

Passiveaggressive

By Brandy Brinson, Contributing Writer

Builders of passive houses are certainly aggressive in their attempts to conserve energy. These houses are ultra-low energy buildings that require little power for space heating or cooling.

Passive houses, though rare in the U.S., are increasing in number as more seek energy efficiency and greener living. Wilmington will soon have its first certified house, as Lucien Ellison will construct a passive house for his family on a picturesque site overlooking Hewlett's Creek.

Ellison received his Certified Passive House Consultant designation from the Passive House Institute U.S. in 2011 and joined Anchorage Building Corp., which was established in Wilmington in 1993 and moved to Chapel Hill in 2006. Ellison is re-establishing the Wilmington office.

Working with local architect Kevin Pfirman, Ellison settled on a unique design for their home.

"After looking at pictures of thousands of houses, my wife Jane and I decided we liked a style called mid-century modern," Ellison said. However, "mid-century modern and passive house are kind of polar opposites. A typical mid-century modern house is loaded with thermal bridges and too much glass. But Kevin did a great job of melding the two."

The design includes two unusual features. For one, the wall system is made out of concrete. It is manufactured in a factory and shipped to the site. Ellison said this makes the house

"super strong" and cuts an enormous amount of time out of the building timeline. Once the concrete panels arrive, they can be erected in two to three days, compared with the four months it would typically take to frame this type of house.

Another unique feature of the home is that it is a split-level design — not something you see very often these days. The Ellisons settled on the design because it makes the best use of the land, which slopes toward the water between two giant live oaks. The west side will be one level while the east is split.

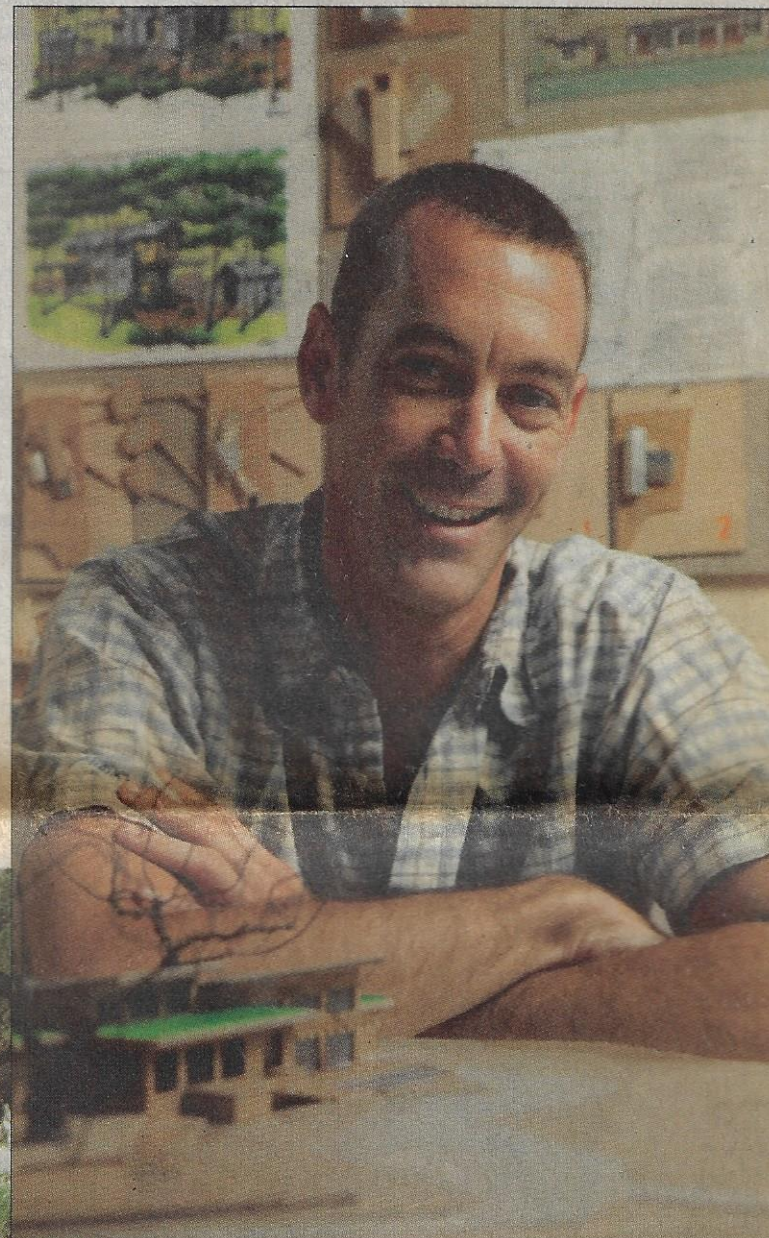
The two majestic live oaks on the property are hundreds of years old and had a major influence on the design of the home. Ellison said it was a challenge to fit everything in between the two trees.

In order to preserve the trees, they called in an arborist.

"We knew the canopy of both trees was running over the existing house and would run over our house too. We knew the roots run out to at least the drip line, and we wanted to make sure we weren't disturbing the roots," Ellison said.

Arborist Scott McGhee of Scott's Treescape advised them to wait until at least September to begin construction.

"The trees are preparing for spring in July, August and the first part of September. They are storing starch at the base of each new bud to initiate growth. Soil disruption and the subsequent stress it can cause during this time period could negatively impact the tree more than some other times of



Staff photos by Joshua Curry

Above: Kevin Pfirman, architect, has created a modern design for the passive style home. Left: The old oak tree provides a canopy over the property nestled along the maritime creek.



the year. The tree begins to slow down a little after the first half of September so we are less likely to cause it undue stress," he said.

To ensure that minimal damage is done to the trees, McGhee will be onsite for the demolition of the foundation of the existing house as well as when the concrete panels are delivered. Huge trucks carrying the concrete panels and cranes will be driving over the root system, which could break the roots. Strategically placing plywood over the roots and then covering the plywood with mulch can help alleviate the pressure.

In order to enjoy the view of the stunning oaks, the Ellisons have included what they call a Zen room into the design of the house.

"It's a place to relax and chill out. We envision it as a place to

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sit and have a great view of this beautiful live oak and the water,” Ellison said.

Describing the house, Chris Senior, who founded Anchorage

Senior said Ellison is a wonderful addition to the company. “An ubergreen custom home-builder needs to be great at, and know a ton about, a lot of things. Lucien is that renaissance person — from world traveler, to MBA, to software expert, to

the third decade of Anchorage Building Corp. in Wilmington, bringing forward this perfect construction approach for the coast.”

Ellison’s passion for this style of building stems from his personal commitment to reducing his carbon footprint.

“Buildings are responsible for about half of the greenhouse gas emissions in the U.S.,” he said. “The building sector really needs to evolve, and passive housing is a great way to move forward toward sustainability. I don’t believe there’s a better way to combine quality and sustainability in a home.”

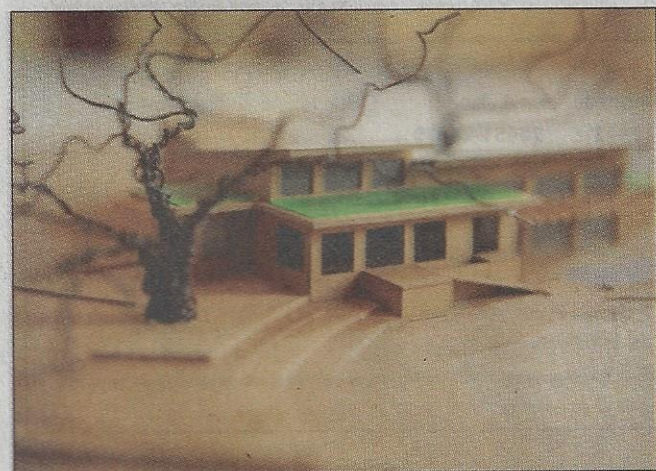
Ellison said the standard is very rigorous.

“It’s different from other building standards like LEED (Leadership in Energy Efficient Design). LEED includes more areas of sustainability, but passive house takes a much bigger bite from the building’s impact on the environment,” he said.

Pfirman said, “It’s a new way of thinking about energy efficiency.” He said the method of construction is “totally unconventional and like nothing we’ve done before.”

The Ellison home will be only the fourth certified passive house in North Carolina. The other

dedicated husband and father of three boys, to green developer, to accomplished airplane pilot, to raising-up important charities, to licensed contractor, to bold surfer, to building scientist. As a rare Certified Passive House Consultant, he understands the peculiar physics of houses. I’m excited to have Lucien begin



Staff photo by Joshua Curry

The model rendering of the Ellison passive house has the home placed between two old oak trees on the property.

Building Corp., said, “Lucien and Jane’s new home will be a bright, happy, extremely comfortable multigenerational hub of activity for centuries. The design is not only proportionally pleasing to the eye, but has been thought through to be hurricane-strong and multi-functional across time.”

Passive houses see overall energy savings of 60 to 70 percent over traditional homes, and up to 90 percent savings on space heating and cooling. The name refers to the use of passive systems within the home without applying expensive active technologies like photovoltaics or solar thermal hot water systems to achieve energy savings.

The homes are held to a standard developed by the Passive House Institute U.S. The total energy use for the home must be less than 38 kBtu per square foot per year, with an annual heating and cooling energy usage of less than 4.75 kBtu per square foot per year.

There are several elements of the construction process to achieve that standard. The house must:

- be super insulated and virtually air-tight — no cracks and crevices for air to move in and out
- utilize high-performance windows and doors
- have an airtight building shell; 0.6 ACH or less at 50 pascal pressure, measured by a blower-door test
- use mechanical ventilation with an energy recovery ventilator (ERV) that provides a constant, balanced fresh air supply
- have thermal bridge-free construction; a thermal bridge is a construction material that runs from the inside of the house through the thermal envelope to the outside of the house, through which heat can travel. The insulation layer of the house is referred to as the thermal envelope, and the idea is to have very few construction materials penetrate this envelope.
- utilize solar orientation and landscaping. The house is designed to maximize solar gain in winter and eliminate as much solar gain as possible in summer through the use of trees and other shading devices. Most of the required heat for the home is generated from the sun and internal gains, which include appliances and residents, who actually put off quite a bit of heat in their everyday movement. A majority of the windows should face south, as that location draws the most solar energy in winter when the sun sits lower on the horizon.

three are located in the Triangle area.

There are only about 100 of these homes in the U.S.

Ellison said he has already met with one potential client interested in building a passive house in Landfall.

“There are a lot of folks around Wilmington who are interested in sustainability, so I definitely think there’s a market for passive house.”

Senior said, “Nature brings people to the beach. Honoring it and working with it is inspired

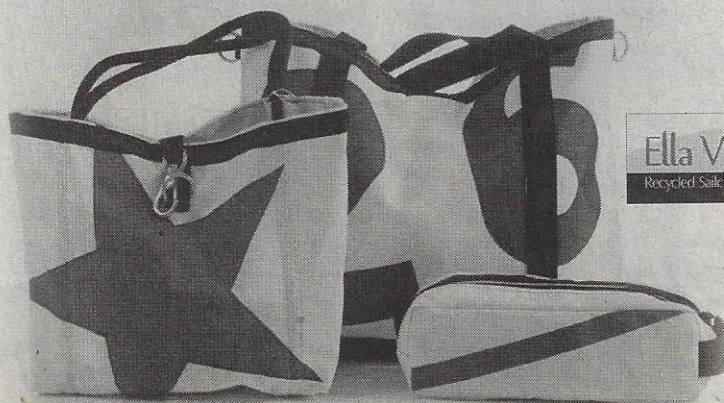
here. A stout home with passive survivability is a perfect match for the salty stormy coast. Beefy, super-insulated, sun-conscious, tiny energy-load homes will become the requisite in Wilmington as folks learn of the cost parity.”

Pfirman also believes there will be more interest in passive houses.

“As energy becomes more expensive, and Baby Boomers start to think about their fixed incomes, one of the biggest variables is energy costs. Wouldn’t it be nice if you lived in a building that uses almost no energy?”

No matter how hot the summers or how cold the winters, the passive house energy bill is almost always going to be extremely low.

“I’d like to see whole communities of these houses,” Pfirman said.



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