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COLUMN

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RADIANT Bonanza

Plus: RPA • Casa Bella Verde • Snowmelt Systems

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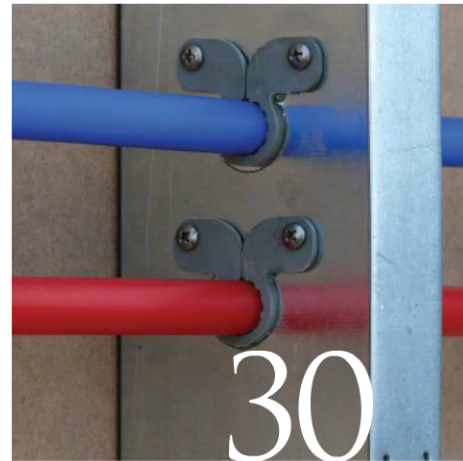
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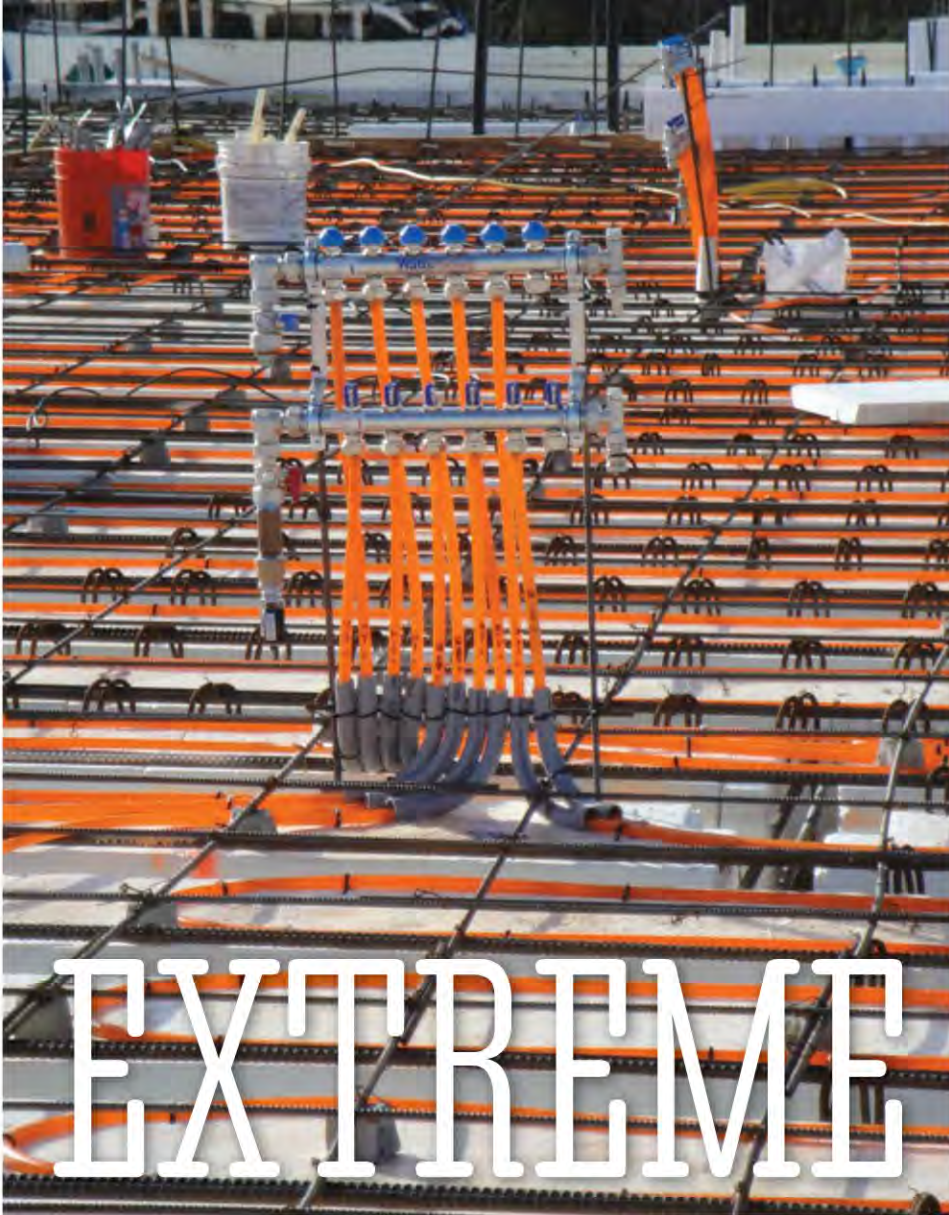
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PEX installation at Casa Bella Verde. Rachel Wenger Photo

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EXTREME

GREEN

Casa Bella Verde. It translates to “beautiful green home.” Sounds like a luxurious eco-resort? Well, that’s the idea.

Nestled into the foothills of Sacramento sits what is billed as one of the world’s greenest homes. What makes Casa Bella Verde so green? It began that way years ago as the brainchild of homeowner and recognized green building consultant, Briana Alhadeff—a woman dedicated to creating a home with every facet of green technology imaginable, beginning with its ICF shell. With a fully insulated concrete form, some call Casa Bella Verde the “Millennium Home,” referring

to the longevity of ICF construction, assuring a thousand-year lifespan.

Also contributing to Casa Bella Verde’s LEED platinum status is the rainwater harvesting system. Any water that hits the surface of the home is collected in an 80,000-gallon cistern that’s housed below the swimming pool. There, the water is filtered, cleaned and used to fill the pool.

A dream come true

While the notion of being green and luxury may sound contradictory, in Alhadeff’s mind, the two are far from mutually exclusive.

Geothermal and radiant feature in California-grown Green Home

By Rachel Wenger

“It had always been a dream of mine to own a self-sustaining home,” she said. “As a child growing up in California, earthquakes were the norm. When the power went out, I always thought to myself, ‘I wish we could have our own power.’ All along the way, I never foresaw having to give up a thoroughly modern standard of living to achieve my goal,” she added. “Many thought it couldn’t be done, but Casa Bella Verde proves otherwise using today’s technologies and even serving as a working laboratory for some things that have never been attempted before.”

From the ground up

Once the property was purchased and Casa Bella Verde was underway, Alhadeff and green building partner and friend, Nicholas Niki-foruk enlisted the help of their mutual friend Dennis Bockhaus, owner of Nora Springs, Iowa-based Bockhaus Plumbing and Heating, to do the geothermal, which was voted the greenest option for heating CBV.

Traveling 1,800 miles each way, Bockhaus began the geothermal work in the fall of 2011, putting in long days and typically staying for ten days at a time. “They were long, long days, he said, “But then I wasn’t there to stare at the sky or play golf, either. We put a lot of planning and preparation into each of my many trips and, when I arrived, the treadmill was moving at a pretty good clip.”

Early into the project, ten vertical bores at 300-foot deep each were drilled on the 40-acre property. The trenches between the home and geoexchange field, 175 feet north of the home, are six feet below grade and enter the home at the bend of the swimming pool.

Three 60,000 BTU water-to-water ClimateMaster Tranquility units and one three-ton water-to-water ClimateMaster Tranquility system extract or reject the ground-source heat, depending on the season.

The first floor of Casa Bella Verde, as well as the guesthouse, is comfort-conditioned

EXTREME GREEN



Casa Bella Verde on the way to LEED Platinum status. Rachel Wenger photo.

by one of the ClimateMaster five-ton units and the three-ton unit. The remaining two five-ton systems provide for the second and third floors of the home.

Among system components are two heat exchangers and a large buffer tank that serves as the radiant system's main source of warmth. Inside the buffer tank is a thermistor that senses and calls for water temperature controlled by the main Tranquility unit's hydronic control module. The module dictates the geo system's cycling into stage one or two, depending on the buffer tank's demand.

"The vertical bores either extract or transfer heat into the ground, depending on whether the system is in the heating or cooling mode," Bockhaus said. In the heating mode, BTUs are exchanged to the heat pumps, and some of that warmth makes its way to the big buffer tank. From there, the buffer tank is the source of warmth for the radiant zones.

Casa Bella Verde is split into five main radiant heating zones as well as a separate injection loop zone for the guest house radiant system. In-floor heat for the home is accomplished through 9,000 lineal feet of Watts RadiantPEX.

Most of the PEX tubing was installed by Alhadeff and Nikiforuk themselves, initially instructed and supervised by Bockhaus. Together, the couple stapled the tubing to the ICF subfloor before pouring the home's insulated concrete floors.

"The RadiantPEX was so easy to install, and now provides consistent warmth throughout every room in the house," said Nikiforuk.

During cooling mode, the home's many fan coil units extract chilled water from three of the geothermal systems. Four, three-ton fan coil units cool Casa Bella Verde's interior spaces. Each fan coil has adjustable CFMs to match the loads in the areas they serve. All told, the fan coils could meet a total, peak demand of 14 tons.

Converting the ample California sunshine into ready-to-use

energy, the photovoltaic system planned for Casa Bella Verde is one to be talked about. When completed, 95 roof-mounted solar panels will supply the home with the great majority of energy it requires.

"If all goes according to plans, we won't need to buy energy from the grid," Alhadeff said. "Most of the time, we'll be shedding surplus electricity, sending it into the grid for reimbursement."

Alhadeff's green energy blueprint also includes a miniature wind generator on the roof amongst the solar panels.

Turning the page to the matter of waste water management, she also chose to forego a traditional septic system in favor of what she describes as a "small, personal municipal wastewater treatment center."

Casa Bella Verde's Delta "Ecopod bioreactor," uses a fixed-film process technology that's both ANSI/NSF International Standard 40/Class 1 and Standard 245 certified, is a system on this project consisting of five 1,500-gallon precast concrete tanks that are simple in design, requiring minimal maintenance.

Once the filtered and treated well water has been used once for domestic purposes, it's directed into the onsite system's first tank. The first and second tanks receive incoming flows and are capable of storing large flows that can develop during large functions at the home. Effluent is time dosed, flowing into the third tank where the liquids and solids are allowed to settle, creating a clear zone.

The liquids then flow to the fourth tank where the reactor is installed. There, the organic matter becomes a highly treated effluent, flowing by gravity to the fifth tank where it's stored and time-dosed to an effluent drain field

All appliances at Casa Bella Verde are Energy Star qualified – using less energy and water and exceeding federal energy standards by up to 48 percent.

Introducing as much natural light into the home as possible, thus reducing the energy required for artificial light, Energy Star windows and skylights at Casa Bella Verde are constructed of double-pane, argon-filled and Low-E insulated glass – making them among the lowest heat-transfer windows available today.

Exceptional solar control value is provided by Hüper Optik multi-layered nano-ceramic window film, which has been engineered to reduce infrared heat build-up in the home by up to 96 percent.

"We're about three-quarters of the way done now with the home's construction and landscaping," Alhadeff notes, looking forward to the day when all the construction dust finally settles. "By the end of 2013, Casa Bella Verde will be complete. Like its name implies, it's my hope that it will truly be a beautiful green home by anyone's measure." **RJ**



Techs from Alhadeff and Nikiforuk lay out a few of the home's 9,000 feet of PEX tubing. Rachel Wenger photo.