

Spring 2005

# Oculus

PUBLICATION OF THE AMERICAN INSTITUTE OF ARCHITECTS NEW YORK CHAPTER VOLUME 67 ISSUE 2 \$10

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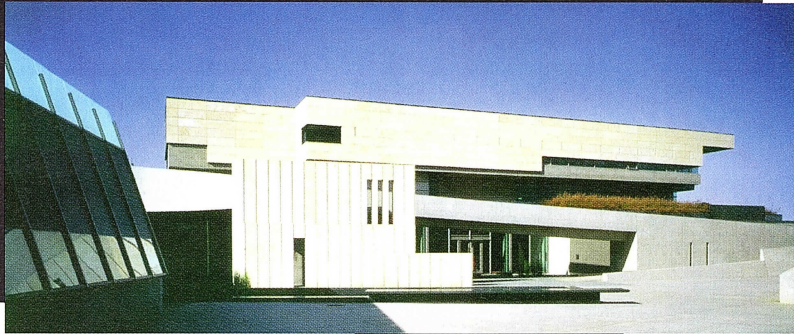


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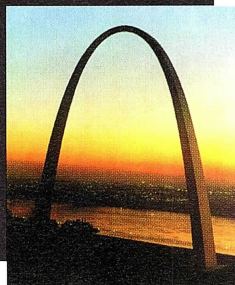
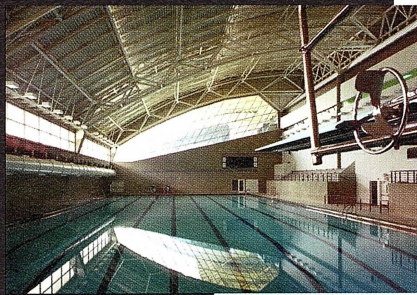
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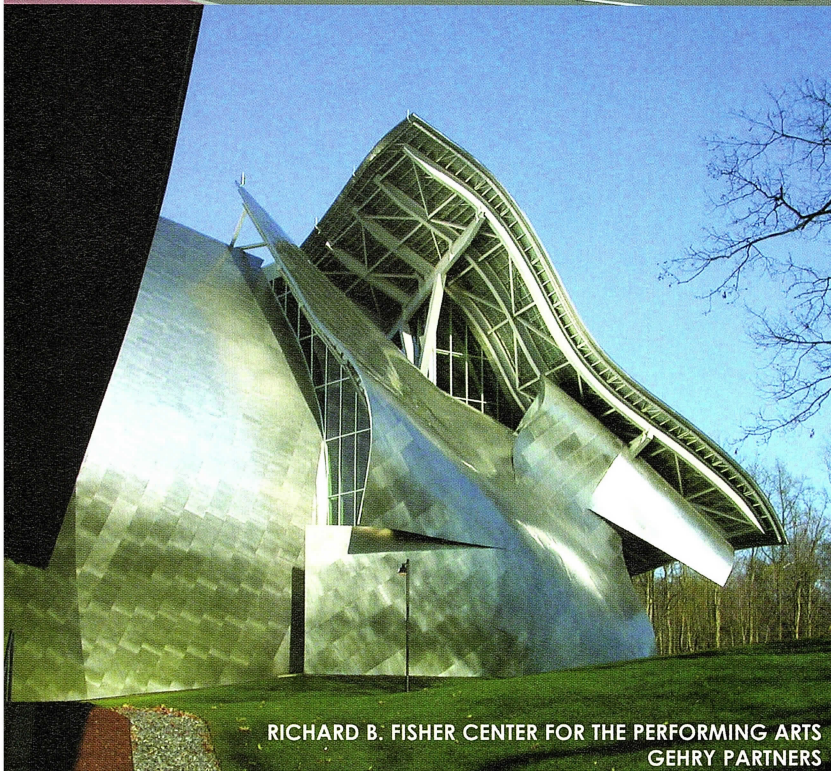
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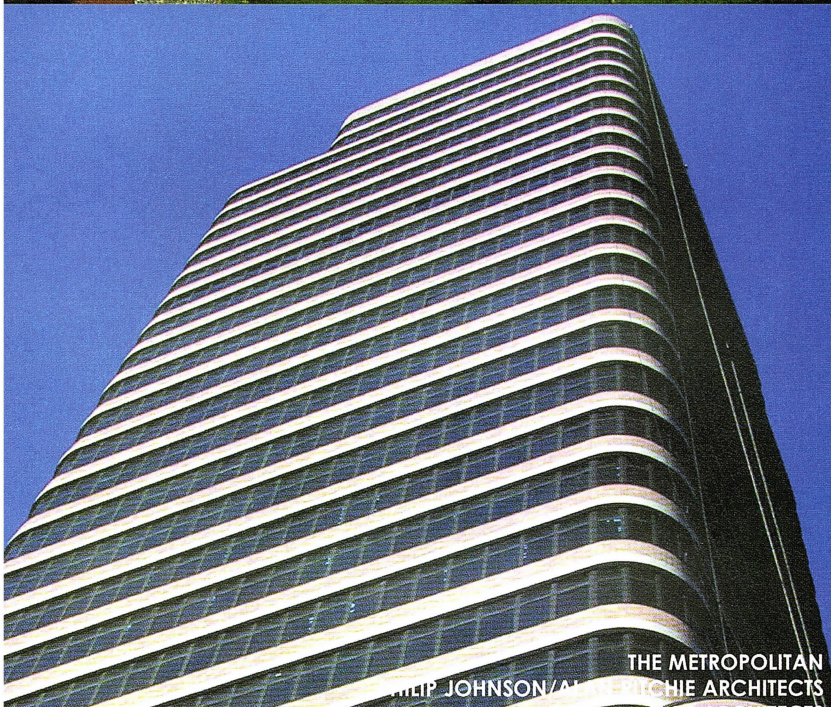
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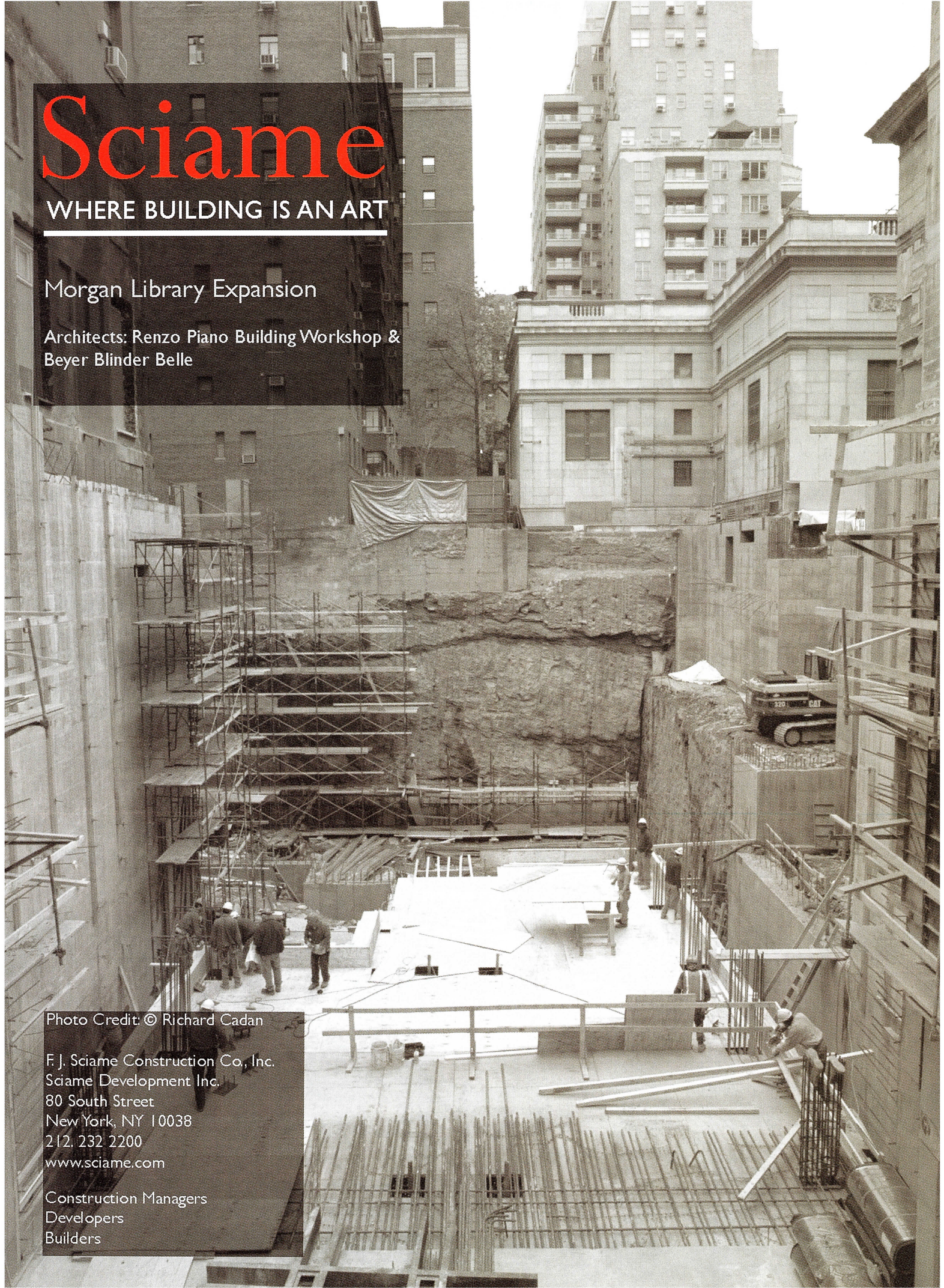
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### Spring 2005

Vol. 67, No. 2

Oculus: A publication of the AIA  
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212-683-0023  
E-mail: [info@aiany.org](mailto:info@aiany.org)

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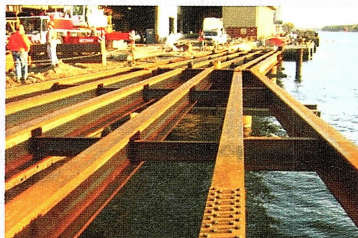
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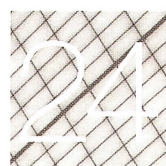
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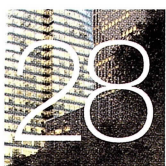
Think Green



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By Richard Staub

Continued . . .



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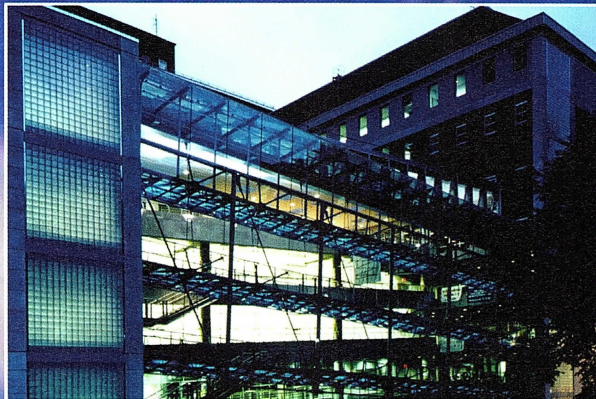
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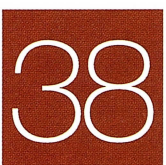
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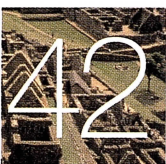
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# Green is the new Black

First Words  
Letter from the President

As architects, we do not like to be part of the problem. The world's population is growing exponentially and the built environment accounts for more than half of the world's annual energy use. This "green" issue of *Oculus* highlights what we have learned from the past, our latest accomplishments, and our view of the future.

"Green architecture," and "high performance building," are recent terms, but not new ideas. Early cultures respected environmental forces when they sited and oriented their structures and they chose materials that retained solar energy for heating or cooling. However, as humanity advanced technologically, we "improved" our built environment through greater use of fossil fuels, while the natural environment suffered.

In the 1970s, declining natural resources, environmental pollution, loss of wildlife habitats, and dramatic population growth focused our attention: our responses to the energy crisis – using more insulation, efficient lighting, insulated glazing, improved HVAC, and institutional waste heat recovery – made us less wasteful. Preservation not only saved the energy embodied in historic buildings, but maintained the historic continuity of our neighborhoods, and reduced the debris sent to landfills.

However, as James Marston Fitch said in 1972, "The sheer ubiquity of equipment for the manipulation of the natural environment – heating, cooling and ventilating; artificial illumination; acoustics and electronic communications; rapid transport – has led architects, engineers and planners to behave as if this circumambient environment could be ignored as a factor in design." Since then, we have tested and revised many strategies to reduce energy use and improve building practices. Some seemed like good ideas at first – fewer air changes, fluorescent lighting, and formaldehyde-based insulation – but they set off their own ecological, microclimatic, and psychosomatic problems. Meanwhile, architects kept testing new solutions to environmental challenges.

In our City's cultural institutions, New York architects have shown – in their renovated and expanded facilities at Queens Botanical Garden, Brooklyn Children's Museum, and the New York Hall of Science – how to apply new technologies, including novel ways to use water, heating and cooling, and recycling.

Responsibility for our actions extends beyond the client's property line. An edifying example can be found in Berlin, where street trees are dependent on the naturally high water table, which is acutely affected by de-watering of construction sites. If the water table becomes too low due to construction activity, then the construction site responsible must recharge the entire city ground water system.

Material choices also matter. Specifying rain forest hardwoods contributes to deforestation and global warming. When the Haupt



CHARLES MCKINNEY

## President at The Gates

Conservatory at the New York Botanical Garden was being restored, the search for a suitable replacement material for its 19th-century cypress glazing stops revealed that many Southern plantation houses were being dismantled to "harvest" their first-growth cypress, and that rainforest wood being sold as "tree farm product" was actually from virgin growth areas that, ironically, were cut down to create these new tree farms.

As New York architects we have experience in dense living, reuse of industrial buildings and brownfields, building technology, and mass transportation. At the same time, we have much to learn from the rest of the world – most green architecture is being built elsewhere. And we need to learn from other cities' public policies that hold buildings accountable for their effect on the microclimate of adjacent public spaces, as well as on energy use and water conservation.

Environmental laws and regulations will become more sophisticated as we build more densely. The architectural community should lead the way by creating responsive building types, new materials and technologies, and by developing appropriate codes and legislation with our civic partners.

Frank Lloyd Wright quipped, "A doctor can bury his mistakes, but an architect can only advise his clients to plant vines." Thinking "green" and accepting stewardship of the earth's resources goes well beyond planting vines. It should be integral to everything we do as we enter the "century of the environment."

Susan Chin, FAIA, President





## CAN YOU NAME THESE NEW YORK ARCHITECTURAL MASTERPIECES?

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# Green Springs Eternal

First Words

Letter from the Editor

M

y first serious introduction to “green” design was in 1992, listening to Bill McDonough explain The Hannover Principles his firm prepared for EXPO 2000 World’s Fair in Hannover, Germany (see below). I was relatively new to the field of architecture. To me, it seemed a no-brainer – who could/would argue? No one, theoretically. But then reality steps in:

budgets and bureaucracy, supply and demand, market demand and marketing. At times, I’m disappointed at how slow people are to get with the sustainability program. At other times, I’m inspired by the dedication to sustainable principles shown by professionals across so many industries, and particularly those presented here. From the New York City Department of Design and Construction to the New Jersey Higher Education Partnership for Sustainability, from green resource library shelves to the terraces of Machu Picchu and a green roof in the South Bronx. (New York City’s terraced landscape is its rooftops, and green roof initiatives are slowly gaining ground – politically and literally.)

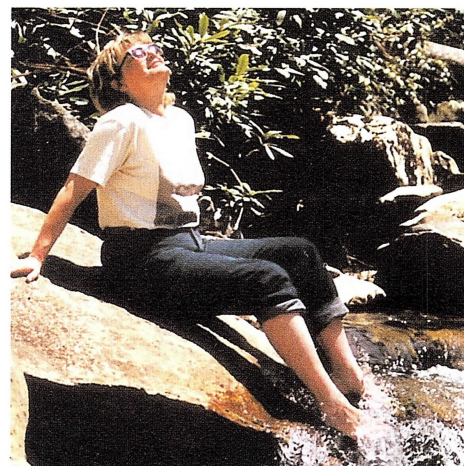
Also in this issue devoted to thinking green, “So Says...” presents Randy Croxton, FAIA, in a candid conversation about sustainable architecture – its successes and its shortcomings. “Around the Corner” has us seeing stars and the ocean floor. Ann Jarmusch of the San Diego Union-Tribune is the “Outside View” who finds architects devising their own urban language in her “reluctant city.” Edward Durell Stone’s public school on West 70th Street is a worthy subject for “42-Year Watch.” An Oculus survey anchors “Good Practices,” which takes a look at where New York City architects stand on the sustainability bandwagon. “In Print+” reviews a book offering secrets of marketing green buildings, another which deals with security planning and design, and a selection of “green” web sites. Finally, “Last Words” takes us into the belly of the Center for Architecture’s geothermal wells.

Special thanks to Chris Garvin, AIA, LEED, and Craig Graber, Assoc. AIA, LEED, co-chairs of the AIA New York Chapter’s Committee on the Environment – their guidance and support were invaluable. And

## The Hannover Principles: Design for Sustainability

William McDonough & Partners, 1992

1. Insist on rights of humanity and nature to co-exist.
2. Recognize interdependence.
3. Respect relationships between spirit and matter.
4. Accept responsibility for the consequences of design.
5. Create safe objects of long-term value.
6. Eliminate the concept of waste.
7. Rely on natural energy flows.
8. Understand the limitations of design.
9. Seek constant improvement by the sharing of knowledge.



KAG PANIC GRAPHICS

Editor getting back to nature

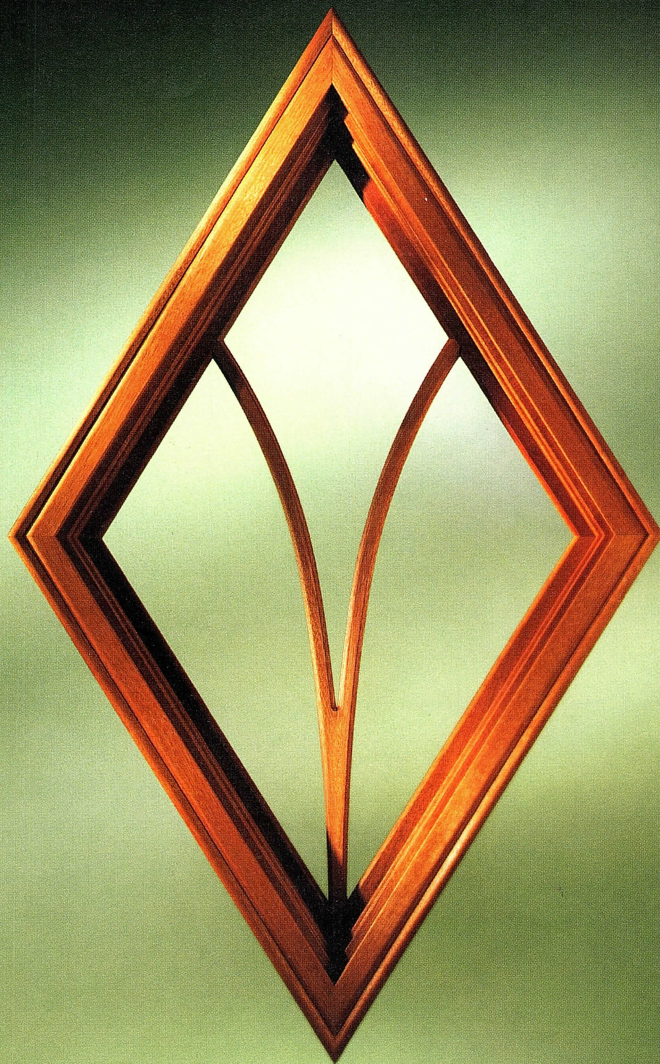
kudos to Michael Gericke and his Pentagram design team for giving Oculus a fresh, new look. Working on this issue has been like a breath of spring air in the midst of a long and snowy winter.

Kristen Richards  
[kristen@aiany.org](mailto:kristen@aiany.org)

Correction: *Oculus*, Winter 2004/05: The article on Rafael Viñoly and Jazz at Lincoln Center (“Riffing It Up”) should have credited Cline Bettridge Berstein Lighting Design for the architectural lighting design, and the team of James Carpenter Design Associates and Skidmore, Owings & Merrill for the design of the 90 x 50-foot window wall in the Allen Room.



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# What's on, What's coming up

Center for Architecture



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Party @ the Center



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2004 Heritage Ball at Chelsea Piers

## Save the Dates: Architecture Week 2005!

The Center for Architecture will kick-off its 2005 Architecture Week on Thursday, October 6, with the 2005 Heritage Ball at Pier 60, Chelsea Piers. The AIA New York Chapter and the Center for Architecture Foundation are delighted to honor **J. Max Bond Jr., FAIA**, Partner, Davis Brody Bond; **Frank J. Sciamé Jr., Hon. AIA NYC**, President, F.J. Sciamé Construction; **Amanda Burden, Hon. AIA NYC**, Chair of the City Planning Commission and Director of the Department of City Planning; and the **New York Restoration Project**. Richard Tomasetti, PE, Co-chairman of the Thornton-Tomasetti Group will serve as chair of the Heritage Ball Dinner Committee. The annual dinner will be followed by the popular Party @ the Center.

Architecture Week will run October 6 – 11, 2005. The Center will host a variety of programs including the annual Design-In Marathon and Family Day, and will be the official welcoming center for openhouse-newyork. Watch your mailbox for details.

## CEEP at the Center

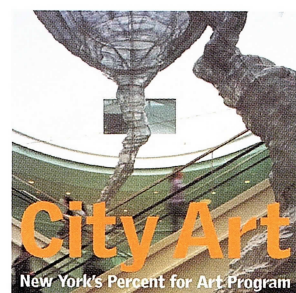
On the second Thursday of each month, the Center for Architecture hosts Go2Buildings' special High Performance Green Building Design Salons. At each lecture, a green building case study is presented by a leader in the field. The program is co-hosted by the New York Chapters of the AIA, U.S. Green Building Council, and American Society of Heating, Refrigerating and Air-Conditioning Engineers, and the Environmental Business Association of New York State. The Salon, created under CEEP (Center for Economic and Environmental Partnership) educational programs, is in its fourth year.



## On View at the Center

Through September 3: City Art: New York's Percent for Art Program.

The exhibition includes original photography, a multimedia installation, models, and architectural plans documenting the program's extraordinary achievement; coincides with release of *City Art: New York's Percent for Art Program*, published by Merrell Publishers (London, New York).



DAVID E. ALLEE

## AIA COTE NY

The activities of the AIA New York Chapter's Committee on the Environment in 2005 reflect an inclusive, diverse, and integrated approach to sustainable design. COTE NY promotes not only leading edge design but also low-tech and low-cost solutions. We welcome not only architects and design professionals, but also contractors, educators and students, public officials, and the public to participate in our educational programs and events. *Chris Garvin, AIA, LEED, and Craig Graber, Assoc. AIA, LEED, Co-chairs*

## Learning By Design:NY

A student brainstorms plans for a "greener" Washington Square Park during a Center for Architecture Foundation (formerly New York Foundation for Architecture) Student Day.



JESSICA KEMPER

**For current/upcoming events at the Center for Architecture, visit [www.aiany.org/calendar](http://www.aiany.org/calendar) or receive e-Oculus every week via e-mail. Contact [bguffin@aiany.org](mailto:bguffin@aiany.org).**



# So Says... Randy



KRISTEN RICHARDS

A pioneer in the evolution of “green” architecture, design, and planning, Randolph R. Croxton, FAIA, founded Croxton Collaborative Architects, P.C., in 1978. He has been a major influence in establishing many of the universally accepted goals and practices in the field of sustainable architecture. A very busy Croxton made time to sit down with Oculus in his aerie on Fifth Avenue overlooking the New York Public Library.

**Kristen Richards:** I've heard you referred to a number of times as “The Green Knight.” How does that make you feel?

**Randy Croxton:** I'll choose to take it as a compliment because I'm sure it can be taken both ways. At the end of the day, I have always seen these issues as issues of architecture. I don't think of this as being something that I pursue purely because I want to be a “green knight” and save the world, but rather because I feel that there is a fundamental concern.

**KR** What about overuse of the terms “green” and “greenwash”?

**RC** There are those who are dealing with the center of the issue and there are others who will use it as decoration – trim it, shape it for other agendas. It's frustrating, but it reflects a major transformation in people's outlook.

**KR** What changes have you seen in the emergence of “green” design?

**RC** The previous surge of interest – in the mid and late 1970s – was not ecological, it was an energy-driven, embargo-driven distortion in the market where the government stepped in and subsidized a lot of immature technologies. We inherited a negative bias from those days: “If it's environmental, it's costly, risky, and ugly.”

Our first attempt to move beyond this narrow framework to a more “ecologically informed” design process was in 1986-88 with the Natural Resources Defense Council. For instance, in trying to assure that no formaldehyde was used in the carpets, we ran into an information “blank wall” with sales reps claiming a “clean” product but with no data for verification. There was no U.S. Green Building Council [USGBC], no Leadership in Energy and Environmental Design [LEED], no EPA independent analysis of materials – we had nothing. Finally, we demanded a signed statement from an officer of the company that no formaldehyde was present or used in processing – and nobody could comply. That “clean” carpet had to come from London! Today we are light years ahead.

**KR** How can a “green” firm get its clients to consider green concepts despite the alleged premium?

**RC** You can put money into a highly detailed, highly designed project, or you can decide that you're going to move some of those dollars into the intelligence of the mechanical system or cleaner materials. In other words, you can orchestrate where those dollars go. We've had clients who were not remotely interested in green – even hostile to the idea, but we integrated these values into their projects simply because it's good design. We still met the budgets – we just deployed the dollars in a more intelligent way, plain and simple.

**KR** And aesthetics?

**RC** An architect's skills are deepened by environmental/sustainable insights. People see some of our projects and say, “Gee, it's a great building but where's the green stuff?” It's much more interesting to have windmills and turbines – highly visible design elements: It's green! You can see it, they move, they glitter! We literally put it into the bones of the building so that it can't be value engineered out. A lot of, quote, “green intentions” end up getting clipped off in the value engineering process and it's like, oh, well, I tried. But why did they get clipped off? Because the question wasn't asked: Given this time and this money without an extra penny, what is the highest environmental sustainable outcome I can achieve in this building?



# Croxton, FAIA

Knight in  
Green Armor

**KR** What is your focus when taking on a new project?

**RC** We use a value-centered design process for each project. The three basic values are: environmental, which are the natural systems; sustainable, which is the clear understanding of the consequences of bringing together natural and built systems; and third, humanistic, which has to do with community and individual health and well being. I would call these a full-spectrum baseline for design.

**KR** How does LEED fit into that spectrum?

**RC** LEED addresses a portion – but not all – of those dimensions because environmental issues are site specific. Most of the humanistic issues have to do with the history of the site, the adjoining community, wayfinding, existing green infrastructure – all the unique things that LEED cannot address. LEED is a powerful tool for what it does, which is to provide a quantification and a rigor for the profession as a whole based on building type – independent of site. And that's all it does. It's been said that if it isn't LEED, it can't be green. My response to that: if it's only LEED it hasn't reached its full "green" potential.

I'm hesitant to critique LEED or the USGBC because I am astounded at the market penetration, the name recognition, and the value of LEED in advancing these issues. In the last two or three years, I hear from a lot of architects who take my course: "We're here because we just don't understand enough about this and our clients are demanding it." "We're here because we lost the last job because we weren't credible on the subject of sustainability." "We're here because our client knows more about sustainability than we do."

For four years, while serving on the National Board of the AIA, helping start the Committee on the Environment [COTE], I held the naïve belief that this was a leadership opportunity for architects. I now look back almost 10 years later at my own naïve notions, realizing that it was only a start.

**KR** What more can be done beyond LEED?

**RC** An example is the World Trade Center Sustainable Design Guidelines, which we have been working on for over two years. About 25 out of the 52 guidelines have a direct basis in the LEED system. More than half of those guidelines are original and unique to the WTC site, addressing issues ranging from wayfinding to urban infrastructure, transportation systems, community and neighborhood concerns – matters that are part of a value-centered design process.

The next step is the Sustainable Design Guidelines Reference Manual, which will elaborate on the 52 guidelines. It is LEED in reverse

– instead of waiting until the end of the project for assessment, it is actually reviewed sequentially at schematic design, design development, and as the project evolves.

**KR** Have you been involved with this from day one?

**RC** In the first year following 9/11, I was very active in New York New Visions – a *pro-bono* effort with the AIA New York Chapter in a major leadership role. I was thoroughly engaged. I just couldn't not be involved.

**KR** Do you see education getting better?

**RC** I don't see that much change in the schools at all. There's enormous demand for this subject from students, and I thought we would be much further along by now. At one of my first lectures on sustainability in the early 1990s at Berkeley and UCLA, the dean and the head of the department said, "We really want to get this information into the school. I don't know if it's going to be a post-graduate thing or maybe a supplemental course on HVAC systems." I said, "You know that studio course that lasts four or five hours, that you have four days a week? Fundamental undergraduate design? You take this insight and you drop it like a pebble in the middle of a pond and it ripples out and it informs and deepens every idea, every concept."

**KR** Some contend that green standards in Europe are far ahead of the U.S. Do you agree?

**RC** In many areas they are ahead. But a fundamental difference between Europe and here – I'm just talking about New York City – is the climate. You frequently see projects in Europe that brag about their environmental accomplishments like natural ventilation and no air conditioning. They are, in fact, much like Southern California – a dramatically different climate zone than New York.

**KR** Is everyone in your firm LEED-certified?

**RC** Yes, everybody in the firm.

**KR** Do you own a car?

**RC** I'm trading in a BMW Sport Wagon for a [hybrid] Prius.





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WINDOW COVERINGS



# Seeing Stars and Sea Anemones

**Around the Corner**  
**Xing and Tides by Lewis.**  
**Tsurumaki. Lewis**  
**By Eva Hagberg**

Lewis.Tsurumaki.Lewis, or LTL, is a New York City firm headquartered in the hipper-than-thou Lower East Side. The firm just took two big steps – in their typically small scale – with two new restaurants, each riffing off solutions developed in projects from café Ini Ani to the firm's contribution to the Venice Biennale.

The 2,000-square-foot Xing, meaning “Star,” serves contemporary Chinese cuisine (think 66, not Hunan Pavilion) smack in the middle of Midtown West's swiftly growing Restaurant Row. The restaurant, at 785 Ninth Avenue, is owned by the client behind LTL's felt-wallpapered bakery Fluff (just down Ninth Avenue). Xing has more going on in its two rooms and one hallway than most Chinese restaurants can dream of. A stunningly vibrant acrylic centerpiece composed of over 10,000 linear feet of two-inch slats of one-quarter-inch thick green acrylic interlaid with increasingly dense stripes of yellow, blue, and red folds over the steel bar, visually linking the luxurious back with the in-and-out front.

A bi-level hallway connects the eating areas, with each dramatically different design still in keeping with LTL's tendency to sculpturally pull the architecture off of the envelope and into the room. The front capsule is enclosed by a wall of perforated backlit bamboo – each cutout is a brilliantly colored hollow that spills into the space. Past translucent restroom doors made of the same acrylic as the centerpiece, a ghostly blue fish tank marks the shift from sleekness to plush luxury. Red velvet panels replace the front's bamboo and stone while a backlit series of gold leaf “Xing” characters gives the wandering eye something to focus on.

For something a little more intimate, a windswept block just east of the firm's offices (venturing into the less gentrified area of the Lower East Side) offers up the 20-seat Tides, a seafood restaurant run by the former chef of Mary's Fish Camp. The menu is thematically expressed by a voluptuously contoured ceiling, evoking by twist and turn a static anemone, gulf eddies, or the seafloor landscape.

“We wanted to pick up and invert sea grass topography,” LTL's Paul Lewis explained, taking a break from the construction he and his architects did themselves, thanks to the delicateness of the restaurant's design. One hundred and twenty thousand bamboo skewers, discovered at Chinatown department store Pearl River (every creative architect's materials standby), penetrate acoustic foam panels to varying depths and angles, their heights and turns following (with a few creative deviations) a CAD-plotted path. The same panels, punctured with a similar pattern, form protective cones on top of three bamboo booths (one a restroom) that line the left wall of the 420-square-foot space.

Two big steps for LTL; two bigger steps for New York's restaurant scene.

Eva Hagberg is a New York-based freelancer who has written for *The Architect's Newspaper*, *Metropolis*, *Wallpaper\**, and the *New York Times*.



LEWIS TSURUMAKI LEWIS

**Xing**



MICHAEL MORAN

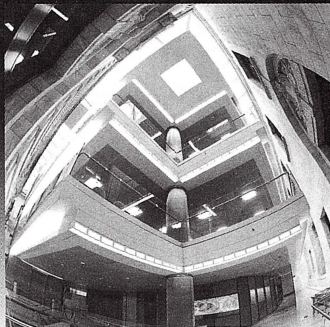
**Tides**



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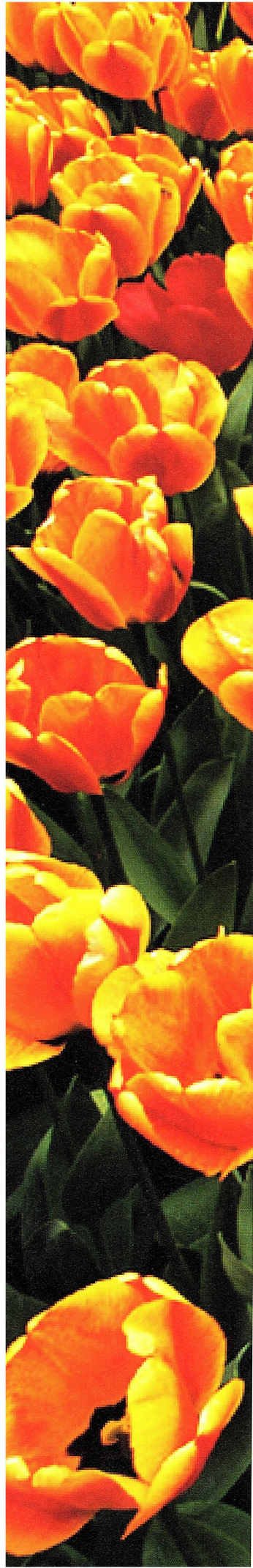
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# Think Green

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This issue of *Oculus* offers a glimpse into the “greening” of a profession, an industry, a city, and a global culture. Perhaps we are getting closer to the “cradle-to-cradle” design paradigm, coined by William McDonough and Michael Braungart, where everything – from buildings to wrapping paper – can be recycled, re-used, or composted.

Meanwhile, the question being asked more and more of architects – by both public and private clients – is not if they know how to design “green” buildings, but how many they have already designed. And among architects, the question isn’t how many, but what LEED ratings they have. That’s good news.

Sustainable design guidelines are being implemented by private developers and public development agencies at all levels around the world. “Green” technologies pervade the systems, materials, and processes that go into the construction and running of every type of built environment. And costs are coming down. Fifteen years ago, building green could add as much as 20 percent to a project’s cost. Today, it’s estimated to add between two and five percent. That’s very good news.

We’re still on a steep learning curve – but climbing higher faster. Research, case studies, and post-occupancy evaluations are proving that an “eco-sustainable” (the “eco” in this case refers to economics, not ecology) approach to building works both financially and environmentally.

So why aren’t all clients chomping at the bit to commission sustainable buildings? For that matter, why aren’t architects exclusively designing “green” buildings? It boils down to education and collaboration – among and between many industries and, ultimately, clients and end-users.

The American Institute of Architects has been working with the U.S. Department of Energy (DOE) since 1979, including co-sponsoring the Top Ten Green Projects competition, and in 2002, signed a memorandum of understanding – similar to one signed this February with the U.S. Environmental Protection Agency (EPA). Both establish a formal, cooperative working relationship to share and advance research, education, and outreach. For example, EPA Region 2 and AIA chapters in New York and New Jersey are promoting local collaborations, from brownfield redevelopment to green building competitions.

“It is indeed a milestone for the AIA to have entered into Memoranda of Understanding to build green buildings and communities with both the DOE and EPA,” says Joyce S. Lee, AIA, LEED, founder of the AIA NY Chapter Committee on the Environment. “There is a renewed sense of public-private partnership.”

Sustainable guidelines are including more building types. For the first time (and probably not the last), the U.S. Green Buildings Council’s Leadership in Energy and Environmental Design (LEED) program has competition. Recently introduced to the U.S. is a version of Canada’s Green Globes rating system, based on the U.K.’s Building Research Establishment Environmental Assessment Method (BREEAM). It may, or may not, give LEED a run for its money. Even the National Association of Home Builders came to the sustainability table in January, albeit kicking and screaming, with NAHB Model Green Home Building Guidelines. In March, the Business and Institutional Furniture Manufacturers Association (BIFMA) International issued its first sustainability guidelines, which outline sustainable business practices and processes that can result in natural, zero waste cycles.

Economics and feasibility are still big factors, but green planning and building is clearly the *modus operandi* for the future – economically, ecologically, and culturally. Kermit (the frog) has lamented for more than 30 years that “it’s not easy bein’ green.” But then he opines: “But green’s the color of spring. And green can be cool and friendly-like.” Just like what you will see in the following pages.

Kristen Richards





**Polshek Partnership Architects: New York Hall of Science, completed November 2004**

# New York City's

## Big Apple boosts sustainable tactics

**By Thomas D. Sullivan**

**A**n unprecedented number of New York architects are using sustainable technologies in projects – and they're not alone. Committed private pioneers and environmental advocates – and some far-sighted public officials – have led the way as designers in New York City move up a learning curve, applying technologies and methods that use energy and water more sparingly, include fewer toxins, and do less damage to the environment.

Along with private pioneers in green design, the New York City Department of Design and Construction (DDC) has helped to encourage sustainable design. DDC assists a number of city agen-

cies with their construction projects by hiring and monitoring the work of architects, engineers, construction managers, and contractors. Its mission is to ensure that taxpayer dollars are spent wisely, that buildings are high quality, and that construction is completed within a reasonable budget and time frame.

### Knowledge Transfer

In 1999, DDC and its Office of Sustainable Design (OSD), then led by architect Hillary Brown, AIA, LEED, published *High Performance Building Guidelines*, a compendium of strategies and tactics for environmentally sound planning, design, construction, and maintenance. The guidelines offer suggestions about ways to improve a building's environmental performance at every stage of development – site design and planning, energy use, indoor environment, material and product selection, construction administration, and operations and maintenance.

Margot Woolley, AIA, Assistant Commissioner, Architecture & Engineering in DDC's Structures Division, explains that the role of the OSD is to make city agencies aware of the benefits of using environmentally sound and energy efficient architecture and design. "Sharing information," is part of this role, she says, describing how OSD informed another city agency that higher levels of daylighting increased students' test scores and reduced worker absenteeism –



prompting administrators to begin incorporating more natural light in city facilities. OSD director John S. Kriebel, RA, comments, "A lot of our role is to demystify" the methods and technologies of environmentally friendly architecture.

Steven Winter Associates (SWA), a sustainable building and design consultant, is involved in a number of DDC/OSD programs, including the Bronx Criminal Courthouse, Queens Botanical Garden, and Kensington Branch Library. SWA's Andrew Zumwalt-Hathaway, Assoc. AIA, notes that many of the measures employed by DDC projects show a two- to five-year payback in terms of the return on investment for the extra cost of energy saving features. "The energy modeling we perform allows designers to make smart decisions about where to spend their money on green features."

#### Meeting the LEED Platinum Standard

When the Queens Botanical Garden surveyed members of its diverse community about what they valued at the garden, the consensus was water. Joan Krevlin, AIA, a partner at BKSK Architects, has made water a major feature and unifying theme for her design for a new administration building at the Botanical Garden. The structure's roof

will collect runoff, which will be used to cleanse "graywater." Water will stream through a channel in the building as a design feature as well as a means of educating visitors about wet and dry seasons.

The new administration building aims to achieve Platinum LEED (Leadership in Energy and Environmental Design) – the highest rating from the U.S. Green Buildings Council (USGBC), which establishes and judges standards for sustainability.

Krevlin says, "The city has genuinely taken a leadership role" in promoting the use of sustainable and environmentally sensible architecture. The Queens Botanical Garden project is for a client that's keen to be green – with design and construction plans optimized for sustainability. Krevlin describes OSD as playing an essential role in this planning: they organized a workshop on high-performance design for "all the stakeholders" involved with the project. That meeting, she says, helped to get everyone on the same LEED page.

The city's adoption and promotion of sustainable methods and technology makes others aware of what's possible. Brendan Owens, LEED Program Manager for Technical Support at the USGBC, says the adoption of green architecture in public buildings "really makes the private sector stand up and take notice."

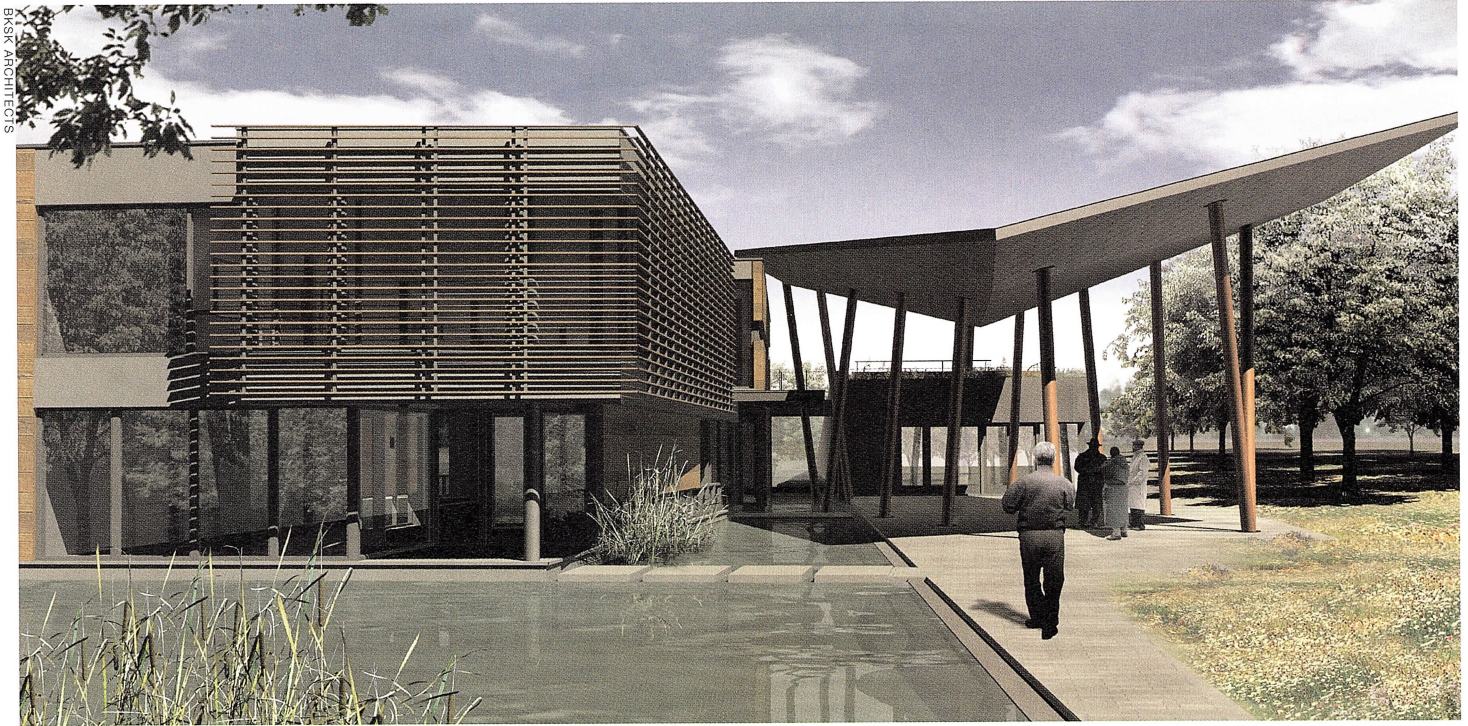
# Learning Curve



JEFF GOLDBERG/ESTO

Translucent insulating fiberglass admits daylight in and cuts lighting costs at the Hall of Science

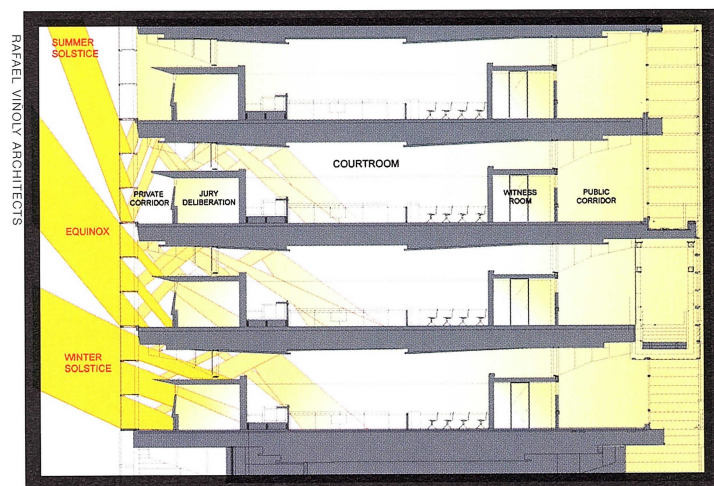




**BKSK Architects: 16,000-square-foot Queens Botanical Garden Administration and Maintenance Building is under construction**



**Above: Rafael Viñoly Architects: 750,000-square-foot Bronx Criminal Court Complex, construction almost complete Below: Courthouse daylighting diagram**



### Letting Light In

At the Bronx Criminal Court Complex, Frederick J. Wilmers, AIA, project architect for Rafael Viñoly Architects, explains that the nine-story building's 18-foot-high floors have three horizontal six-foot bands of glass; the top band is clear to allow light in, and lower bands are glazed to protect the privacy of people in the courthouse and to reduce heat gain. The design "has a perception of openness," Wilmers says. The glass filters the light, providing both energy cost savings and psychological benefits to users.

At the Phase IIA addition to the New York Hall of Science, Todd H. Schliemann, FAIA, and his colleagues at Polshek Partnership Architects, used panels of translucent insulating fiberglass for the walls and roof. The addition, which opened in November 2004, lets daylight in, and cuts lighting costs.

Schliemann is pleased with the project, but adds, "You can always do more," in terms of improving sustainability. He senses a generational shift in green architecture, saying that awareness of the environment and sustainability is part of the mindset of the younger architects in his office. Older architects, like himself, need to do more to make themselves aware of those aspects of design.

Many aspects of green architecture are "no-tech," says Jennifer Ward Souter, Director of Capital Projects at the Queens Botanical Garden. For example, she notes that siting a building properly will save energy and reduce the impact on the surrounding space.

One simple thing architects in New York can do is allow cross-ventilation by providing operable windows, one feature of the planned Kensington Branch Library in Brooklyn. Robin Sen, AIA, of Sen Architects points out that for half the year buildings in New York don't need heating or cooling – just proper ventilation and air circulation.

Sen's design includes a geothermal heating and cooling system as well as simpler green design touches – in the basement, the



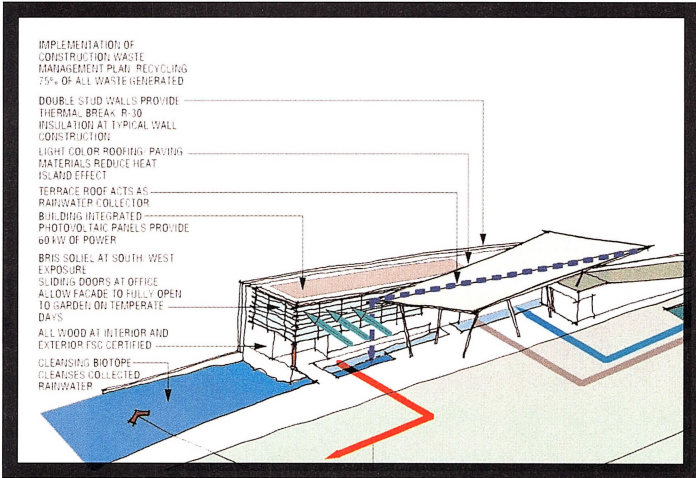
rubber floor is made from recycled tires, while the wood flooring elsewhere in the library is made of bamboo (which grows more quickly than other types of trees).

The Role of City Government

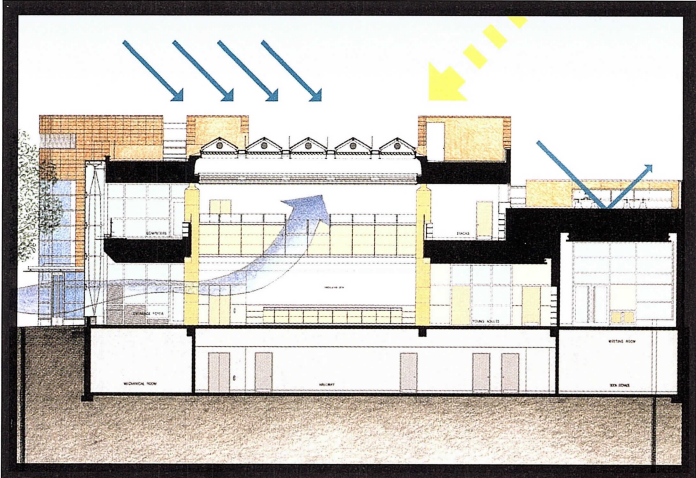
Robert R. Kulikowski, director of New York City's Office of Environmental Coordination, says, "New York City sees itself as a leader in promoting the use of sustainable technologies not only for buildings, but in other areas as well." Toward that end, Mayor Bloomberg has established the Mayor's Task Force on Sustainability to further incorporate environmentally sustainable practices into government operations and policymaking. Kulikowski says, "The city anticipates that its initiatives will further influence the private sector, and that in the long term sustainable practices will be the norm."

DDC's Kriebel already sees the beginnings of that trend: "My sense is that more architects are trying to integrate sustainability into their practice. While not long ago many would resist 'greening' a project, now they are excited to have the opportunity."

Thomas D. Sullivan, former architecture critic of the *Washington Times*, is a freelance writer and *Oculus* contributing editor.



Queens Botanical Garden sustainable design features



Kensington Branch Library schematic section



Sen Architects: 20,000-square-foot Kensington Branch Library, Brooklyn

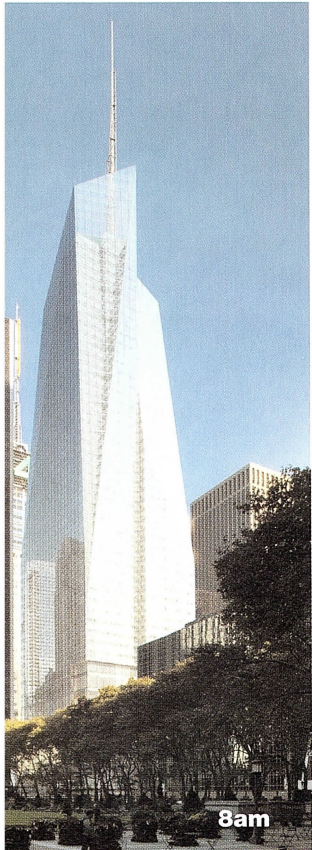
BRSK ARCHITECTS

SEN ARCHITECTS

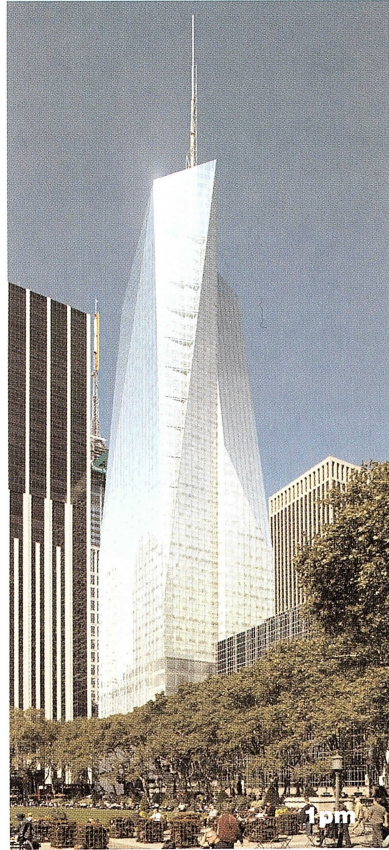
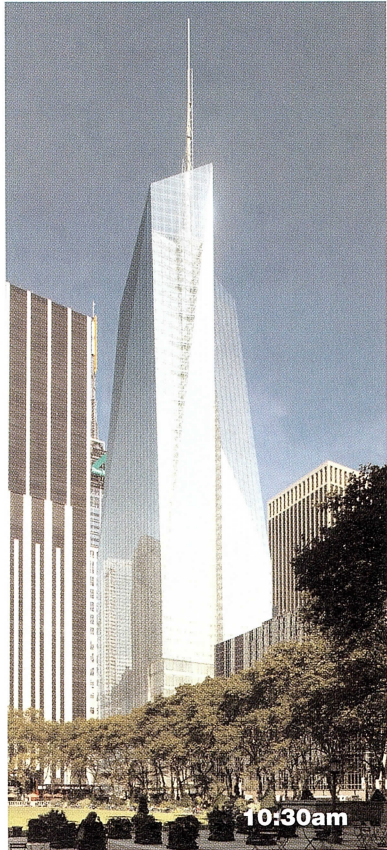
SEN ARCHITECTS



# One Bryant Park Takes the LEED

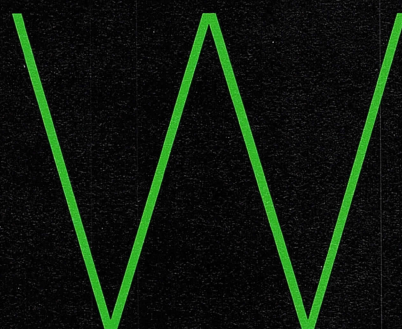


COOK + FOX ARCHITECTS



Cook + Fox  
Architects see  
platinum in green  
By Linda G. Miller





When Richard Cook, AIA, traveled to Cambodia to bring home his new twin sons, the experience dramatically altered the course of his professional life. After seeing the dichotomy between Cambodia's pristine fields and the congestion of its cities, he embraced the mantra: "think globally and act locally." Cook, his partner Robert Fox, AIA, and their firm Cook + Fox Architects have been committed to building environmentally

responsible buildings. It's their belief that as environmental concerns intensify, architectural excellence and environmental sustainability will inevitably be intertwined. "I believe," says Cook, "that we have a spiritual obligation to be wise stewards of our natural resources and pursue designs that act and interact in a different way." They will see the realization of this philosophy when the 54-story building they have designed – the Bank of America Tower at One Bryant Park – is completed in 2008.

The architects drew inspiration in part from the Crystal Palace, the first glass and steel building in the country, which was situated in Bryant Park from 1853 to 1854. A major attraction, the Crystal Palace

Exposition showcased the technological advances of its day, such as the safety elevator. The modern crystalline skyscraper will use high performance green technologies, and will dazzle onlookers with its shape, sense of movement, and the way it will reflect the neighboring buildings.

A joint venture between the Bank of America and the Durst Organization, the 2.2 million-square-foot building at One Bryant Park will be the largest green project in New York City, and perhaps the world. The bank's New York headquarters will occupy 1.1 million square feet.

The developer and the architectural team pledged to push the green envelope – aiming for Platinum LEED. Clean, efficient energy will be produced by an onsite 5.1-megawatt co-generation plant that will provide over two-thirds of the building's total power consumption. Advanced double-wall technology on the south face of the building will dissipate the sun's heat while floor-to-ceiling translucent windows throughout will allow for maximum daylight in

interior spaces. The low-e (emissivity) coated windows will block out most of the harmful UV rays. A gray-water system will reuse harvested rainwater and wastewater, and low flow fixtures and innovative devices such as waterless urinals will save millions of gallons of water per year.

The team has paid much attention to quality of life issues for those who will work in the tower, and have designed a filtered underfloor displacement air ventilation system. The high-rise will act as a giant air filter as 95% of the particulates in the fresh air entering the building are removed and air is filtered on a floor-by-floor basis.

More than a third of the building will be constructed in recycled materials and 75% of the demolition and construction debris will be recycled. An anaerobic digester will convert food scraps and shredded paper into electrical power and compost.

One Bryant Park will offer three times the public circulation space of other as-of-right high-rise office buildings. Most notably, a below-grade pedestrian walkway will link the B, D, and F subway lines to the Times Square subway station, an amenity accompanied by a new glass-enclosed subway entrance at 42nd Street and 6th Avenue and a mid-block subway entrance on 42nd Street. A 5,000-square-foot urban garden at 43rd Street and 6th Avenue will extend the swath of greenery created by the great lawn of Bryant Park. An additional treat for the neighborhood will be a new 1,000-seat theater fronted by the restored landmarked 1918 facade of the Henry Miller Theater on West 43rd Street.

Bob Fox notes, "I am on a personal quest to create beautiful, environmentally responsible buildings, and One Bryant Park is by far my best and most exciting project. I believe that it will fundamentally change the way people think about buildings."

Linda G. Miller is a freelance writer. She formerly served as director of communications at the Municipal Art Society.

**Design Architect: Cook + Fox Architects**

**Executive Architect: Adamson Associates Architects**

**Tenant Interior Architect: Gensler Associates**

**Construction Manager: Tishman Construction Corp.**

**Structural Engineer: Severud Associates**

**M/E/P Engineer: Jaros Baum & Bolles**

**Energy Analysis/LEED Consultant: Steven Winter Associates**

**Curtainwall Consultant: Israel Berger & Associates**

**Base Building Acoustician: Shen Milsom & Wilke, Inc.**

**Landscape Architect: Andropogon Associates**

**Lighting Consultant: Cline Bettridge Bernstein Lighting**

**Design Inc.**

**Historic Preservation Consultant: Higgins & Quasebarth**

**Theater Consultant: Fisher Dachs Associates**

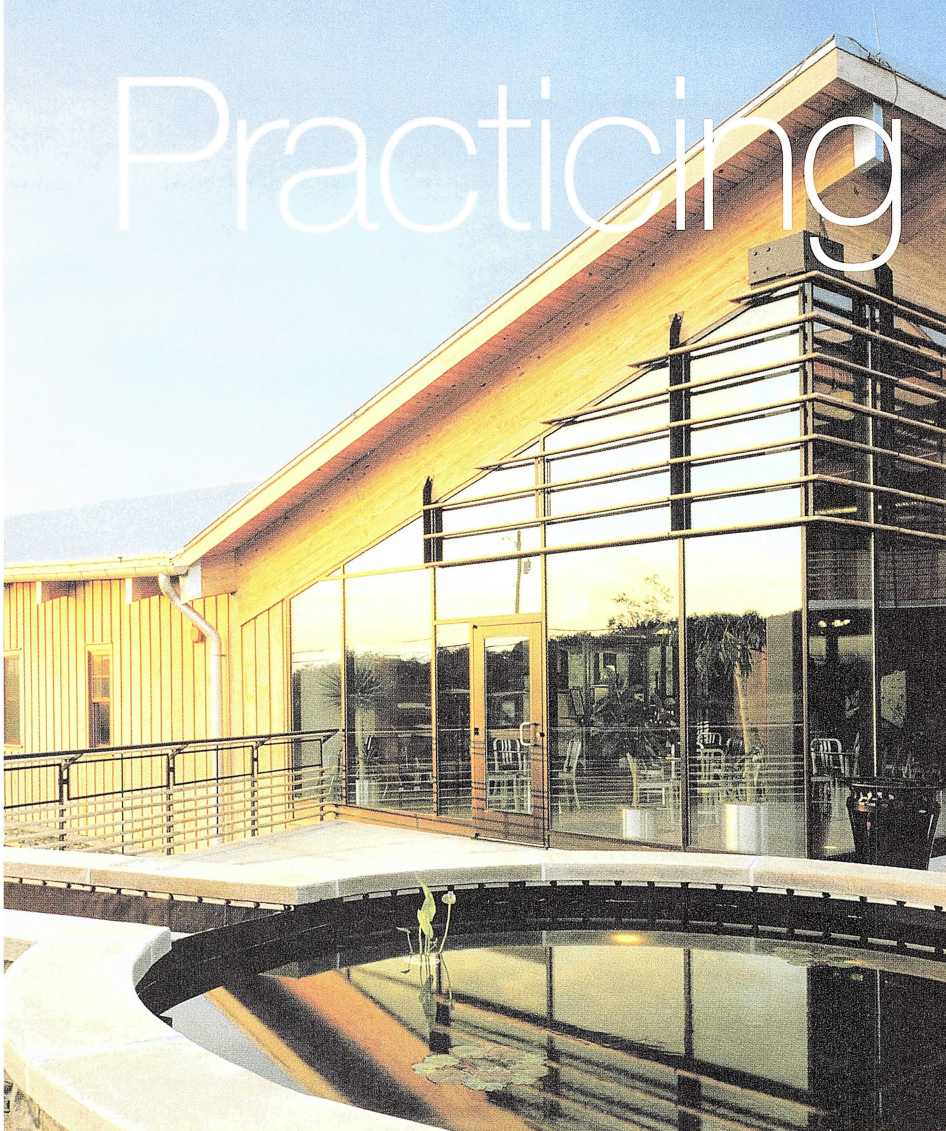
**Theater Acoustician: Jaffe Holden Acoustics, Inc.**





# Practicing

# Green



DAVID ALLEE

**Patrick H. Dollard Discovery Health Center**

Guenther 5 Architects pioneers sustainable healthcare design practices **By Sara Moss**

While firms sometimes have to sell green design, in this case convincing the client was not difficult. The client, the non-profit Patrick H. Dollard Discovery Health Center in Sullivan County, New York, provides a residential, clinical, and social center for people with significant disabilities. The building is part of the Center's 350-acre campus, which includes a functioning organic farm. It made sense for them to build sustainably, says principal Robin Guenther, AIA, who notes, "The fit between green and who they are was so right."

The Discovery Health Center was completed in 2003, and received LEED certification from the U.S. Green Building Council in late 2004, making it only the second such certified healthcare facility in the country. Given recent developments in sustainable healthcare design research, however, Guenther 5 Architects hopes many more such buildings will follow.

The Center came to Guenther 5 in 1999 because of the firm's previous work on non-institutional healthcare projects (like The Continuum Center for Health & Healing at Beth Israel Medical Center in Manhattan) and their experience with the New York State Department of Health. At the time, Guenther and partner John Petarca, AIA, were using ground source heat pumps in townhouses in Lower Manhattan (the first installation of its kind in Manhattan). At the first meeting, the firm proposed using a geothermal system as an alternative to fuel. While this cost more initially than a traditional boiler system, the client has since seen substantial savings. "The beauty of the building is that we're saving 30% of utility costs based on the geothermal system," says Center Director Patrick Dollard, for whom the building is named. Later on in the project, during construction documents, they decided to go for LEED rating.

The 27,000-square-foot building provides medical and dental care for the wheelchair-bound residents at the Center, and is the first licensed medical facility on the campus. Entirely new, it was built as a greenfield development. In addition to the

ground source heat pumps, its sustainable design elements include a high-performance building envelope, interior daylighting, and the use of low VOC materials and cleaning products.

The project was design bid build, with a general contractor; without a construction manager to watch over the process, it was up to the architects to write specifications that covered sustainable building concerns, such as construction waste management and indoor air quality. Masterspec, which incorporates LEED, was not yet in use.

The complex LEED certification process meant that the team needed the contractor, Storm King Contracting, to deliver detailed information on the construction material used. "We improvised without industry models," says Guenther, "and had to deliver documentation [in order to get certified]."

A healthcare facility makes sustainable design especially challenging: it operates 24 hours a day, seven days a week; it must have redundant systems to account for possible failure; and many of its occupants are arguably more sensitive to their environment. Hospitals have what Guenther calls a "huge operational footprint," using large amounts of energy and producing significant amounts of medical and other waste.

The work required to obtain LEED certification is demanding; Guenther cannot venture a guess as to how much work went into compiling all the necessary information. As for cost, the certification



process ran between \$60,000 to \$70,000 (over 1% of the \$5.6 million construction cost), including expenses such as energy modeling and actual application fees, but not the extra hours to assemble the documentation. Of this cost, \$40,000 was covered by a New York State Energy Research and Development Authority (NYSERDA) grant received in 2000. There was also a substantial matching gift for construction costs from the Kresge Foundation as part of its Green Building Initiative program.

When asked about what might have been different had the architects tried to go “green” from the start of the project, Guenther points out that they would have made sure the entire team was chosen for its commitment to the same goals. The site engineer, who was not Guenther 5’s consultant and was not LEED knowledgeable, handled responsibilities such as the selection of exterior lighting, for which the team was unable to earn LEED points.

Accepting that things may go wrong, says Guenther, is part of the process. “Aim high, accept that you will lose some LEED credits,” she says. “Some will be a sacrifice of schedule, some of inattentiveness, or of something else.”

But Guenther does more than speak about the experience. She is sharing her knowledge from this project and others with three key groups. She is a co-coordinator on the steering committee for the Green Guide for Healthcare, an independent best-practices guide that has been developed in tandem with LEED. She also serves on the core committee for the U.S. Green Building Council Application Guide for Healthcare (USGBC-AGH), and is a committee member for the AIA 2005 Guidelines for Healthcare Construction.

Guenther 5 took on the Discovery Health Center project at a time of meager guidance and few regulations in the building process. But now, with the development of healthcare-specific sustainable guidelines, building green should be easier. “We all want to do it better the next time,” says Guenther. “I think we’ve proven that it can be done.”



GUENTHER 5 ARCHITECTS

#### Discovery is a residential, clinical, and social center for people with significant disabilities

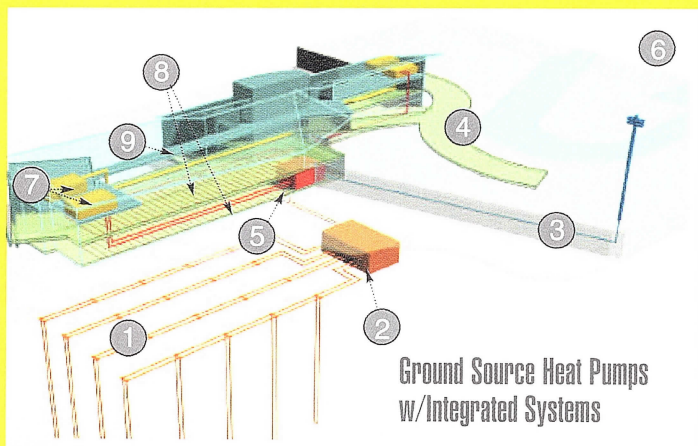
**Client:** Patrick H. Dollard Discovery Health Center

**Architecture & Design:** Guenther 5 Architects, PLLC

**Mechanical and Electrical Engineering:** Lilker Associates

**General Contractors:** Storm King Contracting

Sara Moss works for the Fulton Street Transit Center project and writes about architecture.



- 1 Geothermal borefield
- 2 Manifolds
- 3 Electrical supply
- 4 Radiant snow melting
- 5 Heat pumps
- 6 Emergency generator
- 7 Air handling units
- 8 Radiant slab heating
- 9 Ducts



**A scorecard for New Jersey  
Higher Education Partnership  
for Sustainability (NJHEPS)  
By Richard Staub**

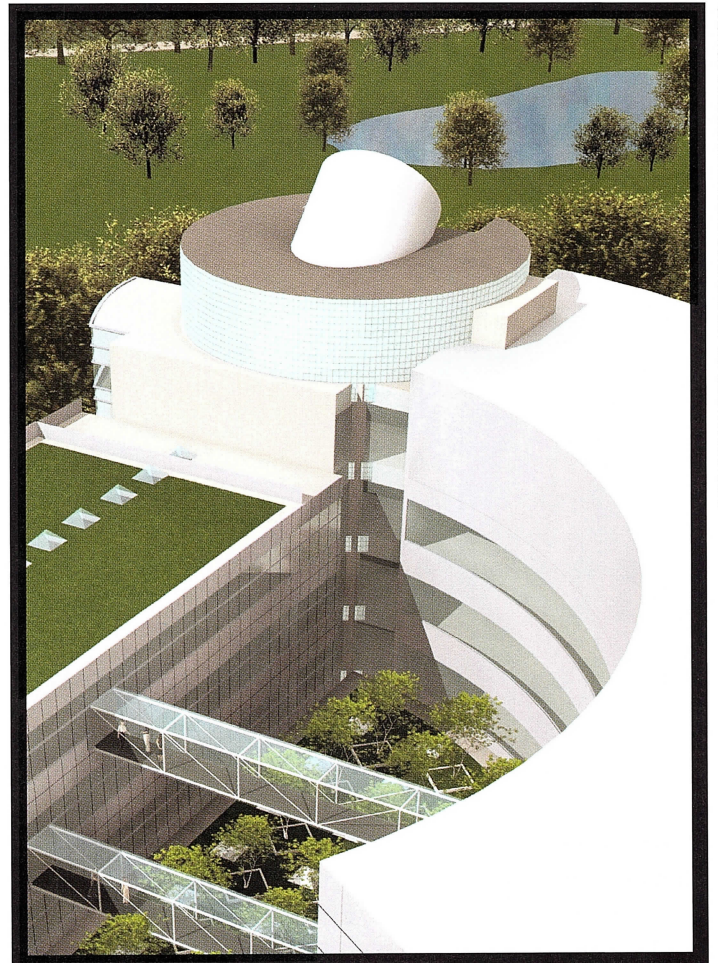
# How Green is the Garden State?

**A**re you thinking green yet? If you're an architect designing a college or university project in New Jersey, you're probably well on your way. One reason is the New Jersey Higher Education Partnership for Sustainability (NJHEPS), an eight-year-old initiative supported by 40 of New Jersey's college and university presidents to make their campuses green.

While the program covers nearly every aspect of university operations, perhaps the most ambitious component is the creation of a two-part High Performance Campus Design Handbook, which offers guidelines for designing sustainable buildings.

NJHEPS Executive Director Dr. Donald Wheeler comments, "We understand that we're calling for a very different design process. It requires architects to adopt an expanded set of values and apply them during every phase of design. We've created the handbook to make that transformation easier."

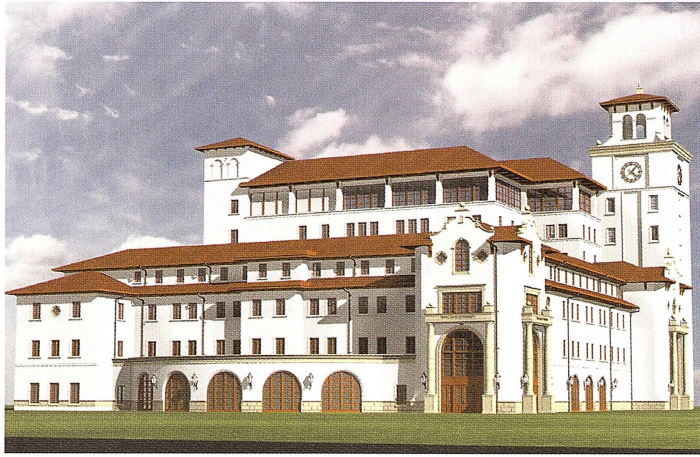
The "we" Wheeler refers to is a group of university architects, administrators, and consultants who have worked together since the creation of NJHEPS to turn good intentions into reality. And the result is green buildings either underway or already completed on such campuses as Rutgers University, Kean University, Ramapo College, and Montclair State University.



CROXTON COLLABORATIVE ARCHITECTS/NADASKY KOPELSON ARCHITECTS

**Croxtton Collaborative Architects and Nadasky Kopelson Architects:  
Center for the Environment, Rutgers University Cook/Douglass Campus,  
New Brunswick, NJ**





SLAM COLLABORATIVE

**SLAM Collaborative: Academic Building, Montclair State University, Montclair, NJ**

Selling green design on academic campuses is easier than in the commercial world. Environmental awareness and responsibility has been an area of intellectual investigation since the late 1960s. In the 1990s, heightened awareness of global warming and the steady depletion of the ozone layer gave a sense of urgency to the movement. Says Kean University President Dr. Dawood Farahi, "The reasoning is very basic. New Jersey is the most densely populated state in the country and we have to keep it livable. Once you make that argument, and show the economic feasibility of green design, your case is won."

Making that case is now more important than ever. All 56 presidents of New Jersey's colleges and universities have signed onto a statewide commitment to reduce green gas emissions to 3.5% below 1990 levels by 2005. Given the continuing growth of campuses and the need for energy to support the technology they require, campuses are fighting an uphill battle. And this is where the handbooks come in. With \$4.7 billion committed to construction by 42 institutions of higher education through 2008, these guidelines to green design will likely be used by more and more architects and other design professionals.

The first volume provides a comprehensive rationale and overview for high performance design. It defines the term, gives the characteristics of high performance buildings, the benefits of sustainable design (in recognition of the importance of the bottom line, cost savings tops the list), and offers implementation strategies. It outlines the principles that guide it and the important features of a green building, and describes the value of LEED and the kinds of government support available.

Advisors to the guide during its preparation include such pioneers in the field as Hillary Brown, AIA, LEED, who developed the first initiative in sustainable design for the NYC DDC; David Orr, the environmental author and educator; and Anthony Cortese, a founder and president of Second Nature, which is devoted to bringing sustainable design to campuses.

The second volume, completed in February, is assembled according to CSI Master Format, and proposes possibilities and alternatives for all the divisions dealing with construction. It's the first green manual to use that format and its editor and one of its authors, Bill Bobenhausen, FAIA, CSI, CSS, takes pride in its comprehensiveness. Says Bobenhausen, "We give enough information to understand what's

to be accomplished and the advantages and disadvantages. What we don't do is include manufacturers because it's too hard to be fair."

Notes Bobenhausen, "We expect that this volume will expand as designers and campus architects gain more experience. There's more experimentation every day, with innovations always being introduced. It will probably always be a work-in-progress."

Those most responsible for maintaining NJHEPS' day-to-day momentum are the campus architects and facilities directors at each of the institutions. Regina Bleck, Rutgers University's Executive Director of Facilities Project Administration, sees progress happening at a deep but constant level, and notes that any worthwhile commitment has to be institution-wide because of the kind of change that's required. The school's first green building, Center for the Environment, is now undergoing feasibility studies, with Croxton Collaborative of New York City and Nadasky Kopelson Architects of Morristown, New Jersey, as the designers.

Eduardo Del Valle, AIA, Associate Vice President for Facilities and Campus Planning at Kean University in Union, New Jersey, was one of the founders of NJHEPS. Del Valle says, "The program has been an



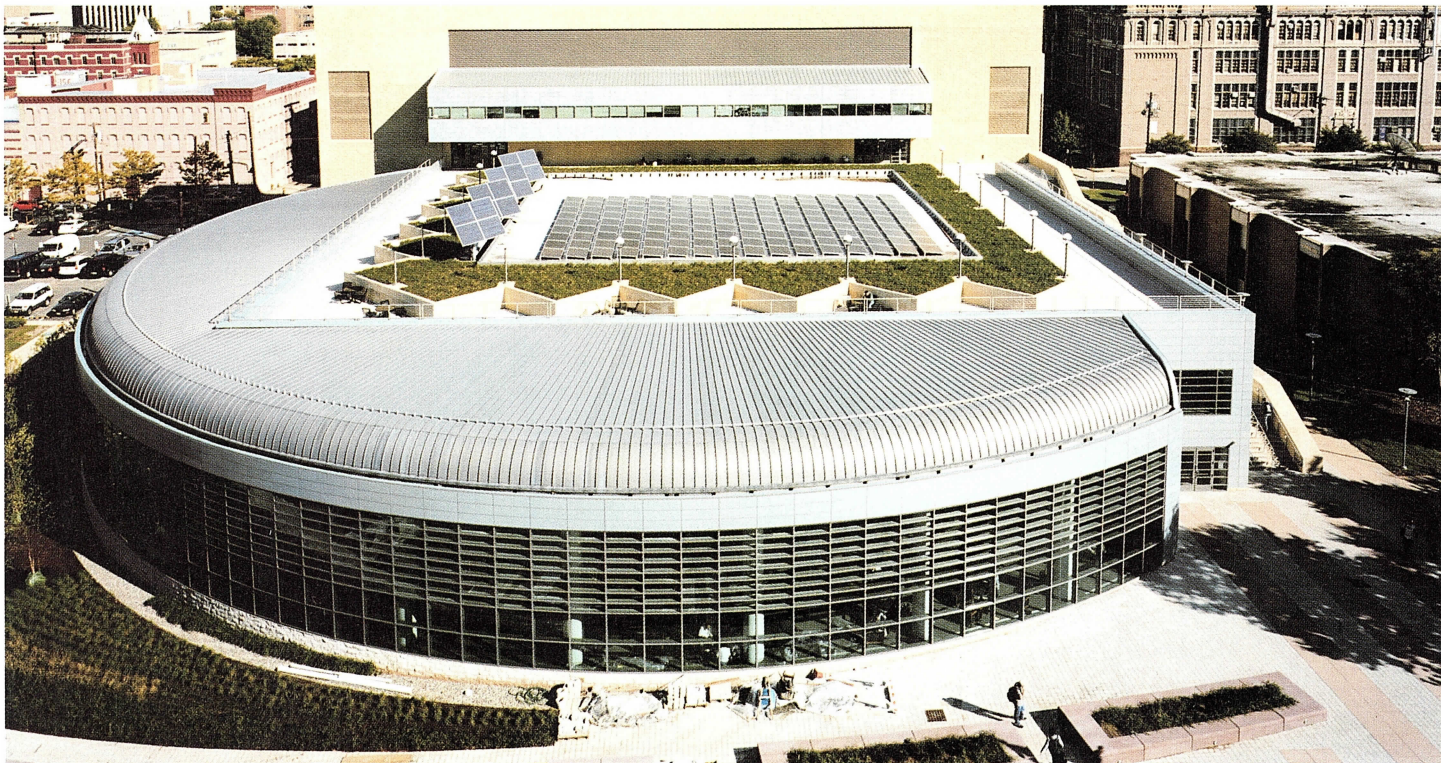
GEORGE SHAGAWAT PHOTOGRAPHY

**Fletcher Thompson: Technology Center, Ocean County College, Toms River, NJ**

important advocate for sustainable design and removed any sense of mystery about it. The meetings, workshops, newsletters, and information briefings they produce keep us all on our toes." He points to the just completed Center for Academic Success, designed by KSS Architects in Princeton, New Jersey, as evidence of their commitment. It's being submitted for a gold LEED certificate. Also underway is a green sports arena, designed by HOK's New York office.

NJHEPS' web site proudly lists many new higher education buildings that are up for LEED designation. Walter Kanzler, a project manager at Montclair State University and NJHEPS advocate, says, "A LEED designation is a benchmark for progress that gets everyone headed in the same direction. We now ask for a LEED certified person on the construction team to police the specs and we make the contractors responsible for keeping track of all the sustainable elements that will get us points." The campus has a new academic building underway, designed by the SLAM Collaborative in Glastonbury, Connecticut, that should qualify for a silver certificate.





**Gwathmey Siegel & Associates Architects and Cody Eckert & Associates: Campus Center and Academic Building, New Jersey Institute of Technology, Newark, NJ**

While not disputing the value of a LEED certificate, Bobenhausen and Randy Croxton, FAIA, of the Croxton Collaborative feel that focusing on a LEED designation can miss the point. Says Bobenhausen, "It's possible to have an element in a building that contributes to its energy efficiency but isn't something measured by LEED. And the design team can get distracted by the quest for LEED and not take a more integrated approach to sustainable goals." Croxton, whose Audubon Building was the first poster child for sustainable design, looks for an approach that includes environmental elements, built and natural systems, and the community.

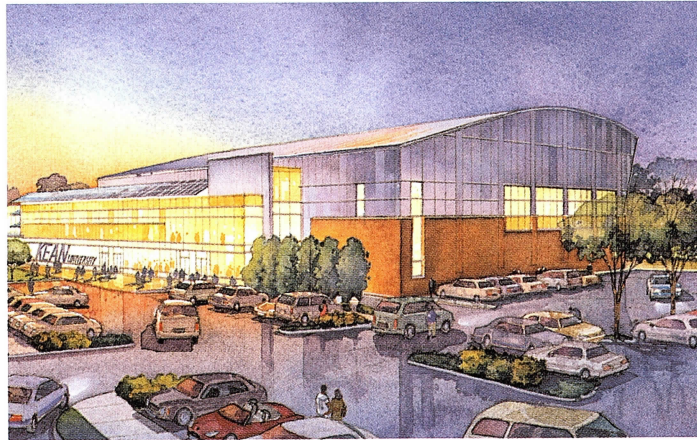
It's that kind of holistic thinking that NJHEPS' High Performance Campus Design Handbook is advocating and, given the commitment of its members, is likely to achieve.

"A LEED designation is a benchmark for progress that gets everyone headed in the same direction."

Richard Staub is a marketing consultant and writer who focuses on issues important to the design and building community.



**KSS Architects: Center for Academic Success, Kean University, Union, NJ**



**Hellmuth, Obata & Kassabaum: Sports Arena and D'Angola Gymnasium Renovation, Kean University, Union, NJ**



# Building a Green Machine

**Sustainable buildings  
begin with engineering**  
By Daniel H. Nall, FAIA, PE

"It is clear that climate engineering in Germany has evolved far beyond its counterpart in the United States, and yet none of these strategies is rocket science. The time has come for American architects and engineers to seek alternatives to their high voltage formulas (sic) and begin to work unplugged."

This paean to European "green buildings" in Architectural Record ("High Tech Tools Give German Engineers Low-Tech Solutions," by Sara Hart, February 2003) articulates the prevailing low opinion of American sustainable design. Is this opinion justified? Clearly much of American building, like that of most countries, is as undistinguished environmentally as it is architecturally. The real question is whether the difference between American and European green buildings is one of quality or of adaptation to a different environment.

In the popular critical jargon, "Light and Air" distinguish European green buildings from their American brethren. "Light and Air" is visually striking, but is it an appropriate "green" response to the Eastern U.S. climate, which differs markedly from that of Northern Europe? Climatic differences render many European strategies, such as natural ventilation and overnight cooling of thermal mass, counter-productive here, where refrigeration and dehumidification are required to maintain summer comfort.

A refrigerated building designed to maximize comfort and energy efficiency looks substantially different from a building optimized for natural ventilation. In the latter case, larger windows maximize air circulation. In the former case, reducing solar heat gain by moderating glazed area results in improved energy performance and comfort.

American climate-adaptive architecture predates the current "green building" movement. The Hooker Chemical Building in Buffalo, by Burt Hill Kosar Rittelmann Associates, used double envelope and movable internal shading devices in the late 1970s. The Prudential Enerplex South Building, by Alan Chimacoff, built in 1982, utilizes an unconditioned atrium, shaded light wells, façade variations by orientation, and geothermal heat pumps to achieve an energy consumption of about 38,000 BTU per square foot each year, more than 35% savings over other new buildings of the era.

So, what are the necessary characteristics of a climate-adapted building for the East Coast? The first step is an appropriate area of high performance glass, protected by external shading devices or self-shading buildings, or moderated by semi-conditioned atrium spaces.

For engineering systems, daylight responsive lighting controls are required. Splitting ventilation/dehumidification and sensible heating/cooling into separate systems allows separate control of these functions, and more efficient refrigeration. This separation also transports sensible heating and cooling by pumped hot and cold water, requiring less than 15% of the transport energy of fan-forced hot and

cold air. Demand controlled ventilation reduces air flow to the volume required by the actual occupancy at any time. Hours of free cooling, through airside or waterside economizer, are greatly increased by providing sensible cooling at higher temperatures. Underfloor air delivery provides individual comfort control in each workspace, while reducing fan energy. Radiant cooling systems in lobbies or other tall spaces reduce cooling transport energy by removing the solar heat gain absorbed by the floor before it convects into the air.

"The most important lesson to be learned from these examples is that climate adaptive architecture, like all good architecture, is specific to its location."

The Hearst Headquarters in New York, by Foster and Partners, with shell and core conservation measures only, including a low temperature, variable volume central fan system with airside economizer, lobby radiant cooling, and high performance glass, is projected to save 23% in energy compared with a standard code-compliant building. Savings may rise to 30% if daylight responsive lighting controls are installed during tenant fit-out. The William Jefferson Clinton Presidential Center, in Little Rock, Arkansas, by Polshek Partnership Architects, utilizes displacement ventilation, radiant cooling and heating, photovoltaic panels, high performance glazing, and external shading to save about 34%, while New York's One Bryant Park, by Cook + Fox

Architects, uses double envelope systems, underfloor air, and cogeneration to save as much as 40%.

The most important lesson to be learned from these examples is that climate adaptive architecture, like all good architecture, is specific to its location. Successful solutions in one location should not be imported slavishly to climatically different areas, and solutions should not be judged by whether they resemble successful solutions from other climates. Certainly, much improvement is needed in the general building stock of both the United States and Europe, but the best examples of sustainable design in both locations offer hope and education for all who care about responsible architecture.

Daniel H. Nall, FAIA, PE, a Senior Vice President at Flack + Kurtz, is an architect and professional engineer. He is a Visiting Lecturer at the Princeton University School of Architecture, and a member of the Board of Directors of the New York Chapter of the U.S. Green Building Council.



High-rise structures are an integral part of the urban cityscape. From Shanghai to Miami, tall residential buildings make possible the levels of density needed for land-efficient urbanization that fosters mass transit, a vibrant mix of uses, and 24/7 neighborhoods.

Due to market-driven requirements and the premium cost of center-city land, a residential high-rise vernacular has evolved that emphasizes efficiency, rapid construction techniques, and first-cost reduction. In Manhattan, most of residential towers built in the past 40 years include crudely detailed masonry walls with exposed slab edges, sliding windows, through-wall PTAC (packaged terminal air conditioning) heating and cooling units, low ceiling heights, and unimaginative unit layouts. The cumulative effect of these characteristics makes for a low-performing building stock, not to mention an uninspired contribution to our cityscape.

### Raising the Bar

Recently a movement has begun to raise the bar on residential high-rise design quality and performance. Four current projects by Fox & Fowle Architects, each of significant scale and each with its own sustainable objectives, present the opportunity to compare and contrast strategies and results.

Using the U.S. Green Building Council's LEED rating system as a basis of comparison, a study examined the 634-unit Clinton Green Mixed-Use Development on West 52nd Street and Tenth Avenue, with construction slated to begin in mid-2005, projected to be LEED Certified; the 460-unit St. Francis Residential Tower on West 31st Street near Penn Station, slated to begin construction in mid-2005, designed to LEED Silver; the 600-unit Helena Apartment Tower on

West 57th Street and Eleventh Avenue, now renting and anticipating LEED Gold; and a detailed proposal for Site 16/17 in Battery Park City, designed to LEED Gold. The scope and impact of this group of projects represents over half a billion dollars in capital investment and over 2,000 new units of housing. In addition, Clinton Green, the St. Francis Tower, and the Helena are all part of the New York State Housing Finance Agency 80/20 Program, providing the same sustainable benefits to both market rate and subsidized units.

A close look at the sustainable applications employed in these projects identifies areas of the LEED rating system that fall short in the service of urban residential projects, as well as ways in which the market is moving beyond LEED.

### The Results

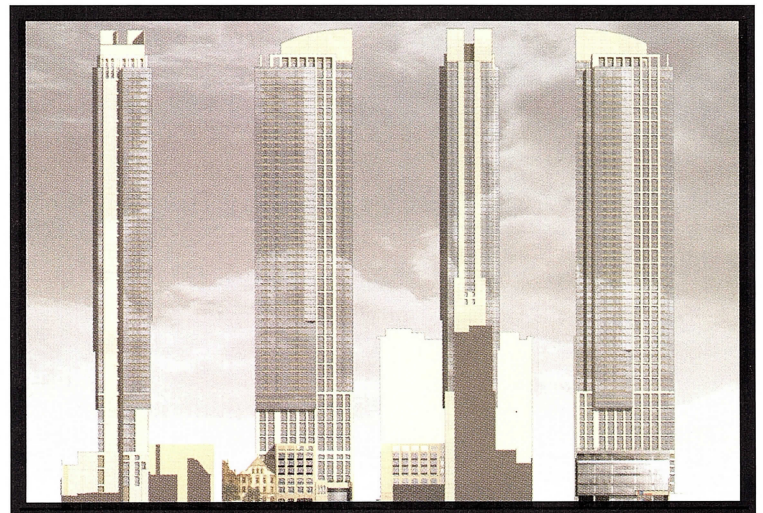
Density goals and alternative transportation options are readily achieved by these projects. Given their significant environmental benefits, LEED may not recognize these strategies enough. Green roofs on the building setbacks help to earn storm water management and heat island reduction credits. The relatively low cost of green roofs – about \$.35 per overall project square foot – and their function as an amenity explains their ready acceptance.

Although Manhattan has some of the cleanest and most reliable drinking water in the world, there remains an urgent need for sustainable water management. Green roofs and on-site water treatment plants at the Helena and Site 16/17 aim to reduce storm water runoff, but price is a major deterrent to the installation of substantial improvements in water efficiency. Of the four projects, only two – the Helena and the proposal for Battery Park City – incorporate on-site blackwater treatment centers.

# Four Shades



**Designed to LEED Certified: Clinton Green, a 634-unit mixed-use development**



**Designed to LEED Silver: 460-unit St. Francis Residential Tower near Penn Station**



None of the projects is able to achieve more than a 35% reduction in energy use in comparison to ASHRAE 90.1. Although manufacturers have drastically improved the performance of glazing, the market desire for large expanses of transparent glass offsets these improvements, leaving mechanical system enhancements as the major contributor to improved energy efficiency. The overall effect is little net reduction in the use of energy compared to residential projects designed 10 years ago.

Photovoltaic panels have also achieved improved efficiencies in their manufacture, installation, and ability to produce energy. That said, their costs are still significantly disproportionate to their output. The cost to achieve the 5% of building load required by LEED falls into the relatively high range of \$1.30 per overall square foot. Significantly, the only one of these four projects that incorporates a substantial photovoltaic array is the proposal for Battery Park City, where the guidelines mandate that a minimum of 5% of the base building load be supplied by building integrated photovoltaics. At the Helena, a 285-square-foot array is incorporated at the entrance, where its function is primarily iconographic. There are another 1,700 square feet of BIPVs (building-integrated photovoltaics) at the mechanical screen wall, and together they supply about 1.5% of the base building load. Other on-site energy solutions including natural gas-fired micro-turbines, while not technically renewable, have become a more effective means for producing clean energy onsite and are incorporated into all four projects.

#### Beyond LEED?

Where the projects excel from a LEED perspective is in improved indoor environmental quality. By making use of materials with low or no volatile organic compounds – now readily available in the market –

these buildings are able to provide a superior indoor environment. However, maximizing outside air distribution to and within the living units is less straightforward. The typical New York practice is to supply treated outside air to the common corridor, provide operable windows in the units, and exhaust via shafts at bathrooms and sometimes in kitchens. This arrangement, while economical, does not provide for a thorough distribution of outside air. When unvented “super kitchens” and ventless dryers are added to the mix, the outcome becomes even murkier. Except for the Battery Park City proposal (which follows stringent and explicit IAQ [indoor air quality] guidelines), the buildings in the study rely on variations of the typical arrangement described above, yet unfortunately comply with the LEED prerequisites.

With the building industry’s environmental awareness on the rise, it is essential to share information gained from previous sustainable efforts to improve future efforts. To this end, Fox & Fowle is making available the full “4 Shades of Green Study” (e-mail [info@foxfowle.com](mailto:info@foxfowle.com) for a copy). The size, location, and relevance of these four projects, as well as the integration of design and environmental goals, speaks volumes about the development of sustainable high-rise residential design and the successes and liabilities of LEED as a rating tool.

Dan Kaplan, AIA, [Senior Principal at Fox & Fowle Architects](#), has overseen the four projects discussed above, as well as the [New York Times Building](#), the [Conde Nast Building at Four Times Square](#), and the [Reuters Building at Three Times Square](#).

Jason Abbey, LEED; Heidi Sawyer, LEED; [and Abigail Carlen, LEED](#), contributed to this article.

# of Green



**Designed to LEED Gold: 600-unit Helena Apartment Tower on West 57th Street**



**Designed to LEED Gold: Proposal for Site 16/17 in Battery Park City**

LEED takes on the residential high-rise

**By Daniel J. Kaplan, AIA**





## Q & A with Hillary Brown, AIA, LEED

Hillary Brown, AIA, LEED, is Principal of New Civic Works, a firm that assists government agencies, universities, and institutional clients in integrating sustainable design practices into their building programs. Current clients include the New York City Department of Design and Construction (DDC), the City of New Haven Public Schools Program, and the State University of New York at Buffalo. Formerly a founding director of the New York City Office of Sustainable Design at DDC, Brown helped realize the City's 1999 High Performance Building Guidelines. She has served on the national Board of Directors for the U.S. Green Building Council and is currently on the Board of its New York Chapter.

**Oculus:** You created the Office of Sustainable Design in 1997 for the City's public works agency, the New York City Department of Design and Construction. Are you satisfied with the pace, scope, and scale of the City's efforts to create high performance public buildings?

**Hillary Brown:** DDC continues to aggressively advance its program, deepening its commitment to green in useful and imaginative ways. I wish the pace were faster in rolling out these practices for the remainder of the City's programs, given the accomplishments and the tools now available. Local government programs should work much harder to embolden each other, sharing lessons learned about the barriers and opportunities common to all. Some of this has been captured in the 2001 publication of the U.S. Green Building Council's "Local Government Toolkit," which New Civic Works co-authored.

**O:** DDC created dozens of superlative demonstration green projects during the period that you headed its environmental program and served as Assistant Commissioner for Architecture & Engineering. Is there any lingering disappointment that there was not more mainstreaming of these efforts into NYC public projects?

**HB:** There were some disappointments, but two things are of upper-

most importance in implementing a program like this. First, find real champions for high performance among the clients (owners and users) who will adopt these principles creatively, and as their own. Second, always stay focused on aligning the green building objectives with the core service mission of the client and doing those things well. For example, the emphasis on daylighting for a library, indoor environmental quality for courtrooms, healthy materials for daycare centers. Often, LEED doesn't ultimately allow that flexibility in emphasis, which is why I also favor the use of guidelines.

**O:** What can be done to better mainstream sustainable practices in urban planning and architecture?

**HB:** First, let's celebrate what seems to be an exponential increase in thinking green in the design world. A desire, across disciplines and sectors, to apply sustainable principles and practices, even though not yet reflected in know-how. This public quest is a good indicator, bringing with it a significant clamor for tools, products, data, and success stories. Along with advocates and early adopters, a more active public can turn its attention to removing barriers to mainstreaming sustainability.

**O:** What are some of the barriers?

**HB:** Two barriers top my list. One is our low level of industry commitment to R&D. Relative to many other countries, we reinvest a lower percentage of building industry GDP in research and development. We've forfeited our early leads in renewable technology, are underfunding building science research in our universities and government labs, and have far to go in addressing linkages between materials science and public health, between ecological health and social health.

Which brings me to the other issue in mainstreaming: the continuing low standing of ecological design in the professional pedagogy for architects and planners. There are still only a handful of schools whose studios actively encourage the use of sustainable principles. Few promote integration of high performance principles into history/theory, materials and methods, and the teaching of



# On Green

professional practice. Sustainable design is all too often relegated to the province of “environmental technology,” and consequently has achieved little standing in the dominant discourse.

**O:** Does LEED go far enough?

**HB:** LEED is the most important common infrastructure we have now in mainstreaming high performance. As I’ve often said, LEED and High Performance Guidelines function as training wheels. I foresee that we need them to keep us on a straight course for a period of time.

But LEED has a limited role. It cannot stand in for appropriate design education. Nor would I suggest we use it to direct our research and development investment. It mustn’t in and of itself become a regulatory tool and I don’t think it is the best possible policy instrument. We are going to need a lot more than a LEED system to move towards ecological solvency. We need to jump scales and disciplines in our environmental problem-solving, rolling out new practices for industrial design, civil engineering, and the planning disciplines.

**O:** What alternatives or supplements to LEED already exist?

**HB:** There are excellent examples all over the country of guidelines that have been developed specific to large capital programs – particularly by government agencies and universities. Here in New York City, customized guidelines impact all the work at Battery Park City and at the MTA.

**O:** How can the evolving focus on sustainability issues in architecture and design influence other disciplines?

**HB:** One example is the forthcoming City of New York High Performance Infrastructure Guidelines, an undertaking of the Design Trust for Public Space and DDC and a companion piece to the earlier HP Building Guidelines. It provides a roadmap for incorporating sustainable practices into the design and construction of the public-right-of-way: paving strategies, tree-planting, utilities, storm drainage, and streetscape and landscape concerns. Even though recommended

improvements are likely to be put in place only incrementally, the overall benefits will accrue as they become implemented long-term on a city-wide basis: reduction of the urban heat island effect, air quality improvements, improved local hydrology, reduced waste, and increased public health and safety and quality of life.

**O:** What are the current projects of New Civic Works? How do you select a client?

**HB:** We’ve been so lucky in targeting good clients – DDC, SUNY, the City of New Haven, for example, who want to revamp their building programs towards sustainability. Ultimately, we look for clients who are willing to partner in research and writing, and include us in the implementation phase. For New Haven, we are working with 10 different design firms doing schools, and get to share information and lessons learned among all of them.

**O:** With all the discussion of “red states” and “blue states,” can a “green state” of mind bring some measure of unity to an ideologically polarized electorate?

**HB:** That’s an important question and a very hopeful point for a largely polarized nation. What’s so compelling about the high performance initiatives sweeping the country is that they have champions on both sides of the aisle. Both parties recognize how economic and environmental interests converge, and are acting accordingly.

**O:** You founded your own firm in 2001, and have been a registered architect for many years, or at least, many more years than you have been a member of the AIA. What led you to join a few years back?

**HB:** Likely it was the convergence of my professional interests and energies around sustainability that drove me recently to restore my connection with the AIA, as it is a focal actor in mainstreaming environmental and social agendas. I’m rewarded in return by enjoying a vigorous local chapter brimming with challenging offerings.



# Cool Roof for the South Bronx

**The South Bronx NewRoof Demonstration Project melds community activism, landscape architecture, and scientific and policy research**  
**By Kathleen Bakewell, RLA**

The South Bronx, long the poster child of urban blight, has shouldered an excess of environmental burdens, including more than two dozen waste transfer stations, a sewage treatment plant, a sewage sludge palletizing plant, and heavy diesel exhaust – all of which contribute to noxious odors, windblown debris and particulate matter, and skyrocketing asthma rates. This poor air quality is compounded by a scarcity of green open spaces; street trees number less than one per acre in many areas. In addition, large areas of impervious surfaces contribute to the urban heat island effect and polluted runoff.

This spring, the South Bronx NewRoof Demonstration Project (NDP) will introduce a lush, green, and cool roof garden to the Hunts Point neighborhood, taking a highly visible step towards healing an environmentally degraded urban community. The proposed garden will be a working, productive landscape with ambitious goals: to foster a larger South Bronx green roof network, an important step for Sustainable South Bronx (SSB), a non-profit group working for community sustainability and environmental justice.

With support from Con Edison, Carlisle Syntec Systems, and Coastal Specified Products, a multi-disciplinary NDP team led by Majora Carter of SSB, myself, and Joyce Rosenthal of Columbia University's Graduate School of Architecture, Planning and Preservation, will meld community activism, landscape architecture, and scientific and policy research.

The roof demonstration project will be constructed on the American Banknote Building, a 1911 Art Deco building located across from Manida Park, one of the only remaining green spaces in Hunts Point. Currently housing SSB headquarters, and the home of the Bronx Academy of Arts and Dance (BAAD) and numerous artist studios, the building formerly served a different "green" purpose: it housed the presses that printed many of the securities, stocks, and bonds traded on Wall Street. In addition to providing the expected benefits of storm water retention and reduced ambient and building



**Bronx NewRoof Demonstration Project**

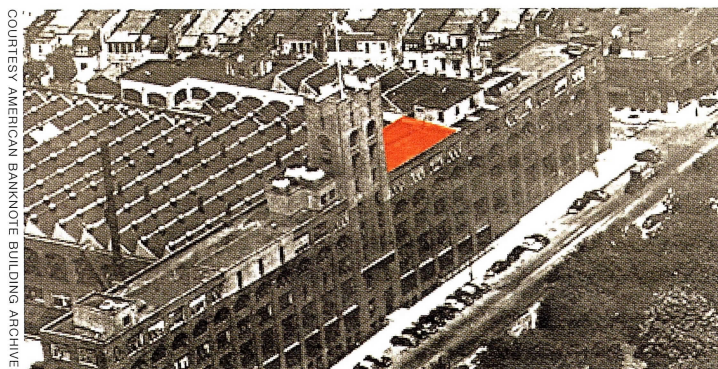
temperatures, the final design of the building's green roof will also be a garden of native plantings.

The research aspect of the project will assess the benefits of cool roof development for the South Bronx. This includes evaluating the multiple advantages of conserving peak electrical loads, and reducing the formation of ground level ozone and summer heat stress. The findings from this large-scale program will be useful in developing urban green roof programs in other urban areas.

The NDP will make presentations on new roof technologies and their community benefits to local schools, and students and teachers will be invited to observe the project as it develops and work directly with the project team. Research findings as well as tours will also be offered to elected officials, regulatory agencies, community boards, housing managers, building owners, development corporations, and the public.

The SSB Community Council will coordinate the project outreach. Objectives include recruiting and educating residents about sustainable development, and what they can do to make a difference.

Kathleen Bakewell, RLA, is associate principal at HM White Site Architects and a member of the NDP team. She also teaches at Columbia University's Graduate School of Architecture, Planning and Preservation and the New Jersey Institute of Technology's graduate architecture program.



**Vintage photo of American Banknote Building shows NDP in red**

COURTESY AMERICAN BANKNOTE BUILDING ARCHIVIST

KATHLEEN BAKEWELL, RLA





KRISTEN RICHARDS

**Resource Directors work to build environmentally friendly design libraries**  
By Katherine Day Sutton

**Katherine Day Sutton among her green shelves**

**T**he architecture and design industry is one of the key forces leading the world to a more sustainable future. While this all sounds very grand, the daily reality is we are bombarded in the trenches with a confusing number of products claiming to be "green." Two basic questions facing every design firm's Resource Director is how to evaluate the validity of these so-called "sustainable" products and how to incorporate them into a meaningful "green" library.

All design firm libraries have limited space, so most librarians integrate the green with the non-green. Some store them by categories (Fabric, Flooring) and others use the CSI divisions (5:Metals, 9:Finishes). But some libraries separate the green from the non-green. Ronnette Riley, FAIA, hired a German industrial designer to set up her green library because she respected Europe's history with sustainable materials. She actively specifies green products, especially solid surfacing, but admits it's not realistic in a service industry like ours to completely avoid standard goods.

If the sustainable and standard products are intermixed, how do architects find the green ones? The simplest answer is to label green items with green dots; architects don't have time to decipher a fancy numbering system. (It also helps to attach copies of the manufacturers' environmental policies to the inside covers of green product binders so designers can examine the details behind the public relations claims.) At Ferris Architects, Pam Krausman collects all loose green product literature into a quick reference "Green Bible." At Fox & Fowle, we display our subscriptions to green magazines with the rest of the periodicals in a central magazine case. To introduce a new green product to the firm, we display it on a New Materials bulletin board or showcase it during an office product Show 'n' Tell luncheon. Beyer Blinder Belle's resource director Morley Bland sends out a Monday e-mail with brief descriptions of new green products she discovered the prior week.

To keep the inventory of products current, Resource Directors throw out old sources when new ones come in. When we have a choice between a new green or non-green material, we opt to keep the green alternative. We also try to avoid the trash heap by recycling our outdated materials – green as well as non-green – among our own staff (you'd be surprised how many people are working on craft projects at home) or we send them off to design schools for student use.

It isn't always easy to be green. This is particularly true in the design industry. "There is a lot of 'greenwashing' going on," says Peter Carey of Butler Rogers Baskett, "and it is hard to believe everything you hear from any given manufacturer." So the burden of justifying green products to clients falls on us. Jackie Suozzi at SOM says they restrict their options to the following criteria: "The product should

# Greening the Office Library

come from a 500 mile radius, have low VOCs, high recycled content, be a rapidly renewable source, and wood should come from a certified source."

To keep our selves and our shelves green, Resource Directors look beyond the green dots. We keep abreast by asking pointed questions of sales reps, working for LEED accreditation, attending educational seminars and, best of all, supporting each other on a daily basis through our national Resource Directors Association e-mail network.

Katherine Day Sutton is the Resource Director at Fox & Fowle Architects and a founding member of the Resource Directors Association. She currently writes a monthly Materials Q+A column for *Contract* magazine, and previously was the Product Editor at *Interiors* magazine.



# Lessons from Machu Picchu

By Jean Gardner



RUTH M. WRIGHT, WRIGHT WATER ENGINEERS, INC., DENVER, CO

**Urban Water Systems as Design Regulators:** Water is the key to understanding the design of Machu Picchu. How did the Incas bring the water to the city, and distribute, drain, and carry it away from their city? Ken Wright discovered the water source on a steep mountain slope north of the city. He realized that the flow of water through a constructed system had determined the entire urban layout, including the site of the royal residence, the Temple to the Sun, and the agricultural terraces. He uncovered an elaborate collection system, which is still distributing water from the

## Machu Picchu

Recent discoveries in the 15th-century Incan city of Machu Picchu demonstrate how a human settlement can make ecological functions the basis for architectural decisions. With more than 30 large-scale development projects in the works, New York City has the opportunity to learn important lessons from the ecologically sustainable design of Machu Picchu.

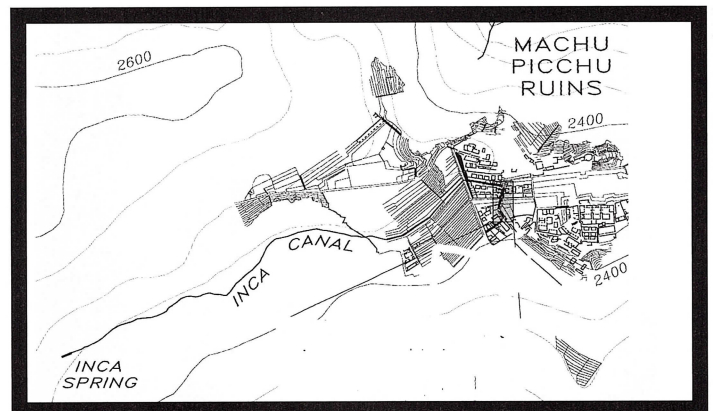
Machu Picchu, the Camp David imperial retreat of its day, represents an extraordinary architectural, civil engineering, and agricultural feat. In the mid 1990s, Denver-based hydrologic engineer Kenneth Wright and his team discovered that this magical aerie in the clouds is an astonishing interlocking preplanned system that integrates hydrology, hydraulics, drainage, foundation engineering, masonry building technologies, soil making, and agriculture. After 20 years of requesting permission to investigate Machu Picchu, Wright began extensive on-the-ground research in 1994. He soon realized that this complex of massive stone buildings and agricultural terraces was conceived and built as a single entity.

**Agricultural Terraces:** Machu Picchu provides an inspiration for soil making relevant to modern green roofs. According to Edward Hyams in his prescient *Soil and Civilization*, the Incas “lacked not merely fertile soil, but level surfaces of any soil at all.” To survive, they expanded onto the mountainsides by preventing erosion of the slopes and building surfaces level enough to be worked even without the plough. “In order to expand over soils that did not receive floodwaters, the Incas discovered the principles of soil regeneration. By carefully regulated and controlled use of manures from fish, by terracing, pit-digging and irrigation, the Incas converted their poor natural soil communities into rich, stable, humanly-made, organic ones.” We could do something similar on our rooftops.

**Cities and Soil Communities:** Cities function as part of the soil communities they overlay. They form vital relationships with regional soil communities as well. Soil is not a dead, inert medium but an organism. The rock, humus, bacteria, atmosphere, water, fungi, and earthworms that comprise soil constitute a biological, organic, living community.

mountain spring after more than four centuries of abandonment.

Before the main canal reaches the 16 fountains near the royal residence, Wright’s team found two control points where excess water spilled into the agricultural terraces or into the city’s main drain so the fountains would not overflow. This drain is only a part of a previously unstudied elaborate drainage system. Wright found 130 drainage out-



KURT A. LOPTIEN, CARTOGRAPHER  
WRIGHT WATER ENGINEERS

## Site Map

lets integrated into walls and structures throughout the city, as well as numerous drainage channels incorporated into stairways, walkways, and building interiors, all built to carry runoff to the main drain. To direct water away from building foundations, the Incas carved channels that collected water falling from roofs. When laying out the urban plazas, they created a deep, subsurface layer of rocks to help water penetrate the ground quickly.

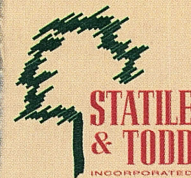
Imagine if New York City’s zoning or building codes regulated the flow of water and recaptured the agricultural potential of rooftop gardens and farms. Yesterday’s industrial detritus could be today’s verdant city – and tomorrow’s archaeological wonder.

Jean Gardner is Senior Faculty, Department of Architecture, Interior Design, and Lighting, Parsons School of Design, and Coordinator of the CUNY Sustainable Construction Initiative. She is author of *Urban Wilderness: Nature in New York City*.



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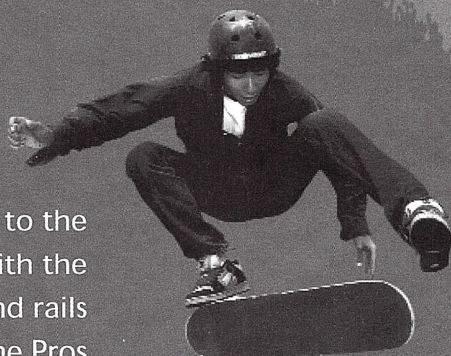
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# Fork in the Road

Outside View

By Ann Jarmusch

The San Diego Union-Tribune

When I first moved to San Diego from a landlocked city, I had eyes only for the BEACHES sign. Nearly 15 years later, I'm still adjusting to the area's prevailing stick-and-stucco

type of construction, which seems flimsily beach-like and anti-urban. Yet stucco over wood works here, where the earth moves, winter is usually a blip on the tranquil screen, and people frequently resettle like shifting sands.

My short drive home from work is usually painless, as freeways go, except for the enormous overhead signs whose bold arrows point to my own nagging dilemma. Which will it be: the lane that speeds north to LOS ANGELES, or the lane that within minutes terminates at BEACHES?

I won't deny it: the coastal siren song remains as tantalizing as ever, but it will never quash the flaming urbanite in me who thrives in New York, Philadelphia, Chicago, Vancouver. When the big-city part of my being requires a quick adrenalin rush, the call of the freeway lures me north to L.A. or south to Tijuana. Both are electrifying in profound and challenging ways San Diego can't quite muster.

Yes, San Diego is growing fast, with thousands of people moving downtown into expensive, shiny new towers and faux lofts; thousands more are sprawling north, south, and east into expensive new tract homes. But gobbling land and living on a denser grid of video stores and fast-food joints does not a city make. A tuned-in new generation of architects working here aptly describes the burgeoning burg as a "reluctant city."



Ocean Beach People's Organic Food Co-op, by ARCHITECTS hanna gabriel wells: an award-winning, solar-powered "green" store and cafe



Solana Beach train station, Solana Beach, by Rob Wellington Quigley: a lookout resembling a lifeguard station crowns the 65-foot tower

This reluctance can be frustrating, even infuriating, to an urban-ista. Despite the dire, decades-old need for a new main library, the design for a brilliant new library and cultural center (by Rob Wellington Quigley with Tucker Sadler Noble Castro) is subject to waves of political and fiscal delays. Despite the area's astonishing natural beauty, chaparral-fringed mesas are still scraped for new gated communities. Despite an enviable number of sunny days, San Diego hasn't embraced solar power any more than Iowa has.

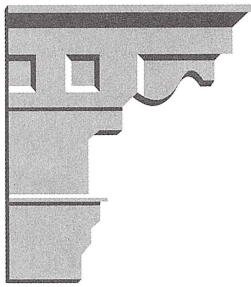
This is where architecture firms like estudio teddy cruz, Public, ARCHITECTS hanna gabriel wells, Studio E, and Jonathan Segal, plus some of their wise, innovative predecessors, such as Quigley and Ted Smith, come in. Working mostly on small-scale buildings or projects, they are creating designs that reflect San Diego's distinct assets and heritage, from Spanish-Mexican concepts for indoor-outdoor living to celebrating surfing culture. In fresh, breezy, and often delightfully inventive designs, these and other architects have devised their own urban language that arises from the region's spectacular geography, climate, and siting along the world's largest ocean and the world's busiest international border. The vibrant, engaging architecture and public places they create satisfy urban-ites, beach creatures, and hybrids like me.

Ann Jarmusch is architecture critic for *The San Diego Union-Tribune* and contributes to *Architectural Record* and *Architecture* magazines. She is indebted to her father for bringing her to New York as a child and insisting that she crane her neck to appreciate the marvelous, very distant details adorning Manhattan's skyscrapers.

ROB WELLINGTON QUIGLEY

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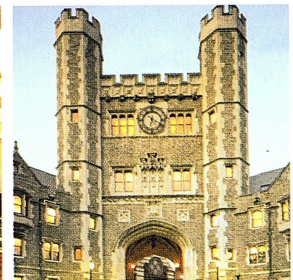
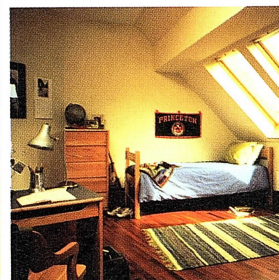
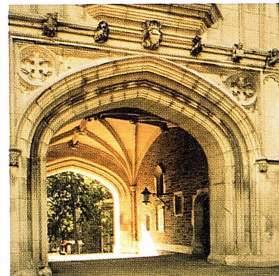
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# 42-Year Watch

P.S. 199, by Edward Durell Stone, 1963

By Fred Bernstein

Edward Durell Stone began his career as an “orthodox” modernist (his Museum of Modern Art, with Philip Goodwin, and his Conger Goodyear House, both from the 1930s, are emblematic of his International Style roots). But Stone’s greatest success came in mid-century with a series of classically-inspired buildings – from his American Embassy in New Delhi (1954) to his Kennedy Center (completed in 1971). Neither of his best-known Manhattan works, the General Motors Building, with its awkward plaza, or his Huntington Hartford Museum, with its unusual “lollipop” details, is as successful as those strongly horizontal, Parthenon-like buildings.

In fact, the clearest expression in New York of Stone’s aesthetic may be a public school building on West 70th Street, just a hop from Lincoln Center (a complex that was itself profoundly influenced by Stone).

P.S. 199, completed in 1963, provided Stone with the kind of site and program his approach required. The site was large enough to permit a freestanding building, and the program dictated that he not build higher than three stories. Stone responded by forming 166 identical white brick piers into a 30-foot-high rectangular structure. The piers, 31 on the east and west sides of the building, 52 on the north and south – support a thin, flat roof that overhangs the building by an extravagant six feet. Groups of concentric squares inscribed beneath the overhang suggest classical patterning, highly atypical of modernist



P.S. 199 entrance

buildings of the 1960s. There are none of the grilles for which Stone was famous, but the long rows of closely spaced piers serve as a grille writ large. In fact, the 18-inch-deep piers make the building envelope (mostly glass, with black brick spandrels) invisible from acute angles. The main entrance, off-center on the north side of the building, is framed by five piers that are indistinguishable from all the others. (Indeed, from a distance, the only evidence of the entrance is a gap in the white-brick retaining wall around the site.)

Classrooms are arrayed along the exterior walls, with the building’s windowless interior reserved for public spaces. A foyer bisects the ground floor. Despite the foyer’s low ceiling, Stone tried to give it grandeur with marble wall panels, a white terrazzo floor, and two rows of

round ceiling fixtures that, in plan, would have resembled colonnades. The double-height auditorium boasts a draped ceiling of metal disks. Still in perfect condition, this hanging screen is Stone at his glamorous best.

The rest of the building is less special. Thanks to the deep piers outside their windows, the classrooms are a bit more claustrophobic than those in other schools of the era. But Stone’s building contains a few surprises. Above a dreary ground floor cafeteria is a double-height gymnasium. With the piers tall enough to read as piers (and not mere mullions, as in the classrooms), the gym feels monumental. On the third floor, classrooms have extra headroom – and the extra windows to go with it. The center of the top floor (actually the auditorium roof) houses an open-air playground. That means the top floor, a rectangular donut, is flooded with light from four inner and four outer facades.

Like any school built 40 years ago, the building has been modified to meet changing conditions. (Among other practical problems: the advent of personal computers required hundreds of additional electric outlets.) Most of the interventions have been handled with discretion. But a few seem overly obtrusive; surely Stone didn’t expect doors set into the white marble foyer walls to be painted baby blue, or wooden picture molding to be hung across the marble. (The molding makes it possible to show student artwork without drilling through marble.) Then again, this is a school, and student work is its *raison d’être*. Fortunately, Stone’s architectural ideas are so strong that a few collages can’t obscure them.



Stone’s draped metal disks still adorn the auditorium ceiling

Fred Bernstein, an *Oculus* contributing editor, has written about design for more than 15 years. He also contributes to the *New York Times*, *Metropolitan Home*, and *Blueprint*.



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# The State of Sustainability:

**Good Practices**  
**By Iva Kravitz**

## So, Where Are We?

There was cynicism, frustration, ambivalence, and grey areas. But in the end, there was hope. *Oculus* set out to check out the reality about green design; through a survey and interviews with New York City-based architects, we asked about awareness of sustainability, whether practices are changing, whether or not people know of and/or are participating in the U.S. Green Building Council's (USGBC) LEED program, and what clients are saying. The firms we spoke to represent a wide range of practice: from very small, two-person shops to some of the largest firms in the city. Because survey participants were solicited through eOculus, there may be a slight skew to green: people who responded tended to be inherently interested. But we also sought out a cross-section in the private and public realms who collectively design stores, corporate offices, schools, hotels and restaurants, housing (market rate and affordable), mixed-use projects, public works, museums, and non-profit and healthcare facilities. Here is what we found.

The amount of information available to architects about green design at this point is tremendous. In addition to mainstream trade publications such as *Architecture*, *Architectural Record*, *Interior Design*, *Interiors & Sources*, and *Contract*, there are a number of web sites focused on sustainability and building, particularly the USGBC web site. Almost as many specialty journals are out there, the most popular of which are *Environmental Building News* and *Environmental Design & Construction*. So we weren't surprised that most, but not all the firms we spoke to, see themselves as at least "aware" of issues of sustainability. On a 1-10 scale of awareness with 10 being highest, the group collectively rated themselves as 6.5.

Almost every firm either circulates information about new technologies and sustainability or has a person on staff who reads and passes it along. But, if you believe Bruce Fowle, FAIA, of Fox & Fowle Architects who says that "It has to be the culture of the firm. You have to walk in the door and know you're in a green office," then we're still not there: only 54% of firms said "true" to the statement "We have policies or goals regarding sustainability that are communicated through the firm." Larger firms, specifically Fox & Fowle and Perkins Eastman, have "green teams" who act as the firms' resources for other project designers.

Several architects see the profession as being "significantly" more aware than the general public. Geoff Kurst of Kostow Greenwood is typical. "Architects are bombarded with information from the trades all the time," he says, "but this stuff isn't on the cover of *Time* magazine; it's not in the public yet. At this point we're the messengers." Another typical comment is that "younger designers have a greater interest and concern than the older ones so progress is painfully slow."

The LEED program, a voluntary, consensus-based rating system for developing high-performance, sustainable buildings, has raised awareness of what sustainable building design means. Everyone we spoke to knew what the program was (although one architect said he had just found out the week before at an AIA-required lecture for educational credits), and all agreed it's a good idea to have an independent body certifying energy savings, materials selection, and design.

Seventy-two percent of the responding firms have a LEED accredited person on staff, and most firms plan on continuing to support LEED accreditation: 76% say they pay for time off for employees to attend green conferences and seminars. Clients, too, are more and more aware of LEED: 64% of the firms said that at least "some" clients had mentioned LEED certification as a design goal. In real life, however, it's very time-consuming and costly to prepare the documentation and submittals for LEED status. (Project registration fees range from \$750 to \$3,750 just to begin the process; certification rates are \$1,500 - \$7,500 and up.)

**Every person who knew what the term "greenwashing" means thinks manufacturers do it, most often answering "absolutely."**

**Two firms identified themselves as having libraries that contain only sustainable materials.**

**When asked whether or not clients see green design as a marketing tool for their businesses, architects said**

- **Yes 43% of the time**
- **No 37% of the time**
- **Unsure 20% of the time**

**Of large NYC firms (more than 65 people), 100% have at least some LEED-accredited architects; the numbers range from three to more than 50 people. Of very small firms (one to five people), only 14% have a LEED person on staff.**

**Three firms who work with large public agencies pointed out that they've experienced friction between the agency responsible for building a green building and the project managers responsible for maintaining it.**

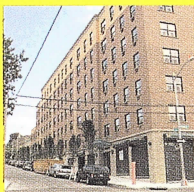
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Where public and private clients land on a more/less sustainability scale

## Public Clients

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### Public Housing & Public Hospitals

Efforts at upgrading and adding sustainable design are slow and ponderous

TAINO PLAZA, BRONX,  
CURTIS + GINSBERG ARCHITECTS

### Public Schools

New York City school administrators "have absolutely no interest" in green design, according to some respondents

HOK



### Transportation

At the Staten Island Ferry, the architects' scope of work includes reseeding oyster beds in New York Harbor; the MTA's Design for the Environment program ensures sustainable standards in all transit projects

ST. GEORGE FERRY TERMINAL, STATEN ISLAND,  
HELLMUTH, OBATA & KASSABAUM

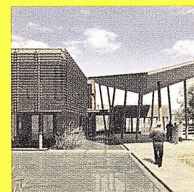


CERVIN ROBINSON

### Universities

New York State guidelines are pushing our public universities toward more sustainable design

ARCADIA UNIVERSITY LANDMAN LIBRARY MAIN READING ROOM, R.M. KLIMENT & FRANCES  
HALSBAND ARCHITECTS



BKSK ARCHITECTS

### Non-Profit Groups

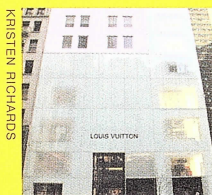
The Queens Botanical Garden and the Wildlife Conservation Society are planning LEED Platinum buildings

QUEENS BOTANICAL GARDEN,  
BKSK ARCHITECTS

Less Sustainable

### Luxury Retail

LOUIS VUITTON,  
NEW YORK CITY  
JUN AOKI



KRISTEN RICHARDS

### Museums

Owner occupied, but not mission-critical

### Hotels

Becoming more aware of waste and efficiency issues

### Corporate interiors

A principal at a large design firm says, "I've never had a client ask us about LEED, earth-friendly materials or the environment, ever"



### Retail

ANTHROPOLOGIE,  
CHESTNUT HILL, PA,  
POMPEI A.D.



PAUL WARCHOL

### Sui Generic

The United Nations is a green client, both in New York City and around the world

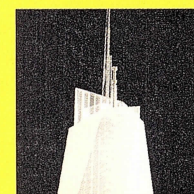
### Healthcare

Starting to wake up to healthy buildings and public health awareness via their facilities

MT. SINAI HOSPITAL LAUDER CENTER FOR MATERNITY CARE, GUENTHER 5 ARCHITECTS

### Private Universities

Being pushed by students on issues of sustainability



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### Commercial Development

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ONE BRYANT PARK, COOK + FOX ARCHITECTS

More Sustainable

## Private Clients



Some of our questions were frankly simplistic. We asked about designing spaces with maximum amounts of daylight and windows that open, and of course it's complicated: more fenestration requires less lighting but more A/C and heating energy, and open windows allow fresh air to circulate but also admit particulate matter and toxins, especially in Manhattan. *The larger point is that many principles of green design, particularly siting and building orientation, are just good design.* Ken Drucker, AIA, a principal of HOK, says, "We think it's an important basis of design. In this world of fashion and sexiness, the values and principles of sustainability form the basis of our design – as opposed to arbitrary choices."

Conversations about materials get more complicated. This story is typical. Mark Kates, AIA, of Kates-Schuster Architects, a small office downtown, explained that he tried to specify ipé, a Brazilian wood that can replenish the forest if grown correctly but deplete the forest if it's not. Some Brazilian foresters are certified by the government to sell it, which should clarify the specification. But when Kates and partner Dorothy Schuster found out that there is a market for counterfeit certificates, they lost patience. Having spent days doing the research, they still had no way of knowing if their wood was grown by good or bad farmers. Many firms are frustrated by the time it takes to verify product claims; as Mark Ginsberg, AIA, of Curtis + Ginsberg says succinctly, "You don't get paid for the research or the additional design."

Innovative systems are just as dicey as materials. Clients, especially large ones like hospitals, are famously risk-averse. Robin Guenther, AIA, LEED, principal of Guenther 5 Architects, says some of her healthcare clients "want 20 years operating statistics before they'll try a new heating system." Murray Levi of Green4NY had this experience: "An underfloor air system was fought tooth and nail by the owner's rep even though it was proven to cost less than the conventionally ducted alternative, the argument being that no contractors in New York would get the installation right."

Almost no New York City firms consider wind as a source of energy. Forty percent of the respondents, however, had experience with solar panels, and the same number with geothermal heating/cooling systems. A surprising 32% said they had used either waterless urinals or toilets in their projects. Other sustainable building features that the respondents have used include photovoltaics, energy transfer/heat exchange mechanicals, roof spray cooling systems, rainwater collection, black- or gray-water systems, fuel cells, composting toilets, constructed wetlands, spray-ceramic insulation, daylight harvesting, ice storage systems, dual flush toilets, underfloor air, and white roofing. Probably the most extreme example of an architectural firm restoring the environment is HOK, which, in the course of designing the St. George Ferry Terminal in Staten Island, is reintroducing oyster beds in the harbor to clean the water around the terminal.

Susan Drew, AIA, of Gruzen Samton notes, "Sustainable design choices are never black and white, but rather a balancing of priorities within a specific project – and a method of design that allows the team to thread a path through a forest of changing technology and sometimes conflicting strategies."

If architects see themselves as 6.5 on an awareness scale, they see

clients as a 4. Again, the wide range of responses depended on market segment. Government and public clients in New York State must meet sustainability quotients as mandated by the new Executive Order 1100. Market-rate housing clients seem unconcerned with green design, especially if the apartments are to be sold immediately. David Blaustein

at Scarano Associates, who is designing dozens of new multi-unit condos in Brooklyn explains, "The life-span of the buildings and materials are secondary to first-cost." Retailers are historically not environmentally sensitive, but that may be changing. Ron Pompei, principal of retail design firm Pompei AD, comments, "Now, department stores are starting to have windows, but it used to be groundbreaking to have a Macy's with windows. Sunlight is proven to increase sales. People are happier in it." Similarly in hospitality: one firm notes that while they never used to discuss green design, "there's been a sea change in the past two years. Now the issue of sustainability comes up in every interview, all the time." And Frances Halsband, FAIA, of R.M.Kliment & Frances Halsband Architects says, "We are beginning to see more university clients asking us for advice on developing green guidelines."

The interviews suggest that the less experience architects have with green design, the more they think it costs. While some imagined their clients tolerating premiums of 10, 12, 15, or 20%, people who have built green projects know the figures are lower. Bruce Fowle says that The Helena, a new apartment building, cost 5.5% more for its LEED gold rating. Michael Kostow, principal of Kostow Greenwood, made the point that it's easier to sell green elements incrementally. "If you tell a client that their \$1 million project will ultimately cost \$1.15 million to be sustainable, they won't buy it. But if you offer \$35/yard recycled carpet as an alternative to \$30/yard synthetic, a client will often accept the product."

Dana Tang, an associate at Gluckman Mayner, related sustainability to her firm's reputation for designing pristine museum environments. Museums tend to be owner-occupied, so there's some incentive for high efficiency. But "people come to us for art, space, and lighting, not for environmental practice," she says. "We've always been able to say, 'If this makes the end-product better, then you should do it,' about aesthetic choices, so we ought to be able to do that for environmental reasons as well."

In the end, issues of sustainability entail moral, ethical, and political values as well as a business and design decisions. Paul Gates, a partner in Gates Merkulova, a small office in Tribeca, calls it the "mothers in the playground" phenomenon, i.e., "Of course everyone says they support the environment, in theory. If government policy supported alternative energy research, it would create innovation and change a lot. The only solution is political." Adds Dorothy Schuster of Kates Schuster: "The green thing is such small potatoes compared to the environmental and animal habitat devastation everywhere. We should be glad there's some small awareness. The trouble is, my whole profession is about the elimination of natural environments. It's a never-ending battle with conscience."

"Many principles of green design are just good design."

Iva Kravitz has been marketing creative services since 1986, working with architectural, interior, graphic and product designers; she is now an independent consultant to several firms



# Is Green More Than A Fad?

**The Insider's Guide to Marketing Green Buildings,**  
by Jerry Yudelson, PE. Portland, OR: Green Building  
Marketing, 2004. 206 pages, ring-bound. \$145.

Until Michael Shellenberger and Ted Nordhaus delivered their paper *The Death of Environmentalism* at a recent conference in Vermont, "green" had long taken its place along with motherhood and apple pie in the pantheon of good American virtues.

Shellenberger and Nordhaus argue that environmentalism is just another special interest, and they make a case instead for a wider approach that sees it as merely one in a series of liberal, progressive issues. "The political eco-system is as real as the physical eco-system so we might as well deal with it," Bill McKibben, a scholar at Middlebury College, recently remarked in a *New York Times* article.

Still, this in no way detracts from Jerry Yudelson's solid work, which tackles the narrower, physical aspects of this chic topic. And while the book's stated focus is marketing, this 206-page opus is more like a compendium – full of green terminology, surveys, standards, criteria, and market sectors – than it is specifically about marketing.

That's due in part to the dilemma inherent in the title – who indeed is marketing what to whom? Yudelson offers profiles of design professionals who market to public and private clients, engineers who market to architects but also directly to clients, developers who market to owners and leaseholders, and vendors of sustainable products and systems who market to just about everybody. Each must take a unique approach. Under design professionals alone, the author lists eight categories.

A key section takes up ways in which a design firm may (and indeed must) integrate the arrows of sustainable design into its marketing quiver. The primary suggestions include:

- Make a major firm commitment to sustainability. Join the U.S. Green Building Council (USGBC), which publishes the LEED Reference Guide, the source for information on LEED (Leadership in Energy and Environmental Design).
- Place green-knowledgeable people on project teams.
- Offer expertise at public seminars that include clients.
- Practice what you preach. Move your offices to a sustainable building and location (e.g. from suburb to sustainable downtown); or build your own.
- Encourage principals and senior staff to mine your client base to uncover what that base is looking for (lower first costs; lower life cycle costs; a more productive, healthier work environment,

including individual thermal controls, outdoor views, reduced VOC emissions, better overall IAQ).

- Know your competitors, their strengths and weaknesses. You may be able to make up a weakness in another area through superior environmental expertise.
- Differentiate yourself by showing clients your command of sustainable tools and how they'll benefit the client.
- Encourage your key management and design staff to become LEED Accredited Professionals (LEED APs numbered some 10,000 by the end of 2004).
- Market a portfolio of your LEED-registered and LEED-certified projects, and list other projects of yours that contain green features.
- Separate skeptical clients from those willing to listen, and focus your marketing on the latter.
- Don't forget the \$15,000 (typically) it will cost to do the energy modeling studies needed to obtain LEED registration. Yudelson mentions a free tool known as E-Benchmark ([www.poweryourdesign.com](http://www.poweryourdesign.com)). It's made up of some 30 criteria for designers to use to achieve high performance in the building envelope, lighting, HVAC, power systems, and controls.

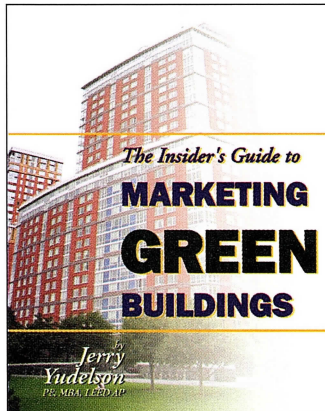
Yudelson devotes a sizable hunk of his book to objections and biases that in his view are hurdles on the road to more green buildings. In a survey of 2,700 attendees at a 2002 conference of the USGBC (49% of whom were design professionals), he found that while 83% of respondents attempted to sell clients on the virtues of LEED, 78% considered added costs as a barrier to sustainable design; 39% were not comfortable with new technologies, although only 24% claimed the market wasn't interested.

Is there a flaw to a marketing approach that focuses on a single service, such as green? The late Philip Johnson used to say that the most important goal of the architect is to get the job. Marketing green services may help you get the job; on the other hand it may work against you if the client prospect has other priorities, or is not open to what may seem a newfangled idea or fad.

So be sure to investigate your client – a sound policy at any time – and use green as a differentiating tool but not necessarily as the sole basis for your message. Yudelson writes: "[Our survey] suggests in some ways that incorporating sustainability and integrated design *into the basic practice of a firm* [emphasis ours] – 'if you hire us, you get the following green measures, no discussion, no argument' – might be more effective and also help firms to differentiate themselves in the marketplace."

All in all, the numbers offer a bullish picture of green design. The author's figures show a hike to 1,428 from 841 or 69.8% in LEED registered projects between July 2003 and July 2004.

Reviewed by Stephen A. Kliment, FAIA





**Security Planning and Design: A Guide for Architects and Building Design Professionals, Joseph A. Demkin, AIA, editor. Hoboken, NJ: John Wiley & Sons, and the American Institute of Architects, 2004. 256 pages. \$60.**

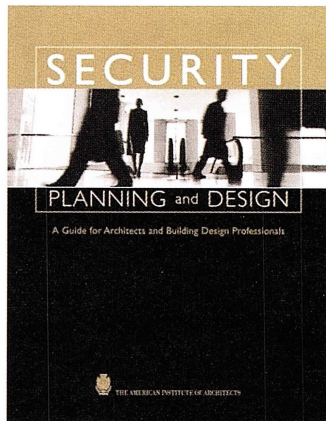
It is one of the ironies of 9/11 and its aftermath that a few months before the planes hit the World Trade Center and the Pentagon, the AIA put out a tightly written, cogent 24-page brochure entitled *Building Security Through Design* which recognized just about every hazard except that of a fully-fuelled airliner ramming an office building during working hours. Progressive collapse, structural redundancy, and strength of exterior cladding were all considered.

So when the Wiley/AIA volume came out, many of the original contributors reappeared, including Stuart L. Knoop, FAIA, Randall Atlas, FAIA, and Peter DiMaggio, PE. An eminently hands-on work, *Security Planning and Design* deals first with the broader conception of security in the built environment – a conception that must take into account regional community concerns and the concentric barriers and levels of defense essential to prevent an attack from reaching its target.

Added pointers take up the necessity of understanding threats, and separate safety threats from security threats. And the book deals with the various techniques by which threats may be carried out, including ballistic attacks, bombs, and chemical/biological/radiological (CBR) attacks.

Readers should not miss the discussion of how the architect and the rest of the building team should go about putting security into practice, especially organization of the team, the role of the client, and what to do during programming, development of contract documents, construction administration, and building operation

Reviewed by Stephen A. Kliment, FAIA



#### Click here: Green Links

The U.S. Green Building Council ([www.usgbc.org](http://www.usgbc.org)) appears to be the closest thing to an umbrella organization for sustainable design. The Council developed LEED, and continues to define the standards for the voluntary pursuit of high-performance design. The home page is easy to follow and includes information on how to register your project, how to take the exam to become a LEED Accredited Professional, and a LEED project list.

Leave it to the GSA to bury their site for green design in a lot of black ink – the direct URL would take up the rest of this page! Visit [www.gsa.gov](http://www.gsa.gov) and enter “sustainable design” or “Office of Applied Science” in the search box. It will yield innumerable nuggets of related information from Low Impact Sustainable Landscape Design and Environmental Policies and Practices, to Urban Development and Environmental Products. Or click “QuickLinks” at the top of the home page for an alphabetized list of pages and topics.

The Environmental Protection Agency is an obvious resource – and the sustainable design site is at the mercifully short address [www.epa.gov/greenbuilding](http://www.epa.gov/greenbuilding). Its organization is graphic, clear, and easy to follow, though for technical information the site may be too general. It has four categories related to sustainability: homes and schools, buildings and the environment, office buildings, and development. It features links to information on energy, water, materials, waste, and indoor environment. The EPA's Energy Star Program is refreshingly basic in its advice, and has a project registration process akin to LEED that can earn a design the EPA Energy Star.

The U.S. Department of Energy has a path to green design by way of [www.sustainable.doe.gov](http://www.sustainable.doe.gov). This site is accessible and informative – a convenient directory of hundreds of web sites and documents relating to green design.

A visit to AIA/COTE, the institute's Committee On The Environment, at [www.aia.org/cote](http://www.aia.org/cote) yields information on the profession's commitment to green design. There are COTE Highlights, Calls for Entries, News, Best Practices, Upcoming Events, and, of course, access to the AIA/COTE Top Ten Green Projects. Worth visiting is the guide to green Request For Proposals at [www.aia.org/cote\\_rfps](http://www.aia.org/cote_rfps), “Sustainable Design Language for Consultant Requests.”

The AIA New York COTE web page, [www.aiany.org/committees/Environment](http://www.aiany.org/committees/Environment), will put you in touch with co-chairs Chris Garvin, AIA, LEED, and Craig Graber, Assoc. AIA, LEED. In addition to an events calendar, it offers an extensive list of Links & Resources.

Building Green at [www.buildinggreen.com](http://www.buildinggreen.com) offers an up-to-date resource for CSI specifications, but an annual subscription (\$99-\$199) is required to access most of the information

Reviewed by Margaret Rietveld, AIA



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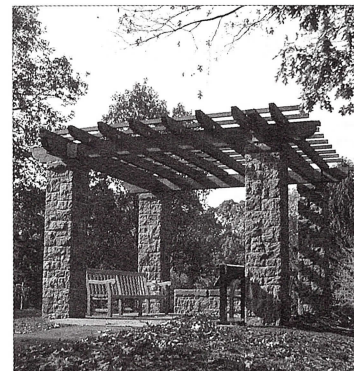
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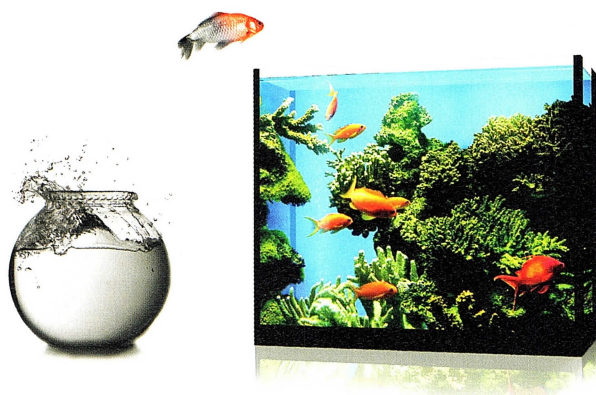
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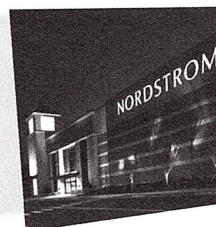
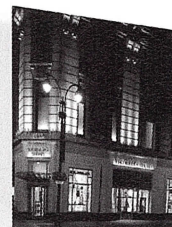
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# Journey to the Center's Geothermal

## Last Words

**Rick Bell, FAIA**

**Executive Director**

**AIA New York Chapter**

**"He must have been in expectation of one of two things, either that a vertical well was about to open under his feet, and thus allow him to continue his descent, or that some insurmountable obstacle would compel us to stop, and to go back by the road we had so long traveled."**

*Jules Verne, Journey to the Center of the Earth*

Standing in the vault under a quiet Greenwich Village sidewalk, former Mayor Ed Koch asked the simple question: "How come nobody knows about this geothermal thing?" The answer wasn't exactly that nobody asked; agency heads and schoolchildren had made the same subterranean trek. Rather, when Hizzoner (or is that hizz-formeroner?), accompanied by former Parks Commissioner Henry Stern, bumped his head on the vault's support structure, the AIA New York Chapter's storefront Center for Architecture at 536 LaGuardia Place had only been open a few months. The geothermal system had not been tested by a summer of operation. Nor had we jammed the public spaces with events drawing 500 people. With no back-up system, no cooling tower, and no margin of error, we were waiting a bit before talking about the AIA going geothermal.

There had been some early mentions. An article about the Center for Architecture by Peter Hall in the May 2004 issue of *Metropolis*, titled "Street Level Politics," described the system: "a network of white plastic pipes gurgles and guzzles around a heat pump like the arteries of a newly transplanted heart." When the AIA decided to move from its Murray Hill aerie, environmental issues were at the forefront of site analysis, program development, and architect selection.

Across from Neil Estern's statue of a pugnacious Fiorello LaGuardia, the new location presented significant challenges. The storefront came with basement and cellar levels that were dark, damp, and dingy spaces barely usable for storage. But an east-facing wall of glass allowed light to penetrate into a poster shop interrupted by columns and randomly placed interior partitions. The possibilities seemed unlimited. Our open two-stage design competition called for "design features that combine environmental and educational value." The competition-winning firm, Andrew Berman Architect, went beyond the program requirements to open up the three levels of space to natural light, enhancing visibility and transparency of AIA operations and Center activities. The design removed four bays of concrete slab to create double and triple-height lecture and gallery spaces. We called for the use of geothermal heat exchange for both heating and cooling.

There are several reasons why a geothermal system made sense for the Center for Architecture:

- it consumes significantly less energy than a conventional condenser system
- it does not require large heat transfer grilles on the building façade
- it could be installed as new technology in the retrofit of an existing building
- it did not require adding a cooling tower to the roof of an occupied building

The system, designed by Michelle Norris, PE of Norfast Engineering (in collaboration with William Bobenhausen, FAIA, of Sustainable Design Collaborative, LLC), is the first geothermal heat exchange installation used for a publicly accessible space in New York City. A grant from NYSEDA significantly offset the cost of the installation, particularly the drilling of two wells, each 1,260 feet deep (by way of comparison, the



ANGELO MONACO

height of the Empire State Building is 1,253 feet). The well drilling took place over a three-week period in the summer of 2003, shortly before the Center for Architecture opened to the public on October 7, 2003.

Geothermal heat exchange is based on the constant temperature of the earth, approximately 52 degrees Fahrenheit, at a thousand feet below ground level in Manhattan. The two wells descending below our sidewalk link to form a continuous closed-loop system naturally filled by groundwater. This groundwater is pumped up from the bottom of the well and circulated through a heat exchanger. Water from the bottom of the well is returned to the top of the well, and remains within the closed loop system as it passes through the heat exchangers. These heat pumps go both ways: accepting heat in cold weather and rejecting it in when it is warm outside. Like most other mechanical systems, air is blown over the water that is chilled or heated by the heat exchangers, and this air circulates through in the building via exposed ducts.

There are other geothermal installations completed or in the works in New York City, most notably the 1400 Fifth Avenue affordable housing project developed by Carlton Brown of Full Spectrum, and designed by architect Frederic Schwartz, FAIA; the Front Street residential project at the South Street Seaport by Cook + Fox Architects; and the Queens Botanical Garden administration building by BSKS Architects. One distinction of the Center for Architecture system is that you have a standing invitation to come see it.



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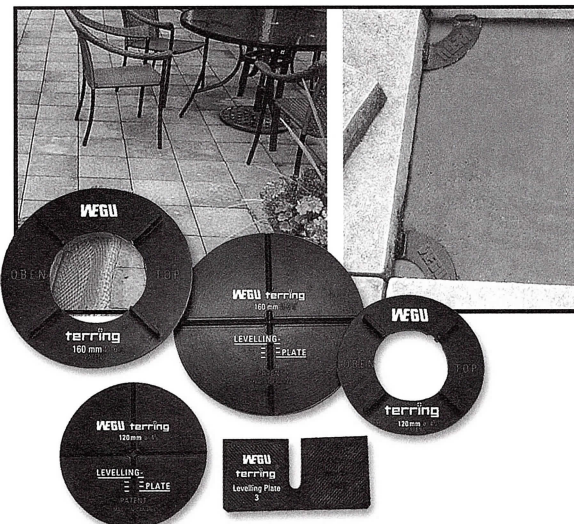
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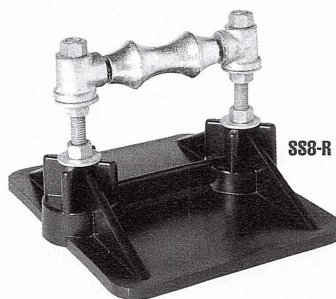
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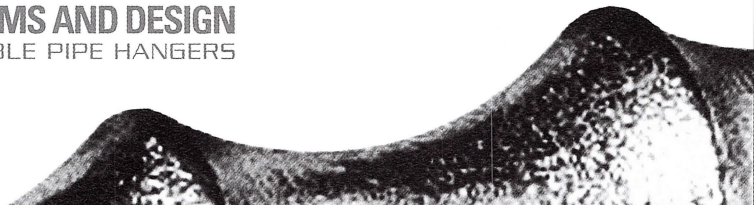
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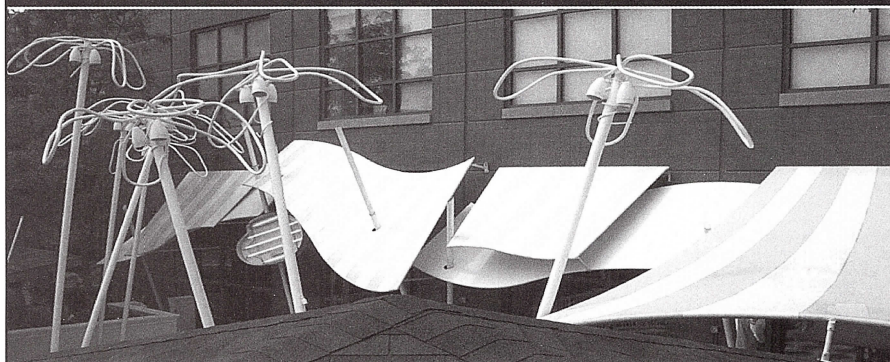


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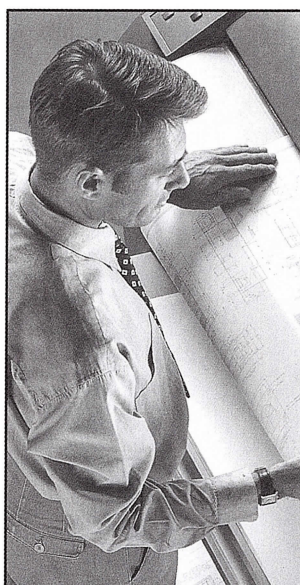
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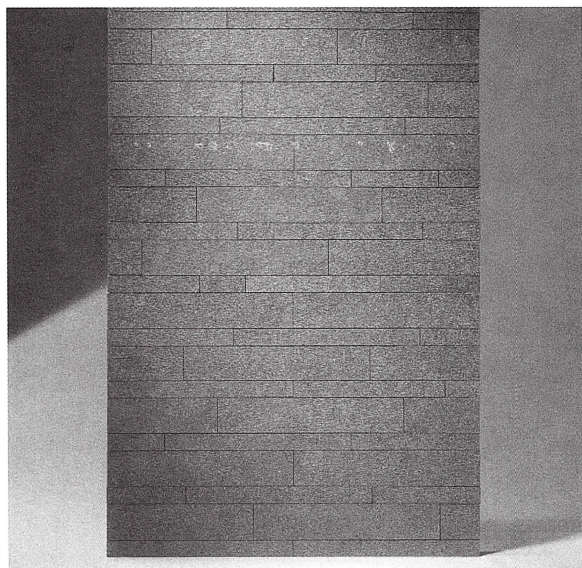
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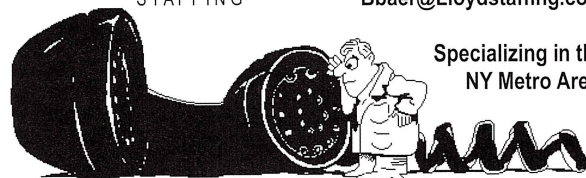


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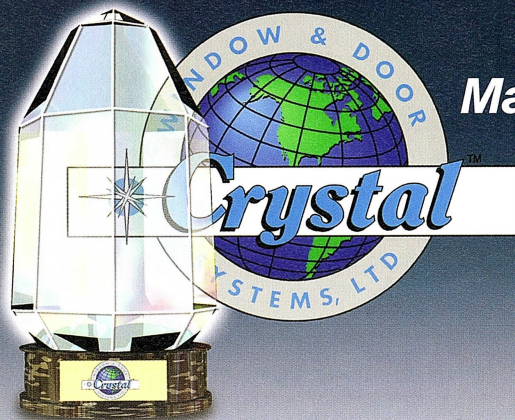
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