O'BRIEN-CUNNINGHAM RESIDENCE

Floor space: 1,650 ft^2

Budget: $225,000 ($136/ft^2)

Construction dates: 1998-1999

Owner: Kathleen O'Brien and John Cunningham

Architect: Jim Musar, Aspects, Inc.

General Contractor: Woodside Construction

Environmental Consultant: O'Brien and Company

Project Notes

Site and water

- **Native environment:** An on-site wetland was protected during construction by flagging, silt fencing and hay bales.
- **Impact area:** Building designed more vertical than horizontal to minimize footprint.
- **Drainage:** A gravel driveway and round steps instead of paved walkways maximize natural water filtration. Groundwater is rerouted to wetland rather than city stormwater system.
- **Water:** Low-flow toilets and showers and a horizontal axis washing machine contribute to water savings of 40% over average use in the region.
- **Transportation:** Home is near owners' offices, city services and public transportation, minimizing dependence on cars.

Energy and atmosphere

- **Natural light:** House utilizes southeast exposure for light, with minimal glazing on north and west elevations to limit heat loss and unwanted solar heat gain.
- **Framing:** Advanced framing system allows higher levels of insulation with two stud corners and insulated headers.
- **Heating:** Space and water heating provided by hydronic radiant floor system supplied only by an efficient hot water heater.
- **Electricity:** Energy efficient refrigerator, washer, dryer and dishwasher contribute to power savings.

Materials and resources

- **Size:** House dimensions were limited to 75% of average new home size.
- **Wood:** Advanced framing and use of engineered wood reduced lumber needed for the project by 15%.
- **Recycling:** During construction cardboard and metal was recycled, waste wood given to laborers.
- **Materials:** Bamboo used for some flooring. Biocomposites produced with agricultural by-products used for flooring and countertops. Wood polymer used for front porch. Other sustainable building materials include fiber-cement siding, metal roofing, concrete with fly ash foundation, fiberglass insulation, drywall, drywall clips and carpet pad with recycled content.

Indoor environmental quality

- **Flooring:** Less than one-third of the floor is carpeted. Easy-to-clean flooring installed instead.
- **Toxics:** Solvent-free paints, latex exterior stains and paints and water-based finishes used throughout rather than highly toxic materials.
- **Air:** Hydronic heating eliminated need for ducts, a common source of dust. Natural cross-ventilation ensures a fresh air supply, and a detached garage keeps fumes away from living areas.
- **Space:** While small by U.S. standards, the house interior is comfortable and feels spacious to most guests.

When Kathleen O'Brien and husband John Cunningham decided to build a new house on Bainbridge Island in 1998, they were going where very few people had gone before. On top of the already daunting task of buying land and building a house, O'Brien, an environmental consultant, ambitiously chose to build green, using architecture and building materials designed to have a minimal impact on the immediate and regional environment.

The project was enrolled in the Build a Better Kitsap program, a voluntary green building initiative of the local building association. Upon completion, the house received a three-star rating in the program, the highest recognition possible.

Size matters

One big initial idea that affected every other decision was the plan to build small. In order to limit the impact to the on-site wetlands and generally do more with less, the owners and designers came up with a plan to build at only 75% of the current average size of houses in the U.S. The reduced size required a design that provides better functionality and livability per square foot. Impact was further reduced by the decision to build vertically rather than a sprawling horizontal building footprint. In the end, the design was a success, evinced by the visitors who often comment that the 1,650-square-foot house "seems much bigger than it is."

The remainder of environmental choices had to do with what went into the house. The project team looked for actions that provided multiple benefits. For example, the wood polymer decking on the front porch uses material that would normally go to landfill. But it also doesn't need to be stained or painted and is highly durable. This choice translates into lower maintenance costs, and more time for other activities.

> "I believe the choice to design and build our home in an environmentally sound manner is what makes this home feel so right. Not only that, based on the experience, I don't see any reason why others can't make the same choice."
>
> —Homeowner Kathleen O'Brien

Price matters

Green building has a reputation today of being expensive—only the wealthiest developers and government agencies can afford such a "luxury," the thinking goes. This was even more the case three years ago when the house was built. Yet, through persistence and creativity, the environmental upgrades added less than 1% to the overall budget.

Energy savings and other operational savings offset this initial investment, while flexibility in overall design and space offers more value for the money spent. Long-term costs to maintain and operate the home were important to the fifty-something owners, so the team looked for environmentally sound products and techniques that translated to improving operating efficiencies, increased durability and reduced maintenance.

Awards and Honors

Cited by the 1999 Seattle AIA What Makes It Green Panel for its Educational Ethic and Green Materials
Featured on the 21st Century Home (HGTV) in January 2000 as an example of sustainable living.
Won two awards in the 1999 Parade of Homes for the Kitsap HBA; one for environmental achievement, the other simply as the best offering in its price category (competing with conventional homes!)
Featured on at least three Web sites as an example of "green" building.
Selected as tour site for multiple national and regional events promoting green building (1,300 individuals have toured the home to date).
Nominated for the 2002 Kitsap County Earth Day Award.

Case study sponsored by:

Seattle Public Utilities

Washington State Department of Ecology

King County

O'Brien & Company

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U.S. Green Building Council Chapter