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GREEN CONSTRUCTION SPECIAL EDITION 2023
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**GREEN INITIATIVES:**
LEED CERTIFIED BUILDINGS WITH ECO-FRIENDLY PRACTICES

**NEW CONSTRUCTION OR RENOVATION:**
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BIOPHILIC DESIGN AND SUSTAINABLE FLOORING

**THE THRILL OF THE CHASE (HALL)**
AT BATES COLLEGE

# GREEN CONSTRUCTION AND SUSTAINABILITY

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# EDITOR'S LETTER

Happy March!

Construction and sustainability are two essential components of modern society that go hand in hand. As the world faces growing environmental concerns and increasing pressure to reduce our carbon footprint, the need for sustainable practices in construction has become more important than ever. This need is especially true in higher education, where universities and colleges are taking a lead role in promoting and implementing sustainable practices in their construction projects.

Many institutions have adopted green building standards such as LEED (Leadership in Energy and Environmental Design) to guide their construction design decisions. These standards require the use of sustainable materials, energy-efficient design, and other environmentally-friendly practices to ensure that buildings are constructed with the least possible impact on the environment.

Sustainable construction provides many benefits for institutions of higher education. For one, it helps to promote the institution's commitment to sustainability, thereby attracting environmentally-conscious students, faculty, and staff. It also helps to reduce the institution's carbon footprint, which can lead to cost savings on energy bills and other operational expenses. Additionally, sustainable buildings often have improved indoor air quality, which can lead to better health outcomes for occupants.

Implementing sustainable construction practices in higher education, however, can offer a series of challenges, as well. One of the biggest of these challenges is the initial cost of sustainable construction, which can be higher than traditional construction methods. Additionally, there may be resistance from stakeholders who are hesitant to embrace new building practices or are not yet convinced of the benefits of sustainable construction.

Despite these challenges, higher education institutions are taking a lead role in promoting sustainable construction practices. By investing in sustainable construction, universities and colleges are not only creating healthier, more environmentally-friendly buildings, but they are also setting an example for the broader community. As we continue to face environmental challenges, sustainable construction in higher education will play an increasingly important role in promoting a more sustainable future for all.

We heard your request for more information on this subject, and this special edition is the result of that interest. We look forward to providing you information that you find helpful for this focus.

Thank you for sharing your time with us—

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# New Construction or Renovation:

## WHICH IS GREENER?

BY DAVID VINSON, PHD


As the climate crisis accelerates, students are expressing their desires for a campus experience that embraces a culture of sustainability. Research shows that a college or university's sustainability strategy can make a major difference in recruitment. *The Princeton Review*, for example, found that 74% of its 2022 survey respondents said that a college's commitment to the environment would contribute to their decision about whether to apply to or attend the school. Higher education institutions are responding in kind.

For instance, initiatives that support campus communities via environmental justice and equity, sustainability-based hiring, and research are becoming more commonplace. Moreover, we are now seeing a boost in mental health and well-being programs that focus on eco-anxiety and climate grief.

Developing a culture of campus-based sustainability also translates to adopting sustainable practices in campus construction and renovation. Perhaps to the surprise of many, the benefits of reusing and renovating buildings can outweigh the benefits of building new energy-efficient structures. A study by the National Trust for Historic Renovation reveals the potential for large carbon impact reduction by comparing relative environmental impacts of building reuse and renovation versus new construction over an assumed 75-year lifetime. According to the study, a new building that is 30% more efficient than one already in use takes ten to eighty years to overcome the negative climate change impacts resulting from new construction. Reusing buildings and renovating them for higher efficiency, especially with renovations requiring few material inputs, have the potential to realize the greatest short-term carbon savings.

### Renovation with Green Rooftops

Private colleges and universities are embracing sustainable design trends that are aesthetically pleasing, functional, and—of course—eco-friendly. One such trend is the installation of green rooftops. A green rooftop has ecological, societal, and social benefits. Not only can it provide a rainwater buffer, but

it purifies the air, reduces ambient temperature, regulates indoor temperature, saves energy, and encourages biodiversity. As a green roof absorbs rainwater, for instance, it delays the discharge of that water to the sewage system; the same water undergoes a purifying process, and then it evaporates through the plants. This cycle helps to stabilize the groundwater level, reduce the peak load on the sewage system, and reduce any risk of flooding. Because a green roof can accommodate greenery like plants and trees, it benefits wildlife and also looks far better than concrete or asphalt. Moreover, the plants in a green roof filter particulate matter from the air and convert CO2 into oxygen, helping to purify the air.

A remarkable domino effect occurs with the installation of a green roof. Plants absorb 50% sunlight while reflecting 30%. Both processes help to create a cooler climate indoors; in turn, air conditioning doesn't have to work so hard, equating to energy savings. Further, increased energy savings positively impact not only the immediate proximity of the building but the broader community, as well, reducing surrounding areas by as much as 3°C in temperature. A green roof also protects the roofing material from external influences like sun, rain, wind, and temperature fluctuations, thereby doubling or even tripling the lifespan of the roof. Sustainable roofs decrease the amount of sound that may travel through a building. Also, what is known as "cool roofs" are becoming popular in higher climates. These use materials that reflect natural light instead of absorbing heat energy like asphalt. Installation involves shingling or painting reflective materials on the building to decrease energy consumption and carbon emissions.

### Renovation with Natural Sunlight and Ventilation

Extra windows allow more natural light to enter buildings on campus. Renovation that prioritizes more efficient use of natural light can cut back on energy consumption and can be managed in a number of ways: lining hallways with windows;

*continued...*

orienting windows in consideration of the sun's positioning; and choosing options with good insulation to manage heat effectively. Another positive effect of embracing natural light for sustainable purposes is the impact it has on students. Studies have shown a link between improved lighting design and a 27% reduction in the incidence of headaches. Also, students with the most daylighting in their classrooms progressed 20% faster on math exams and 26% faster on language-based exams in one year than those with less daylighting.

The pandemic brought to our foremost attention the unseen value in clean air. Poor ventilation systems can spread sickness faster while limiting access to adequate organic air flow. Natural ventilation, as a result, is being utilized across the country to provide students and faculty with cleaner and more efficient airflow on campus. Windows are being installed and opened to create natural ventilation for buildings.

### Other Strategies for Greener Renovation

Solar panels and geothermal energy are another means of powering buildings and outdoor activities while reducing energy. Although they cannot necessarily power an entire campus grid, they can supply enough energy to significantly reduce fossil fuel reliance. Geothermal systems can offer even more efficiency for campuses and could be instrumental in replacing conventional heating and cooling systems. The U.S. EPA reports that new geothermal energy systems have the capacity to reduce greenhouse gas (GHG) emissions 40% and lower energy bills up to 70% due to their efficiency. Low-E, or low emissivity windows, are a great way to reduce heating from the sun. Low-E windows have a coating that allows them to reduce both ultraviolet and infrared light that penetrate the glass, in turn reducing heating from the sun. Steel doors are another simple renovation project, and the

benefits are two-fold: they provide better insulation and are energy-efficient.

It is worth noting, too, that energy audits can help to identify sustainable renovation projects.

The installation of CO2 sensors, fresh air dampers, and new thermostats help to regulate the amount of outside air brought into the building based on CO2 levels. Other simple renovation fixes include the installation of new flooring and energy-efficient LED lighting.

**Greener Campuses and Creating a Forward-Seeing Culture**

The primary objectives of green renovation are to be more environmentally friendly and to forge a forward-seeing culture of sustainability. The ongoing investment in sustainability on college campuses is not only inspiring but serves as a model for how to develop a culture of intellectual and ethical engagement that positively impacts the planet. Moreover, because students care as they do for the health of the planet, greener campuses continue to be powerful recruitment tools. There is little to suggest that such a trend will change in the future As we embark on future green renovations, we must pursue projects that address university initiatives and follow suit in contributing to cultivating a more sustainable future.

ABOUT THE AUTHOR: Dr. David Vinson has a PhD in English with specializations in transatlantic literature and cultural studies. He is a committed scholar, teacher, and dad. If you ever meet David, avoid the subject of soccer. His fandom borders on the truly obnoxious.

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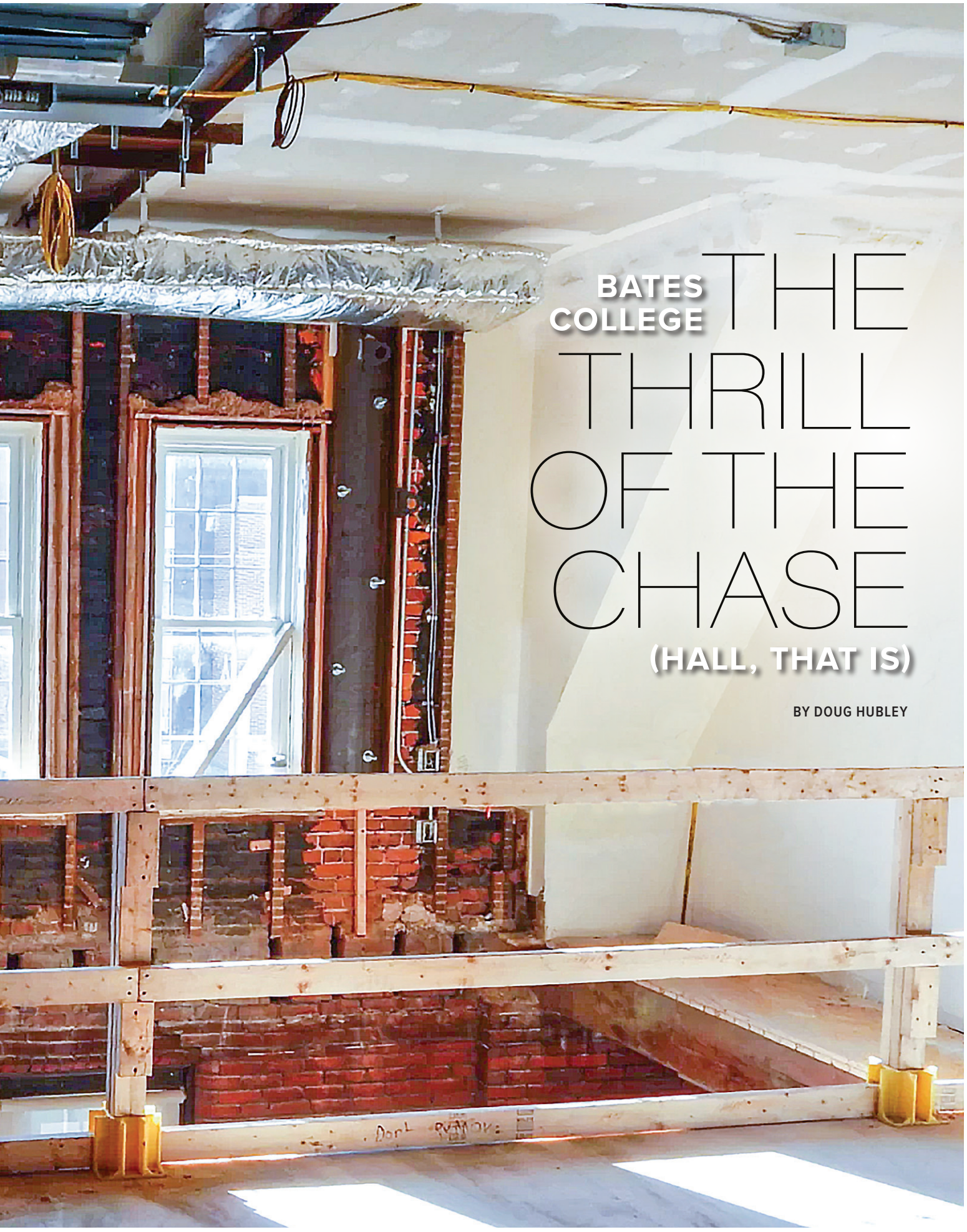

BATES COLLEGE

# THE THRILL OF THE CHASE

## (HALL, THAT IS)

BY DOUG HUBLEY

PHOTO COURTESY BATES COLLEGE

Bates College's Chase Hall is beloved, iconic, historic, but user-friendly? Well, probably not, thanks to unwelcoming entrances and a confounding interior layout that involved nine floor levels and multiple additions, all stitched together by a labyrinth of corridors and stairways. A plan is now in motion, however, to address these challenges. In May 2022, Bates closed Chase and began a substantial renovation involving as much as half of the building's floor space, as well as a systems upgrade and plenty of cosmetic work. This will be the sixth addition or substantial renovation in the building's 102-year history, according to the project announcement.

**Surprises During Construction**

About five months into the yearlong renovation of Chase Hall, Project Manager Kristi Mynhier said that the undertaking had turned an important corner. The first phase of construction, she pointed out, was dominated by demolition and by the abatement of hazardous materials. Those processes uncovered conditions that necessitated changes of plan and unforeseen work, including additional demo and abatement. Every construction project has its surprises, but they've abounded in Chase, for a variety of reasons. Now the demo and abatement days are done, fundamentally changing the course of the renovation. "We've finally [transitioned] from being reactive, while we discovered and uncovered, to being proactive," said Mynhier. "That's probably the most crucial part of a project, when you can start to look forward and plan properly, rather than consistently discovering new things and having to pivot. That's where you start to get good progress."

One of the last of several surprises that lent the Chase project such a thrill-ride quality appeared in September. Wooden floors in the building are supported by joists whose ends rest in notches in the interior brick wall. Demolition in Chase Hall Lounge, though, revealed that the ends of a number of joists overhead had been sawed off, denying them contact with the joist pockets in the brick. The precise motivation for removing the joist ends isn't known, but that work was done adjacent to windows. It's believed that incoming moisture, whether because the window units failed or someone failed to close them, rotted the joists.

To compensate for the lost support, the cut ends were fastened together with additional pieces of lumber, serving as ledger boards. These in turn were attached to the brick wall, but this arrangement didn't provide the same quality of support as the original construction. That change created some saggy spots on the second floor, but baseboard heaters concealed the cause of the droopiness until their removal during demo.

The fix, Mynhier explained, entailed removing interior brick where joist pockets once were, connecting the truncated joist ends to the exterior layer of brick with metal "ties," and then rebuilding the interior wall. (In cross-section, the wall in question consists of a double exterior layer and a single interior layer, separated by an air gap.) She said that "It's probably been about a month from initial discovery of the problem to having the engineer look at it, bringing the abatement contractor back to do the Chase Lounge ceiling, and then having the engineer finalize the plan" for repair.

The first phase of construction was dominated by demolition and by the abatement of hazardous materials. Those processes uncovered conditions that necessitated changes of plan and unforeseen work, including additional demo and abatement. Every construction project has its surprises, but they've abounded in Chase, for a variety of reasons.

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PHOTO COURTESY BATES COLLEGE

The discovery of the need for joist remediation shows how the whack-a-mole nature of exigency response in the Chase project has caused some shuffling of timetables. As Campus Construction Update reported in September, the amount of effort going into mechanical, electrical, plumbing (MEP) infrastructure would be doubled from the original plan.

**Whack-A-Mole Responses**

The discovery of the need for joist remediation shows how the whack-a-mole nature of exigency response in the Chase project has caused some shuffling of timetables. As Campus Construction Update reported in September, the amount of effort going into mechanical, electrical, plumbing (MEP) infrastructure would be doubled from the original plan. That began around the beginning of November, as workers on the first floor started to complement those who had been busy upstairs for a few weeks previously. "In the next month you'll see the overhead mechanical work continue," Mynhier explained—"mechanical" referring largely but not exclusively to HVAC. "That's really our critical path for the entire job."

"Also, to minimize the impact to the schedule," she adds, "we've started framing everywhere"—meaning that the metal and wooden studs that hold walls up are being erected and, in effect, making floor plans visible. "That allows the in-wall [MEP] rough-ins to continue and allows us to at least get board on the walls."

In fact, placing wallboard is well underway on the second floor, whose layout will be the least altered by the renovation. On the first floor, the former lobby and Purposeful Work area is a forest of metal studs and two-by-fours that will ultimately coalesce into the largest unified office space that Purposeful Work has enjoyed thus far. On the ground level, the first few studs for Student Affairs offices have appeared in the former College Store retail area. "In December floor coverings will begin on the second floor," Mynhier said; this effort will mark the start of finish work.

### The Grand Central Stair

In December, too, assembly of a new Chase landmark began: what the project team refers to, variously, as the grand or central stair. "All of the wood is on site for the stair treads and landings, and the steel [for structural support] is on its way," reported Mynhier.

Sited near the Office of Intercultural Education, which will return to its old quarters in Chase at renovation's end, a new elevator shaft will form the core of a staircase that rises from the ground floor and tops out at the OIE level. From there, a nearby stairway original to the building serves the second floor. At the other end of Chase, near Carnegie Science, a current elevator and a new set of stairs will also terminate at the second floor.

Handy to the existing Campus Avenue entrance near Muskie Archives, the central stair will constitute one of the main arteries through Chase. It will touch four building levels—ground floor; the Residence Life and Health Education area a half-level up, near the loading dock; the first floor; and the OIE floor, another half-level higher. A fun fact for readers, if not for the renovation team, is that Chase Hall, with its two additions, is a three-story building that will still contain nine discrete floor levels, even with the renovations.

The central stair will be built in the area behind Chase Hall Lounge that Campus Construction Updates previously referred to as an "abyss" created by removing two big sections of concrete floor slab. Now visible at the bottom of that gulf are a square depression that will provide a base for the elevator, along with a pattern of holes where steel columns will be set to hold up the stairway and new floor slabs.

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PHOTO COURTESY BATES COLLEGE

Meanwhile, we learned more about the building's other main artery, which will begin where it always has—the Campus Avenue entrance near the Kenison Gate—but will otherwise give visitors an experience nearly as new as what the central stair has in store. The definitive differences lie at the street entrance itself. For one thing, entry to Chase will now occur a bit below ground level, via a ramp descending from the sidewalk. The entry will lead to a lobby sited approximately where, back in the day, students used to find P.O. boxes and the College Store.

But a change more dramatic than the ramp involves the three-story former staircase just inside the door: The stairs are gone—they won't be back—and that space instead will be a sort of atrium spilling light on people as they come and go. Additionally, glass interior walls will bring daylight more deeply into the building. In fact, on the first and second levels, floor space will be extended into the atrium. "It becomes more of a viewing area and a welcoming walk-in," said Mynhier. Those who enter Chase through the atrium will find a variety of new and old stairways and elevators to choose from. In a sense, the central stair will take

on the role of the stairs that are now gone from the atrium—that is, a consolidated means of accessing different levels of the building. Other recent progress includes placement of retaining walls flanking the path of the forthcoming entrance ramp, along with the laying of foundations for two wing walls that will line the sidewalk. A pre-cast concrete drainage system will be installed along the Campus Avenue facade in the next couple of weeks.

**Reinvigorating Chase Hall**

A project goal is to reinvigorate Chase as a student resource that will be busy twenty-four hours a day. Built as a campus social center, the hall retains that identity, but there was a period when several of its student-focused functions moved elsewhere—Commons in 2008, and Post and Print, first to Lane Hall and then, in 2016, to the new Kalperis Hall along with the College Store. Chase remained busy after dark with student activities, such as events in the former dining hall, and student organizations like the Student newspaper and the Outing Club, but the building became a little too quiet during the day. "We took a look at the campus to figure out, with all these functions being separated, how could we reinvigorate Chase," explains Pam Wichroski, Bates' director of capital planning and construction. "That was when we recreated the [current] vision for Chase, which was to have more student-focused programs in the building to make it more active and viable twenty-four hours."

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ABOUT THE AUTHOR: Doug Hubley is a writer and musician living in Portland, Maine. Formerly a staff writer at Bates College and now retired, he continues to write *Campus Construction Update* for the College.

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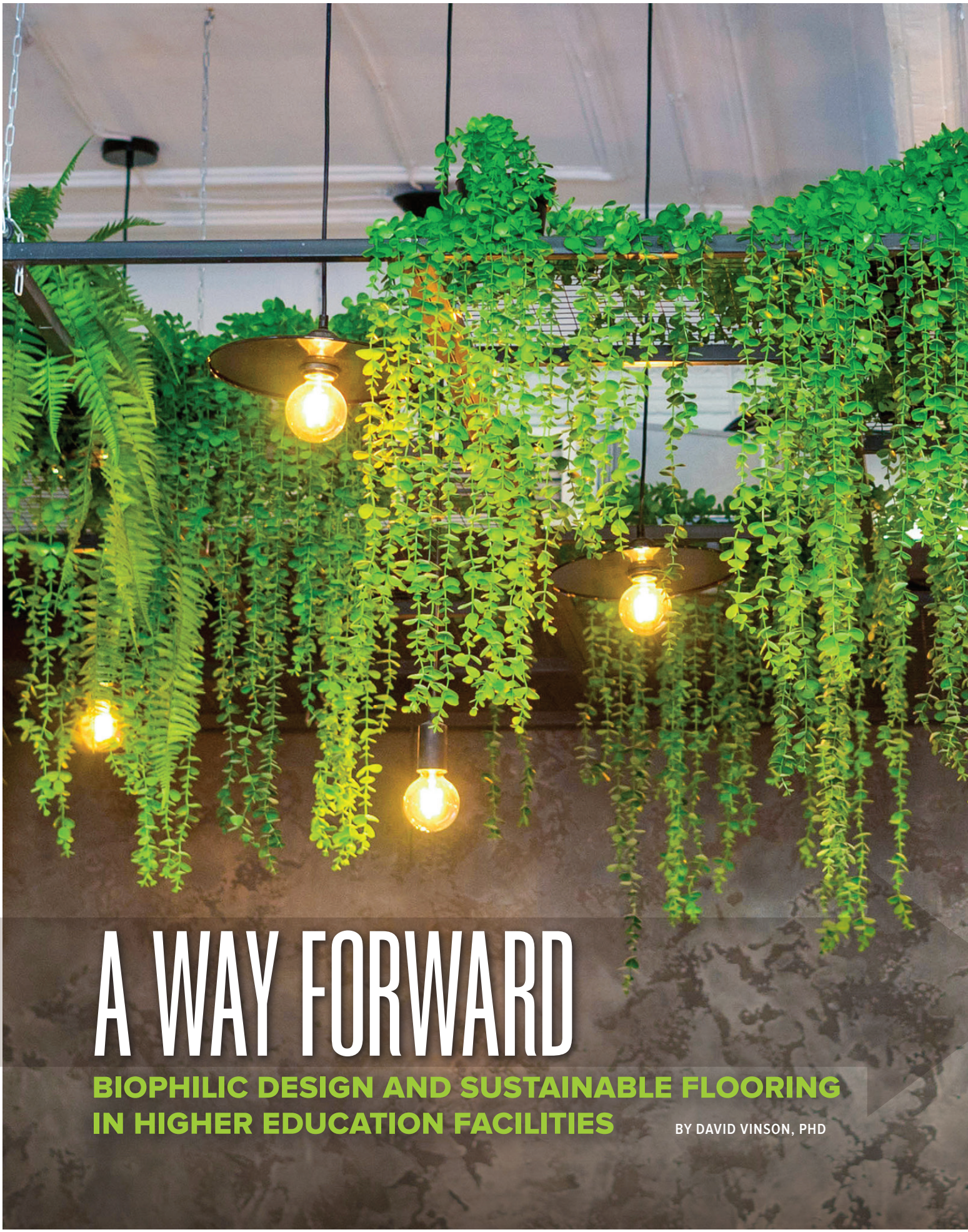

# A WAY FORWARD

## BIOPHILIC DESIGN AND SUSTAINABLE FLOORING IN HIGHER EDUCATION FACILITIES

BY DAVID VINSON, PHD

The Youghiogheny River—or the Yough, as it is commonly called—extends its reach from the west side of the Allegheny Mountains in southwest rural Pennsylvania, down through the southwestern corner of Maryland, until it crosses the border into West Virginia, where its waters are absorbed by the tributaries of the Mississippi.

At the northernmost point of the Yough, along a five-mile stretch of water and rocks and steep plateaus called Bear Run, Frank Lloyd Wright designed Fallingwater in 1935. He was hired by the Kaufmanns, a prominent Pittsburgh-based family that desired a remote vacationing spot in Pennsylvania. Upon the building's completion in 1938, Wright would land the cover of Time, posing with his illustration of Fallingwater. Nearly seventy years later, Smithsonian would include Fallingwater among its "Life's List Of 28 Places to Visit Before You Die."

### Key Lessons from Fallingwater

For those who would like to see higher education facilities transformed into beautiful, safe, and innovative living and learning spaces, key lessons can be learned from Fallingwater, not only in terms of the aesthetic value in its naturalistic design but also in regard to the wide-ranging benefits (physiological, psychological, and economic, to name just a few) that such a design can produce. Fallingwater is surrounded by the dense flora of the Appalachian Oak Forest, and its design echoes a natural pattern established by neighboring rock ledges. In this case, cantilevered concrete "trays" are stacked, together forming a mass sturdy enough to overlook the waterfall that rushes beneath—rather than above—the structure. This thrilling design defies the laws of nature.

Wright's legacy is one of innovation, but he also had a sizeable ego. Fallingwater, however, is not simply a reflection of Wright's hubris and ambition to conquer nature. Its conception is derived from his wish to create architectural harmony between human habitation and the natural world. Wright called this harmony "organic architecture," and within it he sought to achieve a sensibility of space in which the site, the structure, and its furnishings all become part of unified, interrelated composition. The structure rises more than thirty feet above the falls, yet the strong horizontal lines and low ceilings produce a safe, sheltering effect. The outdoor terraces, which are almost the same square footage as that of the indoor space, bring the natural environment into the house just as they also entice its inhabitants out.

### Biophilic Design and Organic Architecture

Biophilic design is an extension of the values inherent to Wright's "organic architecture"—particularly, that nature holds the key to our aesthetic, intellectual, cognitive, and even spiritual satisfaction. Biophilic designers work to reproduce the harmonizing impact of nature, and they do so by creating interior spaces that are inspired by natural materials and patterns. With biophilic design, one can transform higher education facilities into safe, sustainable, and beautiful living and learning environments.

An ideal biophilic space contains windows that overlook lush natural spaces; the windows can also be opened at ease to create desired ventilation and temperature. A direct view of nature also orients the occupants with day and season. Indoor plants can be used to encourage a direct relationship to nature and make possible a multisensory experience, one not only tactile but also olfactory and visual. Water features may also be used to similar effect.

### Biophilic Design and Sustainable Flooring

Designers are fully aware that not every space can be Fallingwater, and further, that not every space is made to accommodate the ideals of biophilic design. Even the most inhospitable spaces, however, can be transformed into comforting and harmonious environments inspired by nature. One simple and effective solution is the use of sustainable flooring, which is produced from sustainable materials and by a sustainable process, and which in turn reduces demands on ecosystems during its life cycle.

As the base or the platform of all interior space, the floor plays a critical and versatile role in biophilic design. Natural flooring materials such as wood, linoleum, or bio-based flooring reflect light, provide warmth and comfort underfoot, and can even benefit people's immediate health. The Asthma and Allergy Foundation of America recommends those with allergies to dust or other particles to choose flooring with smooth surfaces, which the versatility of sustainable flooring can provide.

Hardwood and stone bring nature into interior spaces, and like linoleum or other bio-based flooring, sustainable flooring can be used to simulate the variety of landscapes that one may encounter in nature. One may wish for a space that offers unimpeded views over a distance, or for the opposite, to create a sense of refuge or retreat, which can be achieved with segmented flooring. Another option is a flooring design that creates mystery and invites others to explore the nature of the space. Flooring can contribute to biophilic design by adopting colors and textures found in nature and by creating transitions commonly witnessed in nature.

### Nurturing the Human-Nature Connection

While the aesthetic possibilities of biophilic design and sustainable flooring are exciting, research suggests that creating an interior environment that nurtures the human-nature connection can also benefit the inhabitants' physiological and psychological well-being. Something as simple as hard surface flooring placed near a window can reflectively drive daylight further into a space, thereby improving mood and even reducing the risk of nearsightedness.

High light reflective flooring can also help the environment by reducing the energy needed to illuminate an interior space. In the Human Spaces 2015 report, The Global Impact of Biophilic Design in the Workplace, employees in biophilic spaces reported a higher level of well-being, were found to be more productive, and even expressed feeling more creative. Additionally, "The Economics of Biophilia," a report by Browning et al., showed that integrating naturalistic designs into an office space can save over $2,000 per employee per year in office costs, whereas over $93 million could be saved annually in healthcare costs.

The same report finds that harmonious biophilic design in learning environments facilitated a 20-25% increase in learning rates; improved test results, concentration levels, and attendance; and reduced impacts of ADHD. The research makes a strong case for using biophilically-designed spaces and sustainable flooring to improve human capacity, overall wellness, and job-specific functions.

### More Than a Fad

Biophilic design and sustainable flooring represent much more than a fad in the design world. Together they signal a way forward, a clear and doable strategy for contributing to a cleaner environment and for providing a happier, more rewarding campus experience.

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ABOUT THE AUTHOR: *PUPN* staff writer David Vinson has a PhD in English with specializations in transatlantic literature and cultural studies. He is a committed scholar, teacher, husband, and dad. If you ever meet David, avoid the subject of soccer. His fandom borders on the truly obnoxious.

# GREEN INITIATIVES

## COMPLEMENT LEED CERTIFIED BUILDINGS WITH THESE ECO-FRIENDLY PRACTICES

BY LISA GIBBS, ED D.

The Industrial Revolution, which spans from the 1760s through the early 1900s, brought major technological changes to the planet. The shift from small-scale farming, handmade goods, and travel by horse and foot to mass food production, manufacturing, and locomotives greatly increased accessibility for products and ease of movement around the vast United States and across the globe. However, environmental pollution and disruptions of the landscape are continued nasty side effects. Coal burning factories, steam engines, and internal combustion cars produced dense smog in many early 20th century cities and continue to pollute today. Railways, dirt or cobblestone roads, and city construction have resulted in the loss of forests, prairies, and other natural landscapes.

People concerned with pollution, nature conservation, and wildlife protection formed groups to bring awareness to the issues caused by the Industrial Revolution. In 1905, the United States established the US Forest Service and began designating national wilderness areas. "Green" political movements became more numerous in the 1950s and 60s, and in 1963, the Clean Air Act became law. The act empowered federal and state agencies to research and regulate air pollution. Several later updates to the act—along with the founding legislation of the Environmental Protection Agency—resulted in comprehensive air-quality standards for the U.S.; national emissions dropped 63% between 1980 and 2015 thanks to these policies.

Moving into the 21st century, efforts toward cleaner air, water, and land conservation have become more and more prolific. Private colleges and universities are now microcosms of initiatives that are successful in reducing the carbon footprint of campuses across the country. One major effort, LEED certification, has become the gold standard for new construction and renovations; however, there are other changes campuses have made that complement this eco-friendly construction.

### Wind-Generated Electricity

Naropa University in Boulder, Colorado is committed to using 100% renewable energy. Much of that energy is harnessed from wind turbines. Xcel Energy Inc., a utility holding company operating in Colorado and other Midwest states, allows customers to voluntarily choose how much of their power is received from wind energy. According to the company website, Windsource subscriptions are available in 100kilowatt-hour blocks for a small additional cost. Since 1998, Naropa has been purchasing these Renewable Energy Credits (RECs) to power the campus, supporting wind energy development and production.

### Geothermal Energy

Geothermal energy techniques tap into the reservoirs of hot water found at various depths below the surface of the Earth. This energy source produces consistent power around the clock, and the closed-loop plants emit no greenhouse gases. They use less land than coal, wind, or solar energy plants, and the rate of energy extraction can be balanced with a reservoir's natural flow. Grinnell College in Grinnell, Iowa, drilled wells 120 feet in order to harness the steam and extremely hot water now used to heat and cool the Environmental Education Center in the Conrad Environmental Research Area. The campus currently has four geothermal systems in place and plans to eventually heat and cool the entire campus in this manner, replacing the boiler and chiller plants that rely on fossil fuel energy.

### Zero-Landfill

John Brown University (JBU) in Siloam Springs, Arkansas, became and continues to be the first and only zero-landfill campus in Arkansas. In 2012, the campus put in place numerous methods of keeping waste out of landfills. As their website states, "45% of JBU's waste is recycled, and the rest is compacted and incinerated." All dumpsters were removed from campus and replaced with recycling bins and trash cans in nearly every campus space, resulting in nearly 100% of classroom and office paper, cardboard, and most plastics being recycled. The

*continued...*

Salvation Army arrives during move-out days to collect reusable items discarded by students. Compacted non-food items are incinerated in a power plant that does not release harmful emissions. Food waste is taken to a nearby zoo, and kitchen grease is converted to biodiesel, then used to power landscaping equipment.

JBU partners with off-campus entities to recycle as much as possible. The City of Siloam Springs receives paper, cardboard, most plastics, glass, and pallets in exchange for the containers used on campus to collect such materials. Salvage metal is sold to metal recycling companies in the city. Plastic bags are taken to grocery stores that recycle used bags. Electronic waste is recycled by eSCO, a "full-service electronics recycling and asset recovery firm with a zero electronic waste landfill policy." These initiatives have resulted in hundreds of thousands of dollars in savings for the campus in addition to the positive effects on the environment.

**Agriculture**

At Kenyon College in Gambier, Ohio, nearly 45% of food served in the dining hall is grown within a forty-mile radius of the campus. This return to locally grown food, as opposed to the highly processed food that came from the Industrial Revolution, improves access to healthy, organic options and connects the campus with the local economy and community. In addition, the campus includes Kenyon Farm, a ten-acre plot where students manage the care of farm animals and the growing and harvesting of crops. Students can live in the house on the farm and complete coursework while also tending to the daily work it takes to run a successful farm. Coursework from various disciplines—biology, economics, and environmental studies—uses the farm to explore topics such as conservation, resource allocation, and permaculture.

Aldo Leopold, who in 1924 was instrumental in the designation of Gila National Forest as the first national wilderness area in the US, encouraged people to be citizens rather than conquerors of the land. The efforts outlined above by these institutions demonstrate a return to this type of human stewardship of the environment. Additional practices that complement LEED certified construction include composting, using green cleaning products, bicycles for transportation, low-flow shower heads, motion-sensor lights, and water bottle filling stations. The eco-friendly changes taking place in the microcosms of higher education demonstrate that the larger community can adopt and participate in such practices.

**ABOUT THE AUTHOR:** *PUPN* staff writer Lisa Gibbs earned her Ed.D. in Higher Education Administration in 2018. She is an advocate for arts, particularly dance, in education and for increasing the financial well-being of artists through financial education.

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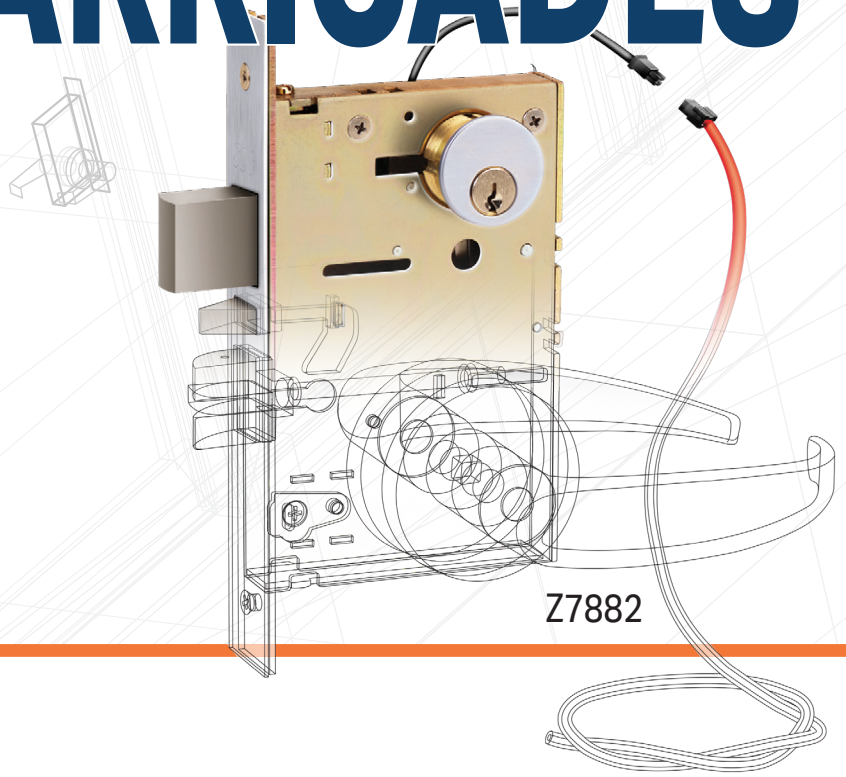


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