

# STRAW BALE HOUSE - GREEN ROOF EXHIBIT



This exhibit demonstrates a combination of strategies to save energy and optimize interior comfort. More importantly, nearly 95% of this house's construction was re-purposed materials including the door, windows, corner posts and straw bales. The wood for the corner posts was constructed from local trees reclaimed from a local fire. The design maximizes the climate controlling effect of the house, such as location of the windows and the roof vents. The roof also insulates the exterior from temperature changes and increases oxygen levels around the house and has an aesthetic resulting in a home with a completely unique look. The roofing system is engineered to support the soil and plant weight as well as incorporating an irrigation and drainage system. All of these techniques result in an environmentally friendly house that improves comfort. This is especially meaningful on hot summer days when you can best experience its insulating capabilities. While at The Garden, ask someone to invite you inside the house to feel the difference for yourself.

## Keeping You Cool



The most impressive strategy of this house is in the name itself—the walls are built out of straw bales rather than wood frames and fiberglass. Straw bales are more energy efficient than lumber framing, and act as a natural insulator. Trees take decades to mature enough to get lumber for 2x4's. But straw is leftover from cereal crops like wheat, barley, oats, rice and rye. It takes almost no energy when harvesting it, and no environmental harm is done. Consider this, once the life cycle of the house is complete (about 100 years), you can strip off the exterior treatments and till it back into the earth.

## STRAW BALE HOUSE - GREEN ROOF EXHIBIT (continued)



### CONSTRUCTION & MATERIALS

The construction of this "tiny house" was simple. A layer of gravel was used as a base with metal beams placed on top to elevate the first row of straw bales. The bales were then stacked to the desired height and re-bar rods hammered in to bond the bales together. The bale walls were wrapped in chicken wire to allow a coat of plaster or "cob" to be applied. The thickness of the straw bales serves for increased insulation. And the roof was built with air vents to allow the house to "breathe."



### INSULATION

Straw bale houses are "green" constructions. Straw insulation can save up to 75% on energy bills. Since most straw used is a by-product of farming, it is an inexpensive and renewable material. It's also located throughout the U.S., requiring less transportation to deliver it to most construction sites. These features reduce its carbon footprint as a building material. Added bonus: Straw bale houses are more sound proof and more fire resistant than most traditionally constructed homes.



### WINDOW SELECTION

Wanting to use recycled materials as much as possible, this window was left over from another project. From the windows you can see how thick the walls are. Thick walls improve temperature control and sound proofing. Nearly any type of window can be used in a straw bale house. In fact, a dual-paned, UV tinted window further improves energy efficiency and sound proofing effect of straw bale construction. A "green roof" gives even more temperature and sound control. Read the next section for details on green roofs.

## STRAW BALE HOUSE - GREEN ROOF EXHIBIT (continued)



### ROOF STRUCTURE & IRRIGATION

Green roofs are a "green" option for home construction but will require help from an expert. They're an engineered set of connected trays, each holding enough soil to plant a variety of water smart plants. The trays also capture rainfall and water from irrigation, minimizing runoff. The layer below the trays is a waterproof and root proof membrane, protecting the roof structure from being damaged. Each tray requires drainage to avoid too much water build up, which can overload the roof and cause damage. Since this tiny house has no gutter system, rain is allowed to runoff reaching plants in the surrounding yard. For full-sized homes, a fully integrated irrigation system is recommended and there are many options to choose from. This house is watered manually to supplement rainy season. Green roofs have several advantages over more traditional roofs: they regulate temperatures inside the house, extend the life of the roof (can last 30-50 years), improve air quality in and around the house, and help reduce greenhouse gases. This tiny house is the peak of efficiency and green friendly techniques.



### PLANT SELECTION

Many different types of plants are used on green roofs. Herb gardens have been successful as green roofs and provide the opportunity for farm-to-table home cooking. However, if your intention is for drought tolerance, low growing succulents are perfect. With seasonal flower variety and contrasting foliage colors, textures and shapes, they are a great choice for home aesthetics as well. When no irrigation system is used, thicker-leaved succulents are best.