



**When Graham Elvidge and Kathleen Stormont first saw 844 Dunlevy Avenue in downtown Vancouver’s Strathcona neighbourhood, it looked and smelled terrible. It was the proverbial haunted house complete with overgrown vegetation and destined to be torn down.**

But the couple had been searching for a house to restore and were drawn to the Queen Anne-style building’s graceful proportions, two-storey bay windows and gingerbread brackets. The interior revealed more glimmering facets in this 1899 diamond in the rough.

says. “Everything was intact: the original wooden windows, mouldings, even the wallpaper.”

In the summer of 2004, the couple began a two-and-a-half-year odyssey that turned a local eyesore into a heritage-designated gem now known as Winchcombe House. Just as remarkable, they took an energy-inefficient

▲ 844 Dunlevy Avenue, Vancouver as it appeared when up for sale in 2004.

▲ *Le 844, avenue Dunlevy à Vancouver, lorsqu’il a été mis en vente en 2004.*

“Unlike many houses in the area, it had never been renovated,” Elvidge

# drop dead green

by Christopher Wiebe

## B.C. Heritage Houses are Energy Efficient Show-offs

house (one that scored zero on the EnerGuide for Houses energy audit) and turned it into a high-efficiency one (now scoring 82, within the range of the most energy-efficient new homes built in Canada).

This resurrection didn't cost the earth, either. By reusing materials in the house, scavenging vintage

wood from nearby demolitions and focusing on draught proofing and insulation to reduce energy costs, the couple achieved both their heritage and energy goals on a tight budget. Modest to look at, 844 Dunlevy Avenue may yet become the poster child for the energy-efficiency adaptability of older homes.



◀ Owner Kathleen Stormont at work on 844 Dunlevy Avenue.

◀ *La propriétaire, Kathleen Stormont, travaillant au 844, avenue Dunlevy.*

## green and heritage: a natural combination

Heritage conservationists have long insisted that rehabilitating old buildings is a green conservation practice, for two reasons. First, existing buildings are vast repositories of “embodied energy”—the energy needed to extract, process, transport and install those materials. Reusing them saves landfill and avoids additional environmental impacts from new construction.

Second, pre-WWII buildings, designed in an age when energy was expensive, often incorporate passive energy-saving features such as walls with high thermal mass (equalizing outdoor temperature fluctuations), operable windows, porches and “zoned” heating.

But can a retrofitted old house compete with a high-efficiency new home? Can it do so without selling out the heritage elements that give it cultural meaning? Case studies in British Columbia have shown time and again that green heritage projects retain material, exploit the natural design advantages of older homes and incorporate state-of-the-art energy conservation.

## the mole hill miracle

Between 1999 and 2003 the Mole Hill Housing Cooperative project in Vancouver’s West End took an entire block of late 19th-century houses and transformed them into 170 heritage, energy-efficient and affordable rental units for low-income singles, families and seniors. It has won architectural, smart growth and heritage awards.

The fight to preserve the 26 houses had gone on for decades. In the late 1950s and early 1960s, the City of Vancouver bought them, intending to eventually tear them down to expand Nelson Park.



Photos: Elvidge and Stormont

▲ Detail showing extent of the porch restoration.

▲ *Détail montrant la restauration du porche.*

## overcoming biases

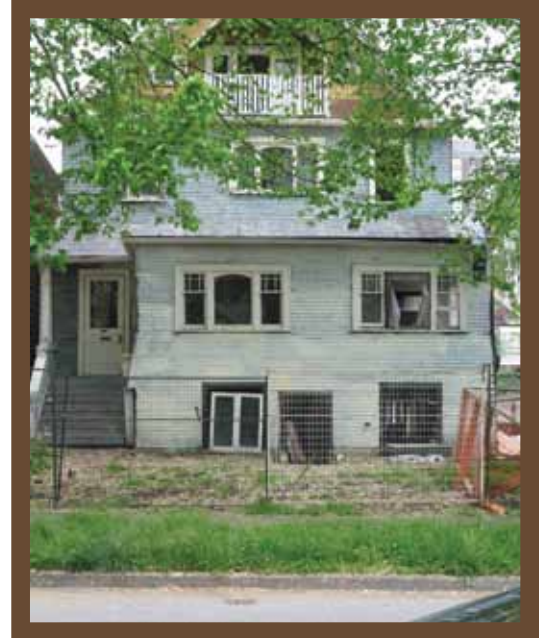
The prevailing notion that old buildings are leaky energy hogs is hard to unseat. The tendency to replace rather than refit serviceable old wooden windows and storms is symptomatic of this broader prejudice that runs contrary to scientific fact.

Recently, BC Hydro ran newspaper ads promoting Energy Star replacement windows because “Having old windows is like having no windows at all.” B.C. heritage groups were incensed. BC Hydro later modified their ad to read “Having inefficient windows is like having no windows at all,” but the claim that newer is better remains implied.

At Dunlevy Avenue, Elvidge reused all of their old windows and had new wooden storms made. He has found higher performance with this assembly than the double-glazed vinyl option.

“Original windows are infinitely maintainable. Even in our neglected house, we found only a few sashes had to be replaced.”





“BC Housing never saw it as a heritage restoration project,” says chief architect Norm Hotson (Hotson Bakker Boniface Haden Architects) of the project’s principal funder, “but we treated it as one.”

According to Don Luxton, the project’s heritage advisor, the houses would never have been saved on the basis of heritage alone. It was the long-term tenants who drove the sustainability agenda during the community redesign phase. The project’s grassroots social dimension gave it political legs and a public following of thousands, including 50 Vancouver neighbourhood associations and such luminaries as Jane Jacobs.

The houses had severely deteriorated from years in limbo. Each house underwent \$400,000-500,000 in improvements, including the installation of geothermal heating systems—a North American first for a social housing project.

Geothermal heat pumps cost \$35,000 per house to install, but the system paid for itself in energy

savings within the first five years. Warm geothermal water pumped from 75-metre depths circulates through the houses where fans evenly distribute the heat.

The lane that runs the length of the block was narrowed to allow space for large community garden plots and meeting spaces. Stormwater was diverted to an ornamental pond instead of to storm sewers. The project achieved efficiencies impossible for any one home.

“It is a model of innovative planning,” Hotson explains, “that rethinks the detached dwellings as a cluster, encouraging sustainability through the use of communal living to minimize consumption.”

The project retained and restored all wooden windows without introducing double-glazing, which would have drastically altered their appearance. Concerned about changing the nature of the envelope, the project team also decided not to remove the 19th-century plaster on most of the ground floor.



▲ Vancouver’s Mole Hill Housing Cooperative project transformed neglected 19th-century houses into 170 heritage energy-efficient, affordable units complete with communal gardens.

▲ Le projet Mole Hill Housing Cooperative de Vancouver a transformé des maisons négligées du 19<sup>e</sup> siècle pour y aménager 170 logements patrimoniaux abordables offrant une haute efficacité énergétique, le tout assorti de jardins communautaires.



▲ Retrofits and upgrades to this Arts and Crafts gem at 222 Vancouver Street, Victoria have cut the owner's energy bills by 75 percent.

▲ *La modernisation et l'amélioration de l'équipement de cette perle du style Arts and Crafts au 222, rue Vancouver à Victoria ont réduit les frais d'énergie du propriétaire de 75 p. 100.*

"We took the energy hit because we wanted to retain the feel of the ground floor rooms," says Hotson.

They also didn't want to disrupt the existing thermal properties of the walls. Installing insulation would have meant introducing a vapour barrier—causing the dew point in the walls to change, leading to wood rot.

"Normal rehabilitation practice in Vancouver is to strip walls to the studs, inside and out, and apply all new finishes. From an energy point of view, you will get better numbers. But from

a heritage and green perspective, it's better to take a modest, less intrusive approach that retains heritage material," he explained.

Mole Hill shows that an open mind is essential for heritage retrofits. The green desire to do maximum intervention and the heritage impulse to minimize it are seemingly at odds. Balancing heritage attributes with green innovations forces owners to understand their building—how it's constructed, how it works, the potential of its site and other environmental influences.





### arts and crafts in the 21st century

In Victoria the new owners of 222 Vancouver Street in the city's Fairfield neighbourhood brought green/heritage integration to a new level. Contractor David Coulson wanted to show the real estate industry that old buildings could have a soft energy footprint.

The new owners wanted to return the house—a shabby duplex when it was purchased—to its original state as a single-family home and

revive its 1910 Arts and Crafts design. Interior heritage elements like brick fireplaces were revived and wood features stripped of paint. Fir soffits and cedar shingles were repaired on the exterior. Removal of load bearing walls and posts during the conversion into a duplex left floors sagging. These were now reinstalled.

In the end, very little material ended up as landfill. Ninety-five percent of the wood trim was reinstalled and the original windows were rebuilt and reglazed.

High-efficiency mechanical systems were introduced, including geothermal-powered radiant floor heating, a heat recovery ventilator, photovoltaic panels for electrical generation and solar-heated hot water.

Coulson took care to integrate these features without affecting the exterior of the house. Soy-based spray foam insulation added high thermal value and was a seismic upgrade, providing added strength to the walls. Other seismic upgrades included reinforcing the chimney base and installing hurricane ties between the floors. The house was sealed with weatherstripping and caulking, even in such unlikely places as electrical outlets and the rim joists between floors. The EnerGuide rating of the original house was estimated to be 50 and the house now sits at 80.

Coulson disagrees with the opinion that insulation and vapour barriers interfere with an old house's need to breathe.

"Everything used to be tight in old houses. That tightness needs to be brought back. The boards have shifted and settled and the old horse-based glues have failed."

He believes he achieved his objective with his 260-square-metre (2,800-square-foot) 1913 home in

### EnerGuide for Houses

The EnerGuide is a Government of Canada program that measures home energy performance. It rates energy efficiency on a scale of 0 to 100. A building's plans are analyzed and a blower door test done. A rating of 0 means major air leakage, no insulation and extremely high energy consumption. A rating of 100 means a house is airtight, well insulated and ventilated and requires no purchased energy.

### EnerGuide Rating Chart

0 to 50

Older house not upgraded

51 to 65

Upgraded old house

66 to 74

Energy-efficient upgraded old house or typical new house

75 to 79

Energy-efficient new house

80 to 89

Highly energy-efficient new house

91 to 100

An "advanced house" that uses little or no purchased energy



Duncan, north of Victoria. When he started sealing the house, a test showed it had the equivalent of a massive kitchen-table-size hole. After three days of draught proofing he had the hole down to the size of a coffee table book.

"I use a clear, latex-based caulking which can be removed after each heating season without pulling off paint. I cut my energy bills by 75 percent. The same thing can be done easily in most heritage homes," Coulsen advises.

### **reduce, reuse, rethink**

Back on Dunlevy Avenue in Vancouver, Elvidge and Stormont achieved comparable results on a similarly modest budget. After 30 years of neglect, Elvidge couldn't salvage the plaster and had to gut the interior to the balloon frame walls. He removed the interior wood trim and catalogued it for easy reinstallation. Rockwool insulation (whose R-value is slightly higher than fiberglass) was

used. It's made from mine-tailings, reducing the environmental footprint.

Elvidge and Stormont salvaged missing pieces of trim, moulding and siding by scavenging vintage houses that were coming down in the overheated Vancouver real estate market.

"We had to be prepared to drop everything and head over with a truck and crew. When we saw orange fencing we would contact the demolition contractor. We often had only a few hours to jump on it."

On one occasion they stripped a two-storey house of its bevel-edged cedar siding in six hours. "It was beautiful wood, six to eight metres in length and clear of knots, destined for the landfill," he said. "We estimated wood of that quality would have cost about \$3,000 from a salvage retailer."

Their greening philosophy was simple. "We wouldn't use things that were expensive or dependent on expertise. We looked for passive efficiencies, which are ultimately more efficient."

## Energy Retrofit Tips

### CMHC

Renovating for Energy Savings  
[www.cmhc-schl.gc.ca/en/co/renoho/reensa/index.cfm](http://www.cmhc-schl.gc.ca/en/co/renoho/reensa/index.cfm)

### U.S. Department of the Interior

Preservation Brief 24: Heating, Ventilating and Cooling Historic Buildings, Problems and Recommended Approaches. 1995.  
[www.nps.gov/hps/tps/briefs/brief24.htm](http://www.nps.gov/hps/tps/briefs/brief24.htm)

### English Heritage

"Building Regulations and Historic Buildings: Balancing the Needs for Energy Conservation with those of Building Conservation." 2004.  
[www.english-heritage.org.uk/upload/pdf/ign\\_part1\\_buildingregs.pdf](http://www.english-heritage.org.uk/upload/pdf/ign_part1_buildingregs.pdf)

- ◀ A modern upgrade to the kitchen at 222 Vancouver Street retains the heritage design elements of this 1910 house.
- ◀ *La modernisation de la cuisine du 222, rue Vancouver a préservé les aspects patrimoniaux de cette maison de 1910.*





▲ The home's original wood features were stripped of layers of old paint and 95 percent of the wood trim reinstalled at 222 Vancouver Street.

▲ *Les éléments de bois d'origine du 222, rue Vancouver ont été décapés, et 95 p. 100 des garnitures ont été remises en place.*

They took especial care with tightening up the envelope—draught proofing and insulating. “The energy auditor said that if the building were any tighter we would need a heat recovery ventilator!”

Although examples like these retrofit projects are opening minds up to new ways of thinking about conservation, the bias toward new construction stills holds sway.

“Most contractors are not used to working in a truly green way, reusing buildings or working with reclaimed materials,” says Robert Brown of Vancouver’s ReSource Rethinking Building Inc. “Those who know how to make heritage and green principles work together are rarer still.”



David Coulson points to a deeper problem. Measuring building performance through the narrow lens of energy use ignores important factors like the durability of materials or a building's overall environmental footprint.

"Nobody has taken the time to measure results in a holistic way. The unique qualities that old houses contribute to sustainability are not fully understood or appreciated yet," says Coulson.

With the growing body of evidence he and others are uncovering, those changing attitudes may be just around the corner.

***Christopher Wiebe has written for such magazines as Canadian Geographic and Literary Review of Canada. He recently completed an article on the loss of rural farmland for Westworld Alberta magazine.***