Affordable Design

The U.S. Department of Housing and Urban Development sponsors or cosponsors three annual competitions for innovation in affordable design. This Cityscape *department reports on the competitions and their winners. Each competition seeks to identify and develop new, forward-looking planning and design solutions for expanding or preserving affordable housing. Professional jurors determine the outcome of these competitions.*

2016 Innovation in Affordable Housing Student Design and Planning Competition: Monteria Village, Santa Barbara, California

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Winning Team: University of Texas at Austin
Brett Clark, Brianna Garner-Frey, Tatum Lau, Megan Recher, and Sarah Simpson

Runner-Up Team: University of Maryland, College Park
Nicole Akpedeye, David Brothman, Robert Grooms, Meghan Leahy, and Oluwatobi Thomas

The Jury
Eliza Edelsberg Datta, James Bowman, Anne Torney, Thomas Vaccaro, and Michael Ruane

Concluding Remarks: What Constitutes Innovative Design?
Bill Zoeller, registered architect, Steven Winter Associates

Introduction

Regina Gray

The Innovation in Affordable Housing (IAH) Student Design and Planning Competition, now entering its fourth year of competition, invites teams of graduate students from multiple disciplines

to submit plans in response to an affordable housing design issue of an existing home or residential building. The goals of the competition are to encourage research and innovation in high-quality affordable housing that strengthens the social and physical fabric of low- and moderate-income communities and to foster crosscutting teamwork within the design and community development process. This article includes notes about the challenges, solutions, and lessons learned by the first- and second-place student teams in 2016; the thoughts of the jury regarding how to recognize innovation in housing design; and the thoughts of an architect who helped the U.S. Department of Housing and Urban Development (HUD) structure the competition on the definition of innovation in affordable design and its importance.

The IAH Student Design and Planning Competition is open to graduate students in architecture, planning and policy, finance, and other disciplines. The competition challenges the students to address social, economic, and environmental issues in responding to a specific housing problem developed by a public housing agency.

HUD partnered with the Housing Authority of the City of Santa Barbara (HACSB) to develop the 2016 challenge—to incorporate innovative design techniques to improve the quality of family housing at a site called Monteria Village. HACSB was interested in proposals for either gut rehabilitation (deep energy retrofit plus new amenities) of the existing buildings or new construction. The secondary interest of HACSB was to incorporate the provision of social amenities for the residents into the solution.

Monteria Village is a 56-unit multifamily housing development built in 1973. The students' task for the 2016 competition was to develop a site plan to improve and expand realistic, high-quality housing options for families living in the development. The students also had to account for the social and environmental needs of the residents, local zoning restrictions, and leveraging opportunities. To foster multidisciplinary efforts, teams were required to submit proposals that embodied innovative approaches in five general elements of design: (1) planning context and analysis, (2) building solutions and technology, (3) community development solutions, (4) site-specific illustrations of new development or redevelopment, and (5) schedule and finances.

The competition is designed in two phases. During phase I, a jury of five practitioners, planners, and architects evaluated first-round proposals, which teams from approximately 30 universities submitted electronically. From these submissions, the jury selected four finalist teams. During phase II, finalists further refined their plans—addressing complex issues, incorporating more detail, improving floor plans, and conducting additional analyses following the site visit to Monteria Village. The site visit enabled the finalists to expand on their original proposal and submit a revised final project. Several weeks after the site visit, all jurors and finalists traveled to Washington, D.C., for the final competition and awards ceremony event at HUD Headquarters on April 19, 2016. At this event, finalist teams presented their revised project solutions in front of the jury and an audience. Following the presentations, the jury selected the team from the University of Texas at Austin as the winner and the team from the University of Maryland, College Park, as the runner-up.

In the remainder of this article, the winning student teams, the jurors, and an architect share their thoughts about the competition. The students reflect on the biggest challenges the team faced and how they attempted to address them, opportunities to learn from mistakes, ideas of what *innovation* is, elements observed that provided value to the design of the project, and any tradeoffs that had to

be made to get a feasible site plan. Jurors share the elements of the winning site plans that represented innovative solutions and address whether the proposed solutions could be implemented at Monteria Village and possibly replicated at similarly situated sites. Finally, an architect from Steven Winter Associates offers lessons on what constitutes innovative design.

The Winning Team: University of Texas at Austin

Brett Clark, Brianna Garner-Frey, Tatum Lau, Megan Recher, and Sarah Simpson

The award-winning site plan from the University of Texas at Austin, called *Meet Monteria*, is a plan for new construction totaling $17 million. It features an updated functional space for the existing Family Opportunity Center and includes an education center that will be developed in partnership with Santa Barbara City College, a nearby community college. The new design emphasizes social interaction, expanded open space for a playground and recreation, and a common area where residents can gather. Also noteworthy is the integrated purification system that reuses gray water and stormwater runoff.

The student team's reflections on the competition experience follow.

What does innovation in affordable housing look like? Our team pondered this question throughout our participation in the IAH competition, ultimately coming to understand that innovation is less about invention and more about integrating existing aspects of living with design in thoughtful ways to improve on current conditions. So, we started with our country's roots in affordable housing and, after reviewing the trajectory of public housing the United States, we found a general absence or undervaluation of social capital within affordable housing communities and also the lack of integration into the larger community. Thus, the building of social capital became central to our understanding of innovation along with the integration of timely, localized opportunities available in Santa Barbara, such as those tied to learning and low-impact design.

Within Santa Barbara, our team found a multitude of social and spatial issues to tap into to contribute to an innovative solution, and, ultimately, our biggest challenge was prioritizing which aspects to resolve to the highest detail in a short amount of time. Developing three core values of (1) 21st century family, (2) lifelong education, and (3) holistic sustainability to ensure that every aspect of design worked toward achieving our goals and helped us overcome this hurdle and pushed us to think broadly in our search for integrative design solutions. For instance, to address the changing nature of the American family, we emphasized flexible unit design for all the housing units in the development, which would accommodate extended family members—a challenge that Monteria Village faces.

These same core values also helped direct each of our team members to different research directions, opening up opportunities to gather information and pull from different areas of planning, design, and finance. Our team members represented five different fields of expertise—planning, sustainability, architecture, urban design, and business—so we already brought an extensive set of skills to the table, but we were able to branch out even further under a guiding social concept. Our varied backgrounds contributed to team learning about many different aspects of sustainability in a relatively short amount of time, including opportunities to enhance access to local transportation; to increase human interaction and social capital, using existing community assets, such as the public garden; and to educate the community about how to reduce energy and utility consumption in buildings.
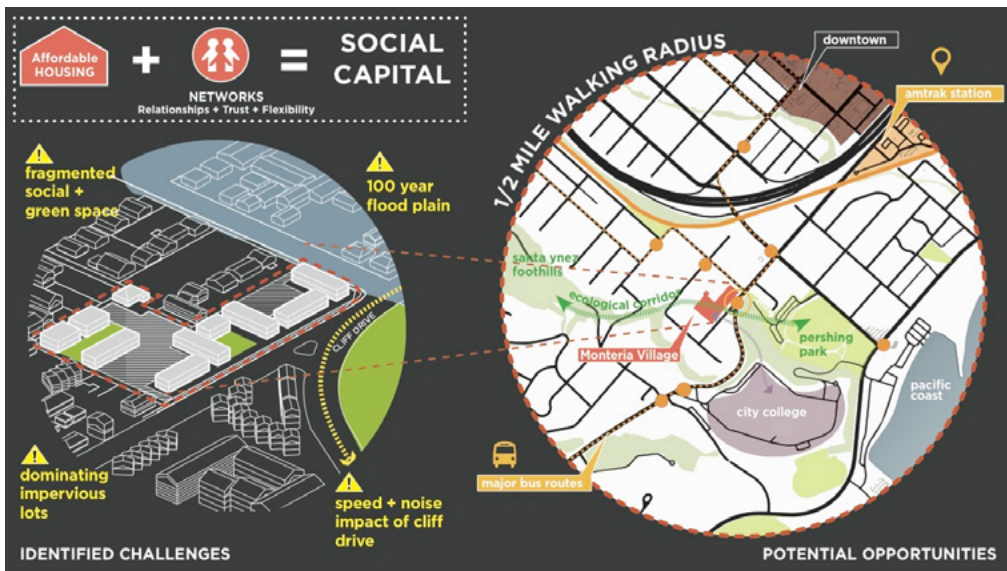
At the same time, in thinking holistically at the broad conceptual level, our team had to make various tradeoffs, the most notable of which was sacrificing a certain level of detail to ensure the big ideas were incorporated into every aspect of the design. We were constantly negotiating the level of detail necessary to bring resolution to our ideas and asking what pieces of information deserved space in our submission limits. We ultimately decided that, to preserve income and minimize displacement of the residents, the project should be developed into phases. We also tried variations in site configuration to accommodate the 65 total affordable housing units while also preserving open space for recreation and resident interaction.

Parallel to our design strategy was the development of financial innovation. The competition asked teams to simulate the Rental Assistance Demonstration (RAD) program[1] and to also simulate other funding sources that would strengthen our proposal. Coming to understand the potential impact of the availability of the low-income housing tax credit (LIHTC) and RAD funding on the housing crisis by providing more secure funding to affordable housing associations was interesting for our team, so we also proposed the use of $4.2 million in tax credits to fund 80 percent of the total project costs. Over the course of the competition, however, we learned that 9-percent LIHTC funding is very competitive to achieve and realized too late that other funding strategies also should have been investigated should we be unable to secure the 9-percent LIHTC.

Nevertheless, the use of sustainable technologies, such as onsite solar energy production and storm and domestic water reuse to decrease typical lifetime operating costs, was the most exciting potential funding strategy our team realized. With our proposed rooftop solar and water cycling design, we estimated that daily operating costs could be more than cut in half, having a major impact on both the residents and HACSB's lifelong utility burden.

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[1] HACSB currently owns and operates the property, which will be converted to a RAD property.
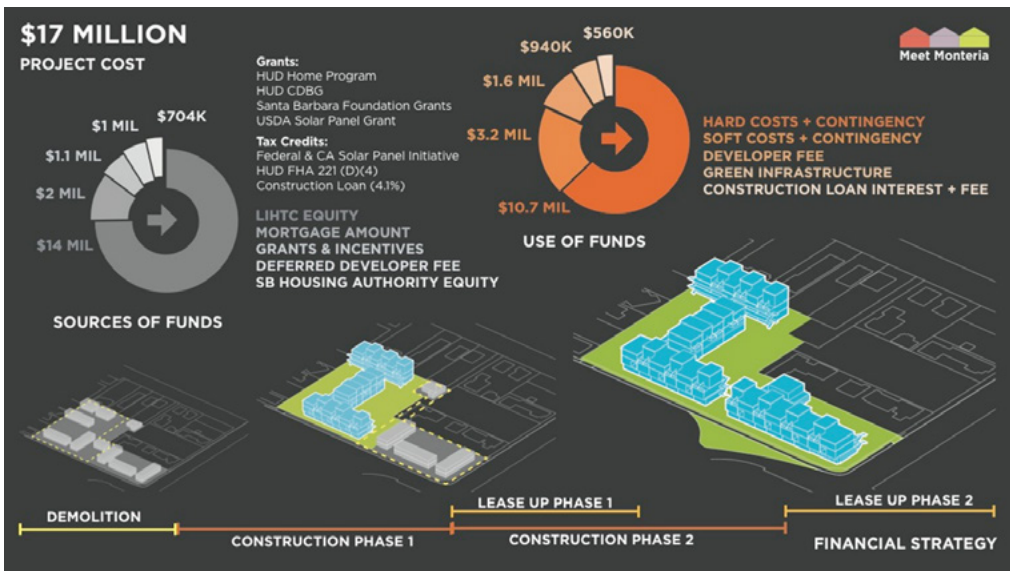
The Runner-Up Team: University of Maryland, College Park

Nicole Akpedeye, David Brothman, Robert Grooms, Meghan Leahy, and Oluwatobi Thomas

The runner-up team from the University of Maryland, College Park, also presented a plan for new construction on the site. The plan emphasizes energy-efficient, durable materials that would be incorporated into site buildings. To reduce operating and maintenance costs, the team proposed a passive cooling system that features the use of clerestory roof and windows that remove heat

during summer, reducing the need for air conditioning in Santa Barbara's hot climate. The jury seemed most impressed with the green roofs that would be integrated in all eight Monteria Village residential buildings. Each townhome unit includes a palate wall for plants and herbs. A two-pronged approach to financing the project using either 9- or 4-percent LIHTC funds, combined with other grant funding, allowed the students more flexibility in addressing the site's specific challenge of expanding affordable housing options for families living on site.

The Maryland student team's reflections on the competition experiences follow.

One of the biggest challenges we initially faced was our lack of familiarity with the Santa Barbara site and our clients—the residents. Designing for a group of people without knowing their exact needs left us with the challenge of forming our strategy based purely on Internet research. Some of the ways in which we design for housing on the east coast simply do not apply to a project in Santa Barbara. For example, geothermal heating systems—and heating, ventilation, and air-conditioning systems in general—were unnecessary for this assignment. This unfamiliarity with the region prompted us to think outside the box, however, ultimately leading to our incorporation of an aquaponics system and individual growing screens for each resident's unit. We designed new retail space for the co-op and café that would attract residents of all ages and the larger public. We included a bike-share and carpool program that would allow for less reliance on automobiles and reduce neighborhood traffic, further enhancing the safety of the residents. We also incorporated defensive space principles into the site design.

Our team settled on some tradeoffs in response to challenges encountered during the development of project plans. For example, we faced the question of how to address the incorporation of a sustainable lifestyle while having to meet such a high parking demand. The question boiled down to this: *Do we maximize the number of units and decrease parking, or do we accommodate a larger parking ratio by building fewer units?* To compromise, we increased the parking ratio to a level higher than our initial submission but also added sustainable alternatives to driving, such as a bike-share depot on the ground floor of our multifamily building. Cars and our reliance on them are a reality that cannot be ignored, and yet we all wanted to push the housing trend toward using alternative modes of transportation. This back-and-forth between choices led to countless passionate discussions within our team.

The financial modeling required for this competition was a complicated but rewarding learning experience. We leveraged the fact that four out of our five team members were students in the Real Estate Development program; thus, many of us had been introduced to the process of creating pro formas. We still had much to learn, however, about financing an affordable housing deal. With help from our faculty advisor and many sleepless nights researching the nuances of tax credit financing, we ended up with a feasible plan to finance the project using a combination of tax credits and other sources of funding, including grants and bond options from local and state governments. An alternative approach would be to pursue debt financing at 56 percent of the cost and secure a Federal Housing Administration 221(d) construction loan if the tax credit financing proved unfeasible.

Thoughts From the Jury

Eliza Edelsberg Datta, James Bowman, Anne Torney, Thomas Vaccaro, and Michael Ruane

The jury for the 2016 IAH Student Design and Planning Competition faced the difficult task of deciding which of the four outstanding student site plans best exemplified an innovative design. The members were asked specifically to consider how well the student teams successfully and convincingly addressed the following critical elements:

- The aspects of the site design that are innovative but that meet the needs of low-income families.

- The way in which the proposed design interacts with the existing physical site.

- The innovative approaches that were employed in developing the design relative to the restrictions or opportunities presented by the site.

- The innovative energy efficiency, water conservation, and renewable energy strategies that were incorporated into the design.

- The innovative approaches that were employed to integrate the design that complements the existing cultural and ethnic neighborhood context.

- The planned services and activities designed to improve the quality of life for the population served.[2]

- The way in which the project will be financed, including the innovative financing solutions for leveraging and establishing partnerships.

- The way in which the proposed design integrates innovative practices.

After eliminating two of the four presentations, the jurors emphasized that the deciding factor would be how well the student teams identified and discussed innovation in their site plans. Although understanding neighborhood context and the needs of the residents is important, the concept of innovation would be greatly emphasized here. After narrowing the competition down to the University of Texas team and the University of Maryland team, the jury set about identifying elements of the site plans they thought were particularly innovative while keeping an eye on the critical elements listed previously.

Defining innovative design was not an easy task, but the discussions offered some insight into what they thought captured the essence of what innovation is: Is the design element new or groundbreaking? Is the approach to problemsolving something that is untried or unexpected? Is the design concept "out of the box," defying or challenging generally accepted techniques? Does the approach introduce a new and creative technology that is functional and applicable to human needs?

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[2] For example, the Monteria Village site currently includes a separate one-story building, which houses the Family Opportunity Center (FOC) where various activities for youth and adults are held. As part of the overall program, HACSB desires that the present onsite FOC be expanded or replaced to meet an additional set of activity requirements. This change to the FOC ideally would include a two-story building with the lower-level space for youth programs and childcare for parents attending workshops and the upper-level space for young adult and adult programs. HACSB also requested two small 2nd-floor offices; a full kitchen; toilet rooms; storage for equipment, tables, and chairs; an outdoor youth garden with a contiguous outdoor play area; and two staff parking spaces.

The University of Maryland team's submission highlighted the use of aquaponics as the example of an innovative design and as a solution for preserving water resources in the community. Other standout innovative features that members of the jury noted were the incorporation of retail as a community attraction and the greening of the existing buildings to promote an environmentally friendly ethos. The jurors similarly identified various aspects of the University of Texas team plan that were particularly impressive: incorporating a traffic island; creatively using public space by reducing parking and increasing density; combining units, where feasible, to acknowledge extended family settings; and making effective use of existing buildings and infrastructure, such as the FOC. The jurors noted that the University of Texas team placed a high value on the importance of enhancing social capital through creative use of space that respects the cultural norms of a community. This approach was the deciding factor in selecting the University of Texas team as the winner of the competition.

Concluding Remarks: What Constitutes Innovative Design?

Bill Zoeller

To discuss the application of a theoretical concept—in this case, innovative design—we must first define the meaning of "innovation."

Innovation has three basic definitions: (1) a new idea, device, or method; (2) the act or process of introducing new ideas, devices, or methods; and the process of translating an idea or invention into a good or service that increases value. Innovation must be mission oriented, with an objective of improvement. In other words, innovation is an idea with a job to do.

It is interesting that the root term *novation* was a 13th century legal term meaning to renew a contract—essentially, to do the same thing over again. *In*novation is the opposite—that is, to do something new or different.

The two types of innovation are *disruptive* and *incremental*.

Disruptive, or radical, innovation figuratively upsets the apple cart and is market shattering. A prime example of this type of innovation is the advent of digital photography. Invented by a young engineer at Eastman Kodak in 1975, the technology went through a series of research and development (R&D) improvements for more than a decade, but it was never allowed to come to market for fear of undermining Kodak's dominant camera film business. Other companies eventually caught up in the digital revolution, but, for Kodak, the business focus turn came too late, forcing the once dominant company to file for bankruptcy in 2012.

Disruptive innovation is often marked by the inferiority of its initial prototypes compared with the product that it would supplant. For example, the first digital camera was black and white, low resolution, not cost effective, and not nearly as good as a roll of Kodachrome in a Nikon single-lens reflex or Kodak Instamatic camera.

Incremental innovations, on the other hand, move from an established point in technology development to a place a notch above. Incremental innovations typically occur in small steps and

may be the result of an R&D effort to improve something, or an incremental innovation may be an aha! moment in which the idea presents itself to the observer who then connects the insight to the existing condition, resulting in the improvement.

Innovative building design is nearly always incremental. We start with a known condition (a site, a design program, zoning and code restrictions, a budget) and set out to produce a design solution that meets all the project's objectives while improving on one or more aspects of the built solution's performance. We cannot accept the initial lower-performance outcomes typified by disruptive innovation. The client, specifically, and society, in general, have expectations of building design professionals, which we are obligated to meet and exceed. We exceed those expectations through incremental innovation: taking a known and applying an idea that has the objective of improvement. As such, innovative design is not an end point, solution, or product. It is a process that happens when problemsolving analysis is applied to every element of the planner's problem.

The starting point for innovative design is deconstructing the design program and the owner's objectives for the project. What is it exactly we are attempting to accomplish? What are the performance attributes we wish to improve? Starting with the broad concepts, we must question preconceived notions and standard practices. How can we improve durability, reduce energy consumption, improve resource utilization, improve indoor environmental quality, reduce environmental impact, increase community integration, increase density, improve residents' quality of life, all while reducing first cost? By analyzing and deconstructing the problem statement and by asking the insightful questions, we place ourselves in a position to uncover, develop, and deploy innovative solutions. It is this journey that constitutes innovative design.

Acknowledgments

Postscript

The competition is thoroughly documented on the web.

To learn more about the award: huduser.gov/portal/challenge/about.html.

To read about the 2016 award guidelines: huduser.gov/portal/challenge/past_competitions.html#2016.

To learn more detail about the winning submissions: huduser.gov/portal/challenge/home.html.