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High-Performance Homes | 20

Deftly executed design offers comfort and energy smarts in equal measure



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Cover: House 610 in San Antonio was designed and built by Craig McMahon Architects. Much of the interior detailing is by Cavan McMahon of Half Inch of Water Studios. Photo: Dror Baldinger

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Performance Anxiety

Few things in construction cause as much confusion as green building. Faced with this reality, the industry began adopting new terms to describe this type of building—such as energy-efficient and, lately, “high-performance”—as a way to make things simpler and to assuage the frustrations of people who had developed green-fatigue. But what exactly is a high-performance home?

“It’s one with a good building enclosure,” writes Allison A. Bailes III, PhD, founder and president of building science consulting firm Energy Vanguard. “That is, it’s airtight and insulated well. It has properly sized, installed, and commissioned heating and air conditioning systems, including the distribution side. Because it’s airtight, it also has mechanical ventilation. The result is a home that’s comfortable, healthful, durable, and energy efficient.”

The explanation seems straightforward to me, but it’s still unclear to many. Some people feel it’s just another green industry invention that exists to sell products, increase construction costs, and create a cottage industry for building science consultants. Believe me, I’ve seen the construction chat rooms: Green backlash is a thing.

Some builders and contractors regard high-performance construction with the same suspicion they view other terms, such as green, eco-friendly, sustainable, low carbon footprint, and net zero. Truth is, we wouldn’t even need these terms if all houses were properly built in the first place. But that’s not the case.

Many houses are built to minimum code. I once heard a construction professional say that if you’re building to minimum code, you’re doing it wrong. Code is the baseline; the bare minimum standard. But people continue to buy energy-hogging, leaky houses that meet minimum code, so there’s no incentive for mainstream builders to step up their game.

These issues, hopefully, don’t apply to you or to the houses you build. As a professional involved in the design and construction of custom homes, there’s no such thing as minimum code. Your houses are correctly oriented and properly air sealed, windows are well flashed, slabs are insulated, basement walls are waterproofed, chimneys are step-flashed, attics are sealed, roofs are protected from ice dams, wall cavities are stuffed with insulation, duct runs are installed *inside* the building envelope, HVAC equipment is properly sized, windows and doors are weatherstripped, and on and on. What people call a high-performance home, you simply call a house—right?

Nigel F. Maynard
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CROWD PLEASERS

Multigenerational living is on the rise, and custom builders are coming up with ingenious solutions for each client

By Susan Bady, Senior Editor

The rise of multigenerational living has created a robust niche market for custom-home builders. Clients are building homes that are large enough for their families to stay for extended periods, if not permanently. They have a long list of requirements, including oversize living spaces and outdoor areas equipped with every imaginable bell and whistle.

"I'd say 85 percent of my clients are people who are ready to retire [to Cape Cod, Mass.] and build big houses," says architect Denise Bonoli of East Falmouth, Mass. "They want a place where the entire family can visit."

Emily Little, co-principal of Architects Clayton & Little, in Austin, Texas, says that many clients are coming to her because they want to be able to age in place. In addition to the requisite first-floor master suite, she says, "there is a desire for a smaller, separate living unit to keep every option open—a bedroom with, perhaps, a kitchenette for a caregiver or an adult child who is moving back in with the parents."

The homes profiled in this article are unique in that they're not primary residences. They're better described as mini resorts where the whole family can enjoy an "all-inclusive" vacation.

The great room has a wood-paneled tray ceiling and a cupola above. Nearly every room faces the water.

multigenerational homes



At those times of year when this home on Cape Cod is full, the homeowners want to be able to seat 12 to 14 at a dining-room table. To accommodate guests, the kitchen's dual islands can seat an additional six people.

Private oceanfront estate

The client had waited four years to buy a pair of oceanfront lots on Cape Cod, Mass. When he finally acquired the property, he decided to combine the two lots and build a large home where he and his wife could carry on their long tradition of family get-togethers.

East Falmouth, Mass., builder Ralph Cataldo says the couple's previous home was approximately 9,000 square feet. The new home measures 13,500 square feet. "The clients have four adult children and four grandchildren," Cataldo says, "and they wanted each child to have a private bedroom and bathroom." To decrease the number of interior walls and open up the plan, the first floor is constructed with 43 steel I-beams.

"You can comfortably seat 12 people at the dining room table and an additional six people in the kitchen, which has two

islands," he says. "There's a three-season room with a fireplace off the kitchen that can hold another 10 or 12 people. And off the three-season room is a gazebo with a giant TV screen and more seating. So in the summertime there are places to sit everywhere."

The first-floor master suite includes a bathroom "that's as big as most bedrooms," Cataldo says, and is equipped with a soaking tub, an oversize shower, and extra large his-and-hers closets. The bedroom has a sitting room and a fireplace, plus a private covered porch.

Also on the main level is a guest suite with a 20-by-20-foot sitting room, and a great room with a fireplace. Laundry rooms are located on each floor.

On the second floor are bedrooms and baths for the children, a sitting room, and a library completely enclosed with glass



In addition to their large family, the clients have guests every weekend during the summer, so the outdoor amenities include a fire pit, a bocce court, and a putting green. With its wood roof shingles and siding, the house will “weather out” over time to a Nantucket gray. The PVC trim, copper components, fieldstone walls and chimneys, and granite patios are also low maintenance.

doors that overlooks the ocean. The sitting room and library can be used by guests who need a quiet place to read or work. A bedroom suite over the garage was designed for one of the client’s daughters. There are also two bedrooms for the grandchildren—one for the boys and one for the girls—separated by a bridge above the breezeway and mudroom. Family members and guests use the mudroom as a separate entrance to the guest bath and laundry room after a day at the beach. They can also access the second-floor bedrooms via the back stair.

Architect Denise Bonoli, who is also based in East Falmouth, says it’s the biggest house she has ever designed and yet the easiest “because I’d done it before. [The clients] liked the house they were living in very much, so [the new home] was, for me, a multimillion-dollar do-over. They would say, ‘We love the kitchen; let’s just make it a little bigger and put a desk over here.’”

Thanks to the clients’ involvement and the efficiency of the design and construction team, Cataldo says the project was completed in about 16 months.

Because it’s a vacation home, “we had to make it big enough for a tremendous amount of people,” Bonoli says. “Usually,

clients want to be able to seat 12 to 14 at a dining room table, but that only happens for two months out of the year. For the other 10 months, it has to be livable for two people. That’s why the homeowners have a first-floor bedroom suite and the second floor is reserved for guests.”

On the lower level, family and friends can watch a movie in the theater room or entertain themselves in the game room. An exercise room was under construction at press time.

Sightlines run from the front door through the dining room to the back porch, offering views of the ocean. The same view is captured from the first-floor stair landing. “Almost every room in that house has ocean views,” Cataldo says.

The extensive outdoor space includes a covered porch that wraps around the rear of the home, an octagonal screened porch, and a fire pit. There is also 300 feet of sandy beach, a putting green, and a bocce court. The aforementioned three-season room has floor-to-ceiling glass doors that fold open, plus its own fireplace.

“What’s different about this house from [similar homes] on the Cape is that the interior spaces are bigger and better, with nicer finishes,” Bonoli says, “plus we maximized the outdoor spaces.”

multigenerational homes



The main house is more Victorian in style than the accompanying cabins, which have a rustic, Texas Hill Country ambience.

Texas-size family compound

Austin, Texas-based Architects Clayton & Little worked with Wimberley, Texas, builder Grady Burnette to develop a family compound for a couple whose children and grandchildren visit often. The grandparents, who live in a two-story, Texas Hill Country vernacular-style house on 16 acres overlooking the Blanco River, “wanted to provide more amenities for the whole family to enjoy,” says architect Emily Little.

Clayton & Little designed a main house that has approximately 3,800 square feet of conditioned space and 1,500 square feet of covered porches. The home has a living room, kitchen, exercise room, library, office, and three bathrooms.

In addition, there are three small cabins, each with a bedroom and bath, that are connected to each other in a 1,700-square-foot structure that steps down the 15-foot slope. The new buildings share a courtyard.

“The cabins are connected by an interior hall,” Little says, “but it steps down, so you feel very separate when you’re in them. The middle cabin is designed as a bunkhouse for the grandchildren, and their parents stay in the other two cabins.”

PHOTO: DROR BALDINGER



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multigenerational homes



Architects Clayton & Little designed the main house with a living room, kitchen, library, exercise room, and office for the use of the clients' children and grandchildren. The second-floor library (shown) is flanked by bookshelves and has a fireplace for chilly weather.

Because flooding has been a serious issue in that area, all of the new structures are located above the 100-year floodplain. They are sited to take advantage both of long-distance views as well as views of the nearby river and the woods.

While the architecture overall is Texas Hill Country, Little says the main house is "a little bit fancier. There's more detailing and it's slightly more Victorian in character, while the cabins are a little more rustic in character."

The new buildings are clad in stone and siding. And, Burnette

says, "There are interior stone walls and wood paneling as well in certain areas."

The compound is actually the family's winter home. Family members stay at another residence they own in Colorado during the summer.

"[Family members] can be on their own if they need to be, but there are also wonderful large areas for them to come together," Little says. "It's a place that has a lot of options. I think for guests, that's always a real bonus." CB

PHOTO: DROR BALDINGER

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GREAT PERFORMANCES

A detached pool house with an art room, sauna, bedroom, and bath serves as both changing room, studio, and guest quarters. Architect Anni Tilt says the gently curving corrugated-metal roofs offer a softer take on typical agrarian structures and mimic the surrounding tree canopies.

high-performance homes

These high-performance custom homes offer a wealth of ideas, from straw-bale and rammed-earth construction to precast concrete panels and VOC-scavenging drywall

By Susan Bady, Senior Editor

The more informed the client, the better the outcome, especially if the project is a high-performance custom home. Clients naturally expect their builder to be up to speed on the latest sustainable methods and technologies, but the builder also expects the client to have more than a rudimentary knowledge of what's available.

The projects depicted here were carried out by highly skilled, well-trained professionals for clients who take green issues seriously. The homes are a reflection of the owners' values and of the dedication of the builders and designers. As architect Arielle Schechter says about the Happy Meadows project, "There were no restrictions except the ones we put on ourselves to walk softly and modestly on the land."

Living off the grid with alternative technologies

A hybrid building system of straw bales and rammed-earth blocks forms the structure of a home that is completely independent of conventional energy sources. The house is sited on 170 acres along a creek in rural Sonoma County, Calif. Most of the property is steeply sloped.

"The site is far from the nearest power line, so one of the biggest concerns we had was solar access and solar gain," says David Arkin of Arkin Tilt Architects, in Berkeley, Calif. Based on solar analysis, the architects sited the house on a south-sloping open hillside.

The clients, who have twin daughters, wanted the house to be a reflection of themselves: natural and healthy. They had seen other homes designed by Arkin Tilt and liked the idea of using straw-bale construction to maximize energy conservation (see sidebar, page 26).

The home is designed as a series of east-west running pavilions, roughly paralleling the topography and stepping up the hill. Direct sunlight keeps the main living spaces warm during cooler months, while overhangs and exterior shade fins direct the summer sun away from windows during warmer months.

The dwelling is relatively small for a family of four (2,249 square feet under the roof, plus a 516-square-foot pool house), but it lives larger, says architect Anni Tilt: "The kitchen transparently links the pavilions

PHOTO: EDWARD CALDWELL



Many reclaimed and recycled materials were used, including the recycled glass countertops in the kitchen.

with doors that open wide to a contoured terrace that connects the main house to the pool house.

The lower level of the two-story home contains the kitchen, dining room, living room, office, media room, and laundry room. Upstairs are the master suite and a large bedroom—divided by double pocket doors—for the two girls, who share a bathroom.

The detached pool house includes a bedroom, a bathroom, a sauna, an art room, and a roof deck for stargazing on clear nights. It serves as guest quarters when the clients have overnight visitors.

The living room has a living roof planted with sedum, a low-maintenance ground cover. The family has a large edible garden that includes insect and butterfly-attracting plants.

Electricity is generated by solar photovoltaic panels, and propane is used for cooking and heating. Reclaimed and recycled materials can be found throughout the house, which is dual-plumbed for future graywater recycling. Drainage off the roof is funneled through rain chains that run to a drainage rill through the central terrace.

“One of the neatest things we did was use material that had been harvested from the site, rather than having it trucked in from another location,” says builder Andy Bannister of Earthtone Construction, in Sebastopol, Calif. “It was mostly Douglas fir and some oak, which we milled into beams, rafters, and ceiling materials.”



The home's modern design mirrors architect Arielle Schechter's other work. Prevailing breezes flow through the covered deck and screened porch into the courtyard, providing continuous fresh air.

Happy life, happy wildlife

Like the California home, Happy Meadows, in Pittsboro, N.C., was built for a couple who wanted a modestly sized house that would express their dedication to the environment and health. "They were the most informed clients I've ever worked with as far as their knowledge of green issues," says Chapel Hill, N.C., architect Arielle Schechter. "They wanted to limit as much as possible the use of PVC, whose manufacturing plants cause chloride and mercury pollution and are disproportionately located in low-income communities."

The couple have no children and are close to retirement. Having seen Schechter's courtyard house designs, they decided they wanted

one. Sited to take advantage of solar gain, the home has an understated entry from the north side, opening up to large windows, views, and light on the south.

The floor plan is one level with an extra bedroom that has a full bath and space for a kitchenette so it can be converted into a caregiver's suite in the future. The couple also wanted a sunny spot for gardens and growing kitchen herbs, which would be easy on the 5-acre, south-facing lot. The internal courtyard provides the "delight" factor and a special green spot that can be enjoyed privately, Schechter says.

The home is under 2,500 square feet, yet it provides plenty of space for a great room, master suite, exercise room, office,

high-performance homes



Almost 100 percent of the rainwater that hits the roof is captured for landscape irrigation and feeding the frog pond.

guest room/future caregiver suite, large pantry, two full baths, two powder rooms, and a “mega mudroom” for storage and organizational tasks such as mail sorting and laundry.

Happy Meadows was built to strict PHIUS (Passive House Institute U.S.) standards. It earned a National Green Building Standard Emerald rating and is awaiting LEED Gold certification. It’s also a U.S. Department of Energy Challenge Home.

“The home is net zero with the potential to go beyond into net positive,” Schechter says. “By adding a few more rooftop solar PV panels, the owners will be able to not only power the house but also a small electric vehicle.”

The walls are made from prefab insulated concrete panels, custom-built off site in two days to the architect’s specifications and assembled on site in another two days with the help of a crane.

“The precast concrete panels are great for providing a very low-maintenance wall assembly,” says Kevin Murphy, president and founder of Newphire Building, in Chapel Hill, N.C. “It’s 5,500 psi concrete, so it’s fire resistant, impervious to insects, and can stand up to extreme weather. Another benefit is that the walls go up quickly, which helps keep the project moving and allows the house to be dried in faster.”

Water capture was a major driver of the home’s design. “We were able to achieve almost 100 percent rooftop rainwater capture,” Schechter says. “The majority of the rainwater falling on the roof is directed to a 1,200-gallon underground cistern, but about 15 percent is channeled via a butterfly roof and scupper detail to a water garden and wildlife pool.”

Murphy says that his biggest challenge was the additional time and cost of sourcing items such as VOC-scavenging gypsum board, recycled PVC pipe, and triple-pane

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A wall of glass overlooking the courtyard shows off creative window composition. For maximum energy savings, Newphire Building sourced triple-pane windows from Europe.

European windows. The home also has a geothermal heating and cooling system. HERS raters give it a score of -1.

The clients insisted on having a wildlife habitat and frog pond from the very start, Schechter says: "It is specifically designed to provide water for the animals that inhabit Happy Meadows. Special attention was paid to providing a safe habitat for frogs, since their numbers have declined severely in the past few decades." She reports that there are already thousands of tadpoles in the frog pond.

Last winter, which was especially cold, the homeowners were able to turn off the heat at night and the interior temperature never dipped below 59 degrees. Their power bill averaged \$16 per month, "which means that although we didn't hit net zero, we are very close," Schechter says. **CB**

BUILDING WITH STRAW BALES AND RAMMED EARTH



ArkinTilt Architects, in Berkeley, Calif., and Earthtone Construction, in Sebastopol, Calif., were a perfect team for the residence in Sonoma County. Arkin

Tilt specializes in energy- and resource-efficient design, while Earthtone focuses on sustainability, mindful building, and energy upgrades.

This was the first time that Earthtone's crew had worked with straw-bale construction and a post-and-beam system that uses I-joists as vertical posts. The bales fit between the posts. Substituting straw bales for lumber relieves the pressure to log old-growth forests and results in net-carbon sequestering, "which is critical as we face growing carbon-driven climate change," says architect Anni Tilt, whose firm has built about three dozen straw-bale houses to date.

Straw-bale construction is a proven, durable method, Tilt adds. If properly built and maintained, straw-bale homes can have a useful life span of at least 100 years.

Earthtone's Andy Bannister says that getting the bales to fit "is pretty labor-intensive; there's a fair amount of trimming and modification required. You start building a wall and find that you have to cut a bale, thread string through it, sew it, and tighten the string. And once the wall is up, there's more trimming to make the wall flush."

The straw-bale walls are coated inside and out with a lime plaster finish. Plaster skins add thermal mass and mediate diurnal temperature swings. When the bales are laid flat and stacked like bricks in a running-bond pattern, the wall is 27 inches thick and achieves an R-30 insulation level.

Adds architect David Arkin, "[The walls] also have great acoustic properties. And you're creating a carbon sink rather than a structure that requires a lot of steel."

The retaining walls are made of Watershed Block rammed-earth blocks. According to manufacturer Watershed Materials, the blocks have 50 percent less cement and 65 percent less embodied energy compared with conventional concrete masonry. They're made from locally sourced earth and recycled aggregates, formed into blocks that fuse soil particles and rock fragments together.

"The lower level, which was cut into the hillside, was all rammed-earth blocks," Bannister says. "Straw bales placed on top of the blocks stayed dry." —**SB**

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STRENGTH



IN NUMBERS

Buyer co-ops are trying to do more than just find rebates for home builders

By Mike Beirne, Senior Editor

Gene Robison used to spend a good part of his week chasing deals by contacting every lumberyard in town to get the best possible price. He doesn't do that anymore. Six years ago, the custom home builder joined the Salt Lake City chapter of CBUSA, a buyers cooperative, and combined his building material purchases with those of a dozen other builders in his market.

"I used to say [to the supplier] that I was willing to give him \$120,000 worth of lumber purchases, which for one guy was OK, but combine that with 10 or 15 other builders and my \$120,000 turns into \$1.5 million to \$2 million in lumber purchases," says Robison, president and CEO of Robison Home Builders, in Orem, Utah. "We do it as a group and go to lumberyards that are part of our buying co-op," he says, "committing to buying more than \$1.5 million worth of random-length lumber during the next three months. Then we ask: What's your best price?"

Cooperatives that leverage purchasing negotiations with manufacturers are popular among suppliers and distributors but less common among home builders. Dennis Hunt of Leading Edge Custom Homes, in Indianapolis, belonged to the Custom Home Builders Co-op for 15 years, but that network dissolved during the recession as lumber companies and other participating vendors went out of business. He'd like to join a buying network again, but in the meantime says he's searching the internet for building material deals. "You have to search—that is, if you have the time to search," he says.

There are businesses, such as HomeSphere, that take pools of builders and handle tracking and collection services for rebates that are offered from pools of manufacturers. Builder Partnerships does that in addition to negotiating incentive buying discounts

from manufacturers for builder members, along with offering consulting services and digital tools to help manage cost profitability. However, the handful of cooperatives out there that were specifically organized to combine purchasing volume in order to extract cheaper prices from suppliers and manufacturers are on the verge of expanding to an underserved industry.

From few to many

Robison's luxury homes sell for more than \$2 million, but at just three closings last year, he and many other independent builders couldn't hope to come close on their own to leveraging volume discounts that the nationals and bigger regional competitors can demand for commodity building materials such as lumber, concrete, drywall, and value-added equipment like water heaters and appliances. But there is strength in numbers. CBUSA, currently with 319 builders, and collective starts and revenue projected to be 5,100 and \$2.3 billion this year, respectively, would rank among the top 10 as a single entity in *Professional Builder's* Housing Giants. Affiliated Builders Group, another home builders co-op, which is based in Edmond, Okla., has more than 100 builders that collectively boast 3,500 starts and over \$1 billion in annual revenue, would be among the top 20 Housing Giants.

"In a lot of these markets, the independent home builder is competing against the nationals or large regional builders that have been leveraging their volume for a number of years to create a competitive advantage in the market," says Todd Waddle, president of Affiliated Builders Group (ABG), which operates cooperatives in Oklahoma City and Tulsa, Okla.; Kansas City, Mo.; Dallas and San Antonio; and New Orleans. "By us assembling a

small group that has equal or more volume in that given market, it allows us to compete at that same level," he says.

Waddle's background includes working for an industrial distributor that belonged to a buying network. He and business partner Hai Bui—the pair met during a stint in the banking industry—saw an opportunity to start their own business running a network for builders in 2006. Today ABG has full-time representatives in its six cities and plans to expand to 10 more markets during the next five years.

"We tackle a wide array of commodity materials on the local level and negotiate prices on behalf of the group. We also have national agreements with manufacturers of appliances, plumbing fixtures, hot water heaters and so forth, where a home builder in our group can specify a particular brand we're aligned with and get additional dollars through ABG from that manufacturer," Waddle says.

Phil Rhees, managing officer of BMI Construction, in Tulsa, Okla., has been in ABG since the network started there 10 years ago. His company builds three to four high-end custom homes annually, and he estimates that the co-op helped him save at least 5 percent of what he otherwise would have paid for building materials.

"We're a relatively small market, and most of the builders here build 10 homes or fewer, so banding together with other builders the same size enables you to purchase materials at the same level as guys that build 200 or 300 homes a year here in town," Rhees says.

Bill Smithers was part of the Custom Builders Council for the Northern Virginia Home Builders Association during the late 1990s when the group launched a volunteer effort to band together for the sake of negotiating better lumber prices. The co-op committee saw initial success, and interest grew from other builders who were connected to council members through Builder 20 group affiliations. Smithers and the original council members saw an opportunity, particularly if business systems were put in place, to take the co-op to the next level. "Our systems back then were Excel spreadsheets that changed colors when the price was higher or lower," Smithers says.

Several council members became investors, and CBUSA rolled out in Houston during 2004 with Smithers as CEO. The investors have since been bought out, and today the co-op has operations in 20 cities and intends to expand this year into Nashville, Tenn.; Seattle; Columbus, Ohio; and Charlotte, N.C.; with Pittsburgh on the radar for a future launch.

The CBUSA staff collects data from builder members who are willing to commit their business up front and assembles a request for proposal for a national contract with, for example, manufacturers of HVAC equipment. The co-op approaches Lennox, Carrier, Trane, and others to bid for the contract, which is not merely the extension of rebates but also a discount based on volume as well, at prices fixed for the period of the contract.

"Our members are saying I'm committing my business up front to whichever one prevails in the bid process," Smithers says. "We become way more attractive to manufacturers because we're not just saying we're putting incentives on the table and maybe our guys will use it and maybe they won't. We can tell who is committed and who isn't. For the HVAC contract, we had 100 guys out of 319 committed, and that number has grown as the contract has progressed and more builders hear about it."

Both ABG and CBUSA make their money by retaining a portion of the rebates that manufacturers and suppliers pay to builders.

However, a co-op isn't a good fit for every independent builder. Summit Custom Homes is among the larger builders in the Kansas

City, Mo., market, and CEO Fred Delibero has a purchasing staff that he believes negotiates better terms with local and national suppliers than he would get from a buying group.

"From our perspective, we don't want to use our size to leverage better pricing for our competition, most

We become way more attractive to manufacturers because we're not just saying we're putting incentives on the table.

—Bill Smithers, CEO, CBUSA

of whom are only building about 10 percent of the annual production we do," Delibero says. "I do imagine it can benefit a smaller builder doing less than 40 to 50 homes a year."

ABG members are bound by a confidentiality agreement that prohibits them from disclosing the prices they get from suppliers and manufacturers, so Waddle doubts builders outside the group really know if their deals are better than the co-op's. "Many builders are told they have the best prices and find out otherwise after joining ABG," Waddle says. "Most home builders would agree that volume drives price. It stands to reason that lower prices can be negotiated when positioning 600 units annually versus 150 units. The notion that volume looks different to suppliers if directed from a single company versus a group of 10 companies is misguided. I often remind home builders that there is a reason many of the suppliers they purchase materials from are part of buying groups themselves."

Kevin and Scott Frankel, co-principals of Frankel Building Group, in Houston, were CBUSA members for about three years before

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leaving the co-op five years ago. The brothers liked their fellow members and consider some as mentors, but being in the buying network wasn't a good fit for a midsize company that builds about 40 houses at a time. "We have a purchasing manager, and we now have our own vendor committee, and I do call other builders to get a pulse on what they're paying for material and labor," Scott Frankel says. "We do the majority of our business with one lumber company, and even though we do 40 houses, they're big homes and [the lumber reps] say, 'We have you buying like a builder who orders for 300 houses.'"

Smithers admits that CBUSA's initial profile of members then was small builders with 10 or fewer starts per year. Also, the co-op wasn't writing national contracts when the Frankels were members. Since then the network has evolved, with cloud-based bidding software that enables members to upload their plans and specs to one or all of the vendors that are part of the group and solicit bids on their project. The software enables builders and vendors to post questions and answers about the bid package, and builders rate their vendor experience so that other members can read about vendor performance.

"We have builders who do \$2 million a year in revenue, and guys who do \$70 million to \$80 million—and everybody in between," Smithers says. "As our program continues to grow, particularly at the national contracts level, we're becoming more attractive to the guys in the 50 to 150 units a year start range because our pricing is blowing away what they're able to get in the market because we have a much bigger footprint. Those guys are typically more systems based and they like the ability of what our tools can do for them."

Joining the club

Both co-ops are selective, so not just anyone can join. When entering a new market, ABG recruits builders that are strong and have a track record for quality, financial integrity, and a good reputation. For existing groups, the members must vote in a new member. CBUSA members refer other builders and vendors they want in the network, and those referred companies are then vetted by the cooperative. Both groups require members to pay on time and to comply with the vendor's conditions for taking deliveries, pickups, takeoffs, and other policies that protect suppliers from dealing with high-maintenance clients. Both networks hold monthly meetings, which provide an opportunity for manufacturers to pitch their products and train builders.

Builders Network is a San Diego-based startup that will accept any home builder or professional contractor. The network is an extension of an existing buying group of large construction companies, many having 40 years of multimillion dollar purchasing history with approximately 30 suppliers, such as The Home Depot, Consolidated Electrical Distributors, Milgard, HD Supply White Cap, USG, and others representing 20,000 manufacturers in all. The core members include

luxury custom home builders, commercial builders, real estate flippers, and a California restoration contractor that has rebuilt more than 2,600 homes destroyed by natural disasters. Builders Network's principals saw that there was an underserved market of home builders and remodelers for their concept and toyed with the idea of operating a buyers club.

"We approached our suppliers and manufacturers and asked: If we were able to open this up to wider array of professionals, rather than just our [current] companies, would we be able to pass those same buying levels on?" says Rob Southon, chief technology officer for Builders Network. "They agreed to do that, with the promise from us to bring them more buyers."

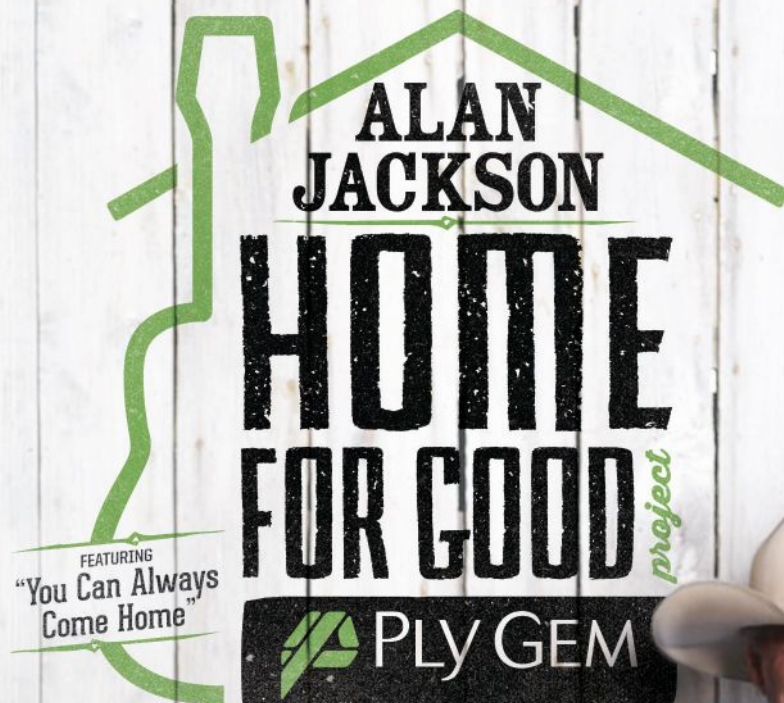
The basic membership is free—Builders Network makes some of its revenue by collecting a portion of rebates from manufacturers and by charging a small processing fee for purchase orders—and participants receive a basic level of discounts from the group's stable of suppliers. There also are upgraded annual membership levels ranging from \$79 to \$499, offering additional discounts of 5 percent, 6.5 percent, and 8 percent for purchases on top of the savings that come with basic-level membership.

The core members have years of building relationships and have streamlined the buying process with suppliers and manufacturers to the point of even testing software, which evolved into BuilderPro. Members get free or inexpensive access to BuilderPro software for purchasing and, if they want, for project management and customer relationship management applications. A staff of account managers negotiates with suppliers and manufacturers for discounts. As with CBUSA and ABG, members can upload their plans and collect bids. At press time, Builders Network had about 100 paying members, but it plans to launch an online marketing campaign this summer to attract more members and expand its supplier network.

"Our buying power is really high without a large number of members because we already purchase really high dollar volumes," Southon says. "So what we offer is the ability for these small and medium-size builders and contractors to piggyback on the spending of the larger companies and join in on the great pricing."

One drawback is that the network's independent suppliers are concentrated in California. While many building material products can be sent to members from local sources, for the time being some markets can only be served by a national supplier like The Home Depot, which may not offer as generous a discount as the local lumberyard or a boutique supplier.

Those builders that are in co-ops are finding more benefits than simply saving dollars. Now that Robison spends less time chasing deals, he devotes more effort to looking at the big picture for his business. "It also allows me more time to bid projects better because I know where my pricing is going to be and allows me to meet more with clients and keep them apprised of where pricing is at," Robison says. CB



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IT'S A FAMILY AFFAIR

Craig and Cavan McMahon design and build to suit themselves, creating demand for their innovative, practical, custom homes

By Teresa Burney

House 610, in San Antonio's Alamo Heights, was designed and built by Craig McMahon Architects. Craig's brother Cavan McMahon, owner of Half Inch of Water Studios, did the detail work, including building the home's steel and wood cabinetry, concrete countertops, and weathered steel fireplace.



PHOTO: DROR BALDINGER

Craig and Cavan McMahon's mother didn't want her sons to go into the construction business. She hoped to spare them the toll the family's concrete business took on loved ones' bodies and souls, so she steered both sons toward artistic endeavors. Craig chose architecture and Cavan went to college for fine art photography and business.

Her plan was half successful. Both sons became artists, but they apply their artistic talents to building original homes in the Texas market.

Craig is an architect based in San Antonio who designs houses and commercial projects for clients and designs and builds a home for his family about every 18 to 24 months. But he doesn't live in the houses for long before people come knocking at his door offering to buy them. He sells the homes, using the profit to fund the construction of his next experimental family home build. With his training in fine art and business, Cavan designs and builds "art houses" at a rate of about one every other year. But parting with them is hard, so he puts them into short-term rental pools for the vacation market in Fredericksburg and, more recently, in Port Aransas on the Gulf Coast.

Herein may be the secret to building a spec home to sell or lease: Crafting beautifully designed houses that you'd be happy to live in yourself has a tendency to resonate with buyers on an emotional and practical level.

Craig left Texas to work at large-scale architectural firms in Chicago and Los Angeles, eventually returning to his home state to work at Lake | Flato Architects, where he learned something that often isn't taught in architecture school: how to design homes that fit with place. "It took me a while to understand how to let the land inspire architecture," Craig says. "I thought I was going to be fired every other month. They had to beat it into me. I was of the world that you move the mountain to put your house where you want it."

The lesson may have been difficult to learn, but it has stuck. Craig started his own firm, Craig McMahon Architects, and began building houses with roots deep in the Texas Hill Country soil, inspired by the area's German pioneers as well as by old Texas agricultural buildings. The result: a soft-edged contemporary industrial vibe. McMahon's homes of wood, stone, and steel hug the hills and offer large expanses of glass protected from the sun by deep overhangs and thoughtful siting—he's a stickler for siting to minimize the impact of heat and cold in the region's sometimes-harsh environment.

For passive cooling, Craig designs for breezeways through the main rooms of his houses, angled to take advantage of prevailing breezes. Open-foam insulation seals the homes, essentially turning them into coolers and creating a bug barrier. His next home building experiment will involve building small homes that are both space- and energy-efficient.

Though Cavan's path to becoming a home builder was different, it also brought him back to the same spot as his brother. After college, Cavan returned to the family concrete business in Big Springs, Texas, until it was sold in 2003. Then he took his family off to live on a sailboat in the Caribbean, until a hurricane hit and he moved his family back to Texas.

Cavan's business, Half Inch of Water Studios (taken from a line in a John Prine song), is based in Fredericksburg, Texas. His homes are handcrafted and experimental; they're the work of an artist who uses homes as his medium. He makes a living by sharing them with others through the market for short-term rentals of

Surf Betty, on the Texas Gulf Coast, was designed and built by Cavan McMahon of Half Inch of Water Studios. The home's design allows for natural ventilation and the play of shadow and light.



unique homes in places people want to visit. Worth pursuing, say the brothers, are home shares such as VRBO and Airbnb that are attracting tourists who want to stay in a small, cool modern home in a distinctive place, Craig says. "Location is key here. We spend more on lots and houses in specific areas where the demand for them is high."

Cavan conceives of his homes as sculptures, evident in Surf Betty, a house he built in Port Aransas on the Gulf of Mexico. The house is a series of simple forms sited so the sun creates ever-changing patterns throughout the day. He builds complex forms for concrete, sometimes wetting the wood to bring out the grain so it will leave its imprint, creating the look of wood. Cavan builds all of the interior accents in his homes, too, often with materials left over from other jobsites. His photography hangs in Surf Betty.

The brothers' collaboration is so organic that they don't really think much about it. Whenever a client is looking for something special for a home, especially in concrete or steel, Craig refers the client to Cavan, whose training and time in the family concrete business have given him a deep understanding of construction and skills that elevate his concrete creations in homes to art. As may be expected of brothers, Craig and Cavan help each other problem-solve while engaging in the kind of good-natured fraternal competition that raises the bar for them both. CB

Teresa Burney writes about business, home building, design, real estate, and development.



PHOTOS: CRAIG MCMAHON



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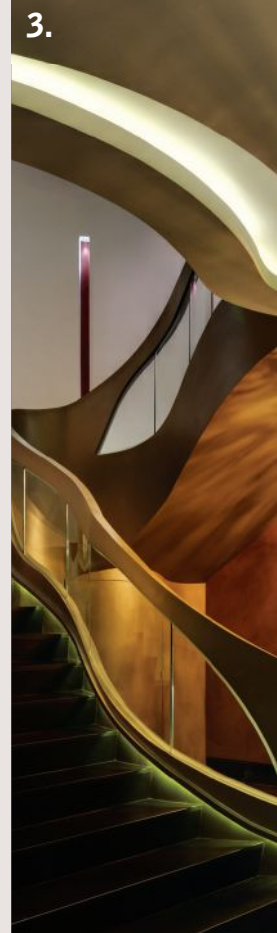


design spotlight: ceilings



Richard Landry, AIA
LANDRY DESIGN GROUP,
LOS ANGELES

While beautifully designed ceilings can add a lot of interest to a room, most architects don't pay them enough attention, instead focusing more on the walls and on floor patterns. Ceilings not only lend scale to a room, they can be dropped or raised to achieve the correct volume and are often the source of light. 1) RGB color panels can read as single or multicolored and can be altered to the rhythm of music. 2) The barrel ceiling divides this large kitchen into three panels to break down the scale of the room. 3) Curves in this basement recreation room enabled us to create lighting effects to counterbalance the angular exterior of this contemporary house.



Christine L. Albertsson, AIA, CID, NCARB
ALBERTSSON HANSEN ARCHITECTURE, MINNEAPOLIS

We spend a lot of time considering how the ceiling plane sets the spirit of a space in motion; much of that task has to do with control of the scale. How high is it? Is it flat or sloped? Even a low, flat ceiling less than 8 feet high can have a grander feel if it has beams and wood paneling to express the structure. In our work, we always try to have a clearly defined ceiling between spaces. When logical and clear edges are given to the ceiling, it allows an open floor plan to feel far more under control. To accomplish this, we often add a wide cased opening between spaces to create the boundary of a room.

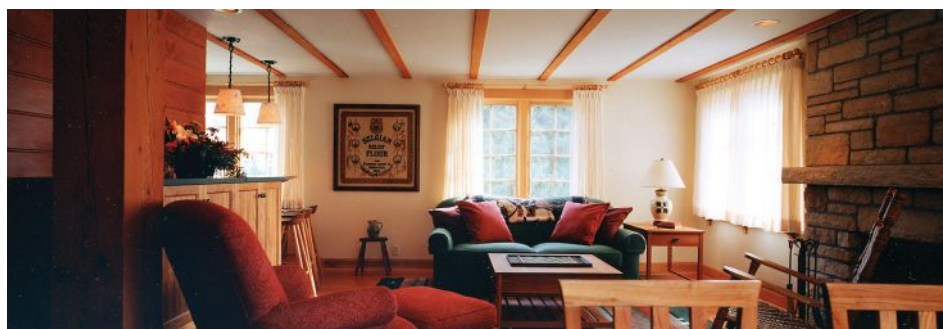


PHOTO: PETER BASTIANELLI-KERZE





PHOTOS: ERHARD PFEIFFER



PHOTO: MORGAN SHEFF



PHOTO: DANA WHEELLOCK

Patrick Ahearn, FAIA

PATRICK AHEARN ARCHITECT, BOSTON

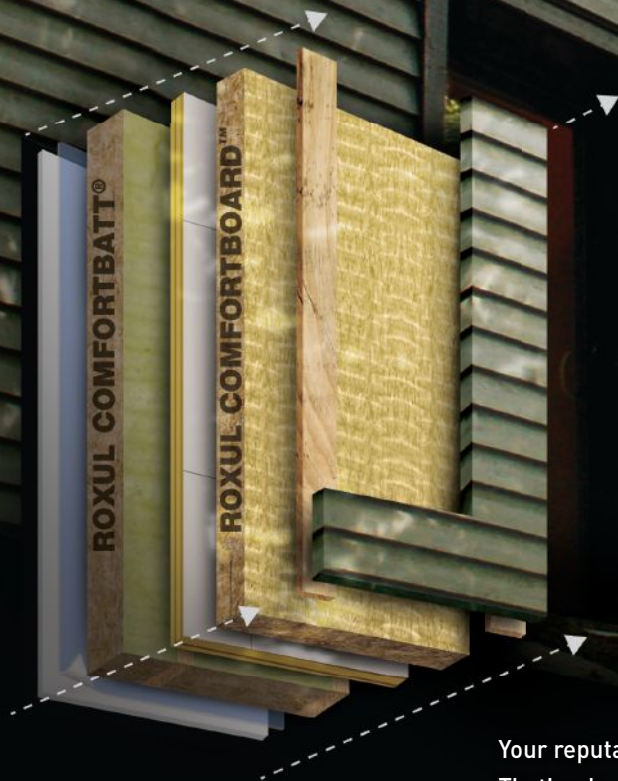


Reclaimed wood beams are a wonderful material to add warmth and character to a space. The imperfections of the wood tell a story of its previous journey, further enhancing the historical feel of the home. White beadboard provides texture and character versus a simple plastered ceiling. 1) These beams frame the shape of the ceiling for a structured appearance. 2) The antique beam inserted to the underside of a cased beam provides vertical depth. 3) The story-and-a-half space allows for design that appears to be more structural than decorative.



PHOTOS: GREG PREMUR

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2. Jobsite Tech Bag

Milwaukee's newest addition to its Storage Solutions line is the Jobsite Tech Bag. Designed to provide ample secure storage for tools and technology while on the jobsite, the bag is constructed of 1,680 denier ballistic material with heavy-duty zippers and a hard molded base for added durability. The Jobsite Tech Bag has a secure place for storing laptops and tablets and comes with an integrated rain fly that covers the laptop pocket and main tool compartment. There are 53 pockets for tool storage, including a dedicated puncture-resistant pocket for sharp tools. **For more information, circle No. 801**

3. Garbage Disposals

Moen has introduced a new line of garbage disposals consisting of seven models that range from 1/3 hp to 1 hp. All Moen disposals feature Vortex permanent magnet motor technology to quickly grind food scraps. High revolutions per minute help reduce jamming, and SoundShield insulation aids in deadening sound levels while the disposal is in use. The disposals offer simple installation thanks to the Universal Xpress Mount that fits all Moen and most existing three-bolt garbage disposal mounting assemblies. **For more information, circle No. 802**

4. Refrigerator

Refrigeration products in Viking's new Professional 7 Series have temperature and humidity controls that purify the air. The feature, called Viking BlueZone Fresh Preservation Technology, preserves food better by ridding the fridge of hydrocarbons, ethylene, microbes, odors, and other contaminants, the company says. The 7 Series also has a ProChill Temperature Management System that quickly chills food and saves energy through two quiet, individually controlled variable-speed DC compressors. **For more information, circle No. 803**

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Marvin's Ultimate Multi-Slide Door has a new Sliding Door Automatic Control (SDAC) system that allows the doors to be opened and closed from a distance via a wall switch or remote control. The automated option works with extremely large size doors: up to 47 feet wide and 11 feet high on the bi-parting configuration, and up to 39 feet wide and 11 feet high on the unidirectional. The SDAC runs on a 100-volt motor and has a battery-powered wireless motion sensor. The wall switch comes in four colors: white, ivory, almond, or black. **For more information, circle No. 804**

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Handcrafted Homes
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new PRODUCTS

Smart Home System

Lutron has updated its Caséta Wireless smart home system line, adding compatible thermostats, new controls for in-wall and in-ceiling lights, and more ways to integrate the system with other connected home products. A new 1,000-watt dimmer works with incandescent and halogen bulbs as well as dimmable LEDs and CFLs. The Lutron Wireless Thermostat is powered by Honeywell and controllable by the Lutron App. Caséta Wireless also now works with Android Wear and the Comcast Xfinity Home app, and operates in tandem with Nest's Protect Smoke + CO Alarm. If Nest detects carbon monoxide, the lights will turn on and the shades will open, helping people in the house safely exit. **For more information, circle No. 805**



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Take one traditional Victorian home in the heart of Cambridge, Mass., add one steel trellis and a West Coast-inspired concrete terrace, and you get an East/West mash-up worthy of its own '90s rap battle in the form of Aamodt/Plumb Architects' Cambridge terrace project.

"It is a typical Victorian Cambridge home," says Mette Aamodt, partner at Aamodt/Plumb. "But one of the clients is originally from California and she wanted an indoor-outdoor living experience." This meant bringing a bit of the Golden State to the East Coast home.

Running above the length of the driveway like a carport, the trellis, which will eventually provide a thick canopy of vines for shade, is made of steel, offering a structure that's as durable and low-maintenance as it is

elegant. Concrete, common in residential construction in California but rarer in the Northeast, was used for the backyard terrace and built-in bench. The terrace acts as an extension of the dining room, which is connected to the area by large glass lift-and-slide doors.

The clients wanted to ensure that there was no space wasted. They don't own a car, so the driveway became a multipurpose space. Setting granite slabs reused from the previous driveway into pea gravel helps the area retain its intended use while doubling as a play space for kids. It also acts as a drywell.

The driveway's versatile design, the steel trellis with just the right amount of patina, the West Coast style terrace, and the traditional Victorian home combine to offer a unique fusion of architectural styles. —David Malone



PHOTOS: JANE MESSINGER

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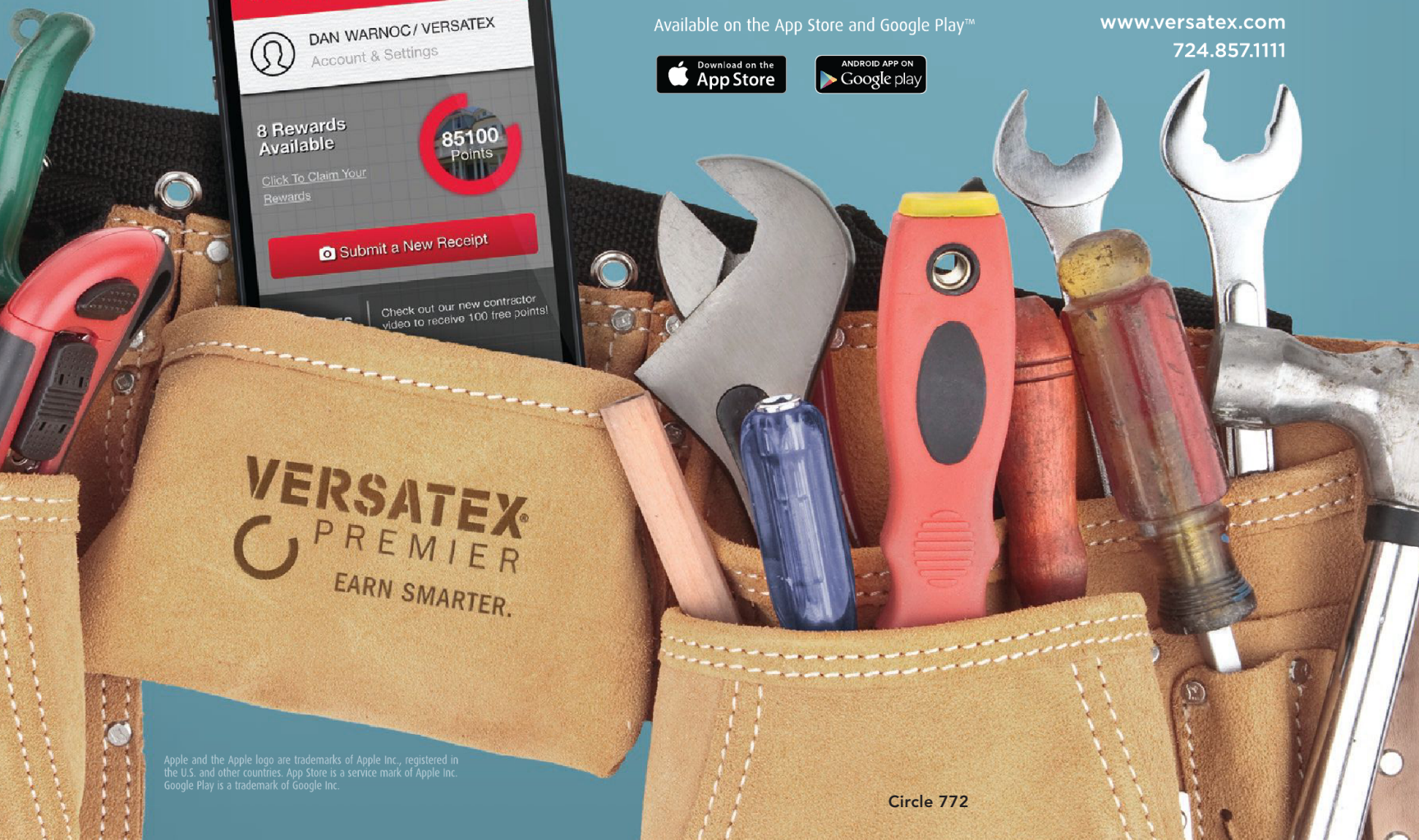
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