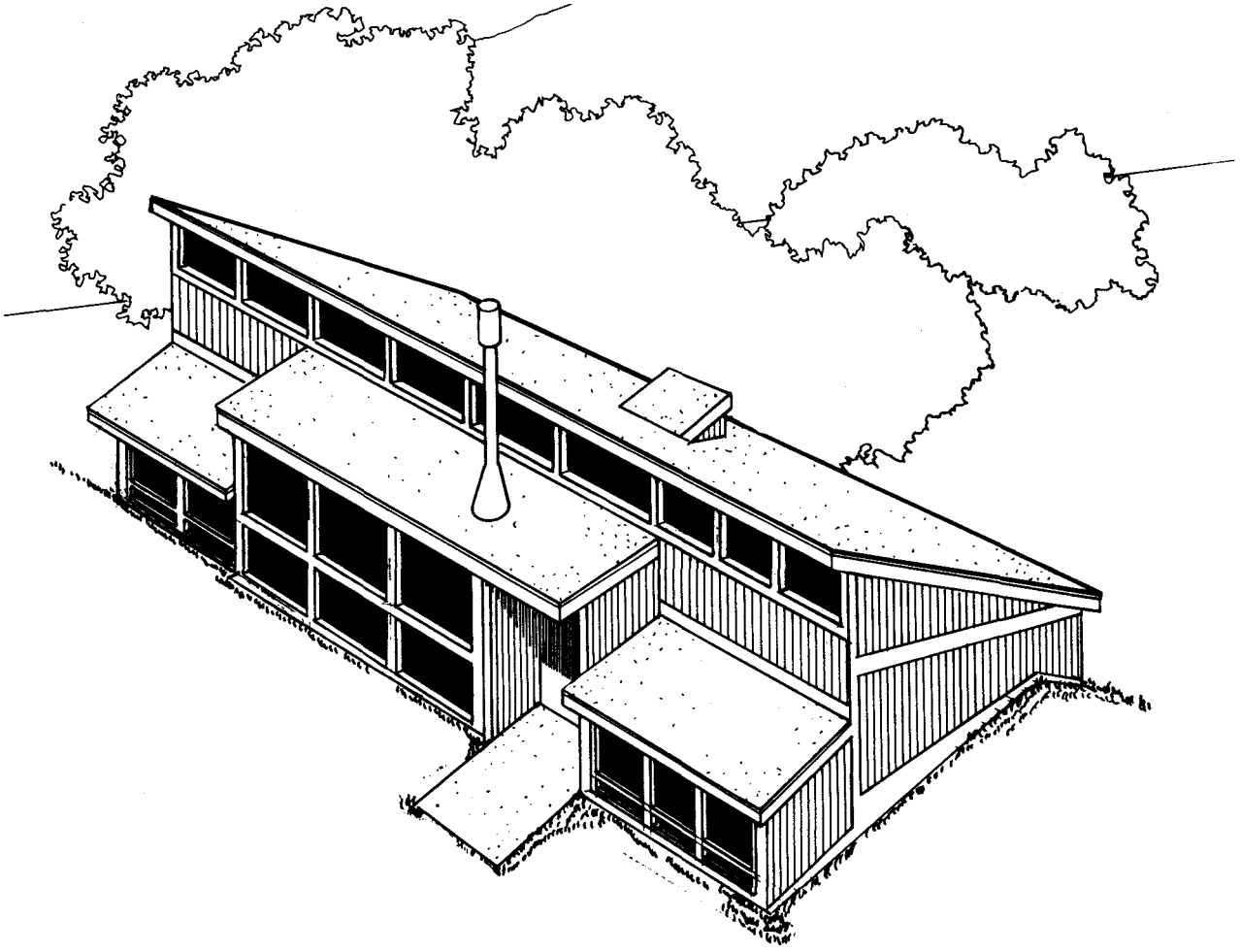
Browntown, VA



Builder: W. Allen Nicholls, Inc., Front Royal, VA

Designer: Design Konstruction, Bentonville, VA

Solar Designer: Design Konstruction

Price: $56,500

Net Heated Area: 1232 ft²

Heat Load: 56.3 x 10⁶ BTU/yr

Degree Days: 4350

Solar Fraction: 64%

Auxiliary Heat: 3.73 BTU/DD/ft²

Passive Heating System(s): Direct gain

Recognition Factors: Collector(s): South-facing windows and doors, clerestory windows, 308 ft² **Absorber(s):** Concrete slab floors, mass walls, surface of plastic containers **Storage:** Concrete slab floors, mass walls, water in plastic containers—**capacity:** 30,170 BTU/°F **Distribution:** Radiation, natural and forced convection **Controls:** Operable window quilts, thermostat

Back-up: Heat pump with an electric resistance coil wood stove

Passive Cooling Type: Natural and induced ventilation

The east, north, and west sides of this small rectangular house are three solid concrete block walls that are backed into the south-sloping side of a hill. The south-facing side of the house features two levels of glass. The site is on five acres of relatively uncleared land in a rural subdivision on a ridge of the Shenandoah Valley in Warren County, Virginia.

Collectors for the passive solar system are panels of double glass in the ground floor where the living room, flanked on each side by a bedroom, is located. On the upper floor, where a central family room looks down into the living room, a den to the west, and the kitchen/dining area to the east, a row of clerestory windows collects sunlight.

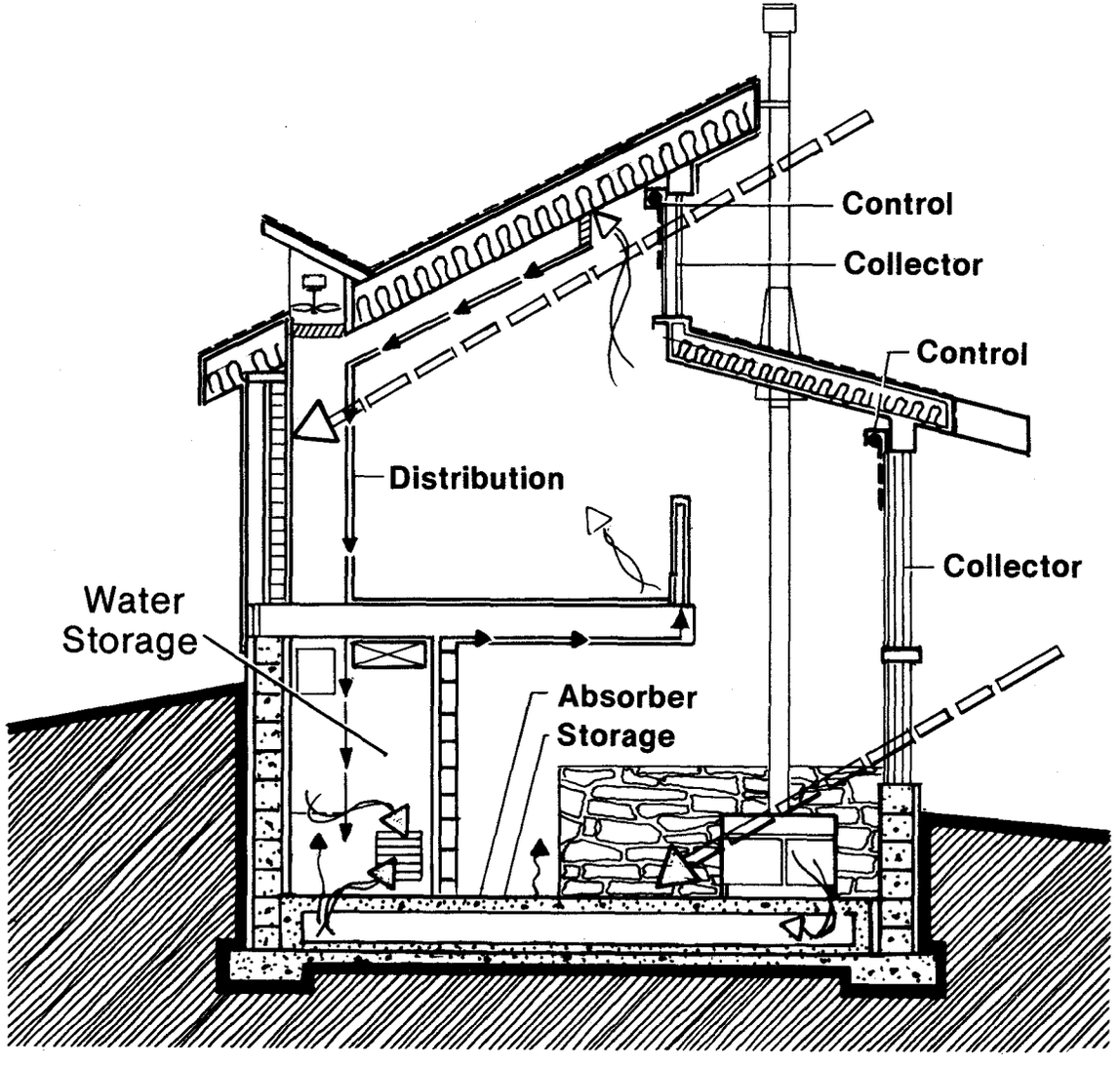
Concrete slab floors and the 12-inch solid walls **absorb** and **store** the direct solar heat. In addition, a specially insulated storage room, virtually underground at the center rear of the house, holds 1,1521-gallon plastic containers for supplemental storage.

Heat is radiantly **distributed** from the storage walls and floor, and to avoid waste, a damper and fan system draw stratified

air from the top of the clerestory area into the remote water storage closet. During periods of overheating, air can also be drawn through floor ducts beneath the concrete slab and discharged into the storage room. The storage closet can discharge through a series of **distribution** ducts to provide nighttime heating through the baseboard upstairs and from the ceiling. of the ground floor.

All windows are fitted with hand-operated window quilts to **control** nighttime heat loss. A wood stove and a heat pump with an electric resistance coil provide back-up heat. When temperature in the storage area and the rest of the house is below the required level, auxiliary heat comes on and is distributed through slab vents and ducts.

In the summer, excess heat is released from the house through a vent stack whose fan pulls air through the hollow floor slab and exhausts it via a roof ventilator. Lower sections of the upstairs glass open for summer ventilatio'n.



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 ofHUD'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.