

Builder: Berg and Associates, Design/Builders, Plymouth, MN

Designer: Berg and Associates

Solar Designer: Berg and Associates

Price: \$120,000

Net Heated Area: 1665 ft²

Heat Load: 76.5 x 10⁶ BTU/yr

Degree Days: 8054

Solar Fraction: 83%

Auxiliary Heat: 0.99 BTU/DD/ft²

Passive Heating System(s): Direct gain, indirect gain, isolated gain

Recognition Factors: **Collector(s):** South-facing panels, glazing, 560 ft² **Absorber(s):** Concrete block wall, concrete floor **Storage:** Concrete block wall, concrete floor—**capacity:** 45,116 BTU/°F **Distribution:** Radiation, natural and forced convection **Controls:** Moveable insulation on Trombe walls, roof overhang

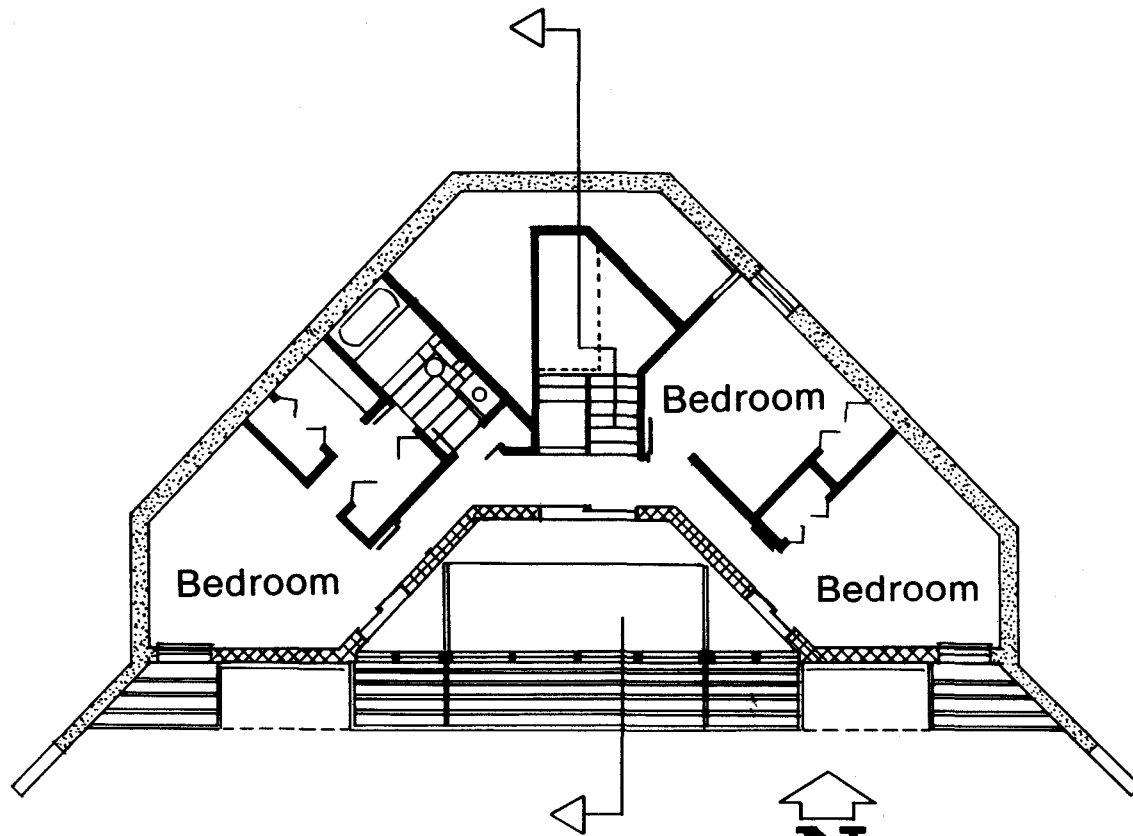
Back-up: Electric resistance heaters (30,000 BTU/H)

This contemporary, 2-story house is part of a 17-unit development. The house is buffered from winter winds by evergreen vegetation to the northwest and from the heat of early morning and late afternoon summer sun by deciduous vegetation to the southwest and southeast. Half of its wall area is sheltered by extensive earth berms; the roof is also partially earth covered. The house is heavily insulated, even for a building in the cold Minnesota climate. The main roof of the building has an A-value of 50. Above grade walls have an A-value of 19. The doors have a value of A-10, and windows are triple glazed.

The building's energy consumption is also minimized by an innovative floor plan and the use of buffer spaces. The living areas with different heating needs have been

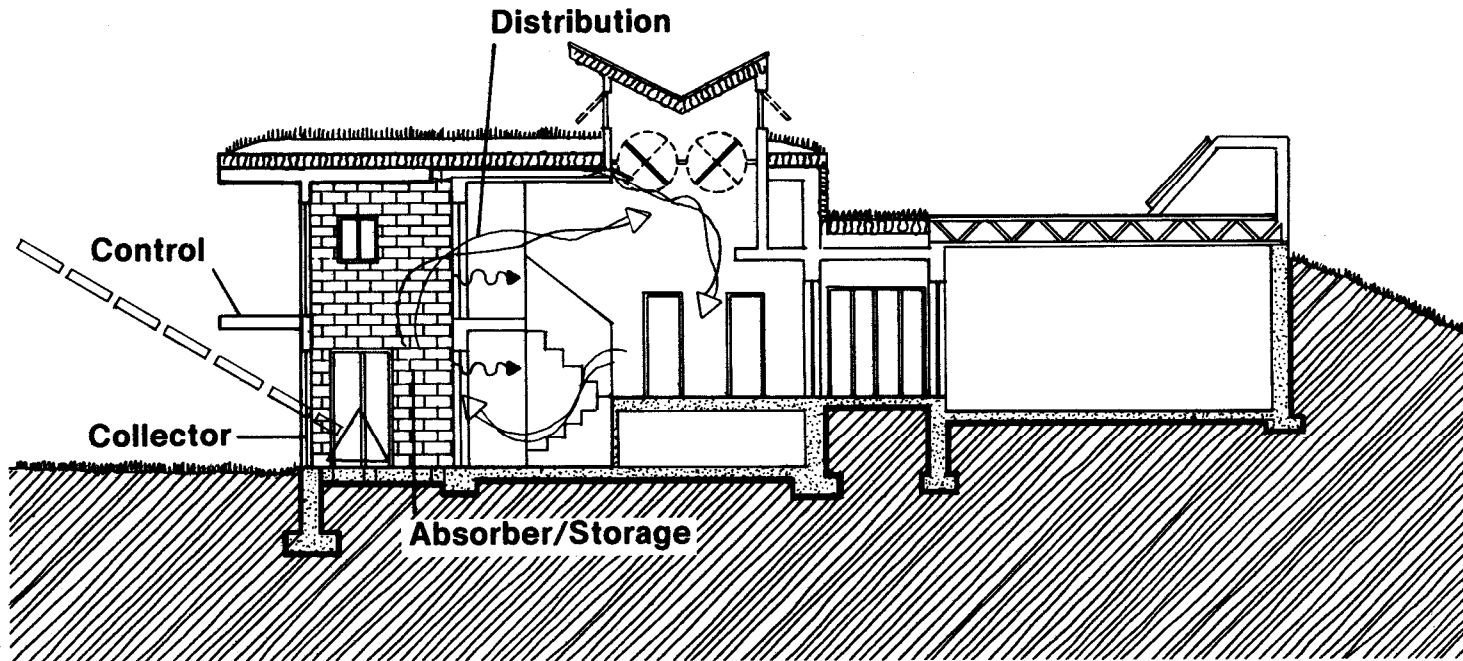
placed on different levels. The upper floor consists of a master bedroom, two additional bedrooms, a bathroom, and storage space. The lower floor includes most of the daytime living spaces: the living room, family room, kitchen, bath, and a large atrium. The garage, entry, and foyer are at an intermediate level. Each room has a separate electric resistance heating unit with individual thermostatic control. The occupants have the option of providing auxiliary heating to the lower level during the day and to the upper level at night.

The house has a well-integrated passive heating system. Three passive collection types are used: (1) over 70 square feet of triple glass on the south walls of the family room, living room, and two bedrooms provide direct heating of these rooms; (2) near-



Upper Floor Plan





above and below
 t ventilation and
 | summer months.

in extensive array
 es: water conserv-
 ; an energy efficient
 aving refrigerator; a
 resent light
 nel active solar
 llector array is
 of. This system's
 a white stone roof
 at

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.

www.BuildItSolar.com

