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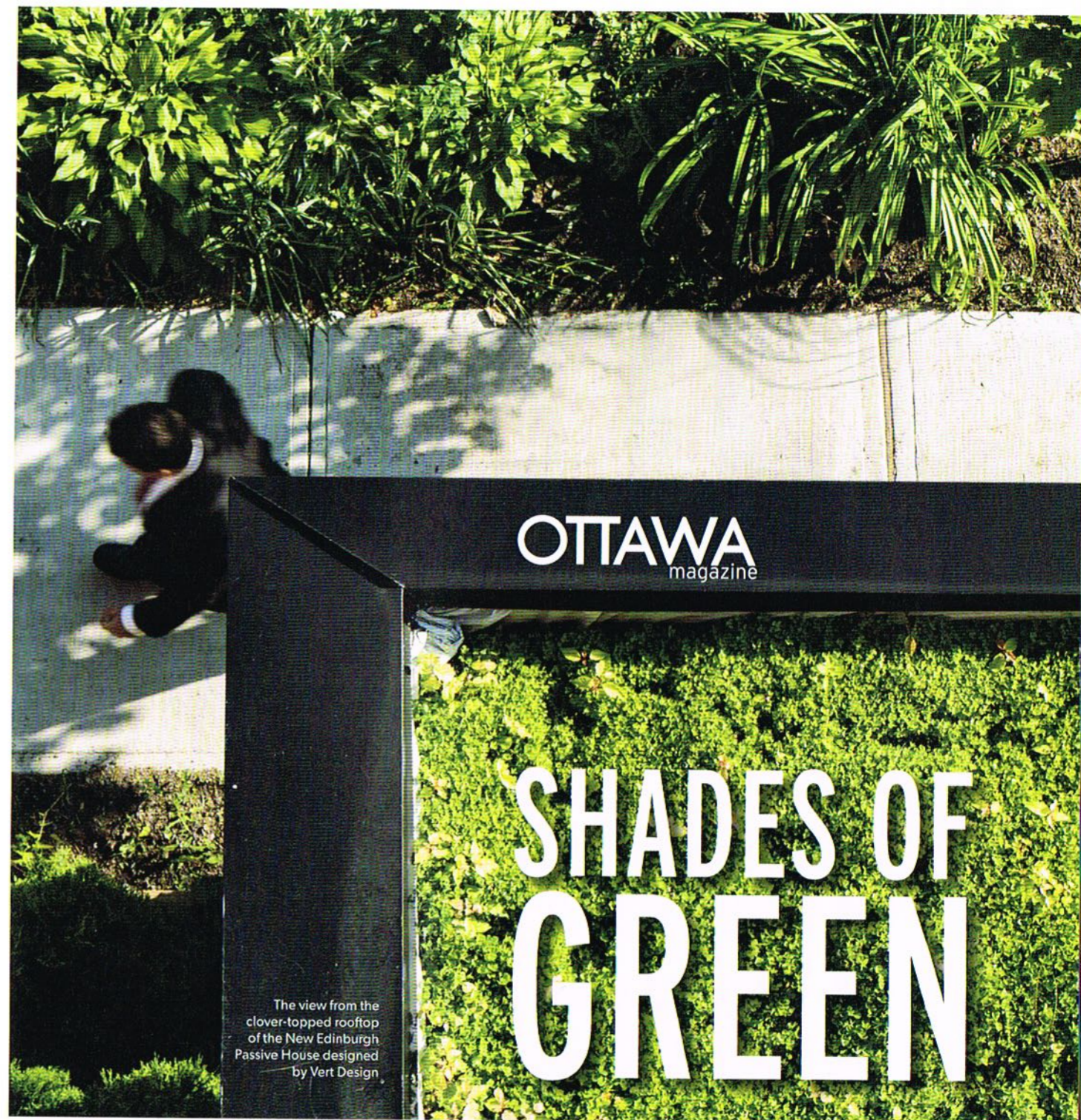
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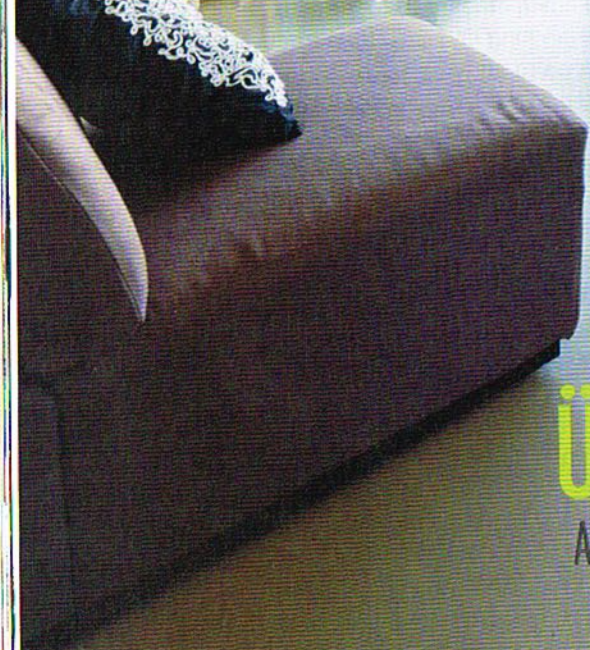
The view from the
clover-topped rooftop
of the New Edinburgh
Passive House designed
by Vert Design

WITH FILES FROM
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As consumers become ever more conscious of the need to minimize their environmental footprint, they're pushing designers, architects, and builders to get with the program. With green building techniques slowly moving from niche to normal status, *Ottawa Magazine* takes a close-up look at the work and ideas of some inspired local innovators.





ÜBER ENERGYMEISTER

A CERTIFIED PASSIVE HOUSE IN NEW EDINBURGH

BY BARBARA SIBBALD
PHOTOGRAPHY BY CHRISTIAN LALONDE, PHOTOLUXSTUDIO.COM

From the verdant rooftop garden to the dazzling bank of triple-glazed windows, Chris Straka's New Edinburgh home proves that energy efficiency can net both significant cost savings and a very beautiful home. Or two homes, in this case. Straka, the owner of Vert Design & Development, and his wife, Carmen Bohn, moved into one half (1,700 square feet) of the new semi-detached building in the fall of 2010. Straka's design ensured it uses only 10 percent of the energy of a typical house. As a result, it's the first residence in Canada to be certified by the Passive House Institute US. It also cost about 10 percent more to build, but Straka calculates that the energy savings will offset that expense in no more than a decade. Straka talks about the design process for his über-energy-efficient house.



Designer Chris Straka (above) and his wife, Carmen Bohn, have been test driving his Passive House for two years; daughter Everley came along for the ride a little more recently. The house design evolved during the building process: the only room that remained the same was the living room (facing page). Its perch on the top floor of the four-level house is ideal for catching treetop views and breezes off the Rideau River. The roll-on epoxy flooring provides a durable covering with an industrial look for the in-floor hydronic heating system. A street view of the semi-detached building (top). The roof boasts solar panels and a vegetable garden (not visible in the photo).

► WHAT WERE YOUR MUST-HAVES IN THIS HOUSE?

In any design process, you have to identify the things that are most important to you. In this particular building, it's energy efficiency. Passive House Certification is all about how much energy it takes to heat, cool, and ventilate a building. To achieve the PH standard, we chose our location carefully to maximize solar exposure. High levels of energy efficiency are achieved by super-insulating the building and by making sure it's as airtight as possible. Another important contributor to the design is the use of efficient mechanical equipment. Our home uses a dual core HRV (heat recovery ventilator) with an ECM (electronically commutated motor) and a geothermal heating system. Other key elements included a vegetated roof and shading structure, high-performance windows to ensure daylight could penetrate into all interior spaces, and lots of attention to details during construction.

► WHAT SPECIFIC GREEN ELEMENTS DID YOU KNOW YOU WANTED? I wanted solar panels. There are two systems – one for each house – at a cost of about \$15,000 per side to set up. But we sell the power back to the Ontario Power Authority for 80.2 cents per kilowatt hour. The capital cost will be paid off in seven or eight years.

I also wanted to try geothermal heating. This system pulls heat from the ground to heat water in two tanks: one for the in-floor heating system and one for water for domestic use. A few months after we moved in, the heating system failed – a

fuse blew. The geothermal heating system didn't work for three or four days, and the temperature dropped from 18 degrees to 15 degrees. Carmen asked me if I'd lowered the thermostat – that's when I figured out what had happened. Geothermal is actually overkill in an air-tight building like this. We could get away with having just a few electric baseboards. You'd hardly ever turn them on.

► DOES THE GREEN ROOF HELP INSULATE THE HOUSE?

Yes, but the main reason I wanted it is because I don't trust the soil out back (the house sits on a former industrial site and railway bed). There's a foot-deep planting medium, and around the edge is (nitrogen-fixing) clover. On the inside of the clover, I've planted onions, eggplants, peppers, squash, cucumbers, 50 tomato plants, and raspberries. It gets full sun all the time.

► HOW DID YOU COME UP WITH THE DESIGN? The form was determined by the size of the lots (two 20-by-40-foot lots) and maximum energy performance, plus it had to fit in with the neighbourhood. But I also wanted to be unabashedly modern. And I wanted to explore the LEED (Leadership in Energy and Environmental Design) and Passive House Certification and take advantage of the potential view.

► HOW IS LEED DIFFERENT FROM PASSIVE HOUSE? The LEED Certification Program has hundreds of potential credits. It's a more comprehensive green building certification than



The open risers on the staircase (above, top) keep light and air flowing through all four levels of the house. To keep conveniences close at hand, every floor has at least a toilet and a sink. The narrow master bathroom (above) was one of many rooms whose layout is determined by the tight (20-by-40-foot) lot size Straka was working with for each of the semi-detached houses.

The cost of the quartz countertops in the kitchen (above, right) was off-set by the very affordable Ikea cabinetry. Straka raves about his new induction cooktop: it's fast, safe, and inexpensive to use. The window above the sink looks out over the Rideau River.



the Passive House. LEED recognizes insulation, efficient heating, and high-performing windows, but it also gives credit for things like location. This house backs onto a river, and it's close to stores, transit lines, and public schools. This neighbourhood is as good as it gets.

► YOU SAY THE HOUSE IS SUSTAINABLE; WHAT DOES THAT MEAN? Sustainability is not only about being environmentally responsible; it's also about society – fitting into the neighbourhood and being close to services – and economy. I work with clients to mesh their goals and realities in guided decision-making. In the downstairs bathroom, for example, there's a lovely glass shower enclosure, the cost of which is offset by Ikea cabinets.

► SPEAKING OF MONEY, WHAT GREEN ELEMENTS DID YOU SPEND THE MOST ON? The construction value of this house was \$225 per square foot. When you add the green roof and the solar generating system, all of a sudden, it's \$250 per square foot. The solar will pay for itself, but I'm never going to pay off the green roof by selling tomatoes or eating them. Some things we do for reasons that are rational, and other things we do for personal reasons. That's part of what custom building is about.

► WHAT GREEN ELEMENTS DO YOU WISH YOU COULD HAVE INCLUDED? My goals were all achieved, but there are things I might have done differently. We used foam insulation, which is expensive and comes from a non-renewable resource. There are also question marks around its impact on air quality. Currently I'm experimenting with cellulose (chopped-up recycled newspaper) insulation. Ottawa is a lumber town. If you want to be true to using what's available locally, then wood is where it's at.

From the top floor of his Passive House (right), Straka operates Vert Design Inc., a firm that offers everything from concept to construction project management. He and his staff, who work remotely, design and construct about six projects a year. His passion for design extends to his library, where he colour-coordinates his books. The open door at Straka's back provides access to the front balcony. From there, the family can climb a staircase to reach the rooftop garden.





Everley's bedroom (above) is a cozy nest, and it has a nice-sized storage area to the right, which hangs over the laundry space on the stair landing the next floor down. Eventually the storage area will be used for water tanks to conserve rainwater.

The sunlit master bedroom (right) includes two frosted windows that look out to the staircase. This allows sunlight to shine through to the front of the house.



► **ALL INFILLS HAVE THEIR CHALLENGES. WHAT WERE YOURS?** This lot was occupied by a single-family house, but we couldn't save it. We needed about 25 variances, but my most significant issue was the size of the lots. They're each 20 feet wide and 40 feet deep, backing onto a public space. Like other houses on this street, we built closer to the property line than is typical in other neighbourhoods. There's only a four-foot rear yard. Normally there would be about 10 feet.

► **WERE THERE HERITAGE DESIGNATIONS TO DEAL WITH?** Formally, no, but practically, yes. My definition of sustainability includes social aspects. I wanted to integrate the project into the neighbourhood as best I could. The houses on the south side of Crichton Street were built between 1915 and 1925. We never set out to recreate an architectural style from 100 years ago, but we really wanted to create a building that respected some of the broad-brush aspects: two or three storeys, flat roof, front porches, no garages, windows on the street, use of red brick, use of wood, and so on.



Straka's rooftop garden (above) is a labour of love that will never recoup its cost. By contrast, the solar panels (visible above and at right) are designed to provide a return on investment. Straka calculates that by selling electricity to the Ontario Power Authority, the solar system will break even in seven or eight years.



► **DEMOLITION IS DECIDEDLY NOT GREEN. WHAT DID YOU DO TO MITIGATE THAT ENVIRONMENTAL COST?** We deconstructed carefully, saving windows, flooring, newel posts, old rads. And I stored all that for future use. We sold the old brick and everything else – about 97 percent of the building that went into the dumpster was diverted to Tomlinson, which will sort and repurpose or recycle. It costs a bit more, but given my ethics, it's worth it.

► **WHAT WAS YOUR BIGGEST CHALLENGE?** Vert Design started to get into construction management a few years ago because, although the materials we use are conventional, we put them together in unconventional ways. And the details that are required to get the design right and make them work properly require attention. One of the most challenging things in this project was the execution.

► **WHAT DO YOU REGRET DOING OR NOT DOING?** In retrospect, there are definitely things that I would change. A big reason why I did the project was so that I could figure out what I'd do differently next time. I wake up in the middle of night and think of how I might have arranged the space differently. I might have put the kitchen on the top floor. But I designed it so that the interior walls can be removed easily, because the floor slab and heating continues right under partitions. The walls are non-structural, so that makes renovation easier. All the guts of the building are in the exterior wall.

I regret not having some of the finishing details done earlier. I've lived here for going on two years, and there are still trellises to be added, partitions, and landscaping. That's a regret – and my wife would certainly concur. **END**

GREENDetails



The triple-glazed windows allow for great insulation, but they're also easy to clean and good-looking. Straka used rigid foam on the outside of the house and spray-in foam inside to fill every gap.



The inside of the house glows thanks to strategically placed windows and open risers. Heating the house is inexpensive and efficient with geothermal heating. In fact, it's likely overkill in a well-insulated house, according to Straka. But he's glad that he was able to try it out so he can tell his clients about it.



Two years after moving in, Straka is finally finding time to finish the details, including green canopies over the porches (to keep the indoors cooler) and these "walls" between the two houses on each balcony. The slatted walls are designed to allow both air flow and privacy.