

APPENDIX D

PIPES-WITHIN-A-PIPE HEAT EXCHANGER USED IN PROVIDENT HOUSE

S.G. Angus
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Consulting Engineers

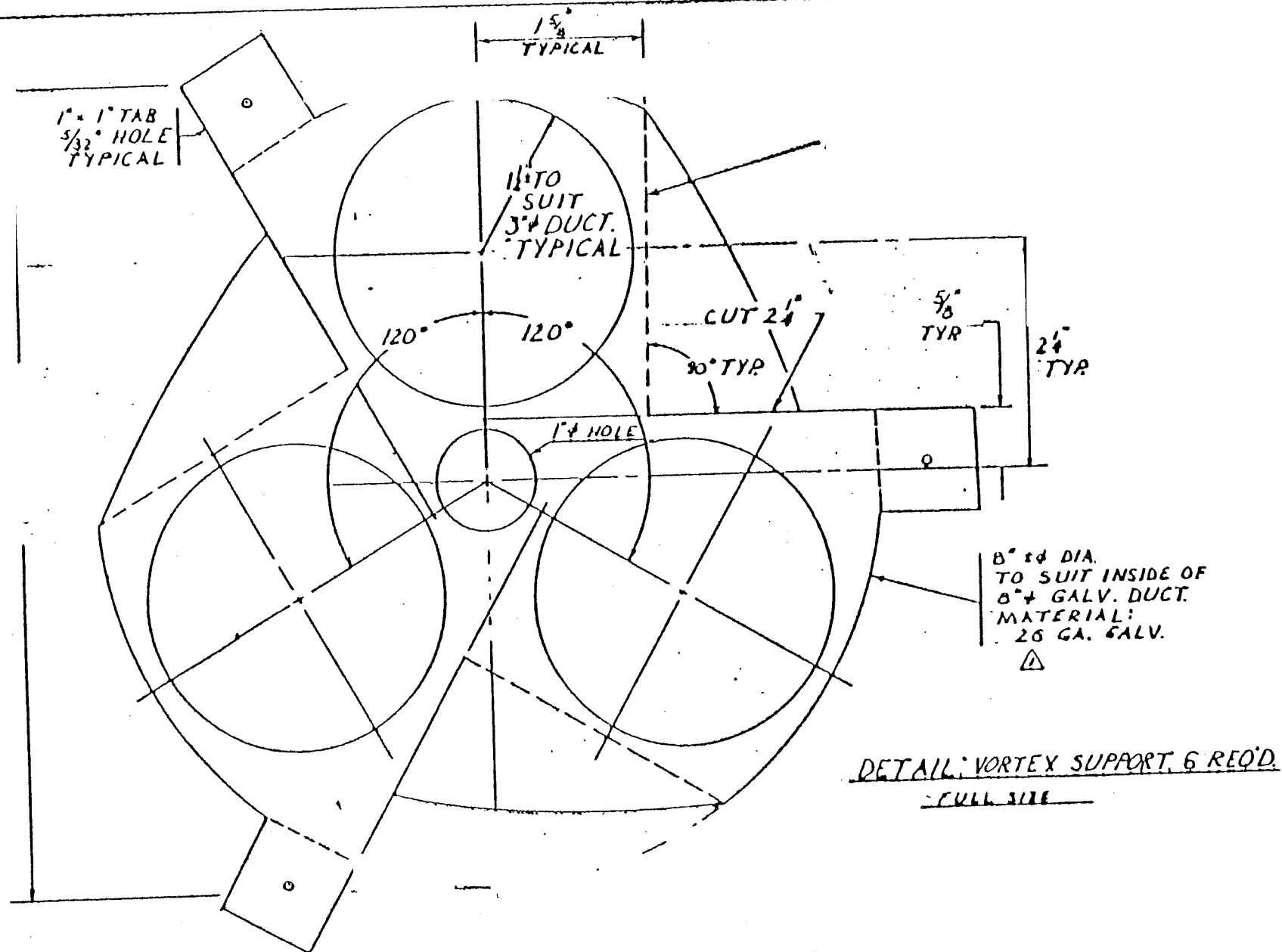
Mr. Angus explained that heat recovery was desirable in Provident House for two reasons:

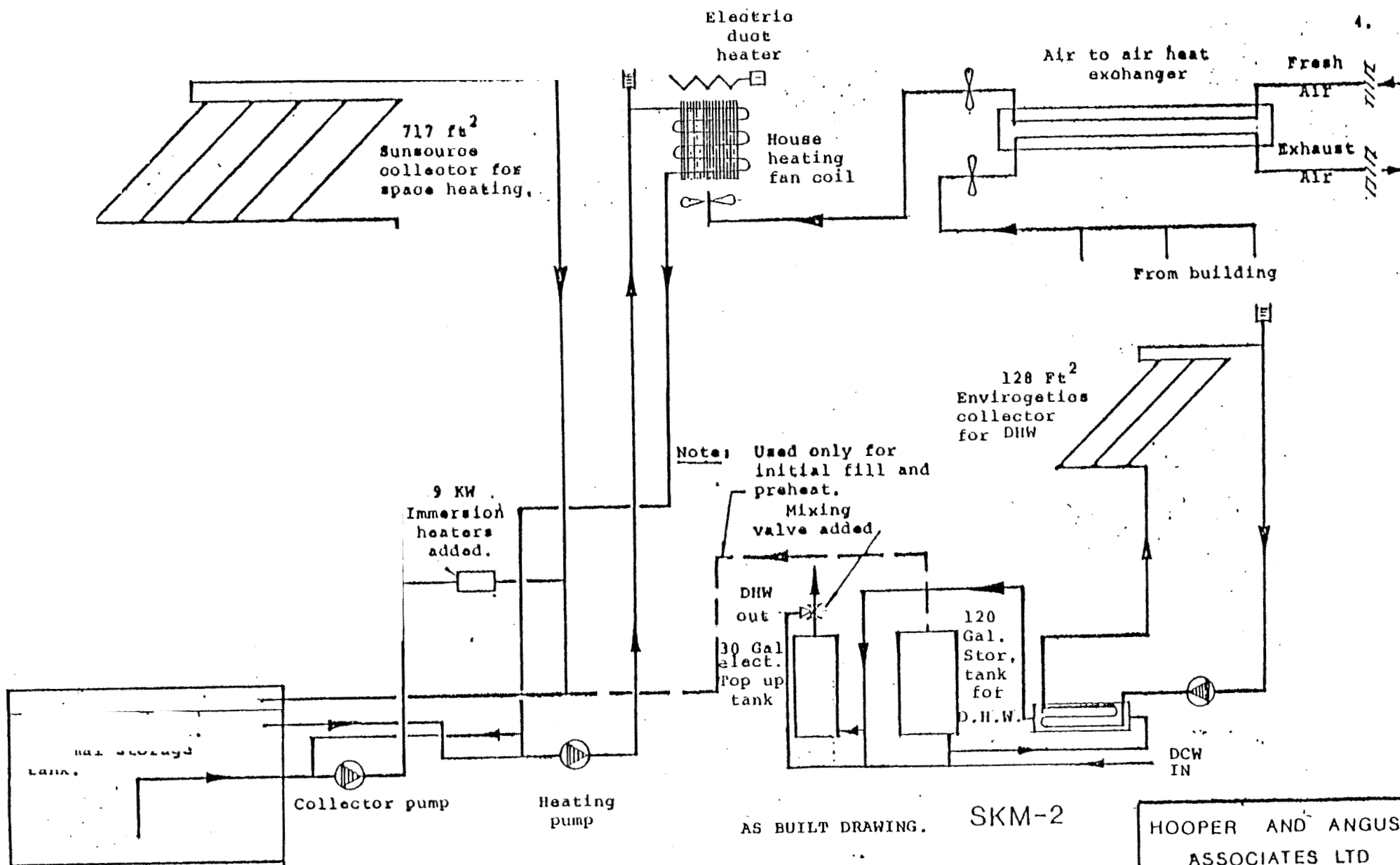
- a) the house was expected to be very tight so a mechanical ventilation system was incorporated and
- b) the cost of the solar system was so high that anything which would reduce its size would be worthwhile.

As nothing small enough was available commercially, his firm designed a heat exchanger that could be economically fabricated as a "one-off". It consists of three 3" galvanized steel ducts within an 8" galvanized steel duct. The 3" pipes carry the intake air and are supported, within the larger pipe, on sheet steel webs which also serve to create turbulent flow. The ducts can be assembled in any desired length. 33 ft. was used in Provident House and this gives a theoretical effectiveness of 60%. The unit was installed with a slight slope to allow condensation to drain out one end. The cost, not installed, was \$250 at the end of 1976. Of this, \$51 was for materials. The design has the disadvantage that it has to be taken completely apart to clean and thus is subject to decreasing effectiveness due to fouling of the heat exchanger surfaces. It is operated by the occupants. One switch turns on both the intake and exhaust fans which are quite inexpensive (\$75 total) due to the small flows and pressures involved. The intake flow is designed to be 75% of the exhaust flow in order to draw a negative pressure in the house.

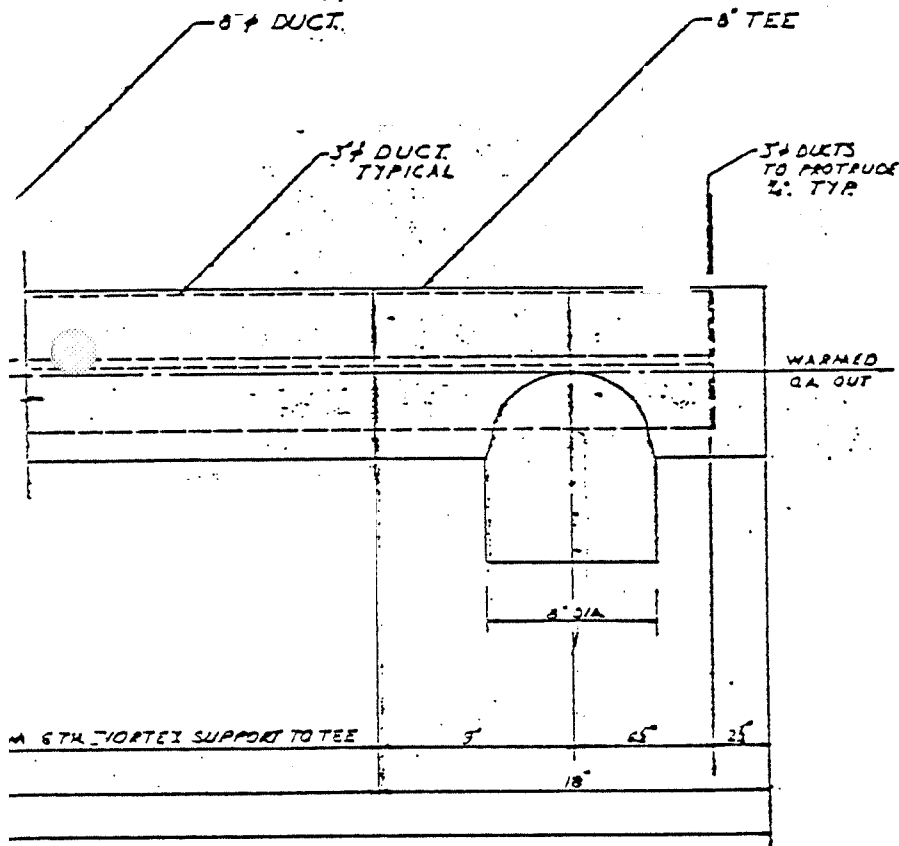
In fact it has not been possible to monitor the Provident House installation since the ventilation system is seldom used. This is because the fans are located in a place where their noise is annoying. Also, the building has not proved to be as tight as originally expected due to one major air leak which has yet to be sealed so it has not been necessary to use the system to control moisture

Mr. Sulman observed that the cost of the heat exchanger itself was seldom very important compared to the final installed cost of the system and he suggested that if future houses were to include such systems they should be designed to minimize the cost by reducing the amount of ductwork.

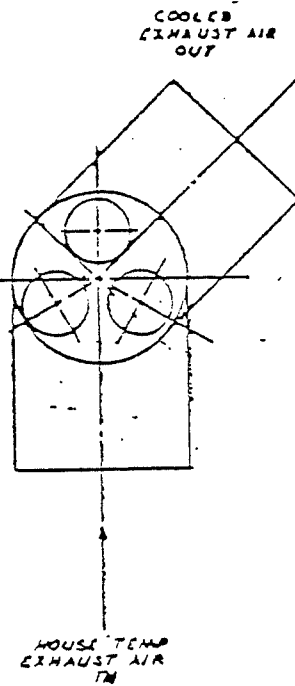




HOOPER AND ANGUS
ASSOCIATES LTD
CONSULTING ENGINEERS



SIDE ELEVATION
SCALE 3"-1'

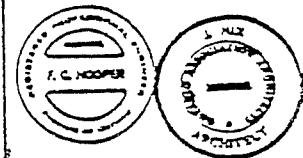


END ELEVATION
SCALE 3"-1'

HOUSE TEMP
EXHAUST AIR
IN

CONSTRUCTION OF UNIT IS
AS SHOWN IN ELEVATIONS
FOR THE EXHAUST AIR
RECLAIMER. THE UNIT IS
TO BE INSTALLED IN THE
HOUSE AS SHOWN IN THE
PLAN. THE UNIT IS TO BE
INSTALLED IN THE HOUSE
AS SHOWN IN THE PLAN.
THE UNIT IS TO BE
INSTALLED IN THE HOUSE
AS SHOWN IN THE PLAN.

REVISIONS
JUNE 1970 ISSUED FOR PERKINS
JULY 1970 REVISED FOR CONTRACT
AUGUST 1970 REVISED FOR CONSTRUCTION



ENVIROGETICS LTD.

ARCHITECT PLANNER
JOHN HIX
MECHANICAL ENGINEER
FRANK HOOPER

**Provident
House**
KING TOWNSHIP
ONTARIO

SHEET TITLE
**HEAT
RECLAIMER**
FOR VENTILATION AIR

MADE BY J.V.L. CHECKED BY
SCALE AS NOTED DRAWING NO. M6
PROJECT NO. E-7501

- MATERIALS
- 8" x 28 GA. GALV. TEES
 - 5" x 28 GA. GALV. SNAP LOCK DUCT
 - 3" x 30 GA. GALV. SNAP LOCK DUCT
 - 28 GA. GALV. VORTEX SUPPORTS
 - 26 GA. GALV. TUBE SHEETS
 - SOLDER

INSTRUCTIONS

VORTEX SUPPORTS REQ'D.

CUT DISC

CUT & SEND FLAPS

MAKE HOLES

ASSEMBLE WITH DUCTS

TUBE SHEETS 2 REQ'D

CUT DISC 8" x 16" TO FIT IN 8" GALV. TEE

MAKE 3 3/16" HOLES AS

SOLDER TUBE SHEETS TO TEES ALL AROUND AIR TEMP

SOLDER 3 3/4" TUBES TO TUBE SHEETS ALL AROUND

AIR TIGHT WITH 3/4" TUBES PROTRUDING 1/4"

GENERAL

ASSEMBLE IN CONVENIENT LENGTHS FOR TRANSPORTATION & INSTALLATION.

INSULATE AT SITE AS SHOWN.

INSTALL SLOPED 1/8" IN 8'-0" DOWN TO Q.A. INLET

HANG FROM 2"x4" PURLING WITH STRAP HANGERS SPACED 5'-0"

TAPE ALL DUCT JOINTS WITH APPROVED DUCT TAPE