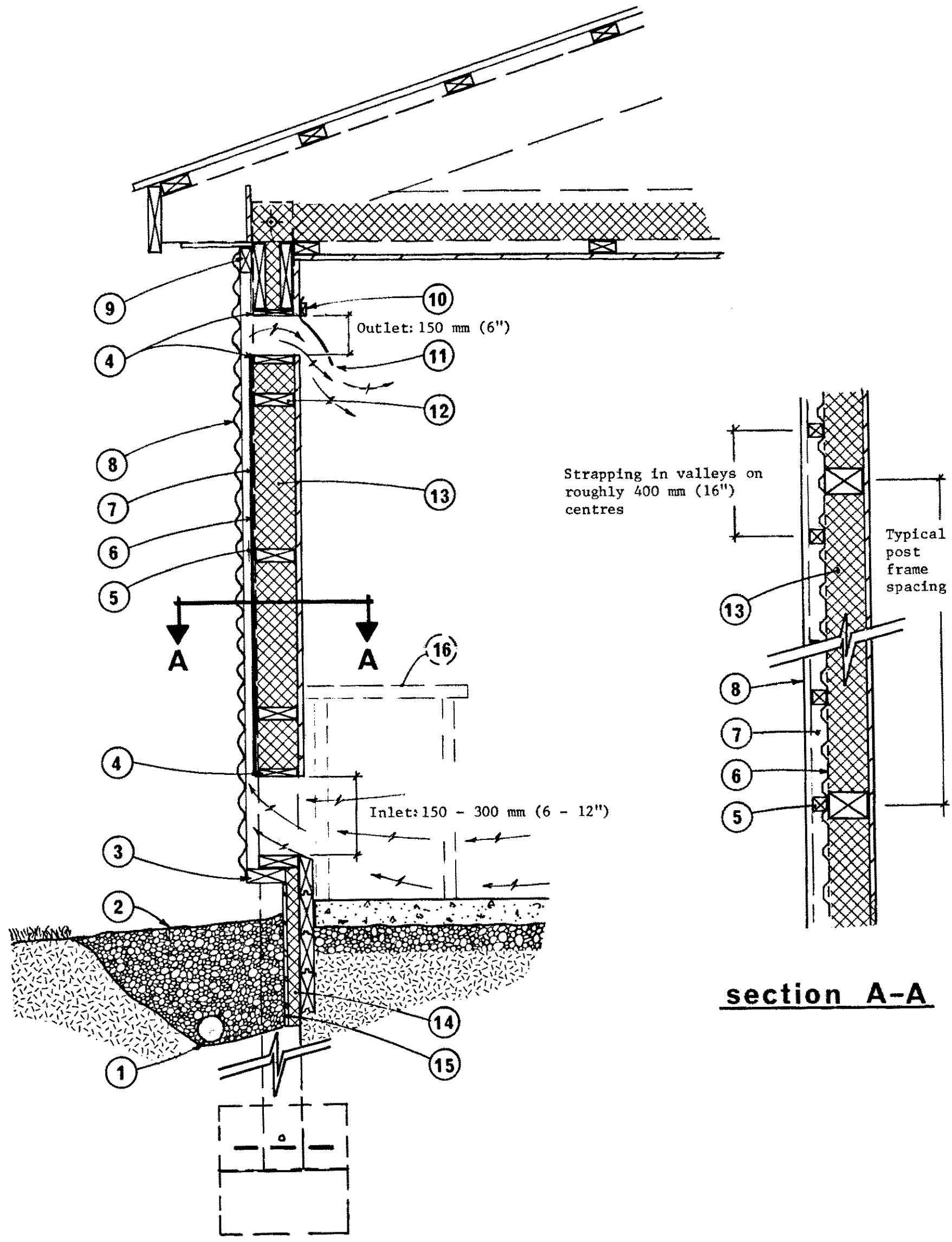
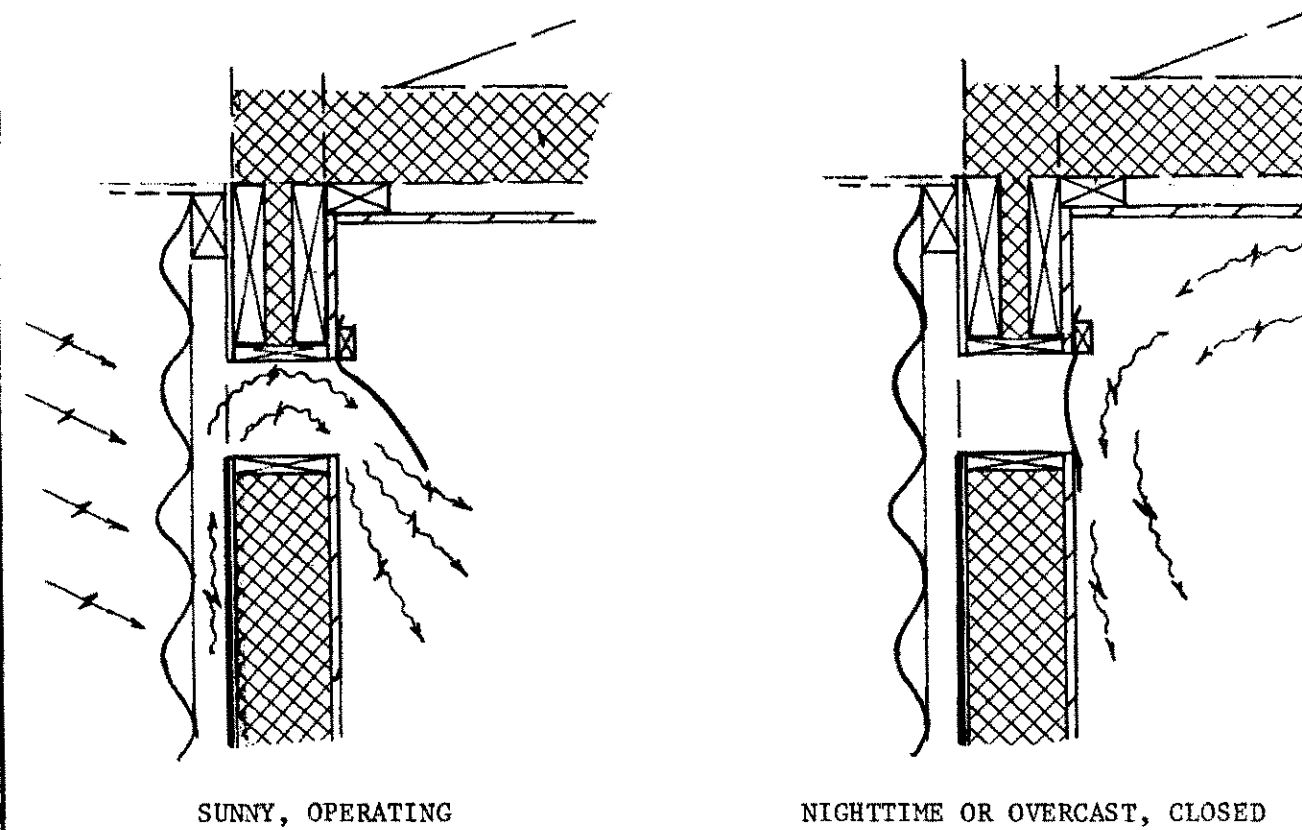


**PERFORMANCE**

This passive solar wall uses natural convection to transfer heat from the collector to the shop. When sunlight strikes the collector. The dark, metal absorber is heated; the air in the 50 mm (2") cavity between the absorber and glazing material is heated; and the warm air rises and exhausts into the shop through the 150 mm (6") continuous opening near the ceiling. Cool air from the shop is drawn into the collector through the opening near the floor to replace the solar heated air which has been expelled from the top opening. Only shop air circulates through the solar collector; no outside air circulates, as in some active solar systems. When the sun shines during the fall, winter, and spring this solar wall heats the shop. This systems starts and stops by itself, depending only on the availability and intensity of sunlight.

To stop the backwards or reverse flow of air through the collector during periods of no sunshine or at night, an inexpensive 4 mil polyethylene flap can be installed on the opening near the ceiling, fastened at the top edge with a batten strip and extending 50 mm - 75 mm (2-3") below the bottom of the opening. (see figure 2)

**FIGURE 2**  
OPERATION OF POLYETHYLENE FLAP



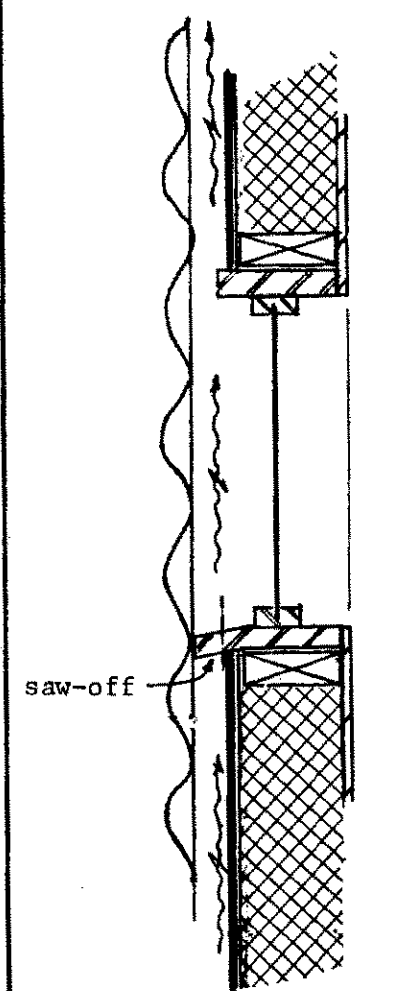
**section A-A**

**OPTIONAL WINDOW IN SOLAR WALL**

When retro-fitting a solar collector to a wall with an existing window, simply saw-off the protruding exterior window frame flush with the exterior metal sheathing continue over the window with the glazing material.

In a newly constructed wall, simply box in the rough hole for a normal window & attach an oversized sheet of plexiglas or smooth transparent fibreglas.

**NOTE:** The air space minimum 38 mm (2") is maintained in both types of construction.



**DESCRIPTION OF NUMBERED ITEMS ON PASSIVE SOLAR WALL IN FIGURE 1**

1. Drain tile all around exterior of building to remove excess groundwater and prevent saturation of rigid insulation.
2. Gravelled rainwater splash to prevent dirt splashing on surface of collector.
3. 38 mm x 140 mm (2" x 6") to support bottom edge of collector glazing.
4. 19 mm x 140 mm (1" x 6") between poles or studs to cover insulation.
5. Vertical Purlins to separate collector glazing from absorber plate and form air space. 38 mm x 38 mm (2" x 2") full height of collector painted same colour as absorber plate.
6. Absorber Plate can be either steel or aluminum sheathing prepainted a dark colour, or salvage steel painted on site.
7. 38 mm (1 1/2") (actual) air space for air flow.
8. Glazing material, corrugated fiberglass reinforced plastic. Installed with corrugations running horizontally to induce turbulence.
9. 38 mm x 89 mm (2" x 4") to support upper edge of glazing material.
10. 19 mm x 38 mm (1" x 2") continuous batten strip to support polyethylene flap.
11. 4 mil polyethylene flap, extending 50 mm - 75 mm (2-3") below the bottom of the opening to stop reverse flow of warm air through the collector.
12. Nailing girt 38 mm x 140 mm @ 600 mm o.c. (2" x 6" @ 2' o.c.).
13. Wall and ceiling insulation RSI 3.5 (R-20). With 4 mil polyethylene vapour barrier on warm side.
14. Perimeter insulation 50 mm x 600 mm wide (2" x 24" wide) continuous all around exterior wall, rigid extruded polystyrene (SM board).
15. Cement-asbestos board to protect rigid insulation.

**NOTE:**

New wall construction plan available upon request through the Ontario Ministry of Agriculture and Food County office's.

Insulated Post Frame Wall C.P.S. #9314 or M-9314 (metric)  
Insulated Stud Frame Wall C.P.S. #9324 or M-9324 (metric)

16. **OPTIONAL** - Interior wall still lends itself to storage or placement of a workbench. Care is recommended to not restrict the air flow in front of the intake.

**COLLECTOR ORIENTATION**

For optimum performance, the passive solar collector wall should face due south. However, variations of up to 15° either east or west of south will decrease the overall performance of the collector only slightly.



**AGRICULTURAL ENGINEERING SERVICE**  
**ONTARIO MINISTRY OF AGRICULTURE AND FOOD**

**PASSIVE SOLAR SHOP HEATING**