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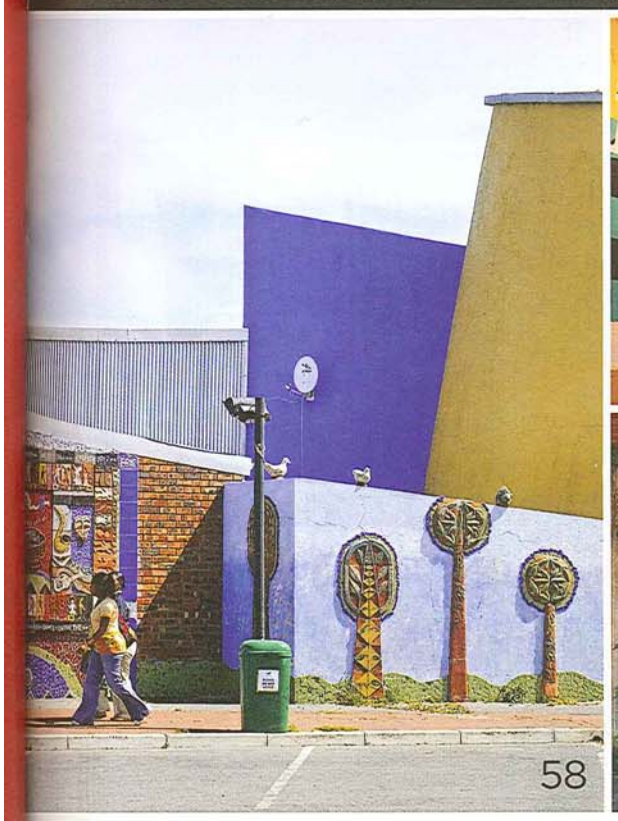

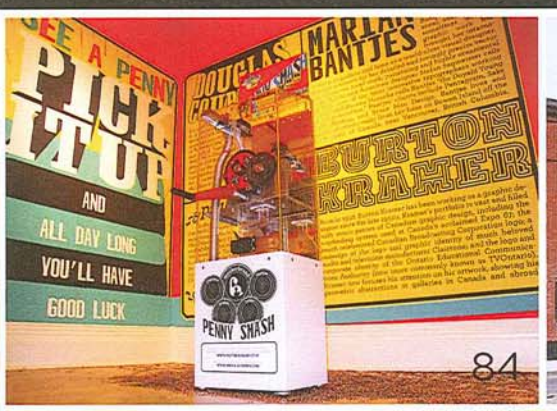

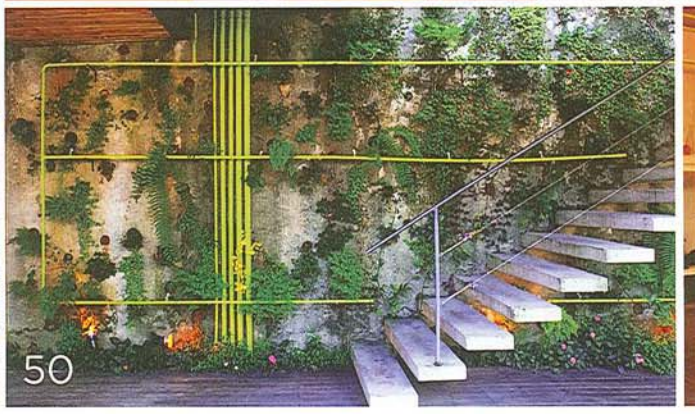

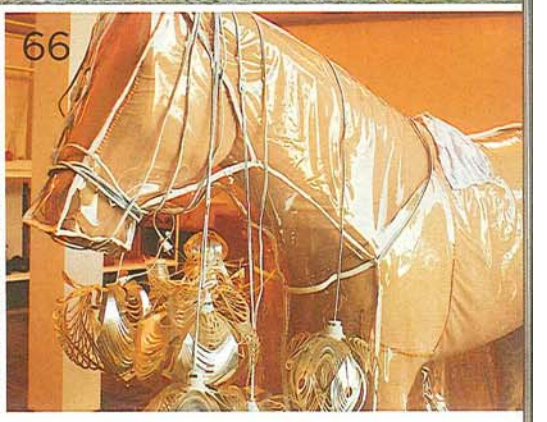

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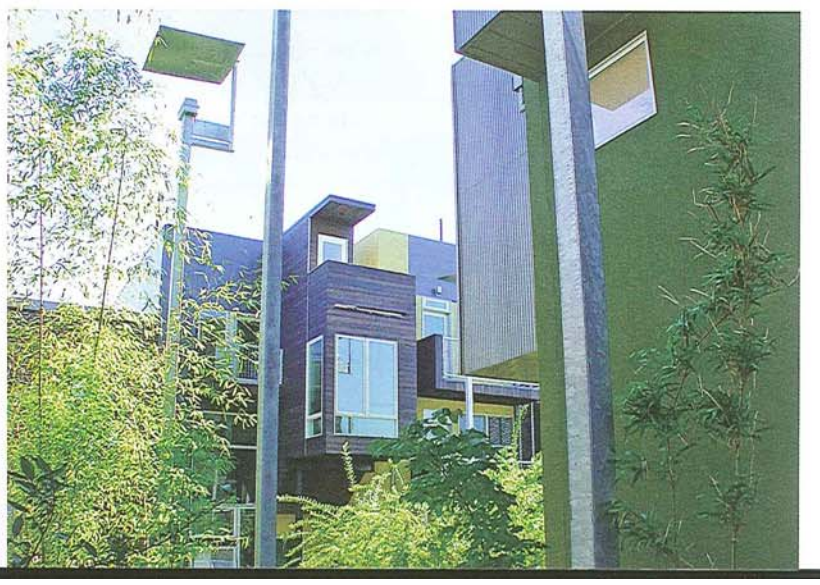
FROM THE UNDER GROUND UP

The 11-unit Rag Flats residence includes a water tank system beneath the parking lot for harvesting rainwater in flood-prone Philadelphia. The water is pumped up to individual units for irrigation.

PHOTOS COURTESY OF ONION FLATS



PHOTOS COURTESY OF ONION FLATS

An outdoor spiral staircase provides access to the rooftop gardens and photovoltaic panels on different levels.

Each two-storey unit combines an industrial steel aesthetic with polished finishes and ample natural light.

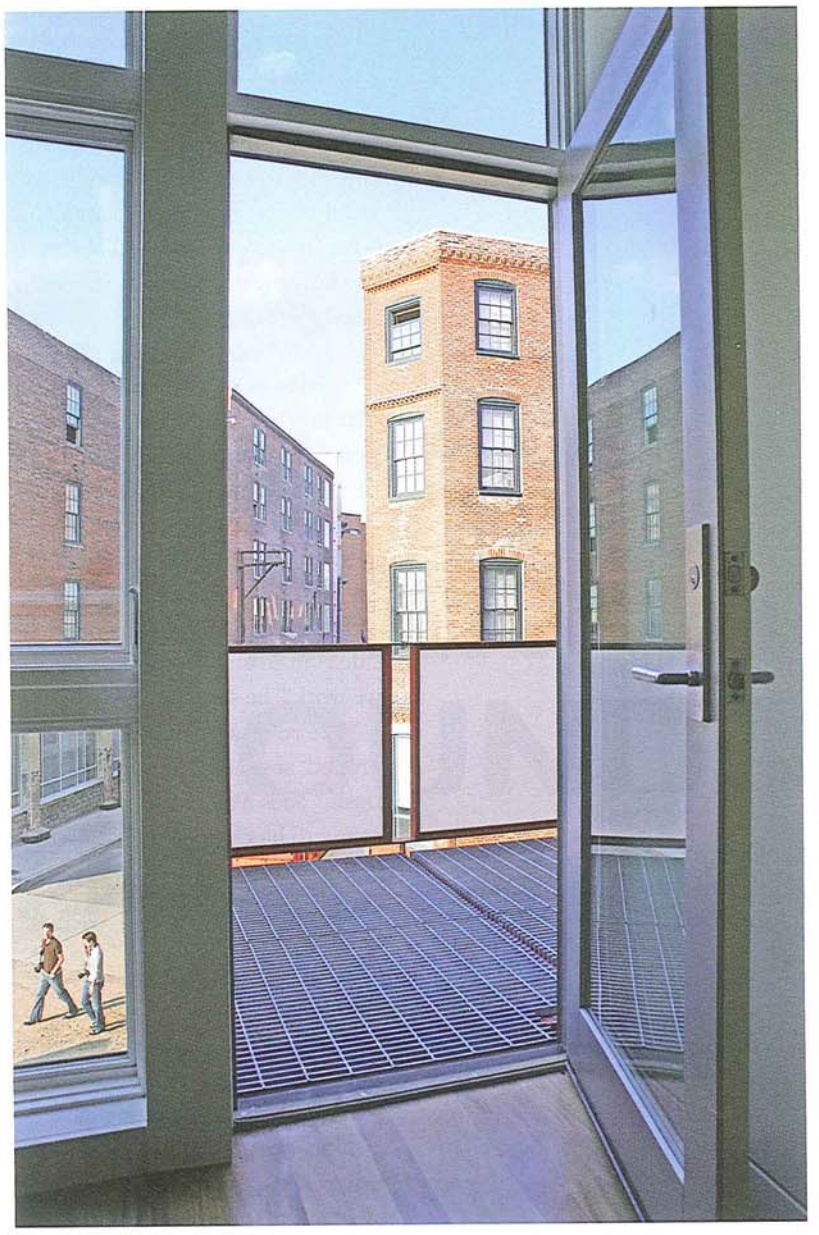
Rag Flats' charming character comes through in the details, such as these custom light standards handmade by the firms' principals.

The oddly named design-development collective Onion Flats has taken root in Philadelphia through eco-friendly infill projects that are redefining how site and city can collaborate

By Tim McKeough

It's a bitter winter afternoon in the rapidly gentrifying Northern Liberties neighbourhood of Philadelphia, but Patrick McDonald and Howard Steinberg – two of the four partners behind the design-build-development firm Onion Flats – barely seem to notice. They're too busy digging a trench in Liberty Lands, a local park. "I love doing this stuff," says Steinberg who, dressed in beige coveralls, explains that they're installing a demonstration rainwater collection system that will eventually be used to help irrigate community vegetable gardens while offering protection against floods. Getting his hands dirty, rather than calling in an outside contractor, "is just the way we work," he says.

"We're spray-painting the ground, shovelling, and picking up trash," adds McDonald, who is trying to block out the cold with a hooded sweatshirt and Harley-Davidson work gloves. This is hands-on design at its most unglamorous. But Onion Flats has always done things this way: taking responsibility for everything from drawing up plans in AutoCAD, to financing and marketing its own developments, to welding steel and, yes, even digging holes. But by building green on its own terms,



"BUILDING IS A CREATIVE PROCESS. YOU THINK WITH YOUR HANDS AS MUCH AS YOUR HEAD"

Thin Flats, the firm's latest completed project, is a reinvention of the typical row house.

The project contains nine units. Decks on the rear of the building recall the area's industrial past.

and figuring out ways to do it affordably, the firm is beginning to have a major impact on the broader city.

Onion Flats was unintentionally founded by Patrick and Timothy McDonald, two brothers who grew up outside Philadelphia. Tim earned his master's degree in architecture at McGill University, and Patrick followed in his father's footsteps and became a master plumber. In 1997, they bought a boarded up, five-storey red-brick building (circa 1820) in the city's historic core, as an investment. In addition to Timothy starting up an architecture gallery named FAARM (now defunct) on the ground floor, the brothers spent nights and weekends renovating the top four floors into expansive loft-style apartments, which they eventually sold. And just like that, they were bitten by the developer bug.

"We just couldn't keep our eyes off all these other amazing build ings and opportunities," says Tim. "We just kept growing." Their brother, John, eventually moved back home from California to join the business, first as a labourer, then as their point man for financing, management, marketing and sales. Soon after, Steinberg, a childhood friend with a degree in architecture and construction management, signed on as partner number four. On paper, the business is split among three distinct entities – the development firm Onion Flats, the architecture firm Plumbob, and the construction company Jig – but in practice it is extremely difficult to distinguish between these offices. Everyone pitches in at every stage.

The advantage of controlling the entire design and construction process is obvious. "I just have no patience for all of the problems that occur between builders and architects," says Tim. "Life's too short. Why not just focus on what you're really interested in doing? For us, that's designing and building our work." The model also allows Onion Flats to follow a different approach to architecture, where details are a little looser in the early stages and the final design only emerges during construction. "I don't believe your imagination stops at the paper stage," says Tim. "Building is a creative process, and you think with your hands as much as your head."

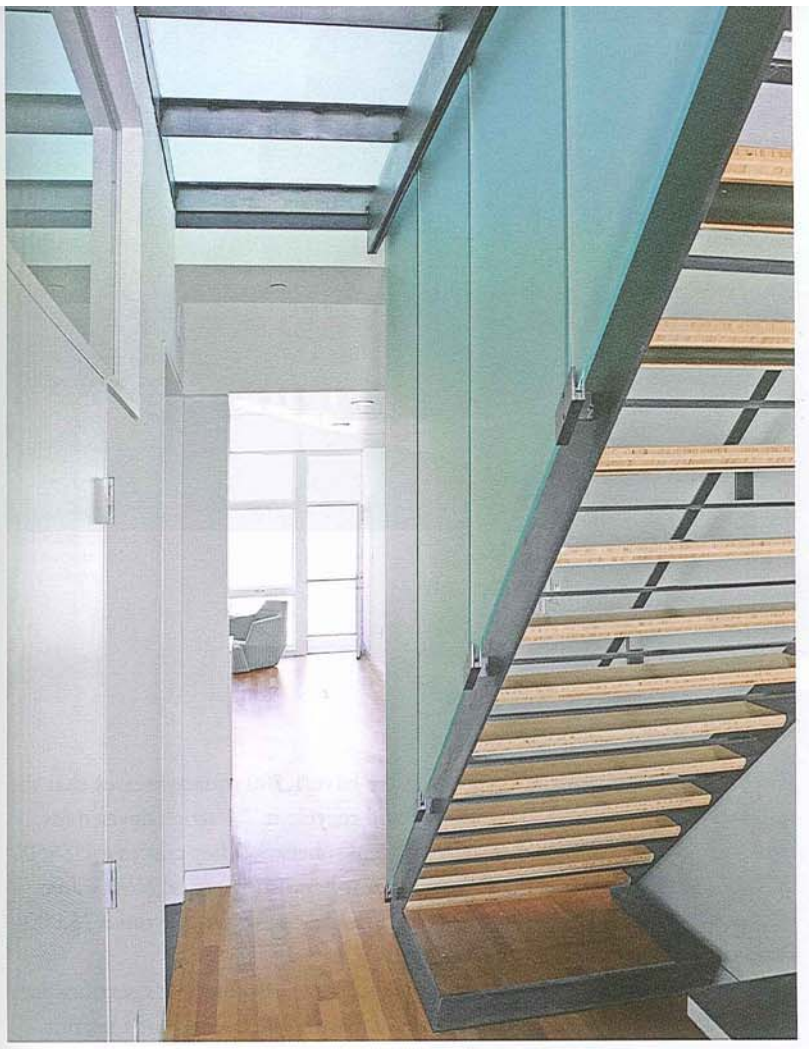
OPPOSITE
Inside one of the upper units at Thin Flats, a steel and glass staircase allows illumination from the skylight to penetrate deep inside.

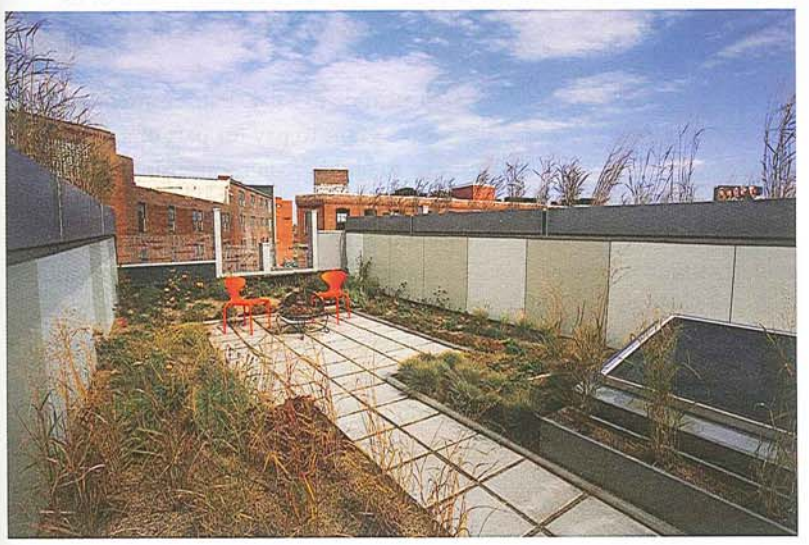
The deconstructed facade makes it impossible to read where separate floors and units begin and end.

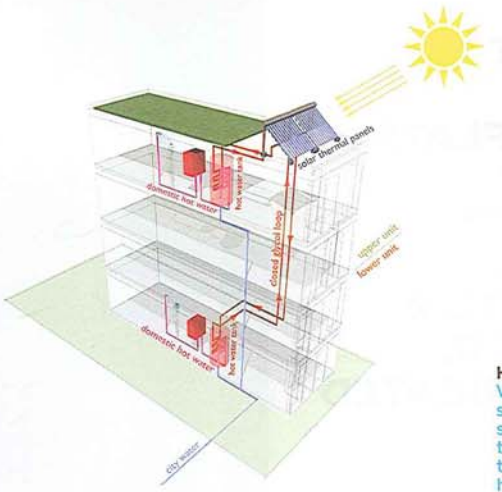
Each upper unit has a habitable green roof; all lower units have gardens.

Thin Flats is expecting to be certified LEED Platinum because of such green elements as a solar panel system for water heating.

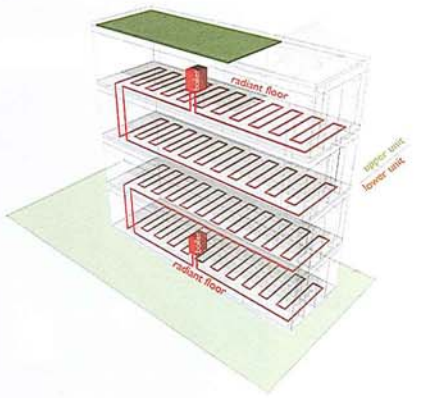
RENDERINGS COURTESY OF ONION FLATS







HOT WATER
Via roof-mounted solar panels, the sun provides most of the heat required to meet the building's hot water needs.



HEATING
A radiant heating system is used in the floors, and a high-efficiency gas boiler ensures a continuous supply of hot water.

STORMWATER
Runoff from the roof is captured in underground tanks, and then used for irrigating gardens and washing cars.

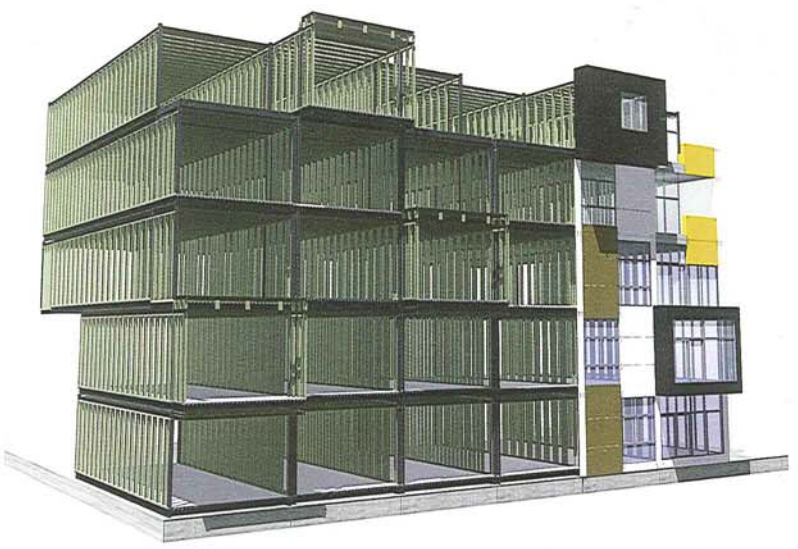
Although Onion Flats has LEED-certified projects under its belt, the partners bristle at the suggestion that they're green architects. All the water collection systems, photovoltaic arrays, radiant heating systems, green roofs and even optional electric cars, they argue, are merely common sense. "We have a pretty simple perspective," Tim says. "We think we've been building green forever – ever since our father took down a beautiful old building at the Philadelphia Navy Yard, stacked it into dumpsters, and hauled it up to the Pocono Mountains. We built our house out of it."

However, Onion Flats did take a definite turn toward greener architecture in 2002, as it began work on Rag Flats, a residential development of 11 multiple units clad in steel, glass, wood and stucco, and grafted onto the brick shell of a former rag factory. Although they didn't set out to make it a model of sustainability, Patrick happened to read a magazine and decided to try building his own water collection system. "Pat is a master plumber by trade and thrifty by nature," explains John. "We were designing and building this urban garden community, and he said, 'I'll be damned if I'm going to

ALMOST ALL OF ONION FLATS' FUTURE PROJECTS WILL BE MADE FROM MODULAR. PREFABRICATED BOXES STACKED TOGETHER LIKE LEGO BLOCKS

Stable Flats is the firm's most ambitious project yet. It will include living walls, and an underground tank system that will help reduce storm-water flooding in the area.

The 70-condominium units will consist of prefabricated boxes – one more way the firm is keeping the project greener and more affordable.



pay the city for irrigation water when we have 1,580 square metres that the rain falls on, and we can harvest, hold and recycle it.'" Patrick devised his own system using three concrete septic tanks, because they cost just US$600 apiece – significantly less than specialty rain-harvesting tanks. Now water gets pumped up to each unit for irrigation and car washing from a 23,000-litre tank buried beneath a parking lot.

To ensure he didn't do anything to jeopardize his plumber's certification, he brought his plans to the city's water department in search of a permit. He was referred from one person to the next, until he came full circle, back to the first. There was simply no permitting process in place for such a system. But the official believed it was a good idea and suggested, off the record, that Onion Flats move ahead and install the system. A year later, the water department recognized it with an award, and today uses it as a case study.

Stormwater is a serious issue in Philadelphia, as in many older cities, because 60 per cent of its sewers are built with a single-pipe system that handles both rainwater and toilet flushes (modern sewers have two separate pipes). When the system gets overwhelmed, it diverts untreated water, including raw waste, into the river, which the department is clearly motivated to prevent. "We've been able to use Onion Flats projects as examples for other developers," says Chris Crockett, director of planning and research at the Philadelphia water department. "They were actually ahead of us, and forced us to step up our game. If everybody did projects like these guys, I probably wouldn't have a job."

Onion Flats took a similar can-do attitude to solar. Patrick attended a course in Florida, and the firm won a grant to pay for part of a system at Rag Flats. They also figured out how to build green roofs, using Patrick's apartment at Rag Flats as an experiment (fortunately, it worked). All these features, and more, made their way into Thin Flats, their latest completed project, which they expect will be certified LEED Platinum. A reinvention of the typical row house, Thin Flats has a deconstructed facade made up of panels in varying sizes and grades of opacity that make it almost impossible to read where the floors and separate units begin and end. The project is four storeys, with two-storey units on the upper and lower levels. Each apartment has access to outdoor green space, the lower units with gardens at the rear, and the upper via stairways that lead to green rooftops. Every owner also gets a parking spot with an electrical outlet, with the option of buying a three-wheeled Zap electric car from Onion Flats to go with it.

But the partners aren't happy with their development model yet. Just around the corner from Thin Flats, a large field awaits the firm's most ambitious project yet: a 70-unit condominium community named Stable Flats. Almost all of their future projects, the partners say, will be made from modular, prefabricated boxes stacked together like Lego blocks, and Stable Flats will be one of the first. It will offer solar power to residents with no up-front costs, by allowing a private company to install rooftop systems that will provide electricity to residents at a fixed rate for the next 20 years. But the most remarkable aspect of Stable Flats is what it does with water. The property is located in a flood-prone area, so rather than merely

Stable Flats is a community-minded project, with various courtyards and catwalks designed to encourage neighbourly interactions.

Typical of other Onion Flats projects, the facade will be a collage of various textures, shapes, materials and colours.

The emphasis is on optimizing outdoor areas and providing green space.

A mechanical parking system stacks cars three high, reducing the amount of space needed for parking.

collecting the development's own runoff, Stable Flats will have an enormous 1.6 million-litre underground tank to accept stormwater from the larger community. The development will then use that water as a heat exchanger to help heat and cool the apartments, in concert with a geothermal system.

Because Onion Flats will essentially be building public infrastructure as part of a private development, the partners have asked the city to subsidize the tank. Amazingly, that just might happen through a credit fund. Since 2006, Philadelphia has required developers to absorb rainwater at new developments rather than funnelling it into the sewer. In November 2008, it began charging a fee to those who couldn't meet that stipulation, with the intention of using those funds to pay for community stormwater collection tanks. Encouraged by Onion Flats' concept, the city is now developing a method for leasing surplus collection capacity from private developers. "We didn't even think a developer would propose it," admits Crockett. "This is major, precedent-setting stuff that Onion Flats always comes along with. It's been phenomenal to have somebody out there in private industry to challenge us like that."

Construction of Stable Flats was scheduled to begin last year, but the project is now on hold, like many across the United States, pending improvements in the real estate market and bank financing. But the changes Onion Flats' inspired have already taken root. Crockett, for instance, notes that water department officials from New York recently paid a visit to Philadelphia to study how the city is managing its stormwater. Green roofs are also proliferating. At Onion Flats, three brothers and a friend who just wanted to do things their own way – by designing and building some decent architecture – have unwittingly become role models for a greener future. **AZ**

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