

# AFFORDABLE HOUSING MATERIALS CASE STUDY MILL CREEK

MOAB, UT • 985 SF/HOME • 5 SINGLE FAMILY UNITS

## DESIGN APPROACH TO MATERIALS

The materials used on the Projects at Mill Creek will be a physical manifestation of the project context: the red rock desert of Moab, Utah. Straw bale and earth plaster provide for a moldable wall surface; earth tones and colors further echo the landscape. The structure, which is typically hidden, is made visible through elements such as beveled window jambs that emphasize the atypical wall thickness and “truth windows” that reveal the straw bales hidden behind plaster. Motifs of plants and animals and carved niches in walls (similar to those found in naturally-occurring sandstone) connect occupants to nature and to the unique setting.

Community Rebuilds has been building net-zero, affordable homes with straw bale and other natural materials since 2010. Embarking on the Living Building Challenge inspired the team to take an even closer examination of their materials palette. To begin, the project team first developed a “core materials list” of products used successfully on past homes. Any non-essential materials on the project were eliminated from the scope, saving on cost, vetting time, and the carbon footprint of the project. In their Biophilic Design documents, the project team indicates that they sought to “practice the essentialism found in nature by consciously reducing the use of resources...and seeking simple elegance as a form of expression.” The “essential materials” were prioritized in the following order: natural materials, salvaged materials, and products in the International Living Future Institute’s Declare database. Any materials that did not fit within either of these three categories were vetted in collaboration with the manufacturers. The project team intended to use Exceptions to the Red List sparingly, as a last resort.

Community Rebuilds has always prioritized the use of natural materials in their homes. Along with providing sustainable, affordable housing, the organization uses its builds as an opportunity to train the next generation of natural builders. Each build provides an education for interns on building processes such as laying adobe floors, applying earth plaster, and utilizing straw bale as insulation. Even the pigmentation and clays for the plaster are often found nearby. Some of

## NOTABLE MATERIALS

### NATURAL

WHEAT STRAW INSULATION  
BURLAP (INSULATION)  
ADOBE FLOOR  
PLASTER

### SALVAGED

PALLETS (PLASTER)  
LUMBER + PLYWOOD CUT-OFFS (PLASTER)  
STICKS (PLASTER)  
CABINETS  
BUTCHER BLOCK COUNTER  
FIBERGLASS INSULATION

### DECLARE

ALPEN ZENITH WINDOW  
OWENS-CORNING  
ECOTOUCH R-11 INSULATION  
THERMAFIBER INSULATION  
ASSA ABLOY HARDWARE  
ECOS PAINT

## TRUTH WINDOW



PHOTO COURTESY OF COMMUNITY REBUILDS





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these materials require a process that can be labor intensive; however, the apprenticeship structure means that these materials are not cost-prohibitive, even for affordable housing. At the Projects at Mill Creek, using a water-resistant plaster, rather than conventional shower surrounds in the bathroom and fabricating concrete countertops on site helps the project avoid the challenges of some of the more troublesome products for affordable housing projects. The use of adobe floors allowed the project team to construct a highly functional and beautiful flooring material which has been used successfully in the southwest for generations. These “dirt cheap” materials, combined with the apprenticeship program, enable the Community Rebuilds team to build houses for just \$70/square foot.

The use of salvaged materials is also an important component in this project. The project site formerly held a building used as Community Rebuilds’ intern housing. This house was originally built as a Civilian Conservation Corps (CCC) bunkhouse. Salvaging and reusing materials from this structure allowed the historical connection to both the community and Community Rebuilds to be woven into the project site’s new incarnation as Living Affordable Housing (the first in Utah!). The project team also avoided the difficulties of finding commercially-available Red List Free and Forest Stewardship Council (FSC) certified cabinets by using salvaged cabinets from this structure for both the kitchen and bathrooms. Other salvaged materials are listed in the box.

Lastly, the project team relied on the Declare database to streamline project vetting. As Community Rebuilds is a non-profit with limited funds, the team worked directly with manufacturers to procure a discount on products that presented a budgetary challenge. Assa Abloy offered a donation of door hardware. Alpen High Performance Products discounted their high-quality fiberglass windows, to avoid the use of vinyl windows that are often found on new affordable housing projects. The project team was able to easily source a few products (including Alpen and Metal Sales) nearby from Denver, Colorado.

### BARRIERS + LESSONS LEARNED

Similar to other project teams, the Projects at Mill Creek team encountered difficulties sourcing FSC wood. FSC wood is not readily available near the project location (eastern Utah) and had to be trucked in, causing a cost premium. The project team mitigated the cost implications by using all salvaged wood for the trim and for all non-structural wood elements on the project. The structural wood that could not be salvaged or designed out of the project was absorbed into the budget.

The project team also encountered a learning curve for the Materials Petal requirements. The Community Rebuilds team is intentionally structured with an educational mission to promote the next generation of natural builders. While the organization maintains a deep institutional knowledge of the construction of straw bale homes, the Red List requirements were new to the team. They also found that some manufacturers were unwilling to disclose information or did not understand the Red List. Given the small scale of the project, it is simpler and cheaper for them to source from the local hardware store. The project team has begun a conversation with their local hardware store about carrying some of the Red List Free materials that were sourced for this project. The project team also found that learning about the Red List helped them develop a broader perspective and question the makeup of materials in their personal lives. One team member described buying a raft and realizing she could not buy a PVC raft after spending so much time eliminating PVC from the Mill Creek projects.

The experiences of this project team underscore the need for collective advocacy on both the Red List and FSC wood. The more that FSC wood and Red List Free products are demanded by project teams, the more readily available and cost-efficient they will become for the entire affordable housing sector (and other sectors). As the first affordable housing project attempting Living Certification (and the Materials Petal) in the southwest, this project is helping to drive demand and will make it easier for future projects to source healthier products.