

MARKPET POTENTIAL



U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON



Our H₂O use. Our Water Use.

UC DAVIS

Market Potential Jury Narrative

Tom Ryan

Staff Project Manager
tomryan@ucdavis.edu

Brooke Carey

Student Project Manager
becarey@ucdavis.edu

Geoffrey Mangalam

Student Project Manager
gmmangalam@ucdavis.edu

Our Story

With its second entry into the Department of Energy Solar Decathlon, the University of California at Davis (UC Davis) is proud to continue its history of student-driven engineering and design with its new team name: the Blue Mustangs. Since its inaugural entry in Solar Decathlon 2015, UC Davis has capitalized on the project as an opportunity for students to explore designs that can address a need. For the agriculturally-focused UC Davis, the lack of suitable housing for migrant farmworkers was a social and environmental problem that felt close to home. To address this problem, the 2015 entry "Aggie Sol" presented below market-rate Zero Net Energy (ZNE) housing, featuring night-time radiant cooling via rooftop sprinklers and a purpose-built floorplan catered to low-income agricultural workers. For the 2017 home, defining the problem scope and determining how the Blue Mustangs could address the problem would be the starting point. Amid a severe drought in California in 2015, the problem seemed obvious, but refining the problem scope and how to tackle such a problem was an extensive and iterative process. Eventually, "Our H₂Ouse" (pronounced "Our House") arose. Similar to the UC Davis 2015 entry, we continue the philosophy of addressing environmental and social needs. Our H₂Ouse balances innovative and experimental systems with a simple and adaptable implementation designed around our three pillars: to be drought-resilient, educational, and inclusive.

Our State

California has the largest population in the United States as well as the largest agricultural output^{1,2}. As such, there are concerns regarding sustainable and renewable sources of water and energy. This plethora of people, animals, plants and machines can require anywhere from 50-100 million acre-feet of water annually³. To sustain such high levels of organic and inorganic activity, California produces the second largest carbon footprint in the U.S.; however, California's per-capita emissions are the third lowest in the nation^{3,4}. The state's acres of fertile soil, fields of oil, and other abundant natural resources have caused Californian officials to seriously reflect upon how to protect and maintain these environments. Today, widespread support from almost all sectors of government and society have brought about rapid funding and development of renewable energy production, advanced water management and treatment systems, as well as the call for everyone and everything in the state to operate at heightened levels of efficiency and conservation. Although the environmental burden of California is high, its low per-capita emissions is a testament to the cognizant and progressive nature of Californian residents. Although California continues to lead standards and innovations in terms of environmental and technological platforms, to maintain the Californian lifestyle, the status quo in California must evolve to meet the challenges of the future. The success of these initiatives and mandates are evident: California residents have repeatedly weathered years of severe drought while maintaining per capita electricity use almost constantly for the past 40 years⁷, all while experiencing one of the highest population growth rates in the world⁸. It is with this history and at this pivotal moment that UC Davis has developed Our H₂Ouse as a model residential solution to help combat these issues at home.

Our Government

Though Governor Jerry Brown of California announced the "end of the drought" this past April, California's water and energy struggles are far from over. The cyclical nature of drought events in California, paired with the continued growth and development of the state's population and cities, has created a pressing need for sustainable, renewable water and energy management. In the past 5 years, numerous state government initiatives including Title 2030⁹ and the Sustainable Ground Water Management Act¹⁰ have responded to these looming issues by setting long-term goals for reduction of water and energy use, as well as the promotion of renewable energy and water management. Many other initiatives involve increases in resource efficiency within the residential sector which exert some of the smallest sectoral consumption rates but have great potential for effective conservation strategies^{5,6}. Commonly cited methods to attain these greater efficiencies include increasing the collection and distribution of water and energy use data to stakeholders in engaging and straightforward ways, and restructuring the format and communication of tiered price and tax rate schemes^{13,14,15}. Perhaps the initiative of greatest relevance is the California Energy Commission's (CEC's) incredibly ambitious goal for 100% of new homes to be ZNE by 2020¹⁶. Along with this announcement, the CEC published a comprehensive plan to overcome diverse barriers such as lack of grid infrastructure and distribution, and lack of ZNE-related education and training. The CEC also clarified relevant regulations, policies, incentives and codes. The undertaking of this plan has resulted in substantial research and development, as well as new political mandates such as AB-327, which allows for increases in net metering¹⁷. To encourage the development necessary to reach such goals, state government organizations have also started numerous programs to promote, subsidize, or mandate more conservative behavior and technology utilization by people, organizations, and cities^{11,12}. The water and energy systems within Our H₂Ouse have many specifications and features that are called for or recommended within these programs, often eclipsing the base requirements. It is likely that this incredible surge of support from state government, NGOs, and local companies will do much (but not all) to overcome the economic and social challenges presented by the state's diverse population.

Our Society

Although the total environmental burden California places on the US is high, the low per-capita emissions are a testament to the cognizant and progressive nature of Californian residents. Californians demonstrate recognition of the importance of sustainable living practices, but the status quo must expand to meet the constraints of the future. Due to improvements in communication by government entities and utility companies, Californians are becoming increasingly aware of the impact their water and energy use has on the community, the environment, and their bank account. In addition, many green industry marketing campaigns have made sustainable technologies and lifestyles seem trendy and attractive, with many large California-based companies such as Tesla and Google producing and pledging support for green technologies and renewable water and energy. As such, the desire to minimize environmental impact is growing, but home buyers want to contribute to sustainability without sacrificing their quality of life and comfort. Leading by example, Our H₂Ouse is a confirmation to the public that a conservative and efficient lifestyle does not have to come at a cost, and that peak residential sustainability relies not just on the home, but also the occupant.

Our Vision

Recognizing the water and energy problems plaguing California, the Blue Mustangs developed Our H₂Ouse to create feasible and desirable homes using California-specific strategies. This house is an inclusive, drought resilient home, and provides salient information feedback for its residents. While Our H₂Ouse displays new and innovative technology it also works hand-in-hand with current technologies.

Our H₂Ouse addresses the most pervasive and unpredictable factor in energy and water savings: user behavior. The virtually untapped resource of user behavior modification can exploit the efficacy of “smart” technologies by modifying the user inputs associated with such technologies, thus bridging the gap between the potential water/energy savings and the realized water/energy savings. Addressing this resource reduction for one home through user behavior requires motivation through education and salient reminders that facilitate long-term lifestyle changes, but to truly impact reduction — reduction that reaches beyond one home and begins to address a growing problem — there must be statewide collective action. Because Our H₂Ouse has been designed to support a wide-range of housing applications, it is the hope of UC Davis students and faculty that Our H₂Ouse can continue to promote educational, inclusive, and drought-resilient residential development while to decrease the environmental impact of the residential sector.

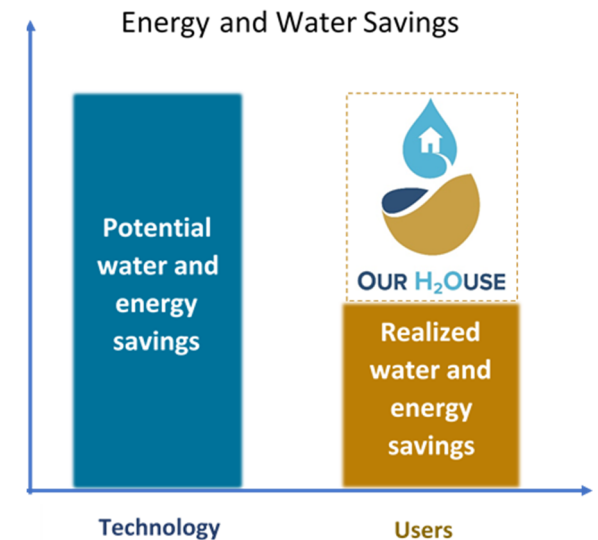


Figure 1: Our H₂Ouse bridges the gap between potential and realized water/energy savings by addressing the user in addition to just the technology

Our H₂Ouse

Overview

Both the design and engineering of Our H₂Ouse respond to current economic, political, environmental and social trends found in California. These indicators suggest that within many areas of California there is a great need for a house that:

1. Treats water efficiency at (at least) the same level that energy efficiency is afforded in ZNE homes;
2. Increases the monitoring, (dis)aggregation, analysis and sharing of water and energy use data between stakeholders; and
3. Provides a widely adaptable, and distributable template for a house that is easy and efficient to build, transport, and operate.

The three founding design pillars of Our H₂Ouse directly correlate to these desires: water efficiency, education, and inclusiveness. As such, the three founding design pillars of Our H₂Ouse directly correlate to these desires, culminating in a drought resilient, educational, and inclusive home.



Our H₂Ouse responds to California drought events with water efficient technology, drought-tolerant landscaping,



Our H₂Ouse educates occupants through feedback mechanisms salient systems, and



Our H₂Ouse is feasible for a wide range of residents, with full ADA accessibility, low-cost solutions. and reconfigurable

These pillars make Our H₂Ouse especially unique in both standard housing markets as well as ZNE markets, as the ZNE market still caters to primarily affluent areas. Allowing only individuals who are willing to personally shoulder the significant investments for green technologies severely limits the societal benefits that arise from collective action. However, based off the results of studies done to determine the feasibility of reaching California's goal of 100% ZNE for all new homes by 2020, subsidies by government and utility companies will begin to allow for the availability of ZNE homes to previously inaccessible markets. Our H₂Ouse is in-line with this initiative, as it is a compact ZNE home that looks to reduce the initial economic burden that it places upon new home buyers. Although it does possess new, innovative technologies, these features provide long term cost saving strategies by reducing energy and water bills, as well providing sustainability benefits that help maintain resale value and make the home valuable and attractive to own long into the future. Rather than abandoning concepts such as widespread affordability, feasibility, and accessibility, as is often the case with ZNE home construction, Our H₂Ouse encompasses these goals while still providing technologically advanced and ultra-efficient avenues towards long term sustainable lifestyles.

Our Market

Market Description

Our H₂Ouse features an adaptable and reconfigurable floor plan with a universally appealing open design and full ADA-accessibility. Its industrial, modern-rustic aesthetic design and versatile, trailer-mounted building structure is suitable for both urban and rural locations. This adaptable home targets the real estate markets of Sacramento (urban) and Yolo (rural) counties where the local environment, government, and majority population conform to the trends which feed our three pillars to be: drought-resilient, educational, and inclusive. As the state capitol, Sacramento is ground-zero for the implementation of all recent legislation aimed at increasing water and energy efficiency standards. Yolo County lies in direct proximity to Sacramento County, and is also home to UC Davis, a public university which houses the United States' largest planned ZNE community, and which has received numerous accolades for its innovation and utilization of green technology, including being ranked the most sustainable university in the world¹⁸. The home buying market in these two counties is poised to offer a strong demand in the foreseeable future, driven by local economic growth and development, and the emigration of Bay Area residents^{19,20}. Many of the buyers driving this demand are millennials (Generation Y) and individuals in Generation X. In addition to its captivating design and distinctive innovations, Our H₂Ouse has unique features and dynamic materials which allow it to be a "green home" that our buyers can afford. Motion triggered recessed circadian LED floor lighting lends a modern, yet cost-conservative touch to Our H₂Ouse, and the walls' near stud-less bamboo panels bestow long-term energy and economic savings. Our H₂Ouse's single wet module helps reduce heat losses and cost from hot water lines, and the external drip irrigation is more reliable, low-cost, and efficient than the substantial amounts of plastic pipe and emitters used in other irrigation systems⁷. We've also taken into consideration that a significant component of a building's energy demand is attributed to air leakage through small cracks and gaps in the home, so we've chosen to augment Our H₂Ouse's thermally insulative properties with Aeroseal, a proven sealing technology with exciting potential to significantly reduce whole-house uncontrolled air intrusion. We have carefully chosen each feature of Our H₂Ouse for our buyers to feel comfortable in their new home, and for them to engage in sustainable living without the burden of unfeasible costs.

Target Market Summary:

Occupant Demographic	4 millennial UC Davis student renters
Monthly Rent/Occupant	\$1500
Location	Davis, CA
Housing format	Student relax/study hybrid
Occupancy	4

Occupant Demographic	Generation X-based family (2 parents + child)
Annual Combined Income	\$100,000
Location	Sacramento, CA
Housing format	Childproof family life
Occupancy	3

In both scenarios, the individuals living within the home are able to pay the fees associated with purchasing and/or living within Our H₂Ouse. A cost study conducted in May, 2017 showed median home prices in the Sacramento area at roughly \$319,000 dollars, which required a salary of roughly \$68,000 for a single purchaser²¹. This result shows that Our H₂Ouse is potentially viable in the current urban home target market, and made even more feasible and attractive by the fact that Our H₂Ouse features numerous features and technology that help reduce costs and consumption over time, such as greywater recycling, selling of excess produced solar energy, and EV vehicle charging. The result of economic analysis is similarly successful in rural Yolo County, where 30% of renter demand is for two bedroom homes with a monthly total fee of between \$1,425 to \$1,600²⁰. Demand is likely to increase as UC Davis invests more heavily in its Long Range Development Plan, a strategy that ultimately looks to substantially increase student and faculty housing, as well likely continued spill over from Bay Area transplants. ZNE housing market feasibility is also expected to increase due to the motivations of government and utility companies to reach their collaborative state wide goal of making all new homes ZNE by 2020, an initiative that will almost certainly require government market intervention in support of residential renewable energy production, storage and distribution. The features that make living in Our H₂Ouse water and energy efficient, educational, and inclusive are demonstrated by the lives of these two different societal scenarios. Although the times, usage, and space requirements differ for each example lifestyle, Our H₂Ouse is able to integrate diverse occupants in a comfortable and engaging lifestyle.

Livability: A case study of 4 UC Davis millennial student renters in rural Yolo County

The 4 millennial UC Davis students are Frank, Tom, Shahab, and Jiao. Frank is an early bird, likes to cook, but is a homebody and likes to study at home. Tom is an active materials science graduate student who also likes to cook and takes road cycling very seriously. Shahab is a transfer student from Iran studying structural engineering who is really into computer game programming and is a night owl. Jiao is a rowdy hydrology major from China who also enjoys doing simple arduino-based projects as a hobby. All the students live in the home as part of UC Davis's real-life Sustainable Living and Learning program, where sustainable practices and education are taught to participants in a more integrated lifestyle approach. Along with the 2015 Solar Decathlon entry "Aggie Sol", Our H₂Ouse forms the beginnings of a research-oriented water efficient, educational, and inclusive community.

Frank and Tom both get up early in the morning and make themselves a breakfast of potatoes and tomatoes grown in the home's raised bed vegetable garden. They are both able to easily navigate around each other while cooking and use counter space to stage cookware and ingredients. They occasionally bang a pot or pan, but the +95% stud-less wall system of the house provides superior acoustic insulation and prevents the sound from waking up the sleeping Renzi and Shahab. Because they are in the middle of an open-skied tract of farmland, they use the home's south exterior shading structure to block the sun while they eat their morning meal on the south-side exterior breakfast bar. Tom does some calisthenics on the south deck, then grabs his bike and heads out on quick 20 mile early-morning ride. Frank begins to study before class by swinging up a stowable table and rolling a modular ottoman out from under the living room's full-wall built-in cabinetry. At night the scene changes, with Frank and Tom asleep in the north building module, but Shahab in the south module playing computer games in a large-screen format using a hidden, furlable projector screen and a high definition projector. He reclines on a couch made from connected ottoman modules and again due to the home's thick insulation, can still hear his video game audio despite what is going on outside. On the outside south deck, Renzi has rolled the accordion table out from its usual main living room location and has fully extended it to act as the center of a raucous drinking game. The bench that spans the entire south exterior living space lets intoxicated students lie down and gaze up at the stars. Although nighttime, the home's dark sky compliant LED wall sconces provide ample light for party-goers to navigate around the 3 spatially separate but connected outdoor living areas. Even though the home is at full capacity with 4 active and diverse occupants, they each can enjoy their comfortable and variable lifestyles in a sustainable and interactive manner.



Figure 2: South deck with full span bench

Livability: Generation X-based family living in urban Sacramento County

Bal and Brooke live in a close-knit suburban Sacramento neighborhood with their 2 year old daughter Marigold. Brooke is a UC Davis graduate who works for the state government as a water-policy analyst and advisor, and Bal is a bay area transplant who works as a freelance website designer/stay at home dad. The family likes to spend lots of time together but ultimately live a busy and variable schedule due to the demands of Brooke's job and the antics of Marigold. The parents regularly host dinner parties with their neighbors where they often discuss and compare each other's water and energy use in relation to the current information feedback settings they are using. The home also plays host to many of Marigold's playdates, which often center around large, messy art and garden projects. On this weekend Brooke's wheelchair bound grandfather, Walter, is visiting for the month and is sleeping in the master bedroom.

Bal and Brooke get up and begin to co-prepare breakfast for everyone. Once breakfast is ready, Brooke rolls his grandfather out from his bedroom while Bal rolls (and extends) out the accordion table onto the south deck living space. Bal, Brooke, and Marigold sit on modular ottomans (Marigold's features two Ottoman tops stacked on top of each other) while Brooke's grandfather easily transitions out of his wheelchair onto the bench, allowing him to stretch out his muscles while he eats. After breakfast, the table and modules are stowed, and the family splits their attention with Bal cleaning the house, Brooke working overtime from home, and Marigold and Walter painting water color pictures. Brooke takes advantage of this feature by focusing on her work outside on the east privacy deck. Brooke sits on a rolling ottoman while she uses the fully compressed accordion table as her work surface. Marigold and Walter sit in the interior main living room, using both stowable tables to allow them to spread out their many art supplies and paintings. Bal checks on them every couple of minutes as he comes and goes from the cleaning supply cabinet that is adjacent to the tables. As he begins to clean the bathroom, the vanity smart mirror tells him that a miniscule flow rate has been occurring for the past 15 minutes in the kitchen sink hot water supply line. He enters the

kitchen and sure enough, water is dripping out of the hot water tap on the kitchen sink. Bal completely closes the faucet and then continues cleaning. Although Marigold's tendencies and activities place a lot of wear and tear on the home, the durable and easily cleanable composite flooring, countertops, decking, and metal siding show very little evidence of such effect. Dinner is a casual affair, with the family again utilizing the accordion table to accommodate their dining needs. After a wonderful meal, the tired parents and child head directly to bed with Walter heading to the roll-in shower. As he showers a ceiling mounted LED matrix sequentially illuminates soft blue LED lights to inform him of the quantity of water he is using. To allow Walter to sleep in the master bedroom, the parents each take a bunk in the second bedroom's murphy bed while the modular ottomans are locked together to form a temporary mattress for Marigold. Everyone falls soundly asleep; that is until Marigold wakes up and needs to use the bathroom. Guided by motion triggered recessed circadian LED floor lighting, Brooke accompanies Marigold on her voyage down the hallway to the bathroom. After her mission is

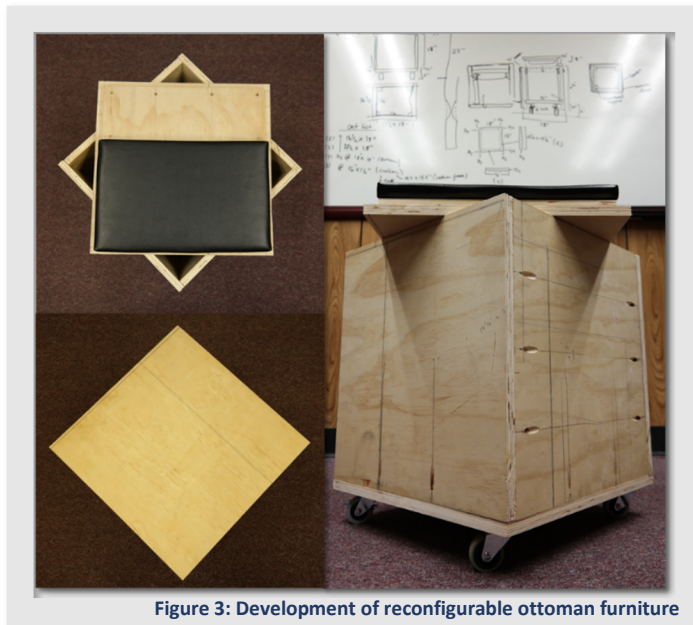


Figure 3: Development of reconfigurable ottoman furniture

accomplished, Brooke rolls in an ottoman with the table top side up for Marigold to stand on so she can wash her hands. The two return to the bedroom and finally fall asleep; just another day of leisurely family-oriented living in a sustainable and comfortable home.

Buildability and Transportability:

Inspired by the best attributes of manufactured homes, Our H₂Ouse features a wide range of prefabricated and modular building strategies which are widely deployable and easily installable. While this format of home building has historically been regarded as lower class, the recent popularity of the “tiny” house has reduced the stigma, paving the road for easy transportation options in a wide variety of areas and terrains. The trailer frames allow linear assembly line building processes to smoothly occur within controlled-environment building facilities, minimizing the total assembly time and protecting the home's assembly from moisture, insects, and other hard to control environmental factors. Assembly time is further reduced by the use of fully panelized roof, walls, and floors. Standard OSB/Polyurethane SIPs can be rapidly set and connected with the use of a quick-drive screw gun and wood splines, or (even faster) foamed in metal camlocks which allow for near-zero thermal bridging within the assembly. The walls are based around a panelized construction, and set in place and connected with stainless steel tracks and splines. An additional benefit of this installed system is the near stud-less cavity which allows for electrical and plumbing lines to be run without drilling through studs and blocking. The home's single wet module not only reduces heat loss from water lines, but it allows for all interior plumbing connections to be made before transport. When the home is ready for transport, the trailer is connected to freight trucks and pulled to its destination. In addition to adhering to the home's industrial modern-rustic aesthetic, finish materials and their installation are able to survive thousands of miles of transport along bumpy roads. By relying heavily on multiple methods of prefabrication, Our H₂Ouse capitalizes on the speed and versatility of manufactured homes, yet still features some of the latest advances in building materials. In addition, it displays a final finish and feel that is unlike anything one would find in a conventional mobile home neighborhood.



References

- 1) Johnson, Hans. "California's Population." *PPIC*. Public Policy Institute of California, Mar. 2017. Web.
- 2) "FAQs." *USDA Economic Research Service*. United States Department of Agriculture, 16 May 2017. Web..
- 3) Mount, Jeffrey, and Ellen Hanak. "Water Use in California." *PPIC*. Public Policy Institute of California, July 2016. Web.
- 4) "Energy-Related Carbon Dioxide Emissions at the State Level, 2000-2014." *State-Level Energy-Related Carbon Dioxide Emissions, 2000-2012*. U.S. Energy Information Administration, Jan. 2017. Web.
- 5) Heberger, Matthew. "Urban Water Conservation and Efficiency - Enormous Potential, Close to Home." *Pacific Institute Insights*. Pacific Institute, 10 June 2014. Web.
- 6) *Fact Sheet - Statewide Residential Programs (2013-2014)*. N.p.: California Public Utilities Commission, Mar. 2013. PDF.
- 7) "California's Energy Efficiency Standards Have Saved Billions." *California Energy Commission*. California Energy Commission, 2017. Web.
- 8) Johnson, Hans, Marisol Cuellar Mejia, and Laura Hill. *California's Future: Population*. Rep. Public Policy Institute of California, Jan. 2017. Web.
- 9) *California's 2030 Climate Commitment - Renewable Resources for Half of the State's Electricity by 2030*. Rep. State of California Energy Commission, 9 July 2015. Web.
- 10) "Sustainable Groundwater Management." *SGM - Sustainable Groundwater Management*. CA Department of Water Resources, Sept. 2014. Web.
- 11) "California Renewable Energy Overview and Programs." *California Renewable Energy Overview and Programs*. California Energy Commission, 2017. Web.
- 12) "Rebates and Programs." *California Water Service*. California Water Service, 2017. Web.
- 13) Hanak, Ellen, Jay Lund, Alvar Escriva-Bou, Kurt Schwabe, and Ken Baerenklau. *California's Water*. Rep. Public Policy Institute of California, Oct. 2016. Web.
- 14) C.A. Legis. Assemb. AB-1755. *The Open and Transparent Water Data Act*. Reg. Sess. 2015-2016 (2016).
- 15) Schranck, Andrew. "Residential Energy Efficiency - Advancing New Technologies Through Public Policy." *Journal of Engineering and Public Policy* 17 (2013): n. pag. *Washington Internships for Students of Engineering*. Web.
- 16) "2020 Planning and Information for California ZNE Homes." *Zero Net Energy Residential*. California Public Utilities Commission, 2013. Web.
- 17) Appleton-Young, Leslie, Selma Hepp, Oscar Wei, Carmen Hirciag, and Rowena Ramos. *Understanding California's Housing Market: An Analysis of Homebuying and Selling Trends*. Rep. California Association of Realtors, 2015. Web.
- 18) UC Davis. News and Media Relations. *UC Davis Named Most Sustainable University in the World*. *UC Davis News*. UC Davis, 29 Dec. 2016. Web.
- 19) "Yolo County Sees Fifth Year of Growth in Property Value." *The Davis Enterprise*. McNaughton Newspapers, Inc., 07 July 2017. Web.
- 20) *Comprehensive Housing Market Analysis: Sacramento-Roseville-Arden-Arcade, California*. Rep. U.S. Department of Housing and Urban Development, 1 Apr. 2015. Web.

NAHB Areas	Cost
siding	\$ 6,366.25
roof	\$ 8,294.61
deck / exterior	\$ 23,699.34
Windows and Doors	\$ 19,331.05
HVAC	\$ 16,526.57
drywall	\$ 1,776.50
paint	\$ 460.56
flooring	\$ 4,173.00
trims, doors, mirrors	\$ 33.32
cabinetry / countertops	\$ 6,899.54
appliances	\$ 8,088.37
plumbing - finish	\$ 4,168.97
landscape	\$ 4,165.10
electrical - finish	\$ 6,474.98
insulation	\$ 4,883.67
electrical - rough	\$ 6,474.98
foundation	\$ 10,341.37
framing	\$ 45,849.72
plumbing - rough	\$ 6,877.46
control systems	\$ 2,814.31
Solar Array, Components	\$ 58,217.50
Greywater Elements	\$ 2,891.27
furniture	
education/feedback elements	
Total	\$ 248,808.44

sq. ft
935

\$/sq ft
\$ 266.11

Cost Estimate by NAHB Area

RS Means Equivalent									
Component					Per Unit Costs				Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total
Dishwasher	113013173100	Dishwasher, built-in, energy-star qualified, minimum	Ea.	1	\$ 505.44	\$ 129.49	\$ -	\$ 634.93	\$ 634.93
Induction stove /oven range	113013150020	Cooking range, residential appliances, free standing, 1 oven, 30" wide, minimum	Ea.	1	\$ 485.00	\$ 42.50	\$ -	\$ 527.50	\$ 527.50
Range hood	113013194150	Range hood, residential appliances, vented, min, 2 speed, 30" wide, minimum	Ea.	1	\$ 90.03	\$ 94.18	\$ -	\$ 184.21	\$ 184.21
Fridge	113013166797	Refrigerator, energy star qualified, 21.7 CF, minimum	Ea.	1	\$ 1,316.25	\$ 183.12	\$ -	\$ 1,499.37	\$ 1,499.37
Washing machine	113013246750	Washing machine, energy star, front loading, minimum	Ea.	1	\$ 670.00	\$ 105.00	\$ -	\$ 775.00	\$ 775.00
Dryer	113013256770	Dryer, electric, automatic, front-loading, energy-star qualified, minimum	Ea.	1	\$ 645.00	\$ 164.00	\$ -	\$ 809.00	\$ 809.00
Water heater OPT #2	223330131080	Water heater, residential, electric, glass lined tank, double element, 5 year, 40 gallon	Ea.	1	\$ 1,299.50	\$ 205.72	\$ -	\$ 1,505.22	\$ 1,505.22
Garbage disposal	113013183300	Garbage disposal, residential appliances, sink type, minimum	Ea.	1	\$ 97.50	\$ 39.50	\$ -	\$ 137.00	\$ 137.00
Microwave	113013151250	Microwave ovens, residential appliances, minimum	Ea.	1	\$ 119.00	\$ 80.50	\$ -	\$ 199.50	\$ 199.50
Projector screen	115213100100	Projection screens, manually operated, economy	S.F.	36	6.79	1.46	0	\$ 8.25	\$ 297.00
Projector lense	115216101400	Movie equipment, lenses, anamorphic, minimum	Ea.	1	1421.55	0	0	\$ 1,421.55	\$ 1,421.55
Sound system	275119100100	Sound system, projector outlet, excl rough-in wires, cables & conduits	Ea.	1	48.45	49.64	0	\$ 98.09	\$ 98.09

Appliances Subtotal: \$ 8,088.37

RS Means Equivalent										
Component					Per Unit Costs				Total Cost	
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total	
Kitchen base corner cabinet	123223102000	Custom cabinets, kitchen base cabinets, hardwood, prefinished, corner base units, standard, 24" deep, 35" high, 36" wide, excl. countertops	Ea.	1	\$ 725.00	\$ 31.00	\$ -	\$ 756.00	\$	756.00
Kitchen base cabinet	123223101000	Custom cabinets, kitchen base cabinets, hardwood, prefinished, 4 drawers, 24" deep, 35" high, 12" wide, excl. countertops	Ea.	1	\$ 305.00	\$ 22.50	\$ -	\$ 327.50	\$	327.50
Kitchen base cabinet	123223100800	Custom cabinets, kitchen base cabinets, hardwood, prefinished, 1 top drawer, 1 door below, 24" deep, 35" high, 12" wide, excl. countertops	Ea.	1	\$ 292.00	\$ 22.50	\$ -	\$ 314.50	\$	314.50
Kitchen base cabinet	123223101220	Custom cabinets, kitchen base cabinets, hardwood, prefinished, 2 top drawers, 2 doors below, 24" deep, 35" high, 30" wide, excl. countertops	Ea.	1	\$ 475.00	\$ 26.00	\$ -	\$ 501.00	\$	501.00
Kitchen wall cabinet	123223104700	Custom cabinets, kitchen wall cabinets, hardwood, prefinished, 2 doors, 12" deep, 24" high, 30" wide	Ea.	1	\$ 360.00	\$ 24.00	\$ -	\$ 384.00	\$	384.00
Kitchen wall cabinet	123223105320	Custom cabinets, kitchen wall cabinets, hardwood, prefinished, 2 doors, 12" deep, 30" high, 30" wide	Ea.	1	\$ 395.00	\$ 29.00	\$ -	\$ 424.00	\$	424.00
Kitchen wall cabinet	123223105020	Custom cabinets, kitchen wall cabinets, hardwood, prefinished, 1 door, 12" deep, 30" high, 15" wide	Ea.	1	\$ 266.00	\$ 26.00	\$ -	\$ 292.00	\$	292.00
Kitchen wall cabinet	123223105000	Custom cabinets, kitchen wall cabinets, hardwood, prefinished, 1 door, 12" deep, 30" high, 12" wide	Ea.	3	\$ 253.00	\$ 25.50	\$ -	\$ 278.50	\$	835.50
Kitchen wall cabinet	123223104100	Custom cabinets, kitchen wall cabinets, hardwood, prefinished, 2 doors, 12" deep, 12" high, 36" wide	Ea.	1	\$ 315.00	\$ 23.50	\$ -	\$ 338.50	\$	338.50
Kitchen wall cabinet	123223106100	Custom cabinets, kitchen wall cabinets, hardwood, prefinished, corner cabinet, 12" deep, 30" high, 36" wide	Ea.	1	\$ 470.00	\$ 34.00	\$ -	\$ 504.00	\$	504.00
Kitchen open cabinet	123223107850	Manufactured casework, cabinet panel	S.F.	12	\$ 10.05	\$ 5.60	\$ -	\$ 15.65	\$	187.80
Kitchen open cabinet	105723190200	Wood shelving, pine, clear grade, no edge band, 1" x 12"	L.F.	4	\$ 4.81	\$ 2.66	\$ -	\$ 7.47	\$	29.88
Main living room built in cabinetry	123223107850	Manufactured casework, cabinet panel	S.F.	50	\$ 10.05	\$ 5.60	\$ -	\$ 15.65	\$	782.50
Main living room south built in cabinet	105723190450	Wood shelving, pine, clear grade, no edge band, 1" x 18"	L.F.	12	\$ 7.20	\$ 2.94	\$ -	\$ 10.14	\$	121.68
Main living room pegboard shelving	062513101600	Hardboard paneling, plastic faced pegboard, 1/4" thick, excluding furring or trim	S.F.	28	\$ 0.80	\$ 1.12	\$ -	\$ 1.92	\$	53.76
Main living room pegboard shelving	105723190450	Wood shelving, pine, clear grade, no edge band, 1" x 18"	L.F.	8	\$ 7.20	\$ 2.94	\$ -	\$ 10.14	\$	81.12
Main living room broom closet	123223107000	Custom cabinets, kitchen wall cabinets, hardwood, prefinished, broom cabinet, 84" high x 24" deep x 18" wide	Ea.	1	\$ 725.00	\$ 56.00	\$ -	\$ 781.00	\$	781.00

Cabinetry & Countertops Subtotal: \$ 6,899.54

RS Means Equivalent									
Component					Per Unit Costs				Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total
Deck Framing Assembly	0302028	Floor framing systems, 2" x 8", 16" OC	S.F.	1100	\$ 3.07	\$ 4.32	\$ -	\$ 7.39	\$ 8,129.00
IBC Bench framing	061110280410	Porch or deck framing, treated lumber, decking, 2" x 4"	S.F.	225	\$ 1.79	\$ 0.93	\$ -	\$ 2.72	\$ 612.00
2x8 deck joist hangers	061110281480	Porch or deck framing, accessories, joist hangers, 2" x 6" through 2" x 12"	Ea.	350	\$ 1.36	\$ 1.86	\$ -	\$ 3.22	\$ 1,127.00
IBC 4x4 support beams	061110280130	Porch or deck framing, treated lumber, girder, single, 4" x 4"	L.F.	60	1.37	0.83	0	\$ 2.20	\$ 132.00
Trex composite decking	068010100120	Composite fabrications, woodgrained decking, 2" x 6"	L.F.	2334	\$ 3.81	\$ 0.87	\$ -	\$ 4.68	\$ 10,923.12
House/deck border flashing	076510100030	Sheet metal flashing, aluminum, flexible, mill finish, .016" thick, including up to 4 bends	S.F.	21.5	\$ 0.98	\$ 1.64	\$ -	\$ 2.62	\$ 56.33
House perimeter flashing	076526100060	Self-adhering sheet or roll flashing, cross laminated, HDPE, 25 Mil, 9"	L.F.	155	0.44	0.29	0	\$ 0.73	\$ 113.15
Rain downspout	077123106000	Steel downspouts, galvanized, rectangular, plain, 2" x 3", 28 gauge	L.F.	11	\$ 3.75	\$ 1.61	\$ -	\$ 5.36	\$ 58.96
Rain gutter	077123302700	Galvanized steel gutters, half round or box, stock, 5" wide, 26 gauge	L.F.	42	\$ 2.45	\$ 2.45	\$ -	\$ 4.90	\$ 205.80
Rain gutter outlet	077123305330	Gutter outlets, galvanized steel, 2" x 3"	Ea.	1	\$ 3.25	\$ 0.73	\$ -	\$ 3.98	\$ 3.98
Rain gutter end caps	077123305190	Gutter end caps, half round galvanized steel, 5"	Ea.	2	\$ 2.30	\$ 0.49	\$ -	\$ 2.79	\$ 5.58
Rain gutter downspout elbow	077123200020	Elbows, aluminum, embossed, 2" x 3"	Ea.	1	\$ 0.96	\$ 3.06	\$ -	\$ 4.02	\$ 4.02
Metal ramp transition	087120652500	Threshold, ramp, aluminum or rubber, ADA, 24" wide x 24" long	Ea.	4	\$ 195.00	\$ 23.50	\$ -	\$ 218.50	\$ 874.00
Railing	055213500930	Railing, pipe, steel, wall rail, primed, 1-1/4" dia, shop fabricated	L.F.	60	\$ 16.68	\$ 6.93	\$ 0.63	\$ 24.24	\$ 1,454.40

Deck & Exterior Subtotal: \$ 23,699.34

RS Means Equivalent

Component			Per Unit Costs						Total Cost	
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total	
Interior ceiling surface area Drywall OPT #1	092910303090	Gypsum wallboard, on ceilings, standard, w/compound skim coat (level 5 finish), 5/8" thick	S.F.	935.00	\$ 0.44	\$ 1.46	\$ -	\$ 1.90	\$ 1,776.50	
Interior Painting	099123740280	Paints & coatings, walls & ceilings, interior, concrete, drywall or plaster, zero voc latex, primer or sealer coat, smooth finish, spray	S.F.	4000.00	\$ 0.10	\$ 0.20	\$ -	\$ 0.30	\$ 1,200.00	
Interior wall surface area	099103400690	Surface preparation, interior, walls, sand, wood, T&G, light 9.5 abg x rooms plus closets maybe remodel	S.F.	1919.00	\$ -	\$ 0.10	\$ -	\$ 0.10	\$ 191.90	

Drywall & Paint Subtotal: \$ 3,168.40

Drywall Subtotal: \$ 1,776.50

Paint Subtotal: \$ 1,391.90

RS Means Equivalent

Component					Per Unit Costs				Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total
Ceiling Fans (int and ex)	260590108362	Paddle fan, residential, variable speed (w/lights), economy model (AC motor)	Ea.	4	\$ 150.00	\$ 32.00	\$ -	\$ 182.00	\$ 728.00
LED strip lights	265113552000	Interior LED fixtures, strip, surface mounted, 3500K, one light bar 4' long, incl lamps, mounting hardware and connections	Ea.	2	\$ 260.00	\$ 38.00	\$ -	\$ 298.00	\$ 596.00
Exterior LED fixtures	265623550120	Exterior LED fixture, wall mounted, indoor/outdoor, 66 watt, incl lamps	Ea.	3	\$ 705.00	\$ 35.50	\$ -	\$ 740.50	\$ 2,221.50
Slide dimmer switches, boxes, plates	260590102700	Switch devices, residential, decorator style, S.P., slide dimmer, type NM cable, 20', incl box & cover plate	Ea.	12	\$ 24.50	\$ 18.80	\$ -	\$ 43.30	\$ 519.60
Normal switches, boxes, plates	260590102110	Switch devices, residential, single pole, ivory, type NM (Romex) cable, 20', 15 amp, incl box & cover plate	Ea.	10	\$ 18.70	\$ 18.80	\$ -	\$ 37.50	\$ 375.00
Washer/dryer high voltage outlet	260590104670	Dryer outlet, residential, 20' of #10/3, 2 pole circuit breaker, type NM cable, 30 amp, 240 V, incl box & exterior cover plate	Ea.	1	\$ 58.00	\$ 50.00	\$ -	\$ 108.00	\$ 108.00
Range & water heater high voltage outlet	260590104710	Range outlet, residential, 30' of #8/3, type NM cable, 50 amp, 240 V, incl box & exterior cover plate	Ea.	2	\$ 85.00	\$ 76.50	\$ -	\$ 161.50	\$ 323.00
Dual interior outlets	260590104015	Receptacle devices, residential, duplex outlet, ivory, type NM cable, 20', 15 amp, incl box & cover plate	Ea.	22	\$ 10.30	\$ 22.00	\$ -	\$ 32.30	\$ 710.60

Electrical Finish Subtotal: \$ 5,581.70

RS Means Equivalent										
Component					Per Unit Costs					Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total	
Leviton evr-green	263343552100	Electric vehicle charging, wall mounted, light duty, hard wired	Ea.	1	\$ 1,125.00	\$ 15.70	\$ -	\$ 1,140.70	\$	1,140.70
Generic model	283149508400	Smoke and carbon monoxide alarm, battery operated photoelectric low profile	Ea.	1	\$ 46.00	\$ 13.40	\$ -	\$ 59.40	\$	59.40
Smoke Detector		Smoke and carbon monoxide alarm, battery operated photoelectric low profile	Ea.	3						
GFCI receptacles	260590104300	Receptacle devices, residential, decorator style, GFI, type NM cable, 15 amp, incl box & cover plate	Ea.	7	\$ 23.00	\$ 26.00	\$ -	\$ 49.00	\$	343.00
Exterior receptacles	260590104500	Receptacle devices, residential, weather-proof cover or above receptacles, add	Ea.	5	\$ 2.47	\$ 10.05	\$ -	\$ 12.52	\$	62.60
Wiring for Stove+ PV panel ground wire (AWG #6, 1W)+ 40 amp EV charger (#8)	260519550501	Non-metallic sheathed cable, copper with ground wire, 600 V, 3 wire, #6, (Romex)	L.F.	304	\$ 1.92	\$ 2.68	\$ -	\$ 4.60	\$	1,398.40
Wiring for 30 amp appliances	260519550401	Non-metallic sheathed cable, copper with ground wire, 600 V, 3 wire, #10, (Romex)	L.F.	132.5	\$ 0.74	\$ 2.30	\$ -	\$ 3.04	\$	402.80
Wiring for PV panels	260519550251	Non-metallic sheathed cable, copper with ground wire, 600 V, 2 wire, #12, (Romex)	L.F.	274	\$ 0.33	\$ 1.46	\$ -	\$ 1.79	\$	490.46
Wiring for receptacles	260519550301	Non-metallic sheathed cable, copper with ground wire, 600 V, 3 wire, #12, (Romex)	L.F.	349	\$ 0.47	\$ 1.61	\$ -	\$ 2.08	\$	725.92
Battery pack wiring	260519900181	Wire, copper, stranded, 600 volt, #4, type THW, in raceway	L.F.	15	\$ 0.85	\$ 0.61	\$ -	\$ 1.46	\$	21.90
Switches, boxes, plates	260590102150	Switch devices, residential, 3-way, #14/3, type NM cable, 20', incl box & cover plate	Ea.	2	\$ 12.40	\$ 22.00	\$ -	\$ 34.40	\$	68.80
Dryer, fire pump, PV backfeed #1 (25 A), water heater (20 A), clotheswasher (20 A), heat pump (15 A)	262416202010	Circuit breakers, 120/240 volt, plug-in, 2 pole with NM cable, 30 amp	Ea.	6	\$ 26.00	\$ 35.50	\$ -	\$ 61.50	\$	369.00
SIS battery pack (80 A) circuit breaker	262416202030	Circuit breakers, 120/240 volt, plug-in, 2 pole with NM cable, 100 amp	Ea.	1	\$ 104.00	\$ 53.50	\$ -	\$ 157.50	\$	157.50
Range (60 A) EV car charger (40 A) PV backfeed #2 (40 A) Circuit breakers	262416202014	Circuit breakers, 120/240 volt, plug-in, 2 pole with NM cable, 50 Amp	Ea.	3	\$ 32.50	\$ 64.00	\$ -	\$ 96.50	\$	289.50
Eaton 200 A main breaker panel	262416104700	Load centers, 1 phase, 3 wire, main breaker, rainproof, 120/240 V, 200 amp, 30 circuits, incl 20 A 1 pole plug-in breakers	Ea.	1	\$ 415.00	\$ 530.00	\$ -	\$ 945.00	\$	945.00

Electrical Rough Subtotal: \$ 6,474.98

RS Means Equivalent

RS Means Equivalent										
Component					Per Unit Costs					Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total	
Upofloor laminate flooring OPT. #1	096533101700	Resilient flooring, conductive, rubber tile, 1/8" thick	S.F.	935	\$ 2.20	\$ 0.85	\$ -	\$ 3.05	\$ 2,851.75	
Upofloor cement	096516108700	Resilient flooring, adhesive cement, 1 gallon per 200 - 300 S.F.	Gal.	5	\$ 30.50	\$ -	\$ -	\$ 30.50	\$ 152.50	
1/4" plywood	061626100018	Underlayment, plywood, underlayment grade, 1/4" thick, pneumatic nailed	S.F.	935	\$ 0.95	\$ 0.30	\$ -	\$ 1.25	\$ 1,168.75	

Flooring Subtotal: \$ 4,173.00

RS Means Equivalent									
Component					Per Unit Costs				Total Cost
Notes	#	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total
Trailer house foundation	BID	Hitchable, mobile home trailers, double-wide, 16'	Ea.	2				\$ -	\$ 9,133.57
Piers	RECEIPT	Foundation piers for house support	Ea.	75				\$ 15.00	\$ 1,125.00
IBC concrete footings	042210110060	Autoclave aerated concrete block, solid, 6" x 8" x 24", includes mortar, excludes scaffolding, grout and reinforcing	S.F.	18	\$ 2.44	\$ 2.16	\$ -	\$ 4.60	\$ 82.80

Foundation Subtotal: \$ 10,341.37

RS Means Equivalent

Component		Per Unit Costs							Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total
Exposed beams	061323100252	Wood framing, heavy mill timber, beams, built from 4" lumber, multiple 4" x 6"	B.F.	229	\$ 1.48	\$ 0.70	\$ -	\$ 2.18	\$ 499.22
Bamcore	BID	2 1/4" pine with 1/8" veneer, and bamboo core composite panelized wall system	sq ft	2000				\$ 12.00	\$ 24,000.00
Drop ceiling	061110126000	2" x 3" wood, suspended ceiling framing, per LF	L.F.	300	\$ 0.39	\$ 0.56	\$ -	\$ 0.95	\$ 285.00
Interior Kitchen/living room soffit	061110361102	Soffit and canopy framing, 2" x 4"	L.F.	50	\$ 0.41	\$ 0.90	\$ -	\$ 1.31	\$ 65.50
Floor SIPs	BID	Structural insulated panel, 7/16" OSB both faces, EPS insulation, 5-5/8" thick						\$ -	\$ 9,000.00
Roof SIPs	BID	Structural insulated panel, 7/16" OSB both faces, EPS insulation, 9-3/8" thick						\$ -	\$ 12,000.00

Framing Subtotal: \$ 45,849.72

RS Means Equivalent											
Component					Per Unit Costs					Total Cost	
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total		
WarmBoard	238316106070	Radiant floor heating, thermal track, straight and utility panel for long continuous runs and direction reverse at run end, both 5.333 S.F	Ea.	176	\$ 29.00	\$ 14.80	\$ -	\$ 43.80	\$ 7,708.80		
Radiant floor 1/2" PEX	238316100210	Radiant floor heating, tubing, PEX (cross-linked polyethylene), non barrier type for ferrous free systems, 1/2"	L.F.	935	\$ 0.50	\$ 0.98	\$ -	\$ 1.48	\$ 1,383.80		
Stainless steel manifolds	238316101174	Radiant floor heating, manifold, stainless steel, valved, 3 circuit, 1"	Ea.	2	\$ 130.00	\$ 78.47	\$ -	\$ 208.47	\$ 416.94		
Compression fittings to hot/cold water manifold for 5 zones	238316107120	Radiant floor heating, PEX tubing fittings, compression coupling, 1/2" x 1/2"	Ea.	10	\$ 6.30	\$ 12.20	\$ -	\$ 18.50	\$ 185.00		
Zone actuator for hot/cold water manifold	238316105130	Radiant floor heating, 6 zone actuator valve control, expandable	Ea.	1	\$ 238.00	\$ 33.00	\$ -	\$ 271.00	\$ 271.00		
Shutoff valves for 5 zones	238316103130	Radiant floor heating, valve, motorized straight zone valve with operator complete, 3/4"	Ea.	5	\$ 138.00	\$ 16.90	\$ -	\$ 154.90	\$ 774.50		
Air to water HP	RECEIPT	PHNIX H8 Heat Pump	Ea.	1						\$ 5,000.00	
Bathroom fan	233423106660	Fans, residential, bath exhaust, grille, back draft damper, 50 CFM	Ea.	1	\$ 56.50	\$ 39.24	\$ -	\$ 95.74	\$ 95.74		
Humidifier, 8 gal	113015434850	Humidifier, residential appliances, portable, 8 gallons per day, economy	Ea.	1	\$ 165.32	\$ -	\$ -	\$ 165.32	\$ 165.32		
Living room register	233713604020	Register, air supply, floor, enameled steel, 4" x 8", includes toe operated damper	Ea.	1	\$ 12.70	\$ 12.77	\$ -	\$ 25.47	\$ 25.47		

HVAC Subtotal:	\$	16,526.57
----------------	----	-----------

RS Means Equivalent										
Component					Per Unit Costs					Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per Unit	Total	
Exterior Bamcore wall Insulation	072126101300	Fiberglass insulation, ceilings, with open access, 11.5" thick, R26, blown-in	S.F.	3160	\$ 0.46	\$ 0.44	\$ 0.24	\$ 1.14	\$ 3,602.40	
Interior Bamcore insulation	072126101000	Blown-in insulation, ceilings, with open access, fiberglass, 5.5" thick, R11	S.F.	655	\$ 0.19	\$ 0.17	\$ 0.10	\$ 0.46	\$ 301.30	
Duct insulation OPT #1 (by sq ft)	230713103110	Duct thermal insulation, blanket type, fiberglass, flexible, fire rated for plenums, 1/2"thick x 24" x 25', per S.F.	S.F.	30	\$ 3.59	\$ 6.75	\$ -	\$ 10.34	\$ 310.20	
Duct insulation OPT #2 (by roll)	230713103100	Duct thermal insulation, blanket type, fiberglass, flexible, fire rated for plenums, 1-1/2 lb. density, 1/2"thick x 24" x 25', per roll	Roll	1	\$ 179.19	\$ 342.08	\$ -	\$ 521.27	\$ 521.27	
Duct insulation OPT #3 (by L.F.)	233346101910	Ductwork, flexible coated fiberglass fabric on corrosion resistant metal helix, insulated, P.E. jacket, 1" thick, 4" diameter, pressure to 12"(WG) UL-181	L.F.	30	\$ 2.80	\$ 2.15	\$ -	\$ 4.95	\$ 148.50	

Insulation Subtotal: \$ 4,883.67

RS Means Equivalent										
Component					Per Unit Costs					Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total	
Planter box wall framing	308026	Exterior wall framing systems, 2" x 4", 16" OC	S.F.	500	\$ 1.73	\$ 2.80	\$ -	\$ 4.53	\$	2,265.00
Planter box floor framing	61110182005	Wood framing, joists, 2" x 4", pneumatic nailed	L.F.	220	\$ 0.41	\$ 0.39	\$ -	\$ 0.80	\$	176.00
Planter box floor framing	61626100018	Underlayment, plywood, underlayment grade, 1/4" thick, pneumatic nailed	S.F.	120	\$ 0.95	\$ 0.30	\$ -	\$ 1.25	\$	150.00
Planter box mulching	329113160100	Soil preparation, mulching, aged barks, 3" deep, hand spread	S.Y.	13	\$ 3.57	\$ 2.13	\$ -	\$ 5.70	\$	74.10
Soil (receipt)	0	Top soil	C.Y.	12.5	\$ -	\$ -	\$ -	\$ -	\$	500.00
1 gallon plants (receipt)	0	1 gallon plants, variable	Ea.	250	\$ -	\$ -	\$ -	\$ -	\$	1,000.00

Landscaping Subtotal: \$ 4,165.10

RS Means Equivalent									
Component					Per Unit Costs				Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total
Included in rough plumbing bathroom			Ea.	1				\$ -	\$ -
Kitchen sink faucet	224139101320	Faucets/fittings, kitchen sink, single control lever handle,	Ea.	1	\$ 200.00	\$ 31.50	\$ -	\$ 231.50	\$ 231.50
			Ea.	1				\$ -	\$ -
Kitchen sink	224116163200	Sink, kitchen, counter top style, stainless steel, self rimming, double bowl, 33" x 22", includes faucet and drain	Ea.	1	\$ 975.00	\$ 119.00	\$ -	\$ 1,094.00	\$ 1,094.00
Shower system	102819105240	Shower surround, fiberglass, 3 wall, 32" x 32", excludes plumbing	Ea.	1	\$ 442.26	\$ 91.56	\$ -	\$ 533.82	\$ 533.82
Towel bar	102813136400	Toilet accessories, towel bar, stainless steel, 18" long	Ea.	1	\$ 46.86	\$ 15.89	\$ -	\$ 62.75	\$ 62.75
Hydrao	BID			1	\$ 99.00			\$ 99.00	\$ 99.00
Shower enclosure and pan	102819100440	Shower compartment, floor mounted, cabinet, no door, fiberglass, 36" x 48", includes bases, excludes plumbing	Ea.	1	\$ 1,200.00	\$ 146.50	\$ -	\$ 1,346.50	\$ 1,346.50
Bathroom toilet	224113131140	Water closet, tank type, vitreous china, floor mounted, close coupled, ADA, two piece, 1.28 gpf, includes seat, supply pipe with stop	Ea.	1	\$ 252.67	\$ 139.31	\$ -	\$ 391.98	\$ 391.98
Vanity	224116131120	Lavatory, vanity top, cultured marble, white, single bowl, 25" x 22", includes trim	Ea.	1	\$ 115.83	\$ 80.88	\$ -	\$ 196.71	\$ 196.71

Plumbing Finish Subtotal: \$ 4,168.97

RS Means Equivalent

Component			Per Unit Costs						Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total
Fire Supression sprinkler heads	211313503740	Sprinkler system components, sprinkler heads, standard spray, pendent or upright, brass, 135 to 286 degrees F, 1/2" NPT, 1/2" orifice, excludes supply piping	Ea.	12	\$ 10.42	\$ 23.89	\$ -	\$ 34.31	\$ 411.72
Fire Supression 3/4" 90 elbow, CPVC	21113180120	Elbow, 90 Deg., plastic pipe fitting, CPVC fire suppression, C-UL-S, FM, NFPA 13, 13R & 13D, 3/4", socket joint	Ea.	4	\$ 1.78	\$ 14.88	\$ -	\$ 16.66	\$ 66.64
Fire Supression 1" 90 elbow, CPVC	21113180130	Elbow, 90 Deg., plastic pipe fitting, CPVC fire suppression, C-UL-S, FM, NFPA 13, 13R & 13D, 1", socket joint	Ea.	3	\$ 3.92	\$ 17.09	\$ -	\$ 21.01	\$ 63.03
Fire Supression tee reducing, CPVC	21113180420	Tee, reducing, plastic pipe fitting, CPVC fire suppression, C-UL-S, FM, NFPA 13, 13R & 13D, 1" x any size, socket joint	Ea.	13	\$ 4.10	\$ 25.73	\$ -	\$ 29.83	\$ 387.79
Fire Supression tee, CPVC	21113180310	Tee, plastic pipe fitting, CPVC fire suppression, C-UL-S, FM, NFPA 13, 13R & 13D, 3/4", socket joint	Ea.	2	\$ 2.45	\$ 25.11	\$ -	\$ 27.56	\$ 55.12
Fire supression piping	22113745480	Pipe, plastic, CPVC, threaded, 1" diameter, schedule 40, includes couplings 10' OC, and hangers 3 per 10'	L.F.	90	\$ 20.91	\$ 8.98	\$ -	\$ 29.89	\$ 2,690.10
Fire supression piping	22113745470	Pipe, plastic, CPVC, threaded, 3/4" diameter, schedule 40, includes couplings 10' OC, and hangers 3 per 10'	L.F.	21	\$ 9.49	\$ 8.07	\$ -	\$ 17.56	\$ 368.76
Fire Supression piping (Tank to check valve)	22113747460	Pipe, plastic, PEX, flexible, non-barrier type, white, hot/cold tubing rolls, 1" diameter x 100', excludes couplings and hangers	L.F.	42	\$ 2.15	\$ -	\$ -	\$ 2.15	\$ 90.30
hot/cold supply piping	22113747460	Pipe, plastic, PEX, flexible, non-barrier type, white, hot/cold tubing rolls, 1" diameter x 100', excludes couplings and hangers	L.F.	340	\$ 2.15	\$ -	\$ -	\$ 2.15	\$ 731.00
RECEIPT	Domestic water	Intermediate Bulk Container						\$ -	\$ 125.00
RECEIPT	Blackwater	Intermediate Bulk Container						\$ -	\$ 125.00
RECEIPT	Fire suppression tank	Intermediate Bulk Container						\$	\$ 125.00
RECEIPT	Pressure Tank	Water Worker	HT20HB	Blue				\$ -	\$ 138.00
RECEIPT	Sump pump	Little giant	5-ASP-LL	-	Little giant	5-ASP-LL	-		\$ 150.00
RECEIPT	Fire Supression pump	General Air Products	Econo XPS-		General Air	Econo XPS1	-		\$ 1,200.00

Plumbing Rough Subtotal: \$ 6,877.46

RS Means Equivalent										
Component					Per Unit Costs				Total Cost	
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total	
TPO roof membrane OPT. #1 and underlayment?	Homewyse	Thermoplastic-polyolefin roofing (TPO), 45 mils	Sq.	973	\$ 2.47	\$ 3.79	\$ 0.31	\$ 6.57	\$	6,391.11
TPO roof underlayment	075213102150	APP modified bituminous membrane, smooth surface cap sheet, polyester reinforced, 170 mils, torched	S.F.	1150	\$ 0.75	\$ 0.52	\$ 0.09	\$ 1.48	\$	1,702.00
Roof drip edge	077143100400	Drip edge, galvanized, 5" wide	L.F.	155	\$ 0.60	\$ 0.70	\$ -	\$ 1.30	\$	201.50

Roof Subtotal:	\$	8,294.61
----------------	----	----------

RS Means Equivalent										
Component					Per Unit Costs					Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total	
Corrugated steel siding	074213300401	Steel siding, galvanized, corrugated or ribbed, on steel frame, 24 gauge, incl. fasteners	S.F.	890	\$ 2.00	\$ 1.34	\$ -	\$ 3.34	\$ 2,972.60	
Droughtwood siding	0408034	Wood siding systems, 1/2" x 8" beveled cedar siding, "A" grade	S.F.	295	\$ 7.91	\$ 2.67	\$ -	\$ 10.58	\$ 3,121.10	
Coravent rain screen system	061110420605	Furring, wood, on walls, on wood, 1" x 3", pneumatic nailed	L.F.	200	\$ 0.42	\$ 0.39	\$ -	\$ 0.81	\$ 162.00	
Tyvek home wrap	072510103000	Weather barriers, building paper, spun bonded polyethylene	S.F.	1185	\$ 0.16	\$ 0.07	\$ -	\$ 0.23	\$ 272.55	

Siding Subtotal:	\$	6,366.25
------------------	----	----------

RS Means Equivalent

Component			Per Unit Costs					Total Cost	
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total
Bathroom mirror	088313100100	Mirrors, wall type, polished edge, 1/4" plate glass, up to 5 SF, excl. frames	Ea.	1				\$ -	\$ -
			S.F.	2	10.31		6.35	0 \$ 16.66	\$ 33.32

Trims, Doors, Mirrors Subtotal: \$ 33.32

RS Means Equivalent										
Component					Per Unit Costs					Total Cost
Notes	RSM Line number	Description	Unit	Qu.	Material	Labor	Equip.	Total Per unit	Total	
Kitchen and main living room window	085213200150	Windows, wood, casement, metal-clad, double insulated glass, 3'-6" x 3'-6" high, incl. frame, screens and grilles	Ea.	2	\$ 490.00	\$ 31.50	\$ -	\$ 521.50	\$	1,043.00
Bedroom north facing window	085213102100	Windows, wood, awning, metal-clad, deluxe, double insulated glass, 40" x 22", incl. frame, screens and grilles	Ea.	2	\$ 295.00	\$ 31.00	\$ -	\$ 326.00	\$	652.00
Master BR and bathroom awning window	085213102050	Windows, wood, awning, metal-clad, deluxe, double insulated glass, 36" x 25", incl. frames, screens & grilles	Ea.	2	\$ 276.00	\$ 31.00	\$ -	\$ 307.00	\$	614.00
Window hardware	087510101000	Window hardware, handles, surface mounted, aluminum	Ea.	4	\$ 5.34	\$ 16.94	\$ -	\$ 22.28	\$	89.12
Ravenwindow?	088130105000	Spectrally selective film, on exterior, blocks solar gain/allows 70% of light	S.F.	70	\$ 15.15	\$ 8.32	\$ -	\$ 23.47	\$	1,642.90
All interior doors (excluding closets) OPT #1	087120151000	Door hardware, apartment, interior	Door	3	\$ 465.00	\$ 70.00	\$ -	\$ 535.00	\$	1,605.00
Door hardware OPT 2 (BR, BR2, BATH)	087120400020	Door hardware, lockset, standard duty, cylindrical, with sectional trim, non-keyed, passage	Ea.	3	\$ 79.75	\$ 34.17	\$ -	\$ 113.92	\$	341.76
Door flashing	076210100900	Sheet metal cladding, aluminum, door casing, up to 6 bends, .024" thick	S.F.	16	\$ 1.50	1.55	0	\$ 3.05	\$	48.80
Door and window flashing	076526100040	Self-adhering sheet or roll flashing, cross laminated, HDPE, 25 Mil, 6"	L.F.	150	\$ 0.30	0.27	0	\$ 0.57	\$	85.50
Front Door threshold	087120652390	Threshold, aluminum, ADA, 7" wide x 36" long	Ea.	1	\$ 78.10	34.17	0	\$ 112.27	\$	112.27
Door weatherstripping	087125101000	Weatherstripping, doors, wood frame, interlocking, zinc, for 3' x 7' door	Opng.	2	\$ 48.40	135.22	0	\$ 183.62	\$	367.24
Mech room doors	081313138100	Doors, commercial, steel, flush, full panel, hollow core, hollow metal, 2' x 2', for bottom louver, add	Ea.	4	\$ 293.48	\$ -	\$ -	\$ 293.48	\$	1,173.92
East deck door	081613100140	Full panel glass door, aluminum clad, 3'-0" x 8'-0"	Ea.	1	\$ 500.00	\$ 37.50	\$ -	\$ 537.50	\$	500.00
Interior doors	081433101380	Doors, wood, paneled, interior, two panel, solid, fir, 3'-0" x 6'-8" x 1-3/8" thick	Ea.	7	\$ 419.98	\$ 60.42	\$ -	\$ 480.40	\$	3,362.80
Main living room front door	081613100140	Fiberglass, exterior, prehung door, half glass, low e, 1-3/4", 3'-0" x 8'-0"	Ea.	1	\$ 500.00	\$ 37.50	\$ -	\$ 537.50	\$	537.50
Main living room sliding glass door	083219100240	Doors, glass, sliding, wood, vinyl clad, economy, 16 mm tempered insulated glass, 10'-0" x 6'-8"	Ea.	3	\$ 2,275.00	\$ 224.00	\$ -	\$ 2,499.00	\$	7,497.00

Windows & Doors Subtotal: \$ 19,331.05