SUSTAINABLE CHICAGO

Spring 2010 • A Publication of Index Publishing Corporation

Changing the View on How We Live

Life in the Lab:

Experimenting With the Single-Family Home

Sullivan Goulette & Wilson

By Matt Baker

It is early adopters that drive down the prices and stretch the capabilities of new technologies, whether it's the first production automobiles or the latest smart phones. And with much of the green building industry only just emerging, it requires that willingness to try something new, to redefine what's possible, if these technologies are to take root.

Even before Jim and Beth Masterson decided to refashion a former schoolhouse from the 1880's into a green home for themselves and their five children, they had begun implementing a greener life. They eschewed the clothes dryer in favor of line drying and the family became avid recyclers and composters. It was an experiment in how environmentally conscious they could make their daily routines without disruption.

Frustration with recyclables cluttering the kitchen and damp laundry hanging off of every rack and railing, among other things, helped inform the design of their new house. "We just started to implement things in our home and saw that there were better ways to do it," said Beth Masterson.

The new house, for instance, features a recycling chute. Paper and plastics drop to the basement for later sorting by the kids and milk cartons and cereal boxes no longer create clutter. Kitchen scraps go into the compost bins in the back yard.

Oddly, Masterson describes the laundry room as one of her favorites in the new space. Defying modern inclinations, the laundry facilities aren't relegated to the basement or some hidden, windowless closet. The space is large, with generous fenestration. This allows the clothes drying racks—all 250 linear feet of them, packed into a compact, foldable system—to soak up ample sunlight to speed up clothes drying.

"It's integral to our lives that the kids are surrounded by it," Masterson said, stressing the importance of educating their kids on sustainability. "I just want them to do this maintenance naturally. To see the clothes hanging—whether they decide to do that in their life ahead, they may not. And that's fine."

One problem in need of a solution was the homeowners' desire for as much daylighting as possible. The two-story brick building has a large, square footprint and getting daylight into the core of the house seemed impossible at first.

The first solution was to install several large skylights in the roof. By opening up the central staircase, the designers allowed natural light to spill into interior spaces. Skylights and large windows are placed strategically throughout the home; there's even a small translucent window set into a staircase landing, allowing the bathroom beneath to borrow some of the abundant daylight.

The beautiful arched vault of the atrium also hides the

second daylighting solution. Built into the columns are Solatube skylight systems. The Solatubes can angle around joists and mechanical systems and still deliver daylight to the darkest corners. The efficiency loss can be as little as two percent. All artificial lighting is achieved through LED and CFL.

The natural wood visible in the home is all reclaimed from the site, including old joists, beams and flooring. In some cases, the wood wasn't milled or finished beyond a simple cleaning. Tongue and groove flooring, for example, was used virtually as is to create textured walls throughout the space. "I loved this because it gave us another five percent of stretch," said Roc Roney of Crescent Rock Development. His firm worked with Sullivan Goulette & Wilson (SGW) as the design/build team on the Masterson residence.

Also in heavy use was Plyboo, a type of plywood manufactured with rapidly renewable bamboo. The Plyboo was used for cabinetry and other finished work. Almost every door in the home is fashioned out of a large Plyboo plank suspended on a track and wheel system. The doors have no trim work and in place of knobs on the doors are simple mortises carved out of the Plyboo.

"From the start, Beth didn't want to apply any ornamentation," said Roney. "There's a reason we apply casing, it just makes things easier and they've been doing casing for three billion years. It's one of the challenges of modern. But once you tease it out, then you can do it again and again. The first one's expensive, because you have to design it. After that it's like, 'what a great solution.'"

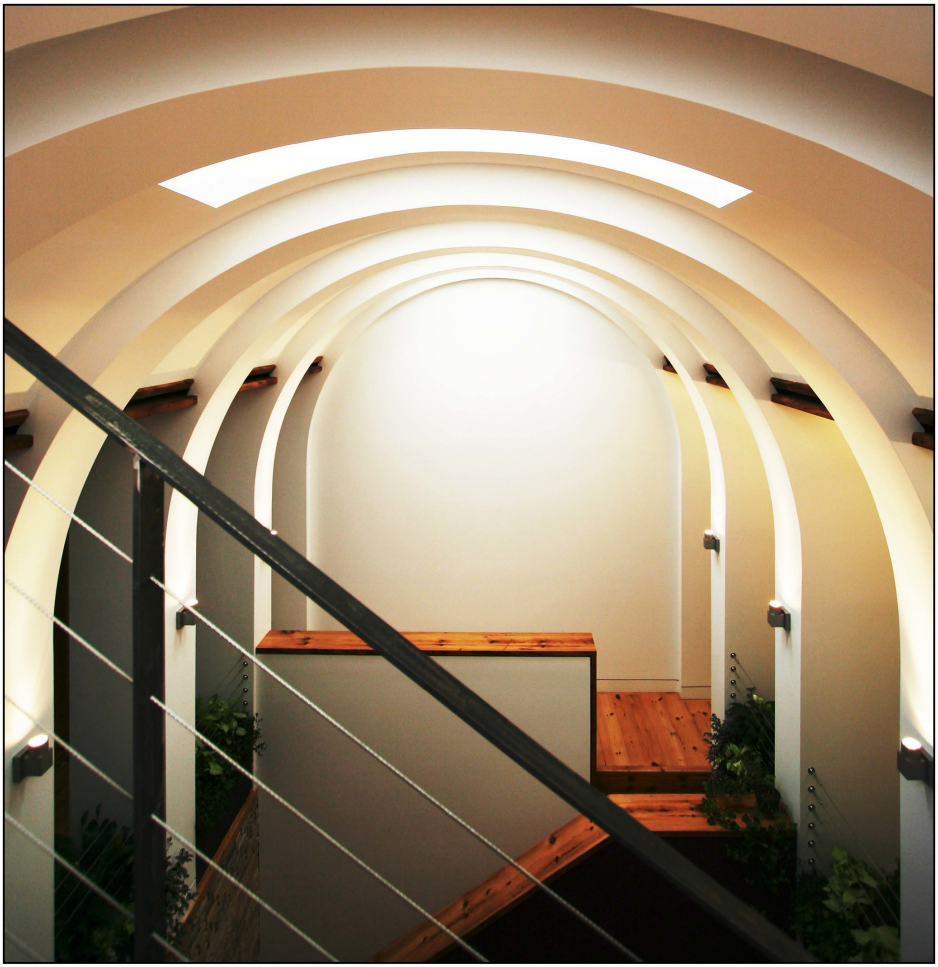
Many of the aesthetic choices in the house were driven by budget, but also because they were the simpler and even greener way to go. A small addition was added to the roof, for an office and to provide access to the green roof and onsite utilities. Partially hidden by the pediment, the new space was also concealed by using reclaimed brick on the front parapet.

"It doesn't try to engage or mimic what's below," said Jeffrey Goulette of SGW. "Its just a modern addition complementing the old façade." The same approach liberated them from period fenestration and allowed for better energy efficiency. "We felt some freedom in doing a modern window pattern in there because the original windows had gone eons ago." The south-facing portion of the addition is also fitted with a modern passive solar overhang, blocking solar gain in the summer while maximizing it in the winter.

On the first floor, much of the ceiling is exposed joists, boldly displaying sections of wood cut by a previous subcontractor. The Mastersons not only felt that concealing these imperfections was un-

Solar panels, a vegetated roof, reclaimed brick and a passive solar overhang were some of the modern additions to the exterior of this 120+ year old building.

Erich Schrempp



Sullivan Goulette & Wilson

necessary, but they thought it helped the house tell the story of its rehabilitation. Fire-scorched beams from the basement were cleaned and reused; interior tuckpointing was done with no attempt to blend mortars; two benches in the foyer made from reclaimed lumber proudly exhibit old joinery wounds. There is a character to this building and they felt it was disingenuous to hide that.

Both heating and cooling are delivered to the house through a hydrothermal radiant system. Two geothermal wells, six hundred feet deep each, offset utility use. Thirteen temperature zones regulate the heat and cooling load in different areas of the home. Supplementing sixty-five percent of the house's hot water needs in the winter (and all of it in the summer, the designers hope) are solar water heaters.

"Those could be from the seventies," Roney said of the passive solar system they installed on the roof. "We could all be wearing bell bottoms." In this instance, he pushed for a little less experimentation, opting for a time-tested technology instead of an evacuated

tube system. While not exactly new, Roney expressed concern over the tubes going out after two or three years and needing replacement.

Many newer technologies were used in the kitchen and surrounding area. An Ecotop counter is manufactured from recycled paper. Though it necessitated purchasing new cookware, the Mastersons installed an induction stove, which can be up to 84% efficient, compared with the roughly 40% one could get from a gas stove, not to mention the improved air quality from eliminating gas combustion. A large glass curtain separates the kitchen from the back yard, letting in ample light. On temperate days, the folding wall system can open up and allow air to circulate as well. The house also features an Ecosmart fireplace, which burns ethanol.

Water savings were achieved with the installation of dual flush toilets in all the bathrooms. An extensive vegetated green roof not only helps with insulation, it retains stormwater runoff. Masterson wanted to install a gray water system to reuse laundry water to flush the toilets, but they discovered that the restrictions in the Chicago Building Code make gray water systems cost-prohibitive. "The city is just not ready for it, which is frankly absurd," said Goulette.

Some spaces were combined to leverage the building's floorplan. Each of the Masterson children plays an instrument and the new design called for a music room where they could practice and store their instruments. To accommodate this, some rooms serve double duty. The dining room also functions as a study area, with each child having his or her own carrel. "It's more than a table and a tea service against the wall," said Roney.

Everyone has their own bedroom, but they are smaller than expected, considering the home's total square footage. Instead, the children are coaxed out of their sleeping

Photos: Erich Schrempp

Clockwise from top left: walls and cabinetry are made from Plyboo and reclaimed tongue and groove flooring; laundry is dried using merely the power of the sun; the kitchen benefits from ample daylighting both from the operable glass wall and the Solatube skylights in the ceiling.

quarters and into other parts of the house. There is a common area between their rooms for reading and lounging.

All five kids also share one bathroom. "Maybe there's a possibility that you don't have to unsuite seven bathrooms because your neighbor does it or because your realtor says so," said Roney. "This has been driving the bus for twenty years."

Roney has also heard from realtors about the choice to tear down the old garage and not replace it. "It was in the plans, but we chose not to do it because we could put that value into the house and use the back yard." An open, usable back yard is a luxury in Lincoln Park, but from a realty point of view, the garage is the better selling point. "That drives so much. It's insane."

The Masterson family moved into their Lincoln Park house last December. The two-story brick building is awaiting a new front door, but otherwise it would seem all work has been completed. The paint is dry and the boxes are unpacked. Daily meals are prepared and homework is completed. They even hosted a Superbowl party. By all accounts, the building is no longer a work in progress; it is a home.

But Masterson is loath to stop considering new ideas. The utility room that serves hot water to the house's hydronic heating system is insulated, but the pipes themselves are not. The result is a room that loses little efficiency beyond its walls, but is stiflingly hot within them. Under consideration are insulating the pipes to expand the room's storage capabilities or somehow using that spare heat in some novel way.

Masterson also wants to install a small wind turbine on the roof. Roney, a friend of the Mastersons before the project and—thankfully for all involved—still one after, rolls his eyes at this. After installing a weather station to gauge the turbine's feasibility, he says, "We finally got enough data to back up the grumblings of people like me who said, 'We need that money for all the other things we know will work.'"

But Roney's pragmatism isn't finite and he welcomed his clients' openness to trying new things and new ways of doing things. "It's fun to hear Beth walk through it and have new ideas for stuff," he said. "It's not cooked." It would seem there is more experimenting to be done.