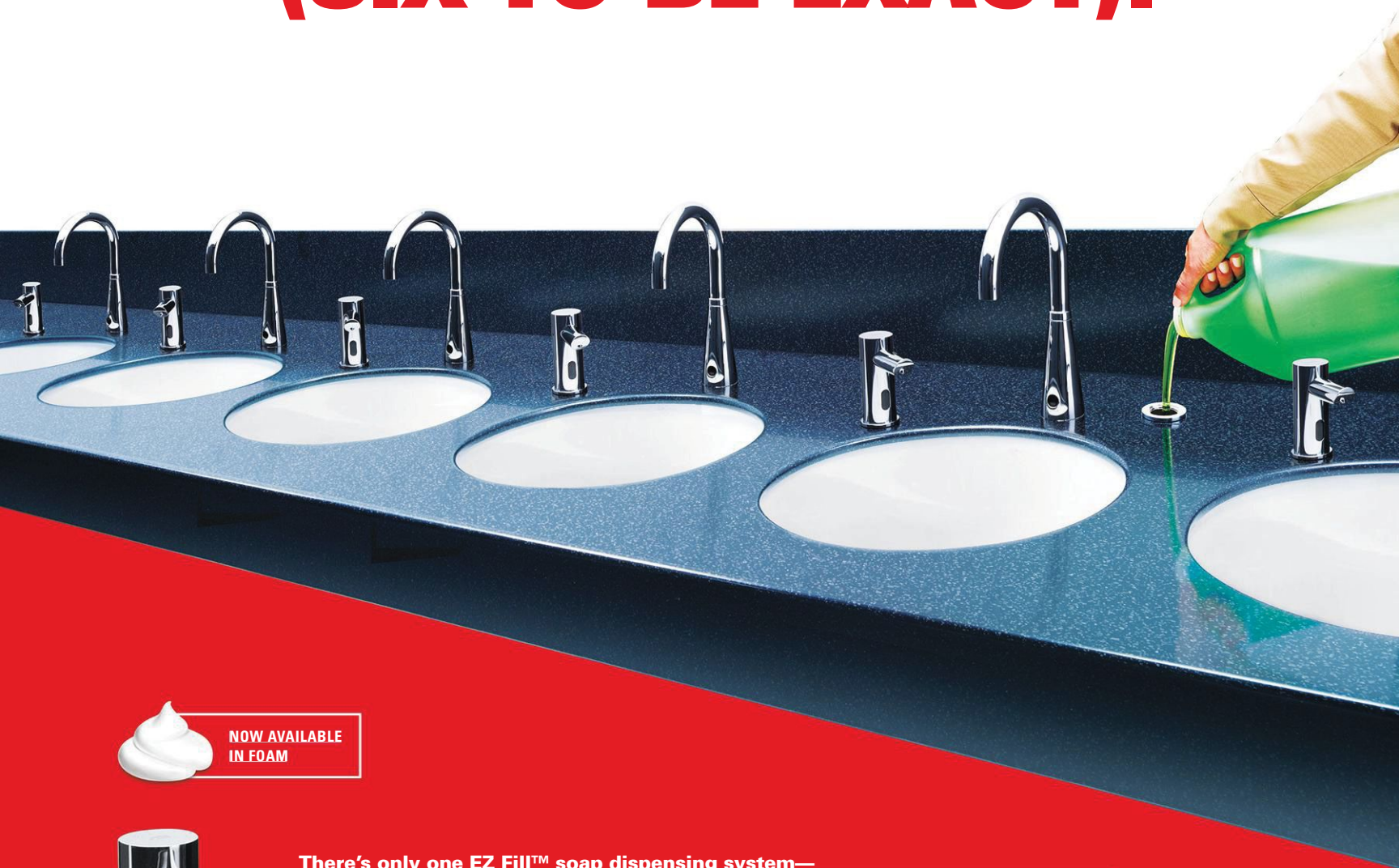
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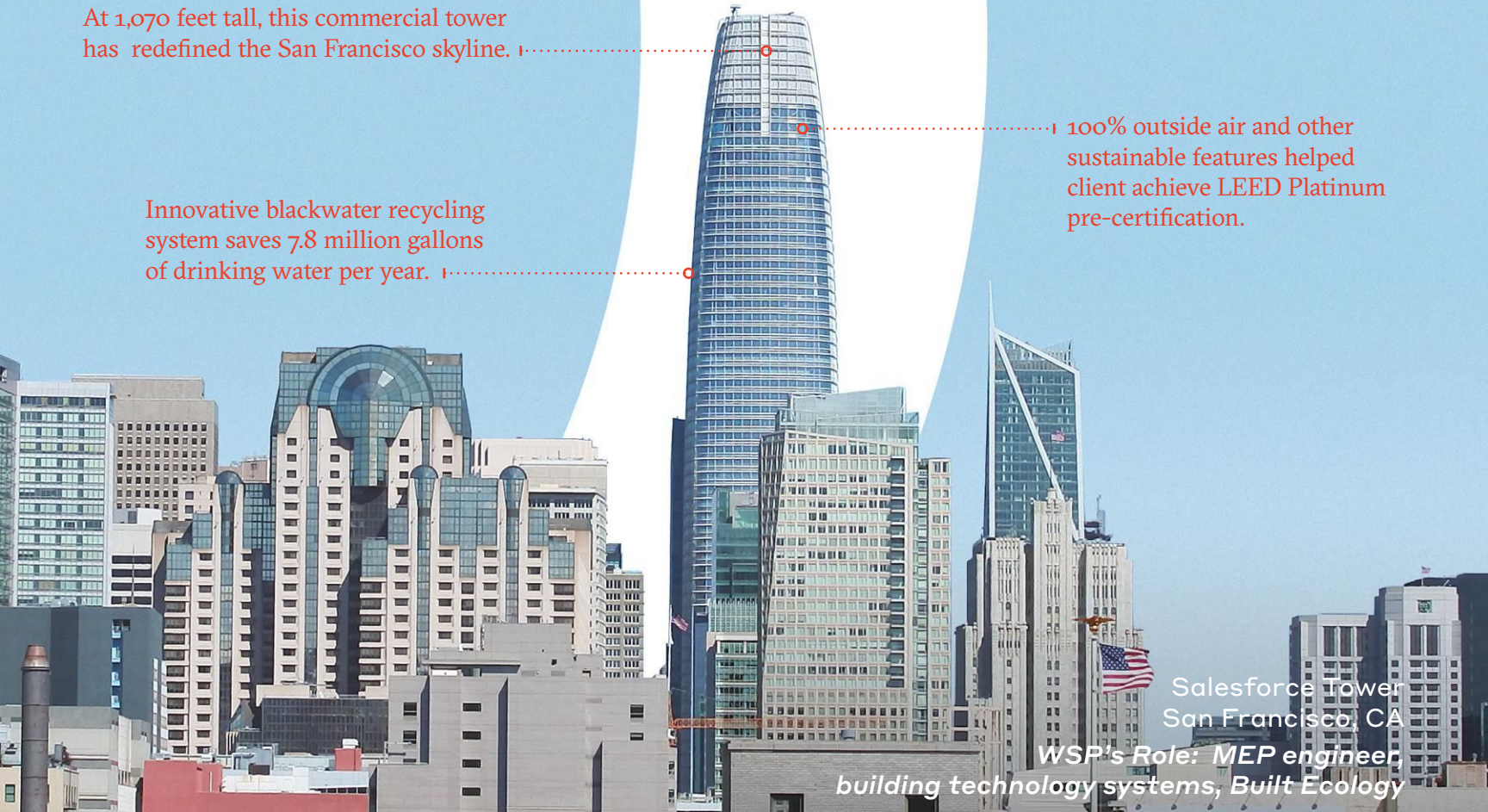


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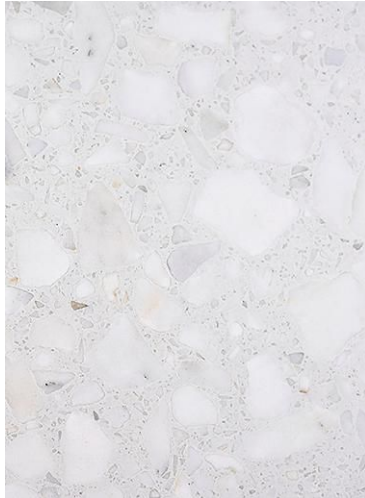
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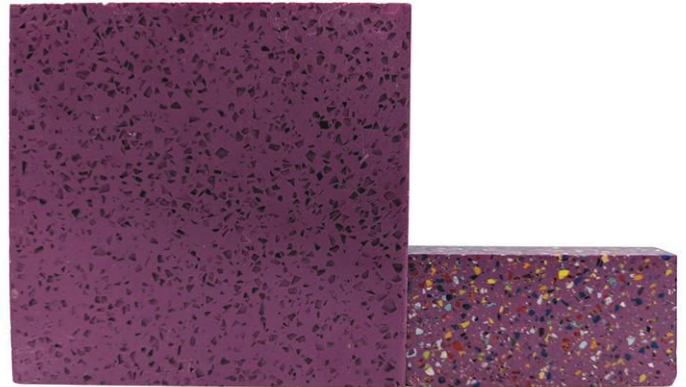
By Kelly Beamon



Retrostone

The Spanish manufacturer Neolith's take on classic poured-in-place terrazzo is actually a thin, easy-to-install slab of crushed quartz, feldspar, and minerals. Part of the company's Fusion collection, Retrostone has a digitally printed pattern and is available in panels measuring 126" x 59" and 126" x 63", with thicknesses of ½" and 0.2" for walls and countertops.

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Solid-surface manufacturer Durat has updated its terrazzo-inspired offerings by producing them in shades of Pantone's Ultra Violet, the 2018 Color of the Year. Durat 750 and 758 are actually made from postindustrial polyester-based plastic, which is granulated and then cast in 10' x 3' sheets to create the ½"-thick surfacing.

modern-surfaces.com



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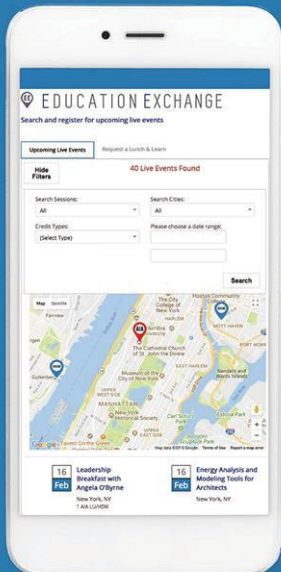
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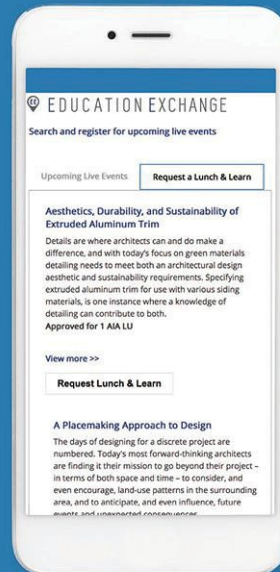


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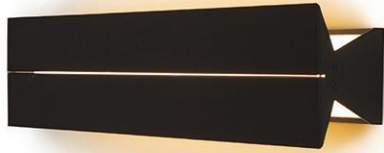
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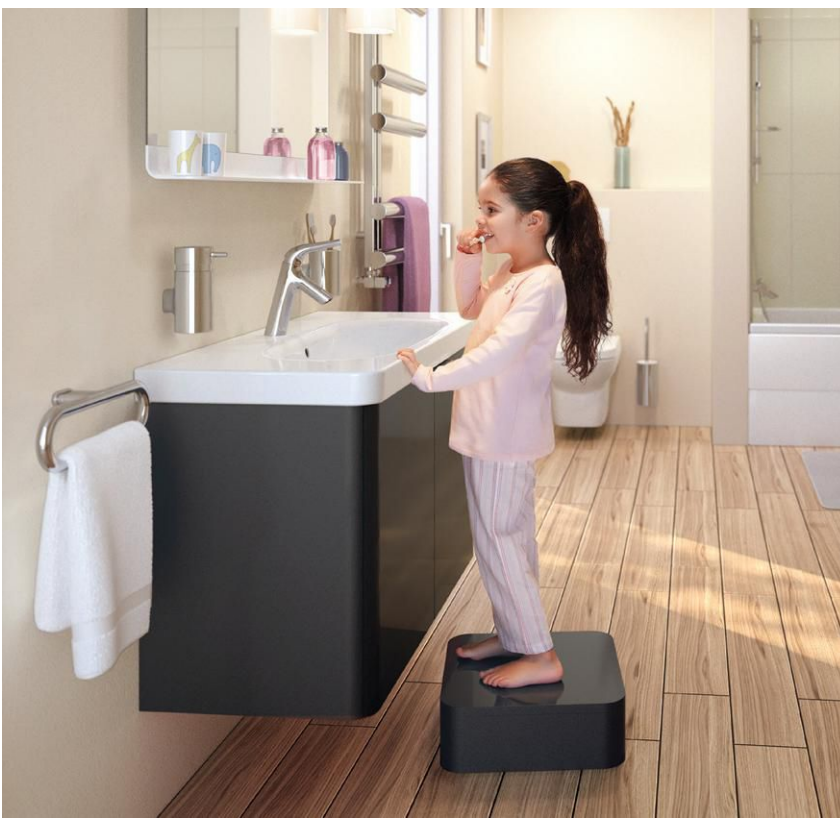
Modularity, one-hand control, and balance support invite everyone to use these furnishings and fittings.

By [Kelly Beamon](#)

Embold

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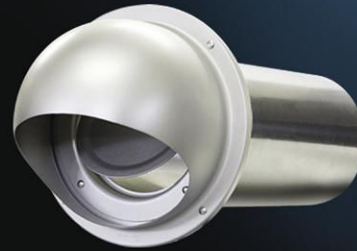
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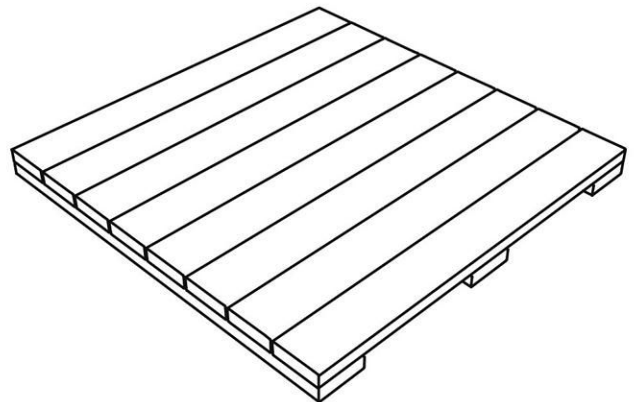
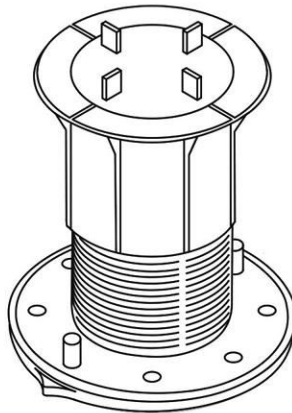
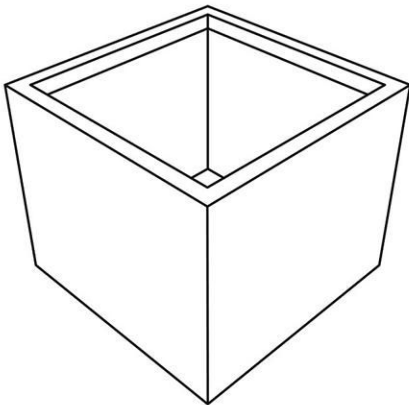




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CREATING ROOFTOP ENVIRONMENTS

project: Partners Healthcare Administrative Campus (Boston, MA) | architect: Gensler | landscape architect: OJB Landscape Architecture | photographer: Kyle J Caldwell



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Glenstone Museum | Maryland | Thomas Phifer & Partners

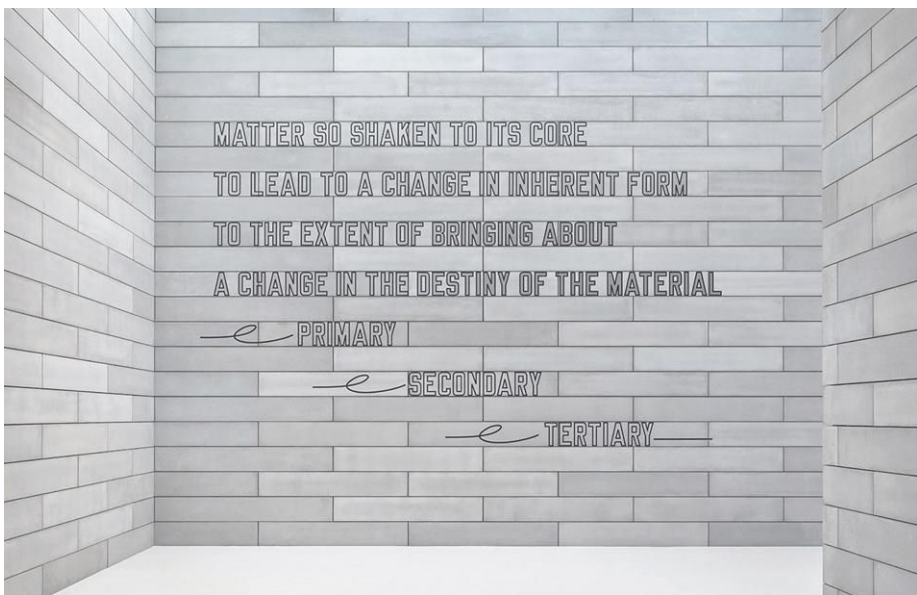
Arcadia for Art

Architecture and landscape come together for a unique cultural experience.

BY CATHLEEN MCGUIGAN

PHOTOGRAPHY BY IWAN BAAN





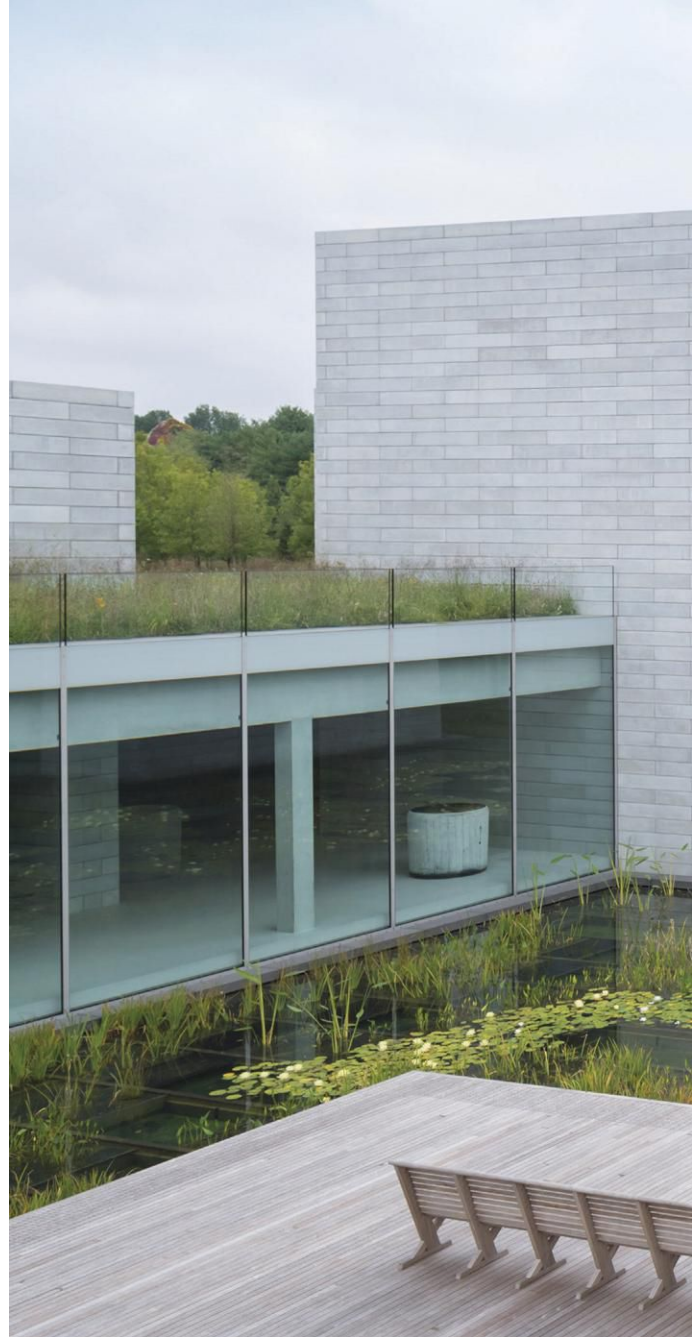
Picture a bright, sunny day, and a walk through a woodland, over a bridge where a creek bubbles below and the lofty trees dapple the light overhead. Beyond is a meadow, and as you follow a gravel path and turn up a gentle slope, an ensemble of solid, cubic architectural forms comes into view. The windowless volumes are crisp but seem rooted in the earth like ancient ruins, their slightly mottled pale gray walls of poured-concrete block softened by the swaying grasses and black-eyed Susans that crowd up to the building's edges.

In this idyllic procession from a distant parking lot to the front door of the new museum at Glenstone, opening on October 4, every move has been choreographed to create an experience meant to make visitors feel that time has slowed, and they can lose themselves in an extraordinary melding of landscape, architecture, and contemporary art. Set in 230 pastoral acres in suburban Potomac, Maryland, Glenstone is just 15 miles away from Washington, D.C., but it might as well be light years: if you want to escape today's political turmoil, this is the place to come.

The design of cultural experience has been evolving at Glenstone for more than a decade. In 2006, its cofounder, Mitchell Rales, opened to the

public a 23,000-square-foot gallery, designed by the late Charles Gwathmey, to show art from his foundation's collection on what was then a 125-acre site (RECORD, June 2008). Since then, he has acquired more land, and he and his wife, Emily Wei Rales, the museum's cofounder and director, have significantly expanded the collection. The parklike property has been undergoing a transformation for a longer time, with Adam Greenspan, design partner of the Berkeley-based PWP Landscape Architecture, in the lead (RECORD, August 2018), enhancing the contours of the land, planting 8,000 trees and helping to site large-scale outdoor sculpture by artists such as Richard Serra, Ellsworth Kelly, and Jeff Koons. In 2010, the clients—after six months of what Emily Rales calls “auditions”—commissioned Thomas Phifer & Partners of New York to design a new 170,000-square-foot museum (the other final contenders were Tod Williams Billie Tsien Architects, and Steven Holl Architects).

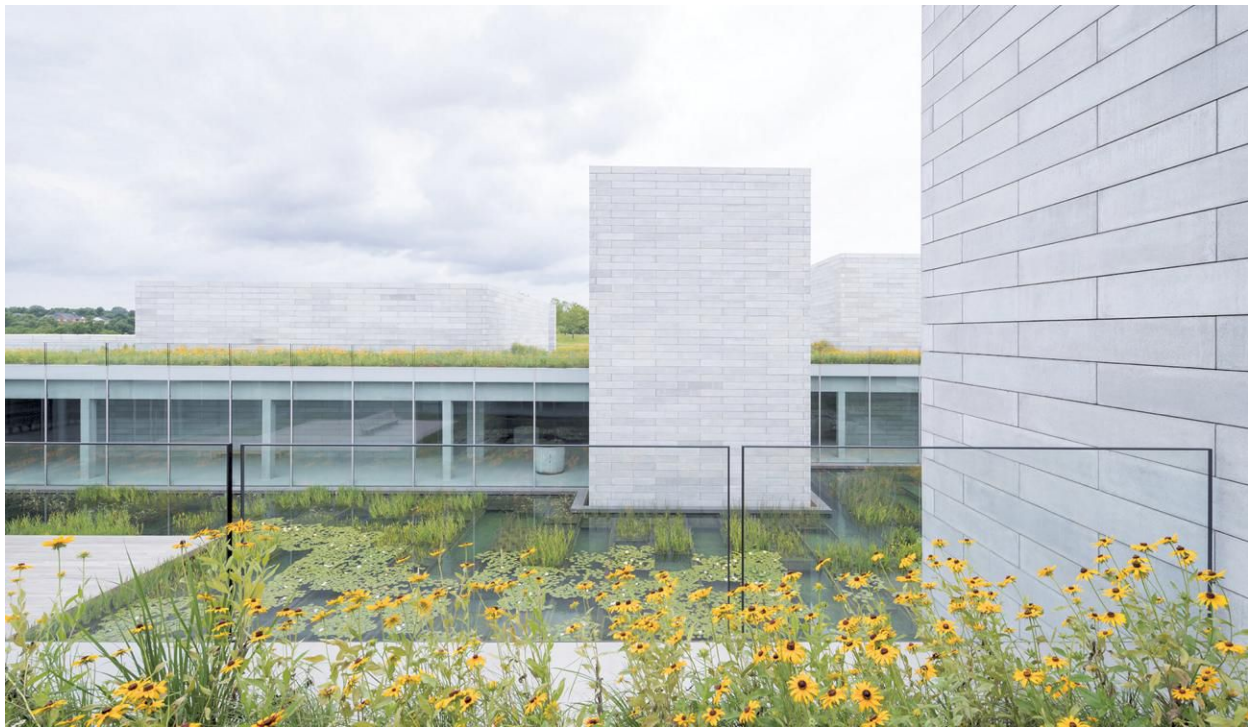
The final brief called for a museum of 11 galleries, nine designated for the long-term installation of work by nine contemporary artists. Thomas Phifer's concept was to create the “village of buildings” that you see as you approach; though the pavilions vary in size and proportion, they are, in fact, all part of one cast-in-place-concrete and steel structure, with an interior circulation route around a central water





SLOW TIME

Glenstone's 11 galleries are dispersed among a "village" of variously sized cubic pavilions arranged in the 230-acre landscape (previous spread). Just inside the entrance to the museum (opposite, top) is a wall piece by Lawrence Weiner (opposite, bottom). Both exterior and many interior walls are composed of smooth poured-concrete blocks (above). Visitors can sit out on the central water court designed by PWP, or view it from above (right).





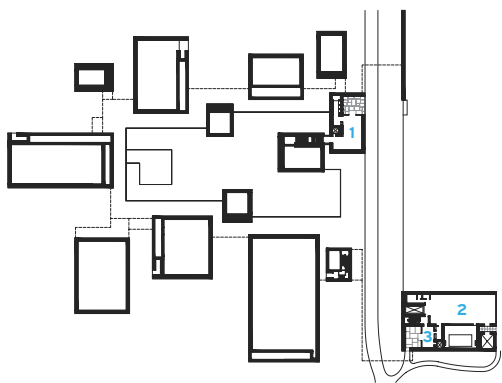
DOWN TO EARTH

Although the pavilions, which appear to sink gently into the earth, look distinct from afar, they are all part of one cast-in-place-concrete and steel structure, connected below grade, with 50,000 square feet of galleries and the water court (right). The museum's offices, on the same lower level, look toward a Michael Heizer piece, *Compression Line*.

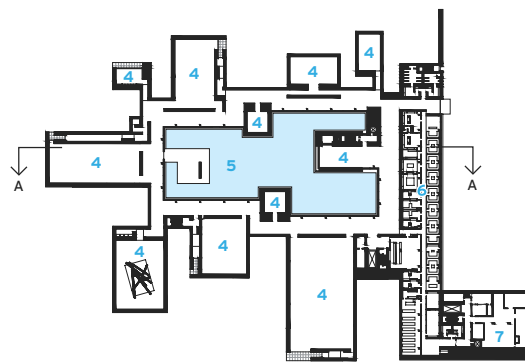
- 1 PAVILIONS
- 2 GALLERY
- 3 ARRIVAL HALL
- 4 PARKING GROVES
- 5 CAFÉ
- 6 WOODLAND TRAIL



GLENSTONE SITE PLAN

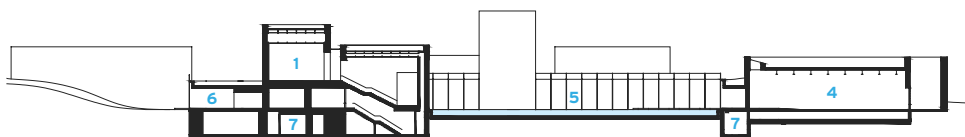
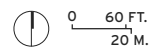


ENTRY-FLOOR PLAN



GALLERIES FLOOR PLAN

- 1 VISITOR ENTRANCE
- 2 LOADING DOCK
- 3 STAFF ENTRANCE
- 4 GALLERY
- 5 WATER COURT
- 6 ADMINISTRATION
- 7 MECHANICAL



SECTION A - A





court, designed by PWP. Phifer organized the building on three levels, largely embedded in the earth. The main entrance and foyer is a relatively small space on the ground floor; the 50,000 square feet of galleries—known as “rooms”—are one level below grade, as is the water court and 12,000 square feet of museum offices. Two levels down is a basement for art storage and conservation.

It is a powerful composition, with the striking architecture heightened by a limited palette of materials, exquisite details, and the deft deployment of daylight and deep shadows—just one example of the yin and yang of visual experience throughout the project.

The seeming simplicity of the architecture echoes the vision that the Rales sought for viewing art—no crowds (visitors will be limited to about 400 a day) and no distractions (a bookstore and two cafés have been exiled to small cedar-clad and glass buildings elsewhere in the park). Once inside the entrance, you confront a wall piece by conceptual artist Lawrence Weiner. A text in 1-foot-high block letters perfectly fills the 1-foot-high faces of several of the poured-concrete blocks that are Glenstone’s fundamental building component, inside as well as out: 1 foot high, 1 foot deep, and 6 feet long, they are stacked like giant Roman bricks, with ¼-inch open joints visible between each course of blocks.

Weiner’s words include the line “a change in the destiny of the material,” and you could take that to mean that a lowly concrete block

has been elevated to a high level of refinement: the 26,000 blocks in the project, poured in North Carolina and Tennessee in plywood forms over two years, are silky to the touch and as elegant as stone in their softly variegated markings, the result of being fabricated in different weather and seasons.

At first, Roman travertine was considered for the exterior cladding. One voice against such a fancy material was the late Cy Twombly, whose relatively little known sculptures grace one of the nine rooms at Glenstone. On a visit to his storefront studio in Lexington, Virginia, before he died in 2011, Emily Rales recalls the artist said of the future museum, “Don’t make it too precious or chic.” Once everyone settled on poured-concrete blocks, the scale of each became a matter of study and experimentation, partly in consideration of the budget. Yes, budget—according to Phifer, the Rales were “disciplined about costs” for the new building, which was \$200 million to construct.

From the Weiner wall, down a flight of stairs, you arrive on the main level of galleries and get your first glimpse through a window wall of the water court, lush with lilies and rushes (and inspired, says Phifer, by the water feature of Carlo Scarpa’s Brion Tomb near Venice). You are indoors looking outdoors, below grade but in a place awash with daylight.

After turning, you snake past two very different sculptures by Martin Puryear in the generous passageways—12 feet high and varying



from 15 to 24 feet wide—with the walls of concrete block on one side as you circulate, and the glass window walls overlooking the water court along the other.

The first gallery you encounter is the largest, at 9,000 square feet, for temporary exhibitions. Emily Rales has curated the inaugural show, of 65 works by 52 artists, drawn from the foundation's collection—and it is a knockout. In just the first space is a superb Franz Kline on the left wall, a stunning 1952 Jackson Pollock, *Number 1*, dead ahead, and three airy Ruth Asawa sculptures from the 1950s floating in a corner. As Mitch Rales explains, about his early collecting, "I ultimately fell in love with Abstract Expressionism." He first bought that beautiful Pollock, and then much more. When he and Emily married, they moved deeply into contemporary art, much of it experimental. The inaugural exhibition reveals their trajectory as collectors, from great examples of modern blue-chip art to the more adventurous. One of their strict criteria for acquiring a work is to ask this question: does it change the way we think about art? Their challenging program for the new Glenstone, with its eclectic range of long-term installations by nine very different contemporary artists, is surely meant to provoke the same question in visitors.

The architect and his team worked closely with the living artists, and the estates of those who are dead, to tailor specific conditions for the artists' rooms. "We developed a particular proportion and particular light quality for each one," he says. Phifer treats natural light as a primary material, which—along with the stout masonry walls—reflects the influence of Louis Kahn. "I didn't want any artificial light in the galleries at all," he says. Though of course there is electric lighting, on a bright day, it is unnecessary. Six of the 11 rooms bring in daylight from above (another room, devoted to a sculpture by Michael Heizer, *Collapse*, is open to the sky).

To avoid direct sunlight on artwork, either light wells with a laylight at the top, or monitors with clerestories wrapping around them protrude above the poured-concrete ceilings. The laminated glass interlayers of these devices provide UV protection; all daylit rooms also have shading systems. The largest clerestory is in the ceiling of a dramatic gallery that displays a single magisterial triptych commissioned from Brice Marden, with a monitor in the 24-foot-high ceiling that is 13½ feet wide by 36 feet long by 13 feet high.

The daylighting features presented major engineering challenges. For example, to span the 75-foot width of the column-free spaces of the temporary gallery, Phifer and his team turned to engineers at SOM who invented a ceiling system using steel trusses, two for each of the five monitors, somewhat visible through the translucent glass of the clerestories. The poured-concrete ceiling slab is hung from the trusses, while the concrete slab on top of each monitor rests on them.

Beyond the temporary gallery is a small room—but, at 36 feet high, the loftiest—devoted to the late Japanese conceptual artist On Kawara, which is installed with *Moon Landing*, a trio of his "date" paintings, for June 16, 1969, June 20, 1969, and June 21, 1969, marking the Apollo lunar mission. Here, a light well, 12 feet high, is topped by a laylight. Like all the galleries, it is sited on the cardinals of the compass; at one moment daylight will be washing over the east wall while the next, when a cloud passes overhead, the light softens and diffuses.

From the zen serenity of On Kawara, you move to a big room hosting an installation by Robert Gober that includes a mural of a forest wrapping the walls; eight industrial sinks with faucets running; and bundles of old newspapers and boxes of rat poison scattered around the edges of the floor (without daylighting but rather moody illumination by lighting designer Jennifer Tipton). And so it goes—from the witty but grim art of Gober to Charles Ray's enigmatic sculpture, including *Baled Truck*, a piece made from CNC-milled stainless-steel blocks that weighs



15 tons (the concrete floor has been temporarily shored up from below) to a room devoted to the late Brazilian artist Lygia Pape, featuring her 1961 *Book of Time*, a wall of 365 small, colorful abstract reliefs that was shown last year at the Met Breuer in New York. (Two other major women artists have work here: a video and sound installation by Pipilotti Rist, and two sculptures by Roni Horn, in a passageway.)

The architecture is a mediator in the rhythm of the museum experience, providing moments to pause after immersion in provocative work. Phifer deliberately created small areas of shadow in counterpoint to the daylit galleries. One room, for contemplation, is entirely clad in maple, with a sensuous bench made by Martin Puryear and Michael Hurwitz that faces a window wall framing a view outside to a grove of honey locust trees. Along the passageways, too, you can sit on benches of Port Orford cedar, also made by Puryear and Hurwitz, and look out at the water court, where swallows wheel and dragonflies dart above the abundant plant life.

The water court is the beating heart of Glenstone. The idea of a courtyard, says Phifer, came from the famous rock garden at Ryoan-ji



LIGHT TOUCH Six of the galleries, including a room displaying sculptures by Cy Twombly (opposite, top), and one containing a triptych by Brice Marden (this page, top), bring in daylight from above; a light well (Twombly's) or a monitor (Marden's) protrude beyond the ceiling to keep direct sun from the artworks. Some passages that link the galleries contain art, such as Martin Puryear's *Big Phrygian* (opposite, bottom). Lygia Pape's colorful *Book of Time* is visible in her room (above, on the right).



Temple in Kyoto, where the enclosing walls screen out all but the sky and the treetops, erasing the horizon line. Similarly, the water court at Glenstone is entirely insulated from the larger world beyond the museum's walls, yet here it is alive with natural phenomena.

Besides the museum's overall concept, the building is a master class in detailing and craft. The biggest challenge, says Phifer, "was getting the precision we needed. The materials are very simple, but they had to be done beautifully." All that is evident in the poured-concrete ceilings and the square, knife-edged concrete columns in the passageways. (You can't touch the art, but you'll want to run your hand over those velvety surfaces.) The floors are a fine, epoxy-reinforced terrazzo. The lites of the expansive glass walls are 9 feet wide and 24 feet high, held with slim, flush stainless-steel mullions; they slip below the floor plane and extend far above the passageways' ceilings, where they act as guardrails on the walkable green roofs at grade that overlook the water court. But not everything is quite so ethereal: some markings on the blocks—the bug holes and slight striations—bothered Phifer at first, but he came to cherish them as signs of craftsmanship. "It's like making a pie," he says. "It has fingerprints."

A few fingerprints turn out to be a good thing, for the architecture's only flaw may be its near-perfection. Yet in its austerity, it is just the right foil to the messy, expressive and cerebral art that it shelters, and the vibrancy of the ever-changing landscape in and around it. "In the end, you want the architecture to dissolve," says Phifer. Fortunately, in that he has not succeeded. Instead, it is central to the trinity of art, architecture, and landscape that elevates to a rare level the design of experience. ■

INSIDE OUT Swaying grasses and wild flowers surround the pavilions. The natural landscape can also be enjoyed from passageways inside, which frame views outside and to the water court with its abundant plant life.

credits

ARCHITECT: Thomas Phifer & Partners
– Thomas Phifer, principal; Gabriel Smith, Andrew Mazor, Michael Trudeau, Rebecca Garnett, Jonathan Benner, John Bassett, Bethany Mahre, Petra Pearsall, Remon Alberts, Greg Bonner, Robert Chan, Isaiah King, Elijah Porter, Lamare Wimberly, design team

ENGINEERS: Skidmore, Owings & Merrill (structural); Altieri (m/e/p/fp)

CONSULTANTS: PWP Landscape Architecture, RAFT (landscape); Reg Hough Associates (concrete); Heintges (facade); Arup (lighting); Philip Dolphin (master mason); BuroHappold (sustainability)

SOURCES

CONCRETE BLOCK: Gate Precast
STAINLESS-STEEL CURTAIN WALL: MBM Konstruktionen, National Enclosure
ROOFING: Sika Sarnafil
GREEN ROOF: American Hydrotech
PHOTOVOLTAIC SYSTEM: Astro Energy Group, Enphase, IronRidge
WINDOWS: Schüco
GLAZING: Thiele Glas, Saint-Gobain, Walker Glass, Viracon
SKYLIGHTS: Linel
DOORS: Steelcraft; Schweiss
PAINTS: Sherwin-Williams
PLASTIC LAMINATE: Formica
SOLID SURFACING: DuPont Corian
LIGHTING: Bartco, Viabizzuno, EcoSense
LIGHTING CONTROLS: Lutron



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Oceanwide Plaza projected to open in 2020.

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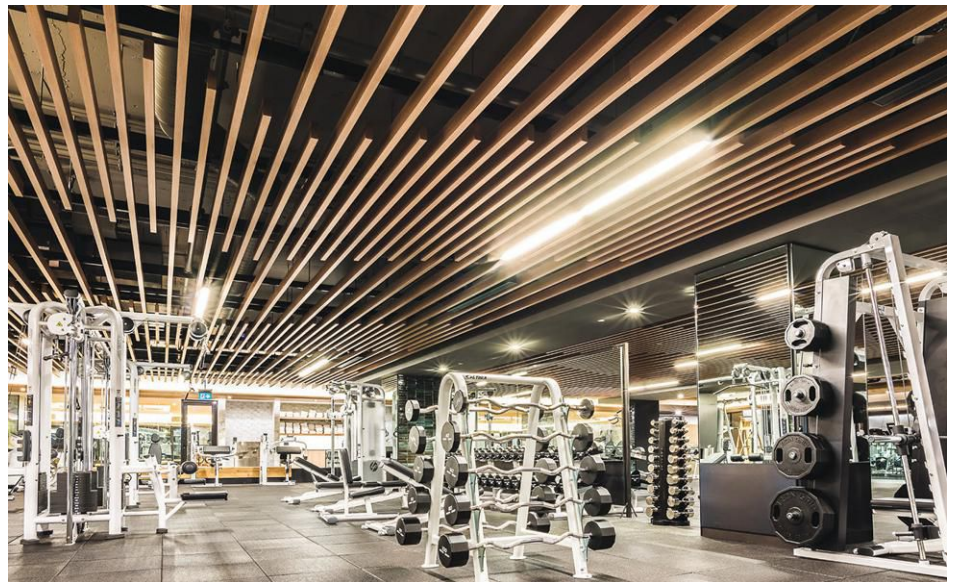
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The Housing Crisis in America

Finding an affordable place to live is becoming an increasingly dire problem for many Americans—from the growing homeless population to middle-class families. The following special section explores the range of causes and effects in a variety of challenged urban markets, and examines how different municipalities are attempting to address this complex issue.



Living in the U.S.: At What Cost?

Rising housing prices are outpacing wage increases nationwide, threatening a living standard that once seemed an inalienable right.

BY DIANA LIND

IT'S NO LONGER shocking, but it should be: the average price of a Manhattan apartment hovers around \$2 million; in San Francisco, the median price of a home increased by 14.5 percent in the past year, and now coasts above \$1.6 million; in some neighborhoods in Seattle, prices have increased 40 percent in a year. Residents of coastal cities—where

land costs have soared—have become accustomed to mind-boggling house prices, but now cities like Cincinnati, Philadelphia, and Salt Lake City are witnessing unprecedented price appreciation.

The median home price rose 41 percent faster than overall inflation between 1990 and 2016. Nearly one-third of U.S. households—38.1 million owners and

renters—paid more than 30 percent of their incomes for housing in 2016. While the situation has been tough for homeowners, it's been undoubtedly worse for renters. According to the Harvard Joint Center on Housing Studies, almost half of all renters are paying more than the federal benchmark of affordability of 30 percent of their gross income for

Home prices in San Francisco (above) rose 14.5 percent in the past year. Rents in changing areas like Downtown Brooklyn, NY (opposite), are rising with new towers.

housing. Fully 80 percent of renters making less than \$30,000 in 2016 were deemed cost-burdened. The National Low Income Housing Coalition (NLIHC) found that to afford the rent for an average one-bedroom apartment, workers would need an hourly wage of \$17.90 at a full-time job. (Do the math: a worker at the national minimum wage of \$7.25 per hour would need to work 99 hours per week, 52 weeks per year to afford the same rent.) While renters make up 36 percent of households nationwide, they're the majority in

42 of the country's 100 largest cities, where the housing crisis is most acute. And there's little relief in sight.

But unaffordable housing is not just an unfortunate economic situation. Studies show that the high cost of housing is driving the United States' widening inequality and serving as an obstacle to economic mobility, especially for young people. It also correlates with racial segregation. The home-ownership gap between black and white Americans is growing larger. Between 1994 and 2016, black home-ownership rates increased just 0.3 percent while white rates rose 2.2 percent; black and white home-ownership rates now stand at 41.6 percent and 72.9 percent, respectively. And while homeowners get economic benefits such as a mortgage-interest tax deduction (up to \$750,000 in the new tax bill) or the ability to leverage home equity for college loans or medical expenses, renters fall further behind.

Homelessness is on the rise too, a stark reality when viewed against cities' booming economies and low unemployment. While chronic homelessness (a condition defined as homeless for more than one year with a disabling condition) was declining for much of the last decade, it has increased by 12 percent since 2016. One might typically think of the homeless as single men, but 33 percent of all people experiencing homelessness are families and, tragically, another 7.4 percent are unaccompanied youth under 25 years old.

Not surprisingly, the lack of affordable housing can be linked to lower mental and physical well-being. Living in substandard housing increases risks to health such as asthma and exposure to lead, while experiencing a foreclosure—even living near foreclosures—is associated with elevated levels of anxiety, depression, and violent behavior.

There is agreement among many local and state governments that we have a housing crisis on our hands, and therefore, an economic, social, and health cri-



“ Nearly one-third of U.S. households paid more than 30 percent of their incomes for housing in 2016. ”

sis. And yet the U.S. Department of Housing and Urban Development (HUD) under Secretary Ben Carson views federal subsidies for housing as a hindrance to self-sufficiency, as evidenced by the proposed Making Affordable Housing Work Act, which would require public-housing authorities to raise the minimum rent on their lowest-income residents from \$50 to \$150 per month. Carson's perspective, notes Diane Yentel, president of the National

Low Income Housing Coalition, is that “if people were to just try harder, they wouldn't be as challenged by housing affordability. Which is just so clearly wrong at a time when the housing-affordability crisis has reached historic heights.” What many officials don't see is the frustrating and time-consuming effort required to access subsidized housing. According to a recent study by the Urban Institute, actually sponsored by HUD, landlords reject

applicants with Section 8 vouchers at rates as high as 78 percent in areas such as Fort Worth; not surprisingly, more denials occur in low-poverty neighborhoods, thwarting the Housing Choice Voucher program's goal of helping people access high-opportunity neighborhoods.

For decades now, federal investment in affordable housing through HUD's signature Community Development Block Grants (CDBG) has been declining. Created in 1974, the CDBG program's budget has remained approximately \$3 billion per year and thus has lost 80 percent of its value due to inflation. In the face of the federal government's stepping back from the severe current problems, cities across the country are racing to find new sources of housing revenue in the form of taxes and bond measures, as well as solutions such as zoning that mandates some affordable housing. But none comes easily, or without controversy.

Seattle made headlines earlier this year for its proposed “head tax” on large businesses, like Amazon, that would have funneled some \$47 million toward affordable housing and addressing homelessness; but after corporations protested, the tax was repealed. On the first day of this fall's legislative session, Philadelphia's mayor and city council agreed to withdraw a long-debated proposal for a tax on all construction, and instead will secure approximately \$71 million for affordable housing over the next five years through the city's general fund and by collecting fees from developers who pay for density bonuses. Meanwhile, a handful of cities such as Washington, D.C., and Boston have directed that residential construction in some areas include a percentage of affordable housing or that developers pay a fee to a housing building fund. But these inclusionary zoning programs are generating far too few units considering the scale of the problem—some hundreds of units against thousands of people on wait lists.



“The evidence on inclusionary zoning is mixed, and I’m not optimistic that it will make a dent in the problem,” says Jenny Schuetz, David M. Rubenstein Fellow at the Brookings Institution. “But an awful lot of places have used it as a Band-Aid and a way to show they care about affordable housing.”

State governments are also getting involved in the creation

and preservation of affordable housing. California, which is home to 21 of the 30 most expensive rental markets in the country, will pose two housing-related ballot questions to voters this November. Proposition 1 would allow the state to take out \$4 billion in general obligation bonds for housing-related programs, including \$1 billion in loans for veterans to purchase housing and

Homeless populations are growing in cities like Philadelphia (above) and Seattle (left); Tiny houses, such as this one in Detroit (opposite, top), are being built to address their needs. San Francisco’s Hunters View (opposite bottom), a joint venture between Paulett Taggart Architects and David Baker Architects, addresses many public-housing issues.

\$1 billion toward a program to assist people with incomes at 60 percent or below Area Median Income. Proposition 10 would reverse a law that prevented municipalities from imposing rent controls on new multifamily buildings.

“These proposals could be a big boost for California’s efforts to end homelessness and the affordable-housing crisis,” says Yentel.

“While these ballot propositions may provide much needed rent relief,” says Vincent Reina, assistant professor, City and Regional Planning, at the University of Pennsylvania, “they do not address a key driver of the affordability problem, which is the severe shortage of supply in response to the state’s overwhelming demand.” The NLIHC has

found that there are 7.2 million affordable-housing units lacking across the country, and 1 million of those are in California alone.

To reduce the time and costs of constructing housing, new companies are touting business models based on technology and prefabrication. Katerra, a Silicon Valley end-to-end building provider now valued at \$3 billion (RECORD, July 2018) is seeking to disrupt the traditional housing industry with factory and jobsite integration that increases productivity and lessens construction waste. Earlier this year, New York’s Department of Housing Development and Preservation issued its first-ever RFP to build a modular, multiuse, mixed-income housing development in Brooklyn’s East New York neighborhood, showing how cities can make building affordable housing, well, more affordable. The nonprofit New Story Charity is exploring 3-D printing and other technologies to create new housing cheaply: the company says it can 3-D-print a 650-square-foot house for just \$10,000. Its main applications will be in disaster zones, but one can imagine the eventual use in U.S. communities. Blokable, another Silicon Valley company, offers a 328-square-foot cottage for \$58,000. Suddenly, a thoughtfully designed tiny house becomes as affordable as a mobile home. But Schuetz warns that much of the time spent developing housing isn’t for construction. It’s the slowdowns, from land acquisition to zoning to permitting, that can add years—and costs—to preconstruction. And, indeed, such tiny houses aren’t legal in many locales.

One way cities are looking at speeding up the supply of new housing is to legalize outlawed alternatives to the single-family house, such as the tiny houses, accessory dwelling units (ADUs)—aka granny flats—and co-living. After years of fighting ADUs, California now supports them as a way to create density without upzoning. In Detroit and Nashville, tiny houses are ad-



addressing homelessness. In New Orleans, the city approved a 233-unit co-living development for service-industry workers, so long as the developers pledge to freeze rents at affordable rates. In Philadelphia, the city is considering bringing old-fashioned rooming houses up to code.

Clearly, new thinking is needed to address such an enormous national problem. Two recent proposals for housing relief from Senator Kamala Harris (D-California) and Senator Cory Booker (D-New Jersey) would provide tax rebates to those paying more than 30 percent of their income on rent. The separate proposals attack the inequality in tax policy for homeowners and renters, but there is a potential downside. “The challenge will be if the market then reflects the tax benefit, and landlords then just charge higher rents,” says Reina.

Yentel sees these “big, bold” proposals as a sign that the country is ready for a national conversation about the affordability crisis in the next presidential election, if not as soon as the midterms this November. And it’s not just coastal Democrats making housing an issue: there are a number of bipartisan bills making their way through the political

process, including a bill to expand the Low Income Housing Tax Credit, and a bill introduced by Senator Todd Young (R-Indiana) to create a national affordable-housing task force.

But government is only one channel for attacking the hous-

“ Millennials have taken up the mantle of YIMBYism (Yes in My Backyard) to fight for more housing. ”

ing crisis. When the market is king, developers have to step up, and a younger generation is calling for changes in the market altogether, with easier and faster development processes that both stimulate the production of housing and encourage housing quality and stability. Often strapped with debt and priced out of desirable housing markets, millennials have taken up the mantle of YIMBYism (Yes In My Backyard) to fight for more housing supply. A new generation of urbanites, NUMTOTs (New Urbanist Memes for Transit Oriented Teens) are using social media to fight for better transit options, to ensure access to affordable housing in more outlying urban neighborhoods. Such grassroots

approaches have helped encourage high-density construction in urban areas and provide cover for politicians who want to see more development too.

Yet, as Yentel reminds us, “there is no silver bullet for affordable housing.” The fact that there is no easy fix can feel disheartening, but it does mean that no one entity is responsible for addressing the affordable-housing crisis. Policymakers, developers, planners, architects, and advocates of all stripes must play an active role in pushing for creative solutions. ■

Diana Lind is the founding managing director of the Penn Fels Policy Research Initiative. Previously she was editor in chief and executive director of Next City.





DATELINE: Oakland

Despite a wide range of initiatives, this diverse city in the booming Bay Area still struggles to preserve its affordability.

BY JOHN KING

THE STATE of the Oakland housing market in 2018—what is needed and what’s actually being built—can be gauged by a pair of very different new developments located within this city of 425,000 that lies eight miles and a deep body of water directly east of San Francisco.

One is a 33-story tower at 1640 Broadway, designed by Solomon Cordwell Buenz, that will hold 254 apartments atop an artfully screened parking podium when it opens next spring; monthly rents are likely to start above \$2,500 for the smallest studio apartments, with amenities that will include a rooftop lounge with fire pits. The other, located less than 12 blocks

away, is decidedly more humble—a cluster of 20 repurposed garden sheds nestled against an elevated highway at 27th Street and Northgate Avenue. Each upgraded shed holds two people who formerly lived in tent camps near the site that were cleared by the city after the “community cabins” opened in May; the doors have deadbolts, and there are double-pane windows to muffle the freeway noise. But toilet facilities are shared, and each shed has only enough electricity to power a single light and recharge cell phones.

Extremes of this sort are seen today across urban America, but they’re particularly troubling in one of the nation’s most racially

Population: 425,000

Median Price of Home in 2012: \$260,400*

Median Price of Home in 2017: \$638,100*

Average Rent for 1-BR Apartment in 2012: \$1,562**

Average Rent for 1-BR Apartment in 2017: \$2,361**

Sources: *Metrostudy **Rainmaker Insights

diverse large cities, and one that in recent years has pursued a wide range of initiatives to provide and protect housing for people of all income levels. Yet with the San Francisco Bay Area’s

tech-fueled economic boom still at full force, Oakland instead is showing how tough it can be for any city in a prosperous region to control its fate.

“It’s not easy to hold back the tide of change,” says Carol Galante, a professor of affordable housing and urban policy at the University of California, Berkeley, College of Environmental Design. Before that, the Oakland resident spent five years as an assistant secretary at the U.S. Department of Housing and Urban Development. “Oakland’s trying to hold on to the [racial and economic] balance that residents value, but it’s not a given that they’ll be able to.”

Simple numbers tell much of the story. Since the end of 2012, a period during which the Bay Area added roughly 600,000 jobs, the median price of a home in Oakland more than doubled from \$260,400 to \$638,100, according to the real-estate analysis firm Metrostudy. In the city center

districts known as Downtown and Uptown, there are more than a dozen market-rate housing complexes under construction or recently completed. Also on the rise is the city's homeless population—the official federal count of 2,761 in 2017 was 25 percent higher than the one taken two years earlier. By contrast, the homeless numbers for San Francisco during that period remained stable.

What the numbers don't capture is the tension in a city that long has prided itself on being an authentic place unto itself, the Town to San Francisco's the City.

To understand why, put aside the notion that this is the West Coast's version of Brooklyn, an adjunct to the main attraction. Oakland is defined by a variety of communities and topographies—from Lake Merritt, a popular spot for strolling and picnicking that flanks downtown, to the tree-shrouded residential hills along the city's eastern edge. Broadway, the onetime commercial spine, struggled for decades but now features such attractions as Oaklandish, where locally made T-shirts extoll the Port of Oakland's industrial cranes, or the Hive, a rough-edged makeover of a car dealership that goes beyond the standard 21st-century millennial fare to include an African-American-owned coffee roaster that used crowdfunding to set up shop.

But Broadway is also a 12-minute rapid-transit ride under the bay from San Francisco. Perennially desirable Berkeley shares Oakland's north border. Gentrification pressures date back at least to the 1980s, waxing and waning with the region's economic tides.

The difference with the current wave of prosperity is its longevity. The growth in jobs and housing demand has been insistent since 2012, altering the landscape in profound ways. Facebook, for instance, is headquartered in Menlo Park, near Stanford University. However, it has leased all 1.2 million square feet of office space in two new towers in San Francisco's Financial District. The



Oakland (opposite), just across the bay from San Francisco, is a city of housing contrasts. Examples of recent and current projects are 1640 Broadway (left)—a market-rate tower that includes such amenities as a rooftop lounge—and garden sheds (above) installed under a freeway for people who formerly lived in tent camps on the same site.

been turned into an ad hoc artist collective. Rents were kept low in part by ignoring basic building codes. The resentment of perceived economic inequality and disruption can also lead to such destructive acts as a quartet of arsonous fires in 2016 and 2017 that leveled market-rate apartment buildings during construction.

Amid all this, the Schaaf administration convened a "housing cabinet" that in 2016 released a 52-page report with detailed recommendations on how to offset housing pressures, both by encouraging the development of 17,000 additional housing units by 2024, and by protecting a similar number of households that otherwise might be displaced.

The production side of the equation is easy to track: Oakland has issued permits for 9,710 housing units since the end of 2015. More

more that Silicon Valley expands, the more convenient—and compelling—Oakland becomes to young, affluent workers who want to feel that they're part of a scene.

"The housing affordability problem has been in the making for decades. The challenge this time is the speed of the change,

and the intensity," says Darin Ranelletti, the policy director for housing security for first-term mayor Libby Schaaf. "It's the breadth and depth of the crisis."

That crisis can take a deadly turn: think back to December of 2016, when 36 people were killed in the fire at a warehouse that had



than 6,500 currently are under construction, with another 11,900 in the pipeline. Zoning was revised to ease restrictions on accessory dwelling units in the backyards of single-family homes; there were 61 such cottages approved in the first six months of 2018, which may not sound like much, but in all of 2017 there were just 57.

What's more intriguing are the efforts to preserve housing options for low- and middle-income residents. City residents approved a measure in 2016 to extend rent-control protections to buildings constructed as recently as 1995 (the prior cutoff was 1980). A \$600 million infrastructure bond approved in the same election

includes \$100 million for such initiatives as the purchase of residential buildings by nonprofits that will then guarantee permanent affordability. Eight properties have changed hands so far—from a handful of single-family homes to a 66-room single-occupancy hotel.

In a similar vein, Oakland is using streamlined paperwork and

a \$500 signing bonus to entice landlords to rent apartments to residents with vouchers from the federal housing assistance program, popularly called Section 8. Early signs are promising—there were 684 new Section 8 leases in Oakland in the first six months of 2018, twice the number of the year before.

“The most pressing issue in Oakland right now is housing security,” says Ranelletti, who has worked at City Hall since 2003 and at one point was interim planning director. “What we’re trying to do goes beyond housing as buildings and units. People should feel secure in their homes.”

The “community cabins” weren’t in the 2016 recommendations. Rather, they’re a city-organized but privately funded response to the spread of homeless encampments that in some cases line underpasses or spill into lightly trafficked roadways. The site planning and upgrades to the sheds were done with the assistance of Michael Pyatok, an Oakland architect who is one of the nation’s best-known designers of affordable housing. He stepped in on the cabins, which are accompanied by support services, because he recognized an opportunity for a quick fix to a daunting problem. “They’ll keep someone warm, keep someone safe, and that’s a huge step upward from the streets,” Pyatok says. As for the greater array of housing challenges that face Oakland, he sees a limited role for architects: “It’s so much larger than design solutions. We’re the caboose in the development train, not the engine.”

It’s hard to look at the current situation and not want to turn back the clock. Market-rate developers have only been required to pay a housing-impact fee or include lower-income units in their projects since 2016; 1640 Broadway and many of the other current projects under construction, since they already were in the planning process, include no “affordable” apartments. And while the initiative to help non-



The city, which covers 78 square miles, has varied topographies, including the popular recreation spot Lake Merritt (opposite, top); a mixed-use development known as the Hive, on the site of a former car dealership (opposite, bottom); and Brooklyn Basin (above). Here, more than a decade after the approval of 3,100 housing units on former port land, the first apartment buildings are finally on the rise.

profits purchase apartment buildings filled with working-class families is admirable, the money would have gone further if the city had intervened aggressively during the depths of the 2008 recession to purchase foreclosed-on houses in struggling African-American neighborhoods that now are being gentrified.

But governments respond to the pressures of the moment, and not always with effective speed. Housing-impact fees were brushed aside by prior administrations, except for one analysis completed the year before the Great Recession seemed to make it moot. And though the Oakland City Council in 2009 steered \$5 million to a community land trust that was to step in and buy 200 foreclosed-on houses, the process moved so slowly that the trust ended up purchasing fewer than two dozen.

“By the time they got started and organized, speculators already were circling East Oakland and picking up foreclosed properties for a song,” recalls Karen Chapple, a professor of city and regional planning at UC-Berkeley who has studied housing trends in Oakland for the past decade. “It’s very hard to think as fast as the market does. We’re well-intentioned folks, but they’re always ahead.”

Today’s good intentions also run up against the entrenched realities of California, a state where residents have spent decades perfecting the art of obstruction. Often this has been for admirable reasons, such as preserving the open ridgelines and farmland that kept the Bay Area from congealing into one mass of sprawl. It also means a political culture where suburbs may be

self-righteous about blocking growth. Look at Silicon Valley’s Cupertino, where computer giant Apple is based—and state figures show that just 27 housing permits were issued in 2017, the same year that Apple opened its Foster + Partners–designed headquarters that holds 3,000 workers.

In Oakland, the hurdles facing large projects can be seen in the 65 acres of former port land now known as Brooklyn Basin. After years of debate, 3,100 housing units were approved in 2006, with 460 to be reserved for low-income residents. Opponents then filed a lawsuit challenging the environmental-impact report, a common tactic to slow down and perhaps derail a project. They lost, as most opponents do—but the combination of the legal delays and the recession means that the first units are only now being built.

It’s this backdrop that makes some observers fatalistic about what Oakland can do.

“The numbers that can be produced are nothing like demand or the indirect forces of displacement that have been set into motion,” Chapple says. “It’s almost like a Band-Aid.”

Ranelletti takes the broad view that any solution to Oakland’s bind must be regional, and that a more aggressive state investment is needed in areas like housing subsidies and homelessness-assistance programs. Nonetheless, he holds out hope that local efforts can make a beneficial mark. “I’m optimistic,” says the City Hall veteran. “I think it’s absolutely solvable, or I wouldn’t be doing it.” ■

John King is the San Francisco Chronicle’s urban-design critic.

DATELINE: New York

The nation's largest city looks to accommodate growth without displacing low- and middle-income residents.

BY RONDA KAYSEN

THE POTENTIAL for what affordable housing could look like in New York is now just a field that spans nearly a square block in East Harlem.

But before the end of the year, ground will break on this city-owned land between 111th and 112th streets and Park and Madison avenues, making way for Sendero Verde, a \$350 million mixed-use project that will deliver 655 units of affordable housing aimed at low- to middle-income residents. The three-building complex, designed by Handel Architects, will house a YMCA, a charter school, a grocery store, a health center, and a pizzeria. Community gardens and a central plaza designed by AECOM will fill the inner courtyard.

Sendero Verde brings the city's vision of a robust housing program into focus. The plan, now called Housing New York 2.0,

promises to preserve or build 300,000 units of affordable housing by 2026, at a cost of \$83 billion. Despite this impressive goal, the most ambitious in the country, New York faces serious hurdles to meet its housing needs and keep the city livable for everyone from the poorest residents up to the middle class.

Roughly 77,000 New Yorkers are homeless, many of them families with children, according to a report from HUD. The city's portfolio of public housing is aging and the stock of city-owned land is dwindling. At the same time, middle-class New Yorkers are migrating to outlying neighborhoods in search of cheaper rent, putting pressure on communities once considered immune from gentrification. Short-term rental services like Airbnb have cut into the housing supply, as tenants and landlords cash in on a hungry

Population: 8.6 million

Median Price of Home in 2012: \$782,300*

Median Price of Home in 2017: \$1,087,100*

Average Rent for 1-BR Apartment in 2012: \$2,385**

Average Rent for 1-BR Apartment in 2017: \$2,716**

Sources: *Metrostudy **Rainmaker Insights

real-estate market. But, unlike other cities facing a relatively recent crisis, in New York, housing has always been a scarce resource.

"At every period, people have felt constrained by the physical barriers of the city. We've always built higher, built deeper, built denser. It's why housing issues are so urgent here," says Benjamin Dulchin, the executive director of the Association for

Neighborhood and Housing Development, an advocacy group. "In some ways, since the founding of the city, we've expressed our class struggles through the struggle over space."

New York City is the nation's biggest public-housing landlord, with 400,000 tenants living in 325 developments controlled by the city's housing authority, NYCHA. But the intense housing needs here reach back into history. The state enacted its first rent-regulation laws in 1920, in response to housing shortages and spiraling rents in the city. After World War II, a mix of private and public investment led to the rise of vast, subsidized middle-class housing developments like Stuyvesant Town-Peter Cooper Village in Manhattan and Co-op City in the Bronx. And in the 1980s, under Mayor Ed Koch, the city began investing billions of dollars of its own capital to turn abandoned properties into affordable housing units as a way to overcome blight. Although Koch's plan was controversial at the time, it has since become doctrine.

Today, New York faces a different kind of housing crisis. The decline of the 1980s has been





A crop of new high-rise residential towers—including Steiner NYC's 55-story Hub (at left, opposite) by Dattner Architects—is changing the landscape of Downtown Brooklyn and neighboring Fort Greene. The Rollins (above), by Beyer, Blinder, Belle, is a mixed-use, mixed-income residential and commercial building on Manhattan's Lower East Side.

replaced with a boom. The population is growing and expected to reach 9 million by 2030. The city is constantly building, with roughly 25,000 new units constructed each year, transforming the skyline into one peppered with cranes and the sidewalks a maze of scaffolding and sheds.

Yet the demand for housing seems insatiable. As land values soar, landlords are pushing out longtime rent-stabilized tenants to make room for those able to pay more. Such evictions can lead to homelessness, putting more pressure on an overburdened shelter system. As New Yorkers move deeper into the outer boroughs looking for housing, neighborhoods that were once havens for the poor have become hot rental markets. A StreetEasy report found that although rents rose 31 percent citywide between 2010 and 2018, the spike was far greater in poorer neighborhoods. For example, the report found that rent in Midtown Manhattan re-

mained relatively stable during that time, rising 16 percent, while in Prospect Lefferts Gardens, a Brooklyn neighborhood 45 minutes from Midtown, rent soared by 45 percent. All this comes at a time of growing economic inequality, with wages stagnating for many New Yorkers.

Mayor Bill de Blasio, who was swept into office in 2013 on a platform decrying a “tale of two cities,” has been combating this crisis using a mantra laid out by Koch: build more units. But affordable-housing advocates worry that the centerpiece of his proposal—to rezone neighborhoods, like East Harlem, for larger development in exchange for mandatory affordable housing—could exacerbate the problem, rather than alleviate it. New market-rate development brings speculation and, inevitably, displacement.

The city sets the rent tenants pay for affordable units based on income, so that renters do not pay

more than a third of their earnings on rent. In New York, the Area Median Income, a federal figure, is \$93,900 a year for a family of three, meaning that such a family should spend no more than \$2,608 a month on rent. The median rent for a two-bedroom apartment in Manhattan was \$4,050 per month in July, according to a Douglas Elliman market report.

The city, private developers, and nonprofit organizations are exploring innovative solutions, like building new limited-equity co-op housing, where low or moderate-income New Yorkers buy apartments, some for less than \$200,000, and can later resell them at restricted prices to other New Yorkers of moderate means; developing micro-units for young professionals; enacting new tenant protections like legal assistance for low-income tenants facing eviction; legalizing basement apartments; and building on the open space—such as

parking lots—in existing public-housing complexes.

“We’re going to need a lot more affordable housing,” says Jonathan F.P. Rose, the president of Jonathan Rose Companies, which is developing Sendero Verde with L+M Development Partners and the Acacia Network. Rose, whose company was a developer of Via Verde in the Bronx (RECORD, July 2012), estimates that the city needs as many as 800,000 affordable units. “There is no one solution,” he says. “We need housing for a broad range of people, from the homeless to middle-income families.”

The apartments at Sendero Verde aim to serve a wide cross section of the population, from extremely low-income up to middle-income. The development will also include 79 units for seniors. Built to meet Passive House standards, the 750,000-square-foot complex will use roughly a third of the energy that a typical development of that size does.

The demand for affordable units is intense, with tens of thousands of people applying in lotteries for just a few hundred spots—as at the Rollins, a mixed-use building on the Lower East Side, where last year nearly 94,000 people applied for 104 affordable units. Designed to target a wide range of incomes, more than half of the units in the city’s plan are set aside for New Yorkers who earn no more than about \$69,000 for a family of three. The initiative reaches down to the poorest residents, allocating 14.5 percent of the space for families earning no more than \$43,000,

and 10.5 percent for families earning up to \$25,770. But it also targets moderate and middle-income New Yorkers, with 20 percent of units intended for those making as much as \$142,000 a year, a figure that may seem startlingly high in lower-cost regions of the country, but points to just how far up the income ladder the housing shortage reaches in New York.

The city argues that the rent middle-income tenants pay helps subsidize the rents for the lowest-income brackets. But housing advocates look at those units and

see space that could be dedicated to the neediest New Yorkers instead going to those with other options. Extremely low-income New Yorkers “can’t make their way in the private housing market,” says Thomas J. Waters, a housing-policy analyst at the Community Service Society, an advocacy group. “If you make \$25,000 a year, you can afford \$600 a month rent, and those apartments just don’t exist to match the numbers of people who need them.”

The city does not actually control its largest anchor of afford-

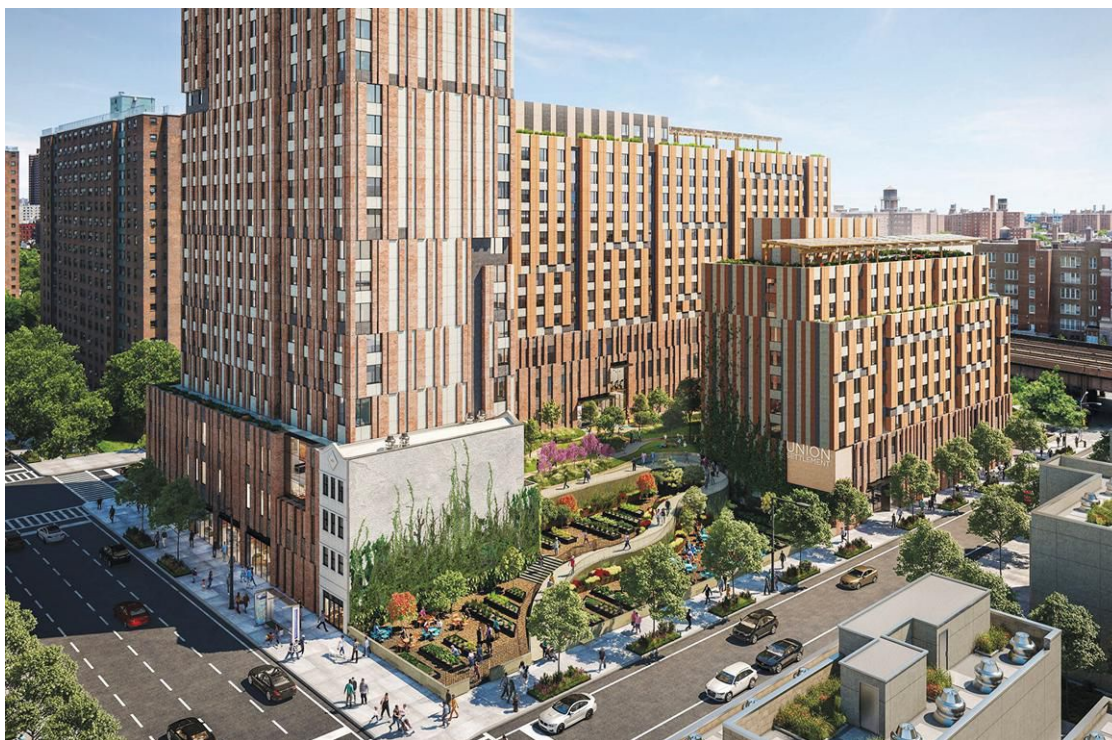
ability—nearly half of its rentals, almost 1 million units, are stabilized under state laws, with rules adjusted by legislators 150 miles away in Albany. Legislative changes have loosened the protection on these apartments over the past 25 years, giving landlords the incentive to oust tenants so the apartments can be deregulated. Between 1994 and 2017, the city lost 284,301 units to deregulation—almost as many units as the goal is in the mayor’s current plan.

Holding onto a rent-stabilized apartment can feel like a blood sport, with landlords turning buildings into never-ending construction sites, offering tenants paltry sums of cash to leave, or bringing erroneous cases against them to get an eviction. Lisa Kirchner, a 65-year-old singer who has lived at the Windermere on the Upper West Side for 35 years, was once offered \$20,000 to vacate her studio. Ms. Kirchner, who pays less than \$1,000 a month, knew that any new apartment would cost significantly more, depleting her windfall in a matter of months. “Unless you leave with something you can invest,” like enough money for a down payment on an apartment, she says, “you’ve rendered yourself homeless.”

Mostly, the relationship with the landlord involves confrontations over repairs, noise, and disruptions. “You feel like there are buzzards circling—they are waiting for you to vacate, either by your own will or by the greater will,” Kirchner said. “It’s a very toxic environment.”

The city has stepped up efforts to protect tenants, offering tenants harassment assistance and, with the passage of a 2017 city law, guaranteeing low-income New Yorkers facing eviction a right to counsel. The city has also created a fund to locate and buy stabilized buildings to keep them out of the hands of investors eager for a quick profit, although it has not bought or designated any buildings as of yet.

Both the city and the state have cracked down on the use of online short-term rental platforms like



Handel Architects' Sendero Verde (above) will be built on a city-owned lot in East Harlem (left). Developers Jonathan Rose Companies, L+M Development Partners, and the Acacia Network promise that the three-building mixed-use complex will be 100 percent affordable. The New York City Housing Authority plans to add affordable senior housing designed by Studio Libeskind (opposite) to its Sumner Houses in Brooklyn's Bedford-Stuyvesant neighborhood.

Airbnb, arguing that such services contribute to rising rents by making neighborhoods more transient and taking potential rental apartments out of circulation. “The risk of running a high-cost city is that, very quickly, it could become solely a tourist destination,” says Matt Murphy, the deputy commissioner for policy and strategy at the city’s Department for Housing Preservation and Development.

However, rezoning gentrifying neighborhoods could undermine the city’s attempts to protect existing housing. Earlier this year, the City Council approved a plan to rezone a 92-block stretch of the southwest Bronx, setting the stage for this longtime low-income area, with low-rise commercial buildings housing auto-body shops, poultry slaughterhouses, and barbershops, to reemerge as one with high-rises and new retail.

Developers will be required to include permanently affordable units in any residential development in a rezoned area, a mandate known as inclusionary zoning. Housing advocates argue that rampant speculation sparked by rezoning will cause rents to rise and ultimately displace people, even if some units are set aside as affordable.

“If you create a situation where it makes sense for the developer to invest in that market-rate housing, that means people are willing to pay more for a fixed-up apartment across the street,” said the Community Service Society’s Waters. “That’s displacement pressure.”

But the city argues that displacement is happening whether or not a neighborhood is rezoned. By facing the issue head on, affordable housing is guaranteed at least a place at the table. “The rents are going up regardless of any rezoning, because the demand is incredibly strong,” says HPD’s Murphy.

In a city where two-thirds of its residents rent, home ownership gets less attention. The city has carved out an affordable co-op program in its plan that allows



low- and moderate-income residents to buy an apartment in a limited-equity arrangement: a future buyer will need to meet income requirements. Ownership “allows people to stabilize over a long period of time,” says Christopher Illum, vice president of housing services for Habitat for Humanity New York City, which is developing, with Almat Group, Sydney House, a 56-unit affordable co-op of one-, two-, and three-bedroom apartments in the Bronx. “You have tenure and you don’t have to worry about deregulation.” Illum says that Habitat for Humanity buyers are typically households headed by single mothers. The minimum income needed for a Sydney House apartment will be between \$41,000 and \$72,000 a year, depending on the size of the unit. Sales will begin in early 2019, with prices ranging from \$188,823 to \$326,000.

The city is looking at open space in public-housing complexes controlled by NYCHA. Last spring, Studio Libeskind was tapped to build a 10-story building for seniors on the site of the Sumner Houses development in Bedford-Stuyvesant, Brooklyn. The white, geometric structure marks a departure from the utilitarian brick style typical of

public housing. It will be Daniel Libeskind’s first residential development in the city.

Solving the housing puzzle means thinking differently. One option: encourage micro-units, apartments smaller than code previously allowed. Consider Caesura, a rental building with 123 mixed-income units in Fort Greene, Brooklyn, designed by Dattner Architects and developed by Jonathan Rose Companies. A furnished market-rate studio, one of the 34 micro-units in the building, was listed for \$2,955 a month for 300 square feet in August, or \$118.20 per square foot—more than twice the Brooklyn average, which was \$46.67 per square foot in July, according to Douglas Elliman.

Micro-units, in fact, are not cheap, and do nothing to provide for families. But with common amenities, like the lending library at Caesura, singles might be willing to forgo space for the chance to live in New York without a roommate.

The city has been encouraging developers to build tinier apartments, removing minimum-size requirements in 2016 for market-rate apartments that were previously set at 400 square feet. The apartments must still have a kitchen and bathroom (where the

costs are), and there are still hurdles for affordable-housing developers because various programs set their own limits on size.

In its quest for space, the city has been eyeing basement apartments. Although many subterranean quarters violate occupancy rules, they could ultimately deliver 40,000 more apartments. Last summer, legislation was introduced to the city council to legalize them, following a pilot program in East New York in Brooklyn, where landlords were encouraged to make safety improvements to the apartments while the city reviewed existing codes, like those regulating minimum ceiling height and window size.

Other overlooked corners to consider include slivers of public land too small for traditional building but large enough for a tiny house. The city plans to launch a design competition to build homes no larger than 400 square feet on some of these parcels. “We want to think about the future as a more efficient city,” says Murphy. “Can we do something smart and visionary that people will want to live in?” ■

Ronda Kaysen, a columnist for The New York Times, writes about housing and real estate.

DATELINE: Orlando

The theme-park capital of the world faces serious questions on how to house its exploding population.

BY MARY SHANKLIN

ORLANDO, the world's top tourism mecca, was so ripe with the American Dream nine years ago that first-time buyers could purchase a house for less than \$100,000. Today, the superheated residential market has become unaffordable for many buyers. Rent hikes have made Orlando a darling of the multifamily investment crowd but have further strapped residents in a wage-challenged economy. As the population swells, bulldozers are demolishing old orange groves and cheap housing to make way

for market-rate and luxury communities. "They are basically building new towns with no affordable housing," said Jaimie Ross, president of the Florida Housing Coalition.

Adequate affordable housing eludes most major U.S. metro areas, but Orlando's conditions are among the worst. Earlier this year, the National Low Income Housing Coalition reported that only Las Vegas had a more severe shortage of rentals for the lowest-income families and individuals. Cities such as Boston, Pittsburgh, and

Minneapolis have twice the rate of affordable housing—at least 40 affordable and available residences for every 100 renter households—while Orlando had just 17.

Orlando's housing plight has captured Hollywood's imagination and has figured in a number of recent movies and television programs. Last year's award-winning film *The Florida Project* depicts raw motel life for poor families living in the shadow of the city's theme parks. The movie *99 Homes* shows Orlando's foreclosure frontlines of evictions, squatters, and real-

Population: 2.5 million (metro area)

Median Price of Home in 2012: \$229,829

Median Price of Home in 2017: \$265,000

Average Rent for 1-BR Apartment in 2012: \$827

Average Rent for 1-BR Apartment in 2017: \$1,189

Source: Housing & Community Development Dept.

estate flippers. And an A+E Networks affiliate filmed the series *Zombie House Flipping* about purchasing, renovating, and selling abandoned houses there.

How a region known for affordability less than a decade ago could so quickly price out many residents is a story that centers on a booming population, a housing-market collapse, and wages that have



A cacophony of billboards and other signage along central Florida's U.S. Highway 192 reflects the region's vibe.



Aging structures continue to provide shelter to families as mid-rise residential buildings sprout up around the city.

stagnated while prices spiked.

Housing pressures have escalated in the last five years; last year, on average, more than 1,000 new residents arrived each week in the country's eighth-fastest-growing metro region, census numbers show. About 40 percent of that growth came from other states, plus a similar share from Puerto Rico (following Hurricane Maria) and foreign countries. With Orlando's unemployment rate dropping from 10 percent in 2010 to just 3 percent in mid-2018, jobs have been the primary draw, but there are other factors as well. Central Florida Congressman Darren Soto, who has long represented working-class neighborhoods, says Orlando has simply become increasingly popular, while wages have lagged far behind housing costs. "It's buyers competing with folks from the Northeast, Canada, Brazil,

Russia, and international markets that aren't tied to the local wages," he says.

Orlando's housing crunch hits everyone from the poor to the middle class throughout the 4,000-square-mile metro area. The onetime agricultural hub is bifurcated by 77.5 million annual theme park visitors to the south and 2.5 million metro-area residents largely to the north. This divide has most shortchanged blue-collar neighborhoods near the theme parks in the region's southern stretches. In Osceola County, for instance, rents rose 11 percent from a year ago to a midpoint of \$1,317, according to ALN Apartment Data.

Metro Orlando is home to six of the world's 10 most-attended theme parks. Walt Disney World's Central Florida operations alone employed 73,000 workers last year. But theme parks pay as little

as \$10 an hour. The National Low Income Housing Coalition recently found that the average wage for renters in the Orlando region was \$16.80 an hour, which would cover \$818 monthly in rent, if following national guidelines that recommend spending no more than one-third of income on housing. But Orlando-area workers earning about \$15 per hour are paying about half their income for the median market-rate apartments. Vacancies are increasingly rare and tenants typically need about \$3,000 for deposits and initial rent.

Chances to build financial stability by purchasing a house have also diminished. In 2009, three of every four houses had owners living in them—far above the national rate of 69 percent at the time, according to the census. Recessionary job losses and foreclosures drove the rate of owners

down to 57 percent by last year. Orlando's home-price collapse—from a median of \$264,000 in 2007 down to \$95,000 in 2011—meant many ordinary people could, in theory, suddenly afford two median-priced houses, according to data from the Orlando Regional Realtor Association. But cash investors and equity groups quickly controlled the market at its depths (with a new wave of landlords buying foreclosed-on houses to rent to newly arriving families and those who lost their homes and ruined their credit on defaulted mortgages). Since then, the metro area has regained a share of homeowners but still lags behind the national rate of 64 percent, so fewer residents are building equity, and more face a future of rent increases that outstrip wage increases.

The housing gap became most evident this year with the opening

of Pendana at West Lakes, a two-story complex of siding-clad apartment buildings. More than half its 201 units had subsidized rents, charging just 30 percent of tenants' income for a handful of apartments. For other government-backed units, one-bedrooms rent for an average of \$593, and rent is \$850 for market rate in this blighted urban pocket. Months before it opened in May, demand swelled, with inquiries from more than 8,000 prospective tenants—or about 40 families vying for each apartment. In comparison, median regional rents of about \$1,300 rose 7.5 percent during the last year as wages grew just 1 percent. The public/private development group that launched Pendana recently halted applications while it works on plans to expand with additional phases.

Just down the street from

Disney's Animal Kingdom and the site for a new Margaritaville Resort, a young mother stands on the balcony of Backlot Apartments. The former Travelodge motel was built during Walt Disney World's infancy in 1973, and the 300-unit, six-building complex sold last year for \$5.3 million. The property is currently being converted into efficiency apartments, some already renting at \$750 per month. Faded billboards clutter the nearby stretch of U.S. Highway 192. "It's better than being homeless," says Eliza Santos, 29, a Puerto Rican hurricane refugee who works at the front desk of an adjacent hotel. "I have found a lot of help for my kids. Really, to be here, it's so amazing." She says she may have to return to her ravaged island but would prefer to stay here because she finds her children's public

school teachers so supportive—a recurring sentiment among those who fled after Hurricane Maria and now hunt for permanent housing in the Orlando area. Four dozen families are currently living in the repurposed motel, and another 96 are on a waiting list for units set for completion in the fall.

Backlot's small apartments may not be ideal for families, but Santos has tried to make the most of it. Inside her clutter-free studio is a bunk bed for her two children and a queen bed she shares with her longtime boyfriend. They have a one-wall kitchenette and a bathroom Santos decorated with a plume-filled vase to match the shower curtain. Renovations include fresh paint, kitchen counters, sinks, refrigerators, and microwaves. A security gate and improved outdoor lighting help safeguard this neglected corner of

the region.

"We require first and last month's rent, and the tenant needs to be working," says Mark Vengroff, whose family business buys and redevelops motels throughout Florida and beyond. "There are people we take a chance on." Backlot is home to a wide variety of tenants—nurses, other hospital employees, and theme park workers, says Vengroff. In addition, the local school board directs homeless families to find housing there, and FEMA sent Hurricane Maria evacuees, before ending the subsidies in September.

Throughout the region, even young professionals increasingly lack the resources to become owners and look to nontraditional housing solutions. Two years ago, Caitlin Dineen purchased a 1,500-square-foot suburban house



A Travelodge motel on U.S. Highway 192 is being converted into the Backlot Apartments, to provide efficiency housing for working-class renters.



Skyrocketing costs have led residents to consider alternative housing options like RVs and “park model” mobile homes like these at the Sherwood Forest RV Resort.

for \$175,000. After a divorce, she sold it last year for \$190,000 but then found limited options for a place to call home. “The market has only gotten more expensive here in Central Florida, and I would have had to compromise a lot,” says Dineen, 32, an administrator at the Orange County Convention Center. “I thought about an apartment but, honestly, I couldn’t afford it even with my pay raise.” Instead, she purchased a new, 450-square-foot “park model” mobile home in the Sherwood Forest RV Resort. Most residents are twice her age and many come for just the winter. Dineen said she paid about \$50,000 for the light-filled unit, which has a loft bed, bathroom, and small kitchen. “It feels like a tiny house,” said Dineen, who tossed most of her belongings. “I don’t feel like I’m missing anything.” Even though monthly costs are manageable, she’s unlikely to achieve savings that would help with a down payment or rent deposit elsewhere.

Orlando’s spiraling lack of affordable-housing options has politicians, nonprofits, and businesses looking for answers. Regional leaders recently com-

pleted a series of housing summits and proposed modifying land-use for more density. They seek to increase the number of unrelated people who may reside together and reduce parking requirements so developers can pass along reduced rents that reflect lower land-acquisition costs.

The Central Florida Foundation, a local philanthropic organization, plans to create a land trust, which would shave costs because residents would pay only for the structure on sites held by the trust. In Orlando’s pricey Winter Park area, the Hannibal Square Land Trust reclaimed a gentrifying neighborhood by building small, cottage-style Florida-vernacular homes so that longtime residents could afford to stay. Near the tourist corridor, Osceola County planners point to a “missing middle” of housing types that falls between traditional homes and apartment complexes. They want to change the zoning rules to accommodate granny flats and garage apartments.

And one Osceola nonprofit is exploring construction of a four-story rental community with as many as 256 units, using shipping containers on 5.5 acres of donated

land. Plans are in early stages as Bumpus and Associates, an architecture firm in nearby Celebration, develops the design, says Mary Downey, executive director of the nonprofit Community Hope Center. “I like the idea of being a good steward of the environment and upcycling,” she says of the scheme for containers as building blocks.

West of Orlando, ENB Architects of Jacksonville is working with a partnership of nonprofits and the government on the Villages at Mercy Drive apartment complex, for low-income tenants. The four-building development will draw on the Urban Land Institute’s healthy standards to provide space for a food pantry, community garden, fitness path, computer use, and jobs fairs. “It’s very much about supporting the whole person,” says Tom Norman, principal of ENB.

Orlando-area governments also are eyeing inclusionary zoning, which calls on large-scale residential projects to include a percentage of units to be designated as affordable. While sometimes unpopular with developers, the model has added below-market-rate housing in Sarasota and other

parts of Florida.

Despite the ideas and efforts, though, Orlando’s affordable-housing shortage is likely to become more severe. Work has started on just 15 percent of the 70,000 houses and apartments needed by 2021. And long-term solutions have been further stymied as the state has redirected much of its affordable-housing trust fund over the last decade to pay for general state operations. Last year, for example, part of it went to school safety after the mass shooting at Parkland.

Near downtown Orlando, Pendana was funded with tax credits. The next phase, which includes 120 low-income units, is set to start in the fall. But credits are limited geographically and cover only about 110 units annually in each designated county, notes Robert Ansley, president of the Orlando Neighborhood Improvement Corporation. “Good Lord,” he says, “We have that many people move here every day.” ■

Mary Shanklin is a freelance journalist, specializing in real-estate coverage, whose work has appeared in USA Today, the Chicago Tribune, and the Orlando Sentinel.

There Goes the Neighborhood

Can gentrification improve urban communities without pushing out longtime residents?

BY JAMES RUSSELL

A PLAIN, one-story, 1890s wood house of little distinction, barely large enough for a couple and their two children in Seattle's Ballard neighborhood, now brings daily offers of \$1 million to its owners. It is not for sale. But enormous wealth accumulation in the once-affordable city has opened up a growing gulf between the tech class—whose high earners can spend \$1 million on an 1890s box—and middle- and lower-class earners, who are living in the same economy of stagnant wages as the rest of America.

A recent McKinsey report on Seattle homelessness found that the supply of housing for those earning around the median income had halved just since 2011. Bill Rumpf, the president of affordable-housing developer Mercy Housing Northwest, describes the low-end rental market as “brutal,” with many people just a health crisis or costly car repair away from eviction.

For decades, cities sought investment to revive blighted streets and bring economic activity back to decimated neighborhoods. Now many urban neighborhoods fear that new public investment or catalytic development will draw real-estate developers, and they will get pushed out—victims of gentrification, not its beneficiaries. Where cities have prospered and real-estate values soared, designers and policymakers are looking for ways to attract needed investment without displacing longtime lower-income residents.

“We find the questions around gentrification very challenging,” says Brian Phillips, partner at Philadelphia's Interface Studio Architects (ISA). The firm's efforts to bring affordable new development to the Fishtown neighborhood turned out to attract “hip-



ster interest”—and that drove up prices. The architects' 100K Houses, designed for developer Postgreen Homes, were meant to demonstrate that inventive architecture and construction could deliver a 1,000-square-foot house for \$100,000. “Within months of completion, others advertised homes ‘near the 100K Houses’ at higher prices,” says Phillips, making replication of the model impossible. “We’ve thought about doing quieter buildings, rather than a design piece that says a new market is around the corner.”

How did gentrification turn into a losing proposition for low-income neighborhoods?

Though gentrification is often discussed as developers buying housing low to sell high, it does not operate in a vacuum but reacts to larger market forces: more people who desire walkable neighborhoods, with charm and character, close to jobs. Such urban neighborhoods appeal to money-strapped younger people as well as empty-nesters who enjoy city life and don't want to depend on a car. And dense neighborhoods work for low-income earners if jobs are accessible by mass transit.

The growing market for such neighborhoods—the classic gentrification magnet—is colliding with

the reality that there are not enough of them in cities around the country. The scarcity attracts more affluent gentrifiers, bids up prices—and displaces long-term residents. In New York, nearly two-thirds of the homeless population in shelters are families—many of them forced out of their homes by rising rents as waves of gentrification crash over formerly affordable neighborhoods.

Though this story is repeated in the coastal hubs of global wealth, gentrification has the power to displace in less likely places. Young people have been flocking to inner-city neighborhoods in Atlanta for their pleasing scale and

cozy cottages and bungalows; in recent years, the city's population has grown faster than the surrounding suburban counties—a reversal of the historic norm. The partly built 22-mile urban BeltLine linear park touches dozens of neighborhoods, both rich and poor, as it circles downtown, and has been spurring redevelopment—and displacement.

Atlanta remains a relatively inexpensive big city, partly because of its high percentage of people who live in poverty (25 percent) or not far above it. One-fourth of renters are regarded as “extremely cost burdened”—spending more than half their income on housing—and are vulnerable to being pushed out even if rents rise only modestly.

But there is a growing consensus about how cities can manage development pressure for everyone's benefit.

INVEST IN LOW-INCOME COMMUNITIES

Cities can support low-income areas by helping owners keep their houses in good repair and strengthen the skills and earning potential of local communities.

Philadelphia's nonprofit Healthy Row House Project successfully advocated for greatly expanded financial assistance from the city to owners who need essential repairs like new roofs, windows, or furnace replacements. It also wrote guidelines for people to maintain the historic character of their row houses, many of which date to the early 19th century.

Although several cities have repair programs for older houses, “getting to scale is the problem,” says architect Kiki Bolender, a Row House Project cofounder and principal of her own firm. The Project's advocacy helped pass a \$100 million bond issue in 2017 to support renovations. It provides \$60 million in grants for very low-income households “who can't float \$10,000 in debt.” The rest supports loans to households with moderate to middle incomes, many of which have been denied private-market funding.

The Hunter's Point South Project (opposite), the 100K Houses (bottom), and a nonprofit's efforts to repair row houses in Philadelphia (right) are part of an effort to maintain affordable housing in the U.S.

Fixing dilapidated housing has a deep impact on those who are already vulnerable. “We linked row house repairs to health,” says Bolender, “because a ridiculous number of African-American kids are hospitalized for asthma, and the risk factors are in the house.” Seniors and children are most susceptible to maladies related to leaks, peeling lead-contaminated paint, pests, leaky plumbing, and dilapidated heating systems.

Cities also can support neighborhoods by investing in the local schools, libraries, clinics, and other resources that help job readiness, encourage collaboration, and strengthen community bonds. The people who have kept neighborhoods together over decades of disinvestment are a powerful resource who have a claim—too often overlooked—on the future. “What is the intention for the people who have lived in these neighborhoods for 40 years?” asks LaShawn Hoffmann, an Atlanta-based community-development consultant. His answer is to help bring jobs to



people in neighborhoods in transit-starved Atlanta. Last spring, the Annie E. Casey Foundation broke ground on Pittsburgh Yards (named after its neighborhood), a mixed-use development on a 31-acre site that will provide work spaces, designed by locally based Stevens and Wilkinson Architects. They will rent at “accessible” rates for approximately 100 businesses, with a focus on local hiring and local workforce development.

SUPPORT SMALL LANDLORDS

The Row House Project discovered many people they called “inadvertent landlords,” according to Bolender, because they had inherited a house, or they take care of houses lived in by extended-family members. There are few aid programs for small landlords, who often must overcome high borrowing barriers. “Small landlords can do a lot with \$40,000 or less,” Bolender notes. “A new house is going to cost at least \$350,000.”





With a unique facade and modern interiors, the Schermerhorn in Brooklyn was designed to instill its formerly homeless residents with a sense of pride in their lodgings, says architect Susan Rodriguez—and it enhanced the neighborhood.

INVEST IN PUBLIC TRANSPORTATION

Doing a better job of connecting lower-income neighborhoods to job-rich areas expands opportunities for long-term residents to move up the income ladder, helping them stay in neighborhoods that attract investment. Hoffmann says poorer neighborhoods seek the park and trail amenities the BeltLine will bring, “but we want what park promoters initially promised: 5,800 units of affordable housing and light rail lines” along the old rail rights of way. The affordable units have been slow in coming, and the transit seems a distant dream. Ample public transit also expands access to more neighborhoods and therefore to more housing, thereby reducing price pressure.

INCREASE THE SUPPLY OF AFFORDABLE HOUSING

New units are most important when growth is driving prices up and the private market fails to serve the demand of both lower- and middle-income households. New York has upzoned large

swaths of the city to accommodate denser development, with incentives to include units for lower incomes. The two-tower Hunter’s Point South project, designed by SHoP Architects, offers 20 percent of its 925 apartments as low-income rentals, with the rest “moderately” affordable, i.e., somewhat below market.

The challenge for architects is to work with this new larger scale while maintaining light, air, and views within neighborhoods already heavily built-up. SHoP’s towers are staggered to make the most of stunning waterfront vistas and minimize the impact on neighbors. But the development attracted 93,000 applications, indicating just how inadequate the supply is.

In Philadelphia, ISA seeks marginal lots to develop because the lower land cost can reduce the sale price, according to Phillips. “We did a 1,100-square-foot house on a 12-foot by 29-foot lot” by building five stories. “We can unlock ways of living that are desirable, though they can present some inconveniences.”

REDUCE LAND-USE REGULATIONS

Changing zoning laws can lower costs and increase housing supply. The worst regulations keep out middle- and lower-income residents: large-lot/large-house requirements; strictly limiting or prohibiting multifamily projects; prohibitions against accessory units; and approval processes that are protracted and costly. Peeling back such regulations isn’t easy, because many affluent neighborhoods passionately disguise their exclusionary agenda by citing “quality of life”—and have the means to make politicians listen.

Unfortunately, the federal government, where the greatest resources could be tapped, has failed to play a constructive role in reducing displacement and homelessness.

Only about one-fourth of households eligible for any federal housing aid receive it. Congress has failed to increase either affordable-housing subsidies or the vouchers—called Section 8—that help families pay

rent. In spite of the growing need, financing for affordable-housing construction is declining because the Low Income Housing Tax Credit, an essential tool, has been rendered all but worthless by the Republican tax plan passed last year: it lowered tax rates so much that the banks and wealthy individuals who used the credit to reduce taxes no longer need to do so. The tax plan also treats real-estate investors generously, which creates incentives to push up real-estate values, because those gains are taxed at lower rates than other investments.

The collapse of consensus on federal financing of surface transportation some years ago has prevented the creation of funding for diverse modes of transit that metropolitan areas need to help attract more investment in housing. Ample supply of low-cost transportation that links jobs to needy neighborhoods is essential to producing the broad affordability that reduces displacement as a product of gentrification.

Design plays an important role in bringing about neighborhood acceptance of low-income or homeless housing. An award-winning project called the Schermerhorn, in Brooklyn, New York, by Susan Rodriguez, former partner at Ennead, enlivens the street front with a ballet school, and also includes a community room to encourage connection between tenants and the neighborhood. The architecture helped melt local resistance to the presence of formerly homeless individuals (116 units) and low-income working people (101 units).

Gentrification and displacement too often have been treated as ultra-local problems, when solutions at scale must ultimately reckon with the human needs of existing residents and the forces—and failures—at the city, regional, and national levels. ■

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Innovative Approach to Housing the Homeless

Rosanne Haggerty, a longtime entrepreneur for social causes, has developed new strategies for a mounting problem.



An important leader addressing our nation's homeless problem, Rosanne Haggerty founded Common Ground Community in New York in 1990. The nonprofit housing-development organization built thousands of affordable and supportive apartments through an approach that brought together architects, health and mental health providers, community groups, and public and private investors. Owing to her accomplishments, Haggerty was named a MacArthur Foundation Fellow in 2001. In 2011, she left Common Ground to start Community Solutions and address the larger problem of fragmented local housing and social-support systems. Through large-scale initiatives including the 100,000 Homes Campaign and, now, Built for Zero, Community Solutions assists cities or counties in coordinating resources and efforts of multiple stakeholders to make homelessness rare, brief, and nonrecurring. The organization's innovative approach creates accountable housing systems and has already eliminated chronic or veteran homelessness in 11 places. More than three dozen other communities are seeing steady improvement.

RECORD'S Cathleen McGuigan and Suzanne Stephens talked with Haggerty about the thinking behind her strategies for reducing homelessness in America.

In such a booming economy, why is homelessness spiking and affordable housing reaching a crisis in many U.S. cities?

Homelessness is not spiking everywhere, but I would say it's the failure of housing policy and practice to adapt quickly to changing demographics and dynamics. Our work is focused on shifting mindsets about the nature of the problem, and building skills in communities that enable them to solve a problem that is not static or uniform in the way it is experienced by individuals and families, and requires disciplined coordination of effort and resources. That coordination calls for accurate and timely information on what is actually happening—does our community have fewer people experiencing homelessness this month than last month? We now have the evidence that homelessness is a solvable problem. But communities need to think about housing as a system: how all the parts—zoning, land tenure, allocation of benefits, regulation of dwelling-unit types and use, plus code enforcement—can better fit together. Much of our work concentrates on helping communities learn how to organize themselves and use practices from other industries to encourage collaborative problem-solving. Most of all, an accountable group in each community needs to know who is homeless and who is on the verge of homelessness. They could bring the numbers down by aligning policies and practices to support connectivity between local agencies and various stakeholders.

What are some places where such connectivity is working?

We could look at Bergen County in New Jersey and Montgomery County in Maryland. Both have

very high-cost housing markets, yet both have achieved zero chronic and/or veteran homelessness. In the case of Bergen County, they've understood how to align all their related housing policies: they learned who was really trapped in homelessness (the chronic) and were able to house everyone. They learned who had a less severe housing need, and had a system in place that could respond quickly. They know who has a disability that needs to be addressed with supportive services along with housing assistance. They know what units are available, where the vacancies are. Both these counties are very disciplined about tying these pieces of demand and supply together, and they are addressing the housing crisis in a transparent, accountable, comprehensive, and connected way.

What are the housing options in those communities for somebody moving from homelessness to a dwelling?

Homelessness is a term we might want to think about retiring. It's like saying "sickness." It does not tell you enough about what is going on, and there are many different manifestations. Various communities figured out that a significant percentage of homeless individuals and families have something else going on in their lives—maybe a health-care crisis or some legal issue. People need well-informed assistance about their options in addressing those problems. Then they might solve their housing situation largely on their own. Other households experiencing homelessness can be helped with essentially a one-time financial reset, perhaps a rent subsidy for a few years.

What do you do about providing housing to the homeless in a high-cost market?

I'll share one example of the local problem-solving required. We just opened an affordable 66-unit apartment building this year outside Denver, a city with high housing costs. The metro Denver area has just over 300 homeless veterans remaining to be housed, with a less than 1 percent vacancy rate in rental housing. We couldn't find landlords willing to rent to these veterans, all of whom had rental subsidies and vouchers. So we bought an existing building, by putting together a group of socially minded investors. For a 3 percent return, they'll get their capital back in seven years—which enabled us to move very quickly to purchase the building before speculators arrived.

You have suggested that corporations should act as private investors in housing.

In Seattle and San Francisco, there is a desire to tax the tech employers for having altered the housing market. Many big companies are sitting on a lot of cash—instead of taxing them, why not convince them to invest in either preserving or building affordable housing? If you can cap returns at a workable level, it would be possible. These employers are stakeholders in cities and towns that are overwhelmed by homelessness and the stress of high housing costs on those with places to live. Their creativity and resources can be tapped in new ways, once communities take collective responsibility for this situation.

We're accustomed to affordable-housing projects financed through low-income housing tax credits that take years to develop

and require multiple funding sources. We have used these programs ourselves, to build projects like the John and Jill Ker Conway Residence in Washington, D.C. The architects DLR Group/Sorg designed the 124-unit complex, which includes 60 apartments for formerly homeless veterans as well as low-income residents. It's a fantastic building, located near the U.S. Capitol and the Washington Monument. But investments from new sources could fast-track the production of new affordable housing, and remove the friction and inefficiency of the tools we've been using.

You have said hospitals and other institutions are becoming stakeholders. For example?

Kaiser Permanente announced a \$200 million housing-investment fund earlier this year. United Healthcare is investing in housing for high-cost patients who are homeless in their markets. Trinity Healthcare has an initiative to support affordable housing in targeted areas. These systems are seeing that stable housing is crucial to health.

Another interesting thing we're seeing is that as health care shifts to outpatient services, and there are more consolidations of hospital systems, old hospital real estate becomes available. A concerted practice of looking to these sites for affordable housing makes sense. This is also true of religious properties. As parishes consolidate, churches close or require less space due to changing demographics, they can continue serving their communities by making their properties available for affordable housing.

How does Community Solutions differ from Common Ground?

During my 20 years at Common Ground, we built lots of affordable and supportive housing, but homelessness in New York City continued to rise. It was clear that new housing alone, or being one organization running good programs, was not having much of an impact on the overall problem. We



Community Solutions spearheaded the John and Jill Ker Conway Residence in Washington, D.C., designed by architects DLRGroup/Sorg, with supportive/affordable units.

no longer believed the rhetoric that it was just a matter of resources. We thought a new way of understanding the situation was needed. We were fortunate to be introduced to an organization called the Institute of Healthcare Improvement, and through them to grasp systems thinking: homelessness is a symptom of broken housing and support systems. Community Solutions establishes teams of organizations with critical housing and support resources; it works with communities that are willing to hold themselves accountable for results in reducing and ending homelessness, and analyzes and changes policies and practices they have in place that contribute to homelessness.

I can't say enough about the communities that have moved past hand-wringing and blame and are working as teams, not competing organizations, to bring about reductions. Our Built for Zero team helps these communities create the data infrastructure

to support collaboration. It provides training and coaching in data analytics, human-centered design, and in developing new housing models. It also enables learning from peers across communities by regularly bringing them all together and by documenting and sharing practices that are working. This is a team sport at every level. Each community needs at the very least the mayor's office, the Veterans Administration, the housing authority, and the consortia of not-for-profit service providers working toward the same goal and holding each other accountable. Once Built for Zero communities have a clear grasp of the type of housing units needed to reach "zero," Community Solutions can develop new affordable housing, plus finance models.

What is the process by which Community Solutions helps put these projects in place?

There are three phases to Built

for Zero: The first phase is all about getting person-specific, real-time data together on homelessness in a community. It's a process of building a clear, comprehensive picture of what this crisis looks like, and helping organizations work as a team. The second phase is using that data to start bringing about reductions, by bringing in successful ideas from other communities and experimenting with new strategies in short cycles to see what works. There is no one solution for every community or every person. You need disciplined, constant testing of strategies targeted at specific problems in the local housing system for measurable progress. The last phase is sustaining the elimination of chronic and veteran homelessness while expanding this system to encompass all those experiencing homelessness in the community.

What about shelters and temporary housing. Do they work?

Every study of this question supports what we are seeing across the 70-plus communities that have been part of Built for Zero: that the key to ending homelessness is helping people keep their housing or get back into stable housing quickly. That's probably what you most need to know about homelessness. Shelters and temporary housing should never be a community's primary investment: it becomes an expensive industry while not solving homelessness. It's a roughly \$2 billion-plus annual industry in New York City, for example—and homelessness is at an all-time high there.

Homelessness mirrors income inequality and racial inequity, and demands attention for those reasons alone. Proof of what works is now emerging. It clearly is a leadership issue at every level of government—one that needs to challenge conventional approaches, require a team-based system, make targeted investments in housing, and provide rental subsidies rather than shelters. Citizens should expect no less. ■

ON THE BOARDS

BY ALEX KLIMOSKI

Amid the housing crisis, developers and architects are seeking out contemporary prototypes for housing that are not only affordable and accessible but that also stimulate local economies and enhance community connection. From the South Bronx, one of New York's most rapidly evolving areas, to Bentonville, Arkansas, which is projected to experience a 75 percent population boom over the next two decades, the following upcoming projects represent a range of single- and multifamily, supportive, and affordable residences designed to revitalize their surrounding neighborhoods.

The Bronx, New York



The Peninsula WXY

The site of a former juvenile-detention center is being transformed into a five-building mixed-use development with 740 affordable housing units and over 100,000 square feet of commercial and retail, community, and light-industrial facilities. When completed in 2024, the nearly five-acre site, once a symbol of New York's broken justice system, will be connected with its surrounding neighborhood and serve as a new urban model for a nexus of health and creativity, with a food-production hub, wellness center, greengrocer, artist studios, and a preschool. The project, which is scheduled to break ground in January, will be completed in three phases.



1490 Southern Boulevard Bernheimer Architecture

Two miles north of the Peninsula, in the Crotona Park East neighborhood, an 85,000-square-foot senior-housing project will also break ground in January. The 10-story building will be completely affordable; 30 percent of the units are to be reserved for formerly homeless tenants. The ground level will serve a diverse range of community functions, with spaces run by the Jewish Association Serving the Aging as well as the LGBT Network. Located next to an elevated subway line, the design incorporates double-glazed windows to mitigate noise while maximizing daylight. Residents can get more sun at an outdoor communal area on the eighth floor. The project is slated to open in 2021.

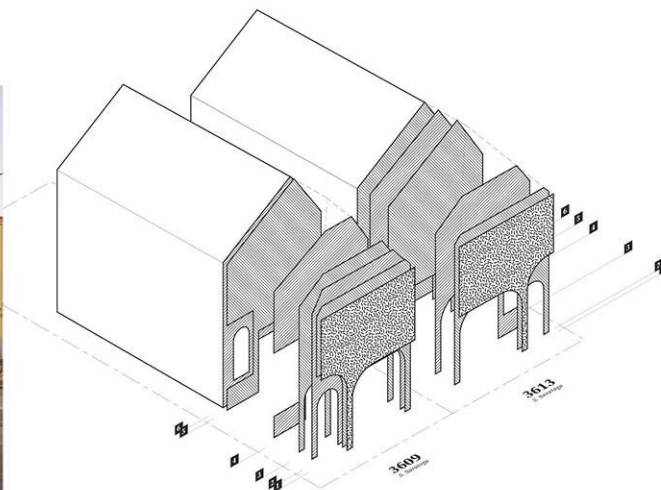


Chicago

La Casa Norte Pierce House Landon Bone Baker Architects

A new supportive-housing facility and community center is currently rising in Chicago's Humboldt Park neighborhood. The 51,000-square-foot building will provide 25 affordable housing units for at-risk or recently homeless young adults and families, as well as access to resources such as a nutrition center, a teen drop-in center, a teaching kitchen and café, and other social services. The project, which opens in December, is on track for LEED Silver certification, featuring edible gardens for on-site food production, multitiered green roofs, and a solar thermal system.

New Orleans



3609-13 S Saratoga Office of Jonathan Tate

This 3,800-square-foot double house will be the third installment of the Starter Home* initiative launched by Office of Jonathan Tate. Formulated as a model alternative to conventional funding processes aimed at producing affordability, the program homes in on overlooked opportunities to expand the market. The Saratoga project is the first crowd-funded real-estate equity in the United States. Informed by its immediate urban context, the 3-bedroom house, located on a nonconforming lot in a transitioning neighborhood, expands on the traditional two-bay and makes use of fiber-cement siding, keeping material costs low to increase financial accessibility. Construction starts this month and will wrap up next June.

Bentonville, Arkansas

Housing NW Arkansas Site 1 Digsau

This winning entry for one of five sites, all part of the Housing Northwest Arkansas competition—an initiative by the University of Arkansas's Fay Jones School of Architecture and Design to come up with plans for mixed-use attainable housing—comprises a range of building forms inspired by regional vernacular, arranged to mimic the buildings on a traditional Ozark farmstead. By stacking structures and landscapes, the nine-acre plan—a mix of single-family houses, multistory mixed-use buildings, and open space—creates a contextualized low-cost medium-density residence solution, with the capacity for inexpensive wood-frame expansion over garages and commercial spaces. The project is expected to break ground in summer 2019.



Housing NW Arkansas Site 2 Kevin Daly Architects

The design for Site 2 of the competition features low-rise housing in a pinwheel arrangement that prioritizes open space and community-building. Prominent pedestrian and bicycle pathways help to integrate it with the existing landscape and enhance the neighborhood. Live-work spaces, arts retail, incubator offices, and local corporate offices will be part of the five-acre development, which is slated to begin construction in January. Pending the completion and success of the first two plans, the remaining three sites are also expected to move forward.



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PANEL

International Models of Urban Housing

Here in the U.S., we've become used to seeing cutting-edge designs for luxury condo towers, but the same can't be said when it comes to most affordable housing. Record searched the globe for innovative architectural and social models that offer well-designed living spaces to a variety of income groups.

- 108 **Drivelines, Johannesburg, by LOT-EK**
- 114 **Dujardin Mews, London, by Karakusevic Carson and MaccreanorLavington**
- 118 **Future Towers, Pune, India, by MVRDV**
- 124 **Pelleport Social Housing, Paris, by Bruther**
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BASAREN BLOCK, STOCKHOLM
BY WINGÅRDHS



DATELINE: Johannesburg ARCHITECT: LOT-EK MODEL: Shipping Containers

BY KAREN EIKER
PHOTOGRAPHY BY DAVE SOUTHWOOD

Located in the historically, culturally, and economically complex Maboneng precinct in downtown Johannesburg, Drivelines is the largest residential shipping-container development in South Africa, where the type is becoming a popular housing alternative for its affordable and sustainable attributes. The building offers unique rental accommodations while celebrating the beauty of existing objects and everyday activities through its carefully considered design.

Developed by South African company Propertuity and designed by

New York-based architecture firm LOT-EK, the 75,000-square-foot project is situated on Albertina Sisulu Road, a prominent arterial that connects the east and west regions of the metropolis. Over the last decade, Maboneng has emerged as a cultural and tourist destination, with Arts on Main and Main Street Life creative hubs the center of a variety of cultural, retail, leisure, small-scale commercial, and mid-income residential offerings. But the precinct has often been criticized as an attempt at gentrification that has excluded the existing community of Jeppestown, an economically disadvantaged area of light



industry, characterized by urban decay.

Jonathan Liebmann, Propertuity founder and visionary behind the development of the Maboneng precinct, explains, “Four years after we started work in Maboneng, we decided to focus on delivering affordable residential accommodation in anticipation of market demand. In Maboneng, the average rental has been about the equivalent of \$330 per month, but we foresee this decreasing to around \$230 over the next couple of years.”

The site, previously home to a small auto-mechanic shop called

CONTAIN YOURSELF Drivelines is the largest residential shipping-container development in South Africa (opposite). Generous walkways act as balconies (above).

Drivelines, plays a crucial role in the development of Maboneng, since it extends the northern boundary of the precinct beyond the busy Albertina Sisulu Road. “The primary design informant was the strange triangular shape of the site, with frontage onto a major thoroughfare,” says LOT-EK principal Giuseppe Lignano. “It’s a very strong location, and we had the opportunity to create a backdrop for Maboneng that would function as a billboard for the east and west approaches.”



As a studio, LOT-EK embraces a sustainable approach to construction through upcycling, with an extensive portfolio worldwide centered on the reuse of shipping containers and other industrial objects. This was why Liebmann approached LOT-EK founders Lignano and Ada Tolla.

“As we started working on the design, we immediately thought about combining the residential component with something more collective,” notes Tolla. “We felt that Drivelines could contribute to the surrounding community through a retail component at ground level, which forms a covered portico with benches along the busy street edge and provides a threshold that connects the building to the city. This sense of collective space could then be carried further by hinging the two arms of the building in response to the triangular shape of the site to create an internal courtyard space.”

LOT-EK was motivated by the qualities of light and space and the idea of silence against the noise of a busy road, opening the units to the internal courtyard, and also by the constraints that come from using containers. “We wanted to defy the narrowness of the container, to create wider and more gentle spaces for residential use,” says Tolla. They achieved this by designing two living units—which range in size from 400 to 500 square feet—out of one rectangular assembly of six containers, with a central core for bathrooms, and windows opening to the left and right, allowing the diagonal bracing of the containers to dictate very simple and efficient fenestration cuts in the corrugated container walls.

Designing to the dimensions of containers provided unexpected opportunities to include communal spaces. The generous width of the walkways between the units and the courtyard generated transitional semiprivate hybrid spaces, and the junction of the building’s two arms accommodates stairs and an elevator at a spot that provides narrow framed views and informal meeting points for residents.

As a first for the South African market, the building was not without its challenges. Local companies that supplied the containers did not have the capacity to transform the containers before delivering them, “so we decided to build out the containers on-site. We had not done that before,” says Lignano. “It was a tough process, but everybody pulled together to make it work with a lot of pride, passion, and commitment.”

“The construction process had its own efficiencies,” Tolla adds. “By handling the metalwork on-site, a lot of cut-out material could be reused for reinforcement. Even the little sculptures in the courtyard are the glori-





credits

ARCHITECT: LOT-EK — Ada Tolla, Giuseppe Lignano, principals; Sara Valente, project architect

ASSOCIATE ARCHITECT: Anita du Plessis

ENGINEERS: Asakheni, Silman (structural); VBK Engineering Systems, Abbinck Consulting (m/e/p)

CONSULTANT: SevenBar Consulting (project management)

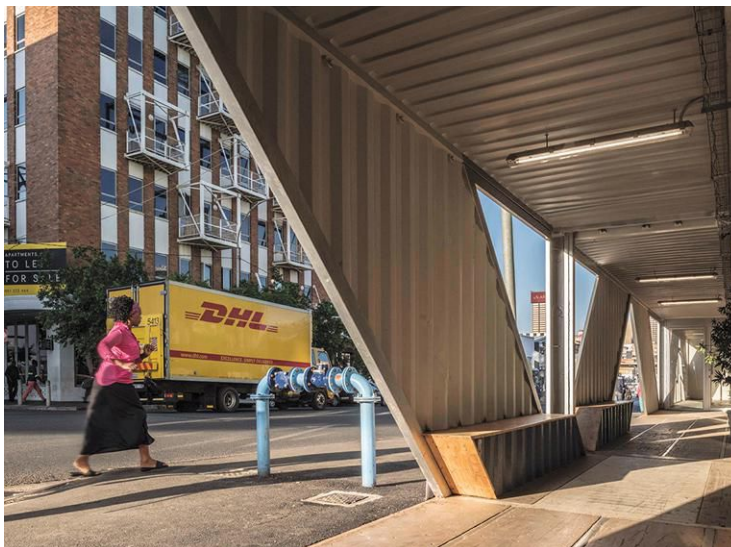
GENERAL CONTRACTOR: Tri-Star

CLIENT: Propertyuity

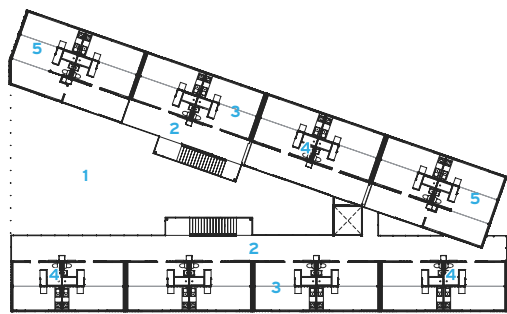
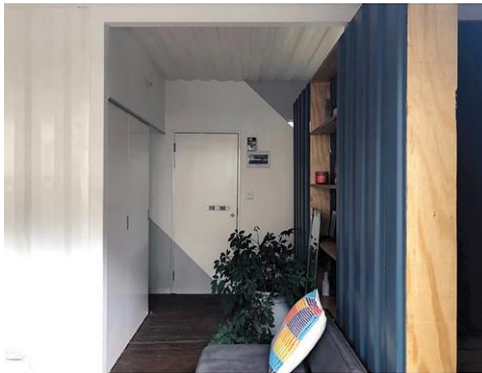
SIZE: 75,000 square feet

COST: withheld

COMPLETION DATE: November 2017

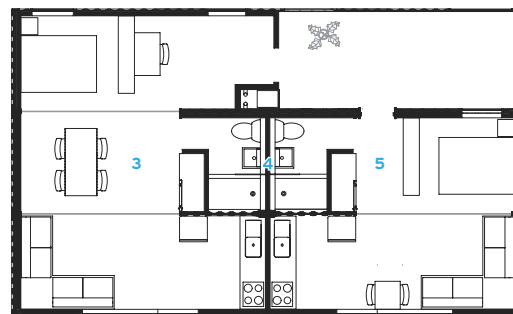


IN THE NEIGHBORHOOD
Drivelines is a towering presence in Maboneng (opposite, top). Its graphic facade serves as a backdrop at the end of a busy road (opposite, bottom). The containers' diagonal bracing dictated very simple and efficient fenestration cuts (above). A covered portico with benches connects to the street (left).



TYPICAL-FLOOR PLAN

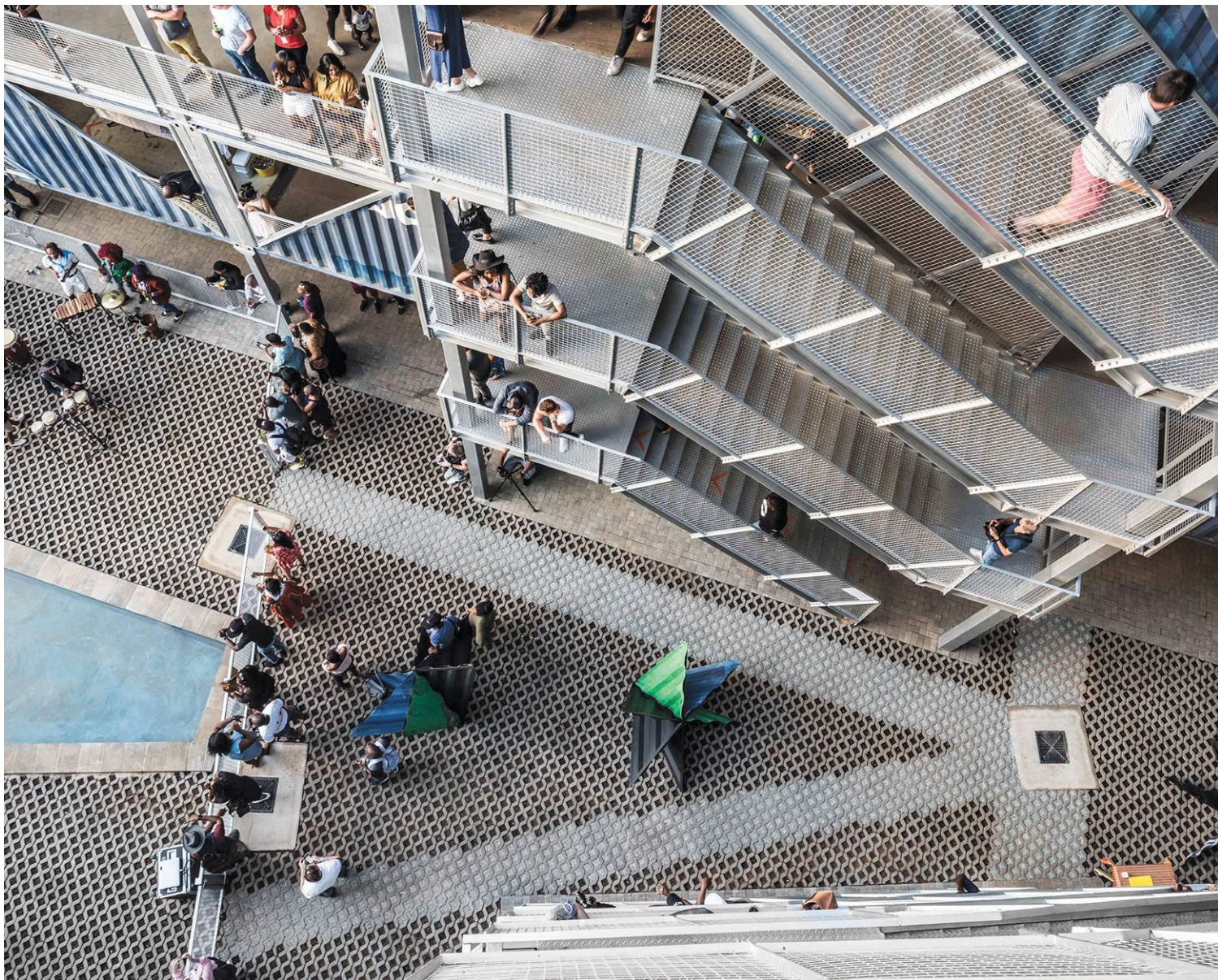
0 20 FT.
6 M.



TYPICAL-UNITS PLAN

0 6 FT.
2 M.

- 1 COURTYARD
- 2 WALKWAY
- 3 STUDIO
- 4 BATHROOM CORE
- 5 ONE-BEDROOM



INSIDE JOB The upcycled shipping containers are transformed into simple dwellings (opposite). Walkways line the triangular courtyard, which serves as a social space for residents (above).

fied leftovers from the window cutouts. We also decided not to paint the facades, but to source containers of the same color for each arm and allow the rawness of the used objects to be expressed.”

LOT-EK collaborated with local architectural professionals Anita du Plessis and Korine Kruger. “One of our biggest challenges was obtaining approval from the City of Johannesburg fire department,” says du Plessis. “We had to prove it was a rational design alternative in a residential building, where cooking takes place, and demonstrate that we were adequately protecting all structural steel elements in the containers.”

“Much of the experience gained on the project can be explored as a model of living for other contexts,” says Tolla. “The concept is completely exportable—from proposing other ideas of beauty and integrating social spaces, to the use of alternative methods and materials that might be more sustainable.”

“South Africa holds a very important place in the world, from a sociopolitical perspective,” says Lignano. “As regular visitors to

Johannesburg, we have watched the evolution of Maboneng and are very proud of this project as a presence in the neighborhood. On a recent visit, it was gratifying to feel that the inhabitants are enjoying daily life in the building. While the original intention was to provide spaces for young people working in the city, we were pleased to see that the studios are flexible enough to accommodate a diversity of tenants of all ages and backgrounds, including young families and retired professionals.”

For Liebmann, the building has surpassed expectations, in terms of both aesthetics and execution. Through its unusual construction methodology, Drivelines pays homage to the industrial nature of Jeppetown and, through its mixed-use and street interface, successfully embeds itself within the urban community. ■

An architect and award-winning journalist, Karen Eicker is a director of the Architect Africa Network.

There can be few clearer examples than this project of how housing architects revisit and reinvent old ideas. This new street of row houses in outer London goes back to 18th- and 19th-century precedents in the shadow of the 1960s towers that they are partly replacing.

British architects have been designing alternatives to high-rise social housing since the late 1960s (see my review of *Cook's Camden* on page 49), in recent years often adopting the form of the high-density courtyard-based development or mid-rise block. Dujardin Mews is different. Designed by architects Karakusevic Carson with MaccreanorLavington, it is a full-blooded return to the idea of the traditional street of attached houses. But unlike some other developments in the UK—especially in rural areas—it is not traditionalist in style.

The north-south street was built on part of a former gasworks next to a railway line in Ponders End, a poor industrial and postindustrial district in the outer North London borough of Enfield. Immediately to the north of Dujardin Mews is the Alma Estate, a large blue-collar social housing project from the 1960s that originally featured a mix of four tall towers and lower buildings. The borough deemed this estate ripe for a 10-year, \$400 million regeneration project. Although much of this has been put in the hands of private developers, the borough decided it would also directly build its first social housing in 40 years and that this should be an exemplar project, to rehouse residents displaced by demolitions on the Alma Estate.

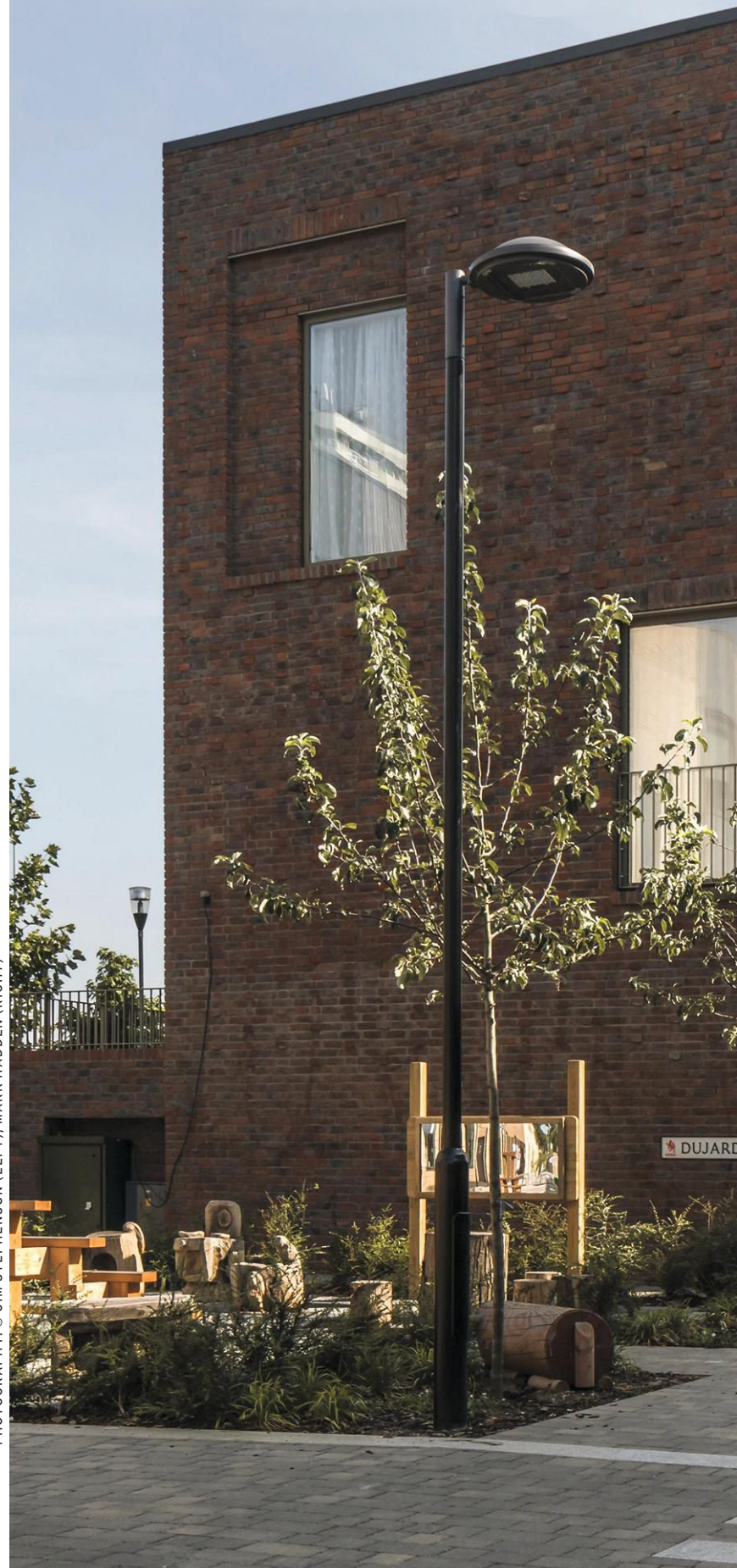
A large new school was built on most of the old gasworks site, leaving only a narrow strip at its western edge for housing. The brief to competing architects envisaged a single row of houses facing the school. But the school made it clear that it was not keen to be observed. In a joint submission, the winning architects proposed instead a double-sided street, achieving this by rotating the house plans on the eastern side 90 degrees, resulting in shallow three-story houses with wide frontages. In place of full-sized rear gardens, a second-floor terrace is provided over a garage in each house on this side, along with a tiny, enclosed ground-floor backyard.

This simple move made a proper double-sided street possible. Measuring 41 feet across, there is just enough space for a roadway,



BRICK HOUSE Window frames are timber faced with powder-coated aluminum on the outside for low maintenance (above). The pedestrian-friendly street features shared surfaces, landscaped areas, and on-street parking (right).

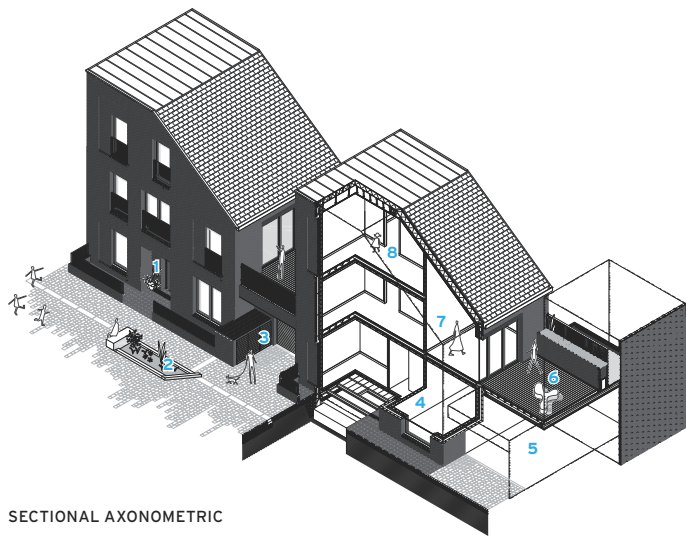
PHOTOGRAPHY: © JIM STEPHENSON (LEFT); MARK HADDEN (RIGHT)



DATELINE: London
ARCHITECT: Karakusevic Carson
& MaccreanorLavington
MODEL: Row Houses

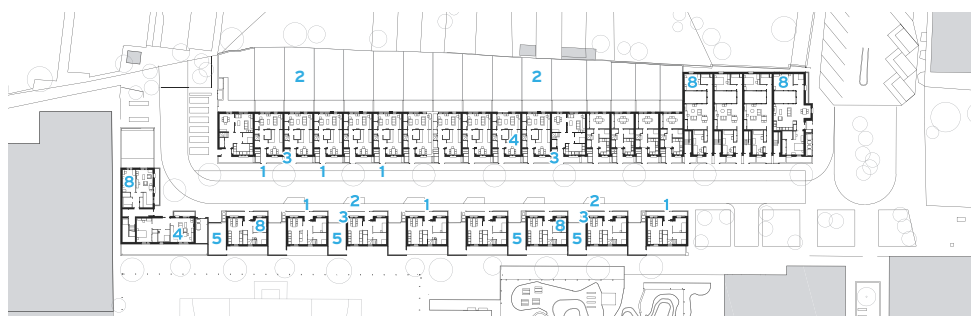
BY HUGH PEARMAN



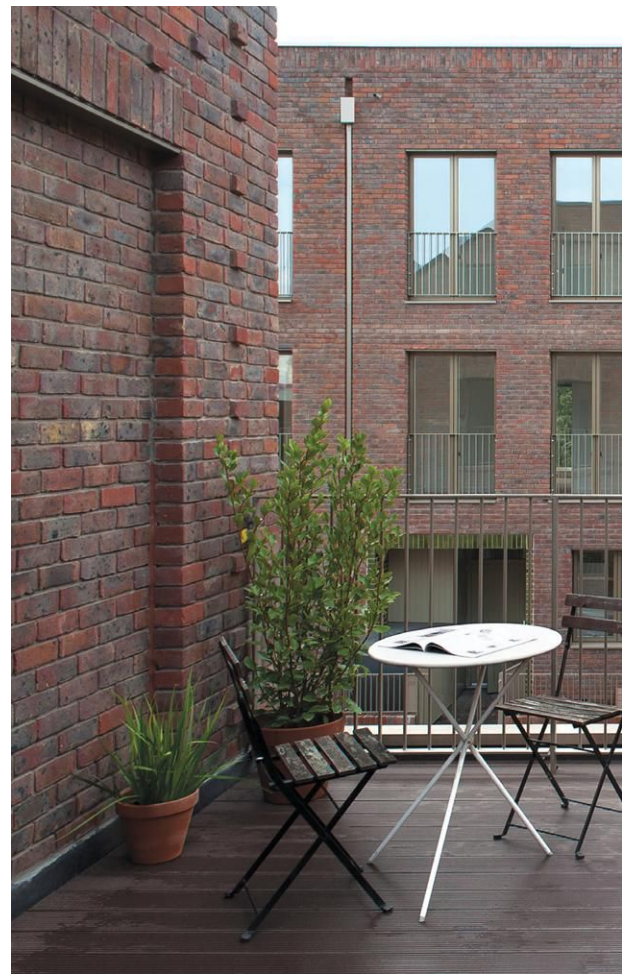


- 1 COVERED ENTRANCE
- 2 GARDEN
- 3 TRASH BINS
- 4 KITCHEN/DINING
- 5 GARAGE
- 6 TERRACE
- 7 DOUBLE-HEIGHT LIVING ROOM
- 8 BEDROOM

SECTIONAL AXONOMETRIC



GROUND-FLOOR PLAN



credits

ARCHITECT: Karakusevic Carson Architects

ASSOCIATE ARCHITECT: MaccreanorLavington

ENGINEERS: Peter Brett Associates (structural and civil); Designbrook (m/e/p)

GENERAL CONTRACTOR: Durkan

CLIENT: Borough of Enfield, London

SIZE: 39,200 square feet

COST: \$9.9 million

COMPLETION DATE: September 2017

SOURCES

BRICK: Freshfield Lane

TILE: Johnson Tiles, Waxman Ceramics

RESILIENT FLOORING: Forbo

ACOUSTICAL CEILINGS: British Gypsum

DOORS: Premdor, Pendle Doors



sidewalks, planted landscape areas, and on-street parking as well as the garages—all in a Dutch-style pedestrian-friendly “Home zone” arrangement of shared surfaces, where cars naturally move slowly and it’s normal to stroll down the middle of the street. A “mews” was traditionally a narrow secondary street with small servants’ dwellings over coach houses and stables. Here, however, internal room dimensions are impressive: when you walk in, these houses feel spacious and full of daylight despite the limited fenestration on the school side. Living rooms are double-height, rising to the roof soffits.

Although there are only 38 units in total, the development contains a number of different types, from one-bedroom apartments to four-bedroom houses. The mix is 50 percent social-rented and 50 percent subsidized-sale. (UK “right to buy” legislation allows social-rent tenants to purchase their homes at a discount from market rates after three years of residence, so increasing private ownership is expected.) All are occupied by previous residents of the Alma Estate, who, along with the school, took part in consultation sessions with the architects as the design progressed. Three-story flat-roofed apartment blocks at each end act as visual stops, the one at the south end also turning the corner so as to screen existing industrial sheds. The variety of unit sizes could have made for a fussy aesthetic, but it is carefully controlled, with just enough visual variation.

A more conventional row house type with gardens occupies the west side of the street, while what appears at first glance to be a single block at the northern end is in fact divided, with each of the two architects designing half. The southern part, by MaccreanorLavington, is houses; the northern, by Karakusevic Carson, consists of courtyard apartments

DAY TO DAY South-facing roof pitches feature PV panels (opposite). Some units include a terrace over the garage (above, left). Living rooms rise to the roof soffit (above).

at ground level with duplexes above. At the rear, they are very different. But on the street-facing side, only subtle detail variations give this away. Similarly, MaccreanorLavington designed the houses on the western side of the street and the southern end-block, while Karakusevic Carson also designed the eastern row and acted as executive architect for the whole development. Says Paul Karakusevic, “We like to collaborate with other practices on housing projects, to create distinctive neighborhoods with real character. For Dujardin Mews, the collaboration yielded a street with a variety of frontages and dwelling types that respond to the surrounding context.”

The various designs share a common language of materials—red brick with gray concrete roof tiles and a mix of planted green and zinc flat roofs. Detailing is of a high order, especially the texturing and modeling of brick on end gables, deep window reveals, and, on the western side, green-glazed brick lintels. Construction quality is impressive for a low-energy project that cost approximately \$255 per square foot to build.

Ideally, Dujardin Mews would be just the start of a grid or ladder of such streets, but at present it feels slightly marooned in the midst of all the redevelopment taking place around it. Perhaps anticipating this, the architects designed the street to feel very self-contained and neighborly. This is a totally convincing revisit of a very London human-scale domestic typology: to heal the scars of industry and of failed earlier housing experiments, it deserves to be studied and replicated widely. ■



DATELINE: Pune, India

ARCHITECT: MVRDV

MODEL: Megastructure

BY CLIFFORD A. PEARSON
PHOTOGRAPHY BY OSSIP VAN DUIVENBODE

Borrowing strategies from both Europe and India, MVRDV designed Future Towers to attract a broad range of homebuyers in the rapidly developing city of Pune in western India. The project's bold formal moves—arranging 17-, 20-, and 30-story wings around hexagonal courtyards and punching variously sized voids through the facades—derive from the Amsterdam-based firm's design DNA, and its mix of income groups follows a Dutch model of housing diversity. But the narrow width of the wings and the particular layouts of the 1,068 apartments acknowledge local preferences. The result is an intriguing hybrid that stands out in a progressive 400-acre development.

Located 90 miles southeast of Mumbai, Pune has leveraged its concentration of higher-educational institutions and its role as a leader in India's automobile-manufacturing sector to become a technology hub drawing young professionals from around the country. Its altitude of 1,800 feet and its manageable size of 3.4 million people make it a more comfortable alternative to the country's teeming mega-cities. But, as in the rest of India, the government hasn't been able to build the modern infrastructure needed to support growth. So, in 2005, the state of Maharashtra, which includes Pune, passed legislation to encourage private developers to build so-called "townships" of at least 100 acres. In exchange for tax relief and development rights, the companies must build all of the power, water, and sewer infrastructure, as well as roads, schools, and hospitals needed for residents.

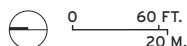
Pune-based City Corporation Limited began constructing Amanora Park Town in 2007. Set on what had been farmland, the town is now home to more than 10,000 people, most living in high-rise buildings, but some in single-family villas. A 2.85 million-square-foot shopping center, a fire station, a post

HOUSE DIVIDED Future Towers comprises nine wings, as tall as 30 stories, around four cores to maximize perimeters and provide increased natural ventilation for the over 1,000 apartments. Large refuge spaces, from one to three stories high, are carved out of the facade to become defining elements of the building.





LEVEL-NINE PLAN



VERTICAL CITY

The building follows a hexagonal grid to provide views and ample daylight for each of the apartments (above). At ground level, trapezoidal voids connect street-facing courtyards to a central green (opposite, top). The interconnected courtyards offer residents relaxed social environments (opposite, middle). The sloping top of each wing features large terraces (opposite, bottom).

credits

ARCHITECT: MVRDV — Jacob van Rijs, partner in charge

ENGINEERS: Neilsoft (m/e/p); J+W (civil, structural)

CLIENT: City Corporation Limited

SIZE: 1.5 million square feet

COST: withheld

COMPLETION DATE: January 2018

office, two primary schools, a high school, a Neoclassical clubhouse with a domed entry rotunda (trying to channel the spirit of Brunelleschi), two artificial lakes, a 26-acre central green, an outdoor amphitheater, and four community centers are spread out around the development.

A fiber-optic cable network and digitally controlled infrastructure provide a sophisticated communications and management network, while systems for recycling nondegradable waste, composting wet waste, and harvesting rainwater make it more environmentally sustainable than most developments in the U.S.

Most of the apartment buildings at Amanora Park cater to a particular income group, though the township as a whole must provide 10 percent of its units to low-income families and set aside land on the property for the farmers who had lived there to build their own homes. Jacob van Rijs, the MVRDV principal in charge of Future Towers, convinced the client to mix units for low-, middle-, and upper-income residents in his firm's project and integrate them within the nine different wings of the building. "We imported the notion of creating a diverse social organization," says van Rijs.

MVRDV won the project in an invited competition that included the venerable Hong Kong firm P&T, which has designed other apartment buildings at Amanora Park, and several Indian offices. The invitation came after van Rijs had lectured in India and MVRDV had done preliminary schemes for other projects in India that did not get built. It is MVRDV's first in India to be completed, though the firm has another currently in construction and two others in design, as well as two more slightly smaller phases of Future Towers.

Asked by the client to create a "vertical city" that would be "an architectural marvel," MVRDV developed a scheme inspired by landscape formations with "peaks and valleys, canyons and bays, grottoes and caves," says van Rijs. In northern Europe, most apartment buildings have compact footprints to reduce perimeter surfaces and the need for insulation. But in the hot climates of India, architects usually maximize perimeters to increase natural ventilation. Even in





AT HOME AND PLAY
 MVRDV created a flexible system that allows the developer to vary the size of the units (above). Various strategies are employed to create a series of neighborhoods within the building (left). Colorful murals adorn the walls of the "scoops"—open-air rooms for various sporting and socializing activities (opposite).



Amanora Park, which has modern power generators for air-conditioning, homebuyers expect naturally ventilated rooms, says van Rijs. As a result, he and his team designed Future Towers as a snaking line of nine 60-foot-wide wings with apartments on either side of a central corridor.

The concrete-frame structures wrap around courtyards defined by a partially expressed hexagonal grid. MVRDV used just four vertical circulation cores, with each one servicing three wings and acting as a knuckle connecting different pieces of the project. Rather than enclosing the cores, the architects opened them to light and air.

Faced with Indian building codes that require refuge spaces where people can gather in case of fire or emergency, MVRDV turned these spaces—called “scoops”—into defining elements. Varying in height from one to three stories, they act as open-air rooms for different activities (yoga, miniature golf, and socializing) and types of residents (toddlers, teens, and sports fans). MVRDV didn’t control the murals on the walls wrapping these spaces, but did select the colors.

At the ground level, MVRDV cut trapezoidal voids where the wings connect to the cores, allowing residents (and fire trucks) to move from the street-facing courtyards to the central green. Painted in vibrant colors such as turquoise and mango, they serve as large, shaded places

to gather when it rains or the sun is too strong. The complex sits on a two-story plinth, with parking under all of the wings and retail facing the most active pedestrian areas.

MVRDV didn’t design the apartments but created a flexible system that allows the developer to vary the size of the units, which are for sale, depending on market demand. Every floor can include a mix of studio and one-, two-, three-, and four-bedroom apartments, with the largest ones usually at the end of each wing where they have large terraces on the sloped side of the building. Each unit gets an outdoor space—either a balcony or a terrace. As is typical in India, bathrooms and kitchens overlook airshafts containing plumbing lines.

In such a large complex, navigating the various cores and long corridors can be tricky for visitors. But the architects shrewdly placed the scoops along the corridors to bring in daylight and break down distances. The scoops and the courtyards also help create a series of neighborhoods and provide a more intimate scale to the project.

With its distinctive profile and punctured facades, Future Towers stands as a visual landmark within the sprawling Amanora Park. Just as important, with young professionals living side by side with extended families and lower-income residents, it serves as a laboratory of social diversity. ■

DATELINE: Paris

ARCHITECT: Bruther

MODEL: Strategic Infill

BY JOSEPHINE MINUTILLO



Among the many challenges to building, a difficult site poses one of the most daunting. For a social-housing complex in Paris's hilly 20th arrondissement, in the northeast part of the city—a rapidly transforming formerly working-class neighborhood—Bruther, a 2017 Record Vanguard firm, faced a particularly unusual spot. “It wasn’t obvious what to put there,” says Bruther cofounder Alexandre Theriot. The architects were confronted with a narrow, irregularly shaped lot that opened onto two streets—Rue Pelleport, a major road that runs through much of the precinct, and Rue des Pavillons, a winding street that descends to the west. Then there’s context. On one side of the tight site was an overwrought tower from the 1990s by Frédéric Borel, known in France for his deconstructivist architecture; on the other, a tall, nearly 400-foot-long housing block from the 1970s. A limited budget—just over \$200 per square foot, typical for this type of project, where rents are often a fraction of market rate—left Bruther with a triple whammy. To build anything at all would be an achievement; that it turned out so well, an exceptional one.

Bruther won the competition for the Pelleport housing—their first win—back in 2009, shortly after the husband-and-wife team of Theriot and Stéphanie Bru formed the Paris-based practice. They’ve since completed several award-winning buildings in Paris and elsewhere in France while construction on this project was stalled due to legal battles initiated by opponents to the building, which houses low-income and formerly homeless residents.

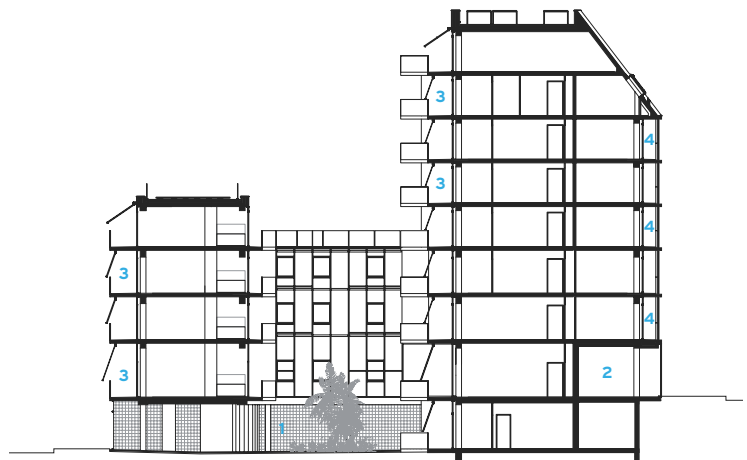
The stripped-down aesthetic and minimal material palette for which Bruther has become known works extremely well here. Vast expanses of glass and corrugated aluminum define the poured-concrete structure, giving it an ethereal, almost transparent quality. Yet it is not intimidated by its imposing neighbors. Instead, the highly articulated building asserts itself as an antidote to the respectively pompous and behemoth forms on either side.

Though actually one building—connected by a three-story bridgelike structure, containing a series of small studios under 300 square feet apiece—it appears as two separate, triangular-shaped ones facing a modest courtyard

TWO FACED The housing project consists of two connected buildings fronting different streets. An eight-story structure, with a facade of glass-enclosed winter gardens, is a prominent presence on Rue Pelleport (opposite), while a smaller structure faces the descending Rue des Pavillons to the west (left).

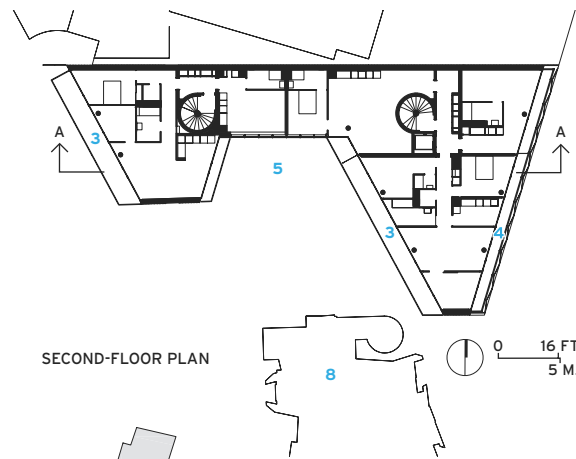


PHOTOGRAPHY: © MAXIME DELVAUX (OPPOSITE); JULIEN HOURCADE



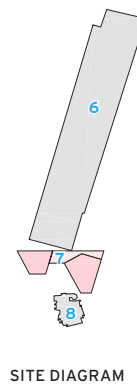
SECTION A - A

0 16 FT.
5 M.



SECOND-FLOOR PLAN

0 16 FT.
5 M.



SITE DIAGRAM

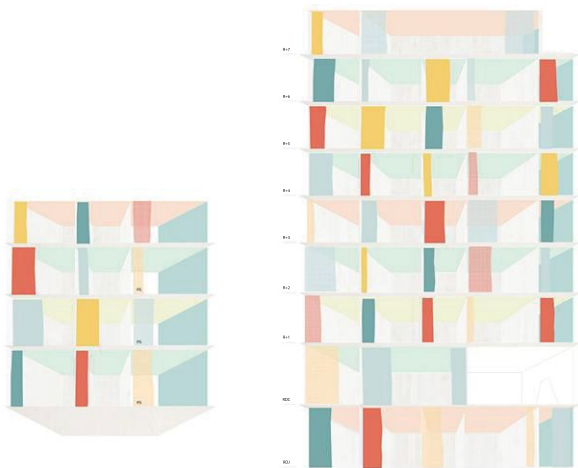
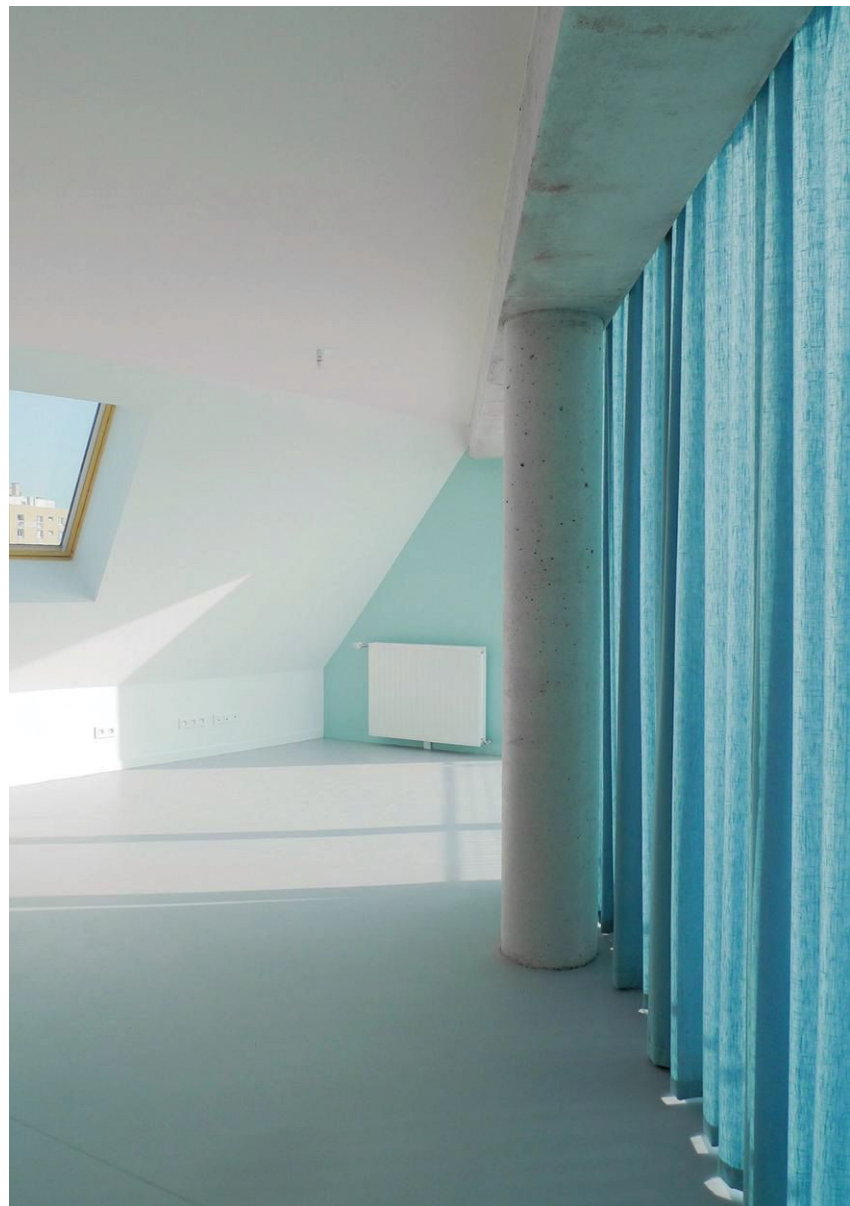
- 1 LOBBY
- 2 COMMERCIAL SPACE
- 3 BALCONY
- 4 WINTER GARDEN
- 5 COURTYARD
- 6 1970s BUILDING
- 7 PELLEPORT SOCIAL HOUSING
- 8 1990s BUILDING

credits

ARCHITECT: Bruther —
Stéphanie Bru, Alexandre
Theriot, principals
ENGINEERS: Louis Choulet
(environmental); EVP
(structural)
GENERAL CONTRACTOR:
SBG Lutèce
CLIENT: Élogie-Siemp

SIZE: 19,900 square feet
COST: \$4.4 million
COMPLETION DATE:
September 2017

SOURCES
GLASS: Saint-Gobain
METAL PANELS: Tolartois



COLOR CODED The rear of the Rue Pelleport structure features balconies with adjustable awnings (opposite, top). On the upper floors, they offer expansive views to the heart of Paris (opposite, bottom). Bruther conducted extensive studies to determine paint and curtain colors within the apartments and along the facades (top and right).

in the middle and delicately hinged between neighbors. Along Rue Pelleport, the larger of the two structures presents a jagged, see-through facade comprising pivoting glazed shutters that enclose winter gardens for the apartments on the upper levels. A commercial space occupies the ground floor.

Along Rue des Pavillons, where grade drops a full story due to the slope of the side street, a smaller structure, more in scale with the low-rise buildings around it, features—like the rear of the Pelleport structure looming in the background—balconies with manually adjustable awnings. As an ensemble, the multiple faces of the building, including the pivoting winter-garden shutters, offer dynamic, constantly changing surfaces. On Rue des Pavillons, this is further enhanced with color. Bruther selected an array of paint and curtain hues for the rooms along the balconies, which the majority of tenants have maintained since moving in late last year. “It is an easy and inex-

pensive way to add atmosphere and a personal touch,” says Theriot.

The largest of the 25 living units—most of which have access to their own outdoor space, whether winter garden or balcony—are 900-square-foot three-bedroom apartments. While finished very simply, they feel ample in size. Exposed raw concrete columns and beams—not always lined up as you’d expect them to be—define spaces and serve as strong architectural accents in the basic but light-filled interiors, which offer variegated spatial qualities because of the unusual geometry of the plan (arrived at partially by zoning and partially for views) and steep roof pitch (on the larger structure). The all-gray hallways and tiled lobby, rather than feeling oppressive, are unexpectedly pleasing, tying in with finishes in the rest of the building to offer clean, bright public areas.

It’s frequently said that constraints help the design process. In this case, facing acute site and budget limitations, Bruther pulled off an impressive piece of architecture, not only for its commanding street presence but also for its generous accommodations—many with expansive views over the heart of Paris—in a building type that all too often is considered less worthy of such. ■



DATELINE: Stockholm

ARCHITECT: Wingårdhs

MODEL: Contextual Mid-rise

BY ANA MARTINS

I'm well known to have no style, architecturally speaking, so I can adopt any style," says Gert Wingårdh, founder of Swedish architecture firm Wingårdhs. It is not surprising then that the designer of many of Sweden's most well-known examples of contemporary architecture—Aula Medica in Stockholm (2013), the Emporia shopping complex in Malmö (2012), and the Kuggen office building in Gothenburg (2011), to name a few—is also the mastermind behind Stockholm's most recent "monument to functionalism," as former Wingårdhs collaborator, architect Anna Söderberg, calls the Basaren apartment building.

The architects took a stylistic cue not only from a rational 1930s two-story commercial structure that was razed from the site, but also from the requirements of the client, Stockholms Kooperativa Bostadsförening (SKB). SKB, a housing cooperative founded in 1916, builds, rents to, and manages properties for its member-residents. Since this is the third project Wingårdhs has designed for SKB, the Gothenburg-based firm was well aware of the organization's expectations when they won the competition for Basaren in 2006: quality, low-maintenance, democratic, community-focused design. The goal was not "a building that would stand out, but one that would fit in," Wingårdh says.

The white brick-clad structure is adapted to its surroundings as if it couldn't have been designed any other way. Yet the scheme is, in some measure, the outcome of a long battle with the city. "At some stage of the design, there were three staircases and elevator cores, all leading up to the same height," Wingårdh explains. "The city thought the building was a bit too big and messy, so we dropped one of the staircases on the upper levels." Following this simple gesture, the smaller floor plates resulted in two towers, with eight and 10 stories respectively, that were given the same heights as their neighboring buildings. Their corners were rounded, not only

STREAMLINED Offset windows and balcony doors lend rhythm to the curving facade, which meets the street level through a simple change from unglazed to glazed white bricks (left).

PHOTOGRAPHY: © ANDRÉ PIHL





credits

ARCHITECT: Wingårdh Arkitektkontor — Gert Wingårdh, principal; Anna Söderberg, project architect

ENGINEER: KE-gruppen (structural)

CONSULTANTS: ACAD-International (acoustics); Nyréns Arkitektkontor (landscape); Projektel (electrical, lighting); Creanova (heating)

GENERAL CONTRACTOR: BTH Bygg

CLIENT: Stockholms Kooperativa Bostadsförening

SIZE: 74,300 square feet

COST: \$19.4 million

COMPLETION DATE: June 2018

SOURCES

BRICK: Randers Tegel

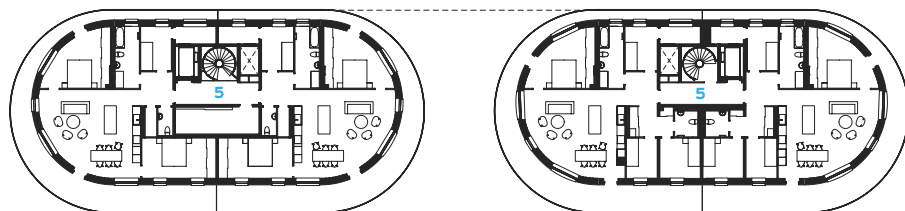
BALCONY RAILINGS: FHT Konstruktion

ACOUSTICAL CEILINGS: LEAB Undertak

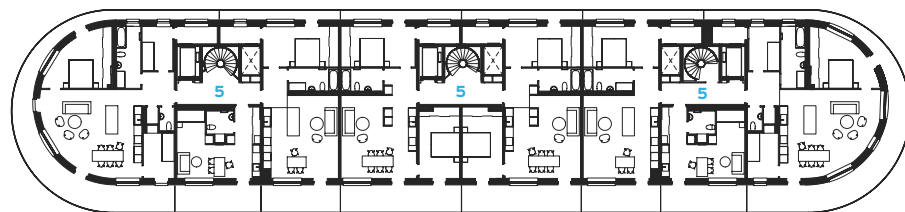
METAL DOORS: Daloc

ELEVATORS: ALT Hiss

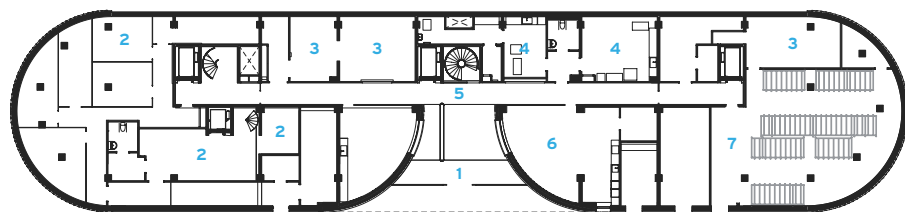
APPLIANCES: Miele, Electrolux



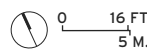
UPPER-FLOOR PLAN



LOWER-FLOOR PLAN



LOWER STREET LEVEL PLAN



- 1 MAIN TENANT ENTRANCE
- 2 STORAGE
- 3 MECHANICAL
- 4 LAUNDRY
- 5 HALLWAY
- 6 MEETING ROOM
- 7 BIKE STORAGE

to allow light to travel continuously around the facade without creating hard shadows, but to create a direct dialogue with a curving building across the street.

In addition to its shape, reminiscent of the country's 1930s functionalist forms, the building's key decorative elements are the strong horizontal bands created by the balconies, and the brickwork details of the ventilation ducts above the entrance. And even though designing an International Style pastiche was not the goal, the architects did borrow some of those key principles and, in doing so, arrived at contemporary solutions that perfectly reconcile the building and environment with its inhabitants.

Completed in June, the Basaren housing complex sits on a privileged hilltop location, a corner plot between busy Hantverkargatan and a quiet backstreet in Stockholm's central Kungsholmen borough. Its 44 units, ranging from 345-square-foot studios to 1,270-square-foot 4-bedroom dwellings, all enjoy a south-facing balcony and unified interiors: terrazzo floors in the entry hall and bathrooms, and oak parquet elsewhere; an open-plan kitchen and living room; and all-white finishes that, together with large windows, maximize daylight during the dark Swedish winters. The 74,300-square-foot building features an ample entry floor with multipurpose common rooms and bike storage, as well as



IN CONTEXT The balconies change size gradually, from bigger facing the water to smaller facing the street (opposite). The heights of Basaren's two towers match adjacent buildings (above). The stark hallways feature terrazzo floors (right).

commercial spaces, including an upscale restaurant, at street level.

The not-for-profit cooperative tenancy model presents an appealing alternative to the regular rental market, offering slightly more affordable, permanent contracts to their members, who pay a yearly fee in order to keep their place in the queue to rent an apartment. “On the edge of affordability,” as Wingårdh puts it, projects like Basaren do not address the lack of affordable housing for low-income populations, but they do offer a solution to other problems that are also part of the housing crisis hitting cities worldwide. Coop developments offer a variety of apartment typologies as they strive to accommodate different households; they are





SCANDI STYLE Light oak floors and white-painted interiors maximize daylight during the dark Swedish winters (above). A colorful upscale restaurant occupies the ground floor (left).

designed to foster community among residents; and, as the building's permanent owners, the organizations ensure a high quality of construction, as well as continuous maintenance.

With Basaren, the building gives back to the city in beautifully composed architectural harmony, where form follows generosity. While centrally located within Stockholm, this model might just be the recipe for change that increasingly segregated areas of Sweden's suburbs so desperately need. According to Wingårdh, "We think that building better properties in those areas is key, and it's possible to do so on a very economically sound basis." ■

Netherlands-based freelance editor and journalist Ana Martins writes about architecture and design.

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Adapt for an Uncertain Future

New guidelines and rating systems help architects design buildings that can respond to a broad range of threats.

By Katharine Logan



ENERGY INDEPENDENCE FSY's Silver Star Apartments, housing for formerly homeless veterans in Los Angeles, incorporates a variety of strategies that should help it weather disruptive events. The measures include orientation-specific window shading, rooftop PVs with battery storage, and a configuration that promotes natural ventilation.



IMAGES: © NATALIA KNEZEVIC PHOTOGRAPHY (LEFT); COURTESY FSJ (RIGHT)

EACH FRESH DISASTER, whether hurricane, wildfire, flood, or tornado, and each sign of global warming, whether rising seas, recurring drought, melting permafrost, or new disease, makes the urgency of resilient design more emphatic. Resilience is sustainability for an unstable world—the capacity to adapt to changing conditions, to maintain or regain functionality in the face of stress and disturbance, and to continue to thrive. As growing public awareness increasingly prioritizes resilience, a slew of new guidelines and rating systems are emerging to help.

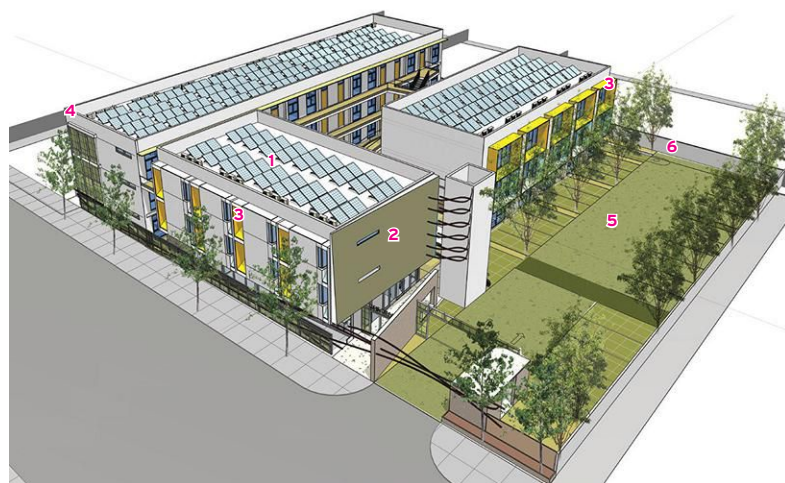
“As with sustainable building, where the LEED rating system—most prominently—provided an easy way for a building owner to specify green, a rating system can do the same for resilience,” says Alex Wilson, president of the Resilient Design Institute. Some frameworks target a single hazard. The Resilience-based Earthquake Design Initiative (REDi) and the U.S. Resiliency Council rating systems, for example, address seismic events—although the latter plans to expand its scope. Others, such as the Insurance Institute for Business and Home Safety’s Fortified programs, focus on weather. But, here, **RECORD** investigates a handful of systems that are more broadly based, helping users address a gamut of acute shocks and chronic stresses, including RELi, a

comprehensive resilience rating system the U.S. Green Building Council (USGBC) is poised to launch.

“Many of the strategies that improve sustainability under LEED inherently improve resilience as well,” says Jennifer Druliner, vice president of governance at the USGBC. A project illustrating her point is Silver Star Apartments, a 49-unit LEED Platinum-certified housing development for formerly homeless veterans, completed in 2017. Designed by Los Angeles-based FSJ Architects, Silver Star is the first zero net energy (ZNE) affordable housing project in L.A. and is on track to achieve Living Building Challenge Zero Energy certification from the International Living Future Institute (ILFI).

Beyond being designed to withstand earthquakes in accordance with the city’s strict seismic regulations, the three-story wood structure’s strategies for sustainability will help its tenants to weather a range of disruptions. For instance, in the aftermath of a disaster that results in power outages, Silver Star will be able to draw on solar-generated electricity from its ILFI-mandated battery storage system to power essential functions in a common area. Residents will be able to charge communication devices, for example, and refrigerate medicines and food.

Complementing the emergency



SUSTAINABILITY MEASURES

- | | |
|---------------------------|---|
| 1 PV/SOLAR THERMAL PANELS | 4 HEAT PUMPS |
| 2 THERMAL MASS | 5 PERMEABLE PAVING |
| 3 SOLAR SHADING | 6 RAINWATER STORAGE/
GROUNDWATER RECYCLING |



BRACED FOR CHANGE The buckling-restrained braced frame structure (left) at the Mahlum-designed middle school for Oregon's Beaverton School District should enhance its seismic performance. The commons (above) has a backup power supply so that it can serve as an emergency shelter for local residents.

power provision are a variety of strategies familiar from LEED and LBC that will help the building remain habitable even without power. These include a courtyard configuration to facilitate cooling and natural ventilation, shading devices appropriate to facade orientations, and daylighting. A less familiar passive strategy is the use of phase change material (PCM), a compound, installed in quiltlike plastic sheets in the building envelope, that hardens as it cools overnight and absorbs heat as it melts during the day. Intended to bring cooling loads within the capacity of the photovoltaics that fit on Silver Star's roof, the PCM will also help the building to remain habitable even if the air-conditioning stops working.

One significant contributor to the development's resilience is a design that fosters social connectivity. Besides being essential to the well-being of the veterans who live here, many of whom struggle with mental-health issues, the patterns of social interaction and mutual support encouraged by the building's plan can help provide a foundation for cooperation after a disruption. So laundry facilities are located to attract people to the building's courtyard and its central, open-air lounge. Staircases are offset at each level to require a short walk along floors other than a tenant's own. And a community garden is in the works. "If sustainability is truly done well," says Anuj Dua, an

associate at FSY, "then you only have to do a little bit more so that, in an emergency, people can continue to function."

Projects certifying under the LEED system for new construction will soon have a framework for thinking explicitly about what that little bit more entails. Three resilience pilot credits, which were available for a period following their launch in late 2015, are now in the process of being refined to harmonize with RELi prior to being rereleased, according to sources on the USGBC's Resilience Steering Committee. The pilot credits provide practical ways for project teams to begin to integrate resilience into their designs, requiring risk assessment and planning, remedies to mitigate impacts, and provision for passive survivability (the ability to maintain a minimum level of habitability during an extended loss of services such as power, heating fuel, or water).

Whether or not a project is pursuing certification, a growing number of frameworks developed by states and municipalities, such as the Oregon Resilience Plan, New York's Climate Resiliency Design Guidelines, and Resilient New Orleans, support resilience planning. To varying degrees these guides have done the legwork of identifying the risks pertinent to their region, and offer resources and recommendations to design for them at a range of scales. The Oregon Resilience Plan

(ORP), for example, the product of a public-private collaboration, released in 2013, addresses the impacts of earthquakes and tsunamis. It has inspired revisions to the state land-use plan that will restrict development within a tsunami-inundation zone, the development of a Resilient Transportation Plan, and increased funding for the seismic upgrade of schools and essential facilities.

To meet and exceed ORP's goal for shelters to open almost immediately and schools to reopen within 30 days, the state's Beaverton School District established three goals for its disaster-resilient new middle school, by the Portland office of Mahlum Architects. The first requires that staff and students are able to shelter in place for 96 hours; the second, that the building and grounds be able to function as a public shelter, distribution center, and campground for 30 days; and the third, that classes have capacity to resume while the school continues to act as a refuge.

In response, the 165,000-square-foot school, completed in 2016, includes several resilience-specific measures as well as providing for overall flexibility of use. The steel buckling-restrained braced frame (BRBF) structure is designed so that the entire building, rather than just designated areas, performs seismically as an essential facility that can be occupied immediately, rather than meeting only the lesser and more common life-safety standard. The school is daylit throughout, including interior stairwells and locker rooms, so that operations can continue without electric light. Provisions for water and waste include piping connections strengthened to resist ruptures, and a bladder (an empty tank) with 96-hour capacity, which can be filled in response to an earthquake-warning system or by an emergency-response water truck after-



SHELTER FROM THE STORM Perkins+Will's schemes for a pair of hospitals, one in Corpus Christi, Texas (above), and another in Oklahoma City (below), respond to threats specific to their locations, including hurricanes and tornadoes.

ward. The gymnasium and commons would shelter displaced community members, with a backup generator providing power for emergency needs, such as heating, ventilation, pumping water, and cooking.

During normal operations, a 138-kilowatt photovoltaic array on the school roof generates renewable electricity, with shortfalls taken from the grid and surpluses returned to it. If the grid fails, a switch allows the PV system to be disconnected from it so solar energy can continue to power the building without risk of sending electricity into a system under repair. For now, however, this is only hypothetical; the building code does not permit the PVs to power the building during a utility failure, even if the array is disconnected from the grid. "That's why it would be better if the ORP became

code," says Rene Berndt, associate principal at Mahlum. Berndt cites the gap between measures that engineering makes possible and measures that jurisdictions will accept as one of the biggest challenges resilience initiatives face. That, and the rising costs of construction.

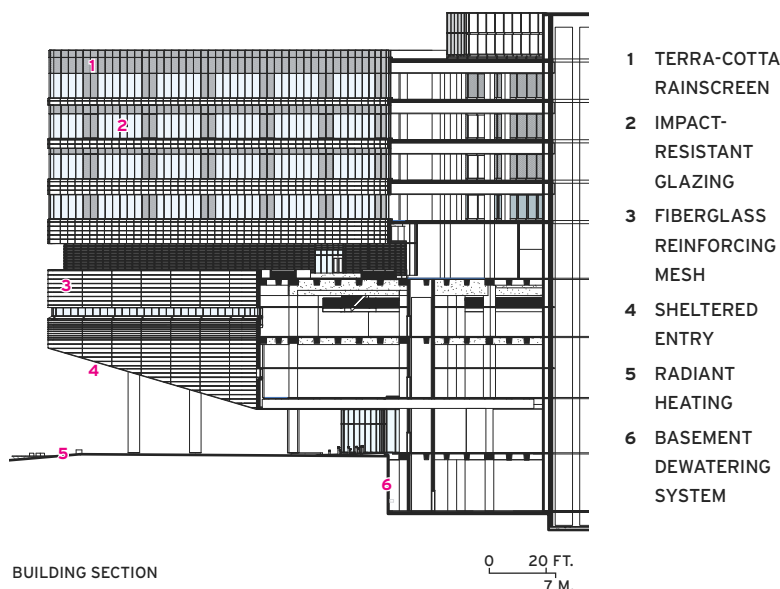
Ultimately, resilience encompasses more than passive survivability, as RELi, a preexisting rating system adopted by the USGBC for rerelease this year, makes clear. Similar in structure to LEED, with categories, requisites, and a menu of credits leading toward four certification levels, RELi takes a comprehensive approach to resilience across a range of scales. "Besides being a narrow-scope response to weather extremes or the specific elements of climate adaptation, the goal is for it to be more holistic," says Douglas Pierce, principal investi-

gator for the RELi standard and a senior associate at Perkins+Will. The firm helped develop the rating system with a host of collaborators, including the University of Minnesota School of Architecture. "The aim is to expand the dialogue of what sustainability is," he says.

RELi's eight categories provide guidance to a Panoramic Approach (planning, discovery, and systems thinking); Hazard Preparedness; Hazard Adaptation; Community Vitality; Productivity, Health + Diversity; Energy, Water + Food; Materials + Artifacts; and Applied Creativity (innovation). In addition to developing new measures, RELi incorporates the relevant strategies from other standards so as not to reinvent—or to lose sight of—what they already do well.

A handful of Perkins+Will projects that have piloted RELi, or aspects of it, demonstrate its utility. Christus Spohn Shoreline Hospital in Corpus Christi, Texas (a 400,000-square-foot tower supporting the consolidation of two hospitals), and a new 10-story tower at the University of Oklahoma Medical Center in Oklahoma City, both under construction, are the standard's first two full projects. They share some strategies, including redundancy in the central plant, provision for a shelter-in-place period, and a command and communication center. Yet each facility's resilience provisions are different, in anticipation of local threats.

Christus Spohn is built above the 500-year flood plain, with hurricane-resistant structure and cladding and oversize roof drains. The area under the ambulance canopy converts into a mass-decontamination facility in case of an oil-rig or other industrial disaster. And in recognition that not all disruption is environmental, its emergency department provides





ECOSYSTEMS THINKING

The Bell Museum of Natural History, in St. Paul, Minnesota, by Perkins+Will, has features aimed at preserving biodiversity, including bird-safe glass incorporating a subtle horizontal frit (above), and a pond that fosters wildlife habitat (left).

for two flows of traffic, so that patients injured in civil unrest, such as gang-related violence, can wait in a separate area from patients in an opposing faction.

At OUMC, where tornadoes are a central worry, the building's skin is hardened by steel-stud spacing reduced to 9 inches, a fiberglass reinforcing mesh under the terra-cotta rainscreen, impact-resistant glazing, and a green roof to protect from penetration by wind-driven objects (in addition to that feature's more familiar advantages). Radiant-heating systems under exterior walkways and driveways reduce the hazards of winter storms. And the building's foundation and steel frame are designed with moment and braced frames to mitigate seismic risk.

The main challenge in using RELi on these pilots, says Julie Frazier, a Perkins+Will senior medical planner who worked on both projects, was "not so much the technical aspects as the paradigm shift." Frazier observed signs of rating-system fatigue among members of the project team: "another checklist, more due

diligence—it can be overwhelming." But by the end of the design process, she says, "I think everybody realized the payoff—we've done something good and it's going to perform."

It's clear why health-care facilities would push the frontiers of resilient design. A museum is a more surprising advocate. But the Bell Museum of Natural History at the University of Minnesota's Twin Cities campus is very much aware of the United Nations' finding that the loss of biodiversity poses as great a threat to our society as climate change: only with a diversity of species can ecosystems adapt. For a natural history museum, this issue is a logical fit, so the 90,000-square-foot building, designed by Perkins+Will's Minneapolis studio and completed in 2017, makes biodiversity a priority, deploying strategies that Pierce expects will inform RELi's next iteration.

To prevent bird strikes on glass that reflects sky or habitat (a significant factor in bird population decline), all of the museum's glazing is fritted with tightly spaced narrow gray lines. Surprisingly unobtrusive, the frit has to be

pointed out to visitors. The building envelope also engages with the issue of diminished forest diversity, expressed by Forest Stewardship Council-certified thermally modified wood. On the grounds, the landscape design features a hybrid irrigation-bioswale-cum-vertebrate-pond, designed to accommodate a 1,000-year rainfall and at the same time to ensure that water levels never fall below the minimum required for habitat. The project's low carbon footprint—which meets the 2030 Challenge (a program of phased targets toward a goal of all carbon-neutral building by the year 2030)—also does its bit to mitigate climate-change-caused habitat loss and species migration.

"The revolution here is in seeing the world as a whole system," says Pierce. "It's really about systems thinking." In the five years since work on RELi began, scientists' understanding of climate change has evolved. While we might all have hoped to avert it with carbon mitigation, says Pierce, the emerging consensus seems to be that abrupt climate change is now under way. As architects are increasingly called on to design for adaptation, resilience rating systems, both familiar and new, can help. ■

Katharine Logan is a designer and writer focusing on architecture, sustainability, and well-being.

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Learning Objectives

- 1 Describe the different types of resilience standards, including those directed at specific threats, those addressing a broad range of disruptive events, and those devised for particular regions.
- 2 Discuss the relationship between green building measures and resilience strategies.
- 3 Explain the importance of biodiversity preservation to resilience.
- 4 Explain concepts and terms relevant to resilient design, such as "passive survivability."

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Sustainability Without Compromise

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- EM** ELECTRICAL AND MECHANICAL
- LS** LIFE SAFETY & CODES

- PM** PRODUCTS AND MATERIALS
- RE** RESIDENTIAL

- ST** STRUCTURAL
- SU** SUSTAINABILITY

Courses may qualify for learning hours through most Canadian provincial architectural associations.

Design firm Studio Gang transformed the National Polish Alliance building, built in 1937, into its Chicago office and earned the building the City of Chicago Landmark status, while creating a 21,000-square-foot office interior that was comfortable and energy efficient.



Photo courtesy of Mitsubishi Electric Cooling & Heating

Sustainability Without Compromise

A closer look at the HVAC, insulation, lighting, and glass solutions that enable designers to balance the demands of sustainable design

Sponsored by Guardian Glass, Mitsubishi Electric Cooling & Heating, ROCKWOOL™, and WAC Lighting | *By Jeanette Fitzgerald Pitts*

Over the years, the scale of sustainable design has exploded, creating an exhaustive list of considerations that range from the sustainability of the selected project site to the energy use and efficiency of the building, the health and wellness supported by the interior, and even the life-cycle impact and recycled content of every product included in the structure. In the past, navigating the necessary compromise was one of the biggest challenges inherent in satisfying sustainable criteria. For example, providing occupants with access to views also required protection from the glare and solar heat gain that causes discomfort and increases the load on the HVAC system, or choosing between products that would enable the building to perform with incredible efficiency or products that were produced with low environmental impact.

Today, the market is much better equipped to support the sustainable design effort. New products, research, and approaches to design enable projects to better satisfy the many different aspects of green building. This course will take a closer look at four projects that satisfied impressive sustainability objectives and the technology and product solutions behind their successful designs.

THE HVAC SOLUTION IN THE HISTORIC RENOVATION OF THE STUDIO GANG CHICAGO OFFICE

The Polish National Alliance building in Chicago, originally built in 1937, was recently transformed into the new Studio Gang Chicago office, the architecture and urban design practice founded and led by Jeanne Gang. The challenging renovation turned

CONTINUING EDUCATION



1 AIA LU/HSW



1 GBCI CE HOUR

Learning Objectives

After reading this article, you should be able to:

1. Describe how a VRF HVAC system enabled the Studio Gang Chicago office to reduce energy use, improve occupant comfort, and satisfy criteria to successfully transform the 1937 structure into a City of Chicago Landmark building.
2. Explain how passive technologies, such as stone wool insulation, were used by The House at Cornell Tech to earn the rigorous Passive House certification, significantly reducing the need to spend energy heating and cooling a building.
3. Explore the multi-faceted nature of sustainable design and the need for LED lighting fixtures that are highly efficient, manufactured in an environmentally responsible manner, and capable of creating a comfortable, high-quality visual environment.
4. Give specific examples of how certain attributes and performance qualities of glass contribute toward satisfying criteria in the LEED v3 and LEED v4 green building rating systems.

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the existing structure into a 21,000-square-foot office space featuring a prairie roof and adjacent event space, and a City of Chicago Landmark building.

The project had several unique sustainability-related design goals. When the studio gang team began thinking about HVAC, that Landmark status became important and required that building performance significantly exceed current ASHRAE standards, while the physical disruption to the original structure was to be minimal. Aesthetically, maintaining the appearance of the historic building without visible modern-day enhancements was critical. The building also needed to function as a contemporary, high-performance office space, event space, and rooftop prairie. People in the building needed to feel comfortable and productive. The rooftop needed to be aesthetically pleasing and suitable for guests.

Careful consideration was given to the various building systems and technologies available to find solutions that would help the project achieve its many sustainability and performance-driven objectives. This was especially true in the case of selecting a suitable HVAC system. The design team needed to find a system that could help the building exceed the ASHRAE baseline performance by at least 17 percent, the mandatory performance criteria for attaining Landmark status. It was also important to keep employees and clients cozy in harsh Chicago weather without creating a historically inaccurate eyesore that would aesthetically disrupt the rooftop space.

For many reasons, designers knew that a conventional, big, packaged HVAC unit was not an appropriate solution. The Landmark Department was adamant about not being able to see the HVAC system components from the street, which made it difficult to add a big unit onto the rooftop of the 1937 structure. The HVAC system would need to be discrete and ultra-quiet so that people could enjoy the event space. Interior comfort was also an important consideration. “In our previous office, which was one open space, we had one massive HVAC unit with a single zone. In the summer, we would never get cool air over where I sat, while other people were too cold. Temperature striation was a big struggle,” explains Harry Soenksen, AIA, LEED AP, senior technical director at Studio Gang. “We also needed something with a small footprint that was acoustically reasonable for us, our neighbors, and attendees in the event space while being cost competitive.”

The HVAC Solution: VRF

The HVAC answer for the Studio Gang Chicago office project was a variable refrigerant flow (VRF) HVAC system. “VRF satisfied the functional, cost, acoustic, and visual requirements.

In terms of cost, it was pretty competitive with a conventional system, but where VRF stood out was that it met Landmark’s performance requirements of exceeding ASHRAE standards by at least 17 percent. No other system could meet that requirement,” Soenksen explains.

The VRF Results: Comfort and Energy Savings

“We’ve been very happy,” said Studio Gang Chief Financial Officer Meredith Mack. “The VRF HVAC system has been far less noisy than the old system and way more consistent and comfortable than our old office. People are way more comfortable, and it’s actually costing us less per square foot,” Mack explains. The previous office space had a monthly expenditure (electric + gas) of \$0.14 per square foot. The new office space comes in at \$0.11 per square foot. In a 21,000-square-foot office space, that generates a savings of more than \$600 every month.

INSULATING THE HOUSE AT CORNELL TECH TO ACHIEVE PASSIVE HOUSE CERTIFICATION

The House at Cornell Tech (The House) is a 26-story residential high-rise for students, staff, and faculty situated on Roosevelt Island in New York City designed by Handel Architects and Steven Winter Associates. Architecturally, this project is notable because when it was built, it was the world’s tallest building to earn certification from the rigorous Passive House international building standard. It has earned LEED Platinum status as well.

The Passive House building standard uses passive design principles to dramatically reduce the amount of energy necessary to heat and cool an interior to keep it comfortable. In short, the standard emphasizes the importance of proper insulation, proper windows, and the elimination of air leakages that enable hot air and heat energy to leave a building. More specifically, a passive building employs continuous insulation throughout its entire envelope to minimize thermal bridging. The building envelope is airtight, preventing infiltration of outside air and the loss of tempered air. Windows and doors are high performance, thermally broken, and triple glazed. There is often some form of balanced heat and moisture-recovery ventilation and a minimal space conditioning system. Buildings are oriented to maximize solar gain in the winter and minimize it in the summer. The impact of these passive measures on HVAC energy use is nothing short of astounding. Buildings built in compliance with the Passive House standard can reduce their demand for heating and cooling energy by up to 90 percent.

High-quality insulation is critical to designing a successful passive construction project. Creating the well-insulated thermal envelope that helped The House to surpass the aggressive ther-

Photo courtesy of Handel Architects



The House at Cornell Tech earned certification from the rigorous Passive House building standard as well as LEED Platinum status.

mal performance criteria of the Passive House standard required semi-rigid stone wool insulation boards 280 millimeters (11 inches) thick in the exterior wall cavity. Lightweight, semi-rigid stone wool batt insulation was specified into the steel-stud interior wall and floor. Multipurpose stone wool boards were also incorporated into the walls, ceilings, and floors of the project. “The building envelope was constructed to exacting standards,” explains Debra Moelis, AIA, PHCD, senior associate, Handel Architects. “To achieve the necessary level of efficiency and thermal performance, new products, procedures, and innovative details were incorporated, including continuous insulation, overlapping vapor barriers, meticulous taping methods, and thermal separation of metals. Extensive, specialized training ensured that the installation and sealing were carried out with precision.”

Every structure that earns Passive House certification must pass a stringent on-site pressure test that ensures that these buildings are sealed airtight, with no leaky windows or building joints, making it possible for them to preserve indoor temperatures. Moelis notes that the building “heroically passed the notably difficult Passive House blower door test, with results that were four times better than required.”

The House became Passive House certified in the autumn of 2017, and it is estimated that this residential structure will save 882 tons of CO₂ emissions per year, which is the equivalent of planting 5,300 new trees.



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LIGHTING THE HOLOCAUST MEMORIAL AND TOLERANCE CENTER OF NASSAU COUNTY

The Holocaust Memorial and Tolerance Center of Nassau County in New York is tucked inside the Welwyn Preserve in Glen Cove. It was the first Holocaust museum and educational center to serve the nearly 3 million people on Long Island. In 2014, a \$1-million renovation was completed, launching The Claire Friedlander Education Institute and dramatically improving the operation of the existing museum facility.

During the renovation, the lighting in the museum was replaced with architectural LED fixtures, including wall washers and monopoints. The lighting upgrade has resulted in several important benefits, including energy savings, simplified maintenance, and more flexible light placement. “With the new lighting, the lobby is now bright and inviting. It gives you a sense that you are in a space of deep history and knowledge,” explains Helen Turner, education director at the Holocaust Memorial and Tolerance Center of Nassau County.

“Before the renovation, we spent a lot of time and money replacing lightbulbs. With the new lighting, we are saving a lot of money, which is very nice,” Turner says. The architectural LED lighting selected for the Holocaust Memorial features proprietary drivers and LED modules that have been rigorously tested to perform

Photo courtesy of WAC Lighting



During a renovation, the lighting in the Holocaust Memorial and Tolerance Center of Nassau County was replaced with architectural LED fixtures, including wall washers and monopoints.

longer than other products over their usable life. For example, both the monopoints and wall wash fixtures installed onto this project have a rated life of 50,000 hours, which means they could be left on for almost six years before the LED modules would need to be replaced.

The new lighting also improved the versatility of the museum space. “The new lights are very mobile. You can turn and angle them, put them up or down, and this flexibility can really change the feel of an exhibition,” Turner explains. The adjustability of the fixtures enable museum personnel to tailor the beam angle and directionality of the throw to precisely match the needs of each unique display.

“Beyond the beautiful and energy-efficient fixtures, we chose these lighting fixtures because of the ethics behind the lighting company,” Turner continues. “I think we have very similar missions to make the world a better place.”

THE GLASS CLADDING ON ANAHA TOWER BALANCES BEAUTY, PERFORMANCE, AND SUSTAINABILITY

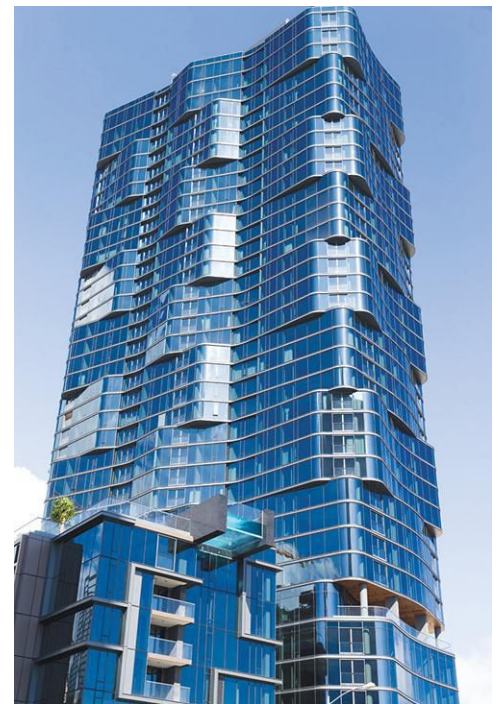
The Anaha Tower in Honolulu, Hawaii, is a luxury, 40-story, 311-unit residential building in the most distinguished urban neighborhood on O’ahu. Designed by Chicago-based architect Solomon Cordwell Buenz (SCB) in partnership with Hawaiian firm Benjamin Woo Architects, this LEED Silver-certified project features a

high-performance, undulating curtain-wall facade. This distinct and beautiful blue-green glass cladding also manages solar energy with a superior level of precision, resulting in energy performance capable of attaining impressive sustainable design certifications.

“The Hawaiian name Anaha translates to mean the reflection of light,” explains Strachan Forgan, principal at SCB. “Abstractions of waves are common in the island’s artistic traditions. The tower’s shape is derived from a sequence of softly curved floor plates, wrapped in a smooth glass skin. The composition is reminiscent of the play between the crests and troughs of a calm ocean wave. Like a wave, the reflection of light off the facade will constantly alter as the viewpoint and environmental conditions change.”

The Anaha Tower is clad in 275,000 square feet of glass, 20,000 square feet of which is curved glass, also referred to as bent glass. “In order for the design concept to be successfully executed, it was important that the alternating glass forms be read as soft and interlocking,” Forgan continues. “This was achieved by using true radiused insulated units and not faceting the windows at the corners. Selecting a high-performance coated glass that could be radiused in large pieces, without optical distortion, was a key technical decision in support of the design.”

© Marco Garcia



The high-performance glass cladding selected for the Anaha Tower in Hawaii could be radiused in large pieces, without optical distortion, and met important solar performance metrics in terms of glare control and solar heat gain management.



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The functional performance of the glass facade had to balance the ability to maximize the amount of beautiful Hawaiian light allowed into the residences, while preventing glare and solar heat gain from causing discomfort and spiking energy bills. Ultimately, the glass specified into the curtain wall provided enhanced solar control that allowed residents to comfortably enjoy their stunning views with minimal deployment of shades.

“The glass we selected for the Anaha Tower project featured the only coating on the market that could be bent and meet the solar management performance criteria, in terms of solar heat gain control and visible light transmission, required by the energy requirements,” Forgan says.

These four projects showcase that sustainability no longer requires compromise when the right solutions are selected. Keep reading for more information on the systems that helped the designers of the featured projects achieve their multifaceted goals.

THE HVAC SYSTEM THAT DELIVERS COMFORT AND ENERGY SAVINGS WITH MINIMAL FOOTPRINT

The VRF HVAC system used in the Studio Gang Chicago office building delivered comfort and energy savings within a small enough footprint to enable the historical building to achieve Landmark status. When looking to specify a system that can provide this combination of benefits, seek a VRF HVAC solution that incorporates an inverter-driven compressor technology, is capable of heat recovery, and uses a two-pipe configuration that can simultaneously cool and heat different areas within a building. Here is a little more information about a VRF system and how it differs from the traditional HVAC solution.

Introducing the VRF System

Traditional commercial HVAC systems inefficiently move conditioned air or water throughout a building. Not only does it require a lot of energy to move that air or water, but those mediums are challenged to provide precise temperature control. A variable refrigerant flow (VRF) system moves conditioned refrigerant directly to the zone to be cooled or heated, conditioning the air within the space and delivering precise and efficient comfort control. Many systems also provide the ability to simultaneously cool some zones while heating others or to limit conditioning to only zones that are in use.

“Traditional cooling and heating systems require tremendous energy to force air from a central blower to a room through a complex system of ductwork, which uses space in buildings and wastes energy. With VRF systems, installation time and costs are reduced, building occupants are comfortable, and energy bills are lower,” explains Kevin Miskewicz, director of commercial marketing, Mitsubishi Electric Trane HVAC US.

Inverter-Driven Compressor

In HVAC terminology, the compressor is the engine driving the HVAC system. In traditional HVAC systems, the compressor speed is constant. It can be on or off. In a VRF system, an inverter-driven compressor controls the speed of the system and can vary the speed depending upon the HVAC needs of the building. The variability of the compressor motor speed can create incredible energy savings.

Heat Recovery

An HVAC system that is capable of heat recovery takes the heat extracted from zones that require cooling and uses it in zones that require heat. This repurposing of available heat allows for better thermal performance across different zones and contributes toward the impressive energy efficiencies created across these systems. It is important to note that VRF systems capable of heat recovery can simultaneously cool and heat different zones within a building.

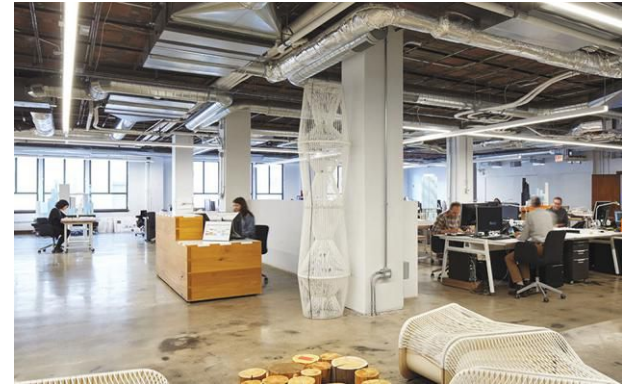
Small and Simple Refrigerant Piping

VRF HVAC systems distribute refrigerant to the area of the building that needs it, conditioning air locally, rather than conditioning air in a central area and then distributing the conditioned air throughout the building. This essentially flips the structure of the system as well. Instead of pulling one run of refrigerant piping from the outside unit to a central location and having bulky ductwork traipse throughout the building to deliver conditioned air, VRF HVAC systems feature more runs of the smaller refrigerant piping pulled to different areas of the building and shorter runs of smaller, low-profile ductwork to deliver the conditioned air into the immediate space, making the footprint of these systems much smaller and easier to design around.

Two-Pipe System Format

A VRF system is available as either a two-pipe or three-pipe system. The two-pipe solution dramatically reduces the total amount of refrigerant

Photos courtesy of Mitsubishi Electric Cooling & Heating



VRF HVAC solutions require smaller runs of ductwork to distribute the conditioned air, dramatically reducing the necessary footprint of the system.



The use of a VRF HVAC system in the Studio Gang Chicago office created a comfortable interior that reduced energy use by more than \$600 per month.

piping needed for the project, making design and installation easier and less expensive. In terms of functionality, there are two-pipe systems that can simultaneously heat and cool interior areas. A two-pipe system capable of heating and cooling simultaneously was selected for the Studio Gang Chicago office space.

Adoption of VRF Systems Worldwide

The technology is gaining popularity in the United States due to its ability to deliver an incredible combination of benefits, enabling designers to achieve aggressive energy performance and interior comfort goals. The system's small footprint makes it easier to incorporate into new construction as well as existing buildings.

▶ Continues at ce.architecturalrecord.com



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PRODUCT REVIEW

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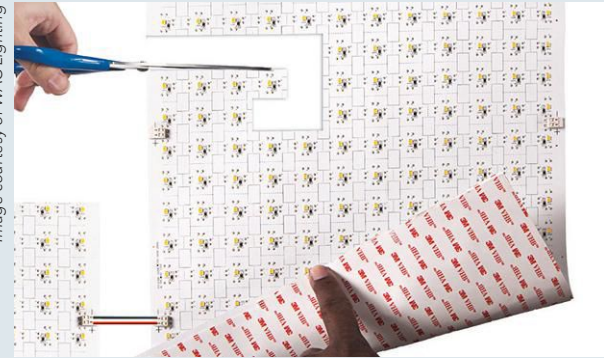
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Floor squeaks can be a sign of construction problems. Overcoming them and creating a quality finished project requires attention to all aspects of a floor system.

Image © 2017 Huber Engineered Woods LLC

Overcoming Structural Floor Squeaks in Wood-Framed Construction

Finished floors only perform as well as the subfloor beneath them

Sponsored by AdvanTech® Subflooring, by Huber Engineered Woods

By Peter J. Arsenault, FAIA, NCARB, LEED AP

Wood-framed buildings are quite well understood by architects, carpenters, building code officials, and others, so why are there so many squeaky wood floors? The concepts of platform framing have remained the same for decades. Even though material choices have changed, the basic principles haven't. Of course, dimensional framing lumber has gotten smaller in actual dimensions, floor spans have tended to increase, and the availability of high-quality wood has decreased, all of which could be contributing factors. In response, engineered wood products have filled the void by providing

consistently strong, stiff materials in the form of trusses, laminated veneer lumber, oriented strand board, plywood, I-joists, and other advanced products. Fasteners and adhesives have also gotten better with some notable engineering improvements.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, is a practicing architect, green building consultant, continuing education presenter, and prolific author engaged nationwide in advancing building performance through better design. www.linkedin.com/in/pjaarch

CONTINUING EDUCATION



1 AIA LU/HSW



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Learning Objectives

After reading this article, you should be able to:

1. Recognize the behavioral characteristics of high-performance wood-framed floor systems with superior strength and stiffness attributes.
2. Investigate the multiple components of a wood-framed floor system and the ways that they all contribute to improved performance and the elimination of movement and floor squeaks.
3. Assess the functional contributions of engineered wood subflooring as it relates to structural strength, fastener retention, water resistance, and overall stiffness.
4. Design and specify wood-framed floor systems that perform as intended and reduce or eliminate squeaks that are indicators of other issues.

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AdvanTech subflooring exceeds PS2 code minimum design standards for strength, stiffness, and fastener-holding power. Documented in the ICC Evaluation Service Report, ESR-1785, AdvanTech subflooring's advanced resin technology provides consistent moisture protection throughout the panels so they stay flat without swelling, cupping, or warping to give finished floors an even, solid feel. With a higher wood density, AdvanTech subfloors are the perfect substrate for a variety of flooring applications, including common gypsum-concrete and two-layer floating subfloor systems in multifamily and light commercial construction.

The Evolution of Water-Resistive and Air Barriers in Commercial Building Envelope Construction

Exploring integrated sheathing solutions with barrier layers incorporated during manufacturing instead of during construction

Sponsored by Georgia-Pacific Gypsum | By Peter J. Arsenault, FAIA, NCARB, LEED AP



Commercial buildings require continuous air and water-resistant barriers in order to meet codes. The means to provide those barriers has evolved since the 1960s with integrated solutions that save time and costs while delivering high performance.

Commercial building envelopes have evolved in recent decades, driven in large part toward better performance for durability, resilience, and energy efficiency. Some of the motivation for these results has been driven by code requirements, others by green building standards, and some simply by owner demands for better performance, faster installation, and labor efficiencies. In response, a number of building products have used innovation backed up by performance testing to address the particular need to create the four barriers needed as part of any building enclosure, namely water-resistive barriers

CONTINUING EDUCATION



1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Explain the key functions required by building codes for water-resistive barriers, continuous air barriers, vapor retarders, and thermal barriers in a building envelope/enclosure.
2. Describe the durability, resilience, energy efficiency, and advantages/disadvantages of various traditional WRB and AB systems, as well as the differences between all-in-one (integrated sheathing with WRB-AB) systems versus traditional WRB and AB systems.
3. Describe the differences—in manufacturing and performance—between coated and fully integrated methods of all-in-one sheathing systems available in the marketplace today.
4. Design with integrated sheathing products to achieve labor, material, and installation time savings in commercial building envelope construction.

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(WRBs), air barriers (ABs), thermal barriers, and vapor retarders. In particular, there has been a rapid acceleration of innovation in air barriers and water-resistive barriers recently.

Therefore, in this course, we will focus on helping architects get up to speed and stay abreast of some of the latest advances in these barriers. Of particular note, all-in-one, integrated gypsum sheathing systems will be looked at that include WRB and AB systems during manufacturing as alternatives to field-applied water- and air-barrier systems. These integrated systems can speed up installation and save time and money during construction. And, since they have been shown to reduce improper field installations, they provide greater reliability and less professional risk compared to separate field-applied solutions.

CODE-REQUIRED BARRIERS TO PROTECT THE BUILDING ENVELOPE

Typically, each of the four common barriers in a building envelope have been treated independently by designers, contractors, and product manufacturers. Indeed, even the building codes address them individually, as we will here as follows.

Water-Resistive Barriers (WRBs)

This barrier is intended to do exactly what its name implies: resist bulk water from penetrating into a wall assembly from the exterior side. WRBs are specifically required by the International Building Code (IBC) and the International Residential Code (IRC) for the purpose of protecting the materials and components of a wall assembly from water that may penetrate past the exterior cladding. Without such protection, unwanted water penetration over time can intrude into the assembly, thus producing deterioration, degradation, and even failure, any of which can render a building unsafe or unhealthy for occupancy. To avoid those conditions, a properly tested WRB is typically called for behind the exterior cladding of a wall assembly on the face of the sheathing or similar surface. The wall assembly then needs to be designed to allow the WRB to function as a water-control layer by channeling water down its exterior face to drain harmlessly away to the exterior. In so doing, it reduces or eliminates potential water and moisture problems inside a wall assembly, particularly in cavity wall framed construction.

Continuous Air Barriers (ABs)

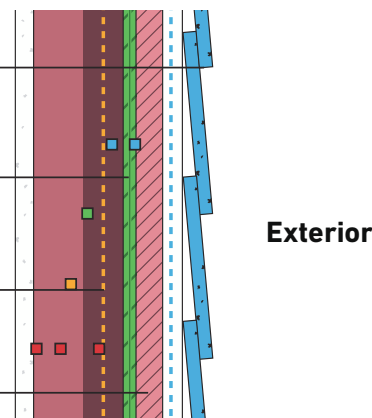
This barrier has received a lot of attention in recent years since unwanted air infiltration has been seen as both a significant drain on energy performance and a means to transfer unwanted airborne moisture into buildings. In particular, the

Water/Rain Control Layer

Air Control Layer

Vapor Control Layer

Thermal Control Layer



The four barriers, or control layers, of an exterior wall envelope all need to be understood independently of each other

International Energy Conservation Code (IECC) now has very specific, mandatory requirements for providing continuous air barriers in building envelopes aimed at restricting or preventing the passage of air in order to assure minimum levels of code required energy performance. The code leaves it to the architect to determine the best location of the AB, whether on an interior or exterior side of a construction assembly, but does indicate that it needs to follow the same line as the building thermal barrier. Its purpose is to essentially “wrap” the building shell to prevent air passing from the outside to the inside due to wind, building “stack effects,” or mechanical ventilation pressure differences. To achieve this in exterior walls, the AB is most typically located behind wall cladding on the face of sheathing or similar surface, just like a WRB.

It is worth noting that the IECC identifies 16 common building materials that qualify as an acceptable air barrier, including such things as plywood, OSB, roof membranes, concrete, masonry, metals, and gypsum board, among others. This makes sense since it is hard to imagine air blowing directly through any of these materials. It clarifies the requirement and also allows for other materials to be used as an approved air barrier if it can show by testing per ASTM E2178 that it achieves an air-penetration rate of no more than 0.004 cfm/ft² (four thousandths of a cubic feet per minute per square foot of material) when tested at a pressure difference of 75 Pascals. This is fairly good news for most materials, but there is an additional requirement that cannot be overlooked, namely the seams, joints, openings, or penetrations of those materials. Under the IECC, in order to qualify as an acceptable continuous air barrier, the entire assembly of materials and products must restrict air penetration. In

this case, the complete assembly must be tested, not just the sheathing or similar product, and demonstrate an air-penetration rate of no more than 0.04 cfm/ft² (four hundredths of a cubic foot per minute per square foot of material), also when tested at a pressure difference of 75 Pascals. While the requirement for the assembly is less stringent than that for the materials, it is nonetheless a dramatic, measurable improvement over previous versions of the IECC, which did not fully address an AB. As a result, it means that much more attention needs to be paid to the continuity of the AB and that all seams, joints, penetrations, and openings must be carefully detailed and properly sealed.

Vapor Retarders

While WRBs address bulk water and ABs address airborne moisture from one side of an assembly, there is also a concern for vapor penetration from the other side of the assembly. Therefore, the IBC and IRC require the use of vapor retarders to protect the building construction on both sides of an assembly. Most commonly, a vapor retarder is required in colder climates and should be installed on the interior face of an exterior wall, roof, or floor assembly. The intent is to prevent warm, moist air from penetrating into the assembly and condensing to form water that can become trapped and cause damage.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, is a nationally known architect, consultant, continuing education presenter, and prolific author advancing building performance through better design. www.pjaarch.com, www.linkedin.com/in/pjaarch



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A perforated and corrugated zinc retrofit envelope helped transform an industrial, turn-of-the-century building—once a bottle-storage facility for an adjacent brewery—into a prime example of innovative sustainable, adaptive reuse at 355 11th Street in San Francisco.

Photo courtesy of Metal Construction Association

The Metal Retrofit Revolution

Delivering longevity, durability, and great aesthetics, metal roofing and cladding panels are a popular choice for today's retrofit and adaptive reuse projects

Sponsored by Metal Construction Association

Long-lasting and durable with a great aesthetic, metal roof and cladding systems are a popular choice for today's commercial and industrial buildings. While these products are in demand for new building projects, the lion's share of activity is taking place in the retrofit market.

Let's start with some terminology: What is the difference between retrofitting a roof and reroofing a roof?

Retrofitting is the installation of new roofing materials over existing roofing materials without removal of the original material.

Reroofing is the complete removal of the existing roofing materials and the installation

of new roofing materials over a clean substrate of furring, decking, or purlins.

The applicable market consists of the residential sector and the commercial/industrial market. Residential buildings are typically high-slope, nonstructural roofing materials applied on a deck of furring or plywood. The commercial/industrial market is typically low slope with differing combinations of structural decking, insulation, and membranes or structural metal panels applied over open framing. Although the materials may look similar, the difference can be significant in several different ways (i.e., material type, material thickness, finish, structural spanning ability, and resistance to water intrusion).

CONTINUING EDUCATION



1 AIA LU

Learning Objectives

After reading this article, you should be able to:

1. Discuss the details of the retrofit and reroofing market, its size, and the different roofing types.
2. Differentiate between the advantages and risks of retrofit and reroofing, and pinpoint key design considerations for these projects.
3. Identify the energy-generating and saving options available with metal roofing projects.
4. Describe best-practice insights for metal wall retrofits.
5. Review helpful metal roofing and cladding renovations.

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When it comes to market size, Chuck Howard, PE, president, Metal Roof Consultants, Cary, North Carolina, writes in the *RCI magazine* article, “Stretching your Retrofit Dollars with Metal Retrofit,” replacement and repair account for approximately 75 percent of all roofing work, with about 30 billion square feet of roofs requiring major repairs every year, according to industry sources.

Furthermore, a national manufacturer of retrofit framing systems has identified one portion of the retrofit market—metal over metal—to be about 24 billion square feet of metal roofs ranging from 27 to 47 years old.

Emphasizing this, Brian Gardiner FRCI, RRC, CCS, BMG Enterprises, San Antonio, points out that the view over any cityscape will show a handful of buildings under construction. “Then compare that with the huge inventory of existing buildings that will eventually need another roof,” he says. “Reroofing/retrofitting of existing buildings substantially surpasses the amount of roofing installed on new construction.”

Acknowledging the “very healthy market” for roofing retrofits, Mark Sullivan, AIA, LEED AP BD+C, NCARB, partner, Joshua Zinder Architecture + Design, Princeton, New Jersey, says this is especially true for buildings with historic status or with a desirable aesthetic that cannot be preserved without the continued use of metal roofs.

But generally speaking, he states, “Replacing an existing metal roof with a new one ensures durability, a long roof life, and an aesthetic that no other material can replicate or match.”

Essentially, Tim Butler, AIA, Murphy Burnham & Buttrick Architects (MBB), New York, states, “Not only is this [retrofit/reroofing] cost-effective, enabling owners to reposition their properties within the marketplace, but it is also a sustainable approach that helps meet the ever-growing demand for new space.”

RETROFITTING VS. REROOFING

In comparing retrofits and reroofing projects, each offers its own advantages and disadvantages.

For starters, retrofits enable the original roof to remain in place to both protect the building interior during the installation and allow building operations to continue. This strategy is less expensive, less invasive, and can be typically done at any time of the year.

Similarly, Andy Feth, P.E., DBIA, LEED AP, project executive, C.W. Driver Companies, San Diego, states, “There is always a market for retrofitting roofs as the original installation reaches the limits of its useful life. Also, with

rooftop photovoltaic systems becoming more popular, some building owners may consider roofing retrofit projects sooner than later.”

Workers are afforded a safer work surface since they are walking on the old roofing, as compared to the open framing members like purlins and joists that workers must deal with when installing a new roof, explains Vincent E. Sagan, PE, senior staff engineer, Metal Building Manufacturers Association (MBMA), Cleveland. Furthermore, demolition waste and the need for a large laydown area for temporary storage of roofing materials is avoided.

“Retrofit takes full advantage of the existing insulation with the option of easily adding more insulation over an existing roof,” he adds.

Even uninsulated roofs still deliver an increased energy efficiency if the cavity between the old roof and bottom of the new metal roof is ventilated. In particular, above-sheathing ventilation (ASV) is recommended, and according to Oak Ridge National Laboratory research, it decreases heat gain through the roof assembly by as much as 30 percent in the summer and delivers a similar heat loss reduction in the winter. With the incorporation of a cool surface, this heat gain reduction can jump to as high as 45 percent.

Another advantage with retrofits is that the through-fastened metal roof system diaphragm remains in place, thereby maintaining the

original structural diaphragm strength used to design the original structure.

“Without this lateral bracing, the secondary roof for a standing-seam type system then requires bridging or other types of bracing and possibly the addition of new framing to meet current wind-loading requirements,” explains Mark James, president, RetroSpec, Dallas. “Granted, if the new roof is a thru-fastened system, then remedial work may not be required for bracing the roof. However, building teams should still anticipate that additional framing may be required to meet current wind loading.”

“In any case, by simply overlaying a new roof over the old one,” Alex Getelman, executive managing director, MBI Group, New York, points out, “The infrastructure doesn’t have to be rebuilt. And if the old roof contains asbestos, retrofitting can be designed to take care of the issue, thereby avoiding the need for expensive removal and disposal.”

“Retrofitting also keeps the building weather resistant during the process, which is the main concern for keeping a building dry and intact,” he adds. “The new high-quality roof can support a building through the unusually strong storms we are now seeing so that the building will stay dry and safe.”

▶ Continues at ce.architecturalrecord.com

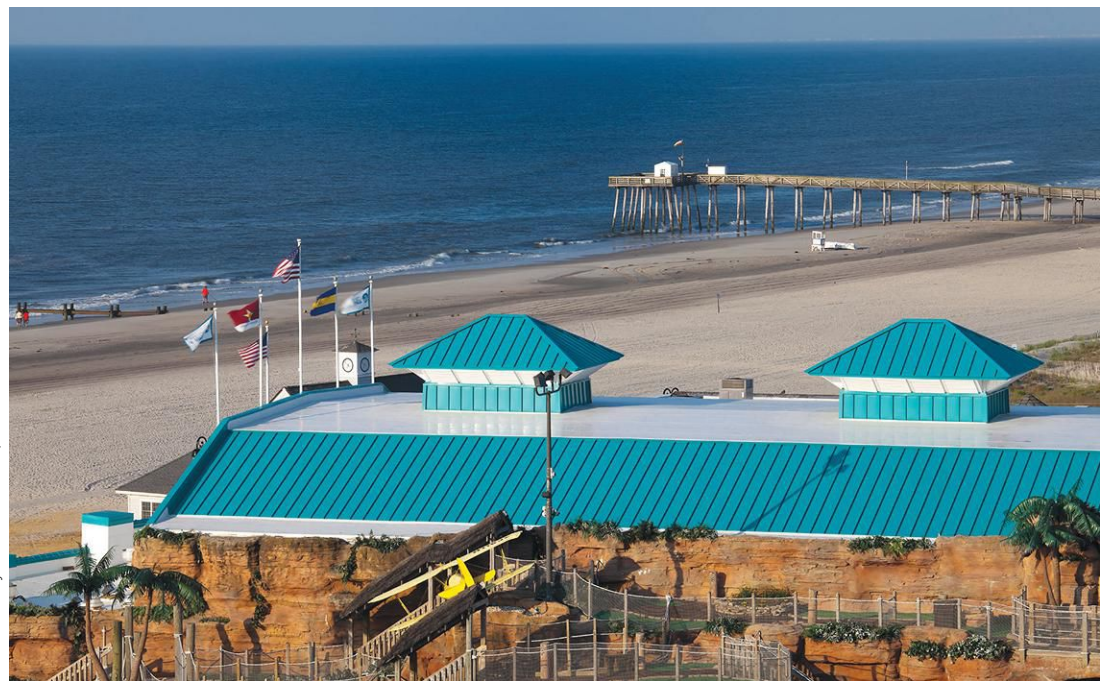


Photo courtesy of Drexel Metals, Inc.

Bringing new life to the Ocean City boardwalk is a bright-blue metal roof retrofit for the Surf Mall in Ocean City, New Jersey.



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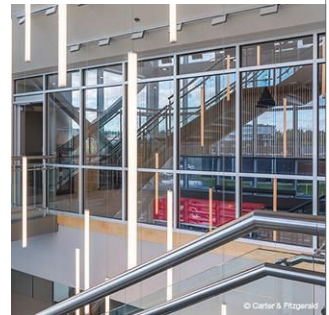
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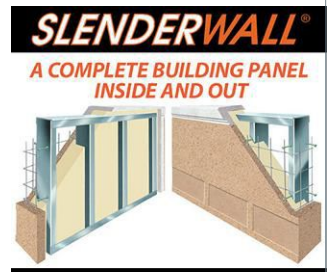
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New and Upcoming Exhibitions

ADFF: NY

New York

October 16–21, 2018

This month, the Architecture & Design Film Festival will launch its 10th season in New York. The event promises dozens of documentaries about creative visionaries, talks with filmmakers and architects, and interactive installations. More at adfilmfest.com.

Edward Burne-Jones

London

October 24, 2018–February 24, 2019

This exhibition at Tate Britain charts Burne-Jones's rise from an outsider of British art to one of the great artists of the European fin de siècle. The museum will display over 150 works in different media including paint, stained glass, and tapestry. More at tate.org.uk.

KAHNSCIOUS: Photographing Architecture

New York

October 27, 2018–January 20, 2019

The Hudson Hall presents Scott Benedict's collection of images, audio documents, and

notes detailing his journey photographing architect Louis I. Kahn's creations. For more information, visit hudsonhall.org.

Paul Rudolph: The Hong Kong Journey

New York

November 29, 2018–March 2, 2019

Through a series of previously unseen drawings, sketches, and renderings, this exhibition at the Center for Architecture will focus on the American architect's three significant projects in Hong Kong. For more information, visit paulrudolphheritagefoundation.org.

The Sea Ranch: Architecture, Environment, and Idealism

San Francisco

December 22, 2018–April 28, 2019

This exhibition at the San Francisco Museum of Modern Art will examine the early concepts and plans for a seminal Northern California Modern development through archival and contemporary photographs, original drawings and sketches from the project's designers, and a full-scale architectural replica. More information at sfmoma.org.

Ongoing Exhibitions

1:1 Drawing, Design, and Communication

New York

Through November 10, 2018

The show at the New York School of Interior Design aims to expose the public to the varied ways designers have approached communication over the centuries, with a specific emphasis on the necessities of communicating designs for production and presentation. The exhibit will include drawings, instructions, objects, and interiors from over 20 historic and contemporary designers. More at nysid.edu.

Mario Bellini for Murano

Venice

Through December 2, 2018

Architect and industrial designer Mario Bellini's glasswork is on display at the Fondazione Musei Civici di Venezia as part of Venice Glass Week. The exhibition features recent productions, including his architecture for the Deutsche Bank headquarters in Frankfurt (2011) and the Louvre's Department of Islamic Art (2012). For more information, see museovetro.visitmuve.it.

B. Wurtz: Kitchen Trees

New York

Through December 7, 2018

For his first public commission, artist B. Wurtz created an installation of five sculptures for New York's City Hall Park. The whimsical, large, arboreal-looking structures are composed of found kitchen items that form "trunks" and cascading "branches," with hanging plastic fruits and vegetables. More at publicartfund.org.

Investigating Where We Live

Washington, D.C.

Through December 31, 2018

The annual exhibit is the product of a five-week program where teens explore and document their interpretation of the city's residents and built environment through photographs, artwork, and writing. The young participants also design and install the exhibit. At the National Building Museum. More information at nbm.org.

Treasures from the White City: Chicago World's Fair of 1893


Chicago

Through January 6, 2019

Held within a gallery that once hosted a reception for the World's Fair of 1893, this exhibit showcases original objects and memorabilia that were designed for and displayed at that international event. Highlighted objects in-




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clude items from the respective pavilions of Tiffany & Company and Gorham Manufacturing Company, which were seen as groundbreaking for their use of silver production at the time of the fair. At the Richard H. Driehaus Museum. For more information, visit driehausmuseum.org.

Renzo Piano: The Art of Making Buildings London

Through January 20, 2019

This exhibit examines the design process of the Pritzker Prize winner and his firm, Renzo Piano Building Workshop, through 16 projects. Each building case study consists of drawings, models, photography, and full-scale maquettes, as well as a new film by Thomas Riedelsheimer. At the Royal Academy of Arts. Visit royalacademy.org.uk.

Ai Weiwei: Life Cycle

Los Angeles

Through March 3, 2019

Chinese artist Ai Weiwei's first major institutional solo exhibition in the city features new and previously unseen sculptural work made in response to the global refugee crisis. The title installation, *Life Cycle*, using the traditional Chinese medium of kite-making, depicts the inflatable boats refugees use to cross the Mediterranean Sea. At the Marciano Art Foundation. Visit marcianoartfoundation.org.

Lectures, Conferences, and Symposia

2018 American Society of Landscape Architects Annual Meeting and EXPO Philadelphia

October 19–22, 2018

The four-day event is the largest global gathering of landscape architects and students, with over 6,000 attendees expected. The program will include more than 135 educational sessions, lectures, and tours, along with a trade show featuring 350 exhibitors. At the Pennsylvania Convention Center. More information at aslameeting.com.

Modern House Day Symposium and Tour New Canaan, Connecticut

October 20, 2018

Hosted by the New Canaan Historical Society, this year's symposium will center on ideals germane to the work of architects, including materiality, proportion, and sustainability. Panelists include Cooper Union's architecture school dean, Nader Tehrani, and architects Sean Godsell and Go Hasegawa. A tour of four modern houses, including Philip Johnson's Glass House,

will follow the discussion. More information at nchistory.org.

Competitions

London Affordable Housing Challenge

Registration deadline: October 9, 2018

As property prices continue to soar in London, this competition asks participants to design a pilot-phase concept for affordable housing in Britain's capital. For more information, go to londonhousing.beebreeders.com.

LA+ ICONOCLAST Design Ideas Competition

Deadline: October 10, 2018

The contest invites landscape architects, architects, planners, artists, and designers to reimagine New York's Central Park. Five winners will share \$20,000 and be featured in a special issue of *LA+ Journal*. See more at laplusjournal.com/ICONOCLAST-Competition.

Memorial to the African Americans Enslaved by William & Mary College

Deadline: October 12, 2018

The Lemon Project Committee on Memorialization invites design submissions for a memorial to the men, women, and children who were enslaved at the College of William & Mary. See wm.edu/sites/enslavedmemorial.

The Rio Reimagined 2018 Ideas Competition

Registration deadline: October 28, 2018

The American Institute of Architects Phoenix Metro Chapter calls on architects, urban planners, landscape architects, developers, and community leaders to submit proposals that would help restore the Rio Salado's natural ecosystem and spur economic vitality in the surrounding eight Arizonan communities that share it. For more information, see aia-phoenixmetro.org/competition-18.

2019 Richard Rogers Fellowship

Deadline: October 28, 2018

Established three years ago by Harvard University's Graduate School of Design, this research-focused residency program takes place at the British architect's Wimbledon House in London. The fellowship is open to candidates who are interested in exploring topics that have been central to Rogers's career, including urbanism and sustainability. Go to richardrogersfellowship.org.

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HELSINKI'S ARCHITECTURAL depth and cultural vitality were enhanced this summer with a lively newcomer: the Amos Rex art museum, a center-city revitalization project by Finnish partnership JKMM, and the new home and identity for the Amos Anderson Art Museum, a private collection housed in a former office building that closed its doors in 2017. The iconic 1938 LasiPalatsi (Glass Palace) was selected as the museum's new venue. Fully renovated, the low-slung white building (seen in the background) now provides entry to the museum and its underground galleries, while the larger project reimagines the adjacent square. Here, exuberant skateboarders, giggling children, and bemused adults swarm around a topography of playfully mounded concrete-tiled protrusions, each tapering to a circular aperture. Below, the various openings illuminate the exhibition spaces and provide glimpses of the civic world outside. The project's biggest challenge, says JKMM principal Asmo Jaaksi, was how to make a museum extension visible and attractive, even though it's subterranean. "Our idea," he says, "was to ask: what if the building refuses to go down completely? What if it's bubbling up from the ground?" *Peter MacKeith*

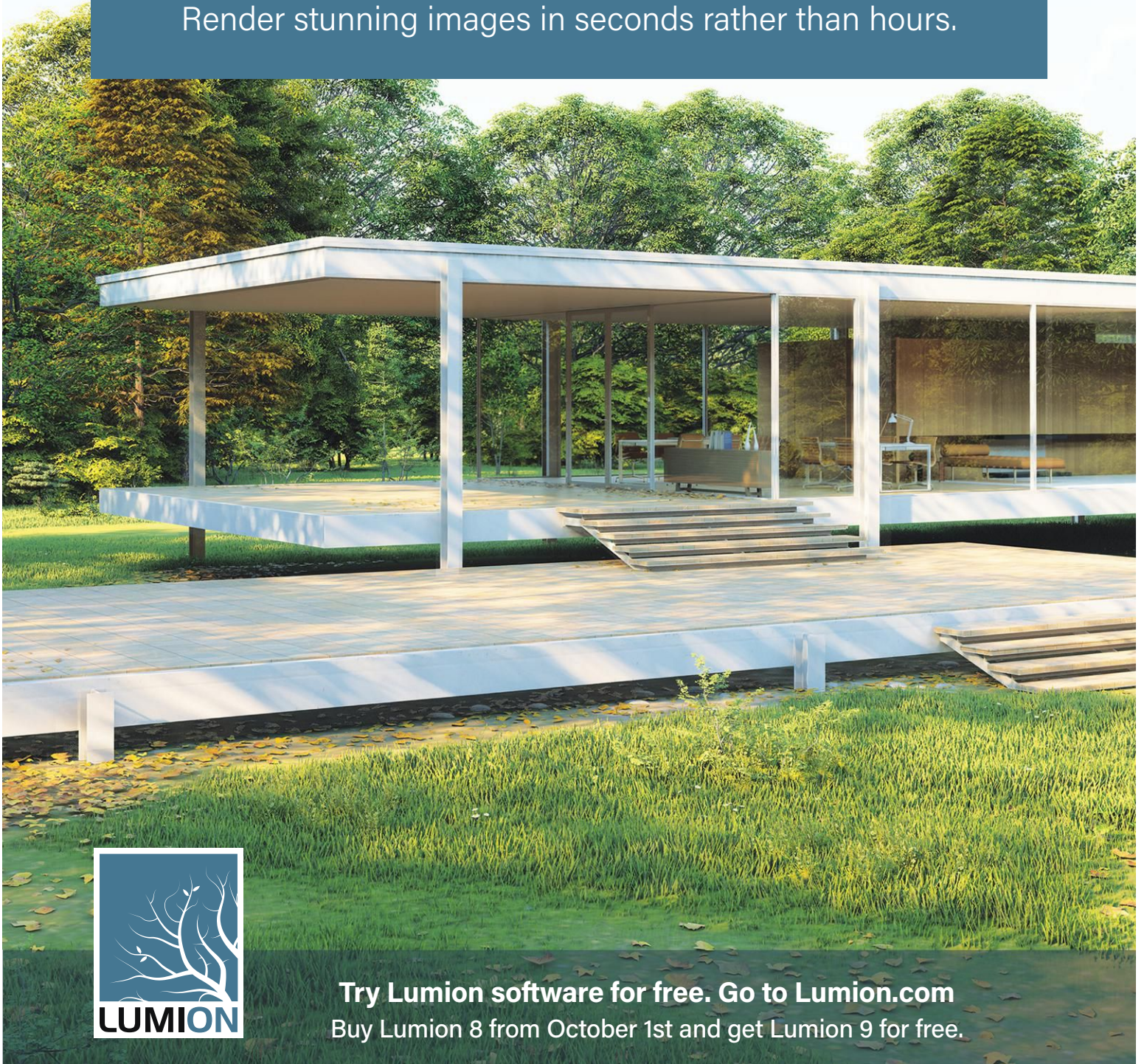




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