

Journey House Maternity Home - Team OSU - AH - Oklahoma State University

Project Description:

Our client is the “Journey Women’s Center,” which is a nonprofit organization that provides shelter, medical care, and training to disadvantaged women through their pregnancy and prepares them for independent living. The project, the Journey House, will be a housing complex with the major goal of providing a safe and positive environment for these women. Here, they will be given the help and care necessary to process trauma and find healing from complex PTSD, childhood abuse, and addiction to break the cycle of systematic neglect and poverty. The major design goal is to create a clean, healing, and functional shared environment that fosters a sense of hope and community. Phase One of the project is to build two attached maternity homes (four dwelling units total) on a 3.3-acre lot in Hillsdale, Oklahoma. Transitional units and additional maternity homes are proposed in future phases.

Design Strategy:

Phase One of the Journey House features two mirrored blocks each comprising two dwelling units: a 5-bedroom maternity unit and a 1-bedroom supporter unit. The maternity unit has space for four women and a space for relief staff. In the women’s private quarters, sinks are provided along with changing stations and wash basins for newborns. Two restrooms are shared between the four rooms. The private quarters are anchored by open-concept public space meant to encourage interaction and community. Separation of the maternity home living area from the supporters, or house parents, space was essential. A separate entry was required for privacy. For security, each dwelling unit only has one entry.

Entry Render:



Project Data:

Location:	Hillsdale, OK, USA
Climate Zone:	4A (IECC 2021)
Lot Size:	3.3 acres
Building Size:	5,980 SF, 1 story
Maternity Units:	(2) 5 BR at 2,333 SF each
Supporter Units:	(2) 1 BR at 688 SF each
Occupancy:	12 adults (498 SF/person)
Construction Cost:	\$177/SF O&P
Energy Performance:	Source EUI: 21.3 kBtu/SF/yr Site EUI: 9.64 kBtu/SF/yr HERS A1/A2: 26/27 (w/o PV) HERS A1/A2: -1/-3 (w/ PV)
Average Utility Cost:	- \$104/month
Carbon Emissions:	- 2.19 kg CO2 eq/SF/yr

Technical Specifications:

Thermal Properties:			
Wall:	R-43	Roof:	R-65
Foundation:	R-14	Windows:	U-0.20, SHGC-0.37
HVAC + Comfort:			
Closed-loop heat pump + chiller (HSPF 15.4, SEER 15.4)			
Passive heating solar collector			
Passive cooling forced ventilation system			
Ductless ERV			
On-Site PV:	Roof-mounted, 7 kW DC		

Partners:

Industry Partners:
Guaranteed Watt Saver, 820 Solar, Dolese Standard Panel, and AWAD Construction

Community Partner: Journey Women’s Center

10 Contests – Project Highlights

Zero Energy Building:

The Journey House achieves net zero energy through the incorporation of a 7 kW DC PV array. This array offsets the electricity demand for the summer months. A passive heating system significantly lowers the heating demand in the winter. The combination of systems reduces the grid energy use to 0.

Carbon Impact:

Due to our complex user needs and the rural location, retrofitting a building was not feasible. To reduce the building's carbon impact, low-carbon materials and carbon sequestering plants and trees are used.

Community Impact:

The Journey House provides free housing and support for disadvantaged women through their pregnancy. This project seeks to help these women find healing and break the cycle of systemic poverty. Over its lifetime, the Journey House can provide no-cost support to as many as 500 disadvantaged women.

Architecture:

Given that construction will be funded by donations, the design of each maternity unit achieves spatial efficiency and simple building form to minimize construction cost. The design encourages sharing and promotes a sense of community. The living-dining-kitchen space is open to maintain views inside. Biophilic design is used to improve occupant health. The south face of the Journey House is maximized to facilitate passive solar heating and natural ventilation.

Engineering:

A closed-loop heat pump provides heating and cooling through individually controlled terminal units in the ceilings of each bedroom and the living space. This system is integrated with a passive heating solar collector. ERVs provide fresh air through MERV 13 filters.

Envelope:

The Journey House is designed with wood framing and SIPs panels. The house sits on a shallow footing concrete slab. The roof is standing seam metal to facilitate easy installation and replacement of PV panels. Plentiful windows to the north and south provide ample natural light to the shared spaces and to the living quarters. An indoor, above-ground storm shelter is employed in case of tornados.

Efficiency:

By reducing infiltration, reducing plug loads, increasing envelope R-values, increasing the efficiency of the mechanical system, and adding passive systems, the building has reduced mechanical loads.

Grid-Interactivity:

The home's PV are mounted on the southern roof to maximize solar gain. Electricity can be stored in DC batteries or sent directly to the house or the grid as AC power. More energy is produced and sent to the grid than is consumed in operations; therefore, the building is net zero operational energy and carbon.

Life-Cycle:

In the cradle-to-grave analysis with a lifespan of 60 years, our building generates 18.8 kg CO₂ eq/SF. Over this time, 149.9 kg CO₂ eq/SF is sequestered from the landscaping around the Phase 1 buildings.

Health:

The rural location of Hillsdale offers an opportunity to escape from abusive relationships. The location acts as a safe haven allowing the women to focus on healing. Internal zoning of spaces allows for private zones away from the louder public spaces.

Market:

The simplicity of design makes the Journey House a viable prototype for a zero energy, zero carbon maternity home. Low operational energy helps the maternity home run at no cost to the non-profit.

Community:

The Journey Women's Center sees a need for an encompassing pregnancy support program. This maternity home will be a safe place for disadvantaged pregnant women as they learn the skills necessary to get on their feet and potentially support a family. The project masterplan envisions a tight-knit community of women within the supportive haven of Hillsdale.