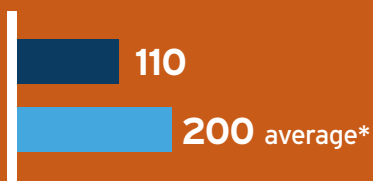


Case Study: Blue Dot Farm

The Blue Dot Farm Farmworker Unit is a prototype for flexible, low carbon, and energy efficient farmworker housing. Farmworkers often do not have access to adequate and affordable housing; yet they are essential workers, growing food and caring for livestock. This house was built for the agricultural community, made with agricultural materials: namely straw bale and sheep's wool. Carbon storing materials are key to the project: strawbale insulation, strawboard interior paneling, and cork rigid insulation. It utilizes a hybrid straw bale system in which straw bales are placed upright between 2x4 studs. This allows for the many benefits of bale walls - R30 insulation, excellent acoustics, carbon sequestration - within the framework of plywood shear walls and the option for a wide range of exterior finishes.

Embodied Carbon

Cradle-to-gate, kg CO₂e/m²



*Average based on report from 2022.

Reduction Strategies



Biobased insulation
(strawbale, cork board)



Lime plaster & salvaged
Redwood siding



Low carbon
concrete foundation



Strawboard
interior paneling



Earth masonry unit
foundation stem wall

Carbon Storage



Strawbale
insulation



Cork board
insulation



Strawboard
paneling

7

tons of CO₂ stored



“

We aimed to bring the values of land stewardship to farmworker housing, caring for people and planet using agriculturally based materials.

Owner, Blue Dot Farm

Operational Carbon | The roof overhangs block direct summer sun and the high-up operable windows provide ideal stack-effect ventilation to stay cool as well as letting in winter sun. The interior plaster on the highly insulating strawbale walls provides thermal mass to slowly absorb heat from the day and release it during the night. These passive strategies result in the residence only requiring a small electric heat pump to provide additional heat in the cold months.



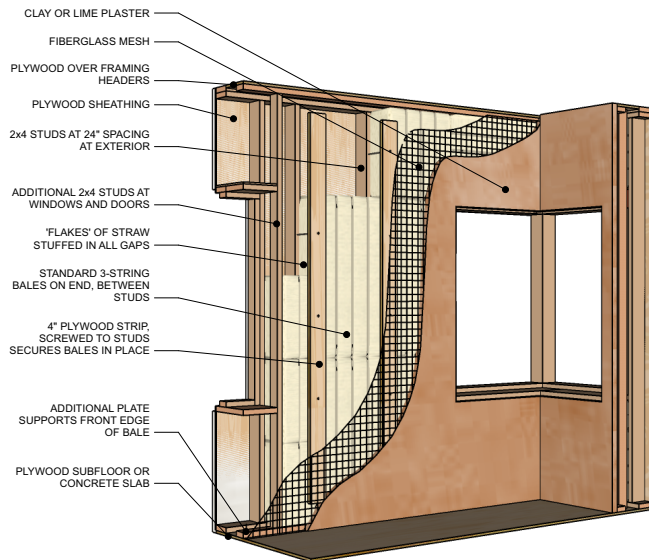
Electric
heat pump



Highly insulating
strawbale walls



Stack-effect
ventilation



Bales on End Between Studs Wall System

In addition to balancing the hard to avoid high emitting materials with sequestering materials like straw and cork, strategies to reduce the project's carbon footprint included careful selection of windows (where glass has a high embodied carbon footprint) and designing mechanical systems for efficient performance while meeting a range of personal temperature preferences. Notably, the overall construction was designed with a modest scale meeting a total embodied carbon intensity of only 3,179 kg per occupant.



Strawbale Installation

Lessons Learned

1. Balance the hard to avoid high emitting materials (metal roofing, glass) with sequestering materials (straw, cork).
2. Work with concrete batch plants to push for mixes with lower cement content for greater reductions in embodied carbon.
3. Specific site conditions (e.g. pouring a concrete "rat slab" under the crawlspace) can have high embodied carbon impacts.

Project Information

Project name: Blue Dot Farm Farmworker Housing Unit

Location: Nicasio, CA

Builder: Hoyt Dingwall, Faultline Builders

Architect: Arkin Tilt Architects

Year Built: 2022

Typology: Farmworker housing, residential

Size: 1,275 SF GFA

Cost: \$500,000 - \$750,000