

GreenSource

THE MAGAZINE OF SUSTAINABLE DESIGN

JANUARY/FEBRUARY 2009
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FIRST ANNUAL Residential Issue

LEED MOVES INTO
THE NEIGHBORHOOD

GREEN HOMES
OUT OF THE BOX

McGraw Hill
CONSTRUCTION

GreenSource

JANUARY/FEBRUARY, 2009
THE MAGAZINE OF SUSTAINABLE DESIGN

Contents



MARINO REED ARCHITECTURAL PHOTOGRAPHY

15 EDITORS' LETTER

DEPARTMENTS

- 17 **CURRENTS**
OBAMA CONFRONTS CLIMATE CHANGE—BUT WILL THE ECONOMIC CRISIS STYMIE HIM?
- 21 **POLICYWATCH**
ESSENTIAL GREEN BUILDING STANDARDS FOR LOW-INCOME HOUSING RISE AT CITY LEVEL
- 27 **PEOPLEWATCH**
SARAH SUSANKA ASKS BUILDERS TO MAKE HOUSES PROPORTIONAL TO OCCUPANT USE
- 28 **EARTHWATCH**
XERISCAPING SAVES PRECIOUS WATER IN DRY CLIMATES WHILE PRESERVING NATIVE SPECIES
- 35 **GREEN PRODUCTS**
BUILDINGGREEN'S PICKS FOR SUSTAINABLE PRODUCTS TO USE IN THE NEW YEAR
- 100 **OPINION**
PETER YOST WANTS GREEN BUILDINGS TO PAY MORE ATTENTION TO MOISTURE AND DECAY

FEATURES

- 44 **LEED FOR NEIGHBORHOODS**
A NEW GREEN NEIGHBOR MOVES ONTO YOUR BLOCK AS LEED-ND NEARS ITS FINAL LAUNCH
- 86 **PREFAB SUSTAINABLE HOUSING**
MODULAR, PANELIZED, AND KIT, OH MY! GREEN HOUSING GETS EASIER WITH PREFAB
- 51 **CASE STUDIES**
- ◀ 52 **THIN FLATS**
THREE BROTHERS MAKE GREEN-LIVING UNITS OUT OF A DERELICT MEATPACKING PLANT
- 58 **THE GALLERIES AT TURNEY**
THE RANCH HOUSE MEETS THE ROWHOUSE IN A GREEN DEVELOPMENT IN PHOENIX
- 62 **DOCKSIDE GREEN**
A MIXED-USE PROJECT IN VICTORIA, B.C. SETS A LEED RECORD WITH WATERSIDE CONDOS
- 66 **GISH FAMILY APARTMENTS**
GISH APARTMENTS PROVIDE AFFORDABLE HOUSING AMID SILICON VALLEY SPRAWL
- 72 **EHRLICH RESIDENCE**
A BUSINESSMAN FINDS TRANQUILITY IN A GREEN HOME BUILT AROUND A GARDEN
- 78 **GUNNING HOUSE**
AN ARCHITECT DESIGNS AN UPSIDE DOWN HOUSE ON A CRAMPED BEACHSIDE STREET
- 82 **JUDKINS PARK HOUSE**
A NARROW LOT PROVIDES A UNIQUE OPPORTUNITY FOR URBAN INFILL

 THE AIA/CONTINUING EDUCATION OPPORTUNITY "GREEN PREFAB" (PAGE 86).

Taking Liberties

ONION FLATS CEMENTS ITS COMMITMENT TO PHILADELPHIA'S NORTHERN LIBERTIES NEIGHBORHOOD—AND SUSTAINABLE DESIGN—WITH A MULTIFAMILY BUILDING DESTINED FOR LEED FOR HOMES PLATINUM STATUS



CASE STUDY

THIN FLATS PHILADELPHIA, PA

DAVID SOKOL

ONION FLATS, A PHILADELPHIA architecture firm run by brothers Tim, Pat, and John McDonald, along with lifelong friend Howard Steinberg, has practiced architecture at the forefront of the profession, embracing cutting-edge movements like design-build and sustainability and not resisting getting its hands dirty in the process. The firm's newest completed project, Thin Flats, combines both approaches, aiming to become the first LEED-Homes Platinum multifamily structure in all of Pennsylvania.

In 1999 Tim and Pat McDonald, Onion Flats' founders, had finished their first design-build project in the Old City neighborhood near downtown Philadelphia. "I was getting very excited by this way of working and living, and I would do walkabouts to learn more about the city," remembers Tim McDonald, an architectural designer who had previously worked for Japanese architect Yasuo Yoshida. At the time Northern Liberties, a neighborhood located north of Old City, was still stuck in the throes of a 1980s real-estate bust. "It was a pretty desperate place," he recalls. McDonald saw a "For Sale" sign in front of a decrepit meatpacking plant. "It was all death and darkness and falling apart, but it had solid bones and beautiful spaces. I was excited by the idea that one building

KEY PARAMETERS

LOCATION: Philadelphia (Delaware River watershed)
GROSS SQUARE FOOTAGE: 20,000 ft² (1,858 m²)
COST: \$3.4 million
COMPLETED: November 2008
ANNUAL PURCHASED ENERGY USE (BASED ON SIMULATION): 32.8 kBtu/ft² (373 MJ/m²), 32% reduction from base case
ANNUAL CARBON FOOTPRINT (PREDICTED): 7.2 lbs. CO₂/ft² (35 kg CO₂/m²)
PROGRAM: Residential

TEAM

OWNER: Onion Flats LLC
ARCHITECT: Plumbob LLC
LANDSCAPE: Michele Smith
GREEN ROOF: JIG Green Roof and Roofscapes
LIGHTING: Colorado VNet
ENGINEERS: Associated Engineering Consultants (structural)
COMMISSIONING AGENT: McGrann Associates
ENVIRONMENTAL AND ENERGY CONSULTANT: McGrann Associates, Hickory Ridge Radiant
GENERAL CONTRACTOR: JIG

MARIO REED ARCHITECTURAL PHOTOGRAPHY

Thin Flats' two-layer facade of glass, metal, and wood-composite panels gives the impression that the building contains many more than its eight units.



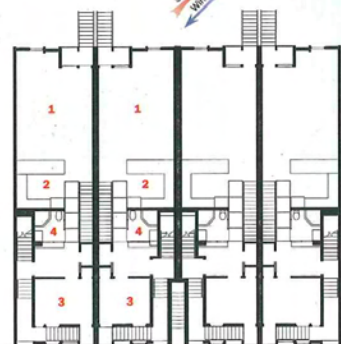
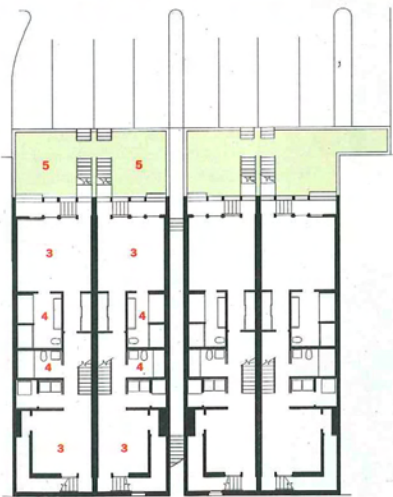
« A kitchen-bathroom core is located in the center of each unit. Most appliances are Energy Star-rated.

» In this living room in the rear of a Thin Flats unit, north-facing floor-to-ceiling windows bathe the space in ambient daylight.



GARDEN & FIRST FLOOR

- 1 Living/dining
- 2 Kitchen
- 3 Bedroom
- 4 Bath
- 5 Private yard



could transform a whole neighborhood."

The McDonalds jumped in. Capital Flats, an eight-unit conversion of the meatpacking building, was completed in 2002, with Tim, Pat (a master plumber), and a group of interns worked hard to make the project a reality. "In the meantime," Tim says, "there was this land all around. It was worthless to most people, but we saw it as our sandbox." The brothers purchased a constellation of land parcels and dilapidated buildings between 1999 and 2000. The four-unit E Flats, already completed, is located just down the block, and Thin Flats consolidates nine of those plots almost directly opposite the old plant. A series of public transportation stops are nearby.

Northern Liberties has served as both Onion Flats' laboratory and its muse, and Thin Flats exemplifies both roles. Tim McDonald expresses admiration for traditional row houses and Philadelphia's signature Trinity buildings as "an incredibly inexpensive, modular way of building in the city for people who didn't have a lot of money." He also marvels at the experience of walking past these rows at night, calling the patchwork of illuminated and dark windows a kind of "urban-scale Mondrian."

Thin Flats comprises a four-story block divided into four 18-foot-wide townhouses. Each building contains a two-story upper and lower duplex apartment. (A second building, a single-family house that terminates the street's row of homes, is still under construction.) The completed string of buildings underscores McDonald's feelings about the streetwall: its facade is a crazy quilt,

featuring planes of glass and metal, airy openings, and gold- and apricot-colored wood-composite panels. It is virtually impossible to tell where one apartment ends and the next begins.

This aesthetic statement also serves as a double skin for the south-facing front elevation of the duplex buildings, which is in reality two layers separated by a three-foot-deep air space. The gap provides a transitional space for entry, and creates a thermal chimney where warm air courses upward and out of openings in the outermost facade. Each skin is constructed as a rain screen, and the low-e-coated windows are double-glazed, argon-filled, and thermally broken.

Perhaps the only visible clue that Thin Flats is, in fact, four distinct buildings is the series of four almost imperceptibly thin pipes that cling to the front of each 18-foot-wide module. These conduits link two more sustainable-design achievements: they funnel rain to two 6,000-gallon cisterns interred beneath the parking area on the north side of the buildings, which then feed backyard gardens.

There might not be too much stormwater to store, since at the top of each of these pipes there is an intensive green roof on 12 inches of substrate.

The green roofs, which include enough hard surfacing for a small party, are planned around off-center skylights. While the southern elevation's outer skin shades occupants from intense, direct sun, each skylight maximizes ambient daylight for residents of the upper duplexes. To expedite light penetration, the stairwells of these apartments are visually featherweight compositions of translu-

» All upper duplexes have access to intensively planted roof gardens, which overlook Thin Flats' immediate neighborhood, Northern Liberties. Solar-thermal panels are mounted at the front of each roof.

» Upper duplexes are distinguished by skylights, the illumination from which penetrates the lower floors by way of translucent glass flooring in the center hallway.





Exemplifying local sourcing, the sink in each Thin Flats bathroom was fabricated just several blocks from the construction site—by Tim McDonald's ceramicist wife Liz Kinder. The vessels are fed by low-flow faucets.

cent laminated glass, punctuated by locally fabricated, recycled-steel hardware.

This stairwell element also appears in the lower duplex units. Here, instead of skylights, McDonald has treated the kitchen-bathroom core as a "lantern" whose laminated-glass walls reflect or emit light, which then cascades to the other unit below.

In both upper and lower duplex units, layouts are open, and the few partitioned rooms include transoms or doors with inset glass panels. "It's about natural light being able to enter as much as it can," McDonald says. He adds that these moves affect the experience of the interior: "If you have this sense that one room is connected to another room via light passing through thresholds, you get an appreciation of total space and proportion."

Immediately behind the parapet of each Thin Flats building, the roofs sport one more green feature. Two 4-by-8-foot flat-plate solar-thermal panels generate all of the domestic hot water for both duplex units. McDonald says that if there were extra space, six panels would have been able to generate the radiant heat that rises from both duplexes' polished-concrete floors. (Concrete floors include at least 25 percent fly ash content, and elsewhere floors are constructed from FSC-certified hardwood. All surfaces are finished in low- and no-VOC paints and sealants.)

Why, then, favor the green roof—couldn't Onion Flats have nixed the party zone and installed more solar-thermal panels? For one, Thin Flats already utilizes 71 percent less energy for heating. In addition, McDonald bases his decisions on quality of life issues as much as building performance. "Does it make sense to make a roof into a living room?" he asks. "Yes, because we live in a city, and open space is a commodity. It doesn't make sense not to."

Indeed, "making sense" is at the root of Onion Flats' approach to the Thin Flats project, and all of its sustainable design work—a philosophy that is free of guilt. Asked to trace his and Pat's commitment to sustainable architecture, Tim McDonald instead expresses reservations about "green" terminology. "[For us], it's always been about common sense and creativity. Does it make sense to knock down a solid concrete building?" he says, referring to Capital Flats, the first project that launched Onion Flats in Northern Liberties. "No. We use the scraps and the history of that building to give it personality, and I don't have to haul it away. If my plumber brother's got a backhoe, we're digging up a site, and he can get tanks for storing rainwater for a couple hundred bucks, are we going to store rainwater instead of paying for it to go to a treatment plant? Yeah, that makes sense. We're not making novelty projects. It doesn't make sense to build any other way." <<

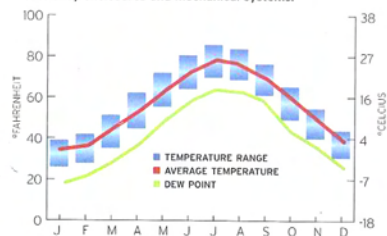
SOURCES

- MASONRY:** Sure Cavity rainscreen weather facing
- WOOD-COMPOSITE PANELS:** Trespa
- WINDOWS/DOORS:** Jeld-Wen
- SKYLIGHTS:** Wasco
- ROOFING:** CertainTeed modified bitumen, Carlisle EPDM
- CABINETWORK AND CUSTOM WOODWORK:** CaliBamboo ply bath lavs
- PAINTS AND STAINS:** Duron Genesis, Ecoprocote; Poly Soy, polyurethane alternative, clear finish for flooring and cabinetry
- FLOORING:** FSC-certified white tigerwood from EcoTimber
- INTERIOR RECESSED LIGHTING:** Halo
- DOWNLIGHTS:** Forecast Lighting
- EXTERIOR LIGHTING:** JBL
- SOLAR THERMAL PANELS:** Chromagen
- RADIANT HEAT AND DOMESTIC BACK-UP BOILER:** Laars
- HRV:** Fan Tech
- DUAL FLUSH TOILETS:** Caroma
- LOW-FLOW FAUCETS:** Grohe
- RAIN-WATER CISTERN PUMPS/CONTROLS:** Conservation Resources
- REFRIGERATOR:** Liebherr
- STOVE:** Jenn-Air
- DISHWASHER:** Fagor
- MICROWAVE:** GE
- WASHER/DRYER:** Whirlpool Duet

>> Occupants enjoy radiant heating through FSC-certified white tiger hardwood floors, as well as low- and no-VOC finishes.

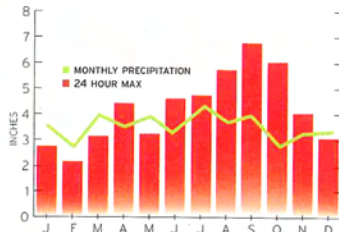
TEMPERATURES & DEW POINTS

Cold winters and warm summers demand both high-efficiency enclosures and mechanical systems.



PRECIPITATION

Year-round precipitation makes it possible to use relatively small cisterns for rainwater reuse.



SKY CONDITIONS

Frequently cloudy conditions make daylight penetration a priority.

