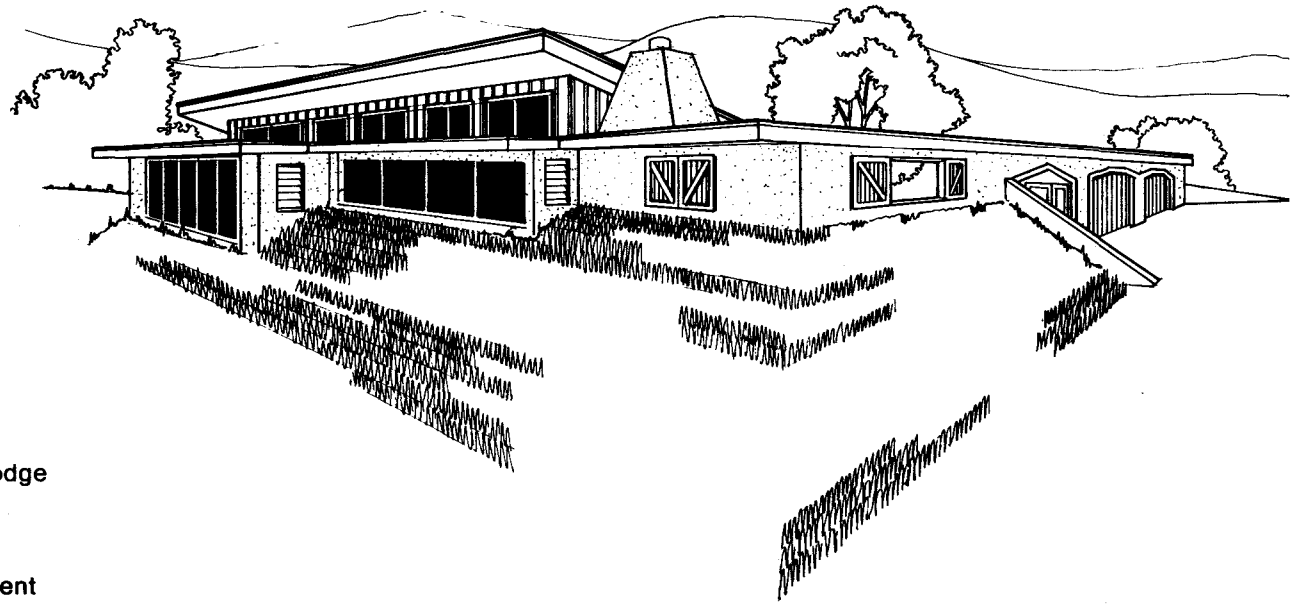
Dodge City, KS



Builder: Country Club Heights Developers, Dodge City, KS

Designer: G.L. Weaver, Dodge City, KS

Solar Designer: Kansas Energy and Environment Lab, Inc., Wichita, KS

Price: $105,000

Net Heated Area: 2496 ft²

Heat Load: 90.6 x 10⁶ BTU/yr

Degree Days: 4986

Solar Fraction: 31%

Auxiliary Heat: 5.05 BTU/DD/ft²

Passive Heating System(s): Indirect gain, isolated gain, sun-tempering

Recognition Factors: Collector(s): South-facing panels, glazing, 250 ft² **Absorber(s):** Concrete slab floor and wall, concrete Trombe wall **Storage:** Concrete slab floor and wall, concrete Trombe wall—**capacity:** 6953 BTU/°F **Distribution:** Radiation, natural convection **Controls:** Moveable greenhouse glazing, vents, roof overhangs

Back-up: Natural gas furnace (52,000 BTU/H), wood stove

Passive Cooling Type: Convection, stack effect

Country Club Heights Developers, Inc., of Dodge City, Kansas, have developed a simple southwestern style 1-story passive house for a climate with extreme annual temperature swings. This locally popular style has been designed to maximize natural lighting and solar gain, while minimizing heat loss.

The house uses three main solar heating systems. The first is a Kalwall glazed greenhouse that collects solar heat. Its concrete wall and concrete slab floor **absorb** and store this heat. Heated air is **distributed** into the living space from the greenhouse through the one-way vents high in the wall, and natural convection recirculates cooled air back to the greenhouse through a vent lower in the wall.

During the summer, the glazing is replaced by screens, and the manually controlled vents high in the wall allow cool breezes to enter. If the lower vent is closed, warm air is expelled into the greenhouse. Insulation in the greenhouse roof also reduces solar gain in the summer.

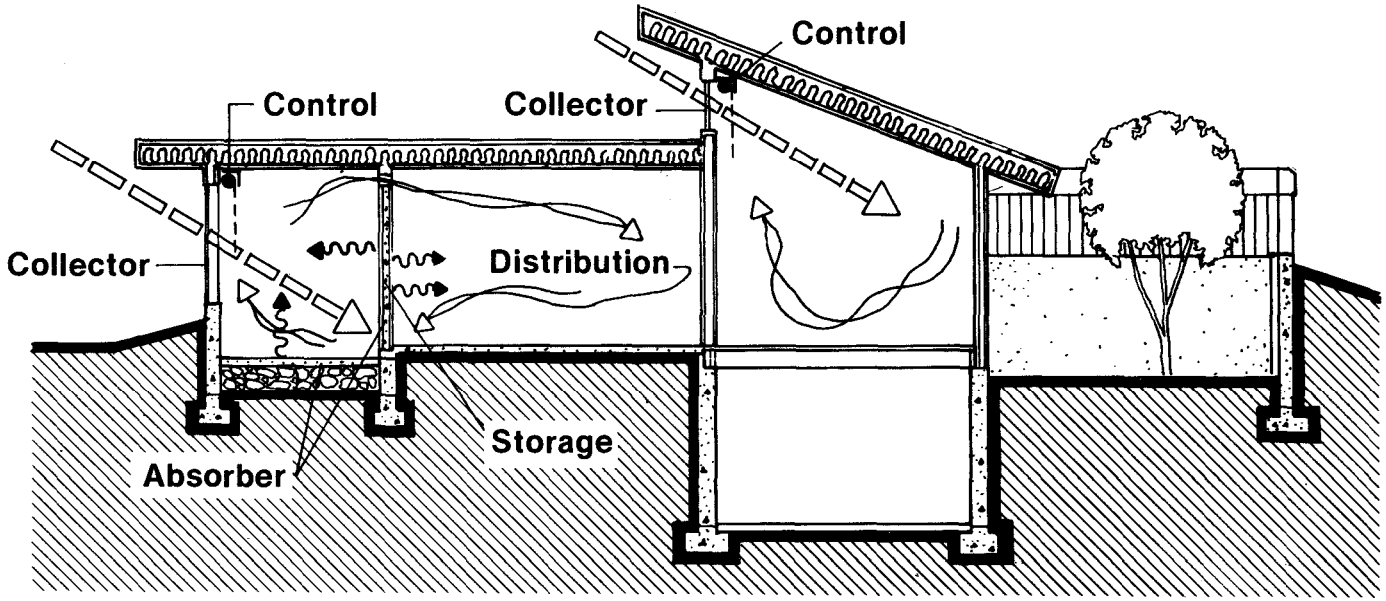
The Kalwall™-glazed concrete Trombe wall provides the second form of solar heating. The masonry storage wall that is central to this Trombe system is an extension of the greenhouse storage wall. The Trombe system provides heat to the eastern half of the great room.

The double-glazed clerestory windows serving the kitchen and bedrooms on the north are the third passive heating system. They

add natural light and some solar gain. Manually operated moveable insulation for these windows **controls** unwanted heat loss. Roof overhangs above the three solar heating systems deter heat gain in the summer.

Back-up heat for the house is provided by a gas furnace and a wood stove; cooling is provided by a conventional electric system.

Several other design features moderate the effects of temperature extremes on the building heating and cooling loads. Sheltered courtyards with full-height walls on the north and east protect the building from winter winds, while the roof slope also deflects the northwestern wind. The main entrance is through an air-lock, and the service entrance opens from the garage into the utility room.



This plan is from the book
“Passive Solar Homes – 91 new award-winning, energy-conserving single-family homes”,
The U.S. Department of Housing and Urban Development, **1982**

The solar homes designs in this book were the winners of HUD’s fifth (and final) cycle of demonstration solar homes. The 91 winning home plans in the book were selected from 550 applications from builders.

This was a time of great interest and activity in the passive solar home designs – many of the winning homes show a level of innovation not found in most of today’s passive solar designs.