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A New Environmental
Footprint Positions
a Historic Home for
a Brighter Future

Long-term Perspective

Green Design Includes Energy Savings and Sustainable Features for now and Long into the Future

Although the size of the home doubled, the sustainable features incorporated translated to a 28 percent reduction in energy use. Photos: Reed Brown Photography

QUALIFIED REMODELER
Master **DESIGN** Awards

Energy-efficiency Retrofit: Gold
Historic Retrofit: Gold

Master Design Awards judge Geno Benvenuti wrote, "With all the constraints, very successfully done. Great job."



The existing home was located in a neighborhood with a historic overlay requiring any alterations to existing buildings adhere to and maintain the historic fabric of the structure and community.

By KJ Fields

In the spring of 2009, a real estate agent contacted Mark Fenelon, general contractor at Nashville, Tenn.'s Mossy Ridge Construction, to team up and invest with her on the remodel of a historic Nashville home that had been vacant for a year. Eager to give the Nashville house an edge in an extremely challenging market, she wanted the speculative project to incorporate environmentally responsible features.

Fenelon had previously built the real estate agent's house to LEED (Leadership in Energy and Environmental Design) standards when LEED for Homes was still in its pilot phase. In addition, his housing experience included other green standards such as Energy Star and EarthCraft, a green building certification program across six states in the Southeast tailored to address regional impacts such as high heat, humidity and temperature swings. The spec opportunity wasn't lost on Fenelon, but banks weren't eager to loan money in 2009.

"I had to put everything on the line to buy the house with the real estate agent, but the house sold even before we finished it, and the green attributes were the biggest selling point," Fenelon recalls. "When we started, nobody was doing green houses in the spec environment, but now 80 percent of the building permits here are in that arena — it's completely boomed."

Fenelon brought in chief manager Scott Wilson of Brentwood, Tenn.-based Scott Wilson Architect LLC to design the remodel. The two met years before at a local conference sponsored by the Washington, D.C.-based U.S. Green Building Council and shared like-minded views on green home building.

Order from Chaos

The \$490,000 project began with an unexpected turn when Fenelon discovered the walls were falling in. A 6-in. dip from the center of the ridge line dented the roof, and walls devoid of footings perched on old

stone foundations that had settled in one corner of the house.

The 1930s home was governed by the Nashville Historical Society, which mandated that as Mossy Ridge Construction made changes, it must deconstruct the interior one floor at a time. Painstakingly, the contractor put in 13 new piers with beams to support the walls and carry the weight of the house. Haphazard renovations throughout the past 80 years created an odd series of shoebox rooms on different floor levels with no relation to each other and essentially required the team to gut the interior. Historic regulations demanded the exterior parts of the home visible to the neighborhood remain the same, so Wilson retained the original façade and two side walls and increased the home's size from 1,700 sq. ft. to 3,300 sq. ft. out the back side.

"The home wasn't comfortable, and other than the façade there was almost no character left to it," explains Wilson,

"but the back had a nice yard with mature trees, which is unusual so close to town. I wanted to celebrate this advantage and create strong connections between the home's interior and the outside."

Wilson opened up the interior spaces and brought abundant daylight into the house through a two-story corner stair tower flanked by interior and exterior windows on each floor. A large doorway between the kitchen and the stairwell fil-

ters in natural light, and a breakfast area offers a view to the backyard. The stairwell also ushers light into the hallways, and the home's new open plan creates visual connections to make the spaces brighter and more inviting. Low-emissivity glass windows grace every main-level space, even the closets.

Crafting Homeowner Savings

Distributing natural light throughout the home lowered electricity needs. Another design element that doubled as an amenity and means of energy reduction was dividing the living room and breakfast area with a fireplace. The fireplace is made of Icelandic

volcanic stone which has high insulating values, radiates heat better than traditional masonry and provides heat to both spaces.

A new HVAC system had been installed two years prior to the remodel, so in the spirit of sustainable reuse, the team removed, stored and refurbished it to service the original portion of the house. The home's addition was equipped with a high-efficiency HVAC system including heat recovery units that preheat outside

Although the renovation doubled the home's size, the team achieved a 28 percent reduction in energy use.

air using the home's exhaust heat. The team conducted testing and balancing to determine how much insulation to incorporate, and the calculated addition of soy-based spray-foam insulation alone dropped the structure's energy usage by 40 percent.

Although the renovation doubled the home's size, the team achieved a 28 percent reduction in energy use resulting in an energy utility cost savings of \$550 per year. The new homeowners save on water bills as well, thanks to low-flow plumbing

fixtures and a 96 percent-efficient water heater with a recirculation system that provides instant hot water.

Like-minded Values

Wilson views every building as a system in which each item affects others in the environment. He asserts that having a builder who shared his passion went a long way, especially when it came to keeping costs in

FAST FACTS ABOUT THIS PROJECT

Square footage before: 1,700 sq. ft.
Square footage after: 3,300 sq. ft.
Location: Nashville, Tenn.
Architect: Scott Wilson Architect LLC
General Contractor: Mossy Ridge Construction

check. For example, the original design of the stairwell was taller with more glass and topped with a flat roof.

"Mark understood what the tower brought to the project and embraced the concept, but he explained that it was pushing us over budget," Wilson says. "We collaborated to figure out which elements drove up the expense. Once I understood which features cost too much, I was able to reconfigure the tower to a shorter structure with fewer windows and a sloped shingled roof to make it work for the budget and meet the green intent of the design."

Everything that went into the house followed LEED criteria. Homeowners benefit from better indoor air quality through features like heavy rubber membrane seals in the crawl space to keep the moisture down, sealed piers at the perimeter walls to prevent moisture intrusion and mold, and dehumidifiers in the basement to remove incidental moisture. Because an automobile can outgas for 45 minutes after it's turned off, Wilson detached the garage to separate the fumes from the house. Operable windows and a fresh-air ventilation system circulate outdoor air throughout the house.

Materials were locally and regionally sourced, and the team educated subcontractors about on-site recycling efforts. The team also created a new demand for green building materials which influenced suppliers.

"We told one of our suppliers that if we are going to do business together we would need Forest Stewardship Council-certified wood. Now, that's practically all

Natural ventilation via operable windows enables fresh air to circulate through the living spaces.

they sell. And suppliers are better engineering deliverable packages for us with perfect cuts so there's no waste," explains Fenelon. "At first, a lot of companies pushed green building aside but now they are totally embracing it."

The Nashville home has already received Energy Star Certification, and EarthCraft certification is pending. Fenelon believes in obtaining third-party certifications to verify his green building claims and assure owners that the homes will use less energy, have less impact on the environment and require less maintenance than conventionally constructed homes.

"Over the life of the building, the initial structure is only 20 percent the cost of the building, which shows that building a home is just the beginning — maintenance and repairs are a big part of the long-term equation," Wilson says. "With the increased interest in green building practices and our economic situation, other builders are now responding to the demand for smaller homes built with better materials and higher overall quality to offer benefits over the life of the home."

Fenelon wants to leave a worthy legacy for others to admire. "We are trying to build something that will last for at least 100 years. I want my daughters to drive

by this house when she is 70 years old and proudly say, 'My dad built that.' We are leaving behind landmarks of ourselves," he says. | **QR**

KJ Fields writes from Portland, Ore., about remodeling and design.

GREEN AT A GLANCE

Energy use before: 36,800 kWh/year
Energy use after: 26,135 kWh/year (28 percent reduction)
Energy cost savings: \$550 per year
Pounds of coal saved per year: 8,671
Number of homes powered per year: 0.69
Electric cars powered per year: 3.15



Left: Low-flow plumbing fixtures and a 96 percent-efficient water heater with a recirculation system provide instant hot water and save energy.

Top Right: Views to the backyard provide continuity between indoor and outdoor spaces.

Bottom Right: Natural light is available in every space on the main level.