

# 3 Solar Energy Projects

Architect: John Hix Architect and Planner

## Provident House, Aurora, Ontario

The program was to create a house heated only by the sun in a Canadian climate. Provident House will provide design data for future solar-heated projects and will demonstrate the feasibility of long-term thermal storage, particularly for larger building projects.

The house has the following advantages. It uses no fossil fuel for heating and the heating system generates no thermal or particulate pollution. Security from the vagaries of world fuel prices and availability is afforded by this system. Since no combustion takes place, the house is relatively free of fire and explosion hazards.

### Fundamental Design Criteria

The solar components were incorporated into a large, medium-to-high-income house. The architecture was to demonstrate the continuum of Canadian vernacular, rather than be an expression of a heating system. Its form was to respond directly to the local microclimate. New environmental possibilities were to be demonstrated by the conservatory, which extends the summer season at both ends.

### Energy Conservation Design

The computer program was used to synthesize climate data and size the amount of collector area and the thermal storage capacity. This program was rerun continually during the design process. No windows were allowed on the south side at bedroom level and an attic space was created for the mechanical equipment, freeing the basement for the storage tank. The optimum angle for the solar collectors in this location and for the particular heating load/collector area/storage capacity characteristic proved to be 50-55° from the horizontal.

SECTION B: 1 collectors. 2 attic mechanical equipment. 3 dining room. 4 hall. 5 storage tank.

SECTION A: 1 deck. 2 conservatory. 3 entry.

BEDROOM FLOOR PLAN: 1 conservatory. 2 storage loft.

GROUND FLOOR PLAN: 1 conservatory. 2 garage.

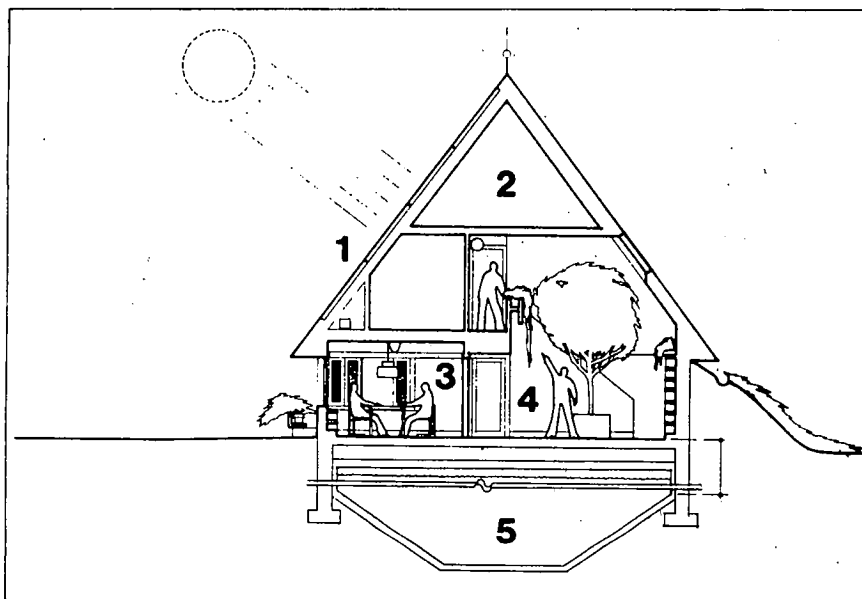
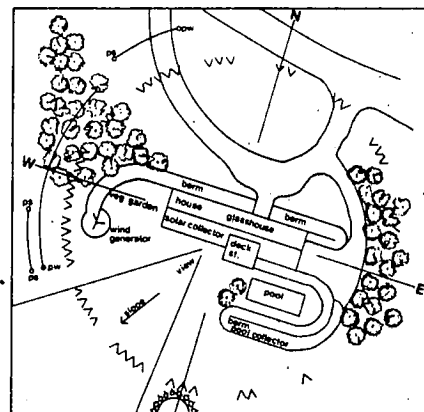
visitors. Major windows have overhangs which, providing shade, minimize the summer cooling load and eliminate the need for mechanical cooling. A fan extraction grill for summer cooling is accommodated in the central hall.

### Microclimate Analysis and Site Considerations

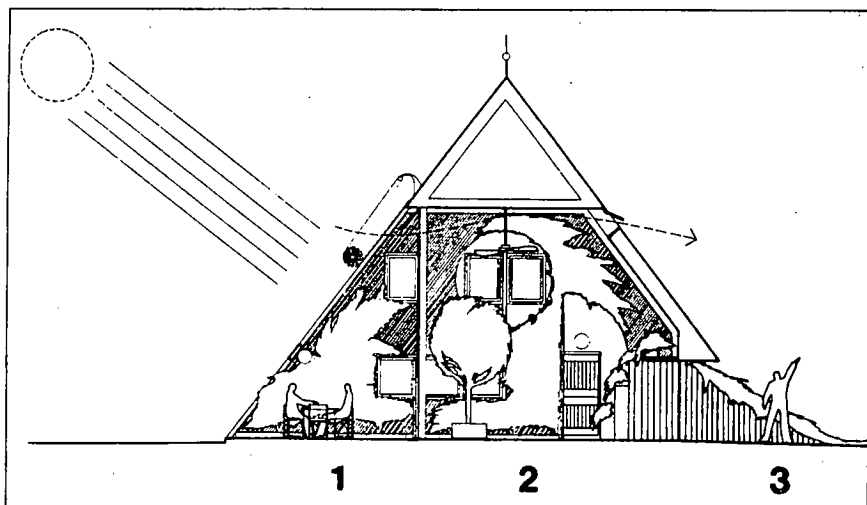
The solar collector roof must be

### Internal Architectural Considerations

The amount of glass in the house was related to studies of Georgian and Victorian houses, around 12 per cent of floor area. Double glazing and storm windows were used throughout. Glass on the north side of the house was kept to the minimum. The R value of the walls is 27, and of the roof 39. Vestibules provide airlocks and lessen infiltration. The conservatory provides a new type of temperate environment and can act as a holding area for



SECTION B



SECTION A