Designed for the Coast

This bold take on a traditional Southern style incorporates sustainability and storm resistance into a new neighborhood home

BY GORDON A. NICHOLSON

New Village is a small development in Mount Pleasant, S.C., just across the Cooper River from Charleston in what's known as the Lowcountry. Unlike most new developments in the area that use design guidelines based on architectural style, New Village is focused on building performance: energy efficiency, thoughtful siting, and sustainability.

Most locals cherish the Lowcountry for its scenic coastal landscapes and its majestic historic homes. However, the region poses technical and aesthetic challenges for architects and builders, who have to design and construct homes in an area prone to hurricanes, earthquakes, floods, corrosive ocean air, and intense sun. When developer Pat Ilderton approached me to design a house in New Village, I welcomed the challenges and took the opportunity to try some new things, but I drew my inspiration from a traditional house form, the Charleston single.

A narrow floor plan promotes natural lighting and ventilation

I've always had an affection for the simplicity of Charleston's single houses. These long, narrow one-room-wide homes have undeniably great proportions, and they make ideal use of their typically narrow building lots. In New Village, I was working with a lot less than 50 ft. wide. The floor plan of a single house seemed to be perfect for making the most of the abundant sunlight and the gentle onshore breezes.

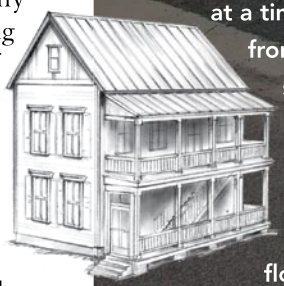
Near the coast, the sunlight is bright and clear as it reflects off the water. To minimize dependence on artificial lighting, I designed the house to take advantage of natural daylighting. However, natural light can produce uncomfortable heat gains. So it was important to control where and how much light enters the house.

On the first floor, the entry-porch roof shades the foyer, the study, and the kitchen windows. Although these rooms don't get direct sun, they still are well lit on clear days without the help of artificial lighting. On the back of the house, a sunscreen hovers over the first-floor windows, marginalizing strong summer sun while permitting ample light deep into the open living and dining area. On the second floor, roof overhangs shield the bedroom windows from high summer sun but welcome lower rays during the winter.

Designing a one-room-wide house also allowed me to harness ocean breezes for natural cooling and ventilation. Each room has windows on at least two walls, so cross ventilation is easy to obtain. I selected casement windows for the south- and west-facing walls because they permit the homeowner to change the

INSPIRED BY THE CHARLESTON SINGLE

The Charleston single, a popular architectural style during the 1800s, made efficient use of narrow building lots. The design was economical at a time when taxes were assessed based on a home's street frontage. Pushed all the way to one side of the lot, a typical single makes room for two-story, side-loaded porches that encourage outdoor living. With few interior walls and lots of doors and windows, the Charleston single promotes natural lighting and cooling cross ventilation, important in a hot, humid climate. Photo facing page taken at A on floor plan; photo above taken at B.



SPECS

Bedrooms: 3

Bathrooms: 3

Size: 2186 sq. ft.

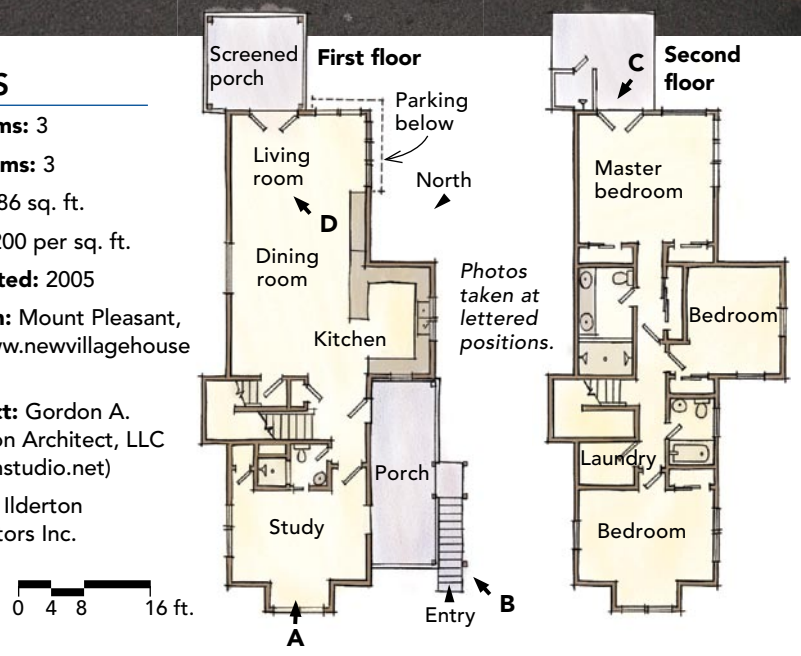
Cost: $200 per sq. ft.

Completed: 2005

Location: Mount Pleasant, S.C. (www.newvillagehouse.com)

Architect: Gordon A. Nicholson Architect, LLC (www.gnstudio.net)

Builder: Ilderton Contractors Inc.



Drawings this page: Chuck Lockhart. Photo facing page: Sara Cook.

angle of individual window sashes and channel breezes into the house. Working with the ceiling fans, high awning windows on the east-facing walls keep the breeze flowing through the house.

Of course, the space that takes the best advantage of fresh ocean air is the two-story porch in the back. The lower porch is shaded and screened, while the upper porch is an open, sunny roof deck, complete with an outdoor shower just outside the master bedroom.

This single is 9 ft. off the ground

In the Lowcountry, strong storms and flooding are a serious threat, so builders and architects have to deal with strict codes that are meant to keep homes safe. The elevation of projected floodwaters in designated flood zones is used to determine the appropriate height of a home's first floor. Flood-zone requirements in coastal South Carolina usually place the first floor 5 ft. to 6 ft. above the ground. Building codes, however, allow 200 sq. ft. under the house to be used for purposes other than living space, so most homeowners opt to raise the floor to 8 ft. or 9 ft. and include parking and storage space below the house.

The most-common foundations used to raise a house are driven wood piles or concrete-block piers built on concrete footings at least 18 in. below grade. Before construction begins, a soil engineer recommends the best choice based on a soil test. In this case, we used steel-reinforced concrete-block piers. They can be built remarkably quickly with little disturbance to the site or the neighborhood. Driven wood piles also can be installed quickly, but the pile driver is loud (at the time of construction, people already were living in the homes on neighboring lots), and the finished piles are not always as accurate as block piers.

The design challenge of a raised foundation is making the solid portions of the house relate to the ground through the column structure. Painting the piers black and wrapping their perimeter in horizontal 1x6 lattice helped to disguise the structural bays beneath the house. By matching the size of the lattice boards to the exposure of the siding and painting them the same color, the lattice has visual weight and substance.

To withstand hurricane-force winds, the entire house from the footings to the roof rafters is tied together with a series of straps and ties forming a continuous load path (drawings facing page). To create a strong shear wall, to prevent the plywood edges from buckling, and to deflect airborne debris that penetrates most easily at sheathing seams, solid blocking is installed behind all joints in the sheathing, which also requires strict nailing patterns. Corners are important for shear strength; for this reason, I avoid windows or other openings too close to the corners.

A commonsense approach to durability and energy efficiency

Sustainable homes get a reputation for being expensive or impractical when they focus solely on green products and the latest technology. For this house, I made simple, commonsense choices that boost energy efficiency and also provide durability in a demanding climate.

The fiber-cement siding (James Hardie Building Products; www.jameshardie.com) is accented with sections of corrugated-

Outdoor refreshment and indoor breezes. *In the South, outdoor living spaces are a must. An alfresco shower (left) is just steps away from the master bedroom. Inside, casement windows on the south- and west-facing walls catch the ocean breeze; a ceiling fan and awning windows on the east-facing walls keep cool air flowing. Photo left taken at C on floor plan; photo below taken at D.*

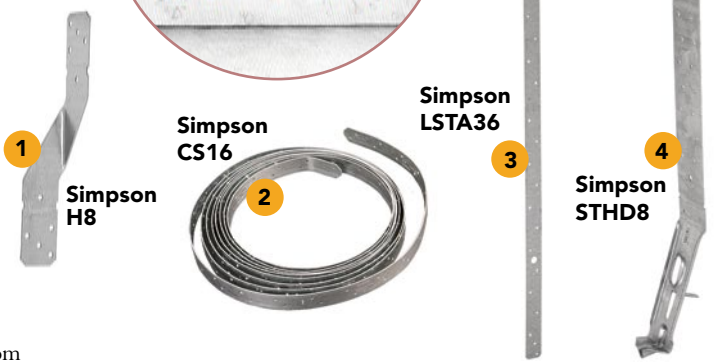
Top photo, facing page: Gordon A. Nicholson. Bottom photos: Krysta S. Doerfler. Drawings facing page: Bob La Pointe.

STRAPS AND TIES CONNECT THE HOUSE FROM ROOF RAFTERS TO FOOTINGS

High winds can damage a house easily due to uplift, shear pressure, and airborne debris. To prevent uplift and racking, stacked framing members form a continuous load path from roof to footings. All the framing (2x4s, 12 in. on center) is strengthened with straps, ties, and continuous sheathing. Solid blocking strengthens sheathing joints and deflects flying debris.

Connectors strengthen framing

Simpson Strong-Tie makes galvanized-steel connectors that stand up to the elements and strengthen the house's framing connections. For a look at all of Simpson's products, visit **www.strongtie.com.**



metal siding and a corrugated-metal frieze. Both are durable in a coastal climate and require less-frequent maintenance than other options. Silver 5v-crimped Galvalume roofing (www.galvalume.com) helps to keep the house cool by reflecting sunlight. Metal roofs are sustainable because of their largely recycled content and ultimate recyclability. Moreover, a metal roof has strong historical associations with architectural vernacular in the Lowcountry.

Beneath both the siding and the roofing is radiant-barrier sheathing: plywood with a thin layer of foil on one side. On the roof, the foil faces down and acts as a low-e coating, keeping heat out of the attic. On the walls, it faces out to reflect radiant heat. The ability to block radiant heat is important on the roof, which gets direct sunlight for most of the day. With an airspace between the sheathing and the roofing or siding material, this low-cost assembly is effective at reducing heat gain.

Stability is a critical consideration for framing material. High humidity and the slow drying time on the coast can make movement in framing lumber a serious problem. The framers used engineered lumber and composite-decking materials that remain stable during construction and over the life span of the house.

Other high-performance aspects of this project include tankless water heaters, dual-flush toilets, compact fluorescent-light fixtures, high SEER-rated (seasonal energy efficiency ratio) HVAC equipment, low-e windows, a pervious driveway, and native plantings. These simple choices can make a big difference in water and energy consumption. The dual-flush toilets, for example, save about 33% of toilet-water use.

With a traditional side porch and a central stairwell for a clear sense of entry, a strong gable and deep overhangs for shading and shelter, and a bold but judicious use of modern materials, this house is a translation of an old form into something new. To me, the most satisfying aspect of this project is that by measure of recent heating and cooling bills, the operating costs of the house are well below average. In this way, the house embraces the spirit of living in the Lowcountry, one that not only respects traditions but celebrates the landscape they are built on. □

Gordon A. Nicholson, AIA, is an architect in Charleston, S.C. Photos by Brian Pontolilo, except where noted.