



UNIVERSITY OF DENVER
Solar Decathlon

ARCHITECTURE
BUILD CHALLENGE



ARCHITECTURE


GOALS

Through this project, we will set the example for the community around us for how they can remodel their homes in the floodplain into a net-zero Home. With both the given and unforeseen risks involved in our retrofit, we will be able to build a step-by-step plan to then learn from and reconfigure to best develop the surrounding neighborhood. Our goal is to achieve net-zero housing in spite of the many challenges including asbestos, the floodplain, and a retrofit. We strive to achieve an architecturally satisfying Renovation all while under a reasonable budget.

HOUSE DESIGN

Overall, our design seeks to one, provide updated housing for University faculty and staff, and two, show other homeowners around Denver what they can do while even being located within a floodplain. First off, the University has invested significant time and money into providing students with housing on and around campus. However, the University has expressed interest in working to provide more assistance to faculty and staff to live closer to the University than otherwise potentially possible. With that goal, the University seeks to update houses already owned by DU in a manner that is rather simple and requires little to no subcontracting to complete the work. Our design seeks to assist in the goal. Additionally, we aim to show others what they can do to their house without having to spend large amounts of money and time to complete the project. The original timeline pre-COVID only lasted a few months. We are working on a cosmetic remodel while also doing simple things to the house that will bring the house to a more energy efficient status. Such elements include using Retrofoam to inject insulation into the walls, and removing old appliances that are past their peak performance age. Cosmetically, we are installing new flooring in the main bathroom and kitchen, as well as retiling the bathroom to modernize it. New cabinets will be installed to give the kitchen a more modern look. Finally, we will repaint the rooms and refinish the hardwoods to freshen up the inside of the house. All this will be elements that others in the Denver area would be able to do relatively simply, thus allowing this same plan to be reused over and over without having to tear down a house and rebuild.

Outside the house, we removed a roof over the rear east-facing porch that was added after the structure was completed. This allowed the house to receive a large amount of natural light not previously possible. This will also allow residents to sit in the mornings watching



the sun come up and crest over neighboring houses as they prepare to walk over to campus in the mornings for work.

We intend to incorporate renewable products into our house including the following:

- ☑ A solar panel array on the roof to help bring the house to net zero. This solar panel array has been installed on two sides of the house to catch as much sunlight as possible along with removing trees that shaded the array and were dying and produced a hazard for future residents.
- ☑ Recycled wood and other products to give the home an earthy feel and sustainable aspect. With the removal of the trees, this provided us with a mulch to use in the future as we redo the landscaping in the yard following major construction activities. Additionally, the University plans to use some of the trunk of one of the trees to cut into slabs and create furniture out of the trunk to be used elsewhere.
- ☑ Recycled barn wood from nearby homeowners will add to the taste through use throughout the house. Although we are still trying to determine where to use the barnwood, we anticipate creating an accent wall or several accent pieces throughout the house. This will allow the team to bring in a unique element to the house, but also reclaim something that would otherwise end up thrown away.

The interior design was going to feature an Aquaponics System that our engineering team was building; however, due to both COVID and customer choice, we were forced to abandon the project. We do have designs and ways that this can be implemented in a few ways. The Engineering Narrative discusses this project in more depth, but this as well is something that people would be able to install within their own homes with minimal help from outside subcontractors. All parts are available from standard local hardware stores. The only things people might need help for would be structural reinforcement below the fish tank, and plumbing the system to ensure all plumbing is done properly to prevent leaks and other secondary issues after the system is installed. We have included a rendering of our design, but there are other cosmetic designs that can be achieved.