



## CASE STUDY: Awards of Excellence for Affordable Housing Built Responsibly

# Housing Vermont's Waterfront Housing



## Waterfront Housing

Waterfront Housing is a mixed-income rental project developed through a partnership between Housing Vermont, a non-profit syndication and development company that creates permanently affordable housing for Vermonters, and the Burlington Community Land Trust (currently the Champlain Housing Trust), a non-profit, member-based organization that works to ensure access to affordable homes and vital communities through democratic stewardship of land. This project was developed to create affordable and sustainable housing for a residential community that reflects the socio-economic background of Burlington. The outcome is attractive affordable housing in the scenic Lake Champlain waterfront area of Burlington, which had previously been a luxury housing enclave.

### Greening Goals:

The goals of Waterfront Housing are to create sustainable, perpetually affordable rental housing in a part of the city that has been largely exclusive and to be an innovative model for sustainable affordable housing in the state of Vermont and beyond.

### Integrated Design Process:

A charrette was held early in the design and development process to coordinate all of the relevant stakeholders and set goals that would drive the development process. This charrette included involvement by project architects, engineers, developers, an energy/green design specialist, and representatives of the city, among others. In addition, sessions were conducted with local residents to elicit community participation, feedback, and buy-in.

### Project at a Glance

**Location:** Burlington, Vermont

**Project Type:** New Construction; Multi-Family Residential; Brownfield Redevelopment

**Ownership/Rental:** Rental

#### Size:

40 units (1-3 BR) in a 4 story building  
40,000 total sq. ft.  
2 acre site, 24 units/acre.

**Project Completion Date:** August 31, 2004

#### Affordability:

- 28 units for households making less than 60% of the area median income (AMI)
- 6 units for households making less than 100% AMI;
- 6 market rate units

#### Project Team:

- Developers: Housing Vermont and the Burlington Community Land Trust
- Architect: Jeff Stetter, Gossens Bachman Architects

#### Development Cost:

Land cost:	\$116,000
Construction costs:	\$5,234,000
Soft costs:	\$1,850,000
Total:	\$7,200,000

#### Cost/Savings of Greening:

The costs and/or savings associated with greening this project were not broken out from general costs.

#### Standards Used:

LEED-NC  
Energy Star Homes

#### Key Green Features:

- Surpassed Vermont Energy Code requirements
- 48% lower energy costs than comparable buildings
- Brownfield remediation and erosion control
- Significant efforts to use locally harvested materials

## Green Features



### Site Design/Landscape Planning:

Site work was regarded as one of the most important components of this development project. The site itself required brownfield remediation and rehabilitation, with contaminated soils and debris removal. One of the biggest challenges of the site was a steep slope where stormwater runoff problems existed. During construction, techniques such as matting, silt fences and rip-rap were implemented to control erosion. The soil of the slope area was reinforced by using geogrid technology and plantings. A stormwater system that includes swales, large concrete infiltration boxes and baffles was designed and implemented to treat and infiltrate the site's stormwater as well as stormwater that flows to the site from adjacent properties. In addition, a parking garage under the building rather than an impervious parking lot was developed. While the site's shape (triangular) and geography limited options for orientation, the building was designed with ample windows taking advantage of west-east winds coming off the lake, passive fresh air ventilation of the underground parking structure, and excellent southern exposure for solar heating and natural lighting. In addition, large native trees were retained and new native vegetation was introduced to provide natural shading. In the final landscaping, all non-native plants on the site were removed and replaced with native species to eliminate the need for irrigation and to provide habitat for native birds and insects.

### Location & Linkages:

Waterfront Housing is located within the Burlington designated downtown area at the northern fringe of the urban zone on the city's waterfront. The site is in close proximity to a waterfront park, skateboard park, bike path, as well as other recreational areas and community facilities. The site is within walking distance of employment opportunities, and shopping and services in two commercial/business districts. Public transportation is available within less than one-quarter of a mile. In addition, public and private schools (kindergarten through university level) are within walking distance of the site.

### Building Design Greening:

**Energy:** The development team worked collaboratively with the City of Burlington's municipal electric utility to maximize energy efficiency well beyond code requirements, which resulted in the building exceeding all EPA Energy Star standards for efficiency. A high efficiency central gas boiler provides heat for the building and hot water is generated by sealed combustion high efficiency gas water heaters. Calculations for proper sizing of the HVAC system were conducted with considerations of contributions from passive solar, and a heat recovery ventilation system was used for maximum energy efficiency and to supply the building with fresh air.

Other energy efficiency strategies include natural lighting and shading, a tan colored membrane roof to reduce heat island effect, fiberglass composite efficient windows, lighting fixtures that exceed Energy Star Standards, motion sensors on all common area lighting, photo switches on all exterior lighting, and Energy Star rated appliances.

**Indoor Environmental Air Quality:** An IAQ management plan was developed prior to the construction of the building, and all duct work was covered during the construction process to eliminate contami-

### Green Highlights

- Energy Star 5 Star rating
- LEED-NC certified
- Cellulose, rigid, and formaldehyde free acoustic batt insulation
- Heat recovery ventilation system
- Formaldehyde free particle board
- 95-97% recycled under-layments
- Recycled content gypsum board and ceiling tiles
- >25% of materials produced within 500 miles
- Locally harvested and manufactured hardwood flooring
- Siding made of fiber cement, metal and brick
- Composite decking
- High volume stormwater treatment system
- Dual Flush toilets (.8 and 1.6 gallons per flush)
- Low-flow water fixtures and aerators
- Carpet with 97% recycled backing
- Fiberglass composite, triple pane, low-e, double glazed windows with a 2.9 R value
- Lighting that exceeds Energy Star standards
- Energy Star rated appliances
- Low/no VOC paints
- Recycling storage area
- Three electric vehicle charging stations

nation of the ventilation system. The indoor environmental quality of Waterfront Housing was enhanced by compliance with ASHRAE 62-1999 and the use of low and no VOC paints and sealants,



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# Green Features

an entry walk off grate (which reduces the amount of particulates tracked into the building), Carpet and Rug Institute Green Label certified carpeting, and exhaust fans in the kitchens and bathrooms. Smoking is prohibited in the common areas of the building and restricted to designated outdoor areas which are located at least 25 feet away from entries, outdoor air intakes, and operable windows. In addition, the ventilation system eliminates cross-contamination between the residential units and the common areas in the building and there is at least one operable window for every 125 square feet of occupied perimeter space.

**Resource Conservation/Materials:** In an effort to reduce material use, engineered lumber, off-site panelization, and manufactured truss systems were implemented. LEED practices for waste minimization were incorporated in the construction plans and specifications. The development team utilized the BEES (Building for Environmental and Economic Stability) program to analyze the life cycle impact of materials and make the most appropriate decisions.

**Water Conservation:** Low-flow faucet aerators and shower heads were installed to reduce water usage. All toi-

lets installed are dual flush (.8 and 1.6 gallons per flush) and the laundry facility is equipped with water saving front loading washing machines. The landscaping of the project consists of native species and therefore requires no additional irrigation.

**Commissioning:** A commissioning agent was hired to ensure that all systems within Waterfront Housing were operating and performing optimally. Blower door tests were conducted to determine building performance. In addition, the systems were reviewed by a LEED accredited professional and received LEED-NC certification.

**Operations and Maintenance:** An operations and maintenance manual was developed by the design team and contractor throughout the development process. All consultants (including the commissioning agent) and the contractor provided maintenance staff training. In addition, the head of the maintenance staff was involved in all aspects of the development process, reviewed

submittals, and attended weekly job meetings throughout the construction process.

## Measurable Benefits

### Energy Efficiency:

Energy Star Home standard exceeded; 50% reduction over the ASHRAE/IESNA Standard 90.1. This project is projected to have 48% lower energy costs than a comparable building built to Vermont Energy Code.

### Conventional Costs vs. Actual Costs:

- Gas: Conventional= \$45, Actual= \$23 (per unit per month)
- Water: Conventional=\$30, Actual= \$16 (per unit per month)
- Electricity\*: Conventional=\$8-10, Actual= \$18 (per unit per month)

\* The increase in electricity costs is due to the electricity consumed by the heat recovery system and fans.

**Resident Education:** The education of occupants is done on a very practical level, with the property manager conducting a one-on-one walkthrough of the building and the units for each resident at move in. While the overall greenness of the building is discussed, most education takes place on the unit level, with the property manager explaining the way unit components, such as the dual flush toilets and the ventilation system, work.

### Occupant Satisfaction:

*“As an elderly person it was difficult for me to find housing that is convenient to downtown...I love the City of Burlington and did not want to move... How lucky I am to move into an apartment that is modern and convenient... (where) my neighbors are even more diverse in background than those I am leaving behind.”*

– Waterfront Housing Resident

## Project Financing

Waterfront Housing was financed through Apollo Housing Capital, Low-Income Housing Tax Credits allocated by Vermont Housing Finance Agency, a construction loan from Merchants Bank, and no-interest deferred loans from the Vermont Housing & Conservation Board, the HUD Economic Development Initiative and HOME program, the City of Burlington Housing Trust Fund, NeighborWorks, and the Burlington Electric Department.

### Sources of Funding/Rebates for Greening:

While the cost of greening Waterfront housing was not tracked, the project was the recipient of a rebate from Vermont Gas and Burlington Electric of \$31,000, which was dedicated to funding the work of the LEED certifier.



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# Looking Ahead

### Challenges:

As with many affordable housing developments, securing adequate funding was a primary challenge. In addition, the LEED rating system was not employed at the beginning of the design process. Because of this some redesign was necessary to comply with LEED once it was adopted, resulting in extra design fees and costs to the project.



### Partnerships:

Waterfront Housing is a model example of a mutually beneficial public/private partnership which effectively brought together private equity, state and federal funds, and conventional debt to develop sustainable affordable housing. By actively working with the City of Burlington and by addressing the needs of the developers, residents, community, and environment, the development team was able to produce housing that satisfied a diverse cross-section of stakeholders.

### Policy/Practice Implications:

Waterfront Housing is the first LEED accredited building in Vermont. It acts as a model and benchmark for sustainable and affordable housing development throughout the state and beyond.

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*“In its Waterfront Housing project, Housing Vermont has transformed a challenging urban brownfield site into an attractive and efficient home for 40 low-income families. Its comprehensive approach and attention to detail in designing a high-performance building – from careful material selection to use of resource efficient systems – sets this project apart.”*

-Member, Awards Advisory Committee

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## Contacts



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