

Green Builder[®]

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GREEN LAND DEVELOPMENT

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WHAT DOES IT COST?

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One Green Builder's Detail

A (VERY) COOL, GREEN ROOF AND WALL SYSTEM

by John D. Wagner

Brian Baker's design-build company, Studio26, owns 44 acres of land in Bucks County, Pennsylvania, just north of Philadelphia, and they plan to make good use of it. "There is a high influx of people moving to this area from New York and Philadelphia," said Baker, "and they have an eco-conscious mindset. The buyers are looking for healthy green homes. We're stepping up to meet the demand." The houses Baker is planning to build in his new Bucks County development will be 3,000 square feet and cost about \$150-\$200 per square foot. Baker is pushing to make them as green as possible.

Baker is an architect with a background in commercial building where he has designed LEED-certified buildings. However, he has recently moved over to the residential sector because he sees a dramatic opportunity to offer advanced energy-efficient designs to a hungry, upscale market. The wall- and roof-system designs illustrated here are for a demonstration home Baker is building for DOE's Building America program. The home will serve as a model for the new homes he is selling now.

BUILDING ENVELOPE INTEGRATION

"We approach each home as a whole-house-building-system integration. Guys on our team don't drive gas-guzzlers, and we don't build them either," says Baker. "We listen to customers as much as we educate them. We consistently hear that they want to save money on utility bills, and they expect a five-year payback on the up-front cost of energy-efficient features. That concern for payback keeps us focused on the building's thermal envelope. As you can see from my illustration, we really tightened up our homes and compromise nothing."

FOUNDATION

"We insulate with R-10 XPS under our foundations and slabs. (All the XPS in our walls and foundations are shiplapped, caulked, and taped.) For foundation walls, we start with a pre-insulated system from Superior Walls. There is R-12.5 built into the wall, but we modify that by blowing Johns Manville Spider Custom Insulation System into the concrete stud bays, and we achieve R-40 foundation walls. You'll see we use Spider in the walls and rafters, too. Spider is a nontoxic, formaldehyde-free blown fiber insulation that performs really well for us; excess insulation isn't wasted because it can be immediately recycled into the blower, or stored for later," says Baker.

WALLS

"We have a unique system for making high-R-value walls, where the floors do not penetrate the thermal envelope of the wall. The result is a continuous outside wall. Floor trusses at ground level rest on top of an extended sill, which is sealed to the foundation wall with Dow's Sill Seal (a flexible polyethylene foam gasket). For upper floors, floor trusses—we use I-joists—sit on Simpson Strong-Tie hangers, which are tied directly into the frame. None of our floors penetrates the outside wall."

"For spot-application spray foams, we use closed-cell Demilec HEATLOK, at least 1-inch thick at the ends of joist and rafter runs," said Baker.


ROOF

"For the roof framing, we use 2x12 rafters sheathed on the top and bottom with 5/8-inch OSB. On top of the lower layer of OSB, we lay 2x4s on their sides to act as purlins. Then we add another layer of OSB that the shingles are nailed to. That way, we get a cool-roof effect and a continuous air gap to the ridge. For roof underlayment, we use Elk Building Products' IceGuard, and for shingles, we use Elk's Cool Colors. They have unique granules from 3M that create a reflective, colored asphalt shingle," said Baker.

BUILDING SHELL, SIDING, AND TRIM

"For housewrap, we use Raindrop, from Pactiv," said Baker. "It has vented vertical threads that won't collapse and offer good drainage. On top of the housewrap, we have 2 inches of XPS, lapped, caulked, and taped at joints. On the interior walls, we use a Smart Vapor Retarder from CertainTeed called MemBrain, which we cover with 1/2-inch drywall."

"Our exterior wall achieves R-33. For siding and trim, it's simple: James Hardie's Hardiplank (on 3/4-inch trim, fastened to studs), Harditrim, and vented Hardisoffit."

 Brian M. Baker is VP of marketing and design, Baker Development Group, Orefield, PA 18069; 610-391-0100.
John D. Wagner is editor in chief of Green Builder Magazine.

The foundation (1), wall (2), and roof (3) systems illustrated here are for a high-efficiency demonstration home that Brian Baker's Studio26 Homes is building for DOE's Building America program. The home will serve as a model for the new homes Baker will build and sell on his 44 acres in Bucks County, Pennsylvania. These homes will average 3,000 square feet and will cost about \$150-\$200 per square foot.

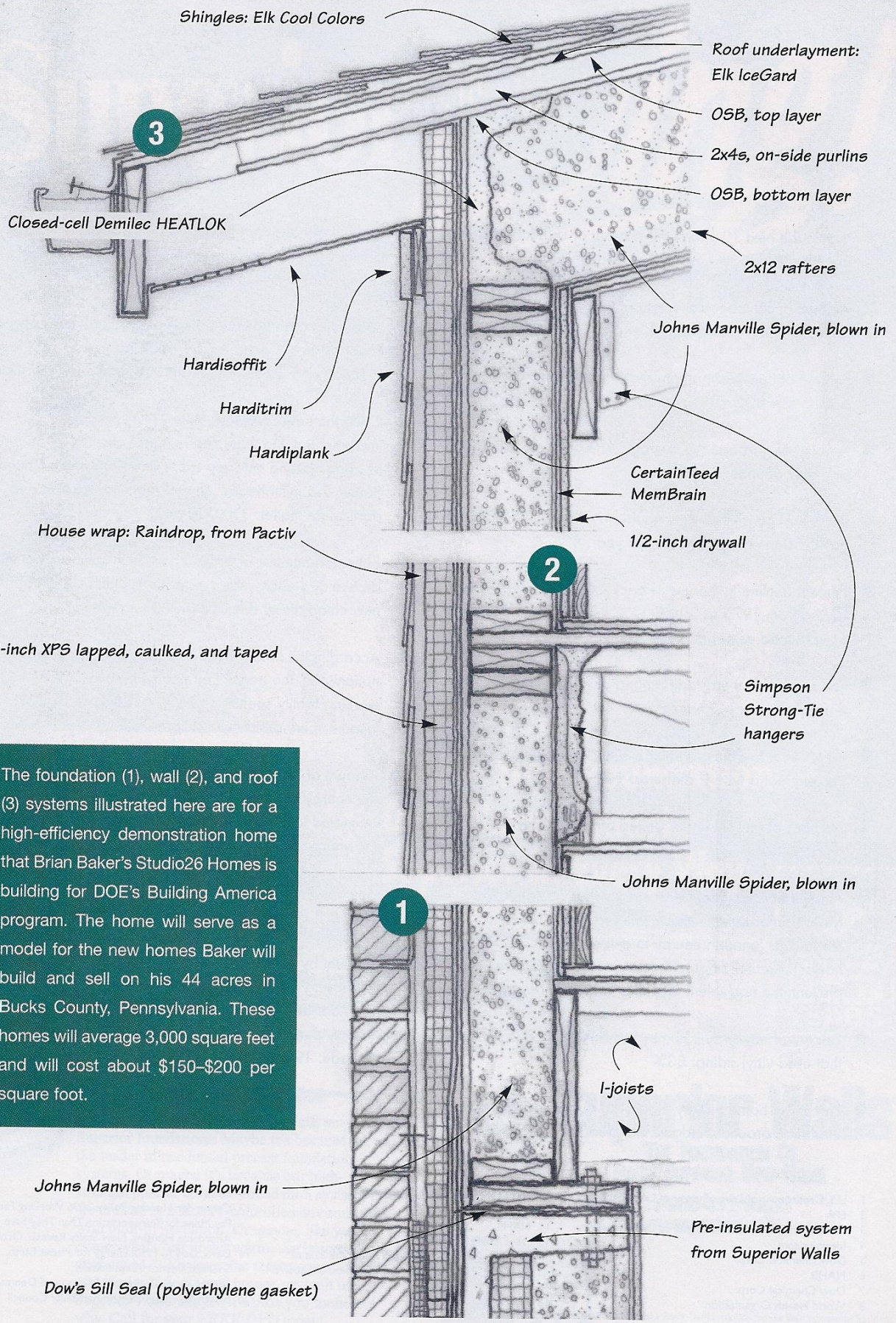


Illustration by Brian Baker, Studio26.