CASE STUDY

2009 AWARDS OF EXCELLENCE

AFFORDABLE HOUSING BUILT RESPONSIBLY

Project at a Glance

Location: St Louis, MO

Project Type: Single Family

Award Category: Home Ownership

Project Completion Date: 12/06/08

Project Size

Number of Units: 27 Homes

Land: 3.4 Acres (total)

Density: 8.0 Units / Acre

Affordability
(Relative to Area Median Income)

31-50% of AMI: 27 Units

Retention of Affordability: At resale, HSHFL usually requires < 50% AMI.

Project Team

Developer and Contractor: Habitat for Humanity St. Louis

Architect: Art Stauder

Landscape Design: Jennifer Shamber

Development Cost (per unit)

Land Cost:	$ 3,000
Hard Costs:	$ 92,000
Soft Costs:	$ 55,000
Total Costs:	$ 150,000

Cost of Green (per unit)

Total Cost of Greening:	$ 5,000
Rebates / Incentives:	$ 5,000
Net Cost of Greening:	$ 0
Percent of Total:	0%

Standards Used

LEED for Homes - Platinum

EPA Indoor Air Package (IAP)

Jeff Vanderlou Project

Habitat for Humanity Saint Louis

The Jeff Vanderlou neighborhood was once a major business and cultural area for St. Louis. But over the years the area declined, leaving deteriorated, vacant properties. In partnership with the city and the local community, Habitat for Humanity St. Louis (HFHSL) began work in the area in 2004. Their vision was to move beyond building homes, and to help bring about a positive transformation of the community.

The primary objectives of the project team included creating homes that were energy efficient and healthy. The team considered these goals to be especially important in order to address the high rate of asthma in the city of St. Louis area, and thus improve the quality of life for the Jeff Vanderlou residents.

The project was able to obtain a variety of funding sources, and make cost-effective use of donated products. Through creative and flexible design, the project team made frugal use of resources. The resulting project has simple, comfortable homes built well to serve the residents now and in the future.

Primary Goals

- Build efficient, healthy, affordable homes for families.
- Build quality, durable homes with minimal upkeep.
- As an organization, to improve process from ENERGY STAR for Homes to LEED for Homes.
- Help rebuild the community of the Jeff Vanderlou neighborhood

Measurable Performance Achievements Compared to Code

Energy savings:	49%
Water savings:	50%
Construction waste reduction:	57%
On-site surface water capture:	67%

Green Features

HFHSL's single family homes have small footprints, enabling a fairly high development density. However, each home has a full basement with a finished bedroom, which accommodates a range of family sizes.

Integrated Design Process. The project team held two design charrettes and held regular team meetings throughout the design and build process. This communication helped to create an efficient site and building design and to better coordinate mechanical systems layouts.

Location and Linkages. This established neighborhood is near many amenities, including bus stops, stores, a community college, churches, parks, and non-profits with resources. The development has also helped to revamp the neighborhood, prompting new resources to open.

Site Design / Landscape Planning. A major effort was required to remediate contaminated soil discovered on-site, which contained lead and coal ash. When the clean-up was completed, the project team received a letter of compliance from the state.

For the landscaping, the team installed native, drought tolerant plants and other landscaping that will require minimal upkeep from homeowners.

Architectural Design and Materials. HFHSL designed the homes to fit in architecturally with the existing neighborhood. The homes are built with different stories, including a one-and-half story home designed specifically for this neighborhood. Each home has a front porch but also a zero-step entrance in back, as well as other universal design features. Such flexibility accommodates a variety of residents and allows for aging in place, avoiding the need for resource-intensive remodels in the future. The team selected durable products like cement fiber siding to further reduce future upkeep costs.

Energy Efficiency. The energy efficient design began with the envelope, including enhanced insulation and windows, and an insulated foundation wall system (Superior Walls). The team carefully sealed all openings using spray foam, caulk, and flashing. They also designed the homes with redundancy in sealing to ensure that energy efficiency remains over time. Consequently, as the home ages (e.g., cracks form), if one system fails, another will keep the home tight. They reduced cooling loads through measures such as a roof sheathing product with a radiant heat blocking foil. The homes include an efficient furnace with programmable thermostat, compact fluorescent lights, and Energy Star appliances.

Indoor Air Quality. Homes have an Energy Recovery Ventilator (ERV) -- this brings in fresh air for ventilation, but uses outgoing air to temper it through a heat exchanger. The team installed laminate flooring and ceramic tile, which reduce particle loads and have a beautiful finish. The homes include a passive radon venting system, and low VOC adhesives, sealants, and paints.

Green Highlights

- Previously developed infill site
- Insulation: R-28 walls, R-38 attic, R-12.5 foundation
- Low E, double pane windows
- 94% efficient furnace, 14 SEER air conditioner
- Tankless gas water heater
- Universal Design features: (zero-step rear entrance, wider doorways, 1st floor bedroom)
- 2x6, 24" on center framing for roof, walls, and ceiling joists
- Dual-flush toilets
- Very low-flow showers and faucets
- Recycled content decking
- Ductwork was sealed during construction.

Installing OSB roof decking with reflective coating.

HFHSL uses precast, insulated foundations.

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Project Significance

In building the homes, HFHSL helped to revitalize a neighborhood. Located in the near north side, the area is close to downtown business and tourist areas. By the 1940's, it had developed into a residential, business, and entertainment center, and was one of the few areas of the city where African-Americans could own homes. But the neighborhood later declined. By the 1990's many properties were vacant and dilapidated. The city and local community launched a major effort to revamp the neighborhood in 1998. The HFHSL homes are a key component in the success, and they have triggered other new development. "We used to have to take two buses to get to a grocery store," says Pandora Crosby, a resident in one of the Habitat homes. Now, the neighborhood has a grocery store.

Partnerships & Collaboration

HFHSL worked with several other organizations, including:

- The local community and city council members to identify the neighborhood's priorities. For example, neighbors emphasized that the new homes should blend in with existing homes.
- The MO Department of Natural Resources to remediate the sites.
- Guaranteed Watt Saver and ASERusa to shepherd them through the LEED for Homes process, provide energy efficiency suggestions, and to verify that all green measures were installed correctly.
- Laclede Gas to track energy use for research purposes, once homes were occupied.

Financial Strategies

The project team reduced costs by using donated products, including stoves, refrigerators, and several DOW products (e.g., blueboard, insulation in Superior Walls). (DOW products are generally free for Habitat affiliates). They incorporated some equipment, such as tankless water heaters, specifically because they were donated.

The project team achieved efficiency in their design and processes. Much of this communication was established and maintained through charrettes and ongoing team meetings.

- By recycling construction waste, the project team saved on tipping fees.
- HFHSL incorporated material from its ReStore, including scrap material for blocking in the pre-fabricated walls.
- The ERV is located to also provide bathroom exhaust. Eliminating the need for a bathroom fan helped offset the cost of the ERV.
- One reason why basements were included was because the top 5 feet of soil needed to be removed to reach bearing soil. It made sense financially to excavate a few more feet and provide a basement.
- HFHSL did considerable work in-house, including construction of the insulated panelized foundation walls, after refining the process in earlier projects.

Project Financing

Funding Sources

Grants / Incentives

Charitable Donations:	$ 2.7 M
City of St Louis:	$ 0.8 M
Softwood Lumber Grant:	$ 0.2 M
Home Depot Foundation:	$ 0.1 M
Other:	$ 0.2 M
Total:	**$ 4.0 M**

Development Costs

Land Cost:	$ 0.1 M
Building Cost:	$ 2.5 M
Soft Cost:	$ 1.5 M
Total:	$ 4.0 M
Grants / Incentives:	$4.0 M
***Net Costs*:**	**$ 0.0 M**

Cost of Greening Project

Total Costs:	$ 135,000
Rebates / Incentives:	$ 135,000
Net Cost:	$ 0

Quotes

"I love the bills I pay," - Pandora Crosby, resident, who reports that her bills are low even in winter

"Since we've been living in this house, the asthma seems like it's fading away."- Brian Waters, whose three daughters have asthma

" That they built LEED Platinum homes at $75 per square foot is extraordinary." Awards of Excellence Committee member

"Not only did they use panelized construction, but they did it themselves." Awards of Excellence Committee member

Contacts

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Looking Ahead

Challenges and Lessons Learned

HFHSL had built to Energy Star homes specifications prior to Jeff VanderLou. An integrated design process was critical to move to the next level of green. Having all members of the team attack the design and figure out how all the systems would interact reduced changes in the field. The inclusive design process was also important in communicating the "why's" to project team members and volunteers.

The soil and groundwater contamination discovered on-site added unexpected costs, and it meant that HFHSL could not build the homes in phases as planned. Equipment and manpower were all stretched thin, and volunteers and staff had to be flexible to cope. HFHSL is completing another 24 homes in this neighborhood for its 2009 build. Having learned from the 2008 build, they began site remediation earlier.

Looking to move to an even higher level of green, some of the 2009 homes will use groundsource heat pumps. (Heat pumps are currently incentivized with a tax credit.) The team plans to compare the total cost (initial and operating) and energy use of heat pumps with high efficiency gas heaters.

Education and Outreach

Residents must invest sweat equity during construction. Through the process, they learn valuable skills. The Waters family assisted in the caulking and sealing of their home during construction, and they now re-seal areas as needed. They also installed flooring in the basement, after working with HFHSL to install it in the 1st floor. Residents also received 2 training sessions on operations and maintenance, as well as a homeowner's manual.

These Habitat homes are included in the city's annual green home tour. Besides showcasing a variety of green features, they demonstrate that green homes can be built at low cost. They also show what perseverance, and a "stepping-stone" approach to improving on previous projects, can achieve.