Green Home Case Study

Healthy homes for a healthy environment

Eva Rose Building

With a coffee shop below and living units above, this highly energy-efficient building makes maximum use of a small, narrow lot within walking distance of shops and public transportation. An atrium brings in free solar heat during the winter and exhausts hot air in the summer.

About the project

Name: Eva Rose Building
Type: New, mixed-use construction
Square Feet: 670 commercial;
1,650 and 840 residential
Location: Seattle's Ballard neighborhood
Completed: May 2005

This new, three-unit building makes maximum use of a small, narrow lot and helps concentrate development where people can walk to shops and use public transportation. The ground floor not only has a permit for commercial use (currently a coffee shop) but also is equipped with a kitchen and a bathroom with a shower to allow the possibility of a live/work situation. The second floor houses a one-bedroom flat. The third and fourth floors are a two-bedroom, townhouse-style unit. The architect and builder also found a way for the 2,000-square-foot lot to accommodate two one-car garages and landscaping that features native and drought-tolerant plants.

Because of the commercial unit, the structure has fire sprinklers, full handicapped access on the ground floor, and other features generally found only in business buildings. Many of the finish materials inside and out also are of commercial quality. These choices should make the building extremely durable and reduce the need for maintenance considerably, both factors that make wise use of resources and significantly cut down on waste.

The builder and architect also put a high priority on energy-efficiency and indoor air quality. The first floor sits on a concrete slab that's fully insulated, and higher floors have thick concrete floors, which absorb and hold heat from the sun so that the building needs less heat at night. The heating system for each unit is minimal: just a hot water tank (the same one that supplies taps) plus flexible tubing that runs past a wall fan in each room. On the roof, photovoltaic panels generate 1,500 kilowatt-hours of energy each year, half the electricity used in one unit. Formaldehyde-free insulation and low-VOC finishes were used throughout. (VOC stands for volatile organic compounds, substances that convert to gas at room temperature and can be irritating or even toxic.)

Ratings & Awards

Home Builder Award,
2005 Built Green™
Design Competition

Built Green™ 4-Star
Certified Project
(360 points)

The Team

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Construction Lending

Bank of Washington

Resources/Products

Hydro-Air™ heating system

Bio-Radiant Energy Inc.
(425) 487-6272
www.bio-radiant.com

Multi-port ventilation fan

American Aldes Ventilation Corp.
(941) 351-3441
www.americanaldes.com

Photovoltaic panels

Sound Power Inc.
(425) 844-8748
www.bio-radiant.com

Recycled-tire entry mats

Tyrex brand, available through
De Mar Company
(206) 575-0345
www.demarfloors.com

Metal siding, railings, etc.

Commercial Metal Systems
(253) 288-8741

Bamboo poles

Bamboo Hardwoods
6402 Roosevelt Way NE, Seattle
(206) 529-0978

For More Info

Built Green™ – a residential green building program/rating system developed by the Master Builders Association of King and Snohomish Counties in partnership with Seattle.
www.builtgreen.net

Energy Star – a government-backed program helping businesses and individuals protect the environment through superior energy efficiency.
www.energystar.gov

King County Construction Works – provides free assistance and recognition to builders who recycle, reduce waste and use recycled-content building materials.
www.metrokc.gov/dnrp/swd/greenbuilding

Seattle Sustainable Building Program – provides guidelines, incentives, and assistance to increase the environmental performance of buildings in Seattle.
www.seattle.gov/dpd/sustainability

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Goals/Challenges

Site issues

Because the 25-foot-wide lot is on an arterial street with bus service and nearby shops, one goal of the project was to make maximum use of the site. The builder previously owned the lot next door and had planned ahead by providing an easement so its driveway could serve this lot. As a result, no space or resources were wasted duplicating pavement. The easement also provided for shared use of each lot's narrow side yard, creating a more useful 6-foot-wide space, which is now filled with diamond-shaped stepping-stones and plants. A standard walkway would have used more concrete and blocked more rainwater from percolating into the soil.

Flooring

Flooring decisions were based on comfort, energy efficiency and maintenance needs, not just appearance. On the ground floor, commercial-grade porcelain tiles cover the concrete slab. These tiles cost more than residential-grade ceramic tiles, but they're virtually chip-proof. By the door, entry mats made from recycled tires trap dirt. The mat consists of individual tiles, which can be replaced independently, if necessary.

On upper levels, standard concrete 1.5 inches thick covers a wood support system. Typically, in a building like this, a builder would put perhaps 3/4 inch of lightweight gypsum concrete over the wood and top that with carpet. But standard concrete in a thicker layer not only holds more heat, it also deadens more sound and provides better protection against the spread of fire from one floor to the next. Plus, it's durable enough to double as the finished flooring. The only carpeting in the building is in the townhouse unit on the stairs between the third and fourth floors.

Heating and cooling

Because the structure is well insulated and sealed, only a modest amount of additional heat is needed. Although gas fireplaces can be used for heat, the main heating system is more innovative. Made locally in Woodinville, it sends hot water from a standard-type water heater through flexible tubing that runs in front of wall fans in each room. The fans distribute the heat directly, without ducts. However, the building is so well-insulated that the fans are rarely turned on except during the coldest days of winter. The rest of the time the only heat needed seeps out from the tubing and from the water heater itself — a direct-vent gas model located in a closet within the heated space.

Indoor air quality is maintained with a multi-port, low-volume ventilation system in the residential units that cycles on and off on a regular schedule and draws in fresh air through ports in each bedroom and living area.

The top floor includes an unheated atrium of about 140 square feet. By opening or closing its windows and door to the rest of the house, residents bring in free solar heat during the winter and exhaust hot air in the summer. Three ceiling fans, including one within the atrium, ensure that the top floor never becomes uncomfortably hot. The atrium could double as a greenhouse, and there is a deck outside with room for container gardening.

Custom touches

Many of the home's decorative materials have "green" features. The knotty alder doors, alder cabinets and knotty pine shelving all were made locally, from local woods. The countertop material and metal siding were manufactured in the Seattle area. Towel bars are poles of bamboo, a rapidly renewable resource.

Other efficiencies

Because so much is packed into a small lot, routine maintenance chores, such as painting, would be difficult. So the siding, railings, gates, trellises and flashings are all metal with factory finishes designed to last for decades. The siding is 24 gauge, thicker than normal, reducing the likelihood of dents. The commercial space is faced with brick, which also should weather just fine.

Inside, there are water-thrifty dual-flush toilets and Energy Star-rated appliances. At least half the lighting is fluorescent. The kitchen sink in the townhouse unit is a used, three-compartment deli model. Besides looking stylish and creating a better environment for hand-washing of dishes, the sink has smaller-than-usual basins, so they fill up with less water.

Lessons learned

Ventilate often

The ventilation system, which cycles on and off automatically day and night, has completely prevented mildew problems, even in shower areas. The builder also credits use of shower curtains, rather than doors, because the curtains allow better air circulation within bathrooms. Because of the success here, Martha Rose Construction no longer installs shower doors on any of the houses it builds.

Keep learning

This building missed Energy Star certification by a few points, prompting the company to use thicker roof supports on later buildings so there is room for more insulation. The company has also switched to using more efficient water heaters and ventilators. "As we learn more, we're always striving to do more," Rose says.