Keeping It Green

Alumni contribute to sustainable building • by Nell Porter Brown

Maryann Thompson at the "Zero Impact House"

Maryann Thompson
M.Arch.-M.L.A. '89
Architect

For the first time that she can remember, clients are requesting "sustainable homes," says Cambridge architect Maryann Thompson, who is known for her "green building" principles. "It's very exciting. Lots of clients who may have been looking to tear things down are instead looking at adaptive re-uses, which is the most targeted kind of recycling you can do."

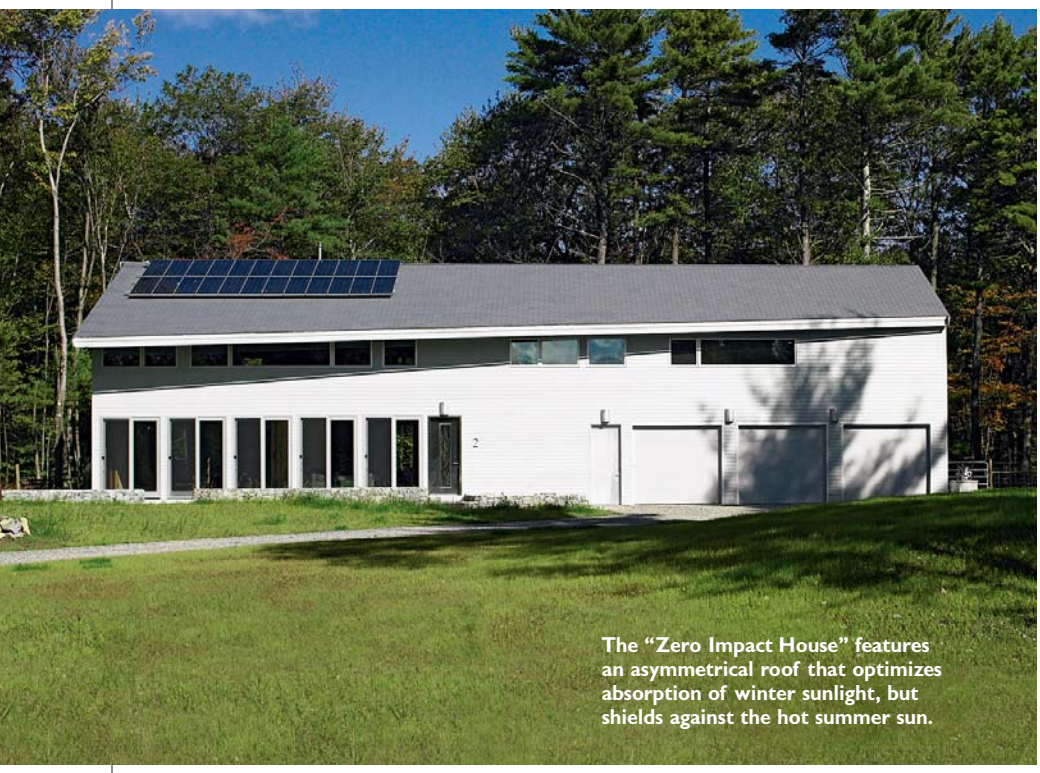
It's about time, she says. With the New England winter upon us, high energy prices, and the world's climate crisis closing in, conservation and efficiency are at the front of everyone's mind, she explains: "People are really trying to figure out what they can do personally to tread more lightly on the earth."

As a high-school student, Thompson was influenced by the Earth Day movement; she even wrote her college application essay on global warming. At Princeton, she studied engineering and architecture and, influenced by Jimmy Carter's energy policies, gravitated to a professor who focused on solar energy. "Sustainability has always been a part of my value system," she says.

In her professional life, Thompson has developed a variety of residential and commercial projects—including garden-roofed structures and a few elementary schools—in which sustainability is the overarching theme. Three current commissions—houses on Martha's Vineyard and in Scarsdale, New York, and a nursery school in New Canaan, Connecticut—will boast sedum-planted roofs as part of the insulation system. The drought-resistant sedum grows a few inches high, needs no mowing, and thrives in inorganic matter, such as ground-up stones. (The plants also block out ultraviolet rays, which break down building materials.)

Two Thompson projects near Harvard Square show innovative, adaptive-reuse techniques. One is The Atrium School, in Watertown, where an outdated, industrial warehouse was turned into a sun-filled elementary school, and the adjacent, vacant asphalt lot was transformed into a grassy campus and playground. Thompson has also converted the old Fayerweather Street School building in Cambridge into a residence. That "brutalist concrete structure"

Photograph by Jim Harrison



The "Zero Impact House" features an asymmetrical roof that optimizes absorption of winter sunlight, but shields against the hot summer sun.

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was on the market for years, Thompson explains, because nobody knew what to do with it. She added wood to the exterior, along with balconies and terraces; she also shifted the building's main orientation to emphasize its southern façade, replacing former classroom walls with glass to offer views of the backyard and to let in sunlight that soaks into the "thermal mass" of the concrete floors and walls, then radiates back at night.

In her renovation, Thompson also made use of super-insulation and double-paned windows. Such features are beginning to border on the norm in construction and save huge amounts of energy. "There is a whole green-house movement in Germany now, of building houses without heating systems. Isn't that amazing?" she exclaims. "In the United States, by code, we *have* to put in a heating system. It's so stupid."

Of her larger residential designs, an award-winning geothermal home outside of Boston has received a lot of attention—and some criticism. The wooden house, a

series of horizontal planes, sits on a south-facing hill above a small pond. All rooms take in light on two sides; the north side is more insulated, with storage rooms and the like (inspired by the work of Frank Lloyd Wright, a master of landscape siting and space efficiency), while the south side is open to the sun and grounds. Both heating and cooling systems are geothermal. But touting the structure as "sustainable" hits a false note when its overall size, 4,700 square feet, is revealed. "One of the criticisms has been that I can't really say it's sustainable because it's so big," she says. "It's more of a house for a rarefied section of society."

That's not true of the "Zero Impact House," a simple but appealing white box with an asymmetrical roofline that Thompson designed and built in 2002 in Easton, Massachusetts. For starters, solar panels soak up so much energy that the owner sells electrical power back to the local electric utility company at retail prices. The whole house is heated with

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The "Zero Impact House" contains countertops made of recycled metal shavings and a two-foot-thick concrete floor that absorbs solar heat.

"Everyone should start doing this—they could have their own independent solar farms."

two wood-pellet stoves (one of which is rarely lit), because the interior is designed to keep warm air circulating in the winter, and then to expel it in the summer, by means of a central atrium and a clever cross-ventilation system. (No central-air system is needed.) At 3,000 square feet (including the garage), with a modest façade, "this house is also something that anyone can do," Thompson says. "It's a regular American house that sort of looks like a colonial, but functions like a little machine."

The house faces due south on a 5.5-acre lot and uses naturally occurring materials, as well as recycled-tire rubber roofing and interior glass tiles, reclaimed wood cabinetry, and thermal-efficient windows. The roofline is angled to allow natural light in at the sun's lowest points during the winter, and shut it out at its highest and hottest. "Everyone should start doing this—they could have their own independent solar farms," Thompson declares. The whole house is constructed of thick concrete slabs, which hold heat, and the owners have made smaller adjustments, such as using low-wattage LED lights, and putting all electrical appliances on special switches to conserve energy.

Thompson's newest projects include the HingeHouse, a prefabricated series that promotes sustainability primarily through its flexible design (the hinging sections can be sited to take advantage of southern exposure and passive solar energy on any landscape), and through saving time, money, and significant resources in the construction process. The homes are to be manufactured by Empyrean Inc., in Acton, Massachusetts, in partnership with *Dwell* magazine. "These are environmentally sensitive," she explains, "because all of the pieces are cut at one site to minimize waste."

The HingeHouses are another part of the changing architectural landscape, says Thompson, who is also an adjunct professor at the Graduate School of Design. "Requests for proposals are requiring LEED (Leadership in Energy and Environmental Design) certification, and that is amazing," she continues. "At a recent GSD faculty meeting, they were talking about adding a whole new core sustainable sequence. I think that's really amazing. I never did believe in a zeitgeist until all of this started to happen with sustainable design. But now I do."

Sarah Beatty '88
Founder, Green Depot

A week before her first child was due, Sarah Beatty '88 was told her newly renovated Manhattan co-op apartment "might not be a safe living environment" because of mold contamination. Fortunately, an expert soon confirmed that the unit was not toxic. But the incident spurred Beatty to think about the products she used at home, and to switch to nontoxic cleaners, paints without volatile organic compounds (VOCs), and low-emitting caulks, sealants, and adhesives.

In educating herself about environmental issues in the home, she found a wealth of information on the Internet about "green" products, but serious hurdles to obtaining them. "New York—in fact, the whole East Coast—was underserved. There were no local resources," she says. "Most of the innovative product development and infrastructure was occurring on the West Coast." So she did what any enterprising marketing professional might

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have done in 2005: she started her own company, Green Depot.

Five years later, the Brooklyn-based venture supplies environmentally friendly products to professionals and homeowners through five showrooms (including one just outside Boston, in Stoneham); a stand-alone retail store is set to open in New York City this winter. "In 10 years there will be no such thing as 'green buildings,' because buildings will *be* green," she predicts. "But in the meantime, I see our mission as empowering the consumer to drive the marketplace for these products."

Beatty's company is playing a role in the green-dorm pilot program at Columbia University (which is considering the best affordable, sustainable options for renovating its older buildings), and recently completed three prototypes that currently house students: one constructed with recycled/reclaimed/reused materials; one built solely with green and energy-efficient products; and a "health suite" designed for students with respiratory problems or chemical sensitivities.

Green products promoter Sarah Beatty at the opening of her Greenport, New York, store

GREEN DEPOT

In New England, Green Depot has worked with subcontractors on Harvard's newest chemistry labs and various office renovations, and with other clients on residential developments and commercial ventures. Beatty cites in particular a LEED project to "green" a Taco Bell in Northampton, Massachusetts: her company supplied Forest Stewardship Council-certified lumber, recycled sheetrock, and adhesives.

Because today's green-certification processes are "a little like the Wild West," Beatty says, Green Depot has developed its own internal methods to assess products and their ingredients. "The good news is that a lot of the certifications and

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rules surrounding a lot of the issues are in development, but they are not consistent yet," she explains. For example, an Environmental Protection Agency organic compound list exists, but "creative chemistry" sometimes enables manufacturers to replace a prohibited chemical with something else known to have health risks but not on the proscribed list.

The ultimate goal is comparable efficacy. "Products have to work properly, and be durable and effective compared to other products in their class," Beatty says. "They have to be warrantied, easily repairable, and easily maintained with nontoxic products. If something doesn't perform as well as non-green products in its class, it's not ready for the market yet."

In terms of integrating green products into the traditional construction trade, it doesn't hurt that Beatty has located her stores adjacent to or inside MarJam Supply distribution centers. The company, which calls itself "the Northeast's leading building materials distributor," was founded and is owned by her husband, Mark Buller, and his brother.

Yet Beatty had little to do with the company before environmental concerns drew her in. At Harvard, she concentrated in sociology with a strong secondary focus on East Asian studies. From there, she eventually became vice president of trade marketing and global branding at MTV and, before her daughter was born, worked under Barry Diller as the senior vice president for USA Network.

Now what stimulates and challenges her is understanding where the environment and concerns about natural resources intersect with bricks and mortar. "We must build our communities to be sustainable and embrace those innovations that help us achieve that," she says. Partly for the sake of her daughter, now four, and two-year-old son, Beatty continues to look at the green movement in wholly practical terms: what will enable people to live more healthily now and in the future? "We have to reframe the discussion around 'green,'" she insists. "It is not an all-or-nothing proposition, but let's start focusing on the subtle, smart adjustments that can be embraced today to create a positive impact for ourselves, our families, and our world."

David Hamilton

M.Arch. '00

Developer and Architect

David Hamilton, M.Arch. '00, grew up in rural North Carolina, surrounded by a lush green landscape of tobacco farms,

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Left: David Hamilton reviewing plans in rural Virginia. Right: A rendering of planned development at Myers Farm in Greenfield, Massachusetts

"many of which are now Bed, Bath & Beyonds," he says. At Middlebury College, he grew to love another rural environment, full of dairy farms. "Vermont," he says, "has had tremendous success with protection of land, but at great cost to housing affordability, economic development, and to the state's political unity."

At the Graduate School of Design, where integrated urban planning was the focus, Hamilton plunged into work on Professor Rem Koolhaas's Harvard Design School Project on the City because, he says, "urbanization was, and remains, the greatest demographic shift afoot in our world." Still, he could not help but notice that rural landscapes, like unfa-

vored children, did not receive equal attention. "While we designed our urban spaces, we seemed, as a profession, to simply wave off rural areas: downzone them, donate them, or think, 'Maybe someone will farm them,'" he explains. "Of course, if you've spent time in rural areas, you understand that this is not just empty, natural land that needs protection from development. It's an economy, a culture, and a man-made landscape: all needs that must be addressed by planners who hope to shape a regional future."

Such is his role these days as a principal in Qroe Farm Preservation Development, based in Swampscott, Massachusetts. Qroe (pronounced "crow") was founded 30 years ago by the late William Baldwin '52, M.B.A. '56, and has developed or is still working on eight innovative properties in New England. These include Running Brook Farm, in Derry, New Hampshire—the 72-acre property, with its woodlands and open fields, has roughly 57.5 acres preserved through conservation easements—and, in Massachusetts, Todd Pond in Lincoln and Myers Farm in Greenfield.

Baldwin was a leader in the Urban Land Institute (and its sustainability council) and believed, Hamilton says, that private-sector developers were responsible for helping to control unplanned sprawl and preserve communities. Myers Farm is a good example of such "smart growth" philosophy. The 50-acre development encompasses an historic farmhouse, a fully enrolled charter school, and 39 new "farm-style condominiums" clustered on six acres. Most of the property will remain as it has for more than a century: working farmlands for hay, corn, and wildflower meadows. "What we're trying to do," Hamilton explains, "is find a way that development can occur without eliminating farming."

Qroe is targeting a mixed-use population, too: families who need a good school and older people who want to live in the country while enjoying access, via walking trails, to amenities like free classes at the nearby Greenfield Community College, to which Qroe donates a percentage of every home sale. Most of the acreage is permanently assigned to farming; in 2005, Qroe sold about 37 acres of the land to the

DAVID HAMILTON

"Farm-style" condominiums on preserved acreage at Myers Farm

Franklin Land Trust, which then sold an agricultural preservation restriction to the state, and then sold the protected land to a dairy, Bree-Z-Knoll Farm.

Such "preservation development," while not altogether new, is more critical now than ever, Hamilton asserts. Farmland is being converted for development at "alarming" rates nationwide. According to statistics available from the U.S. Department of Agriculture's most recent National Resources Inventory, between 1992 and 1997 the average annual rate of conversion of farmland to development was 1.23 million acres, and the average annual rate for all rural land was 2.3 million acres.

The main problem in rural land conservation, Hamilton points out, "is that farmland worth $1,000 an acre is worth $100,000 an acre if it is to be developed; it's a gross differential." Conservation projects and/or easements do protect land—and Qroe utilizes them to permanently safeguard farm belts—but however you slice it, he adds, someone is paying: "Property taxes are lost, equity is lost. Sometimes a land trust can purchase the land and use state tax credits, et cetera, to offset costs, but the amount of land covered by conservation easements is less than half of the land being converted to developments."

For the last two years, Hamilton has focused on a much bigger landscape: the 2,300-acre Bundoran Farm in North Garden, Virginia, near Charlottesville, which is owned by Qroe and its partner, Charles E. Adams, M.B.A. '89 (one of the leaders in refurbishing the Mount Washington Resort in New Hampshire). This bucolic southern property has mountainous terrain, rolling hills, and hardwood forests and currently boasts 400 cows and calves and a 200-acre commercial apple orchard. Hamilton stresses that about 93 percent of the farmland will be permanently preserved and used for agriculture and forestry. Qroe is also exploring the cultivation of non-timber forest products, such as mushrooms, ginseng, and herbs, which it views as a growth market.

This is self-funded conservation. "Qroe asks its buyers, 'Do you like that view? If so, then pay for it.'"

The goal, ultimately, is to sell up to 108 building lots, sized at two to 100 acres, for between $350,000 and $1.3 million each. Qroe does not build the homes in most of

its projects, but does issue guidelines encouraging vernacular rural architecture and local materials. "We're most concerned with how homes sit on the land," says Hamilton. "What we're watching for and are more worried about is people bringing designs from Orlando, Florida, and trying to fit them into a hillside in New England; that's the problem with McMansions." Qroe does require a basic standard of sustainable construction called "Earthcraft"; LEED certification is recommended, but not enforced. "Most homeowners are not interested in LEED," he notes, "because it's expensive and there is a lot of paperwork."

Eleven lots have been sold and the first house is set to be occupied in April. Although there is no doubt that multimillion-dollar homes will go up on Bundoran, most Qroe project buyers "are land people," Hamilton says. "They want a modest home that fills their needs (which is not necessarily inexpensive), but they are more interested in their gardens, their landscaping, in being outdoors, and walking on trails and having beautiful views—and in the permanent protection of those things."

This is self-funded conservation. "Qroe asks its buyers, 'Do you like that view? If so, then pay for it,'" Hamilton explains. "Each homeowner pays for a chunk of the conservation land and what they get is to live in a place where they will always be looking at a farm because we've eliminated the potential for that land to ever be developed and become a Wal-Mart."

Such a concept was a much harder sell when Baldwin started out 30 years ago, Hamilton says, but because of high energy costs, global warming, and cultural shifts, "There is a class of buyers out there in the market for five acres next to conservation land; it is a well-defined market that we serve." Indeed, the number-one amenity requested by baby boomers and empty-nesters, he reports, is neither a golf course nor a tennis club (as it was a decade ago), but walking and biking trails. "You're not only getting the right to build in a discrete location, you get the right to walk the land," he says. "And in Virginia, that's 2,300 acres. You can walk anywhere and go have a picnic in a field, as long as the cows aren't using it at the moment."