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THE PRIDE OF QUEENS

A view from the East River will never be the same after this Steven Holl masterwork.

The design requirement was simple enough: Create an instantly recognizable landmark.

The astonishing part? That is exactly what the design team at **Steven Holl Architects** achieved with the opening of **Hunters Point Community Library**. Scarcely a year old, the $40 million, 22,000-square-foot structure is now hailed as the second-most stunning library on the planet. (Number one? Canada's Calgary Central Library.)

Olaf Schmidt will tell you that the journey to worldwide acclaim isn't swift or easy. The lead architect on the project says this "is the longest I've been involved in a project, from the first conceptual watercolors Steven [Holl] presented until completion last fall." Schmidt is a 19-year veteran of the renowned New York–based architecture firm.

Approximately two dozen early design schemes were rendered before the winner emerged from a sculptural study Holl had crafted for a small art exhibit in Italy. "The concept quickly developed into the building you see today," Schmidt says.

STAR POWER

And what a concept. The silvery five-story rectilinear mass features large organic cutouts that toy with convention. In an architectural hothouse that can quickly reduce exceptional structures to ordinary, Hunters Point Community Library shines like a captivating star on the Queens side of the East River.

Creating breakout design requires uncommon diligence, persistence, and, of course, an open-minded owner. One area that drew little question was the concrete envelope strategy. "Concrete was always in our mind. We did switch from a formed-aluminum cladding to exposed concrete coated in silver. At first, we here hesitant about the exposure, but we were quite pleased when construction was underway," Schmidt recalls.

Concrete proved to be a crucial—if not *the* decisive—design decision, for at least five reasons:

1. **The load-bearing shell** enabled a support-free sequence of interior spaces that create an architectural energy that catches first-time visitors by surprise. The cantilevered layering is a head-turner, offering sightlines that wow and inspire.
2. **The wall structure** was fashioned by 12-foot-by-10-foot formed-in-place concrete panels using common OSB as the form liner, tied together by dense steel rebar. A scaffolding system followed the panel sequence up the 82-foot-tall structure in a series of lifts.
3. **The 12-inch-thick concrete shell** was insulated by mineral wool with a foil-backed vapor barrier. The floor frame is composed of steel. To reduce thermal conductivity, a thermal break element was imposed between the two materials.

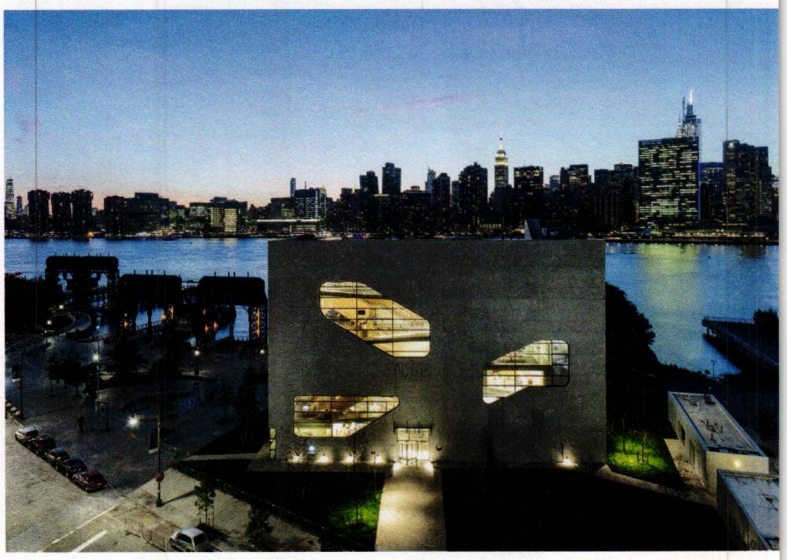

Photo credit: © Paul Warchol

4. **The exterior silver coating** is a mineral product engineered to penetrate the concrete exterior, holding a soft-sheen luster decades longer than conventional paint and reducing maintenance expense.
5. **The stark, striking simplicity of the exterior** contrasts nicely with the warmth of the wood-clad interior. A rooftop terrace of ipe wood decking invites patrons to relax topside in warm-weather months.

Amid this architectural splendor is a vibrant, functioning community library, the pride of the Queens library system. "It's remarkable the city has the ambition and vision to do this kind of project. It speaks well of the city's pride and sense of place," Schmidt quietly observes. A pride that is now admired worldwide.

Client: DDC and Queens Library
Architect: Steven Holl Architects
Landscape Architect: Michael Van Valkenburgh
Structural Engineer: Robert Silman Associates
MEP Engineer: ICOR Associates
Lighting: L'Observatoire International
LEED Consultant: ADS Engineers
Code Consultant: Irene Joyce Berzak-Schoen
Civil Engineer: Langan Engineering & Environmental Services
Fire Safety: Rolf Jensen & Associates
Cost Consultant: Davis Langdon
Specifications: Construction Specifications
Climate Engineering: Transsolar

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Architect: CambridgeSeven | Photo Credit: Jeff Goldberg - Esto

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On the cover: Campau/Davison/Banglatown Neighborhood Framework Plan by Interboro Partners; photo courtesy Interboro Partners.

AIA 2020 AWARDS

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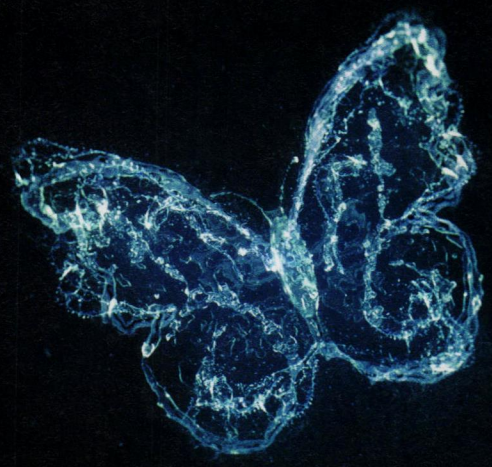

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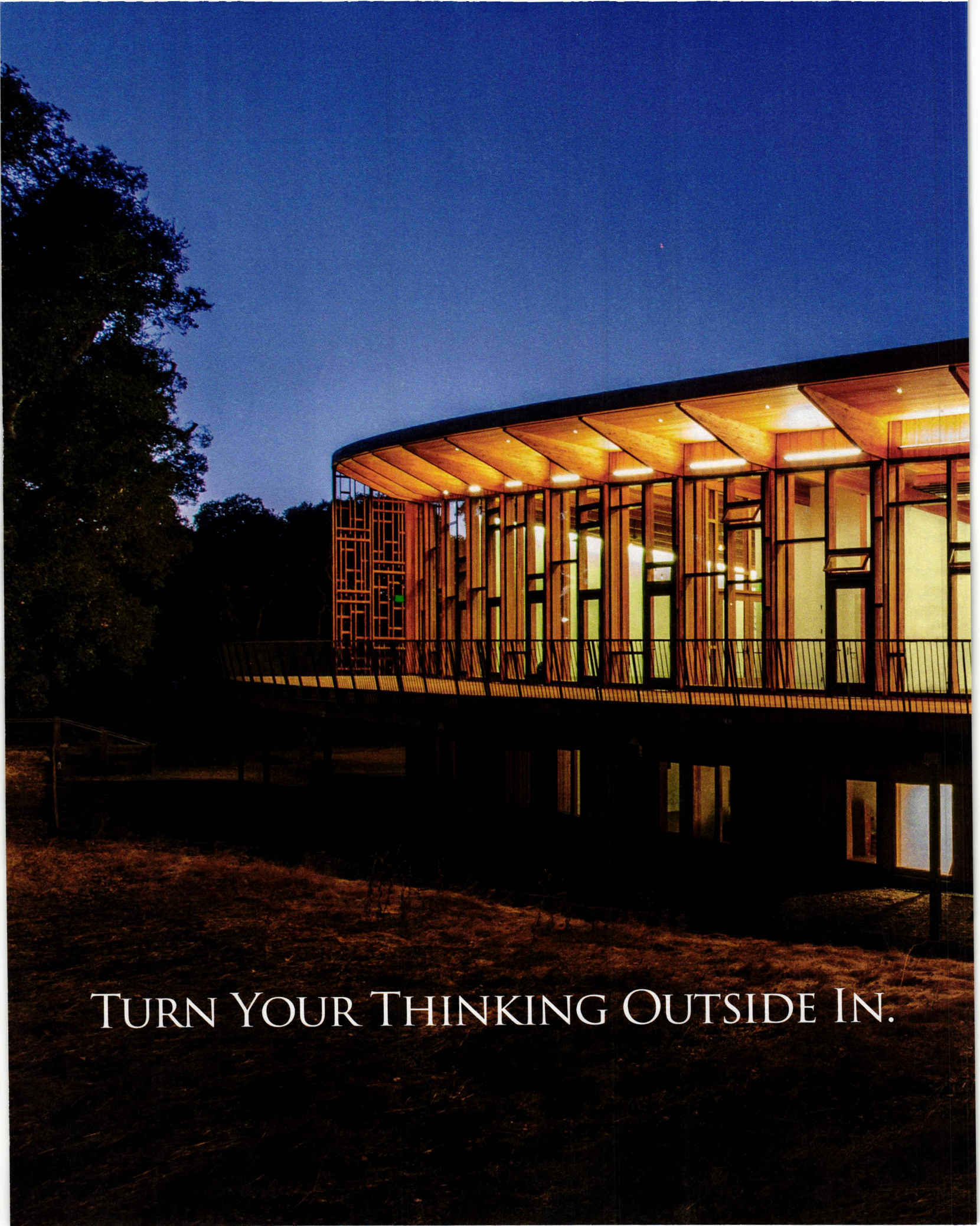
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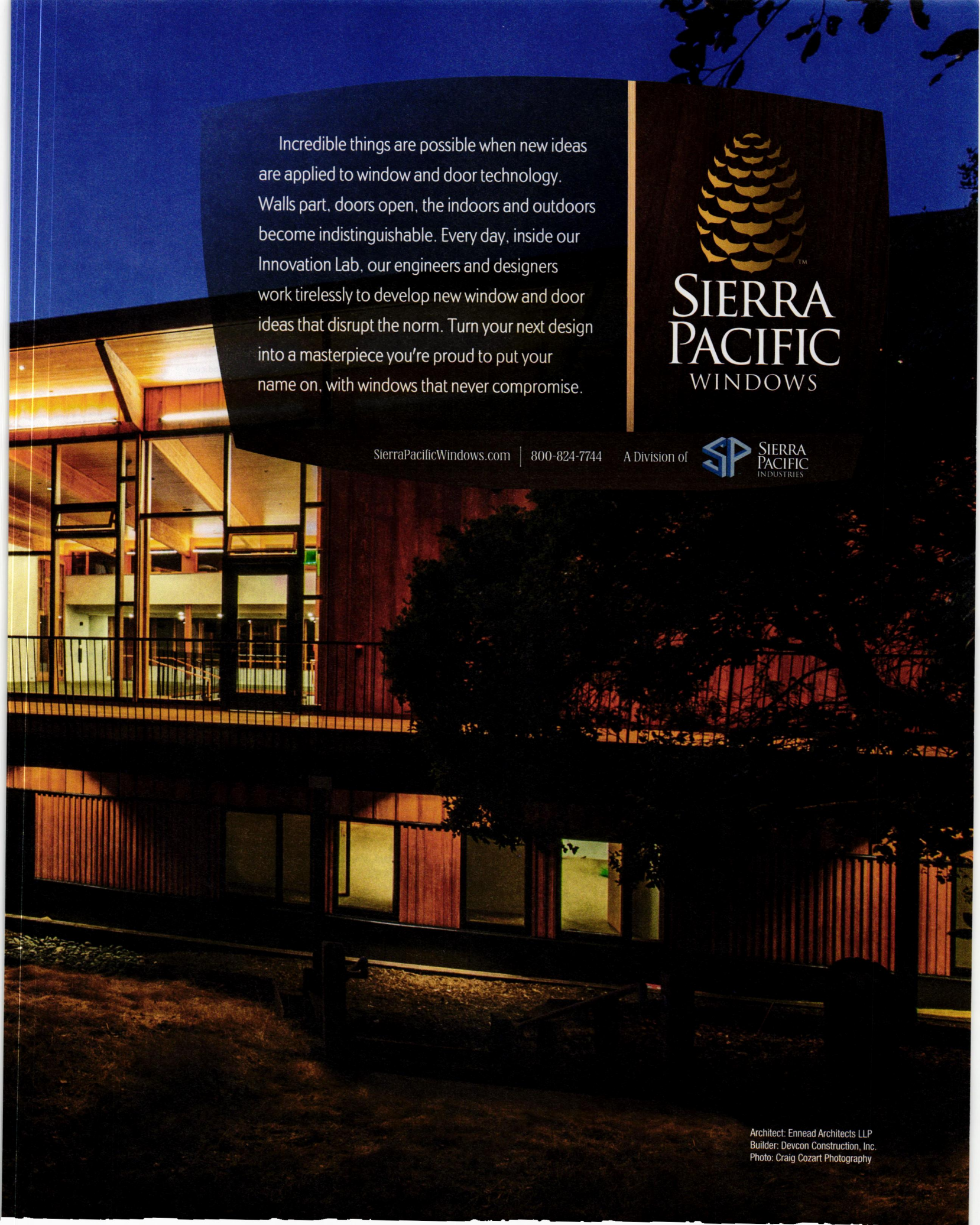
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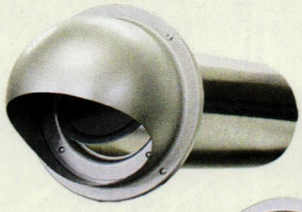

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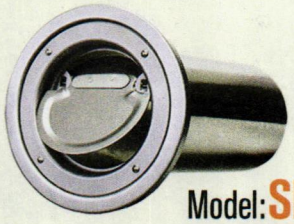

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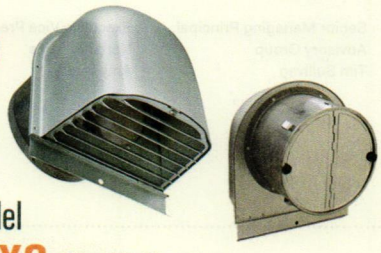

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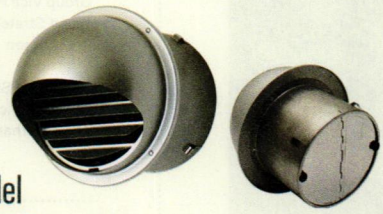
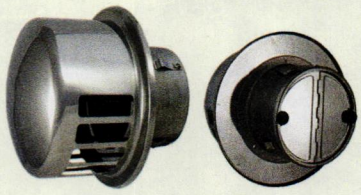


Model
SFZC 4"& 6" Aluminum



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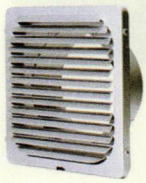

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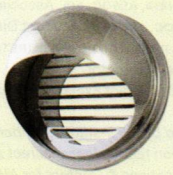

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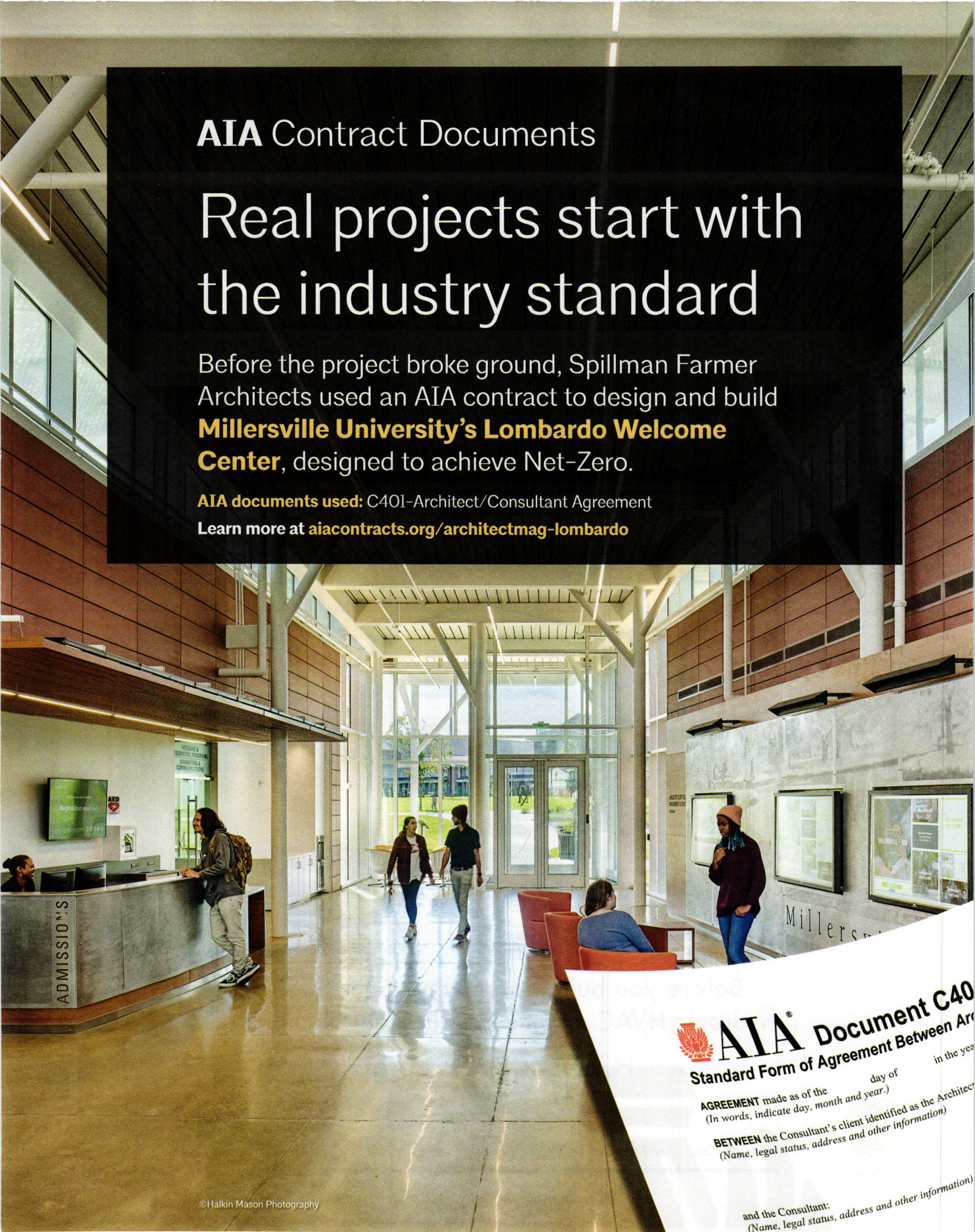

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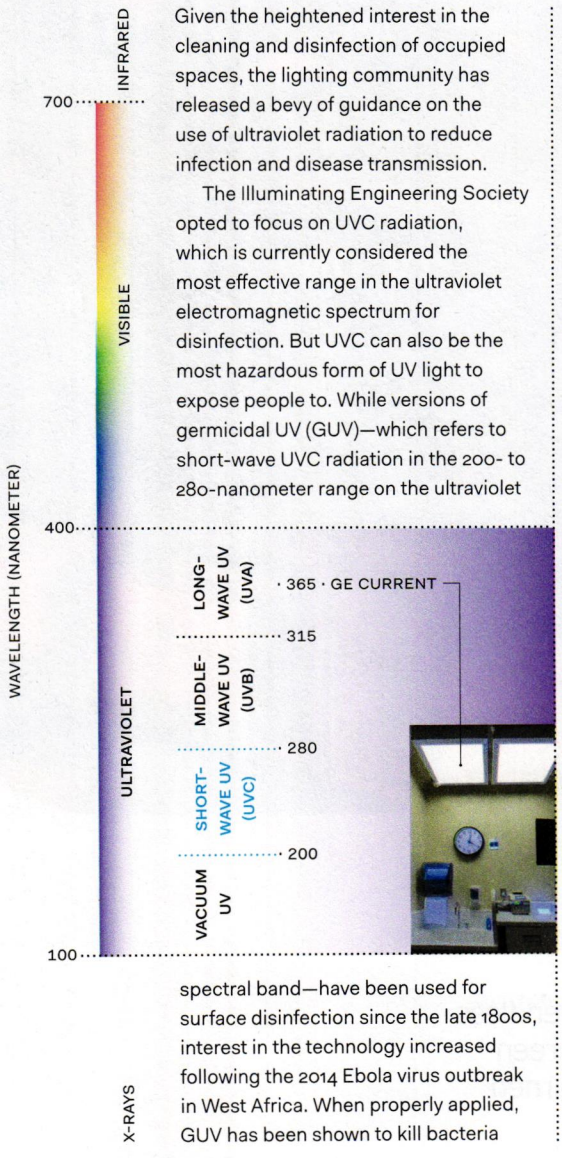
Architectural Lighting: The Realities of Germicidal UV

TEXT BY KATHARINE KEANE



Given the heightened interest in the cleaning and disinfection of occupied spaces, the lighting community has released a bevy of guidance on the use of ultraviolet radiation to reduce infection and disease transmission.

The Illuminating Engineering Society opted to focus on UVC radiation, which is currently considered the most effective range in the ultraviolet electromagnetic spectrum for disinfection. But UVC can also be the most hazardous form of UV light to expose people to. While versions of germicidal UV (GUV)—which refers to short-wave UVC radiation in the 200- to 280-nanometer range on the ultraviolet spectral band—have been used for surface disinfection since the late 1800s, interest in the technology increased following the 2014 Ebola virus outbreak in West Africa. When properly applied, GUV has been shown to kill bacteria and spores, and to deactivate viruses, including SARS-CoV-2.

Following a special IES subcommittee convened this spring to address GUV, the organization published the report "Germicidal Ultraviolet (GUV)–Frequently Asked Questions." "There is enough misleading information that we felt we really needed to address the typical questions people have," says subcommittee chair and medical physicist David Sliney.

"For viruses, very-short-wavelength UVC will break down its RNA, preventing the virus from replicating," explain professor Mark Rea and senior research scientist Andrew Bierman. Both are based at the Lighting Research Center at Rensselaer Polytechnic Institute, in Troy, N.Y. "For bacteria, the UV is absorbed by a chromophore, which creates intracellular reactive oxygen molecules, like hydrogen peroxide, that react with life-sustaining molecules."

If used properly, luminaires outfitted with UVC light sources will not likely cause harm to occupants. Sliney remarks that the long-held belief that UVC causes skin cancer "is largely a myth." However, direct exposure can cause uncomfortable eye conditions such as photokeratitis—also known as "welder's flash"—or photoconjunctivitis. As such, the IES recommends the use of UVC light only in upper air germicidal fixtures, where the source is positioned at least 7 feet high and directed at the ceiling to irradiate air as it circulates.

"Upper-room GUV disinfects large volumes of room air (above occupant heads) at once, resulting in high 'equivalent' air changes per hour in terms of air disinfection only," the IES report explains. For rooms that do not have the requisite minimum ceiling height of 7 feet, designers can instead specify UV lamps designed to be installed inside air ducts for both residential and commercial HVAC systems. However, when installed in ducts, this technology cannot limit the spread of disease between people, cautions the IES in its report.

Many lighting manufacturers and technology companies have developed alternative options to UVC sources, leveraging LEDs and other light spectra to offer antimicrobial effects without limiting occupation. GE Current, for example, sells a recessed LED luminaire that outputs both UVA light (at a wavelength of 365 nanometers) for disinfection and white light for direct illumination.

Greenville, S.C.–based Hubbell Lighting's SpectraClean line of fixtures targets bacteria, molds, fungi, and yeast in commercial settings with 405-nanometer visible light.

Troy, N.Y.–based LED technology company Vital Vio's VioSafe White Light Disinfection technology targets strep, MRSA, *E. coli*, and salmonella. Vital Vio founder Colleen Costello says her company can replace overhead lighting with fixtures that create "inhospitable environments for germs, just through lighting."

SOURCE: ILLUMINATING ENGINEERING SOCIETY

> *For more information on the technologies available for reducing bacteria, mold, spores, and viruses using light, visit bit.ly/ARGUVLight.*

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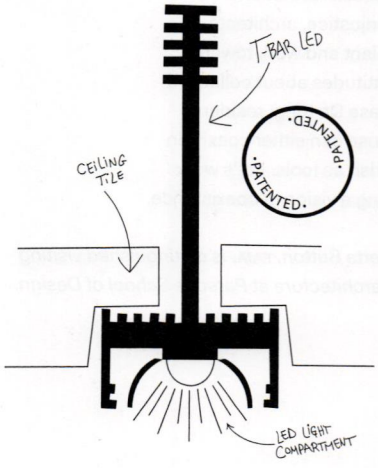

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Opinion: Envisioning a Communitarian World House

TEXT BY SHARON EGRETTA SUTTON, FAIA

Fifty years ago, Dr. Martin Luther King Jr. nailed America's greatest challenge: learning to coexist within "the architectural pattern of [a] large world house," its upper floors soaring into the stratosphere of science and technology, its foundations mired in racism, poverty, and violence. Dr. King envisioned two futures: one powered by injustice, the other by social vision; one leading to chaos, the other to community.

Despite scientific and technological progress, a chasm in the nation's economic system has steadily undermined the foundation of collective life, creating inequities that threaten catastrophic failure. On one side of the abyss are billionaires who purchase palatial abodes as safety deposit boxes for investment income. On the other are renters and homeowners who struggle to circumvent a growing mismatch between housing costs and earnings.

When the economy was robust and unemployment at historic lows, developers were raking in profits from new subdivisions, especially from areas with cheap land and low taxes. Yet, low-income families—and even median-income families—were priced out, both groups facing eviction, forfeiture of property, stays in homeless shelters, depression, illness, unemployment, and school failure.

The housing crisis that stemmed from commodifying a human necessity existed long before the pandemic but went largely unnoticed. The pause that halted business as usual exposed its ugly secrets, accentuating the life-and-death difference between sheltering in commodious spaces and sheltering in crowded ones or in streets and other spaces unfit for human habitation. News reports exposed the absurdity of "sheltering" poor people "in place," especially black Americans, many of whom live in abysmal environments, overrepresented among the homeless and now among COVID-19 victims.

Yet, Cornell University historian Nicholas Mulder speculates that COVID-19 could produce a silver lining as occurred after World War II when social inequalities flattened. With business as usual on hold, we architects could seize the opportunity created by increased public consciousness of housing injustice. We could animate public dialogue about homeownership as a source of wealth, which while benefiting some, has put the most basic means of survival up for grabs to the highest bidder. Echoing sociologist Amitai Etzioni's call for a bond among the nation's social groups, we could envision a communitarian contract as the foundation of a world house. We could call for equilibrating the rights and responsibilities of residents, whether impoverished, affluent, or middling. We could demand that politicians guarantee the right to housing, while requiring that taxpayers contribute to community well-being according to their means.

At this watershed moment, we could reimagine our roles as architects. Not waiting for developers to call the shots, we could about-face and work with residents to create the dwellings of community. We could reinvent ourselves by studying innovations like New York's Urban Homesteading Assistance Board or Boston's Dudley Street Neighborhood Initiative, where affordability stems from sweat equity, share loans, resident management, mutual aid, and energy efficiency. However, we would need to raise the bar and persuade well-heeled folks to live in mixed-income, collectively owned, limited equity communities that pool financial, social, and cultural wealth. We would need to take advantage of the public's heightened awareness of low-wage workers' contributions to society and call for nothing less than total reconstruction of the nation's architectural pattern.

Dr. King noted that, like Rip Van Winkle, protectors of the status quo sleep through social revolutions. As obstructers of injustice, architects can remain vigilant and work toward transforming attitudes about collective life. To paraphrase Dr. King, residents of the world house can either coexist in harmony or perish as fools. Let's work toward designing a vision of coexistence.

Dr. Sharon Egretta Sutton, FAIA, is distinguished visiting professor of architecture at Parsons School of Design.

> *To read more opinion pieces by thought leaders in the design community, visit bit.ly/AROpinion.*

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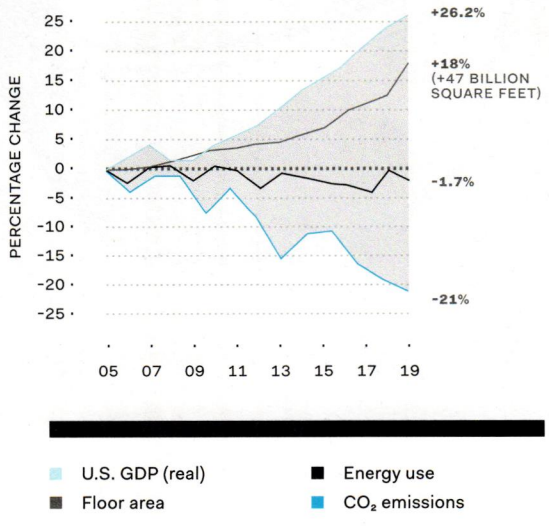
CarbonPositive: Danger and Opportunity

TEXT BY EDWARD MAZRIA, FAIA

> *"When written in Chinese, the word crisis (危机) is composed of two characters. One represents danger and the other represents opportunity."*
>
> —John F. Kennedy

The heartbreaking crisis of the COVID-19 pandemic brings with it a rare opportunity for the architecture, planning, and building community. We know the pandemic is already changing the way we live and conduct business, affecting the way we will design and ultimately the way we will build.

U.S. GDP and Building Floor Area, Operating Energy Use, and CO_2 Emissions, 2005–2019



As temperatures continue to rise and many are still sheltering in place, we are also reminded of the need for dramatic action to mitigate the other planetary emergency we are facing: the climate crisis. Our collective work to effectively address this life-threatening crisis is already underway. We have realized the seemingly impossible and have paved the way for our community to move forward.

Since the Industrial Revolution, as the economy grew so did the building sector, resulting in more construction, more energy consumption, and more CO_2 emissions. During the Great Recession, from 2007 through 2009, the U.S. gross domestic product stalled and so did the building sector. However, after 2009, when the economy began to grow again and GDP rose, the unexpected happened:

> *Beginning in 2010, U.S. economic growth and increased building construction decoupled from building sector energy use and CO_2 emissions—an unprecedented achievement in modern U.S. history.*

While U.S. GDP increased 26.2% and the building sector floor area by 18% (about 47 billion square feet), operating energy use and emissions in the building sector decreased by 1.7%, and 21%, respectively. This decoupling now appears to be actualizing globally as well.

Our leadership, influence, and power as architects, designers, and allied professionals go beyond borders and governments, as we are primarily responsible for shaping the built environment. It's clear we can grow our economies, create and support livable and equitable communities, and phase out fossil fuels to solve the climate crisis.

Now is the time to deepen our motivation and expand our actions—designing buildings with no on-site fossil fuels; shifting to carbon positive buildings, materials, construction, and infrastructure; implementing building decarbonization; creating clean energy jobs; integrating passive design strategies and renewable energy in projects; and designing to keep people safe during climate catastrophes and pandemics.

With global building construction stalled and the sector's emissions set to drop significantly this year, by accelerating our efforts post-pandemic and continuing to work together with a shared vision, we suddenly have within our grasp what once seemed unreachable: keeping planetary warming to 1.5 degrees C. We should welcome this opportunity as we reshape our world in this time of crisis.

Edward Mazria, FAIA, is founder and CEO of the nonprofit Architecture 2030.

SOURCE: ARCHITECTURE 2030, U.S. ENERGY INFORMATION ADMINISTRATION,

> *If your firm hasn't joined the 2030 Commitment to help decarbonize the building sector, visit bit.ly/2030Commitment.*

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The Rules: COBRA and the Affordable Care Act

TEXT BY TERRI PETERS

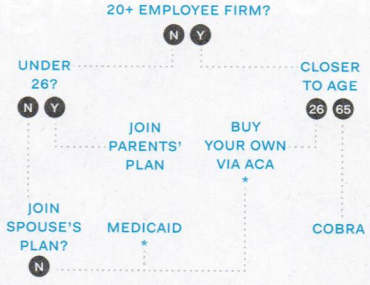
One immediate concern following a layoff or work-hour reduction is the impact on health care coverage. If your firm has 20 or more employees, the Consolidated Omnibus Budget Reconciliation Act (COBRA) gives workers the right to keep their group health insurance plan if they lose or leave their jobs, or if they no longer qualify for coverage due to reduced work hours. Ask "if your employer will be helping to subsidize COBRA coverage," says Jennifer Berman, CEO of Pikesville, Md.–based MZQ Consulting, which specializes in benefits compliance. Otherwise, individuals "can be required to pay up to 102% of the cost of that coverage," which amounts to the cost of the plan plus a 2% administrative fee.

That may be too expensive for the newly unemployed. The national average COBRA premium is approximately $600 per month for individual coverage, estimates Den Bishop, president of Holmes Murphy & Associates, a Des Moines, Iowa–based insurance brokerage that represents more than 750 architecture and engineering firms in the Midwest. "While there is debate in Washington, D.C., about subsidies for COBRA continuation," he says, "there is nothing in any of the recovery funding for this yet."

Losing health coverage is typically considered a qualifying life event, so you can be enrolled in your spouse's employer health care plan, if the option exists. If you are under the age of 26, you can join your parents' plan thanks to the Affordable Care Act. You may also be eligible for Medicaid, a government-funded, means-tested program for low-income adults, families, and the elderly; eligibility varies by state.

Another option is to purchase an individual health insurance plan. The Affordable Care Act Marketplace offers a range of options, though not every insurer offers plans through that exchange. "These plans are priced based on location and also age," Berman says. "In many cases, COBRA will be better in terms of pricing for those closer to age 65, but younger individuals may be better off purchasing coverage on their own."

Health care options for people without an employer group plan†



† ELIGIBILITY AND CONDITIONS VARY PER EMPLOYEE, EMPLOYER, AND STATE.
* CHECK ELIGIBILITY AND SUBSIDIES

Bishop says, "Based on an individual's income—which may be difficult to determine if they just lost their job—they might qualify for a subsidy for individual coverage, or could even qualify for free coverage through Medicaid." However, you can only receive the subsidy if you purchase a plan through your state's health insurance marketplace.

Though the ACA continues to be contested in court, Berman believes it is here to stay. "It has now been over 10 years and [the ACA] is deeply entrenched in our system at this point," she says. "Any change would also severely disrupt the health care system in the midst of a health care crisis. In light of these factors, I believe any Supreme Court decision in the current cases would be very narrow."

Introduced as part of the CARES Act signed into law in March, the Families First Coronavirus Response Act requires health care plans to cover all costs related to COVID-19 diagnostic testing—but nothing after that. "As a result, most health care plans cover COVID-19 treatment with the same deductibles and copays that apply to any other medical treatment," notes John Arendshorst, a partner at Grand Rapids, Mich.–based law firm Varnum. "We have seen a few employer group health plans reducing or waiving cost-sharing with respect to [COVID-19] treatment as well, but they are not required to do so."

Staying informed about health care coverage for you and your employees is even more crucial during the COVID-19 pandemic. "Health insurance in the U.S. is the most complicated consumer industry on the planet," Bishop says. "And that was *before* COVID-19 came along."

> *To read more of The Rules, a monthly series covering important regulations in a clear manner, visit bit.ly/ARTheRules.*

Next Progressives: Dash Marshall

EDITED BY KATHARINE KEANE

Location:
Brooklyn, N.Y., and Detroit

Year founded:
2009

Education:
Yang: B.S., MIT; M.Arch., Columbia University Graduate School of Architecture, Planning & Preservation; *Yao:* B.S., University of Waterloo; M.Arch., Harvard Graduate School of Design; *Boyer:* B.F.A., Rhode Island School of Design; M.Arch., Harvard GSD

Firm size:
Five full-time, but we bring in collaborators to contribute to specific aspects of projects as needed

How founders met:
At the office of Toshiko Mori, FAIA

Origin of firm name:
Dash Marshall is the name of an imaginary bossman we invented to lend our fledgling enterprise more credibility. We wanted something that sounded as familiar as General Motors and vaguely like a person's name—like Don Draper but older. At the time, we created a whole backstory for Dash: "He was this lovely Australian from Perth who passed away in his 80s and we work to continue his legacy." The name is also a jab at the fact that more often than not old white men are still the ones running architecture firms. Progress on racial and gender equity cannot come soon enough.

Firm leadership:

Amy Yang

Ritchie Yao

Bryan Boyer, ASSOC. AIA

Mission:
We create spaces that work well for people, so they can be better advocates for spaces that work well for the community. Beyond the projects, we're trying to create a good environment for our team where, together, we can do good work for others.

Favorite project:
Yang: We still hear from the owners of our Raft Loft project, in New York, about how much it has changed their experience of home. Hard to beat that. *Yao:* We are currently in design development on a new home for the Detroit Public Theatre. It is an adaptive reuse of one of the first auto garages in the United States. *Boyer:* The Autonomous Vehicles: Future Scenarios project we created for the National League of Cities as a joint venture with our frequent collaborator Star City Group. Our scenarios show how urban leaders can harness AVs for policy goals—improving everyday life for normal people. They're systemic and tangible at the same time, and were co-created with input from the mayoral leadership of 10 cities assembled into a network by Bloomberg Philanthropies and The Aspen Institute, so it had an immediate and important audience.

A tool you would love to invent:
Global Architect Card, which would be something you can flash like an FBI agent and say, "I'm an architect!" It would give you access to every nice building in the world so you can take pictures, inspect finely detailed stairs, or see the hidden courtyards. We got tired of waiting and created this already—you can buy them on our website now.

Special item in your studio space:
We created an experimental device called the Very Slow Movie Player to see if we could change the way we perceive time. It plays a movie at 24 frames per hour and takes more than a year to complete a single film.

A design trend that needs to return:
Civic clocks

Greatest design challenge you've overcome:
The matter battle, which is the difficulty of realizing digital designs in physical material. We like to think that we detail and build spaces that are as nice in person as they are in photos.

A social media account to follow:
One whose opinion you disagree with

Biggest career leap:
Starting a business during the Great Recession

Design aggravation:
People pretending to draw by hand for the sake of Instagram

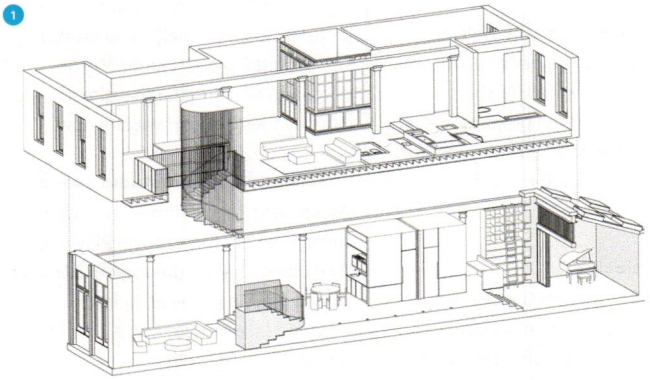
Advice for your younger selves:
Go to parties of non-architects in school and become friends with them.

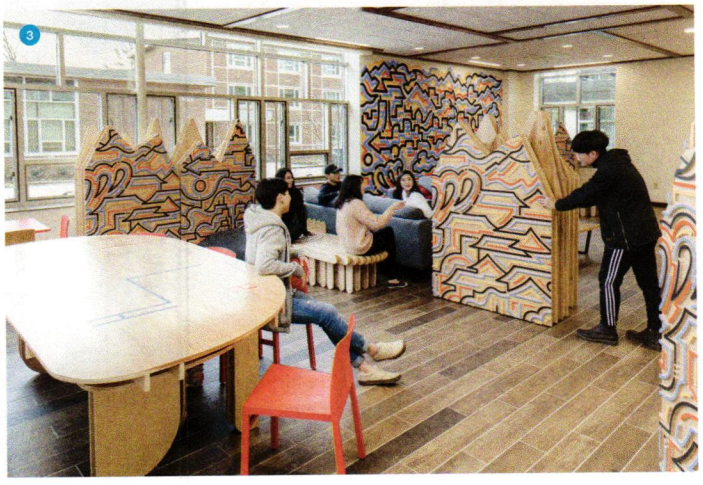
COURTESY DASH MARSHALL

> *For more on Dash Marshall's work and inspiration, visit bit.ly/ARDashMarshall.*

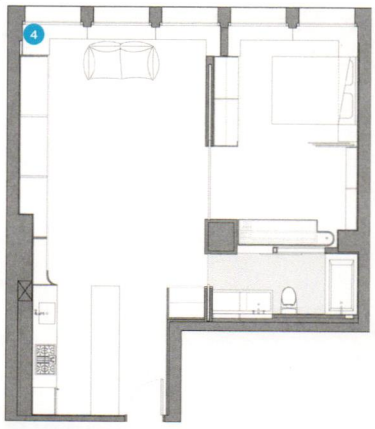
Next Progressives:
Dash Marshall

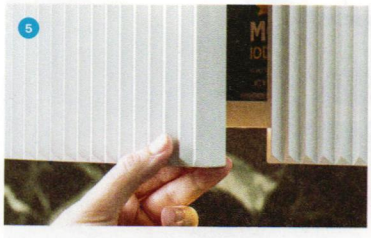
1

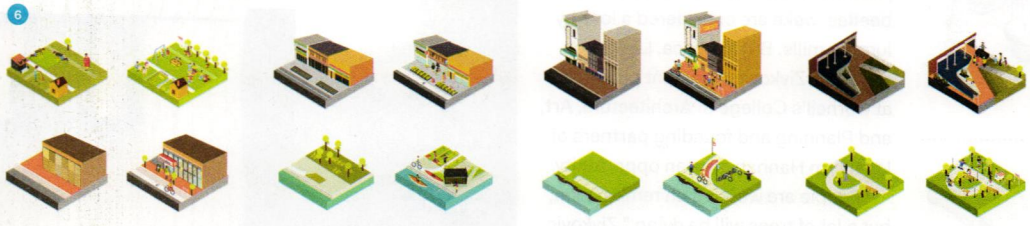




1, 5: MARK WICKENS; 2, 6: COURTESY DASH MARSHALL; 3: MARC NEWTON



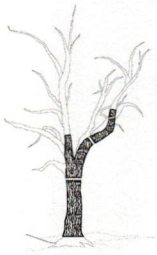


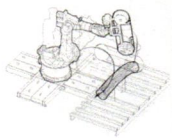


1. The Raft Loft, in New York City, uses an elevated platform, or raft, that divides the ground floor into three distinct zones. A suspended staircase helps to maximize floor space in the living room. 2. The Autonomous Vehicles: Future Scenarios project features "pro-urban AV concepts through a glimpse of the daily life of residents of future cities," according to the firm. 3. Designed in collaboration with New York–based artist Yoon Hyup, this furniture series for the Young Sam Kim Korean Student Center at Binghamton University, in Upstate New York, includes a table, benches, and a screen module made of wood to evoke the traditional Korean home and is finished with abstracted houses, rivers, and mountains. "The ideal Korean house sits facing a river, with mountains at its back," the firm explains. "For students who are away from home, we built all three." 4. Dash Marshall renovated a 715-square-foot New York apartment into a "space capsule temporarily docked here on Earth" that can hide away all personal items. 5. The firm re-created and reconceived Ludwig Mies van der Rohe's signature design elements for this Detroit house renovation. In the kitchen, verde alpi marble acts as a nod to Mies's use of the material in corporate lobbies, and corrugated cabinet doors become a seamless volume. In an office, the firm opted to borrow the architect's "clever soffit detail at the façade [to create] a similar nook in the closet." 6. Dash Marshall worked with the Reimagining the Civic Commons initiative to create a visual CliffNotes of before-and-after scenarios for urban design interventions.

4: ELIZABETH WENTLING

Residential: Ashen Cabin, by Hannah





TEXT BY MADELEINE D'ANGELO

In 2018, the 100,000 ash trees in Cornell University's 4,200-acre Arnot Forest in Ithaca, N.Y., faced an alarming threat: Caretakers detected *Agrilus planipennis*, commonly known as the Emerald Ash Borer—an invasive beetle that threatens billions of ash trees in 35 U.S. states and several Canadian provinces. The withered trees left in the beetles' wake are considered a loss by lumber mills. But in Ithaca, Leslie Lok and Sasa Zivkovic, assistant professors at Cornell's College of Architecture, Art, and Planning and founding partners of local firm Hannah, saw an opportunity.

"People are working on remediation, but a lot of trees will be dying," Zivkovic says. "We think they are an enormous material resource and should be used for construction." Intent on finding a use for the castoff trees, the firm began work on a prototype residential project in 2017.

The result is the Ashen Cabin, a compact getaway outside Ithaca. With 3D-printed concrete footings and an envelope made from infested ash wood, it serves as an investigation into how unconventional building materials and technologies can influence the design of residential projects. "You start with the intention of looking at how we can use these materials differently, or to develop novel architectural expression," Lok says. "It allows us a larger range of tools and materials that we can design with."

First, Lok and Zivkovic developed the cabin's concrete foundation, pulling from their research at Cornell's Robotic Construction Laboratory (RCL). They

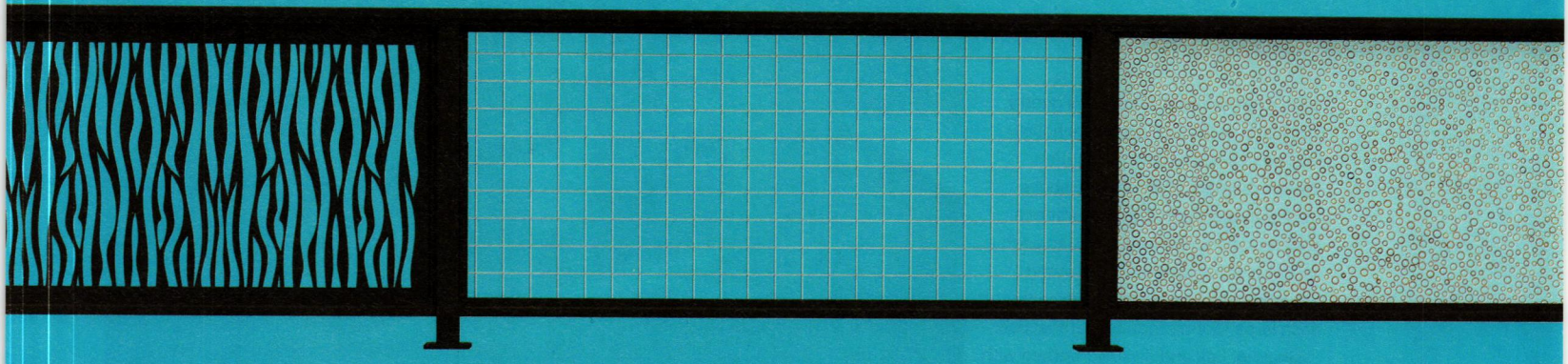
Perched on concrete footings, the house's envelope highlights the natural curve of infested ash wood.

COURTESY HANNAH

Project Credits
Project: Ashen Cabin, Ithaca, N.Y.
Client/Architect: Hannah, Ithaca, N.Y. · Leslie Lok and Sasa Zivkovic (principals); Byungchan Ahn, Alexander Terry (wood fabrication/design); Xiaoxue Ma, Alexandre Mecattaf (wood studies); Freddo Daneshvaran, Ramses Gonzalez, Jiaying Wei, Jiayi Xing, Xiaohang Yan, Sarah Bujnowski, Eleanor Krause, Todd Petrie, Isabel Branas, Xiaoxue Ma (wood assembly/documentation); Christopher Battaglia, Jeremy Bilotti, Justin Hazelwood, Mitchie Qiao (concrete); Reuben Chen, Alexandre Mecattaf, Ethan Davis, Russell Southard, Dax Simitch Warke, Ramses Gonzales (concrete assembly/documentation)
Scientific Support: Cornell Robotic Construction Laboratory
Forestry Consultant: Peter Smallidge
Size: 100 square feet
Cost: Withheld

> *For more photos of the Ashen Cabin, visit bit.ly/AshenCabinHannah.*

GET



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Residential:
Hannah

The architects maximized the compact plan by anchoring each wall with functional built-in objects.

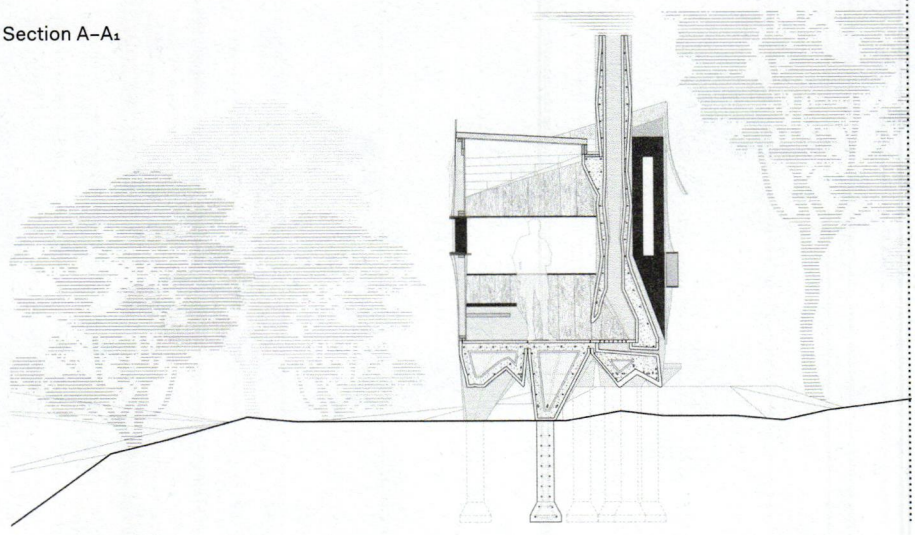
used a large-format three-axis gantry 3D printer at the RCL to create hollow footings for the cabin's foundation. When complete, the concrete shells were transported to the site, where a custom rebar cage was added to each void before being filled with poured concrete; blocks of foam in the center of each large footing reduce material use.

In 2019, Lok and Zivkovic worked with Peter Smallidge, the senior extension associate for the Arnot Forest, to hand-select trees that had been killed by the beetle infestation. Although regular sawmills can't process the damaged trees due to their irregular curvature, Lok and Zivkovic used an iPad-based scanner to generate precise digital models to determine the best way to cut each log, and sent those models to a 5-horsepower band saw, custom-built for the RCL, which sliced boards of varying thicknesses that exaggerate or minimize the wood's curve. A system of screens and biodegradable foam combine with the low-moisture wood to form an insulated, waterproof envelope.

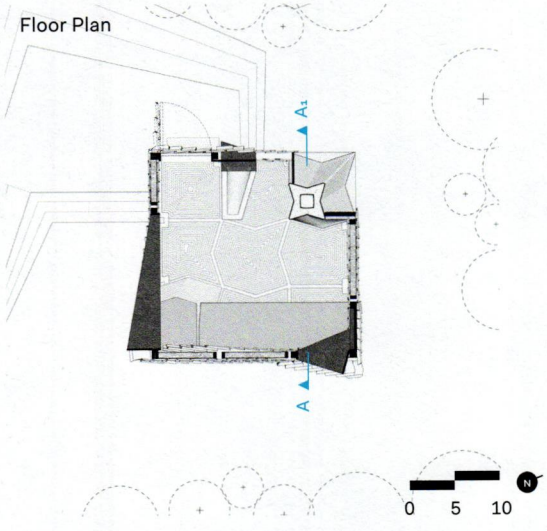
Windows at varying heights allow natural light into the spare, 100-square-foot interior. Each wall contains a different necessity: a sink and camping pump, a 3D-printed concrete fireplace, and a bench (the only furniture).

"We have demonstrated that this is a viable method to use these infested trees," Zivkovic says. "Hopefully we'll get an opportunity to scale this up into a full residential project and then further."

Section A–A₁



Floor Plan



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Typology: Xero Studio, by Studio Ma

TEXT BY KATIE GERFEN

For 15 years, Studio Ma called downtown Phoenix home. In that time, the firm saw the urban core transform from an office-hours-only environment into a vibrant district. But an increasingly traffic-filled commute and the trials of tenancy drove the sustainably minded firm to find its own space: "When it came to installing photovoltaics, looking at alternative water, or incorporating nature, we ran up against the limitations of being a renter," partner Christopher Alt says.

Mindful of its carbon footprint, the firm sought out existing properties, and found one northeast of downtown that fit the bill. Years of service as a dentist's office had left the building "looking like old dentures," partner Christiana Moss, FAIA, says, but its unusual siting (at an angle to the street) was compelling, as was the option to preserve embodied carbon by reusing the bulk of the

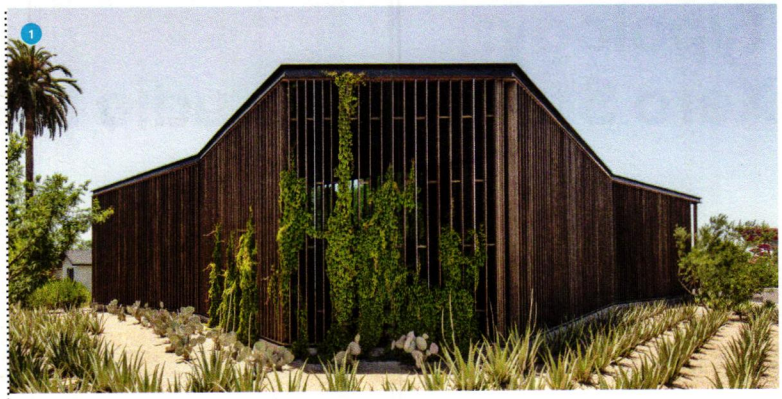
Project Credits
Project: Xero Studio, Phoenix
Client: Studio Ma
Architect/Interior Designer: Studio Ma, Phoenix · Christiana Moss, FAIA, Christopher Alt, Tim Keil (project team)
Structural Engineer: Pangolin Structural
Mechanical/Plumbing Engineer: GLHN Architects & Engineers
Electrical Engineer: Woodward
Civil Engineer: Jacobs Wallace
Construction Manager/General Contractor: Vista General
Landscape Architect: Floor Associates
Lighting Designer: RC Lurie Co.
Materials Consultants: Progressive Roofing; Arcadia Custom; Bulthaup
Size: 2,515 square feet
Cost: $525,000

Xero Studio presents a screened wall composed of Kebonized wood decking boards to the street.

BILL TIMMERMAN

> *For more images of this project, visit bit.ly/XeroStudioPHX.*

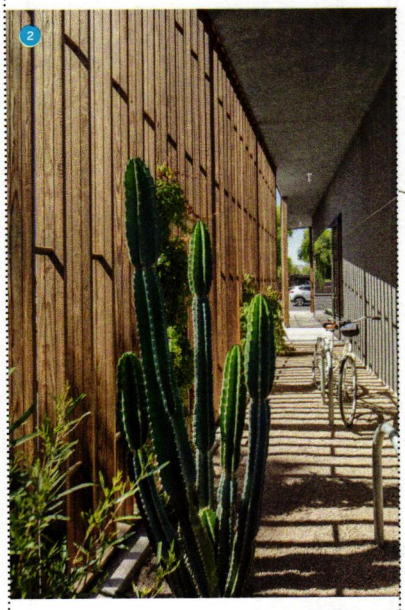
Typology:
Studio Ma



masonry structure. The firm engineered a bespoke wood truss system in order to increase the height of the structure with wood framing, while allowing the bulk of the interior to remain open-plan and column-free. They wrapped the exterior walls and sheltered walkways in a screen made of Kebonized wood—a resin-infused Southern Yellow Pine that won't degrade in desert conditions.

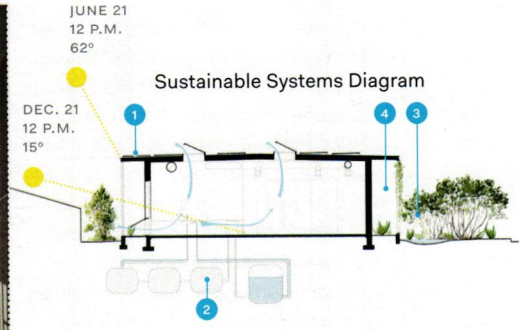
The firm set an aggressive goal of a triple net-zero (for energy, water, and waste) workplace, and has been making progress: Adding photovoltaics dropped the energy use intensity (EUI) from 45 in 2018 to zero in 2019. (A typical EUI for the building type is 76.) The PV panels supplement passive strategies: operable skylights expel warm air and cut the need for artificial light, while the exterior wood screen shades the envelope to reduce heat gain. The firm drastically reduced waste through on-site recycling and composting, and even a policy of returning all product samples to suppliers. "There is basically no garbage garbage," Moss says.

Net-zero water has been difficult because it is "mired in regulation," Alt says. After unsuccessful attempts to convince the city to allow a closed-loop treatment and reuse system, the firm is now pursuing a combination of composting toilets and a process called hand printing, which, in addition to a reduction in overall water use, involves "improving water efficiency on other properties, to offset your use on-site," Alt says. "You are just not allowed to treat blackwater. Here, it is a non-starter."



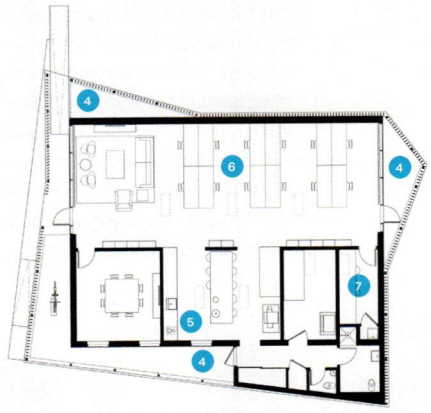
The irony is that blackwater-to-potable systems are readily available, Moss says. But municipalities won't allow them because they "want to do it all: Collect the sewer, treat it, and have a giant graywater loop, which would be great. But the question is: When?"

The light-filled office interior has an open kitchen, a small shop, and bench seating that boasts views to shade gardens of native plants. And while the design "put our money where our mouth is" in terms of setting a sustainable example, Alt says, it has also brought in business: "We had our first-ever walk-in client, who drove by, loved it, and said: 'Can you build me one of these?'"



Sustainable Systems Diagram

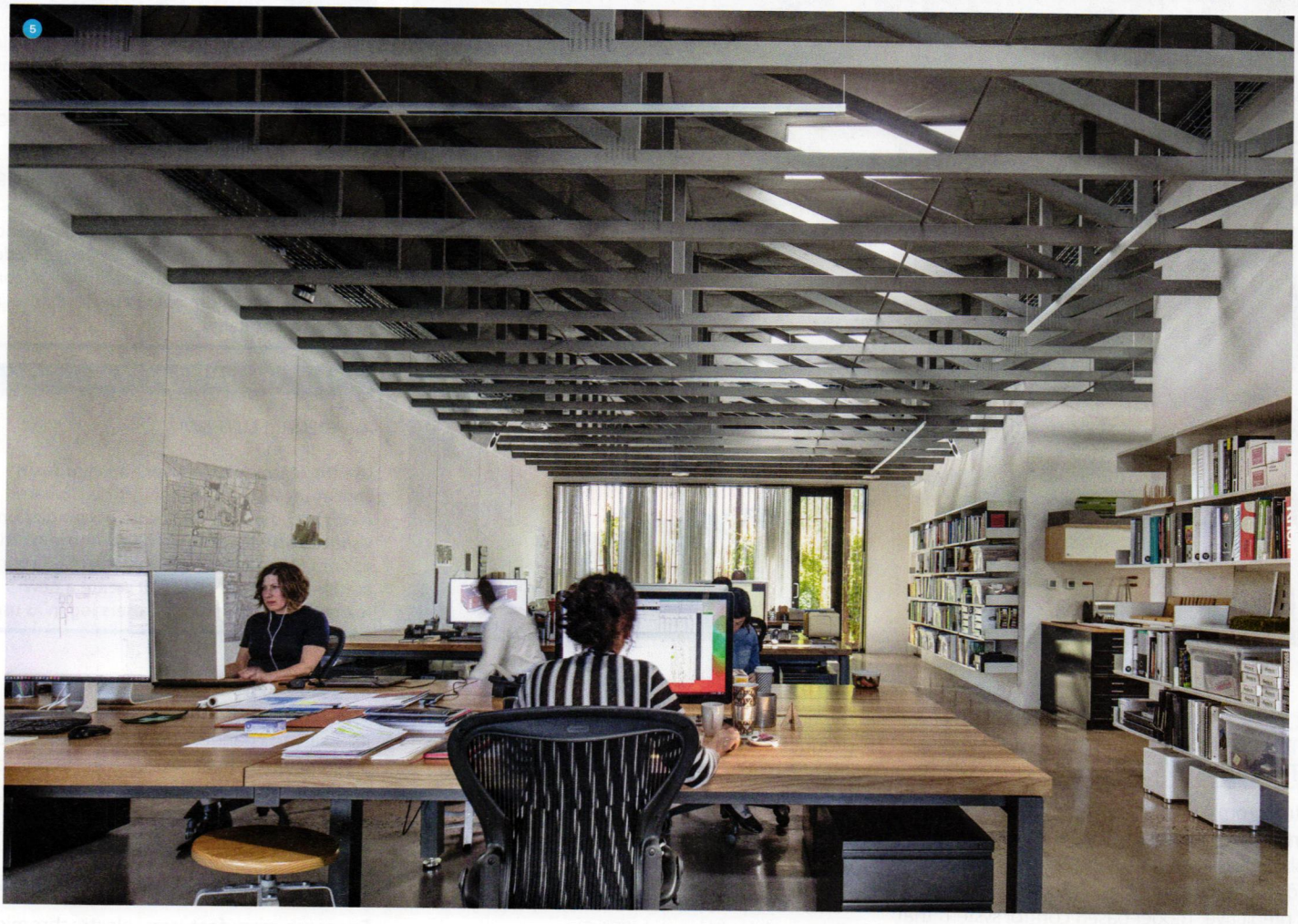
Floor Plan



1. Photovoltaic panels
2. Water reclamation system
3. Bioswale
4. Garden biome
5. Kitchen
6. Open studio
7. Shop

0 10 20

BILL TIMMERMAN



1. Xero Studio's articulated form sets it apart from the largely orthogonal buildings in the area. 2. A wood screen helps keep staffers' bikes cool during hot desert days. 3. The screen's shade also makes full-height glazing possible, despite a tight energy budget; the interior is comfortable without mechanical HVAC for seven months out of the year. 4. A garden behind the screen incorporates native plants that require minimal irrigation. 5. The studio has been largely empty since March due to COVID-19, and the firm's options for reopening include alternating staffers' days in the office to limit occupancy. But with around 7 feet of desk per person, social distancing is already built in.

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LEARNING OBJECTIVES

1. Analyze the role of electrochromic (EC) glazing in achieving energy performance, daylight and views, and occupancy wellness.
2. Compare and contrast next-generation EC glazing to conventional solar control solutions.
3. Examine the role of EC systems in meeting energy performance and user comfort needs.
4. Identify key aspects of zoning with EC and how zoning can be used to optimize tradeoffs between the competing goals of glare control, daylight admission, energy performance, and light color quality.

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ELECTROCHROMIC GLASS: BENEFITS, FEATURES, AND COMPARISONS TO STATIC WINDOWS[1]

Electrochromic (EC) glass, sometimes known as smart glass or dynamic glass, is an electronically tintable glass used for windows, skylights, facades, and curtain walls. The glass is managed by a predictive, model-based control system that considers multiple building-specific parameters, along with weather patterns, to select the right tint level at the right time. It can also be directly controlled by building occupants. It is popular for its ability to maximize access to daylight and outdoor views, reduce energy costs, and improve occupant wellness.

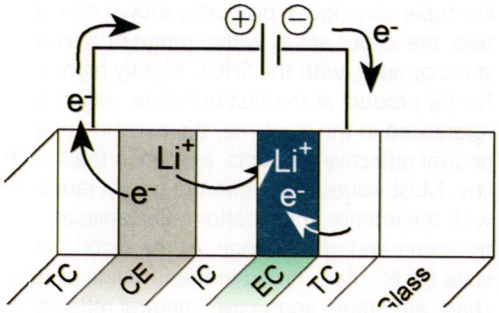
Electrochromic Glass Versus Other Smart Glass

Electrochromic glass can also be referred to as "dynamic glazing" or "smart glass." Dynamic glazing is defined as "any fenestration product that has the fully reversible ability to change its performance properties, including U-factor, solar heat gain coefficient (SHGC), or visible transmittance (VT)."[2] The category not only includes electrochromic glass, but also photochromic (PC), thermochromic (TC), suspended particle device (SPD), and polymer dispersed liquid crystal (PDLC).

With electrochromic glass, an electric charge is applied that allows it to change its performance properties, specifically visible light transmittance and solar heat gain coefficient. Suspended particle devices and polymer dispersed liquid tend to be either on or off, meaning they are either transparent or opaque; however, some have intermediate tint states. Electrochromic, photochromic, and thermochromic are all able to provide gradations of tint but do not become opaque. Photochromic means that light initiates its ability to change, and thermochromic changes are initiated by heat. As opposed to photochromic and thermochromic glass, which are reactions that cannot be controlled, electrochromic is a unique smart glass that can be controlled and set.

Components of Electrochromic Glass[3]

For some manufacturers, electrochromic coating consists of five layers that are less than a fiftieth of the thickness of a single human hair. The five layers of electrochromic coating include two transparent conductor (TC) layers; one electrochromic (EC) layer, sandwiched between the two TC layers; the ion conductor (IC); and the counter electrode (CE). Applying a positive voltage to the transparent conductor in contact with the counter electrode causes lithium ions to be driven across the ion conductor



Movement of lithium ions and electrons between the layers gives EC the ability to change tint.

and inserted into the electrochromic layer. Simultaneously, a charge-compensating electron is extracted from the counter electrode, flows around the external circuit and is inserted into the electrochromic layer.

The tint of electrochromic glass is controlled by the amount of voltage applied to the glass. Applying a low voltage of electricity darkens the coating as lithium ions and electrons transfer from one electrochromic layer to another. Removing voltage, and reversing its polarity, causes the ions and electrons to return to their original layers, causing the glass to lighten and return to its clear state.

The result is that one piece of glass that can dynamically alter its visible light transmittance at different times as needed. While there are differences among manufacturers, there are typically four primary tint states to electrochromic glass: 60% (clear), 18% (intermediate state #1), 6% (intermediate state #2) and 1% (fully tinted).

While coatings enable these transitions to be made, the control system is the intelligence that allows users to take full advantage of electrochromic glass's range of functions.

In-Pane Zoning and Gradient Tinting

At many points in time, only a portion of a given window is subjected to glare and strong solar radiation. To control this, entire windows would typically have to be tinted, which would detract from the quality of natural light emitted into a space. However, in-pane zoning or gradient tinting technology allow for some areas of a pane to be tinted while others remain clear. The clear areas of the pane permit natural light to enter a room while the tinted areas control glare and heat gain. Light quality can be maintained even if just 10–15% of a glazed area remains clear. While newer, gradient tinting technology is quickly becoming popular for its aesthetic benefits.

Smart Glass Control System

While it is the glass that tints, it is the control system that helps it do so intelligently. This means ensuring the glass tints only as much as is needed, when needed, to maximize occupant comfort. The product is more than just tintable glass; it is a turnkey intelligent glazing system.

A digital model of each project is created. This model considers factors such as building location, orientation, window-wall ratio, occupant layout and space use, sun angle and time of day. These modeled parameters are combined with on-site weather readings, from sensors on the building, to dictate how each IGU should tint.

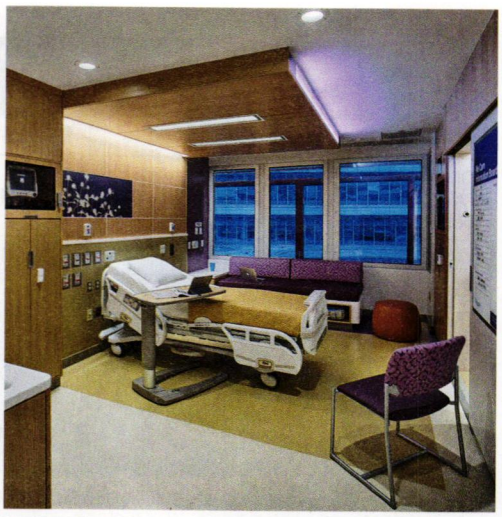
In-pane zoning on display at the University of New Mexico Farris Engineering Center.

While EC systems are designed to work automatically, different forms of manual control are also provided. The most common is through wall mounted touchpads that let users change the tint of the glass. Mobile apps are also available for similar control. Finally, integration into Building Management Systems is also possible through standard communication protocols.

Sunlight

Electrochromic glass's ability to provide both energy and health benefits is inseparable from its ability to control and distribute sunlight. When the sun rises in the morning, electrochromic glass can fully tint east-facing windows to block harsh morning sun. Other orientations remain clear, maximizing (or harvesting) daylight. By noon, when the sun is directly overhead, portions of glass can be tinted as needed. For example, some can be moderately tinted to 20%, while others are at 6% or perhaps, if facing to the south and west, fully tinted.

The different tint states of electrochromic glass in action at Ashford Castle in Cong, Ireland ©Sean Conboy.



EC glass gives patients at this hospital enhanced control of their environment from their bed.

Late afternoon in a cooling-dominated climate zone is peak load time. The grid is often stretched, and energy rates can spike; consumption must be lowered. During this time of day, the BMS can override standard controls and become fully tinted, maximizing heat rejection and load reduction. By sunset, the majority of the building is back to a clear state. With zoned or gradient glare control, where only part of a pane tints, glare can be blocked while daylight enters.

Daylight and Views[4]

Controls affect a building's functionality in several ways, but initially by regulating natural daylight and views. Daylight, as opposed to artificial electric light, has been shown to provide mental health benefits and increase productivity. Research has demonstrated that with daylight and a view of the outdoors, mental function and memory are 10-25% better, cell processing is 25% faster, and hospital stays are 25% shorter. Daylight also allows workers to be 18% more productive and students to score 5-14% higher on test scores and learn 20-26% faster. When buildings have sufficient natural daylight, retail sales increase 15-40%. Daylight and views contribute to better health, better sales, and better buildings.

While daylight and views can contribute to the overall well-being of the individuals within a structure, significant amounts of daylighting and views have the potential to cause unwanted heat gain or loss in addition to glare. Blinds have been the traditional solution to preventing temperature fluctuations and controlling glare. However, blinds obstruct daylight and views, negating the initial purpose of the window installation. Electrochromic glass provides a genuine solution to all of the issues mentioned above.

Electrochromic Glass Versus Traditional Glass

By adapting to the external climatic conditions, electrochromic glass minimizes energy use by reducing heating loads in winter, air conditioning in summer, and electrical lighting all year long. According to the U.S. Department of Energy,[5] energy lost through conventional windows accounts for approximately 30% of heating and cooling energy.

Conventional windows also contribute to glare and heat gain and require blinds and shades to offset the negative effects of the sun. Electrochromic glass eliminates the need for additional solar shading systems, as well as the use of additional energy and resources for their manufacturing, transportation, and installation.

If shades and blinds are used, not only do the windows need to be cleaned and maintained but also the window coverings. With electrochromic glass, there are no additional maintenance requirements besides keeping the glass clean, thus limiting the environmental impact of the building.

Because EC glass delivers the performance of four different types of glass, it is further helpful to compare it to several types of traditional static glass.

No static glass can meet the performance of EC at 1% Visible Light Transmittance (VLT) and 0.09 Solar Heat Gain Coefficient (SHGC).

	VISIBLE TRANS (%)	VISIBLE REFL. OUT (%)	VISIBLE REFL. IN (%)	SHGC	WINTER U-FACTOR
TYPICAL EC (CLEAR STATE)	60	16	14	0.41	0.28
COMPARABLE STATIC GLASS (TRIPLE SILVER LOW-E)	51-70	11-14	12-19	0.23-0.39	0.29
TYPICAL EC (TINT #1)	18	10	9	0.15	0.28
COMPARABLE STATIC GLASS (NEUTRAL REFLECTIVE)	19-21	6-20	7-18	0.15-0.17	0.24-0.25
TYPICAL EC (TINT #2)	6	10	9	0.10	0.28
COMPARABLE STATIC GLASS (NEUTRAL REFLECTIVE)	9-13	10-12	7-27	0.13-0.19	0.24-0.33

EC values can vary by manufacturer as well as substrate color. Values listed are for standard clear glass. Data on comparable static glass products derived from Oldcastle BuildingEnvelope's GlasSelect tool, Oct. 2017. Data indicative, does not represent all comparable static glass products available.

For triple silver low-E products, shown on line two, the values are all within range of typical static options, with the SHGC slightly higher. For EC product at the first tint state, which is referenced in the third line, the benchmark is neutral reflective products, as seen in the fourth line. Most values are within the typical range, with the interior and exterior reflectance at the lower end of the range. At the second tint state for EC glass, noted in the fifth line of the chart, are "more aggressive" neutral reflective products. Here, EC outperforms SHGC and is at the low end of reflectance, with a U-factor in the middle of the range. While EC glass varies by manufacturer, this chart still provides a general sense of the differences between static and electrochromic glass.

When evaluating EC, it is important to understand that glare control is a function of proper controls and the inherent product capability. Lawrence Berkeley National Labs maintains, "An EC with a broader switching range and a very low transmittance (1% or less) [...] would reduce or eliminate the dependence on interior sun-blocking shades for some applications."[6] Having 1% VLT eliminates the need for shades or blinds and avoids the blackout that occurs with 0% VLT.

The components of electrochromic glass gives users precise control over the amount of sunlight entering a space, helping to lower a building's energy costs all while eliminating the need for shades or blinds and maintaining natural views.

SUSTAINABILITY, CODE, AND DESIGN[7]

In addition to maximizing occupant comfort, electrochromic glass is also a sustainable product that allows architects and builders to elegantly solve solar-control challenges without sacrificing aesthetics. A building even partially glazed with EC can be designed to take advantage of natural daylight without compromising the connection to the outdoors, making it a great fit for projects aiming to achieve sustainability certifications.

Energy Performance

In addition to occupant benefits, electrochromic glass helps building owners achieve their sustainability goals through energy conservation. By maximizing solar control while minimizing heat and glare, electrochromic glass allows building owners to achieve cost savings

over the building's life cycle by reducing overall energy loads by an average of 20 percent and peak energy demand by up to 26 percent.

Due to electrochromic glass's reliance on low-voltage electricity, it takes less electricity to operate 2,000 square feet of electrochromic glass than to power a single 60-watt light bulb. Maximizing daylight through the strategic use of smart glass can reduce a building's reliance on artificial lighting and significantly reduce its cooling load. In addition to sustainability and occupant benefits, architects are also given the freedom to design without the need for blinds and other shading devices that clutter the exterior of the building.

Uncontrolled glare and heat gain at Bowie State University could have made this space unusable.

Electrochromic Glass tints to control heat and glare, making the space usable again.

This article continues on http://go.hw.net/AR062020-4. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. Less than a fiftieth of the thickness of a single human hair, electrochromic glazing consists of ____ layers.
   a. 2
   b. 3
   c. 4
   d. 5

2. The tint of electrochromic glass is controlled by the amount of _____ applied to the glass.
   a. In-pane zoning
   b. Voltage
   c. Plastic
   d. Solar zoning

3. EC glass is the ultimate connector between the built and natural environments. Which of the following characteristics help to bridge the indoors with the outdoors and enhance occupancy comfort?
   a. Manage light and glare
   b. Energy use
   c. Color rendering
   d. All of the Above

4. According to the course, daylight and views allow workers to be _____ more productive and students to score _____ higher on test scores.
   a. 18%; 65%
   b. 90%; 100%
   c. 18%; 5–14%
   d. 85%; 99%

5. Due to electrochromic glass's reliance on low-voltage electricity, it takes less electricity to operate 2,000 square feet of electrochromic glass than to power a:
   a. Car engine
   b. Single 60-watt light bulb
   c. Pool heater
   d. Dishwasher

6. According to the UN Environment and the International Energy Agency (2017 report), buildings and construction together account for ____% of global final energy use.
   a. 36%
   b. 89%
   c. 39%
   d. 44%

7. EC glass can help earn credit towards green building certifications such as
   a. LEED
   b. BREEAM
   c. WELL
   d. LBC
   e. All of the Above

8. Electrochromic glass can help reduce the _____ impact on building energy performance when orientation is sub-optimal.
   a. Negative
   b. Positive
   c. Neutralizing
   d. None of the above

9. According to the course materials, which primary tint state is deemed clear?
   a. 90%
   b. 5%
   c. 60%
   d. 1%

10. According to the U.S. Department of Energy, energy lost through conventional windows accounts for approximately:
    a. 90% of heating and cooling energy
    b. 60% of heating and cooling energy
    c. 100% of heating and cooling energy
    d. 30% of heating and cooling energy

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Minimizing Risk and Optimizing Construction Management with Rainscreen Specification

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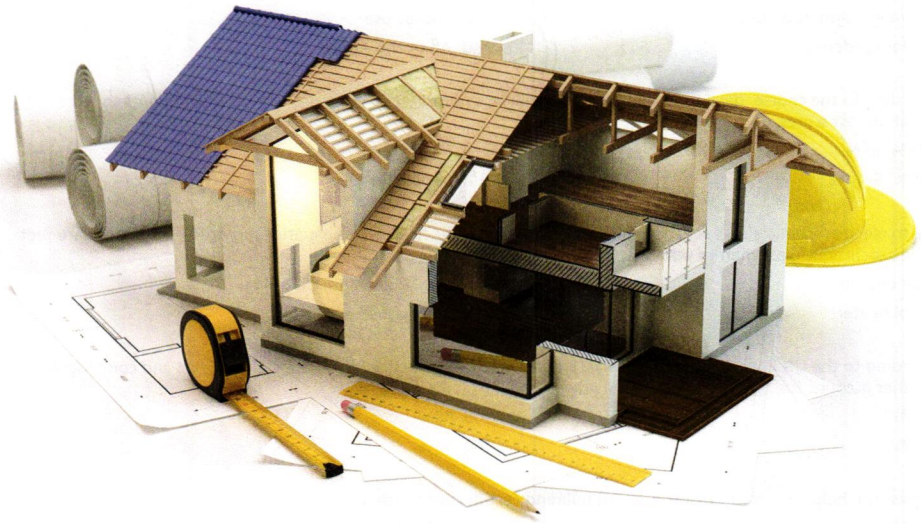

LEARNING OBJECTIVES

1. Identify the challenges facing the built environment due to ineffective rainscreen specification.
2. Examine the benefits specific to new rainscreen technologies, such as a 3-in-1 water resistive barrier system.
3. Analyze best practices for specifying a rainscreen system that enhances the building envelope through drainage, drying, and construction efficiency.
4. Explore opportunities where a 3-in-1 water resistive barrier system enables the construction project to decrease the overall project timeline, as well as labor and material costs.

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LITIGATION AROUND MOISTURE MANAGEMENT

"Moisture, in all its physical forms, is commonly regarded as the single greatest threat to durability and long-term performance of the housing stock," states the U.S. Department of Housing (HUD).[1] With moisture comes damage to building components and materials, unhealthy indoor environmental and air quality, mold, mildew, and a host of other issues including

- decay of wood and corrosion of metals
- infestation by termites, carpenter ants and other insects
- reduced strength in building materials
- damage to materials due to expansion/ contraction
- reduced thermal resistance of wet insulation
- premature failures of paints and coatings
- damage to building contents, and
- negative effects on building aesthetics.[2]

Resolving any of these issues can prove costly and has the potential to result in litigation for architects, builders, and other stakeholders.

THE CANADIAN "LEAKY CONDO CRISIS"

An infamous example of litigation surrounding water management is what has been dubbed the "Leaky Condo Crisis," referring to widespread building envelope failure in British Columbia, Canada.

Background

Between the mid-1980s and early 2000s, more than 150,000 multi-family, wood-frame housing units were built in B.C, as well as over 700 schools. The boom in building attracted industry professionals from a variety of places outside of B.C., some of whom were unfamiliar with the rainy climate. The rainfall in Vancouver, for instance, is 50.5 inches per year, and the average temperature is only 49.8°F, meaning that buildings experiencing water intrusion are not likely to dry out quickly.[3] For perspective, London experiences 24.4 inches of rainfall per year and has an average temperature of 52.1°F.[4]

Problems[5]

In addition to industry professionals using techniques ill-suited to British Columbia's rainy climate, the building codes at the time were not as stringently enforced as today's. Architects, engineers, and designers were not required to certify that buildings were designed in accordance with code, nor were builders and developers compelled to

prove that buildings had been constructed according to code. In 1998, a commission of enquiry determined:

> *The evidence suggests that significant building envelope failures in British Columbia since the early 1980s, is not the result of the Building Code. It is a result of numerous factors, including design features inappropriate for our climate; a reliance on face-sealed wall systems; a fundamental lack of awareness regarding the principles of enclosure design suitable for our climate; meaningful inspection at critical stages of construction; and a regulatory system which was unable to understand that failures were occurring and to redress them.*

The commission also determined that several design features popular in the 1980s and 90s were additionally to blame. It maintains "open walkways, arched windows, complex, intricate and visually-appealing joints and the removal of overhangs, provided more opportunities for water penetration" and that "zoning by-laws relating to floor space ratio (FSR) exacerbated the problem." Because roof overhangs were included in the calculation of FSR, they were frequently eliminated from blueprints. Importantly, the commission further noted, "The calculation of FSR from the outside of the building envelope, instead of from the centre or interior side of the wall, tended to promote face seal at the expense of thicker, heavier walls, or rain screen systems."

This confluence of factors resulted in 45% of the 159,979 multi-family housing units built between 1985 and 2000 experiencing issues with water infiltration; 400 out of 700 of the schools built during that time experienced similar issues. For the schools alone, repair costs were estimated to be upwards of $377 million (CAD).[6] Some estimates state that housing repairs have exceeded $3 billion (CAD).[7] As of 2004, the city of Victoria began budgeting $400,000 (CAD) a year to cope with legal settlements.[8]

Rainscreen Solutions[9]

By 1997, the commission established to deal with the crisis overhauled the Canadian construction code to make the inclusion of rainscreens mandatory in coastal regions of British Columbia. While some sources cite that research on the value of rainscreens was conducted in Canada as early as the 1960s,[10] additional research began in 2001 in the midst of the crisis.

In 2001, five wood frame residential buildings were constructed in Vancouver with rainscreens. The buildings "share typical wood stud construction with batt insulation within the stud space, an interior polyethylene vapour retarder, plywood sheathing, and different ventilated rainscreen claddings over strapping (cement stucco, vinyl siding, and cement board)." The buildings were monitored for five years so that wetting and drying trends could be analyzed during all seasons. While having a rainscreen was found to be more effective than not, researchers determined that further improvements could be made to help buildings contend with British Columbia's rainfall and low temperatures.

The study concluded that the use of a ventilated rainscreen system helps to dry "accidental leaks and removes moisture stored within absorptive cladding materials"; however, due to relatively high humidity, wood sheathing has the potential to experience higher levels of moisture during the winter months. Having "insufficient ventilation behind absorptive claddings such as brick or stucco [also] has the potential to increase the sheathing moisture content further to unsafe levels."

GLOSSARY

- **3-in-1 Water Resistive Barrier System**—systems enhance drainage efficiency, drying proficiency, and improve construction expediency; hybrid system that includes a polypropylene non-woven material with a polyethylene film for vapor control.
- **Ability to Impede Air Flow**—the test for this is ASTM E2178, Air Permeance of Building Materials. During this test, drainable wrap is sealed with polyethylene sheeting and tested with preset air pressure. The polyethylene sheeting is then removed, and the variation gives the air permeance. The maximum allowed by AC38 is 0.02 L/(sm^2).
- **Drainage Efficiency**—the test for this is ASTM E2273. During this test, a wall assembly is created with drainage wrap over the sheathing behind the cladding, and water is applied to the assembly with the amount of drainage over time recorded. The AC38 minimum is 90%. Some manufacturers have scored as high as 96%.
- **Drainable Wrap**—wraps effectively eliminate excess moisture and mitigate the damaging effects of mold and rot; non-woven housewrap that removes at least 100 times more bulk water from a wall than standard wraps.
- **Durability and Tear Resistance**—the test for this is ASTM D5034, Breaking Strength and Elongation of Textile Fabric. During this test, drainable wrap is put under a constant rate of extension until breakage. The minimum for AC38 is 35 lb CD and 40 lb MD.
- **ICC-ES AC38**—establishes guidelines for the evaluation of WRBs which are limited to sheet materials used on exterior walls as water-resistive barriers; moisture protection barriers; weather-resistive barriers; and (optionally) air barrier materials.
- **"Leaky Condo Crisis"**—widespread building envelope failure in British Columbia, Canada.
- Rainscreen—consists of a water resistive barrier (WRB); an air gap between the WRB and the back of the siding; flashings at all penetrations and vulnerable areas; weep holes, typically at the bottom of the wall; optional ventilation openings at the top of the wall.
- **Water Resistance**—the test for this is AATCC Test Method 127: Hydrostatic Pressure Test. During this test, three control specimens and three specimens that have been weathered via UV/acceleration are placed under a hydrostatic head of 55 cm for 5 hours. Wraps should have no water leakage, meaning that they met the water resistance requirement of AC38.
- **Water Vapor Transmission**—the test for this is ASTM E96 Desiccant Method. During this test, the specimens are spread across a test dish with one side containing a desiccant (a material that absorbs moisture vapor) and then placed in a temperature and relative humidity-controlled environment with periodic weighs determining the rate of water vapor movement. The AC38 minimum is 5 perms, but the building industry trend is 10–20 perms.

Overall, researchers maintain:

> *In the coastal climate of Vancouver, one of the best ways to improve the performance of ventilated or drained rainscreen walls is to effectively decouple the sheathing from the ventilation airspace by use of thermal insulation, and the more the better. Providing as little as 25 mm of exterior insulation can greatly improve the performance by reducing the sheathing moisture content. This provides an improved factor of safety against accidental wetting from rain or interior air leakage.*

All new construction in British Columbia now includes rainscreens, and the majority of the structures that were part of the crisis have now been retrofitted with rainscreens.

MARKET DEMAND FOR RAINSCREEN CLADDING[12]

Grand View Research, a market research and consulting company, provides research reports to academic institutions and Fortune 500 companies so that they might better understand global and regional business environments. A recent report concluded that the U.S. rainscreen cladding market size was an estimated $25.8 billion (USD) in 2017. Grand View Research attributed this growth to "increasing product penetration in the U.S. construction industry owing to ease of availability, durability, energy efficiency, and aesthetic appeal." By 2025, the global rainscreen cladding market size is expected to be worth $183.3 billion (USD).[13]

Grand View Research cites the following reasons for the growth in rainscreen cladding:

- Increasing demand for enhanced moisture management solutions and ease of product replacement
- Increasing trend of protecting exterior walls, coupled with surge in construction of non-residential buildings, such as offices and institutions
- Increasing awareness regarding sustainable construction
- The product aids in increasing energy efficiency of a structure, leading to decrease in energy requirement for heating, ventilation, and air conditioning (HVAC)

All of these factors have resulted in the creation of various new wall panels, which are produced using innovative and high-tech materials. The most popular systems include vented, drained and vented, and those that are pressure equalized.

Grand View Research also notes the potential for negative impacts on the rainscreen cladding market. The largest concern at the time the firm gathered data was the occurrence of multiple fires caused by flammable claddings, such as the Grenfell Tower fire in the U.K. and the Jecheon fire in South Korea. The firm notes, however, that these tragedies have spurred those in the industry to develop fire-resistant rainscreen cladding. Such innovations are expected to create more growth and opportunities in the market.

The Crisis and the Role of the Building Envelope Professional[11]

In 1999, in response to the crisis, the Joint Building Envelope Qualifications Committee of the Architectural Institute of British Columbia and the Association of Professional Engineers and Geoscientists of British Columbia developed a formal designation, called the Building Envelope Professional (BEP). The committee outlined the acceptable boundaries for engineering involvement in what was a traditionally architectural sphere. By October 2000, two-thirds of the 47 professionals on the committee's BEP list were engineers. The committee defined the role of the BEP as intended to provide:

"Review of the building envelope design to the project architect or coordinating registered professional with respect to environmental separation and the performance of materials, components, and assemblies of the building envelope. The responsibility for the design and field review of the construction of new buildings rests with the project Architect, except when a professional engineer is providing architectural services."

In short, BEPs would give design assistance, help with field review, and assess the components of the building envelope. Their role would be restricted to residential buildings containing more than two units and more than two stories in height that have cladding systems over wood or light steel framing. Overall, the committee stipulated the BEP "be involved from the concept design phase through design development to contract documents, tender, and construction phases."

THE ESSENTIAL ELEMENTS OF A RAINSCREEN

Building scientist Joseph Lstiburek observes, "'People continue to put their faith in every kind of cladding material, but in the real world all claddings leak sooner or later. They always have, and they always will.'" Such observations by experts, in addition to practices already in use in Europe, have led to the more mainstream use of rainscreens.[14]

Rainscreens consist of

- A water resistive barrier (WRB)
- An air gap between the WRB and the back of the siding
- Flashings at all penetrations and vulnerable areas

- Weep holes, typically at the bottom of the wall
- Optional ventilation openings at the top of the wall

Rainscreens are most effective in regions that experience a minimum of 20 inches of rainfall annually.

One of the most important components of a rainscreen is the inclusion of an airgap between the cladding and the housewrap. This is particularly important with claddings like stucco and manufactured stone veneer (MSV) that are airtight and with cavities that are spray insulated. Lstiburek recommends 3/8 of an inch for stucco, MSV, wood claddings, and other claddings that lie flat against the housewrap. Vinyl and aluminum cladding usually create a natural air gap.[15]

Code Requirements for Rainscreens

In the 2015 and 2018 versions of the U.S. building code, it is never directly stated that a rainscreen must be used in residential applications. However, the code does state that there should be a drainable plane and water-resistant barrier. This is based on ASTM E2273, which requires 90% drainage efficiency. Some manufacturers provide wraps that meet these criteria with up to 96% efficiency.[16] The inclusion of a rainscreen, though, would allow moisture to drain even more quickly. It has been speculated that the 2021 International Building Code (IBC) will directly address the use of rainscreens.

This article continues on http://go.hw.net/AR062020-1. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

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QUIZ

1. Along with unhealthy indoor environmental and air quality issues, moisture intrusion into a building can cause:
   a. Termite infestation
   b. Premature failures of paints and coatings
   c. Reduced thermal resistance of wet insulation
   d. All of the above

2. The Leaky Condo Crisis resulted in _____ of the 159,979 multi-family housing units built between 1985 and 2000 experiencing issues with water infiltration; 400 out of 700 of the schools built during that time experienced similar issues.
   a. 10%
   b. 25%
   c. 45%
   d. 75%

3. A recent report concluded that the U.S. rainscreen cladding market size was an estimated _____ (USD) in 2017.
   a. $5.8 million
   b. $5.8 billion
   c. $25.8 million
   d. $25.8 billion

4. According to the course materials, rainscreens consist of:
   a. WRB
   b. An air gap
   c. Weep holes
   d. All of the above

5. U.S. building code states that there should be a drainable plane and water-resistant barrier. This is based on ASTM E2273, which requires ____ drainage efficiency.
   a. 90%
   b. 80%
   c. 70%
   d. 60%

6. The U.S. National Green Building Standard was first developed in _____.
   a. 2000
   b. 2004
   c. 2008
   d. 2012

7. Performance benefits of the 3-in-1 rainscreen system include which of the following?
   a. Enhances drainage efficiency
   b. Enhances drying proficiencies
   c. Improves construction time and cost
   d. All of the above

8. In terms of annual rainfall, BEMMI states, "Any area receiving more than _____of annual rainfall should incorporate enhanced drainage techniques in the wall system, especially if using an absorptive cladding material. Areas receiving 40" or more of rainfall should utilize rainscreen design regardless of cladding material."
   a. 15"
   b. 20"
   c. 25"
   d. 35"

9. Which of the following is the first step in rainscreen installation best practices?
   a. Install window
   b. Jamb and head tape
   c. Rough opening
   d. Sill tape

10. Where wood strapping only vents approximately ____ of the wall, building wraps with an integrated rainscreen provide a continuous vented airspace over the entire surface area of the wall, providing greater drainage and more effective drying.
    a. 95%
    b. 90%
    c. 85%
    d. 80%

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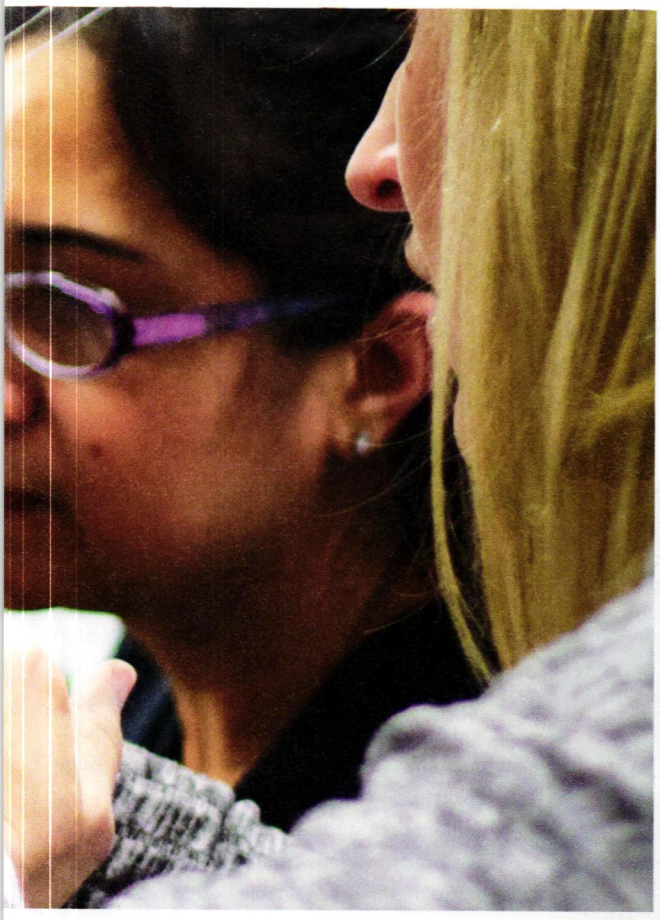

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During this time, we at TAMLYN know the importance and value of everyone working together to join in the fight against COVID-19. As a united front, we will ALL overcome this and be even stronger when this crisis passes. We are here to help.

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Sokol Blosser Winery Pavilion by Allied Works Architecture. Photo by Jeremy Bittermann.

LEARNING OBJECTIVES

1. Examine how consumers and businesses are increasingly making choices based on the environmental impact of goods and materials.
2. Describe the environmental benefits of Western Red Cedar.
3. Review how Western Red Cedar is harvested and Environmental Product Declarations that trace the life cycle of Western Red Cedar siding, decking, and timber products.
4. Explore case studies where Western Red cedar was used in various commercial applications, including three sustainable design projects.

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A SHIFT IN CONSUMER MINDSET

Eco-friendly behavior is changing how we live and the choices we make about our purchases. Consumers are savvier about the environmental repercussions of their buying habits and are demanding to know where their goods come from and how they are manufactured. Nielsen, a global measurement and data analytics company, in their 2018 study *Sustainable Shoppers Buy the Change They Wish to See in the World*, confirms this: "A new era of sustainability is rising, and it's touching every corner of the world. Consumers in markets big and small are increasingly motivated to be more environmentally conscious and are exercising their power and voice through the products they buy."

Companies, organizations, and entire industries must be conscious of the impact their supply chains, manufacturing processes, and working conditions are having on all aspects of society, including economic, environmental, and social. There is a term for this self-regulating business model—Corporate Social Responsibility (CSR). According to Investopedia, "To engage in CSR means that, in the ordinary course of business, a company is operating in ways that enhance society and the environment, instead of contributing negatively to them."

While not a mandatory standard, the International Standards Organization (ISO) does provide guidance for businesses and organizations committed to operating in a socially responsible way, via ISO 26000, a voluntary standard.[1] The ISO notes, "In the wake of increasing globalization, we have become increasingly conscious not only of what we buy, but also how the goods and services we buy have been produced."

RESPONSIBLE FORESTRY MANAGEMENT—CSR IN ACTION

One example of an industry that has taken great strides over the past generation to

transform their industry is lumber. They have improved their environmental performance, the sustainability of forest management and milling operations, and the use of forest fiber. In fact, there are very few products today that come from 100% renewable sources like wood products. Forest management companies are continually balancing environmental and economic values, which include biodiversity, cultural heritage, fish/riparian health, forage and associated plant communities, resource features, soils, timber, visual quality, water quality, and wildlife.

Much of the world's Western Red Cedar is sourced from British Columbia, Canada. The provincial government owns 95 percent of the timberland in British Columbia.[2] That acreage is managed under Tree Farm Licenses (TFL) that are held by timber management companies. The timber companies manage those lands for free, but in exchange they get the rights to the sustainable yield harvest from those lands. Hence, many timber manufacturing companies also operate lumber mills. They must manage the land according to the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.[3] And, they receive 3rd party certification from either the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), or Canadian Standards Association (CSA) to prove they have protected forest values and that the forests are sustainably and responsibly managed.

Timber manufacturing companies begin the annual cut process with a timber supply analysis. They consider the forest composition, the rates of growth, the values that need to be managed, and the constraints that need to be applied to the forest to manage those values.

- In British Columbia over 60% of the 90 million hectares of land base is covered by forest.
- This is 62 million hectares of forest land, of which 52 million hectares are 3rd party certified as sustainably and responsibly managed.
- Less than one half of one percent of forest land is harvested annually.[4]

ARCHITECTS MUST SPECIFY RESPONSIBLY SOURCED WOOD[6]

Social responsibility does not stop at the building product manufacturer. Architects must also understand how their designs impact raw material use, land development, and the health, safety, and welfare of their clients and building occupants. Every building material they specify for a project has an impact on the environment, so designers bear the responsibility and wield the power to source products from manufacturers with sustainable and ethical business practices.

Architects and other building industry professionals must know where the wood they specify comes from to ensure it's sourced from responsibly managed forests. Grace Jeffirs is an artist and designer who has been studying, writing, and speaking about material use in art and architecture for over a decade. In her white paper *Design for Global Forestry—A New Paradigm for Creative Material Specification* she challenges today's designers to consider how their choices impact this planet and the future. Jeffirs tells architects and designers that they must ask three questions every time they specify wood:

- What is this wood's conservation status?
- From where did this wood originate?
- What is the state of the forest from which the wood was harvested?

Prior to specifying any wood, designers must understand and document where the wood comes from. In a national survey of architects and designers conducted by Wilsonart, it was found that 99% of respondents couldn't identify the majority of endangered and threatened wood and only 24% were very familiar with the Lacey Act, which makes

COMMERCIAL BUILDINGS

SOKOL BLOSSER WINERY PAVILION[5], DAYTON, OREGON

Cradled in Oregon's wine country, Sokol Blosser Winery Pavilion is a social hub for the entire 100-acre estate. Stretching west to east between the original 1970's winery buildings and a stand of native Oregon White Oaks, the pavilion offers sweeping views of the landscape, and a range of spaces for gathering, entertaining and wine tasting. The heart of the building is a beautiful cedar-clad pavilion, which is flanked by a library, an eat-in test kitchen, an in-ground cellar, and VIP room. Generous overhangs as well as a secret garden—complete with stunning cedar decks and walkways—provide opportunities for enjoying wine, food, and company in all seasons. As with the exterior surfaces, the interior is almost entirely clad in a warm and textured knotty grade of Western Red Cedar, as if the entire structure were carved from a single mass. "The materiality and detailing of the wood were central to the project vision," explains Nathan Hamilton, Associate Principal at Allied Works Architecture.

"Subtle pushes and pulls from square or rectangular forms give the building a more organic feel, just as the unity of materials blur the boundaries between interior and exterior. Altogether, the building simply feels more 'of' the landscape than any standard form of construction." As for finishing, the AWA team opted for contrasting colors to emphasize public spaces. The outward facing façade was stained with a dark, semi-solid stain, while the interiors and recessed areas of the exterior were finished with a transparent stain intended to preserve, as closely as possible, the natural appearance of the cedar, while maintaining that color over time. According to Hamilton: "Now in its seventh year, the cedar has maintained its fresh appearance and is weathering beautifully."

The heart of the building is a beautiful cedar-clad pavilion, which is flanked by a library, an eat-in test kitchen, and an in-ground cellar and VIP room. Sokol Blosser Winery Pavilion by Allied Works Architecture. Photo by Jeremy Bittermann.

using responsibly harvested wood not only an ethical choice, but a legal responsibility. That being said, 70% prioritize using responsibly sourced wood and 67% are willing to pay more for legally sourced wood.[7]

One way building product manufacturers can be open about their supply chains and manufacturing processes is through transparency documents such as Environmental Product Declarations (EPD's), which we will discuss later in the article. EPDs are an easy way for architects to ensure they are specifying environmentally responsible materials. One such material is Western Red Cedar.

THE LONG HISTORY OF WESTERN RED CEDAR

In recent years, composites have been overtaking wood as a building material for siding, decking, and landscape elements. But, as consumers become more educated about the environmental role of building materials and the negative consequences of composites, they are realizing the benefits of wood. Price and appearance are still primary factors when choosing a material, but environmental impact is on the rise as a consideration.

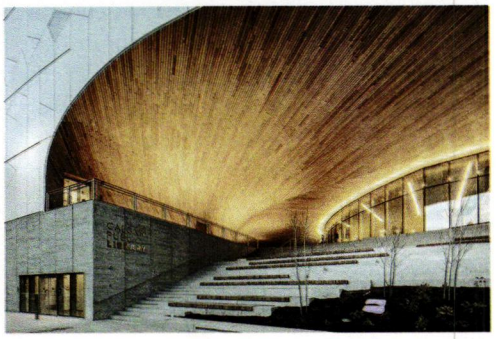
Western Red Cedar, scientific name Thuja plicata, is the only Thuja species native to Western North America.[9] It is a natural wood

LIBRARIES AND OTHER PUBLIC BUILDINGS

CALGARY CENTRAL LIBRARY[8], CALGARY, ALBERTA, CANADA

Proving you can never have too much of a good thing, the Calgary Central Library uses approximately 21,000 SF of Western Red Cedar on its soffit, which is also one of the largest freeform double-curved surfaces in the world. For the Snøhetta architecture team—who co-designed the technologically advanced public space with DIALOG—using nature's most versatile building material on community projects is somewhat of a specialty. The Norwegian trans-disciplinary firm also built the Charles Library at Temple University in Philadelphia, using over 25,500 SF of Western Red Cedar on the main dome, which is a 42' tall double-curved ellipsoid. As for DIALOG, using beautiful warm wood to create bold civic buildings is nothing new either. Together, these award-winning firms really out did themselves when it comes to incorporating natural materials with contemporary design for maximum impact.

Inspired by the nearby foothills, the site is transformed into a terraced topography that rises up and over the existing Light Rail Transit Line crossing the site. The lifted library, with an open entry at the heart of the site, allows for a visual and pedestrian connection between East Village and Calgary's downtown. For the stunning cedar soffit, Vancouver-based engineering firm, StructureCraft was brought on board to design and build the



Each cedar panel curves down toward the ground, creating an entrance intended to attract the public into the building. Calgary Central Library by Snøhetta & DIALOG. Soffit by StructureCraft. Photo by Lucus Epp & Julian Parkinson.

freeform wood structure. The cladding is formed into a series of arches and curves inspired by the Chinook winds, with Western Red Cedar battens creating a series of bifurcating patterns across the surface. To achieve this doubly curved underbelly, the battens were initially straight but then bent and twisted as they were applied onto panels, following minimum energy curves known as geodesics across the surface. Thanks to the rich warmth and natural beauty of cedar, this magnificent modern mass creates an inviting opening and acts as the welcoming point for all visitors.

GLOSSARY

Corporate Social Responsibility (CSR)—A self-regulating business model that helps a company be aware of the impact they are having on all aspects of society, including economic, social, and environmental, and be accountable to itself, its stakeholders, and the public

Environmental Product Declaration (EPD)—A transparent, objective report that communicates what a product is made of and how it impacts the environment across its entire life cycle

Flame Spread Ratings—Describe the surface burning characteristics of interior finishes and are used to regulate the use of interior finish materials to reduce the probability of rapid fire spread

Forest Stewardship Council (FSC)—An international system covering forest management practices and the tracking and labeling of certified products and paper products with recycled content

Life Cycle Assessment (LCA)—Also known as a cradle-to-grave or cradle-to-cradle analysis, an LCA is a rigorous study of inputs and outputs over the entire life of a product or process and the associated environmental impact of those flows to and from nature

Life Cycle Improvement Analysis (LCIA)—Identification of areas where environmental impacts can be reduced or mitigated within the life cycle of the product or processes

Product Category Rule (PCR)—Defines the product category, describes the scope of the life cycle assessment (LCA) to be conducted, and identifies the types of potential impacts that must be evaluated and reported in an Environmental Product Declaration

Sustainable Forestry Initiative® Program—A sustainable forest management standard targeting large industrial operations in Canada and the United States

Tree Farm Licenses (TFL)—Licenses held by timber management companies that ensure they manage the land according to Canada's Ministry of Forests, Lands, and Natural Resource Operations and Rural Development; TFL's also giver timber management companies the right to the sustainable yield harvest from those lands

Western Red Cedar—A natural wood product, scientific name Thuja plicata, that is used as a building material in siding, decking, trim, interior accents, and timbers and beams

product used as a building material in siding, decking, trim, interior accents, and timbers and beams. Western Red Cedar grows along the Pacific coast from northern California to southeastern Alaska, occuring sporadically at its southern limit in Humboldt County, California.[10] Western Red Cedar is primarily harvested from the forests of British Columbia, but Washington, Idaho, Montana, Oregon, and Alaska are also large producers. The end product varies depending on where it is sourced.

Large Western Red Cedars can reach ages of 800 to 1,000 years, and some individuals in western Washington may be 2,000 years old. Western Red Cedar products have been important since prehistoric times when native tribes living along the coasts of Washington and British Columbia used the wood for totem poles, ocean-going canoes, and large timber frame structures.[11]

PERFORMANCE CHARACTERISTICS OF WESTERN RED CEDAR[12]

Western Red Cedar has been used in residential design for decades, but is now increasingly specified for commercial and institutional facilities such as schools, libraries, hotels, and commercial buildings. It is prized for its beauty and performance characteristics such as low density, thermal insulation, dimensional stability, acoustical properties, and sustainability.

This article continues on http://go.hw.net/AR062020-2. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

SPONSOR INFORMATION

REAL CEDAR

The Western Red Cedar Lumber Association represents quality "Real Cedar" producers, distributors and retailers throughout North America. Founded in 1954 and known as "the voice of the cedar industry," WRCLA offers extensive resources to assist with selection, specification and quality standards. For more information, visit RealCedar.com.

QUIZ

1. What term describes a self-regulating business model that helps a company be aware of the impact they are having on all aspects of society?
   a. Ethical Business Practices
   b. Corporate Social Responsibility
   c. Responsible Business Relations
   d. Conscious Corporations

2. The provincial government owns _____% of the timberland in British Columbia.
   a. 10
   b. 40
   c. 75
   d. 95

3. Of the 62 million hectares of forest land in British Columbia, _____ million hectares are 3rd party certified as sustainably and responsibly managed.
   a. 32
   b. 42
   c. 52
   d. 62

4. In a national survey of architects and designers, it was found that _____% of respondents couldn't identify the majority of endangered and threatened wood and only 24% were very familiar with the Lacey Act, which makes using responsibly harvested wood not only an ethical choice, but a legal responsibility.
   a. 25
   b. 50
   c. 75
   d. 99

5. Which of the following describes a transparent, objective report that communicates what a product is made of and how it impacts the environment across its entire life cycle?
   a. Environmental Product Declaration
   b. Life Cycle Impact Assessment
   c. Health Product Declaration
   d. Tree Farm License

6. According to the course materials, Western Red Cedar is primarily harvested in which area?
   a. North Dakota
   b. Minnesota
   c. Maine
   d. British Columbia

7. Cedar's _____ enhances its insulation value and makes it an easy wood to transport and handle.
   a. Low density
   b. Acoustic attenuation
   c. Dimensional stability
   d. Flame spread index

8. The flame spread rating for Western Red Cedar is _____ (Class B/Class 2 rating) and the smoke developed index is _____.
   a. 45, 115
   b. 35, 125
   c. 45, 125
   d. 55, 115

9. Lumber producers have been replacing harvested trees so diligently over the last few decades that North American forests have actually grown by _____% since 1970.
   a. 50
   b. 20
   c. 30
   d. 40

10. According to research presented within this course, specifying wood in building projects results in which of the following?
    a. Lower greenhouse gas emissions than steel or concrete
    b. Lower air pollution than steel or concrete
    c. Lower water pollution than steel or concrete
    d. Lower solid waste by-products than steel or concrete
    e. All of the above

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AIAQ&A

How Design Helps Us Fight Infection

Q&A with Michael Murphy and Chris Scovel

MASS Design Group hopes that this crisis can help us understand our spaces more effectively.

By Katherine Flynn

How can design fight for infection control? It's a question that architects and design professionals have been asking themselves this year as COVID-19 began a rapid global spread. Suddenly, creating optimal spaces to treat this emerging and still-mysterious illness became the most urgent design problem to solve.

For the international nonprofit MASS Design Group, which has applied design thinking to health care centers in places such as Rwanda, Haiti, and Liberia since 2008, the pandemic provided a unique challenge—and a unique opportunity for innovation.

Through MASS Design Group's COVID-19 Response Team, which was rapidly assembled in March to combat the growing number of cases in the Boston area and across the United States, MASS was able to compile guidelines for safer health care facilities during the pandemic—both in ad hoc tent facilities thrown together in a matter of days and repurposed spaces in existing hospitals.

"Our intent is not to design buildings; our intent is to help others who have to solve problems, some of which have to do with buildings, with guidelines for best practice," says Chris Scovel, a director at MASS Design Group. We chatted with Scovel and Michael Murphy, founding principal and executive director, about the organization's COVID-19 response, their work consulting on tent facilities for Boston's Healthcare for the Homeless Program, and how this crisis might help us all understand the spaces around us more effectively.

What role can and should architecture play during a health crisis like the one we're currently experiencing?

Michael Murphy: I think what's clear to all of us now sitting in isolation and working in our own homes is that the buildings around us are playing a very direct role in the epidem
It's the spaces around us that are a cont

AIAQ&A

of the possibility of contamination. I think that the role it could play is for us to design [the space], repurpose it, or convert it in a particular way to make us less sick, less contagious, and more healthy, essentially.

We're talking about spaces that aren't designed for infection control, nor will they ever be—like your home, or the waiting area of a restaurant. I think the responsibility isn't on designers alone, but in the same manner that these things are all interrelated, we as designers can pivot and act more urgently to assist our communities in understanding how the space around them is threatening. That spatial literacy that we can provide as a profession offers an enormous amount of opportunity. It's also an opportunity to reinforce the very intimate relationship that the built environment has to our own ability to live a healthy and protected life. Our health and our buildings are related; they're not separated. I think that recognition, that awareness, that awakening is happening in the middle of the pandemic.

Chris Scovel: That's true. The notion that architecture can heal but it can also make people sick has been the root of MASS Design Group as an organization since the beginning. Architecture is an inherently optimistic and idealistic undertaking; it's future-oriented; it's about making things better. Architects are idealists, and at this time, we're trying to find ways that we may have overlooked in the past to follow through on our idealism. Aside from the work that MASS has been doing with enormous energy, we've also witnessed colleagues who have been trying to find ways to participate in the COVID-19 response.

We are in this moment in which we are all, as a society, becoming so aware of space and dimension. All of a sudden, the fundamentals of what architects practice and consider—the relationships between people, the relationships that people have to their spaces, to light, and to air—all of those things are front and center in the public consciousness. Everyone knows, all of a sudden, what 6 feet is, what 10 feet is. And so, in a way, it's an extraordinary moment for architects and for architecture to follow through on that consciousness, and perhaps even use it to heal and to fix some of the systemic flaws and fractures that are so visible to us now as a society.

How did you go about creating the design criteria for the construction of temporary treatment facilities and emergency shelters?

Scovel: MASS is doing an enormous amount of work creating various guidelines, but one of the first we issued was for a tent clinic facility that we helped with in Boston for a long-term client of ours, Boston Healthcare for the Homeless Program, the largest provider of health care to the homeless in the United States. That project came to us out of the blue one morning when the Chief Medical Officer called and let me know that there was this need. I consulted with colleagues at MASS who have experience in infection control, very quickly, in order to help them. We also brought the experience of infectious disease doctors, as well as mechanical engineers and other academic experts in infectious disease.

We brought institutional experience to [that project] because MASS has a deep knowledge and history with handling infection control measures for various contagions and clinical settings. We brought all of that together in a white paper that we wanted to offer very broadly so that it could be used by other decision-makers who would be under enormous time pressure to realize similar kinds of facilities.

What were some of the unique considerations for the Healthcare for the Homeless Program facility?

Murphy: As is becoming widely known, the homeless are uniquely vulnerable to COVID-19 for several reasons. There is a seven times greater likelihood of contracting COVID-19 in Boston if you are homeless. I credit to the city of Boston and to folks like the Boston Healthcare for the Homeless Program for planning for the homeless population in unique ways.

One of those ways was for the city to fund this tent clinic that we consulted on. It's very simple, and it's very crude—it's two combinations of multiple tents that house close to 40 patients. These are tents that would otherwise be serving wedding functions in the summertime. When we became involved, there was still an opportunity to re-plan the tents in order to introduce infection control measures and to limit the potential for cross-contamination between patients and to limit, very importantly, the potential for health care providers to be contaminated by patients. We did this with just some basic planning techniques about creating separate entrances for health care providers, creating donning and doffing areas that were well-located, and limiting unplanned interactions between providers and patients. So there were several basic health care planning strategies that were implemented in the tent.

Beyond that, we also introduced some ideas about the cleaning and disinfection of materials, and also some airflow strategies. In this, as in a lot of health care design, airflow should be considered as very important.

Can you tell me about your firm's experience designing hospitals in the developing world?

Scovel: Basically, we had to repurpose medical facilities that were not designed for infection control and make them applicable and better-functioning to reduce infection without the same tools that we might have, let's say, in a United States hospital. U.S. hospitals, to a large degree, rely on large-scale mechanical systems and hermetically sealed medical facilities to control, move, and decontaminate air. And because medical facilities in Rwanda or Haiti or Liberia may not have easily available mechanical systems or maintenance teams that can support them as effectively, they may not function as well as they could. So, you have spaces that were not designed for infection control principles really becoming more dangerous, unless we repurpose them.

Our designs in Rwanda were really about repurposing spaces to make them better-performing for airborne disease. Those lessons are completely applicable today because we're dealing with the same question in all of the spaces around us as we learn how to fight this new illness.

We can't expect large-scale infection control protocols to be implemented in your home or your apartment building, but we can potentially understand the space around us more effectively to fight this invisible virus and recapture some agency as we control that space.

Murphy: There are no guidelines for COVID-19. Infection control guidelines are really reactionary—they respond to the most recent outbreak, whatever it may be. We saw infection control guidelines change after tuberculosis, after cholera, after Ebola in particular. I think we can learn a lot from those moments of economic outbreak about where we might repurpose and convert spaces into higher-performing ones for this current pandemic. I don't want to say something is poorly designed; I want to say that we are in a new space that we have to actively readjust to, and do it quickly. AIA

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39% of Firm Leaders Expect That They Will Invest in New Technology This Year

By Michele Russo

In order to keep their firms competitive and able to benefit from new opportunities that arise this year, nearly 4 in 10 firms report that they will invest in new information technology and communication systems. Given the sharp economic downturn, 17% expect to reduce staff considerably, 14% plan to offer an expanded set of design or construction services, and 8% plan to diversify into new sectors or geographic areas.

Source: Survey of AIA's Architecture Billings Index panelists (representative of firms and construction activity across the U.S.), April 1-9, 2020.

AIA Feature

CREDIT: MAYA ISH-SHALOM

Bringing a Building to Life

In the future, will every building resemble the model set by the Living Building Challenge?

By Amanda Koellner

What if every single act of design and construction made the world a better place? This is the question posited by the Living Building Challenge, a green architecture standard created by the International Living Future Institute in 2006. It's a "philosophy, certification, and advocacy tool for projects to move beyond merely less bad and to become truly regenerative," according to the program's mission statement.

Given that our planet houses 7 billion people and counting, and the consequences of rising global temperatures are becoming more and more dire, moving beyond "merely less bad" is crucial. The ILFI's vision is one for an overhaul of building, infrastructure, and community design—a reestablishment of ourselves "as not separate from, but part of nature, because the living environment is what really sustains us."

Recognizing that 40% of the carbon emissions in the United States can be attributed to the built environment, in 2019, AIA set forth a goal of net-zero emissions in the U.S. building sector by 2050—with incremental goals for net-zero carbon energy use and 50% less embodied carbon by 2050. In light of these aims, high-performance standards like the Living Building Challenge won't be aspirational in the coming decades—they will be the new norm.

"We're just getting clearer and clearer data that what we've been doing hasn't been taking us in the right direction, and that not only do we need to do better from project to project, but we need to start reversing past behavior," says Laura Lesniewski, AIA, principal at BNIM, who has worked on two Living Building projects. "It's going to take really aggressive action to steer the ship in the right way."

Lesniewski's colleague Steve McDowell, FAIA, who collaborated with her on the LEED Platinum and Living Building Challenge–certified Omega Center for Sustainable Living in Rhinebeck, N.Y., and has independently worked on two additional LBC projects, adds: "As licensed architects, the thing that we're licensed to do is look after the public good and design buildings, and I think that the Living Building Challenge is a great strategy for achieving better ways of doing those things."

The Living Building Challenge consists of seven performance categories, or Petals: place, water, energy, health + happiness, materials, equity, and beauty. Each Petal encompasses several imperatives within, for a total of 20. In order to assess which of these apply to a specific project, a team must identify which Living Building Challenge typology their project fits into: new building, existing building, interior, or landscape/infrastructure.

There are three different paths to certification—Living Building Certification (full certification, where projects have achieved all the imperatives applicable to their typology), Petal Certification (awarded for completing at least three complete Petals), and Zero Energy Certification. It's also important to note that Living Building Challenge compliance is based on actual, rather than modeled, performance, and projects are audited after 12 months of occupancy.

Kathy Wardle, director of sustainability and associate principal at Perkins and Will, worked on the VanDusen Botanical Garden Visitor Centre in Vancouver. The structure received both LEED Platinum and Living Building Challenge Petal Certification, and Wardle notes that for this reason, architects eyeing Living Building Challenge certification for the first time should have a clear understanding of their occupancy load early on.

In the case of the visitor center—an apt fit for the Living Building Challenge, which is based on the metaphor of a flower—one of the project's main goals was to reinvigorate the botanical garden, located in the hear

AIA Feature

CONTINUED

the city. Succeeding at this goal many times over—visitorship has roughly tripled since the opening of the visitor center—meant that the garden's technology wasn't designed for such a high capacity. A commercial-grade caterer ended up moving into the café and running a large dishwasher many more times during the day than the solar hot-water system could accommodate. This unforeseen challenge, among others (again, all positive with regards to a high number of visitors), meant that the project—despite design intentions around net-zero water and net-zero energy—did not receive the water or energy petals. Wardle advises anyone interested in the Living Building Challenge to work hard with their clients to understand who the occupants and tenants are going to be, and in turn, make sure that the project goals are realistic from the outset.

Collaboration is really at the heart of any Living Building Challenge success story. Both Wardle and Stephanie Lan, AIA, a senior associate and technical director at Gensler who worked on the Petal Certified Etsy Headquarters in Brooklyn, N.Y., state the importance of getting everyone on board from the onset. "A really transformational piece was the partnerships with the client and the platform we had," Lan says of Etsy. "The ability to talk to contractors, consultants, and manufacturers and to educate them on LBC [was important], yes, but the significance of thinking about things differently and in a more aspirational way that would have greater impact across the industry—that was probably the largest takeaway for me."

She advises architects to break down Living Building Challenge standards in terms of how they will impact the client: "Their schedule, their budget, their operations. You have to really put yourself in the client's shoes and think, 'If I were them, this is what I'd want to know.' "

Lesniewski echoes the sentiment, noting the team for the Omega Center for Sustainable Living (the first project in the world to achieve both Living Building status and LEED Platinum) was enthusiastic about Living Building Challenge but if that isn't going to the case, it's crucial for the architects to understand from the get-go. "If they're not on board, it turns into a different conversation," she says. "We're still constantly pushing for certain systems, strategies, or innovations to happen if [the client doesn't] buy into LBC, but it matters so much early on in the project to know where the client lands in their thinking."

For the Etsy project, Lan and her team

"You have to really put yourself in the client's shoes and think, 'If I were them, this is what I'd want to know.'"
—Laura Lesniewski, AIA

quickly learned that the energy Petal wasn't in the cards because working in an existing building rendered any changes to wall insulation or structural support systems impossible. New York City's infrastructure also took the water Petal off the table. Knowing these facts, Lan and the team doubled down on the materials Petal.

"The interesting thing about Etsy was they wanted a lot of the furniture to be local and handmade; they had a really strong conviction that they wanted to be a positive influence on the local economy," she says, noting that the team then collaborated with the makers to help reach the goal of getting the 38 necessary Declare labels to attain the materials Petal—a standard that asks about materials, "Where does it come from? What is it made of? Where does it go at the end of its life?" Additional avenues like reclaiming and repurposing wood from the water towers formerly atop the building also helped reach this goal.

Wardle achieved the materials Petal at the VanDusen Botanical Garden Visitor Centre, and she highlights the ILFI's Materials Red List—which identifies worst-in-class materials prevalent in the building industry—as a huge dial-mover for green design. "The introduction of the Red List, at the time—12 or 13 years ago—that was transformative," she says. "It called upon manufacturers to actually disclose [material properties], and it just makes design professionals so much more aware of what they're putting into interior and exterior environments. That growth in awareness around healthy materials has been a hugely positive shift resulting from the Living Building Challenge." Collaboration, again, deserves ample credit, as Wardle says they had a list of about 278 products that had to be vetted—an achievement only made possible by a highly cooperative relationship with the contractor, who had someone on-site full-time to scrutinize all materials.

The ILFI says that the Imperatives can be applied to almost every conceivable building project, both new and existing, in any location, and at any scale. However, the 198,635-square-foot Etsy Headquarters is the largest Petal Certified building to date, and some architects cite scalability as one of the challenge's biggest hurdles. "It's much easier for small buildings than for larger structures, which has to do with capacity of the site to deal with energy generation. It also has to do with water," McDowell says. "So on one level, it's more suited to small boutique projects, and less suited to projects and specific users like, say, investment office building, or in some cases, maybe a campus building that you might be designing for a long life where the population density in the building may change, meaning the energy requirements will change." The Living Building Challenge does include a "Scale Jumping" overlay that allows multiple buildings or projects to operate "in a cooperative state" by sharing green infrastructure, depending on technology and operating costs.

The Living Building Challenge is iterative, and currently in version 4.0. ILFI staff monitor changes in the field and market and make adjustments as needed. As their website notes, they "also strive to keep raising the bar as we learn together, moving our projects closer still to the goal of a regenerative living future." The Institute collects feedback from a diverse group of stakeholders in order to understand how to refine the program to ensure it is having the greatest possible impact.

Wardle wondered if future updates might result from the current COVID-19 crisis—pondering changes in inspection control, particularly in hospitals and other health care facilities. Jason F. McLennan, founder of ILFI, says that with regards to the pandemic, he believes there may be a tendency to overstate architecture's role.

"As architects, we need to accept that design alone cannot solve all problems," he says, stating that he believes that solving a problem like a pandemic requires social, political, and economic change.

Current crisis notwithstanding, each architect we spoke to for this article is in agreement that the Living Building Challenge sets the standard for where design needs to go—beyond the bare minimum of building codes in various jurisdictions. "With the Living Building Challenge, it's going to be a little bit outside of the box, it's going to be a little bit uncomfortable, and you're going to get resistance," Lan says. "But you're never going to achieve anything great [without] hurdles." AIA

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Calgary Central Library: Snøhetta + DIALOG, AIA Architecture Award 2020. Image credit: Michael Grimm

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Building an Architecture Career Amid COVID-19

It's a challenging time for emerging professionals, but there are silver linings.

By Steve Cimino

Natale Cozzolongo, AIA, graduated from Carnegie Mellon University in 2009 and entered the working world in the middle of the Great Recession.

"You kind of took whatever was available, whether it was a good fit or not," he says.

His first job was one of those bad fits. He's not complaining; it allowed him to get his then-IDP credits and pass the AREs, which led to his current position at Kohn Pedersen Fox in New York City. But it was a far cry from the architectural hopes and dreams instilled in him during college.

"We'd ask ourselves, 'What kind of museums are you going to design? What star architects are you going to work for?'" he says. "And then you're shifting walls around in an exam room at the local doctor's office. Not to diminish the value of that work, but it's very out of step with what we were educated believing."

Now, as the COVID-19 pandemic pauses wide swaths of the economy and unemployment seems guaranteed to remain in the double digits for months, emerging professionals will run into the same issues. After a historic boom period, work will be hard to come by, and many designers may start to wonder if the traditional entry points to the profession are worth maintaining.

A Need for Architects Who Think Outside the Box

Jennie Cannon West, AIA, also felt the uncertainty of the Great Recession. After graduating from Auburn University in 2008, she ended up in New Orleans, which she said was "still in the Katrina bubble" and receiving federal recovery funds that kept firms propped up. She spent several years at Eskew Dumez Ripple and then bounced around, eventually getting the chance to start a local office for a national firm.

"I got a taste of what that was like, albeit with someone else's capital," she says. It led to her starting her own firm, Studio West Design & Architecture, where she's been practicing semi-solo for almost two years.

"I have one part-time employee who is about to graduate," she says, "so in a couple of weeks we'll be two full-timers in the office."

Despite the ongoing pandemic, West feels confident about taking on a new employee. She hasn't yet seen a dip in business due to COVID-19, though figuring out the logistics of each project has been exhausting.

"I spent a lot of time in the early days on the phone, finding out if my clients were comfortable proceeding," she says.

Fortunately, West handles a good deal of development and pro forma work, which can mean wearing many different hats at once but also offering numerous services at a time when clients are looking for answers.

"I think owners want architects who can think outside the box and really work with them on projects, in lieu of the traditional 'Here's an idea, come back when drawings are complete,'" she says.

West knows she's lucky; she was able to start her own firm because several clients who followed her from firm to firm asked her directly to go it alone. She has faith that those projects won't be going anywhere, but that doesn't mean it's been easy.

Architecture Students Ponder an Uncertain Tomorrow

Erin Conti, AIAS, just graduated from the Illinois Institute of Technology with a master's degree in architecture. Fortunately, she's the incoming president of the American Institute of Architecture Students, so she doesn't have to worry about finding work right away. At the same time, stepping into a role that represents all architecture students has given her copious insight into their concerns about the future.

"I'd say the main anxiety is, 'What do we do after this is over?'" she says. "I know a lot of students who had jobs or internships lined up that have disappeared. Firms have implemented hiring freezes; interviews were suddenly canceled. How long will this go on for? What should students plan to do once they finish school?"

AIAS has created a COVID-19 resource center for students who are impacted or even just uncertain about what comes next, but no one can predict how the virus will affect our lives or the economy from day to day, let alone month to month. For now, Conti is trying to find the silver linings, especially in the shift to online classes.

"There is something about the studio that you can't fully replicate digitally," she says, "but honestly the adjustment hasn't been that bad. If studios can go online—by choice and not by necessity—it would make it easier for more students to access an education in architecture."

Emerging Professionals Feel the Strain of COVID-19

After graduating in 2010 and going through several years of on-again, off-again employment, Gail Kubik, ASSOC. AIA, opened Fused Studios with her partner in 2017. The firm focuses on historic preservation and

AIAFuture

CONTINUED

resilience projects, but the team of two had a narrow pipeline and not enough work in the wings to keep them operational during a crisis.

She does see a good deal of potential for emerging professionals down the road, though, especially in specialized areas. Her firm is developing a new set of offerings through what she calls social impact strategy—"diving into intersections of human-centered design, community needs assessment, and mobilization—but she also anticipates a real focus on biophilic design.

Tamara Elena Pérez Hernández, ASSOC. AIA, has also felt the professional sting of COVID-19. She'd been a junior architect at Puerto Rican coworking company Piloto 151 for nine months, finding new spaces to transform into offices and redesigning the interiors, when the island went into lockdown and her whole team was laid off.

Hernández wasn't overly shocked. After not only Hurricane Maria but a series of earthquakes in early 2020, Puerto Rico's economy is as shaky as it's ever been. In addition, the island's status as a U.S. territory means its companies have long faced competition from American behemoths seeking an additional outpost.

"This happens a lot with small-scale businesses in Puerto Rico," she says. "They're paycheck to paycheck, not just the employees but the companies themselves. The waters are very, very shallow."

For now, she's doing freelance residential design for private clients who are flipping houses. Thanks to a few timely referrals, she's getting by. But she's also questioning how she and her peers were told to find their way into architecture: catch on at a big firm, bide your time, and be grateful for the gig.

"Maybe we need to rethink how we do business," she says. "So many of us are working within this old-fashioned model of this big firm with hundreds of employees. I know from experience that this is not sustainable for the majority of practicing architects out there. In Puerto Rico, there are two or three big firms; the rest of us are on our own."

She thinks the fissures laid bare by this global pandemic will further reveal what she's already come to believe: There is something outdated about the way many firms do business.

Hernández has three bachelor's degrees and a master's degree. She speaks five languages. She's been honored by the local AIA chapter. She's done everything right, and yet she still can't find a place in the profession. Fortunately, her belief in herself far outstrips her belief in the current system.

"I am prepared," she says. "I am more than prepared." AIA

AIAPerspective

CREDIT: J CARRIER

Envisioning the Future

Individual action has the power to solve global challenges.

Although formal commencement ceremonies are absent this year, over the last several weeks this profession has welcomed thousands of new colleagues. To the women and men who have completed their studies and look to begin a career in the profession of architecture, I want to say two things: welcome, and the world needs you.

You achieved this milestone during a difficult and daunting time. The last few months have been uncertain and tragic. You begin your journey in a world that will measure time by before the COVID-19 pandemic and after.

Just as other generations have met the unique challenges of their time—from fighting and defeating tyranny abroad in World War II, to standing up to racial injustice and creating a basic social safety net in this country two decades later, to navigating a cold war, and then a hot war on terror—every generation is called to meet unique and serious challenges that will define them.

All of us will be defined by how we meet the challenge of COVID-19 and the related, longer-term challenge of climate change. There is no playbook, no historical touchstone for navigating a global pandemic or an environmental disaster in the 21st century.

While COVID-19 has reminded us of our vulnerability as a society and as individuals, it has also revealed what is best about humanity: compassion and sacrifice for the greater good.

Your training as an architect will make you invaluable to your community. The ability to envision something that doesn't yet exist, to solve problems with a mixture of equal parts technical acumen, creative instincts, and passion to leave our world better than you found it—all of this confers an added duty to look for ways to help and to serve.

It is true that COVID-19 has touched and reshaped our lives and will present challenges that we haven't thought of today. It is also true that we don't have to be defined by those or any other challenges we face. Instead, we can choose to be defined by our response personally, professionally, and as citizens of the global community.

I can't tell you how proud I am that so many continue to choose architecture as their path in life. Our profession, as you know, has a long, rich history of providing solutions to society's challenges through the power of design.

I look forward to working with you and your colleagues to solve the challenges ahead, one project and one community at a time.

Even though I won't personally meet many of you, I have no doubt that I will see your impact. The paradox of the COVID-19 pandemic is that while it has required us to social distance, it has helped bring us all closer and has reminded us how connected we are.

The truth is, both the pandemic and climate change have scrambled even our most basic assumptions of what the future will look like. Like you, I don't have any idea what the "new normal" will look like, but I know this: Collectively, we have the power to meet the many challenges in the days ahead. I also know that we will be stronger in the end for our efforts.

We all have a lot of work ahead of us. Our job at AIA is to help you help your community not just during this current crisis, but for years to come. COVID-19 will continue to alter what we consider normal. AIA is committed to ensuring that you have the tools, knowledge, and policies you need to respond to the challenges of the new normal and to lead efforts to create a healthier, safer, more equitable, and sustainable built world.

If there is a bright spot to the COVID-19 tragedy, it is that it has demonstrated what is best about all of us, and the power of individual action to help solve a global challenge.

Again, congratulations to all of the new graduates. I look forward to seeing how you make a difference in a world that desperately needs your talent and energy to meet the challenges ahead. AIA

Jane Frederick, FAIA, 2020 AIA President

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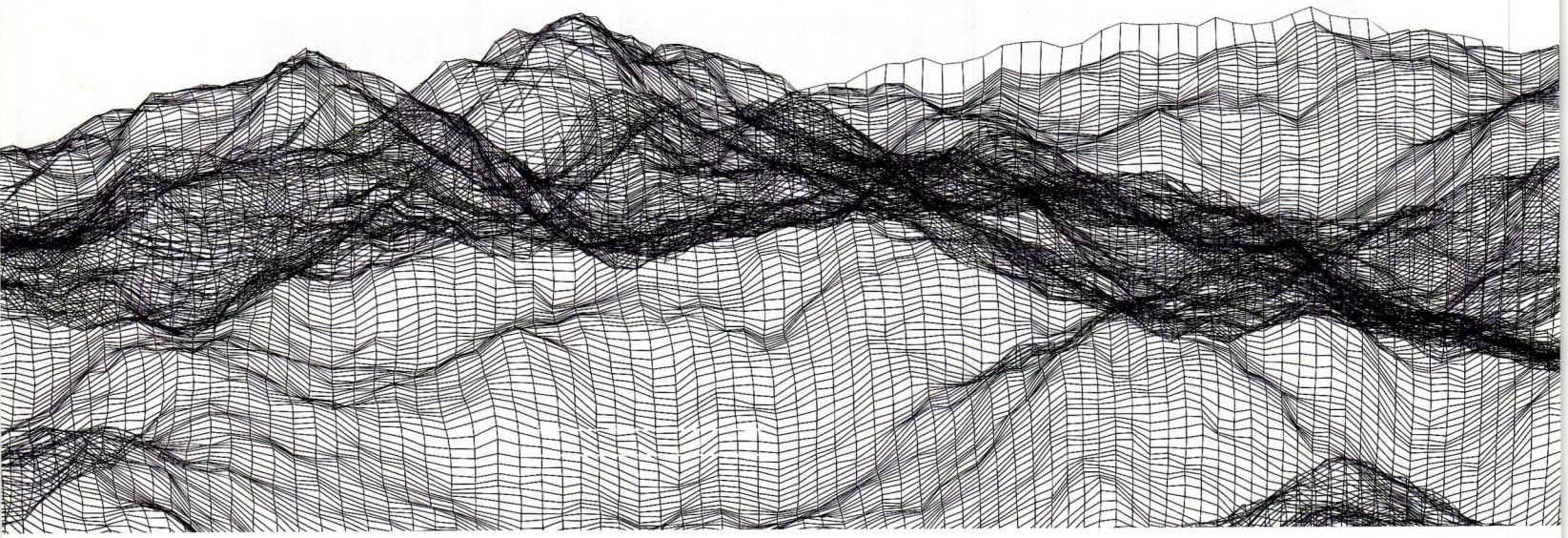

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AIA 2020 AWARDS

The volume of Google searches for the term "social distance" increased 100 fold in March, as the COVID-19 pandemic took hold in the United States, leaving millions of Americans isolated in their homes (and millions more exposed to infection as "essential workers"). So it seems prescient that in January, the juries for the AIA Awards for Interior Architecture and Regional & Urban Design premiated 11 projects that showcase design's capacity to foster communities—connecting people in parks, shopping districts, local landmarks, and office buildings. While we will likely occupy such spaces differently going forward, architecture's critical role in fostering human connection will not waver.

> *See more images, drawings, and full project credits for each winning project at bit.ly/HonorAwards.*

TEXT BY IAN VOLNER
EDITED BY KATIE GERFEN

ALBERT VECERKA/ESTO

AIA 2020

I A

R & U D

INTERIOR ARCHITECTURE AWARDS JURY
Zena Howard, FAIA, Perkins and Will (chair)
Benjamin de Rubertis, AIA, Flad Architects
Kelly Haigh, AIA, DesignLab Architects
James Garrett, AIA, 4RM+ULA
Kelly Bauer, White Baux Studio

REGIONAL & URBAN DESIGN AWARDS JURY
Carol Ross Barney, FAIA, Ross Barney Architects (chair)
Jen Maigret, AIA, Ply+
Nichole Wiedemann, AIA, University of Texas at Austin
Katherine Darnstadt, AIA, Latent Design
David Kunselman, AIA, City of Seattle

1

Hunter's Point South Waterfront Park
New York
SWA/Balsley and Weiss/Manfredi Architecture/Landscape/Urbanism

ALBERT VECERKA/ESTO

A revitalized waterfront blends the natural with the architectural in a public park that doubles as resilient infrastructure.

R & U D 1

Many lifelong New Yorkers would have to confess that they've never been to Newtown Creek, the narrow stream separating Brooklyn from Queens. But with the completion of the **Hunter's Point South Waterfront Park**, the long-neglected channel is poised to become a major destination: The sprawling 11-acre public space begins at the celebrated Gantry Plaza State Park in Long Island City, and continues south along the East River with a series of grand promenades and winding paths that provide a perfect environment to get fresh air and take in the view while still maintaining social distance.

A unique combination of environmental design and urban planning, the project is the result of a collaboration between New York–based firms SWA/Balsley and Weiss/Manfredi Architecture/Landscape/Urbanism; the resulting park features a balance of landscape and architecture. For nature lovers, the park features landscapes that range from a peaceful island grove to dragonfly-filled wetlands, where marshy edges double as a flood-mitigation mechanism. For fans of architecture, the park affords highlights like a cantilevered lookout point surrounded by crisply designed bench seating, a boat launch, and an outdoor exercise zone with stationary equipment set on a spacious concrete platform.

The primary recreational feature of a still-under-construction residential district next door, the park affords sensational views of the Manhattan skyline, and ties together the more developed portion of the Queens waterfront with the lesser-known Newtown Creek section. As visitors round the southern curve of the park, they find the old waterway waiting for them and can begin to explore a revitalized resource they didn't know they were missing.

An interior that sculpts both space and daylight provides a fitting backdrop for a vibrant collection of glass objects.

I A 2

As client-designer pairings go, the **Corning Museum of Glass** and Thomas Phifer and Partners are remarkably well-suited—the institution, which is devoted to preserving and displaying delicate works, is a perfect match for the architect's sensitive, artful approach. The fruits of their collaboration are showcased in the museum's newest wing in Corning, N.Y., which boasts an interior sturdy enough to accommodate a half-million visitors per year, yet as refined and elegant as the Lalique glassware on display.

The architects began by leaving behind the boxy contours of the building's square-planned envelope—which fills out a museum complex with wings by Gunnar Birkerts and Smith-Miller + Hawkinson Architects—opting instead for gently curving white interior walls that seem at times to disappear. The sensation of unbounded space is accentuated by a lighting solution that puts the focus on the work: Raked ceiling beams, acting as louvered shades, direct filtered natural light onto free-standing display cases in the middle of the galleries. The sunbeams strike the colorful objects within, enhancing their vibrancy in such a way that they seem to float against the room's white backdrop.

As airy and evocative as the exhibition spaces can be, Phifer's scheme also includes pragmatic accommodations like new offices for museum employees, auxiliary rooms for public meetings, and a renovation of the museum's existing glass-blowing demonstration space, with a lofted viewing theater where museumgoers can watch professional glazers at work. Translucent glazing allows visitors to gaze out at the surrounding museum campus and to the longtime headquarters of Corning Inc., which is still making the clear stuff after more than a century and a half.

A library in Chicago respects its site's industrial past and introduces amenities that look to the future.

I A 3

Perhaps best known in their hometown for corporate towers, Skidmore, Owings & Merrill recently undertook something altogether different in scale, though no less innovative and eye-catching: a series of new public libraries. For the **Chicago Public Library's West Loop Branch**, the firm transformed a pair of former industrial spaces into a new facility, preserving the best of the historic structures while adapting them to the current needs of a diverse community.

The highlight of the interior scheme is the main reading room: Opting for a moody, steel-and-wood palette, SOM retained the original lofted wood ceiling, along with the exposed brick walls, which are now theatrically lit by fixtures concealed behind the bookcases. Spiked with splashes of bold color and blocks of stenciled text, the reading room has a raw ambiance as chic as any high-end loft, with comfortable furniture and reading nooks that make it only too easy for library visitors to get lost in a good book. The same hip-yet-welcoming sensibility is on display in every part of the nearly 17,000-square-foot space—from meeting rooms with glass walls covered in playful graphics, to oversized pendant light fixtures over the reading tables, to children's reading rooms and playrooms filled with quirky furniture that begs to be crawled upon.

Melding the two structures into one and maximizing their programmatic potential, all while revealing long-hidden details from the buildings' industrial past, SOM's design takes advantage of embodied carbon while also bearing out the firm's unique feel for Chicago's history, as well as its ongoing commitment to the city's future. At press time, Chicago Public Library branches remain closed in response to COVID-19, but they are expected to reopen in the coming weeks.

With retail, education, and production, this adaptive reuse project proves that factories can make sweet neighbors.

I A 4

One of two wins for Gensler in this year's Interior Architecture Awards, the firm's design for the **Dandelion Chocolate Factory** combines atmospheric nostalgia with state-of-the-art functionality, all in pursuit of the perfect chocolate bar. Located on the northern perimeter of San Francisco's Mission District, this carbon-sensitive adaptive reuse project transformed a century-old vacant warehouse into both a tourist-friendly boutique—complete with a café, a shop, and a tasting station where visitors can sample the wares—as well as a fully operational factory, equipped with all the complex mechanisms necessary to sustain commercial-grade artisanal production.

The café has been closed for all but limited pickup orders since San Francisco's shelter-in-place restrictions went into effect in early March, and remains so at press time. But when it reopens, chocolate lovers will once again be confronted with a fresh interior in a palette of white, brown, and black, with carefully detailed metal fixtures and wooden displays for the chocolate on offer. Glazed partitions allow unimpeded sightlines all the way back to the work floor, where staff busily tend to a variety of boilers, sifters, and refrigerators. A redwood-lined corridor that passes above the machinery affords a bird's-eye view of the Wonka-esque goings on; for those interested in a more hands-on understanding of the cocoa biz, the chocolatier offers classes in adjacent brick-walled learning spaces, where company professionals share the secrets of their trade (literally spilling the beans).

In a densely populated city where real factories have become scarce in recent decades, Gensler's project is a model of neighborhood-friendly manufacturing, with an interior as sweet and mellow as their client's signature product.

2

Corning Museum of Glass
Corning, N.Y.
Thomas Phifer and Partners

SCOTT FRANCES/OTTO

Chicago Public Library, West Loop Branch
Chicago
Skidmore, Owings & Merrill

3

Dandelion Chocolate Factory
San Francisco
Gensler

4

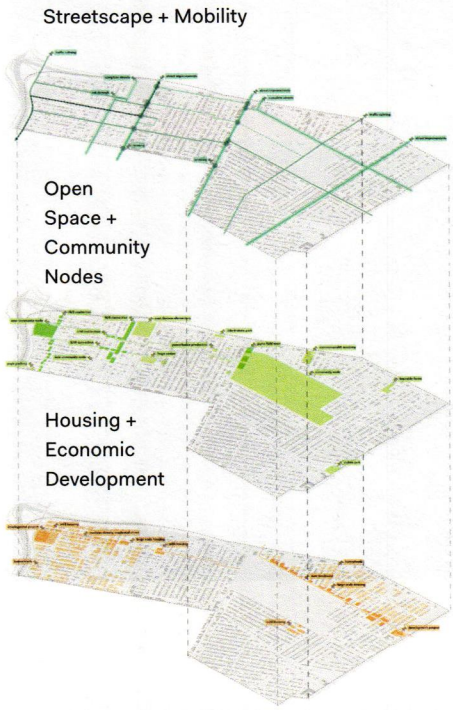
3: TOM HARRIS; 4: RYAN GOBUTY/GENSLER

5

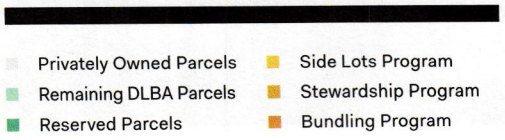
Campau/Davison/Banglatown Neighborhood Framework Plan
Detroit
Interboro Partners

R & U D 5

Developed through intensive conversation with residents, this plan builds on existing patterns of use.



East Davison Village Plan



For more than a decade, Brooklyn, N.Y.–based Interboro Partners has made Detroit (and the socioeconomic challenges confronting it) a particular focus of its practice—so much so that the firm opened an office there. The fruits of those efforts are manifest in the **Campau/Davison/Banglatown Neighborhood Framework Plan**, a comprehensive vision for a troubled yet vital neighborhood north of downtown.

With a careful, community-focused approach, Interboro initiated in-depth conversations with a cross section of area residents, using, among other strategies for engagement, an ice-cream truck (see the cover) to cruise the neighborhood soliciting information and ideas from would-be customers—and rewarding them with free ice cream in return. The plan that emerged from this resourceful client-designer dialogue is at once bold and understated: Building on existing patterns of use, the team identified mechanisms to encourage the annexation of empty lots by adjacent homeowners. This both improves connections between major loci of activity and preserves key facilities currently in disrepair, effectively harnessing the informal urbanism long deployed by the community.

As elsewhere in Detroit, an exodus of residents and chronic underfunding of public services has obliged many locals to adapt, devising stopgap measures; Interboro's scheme recognizes these ad hoc solutions, and supports them with new residential developments and infrastructure that reflect on-the-ground priorities. Favoring precision interventions and bottom-up thinking, Interboro has taken inspiration from Detroit residents' vision and devised a methodology to help turn it into reality.

I A 6

An academic campus brings dynamic urban life to an island in the East River between Manhattan and Queens.

Roosevelt Island is New York City's perpetual "neighborhood of the future," a screen on which generations of designers have tried—and repeatedly failed—to project an image of the "new" city. But with Skidmore, Owings & Merrill's **Cornell Tech Campus Framework Plan**, the southern side of the slender landmass in the East River assumes a credible and durable form—one that is truly integrated into the city as a whole.

On nearly 13 acres of land, SOM has created a center for innovation that serves as a year-round intellectual community as well as a public amenity. It's a gateway of sorts to both the ruins of the island's abandoned 19th-century smallpox hospital and Louis Kahn's Franklin D. Roosevelt Four Freedoms State Park to the south. Flanked by waterfront promenades and marked by open space master planned and designed by James Corner Field Operations, the campus is equal parts conventional collegiate quad and dynamic urban experience, with a central spine intersected by angled tributary paths at irregular intervals. Like a tree with its branches, the various walkways "sprout" in the form of structures (those by Morphosis Architects, Weiss/Manfredi Architecture/Landscape/Urbanism, and Handel Architects are already complete; two by Snøhetta are still forthcoming), each angled to enjoy optimal views of Manhattan on one side and Queens on the other.

The functional diversity of the plan, which intermingles residential and educational uses, is further enhanced by dining spaces and public areas, inside and out. Not just for students and faculty, the communal feel of the campus makes it an ideal resting spot for those making a sojourn to the hospital, the park, or the campus—a worthwhile destination on its own.

COURTESY INTERBORO PARTNERS

A historic hangar gets new purpose as an innovative office for an internet powerhouse.

I A 7

History, technology, architecture, and art come together in ZGF Architects' interior for the **Google Spruce Goose** headquarters in Los Angeles. Located in a burgeoning business district just north of LAX, the Spruce Goose takes its name from the famed (not to say infamous) wood aircraft created by magnate Howard Hughes for the United States War Department during World War II; though the prototype was never put into production, its nearly half-million-square-foot construction hangar remains, now repurposed as offices for the internet-search giant.

To achieve the transformation, ZGF played up the most striking aspect of the original building—its enormous clear-span floor space—leaving the vast wooden ceiling and its arching supports exposed, to stunning visual effect. Into that void, the designers inserted an irregular stack of free-standing terraced structures that runs the full length of the 250-yard-long hangar. Alternating between wood and sleek white cladding, supported by black steel columns, and trimmed with glazed balustrades, the insert is alive with function. From private nooks and conference rooms to amenity spaces and open-plan offices, ZGF's novel infrastructure answers all the programmatic requirements of the modern workplace. The spaces are connected by zigzagging stairs and open catwalks that create a sense of flow while fostering opportunities for social contact.

Reflecting Google's famously creative corporate culture, the design incorporates oversized murals by Los Angeles–based artists that riff on themes from the building's storied past, punctuating the interior with vibrant color as well as a sense of history.

6

Cornell Tech Campus Framework Plan
New York
Skidmore, Owings & Merrill

IWAN BAAN

7

Google Spruce Goose
Los Angeles
ZGF Architects

A music building for the University of Iowa features interiors as finely tuned as the instruments played there.

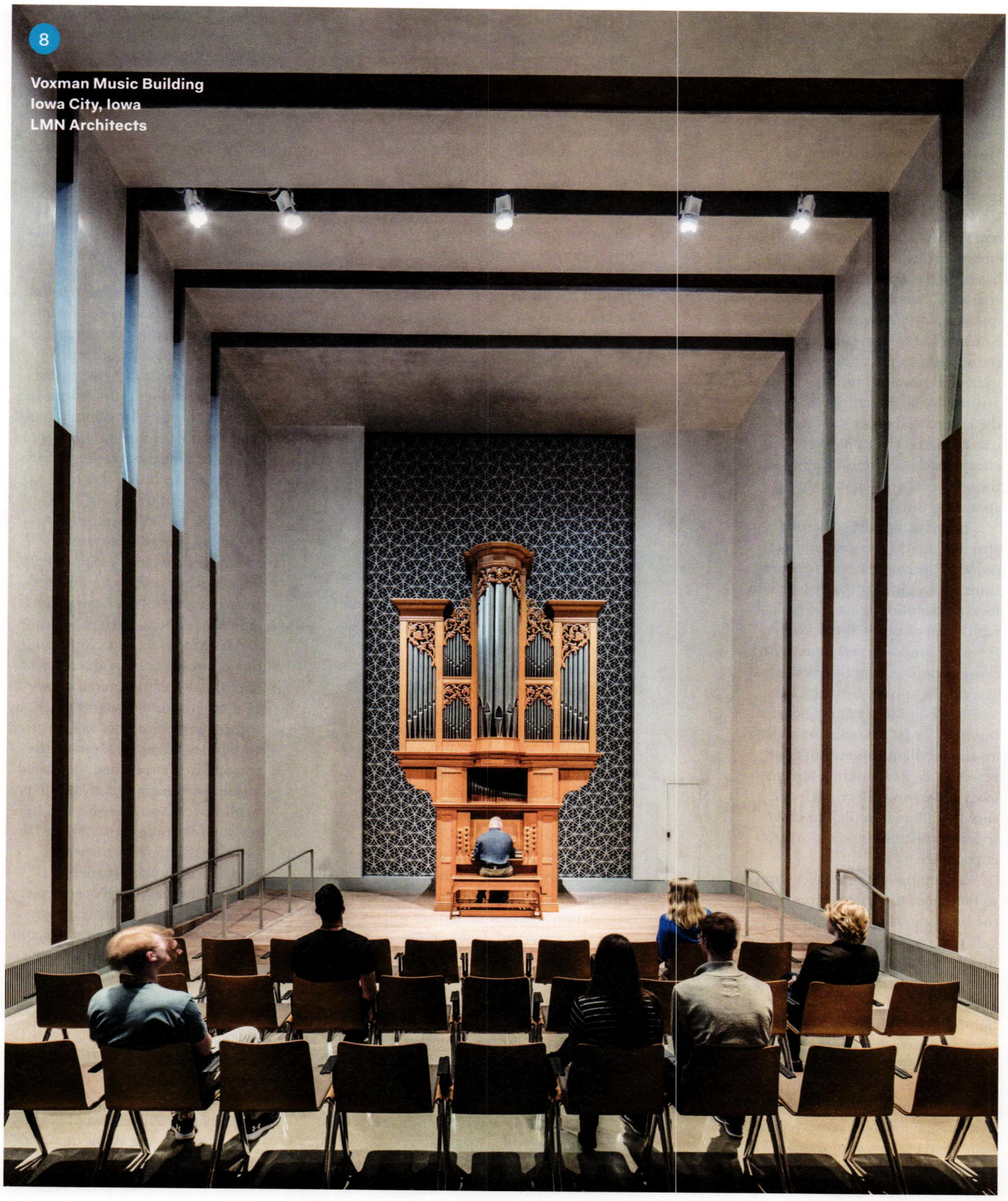
I A 8

Located on the urban edge of the sprawling University of Iowa campus (at a safe remove from the flood-prone Iowa River, which damaged its predecessor building) the **Voxman Music Building** houses a shade under 200,000 square feet of rehearsal and performance space spread out across six floors. Behind a façade of alternating glass and white terra cotta panels, LMN Architects created an interior that unfolds as a series of surprises.

The campus is currently closed in response to the COVID-19 pandemic, and all in-person classes and events have been either moved online or canceled through at least July, but when the restrictions lift, visitors will once again enter into a three-story atrium where students, guests, and musicians can mingle and meet before moving to the performances held on the floors above. The stars of the building's program are its three main performance spaces, which are radically different from one another in both expression and the kinds of musical experiences they foster: The first is a 700-seat concert hall topped by a billowing sound baffle of white tesserae that references the building's façade; the second is a 200-seat recital hall swathed in red, with one floor-to-ceiling window that connects the interior to the world outside; the third is a reverberant organ recital hall, with warm wood accents and an intricately patterned feature wall behind the instrument on stage.

Augmented by a music library, flex spaces, practice rooms, and classrooms—some equipped with adjustable baffle pendants to optimize acoustics—the building provides both the school and Iowa City with a new amenity: a place for creation and creativity that brings together town and gown.

CONNIE ZHOU



8

Voxman Music Building
Iowa City, Iowa
LMN Architects

TIM GRIFFITH

AIA 2020

A building on the edge of a 160-year-old factory complex is remade as a gallery for immersive installations.

I A 9

Deep in the heart of New England's Berkshire Hills, the **Massachusetts Museum of Contemporary Art (MASS MoCA)** showcases some of the boldest and most challenging work of our time in a setting far removed from the typical exhibition environment. Its home since 1999 has been the Arnold Print Works complex, a defunct factory in the town of North Adams. Boston-based Bruner/Cott & Associates has driven the adaptive reuse of the 20-building industrial campus into a world-class arts facility in several phases over the last 20 years. But the recent transformation of **Building 6** encapsulates the intrepid spirit of the whole institution in a single, sprawling interior.

The existing wedge-shaped structure marks the westernmost point of the campus, and features three floors totaling 130,000 square feet of exhibition space, all replete with original exposed-brick walls, gracious windows, and slender cast-iron columns. Using these elements as a starting point, Bruner/Cott wove a design that reimagines the building for its new role: At its heart, an airy, skylight-topped corridor serves as a spine, guiding visitors from gallery to gallery, each one slightly different in plan in order to foster different kinds of artistic encounters.

Museumgoers enjoy views out to the waterways that surround the building while they explore galleries and special-purpose rooms inside, including a double-height lounge, an ingeniously configured James Turrell installation, and a lightbulb-filled hallway from artist Spencer Finch that has become an Instagram sensation. Inviting, easily navigable, yet preserving the old building's rough and rustic grandeur in a scheme that also preserves its embodied carbon, Building 6's interior is as impressive as the art, without ever upstaging it.

A holistic urban plan for Afghanistan's capital city reintegrates nature and fosters development.

R & U D 10

In Afghanistan, where economic development and social change have been rapidly gathering pace, President Ashraf Ghani and the Ministry of Urban Development and Housing tasked Boston- and Shanghai-based Sasaki with developing a scheme for the country's fast-growing capital that gives it the infrastructural capacity to keep pace with its increasing size and complexity while remaining true to its history. The resulting **Kabul Urban Design Framework** focuses not just on the city's physical form, but also on its social infrastructure, equally prioritizing concepts such as sustainability, resilience, and equity.

A major hurdle for any new plan for the city is navigating its highly irregular sprawl: New residents flocking to the war-torn city in the hopes of increased security and opportunity have made Kabul the fifth fastest-growing city in the world, but construction has proceeded unchecked, causing traffic snarls and threatening vital resources. Sasaki responded with interventions aimed both at drawing development towards new infrastructural nodes and paring back overdevelopment in key areas. Along the city's famed Darul Aman Road (built in the 1920s as Kabul's answer to the Champs-Élysées) and Massoud Boulevard (the primary route to Hamid Karzai International Airport), improved circulation and new armatures will spur the growth of denser, more-coherent neighborhoods, making the corridors magnets for commerce while preserving the active street life.

With a keen eye on sustainability, Sasaki's plan calls for reintegrating nature into the urban fabric—new parks and areas reserved for farming will provide ample recreational opportunities, foster economic diversity, and protect the city's fragile water supply, ensuring Kabul a cleaner and greener future.

A thoughtful, worker-focused refurbishment brings a landmark office building and its iconic atrium into the 21st century.

I A 11

Kevin Roche's 1968 Manhattan headquarters for the **Ford Foundation** was a trendsetter of major proportions: It proved that an indoor atrium arrangement (an idea that had been circulating for offices since Frank Lloyd Wright's 1906 Larkin Administration Building in Buffalo, N.Y.) could be optimized to the modern office tower, and it has spawned countless imitators in the five decades since its completion. Charged with renovating the landmark, global firm Gensler didn't just retrofit the structure for the 21st century, it also reinforced what made the original design so influential to begin with.

On the technical front, Gensler ticked off a long list of key goals, including improving fire safety, accessibility, and energy performance with prudent interventions such as an updated sprinkler system, ADA-compliant ramps, and more efficient lighting and bathroom fixtures. Reflecting the foundation's democratic vision, the firm also engineered a more egalitarian working environment by shifting the office plan so that more employees can enjoy views to the surrounding streets and the famed atrium (although that layout, like in all workspaces, may have to be revisited to conform to new social distancing requirements when offices in New York reopen).

Always the design's centerpiece, the greenhouse-like atrium has been rendered still more active and attractive, with a touch-and-smell garden for the sight-impaired, new areas for public gatherings, and an improved glass façade and ceiling canopy that fill the space with daylight. With its thoughtful renovation, Gensler succeeded in reigniting the building's functional and formal excitement and helping it to live up to the ambitions of its new name—the Ford Foundation Center for Social Justice.

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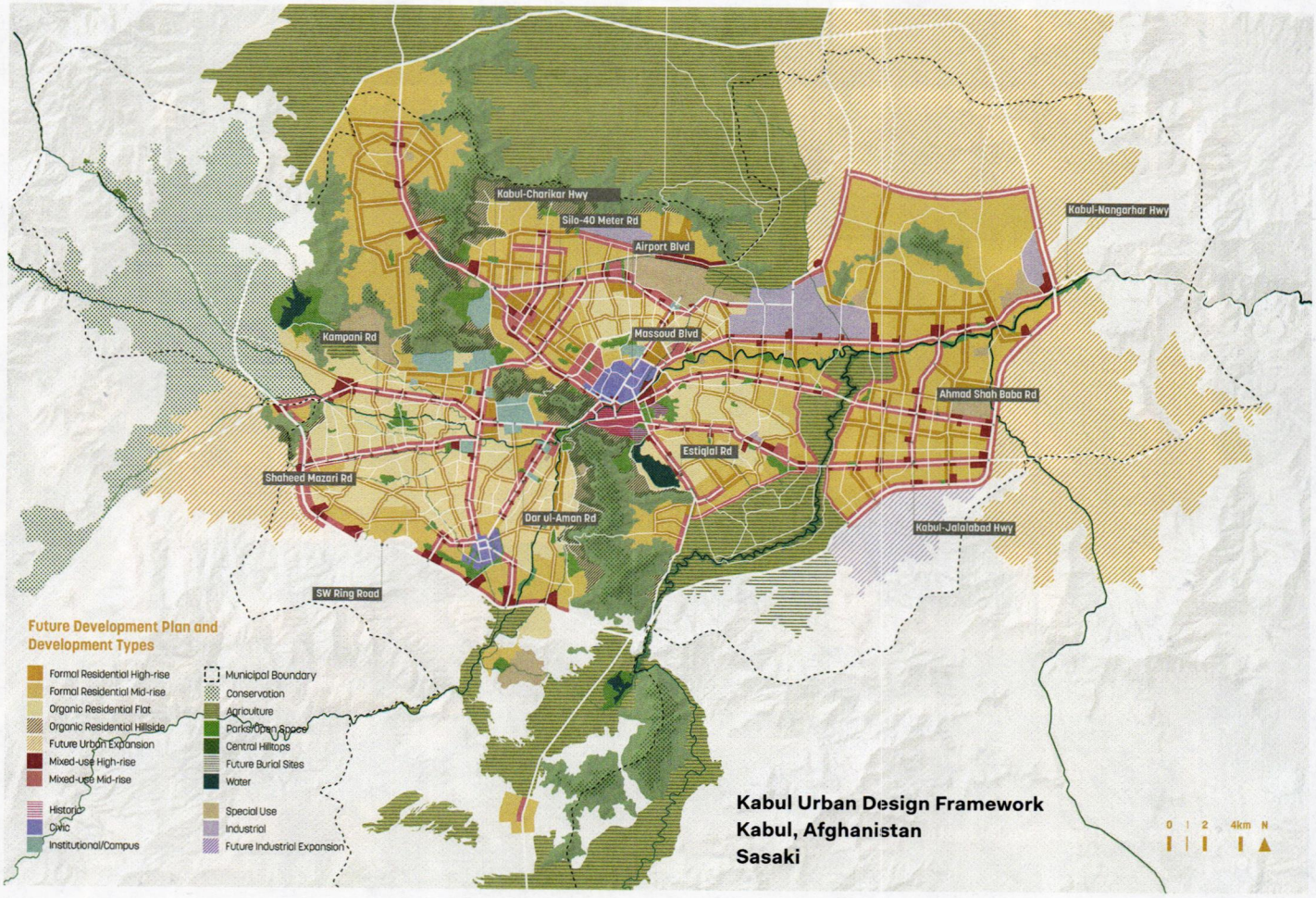
Massachusetts Museum of Contemporary Art, Building 6
North Adams, Mass.
Bruner/Cott & Associates

10



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Ford Foundation Center for Social Justice
New York
Gensler

GARRETT ROWLAND

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ARCHITECT

Editorial: So Long, and Thanks for All the Fish

I should begin this apologia with an apology, for the silly headline. Referencing *The Hitchhiker's Guide to the Galaxy* isn't always a good idea, but it just seems fitting, somehow, at this surreal moment in history. And at least I'm not signing off with a pun.

Yes, signing off. This is my last issue of ARCHITECT.

The world has changed since I got the gig to create the brand back in 2006. Much of it for the better: Our country elected its first black president, marriage equality became the law of the land, and architects cracked the code for net-zero carbon and net-zero energy.

Of course, much changed for the worse: Income and wealth inequality grew, corruption and polarization deepened, the climate kept warming, and a pestilence landed on our shores. Suddenly, devastatingly, my grandparents' stories about the Great Depression feel totally immediate.

Throughout it all, my colleagues and I endeavored to serve the profession. We determined from the outset to place commodity and firmness on equal footing with delight. We resisted (not always with success) the hollow charms of celebrity and consumer culture. We amplified (never enough) the voices of the brave, ethical, and underserved. We tried to help architects find success through the upheavals.

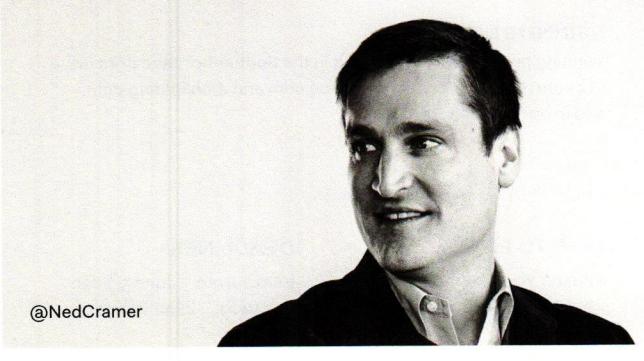
Mistakes were made: Not least, I should have clamored for climate action sooner and more fiercely, provided a steadier platform for equity, and spent less time gazing inward and more time learning from you.

A resounding thank you to everyone at AIA—the passionate leadership, staff, and members, past and present—for taking a chance on a fledgling publication, for suffering the impolitic opinions that occasionally found their way onto this page, and above all, for being such smart, committed partners. We work better together, and much remains to be done.

If you haven't worked at Hanley Wood, feel free to skip this paragraph: A warm hug or a firm handshake—whichever feels right—to Braulio Agnese, Sal Alfano, Rizwan Ali, Aubrey Altmann, Lori Anderson, Frank Anton, Christie Bardo, Mike Bender, Mike Bendickson, Bob Benz, Gillian Berenson, Kriston Capps, Joe Carroll, Pat Carroll, Jen Castenson, Dave Colford, Dan Colunio, Claire Conroy, Caitlin Conville, Maggie Coulter, Madeleine D'Angelo, Clay DeKorne, Nickie Denick, Denise Dersin, Elizabeth Donoff, Russ Ellis, Matt Flynn, Bridget Forbes, Mike Gilbert, Maggie Goldstone, Peter Goldstone, Dan Goodman, Jeannette Haislip, Sheila Harris, Nick Hayman, Kim Heneghan, Curtis Hine, Alex Hoyt, Amanda Kolson Hurley, Katy Keane, Ron Kraft, Todd Latham, Wanda Lau, Jeff Lee, Kate Light, Deane Madsen, Olivia Martin, Hannah McCann, Rick McConnell, John McManus, Jeff Meyers, Greig O'Brien, Robb Ogle, Dana Pace, Bill Palmer, Jennifer Pearce, Andy Reid, Bill Richards, Bryan Rippeon, Tom Scala, Jim Schneider, Cliff Smith, Ron Spink, Glenn Stevens, Paul Tourbaf, Cathy Underwood, Joel Walters, Katie Weeks, Eric Wills, Mike Wood Jr., and all who made me think and laugh.

To those who have written complaining that the type is too small, I say with great feeling and growing empathy: Get a better prescription.

It is time for fresh vision. I leave you in the supremely capable hands of a beloved friend and longtime partner in crime: Katie Gerfen. Fare thee well.



STEPHEN VOSS