

Dark Skies at Night  
PPP Loans and Forgiveness  
Unearthing Truths From Richmond's Slave Trail  
Kwong Von Glinow Smuggles Architecture

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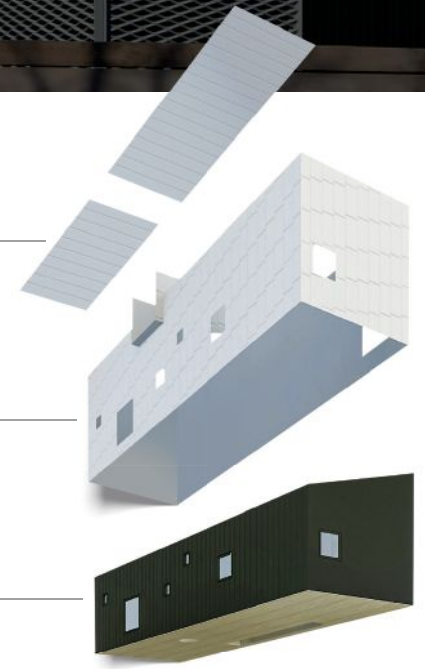


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Volume 109, number 10. October 2020.

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Brooks + Scarpa

United States Land Port of Entry,  
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John W. Olver Design Building  
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Leers Weinzapfel Associates

Etsy Headquarters  
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Environmental Nature Center and Preschool  
Newport Beach, Calif.  
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# THE GRACEFUL DEFIANCE OF THE HEYDAR ALIYEV CULTURAL CENTER

This Zaha Hadid masterwork delights the eye thanks in part to glass fiber reinforced concrete cladding.



Photo Credit: Hufton + Crow Photographers



Photo Credit: Hufton + Crow Photographers

For the 10 million citizens of Azerbaijan, the architectural symbolism couldn't be more poignant or liberating.

There, gleaming in defiant contrast to the dull architectural dreariness of capital city Baku's Soviet-era buildings, rises the swooping, twisting, and parametric joy of the Heydar Aliyev Cultural Center. The building's fluidity and playful form openly mocks its rigid, monolithic neighbors, a 619,000-square-foot reminder of the country's break from the Soviet Union in 1991.

Few structures display as much architectural daring and heart as the eight-story Aliyev Center. London-based Zaha Hadid Architects (ZHA) is the design team.

## CONSTRUCTION CHALLENGE

"The client really wanted something different and ambitious. All credit to them for thinking so boldly," says Sara Sheikh Akbari, senior ZHA associate and a key member of the design team throughout the five-year project.

The design, engineering, and construction team rallied around the \$250 million neo-futuristic design. The motivation and determination to realize the ZHA vision was high in spite of one big question: How do we build it?

The interior and exterior construction challenges were daunting. To maintain fluidity and spatial continuity, the use of columns was ruled out. The building is a mixed-use venue, hosting an assortment of functions within the curvilinear form: a conference hall that contains three auditoriums, a library, and a museum. The absence of columns freed the designers to create a fascinating interior vocabulary that greets visitors with an immersive passage of crosswalks and other unexpected forms.

## SPACE FRAME SUPPORT

It was decided a space frame structure composed of a vast steel tube-and-node system would form the endoskeleton (just under 25 miles of steel tubing). The space frame supports the grand architectural feature: the cladding system.

"We had to ensure the space frame could support the freeform roof structure and how it responds to different environmental requirements, like wind loads and seismic events," Akbari says. To make double certain of their space frame ideas, computational analysis was rendered on two separate 3D finite element programs.

## CLADDING PANELS

Another concern was the cladding panels. The panels shouldered many requirements—environmental, structural, maintenance, color, and texture, for starters. What should they be made of? What composition offered the least risk with the most aesthetic reward?

"Everyone was involved in that process very, very deeply from early on," recalls Akbari. "There are so many considerations in our investigations. Could we even manufacture whatever we selected at scale, for example? How would we transition the panels that seamlessly link the plaza with the structure? What are the joint requirements? UV radiation? Temperature extremes? What about cleaning? The city of Baku has large oil refineries nearby. How would the panels stand up to oil and dirt after years of exposure? The panels had to check a lot of boxes."

## GFRC SELECTED

Numerous options were thoroughly tested and considered. The team settled on two panel compositions: glass fiber reinforced polymer and a material ZHA increasingly specifies for their award-winning work, glass fiber reinforced concrete (GFRC).





What is GFRC? As the name indicates, fine glass fibers are blended together with portland cement and water to create a surprisingly lightweight and exceedingly durable material (ancient Roman engineers used horsehair as their “glass” fiber). GFRC has been actively used for about 30 years and is utilized in many applications beyond cladding panels, including domes, statues, planters, and fountains. More prosaic applications include fireplace surrounds, kitchen countertops, and artificial stonework.

#### GFRC UP CLOSE

What drew the ZHA team to GFRC are its characteristics:

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- **Durable.** GFRC will outlast precast concrete, cast stone, and even some natural stone, thanks to low alkaline cement and pozzolans.
- **Sustainable.** GFRC qualifies as a sustainable material because it uses far less cement than other concrete and frequently uses significant quantities of recycled materials, such as pozzolan.
- **Economical.** At a thickness of about ¾ of an inch, GFRC is typically less than \$2 per square foot.

The extreme geometries of the Aliyev Center also required another attribute: mass off-site fabrication with fail-safe precision. All told, the

Center’s skin comprises 16,150 panels. No two are alike. Some are single curve, others double curve. Each one is roughly 1.5 meters wide by 7 meters long. To help keep track of thousands of meticulously fabricated panels, each one was embedded with a microchip for fast electronic recognition.

#### IT JUST MADE SENSE

There’s little dispute today that the Heydar Aliyev Cultural Center achieved “different and ambitious” at a scale few could have imagined. A great many things had to come together to make it possible. One of them, Akbari says, was the unifying force of concrete. “Concrete was part of the planning process so long, it’s hard to imagine anything else in its place. It just made sense.”

That sense is now about to be on worldwide display once again. Sometime early next year, it’s expected that the Bee’ah Headquarters—another ZHA design that delights the eye and breaks new ground in environmental responsibility—will open in Sharjah, UAE.

“We’ve been using GFRC quite a bit since [the Aliyev Center]. We explore a different aspect of the material in every job. For the Bee’ah project we’re focusing on it in a different way. I guess you could say we love concrete,” she says.

As for the Aliyev Center, Akbari vividly recalls her last visit to the finished structure. “There were a lot of tourists walking the plaza with selfie sticks,” she smiles.

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**Location:** Baku, Azerbaijan  
**Owner:** The Republic of Azerbaijan  
**Architect:** Zaha Hadid Architects  
**Main Contractor:** DIA  
**Structural:** AKT, Tuncel Engineers  
**Space Frame:** Mero  
**Façade:** Werner Sobek  
**Mechanical:** GMD Engineers



Photo Credit: Luke Hayes

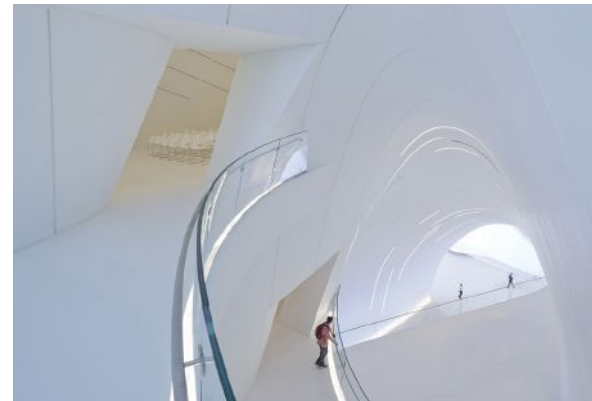


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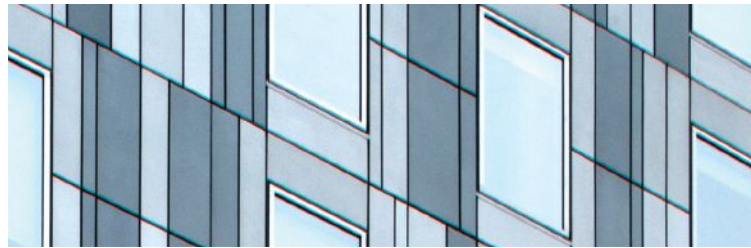
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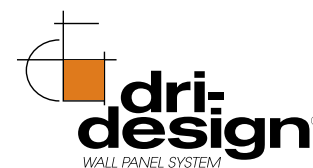
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Aloft/Element Hotel – Austin, TX  
Architect: HKS – Dallas, TX

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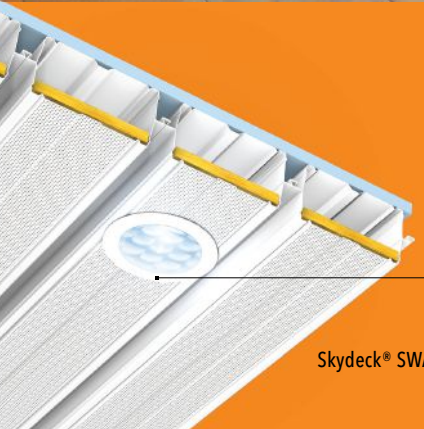
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# Architectural Lighting: Keeping Skies Dark at Night

TEXT BY MURRYE BERNARD, AIA

A staggering 99% of inhabitants of Europe and the United States—and 83% of the world's population overall—experience some form of light pollution, according to a 2016 study published in *Science Advances*. Many jurisdictions follow older versions of building codes that are out of alignment with newer LED technologies that offer unprecedented efficacy, outputting more lumens per watt than conventional light sources.

Aside from inhibiting views of a star-filled night sky, light pollution disrupts the circadian rhythms of humans and wildlife. According to the International Dark-Sky Association, a Tucson, Ariz.-based organization combating light pollution worldwide, an estimated 30% of outdoor lighting in the U.S. is wasted by fixtures that are unshielded, poorly aimed, or both. That means that approximately \$3.3 billion worth of energy is lost to sky glow each year. Architects and designers can help reduce that waste by leveraging new lighting guidelines and control systems.



Loghaven Artist Residency at dusk

## Dark-Sky Principles and Programs

In April, the IDA and the Illuminating Engineering Society announced a strategic partnership to address lighting pollution. The boards of both organizations adopted principles for responsible outdoor lighting, including the limiting of nighttime lighting to where and when it is needed, avoiding overlighting, and maintaining sensitivity to local ecosystems.

Designers voluntarily following these principles would minimize a project's number of exterior fixtures, specify lower lamp wattages, aim fixtures downward to prevent sky glow, and avoid casting light onto adjacent properties to reduce light trespass. Using lighting control systems equipped with timers and dimmers can help limit lighting to its intended purpose. Using warm lamps, with color temperatures below 3000K, can further enhance visual comfort.

Complementing the efforts of IDA and IES, the Fairfax Station, Va.-based Smart Outdoor Lighting Alliance has launched the Community Friendly Lighting Training and Certification program, which prepares lighting professionals to design, plan, and install successful LED public lighting projects in residential neighborhoods.

As part of the program requirements, designers must engage community members through public outreach and engagement initiatives such as town hall-style meetings, mock-ups, pilot tests, walking tours, and surveys.

## Best Dark-Sky Lighting Practices

For outdoor lighting, IDA recommends the use of lamps with color temperatures below 3000K and of shielded fixtures, particularly when using LEDs or metal halides. The spectrums for these sources contain large amounts of blue light, which brightens the night sky more than any other color of light. While IDA itself doesn't sell fixtures, it does recommend dark sky-compliant fixtures through its third-party certified Fixture Seal of Approval program.

The lighting codes of many municipalities integrate dark-sky principles. In 2011, IDA and IES developed the Model Lighting Ordinance, which sets forth outdoor lighting standards to reduce glare, light trespass, and sky glow. The MLO assigns appropriate lighting levels based on land use and lighting zones.

Before developing an outdoor lighting system, a lighting designer should observe the impact of nearby projects. Francesca Bastianini, a Brooklyn, N.Y.-based founding partner of Sight Studio, makes it a practice to visit a project site at night, even before construction begins. She also favors creating "bread crumbs"—points of light in the landscape created through path lights—or highlighting special features instead of deploying continuous path lighting.

## Case Studies

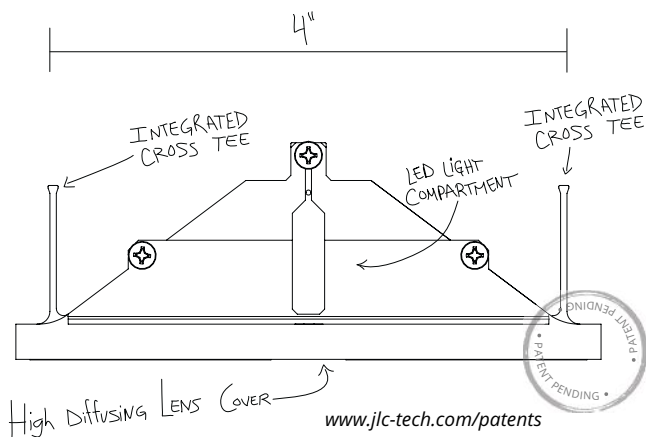
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## Architectural Lighting: Keeping Skies Dark at Night

Architecture, Sichte Studio cast light down vertical surfaces and across louvered gables at the ends. The weathered wood surfaces subtly glow without creating unnecessary light trespass. During commissioning, Bastianini chose to dim preset levels further to achieve the desired effect. As the evening progresses, the luminance levels lower before the fixtures eventually turn off.

For municipal projects, Bastianini says, "Often, the focus is on upgrading from legacy sources ... to LEDs, with cost savings and efficiency as the priorities. If you are focusing on efficiency, then you have more light for less wattage. But as a lighting designer, that shouldn't be your primary goal—we don't, in fact, need more light."

When Boston City Hall, the controversial Brutalist behemoth designed by Kallmann, McKinnell, and Knowles, was completed in 1968, façade-mounted floodlights illuminated the structure. Those floodlights eventually burned out and were never properly updated. As a result, the base of the building—designed to appear light and porous—looked heavy, shadowed, and uninviting. As part of a multiphase revitalization effort, local architecture and planning firm Utile and lighting designer LAM Partners relit the exterior and updated the lobby in October 2016.

To highlight the Brutalist architecture once again, the design team stripped away the old floodlights and conduits—which LAM principal Justin Brown

recalls as looking "like big, horrible barnacles on the façade." Given that the structure is a historic landmark, options for placing new fixtures were limited. LAM Partners relied heavily on pole-mounted fixtures that project light onto the façades. Along Congress Street to the north and east, LAM Partners mounted fixtures on existing city streetlights and utilized wireless DMX, which is set on a schedule so that lights ultimately turn off at night. "We took a targeted approach with each fixture so they are not flooding the building and there isn't much spill light," LAM Partners principal Keith Yancey, AIA, says. "Lumens weren't wasted."

Utile designed a custom bronze detail to conceal new façade-mounted linear fixtures that illuminate the structure's massive corner columns. Within the exterior colonnade, existing fixture locations in the soffit were reused for new downlights—a challenge given that the existing conduits and wires were embedded in a mass of concrete.

Though the upgraded exterior lighting scheme was intended to be white, the project features dimmable RGBW LEDs. "The city found out about the color-changing capacity, and they were into it," Yancey recalls. Using Lumenpulse's Lumentalk system, both



Top: Boston City Hall, view from west at night

Bottom: Color-changing luminaires, lobby

the power and color-changing data signal are transmitted to the fixtures using the building's existing wiring. An online custom control interface allows city staff to program and customize the color-changing light from an iPad.

The new lighting scheme fulfills the goal of exposing the activities inside Boston City Hall's exterior massing, making an eye-catching statement while adhering to dark-sky lighting best practices. "We brought back a lot of the grandeur that was there [originally] ... by making the base more inviting and creating a better experience for passersby," Yancey says. "With new technologies, we were able to do what wasn't possible when the building was built while emphasizing the architecture."





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# Opinion: The 6-Foot Fence

TEXT BY IBRAHIM GREENIDGE, AIA



I was 9 when the Crown Heights Riots happened a few blocks from my elementary school. My belief that people who ultimately occupy a space should take part in determining its intended use and design can be traced to that moment when I discovered that people were willing to die over it.

Architecture, among other STEM fields, is inhibitive to women and people of color. Ironically, the most prominent voices in the fight for justice are women and people of color; crucial and unapologetic voices remain missing. In an industry that caters to wealthy individuals, a social justice approach requires addressing inequities in land distribution, access to capital, and zoning laws. J. Max Bond Jr., Phil Freelon, Curtis Moody, FAIA, Sharon Egretta Sutton, FAIA, Jack Travis, FAIA, and Roberta Washington, FAIA, among others, have bridged divides in class, gender, and race. They have created a blueprint for social justice architecture.

In the private sector, architects primarily work for upper-class communities. We are told to cater to the client, who is seldom poor, young, or of color. For these reasons, though my early clients were high net-worth individuals and developers with easy access to capital—and lots of it—I have

since started a practice that seeks clients who are active community members and who see their home, business, or institution as an opportunity to engage others.

Rooftop access allows me to witness the evolution of my Bed-Stuy community in Brooklyn, N.Y. The disparity in median household incomes is already wide (\$50,200 versus \$28,000, respectively, according to 2015 city data). Increasingly, I have seen one modern horizontal fence after another pop up, enclosing the backyards of homes around me. These 6-foot-barriers may reflect the residents' customs in their prior neighborhoods, or their desire for status or a sense of security—or they could simply be the result of a wildly successful word-of-mouth recommendation for a contractor.

Nevertheless, I wonder if my new, fenced-in neighbors ever considered the community impact of their decisions. In a COVID-19 world, these fences create additional barriers. Chance encounters to socialize with your neighbors—to discuss the soil you intend to use to grow basil or to take joy in sharing the overflow of homegrown tomatoes—become even rarer. We will miss our children growing up playing in the backyard.

The responsibility to consider the impact of design decisions on the larger community falls for now on those with means, who dictate how our spaces are designed. They become

accountable for the collective experience. Reconsidering the height of your fence, or even the decision to erect one, is exactly the kind of thing that has a lasting impact on the health and vitality of a community—and it is within the control and consciousness of each homeowner, contractor, and architect.

Architects have a unique opportunity to design spaces that facilitate trade, scholarship, culture, and exposure close to home. In the same ways that you ask “Does this form follow function?” or “How will this be experienced in section?,” how might you use your position to design a more equitable and inclusive community, city, and world?

Robert Moses built to protect and preserve a class of people. Highways, causeways, parks, bridges, and streets honor him. In 2020, we understand the long-term effects of his and many others' racist urban planning practices. We have heard the global charge to end white supremacy. In 2021 and beyond, for every Robert Moses Park and Causeway, we should have a Jumaane Stewart Way, Beverly Greene Parkway, Julian Abele Boulevard, and Richard Franklin, AIA, Causeway. The future of design and the built environment will be for those committed to all communities thriving.

#ArrestTheOfficersWhoKilledBreonnaTaylor

*Ibrahim Greenidge, AIA, is founder and managing partner of Bolt Architecture, in Brooklyn, N.Y.*



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## HAVE YOU OVERLOOKED THIS CLADDING SOLUTION?

There are at least three reasons why IMPs are trending well in project designs.

In 1996, a young man named David Spathaky set a world record for keeping 108 plates spinning simultaneously on sticks scarcely larger than a pool cue.

That feat of poise, precision, and determination pales in comparison to the balancing act often faced by today's commercial building architect.

Consider the building envelope, for example: Balancing the requirements of the owner's vision, code, sustainability, budget, and design intent takes a special brand of resourcefulness and insight.

When selecting an envelope assembly, architects have to ask themselves: "Is the cladding ASHRAE 90.1 compliant?" and "What about the fire rating? Red list issues? Code? Transitions and details? Wind load? LEED objectives? Color fastness? Warrantability? Moisture and air barriers? Insulation? Installation ease?"

Maneuver through that thicket and you still face possible liability concerns should any question go sideways. That's a lot of pressure and risk.

Few outside observers know those challenges better than Brandon Kinsey and Brian Finnegan, both regional architectural sales managers for CENTRIA, a large manufacturer of insulated metal panels (IMPs), a cladding system known for its crisp, engineered facades. Architects frequently consult with the veteran advisors on cladding matters. "We're involved very, very early—when the design intent may be little more than ideas sketched on a napkin," Kinsey says.

The challenge is that there are many cladding options today, including metal composite material, aluminum composite material, fiber cement, EIFS, terra cotta, zinc, brick, glass, and IMPs, to name a few. All have their merits. The differentiators, say Kinsey and Finnegan, often come down to specification confidence, simplicity, and budget. Each consideration plays well to IMP's strengths:

**1. Confidence.** Specifying IMPs can safeguard the owner's investment for many years. CENTRIA, for example, "... takes full cladding responsibility for everything from the inner vapor and air barrier to the exterior cladding. We're on the hook for 20 years," Finnegan says. CENTRIA IMPs also

comply with all code requirements, including the NFPA 285 fire test standard.

**2. Simplicity.** IMPs are structural steel panels (not aluminum) with available panel sizes of up to 10 feet. That dramatically reduces the need for falseworks, saving considerable labor expenses, materials, and packaging waste. Red list-free foam is also integrated into some panels, offering insulation values of up to R-22. You can build right over stud material without extra barriers. Less wall assembly material means an inherently greener structure, which can be recognized with LEED points.

**3. Budget.** Architects seeking terra cotta, zinc, natural stone, masonry, or other high-end design effects will be pleased by what is possible with IMPs. The system's broad use in large-scale projects such as stadiums, convention centers, schools, hospitals, government service, and aviation hangars illustrates the material's exceptional value across many applications.

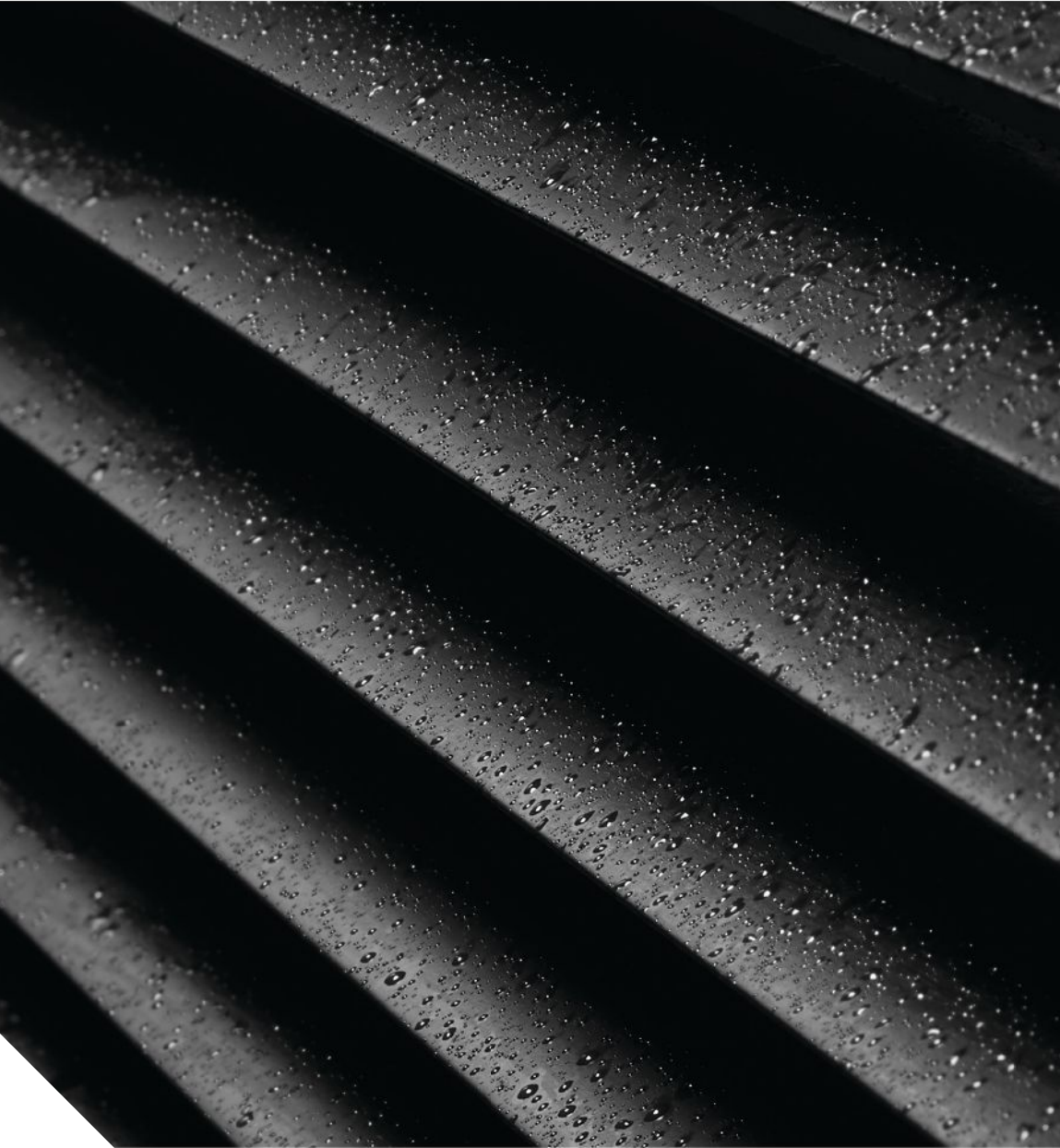
No cladding solution is perfect. Compare EPDs. Samples. Project histories. As you investigate alternatives, keep IMPs on the shortlist. IMPs merit special consideration on any project where confidence, simplicity, and budget are key to project success.

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# The Rules: Repaying PPP Loans

TEXT BY TERRI PETERS

## Sample Forgivable PPP Loan Makeup



Architecture  
PPP Loans

\$150,000–\$500,000 ..... 1,995  
 \$350,000–1 MILLION ..... 1,078  
 \$1–2 MILLION ..... 272  
 \$2–5 MILLION ..... 127  
 \$5–10 MILLION ... 32

As part of the U.S. government's \$2 trillion CARES Act signed into law in March in response to the COVID-19 pandemic, the \$349 billion Paycheck Protection Program provided low-interest and potentially forgivable loans for businesses to help keep their workforce employed. The Small Business Administration program has helped thousands of firms subsidize rent, utilities, and wages. As of July, 3,504 firms providing architectural services had received loans of greater than \$150,000, according to public records. But how much must firms pay back and by when?

For the federal government to forgive the loan in part or in its entirety, firms must meet several conditions: Namely, the loan must have been spent on sanctioned purposes—mortgage interest, rent, utilities, and other business debts—and at least 60% of the prospective amount to be forgiven must have been directed toward payroll.

Borrowers also need to show how they applied their loan toward PPP's primary objective: keeping employment numbers similar to pre-pandemic levels. In June, Congress passed the PPP Flexibility Act of 2020. Katharine Kohm, a Providence, R.I.-based partner at the law firm Pierce Atwood, says that the most notable changes from this addendum were the extension of the loan coverage

period from eight to 24 weeks and the extension of the safe harbor period through Dec. 31, both of which allow employers "more time to rehire workers without facing the reduction penalty to their forgiveness amount." This amount may decrease depending on the ratio of the borrower's average number of full-time employees during the loan-spending period to that between Jan. 1 and Feb. 29, 2020, or between Feb. 15 and June 30, 2019. Borrowers receiving a loan prior to the June act can decide whether to use the eight- or 24-week duration as the comparison baseline.

An Aug. 24 amendment, the Interim Final Rule, introduced exceptions for companies unable to hire staff due to a lack of qualified workers or to provide a workplace environment that meets social distancing or safety requirements. Borrowers should document their attempts to potentially avoid a forgiveness penalty for the sustained workforce reductions.

While "there is no hard and fast deadline" as to when firms must begin the repayment process, Kohm says the forgiveness application currently "needs to be submitted to the lender no later than 10 months from the end of the loan-spending period," whether that be eight or 24 weeks.

To begin the repayment process, borrowers can ask their SBA lender

which documents it requires. Examples include "bank account statements, third-party payroll reports, canceled checks, invoices or billing statements, payroll tax forms, and account statements documenting the amount of employer contributions to employee health insurance and retirement plans," says Kevin Johns, a tax specialist at Southfield, Mich.-based accounting firm Clayton & McKerverve. The bank will then review the loan forgiveness form before submitting it to the SBA for approval.

Businesses should monitor the PPP for future developments because the forgiveness rules continue to evolve. The August Interim Final Rule, for instance, suggests that any expenditures toward rent will be forgivable to the extent that the underlying property has paid interest on a mortgage.

This "clarification," Johns says, means that "if there is no mortgage [on the business property], then no rent payments would be eligible." He worries that lenders may not have discussed this exception with borrowers during their loan application process. However, he notes, legislation is pending that would simplify the filing process and forgiveness calculation for loans under \$150,000. And that would be news some borrowers can take to the bank.

SOURCE: SMALL BUSINESS ADMINISTRATION

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

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# Next Progressives: Kwong Von Glinow

**Firm leadership:**

Alison Von Glinow, AIA,  
and Lap Chi Kwong

**Year founded:**

2017

**Location:**

Chicago


**Firm size:**

Two partners and three to five interns

**How founders met:**

At the Harvard Graduate School  
of Design

**Experience:**

Von Glinow: Herzog & de Meuron,  
Skidmore, Owings & Merrill (Chicago  
and New York offices), Toshiko Mori  
Architect, Svendborg Architects;  
Kwong: Herzog & de Meuron, Schacht  
Aslani Architects.

**Firm mission:**

"Enjoy architecture." When we first put  
the two words together, it sounded  
quite odd in a good way. "Architecture"  
tends to sound serious and critical,  
while "enjoy" is a little too lighthearted  
for the context of architecture. We  
like that tension. The phrase "enjoy  
architecture" has emerged as an  
attitude as well as an approach and  
mission in our office.

**First commission:**

The Storage "T"

**Favorite project and why:**

Ardmore House. After working through  
several housing competitions that  
tested new values for living, we wanted  
to bring those values to a built reality.  
We received several inquiries for  
housing developments but found it is  
not easy to convince potential clients  
of the value of shared spaces and light  
and air without a built precedent.  
We decided to put these values to the  
test in our own development project.  
Ardmore House is not designed  
for one specific client, but the goal  
is to rethink housing's future by  
considering how the next generation  
of homebuyers wants to live.

**Another favorite project and why:**

The Table Top Apartments. From the  
start, the objective of our practice was  
to create projects that were relatable—  
so that people could understand our  
work and perhaps our work could  
help to make architectural thinking  
accessible to more people. It was  
during this project that we started to  
use the term "borrowing the familiar"  
as a way to make spaces relatable

through their familiarity, albeit in a  
different context. This is how the Table  
Top apartments came about.

**Biggest challenge in running a  
successful practice:**

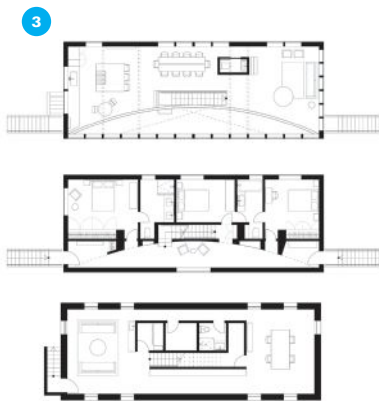
We learned quickly that just being  
a good designer doesn't keep the  
projects running or coming. We've  
had to teach ourselves and our staff  
new skills, including talking to clients,  
lecturing, marketing, and managing a  
team in addition to finances. Basically,  
how to be everything all at once, while  
still making design the most important  
part of our practice.

**Favorite rule to break:**

We use a term called "smuggling  
architecture" in our work, which  
sounds like breaking the rules, but is  
actually about working within them.  
For us, smuggling architecture means  
providing a new and alternative  
approach to design that injects  
architectural significance into topics  
that have lost their connection  
with the discipline—or that weren't  
associated with it to begin with. We  
recently had an installation on display  
at the Swiss Architecture Museum  
in Basel, Switzerland, where we  
smuggled architecture into suburban  
model homes. The builders of these  
homes were not necessarily seeking  
alternatives to their stock plans, but  
smuggling architecture plays along  
with the common and everyday and  
engages subtly. Perhaps this is soft  
rule-breaking.

**Next Progressives:  
Kwong Von Glinow**





1. The Table Top Apartments, a modular system that resembles (what else?) a series of stacked table tops, can be configured as anything from a four-story walk-up to a residential tower, with the modules arranged to create shared outdoor space. 2. The *Smuggling Architecture* exhibition, which was on display at the Swiss Architecture Museum in Basel, updates three suburban home plans with subtle architectural tweaks. 3. Kwong Von Glinow served as developer and architect for Ardmore House, a spec home in Chicago that defies convention by placing the bedrooms on the lower level and the shared living spaces on the second floor. 4. The Storage "T," an apartment renovation in Hong Kong, combines all of the closet and storage spaces into one T-shaped unit that serves as the defining element of the layout. 5. In the Loop, a proposal for an ADA-compliant entrance to City Hall in San Antonio, Texas, doubles as a gathering space. 6. The "Give me a minute, please!" pavilion, which was designed with UB Studio, will be displayed next summer as part of the Designing a Better Chicago initiative. It contains a series of furniture-scale follies that will offer a brief moment of retreat from the bustle of city life.



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# Residential:

## PH01:BRK

Brookings, S.D.

SDSU DoArch Students, Charles MacBride, and Robert Arlt

TEXT BY MADELEINE D'ANGELO

It's not only the charcoal-colored exterior, or lack of a traditional porch, that makes PH01:BRK stand out in its Brookings, S.D., neighborhood. In a state that has failed to adopt energy codes, the 2,013-square-foot residence is also South Dakota's first custom-designed passive house and the first house in the region to sell energy back to the grid. Designed by students from the South Dakota State University Department of Architecture and their instructors Robert Arlt, AIA, and Charles MacBride, AIA, the three-bedroom, two-and-a-half-bath house is a showcase for environmentally conscious housing in the region.

After receiving a grant from former governor Dennis Daugaard to launch

### Project Credits

*Project:* PH01:BRK, Brookings, S.D.

*Client:* Governor's Office of Economic Development

*Design Architect:* South Dakota State University Department of Architecture (DoArch) Students, Brookings, S.D. · Anthony Dyk, ASSOC. AIA, Beau Prest, Emily Hamer, Emily Nelson, Ethan Millar, Spencer Sommers, AIA (design team); Charles MacBride, AIA, Robert Arlt, AIA (instructors)

*Structural Engineer:* Rise

*Mechanical Engineer:* Luke Langals

*PV Consultant:* Reinaldo Tonkoski, SDSU Department of Electrical Engineering

*Passive House Consultant:* Passive House Institute US

*Passive House Verifier:* David Holtzclaw

*General Contractor:* Brookings Built Green

*Size:* 2,013 square feet

*Cost:* \$420,000



Cement-fiber lap siding conceals Zip System sheathing from Huber.



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**Residential:  
South Dakota State  
University Department  
of Architecture**



an SDSU design-build studio in 2016—where the sale of one house would fund the construction of the next one—Arlt and MacBride worked with sixth-year graduate students to design a house for a narrow infill site near campus. After reviews and a final class vote, MacBride, Arlt, and their students selected a simple, gabled structure with fiber-cement lap siding and a detached garage in the rear.

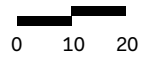
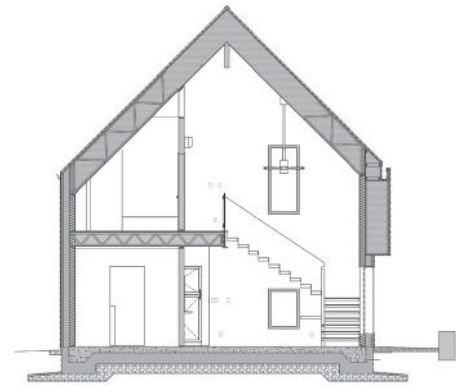
Due to the site's size, the team chose a linear program with a front-facing entry and an exterior courtyard between the residence and garage. In lieu of a traditional front porch, they carved out a cantilevered, clear-finished cedar-lined entry from the structure's south side. "Not only do you get the change in wood when you walk in, but it also provides the necessary shading on those south side windows," Arlt says.

The residence's dark exterior contrasts with a light interior lined in white walls and wood accents. A double-height living and dining area is anchored by a CLT-and-solid-glulam stair; shaded windows offer south light with minimal heat gain.

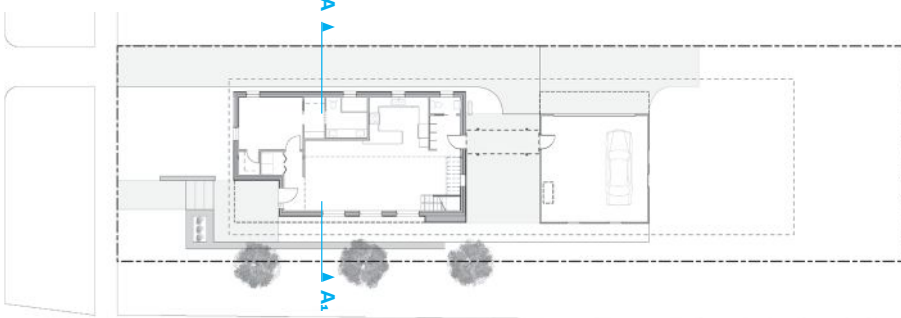
The house's simple design lent itself to the technical challenge of meeting passive house standards in South Dakota's continental climate. "The first thing with the passive house is that the whole point is to be dumb and to make it passive," Arlt says. "The technology is actually what you do with physics." The designers crafted an airtight envelope and specified systems such as an energy recovery ventilator, a mini-split heat pump, and a PV array that "almost, not quite, brings us to net-zero electrical usage" overall, says MacBride (who has since moved to the University of Texas at Arlington).

The heavily insulated structures are lined with insulation from InSoFast, Benchmark Foam, and Johns Manville.

Section A-A<sub>1</sub>



Ground-Floor Plan



Second-Floor Plan



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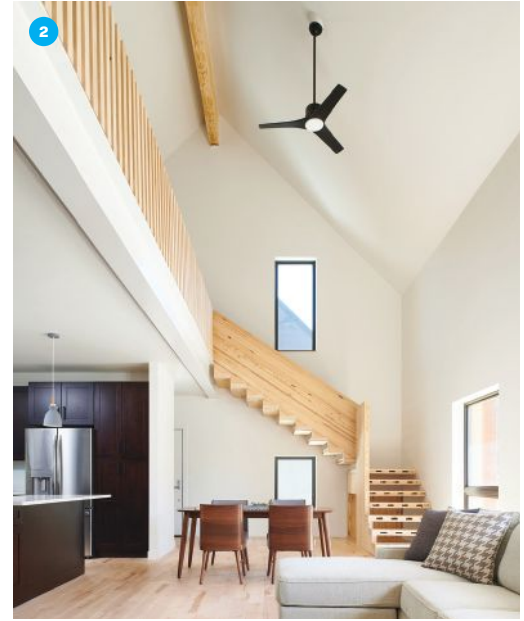
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\*Like Solarban® Starphire® glass, Solarban® Acuity™ glass delivers a distinctive, highly transparent low-iron aesthetic.

**Residential:  
South Dakota State  
University Department  
of Architecture**

After its completion, PH01:BRK was sold to a private owner who helps track the house's energy use and output via an online portal for a whole-house energy modeling system. The construction of a second passive house by SDSU has since stalled, but Arlt has applied elements of the curriculum to retrofit studios, testing passive house construction strategies for cool climates. "We're trying to build a body of research that checks a lot of boxes for what housing looks like here, and provides an alternative," Arlt says.



**1.** The three-bed-two-bath interior features light woods in contrast with the project's dark façade. **2.** A stair made from cross-laminated timber and solid glulam rises up from the first-floor living area and provides an indoor focal point. **3.** A double-height living and dining room and connected kitchen serve as the core of the house. **4.** An exterior courtyard in the middle of the site bridges the gap between the residential structure and the detached garage. The envelope on both structures is kept tight with Alpen Windows and Therma-Tru doors.

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# Typology:

## Metz Bicentennial Grand Carillon, Indiana University Bloomington, Ind. Susan T Rodriguez | Architecture • Design

TEXT BY EDWARD KEEGAN, AIA

Not only will you not find “carillon” in any edition of architectural graphic standards, it’s pretty hard to find an architect who’s designed one; there are just over 600 in the world, and most aren’t very new. So when New York–based architect Susan Rodriguez, FAIA, received a call from Indiana University’s president saying, “I have a great opportunity for your new studio,” she didn’t necessarily know what to expect when he told her the project was for a carillon to commemorate IU’s bicentennial in 2020.

Rodriguez had worked with the university for nearly 15 years when she was a partner at Ennead, first on the Global and International Studies Building, and then on the renovation of I.M. Pei’s Eskenazi Museum of Art. Both buildings face the campus arboretum—a leafy landscaped preserve that replaced the school’s old stadium in 1980, and that now has a new centerpiece with the Rodriguez-designed bell tower.

The 61-bell carillon was initially installed in a Brutalist, cast-in-place concrete enclosure to celebrate the university’s sesquicentennial in 1970. Fifty years later, the new tower sees the addition of four bells that extend the instrument’s musical range and give it standing as a grand carillon—one of fewer than 30 in the world.

Many carillons are housed in opaque towers or attached to buildings. “I felt it was important to make it open so that you can move under and through it,” Rodriguez says.



The Metz Bicentennial Grand Carillon, as seen from above.

### Project Credits

**Project:** Metz Bicentennial Grand Carillon, Indiana University, Bloomington, Ind.

**Client:** Indiana University

**Architect:** Susan T Rodriguez | Architecture • Design, New York · Susan T. Rodriguez, FAIA, Mikhail Grinwald, Joshua Homer, AIA, Jessica Bello, AIA, Duncan White, AIA, Lucy Flieger (project team)

**Architect of Record:** Browning Day, Indianapolis · Jonathan Hess, AIA, David Long, AIA, Emma Li, Nick Worden

**Structural Engineer:** LERA Consulting Structural Engineers (design); Fink Roberts & Petrie (engineer of record)

**ME Engineer:** Ross & Baruzzini

**Civil Engineer:** Bledsoe Riggert Cooper James

**Geotechnical Engineer:** ATC Group Services

**Construction Manager:** Weddle Bros. Construction Co.

**Landscape Architect:** Browning Day

**Lighting Designer:** Fisher Marantz Stone

**Acoustical Design:** BAi

**Bell Foundry:** Royal Eijsbouts

**Carillonneur:** John Gouwens

**Size:** N/A

**Cost:** Withheld

**Typology:**  
**Susan T Rodriguez |**  
**Architecture • Design**

“But how do you support 88,000 pounds of bells?”

Rodriguez worked with Dan Sesil and Pat Hopple from LERA Consulting Structural Engineers on developing a radial structure that would support the instrument's heft and allow its sound to project across the campus. But determining the height of the structure required a bit of Goldilocks-like collaboration. If the carillon is too low, the sound is confined to a limited area; too high, and the sound dissipates.

“We worked with carillonneur John Gouwens and the bell fabricator [Netherlands-based Royal Eijsbouts] to define the ideal,” she says.

The solution employs six 128-foot-tall limestone piers that support six radial steel hubs braced by six vertical precast concrete fins. An acoustical louver system shields the bells while allowing their music through. The structure's monochromatic hue is based on the Indiana limestone that clads its piers, the famed masonry that

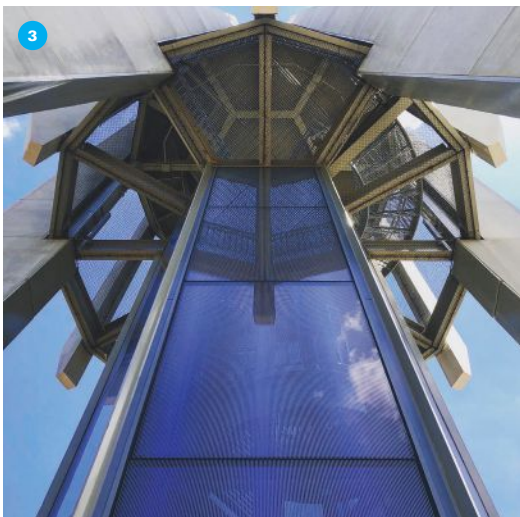


is locally quarried and used on many of the campus's buildings.

The instrument is played from a console chamber that sits at the base of the enclosed section of the tower, which doubles as a microclassroom that allows the carillon to be used for small-scale instruction.

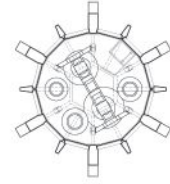
Each bell has a quote about music from an English or American author. "We were fascinated that the [old] bells were inscribed with quotes," Rodriguez says. But when she and her studio read

them carefully, they realized that the 61 inscriptions were all from men. "We pointed that out and I said, 'Well, that has to change,'" Rodriguez says. "They were excited to select four women to add." The four new bells are inscribed with quotes from Maya Angelou, Emily Dickinson, Hildegard of Bingen, and Sappho. "It's a subtle subtext that's wonderful and speaks to the leadership of the university," she says. Which sounds like something worth ringing a bell (or 65) about.

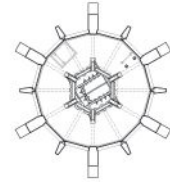


- 1. The tower is composed of radial steel hubs braced by six Indiana limestone piers from Evans Limestone Co. and six precast fins fabricated by Precast Specialties.
- 2. The carillon's 65 bells are concealed by acoustical louvers from Airolite that allow the sound to pass through and carry across campus.
- 3. A glass-enclosed spiral stair provides access to the console room (from which the carillon is played) and a microclassroom located part-way up the tower.

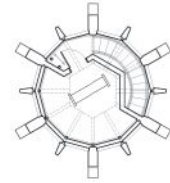
Fifth-Level Plan



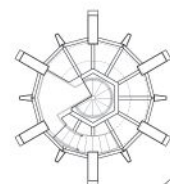
Fourth-Level Plan



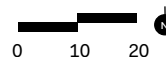
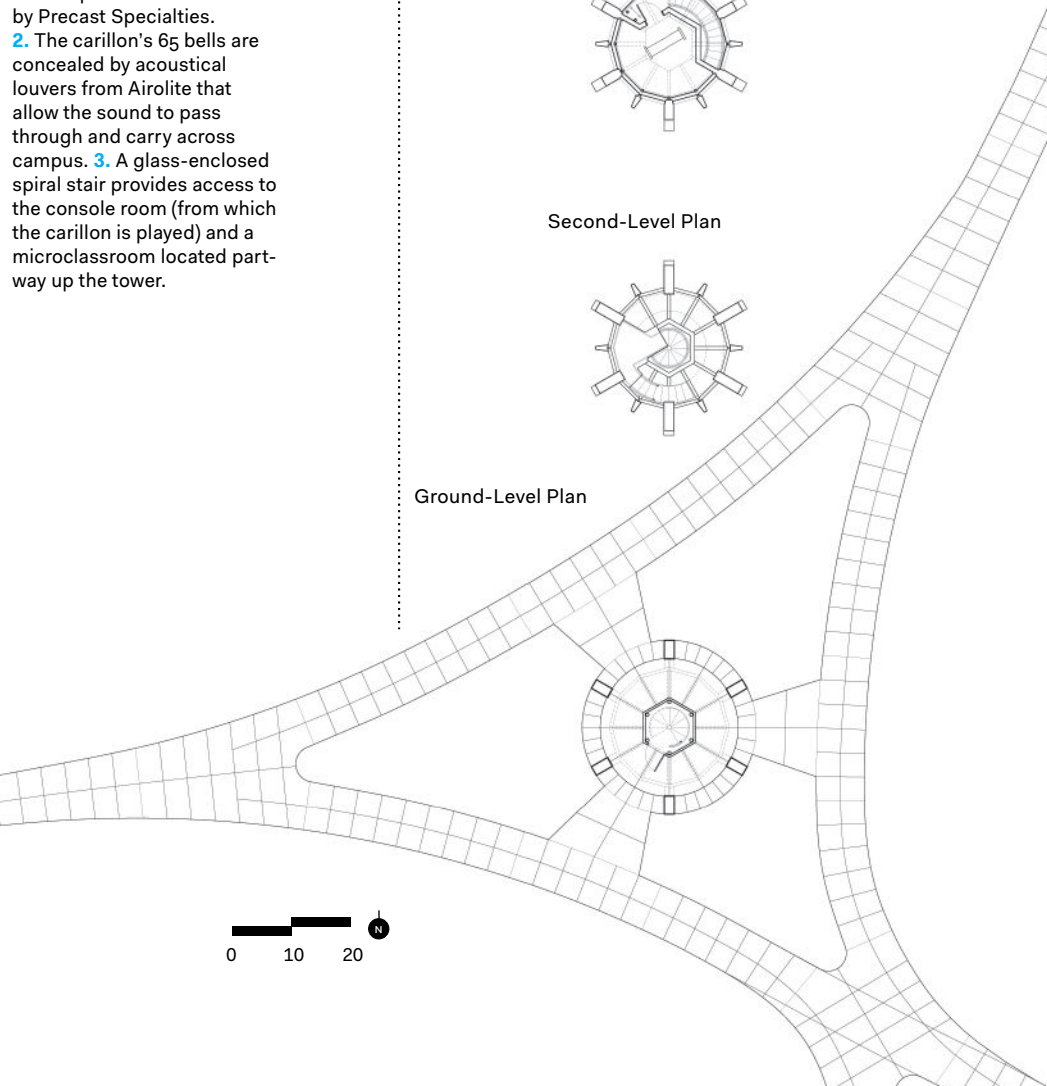
Third-Level Plan

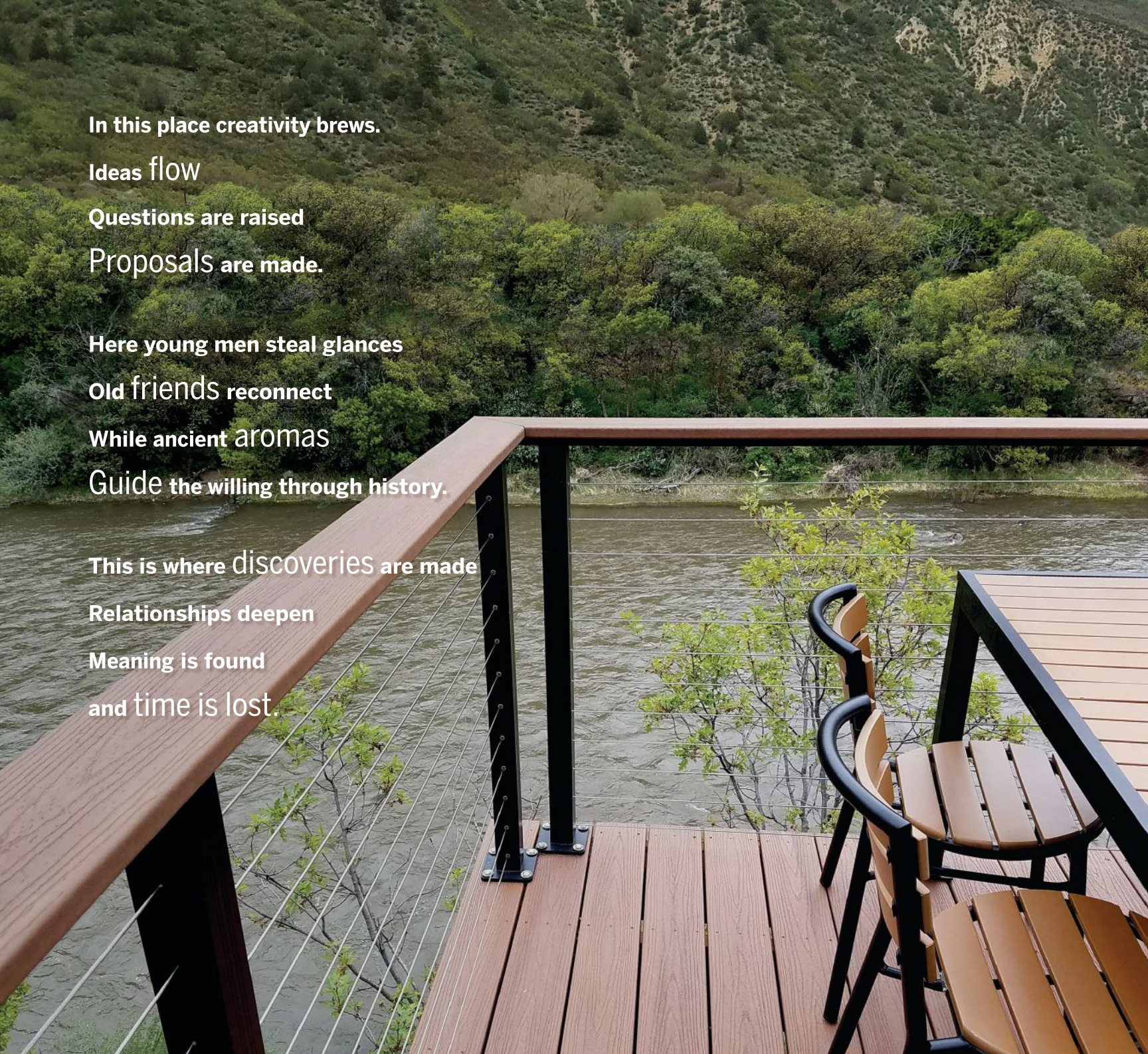


Second-Level Plan



Ground-Level Plan





In this place creativity brews.

Ideas flow

Questions are raised

Proposals are made.

Here young men steal glances

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While ancient aromas

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Meaning is found

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# On the Boards:

## Richmond National Slavery Museum at the Lumpkin's Slave Jail Site Richmond, Va. SmithGroup

TEXT BY KATIE GERFEN



In the mid-1800s, Richmond, Va., was the second-largest slave trading hub in the United States; one of its most notorious sites was Lumpkin's Slave Jail, known as the "Devil's half acre," where scores of Black men, women, and children were imprisoned, tortured, sold, and killed. After Emancipation, the site was covered over until being excavated in 2008. In 2016, the city tasked SmithGroup and a team of architects, engineers, archaeologists, historians, landscape architects, and planners with crafting a structure to acknowledge the site's painful history.

An intensive community outreach process started with large-forum meetings, but "we needed to go deeper," recalls principal Jame Anderson, AIA. It evolved to include small group sessions, on-location conversations, and workshops. The team logged hundreds

of responses and developed guiding principles, including honoring the adjacent African burial ground, acknowledging the history and archaeology of the former jail site, and creating an iconic place that enhances the experience of the larger Slave Trail of historic sites across the city. The building should also provide services and spaces to enrich and support the present-day community.

The resulting pavilion erupts from the ground, its form "based on this idea of unearthing buried history, buried truths," says principal Dayton Schroeter, AIA. The façade uses the iconography of stripes—which recall the American flag and "the uniforms of Black men on chain gangs during Reconstruction, physical jails, and even the rows of cotton of Antebellum slavery, in which African labor was

exploited," he says. Inside are interpretive galleries, community spaces, and places for quiet reflection, all under a green roof that references, among other things, the gardens cultivated by African American healers. "Often we talk about this history as Black history, but it is American history," Schroeter says. "It's an opportunity to preserve a rare artifact and create a comprehensive learning experience around it."

### Project Credits

*Planning/Conceptual Design/Architecture:* SmithGroup  
*Cultural Organization Planning:* Chora  
*Interpretive Planning & Design:* Gallagher & Associates  
*Local Architects/Interior Design:* KEI Architects  
*Architectural History/Archaeology/Community Planning:* Gray & Pape  
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# Specifying Code-Compliant Toilet Partitions

Presented By:



BUILDING VALUE SINCE 1906



Photo courtesy of Brett Drury

## INTRODUCTION TO MODEL FIRE CODES AND STANDARDS

Currently, in the United States, there are two key organizations that model codes and standards for fire safety and building construction: the International Code Council (ICC) and the National Fire Protection Association (NFPA). The codes and standards they develop are mandatory when adopted by a jurisdiction such as a city, county, state, or the federal government.

At this time, 48 states (all but Hawaii and Texas), Washington DC and the Federal Government have adopted the 2009 or later versions of the various ICC (IBC, IFC) and NFPA codes. Current ICC codes effective in each state can be located at the ICC's website at <http://iccsafe.org> under "International Building Code." The top result directs users to an IBC Overview page. Under "Adoptions of the IBC," there is a link to a PDF chart labeled "State Adoptions." This up-to-date document summarizes the status of each ICC code's adoption by State.

Regardless of government policy, many major corporations require compliance.

There are numerous model codes written by both the ICC and NFPA. The codes of most interest pertaining to the subject of interior finishes, which include toilet room privacy partitions, are the International Building Code (IBC), International Fire Code (IFC), NFPA Life Safety Code® (NFPA 101®) and NFPA Fire Code (NFPA 1), which is virtually identical to NFPA 101 with regard to the requirement being discussed.

## Revised Toilet Partition Requirements

Revisions started with the 2006 editions of codes written by the ICC and NFPA. The 2009, 2012, 2015 editions of the IBC and IFC, as well as the 2012 editions of the NFPA 101 and NFPA 1, reaffirm earlier editions that toilet room privacy partitions must be regulated as interior finish, and as such, must adhere to any compliance standards pertaining to interior finish.

## LEARNING OBJECTIVES

1. Understand current toilet partition fire code compliance.
2. Analyze how to select the most appropriate toilet partition material, hardware, mounting configuration, and privacy options based on building type.
3. Examine three ADA accessible toilet compartment layouts.
4. Identify guidelines for writing toilet compartment specifications.

## CONTINUING EDUCATION

AIA Credits: 1 LU|HSW

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This is an important clarification as some jurisdictions have interpreted that fire and building code requirements for interior finish do not apply to various types of partitions, including toilet room privacy partitions.

### PP and HDPE Interior Finishes Compliance

Starting with the 2012 through 2015 editions of the IBC and IFC, and with the 2012 editions of the NFPA 101 and NFPA 1, the requirements for polypropylene (PP) and high-density polyethylene (HDPE), have been revised.

It has been recognized for some time that ASTM E 84 (Tunnel Test) is not the best test method to use in most cases when testing certain plastics.

Instead, both the ICC and NFPA concluded that the test performance of non-polypropylene (PP) and non-high-density polyethylene (HDPE) was such that testing per ASTM E 84 was inappropriate and that NFPA 286 (Room-Corner Test) is the proper way to regulate them.

As a result, all four codes now require that interior finishes using PP or HDPE be tested in accordance with the NFPA 286 Room-Corner Test. This full-scale test is far better at determining the hazards of an interior finish, especially with certain plastics, than is the traditional Tunnel Test, ASTM E 84. It should be noted that both the IFC and NFPA 101 apply this new requirement to existing interior finishes.

### Non-PP and Non-HDPE Interior Finishes Compliance

Non-PP and non-HDPE toilet partition materials include stainless steel; painted metal; high-pressure laminate (HPL); compact laminate (CL), also known as solid phenolic core (with brown or black edge); and color-through-solid phenolic and solid color reinforced composite (SCRC). These materials, used as toilet room privacy partitions, are regulated as an interior finish and require testing in accordance and compliance with ASTM E 84 or UL 723 testing. They are also allowed to be tested in accordance and compliance with NFPA 286 Room-Corner Test instead of ASTM E 84 or UL 723.

### Requesting Test Documentation Confirming Compliancy

It is recommended that architects, interior designers, specifiers, and contractors request

complete ASTM E 84 or UL 723 Tunnel Test compliance documents from high-pressure laminate (HPL), compact laminate (CL), color-through-phenolic, solid color reinforced composite (SCRC), stainless steel, and painted metal toilet partition manufacturers. In addition, architects and designers must insist on NFPA 286 Room-Corner Test compliance documentation from polypropylene (PP) and high-density polyethylene (HDPE) toilet partition manufacturers prior to specifying or purchasing PP or HDPE toilet partitions.

### Code-Compliant Specifications

Whether one is specifying a roofing system or toilet compartments, every client expects compliance expertise from an architect. Clients do not want the risks and liabilities of building code violations. In any specification for solid plastic, solid polymer, PP or HDPE toilet compartments, adding specific language to ensure the toilet compartment specifications are code compliant is recommended.

If HDPE solid plastic toilet compartments, which includes solid polymer, polypropylene, or high-density polyethylene (HDPE), are being specified, the phrase "Solid plastic, HDPE toilet compartments shall be tested and comply with the NFPA 286 Room-Corner Test" should be included in the solid plastic HDPE toilet compartment specifications.

If non-plastic toilet compartments, such as compact laminate, high-pressure laminate, or stainless steel, are being specified, the language, "Compact laminate, high-pressure laminate or stainless steel toilet compartments shall be tested and comply with ASTM E84, UL 723 or alternatively, NFPA 286" should be used.

By adding language appropriate for the material specified, architects and designers can ensure that toilet compartment specifications are code compliant. It then becomes the contractor's responsibility to fulfill those specifications.

### SPECIFYING TOILET COMPARTMENTS BASED ON BUILDING TYPE

#### Material and Construction Methods

Six common materials are used for toilet partitions—painted metal, stainless steel, high-pressure laminate, compact laminate, high

## GLOSSARY

**American Disabilities Act (ADA)**—civil rights law passed in 1990 that prohibits discrimination in public life (schools, work, transportation, etc.) against those with disabilities

**Extended Height Toilet Compartments**—feature panels that are made to fit the height of the restroom; high level of privacy; cost is mid-range to high-end

**Extended Height Panels and Door**—extended height privacy compartments consist of 72-inch high doors and panels with nominal 4-inch floor clearance and come with standard or full-height hardware

**Heavy Traffic Buildings**—characterized by heavy traffic flow with a possible high incidence of vandalism; include K-12 schools, retail malls, amusement and recreation facilities, and transportation centers; equipment durability is prioritized over design, and extra-large dispensing and disposal capacities are necessary

**Increased Height Toilet Compartment**—typically consist of 72-inch-tall panels; this classification includes standard toilet partitions with taller options, as well as many European-style cubicle systems; provide medium privacy; cost is mid-range

**Individual Toilet Room with Lavatory**—individual restrooms where all necessary fixtures are self-contained; highest level of privacy; highest level of cost

**Integrated, No-sightline Privacy Doors and Stiles**—have routed edges that result in an interlocking design with no sightlines; they come with standard or optional full-height hardware. These configurations typically produce flush styling across a series of doors and stiles to produce a well-designed, clean aesthetic

**Prestige Buildings**—signature facilities with moderate- to low-traffic flow with minimal use and abuse; includes corporate headquarters, Class A office projects, civic center icons, and major universities; focus is on architectural design excellence and quality materials and equipment

**Standard Toilet Compartment**—known for a large amount of floor clearance, as well as large gaps between doors and stiles; cost ranges from low to mid

**Standard Use Buildings**—have moderate to heavy traffic and moderate to heavy incidence of vandalism; include commercial office facilities, healthcare centers, hospitality projects, and manufacturing plants; equipment durability is important, as are budget-sensitive specifications; design choices for standard use buildings is typically price driven

density polyethylene (HDPE), and solid color reinforced composite (SCRC). Other materials, such as solid surface, special laminates, and marble are also available. There are pros and cons to every material, and the six most common materials can be positioned by their construction methods:

- Honeycomb construction: includes painted metal and stainless steel.
- Bonded construction: includes high-pressure laminate.
- Layered construction: includes compact laminate.
- Homogeneous construction: includes HDPE and SCRC.

### Honeycomb Construction

#### Painted Metal

Painted metal, with either a baked enamel or powder coated surface, and stainless steel both have a honeycomb cardboard core. The pros of painted metal toilet partitions are their wide availability and low cost. Another benefit is that they can qualify as a Class “A” Interior Wall Finish classification.

The cons of painted metal partitions are that they rust, dent, and scratch, and their exposed cardboard cores can absorb odors. Also, graffiti is difficult to remove from painted metal partitions, and they have a limited warranty.

#### Stainless Steel

The pros of stainless steel toilet partitions are that they are corrosion resistant, improve cleanliness, have high design appeal, and can receive a Class “A” Interior Wall Finish classification. The cons, like painted metal, are that they dent and scratch, their exposed cardboard cores absorb odors, and they have a limited warranty. In addition, stainless steel is more expensive than painted metal.

### Bonded Construction

#### High-pressure Laminate

The bonded construction method for high-pressure laminate uses high-pressure plastic laminate on the outer surfaces bonded with glue to industrial-grade wood particle board. The particle board may vary in density; three-ply, 45-pound density is best for durability and sub-surface support.

The pros of high-pressure laminate toilet

partitions are that they are available in many colors and patterns and are graffiti- and scratch-resistant. High-pressure laminate toilet partitions are inexpensive and can obtain a Class “B” Interior Wall Finish classification. The cons are that they have visible brown or black edges, deep scratches may expose dark Kraft paper, the core material may swell when exposed to excessive moisture, and they absorb odors. Also, special laminates may increase costs and lead time and have a limited warranty.

### Layered Construction

#### Compact Laminate

Partition materials with layered construction are known as compact laminate, “solid phenolic,” or “thick stock.” Compact laminate is constructed of layers of resin-impregnated Kraft paper, a color or decorative sheet on the top and bottom, and over that, a clear melamine protective sheet. All of this is fused together using pressure and heat.

The pros of compact laminate toilet partitions are that they are water resistant so they can be “hosed-down” for cleaning. They are a hard material that is dent resistant, scratch resistant and graffiti resistant. Compact laminate partitions are available in a wide color selection and have Class “A” or “B” Interior Wall Finish classifications with a 25-year warranty.

The cons are that because compact laminate is a layered construction, the black core can be exposed by deep scratches. Black or brown edges are also visible.

### Homogeneous Construction

#### HDPE

Homogeneous construction has the same material properties throughout the thickness of the material. A popular material with this type of construction is HDPE, which has the same material and color throughout the thickness of the partition and is made by extruding HDPE pellets into sheets.

The pros of HDPE toilet partitions are that they have a homogeneous solid color throughout and are therefore repairable; gouges and scratches can be sanded out. The material is also water resistant so it can be “hosed-down” for cleaning, and it has high recycled content and an extended warranty.

The cons of HDPE are that graffiti “ghosts” into the material and cannot be fully removed. It is the softest of the materials discussed in this course, and it can be easily scratched and dented due to its low impact resistance. To comply with 2009, 2012, and 2015 IBC, and 2012 NFPA 101, HDPE partitions must comply with the NFPA 286 Room-Corner Test. It is critical to request NFPA 286 Room-Corner Test documentation from the manufacturer when specifying HDPE partitions.

### SCRC

Another homogeneous material is SCRC, which consists of a clear melamine sheet on the top and the bottom, fused under pressure to dry-formed wood chips impregnated with phenolic resin. The pros of SCRC are that the material is a homogeneous solid color throughout, and like HDPE, it is repairable so gouges and scratches can be sanded out. It has a graffiti-resistant surface (no ghosting) and is a hard material with high resistance to scratches and dents. The material is also water-resistant, allowing it to be “hosed-down” for cleaning. It has a Class “B” Interior Wall Finish classification and a 25-year warranty.

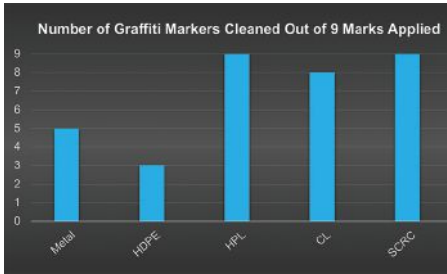
However, SCRC toilet partitions are only available in limited colors, and the price of SCRC partitions is similar to stainless steel partitions

### Graffiti-Resistance Test:

#### Protocol ASTM D 6578

In addition to the pros and cons mentioned above, performance testing can better help specifiers to compare the six materials discussed. The American Society for Testing and Materials (ASTM) protocol was selected because it provides an objective, repeatable, and comparable procedure that can be used to analyze the relative differences between toilet partition materials.

The graffiti resistance test consists of preparing samples of material with marks from nine different staining agents. After 24 hours, the marks are cleaned using different cleaning methods until they are removed. The removability or non-



removability of the nine different marking agents is then recorded.

This chart details how different materials respond to being cleaned after being marked with graffiti. Along the horizontal (X-axis) are the five different partition materials tested. Along the vertical (Y-axis) are the number of graffiti marks cleaned. The results are as follows:

- All nine marks were removed from high-pressure laminate and SCRC.
- Eight marks were cleaned from compact laminate, leaving one.
- Five were cleaned from painted metal, leaving four.
- Three were cleaned from untreated HDPE, leaving six.

Overall, the test concluded that high-pressure laminate and SCRC are the easiest to clean. These materials are well-suited to locations where graffiti is a problem. The test revealed



This article continues on

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## QUIZ

- Which test compliance is recommended when specifying toilet partitions made from HDPE or PP?
  - ASTM E 84
  - UL 723
  - NFPA 286 Room Corner Test
  - ASTM E 92
- Which of the following statements is incorrect?
  - The ICC and NFPA codes state that toilet room privacy partitions are regulated as interior finish.
  - The ICC and NFPA codes and standards are mandatory when adopted by a jurisdiction.
  - The NFPA 286 Room Corner test is far better test than ASTM E84 at determining the hazard of an interior finish.
  - It is NOT recommended to add specific language to ensure that the toilet compartment specifications are code compliant.
- Which construction method is utilized with painted metal and stainless-steel partitions?
  - Honeycomb Construction
  - Bonded Construction
  - Layered Construction
  - Homogenous Construction
- Which construction method is utilized with high-pressure laminate?
  - Honeycomb Construction
  - Bonded Construction
  - Layered Construction
  - Homogenous Construction
- To obtain an Interior Wall and Ceiling Finish Classification, the Smoke Development Index must be \_\_\_\_\_.
  - <500
  - <300
  - <450
  - <250
- Which type of toilet partition hardware is the most durable?
  - Zamak
  - Aluminum
  - Full-Height Institutional
  - Stainless Steel
- Which of the following statements concerning partitions made with homogeneous construction using HDPE is incorrect?
  - The material has a graffiti-resistant surface (no ghosting).
  - It is the softest of the materials discussed in the course.
  - Partitions are made by extruding HPDE pellets into sheets.
  - The material is water-resistant.
- Which mounting configuration offers the sturdiest mounting configuration at a budget price level?
  - Floor-to-Ceiling
  - Overhead Braced
  - Floor-Anchored
  - Ceiling-Hung
- Which partition material is the best choice for standard use buildings?
  - HPL
  - Painted Metal
  - HDPE
  - Compact Laminate
- Which statement concerning ADA accessible toilet compartments is FALSE?
  - An ambulatory accessible toilet compartment is used where four or more fixtures are provided.
  - For all ADA accessible toilet compartments, toe clearance for adults is 9 inches minimum.
  - Minimum width is 60 inches for wheelchair accessible toilet compartments.
  - A large wheelchair accessible toilet compartment requires a 66 x 66-inch compartment interior.

# Defend Against the Ordinary

CREATING AN INNOVATION MINDSET IN COMMERCIAL AND RESIDENTIAL CONSTRUCTION AND DESIGN

Presented By:



## LEARNING OBJECTIVES

1. Understand current business trends affecting design professionals, builders, and contractors and how economic challenges of COVID-19 are forcing professionals to think outside the box.
2. Define innovation, learn the principles of innovation management and how to measure it, and discuss how to innovate during a crisis.
3. Assess how to measure innovation activities, source data, and implement innovation during a crisis, and understand the catalysts for change in the construction industry.
4. Examine innovations in green building practices and how standardization is driving innovation, as well as evaluate the potential impact of financial incentives to invest in innovative activities.

## CONTINUING EDUCATION

AIA CREDIT: 1 LU/Elective

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Going into 2020, the construction industry was at a crossroads. New technologies, design and build practices, and a focus on sustainability and energy efficiency were already changing 'business as usual.' Most of this change was incremental. Then, the unexpected happened, and a novel Coronavirus (COVID-19) became a pandemic and disrupted every industry around the world.

In the past, the concept of innovation has been a desired state for most businesses; a want-to-have, but not a necessity to be profitable. Now, builders and design professionals need to be innovative to survive. COVID-19 has challenged almost every notion of 'business as usual' and forced industries to adapt to change in a

matter of weeks, not years. The ability to think outside the box and retool the old business model will mean the difference between sustainability and insolvency.

## 2020 TRENDS AFFECTING COMMERCIAL AND RESIDENTIAL CONSTRUCTION

2020 began with a positive outlook for the construction industry. Fears about an impending recession were minimal, and the industry was benefiting from a steady growth market not projected to go down anytime soon.

Overarching trends included:

- Slow but steady growth
- Shift to modular builds
- Sustainability
- Digital adoption



Commercial construction started 2020 strong with first quarter growth. Despite bottom line pressure, overall revenue growth was still positive. A low profit margin of around 5.5 percent globally meant that there wouldn't be much room for uncertainties in project planning, but a steady shift toward pre-fabrication and modular assemblies were two viable solutions to cost constraints. Few commercial construction projects were utilizing digital tools effectively, yet tech investments were well-known to improve efficiencies and productivity.

Infrastructure upgrades and a shift to sustainability created an environment for dynamic opportunities in commercial design and construction. Urbanization continues to drive the need for more digital technology and sustainable building practices, and commercial builders and designers have a unique opportunity to fill a gap in the marketplace with their knowledge and expertise.<sup>1</sup>

On the residential side, more homes were set to be built with an industrial design scheme, moving away from the traditional rustic farmhouse style that had been popular in recent years. Hallmarks of industrial style and design are marked by asymmetrical forms, mixing textures like metal and wood, and smooth, simple lines. The open floor plan was another trend expected to continue into 2020. Multi-function rooms where everyone can gather are preferred over closed off, separate spaces, although this also presents

concerns for noise levels. The irony of open space design is that while homeowners' desire open spaces, they also want quiet spaces. In this respect, homes with separate offices and rooms to work or for relaxation became in-demand.<sup>2</sup>

A major shift in residential home construction and design going into 2020 was the increased focus on outdoor living spaces. The industry saw more homeowners drawn to designing outdoor patios with indoor comforts, like full kitchens, entertainment areas, furniture, and fireplaces. More builders were starting to include outdoor living spaces in new build options, which not only increased homeowner satisfaction but also project value.

S&P Global's Industry Top Trends for 2020 noted that a quarter of North American homebuilders had a positive outlook due to improved debt leverage, and the majority at least had stable ratings with only about ten percent of builders reporting a negative outlook. Demand for new homes would continue as long as the economy continued to create jobs and boost wages. Revenue growth was supposed to be steady.<sup>3</sup>

### CHALLENGES TO INNOVATION IN THE CONSTRUCTION INDUSTRY

Regardless of whether builders and designers are in commercial or residential construction, the industry has encountered some entrenched challenges to innovation. Macroeconomic factors such as labor

## GLOSSARY

**Closed Innovation:** The concept that innovative ideas and innovation-relevant knowledge should stay within the organization, from idea generation to development and marketing.

**Green Districts:** Densely populated areas within a city that use technology and design to reduce resource use and pollution.

**Innovation:** According to ISO: "new or changed entity, realizing or redistributing value" and according to the Oslo Manual: "a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)."

**Innovation Management:** Includes all systematic activities to plan, govern and control internal and external resources for innovation, such as how resources for innovation are allocated, organization of responsibilities and decision-making among employees, management of collaboration with external partners, integration of external inputs into a firm's innovation activities, and activities to monitor the results of innovation and to support learning from experience (taken from Oslo Manual).

**International Standards Organization (ISO):** The International Standards Organization seeks to promote universal best practices in a variety of disciplines that international experts agree on.

**Object Approach (to innovation measurement):** A measurement framework that focuses on the phenomena of interest. For example, detailed survey questions about a single innovation to understand granular-level details.

**Open Innovation:** The concept that ideas and innovation-relevant knowledge should flow freely between external organizations, though it does not necessarily imply that knowledge is free or exempt from use restrictions.

**Oslo Manual:** An international standard of reference for theorizing and measuring innovation.

**Productization:** The process of taking a skill, service, or individual component and developing it into a standard, fully tested, packaged, and marketable product.

**Subject approach (to innovation measurement):** A measurement framework that focuses on the actors that are responsible for the phenomena. For example, general survey questions about strategies and innovation practices.



shortages and high cost of goods and supplies create tightened profitability for individual firms.

- Productivity
- Labor shortages
- Digital adoption
- High costs
- Slow growth

For about two decades, construction has averaged only about 1 percent productivity growth each year, compared to 3.6 percent for manufacturing. There are many factors affecting construction's productivity problem, and for at least a couple years industry leaders have been making incremental changes to move the needle faster.<sup>4</sup> Without enough skilled labor, no amount of large-scale changes can be successful. Construction has struggled to attract and retain a workforce capable of getting the job done right, especially for specialized jobs.<sup>5</sup>

One of the bigger challenges that construction has faced is the risk associated with innovation. It is hard to fully embrace the unknown when profit margins do not allow much room for uncertainty. Though investments in technology and other tools are one way to maximize profitability, ultimately innovation itself holds the key to better profits. One way this has been changing is with drones, jobsite cameras, and AI.<sup>6</sup>

Historically, construction has been slow to adapt to changing technology, but that will need to change if firms expect to continue to compete. Not only can technology and digital tools enhance safety, communication, and project planning, but also customers and workers alike expect digital know-how.

In the short- to middle-term, growth will continue to be difficult. Associated Builders and Contractors reported that confidence among U.S. construction leaders continued

to decline as of July 2020, as sales and profit margin expectations were still below 50. Less than 30 percent of contractors expected increased profit margins over the next six months while almost half expect lower profits. The backlog of projects initially caused by coronavirus shutdowns is almost gone, leading many construction leaders to wonder about what comes next.<sup>7</sup>

**The Impact of COVID-19**

In the immediate aftermath of COVID-19, many states completely or partially shut down construction operations. While some states deemed construction essential, job sites still suffered due to lack of available employees and supply chain disruptions. Even now, several months into the pandemic, many more uncertainties remain. Jobs that were put on hold may have been cancelled entirely. Increased demands for worker and jobsite safety strained already reduced budgets and stretched productivity and efficiency margins more than usual. Moreover, lenders have been slow to finance new projects with the amount of anxiety in the market. Project financing is at risk, and builders and designers are being forced to rethink the way they do business.<sup>9</sup>

The upside to the pandemic is the push toward innovation for the sake of survival.

**OPPORTUNITIES FOR INNOVATION**

The future is still bright for construction. There are opportunities for innovation in sustainability, energy efficiency, productivity, digitization, and more. Though adopting an innovation mindset can seem risky and uncertain, there's never been a better time to invest in innovation. A 2018 GE Global Innovation Barometer concluded that "40 percent of innovations over the last five years have had a positive impact on [the] bottom line."<sup>10</sup>

COVID-19 is accelerating change that was already happening. According to McKinsey & Company, nine shifts will take place in the construction industry over the next five to ten years. These are:<sup>11</sup>

- Product-based approach
- Specialization
- Value-chain control and integration with industrial-grade supply chains
- Consolidation

**EMBRACING TECHNOLOGY AND MEETING CUSTOMERS  
WHERE THEY ARE: E-COMMERCE SOLUTIONS<sup>8</sup>**

As more business is conducted online, the construction industry must meet its customers where they are, wherever they are. Distributors and suppliers can't rely on in-person sales and meetings anymore. One manufacturer of residential and commercial outdoor products has moved to an online, e-commerce platform to better meet customer needs. This innovative strategy involved partnering with external stakeholders to offer a robust online inventory of products including ornamental steel fencing, residential aluminum fencing, PVC decking, composite decking, and matching fasteners. Says the Director of Channel Sales, Retail, and E-Commerce: "Our industry is changing in front of our eyes—we're seeing more and more buying decisions being made online. By operating in alignment with consumer purchasing habits, we're able to better serve our customers and jumpstart a new phase of company growth."





- Customer-centricity and branding
- Investment in technology and facilities
- Investment in human resources
- Internationalization
- Sustainability

To get there, construction builders and designers will need to adopt an innovation mindset.

### WHAT IS INNOVATION?

One of the hurdles that businesses face is a common understanding of *innovation*. The International Standards Organization, or ISO, defines innovation as a “new or changed entity, realizing or redistributing value.” It is an outcome; a destination where the end point may continually be modified depending on market demands. Innovation is more than a process or activity.

ISO’s definition of innovation centers on two characteristics: value and novelty. Value is any kind of value: financial, social, experience, or well-being. ISO goes on to say that anything can be innovated, whether it is a product, service, process, model, or method and innovation can be incremental or radical.<sup>12</sup>

The Oslo Manual (2018), an international standard of reference for theorizing and measuring innovation, defines innovation as “a new or improved product or process (or combination thereof) that differs significantly from the unit’s previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).”

Innovation is *not*:

- Routine changes or updates
- Capital replacement or extension
- Minor aesthetic changes
- Custom production for one-off items without substantially different attributes
- Advertised concept or product model that doesn’t exist yet
- Outputs of creative or professional services firms, such as reports, books, or films
- Actions taken to extend the range of products or services offered to customers
- Activities of newly created service firms
- Mergers and acquisitions
- Pulling a product, service, or process
- Pricing changes due to external factors
- New corporate or managerial strategy unless it is implemented

### QUIZ

- According to the course materials, 2020 trends for the construction industry included all of the following except:
 

A. Rapid growth	B. Shift to modular builds
C. Sustainability	D. Digital adoption
- Construction has averaged about \_\_\_\_ percent productivity growth each year for about two decades.
 

A. 3.6	B. 1
C. 2.4	D. 3
- The ISO definition of innovation focuses on two characteristics: \_\_\_\_\_ and novelty.
 

A. Productivity	B. Efficiency
C. Profitability	D. Value
- As described in the course materials, examples of innovation do not include:
 

A. Routine changes or updates	B. Minor aesthetic changes
C. Pricing changes due to external factors	D. All of the above
- \_\_\_\_ percent of global executives say that innovation is extremely important, but \_\_\_\_ percent say they are dissatisfied with their innovation performance.
 

A. 84 / 94	B. 75 / 85
C. 90 / 95	D. 65 / 85
- This statement is an example of which one of ISO’s Innovation Management Principles? “Create future scenarios and determine the transformations they imply and the structures and resources needed.”
 

A. Managing Uncertainty	B. Exploit Insights
C. Adaptability	D. Strategic Direction
- According to the course materials, sources for innovation data include all of the following except:
 

A. Staff emails	B. Surveys
C. Company filings	D. Financial disclosures
- According to McKinsey’s Eight Essentials of Innovation, the first three fundamentals that should be prioritized in an economic downturn are (in order):
 

A. Evolve, Discover, Choose	B. Discover, Evolve, and Choose
C. Aspire, Accelerate, and Scale	D. Aspire, Discover, and Accelerate
- Green districts can reduce energy consumption by \_\_\_\_ percent.
 

A. 50–60	B. 45–55
C. 80–95	D. 20–40
- \_\_\_\_\_ buildings can result in a time savings of around 50 percent compared to other projects.
 

A. Multi-family	B. Small
C. Modular	D. Green



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# The Form and Function of Decorative Concrete

Presented By:



Louis Kahn's Salk Institute

## INTRODUCTION: EARLY PIONEERS OF DECORATIVE CONCRETE

Perhaps the earliest pioneer in decorative concrete, Lynn Scofield changed the way the building industry viewed concrete. Scofield, who was an engineer, developed proprietary systems in 1915 to enhance concrete's beauty and durability. By the 1920s and 30s, Scofield's products were becoming widely recognized by architects and designers, particularly those in California working on Art Deco, early Modern, and Spanish-influenced designs. His early products included "color hardeners (cement, color, and aggregate broadcast on the surface of fresh concrete to color and harden the surface), internal color, color wax curing and sealers, and chemical stains."<sup>1</sup> Scofield became the first person to introduce colored concrete to the U.S., and his "chemically reactive, penetrating stain was used to add variegated color to new or old concrete," producing

"antiquated patina, stone-like features, or one-of-a-kind-faux finishes."<sup>2</sup>

Like Scofield, Brad Bowman also stirred interest in the ways concrete could be used decoratively. He is recognized as the founder of stamped concrete, developing tools and processes for stamping patterns in concrete flatwork and holding the patent for stamping concrete until the early 1970s. The Bomanite Corp., of which Bowman was a founding member, then "franchised contractors across the United States to install imprinted concrete using his process."<sup>3</sup>

Bill Stegmeier, working around the same time as Bowman, is one of the original developers of sprayable knockdown texture toppings. He was able to achieve an antiquing effect "by adding color to a powder broadcast onto the surface." Stegmeier invented a latex tool that provided a wood-grain texture to newly poured concrete. A common

## LEARNING OBJECTIVES

1. Review the history of decorative concrete.
2. Examine current key concrete applications and finishes, including cast-in-place decorative concrete, stained and dyed concrete, decorative overlays, and precast concrete and furniture amongst others.
3. Analyze the benefits, attributes, and limitations of various concrete applications and finishes.
4. Explore the legacy of exposed concrete through the work of Calatrava, Ando, and Kahn.

## CONTINUING EDUCATION

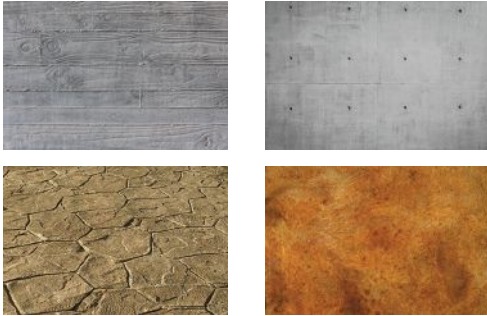
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application for Stegmeier was swimming pool decks, which he termed "Cool Decks," where his finish prevented the surface from becoming too hot for bare feet.<sup>4</sup>

Jon Nasvik is credited with modernizing Bowman's stamping tools. Nasvik developed modern urethane stamps that were "light and long-lived," replacing Bowman's aluminum tools, which were "heavy, had a limited life, and printed only patterns, not textures." By the late 1970s, Nasvik's plastic stamp could imprint both patterns and textures on fresh concrete. The first pattern used commercially was one replicating brick; Stegmeier's release powder made Nasvik's stamps possible. Today, there is no pattern or texture that cannot be replicated in concrete.<sup>5</sup>



Decorative concrete ranges from textured forms and stamps, to colored concretes and stains.

### Types of Early Decorative Concrete: 1970s-1990s

Following the inventions of early pioneers like Scofield, Bowman, Stegmeier, and Nasvik, the most common types of early decorative concrete included the following:

- Stenciled
- Roller embossed
- Stenciled overlay
- Stained concrete
- Colored concrete with a broom finish
- Solid color epoxy garage coating

Today, decorative concrete has continued to evolve, and there are numerous applications and finishes from which to choose.

### KEY CONCRETE APPLICATIONS AND FINISHES

Cast-in-place decorative concrete, cast-in-place stamped concrete, stained and dyed concrete, decorative overlays, sealers and coatings, polished concrete, and precast and furniture are all key concrete applications and finishes.

#### Cast-in-place Decorative Concrete

Frequently called “flatwork,” cast-in-place decorative concrete is often colored, textured, or exposed aggregate or combinations of these techniques. It has become a popular finish over the last decade.

#### Key Finishes

##### Colored Concrete, Textured Concrete, and Exposed Aggregate

Colored concrete can be finished with a wide range of textures and can be jointed or saw cut to provide extra aesthetic value. Exposed aggregate is one of the most popular decorative cast-in-place finishes.

## GLOSSARY

**Bowman, Brad**—recognized as the founder of stamped concrete, developing tools and processes for stamping patterns in concrete flatwork and holding the patent for stamping concrete until the early 1970s

**Cast-in-place Decorative Concrete**—frequently called “flatwork”; is often colored, textured, or exposed aggregate or combinations of these techniques

**Cast-in-place Stamped Concrete**—by far the most recognized decorative finish; has been the face of the decorative concrete industry for over 50 years; almost any texture or finish is available in an infinite range of colors

**Decorative Overlays**—encompasses both thin and thick decorative cement-based toppings; offers a wide variety of finishes from polish smooth to textured and imprinted; overlays provide options for almost any decorative project

**Decorative Sealers and Coatings**—often the last product to be applied on a decorative project, sealers and coatings are frequently misunderstood and/or overlooked; in most cases, they are the wear surface and protect the underlying decorative finish;

sealers and coatings range from thin breathable films to high-performance coatings and penetrating protective systems

**Nasvik, Jon**—credited with modernizing Bowman’s stamping tools; developed modern urethane stamps that could imprint both patterns and textures on fresh concrete

**Precast Decorative Concrete**—niche market driven by the popularity of concrete countertops; also includes furniture, veneers, and specialty concrete pieces

**Scofield, Lynn**—first to introduce colored concrete to the U.S.; changed the way building industry viewed concrete

**Stegmeier, Bill**—one of the original developers of sprayable knockdown texture toppings; invented a latex tool that provided a wood-grain texture to newly poured concrete

**Vertical Concrete Applications**—have gone from structural and hidden to decorative and part of the aesthetic design; for example, board-formed cast-in-place concrete can serve both a structural and aesthetic function

Various degrees of aggregate is exposed resulting in a uniform textured surface. These finishes range from very light sand exposure to large aggregate exposure. Different types of aggregate, such as colored sand, colored stone, glass, tile, and metal, can be incorporated providing added artistic value. These finishes are desirable because of their increased slip-resistance and durability. Most exposed finishes are sealed with a penetrating sealer to protect the surface without forming a film.

#### Decorative Saw Cuts and Designs

Decorative saw cuts and designs can be included in most cast-in-place concrete work to increase the aesthetic value. These can vary from simple geometric patterns to complex artistic free-form work. In most cases, these cuts are shallow (less than 1/8” deep), decorative in nature, and not designed to provide crack control or structural value.

#### Inlays and Mosaics

This is an example of “Litho Mosaic” a patented process that creates a mosaic using



Hal Brown Park, Kentfield, CA

natural materials (tile, glass, metal) in the concrete surface. Installed when the concrete is placed and finished, the resulting mosaic compliments the surrounding concrete. The process involves individually gluing the tile or glass pieces, in reverse, onto a special mesh fabric. The fabric with the mosaic is then placed into fresh concrete, face down, and finished into the surface. The surface mesh is removed and the concrete let to cure. Once cured, a thin top layer is removed exposing the underlying mosaic. These types of mosaics can be any size and range from basic to intricate levels of complexity.

**Vertical Concrete Applications**

Vertical concrete applications have gone from structural and hidden to decorative and part of the aesthetic design. For example, board-formed cast-in-place concrete can serve both a structural and aesthetic function. In some cases, there is no color in the concrete, just the natural variation from placing gray concrete in vertical forms.

**Benefits, Limitations, and Attributes**

The two biggest factors for successful cast-in-place decorative concrete work are the consistency of color and finish. Maintaining batch-to-batch consistency of the concrete impacts the color and finish, especially on large projects with multiple pours. Installers who have established processes to control consistency on the job historically produce quality work.

Cast-in-place decorative concrete can be used in interior or exterior applications; combines aesthetics and durability; combines with other materials; has anti-slip properties; increases solar reflectivity index (SRI) which reduces the urban heat island effect; and increases property values.

**Cast-in-place Stamped Concrete**



Berard Residence

By far the most recognized decorative finish, stamped concrete has been the face of the decorative concrete industry for over 50 years. Today, almost any texture or finish is available in an infinite range of colors.

**Key Finishes**

**Stone Patterns**

Pool decks are frequent applications for stone patterns. By using concrete rather than pavers,

maintenance is considerably reduced. Specialty stamped concrete can be customized in multiple colors, grouted, and then sealed. Unlike pavers, there is no shifting and no weeds while a similar aesthetic is maintained.

**Seamless Texture**

Roughly 600 yd<sup>3</sup> of integral colored concrete was used to create this 13,000 ft<sup>2</sup> heated driveway and walkway area along with 25,000 ft<sup>2</sup> of unheated driveway paving. The driveway design included stamped concrete borders and motor court as well as broom finish textures throughout. The stone-like natural buff color on the main motor court ties in with the color of the home's stone veneer and a contrasting slate gray border picks up color from the surrounding landscape. The entire driveway is heated internally.

**Wood Patterns**

Wood patterns, often in planks, are realistic, durable, and slip-resistant whether wet or dry. Maintenance is low, and any color can be used.

**Tile and Borders**



Florida Turnpike

When the Florida Turnpike Commission approved the renovation of all rest stops, they selected stamped and textured concrete for the paving at the entrance areas. Each rest area has a different theme in color and design. The project above is using a combination of brick and tile patterns to frame different types of stone.

**Specialty Applications**

Stamped concrete can be customized in many ways. Special textures, patterns, and even natural imprints are available. Reusable, rigid in-laid tools create clean lines and detailed accents in the concrete.

**Benefits, Limitations, and Attributes**

From a stand-alone patio or deck to part of an outdoor living space, stamped or textured concrete has become the backbone for this new type of living area. A stone, wood, or tile patio comes to life when combined with a fire pit, outdoor kitchen, gazebo, or other gathering space. Such outdoor living spaces have become an extension of the home.

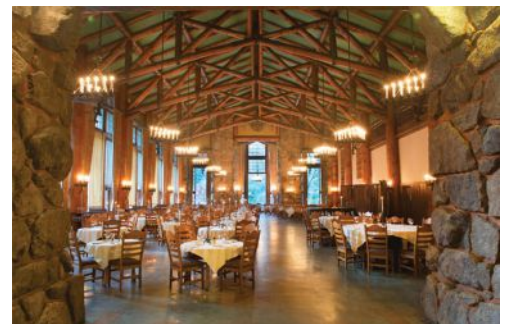
Stamped concrete provides an excellent option for the beautification of large promenades and urban areas. Using large imprinting tools or textured rollers, large areas can be textured without a significant increase in labor or time. The aesthetic value of large areas that have been colored and textured compared to plain concrete is significant.

The experience of the installer, however, is the biggest limitation for successful stamped or textured concrete work. This is especially true for complex projects that include stairs, multiple elevations, banding, insets, various colors, and a combination of patterns or textures. Contracting with an installer who has the experience is worth the potential added cost. Another benefit of working with an experienced installer is they will manage expectations properly, so all parties understand the outcome before the project begins.

Overall, stamped or textured concrete resembles natural textures; offers design flexibility; accentuates outdoor living spaces; increases real estate value; is cost-effective for large areas; and adds beautification for urban areas.

**Stained and Dyed Concrete**

Stained concrete is the oldest of the decorative finishes, with some variations of post-colored flooring dating back to antiquity. One of the



Ahwahnee Hotel Dining Room Yosemite National Park

first documented commercial stained floors was the dining room at the Ahwahnee Hotel in Yosemite National Park, CA which was installed in 1920 and remains today.

### Key Finishes

#### Reactive Stains

Reactive stains often referred to as “acid stains,” are the most identified of concrete stains. Metallic salts of iron, magnesium, copper, and others react with calcium hydroxide in the concrete to produce a permanent earth tone color. These rich translucent color tones are one-of-a-kind and unique to each project. Once sealed, the true color of the stain comes to life as it accentuates the finish of the concrete. Decorative saw cuts or patterning are often incorporated into a stained floor as a decorative option.

#### Water-Based Stains

What was once an outdated thick and heavy linoleum flooring is now an updated sanctuary using non-reactive water-based stains. In addition to installing stain on the floor, the client also envisioned a labyrinth prayer walk feature, which has a different color than the stained floor. The pattern includes detailed lines as pathways for the congregation to pray and meditate as they walk, symbolizing the journeys of faith and life.



This article continues on <http://go.hw.net/AR102020-2>. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

### SPONSOR INFORMATION



Build with Strength, a coalition of the National Ready Mixed Concrete Association NRMCA, educates the building and design communities and policymakers on the benefits of ready mixed concrete, and encourages its use as the building material of choice. No other material can replicate concrete’s advantages in terms of strength, durability, safety and ease of use.

### QUIZ

- According to the course, who was possibly the earliest pioneer in decorative concrete?
  - Brad Bowman
  - Lynn Scofield
  - Jon Nasvik
  - Bill Stegmeier
- Which early decorative concrete pioneer developed modern urethane stamps?
  - Brad Bowman
  - Lynn Scofield
  - Jon Nasvik
  - Bill Stegmeier
- Which type of decorative concrete is frequently referred to as “flatwork”?
  - Cast-in-place decorative concrete
  - Cast-in-place stamped concrete
  - Stained and dyed concrete
  - Decorative overlay
- According to the course, what are the two biggest factors for successful cast-in-place decorative concrete work?
  - Installer experience and texture
  - Condition of the substrate and maintaining the sealer
  - Consistency of color and finish
  - Proper surface preparation and material selection
- What are the two most critical factors for the successful application of any overlay project?
  - Installer experience and texture
  - Condition of the substrate and maintaining the sealer
  - Consistency of color and finish
  - Proper surface preparation and material selection
- The dining room floor at the Ahwahnee Hotel in Yosemite National Park is the first documented example of \_\_\_\_\_.
  - Stained and dyed concrete
  - Decorative overlay
  - Cast-in-place decorative concrete
  - Polished concrete
- Often referred to as “acid stains,” there are the most identified of concrete stained.
  - Water-based stains
  - Reactive stains
  - Concrete dyes
  - Solid color stains
- According to the Concrete Polishing Council, there are \_\_\_\_\_ appearance levels of polished concrete.
  - 1
  - 2
  - 3
  - 4
- Which of the following was one of Calatrava’s goals when designing Florida Polytechnic University?
  - Reflect the important role that the landscape, vegetation, and water play in central Florida
  - Create a “pedestrian-friendly” campus environment
  - Create an iconic structure marking the campus within the larger local and regional context
  - All of the above
- Whose concrete has been described as “smooth-as-silk,” achieving an “almost reflective” finish?
  - Santiago Calatrava
  - Lynn Scofield
  - Tadao Ando
  - Louis Kahn

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# The Importance of Improving Hygiene in Commercial Restrooms

Presented By:

**SLOAN**  
Water Connects Us®



## IMPORTANCE OF HYGIENE IN COMMERCIAL RESTROOMS

In commercial buildings, the restroom is the second most visited room after the lobby, and users are demanding more of the space. They want both privacy (i.e. individual restrooms) and a comfortable atmosphere and demand that restrooms are clean and well-maintained. There is also an increased desire for health and wellness in the restroom. Add in the complications surrounding the pandemic, and the commercial restroom industry is poised for change. We all have to share commercial restrooms, and it's more important than ever to implement training and tactics that mitigate potential health risks in these environments.

Increased focus on the commercial restroom will not end any time soon. Plumbing manufacturers are laser-focused on hygiene, sanitation, and accessibility, developing products that play an essential role in the fight against the pandemic. The Co-president and CEO of one national plumbing fixture manufacturer notes, "Any product that eliminates or reduces the number of surfaces the user touches is now of the utmost importance, and the pandemic's rapid uptick has accelerated the need for such touch-free products. While there has already been an increased demand for sensor-operated products, that need will only continue to grow."<sup>1</sup> These needs are facilitated with sensor-based, touch-free products throughout the entire

## LEARNING OBJECTIVES

1. Understand the importance of designing commercial restrooms to create a culture of hygiene, reduce the opportunity for user germ transmission, and benefit occupant health by reducing bacteria, multiple touch points, and cross-contamination.
2. Examine best-in-class products such as soap, hand sanitizers, sensor-activated soap dispensers, faucets, and hand dryers with HEPA filters that can improve wellness and enhance the overall hygiene of commercial restrooms.
3. Explore technological and sustainable advances in the commercial restroom space that can improve health and wellness.
4. Describe how sustainability efforts in commercial restrooms can serve the dual purpose of improving user health and how the LEED, WELL, and Fitwel Certification tools can be leveraged to support building owners and designers in the pursuit of improved health and wellbeing.

## CONTINUING EDUCATION

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restroom, including sinks, faucets, flushometers, soap dispensers, and hand dryers. Equally important are the type of soap and hand sanitizer provided for users and how they are dispensed. With training and education, facilities can create a culture of increased hand hygiene that can positively impact public health and help combat contaminants in public restrooms.

Architects and allied professionals are in a unique position to coordinate a range of mitigation strategies that can reduce bacteria, multiple touch points, and cross-contamination during the pandemic. The American Institute of Architects released a Re-Entry Assessment Tool on May 28, 2020 to provide architects, private clients, and civic leaders with a framework of strategies for reoccupying buildings and businesses that are in the process of transitioning from being fully closed to fully open. The AIA wanted to “holistically address the CDC’s Hierarchy of Controls in order to ensure the public’s health, safety, and welfare by controlling workplace hazards.” It proposes

that the best ways of controlling the hazards are to systematically remove them, using a combination of control measures, rather than primarily relying on workers or the public to reduce their own exposure. This document “aims to provide a range of general mitigation measures to consider, with the understanding that the risk of infection can only be reduced and not eliminated entirely. Effective solutions require a coordinated approach between building features and operational practices.”<sup>2</sup>

Section 3.5 Plumbing and Plumbing Fixtures provides the following guidance:

- 3.5.1 Consider implementation of water management program for building operations per CDC guidance.
- 3.5.2 For buildings experiencing extended closure, flush and test potable water systems.
- 3.5.3 Replace flush valves and faucets with hands-free devices.
- 3.5.4 Add touchless handwashing/hygiene stations.

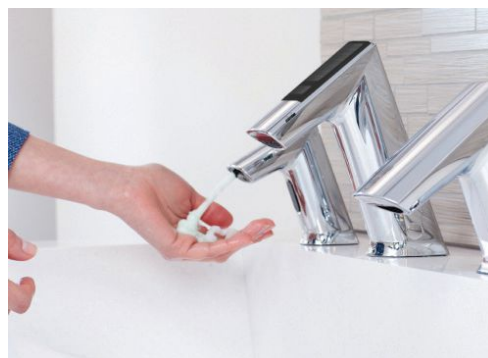
- 3.5.5 Eliminate drinking fountains, replace with touchless glass/drinking bottle filling stations.
- 3.5.6 Install toilet lids.

Other sections of the Re-Assessment Tool relevant to our discussion note:

- 3.9.5 Provide touchless hand soap and towel dispensers.
- 4.2.9 Promote hand washing, personal hygiene, and respiratory etiquette.
- 4.2.11 Provide alcohol-based hand rubs containing at least 60% alcohol disinfectants.
- 4.3.5 Provide disposable towels and disinfectants for occupants to clean work surfaces prior to use.

#### CDC GUIDELINES FOR PROPER HANDWASHING

Hygiene is important in any commercial restroom, but it’s especially critical where larger numbers of people may be exposed to germs such as hospitals, airports, stadiums,



The CDC recommends that users wet their hands with clean, running water (warm or cold), make sure the water is no longer running, and apply soap; then lather for at least 20 seconds, rinse, then dry hands with a hand dryer with HEPA filter, clean paper towel, or clean hand towel.

#### GLOSSARY

**CDC**—The Centers for Disease Control and Prevention; the CDC publishes guidelines for proper handwashing to help prevent sickness and the spread of germs.

**Closed System Soap/Sanitizer Dispenser**—Closed systems utilize cartridges or bags that are sealed from the air and fit into the dispenser, fully eliminating the risk of soap/sanitizer contamination.

**Coronavirus**—A member of a family of single-stranded RNA viruses that infect people and animals. The disease COVID-19 is caused by a newly discovered coronavirus called SARS-CoV-2

**Electronic Soap Dispenser**—Sensor-activated soap dispensers automatically dispense a pre-measured amount of liquid soap or foam soap to reduce waste while delivering the convenience of touch-free operation.

**Fitwel Certification System**—A standard that provides tailored scorecards that include 55+ evidence-based design and operational strategies that enhance

buildings by addressing a broad range of health behaviors and risks.

**Hand Sanitizer**—A liquid, gel, or foam generally used to decrease infectious agents on the hands.

**HEPA Air Filter**—A hand dryer filtration system that removes 99.97% of potentially present bacteria at 0.3 microns from the air.

**Internet of Things (IoT)**—A network of physical devices that collect and exchange data via the internet so that it can send information, receive information, or both.

**Open Refillable “Bulk” Soap System**—Those that are refilled by pouring soap into an open, partially filled reservoir.

**WELL Building Standard**—A performance-based system for measuring, certifying, and monitoring features of the built environment that impact human health and well-being.

schools, restaurants, and offices. The Centers for Disease Control and Prevention (CDC) has long published guidelines for proper handwashing to help prevent sickness and the spread of germs. According to the CDC, “Handwashing education in communities reduces the number of people who get sick with diarrhea by 23 to 40 percent; reduces diarrheal illness in people with weakened immune systems by 58 percent; reduces respiratory illnesses, like colds, in the general population by 16 to 21 percent; and reduces absenteeism due to gastrointestinal illness in schoolchildren by 29 to 57 percent.”<sup>3</sup>

They recommend that users wet their hands with clean, running water (warm or cold), turn off the tap, and apply soap. Turning off the water prevents the user from washing their hands in standing water sitting in a contaminated basin. Sensor faucets with automatic shut-off are a great solution to eliminate this potential risk. Using soap to wash hands is more effective than using water alone, because the surfactants in soap lift soil and microbes from skin, and people tend to scrub hands more thoroughly when using soap, which further removes germs. Lathering all areas of the hands, including under the nails, is important—and don't forget your thumbs! The optimal length of time for handwashing is a bit subjective depending on the amount and type of soil present, but the CDC recommends an average of 20 seconds, with an additional 20 to 30 seconds for drying.<sup>4</sup>

### REDUCING OR ELIMINATING BACTERIA, MULTIPLE TOUCH POINTS, AND CROSS-CONTAMINATION

Anything that eliminates or reduces the number of surfaces the user touches cuts down the potential for cross-contamination, be it bacteria, virus, bodily fluids, feces, chemicals, and more. Sensor-operated restroom fixtures that prevent the need to touch surfaces are an important component of hygienic restroom design. A recent blog post from a leading plumbing fixture manufacturer noted, “When you walk into some commercial restrooms today, you probably notice devices that aren't automatic. Those doors, light switches, soap dispensers, faucets, flushometers, hand dryers, and even hand sanitizer dispensers can be touch-activated or require physical contact. They represent opportunities for improvement, and the public is driving the move to touch-free. If you thought it was a trend before COVID-19, just wait for the demands and expectations after this [pandemic].”<sup>5</sup>

Touch-free faucets and toilets have been around since the 1970's but are now ubiquitous in commercial restrooms. But, despite their familiarity with touch-free technology today, that doesn't mean people use it to achieve effective handwashing. The blog says, “Repeated research indicates that the public either does not always wash their hands or, if they do, they will take much less time than the CDC-recommended 20-second scrub

time. Internet of Things (IoT)-enabled faucets launched almost two years ago are measuring and reporting millions of actual handwashing experiences. Time will tell if current COVID-19 events will increase average scrub times and if those increases eventually trend back down once the pandemic scare is over.”

IoT data can be used to improve public health and hygiene. With IoT-enabled faucets, flushometers, soap dispensers, and hand sanitizer dispensers, facility managers can support facilities remotely, extract relevant technical data, and even get help more easily from the manufacturer's technical support personnel. In addition, LCD display screens on faucets can guide users to perform CDC-compliant handwashing. This is called a guided handwashing faucet and is ideal for areas where handwashing compliance is a concern. A sensor is embedded right where the water exits to initiate the flow of water on-demand. This provides water-saving benefits and optimal hygiene for every user. A solar LCD screen on the faucet crown walks the user through the CDC's five steps to correctly wash hands. It indicates to wet the hands with clean running water, then lather the hands together with soap, scrub hands for at least 20 seconds, rinse hands well under clean, running water, and finally dry hands using a clean towel or hand dryer with a HEPA filter. The LCD display gives a countdown for the duration of each step for the user.<sup>6</sup>



Anything that eliminates or reduces the number of surfaces the user touches cuts down the potential for cross-contamination. Sensor-operated restroom fixtures that prevent the need to touch surfaces are an important component of hygienic restroom design.



Placing soap and sanitizer in prominent locations will remind everyone to practice good hand hygiene, and sharing best practices can help inspire staff and customers to wash and sanitize at the right times.

## IMPORTANCE OF USING SOAP AND HAND SANITIZER

Creating a culture of hand hygiene is very important, especially in light of current events. Placing soap and sanitizer in prominent locations will remind everyone to practice good hand hygiene, and sharing best practices can help inspire staff and customers to wash and sanitize at the right times. Making a trusted product available in prominent locations can have a dramatic impact on how people perceive facilities. Making hand hygiene and surface disinfecting products available where they are needed can significantly increase the likelihood of use and remind everyone to be mindful of hygiene best practices.

When it comes to proper hand hygiene placement, it's important to think about when people need to wash or sanitize their hands, like before eating, in shared public spaces, and entering and exiting buildings. The CDC recommends washing hands if they're visibly soiled and sanitizing if soap and water aren't available. To sanitize, apply sanitizer to both hands, covering all surfaces including between fingers, and rub hands together until dry.



This article continues on <http://go.hw.net/AR102020-3>.

Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

## SPONSOR INFORMATION



Sloan is the world's leading manufacturer of commercial plumbing systems. Sloan has been at the forefront of the green building movement since 1906 and provides smart, sustainable, and hygienic restroom solutions by manufacturing water-efficient products such as flushometers, electronic faucets and soap dispensing systems, sink systems, and vitreous china fixtures to promote wellness in commercial, industrial, and institutional markets worldwide.

## QUIZ

- The CDC recommends a minimum of \_\_\_\_\_ seconds of scrubbing, with an additional 20 to 30 seconds for drying to properly wash hands and prevent the spread of germs.
  - 10
  - 20
  - 30
  - 40
- Which features of a commercial restroom represent an opportunity to upgrade to sensor-operated, touch-free fixtures?
  - Soap/sanitizer dispensers
  - Faucets
  - Hand dryers
  - Flushometers
  - All of the above
- There are hand sanitizer formulations available that kill \_\_\_\_\_% of most common germs that may cause illness and are effective in critical situations, while maintaining skin health in high-use environments.
  - 98.99
  - 99
  - 99.99
  - 100
- Which method of soap/sanitizer dispensing is more hygienic?
  - Bulk soap dispensers
  - Closed and sealed soap dispensers
  - Manual
  - Touch-free
  - Both B and D
- Research has demonstrated that up to \_\_\_\_\_% of bulk hand soap dispensers from office buildings, health clubs, schools, food service centers, retail spaces, and other locations are contaminated with unsafe levels of bacteria.
  - 5
  - 15
  - 25
  - 50
- Touch-free closed and sealed soap dispenser designs reduce labor time by \_\_\_\_\_%, are more hygienic, and eliminate safety concerns.
  - 32
  - 45
  - 57
  - 63
- Which of the following was a finding of the *Journal of Occupational and Environmental Medicine's* study about offices with hand sanitation programs?
  - there were fewer health care claims for hand hygiene preventable illnesses
  - they significantly reduced unscheduled paid time off
  - office morale was bolstered
  - having access to hand sanitizer positively impacted their impression of their employer
  - all of the above
- A high-speed, no-heat wall dryer dries hands in 10 seconds while only using \_\_\_\_\_ watts of energy, making it the most energy-efficient and environmentally-friendly wall-mounted hand dryer available.
  - 200
  - 300
  - 400
  - 500
- Which type of solid surface material continuously kills bacteria\*, eliminating more than 99.9 percent of bacteria within two hours?
  - CuVerro
  - Hydrophobic
  - SaniGuard
  - HEPA
- Which is a certification based on research conducted by the American Medical Association, the Cleveland Institute, and the Green Building Council that focuses on seven key performance indicators: air, water, nourishment, light, fitness, comfort, and mind?
  - LEED
  - WELL
  - Fitwel
  - USGBC



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# AIA Architect

## AIA Voices



CREDIT: MERON MENGHISTAB

## Framing Change

**Ten key design principles can help define our future.**

Margaret Montgomery, FAIA, is the global sustainable design director at NBBJ and one of the stewards of AIA's Framework for Design Excellence—a 10-principle outline that prioritizes climate, equity, resilience, and health in the built environment. The framework prompts architects to investigate areas such as well-being, equitable communities, and ecosystems, bringing a more holistic perspective to design. “Using this framework in the design process,” she says, “will almost always uncover at least one important design influence you might not have considered otherwise.”

As told to Steve Cimino

Relevant design must encompass both performance and beauty. Most architects would agree that our work isn't finished once we create an elegant form. [The structure] has to perform well in crucial ways. The framework articulates how design can improve our future, both as a society and as a profession. It was developed to speak to architects across many practices and scales.

The breadth of topics highlighted in the framework is intentional. An architect might be an expert in net-zero buildings, yet perhaps they're less focused on community participation or material health. Those are blind spots. We all have them. These principles can help broaden our thinking, expose us to new angles, and uncover what we may have missed.

When we recently updated the framework to address systemic racial injustice, we wanted to make its aims explicit, yet also universal. We want the framework to prompt questions like, “Whom might the project be forgetting? How can the design process and its outcomes remove barriers and promote inclusion and

social equity?” We want the framework to prompt questions and dialogue like this for all architects—to promote meaningful conversations and action steps that will only make our work better.

Embedded into the 10 principles is a vision for contributing to a more equitable society by changing how we craft the built environment. How we learn to apply the principles is the journey we each take—and there is so much more to do as we work to understand issues of social justice and sustainability on a deeper level.

This is an era of generosity rather than one of proprietary knowledge. Architects and designers want to create a better world, and the only way we do that is if every project makes progress in a positive direction. If we can get the performance right, the brilliance of the design is still up to the individual, the team, and the firm. But it should be richer in its content than by yesterday's standards.

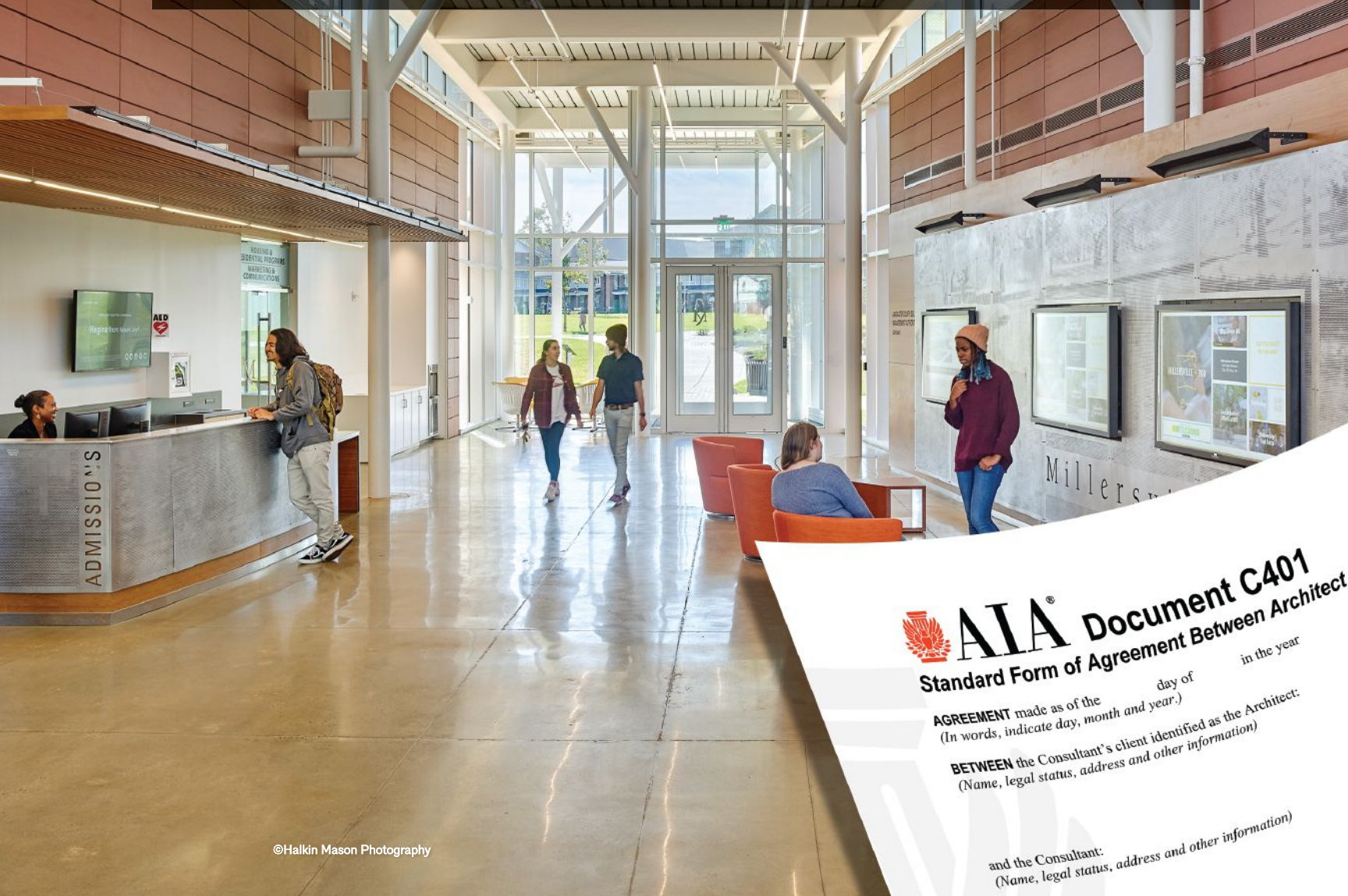
Because our access to information is so ubiquitous, it is critical that we talk to each other, question each other, and push each other. **AIA**

**AIA** Contract Documents

# Real projects start with the industry standard

Before the project broke ground, Spillman Farmer Architects used an AIA contract to design and build **Millersville University's Lombardo Welcome Center**, designed to achieve Net-Zero.

**AIA documents used:** C401-Architect/Consultant Agreement  
Learn more at [aiacontracts.org/architectmag-lombardo](http://aiacontracts.org/architectmag-lombardo)



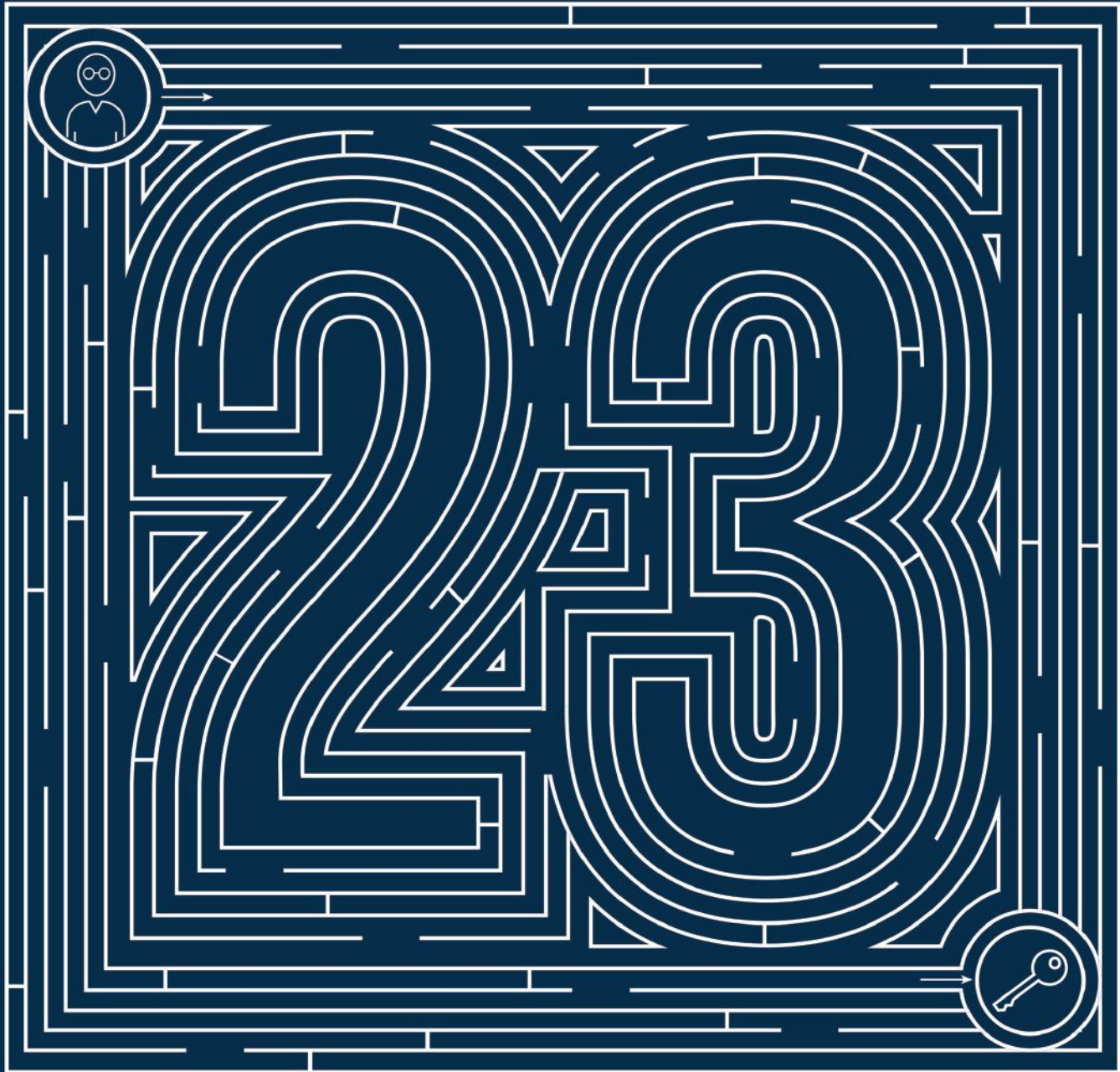
 **AIA** Document C401  
Standard Form of Agreement Between Architect

AGREEMENT made as of the \_\_\_\_\_ day of \_\_\_\_\_ in the year \_\_\_\_\_  
(In words, indicate day, month and year.)  
BETWEEN the Consultant's client identified as the Architect:  
(Name, legal status, address and other information)

and the Consultant:  
(Name, legal status, address and other information)



# AIANow



CREDIT: ELSIE DWYER

## 23% of Firms Have Ownership Transition Plans

By Michele Russo

This is a misleading number. While 90% of large architecture firms (with more than 50 employees) have ownership transition plans, only 15% of small firms (with two to nine employees) have them. For sole practitioners, that number drops to 4%. Midsized firms (with 11 to 49 employees), meanwhile, sit in the middle, with 60% reporting ownership transition plans.

There is less disparity in the number of firms that have business plans: 69% of firms with more than 50 employees have them, as do 49% of firms with 11 to 49 employees; 37% of firms with two to nine employees; and 22% of firms with one employee.

SOURCE: AIA FIRM SURVEY, 2020

# AIA Feature



CREDIT: CORNELIA LI

# Out in Architecture?

**Workplace norms are changing, but how inclusive is the profession for LGBTQI+ architects?**

By Stephen Hicks

For Julia Oderda, AIA, it all started with blocks and Legos as her preferred playtime activity—any constructable toy she could get her hands on. A drawing class in high school further captured her imagination. One assignment was: draw a house along with floor plans and elevations. Immediately, she noticed she was devoting more hours to this assignment than usual and realized that she enjoyed the deep dive. From there, she started working as an assistant at a firm, was accepted to architecture school, and has not stopped since.

“Being able to be an architect has been a central part of my identity and who I am,” says Oderda, an associate principal at VCBO Architecture based in Salt Lake City, Utah.

When Oderda became an architect, she fit the traditional archetype of the field: white, straight, and cisgender male. In 2018, however, Oderda came out to her wife, family, and friends as a transgender woman.

She reflects the changing face of a discipline that has long lagged behind other fields when it comes to diversity. As architecture catches up to the broader society, the visibility of out LGBTQI+ architects like Oderda has the potential to revolutionize the profession, but it can still be difficult for someone to openly be gay or transgender in the architectural profession.

Oderda was met with a lot of positivity, but she also suspected that disclosing her gender identity wouldn’t generate warm welcomes and affirming embraces from everyone. The stories—better yet, cautionary tales—are plenty: alienation from family, housing instability, unemployment.

“The more I progressed in my transition and the better I felt, the more it was obvious that I would have to come out at work,” she says.

In many ways, Oderda was lucky. Governor Gary Herbert (R) signed state legislation SB 296 into law in 2015, which added sexual

orientation and gender identity to Utah’s Anti-Discrimination and Fair Housing Acts. This law has made great strides in protecting LGBTQI+ people, specifically in employment and housing. That same year, a Gallup poll ranked Salt Lake City seventh among major metropolitan areas with the highest percentage of LGBTQI+ adults. By June 2018, when Oderda was transitioning, 18 states (in addition to Washington, D.C.) had passed laws barring discrimination in housing, jobs, and public accommodations to LGBTQI+ individuals.

“I at least have that [SB 296] as something to theoretically protect me. Although there are all sorts of reasons that people could find to fire you,” she says. “It was very scary.”

Not knowing what to expect from her firm, Oderda drafted a plan with a detailed timeline of tasks that needed to be completed before she came out to VCBO’s leadership. As it turned out, the firm’s response was supportive and receptive. “One of the principals made the statement that, with my transition, they have the opportunity to do the right thing,” Oderda says.

But not every LGBTQI+ architect has been embraced when coming out.

Much like Oderda. Amy Braun, AIA, found her architectural inspiration early on. Braun wanted to influence the environment around her. That desire, combined with her artistic background and formidable math skills, meant

that becoming an architect wasn’t far-fetched at all. She took a conventional path for her education, earning her architectural degree from the University of Southern California in 2007 when the recession was heading toward full tilt. When she had trouble securing work at an architecture firm, she instead found a job working for a contractor performing bidding and field supervision duties—an atypical path, she says. Then, she made another atypical move and founded her own firm in 2014. She now works full-time at HMC Architects.

“Being visibly trans comes with its own disadvantages. Because of my choice to be visible, to be out as trans, some opportunities for me were hindered,” she says. “I do think that there are probably lots of parts of the country where being out, being visibly LGBTQI+, comes at risk of economic survival. We don’t talk about that enough, if at all.”

Oderda was fearful of these negative outcomes when she weighed coming out to her colleagues—potentially losing her job in a field to which she’s dedicated her life. Out of necessity, Braun launched her company when she was 30 years old, feeling she needed to make an opportunity for herself. “I hope that this profession is moving in a direction where people feel like they can be open about themselves and be fully respected in the workplace without risk to their own livelihood,” she says.

# AIA Feature

CONTINUED

In June, the Supreme Court ruled that the Civil Rights Act applies to discrimination based on sexual orientation and gender identity, protecting gay and transgender workers from workplace discrimination. The day before the ruling, the Trump administration rolled back certain protections for transgender individuals under the Affordable Care Act.

Visibility is costly when architects aren't sure how they will be perceived, from fellow architects to a firm's board members and clients to the construction site. Outing oneself as LGBTQI+ can yield different results depending on the architect's race, the firm's leadership, the state's civil rights legal protections, and the presence of allies and advocates within a specific company. Oderda's and Braun's experiences speak of that uncertainty, as well as the pressure to protect one's career and livelihood when the power dynamics can be leveraged against an individual even if they are part of a protected legal class.

Kevin Johnson, AIA, remembers his reluctance in coming out as a gay man to his colleagues at an architecture firm where he interned during college. The firm was large for an Indiana company. He waited and observed. There were not enough LGBTQI+ architects at the firm, he says. It was not yet time. When Johnson moved to Washington, D.C., and joined SmithGroup in 2005, he grew more comfortable but still kept waiting and observing. A business trip opened the prospects for coming out: As he and his male colleagues were returning from the trip and awaiting their rides at the airport, Johnson recalls one of his colleagues getting picked up by his husband. No big deal.

"It gave me confidence to be my full self. Seeing other out architects succeeding and thriving helped me understand the value of being my full self, and how bringing that to the table would make me a better architect," Johnson says. "For me specifically, the things that SmithGroup did to be supportive [weren't] just tolerance. It [being out] just didn't appear to be an issue. Bigger than that, there's mentorship and seeing people as role models. Seeing that they were able to be completely comfortable with who they were I think was really a big thing, especially when I was 23 years old."

Johnson's career has blossomed at SmithGroup, where he's led or made significant contributions to higher education projects at the University of Pennsylvania, the University of Utah, Georgetown University, New York

Law School, and Auburn University. He participated in the firm's emerging leaders' program, a three-year process resulting in a capstone project. This December will mark six years since he made principal, a remarkable feat considering his age. As one of his current assignments, he is project manager for a 300,000-square-foot building that is part of Virginia Tech's new Innovation Campus located just outside of Washington, D.C.

Architecture is still striving to live up to the ideals set forth by Whitney Young Jr. in his speech at the 1968 AIA National Convention. Young, head of the National Urban League, challenged the nearly all-white assembly of architects: "You are not a profession that has distinguished itself by your social and civic contributions to the cause of civil rights ... You are most distinguished by your thunderous silence."

More than 50 years later, Black people remain underrepresented in architecture. Since Young's speech, more attention has been paid to racial and gender diversity, but not explicitly LGBTQI+ representation or the intersections of multiple identities. Devin Davis, ASSOC. AIA, a senior technical project designer at Cleveland-based firm Vocon, is Black and gay and sees a shift in the current architecture climate.

"I feel there's a full breadth of myself that I can now offer to projects," Davis says. "Proportionately, there's always been a fair amount of LGBTQI+ identified people within the industry. It's the Black spotlight that I think we have space that we need to fill."

Davis believes firms can do more for visibility of LGBTQI+ individuals and connecting their work with its long-term impact on the built world. This includes incorporating intentional space for community within plans. "We need to use the voice that we have as design professionals and architects. We're being hired to occupy that space. We're being hired to bring what we know to the table. And I think we need to own some of that and realize we can help navigate and build the world to be a better place," he says.

"Lean into the power you may have within your firm. Lean into the strength you have within yourself and make space occupied space. We just have to be more mindful about how we move."

Davis, 41, is impressed by the younger architects coming into the field for not waiting for others to validate their identities. His advice: Own your story and speak your truth.

Larry Paschall, AIA, a gay man, has been a vocal proponent of architecture's EDI aspirations, including LGBTQI+ representation. His company, Spotted Dog

Architecture, is based in Dallas. He also authors the blog "The Big Gay Architect" and serves on the advisory group for the AIA Practice Management Knowledge Community.

Paschall has been openly gay his entire career, which he attributes to working for progressive firms as well as being a firm owner himself. However, he's painfully aware of the challenges others have faced being open about their identities at work. "As a society, I think we've become more comfortable with people on the queer spectrum, whether you're gay or lesbian, transgender, [or] bisexual," Paschall says. "As an industry, I think there's still a lot of hesitation to talk about it. We will talk about gender and ethnicity because we can see it. Queer isn't always visible."

To capture accurate numbers of those who currently may feel invisible, Paschall wants better data collection that includes queer architects of various races and genders. AIA's 2016 report "Diversity in the Profession of Architecture" breaks down the responses to gender and race but does not include LGBTQI+ questions or responses. In 2018, NOMA partnered with The National Council of Architectural Registration Boards for a separate report that stratified race and ethnicity in further detail, but still didn't include LGBTQI+ options in the surveys. Last year, AIA published the second installment of its "Guidelines for Equitable Practice". The document, created in partnership with the University of Washington, the University of Minnesota, and AIA's Equity and the Future of Architecture Committee, comprises a "vital part of AIA's long-term commitment to lead efforts that ensure the profession of architecture is as diverse as the nation we serve."

It strives to be more inclusive of LGBTQI+ members of the profession. "I think within the profession, maybe that is still some of the issue, that we are not comfortable talking about queer issues even though they [AIA leadership] know we are there. And of course, people are still facing the challenge of worrying about their job," Paschall says.

Braun remains optimistic about the profession's prospects moving forward.

"For me," she says, "to be an LGBTQ architect in 2020 is actually a tremendous time of opportunity. In the work I am engaged in at HMC Architects, there's a lot of possibility to address gender inclusion in the buildings that we are designing. That's something that I have never seen until the last couple of years. I think these opportunities exist now because of the visibility of LGBTQ people in the culture." **AIA**

Nov 19  
to  
Dec 3

ONLINE

# adff 2020

## The Architecture & Design Film Festival

will take place from November 19 to December 3. ADFF has curated an illuminating selection of films that celebrate the creative spirit behind architecture and design paired with introductions by special guests and followed by Q&As from the films' directors.

[adffilmfest.com](http://adffilmfest.com)

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# AIA Collaboration

## Architecture and Design Film Festival Goes Digital This Year

**Despite its virtual setting, ADFF will continue to showcase innovative films about the built environment.**

By Jocelyn Rogers

Like so many other events in 2020, the Architecture and Design Film Festival has gone virtual in response to the global pandemic. ADFF:2020 is set to take place from Nov. 19 to Dec. 3, providing viewers ample opportunity to watch films on their own schedule and from the comfort of their own homes.

The ADFF team has assembled a diverse and exciting program, with a special focus on films that explore social justice issues and the experiences of architects from underrepresented communities. “Hollywood’s Architect: The Paul R. Williams Story” is one of the heavy-hitters, portraying Williams’ determination and triumphs as he designed homes in communities where AIA’s first Black member was not allowed to live. ADFF will be offering this film for free during the festival.

Another standout is “Magical Imperfection,” which presents the life story of Raymond Moriyama, a Canadian architect of Japanese descent whose experience in a World War II internment camp inspired him to become an architect and forever influenced his conception of space.

A new French film on Charlotte Perriand is a testament to the creative force that drove her designs, from her time as a young architect working in Le Corbusier’s office to her design of Les Arcs ski resort, and everything in between.

In this time of curtailed travel, the world premiere of “Tokyo Ride” offers a unique escape. The latest offering from acclaimed directors Bêka & Lemoine, the film is presented as a one-day adventure, providing a tour of Tokyo architecture as viewers vicariously drive through the streets in an Alfa Romeo, accompanied by Japanese architect Ryue Nishizawa, a partner at SANAA.

Shot in Copenhagen, “Making a Mountain” examines Bjarke Ingels Group’s innovative design for a power plant that doubles as a ski slope. The project, which Ingels describes as



“Tokyo Drive” follows architect Ryue Nishizawa over the course of a day-long drive through his home city of Tokyo.

“the cleanest waste-to-energy power plant in the world,” demonstrates the possibilities of what Ingels calls “hedonistic sustainability.”

Since the onset of the pandemic, ADFF has hosted several virtual events. Like the screenings ADFF hosted over the summer, ADFF:2020 will give viewers the chance to get in-depth perspectives from the filmmakers and film subjects through pre-screening introduction segments and post-viewing question and answer sessions. For an enhanced experience, viewers will have the option to watch the films in high resolution through streaming platforms like Apple TV and Roku.

Even after it becomes possible to gather in large numbers again, ADFF will continue to host virtual events given their demonstrated appeal and value. Still, ADFF founder and director Kyle Bergman is eager to get back in theaters. “There’s nothing like going to a big theater and sitting in the dark with a lot of other people,” he says. “It’s like a two-hour vacation, where you forget about everything except for what’s on the screen.”

Although there’s no substitute for the silver screen, virtual events do offer silver linings: “It makes it more democratic in a way,” Bergman says. “Whether you live in Tulsa, Vermont, Texas, or Hawaii, people anywhere across America and Canada can see these films—not just people who happen to be in New York,” or other cities where ADFF used to hold in-person events. Indeed, Bergman predicts that attendance for ADFF:2020 could reach over 30,000 (in comparison to the 22,500 who attended ADFF events last year).

Ticket buyers can choose from more than 16 film programs that will include a combination of features and short films, including AIA Film Challenge entries.

“We are always thankful and amazed how many people put their heart and soul into making films on architecture,” Bergman concludes. “Like architecture itself, making films about architecture is a labor of love. People make these films because they’re committed and passionate, and we’re grateful to all the filmmakers who submit their works of art to us.” **AIA**

# AIAContracts

## AIA Debuts Its Newest Sustainability Scope of Services and Updated Guide

**A new document supports sustainable objectives for buildings.**

By Colleen Telling

In May, AIA launched a new scope of services document for sustainability consultants, C204-2020, which provides a roadmap for sustainable design and construction. The document responds to a growing trend of owners shifting traditional sustainability coordination efforts from architects of record to consultants who specialize in sustainability. C204 is drafted for architects and non-architects who are implementing the many stages of the sustainability process. A sustainability consultant works with the owner to identify the owner's sustainable objective. This might include achieving a sustainability certification; minimizing the building's carbon footprint; optimizing the health and well-being of the building's occupants; and improving the building's energy efficiency. Before the conclusion of the project's schematic design phase, the consultant conducts a sustainability workshop with all stakeholders, including the owner, the owner's other consultants, the architect, the architect's consultants, and the contractor, if they joined the project early.

"Although we have many staff with professional sustainability accreditations, we often encourage the owner to hire the sustainability consultant directly to manage the process and deal with all of the paperwork, allowing us to focus on creating a sustainable design," says Tara Myers, AIA, a principal at Earl Swenson Associates. "C204 will give owners an agreement tailored specifically to this process."

Following the workshop, the sustainability consultant prepares the sustainability plan, which outlines the measures necessary to achieve the sustainable objective. The plan allocates responsibility for each sustainable measure—a specific design or construction element, or post-occupancy use, operation, maintenance, or monitoring requirement—to the project participant in the best position



Gulch Crossing, an office complex in Nashville designed by ESa, received LEED Gold certification.

to perform it. The sustainability plan also serves as a contract document and must be incorporated into agreements with project participants performing services or work in any way associated with the sustainable objective. In addition, the plan details responsibilities for sustainability documentation required for the project; implementation strategies to achieve the sustainable objective; and specific details about design reviews, testing, or metrics to verify achievement of each sustainable measure.

C204 addresses the consultant's services during procurement and construction and contains a supplemental services table with

categories specific to sustainability. Examples of these categories include daylight analysis, envelope and glazing thermal modeling, and indoor air quality analysis. Other responsibilities of the sustainability consultant include gathering information and coordinating with all parties; submitting documents to the certifying authority and obtaining approvals; and handling fees.

C204 is part of AIA's conventional design-bid-build family of documents and is not a standalone agreement; accordingly, it must be paired with a document that provides necessary contract terms, such as C103-2015 Standard Form of Agreement Between Owner

# AIAContracts

CONTINUED

and Consultant without a Predefined Scope of Consultant's Services. Because C204 works in conjunction with the E204-2017 Sustainable Projects Exhibit among the owner, architect, and contractor, the owner will need to edit E204 to account for the consultant's role and eliminate overlap with the architect's role. E204 defines key sustainable terms, and C204 references these definitions.

Along with the publication of the new C204, AIA released its revised Sustainable Projects Guide, D503-2020. The guide details a variety of sustainable topics and discusses how to develop a sustainability plan based on a particular certification system. Rather than referring to the retired SP documents, as D503-2013 did, the 2020 update presents an in-depth commentary about each provision in E204.

"Sustainable projects can have a lot of nuances that are not addressed in most standard agreements, which makes AIA's family of sustainable documents even more important," Myers says. "D503 has served as a great resource for me in the past and the updates make it an even more valuable reference guide."

D503's primary focus is to explain the roles and responsibilities of the owner, architect, and contractor regarding sustainable design and construction projects. Additionally, the guide covers current topics, such as materials transparency; resilience; environmental product labels and certification systems; and jurisdictional requirements relevant to sustainable projects. New to this guide is commentary on the C401-2017 and C402-2017 Architect-Consultant agreements, as well as a sample of a completed WELL Certification Plan.

Also published as part of AIA's May 2020 documents release was an updated Programming Scope of Services, B202-2020. B202 outlines steps for architects to discuss programming requirements with owners. Among its many changes, B202 now defines programming, which entails identifying, discussing, and prioritizing values, goals, and objectives to establish performance and design criteria for the project. Once the architect and owner have defined the program, the architect gathers project-related information, analyzes data, and develops program documents for the project. B202 must pair with an Owner-Architect Agreement—ideally B102-2017 Owner-Architect without a Predefined Scope of Architect's Services. However, B202 may attach to other AIA Owner-Architect Agreements to satisfy provisions requesting the owner's program for the project. **AIA**

# AIA Perspective



## Energy Modeling Is Pivotal

**AIA's 2030 Commitment, now in its 10th year, is combating climate change through data.**

The 2030 Commitment is one of our most effective tools for advancing energy efficient design. And the latest report on 2019 progress illustrates that architects are taking action and making a difference.

Reporting firms recorded 3.3 billion gross square feet worth of projects across more than 100 countries. That's nearly the size of New Mexico. And they achieved a 49% reduction in predicted energy use intensity—the greatest reduction in the program's history.

As you know, the 2030 Commitment is a platform for architects, engineers, and owners to work together toward the architecture and design community's goal of achieving a carbon neutral built environment by the year 2030. The Commitment aims to transform the practice of architecture to respond to the climate crisis in a way that is holistic, firm-wide, project-based, and data-driven.

According to Architecture 2030, as much as 50% of a city's greenhouse gas emissions can be produced by fewer than 5% of that city's buildings. This is an issue that architects have the power to address.

To date, 829 companies have joined the Commitment. Even small firms can make a big impact. I can confirm that firsthand: Our small residential firm reported a 79% reduction last year.

Our data confirms that energy modeling is pivotal. In 2019 alone, projects that used energy

modeling were 29% more energy efficient than non-modeled projects. Take the average medium-sized office building in Boulder, Colo. With an energy efficiency increase of 29%, that building could save 133,400 kilowatt hours of electricity and nearly \$14,000 each year. Even if the building doesn't hit the 2030 targets, that's significant. If you're not modeling, you're leaving real energy and cost savings for clients on the table.

The 2030 Commitment also recognizes that operational carbon is just one piece of the climate action puzzle. To meet international targets, it's critical to consider embodied carbon—meaning all the carbon emitted during the manufacturing and transport of materials and during building construction. Unlike operational carbon, which can be reduced during a building's lifetime, embodied carbon is locked in as soon as a building is completed. It can never be recaptured.

That's why we're revamping the Design Data Exchange to enable firms to track whole building embodied carbon beginning this month.

When we launched the 2030 Commitment 10 years ago, signatories used an elaborate spreadsheet to calculate and report their performance. Now, through the Design Data Exchange, tracking is much easier. Firms can quickly visualize their portfolio projects and compare their projects to others around the world.

Architects know we can't achieve progress alone. That's why it's so encouraging that engineering companies are joining the 2030 Commitment. Participation increased 22% last year, and we welcomed the program's first building owner—a nonprofit affordable housing developer.

We're committed to making the moral and financial case to clients to help them better understand the importance of energy efficient design that will make their buildings more sustainable, more resilient, and more economical. And as daunting as the challenge may seem, progress is happening: According to an Architecture 2030 analysis, building sector carbon dioxide emissions are down 21% since 2005—even though the United States added more than 47 billion square feet of built space over the same period.

After 10 years of the 2030 Commitment, we know that design changes can reduce climate impact significantly. We know progress is possible, and we have the technology and the knowledge to make an immediate impact. **AIA**

Jane Frederick, FAIA, 2020 AIA President





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# 2020 COMMITMENT ON ENVIRONMENTAL TOP

INTRODUCTION AND INTERVIEWS BY KATIE GERFEN

**2020 JURY**

**Bob Berkebile, FAIA, BNIM**  
**Roy Decker, FAIA, Duvall Decker**  
**William Horgan, INTL. ASSOC. AIA, Grimshaw**  
**Andrea Love, AIA, Payette**  
**Vivian Loftness, FAIA, Carnegie Mellon University**

> For project credits and more information on each winning project, visit [bit.ly/AR2020COTE](http://bit.ly/AR2020COTE).

# AIA

# THE

# THE

# NMENT

# TEN

**There's no guesswork when it comes to determining whether or not the winners of the AIA Committee on the Environment Top Ten Awards are sustainable. The proof is in the numbers.** Submitted in 10 categories—integration, community, ecology, water, economy, energy, wellness, resources, change, and discovery—the data points demonstrate just how extensively the design teams have reduced the impact of this year's winning projects on the environment.

These achievements should be celebrated, but they shouldn't seem out of reach. Instead, the winning projects, which are showcased on the following pages, offer examples of design strategies that every firm can learn from, implement, and achieve.

So it's fitting that the program's 10 areas of focus have been expanded upon to form the 10 principles of AIA's new Framework for Design Excellence. The framework (read more about it on page 69) provides a series of questions that all architects and their clients can discuss at the beginning of the design process to prioritize sustainability. The holistic approach considers not only needed reductions in carbon and energy, but the effect buildings have on the health and equity of the people and communities in and around them.

"This year has put a spotlight on that, with COVID and the communities of color that are so highly impacted," says AIA President Jane Frederick, FAIA. "When you start looking, you say: 'No wonder, we have pushed all the pollutants next to low-income communities, which compounds the problem of health.' Health and racial equity go hand-in-hand with

sustainability. If you don't have healthy communities, you can't have sustainable communities."

Building performance is improving—firms signed onto AIA's 2030 Commitment report an overall pEUI reduction of 49% in 2019—but with the 2030 target for delivering carbon-neutral buildings only a decade away, there is a lot of work yet to do. The framework will help all architects "design not just something that is beautiful, but that is good for the environment," Frederick says. "That's just what good design is." The 2020 COTE Top Ten winners are inspiring case studies.

# UpCycle

## Austin, Texas

Gensler

This recycling center-turned-office was designed to reuse 95% of the original structure, saving 1,824 metric tons of carbon emissions—a 76% reduction in embodied energy.

### What were some of the design goals for the project?

Travis Albrecht, AIA, studio director: One was the reuse of the building—that was a parameter from the beginning. As surprising as it is to say that an old metal shed would be fantastic for an office, trying to maintain that character was a big design driver. The other was making the building more engaging. It started off as a manufacturing building and ended up as a building for sorting piles of trash. The path to transformation was: How do you keep the recognition that this was an old warehouse, but make it light-filled and approachable—like it is meant for humans rather than trash and trucks?

### How were sustainable strategies integrated into the design process?

The first was reuse: We reused not just the structure and roof decking, but old exhaust fans, the existing metal skin, artwork that we found inside the space—reuse was throughout. Another one was daylight: A lot of our interventions involved setbacks to create outdoor porches, which allowed us to have covered and shaded big windows. The pop-ups down the center of the building were all about bringing in an abundance of natural light.

### How did the focus on materials reuse influence your design process?

I learned a lot about keeping an open mind to what can be reused and how. Pretty much every component we had, we thought about: Could we reuse this? Is this something that could be put somewhere else in the building? Is it a planter, a piece out in the landscape, or something in the lobby?

Whenever the contractor was demo-ing components and things that we couldn't technically reuse, they took them down and then sent them home either with somebody who collects and resells them, or with local craftspeople whom we know to contact. A lot of it got picked up that way.

### What do you think is the most innovative sustainable aspect of this project?

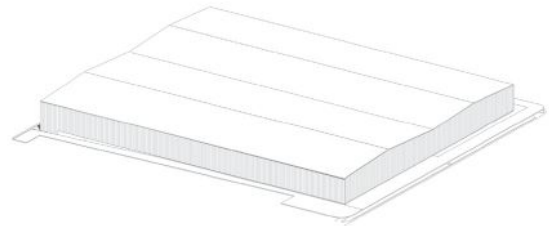
The idea of repurposing buildings to save on the embodied carbon and on all the energy that goes into producing the materials that make buildings—we will probably see a lot more of that. It's a conversation that we're starting to have more and more with our clients. Do you have to do a new building? Could you redevelop rather than finding a fresh site or tearing something down to build something that feels foreign to the neighborhood?

What I appreciated about this project was that it's adaptive reuse, but it's a bit different. A lot of times when people think adaptive reuse, they think of full-on preservation. Being able to think through the creative reuse, to transform and reuse at the same time, was pretty incredible.

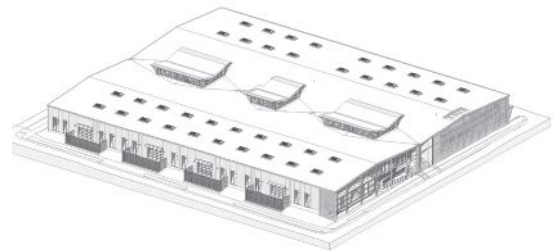
### What was your favorite lesson learned from this project?

Not to say no. Being open-minded enough to see what's there and explore it.

Before



After



## RESOURCES

### Mandatory Metrics

*CO<sub>2</sub> intensity:* Because of reuse, only added 601 metric tons of embodied CO<sub>2</sub> (out of 2,425 metric tons total in the project)

*Estimated carbon emissions associated with building construction:* 16 pounds CO<sub>2</sub> per square foot



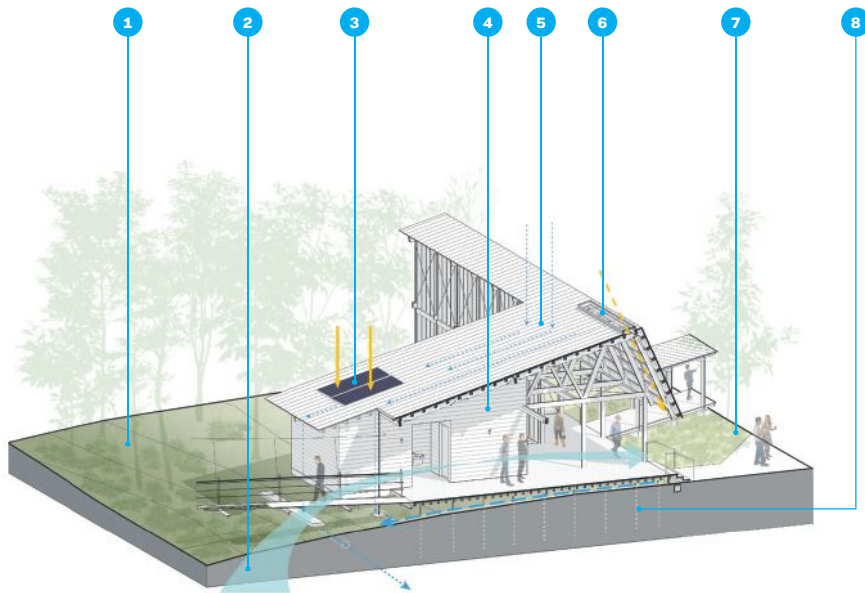
# Marine Education Center at the Gulf Coast Research Laboratory Ocean Springs, Miss.

Lake|Flato Architects and Unabridged Architecture





After an existing structure was destroyed by Hurrigan Katrina, the design team crafted a resilient campus that merges learning and nature while stepping as lightly as possible on the landscape.



1. Existing native planting
2. Captures winds off the water
3. Solar hot water
4. Cement-board rainscreen
5. 65" of rain annually
6. Skylights
7. New native planting
8. Helical piers for maintaining site drainage

## WATER

### Mandatory Metrics

Was potable water consumption measured after occupancy? Yes

Is rainwater captured for use by the project? Yes

Were strategies employed to manage stormwater on site? Yes

Percentage of rainwater managed: 100

### What were the design goals of this project?

Bob Harris, FAIA, partner: This project came out of the catastrophe of Katrina. There were still a lot of questions about how or whether one should build or what we would do in order to create a more resilient solution. The primary design directive was to make sure that we fit into a natural environment and create a resilient attitude toward leveraging the site's attributes and crafting an appropriate presence and lasting investment in the educational opportunities of that site. The building needed to frame all that.

### What is the most innovative strategy you used?

Heather Holdridge, ASSOC. AIA, director of design performance: Maintaining the site and the landscape as our first line of resilient defense [against future hurricanes] instead of the structures itself, along with the integration of our team. Bringing in biologists and coastal ecologists, along with the design team, contractor, owner, and users so that everyone could really understand that strategy—and make sure that it worked with the way that the building was operating—felt like a novel approach.

### How did you balance ecology and construction?

Grace Boudewyns, AIA, project director: There was a strong priority to keep the construction limits tight to the buildings—5 feet past every footprint was our construction limit. One of the successes on opening day is that it looked like these buildings just popped up out of nowhere because the natural landscape was preserved.

### How did concerns about contamination of or by materials after a storm affect the palette?

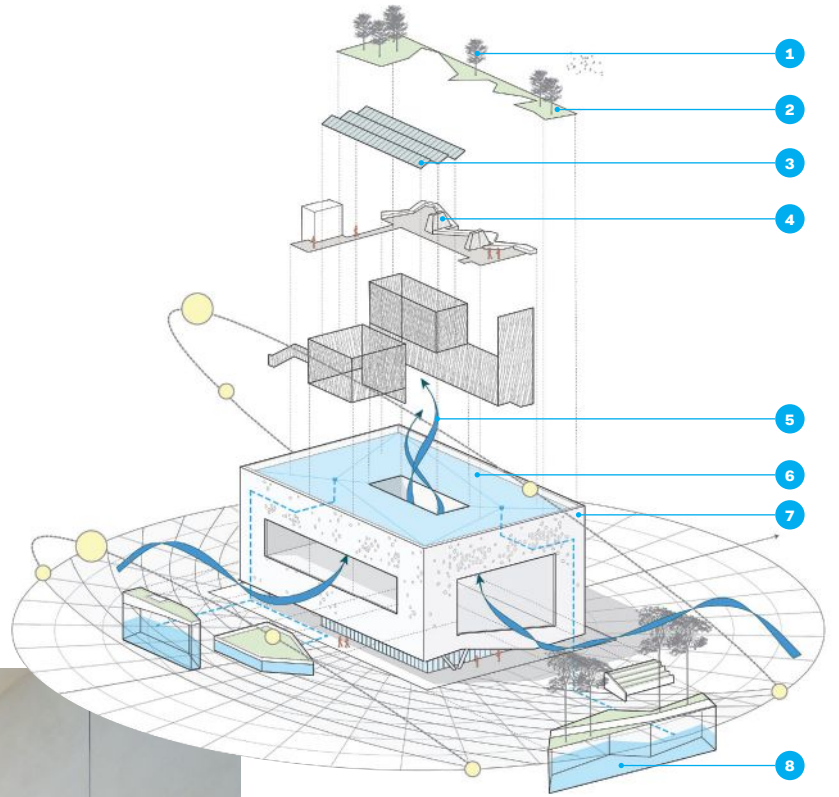
Boudewyns: We used locally sourced materials as much as possible. Chris Snyder, the center's then-director, said, "All buildings eventually end up in the ocean." We adopted that mantra, avoiding any material that would leach into marine life, and using lumber that is readily available for repairs.

### How did you apply lessons from previous hurricanes in your resilient strategies?

Holdridge: We chose the least sensitive ecological zone to build on. And higher is better for dealing with storm surge. The buildings are sited 3 feet above the 500-year flood plain—we went above even FEMA recommendations because we recognized, as we're experiencing now, that these natural disasters are becoming far more frequent and more intense. We needed to plan accordingly.

Sustainable Systems Diagram

**The Six**  
**Los Angeles**  
Brooks + Scarpa



**This Skid Row Housing Trust project provides permanent supportive housing for formerly homeless veterans in an environment that integrates sustainable approaches to health, wellness, and budget.**

1. Water-efficient species and irrigation systems
2. Green roof provides heat reduction and stormwater collection
3. Solar collector for hot water and energy production
4. Rooftop deck
5. Induced airflow creates breeze that contributes to cross ventilation for units
6. Cool roof
7. Blown-in recycled cellulose insulation reduces infiltration and thermal bridging
8. Stormwater collection basins

## ECONOMY

### Mandatory Metrics

*Cost per square foot:*  
\$254

*Explain how building size was managed to comply with budget and meet operating requirements:* Buildings with smaller units cost more and use more energy and water (due to a higher fixture count and higher tenant density). We utilize an in-house matrix of unit sizes that are just above the minimum allowed by the State of California Tax Credit Allocation Committee, the funding arm of this housing type. We have flagged "too large" minimums in the past, and TCAC has further reduced requirements, ensuring efficient minimum sizes.

### Encouraged Metrics

*Comparable cost per square foot for other similar buildings in the region: Cost/sq ft + commercial prevailing wage = \$300/sq ft*

*How did design choices minimize materials, allowing for lower cost and more efficiently designed systems/structure?* By utilizing a wood-framed prefab system of roof and wall-truss framing, and design-build floors with performance specifications, we were able to save cost, lower the carbon footprint, and save time in permitting.

*Life Cycle Analysis of the costs associated with measures taken to improve performance:*

Hot water panel solar system cost of \$96,000 has a payback time of less than five years. Common boiler, combined multi-unit mechanical equipment, and master-metering contribute to shorter payback.

Water savings of approximately 30% above average due to low-flow fixtures equates to substantial cost savings for both utility domestic and sewer water rates. Payback time is less than one year due to the low cost of these fixtures.

### What are some of the design goals for The Six?

Angela Brooks, FAIA, principal: We were trying to make a very dense project, but we wanted to design something that felt open, and that was nurturing for the people who live here. Every time we design a building that's six stories and below, it's passive, with natural ventilation and daylight in every unit—that basically means you have to design a courtyard building. So, you have a connection to natural light, you have open space and circulation, but you also give people different ways to be outside and to circulate. You don't force them to do something.

### Tight budgets are a hallmark of affordable housing projects. How did you strategically decide what to prioritize?

By not being so prescriptive with the structure of the building, we were able to be more cost-efficient with it. By having my structural engineer design the performance spec and letting the contractor have his subcontractor design it in the most cost-effective way, we saved money. And it's not something I or my structural engineer would have ever designed.

### One method of savings is a low- or no-maintenance building. How did you prioritize?

With our stucco buildings, when we use colors, they are integral pigments. The concrete is always exposed concrete. It's a win-win, because it saves on the environment, but it also saves money for the client. And a lot of things do that. If you have a building that is designed passively, and you can open your windows, and you don't need to turn on your air conditioning, then that saves money and maintenance. It's thinking about things smartly.

### What are some of the lessons learned?

The biggest thing that surprised me is on the energy side. We were trying to get our EUI really low and we had a hard time. Once I got the actual data, I was surprised at how much more water and energy were being used than I originally anticipated. What I realized is that permanent supportive housing uses more energy. Lights are on more frequently, and maybe people run their air more because they don't want to open their window for whatever reason.

These are people who need help, and helping them is more intensive. These projects are doing a lot more than just providing housing.

## U.S. Land Port of Entry, Columbus, N.M.

### Columbus, N.M.

Richter Architects

**A Land Port of Entry on the U.S.-Mexico border leverages the ecologies of the Chihuahuan Desert to create a transparent, welcoming, and sustainable environment for visitors.**

#### **What were the main design goals of the scheme?**

Elizabeth Chu Richter, FAIA, principal: Ports of entry are complex projects; there are a lot of moving parts. You have to be efficient and economical, and on top of that, you have the added value of sustainability, flexibility, comfort, and that welcoming presentation we want for travelers.

David Richter, FAIA, principal: The environment here is extraordinary; the natural beauty is profound. It has an incredible macro scale, where you can see for dozens of miles—and because it's sparsely populated, there are vast areas where there's virtually no sign of human intervention at all. But immediately at the site, it's quite neighborly. It's a porous border and a cross-cultural place, so we wanted architecture that is very connected to the land, and that is scaled to the pedestrian, despite the wide open spaces. There are lots of pedestrians that cross back and forth, every day.

#### **How were sustainable strategies prioritized in this design process?**

Chu Richter: The Chihuahuan Desert is what binds the two countries together here. So the resources, the beauty of that land, is what we wanted to share and preserve. Because we had to create distance between the border and the processing—it's about 500 feet—we wanted to create this opportunity to showcase the beauty of that environment. To create these park-like grounds that people go through every day and appreciate.

One of the factors about this site is the rain. You have a lack of water—it's a desert—but you also have summer monsoons, which send an overabundance of water and result in flooding. Managing and harvesting water are sustainable elements that we worked into this landscape.

Another is daylight, which we harvest in the port of entry building via roof monitors—an integrated modular system we designed that maximizes light capture. We tried to bring in a sense of transparency and openness.

#### **What is the biggest lesson learned from this project?**

Richter: We were obviously proud that the building was certified LEED Platinum—you don't get that without being diligent and scrupulous, without doing everything that you can to be sustainable. But it's about more than making sure that your paint doesn't off-gas. When we first started doing work in the desert years ago, we were struck that it's about what's under your feet and over your head—the earth and the sky. Sustainable design is a matter of making sure your heart and head are in the right place.

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### ECOLOGY

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#### Mandatory Metrics

*Percentage of site area designed to support vegetation: 54*

*Percentage of site area supporting vegetation before project began: 42*

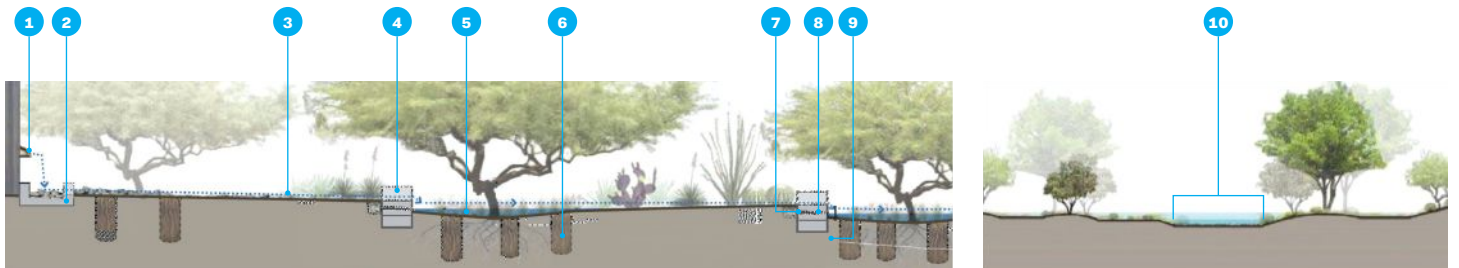
*Percentage of landscaped areas covered by native or climate-appropriate plants supporting native or migratory animals: 100*

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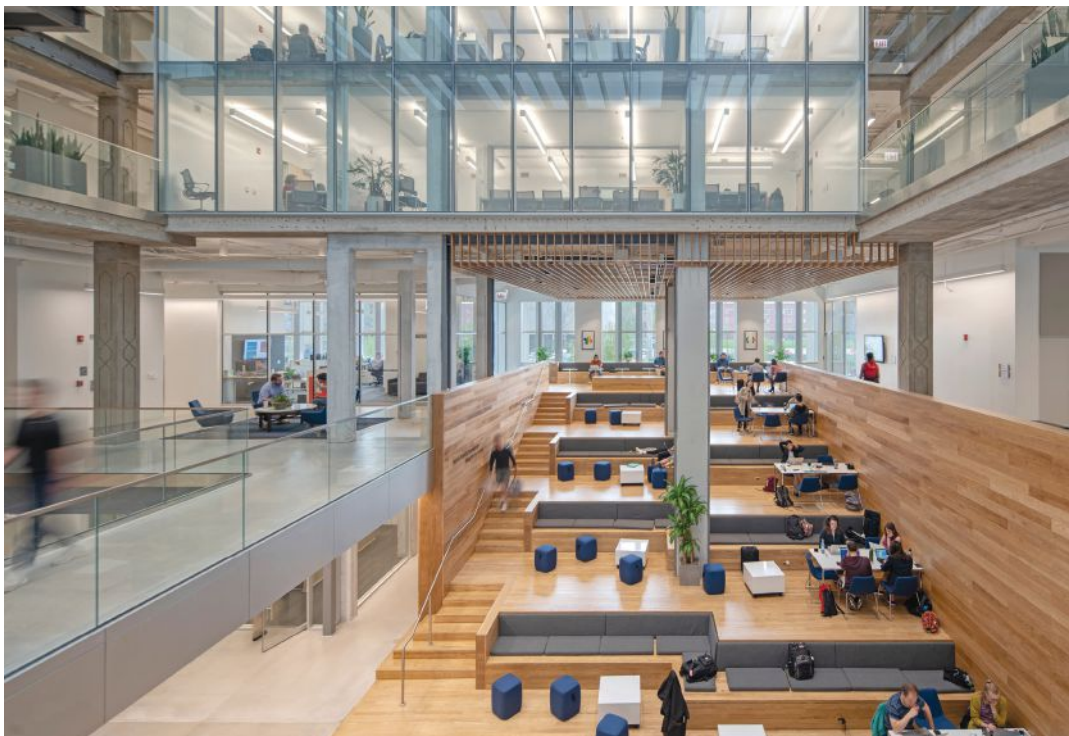


- 1. Downspout nozzle
- 2. Concrete runnel
- 3. Water flow
- 4. Weir
- 5. Shallow basin
- 6. Water-harvesting sponge
- 7. Gravel and filter fabric
- 8. Weep hole
- 9. Terrace wall
- 10. Portion of lined channel

Site Stormwater Management Diagrams



**Keller Center, Harris School of Public Policy**  
Chicago  
Farr Associates and Woodhouse Tinucci Architects



This thoughtful renovation at the University of Chicago transformed a dark, insular behemoth into a light-filled space for collaboration that better connects to the community around it.

**CHANGE**

**Mandatory Metrics**

Percentage of project floor area, if any, that represents adapting existing buildings: 100

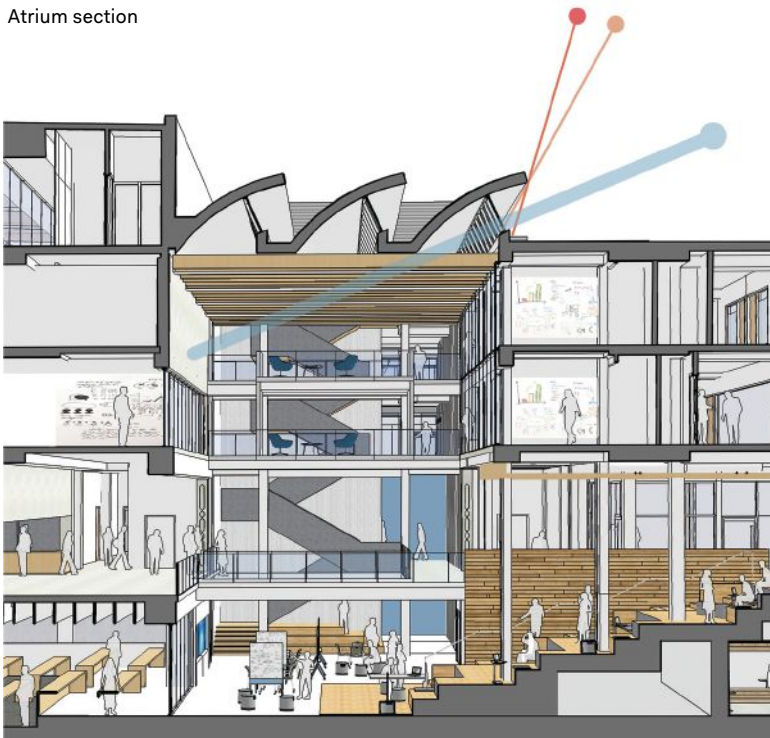
Can the project maintain function without utility power? Partial backup power

What type of backup power does the project primarily have? Fossil-fuel generator

**Encouraged Metrics**

Percentage of power needs supportable by onsite power generation: 9

Atrium section



**What were your goals for reinventing the building?**

Douglas Farr, FAIA, president, Farr Associates: The existing [Edward Durrell Stone–designed] building was a big, dark battleship with low ceilings and limited natural light at the perimeter. It’s the size of a soccer field, so we knew we had to carve into it. We also wanted to create the greenest building on the University of Chicago campus and among public policy schools in the country. We looked at the Living Building Challenge and concluded that we weren’t going to be able to match goals in energy or water. So we pursued the LBC Materials Petal certification.

Kelly Moynihan, AIA, associate principal, Farr Associates: The university wanted to preserve a lot of the existing building’s historic charm—the pieces that it did have. It was about reinvigorating the South campus.

Andy Tinucci, AIA, principal, Woodhouse Tinucci Architects: The idea that a school of public policy should be dealing with transparency both literally and figuratively was a way for them to join a bunch of their programmatic and curricular objectives with architectural ones.

**How did daylight become central to the design?**

Gabriel Wilcox, AIA, associate principal, Farr Associates: It’s easy to throw skylights on a roof and get light down, but to do it thoughtfully so that you’re not just wasting energy or overheating the space is an art form. In an effort to shade the summer sun, we used custom sunshades. But to allow light to come into the building and provide that sense of warmth during Chicago winters is important.

**How does the project forge connections to the surrounding neighborhood?**

Wilcox: This building was a big barrier to the greatly underserved South Side communities, where big institutions like UC have been a stronghold. But our design opened a passage through the building; the opportunity for it to serve as a portal is important to us. We also collaborated with artist Theaster Gates on the wood for the atrium. Talk about getting contractors involved from the local area, but to have ties to a new mill that was only a few blocks from the site to supply wood from a salvaged sustainable source [of trees killed by the emerald ash borer] was important.

## Ford Foundation for Social Justice New York Gensler

**A sensitive reimagining of Kevin Roche's Ford Foundation Building balances preserving its innovative structure and making it more sustainable, healthy, and inclusive for the next generation.**

### **How did Gensler get involved in this project?**

Edward Wood, design director: The building wasn't fully sprinklered; it had to come to code, and we were brought in to do an evaluation. It's a big project to remove the ceilings and bring standpipes and sprinklers throughout so the president, Darren Walker, felt it was time to reevaluate everything.

### **How were sustainable strategies integrated into the design process?**

Wood: The building was very private office-intensive. As a whole, the design shifted to a predominantly open environment where you can see through the building. Almost everybody either has a view or a window, or looks onto the garden or the perimeter. And there was a treasure trove of beautifully detailed furniture and elements that had been in the project, so we used a substantial amount of existing furniture that was restored and refurbished.

In doing the garden design, we built in accessible lifts and sloped a lot of the walkways. We paved them with reused brick to create the ability for anyone, either in a wheelchair or with any kind of disability to migrate or travel through the building. It is part of a Ford vision that everybody should have access to all things.

David Briefel, sustainability director: Ford Foundation's core values are focused on the idea of being transparent and inclusive. That was informing some of these decisions to move toward the egalitarian side of planning, which by its very nature helps us with all of the environmental and sustainable features, from health and access to daylight to more efficient energy planning.

### **Were there any sustainable design innovations in this project?**

Briefel: The innovation of the project is fitting all of the puzzle pieces together. We were trying to figure out if we could get solar panels on the roof. But when we were doing those studies, unfortunately they posed an issue with landmarks, being visible from the ground level. There were certain things that we did explore and the client was in favor of, but there were limitations. But that's the beauty of design, when you put restrictions on it. What come out on the back end are the creative solutions to make all of those limitations or restrictions work.

### **What are some of the biggest lessons learned from this project?**

Briefel: These are clients who are values driven. And the way those values get translated into a project adds to the authenticity of a project that you can't replicate. I think that's the goal: to find the values of whatever client we're working with and try and be able to translate them into the projects. That's what brings out the real richness.




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## COMMUNITY

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### Mandatory Metrics

*Walk Score:* 100

*Transit Score:* 100

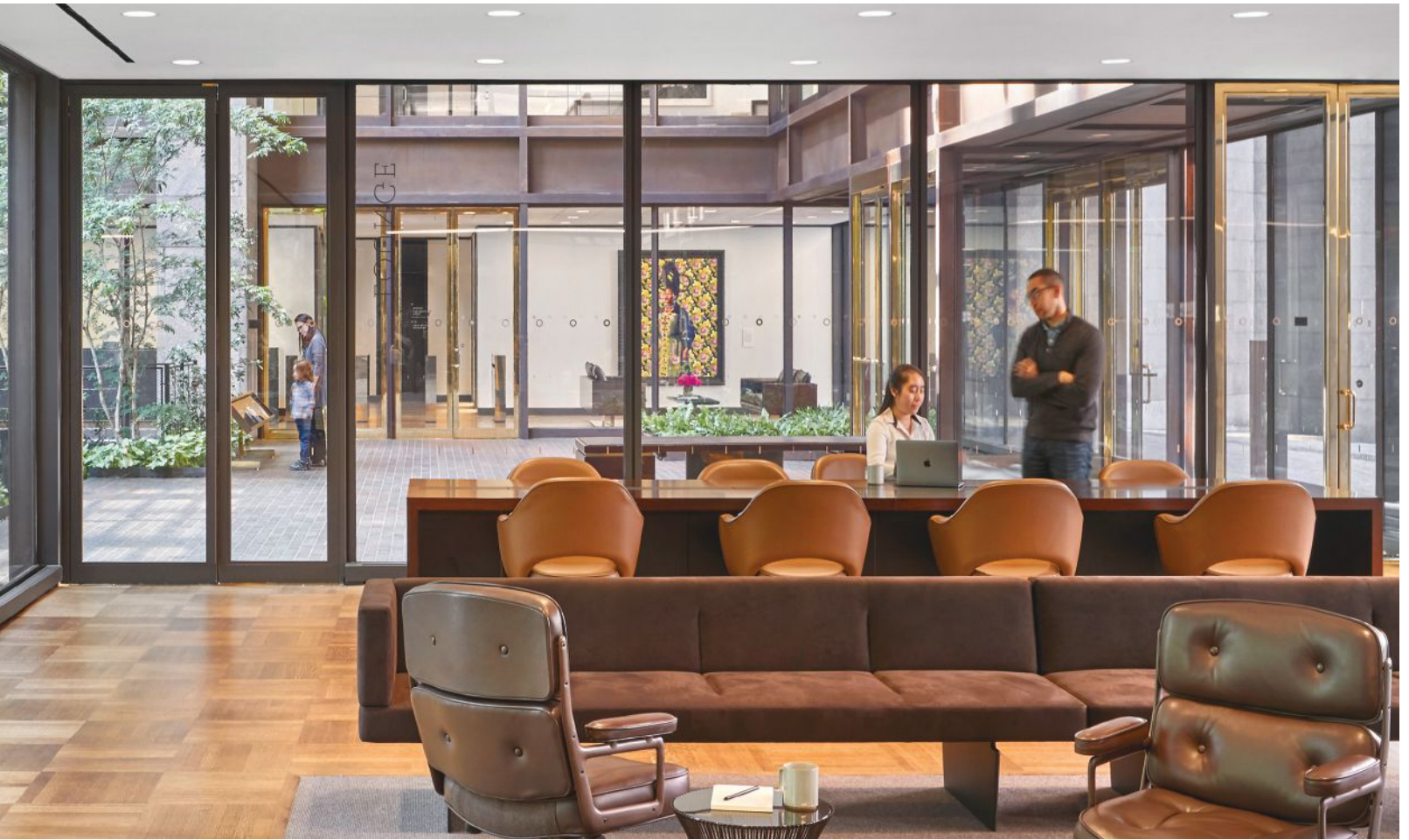
*Bike Score:* 73

*Community engagement:*

Collaborate: A partnership was formed with stakeholders to share in the decision-making process, including development of alternatives and identification of the preferred solution.

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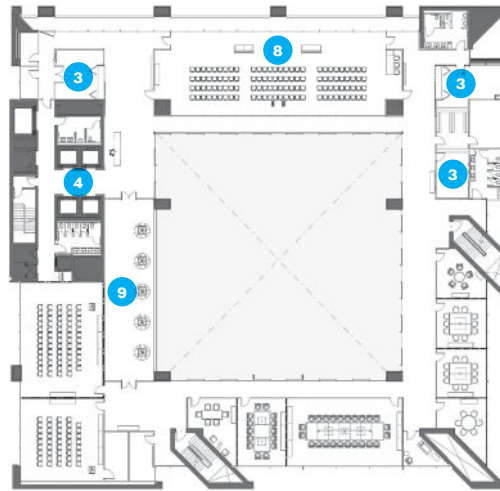




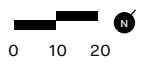
Fifth- to Ninth-Floor Plan



Tenth-Floor Plan

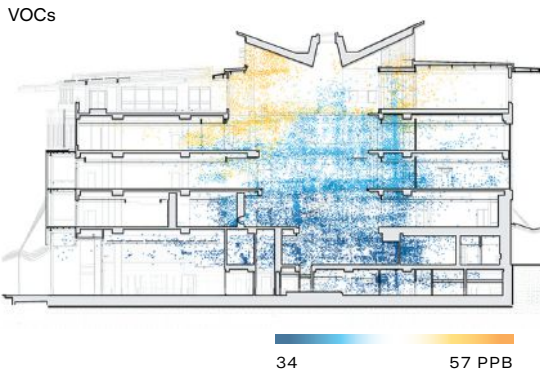
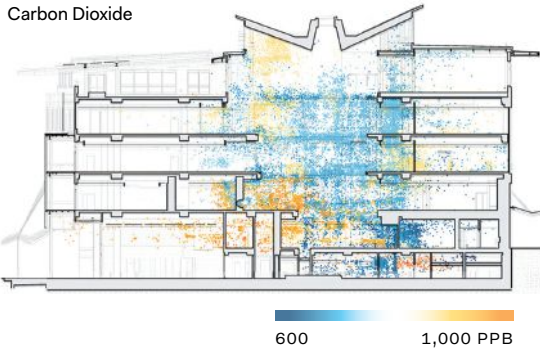


- 1. Closed collaborative space
- 2. Workplace
- 3. Support
- 4. Elevator lobby
- 5. Pantry
- 6. Work/café
- 7. Focus room
- 8. Convening room
- 9. Overlook



**Austin Central Library**  
Austin, Texas  
Lake|Flato Architects  
and Shepley Bulfinch





**Style and substance meet in this LEED Platinum community resource that offers egalitarian access to live, learn, and play in a healthy and daylit environment.**

**How did you get involved with the project and as a team?**

Sidney R. Bowen III, AIA, managing principal, Shepley Bulfinch: The secret sauce was that we were a team of a Texas designer and a library expert who had worked on similar programs. I think the city council saw the wisdom of connecting the Texas vernacular that Lake|Flato represents with the city. It was a thoroughly Texas thing.

**What were the driving design goals for this project?**

David Lake, FAIA, partner, Lake|Flato: The overarching desire was to represent the future of libraries and their ability to build a body of knowledge and to create a community destination through the sharing of it. We also wanted to make the cityscape more active. We have three entrances and a restaurant, bookstore, gallery, and events space animating the street level. You're always being encouraged to move up through this vertical living room, outdoors to porches, and up to a rooftop butterfly garden. As you move through the building, there are destinations throughout.

Jonathan Smith, AIA, associate partner, Lake|Flato: The library is on the shore of Lady Bird Lake in the Seaholm EcoDistrict. Most folks who can take advantage of that site are in a luxury 70-story condo tower, not normal members of the public. So trying to make great public space that takes advantage of the breeze off the lake and views toward downtown was key.

**You wanted to meet 2030 targets for energy reduction, but the library exceeded those and your own predicted EUI. How did you achieve that?**

Heather Holdridge, ASSOC. AIA, director of design performance, Lake|Flato: We started with an integrated design workshop with the design and construction team and owners, users, and community members. It was about setting the vision, and out of it came the aspirations to be the best daylit library in North America and to serve as a model for water conservation. Those goals—and being rigorous about tracking them—resulted in a LEED Platinum rating, rather than the other way around.

**What is the biggest lesson learned from this project?**

Steve Raike, AIA, partner, Lake|Flato: To see it embraced by the city is a testament to collaboration and the buy-in that we had at every level, particularly on the city's part. That's been incredibly rewarding.

Jim Chambers, AIA, vice president, Shepley Bulfinch: The importance of not losing sight of our goals and expectations was incredibly valuable to learn. In a 10-year project, you can lose steam, but the team didn't let anything go. We see the value in how much the public loves the building.

**ENERGY**

**Mandatory Metrics**

*Predicted consumed EUI (Site EUI): 51 kBtu/sf/yr*

*Identify which simulation tool was used: Trane Trace*

*Predicted net EUI: 46.8 kBtu/sf/yr*

*Predicted net carbon emissions: 13.8 lbs/sf/yr*

*Predicted percent reduction from national average EUI for building type: 55*

*Baseline generator: AIA 2030 Commitment DDX*

*Predicted lighting power density: 0.62 W/sf*

**Encouraged Metrics**

*Actual consumed EUI: 49.8 kBtu/sf/yr*

*Actual net EUI: 45.1 kBtu/sf/yr*

*Actual net carbon emissions: 10.5 lbs/sf/yr*

*Actual predicted percent reduction from national average EUI for building type: 56.6*

## John W. Olver Design Building Amherst, Mass.

Leers Weinzapfel Associates

**Using new and new-to-them sustainable materials and holistic design strategies, the project team created a building that integrates seamlessly into the campus and connects the users within it.**

### **How were sustainable strategies integrated into your design process?**

Andrea Leers, FAIA, principal: Prior to our becoming involved, the schools of architecture, landscape architecture and regional planning, and building construction technology gathered to create a mission statement, the central focus of which was a commitment to sustainable design. They brought that to us as their value, and it was a good match with ours.

Josiah Stevenson, FAIA, principal: In our office we have a strong green group—because we're in Boston, we call it the Green Monsters—so there's great interest. That said, this was very much client driven. The building construction technology school does a lot of testing on wood structures, and they specifically asked if it could be a wood building. We had never done one before, but we embraced it.

### **This project focuses on bringing together schools, teams, and systems. How did that drive the design?**

Leers: Our beginning principle was about the integration of this facility into the campus. The site connects the higher topography of housing and the lower topography of academic buildings, so the landscape was thought to pass through our building and to create a passage for the whole campus.

Tom Chung, FAIA, principal: There's a real integration of form and program, which worked relative to the site and the solar orientation. The courtyard allowed us to bring daylight and views into the middle of the building, which is an amalgam of different types of program spaces. We were thinking carefully about this when we were designing the envelope; we concentrated large studio spaces facing north with large openings, and offices on the south side with smaller openings, which worked well to reduce heat gain.

### **Are there sustainable systems that you used for the first time here?**

Jeffrey Fishbein, AIA, senior associate: We incorporated not just wood and mass timber, but an innovative composite CLT slab system that hadn't been used much in the United States. We also started design at a time when we were moving away from a formalist approach to architecture and toward performance-driven design—even when we were looking at different partis at the beginning, we did energy analysis to evaluate passive options for each.

Ashley Rao, AIA, associate: Following that approach through the entire course of the design, through the metering and verification process when you're comparing your early assumptions to how things actually performed in the buildings was a learning curve as well. We have a vibrant, sustainable practice, and this was a new step.

## INTEGRATION

Bringing together the previously dispersed departments of architecture, building construction technology, and landscape architecture and regional planning, the building fosters collaboration. Its LEED Gold certification exemplifies the University of Massachusetts at Amherst's commitment to sustainable design.

An integrated approach to sustainability maximizes the impact of passive design while incorporating strategic engineering solutions to minimize energy use. As the largest cross-laminated timber academic building in the country, it demonstrates the sustainability, economy, and beauty of mass timber.

The surrounding landscape and roof garden restore a visibly functioning ecosystem, creating an outdoor classroom for detailing, site engineering, plant ecology, soil science, and stormwater management.

For students, the building is a teaching tool, demonstrating the power of design that expressively integrates structure, landscape, and architecture.



### Systems

1. Radiant heating
2. Perimeter heat for thermal control
3. Photovoltaic panel-ready
4. Low-flow fixtures
5. Energy-efficient systems:
  - High-performance HVAC with energy recovery
  - Controls and submetering
  - On-demand controlled ventilation
  - Chilled beams
  - LED site lighting

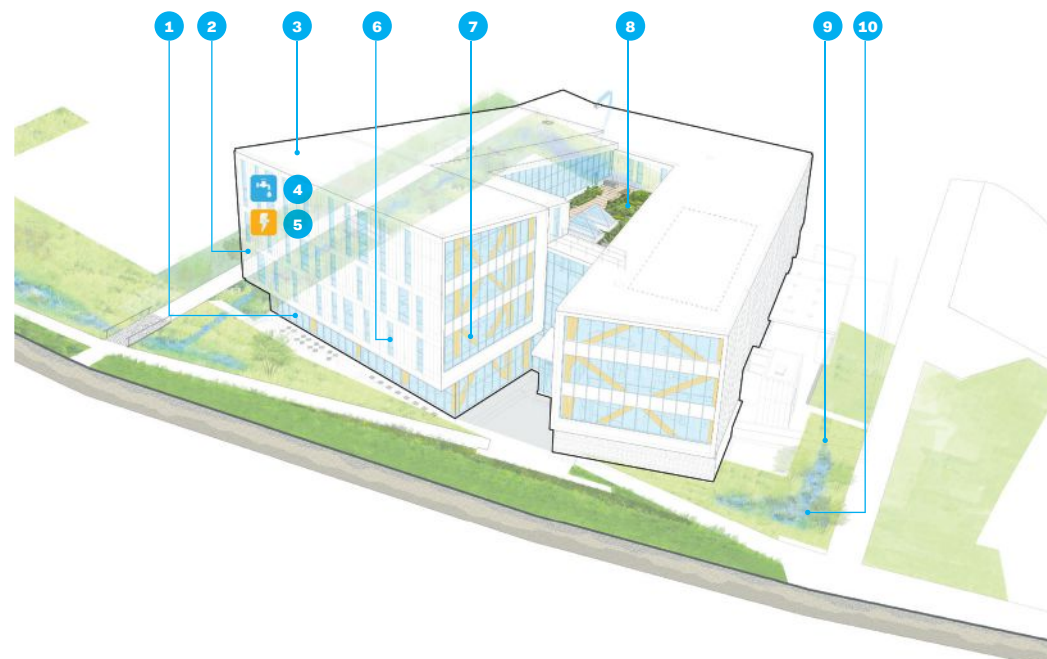
### Building Envelope & Structure

6. High-performance curtain wall with electrochromatic glazing
7. Sustainably sourced timber structure

### Site & Landscape

8. Intensive/extensive green roof
9. Native plant species
10. Bioswales

Sustainable Systems Diagram



# Etsy Headquarters

## Brooklyn, N.Y.

Gensler

**A former printing factory in Brooklyn transformed into the maker marketplace's New York headquarters prioritizes reuse and employee well-being in every square foot.**

### What were some of the driving design goals of the project?

John Mulling, design director: Through our lengthy series of vision sessions with the different groups at Etsy, we came up with four design principles: First, the experience of the space had to celebrate the craft of making; second, we had to embody this idea of controlled chaos; third, it had to tell a meaningful material story; fourth, it had to bring the outdoors in.

### How were sustainable strategies prioritized in the design process?

David Briefel, sustainability director: Early on, we were looking at materiality. And one of the things that Etsy was prioritizing is that if we had an existing part of the building that we could show or leave unfinished, we would just leave it in its existing or unfinished condition and celebrate that. It was a good design restriction, and it drove a strong project.

### Did you use any new sustainable approaches or systems in this project?

Mulling: Yes. This project is a certified Living Building Challenge Materials Petal building, which took a Herculean effort, vetting more than 1,500 materials for Red List chemicals. It's one of the most amazing undertakings for the project. Also, engaging local artists and makers—the project included over 750 maker pieces, including lighting and furniture throughout.

### I want to revisit the idea of vetting all of the products for Red List chemicals. Did you develop strategies or best practices?

Briefel: When we started, there was not a lot of precedent for doing an LBC project period, let alone at this scale. So we had to invent a lot of processes. We leveraged some internal knowledge, but a lot of what we built became foundational not just for how Gensler does LBC projects, but also for the industry; we've shared quite a bit of it. It involves an amazing amount of integration across the project team, the client, and the contractor. We developed a lot of advocacy forms to get feedback and a robust tracking spreadsheet that we used to record and document all of the information.

### Health and wellness were critical to this project. How did they become such a focus and how is that expressed in the design?

Mulling: It's not a surprise that happy employees are productive employees. But because it's Etsy, providing a sense of delight and discovery in your daily experience contributes to your well-being. This was a paramount goal that's expressed in a lot of ways: being exposed to greenery, daylight, and fresh air; connection to the outdoors; being surrounded by art installations and sculpture. Just incorporating all of that into your daily experience contributes enormously to a person's well-being.

## WELLNESS

### Mandatory Metrics

*Is this project a workplace? Yes*

*How many occupants per thermal zone or thermostat? 700*

*Were material ingredient disclosure documents collected? Yes. The project pursued the LBC Materials Petal. Through the Red List vetting process, the project team collected documentation that included Declare, HPD, C2C, and other third-party methods of material disclosure. More than 1,500 materials were documented in total.*

### Encouraged Metrics

*Peak measured CO<sub>2</sub> levels during full occupancy: 727 ppm*









*Peak measured VOC levels during full occupancy: 462 micrograms*

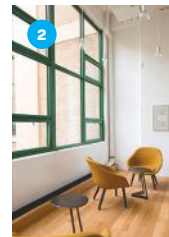
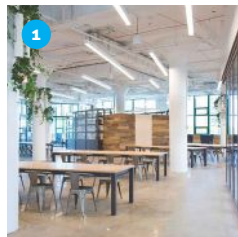
*Were chemicals of concern tracked? Yes*

*Identify each of these chemicals or classes of chemicals that were tracked and the standard that was used as a guide: Maximum thresholds for the following: Formaldehyde (50 ppb), PCH (3 µg/m<sup>3</sup>), Ozone (51 ppb) according to ISO 17025.*

Floor Plan Diagram



-  Diversity of spaces
-  Art and craft
-  Interior greenery
-  Natural materials
-  Lighting
-  Celebration of views
-  Zero waste
-  Maker furniture









**COTE**  
Top Ten  
PLUS

**Environmental Nature  
Center and Preschool**  
Newport Beach, Calif.  
LPA



Completed nearly a decade apart by the same team, two buildings on a shared site provide a master class in the evolution of contemporary sustainable design.

**What were some of the design goals for this campus, including the Environmental Nature Center, completed in 2008, and the associated preschool, completed in 2016?**

Rick D'Amato, FAIA, principal: The design for the ENC was about nature being on display. The design for the preschool became about how to start to become part of nature, rather than just looking at it. So, we took two different approaches, but that hands-on approach is what drove the preschool.

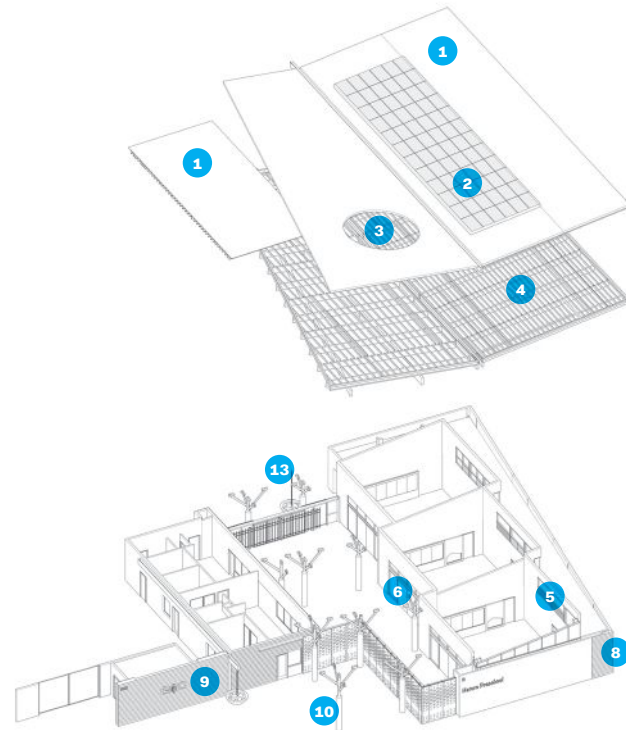
**A lot changed in the eight years between completing the two projects. Had your design process changed as well?**

The original goal of the preschool was to take what we learned in the Nature Center and not only amplify those strategies, but showcase what we had learned in the intervening time. The preschool started out a lot more aggressive in its approach to materials and systems, but the overriding factor in both projects was budget.

For the ENC, we started with more aggressive targets as well, but we kept having to pare down and hold back. We might get a little extra money from a donor and then we'd be able to put something back in. When we started the preschool, we understood that and designed for the project to be able to morph, change, adapt, and grow as we got more money, or as things changed on site.

**What is the most innovative sustainable aspect of these projects?**

The goal for the ENC, and the target for the preschool, was to be completely naturally ventilated. Today, that's been done a lot. But in 2008, it was so unheard of that we couldn't get LEED certification for the building because so much of the certification process was based on MEP. We had to talk to them and change their certification requirements; it became the first time a building had been certified without a mechanical system, and at LEED Platinum. With the preschool, the most innovative thing is that learning doesn't happen in four walls. Rain or shine, those kids are outside every day, and the classroom is really an adjunct to the outside space, whereas, in a typical school, it's reversed.



**Are there lessons from the net-positive ENC that drove the energy strategy for the preschool?**

Well, you can't learn much more effective strategies than having your building be completely nonreliant on mechanical systems. But when we started doing the preschool, the thing that influenced us was the evolution of products and materials. I remember the photovoltaic array on the ENC just being so big and cumbersome—although, at the time, it was the ultimate. Whereas on the preschool, almost a decade later, it was much smaller and cheaper. Everything we did on the preschool from an energy standpoint seemed easier.

In the preschool, we had to have some sort of heating and cooling. We chose a radiant system, which is the most energy-efficient and cost-effective way of heating a room. But it's still a very simple setup because we knew it would likely never get used. The classrooms all have giant sliding glass doors, and there are still ways to move air around the space. There is every opportunity for them to never turn on any HVAC. That was the biggest lesson learned—how much you don't actually need those systems.

## DISCOVERY

### Mandatory Metrics

*Has a post-occupancy evaluation, including surveys of occupant comfort, been performed?*

Yes. A preliminary post-occupancy survey of occupants was conducted with a 67% response rate. Highlights of survey findings were shared with the owner and designers, including that 100% of respondents were satisfied or very satisfied with the natural ventilation and indoor air quality afforded by operable windows and sliding glass window-walls, which provide seamless connection between

indoor and outdoor learning environments. Overall, 94% were satisfied or very satisfied with personal workspaces and the ability to control internal temperatures. Lower satisfaction ratings were reported for acoustics in terms of noise levels (71%) and sound privacy (64%), for which adaptive strategies will be explored as the preschool continues its first year of operation.

*Which of the following post-occupancy steps were taken? Contacted the owner/occupant*

to see how things are going; obtained utility bill to determine actual performance; surveyed building occupants on satisfaction; shared collected data with those occupants; conducted a post-occupancy energy analysis; developed and shared strategies to improve the building's performance; taught occupants and operators how to improve building performance.

*Were lessons learned through post-occupancy used to improve subsequent projects?*

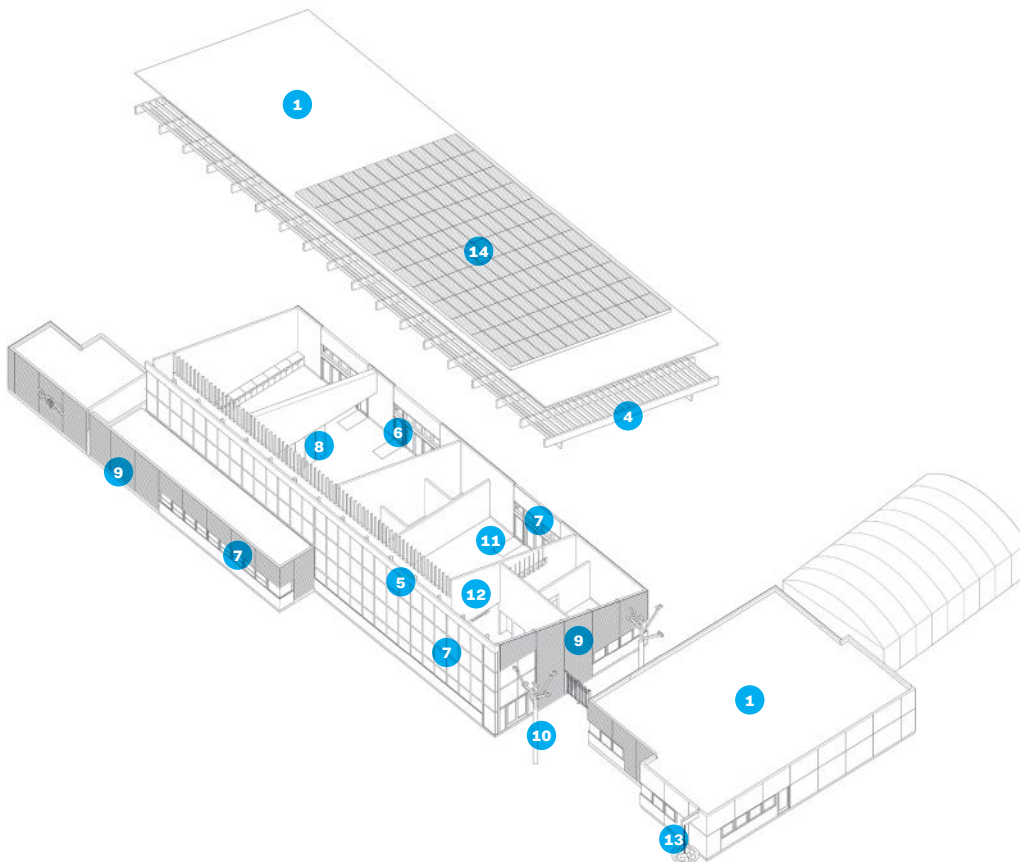
Yes. The original ENC became an informative tool for the design of similar types of future projects as well as the design of the more recent prechool project.

Because the ENC is a naturally ventilated building with no heating or cooling systems, the interior was directly affected by the changing exterior environment. With a close proximity to the Newport Beach Back Bay, moisture content in the air became a major contributor to the performance of the interior finishes.

While some behaved properly, others were compromised by the nightly influx of moist air through the building's venting systems. These products were removed from our internal design materials green list, and others that were vetted and researched within similar conditions were substituted.

Interior joints, connections, and transitions were also affected by the moisture content of the air and redesigned for the subsequent preschool project.

Environmental Nature Center Axonometric



1. White single-ply roof membrane
2. 32 kW PV array
3. Oculus for daylight
4. Exposed glulam beam structure
5. Insulated clerestory windows
6. Large sliding glass doors
7. Operable windows
8. Operable partition wall
9. Composite wood wall panels
10. High fly-ash concrete caissons
11. Recessed 6" walk-off mat
12. 85% denim blue jean insulation
13. Rain chain for rainwater collection
14. 42 kW PV array



**Library of Play**

*Student:* Nicole Andersson  
*School:* Montana State University  
*Faculty Sponsors:* Steven Juroszek, AIA, and Jaya Mukhopadhyay



**Elevated Integration**

*Students:* George Sorbara and Hunter Harwell  
*School:* Clemson University  
*Faculty Sponsors:* Ulrike Heine, David Franco, and George Schafer



**2020 AIA/ACSA  
 COTE TOP TEN  
 FOR STUDENTS**

These winning schemes showcase an integrated approach to design, systems, and technology for projects targeting operational carbon neutrality.

**Matriochkas**

*Students:* Marie-Hélène Cliché, Michael Comtois, and Étienne Vigneau  
*School:* Université Laval  
*Faculty Sponsors:* Claude Demers and André Potvin



**Reclaim Resiliency: Dismantle. Dredge. Dwell.**

*Students:* Ryan Bing and Joe Scherer  
*School:* Clemson University  
*Faculty Sponsors:* Ulrike Heine, David Franco, and George Schafer



**Bio Tower: A Green Medical Research Hub**

*Students:* Sophia Bullock, Drake Cecil, and Alex King  
*School:* University of North Carolina at Charlotte  
*Faculty Sponsors:* Kyoung-Hee Kim, AIA, and Liz McCormick, AIA



**Copain, Copain?**

*Students:* Audrey Rochon, Anton Zakharov, and Melaine Niget  
*School:* Université Laval  
*Faculty Sponsors:* Claude Demers and André Potvin

**Romberg Center for Ecology and Resilience—  
 High-Performance Historical Renovation**

*Students:* Pitchayut Kingkaew, Qihui Bao, and Shuang Yan  
*School:* University of California, Berkeley  
*Faculty Sponsors:* William Leddy, FAIA, Marsha Maytum, FAIA, and Hsin-Hsein Chiu



**Bazaar 324**

*Students:* Anannya Das and Connor Mouglin  
*School:* Iowa State University  
*Faculty Sponsor:* Ulrike Passe, INTL. ASSOC. AIA

**[Up]-Lift Technology Tower**

*Students:* Bekim Sejdiu, ASSOC. AIA, and Devin Waddell  
*School:* University of North Carolina at Charlotte  
*Faculty Sponsors:* Kyoung-Hee Kim, AIA, and Liz McCormick, AIA

**Waterline**

*Students:* Cera Yeo and Jingyi Luo  
*School:* California College of the Arts  
*Faculty Sponsors:* Evan Jones and Margaret Ikeda

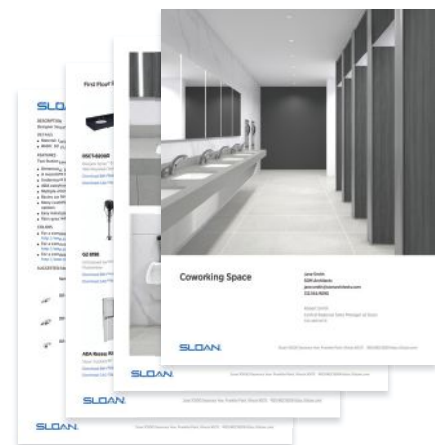


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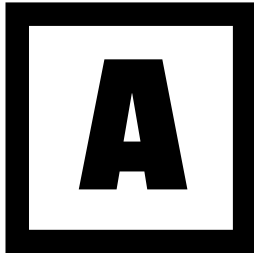
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# ARCHITECT

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# Editorial: All the Greek Letters

TEXT BY KATIE GERFEN

Picture a frustrated boy standing over a broken toy. He's old enough to know that curse words exist and that they could be relevant to his situation, but neither old enough to know the words nor rebellious enough to use them. Instead, he stares down at his empty hands and names the awful feeling: "All the bad words."

That little boy was my brother and the identity of the toy is lost to history, but that phrase has perpetuated with my family. It has become a coping mechanism for situations that are so frustrating, devastating, or overwhelming that they defy standard description.

I have invoked "all the bad words" countless times in 2020, a year that has tested society and its people on so many heartbreaking fronts. One of those times was in mid-September, when the National Hurricane Center announced that it had run through its predetermined list of names for 2020 storms. For only the second time in recorded history (the first was in 2005), it will have to use the Greek alphabet to identify the remaining storms of the year. Hurricane season lasts through November.

Upon learning this, my brain filled not with all the bad words, but with all the Greek letters. The fact that this year has seen more storms than in almost every year past indicates that the consequences of climate change are getting measurably worse, and quickly.

Another devastating fact about 2020? Already, nine named storms have made landfall in the U.S. during the Atlantic hurricane season, tying a record held since 1916. These storms have killed nearly 150 people, caused billions of dollars in damage, and destroyed thousands of buildings. That damage affects vast tracts of land, but disproportionately affects communities of color. Aid to rebuild favors white communities—as shown recently in studies by NPR, Bloomberg, and others after Hurricane Harvey devastated swaths of Texas in 2017.

As I write this, the remnants of Tropical Storm Beta are dissipating after it spiraled into the Gulf Coast and caused widespread flooding in Texas and Louisiana. Before Beta, there were Sally, Laura, Isaias, and others. Climate change's cruel blend of feast and

famine means devastating storms and flooding in some regions, devastating fires and drought in others, and very few temperate spaces in between. Our planet is out of balance.

But still glimmers of hope remain.

Take a project like the Marine Education Center at the Gulf Coast Research Laboratory in Ocean Springs, Miss. (page 86), designed by Lake|Flato Architects and Unabridged Architecture. One of this year's AIA COTE Top Ten award winners, it replaces a building lost to Hurricane Katrina. Exemplifying a resilient approach to site ecology, design, and materials, it has proven unflappable in the face of winds and storm surge alike.

Architects have the power to make communities resilient, equitable, and sustainable. They also have the power to help slow the advancement of climate change before it's too late to reverse the damage.

More than 800 firms have signed AIA's 2030 Commitment. That's a great start, but more firms are needed to turn the tide of carbon consumption and greenhouse gas emissions from the built environment; more need to join the call to design more sustainable, healthy, and equitable buildings and communities. We don't want to find out what naming convention comes after the Greek alphabet is exhausted. Our industry can do it if we work together. The only question is, can we do it in time?



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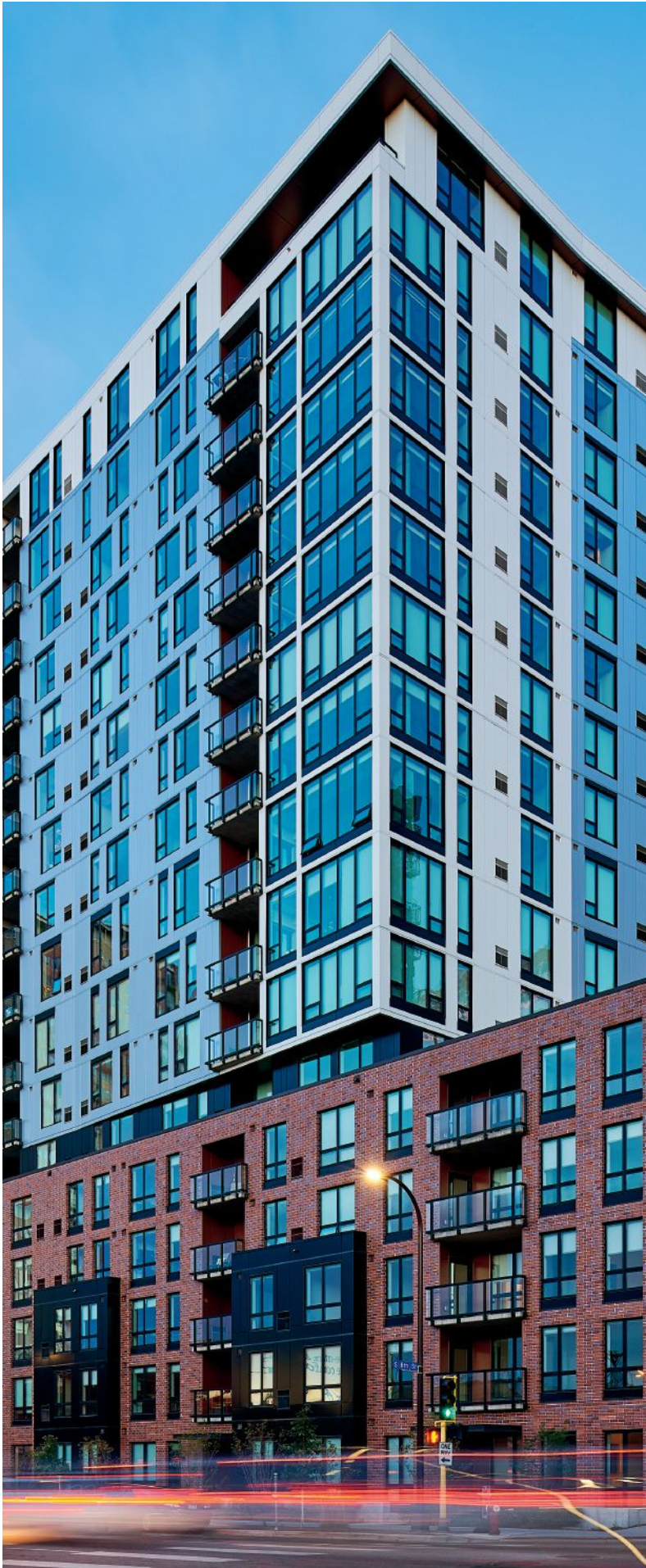
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