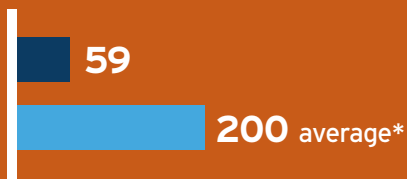


Case Study: Vali Mews

Vali Mews is a missing middle urban infill project located in Phoenix, AZ. The four homes represent the “everything bagel” of truly good building. Every single material was selected with the care put forth by a top chef creating an organic local menu. Vali Homes designs buildings to maximize human joy while minimizing impact. These homes are the healthiest and lowest carbon modern homes in Arizona.

Embodied Carbon

Cradle-to-gate, kg CO2e/m²



*Average based on report from 2022.

Reduction Strategies



Healthy, low-carbon insulation



Red List free airtightness and waterproofing products



Natural low-carbon finishes (like Accoya)

Carbon Storage



Gutex Woodfiber exterior insulation



Blown cellulose insulation for floors and roofs



Havelock Wool insulation



Wood framing (FSC where possible) and flooring

37 tons of CO2 stored



Photos by Vali Homes



“

Is it ok that I feel this good in here?

Vanessa Ray, Coldwell Banker Real Estate

Operational Carbon | We followed Passive House design strategies to achieve 90% lower energy use than the average new home in Phoenix. All units were at least 50% tighter than the Passive House standard with 0.3 ACH50. We used a combination of Pro Clima airtightness (Intello and Adhero and window tapes) with Aerobarrier as our icing on the cake (to seal up penetrations caused by the trades during construction).



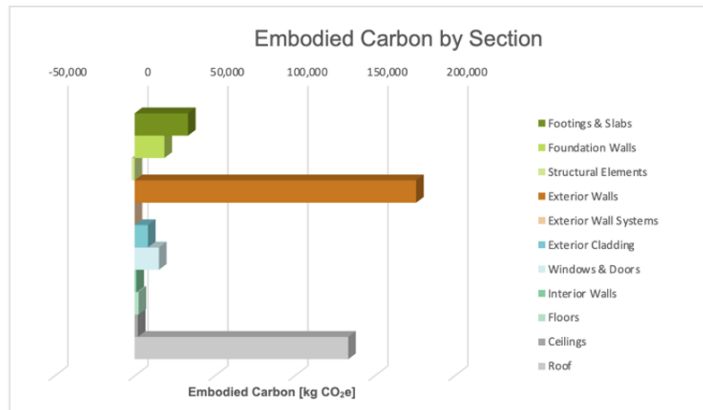
0.3 ACH50 airtightness performance achieved



Reduced energy usage with Passive House design strategies

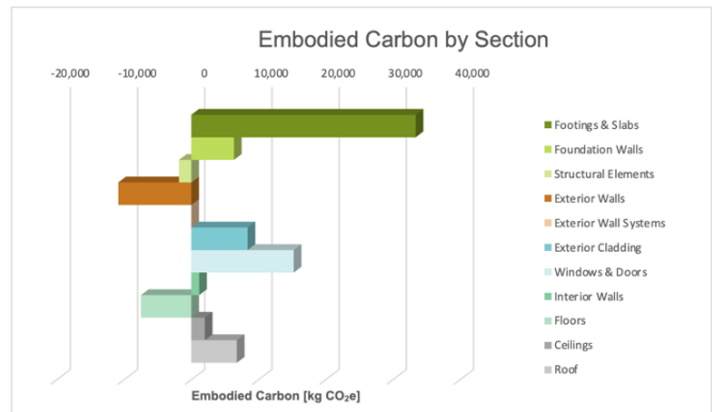
Baseline design for high performance home in Phoenix (spray foam and XPS insulation):

Section	Embodied Carbon [kg CO ₂ e]
Footings & Slabs	33,389
Foundation Walls	18,629
Structural Elements	-1,835
Exterior Walls	175,960
Exterior Wall Systems	0
Exterior Cladding	8,366
Windows & Doors	15,240
Interior Walls	1,169
Floors	2,533
Ceilings	2,004
Roof	133,507
NET TOTAL	388,962



As-built home (Vali Mews) with low carbon insulation (woodfiber, wool, cellulose):

Section	Embodied Carbon [kg CO ₂ e]
Footings & Slabs	33,389
Foundation Walls	6,344
Structural Elements	-1,835
Exterior Walls	-10,870
Exterior Wall Systems	0
Exterior Cladding	8,365
Windows & Doors	15,240
Interior Walls	1,169
Floors	-7,506
Ceilings	2,004
Roof	6,773
NET TOTAL	53,073



The as-built home exhibits an embodied carbon result of 87% less than typical high performance construction in Phoenix which would typically have spray foam for interior insulation (walls and roof) plus exterior XPS insulation with synthetic stucco finish. Reductions from baseline were achieved by switching from standard high carbon impact insulation to healthy low carbon, or carbon-storing, insulation options.

Lessons Learned

1. The trades truly enjoyed using healthy low carbon materials and embraced the design team's goals for low carbon high performance.
2. Foam insulation, specifically spray foam and XPS rigid board, can be 10x the material carbon emissions of concrete.
3. It can be challenging to make truly good building profitable, but research and development is ongoing to better understand how healthy low-carbon materials perform in hot and mixed climate zones.

Project Information

Project name: Vali Mews

Location: Phoenix, AZ

Builder: Beckett Construction and Vali Homes

Architect: Colab Studio and Vali Homes

Year built: 2023

Typology: Zero lot line single family residence

Size: 2,400 SF

Cost: \$1,250,000 - \$1,500,000