SPRING 2007

ASID OREGON Chapter News

AMERICAN SOCIETY OF INTERIOR DESIGNERS

The Cannon Beach Residence.
Owners: Jane & John Emrick;
Interior Designer: Georgia Erdenberger, ASID, IIDA;
Architect: Nathan Good, AIA.

IN THIS ISSUE

The Cannon Beach Residence

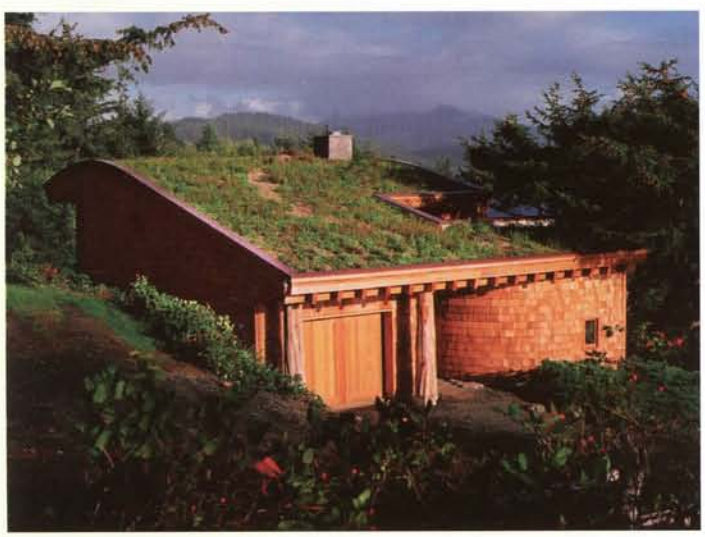
By Nathan Good, AIA

My client's previous home, a stone's throw from the beach, had been the setting for numerous family reunions, gatherings with friends and personal retreats. A few years ago, they lost their home and most of their possessions while they were away, the result of a fire that spread from an adjacent home under construction. The tragedy evolved into opportunity when they decided to rebuild, this time in response to their environmental values.

My client's requests were for, "... a small home that will provide shelter, comfort, and rejuvenation. We would like for it to be equally comfortable when inhabited by just the two of us as when family and friends join us. Our new home should reflect the character of Cannon Beach and capture our love of materials and forms found in nature. We prefer for it to be low profile and understated. Our goal is to build a home that is healthy to live in using materials and systems with a dramatically reduced impact on the environment."

Early in the design, my clients embraced the idea for an integrated design team. The owners, architect, interior designer, landscape architect, and contractor collaborated on the design of the home with few boundaries between disciplines. I facilitated a number of design charrettes, occasionally joined by content experts in energy efficiency, solar systems, indoor air quality, and green building materials. The spirit of collaboration continued through the project with the contractors and trades folks rendering their expertise and creativity to the home's construction.

Including the general contractor, Rich Elstrom, in the design team was a tremendous asset. Rich provided timely feedback on design alternatives, projected construction costs, life-cycle assessments (LCA), constructability, and the nuances of building for long-term durability and low maintenance in a coastal environment. Prior to the start of construction, we teamed up to host a day-long training session on green building philosophy and techniques for the local building officials, the sub-contractors, material providers, and other interested contractors in the area. Rich and his project superintendent, Mark Ward, were exceptional at carrying the green building and environmental stewardship objectives through the construction phase. Their diligence contributed to the project receiving the National Association of Home Builder's "Custom Green Home of the Year" award in 2005.



The home has two bedrooms, three baths, a great room, kitchen and an office loft area above the kitchen. It is nestled into the hillside overlooking the Pacific Ocean and village of Cannon Beach. Care was taken to preserve a centuries-old Sitka spruce on the property.

The home's simple architectural design is composed of two gently curved overlapping roofs. The upper roof was designed as a vegetative roof for aesthetic and environmental reasons. The owners offered their rooftop as a meadow to neighbors with homes on the hillside above them. The 4" of lightweight soil and host of soil-stabilizing and flowering plants help reduce the impact of the 80 to 90 inches of annual rainfall on the municipal storm sewer system. The green roof also adds to the fire resistance of the home and energy performance. The lower roof serves as the platform for the 5.9 kW (DC input) photovoltaic system, provides shading to the large picture window, and creates shelter for the patio below.

Most of the home's windows face south to capture the spectacular view of the Oregon coastline and to optimize the sunlight for daylighting and solar tempering. High performance Cardinal glazing with a U-value less than .32 was used. The high clerestory windows, interior light shelves, and a raised ceiling in the greta room provide excellent natural lighting, even on the overcast days common along the Oregon Coast.

Our understanding of the relationship between the generation of grid-provided electricity and global climate change resulted in our goal for the home to generate as much energy as it consumes on an annual basis, referred to as net-zero energy. This would require that the home be designed for its climate, using available natural resources for heating, cooling, daylighting, and the generation of electricity on-site.

Despite the moderate climate along the Oregon Coast, a high-performance building envelope with insulation values substantially higher than the Oregon Energy Code was required to conserve heat and energy. The design team effectively reduced internal electric loads with the thoughtful selection of energy-efficient appliances, lighting, and equipment. Energy modeling and expertise provided by the Oregon Department of Energy's Charlie Stephens gave us on-going feedback on energy performance throughout the design, construction, and building commissioning process.

This home incorporates a number of technologies that are unique for this region. The home is one of the first in the Pacific Northwest to use the Durisol ICF wall-forming system. Although Durisol was developed approximately fifty years ago in Switzerland, it is relatively new to the US market. The 12" thick Durisol blocks, made of recycled wood chips and Portland cement with enhanced rock wool insulation and 3 ?" thick concrete cores, resulted in perimeter walls that are well insulated (R-25), fire-proof (4-hour rated with zero flame spread and smoke generation), moisture resistant, rot and termite proof, vapor permeable, as well as mold and mildew inhibiting. A simplified LCA by Rich Elstrom during the schematic design phase demonstrated that the cost of the Durisol wall system was comparable to wood frame exterior walls that used sustainably harvested lumber (FSC certified) with steel moment-resistive frames.

One of the detail challenges was the design of an well-insulated roof (R>50) over the vaulted ceilings. Venting the roof cavities to the outside under the vegetative roof would reduce much of the thermal benefit offered by the mass of the soil and roof structure. We turned to Betsy Pettit and Joe Lstiburek of the Building Science Corporation for guidance on the design of a roof sandwich that would meet our energy, indoor air quality, environmental, and durability criteria. The final solution utilized three inches of closed cell spray foam insulation (R-7 with PERM< 1, per inch) applied to the underside of the plywood roof deck. Beneath this we installed a 10-inch blanket of Johns Manville's R-38C formaldehyde-free batt insulation. The ceiling was finished with 1x4 tongue and groove Pine.

Another terminology that we incorporated into the design was "short basement". Oregon residential codes require crawl spaces to be vented. Crawl spaces are an excellent means of providing flexibility for electrical wiring, telecom, and ducts; however, their venting results in significant energy losses. By installing a concrete floor and a moderate amount of conditioned ventilation we increased the energy efficiency of the building envelope. The shift in name from "Crawl Space to "Short Basement" was not just a matter of semantics with our building code officials - it was the difference between venting and not venting.

Our local building official, Tim Lindsey, was a key individual in the design development of this pioneering home. Tim serves as both plans examiner and building inspector for the community of Cannon Beach. His twenty-plus years of experience as an inspector along the Oregon Coast have resulted in an eye for designs and details that could lead to building failure. His interest in the project was enhanced after attending our green building seminar. Over the course of the design and preparation of construction documents, Tim, Rich and I met a number of times to review materials, systems, and construction techniques that were new to the area. His support was paramount to the overall success of the project, which could have otherwise been met with reluctance and opposition.

The heating and ventilating system in the Cannon Beach Cottage uses conventional components in a unique way to provide space conditioning for the occupants while minimizing overall energy use. The home was designed to have very low space heating and water heating loads, and no air conditioning is needed in the coastal climate

The use of three Stirling 200DX Energy Recovery Ventilators (ERVs) as air handlers is the backbone of a strategy for enhanced indoor air quality throughout the year. The entire design team was diligent in their selection of materials that were free of formaldehyde and volatile organic compounds (VOCs). This diligence was motivated, monitored, and encouoraged on a

regular basis by our client's commitment to a home with exemplary indoor air quality. Operable windows are strategically placed throughout the home to facilitate good cross-ventilation.

Energy for the space heating system and domestic hot water is provided by a combination of evacuated tube solar-thermal collectors and a ground-source heat pump system. Ninety Thermomax® evacuated tubes gather solar energy and heat water in a circulating loop. A heat exchanger transfers the heat from the loop to two 120-gallon storage tanks in the basement. When the storage tanks are fully charged, excess solar energy is routed to the geothermal wells to seasonally store extra energy in the natural basalt rock formations beneath the home for later extraction by the ground source heat pump. Space heat delivery is provided by a hydronic forced air system using the three multi-functional, high-efficiency ERVs moving warmed ventilation air to each zone.

As part of the home's participation in the Earth AdvantageÔ green building certification program, a third-party auditor calculated the Home Energy Rating (HERS rating) to be 94.0, with a rating of 5 Star+, 58% more efficient than the Oregon Energy Code requires. They also conducted a "Duct Blaster" test with duct leakage results of 80 cfm at 50 Pascals, and a "Blower Door" test result of 0.23 ACH at 50 Pascals. After the home was completed and commissioned, it received the Platinum certification level with the most points in the Earth Advantage program's seven-year history.

Most of the hot water-using fixtures in the house are served by an insulated ?-inch diameter circulating loop with smaller diameter individual branch lines to each fixture. A Metlund on-demand circulator system rapidly delivers hot water to the farthest fixture on the loop when activated by wireless switch. A sensor on the line at that point shuts the circulator pump off when the water temperature reaches approximately 85º F. "Instant" hot water is then available to all fixtures on the delivery side of the loop. This system is projected to saves thousands of gallons of water each year.

A 5.9 kW photovoltaic array on the lower (south) roof produces the energy to offset the home's consumption. Early data suggests that the home is on track to reach its goal of generating more energy than it consumes on an annual basis. During the month of August 2005, the home delivered 173 more kWh to its electric utility provider than it consumed.

The owners want others to study the lessons learned from their project to facilitate a new generation of sustainably built homes. Charlie Stephens of the Oregon Department of Energy worked with Kent Stidham of Environmental Controls Corporation and Bob Rogers of the Oregon Institute of Technology (OIT) and his students to install and commission more than 90 sensors in the home. These are connected to an Alerton DDC building automation control system that allows the home's performance to be tracked remotely. The Oregon Department of Energy will produce a detailed case study documenting the results after the first year of the home's occupancy, scheduled for publication in the late summer of 2006.

The design team specified predominantly local, sustainably harvested and recycled materials for the home. FSC (Forest Stewardship Council) certified sustainable forest products were used for the concrete formwork, interior wall framing, roof structure, and cabinetry. Wind-fallen trees were used for the interior heavy-timber framing of the loft and archways. The six Incense Cedar tree-trunk columns were obtained from the Collins Pine FSC forests. The Douglas Fir flooring was salvaged from windfall trees. The interior doors and some of the home's trim were milled from Douglas Fir logs salvaged from the nearby Columbia River. The unique stairway to the loft was built from wind-fallen Douglas Fir treads with supports from Spruce and Beech limbs from trees on the property. Salvaged doors, hardware, appliances, and bath fixtures were used throughout the interior.

The interior designer for the project, Georgia Erdenberger, ASID, IIDA of Czopek & Erdenberger, worked closely with the owners to select interior finish materials that were produced from natural materials, that were locally sourced, and would not off-gas. Georgia's husband, landscape architect George Erdenberger, carefully selected plants that would flourish along the Oregon Coast without maintenance, the use of pesticides, fertilizers, or irrigation during the dryer summer months.

The home was designed and built with the goal of being 100% PVC and formaldehyde free. The only PVC known to exist in the home is the conduit for the underground electrical supply into the home and the sheathing to the electrical wiring. The concrete foundation utilized 25% fly ash with 35% fly ash utilized in the ICF concrete cores. The steel beams for the home's roof contain 90% recycled content and the rebar used within the ICF concrete cores is 100% recycled steel. Portland artist Shannon Belthor utilized Aglaia nature-based paints, stains, and sealants on the plaster walls, floors, and woodwork.

This residence was designed to bridge environmental performance with character and aesthetics. The use of natural materials, spaces that offer "prospect and refuge", simple organic forms, and exemplary craftsmanship have resulting in a distinguished home with a strong sense of permanence and place.

Thank You to our Sponsors & Vendors

who participated in the Annual State Conference and Vendor Fair

SPONSORS

ARIZONA TILE

CAMBRIA

FERGUSON a WOLSELEY company

Benjamin Moore Paints

kravet

Goldsmith Company

CFM Contract Furnishings Mart

STAINMASTER CARPET

CHOWN HARDWARE SINCE 1879

madisonmillinger

VENDORS

Bradshaw Frame and Gallery
Crowley's Granite Concepts
Delta Faucet Co.
Rodda Paint
Belles of Glass
Intrepid Design
T & A Supply Co.
Stroheim JAB
Architex
Formica Corporation
Pearl Painters
Best Window Covering
Yolo Colorhouse
Pratt & Lambert
Eclectic Home