

# Draft

## HOUSES OF THE NORTH

A Compilation by CMHC  
of Recently Built Houses  
in the Far North

Canada Mortgage and Housing Corporation  
Société canadienne d'hypothèques et de logement

Canadian Housing Information Centre  
Centre canadien de documentation sur  
l'habitation

## INTRODUCTION

This report is an assembly of house designs which were built in Northern Canada. The purpose of this assembly is strictly to inform. No attempt was made to evaluate the designs or the construction details. It was felt that design and construction in the North is currently undergoing a significant evolution. This evolution encompasses not only the envelope but also the support, heating and ventilation systems. To assist in that evolutionary process it was decided to make available, to those in the field, examples of some of the more recently constructed houses.

These examples include a good range of designs and construction techniques. It is left up to the reader to decide on the merits and disadvantages of these solutions and the potential use for or modification of them.

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DATA SHEET

HOUSE TYPE: Woolfenden

DATE OF CONSTRUCTION: 1978 (?)

COST PER UNIT:

LOCATION(S):

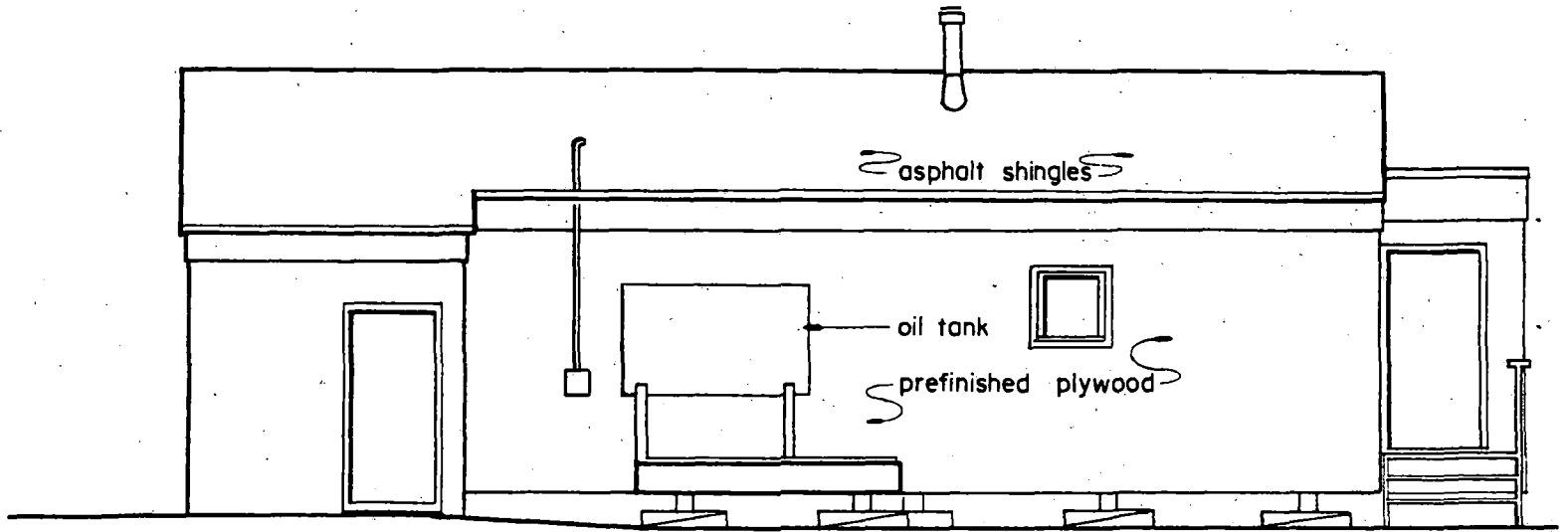
OWNER OR AUTHORITY:

DESIGNED BY:

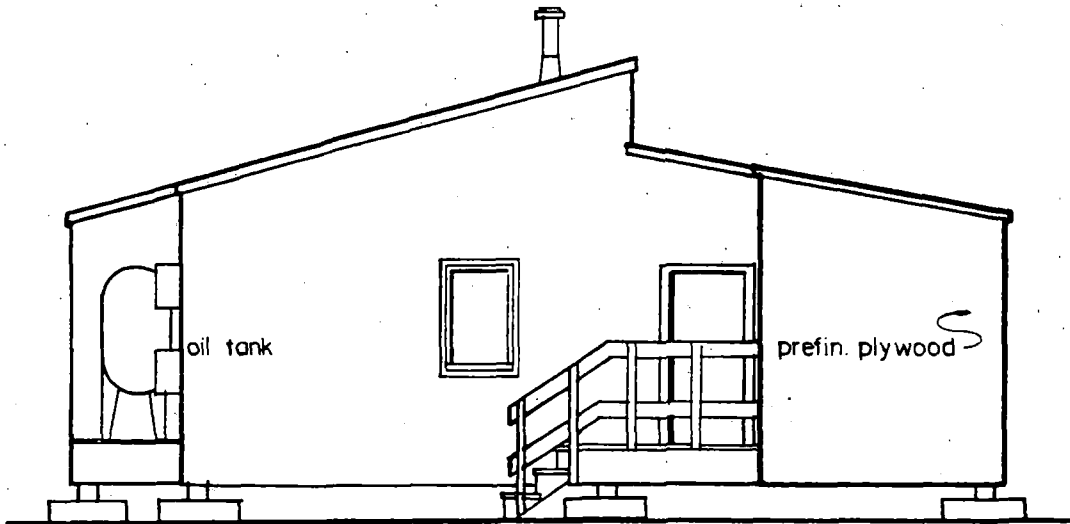
BRIEF DESCRIPTION OF  
SALIENT FEATURES:

MONITORING REPORTS:

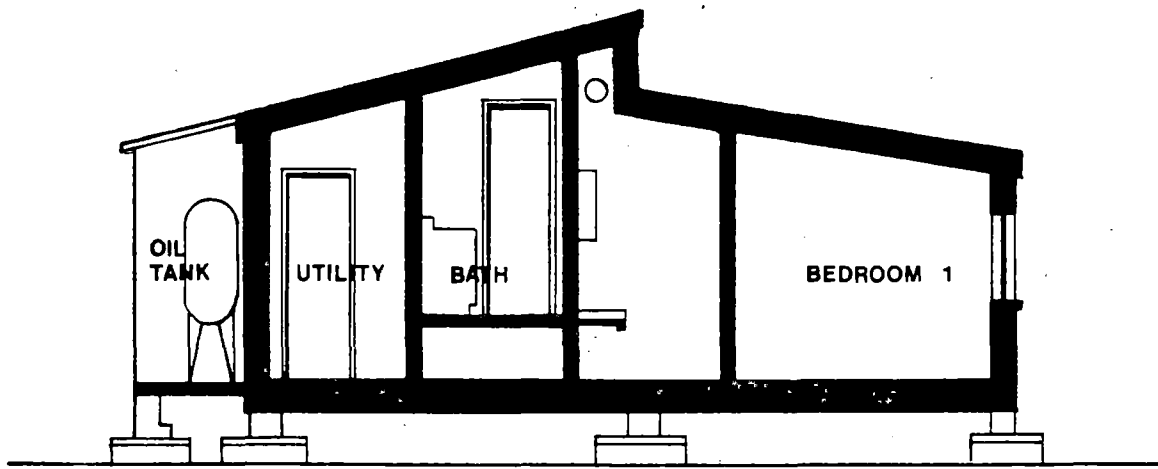
HISTORY: NWTHC to complete data sheet.



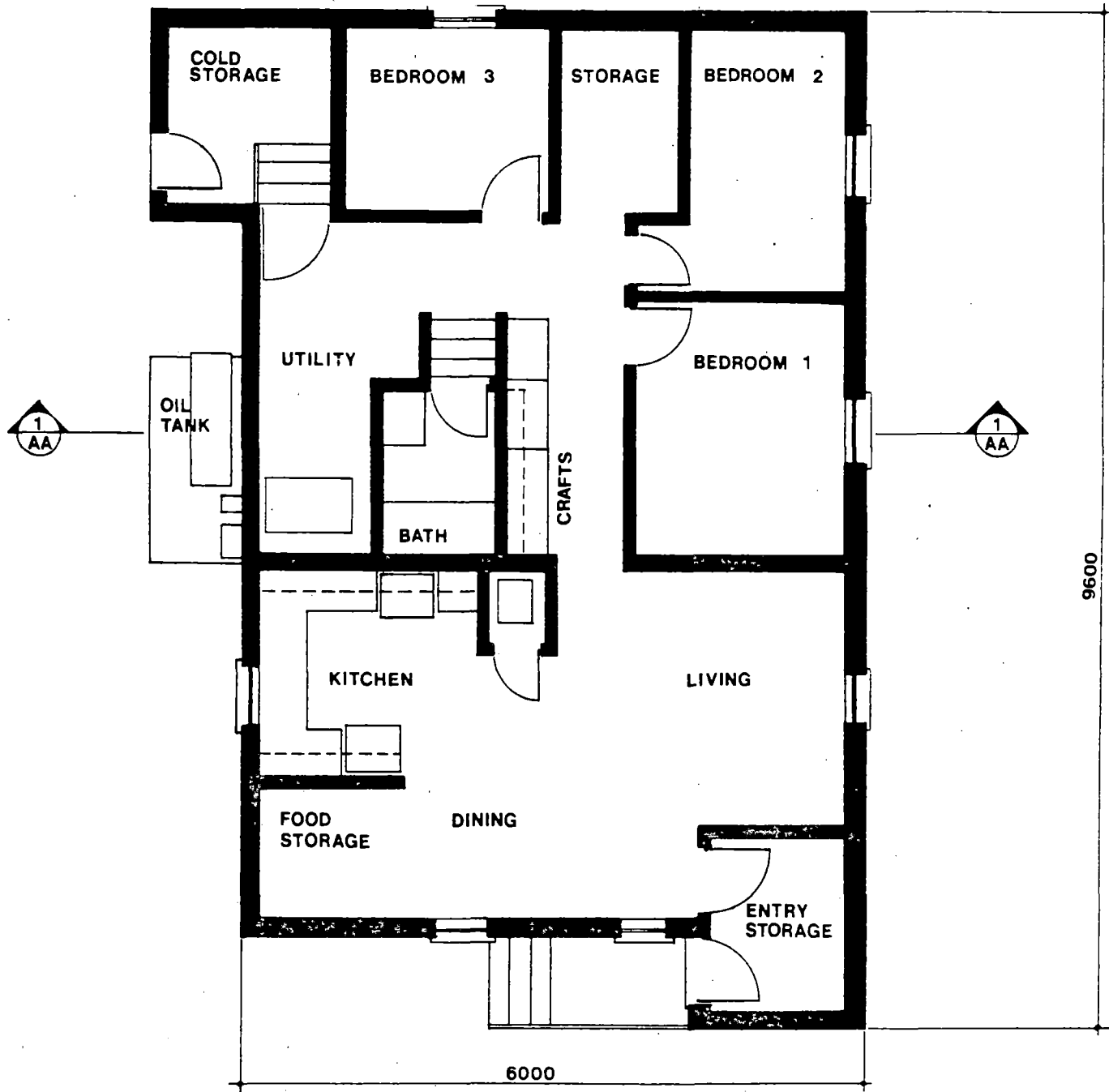
Front Elevation



Side Elevation



Section AA



Ground Floor Plan

DATA SHEET

HOUSE TYPE: Keewatin Demonstration House

DATE OF CONSTRUCTION: 1980

COST PER UNIT:

LOCATION(S): This unit was built in seven locations in the Keewatin District of the Northwest Territories.

OWNER OR AUTHORITY: Northwest Territories Housing Corporation.  
Box 2100, Yellowknife, NWT, X1A 2P6

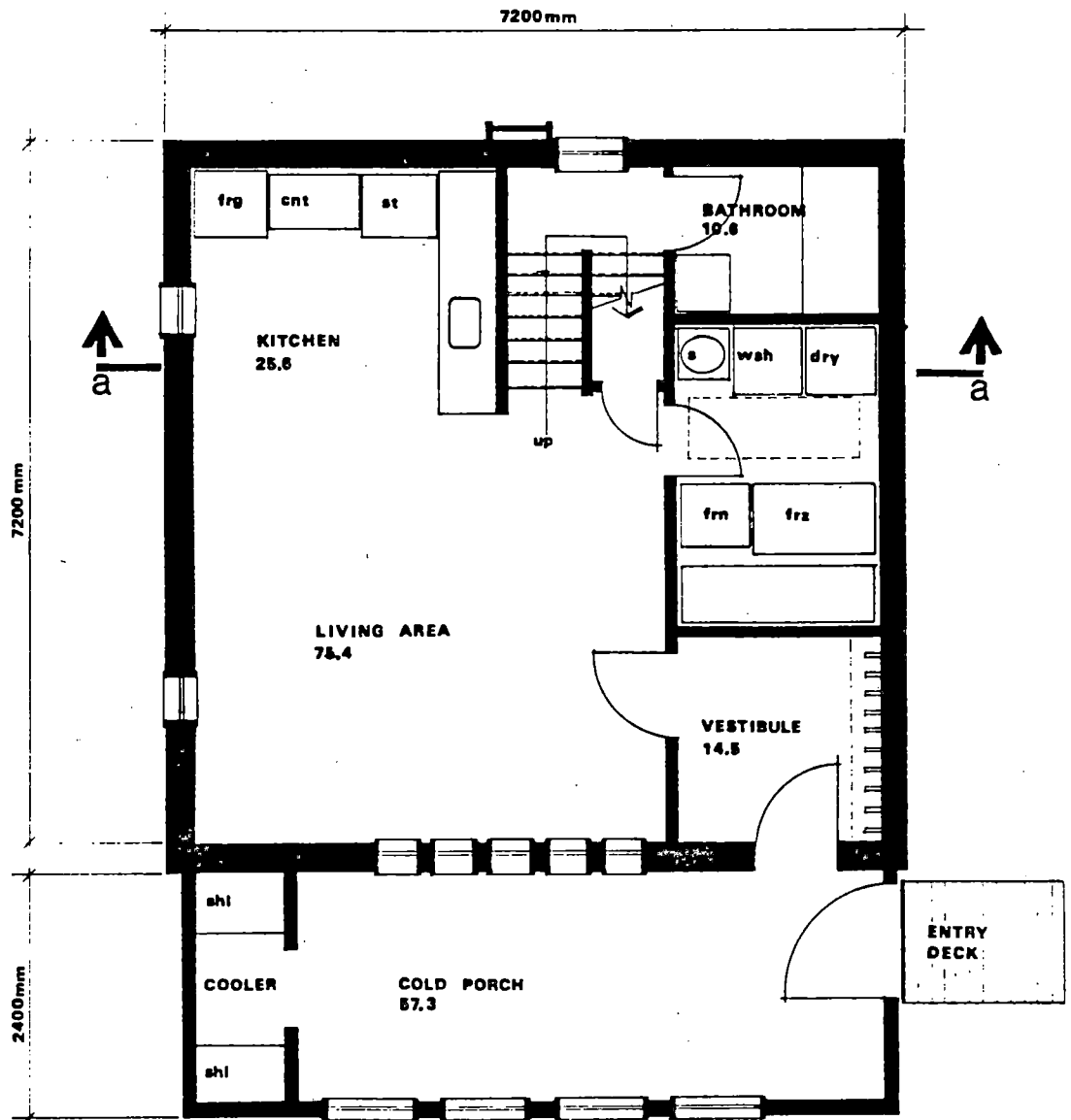
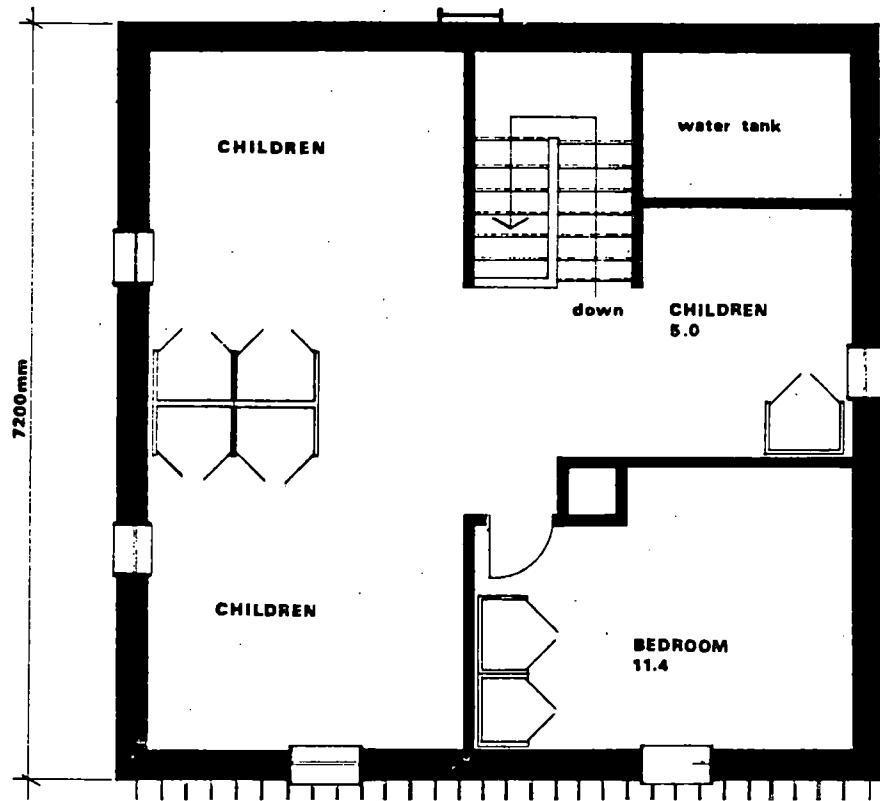
DESIGNED BY: Allan, Drerup, White (Toronto) from a concept of officers of the NWT HC and discussions with Inuit clients.

BRIEF DESCRIPTION OF SALIENT FEATURES: Gluelam wood perimeter beam foundation continuous wall/roof truss system gravity feed for water and fuel oil.

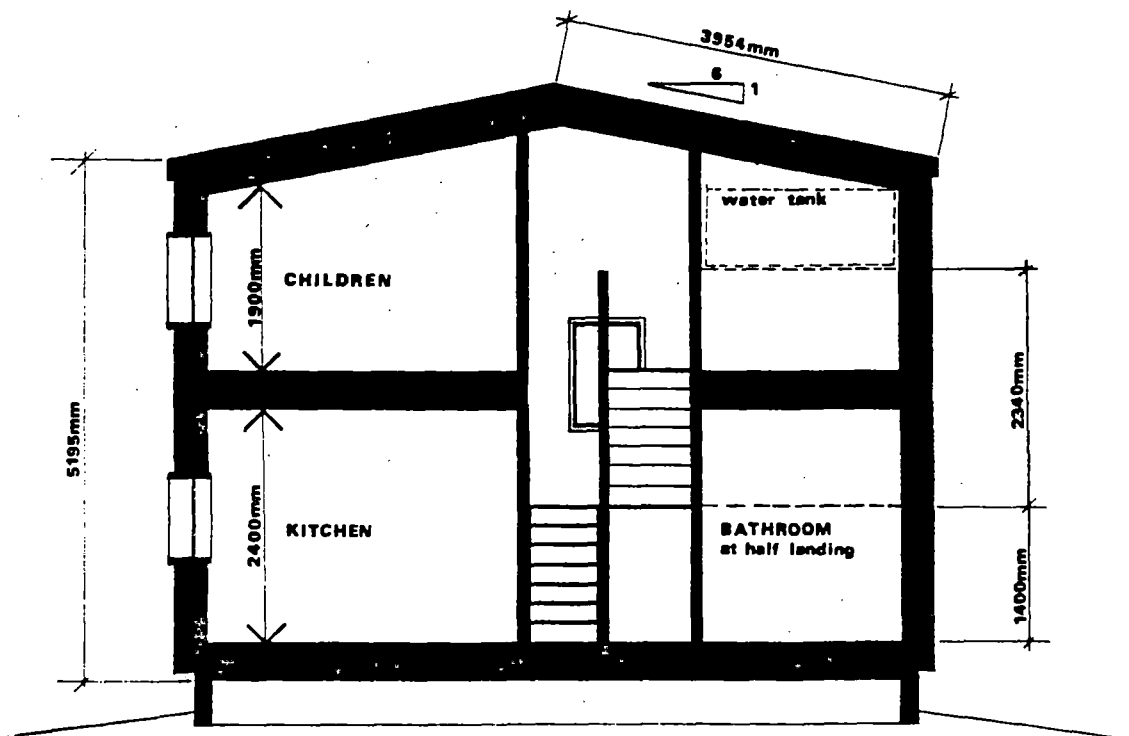
The unit was designed to remain self-sufficient for at least two weeks if the electrical power supply failed.

MONITORING REPORTS: Scanada Consultants Ltd., Ottawa  
(monitoring report 1982)  
Larsson Associates - Ottawa  
(Design Assessment and Evaluation Final Report 30 October 1983)

HISTORY: This demonstration unit was particularly successful in establishing the two storey house as a preferred form of accommodation. It seems to be well liked, although a few of the other design features (e.g. construction system, sun porch, gravity water and fuel oil systems, moveable bedroom partitions etc.) have provided serviceable and have been dropped.







DEMONSTRATION HOUSES KEEWATIN  
1980  
northwest territories housing corporation  
section a-a

DATA SHEET

HOUSE TYPE: Woolfenden, 3 bedroom.

DATE OF CONSTRUCTION: 1981

COST PER UNIT:

LOCATION(S):

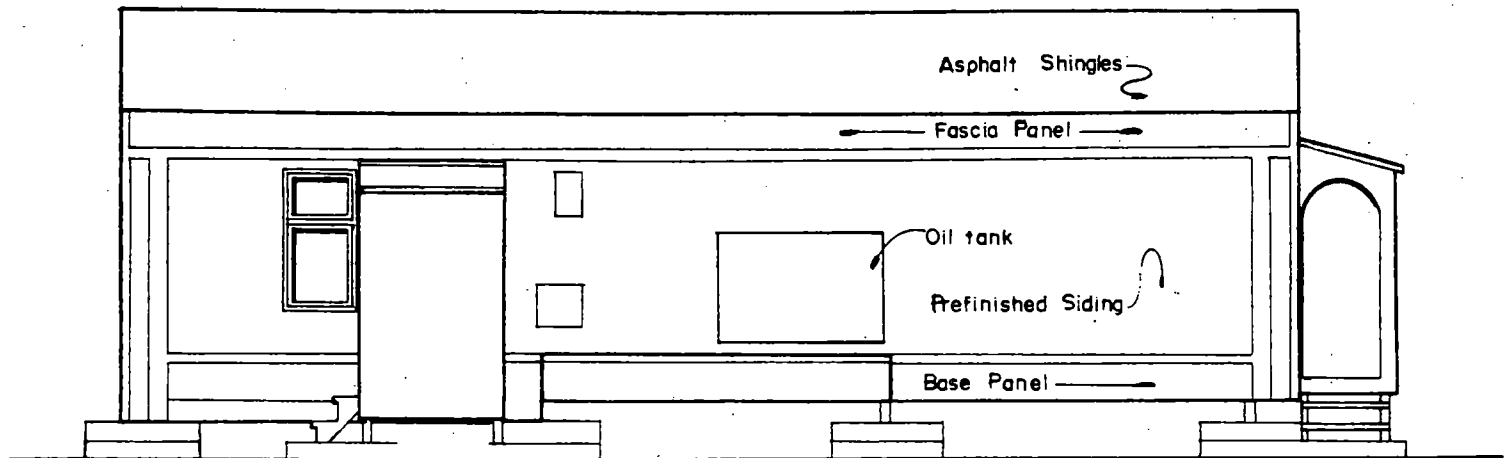
OWNER OR AUTHORITY:

DESIGNED BY:

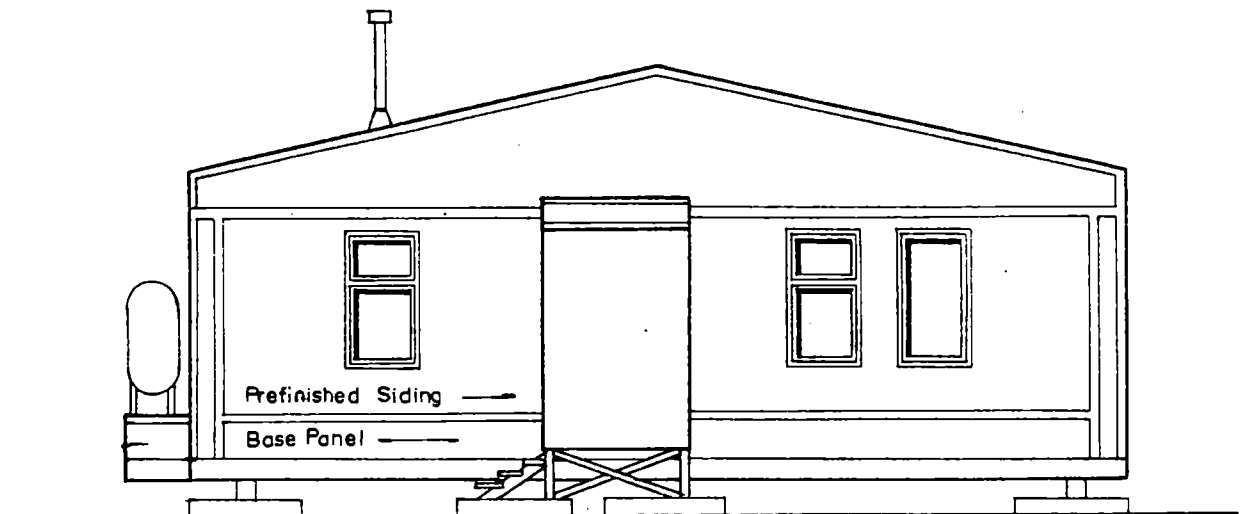
BRIEF DESCRIPTION OF  
SALIENT FEATURES:

MONITORING REPORTS:

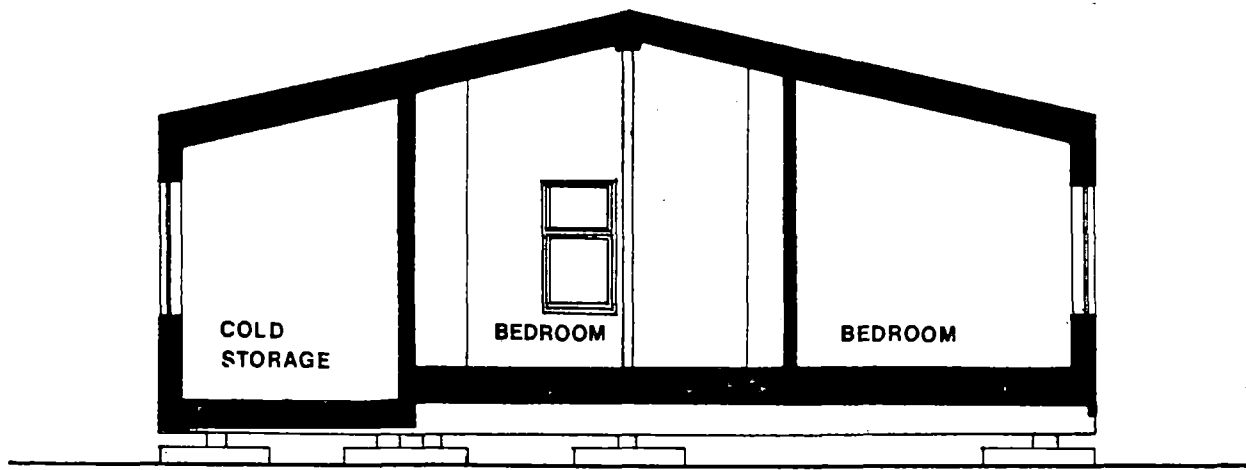
HISTORY: Check data with NWTHC.



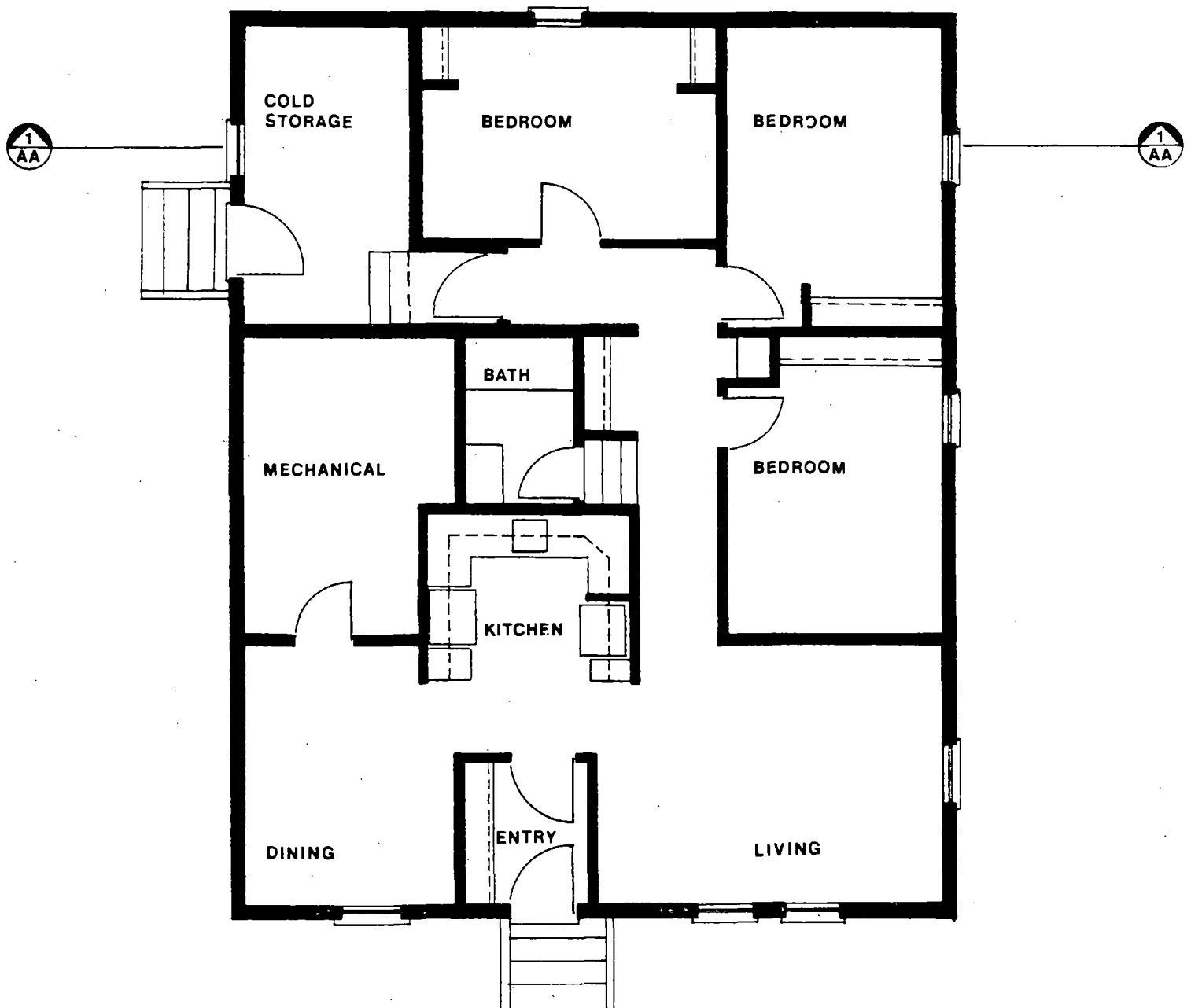
Rear Elevation



Side Elevation



Section AA



Ground Floor Plan

DATA SHEET

HOUSE TYPE: House for Maggie Einish  
1100 square foot bungalow designed to accommodate a family with one member in a wheelchair.

DATE OF CONSTRUCTION: 1982/83

COST PER UNIT: Construction only (1982) \$79 502 or 72.27 sq.ft.  
Misc. additional costs \$ 9 725  

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Total (1982) \$89 227  
Similar housing (1984) \$103 000 or \$93.64 sq.ft.

LOCATION(S): Kawawachikamach  
Schaefferville, Quebec

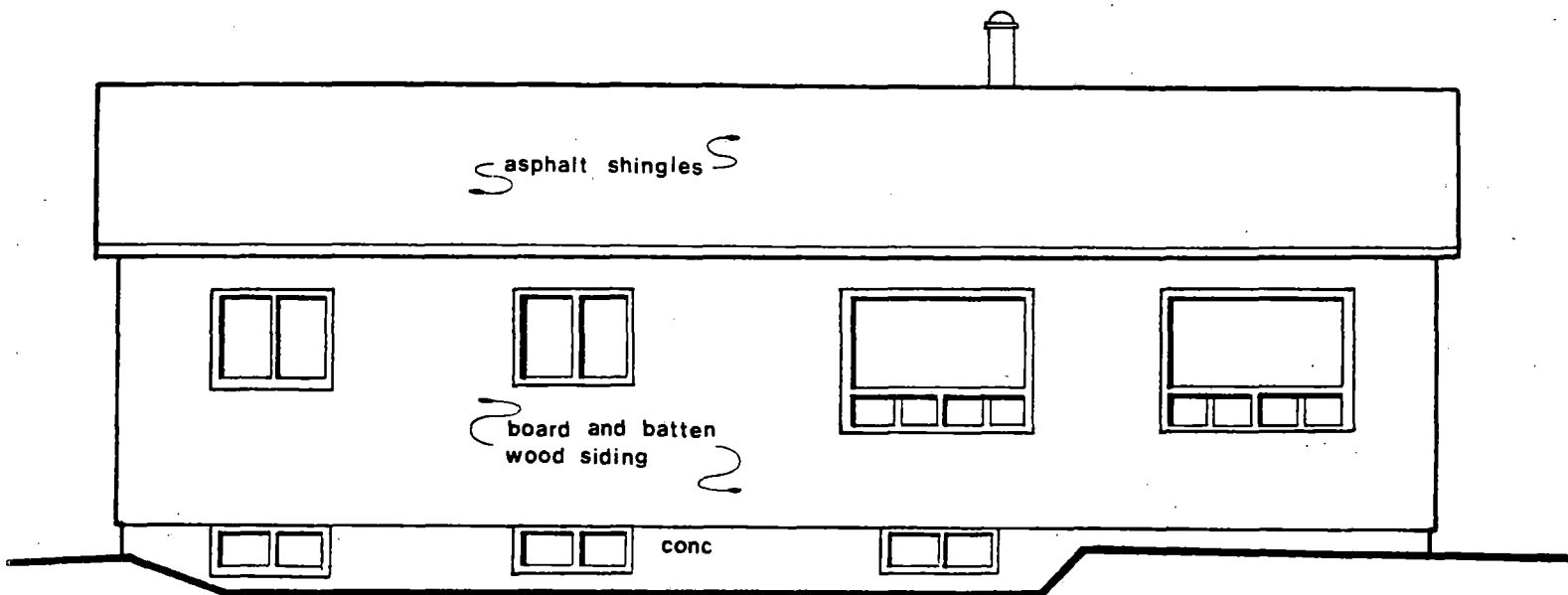
OWNER OR AUTHORITY: Naskapi Indian Band  
Naskapi Relocation Corporation  
275 Rue St. Jacques  
Suite 50  
Montreal, P.Q. H2Y 1MG

DESIGNED BY: Jeremy Jenkins  
Shelter Const. and Development Ltd.  
9 Lakeshore Drive,  
Toronto, Ontario M8V 1Y9

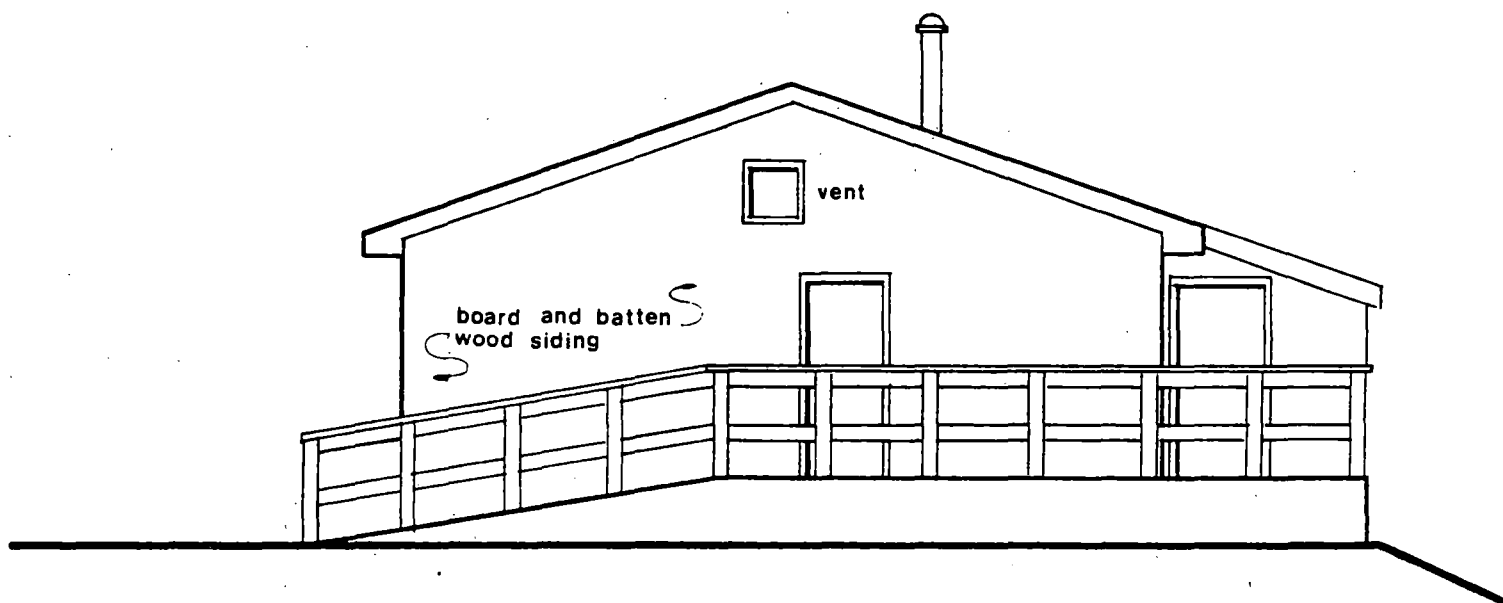
BRIEF DESCRIPTION OF SALIENT FEATURES: Super insulated houses with 11" walls (R.40) airlock porch entrance. Multiple glazed windows, heavy (6 mil.) Polyethylene vapour barrier caulked or rolled at all joints. A home-made air to air heat recovery unit was installed.

MONITORING REPORTS: Report by Jeremy Jenkins (24 May 1984) may be obtained from the Canadian Housing Information Centre  
National Office  
Montreal Road  
Ottawa, Ontario K1A 0P7.

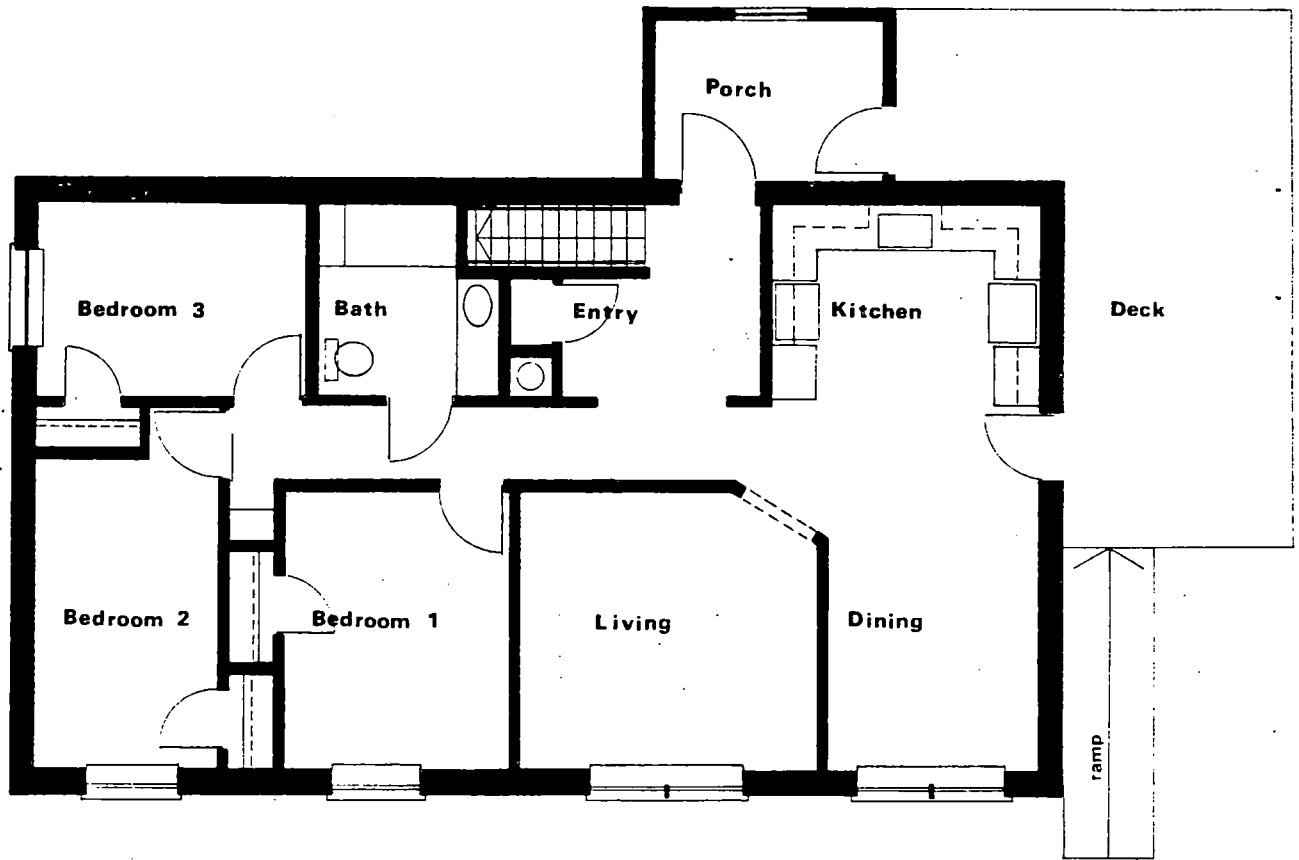
HISTORY: The Maggie Einish House was designed as the prototype for Naskapi Resettlement Housing of Kawawachikamach, Schaefferville, Province of Quebec.



Front Elevation

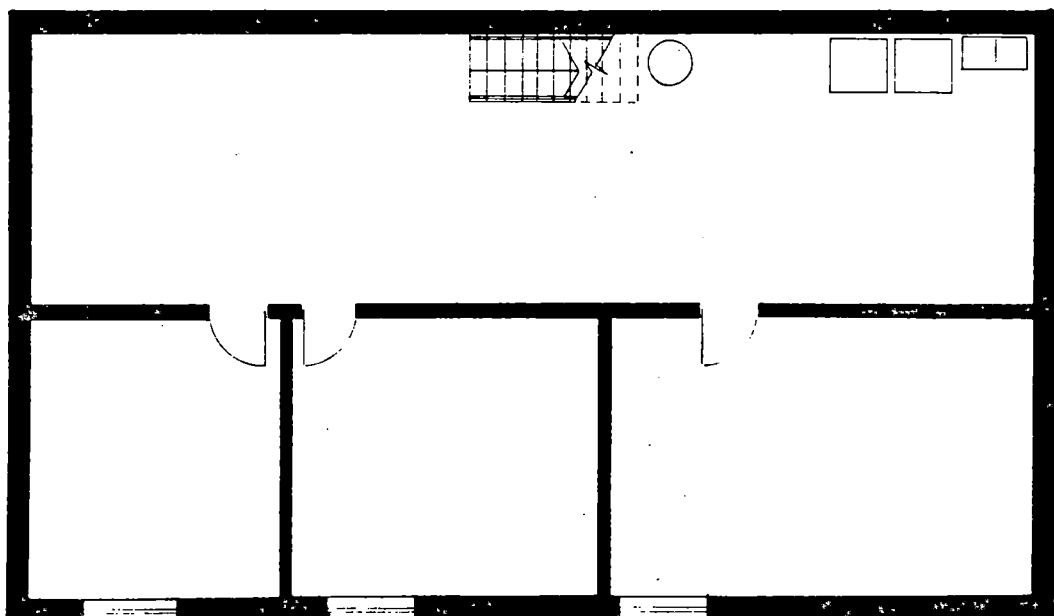


Side Elevation



Main Floor Plan

13665



7802

Basement Plan

DATA SHEET

HOUSE TYPE: 'Coldstream' House. By Coldstream, Winnipeg, (Manufactured)

DATE OF CONSTRUCTION: 1983

COST PER UNIT: Average (1982) \$130 000 (average for identical design in conventional construction, \$120 000).

LOCATION(S): A total of twenty four units were constructed in the Keewatin communities of Rankin Inlet, Chesterfield Inlet, Eskimo Point and Repulse Bay.

OWNER OR AUTHORITY: Northwest Territories Housing Corporation (NWTHC).

DESIGNED BY: #10 Architectural Group; Winnipeg.

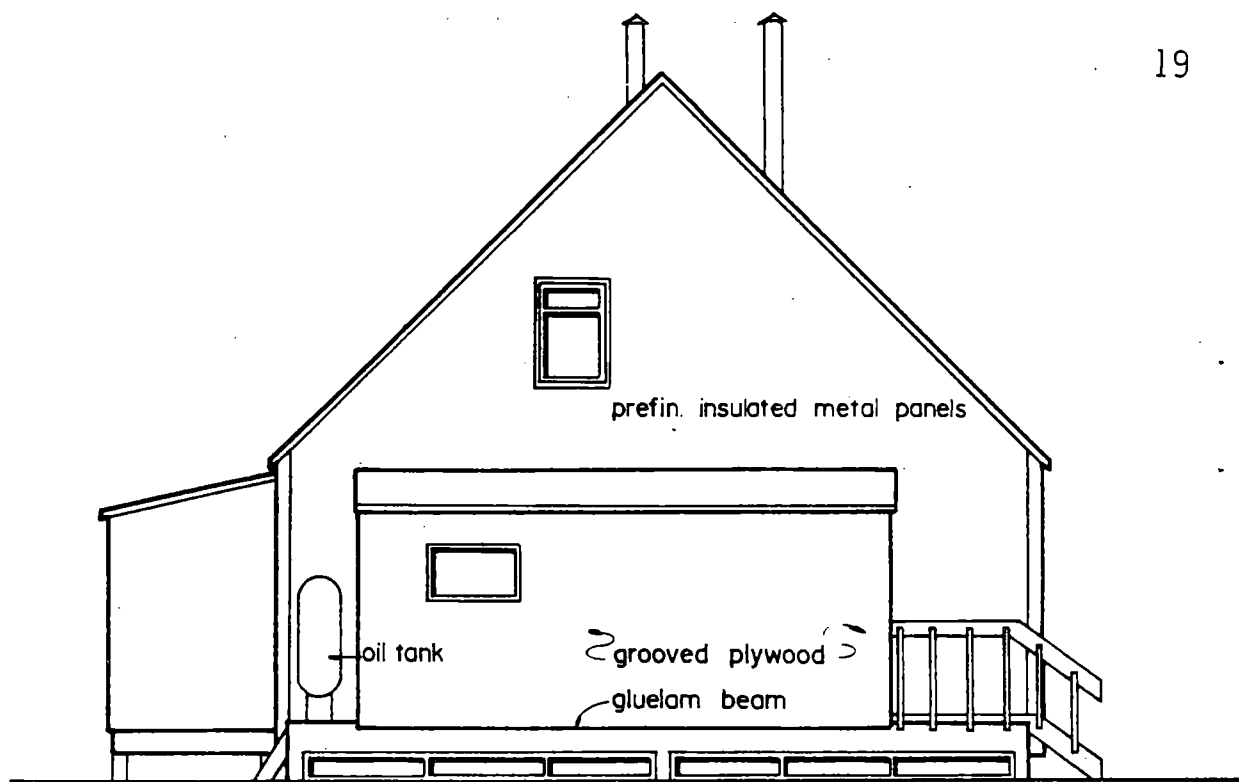
BRIEF DESCRIPTION OF SALIENT FEATURES: The use of 5" foam filled, metal clad panels produced a virtually airtight shell, with no thermal bridging except at openings. The foundations were of the buried crib type similar to that developed for Greenland.

MONITORING REPORTS: Coldstream Project monitoring (Fall 1984, CMHC Report).

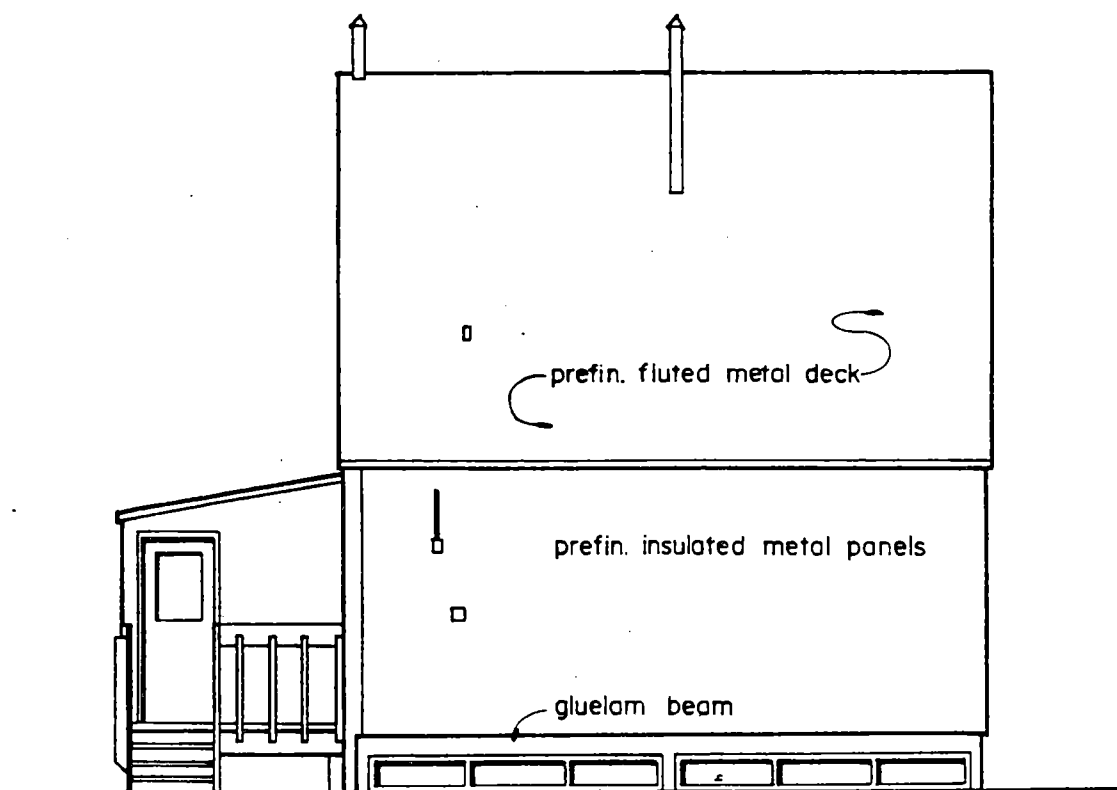
HISTORY: This unit, and its conventionally built counterpart, are direct successors to the Keewatin Demo House (See # \_\_\_\_). Having essentially the same plan, but with a steep pitch.

Delamination of the metal from the foam did occur, and in 1984 the use of this material was suspended (except as roofing) until future tests were carried out (proceeding, June 1985).

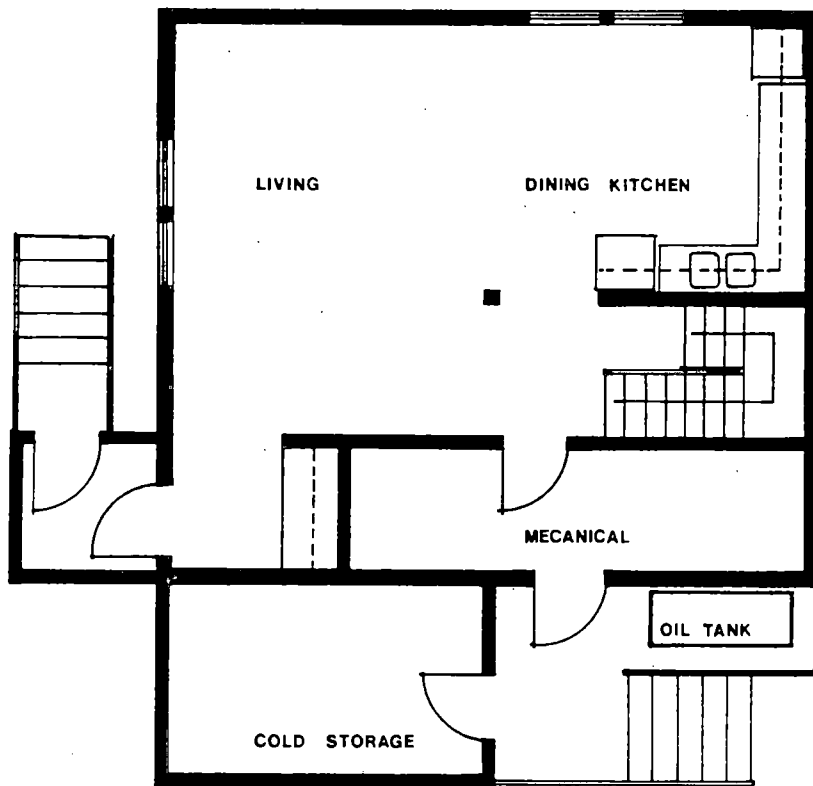




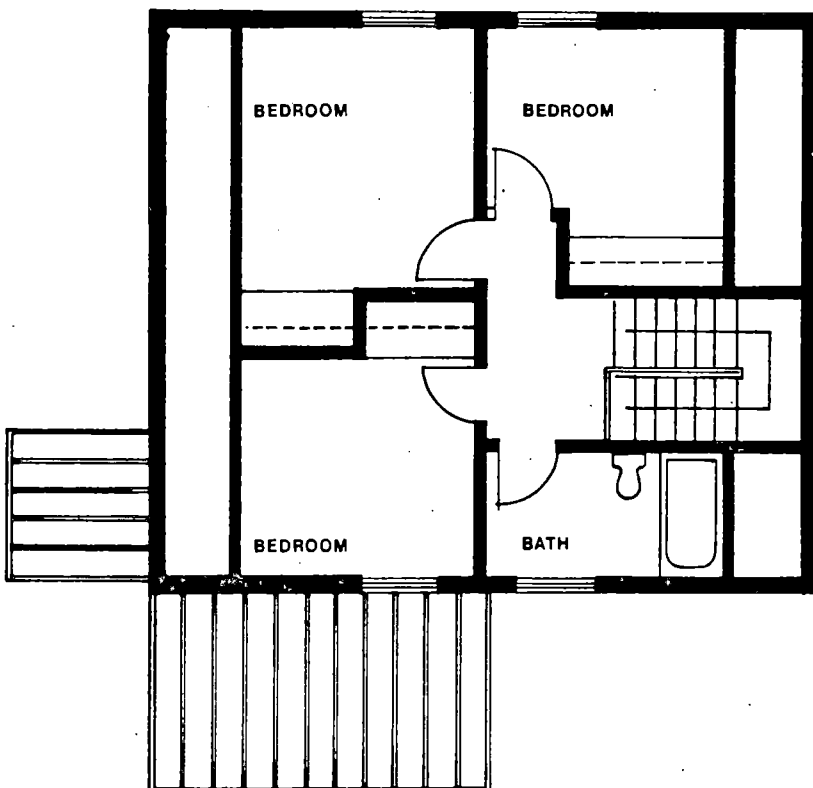
Front Elevation



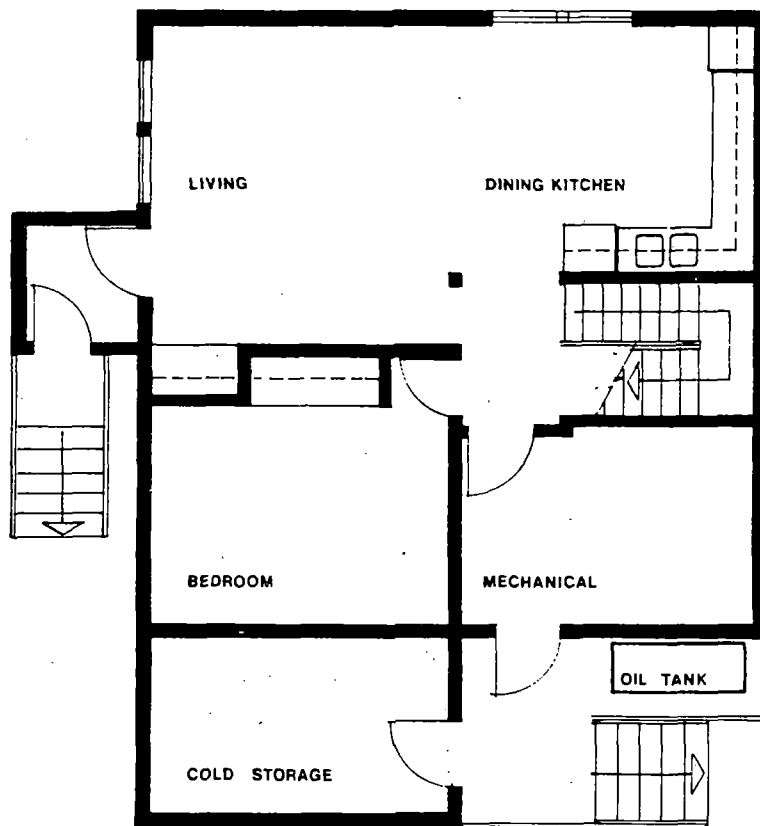
Side Elevation



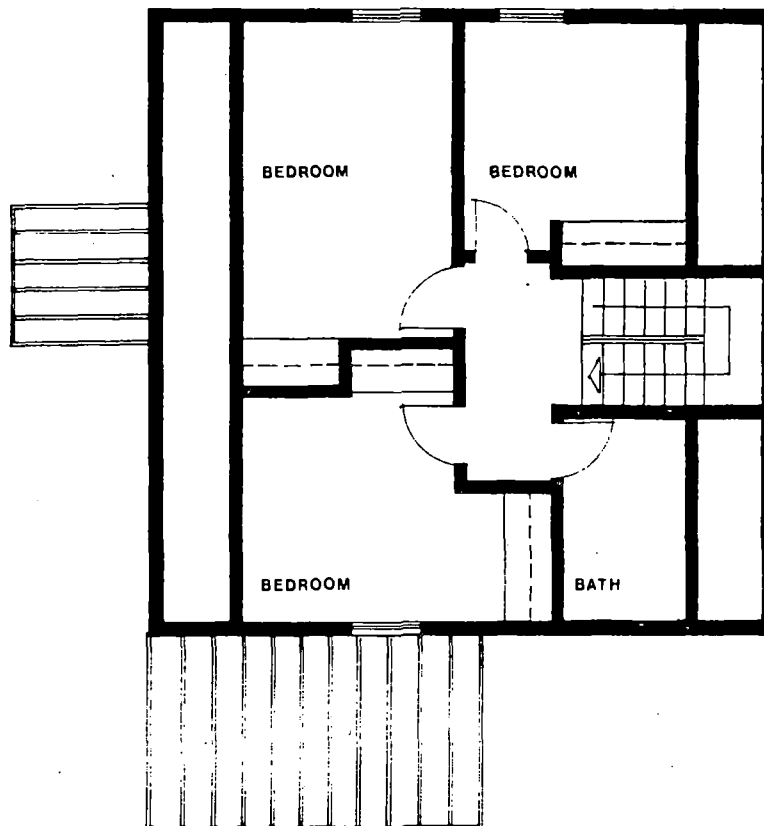
Three Bedroom  
Ground Floor Plan



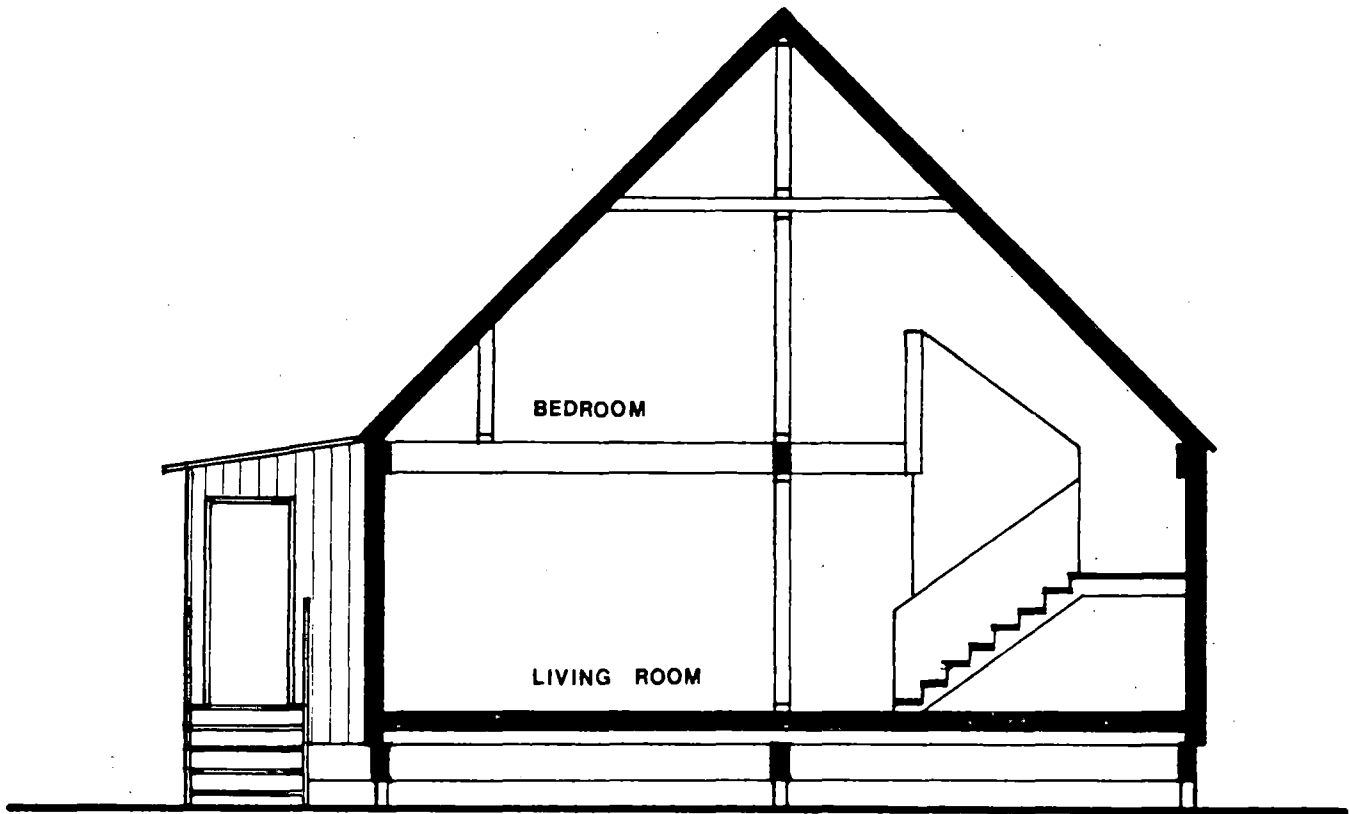
Three Bedroom  
Upper Floor Plan



Four Bedroom  
Ground Floor Plan



Four Bedroom  
Upper Floor Plan



Typical Section

DATA SHEET

HOUSE TYPE: INPHC. Cape Dorset.

DATE OF CONSTRUCTION:

COST PER UNIT:

LOCATION(S):

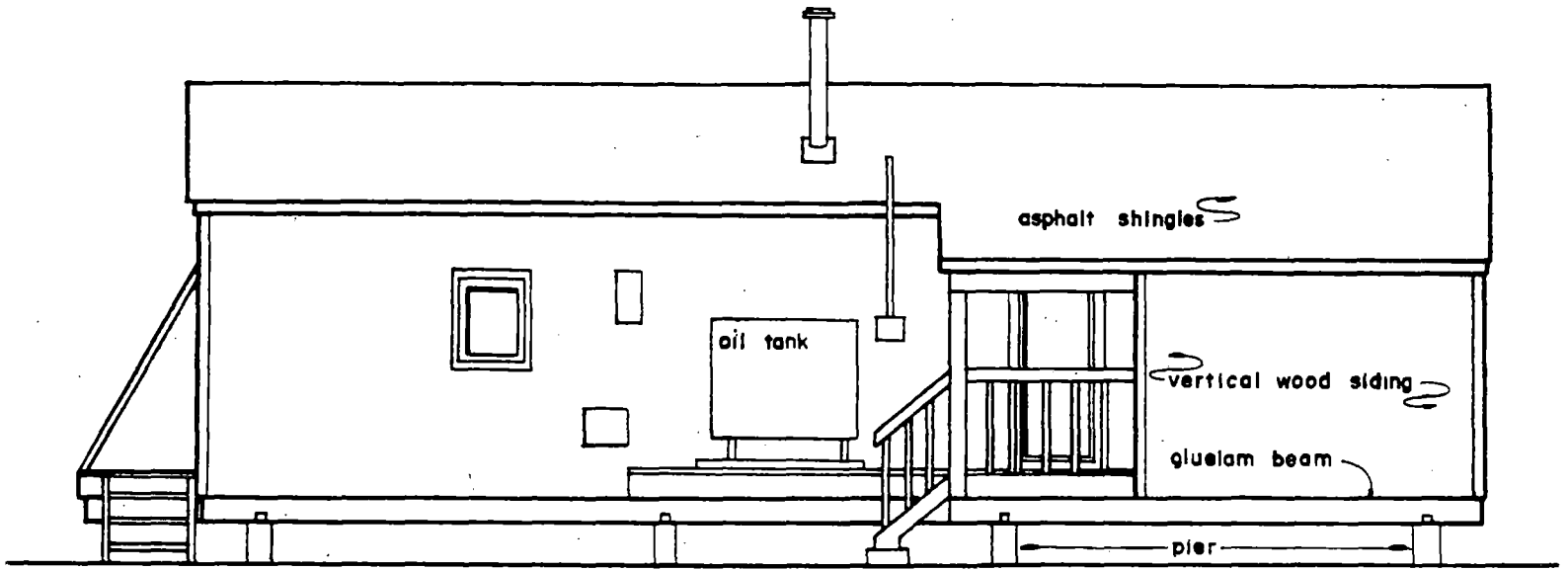
OWNER OR AUTHORITY: Inuit Non-Profit Housing Corporation.

DESIGNED BY: Woolfenden Associates, Edmonton, in consultation  
with Canada Mortgage and Housing Corporation.

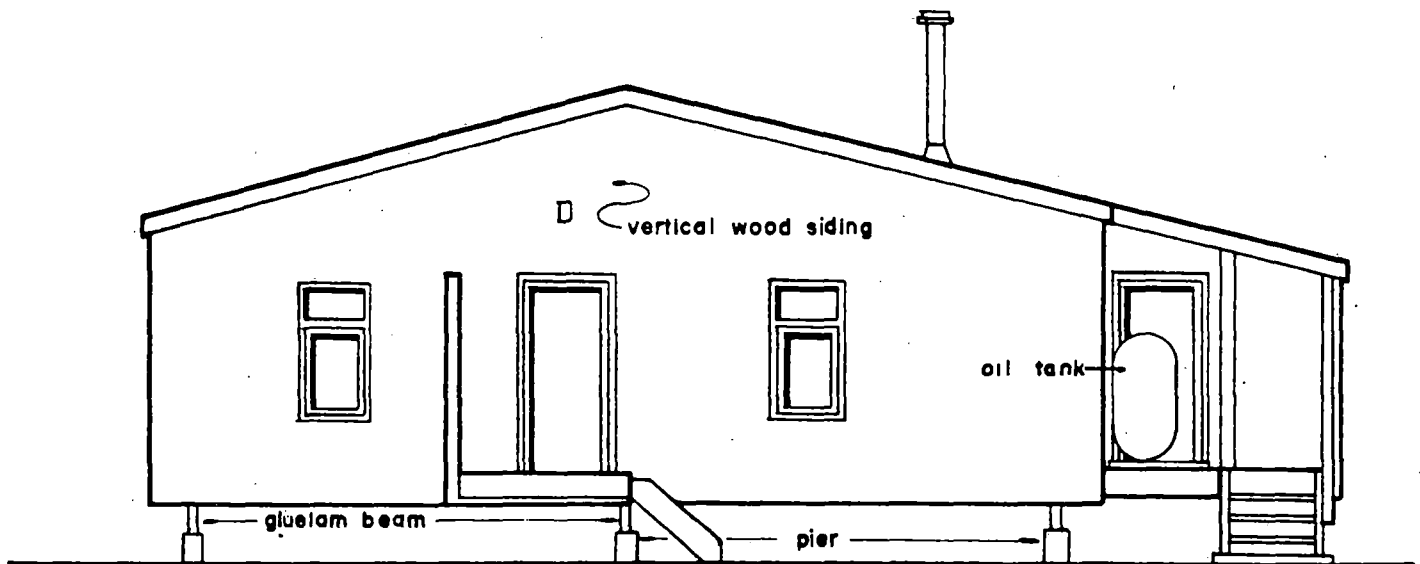
BRIEF DESCRIPTION OF  
SALIENT FEATURES:

MONITORING REPORTS:

HISTORY: P.I.D. to complete data sheet.



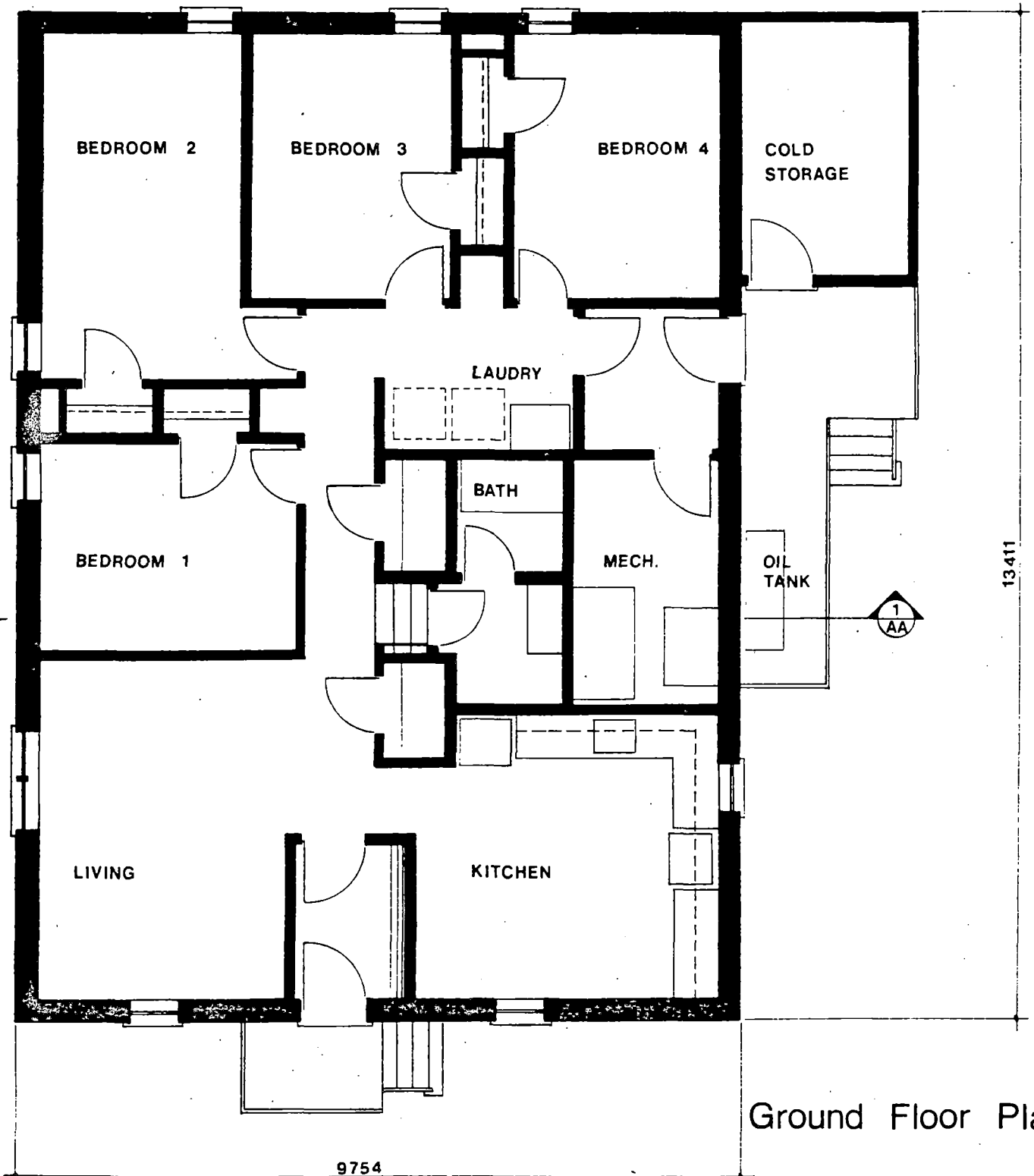
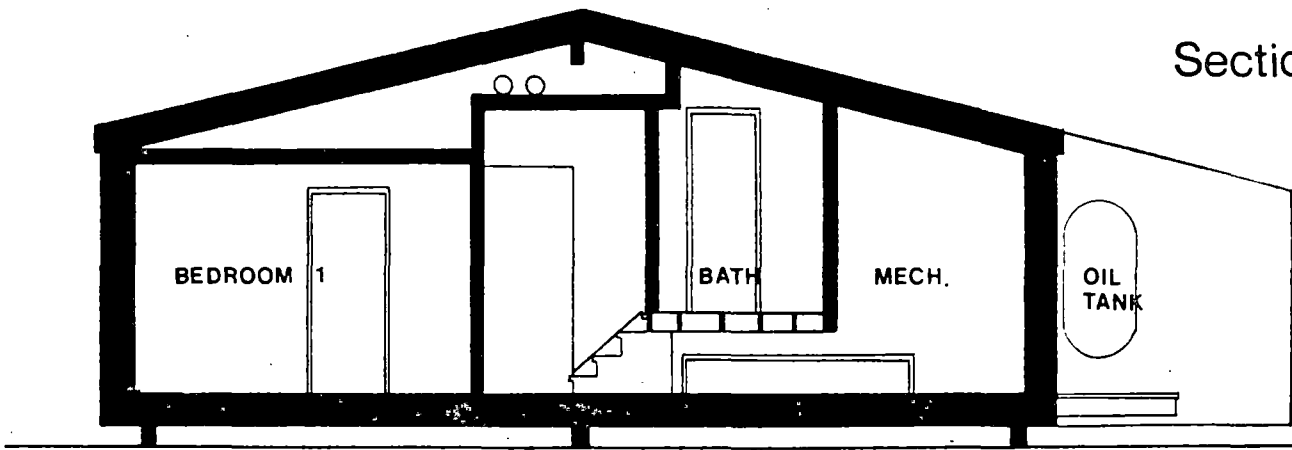
Side Elevation



Front Elevation

# Section AA

27



Ground Floor Plan

DATA SHEET

HOUSE TYPE: 1984/85 Public Housing

DATE OF CONSTRUCTION: 1984/1985

COST PER UNIT:

LOCATION(S):

OWNER OR AUTHORITY: Northwest Territories Housing Corporation

DESIGNED BY: Northwest Territories Housing Corporation

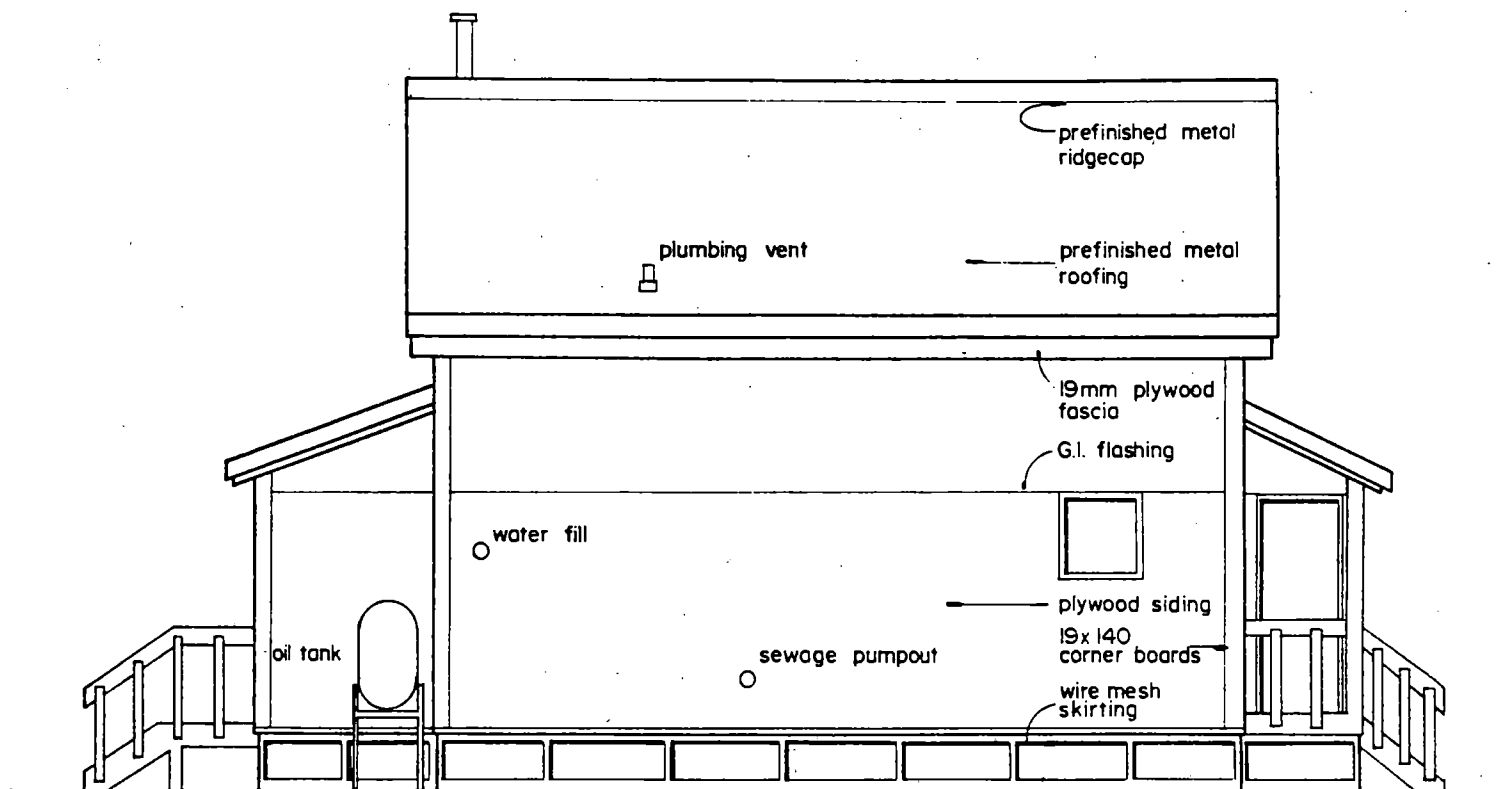
BRIEF DESCRIPTION OF  
SALIENT FEATURES:

This design is the direct successor of the 'coldstream' unit and it's conventional counterpart. The main difference is in a revised roof design that reduces the pitch and permits the use of the whole of the upper floor space, increasing the size of all bedrooms.

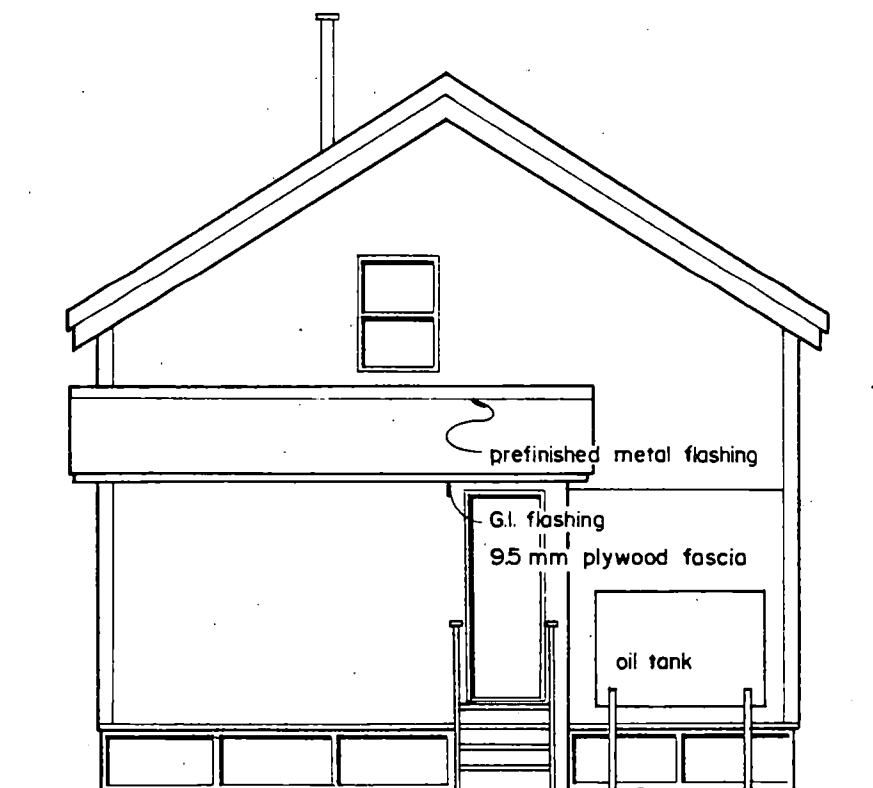
MONITORING REPORTS:

HISTORY: NWT HC to complete data sheet.

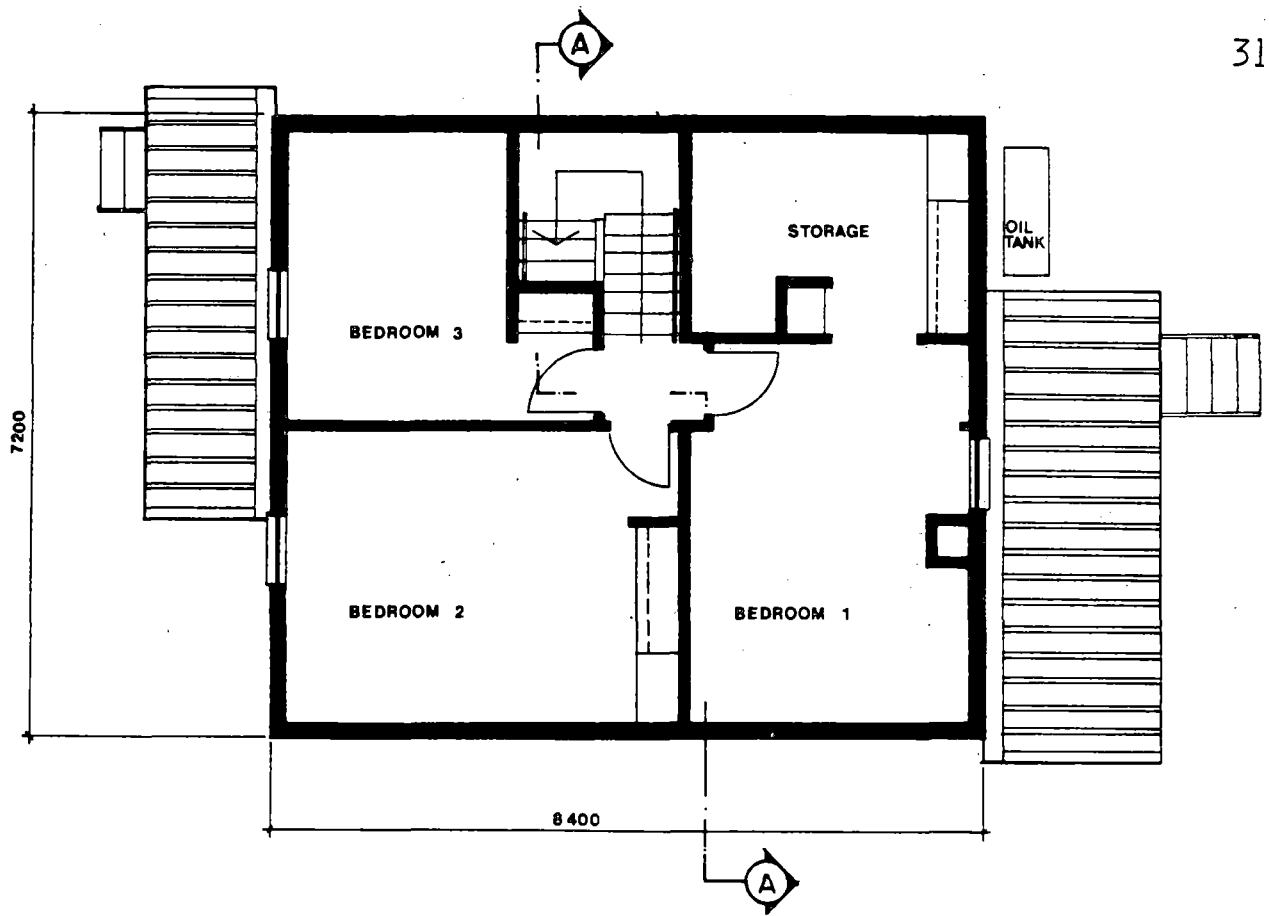




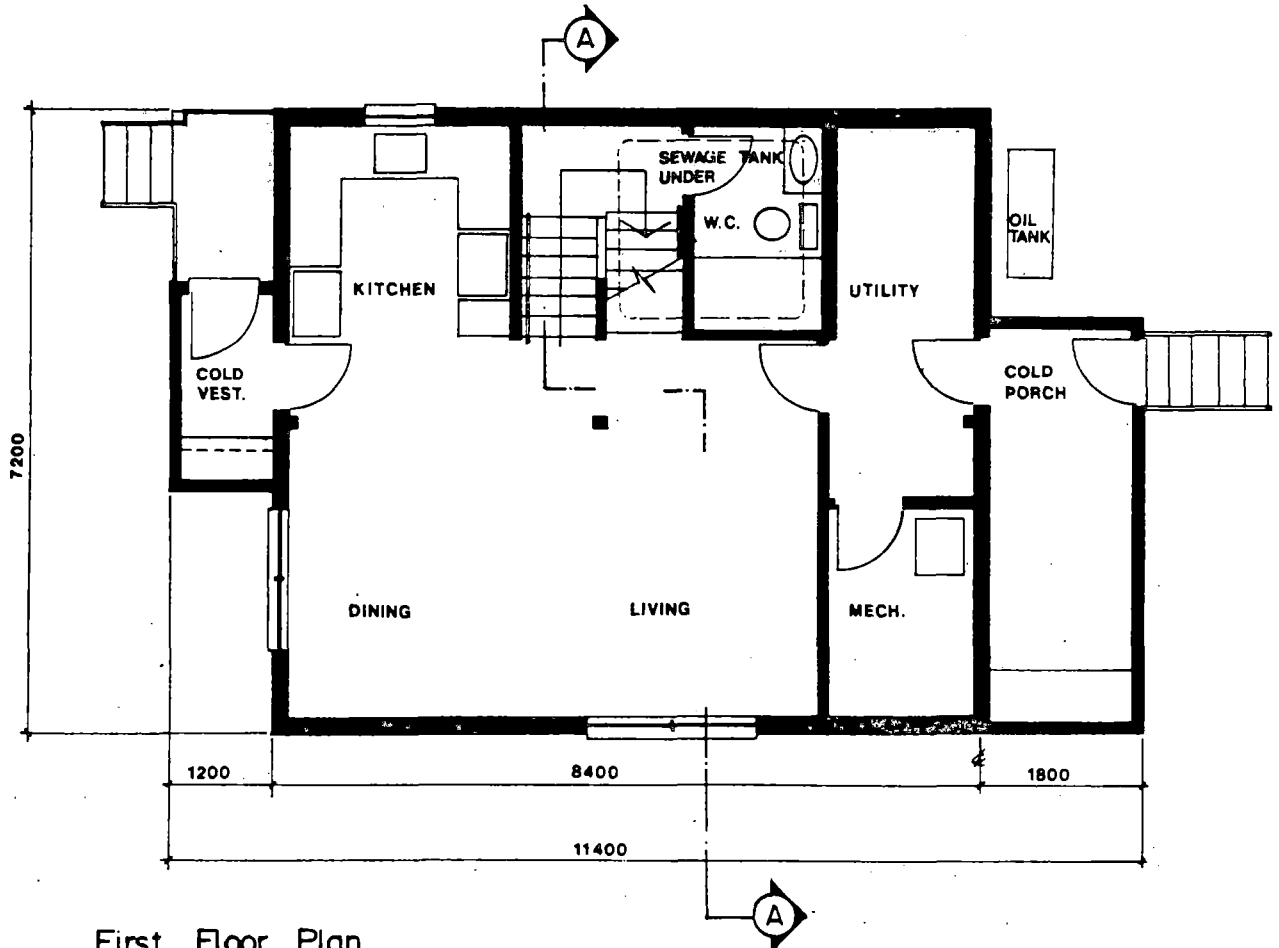
Left Elevation



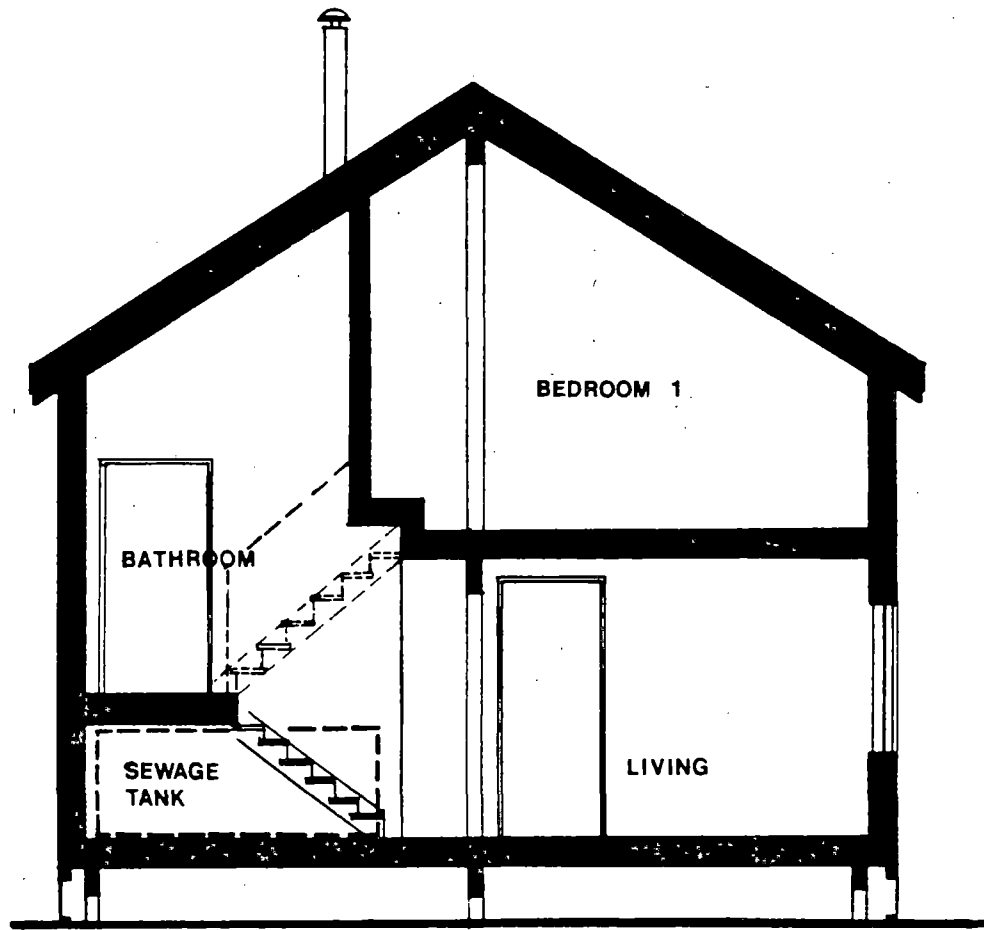
Rear Elevation



Second Floor Plan



First Floor Plan



Section AA

DATA SHEET

HOUSE TYPE: Jumele. Four bedroom, two storey duplex (various configurations available).

DATE OF CONSTRUCTION: 1984/1985

COST PER UNIT:

LOCATION(S): Nouveau Québec

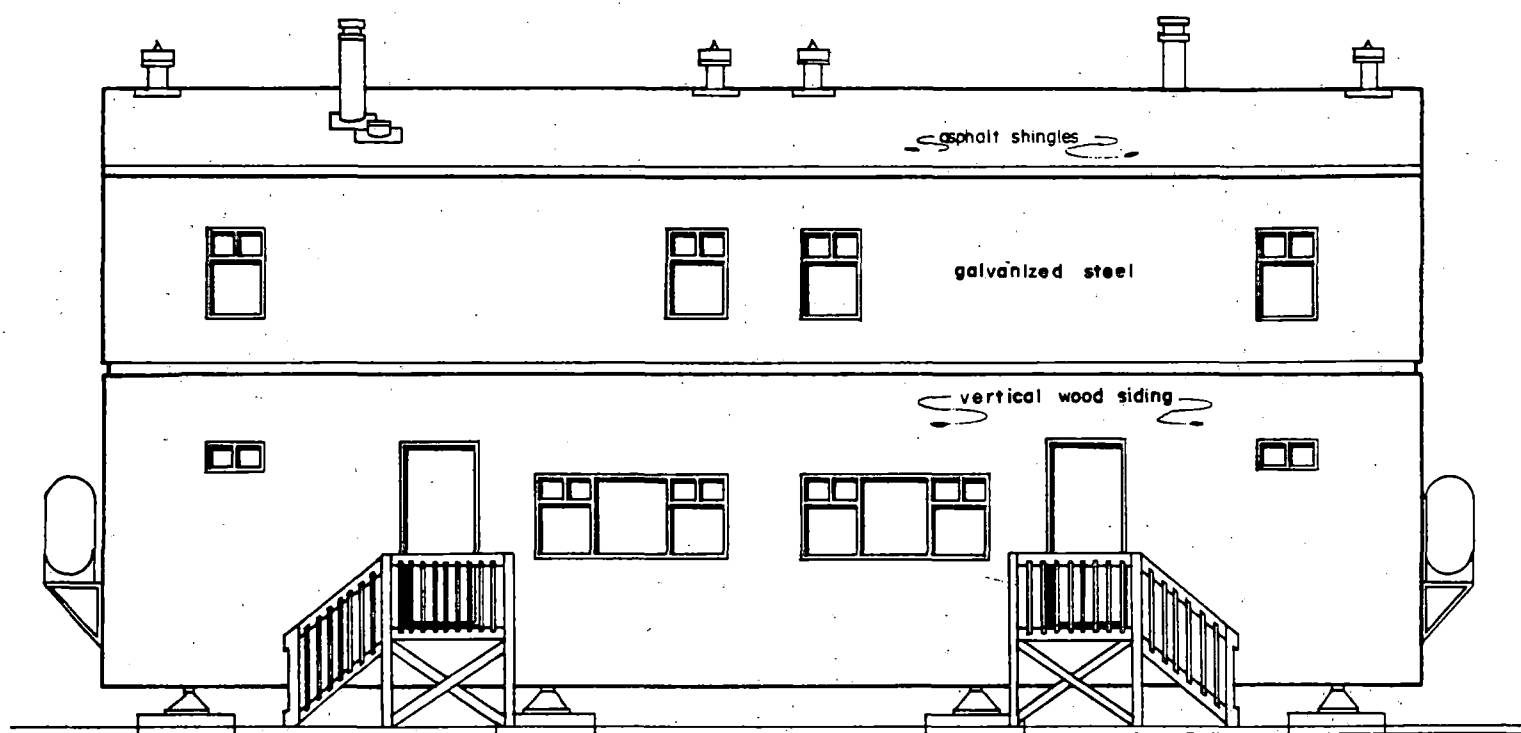
OWNER OR AUTHORITY: Société d'habitation du Québec (S.H.Q.)

DESIGNED BY: Selim Massouh, Serge Lépine Architects;  
Jean-Claude Deblois, Engineer;  
René Gingras, Electrical Engineer

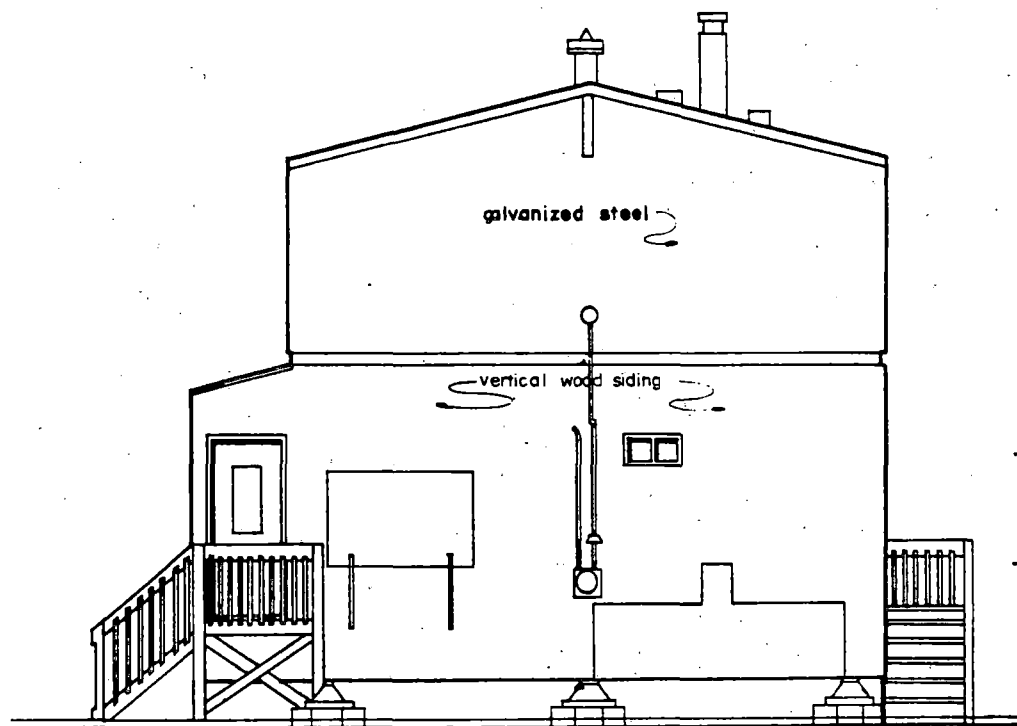
BRIEF DESCRIPTION OF  
SALIENT FEATURES:

MONITORING REPORTS:

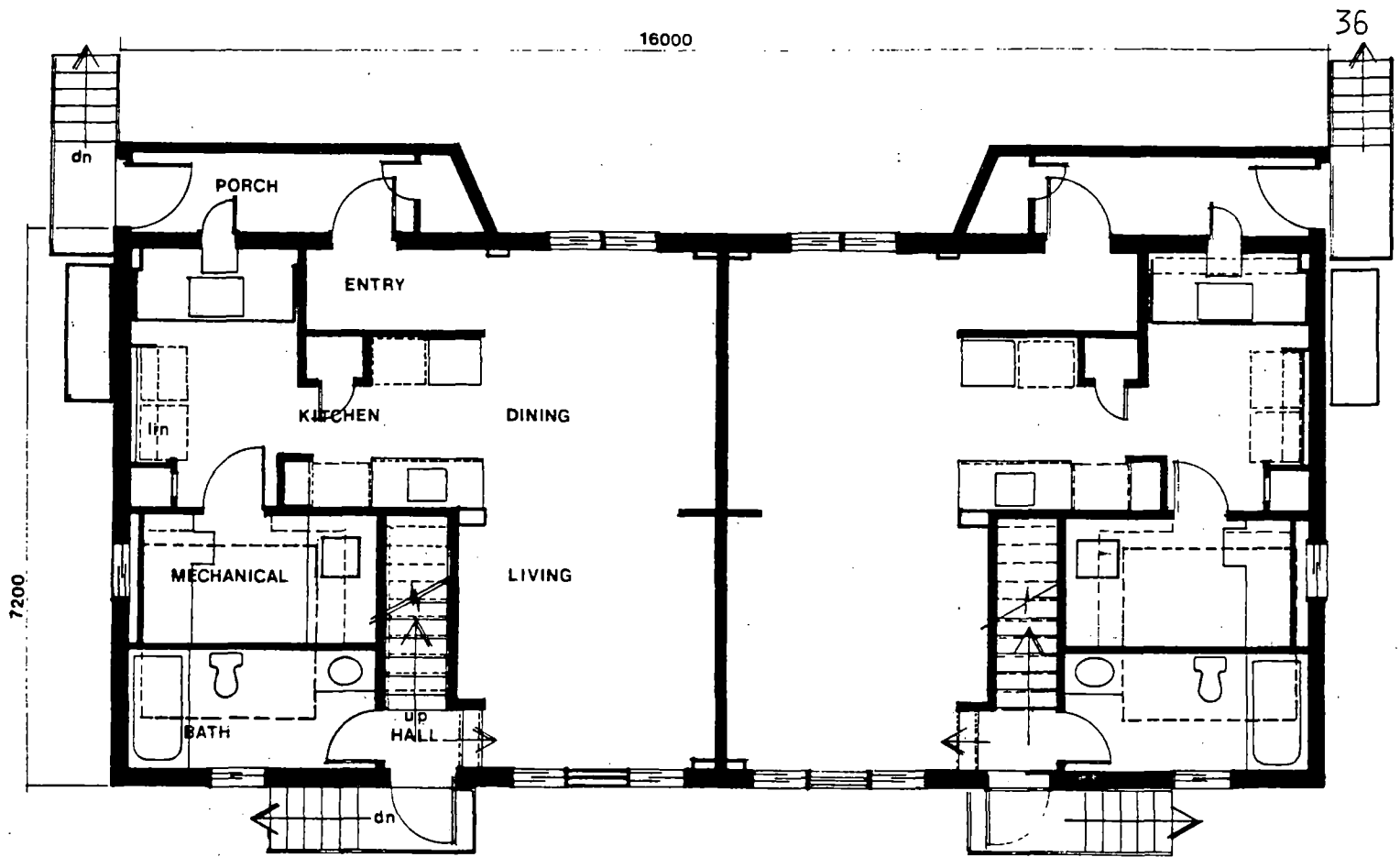
HISTORY: S.H.Q. to complete data sheets.



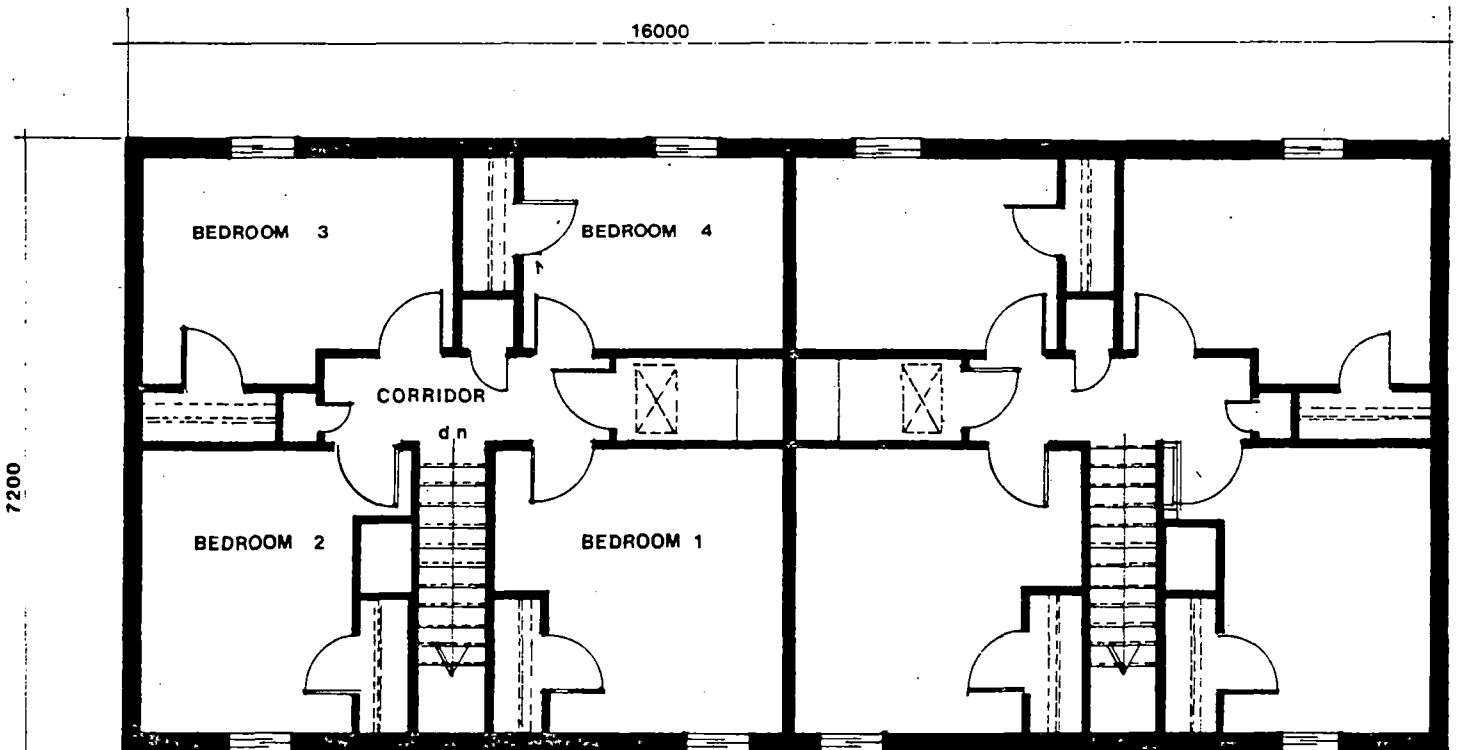
Front Elevation



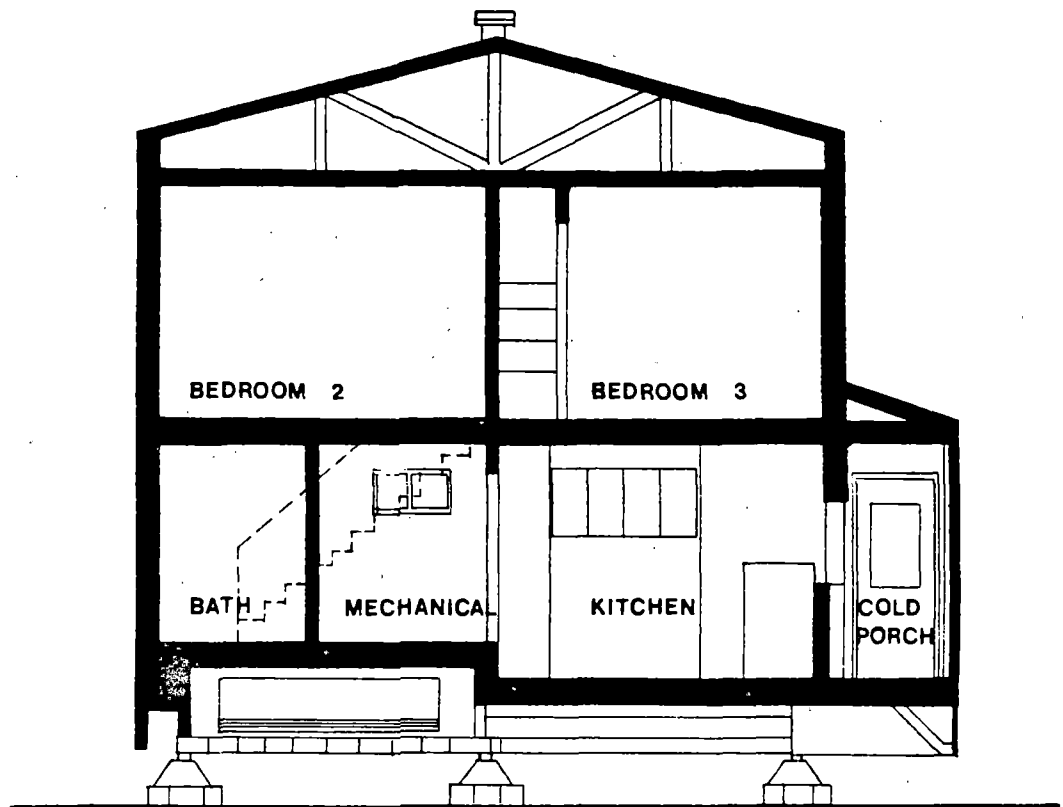
Side Elevation



Ground Floor  
(suspended basement)



Upper Floor



Section

DATA SHEET

HOUSE TYPE: Keewatin. Three bedroom 'A'.

DATE OF CONSTRUCTION:

COST PER UNIT:

LOCATION(S): Widely distributed across the North.

OWNER OR AUTHORITY:

DESIGNED BY: Person Buildings Ltd.

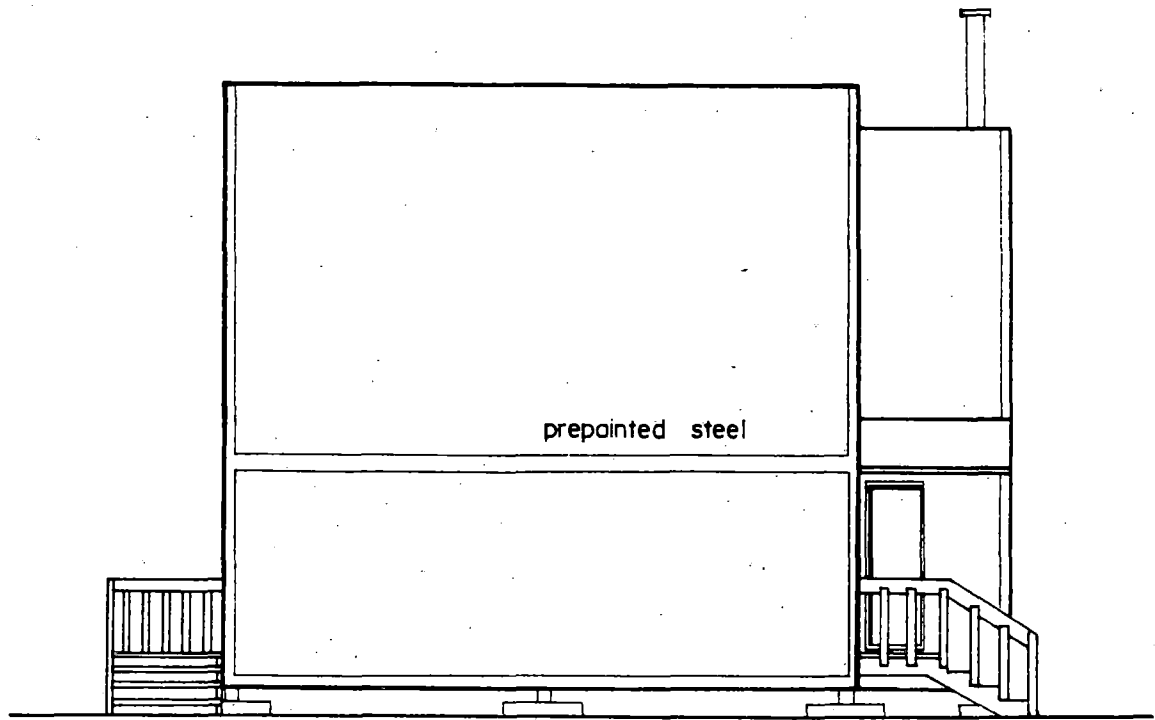
BRIEF DESCRIPTION OF  
SALIENT FEATURES: The arched wall/roof design eliminates the eaves,  
and permits a single form of construction to run  
continuously from the ground to the ridge, a  
particularly stable form of construction.

MONITORING REPORTS:

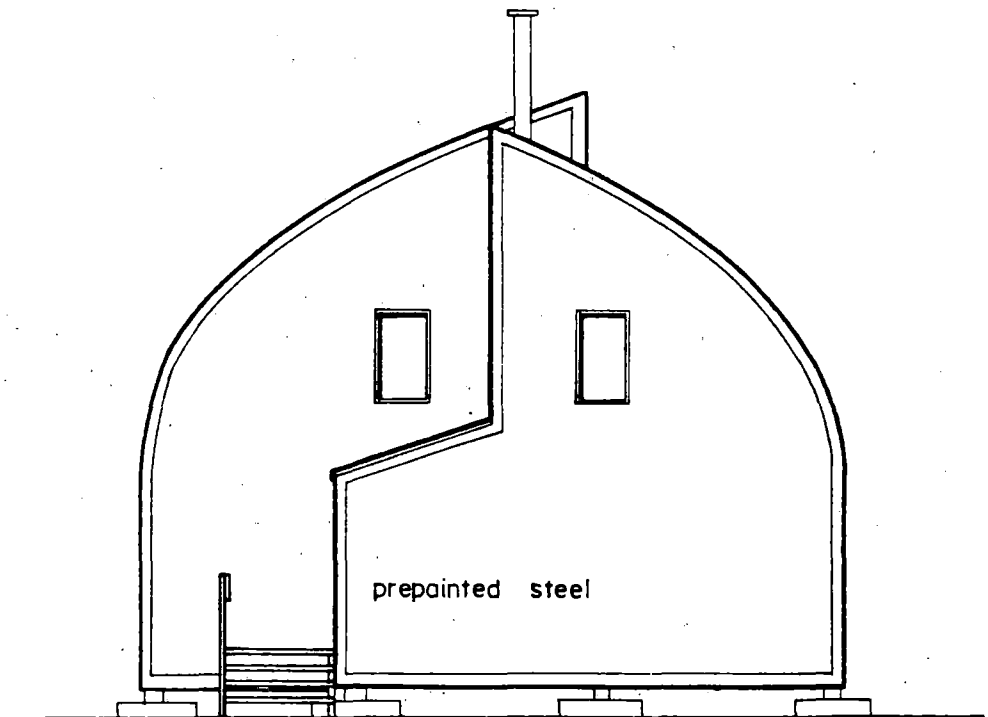
HISTORY: This arched design has been used extensively  
across the Arctic and elsewhere for housing,  
nursing stations and other buildings, and has  
gained a good reputation for suitability and  
reliability.

Regrettably, the firm who designed and  
manufactured the system has gone out of business.

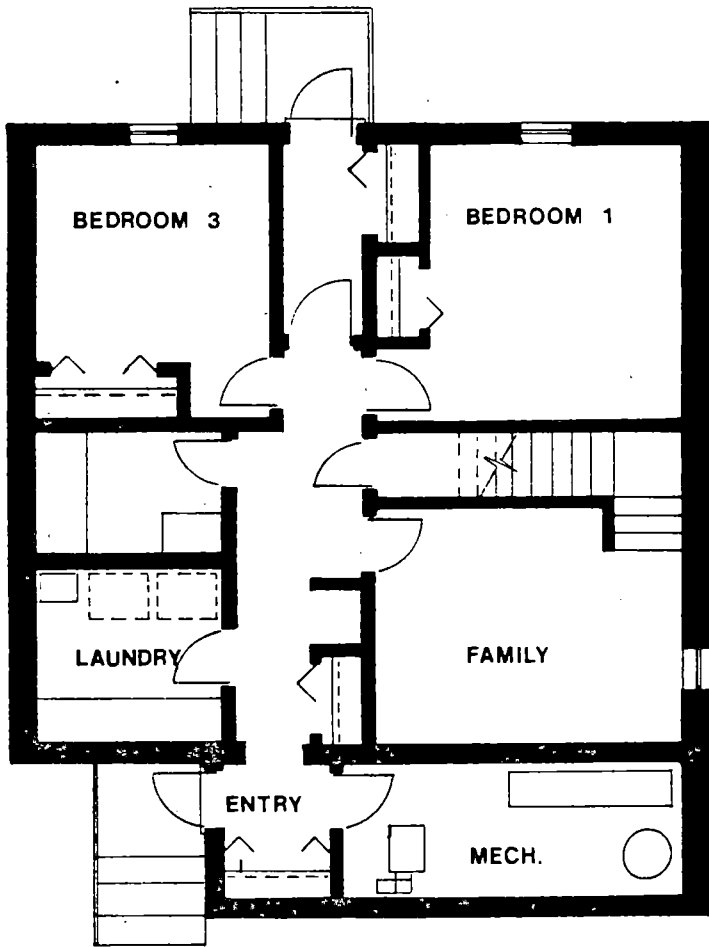
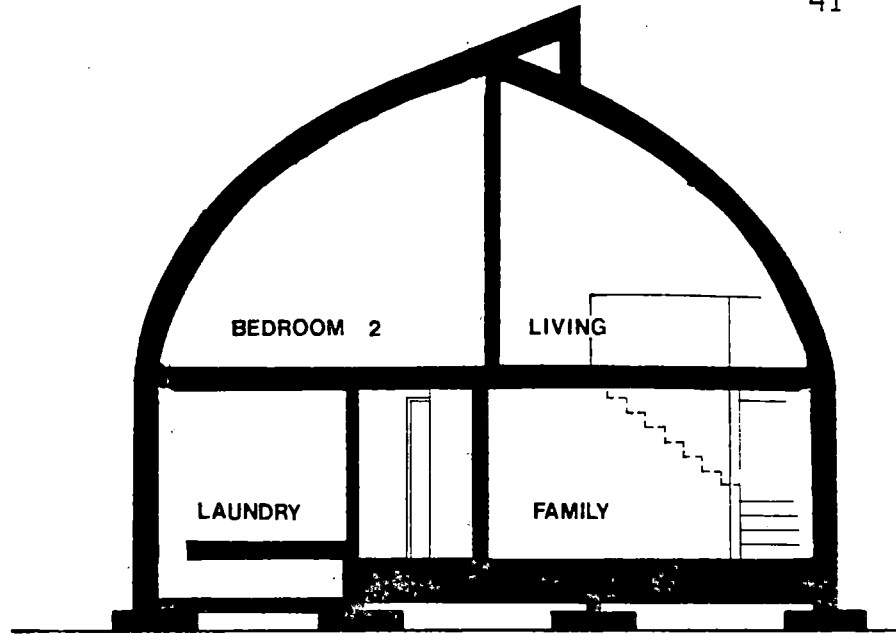




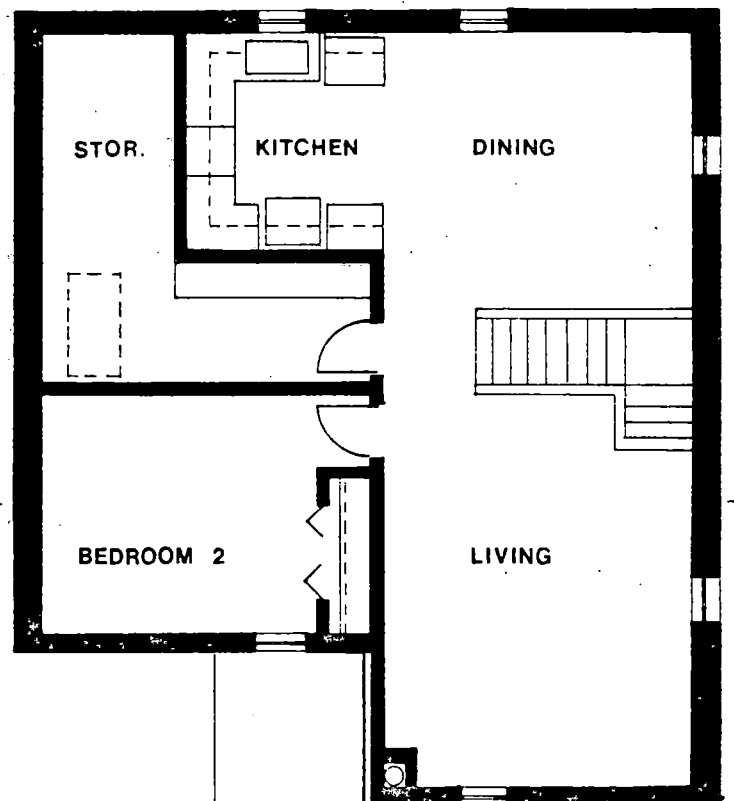
Side Elevation



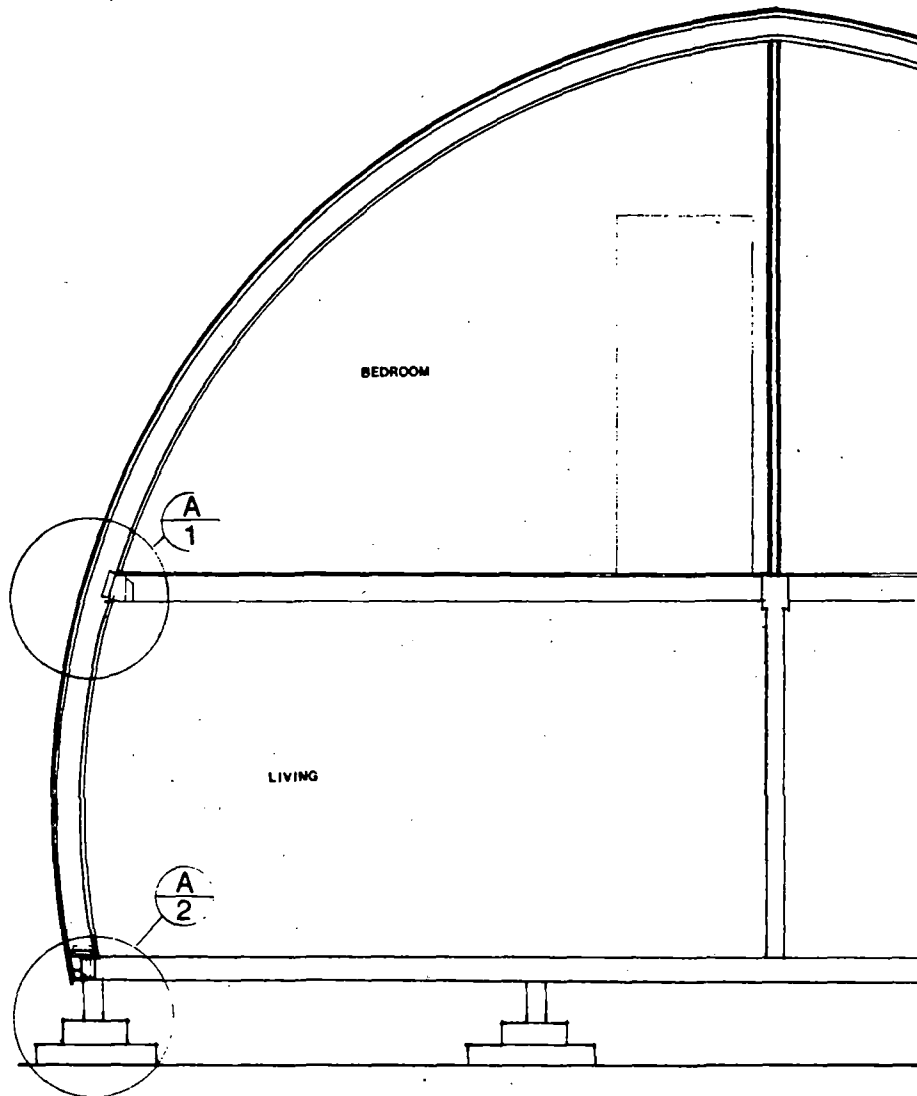
Front Elevation



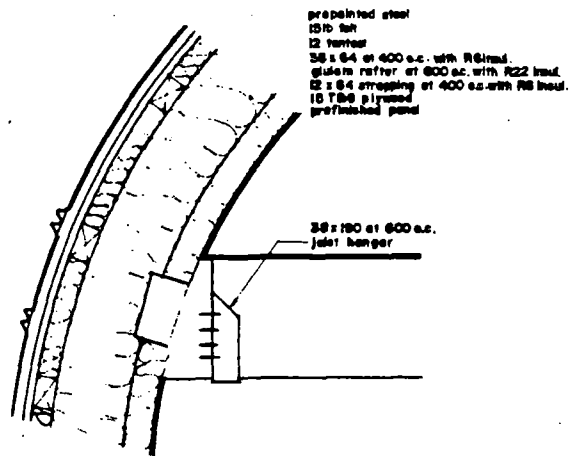
First Floor Plan



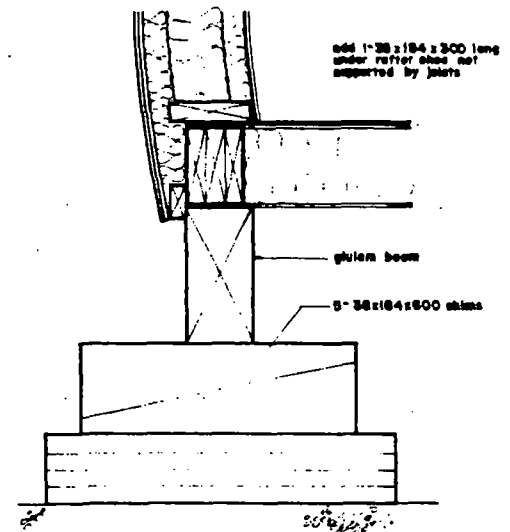
Second Floor Plan



Typical Section



Detail A1



Detail A2

DATA SHEET

HOUSE TYPE: Replacement House

DATE OF CONSTRUCTION: 1984 Construction Season

COST PER UNIT: Varies

LOCATION(S):

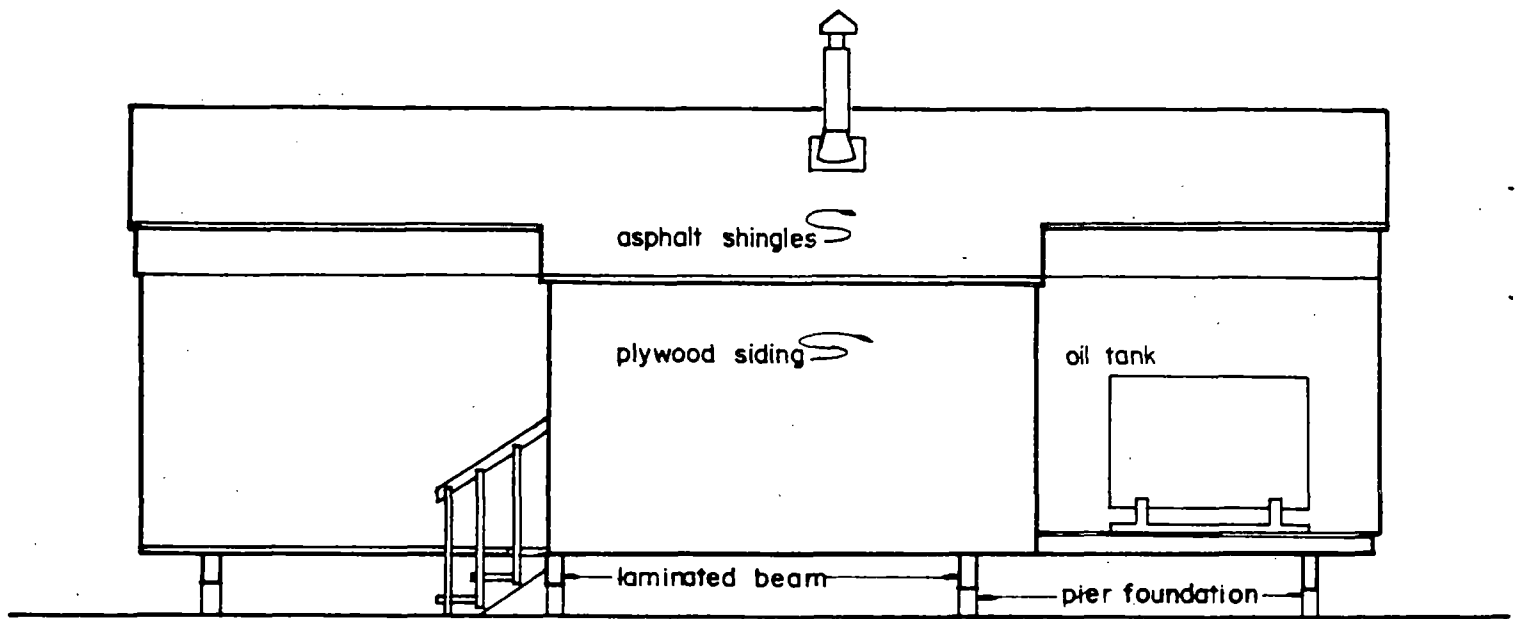
OWNER OR AUTHORITY: Northwest Territories Housing Corporation

DESIGNED BY: Northwest Territories Housing Corporation

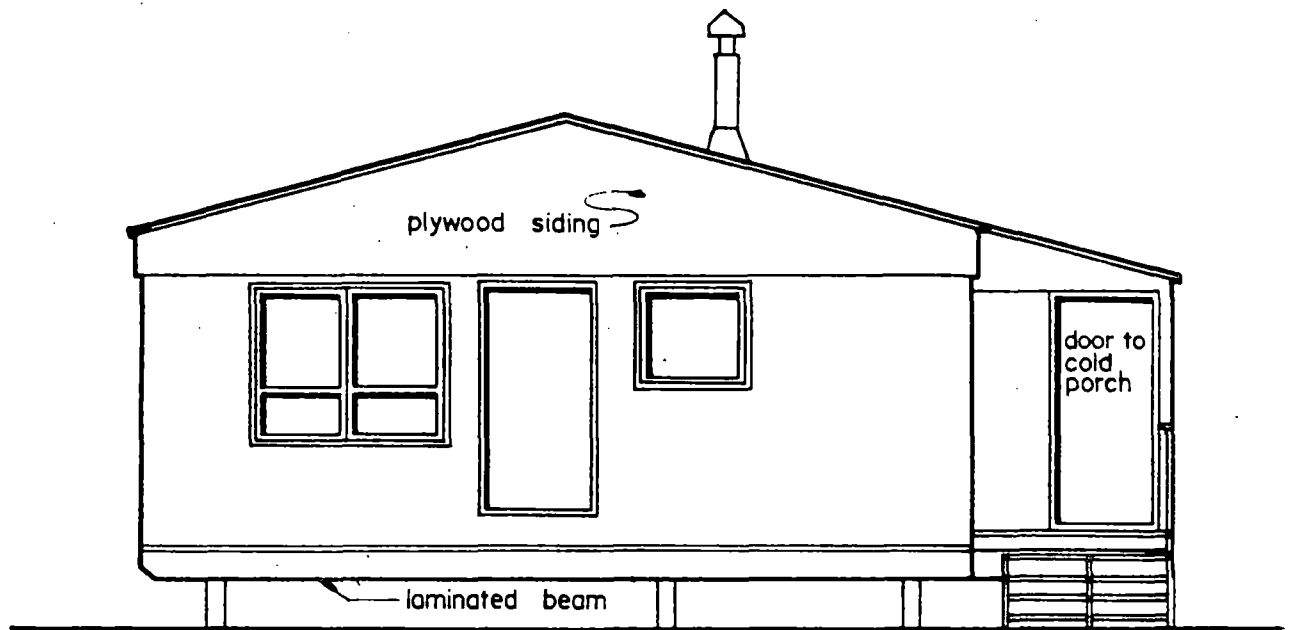
BRIEF DESCRIPTION OF  
SALIENT FEATURES: This was intended to be a 'back-to-basics' house,  
and was designed to the minimum standards  
consistent with health, safety and comfort. The  
design of the suspended floor is particularly  
noteworthy.

MONITORING REPORTS:

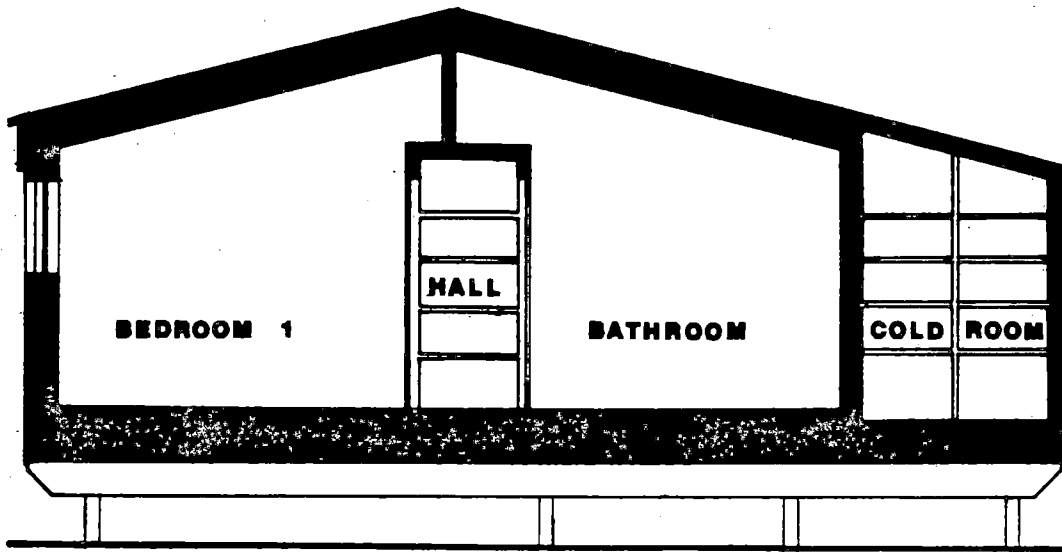
HISTORY: Originally designed to cost somewhere in the  
\$50 000 - \$60 000 range. It was, in fact,  
considerably more expensive. It is a clean and  
thoughtful design, and the higher price may have  
been due to preliminary over-optimism in  
estimating, over-priced bidding and to some over  
design of the wood frame.



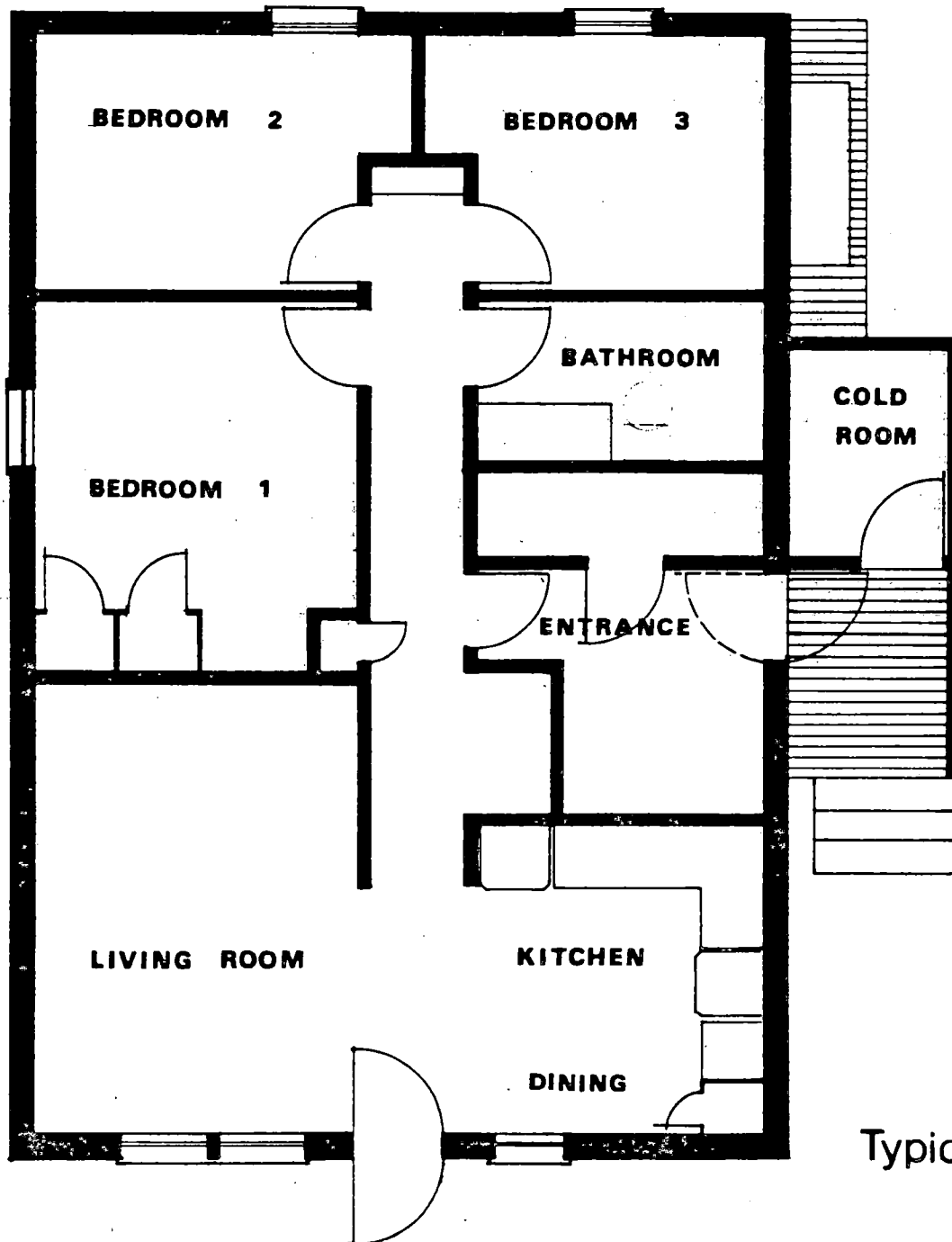
Right Side Elevation



Front Elevation



Typical Section



Typical Floor Plan

DATA SHEET

HOUSE TYPE: INPHC. Lake Harbour.

DATE OF CONSTRUCTION:

COST PER UNIT:

LOCATION(S):

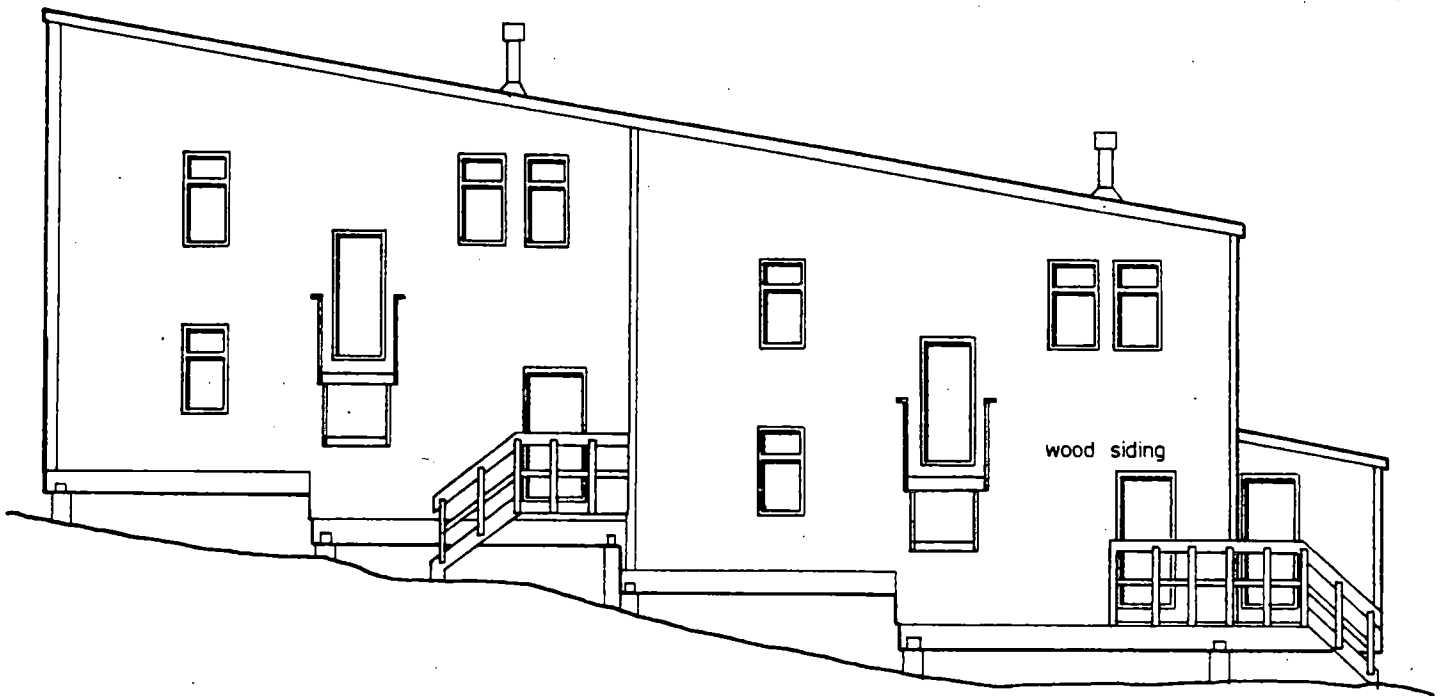
OWNER OR AUTHORITY: INPHC.

DESIGNED BY:

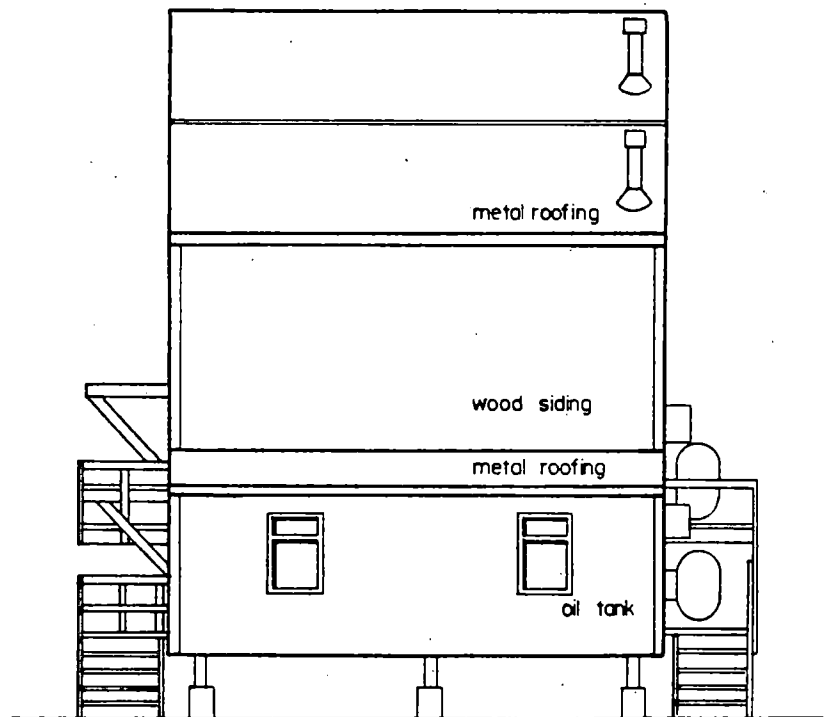
BRIEF DESCRIPTION OF  
SALIENT FEATURES:

MONITORING REPORTS:

HISTORY: P.I.D. to complete data sheet.

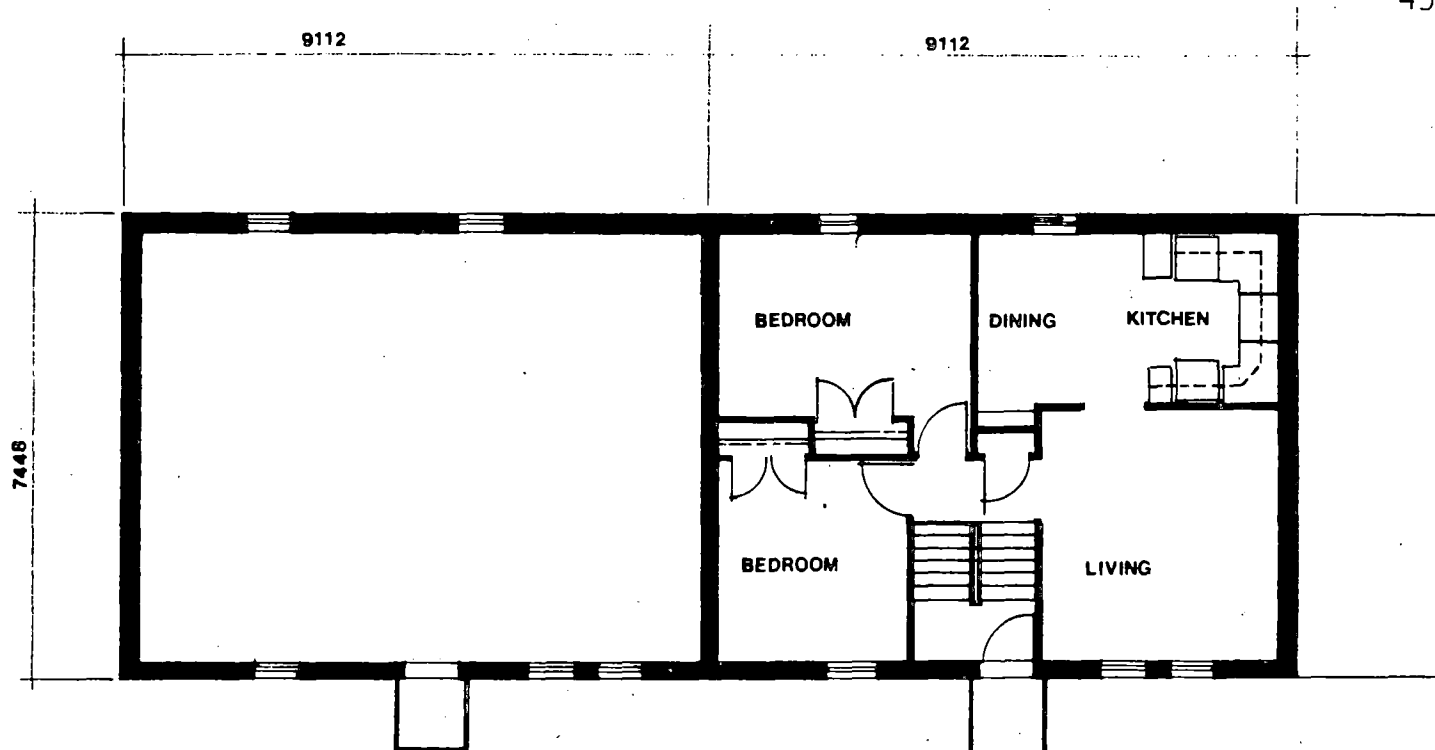


Front Elevation

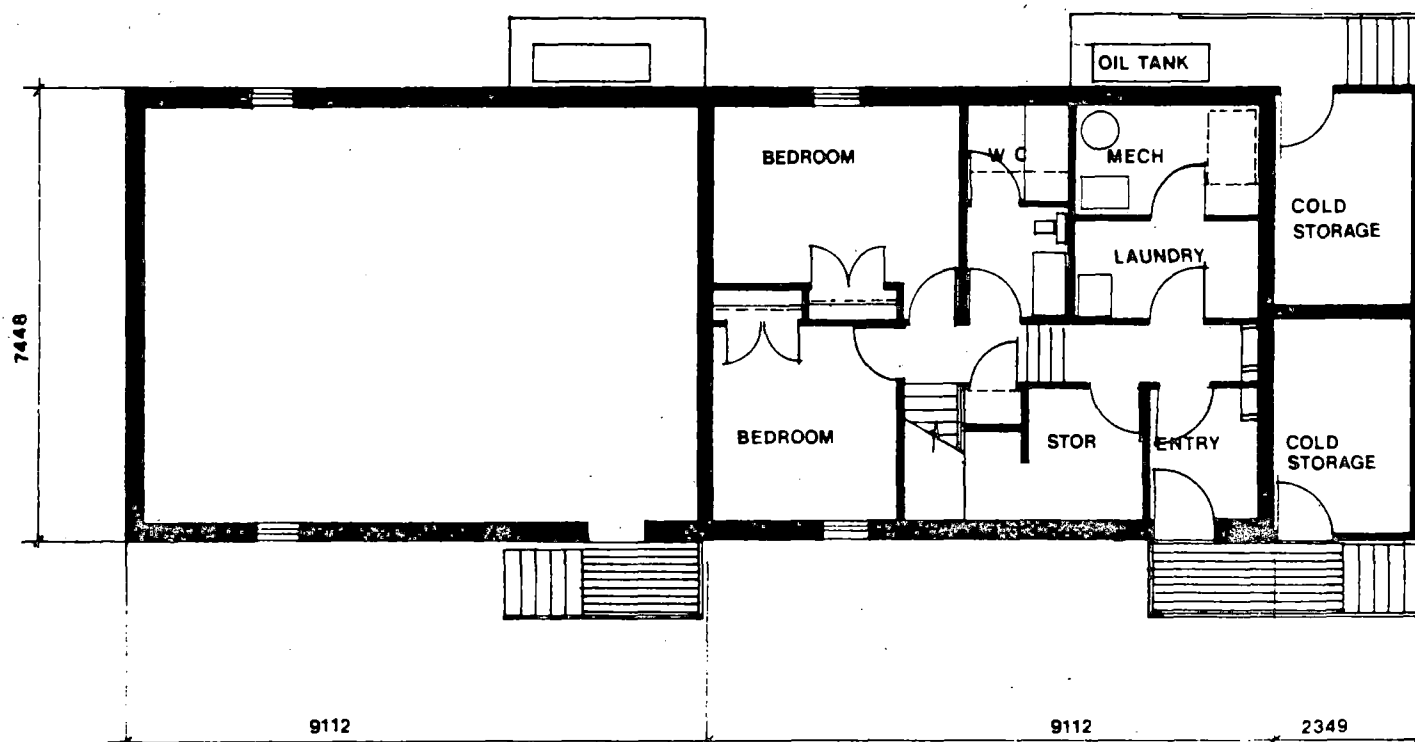


Right Side Elevation





Upper Floor Plan



Lower Floor Plan

DATA SHEET

HOUSE TYPE: Staff House. #426 and #598. Three bedroom, two storey 'suspended basement'.

DATE OF CONSTRUCTION:

COST PER UNIT:

LOCATION(S): Frobisher Bay; Baker Lake.

OWNER OR AUTHORITY: Department of Indian and Northern Development

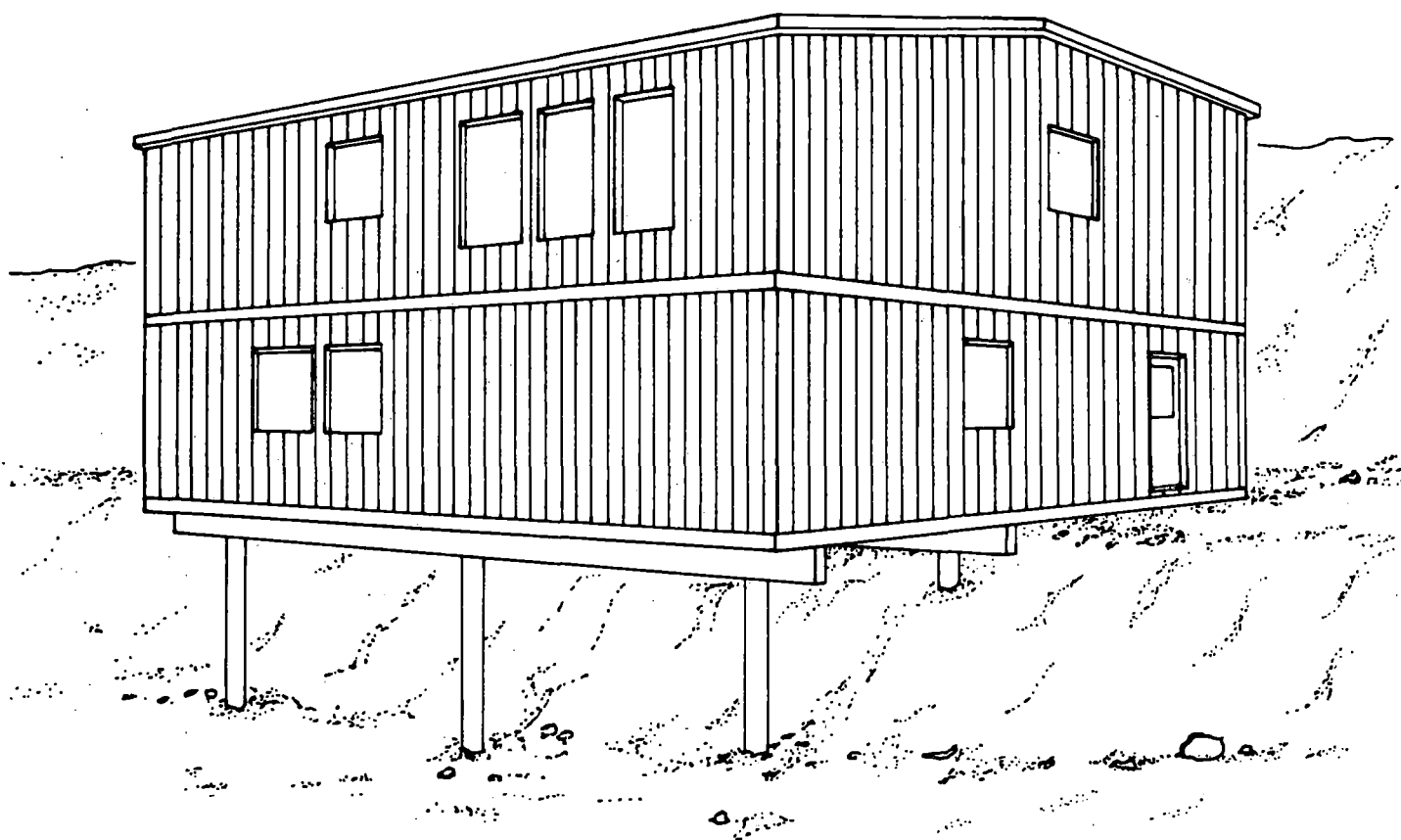
DESIGNED BY: Department of Indian and Northern Development

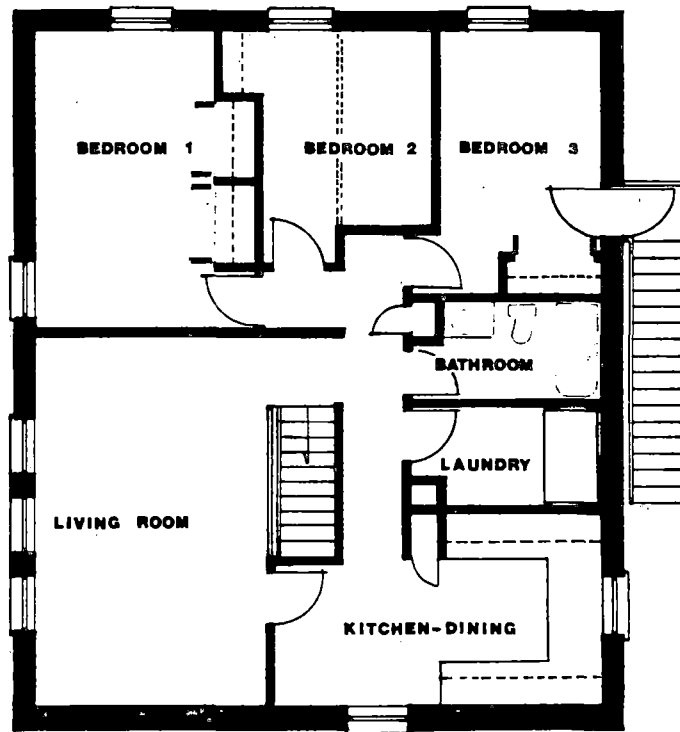
BRIEF DESCRIPTION OF SALIENT FEATURES: Designed for maximum energy efficiency. This house is one of the most effective constructed in the north.

Panels were constructed in Quebec under careful supervision. All elements in the house are designed for long life under Arctic conditions.

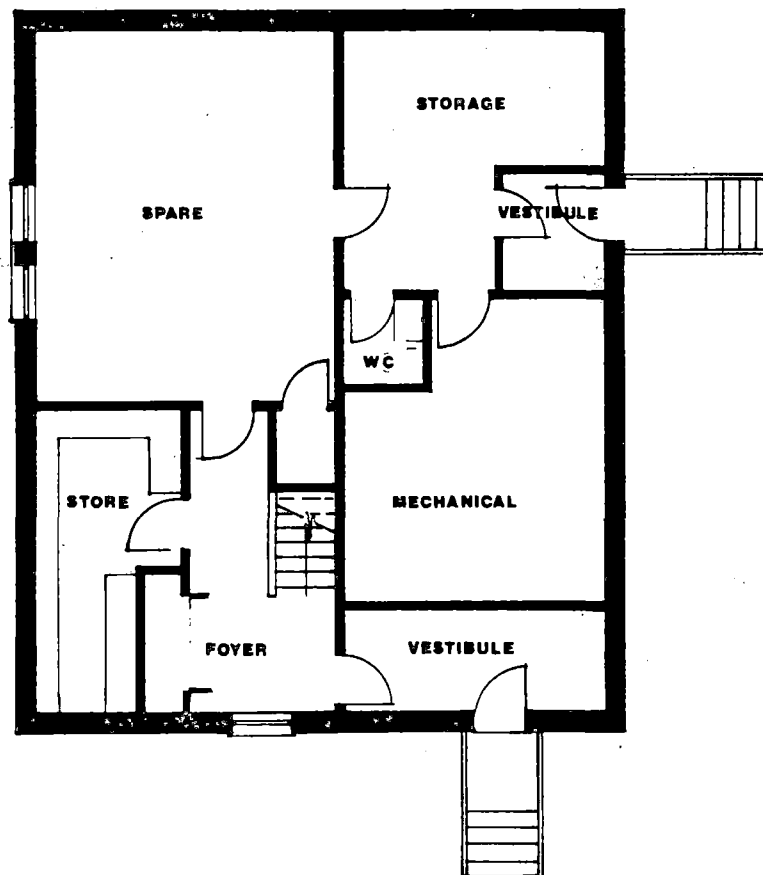
MONITORING REPORTS:

HISTORY: The reason for success of these houses is the careful design of the buildings by people familiar with the Arctic and experienced in Arctic design, and secondly, the careful supervision of the construction process which did not permit field deviations from the design.

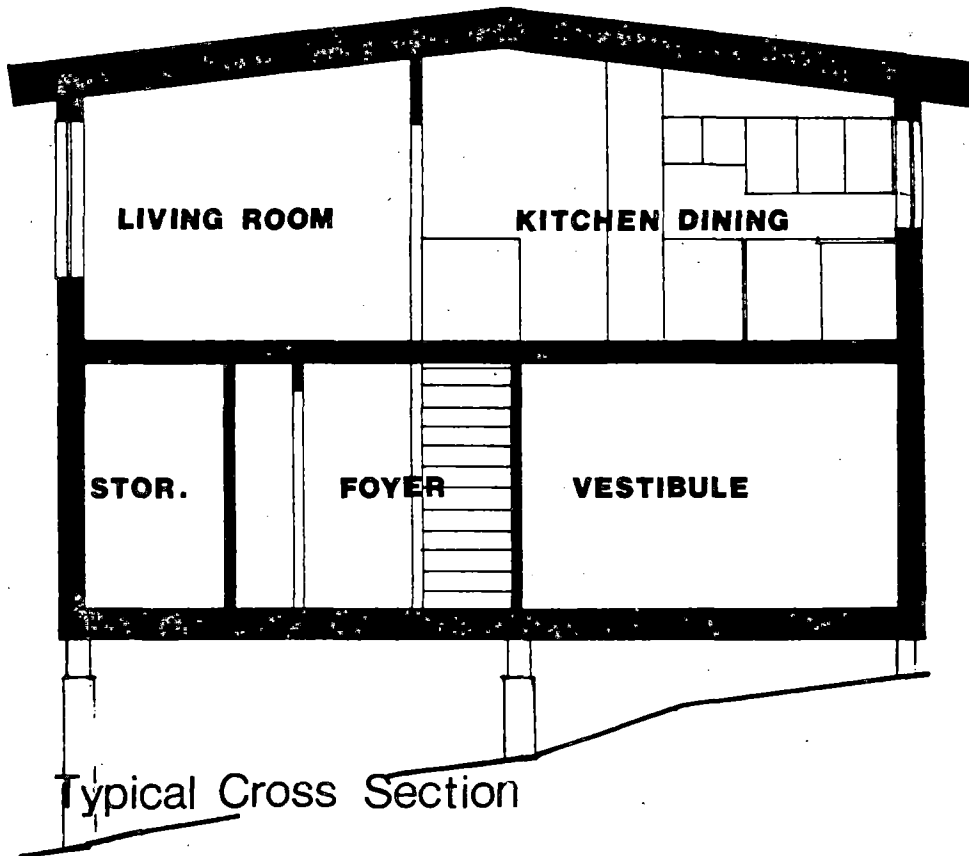




Upper Floor Plan



Lower Floor Plan  
(suspended) basement



DATA SHEET

HOUSE TYPE: Alaska

DATE OF CONSTRUCTION:

COST PER UNIT:

LOCATION(S):

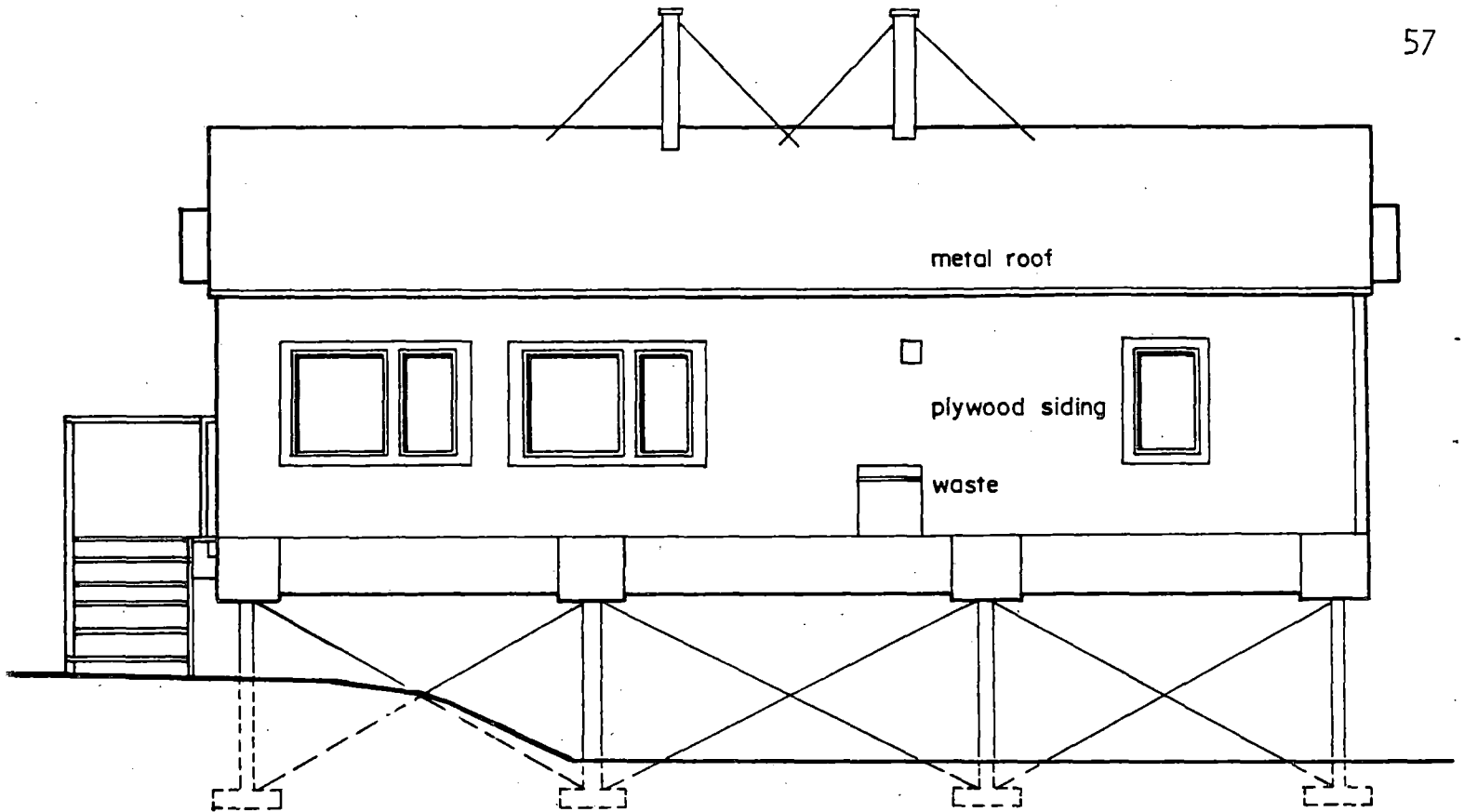
OWNER OR AUTHORITY: Pacific Rim Housing Corporation (Check)

DESIGNED BY:

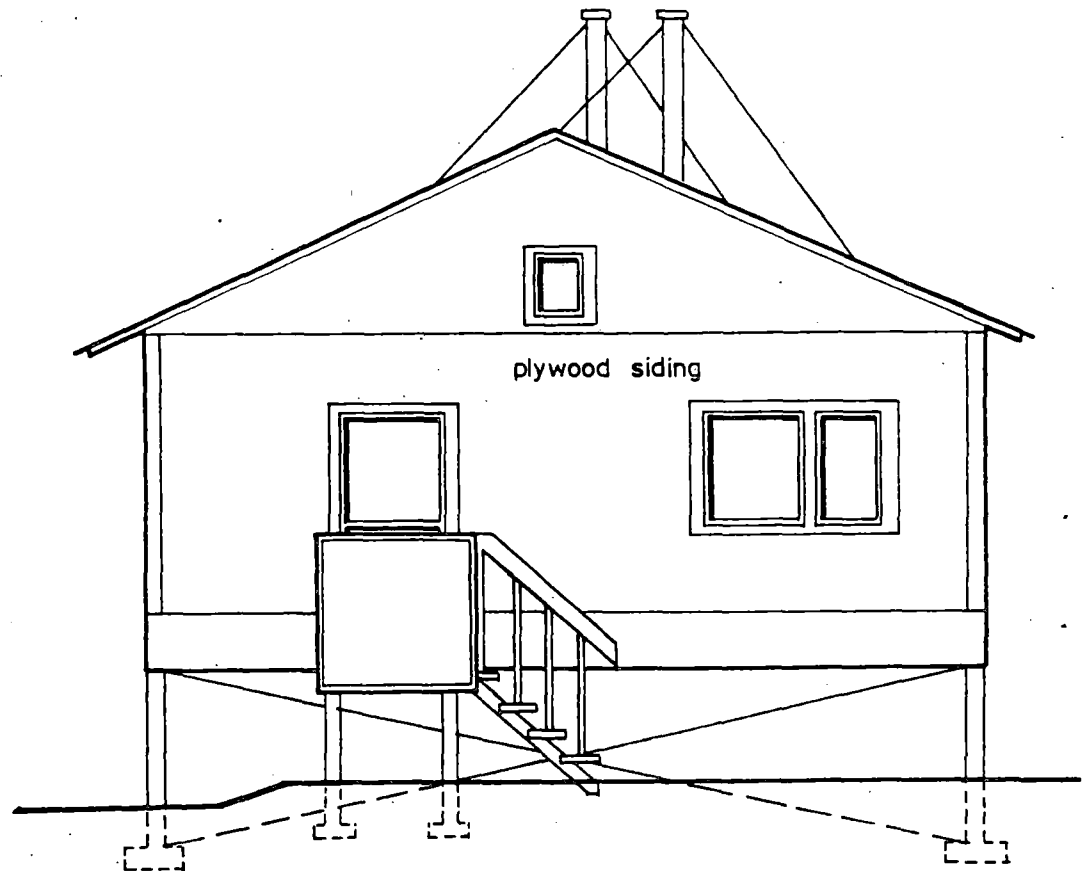
BRIEF DESCRIPTION OF  
SALIENT FEATURES:

MONITORING REPORTS:

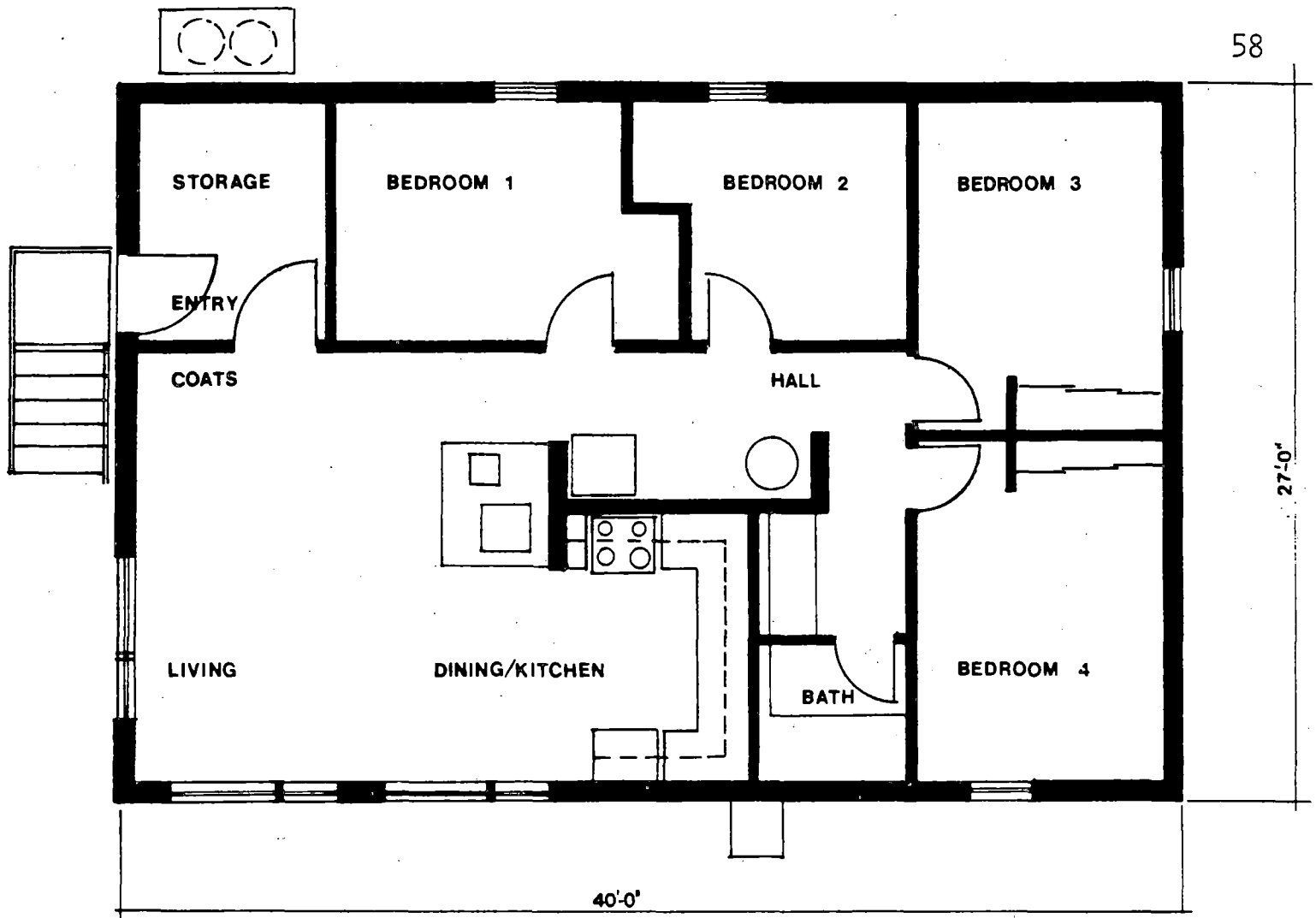
HISTORY: No information available. Check with HUD? Under  
memo of understanding.



Front Elevation

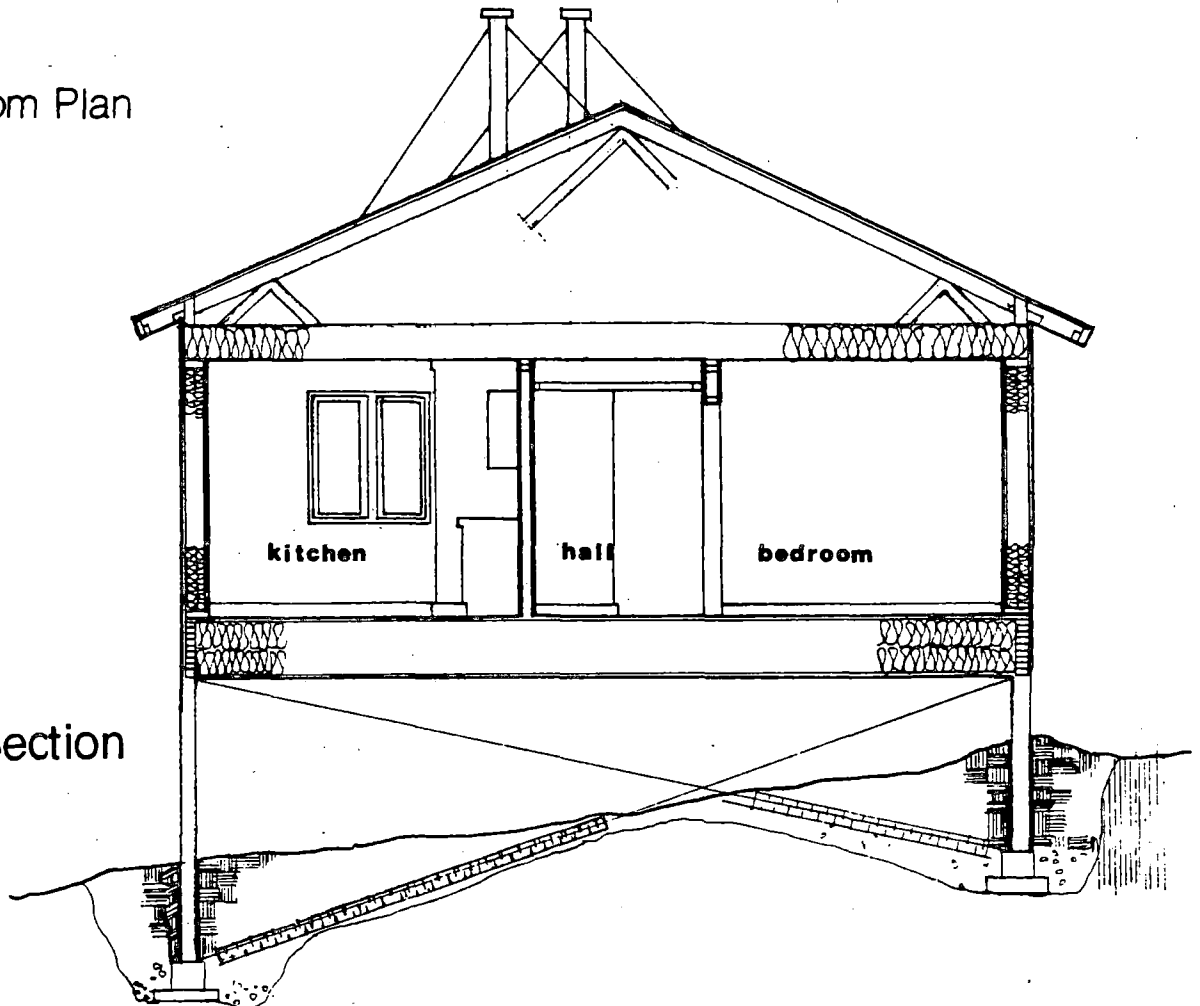


Side Elevation



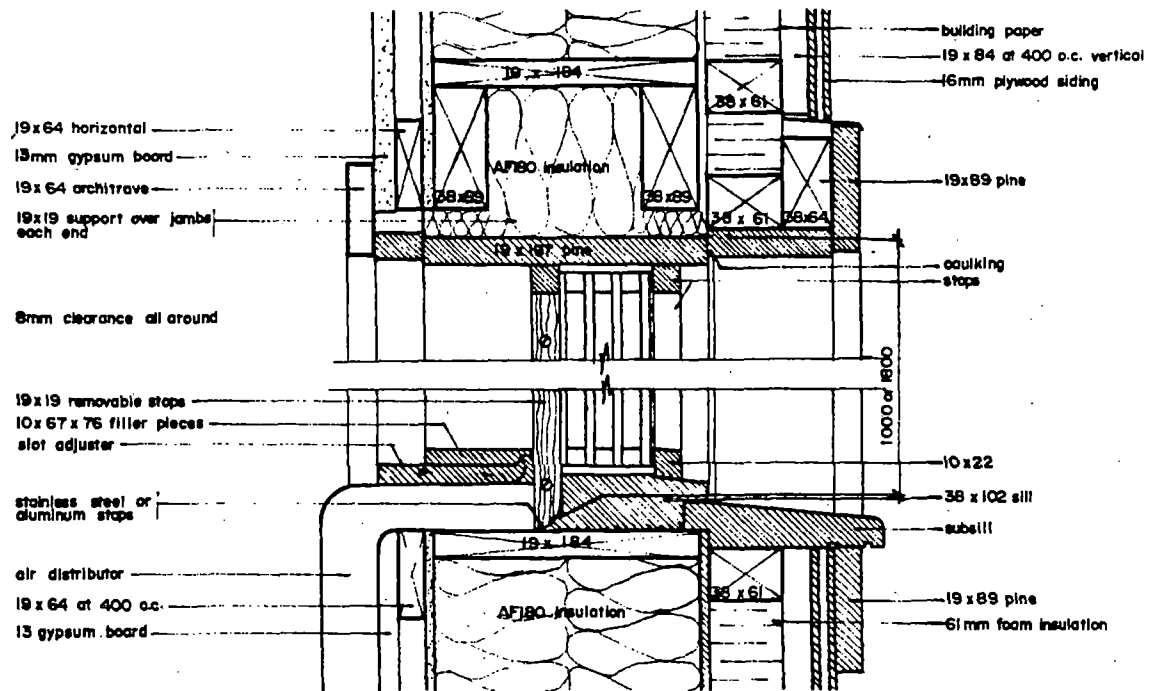
Four Bedroom Plan

Typical Section

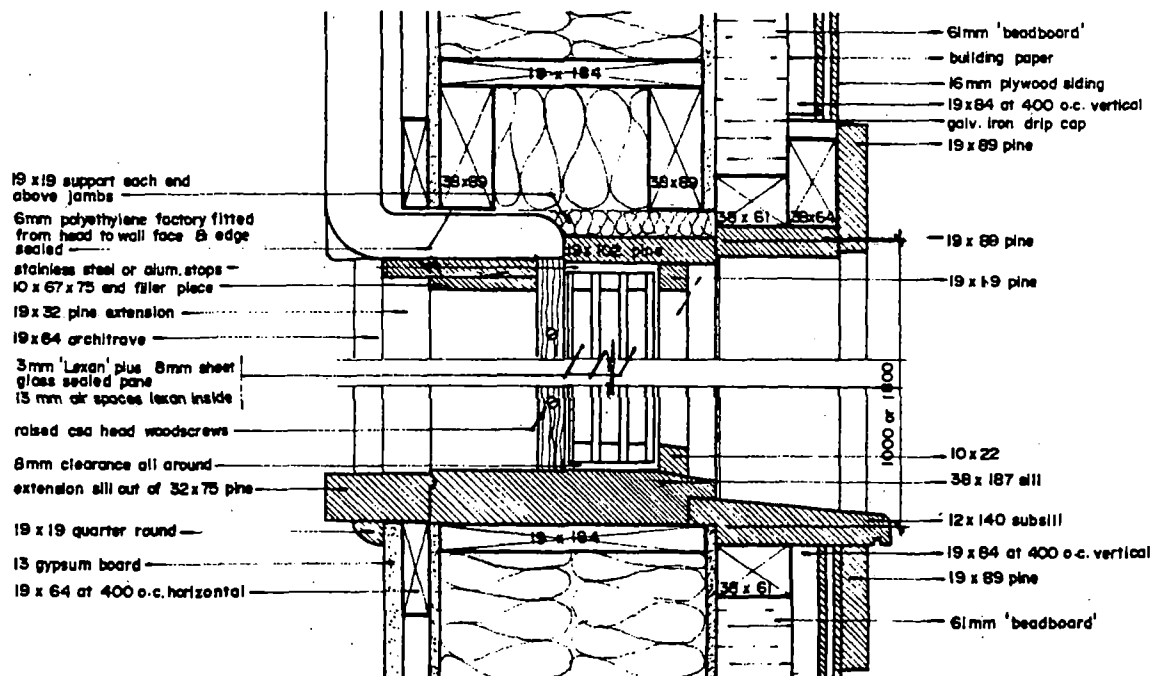




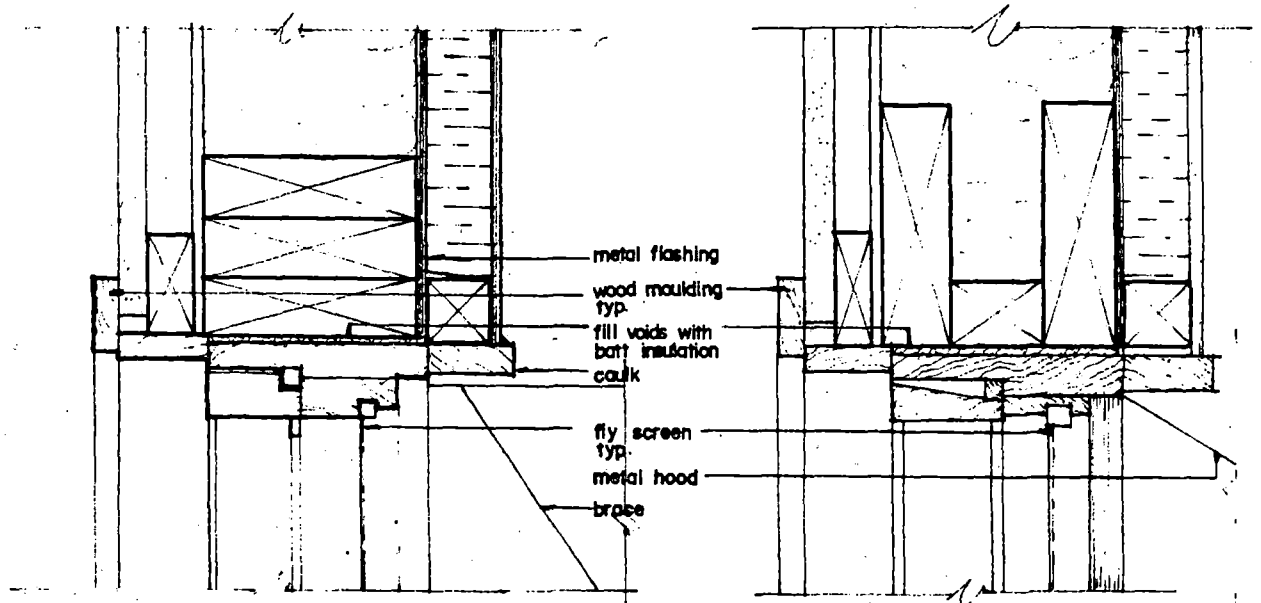
**Miscellaneous Design Details  
and Construction Techniques**



Upper Floor Window Section

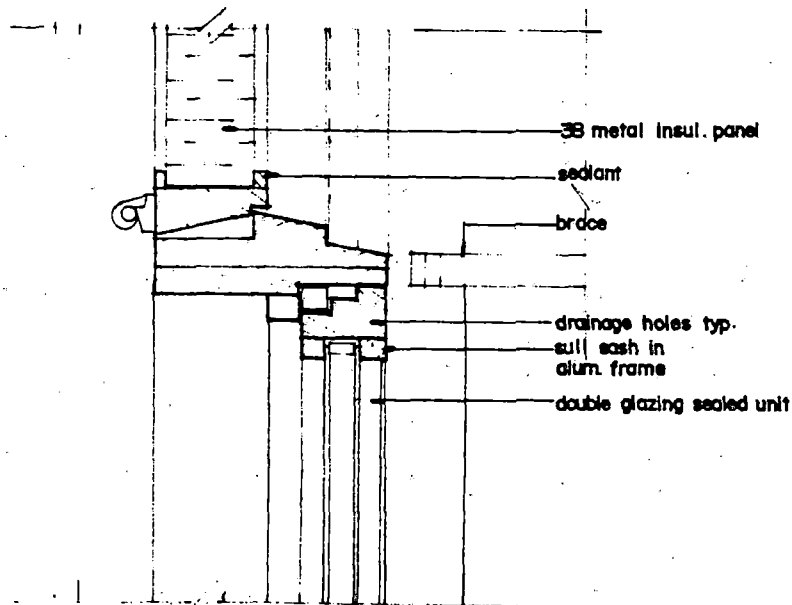


Lower Floor Window Section

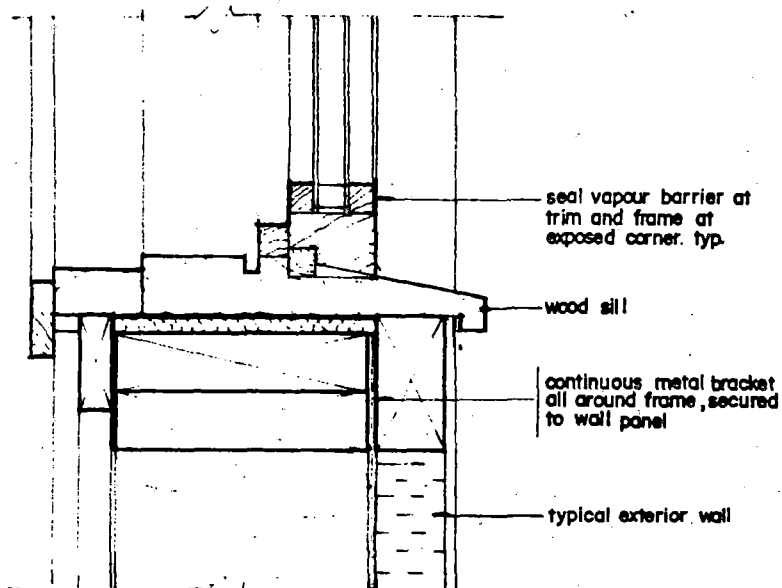


Jamb at Vent

Head at Vent

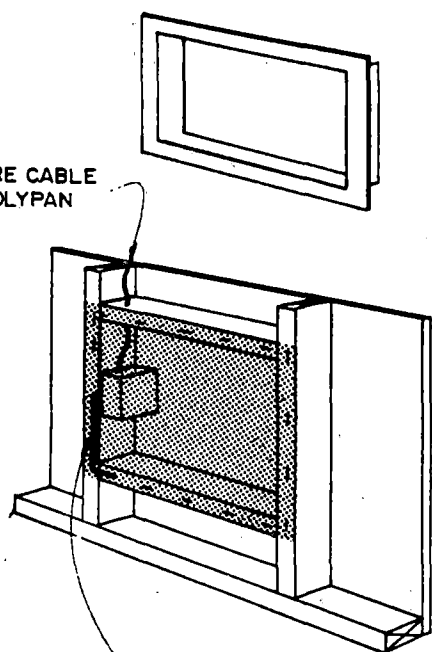


Mullion

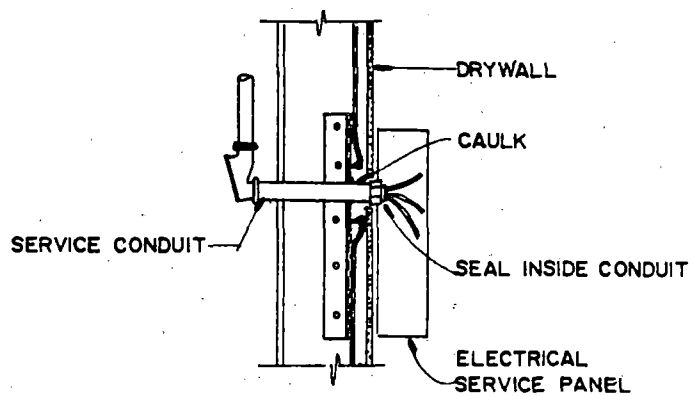


Window Sill

SEAL WHERE CABLE  
ENTERS POLYPAN

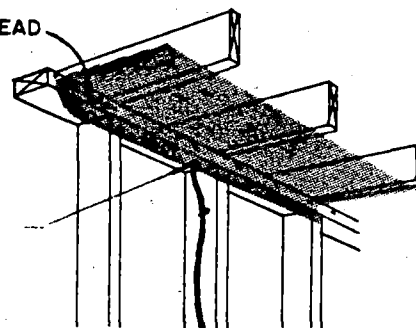


SEALANT BEAD



SEALANT BEAD

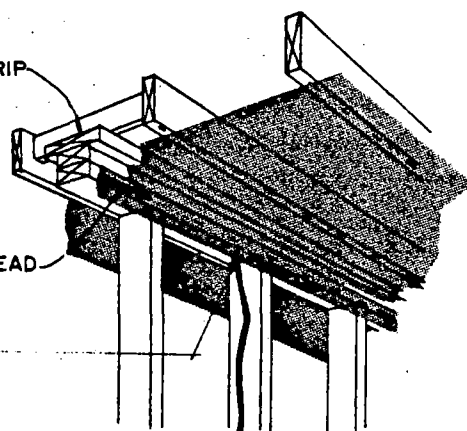
CAULK

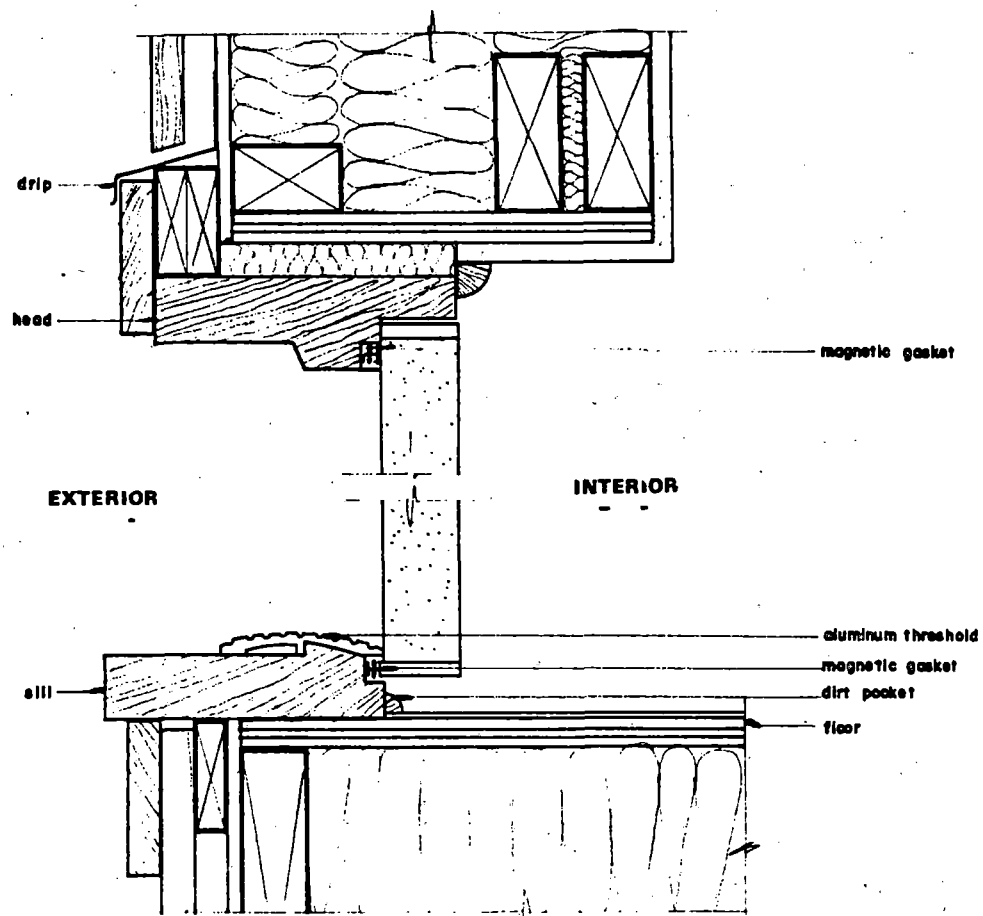


NAILING STRIP

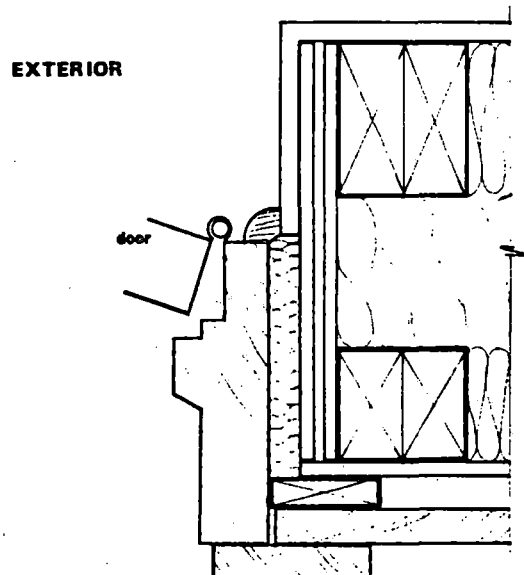
SEALANT BEAD

CAULK

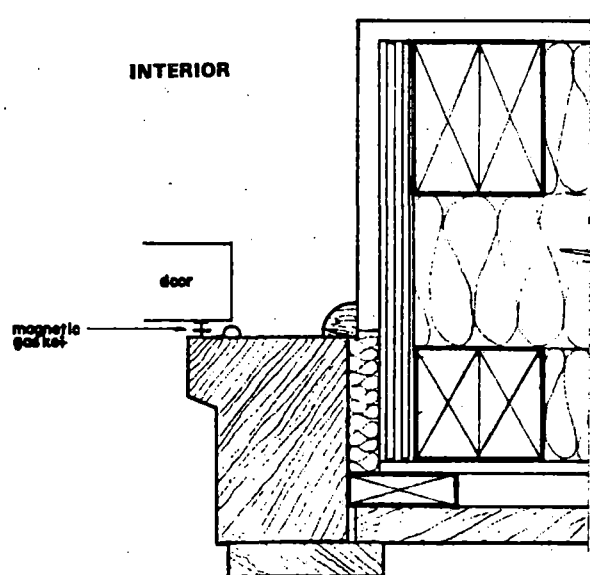




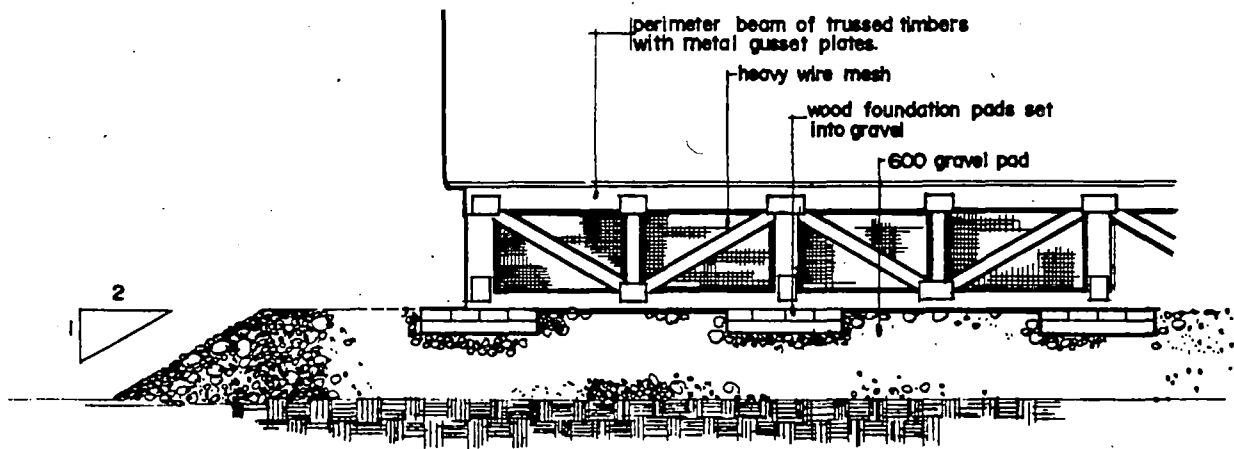
Vertical Section thru Exterior Door



Horizontal Section of Jamb  
(normally hinged)

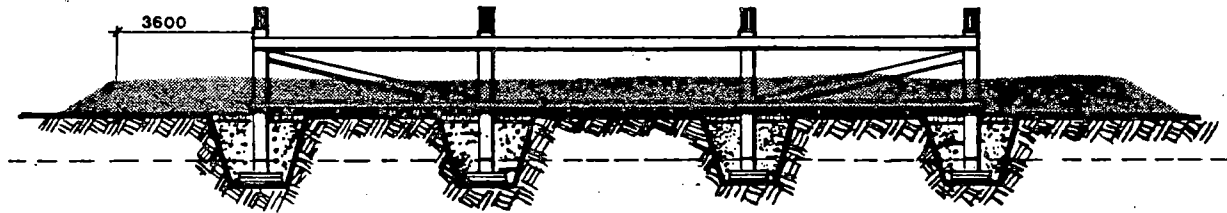


Horizontal Section of Jamb  
(modified jamb & hanging)

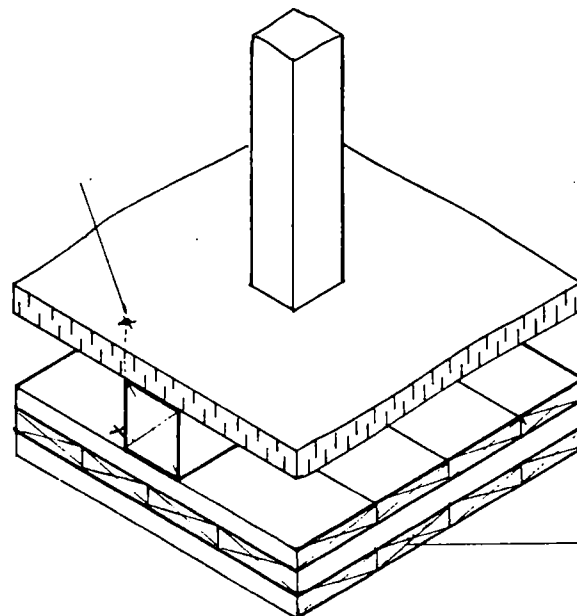
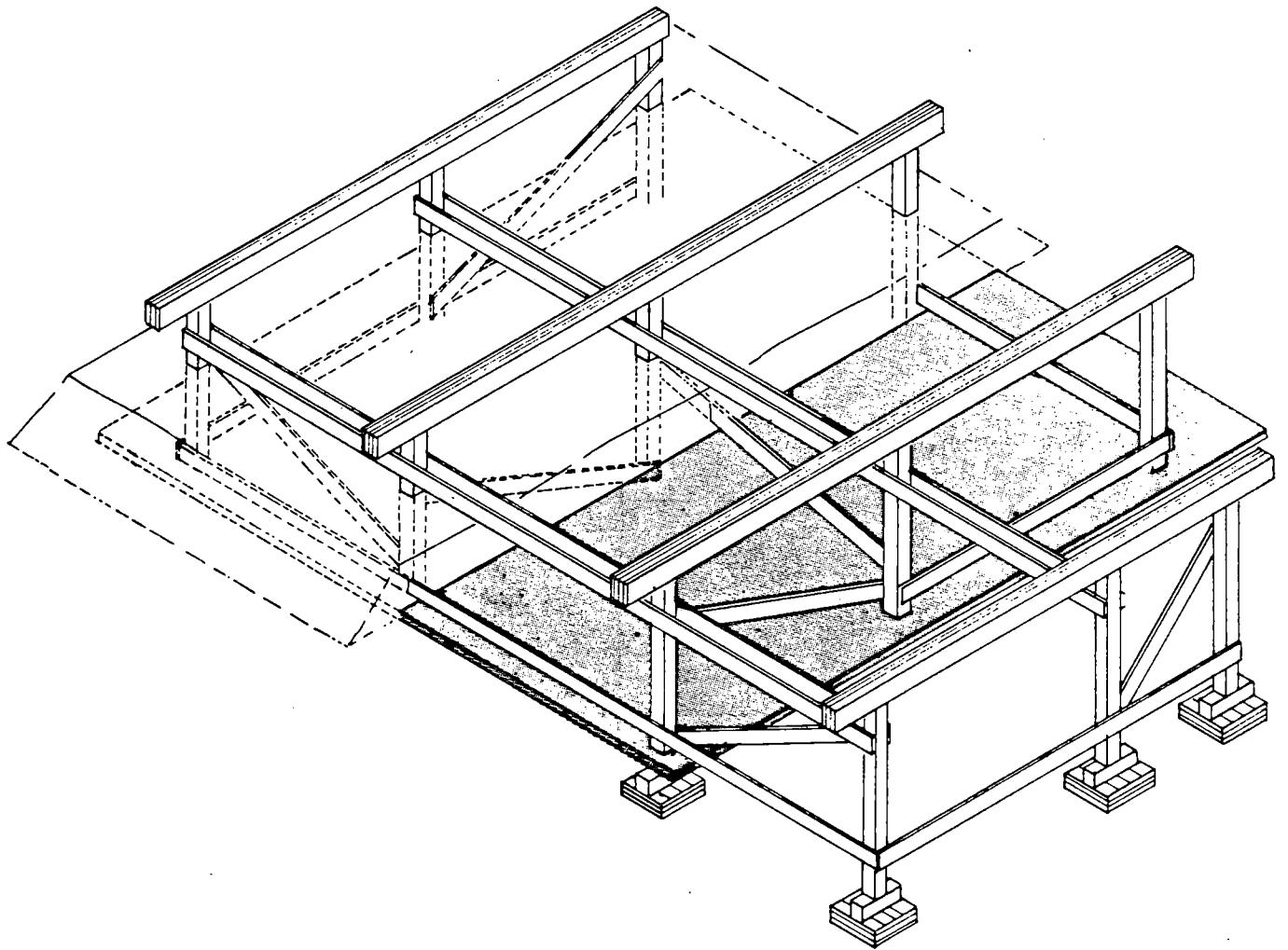


### A Variant of Perimeter Beam Foundations Using Trusses

This system appears to have all the advantages of the solid perimeter beam; however, it also permits air to freely penetrate the crawl space and to maintain the permafrost over the full depth gravel pad. In addition, the wind can scour the underside of the building penetrating heavy snow drifting which can otherwise make access difficult.



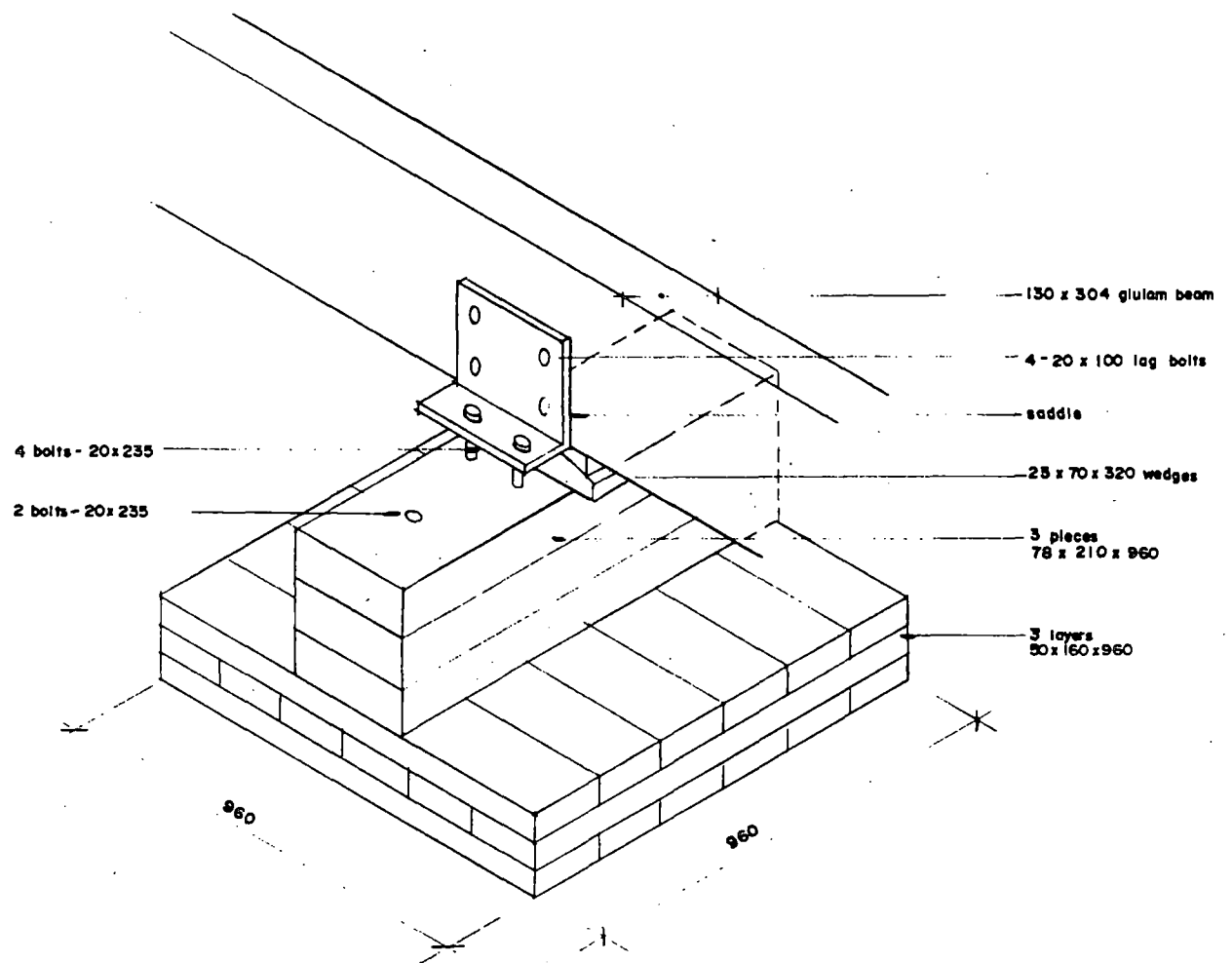
Gravel Pad with Concrete Footings



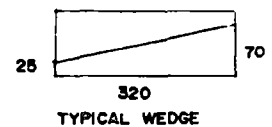
3 layers  
4x2x8x3 pods

Typical Foundation

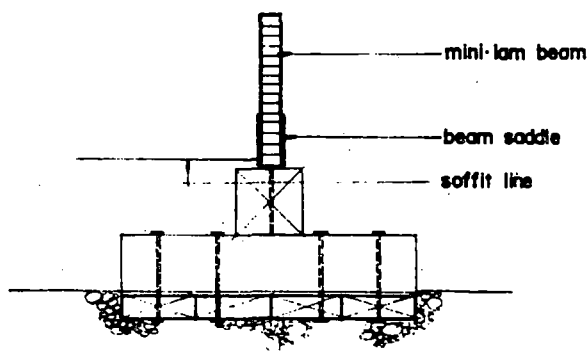




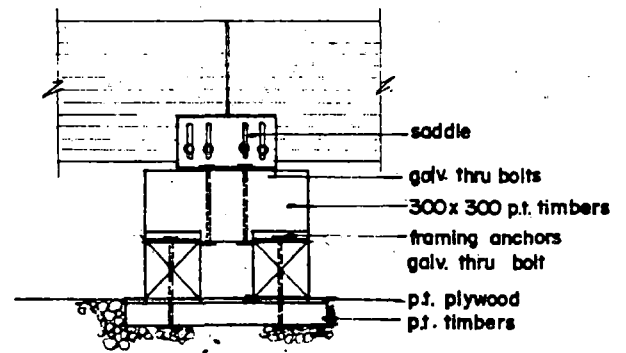
All wood is pressure treated.  
All metal is protective coated.



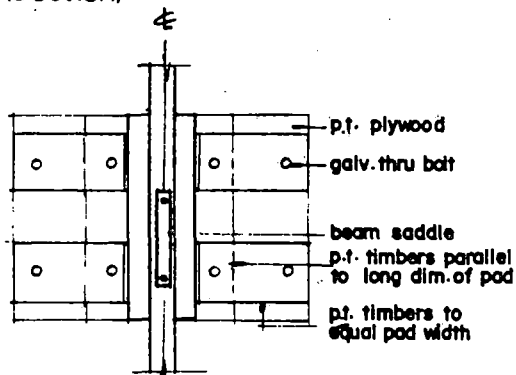
## Above Grade Foundation System



Foundation Pad on Grade  
(Section)



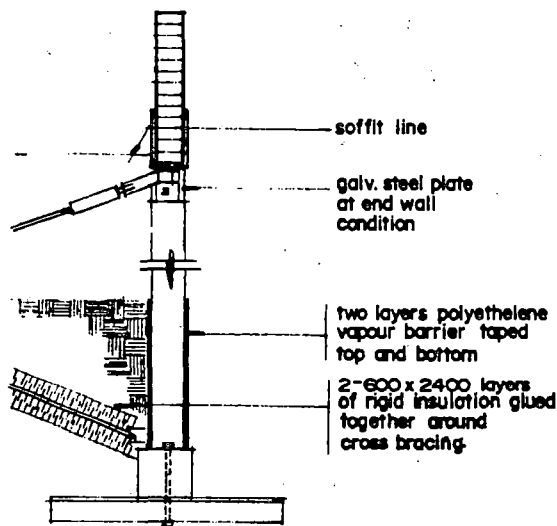
Foundation Pad on Grade  
(Elevation)



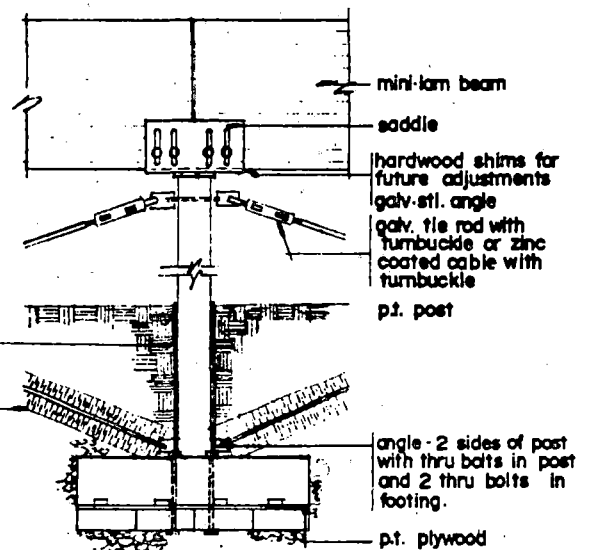
Foundation Pad on Grade  
(Plan)

Note:

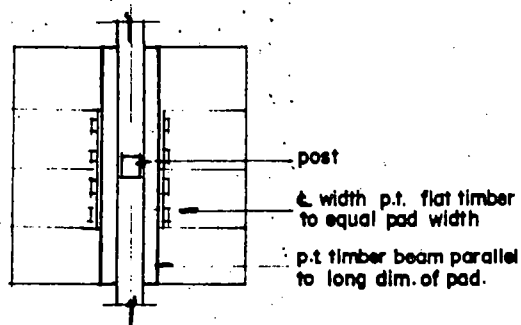
- mini-lam beams to be discontinuous over intermediate supports.
- all bolts hot dip galvanized.



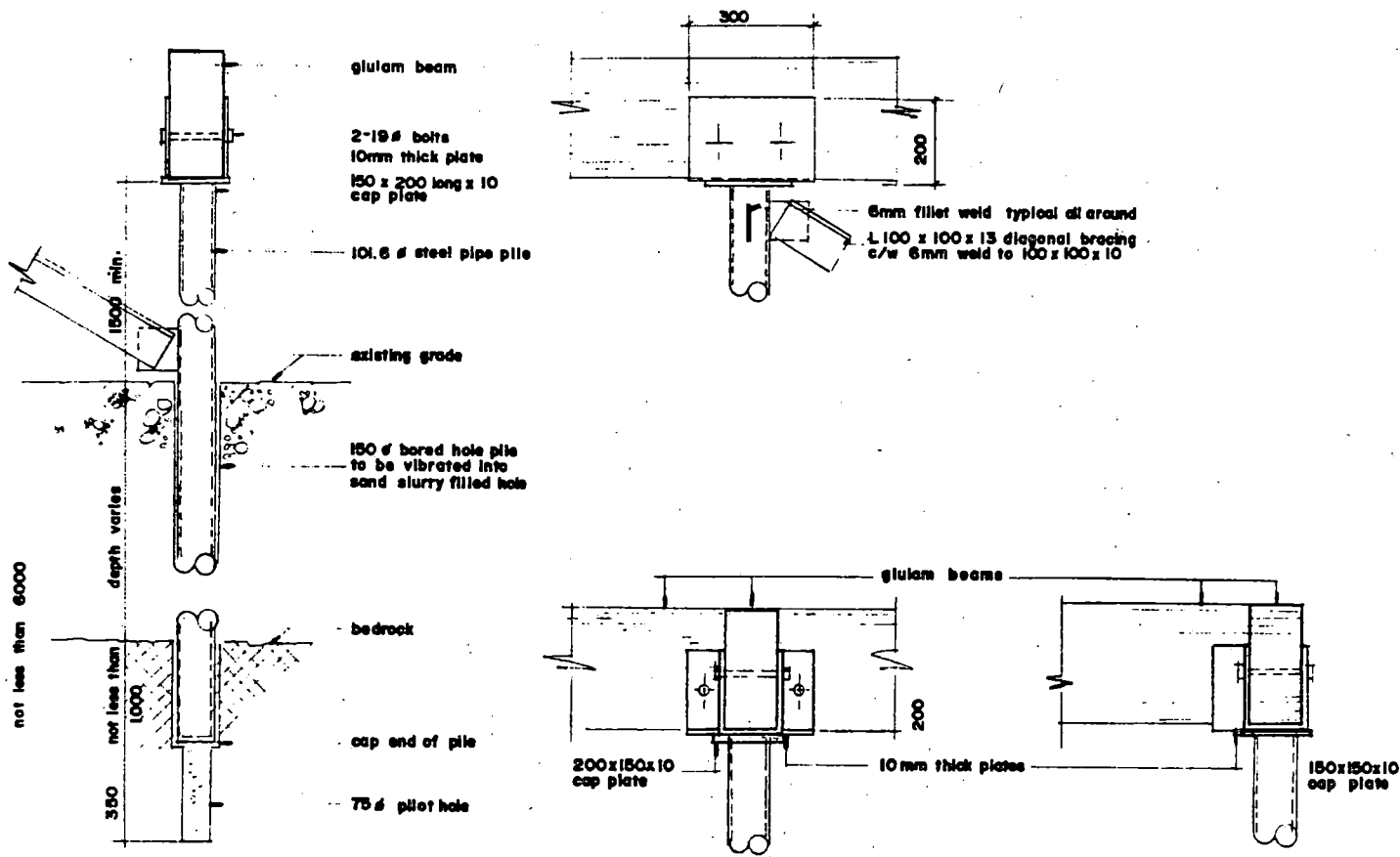
Post and Pad  
(Section)



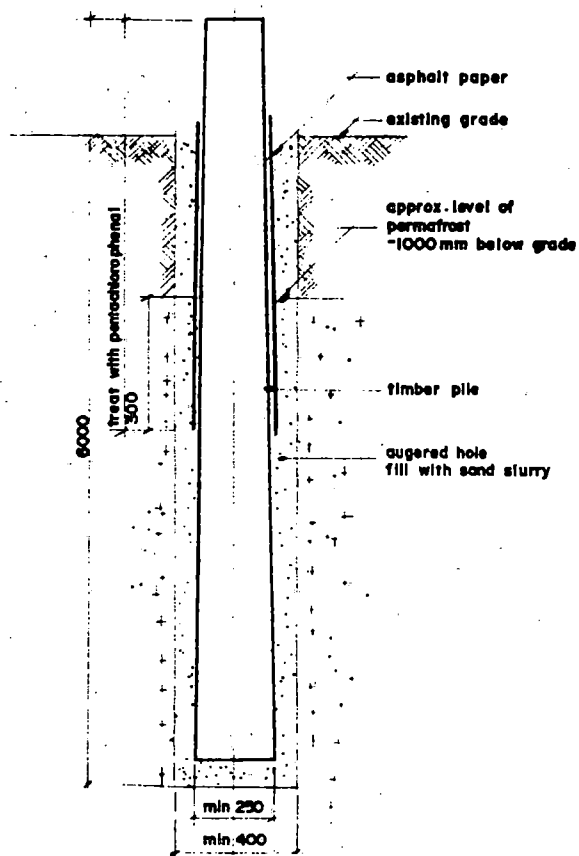
Post and Pad  
(Elevation)



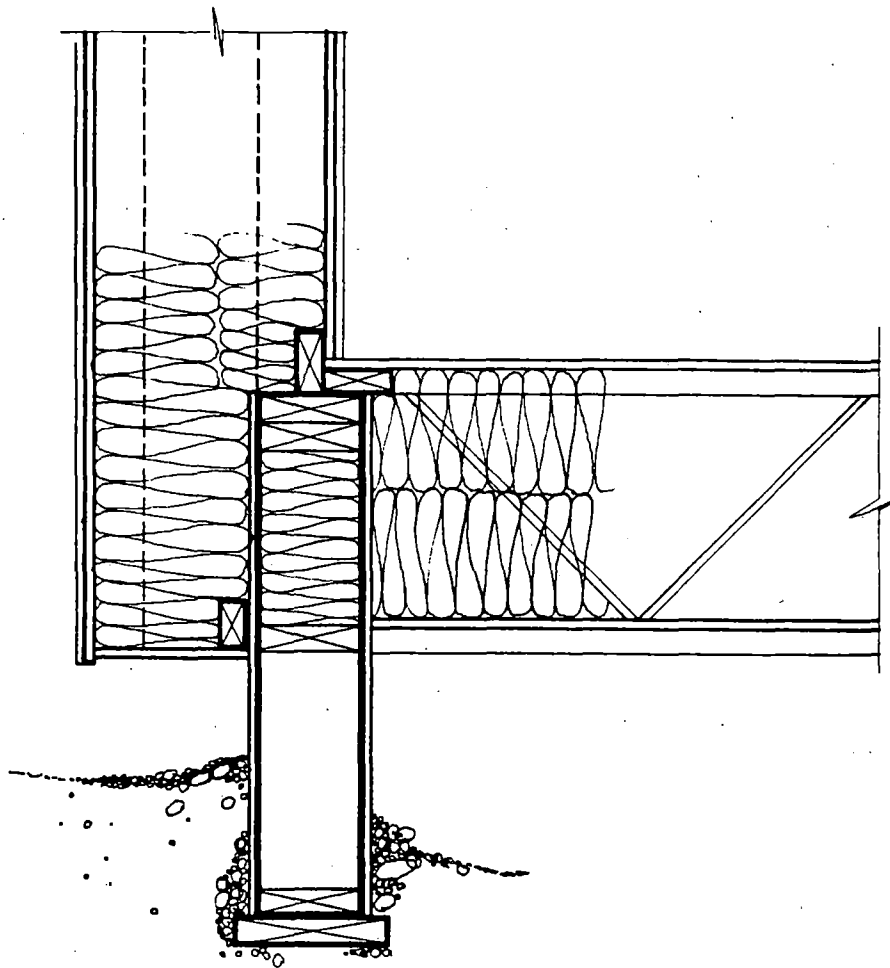
Post and Pad - Plan

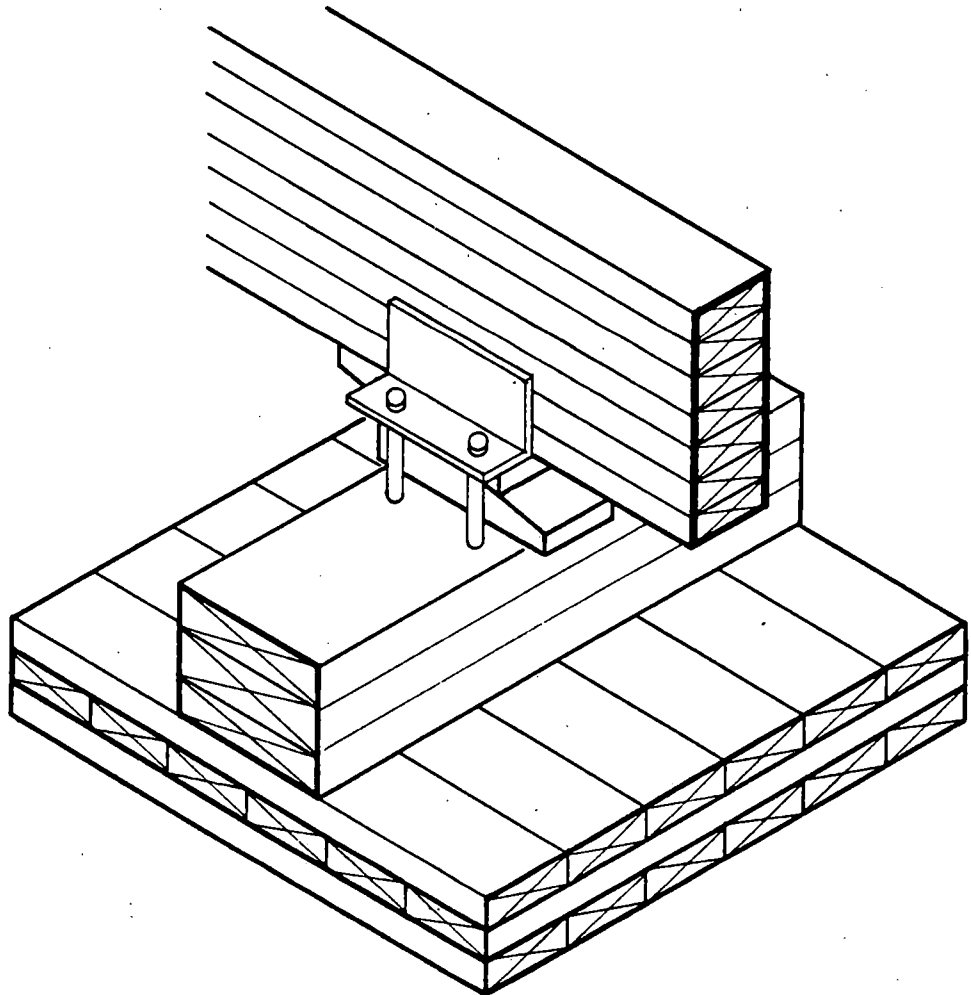
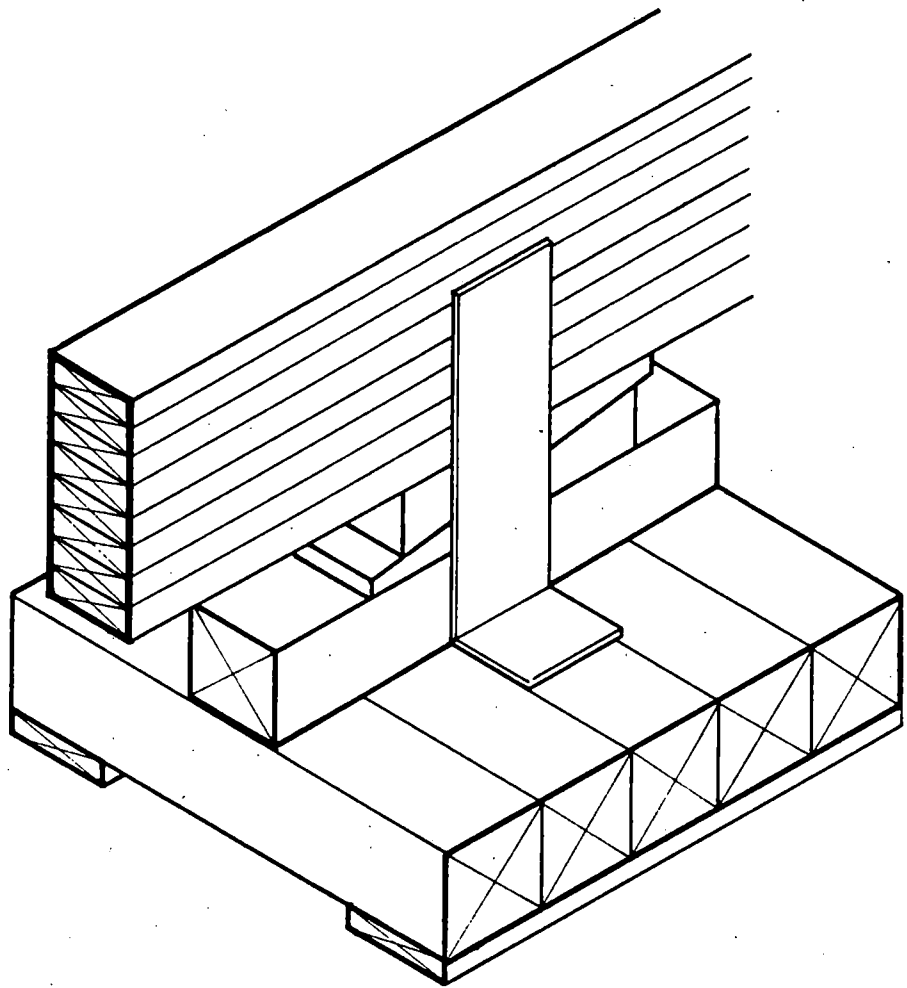


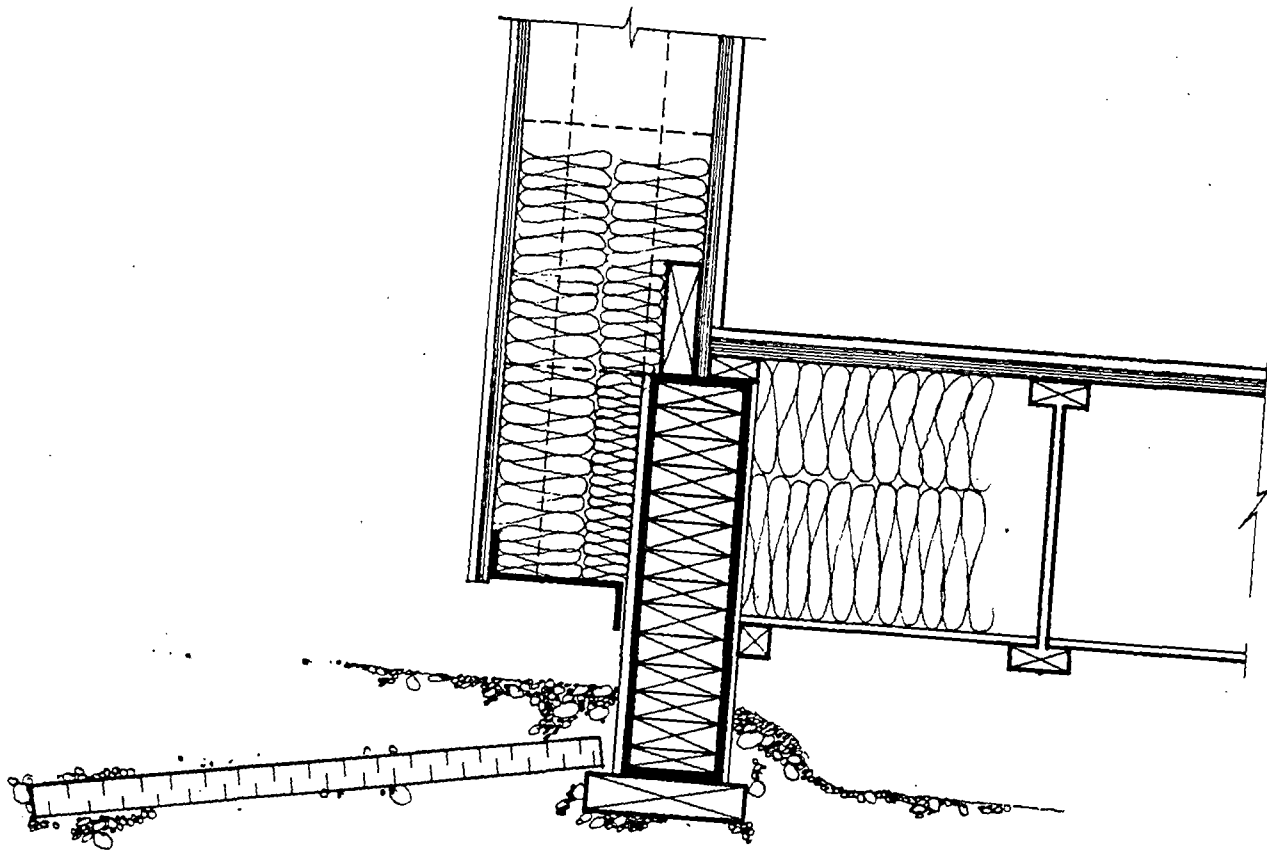
Steel Pile

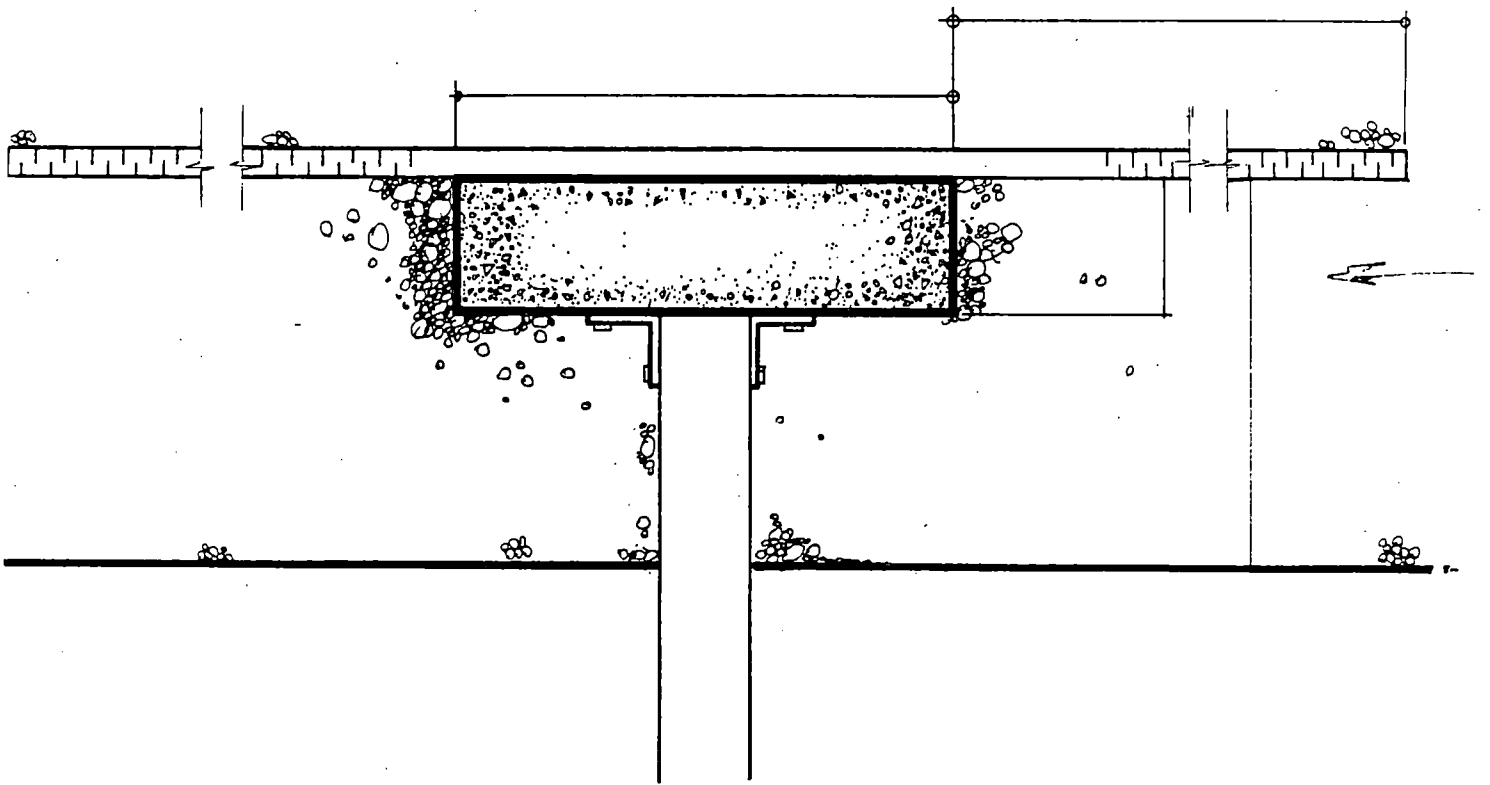


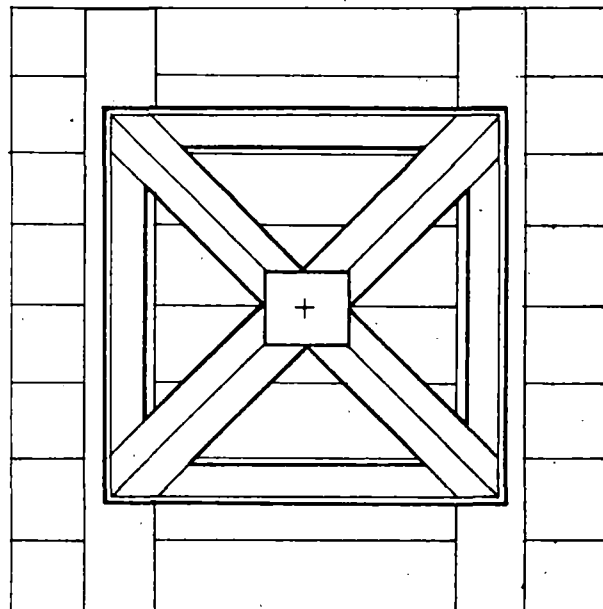
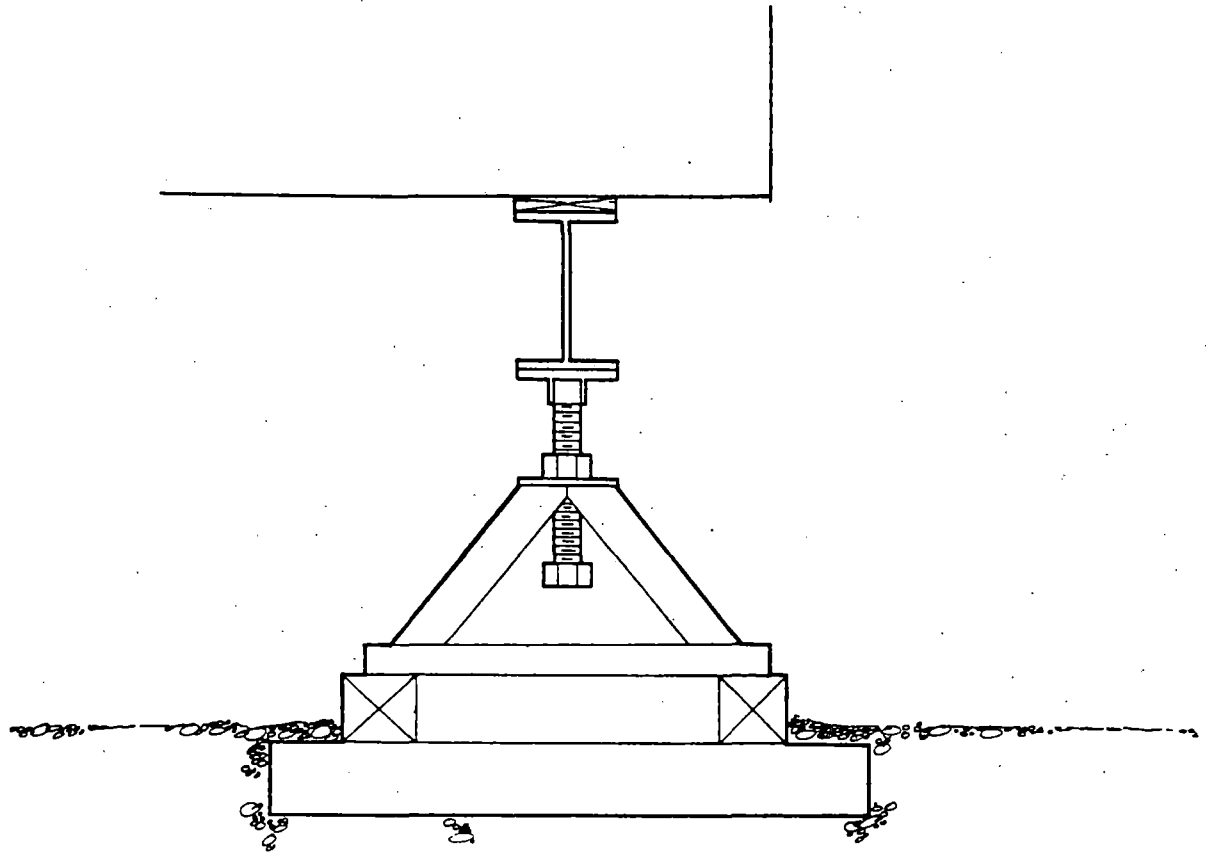
Typical Timber Pile Installation





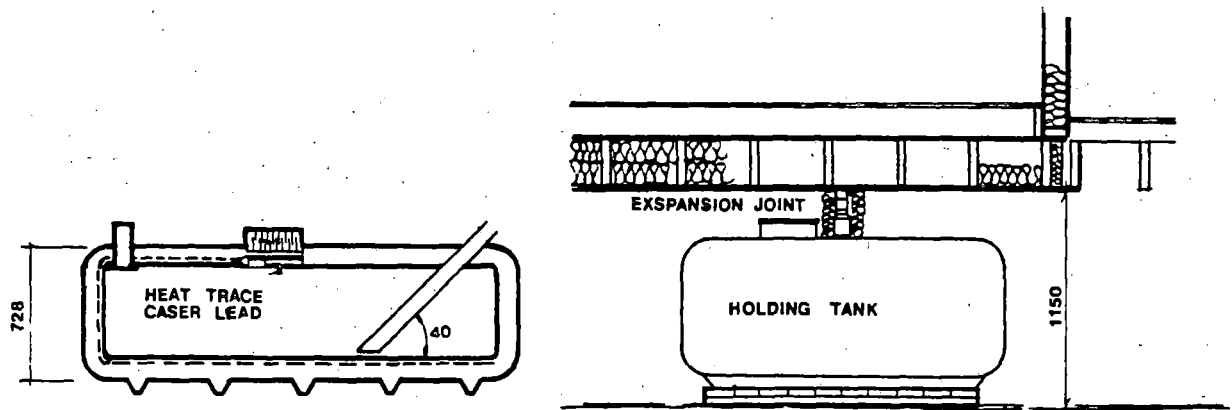












Sewage Holding Tank Section & Installation