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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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DEMONSTRATION OF COCONUT WOOD UTILIZATION IN PREFABRICATED HOUSING

SI/PHI/84/801

PHILIPPINES

Technical report: Erection Manual for the demonstration of coconut wood utilization in prefabricated housing*

Prepared for the Government of Philippines
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Gregorio G. Santa Maria,
Designing Architect and Consultant

United Nations Industrial Development Organization
Vienna

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INTRODUCTION

SI/PHI/84/801 - DEMONSTRATION OF COCONUT WOOD UTILIZATION IN PRE-FABRICATED HOUSING

In the Project Proposal of United Nations Industrial Development Organization for the Provincial Government of Quezon Province, Lucena City, Philippines with Project Title Demonstration of Coconut Wood Utilization in Prefabricated Housing, the following are the Objectives, Special Considerations and Background and Justifications quoted herein below from Project Document No. SI/PHI/84/801.

I. Objectives

Development Objective :

To promote the use of indigenous non-traditional materials in construction and introduce substitutes for depleted sources of lumber.

Immediate Objectives :

Demonstrate the feasibility of utilizing coconut wood for a low cost housing project in Quezon Province using prefabricated building components be erecting a prototype unit. To that end to :

(a) Redesign the coconut wood housing unit constructed under SI/PHI/83/801 on the basis of experience to :

(1) introduce prefabrication of components ;

(2) optimize the use of coconut wood in combination with other locally available building materials ;

(3) take into account specific requirements of the Government of Quezon Province.

(b) Transfer coconut wood processing technology to local commercial sawmill,

kiln-drying and planing mills selected to supply lumber and lumber products for the proposed project ;

(c) Set up prefabrication systems for housing components ;

(d) Develop techniques of optimizing utilization of coco lumber cut for the Project by converting lumber trimmings, edgings and offals into low cost furniture and joinery products of simple design ;

(e) Determine the costs involved in the erection of the prototype and estimate costs for the proposed housing project ; and

(f) Disseminate the state of the art in coconut wood processing and utilization to builders and wood processing plant operators in Quezon Province.

2. Special Considerations

Not applicable

3. Background and Justification

Under a recently completed project, entitled "Demonstration of the Coconut Wood Utilization for Low Cost Housing", SI/PHI/83/801, which was executed by UNIDO with the Southern Philippines Development Authority (SPDA) as a counterpart agency, the coco house designed under UNIDO Project RAS/81/110 was revised and tested by the erection of two prototype housing units. The experience from this Project indicated that it may be preferrable NOT to use coco lumber alone as the wooden material to build an entire house. The distribution of lumber grades obtained from coconut stems does not correspond to the distribution of lumber grades needed for the construction, so that a combination with traditional wood materials may be more economical. It was also shown in Project SI/PHI/83/801 that the volume of coco lumber required to build low cost housing units in one hectare (10,000 square meters) is much more than the volume of coco lumber that may be processed from coconut stems cut in the same hectare of coconut farm. Furthermore, the milling and construction activities in the previous project gave rise to shorts, trimmings and offals which could be used in the fabrication of other secondary wood products such as simple furniture and joinery

items. Building on this experience, it is proposed to redesign the above-mentioned housing unit in order to allow optimum combination of coconut wood with other wood materials, and maximize utilization of lumber cut for the Project by converting the milling and construction by-products into low cost furniture and joinery products to be used in the proposed housing units.

It is expected that the raw material input in Quezon Province will be different from that of Davao because in Quezon Province the stems will come from plantations exposed to typhoons. Davao is a typhoon-free area. The expected difference in physical and mechanical properties of the coco stems in Quezon Province may influence further adjustments on the machining technology developed in Davao City.

It is also desirable to review the design in order to make it suitable for prefabrication, thus rationalizing construction. For example, prefabrication will overcome the problems of pre-drilling for nail holes and lumber surfacing activities which slowed down the erection of coco houses en situ. It is necessary, however, to study the economies of scale to see at what point it would be economical to set up special prefabrication systems.

The Government of Quezon Province is planning to build a 500 unit low cost housing project on property already purchased by the Government. Having observed the above-mentioned experiment, it wishes to receive UNIDO assistance in examining how the current know-how could be applied in utilizing coconut wood in the proposed housing project.

DESCRIPTION OF

SI/PHI/84/801 - DEMONSTRATION OF COCONUT WOOD UTILIZATION IN PRE-FABRICATED HOUSING

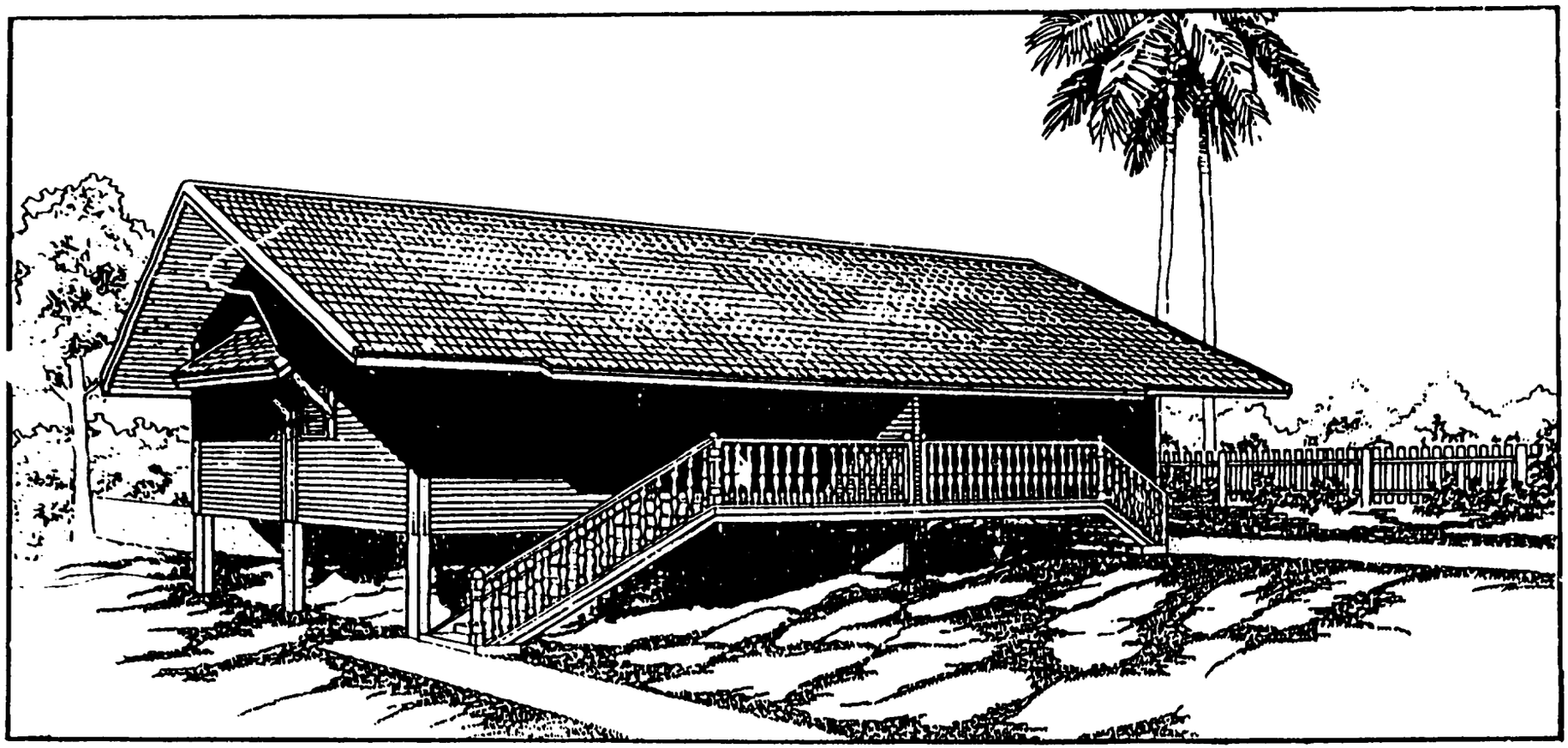
The demonstration house is a duplex type with over-all floor area of 117.84 square meters to be constructed on reinforced concrete stilts using cocoonut wood as construction materials in pre-fabricated system with traditional wood species.

Both units composed of two bedrooms with built-in closets, living, dining, kitchen, toilet and bath, main entrance balcony and service entrance.

The design provides future expansion for basement and first floor rooms or utility area common in both urban and rural typical filipino houses.

The approach in planning is that the units can be expanded and converted from the basic design of single detach to duplex, quadruplex and row houses for urban and rural housing developments using the same modules and span for the purpose of building low cost housing project using predominantly cocoonut wood.

The construction of the low cost housing design will be in accordance with the standard erection procedures and in accordance with the Philippine National Building Code under the supervision of the designing architect, consulting structural engineer, sanitary and electrical engineers.



PERSPECTIVE

PRE-FABRICATED COCONUT WOOD HOUSE

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
A.	EARTHWORKS			
1.0	EXCAVATION			
	COLUMN FOOTING	cu. m.	12.15	
	WALL FOOTING	cu. m.	3.05	
	STAIR BASE	cu. m.	0.24	
	SEPTIC VAULT	cu. m.	7.88	
	Sub-total	cu. m.	23.32	
2.0	BACKFILL			
	COLUMN FOOTING	cu. m.	9.30	
	WALL FOOTING	cu. m.	1.35	
	Sub-total	cu. m.	10.65	
B.	CONCRETING AND MASONRY WORKS			
1.0	CEMENT	bags	164	
2.0	SAND (S-1)	cu. m.	11	
3.0	GRAVEL (G-1 & 3/4)	cu. m.	8	
4.0	108 x 108mm GLAZED TILES	pcs.	2750	White or colored
5.0	108 x 108mm UNGLAZED TILES	pcs.	550	White or colored

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
6.0	WHITE CEMENT	bag	1	
7.0	150mm thick CHB	pcs.	381	Load bearing
8.0	100mm thick CHB	pcs.	427	Non load bearing
	Total			
C.	REINFORCING STEEL			
1.0	16mm ø x 6.0 M.	pcs.	21	
2.0	12mm ø x 6.0 M.	pcs.	54	
3.0	10mm ø x 6.0 M.	pcs.	75	
	Total			
D.	FORMWORKS (GRADES A,B & C COCOWOOD)			
1.0	25 x 50 x 2438mm ROUGH COCO WOOD	pcs.	12	Grades A,B & C,rough,green
2.0	25 x 50 x 3048mm " " "	pcs.	2	" " " "
3.0	25 x 50 x 3657mm " " "	pcs.	30	" " " "
4.0	25 x 50 x 4267mm " " "	pcs.	16	" " " "
5.0	25 x 100 x 2438mm " " "	pcs.	4	" " " "
6.0	25 x 100 x 3048mm " " "	pcs.	56	" " " "
7.0	25 x 150 x 3048mm " " "	pcs.	40	" " " "

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
8.0	50 x 50 x 2438mm ROUGH COCO WOOD	pcs.	8	Grades A,B & C,Rough green
9.0	50 x 50 x 3048mm " " "	pcs.	73	" " " "
10.0	50 x 50 x 4267mm " " "	pcs;	1	" " " "
11.0	50 x 75 x 1828mm " " "	pcs.	4	" " " "
12.0	50 x 75 x 2438mm " " "	pcs.	2	" " " "
13.0	50 x 75 x 3048mm " " "	pcs.	2	" " " "
14.0	50 x 100 x 1828mm " " "	pcs.	5	" " " "
15.0	50 x 100 x 3048mm " " "	pcs.	11	" " " "
16.0	50 x 100 x 4267mm " " "	pcs.	40	" " " "
E.	CARPENTRY WORKS			
1.0	WOOD POST			
	125 x 125 x 3048mm S4S	pcs.	15	Yakal, air dried
2.0	FLOOR GIRT			
	50 x 250 x 4267 ROUGH	pcs.	12	-do-
	50 x 250 x 5486 "	pcs.	6	-do-
	50 x 250 x 3048 "	pcs.	1	-do-
	50 x 250 x 5486 "	pcs.	2	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
3.0	FLOOR GIRT HANGER			
	50 x 100 x 2438 S4S	pcs.	2	Coco-wood,grade A, air dried
4.0	FLOOR JOIST			
	50 x 125 x 2438 S4S	pcs.	25	-do-
	50 x 125 x 3048 S4S	pc.	1	-do-
	50 x 125 x 3657 S4S	pcs.	84	-do-
	50 x 125 x 4267 S4S	pcs.	12	-do-
5.0	FLOOR JOIST BRIDGINGS			
	50 x 125 x 2438 S4S	pcs.	16	-do-
6.0	FLOOR BOARD			
	EX 25 x 100 x 3657 T.& G.	PCS.	405	Prof.,coco-wood,grade A,kiln dried
7.0	ROOF GIRT			
	50 x 200 x 4267 S4S	pcs.	16	Yakal, air dried
	50 x 150 x 4267 S4S	pcs.	8	-do-
8.0	TRUSSES (T-1)			
8.1	BOTTOM CHORD			
	50 x 100 x 4267 S4S	pcs.	26	Coco wood, grade A, air dried
	50 x 100 x 3657 S4S	pcs.	26	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
8.2	VERTICAL WEB MEMBERS			
	50 x 100 x 4267 S4S	pcs.	20	Coco wood, grade A, air dried
8.3	DIAGONAL WEB MEMBERS			
	50 x 100 x 3048 S4S	pcs.	26	-do-
8.4	TOP CHORD			
	50 x 125 x 4267 S4S	pcs.	13	-do-
	50 x 125 x 3657 S4S	pcs.	26	-do-
8.5	SPLICE AND JOINT PLATES			
	50 x 100 x 3657 S4S	pcs.	24	-do-
8.6	COLLAR PLATES			
	50 x 125 x 1828 S4S	pcs.	13	-do-
9.0	PURLINS			
	50 x 50 x 3657 S4S	pcs.	188	-do-
	50 x 50 x 2438 S4S	pcs.	47	-do-
10.0	PURLINS WOOD BLOCK			
	50 x 50 x 4267 S4S	pcs.	13	-do-
	50 x 50 x 3657 S4S	pcs.	26	-do-
11.0	FACIA BOARD NAILERS			
	50 x 50 x 4267 S4S	Pcs.	4	Coco wood, grade B. air dried

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
	50 x 50 x 3657 S4S	pcs.	12	Coco wood, grade B, air dried
	50 x 50 x 2438 S4S	pcs.	18	-do-
12.0	WOOD SHINGLE ROOF			
	10/20 x 100 x 600 WOOD SHINGLES	pcs.	8256	coco wood, grade A, B, & C CCA treated, air dried
13.0	FACIA BOARD			
	Ex25 x 100 x 4267 V-CUT	pcs.	6	coco wood, grade A & B, profile air dried, CCA treated
	Ex25 x 100 x 3657 V-CUT	pcs.	36	-do-
	Ex25 x 100 x 2438 V-CUT	pcs.	6	-do-
14.0	RIDGE ROLL			
	EX125 x 125 x 3657	pcs.	4	-do-
	EX125 x 125 x 2438	pc.	1	-do-
15.0	FLASHING			
	EX125 x 125 x 4267	pcs.	4	-do-
	EX125 x 125 x 3657	pcs.	4	-do-
16.0	CANOPY (EXCLUDING WOOD SHINGLES)			
16.1	BASE PLATE			
	50 x 150 x 3048 S4S	pcs.	3	Coco wood, grade A, air dried
16.2	BRACE			
	50 x 125 x 2438 S4S	pcs.	4	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
16.3	RAFTER			
	50 x 125 x 1828 S4S	pcs.	3	Coco wood, grade A, air dried
16.4	PURLINS			
	50 x 50 x 3657 S4S	pcs.	8	-do-
16.5	FACIA BOARD NAILERS			
	50 x 50 x 3657 S4S	pcs.	2	Coco wood, grade B, air dried, CCA brushed
	50 x 50 x 2438 S4S	pcs.	3	-do-
16.6	FACIA BOARD			
	Ex25 x 100 x 3657 V-CUT	pcs.	6	Coco wood, grades A & B, profiled, kiln dried
	Ex25 x 100 x 4267 V-CUT	pcs.	6	-do-
17.0	MAIN STAIRS AND BALCONY			
17.1	CARRIAGE (STRINGER)			
	50 x 250 x 4267 S4S	pcs.	2	Yakal, air dried
17.2	TREADS			
	50 x 300 x 2438 S4S	pcs.	5	-do-
17.3	RISER			
	25 x 125 x 2438 S4S	pcs.	6	Coco wood, CCA treated, grade A air dried
17.4	KICKER PLATE			
	50 x 125 x 2438 S4S	pcs.	1	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
17.5	STAIR NOSING			
	50 x 100 x 2438 S4S	pc.	1	Coco wood, CCA treated, grade A air dried
17.6	BALUSTRADE			
	HAND RAIL (BUILT UP)			
	50 x 100 x 3657 PROFILED	pcs.	6	Coco wood, grade A, profiled kiln dried
	50 x 100 x 4267 PROFILED	pcs.	3	-do-
	RAIL POST (BUILT UP)			
	50 x 100 x 2438	pcs.	6	- do-
	BOTTOM RAIL			
	50 x 125 x 3657 S4S	pcs.	2	Coco wood, grade A, CCA treated air dried
	50 x 125 x 4267 S4S	pc.	1	-do-
	BALUSTERS (TURNED WOOD)			
	75 x 75 x 3657 mm	pcs	36	Coco wood, grade A, profiled, kiln dried
	FACIA BOARD			
	Ex25 x 100,x 4267 V-CUT	pcs.	15	Coco wood, grade A & B, profiled kiln dried
	FACIA BOARD NAILERS			
	50 x 50 x 3048 S4S	pcs.	3	Coco wood, grade B, air dried
	50 x 50 x 3657 S4S	pcs.	5	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
18.0	SERVICE STAIR			
18.1	CARRIAGE (STRINGER)			
	50 x 250 x 4267 S4S	pcs.	2	Yakal, air dried
18.2	TREADS			
	50 x 300 x 2438 S4S	pcs.	5	-do-
18.3	RISER			
	25 x 125 x 2438 S4S	pcs.	6	Coco wood, CCA treated, grade A air dried
18.4	KICKER PLATE			
	50 x 125 x 2438 S4S	pc.	1	-do-
18.5	RAILINGS			
	TOP RAIL			
	50 x 100 x 4267 S4S	pc.	1	-do-
	50 x 100 x 2438 S4S	pcs.	2	-do-
	HORIZONTAL RAILS			
	50 x 100 x 4267 S4S	pcs.	2	-do-
	50 x 100 x 2438 S4S	pcs.	4	-do-
	BOTTOM RAIL			
	50 x 100 x 4267 S4S	pc..	1	-do-
	50 x 125 x 3048 S4S	pcs.	2	-dO-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
	RAIL POST			
	50 x 100 x 4267 S4S	pcs.	1	Coco wood, CCA treated, grade A air dried
	VERTICAL RAILS			
	50 x 100 x 1828 S4S	pcs.	7	-do-
18.6	SERVICE STAIR NOSING			
	50 x 100 x 2438 S4S	pc.	1	Coco wood, CCA brushed, grade A air dried
18.7	FACIA BOARD			
	Ex 25 x 100 x 3048 V-CUT	pcs.	8	Coco wood, grades A&B, profiled kiln dried
	Ex 25 x 100 x 4267 V-CUT	pcs.	4	-do-
18.8	FACIA BOARD NAILERS			
	50 x 50 x 2438 S4S	pcs.	3	Coco wood, grade B, air dried CCA brushed
19.0	FRAME 1 / FRAME 2			
19.1	FRAMING			
	50 x 75 x 1828 S4S	pcs.	8	Coco wood, grade B&C, air dried
	50 x 75 x 3048 S4S	pcs.	28	-do-
	50 x 75 x 3657 S4S	pcs.	24	-do-
19.2	PANELING (EXTERIOR/INTERIOR)			
	Fin19 x 100 x 3657 V-CUT	pcs.	172	Coco wood, grade B&C, profiled, kiln dried
	Fin19 x 100 x 1828 V-CUT	pcs.	128	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
20.0	FRAME 3			
20.1	FRAMING			
	50 x 75 x 1828 S4S	pcs.	16	Coco wood, grade B&C, air dried
	50 x 75 x 3048 S4S	pcs.	24	-do-
	50 x 75 x 3657 S4S	pcs.	24	-do-
20.2	PANELING (EXTERIOR/INTERIOR)			
	Fin.19 x 100 x 3657 V-CUT	pcs.	172	Coco wood, grade B&C, profiled, kiln dried
	Fin.19 x 100 x 1828 V-CUT	pcs.	128	-do-
21.0	FRAME 4			
21.1	FRAMING			
	50 x 75 x 2438 S4S	pcs.	14	Coco wood, grade B&C, air dried
	50 x 75 x 3048 S4S	pcs.	6	-do-
	50 x 75 x 3657 S4S	pcs.	4	-do-
21.2	PANELING (EXTERIOR/INTERIOR)			
	Fin19 x 100 x 1828 V-CUT	pcs.	32	Grade B&C, coco wood, profiled, kiln dried
	Fin19 x 100 x 3048 V-CUT	pcs.	48	-do-
	Fin19 x 100 x 3657 V-CUT	pcs.	16	-do-
21.3	FLOOR SEPARATOR			
	50 x 100 x 3048 S4S	pcs.	1	Coco wood, grade A, air dried.

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
21.4	BASE BOARD			
	25 x 100 3048 S4S	pcs.	4	Coco wood, grade A, kiln dried
22.0	FRAME 6/FRAME 7			
22.1	FRAMING			
	50 x 75 x 2438 S4S	pcs.	6	Coco wood, grade B&C, air dried
	50 x 75 x 3048 S4S	pcs.	12	-do-
22.2	PANELING (EXTERIOR/INTERIOR)			
	Fin.19 x 100 x 2438 V-cut	pcs.	22	Coco wood, grade B&C, profiled, kiln dried
	Fin.19 x 100 x 3048 V-cut	pcs.	36	-do-
23.0	FRAME 8			
23.1	FRAMING			
	50 x 75 x 2438 S4S	pcs.	7	Coco wood, grade B&C, air dried
	50 x 75 x 3657 S4S	pcs.	5	-do-
23.2	PANELING (EXTERIOR/INTERIOR)			
	Fin.19 x 100 x 3657 V-CUT	pcs.	64	Coco wood, grade B&C, profiled, kiln dried
23.3	FLOOR SEPARATOR			
	50 x 100 x 1828 S4S	pc.	1	Coco wood, grade A, air dried
23.4	BASE BOARD			
	25 x 100 x 3657 S4S	pcs.	2	Coco wood, grade A, kiln dried

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
24.0	FRAME 9/FRAME 10			
24.1	FRAMING			
	50 x 75 x 2438 S4S	pcs.	28	Coco wood, grade B&C, air dried
	50 x 75 x 3048 S4S	pcs.	16	-do-
	50 x 75 x 3657 S4S	pcs.	8	-do-
24.2	PANELING (EXTERIOR/INTERICR)			
	Fin.19 x 100 x 3048 V-Cut	pcs.	224	Coco wood,grado B&C, profiled, kiln dried
	Fin.19 x 100 x 3657 V-CUT	pcs.	32	-do-
24.3	FLOOR SEPARATOR			
	50 x 100 x 3048 S4S	pcs.	2	Coco wood, grade A , air dried
24.4	BASE BOARD			
	25 x 100 x 3048 S4S	pcs.	8	Coco wood, grade A, kiln dried
25.0	FRAME 11			
25.1	FRAMING			
	50 x 75 x 2438 S4S	pcs.	15	Coco wood, grade B&C, air dried
	50 x 75 x 3657 S4S	pcs.	3	-do-
25.2	PANELING (EXTERIOR/INTERIOR)			
	Fin.19 x 100 x 2438 V-CUT	pcs.	96	Coco wood, grade B&C, profiled, kiln dried

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
25.3	FLOOR SEPARATOR			
	50 x 100 x 3657 S4S	pc..	1	Coco wood, grade A, air dried
25.4	BASE BOARD			
	25 x 100 x 2438 S4S	pcs.	3	-do-
26.0	FRAME 12			
26.1	FRAMING			
	50 x 100 x 2438 S4S	pcs.	3	Coco wood, grade B&C, air dried
	50 x 75 x 2438 S4S	pcs.	4	-do-
	50 x 75 x 3657 S4S	pc.	1	-do-
26.2	DIAGONAL PANELING			
	Fin.19 x 100 x 1828 V-CUT	pcs.	44	Coco wood, grade B&C, profiled, kiln dried,
26.3	FLOOR SEPARATOR			
	50 x 100 x 1219 S4S	pc.	1	Coco wood, grade A, air dried
26.4	BASE BOARD			
	Ex. 25 x 100 x 2438 S4S	pc.	1	Coco wood, grade A, kiln dried
27.0	CHB WALL PANELING			
27.1	NAILERS			
	25 x 50 x 2438 S4S	pcs.	34	Coco wood, grade B, air dried
	25 x 50 x 3048 S4S	pcs.	2	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
27.2	V-CUT PANEL BOARDS			
	Fin. 19 x 100 x 2438 V-CUT	pcs.	64	Coco wood, grade B&C, profiled, kiln dried
	Fin. 19 x 100 x 3048 V-CUT	pcs.	4	-do-
28.0	BEDROOMS CEILING			
28.1	CEILING JOIST			
	50 x 50 x 3657 ROUGH	pcs.	56	Coco wood, grade B, air dried
28.2	CEILING BOARD			
	Fin. 12 x 100 x 3657 V-CUT	pcs.	192	Coco wood, grade B&C, profiled, kiln dried
29.0	TOILET AND BATH CEILING			
29.1	CEILING JOIST			
	50 x 50 x 2438 ROUGH	pcs.	8	Coco wood, grade B, air dried
	50 x 50 x 3048 ROUGH	pcs.	6	-do-
29.2	CEILING BOARD			
	Fin. 12 x 100 x 2438 V-CUT	pcs.	35	Coco wood, grade B&C, profiled, kiln dried
30.0	MARINE PLYWOOD SHEATHING			
	6mm THICK MARINE PLYWOOD	pcs.	44	

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
31.0	V-CUT TRUSS PANELING			
31.1	PANELING			
	Fin. 19 x 100 x 3657 V-CUT	pcs.	35	Coco wood,grade B&C, profiled, kiln dried
31.2	NAILERS			
	50 x 50 x 3657 S4S	pcs.	20	Coco wood, grade B, air dried
	50 x 50 x 4267 S4S	pcs.	22	-do-
32.0	VERTICAL BOARDS			
32.1	EXTERIOR VERTICAL POST WRAP BOARDS			
	Ex. 25 x 150 x 3048 V-CUT	pcs.	8	Coco wood, grade B&C, profiled, kiln dried
	Ex. 25 x 100 x 3048 V-CUT	pcs.	24	-do-
	Ex 25 x 100 x 2438 V-CUT	pcs.	12	-do-
32.2	INTERIOR VERTICAL BOARDS			
	Ex 25 x 100 x 2438 S4S	pcs.	30	-do-
33.0	PANELING OF GIRTS ALONG LINE "1"&"3"			
33.1	NAILERS			
	50 x 50 x 3657 S4S	pcs.	8	Coco wood, grade B, air dried
	50 x 50 x 3048 S4S	pcs.	10	-dO-
33.2	V-CUT PANEL BOARDS			
	Fin. 19 x 100 x 3657 V-CUT	pcs.	40	Coco-wood, grade B&C, profiled, kiln dried

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
34.0	DOORS AND WINDOWS			
34.1	D-1 (0.90 x 2.10 m. clear opening)			
	RAIL (HORIZONTAL FRAME)			
	50 x 100 x 1828 S4S	pcs.	4	Coco wood,grade A, kiln dried
	STILE (VERTICAL FRAME)			
	50 x 125 x 2438 S4S	pcs.	4	-do-
	NAILERS FOR V-CUT			
	25 x 50 x 1828 S4S	pcs.	15	Coco wood, grade B, air dried
	V-CUT PANELS			
	Fin. 12 x 100 x 2438 V-CUT	pcs.	32	Coco wood, grade A, profiled, kiln dried
34.2	D-2 (0.80 x 2.10 m. clear opening)			
	RAIL (HORIZONTAL FRAME)			
	50 x 100 x 2438 S4S	pcs.	6	Coco wood, grade A, kiln dried
	STILE			
	50 x 125 x 2438 S4S	pcs.	8	-do-
	NAILERS FOR V-CUT			
	25 x 50 x 2438 S4S	Pcs.	12	Coco wood, grade B, air dried
	25 x 50 x 1828 S4S	pcs.	12	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
	V-CUT PANELING			
	Fin. 12 x 100 x 3048 V-CUT	pcs.	48	Coco wood, grade A, profiled, kiln dried
34.3	D-3 (0.80 x 2.10 m. clear opening)			
	RAIL (HORIZONTAL FRAME)			
	50 x 100 x 1828 S4S	pcs.	4	Coco wood, grade A, kiln drie
	STILE (VERTICAL FRAME)			
	50 x 125 x 2438 S4S	pcs.	4	-do-
	NAILERS FOR V-CUT			
	25 x 50 x 1828 S4S	pcs.	6	Coco wood, grade B, air dried
	25 x 50 x 2438 S4S	pcs.	6	-do-
	V-CUT PANELING			
	Fin. 12 x 100 x 3048 V-CUT	pcs.	24	Coco wood, grade A, profiled, kiln dried
34.4	D-4 (0.60 x 2.10 m.clear oponing)			
	RAIL (HORIZONTAL FRAME)			
	50 x 100 x 2438 S4S	pcs.	4	Coco wood, grade A, kiln dried
	STILE (VERTICAL FRAME)			
	50 x 125 x 2438 S4S	pcs.	8	-do-
	NAILERS FOR V-CUT			
	25 x 50 x 1828 S4S	pcs.	24	Coco wood, grade B, air dried

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
34.5	DOOR JAMBS			
	D-1			
	50 x 125 x 2438 S4S	pcs.	5	Coco wood, grade A, kiln dried
	D-2			
	50 x 125 x 1828 S4S	pcs.	2	-do-
	50 x 125 x 2438 S4S	pcs.	8	-do-
	D-3			
	50 x 125 x 1828 S4S	pcs.	1	-do-
	50 x 125 x 2438 S4S	pcs.	4	-do-
	D-4			
	50 x 125 x 2438 S4S	pcs.	8	-do-
	50 x 125 x 3048 S4S	pcs.	1	-do-
34.6	W-1 (6 sets)			
	JAMBS			
	50 x 125 x 1828 S4S	pcs.	12	-do-
	50 x 125 x 3048 S4S	pcs.	9	-do-
	LOUVER ZIGZAG			
	25 x 75 x 2438 S4S	pcs.	12	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
	V-CUT LOUVER BLADES			
	Fin. 19 x 100 x 2438 V-cut	pcs.	72	Coco wood, grade A & B, profiled, kiln dried
34.7	W-2 (8 sets)			
	JAMBS			
	50 x 125 x 1828 S4S	pcs.	8	Coco wood, grade A, kiln dried
	50 x 125 x 3048 S4S	pcs.	8	-do-
	LOUVER ZIGZAG			
	25 x 75 x 2438 S4S	pcs.	8	-do-
	V-CUT LOUVER BLADE			
	Fin. 19 x 100 x 2438 V-CUT	pcs.	48	Coco wood, grade A & B, profiled kiln dried
34.8	W-3 (2 sets)			
	JAMBS			
	50 x 125 x 2438 S4S	pcs.	2	Coco wood, grade A, kiln dried
	LOUVER ZIGZAG			
	25 x 75 x 2438 S4S	pcs.	1	-do-
	V-CUT LOUVER BLADES			
	Fin. 19 x 100 x 1828 V-CUT	pcs.	6	Coco wood, grade A&B, profiled, kiln dried

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
34.9	W-4 (2 sets)			
	JAMBS			
	50 x 125 x 2438 S4S	pcs.	2	Coco wood, grade A, kiln dried
	LOUVER ZIGZAG			
	25 x 75 x 2438 S4S	pcs.	1	-do-
	V-CUT LOUVER BLADES			
	Fin. 19 x 100 x 1828 V-CUT	pcs.	6	Coco wood, grade A&B, profiled, kiln dried
34.10	FIXED WOOD LOUVER VENTS			
	JAMBS			
	50 x 125 x 2438 S4S	pcs.	4	Coco wood, grade A, kiln dried
	LOUVER BLADES			
	Fin. 19 x 100 x 2438 V-CUT	pcs.	12	Coco wood, grade A&B, profiled, kiln dried
	LOUVER FRAME			
	Ex 25 x 75 x 2438 S4S	pcs.	2	Coco wood, grade A, kiln dried
35.0	KITCHEN COUNTER			
35,1	BASEBOARD FRAMES			
	50 x 100 x 3048 S4S	pcs.	2	-do-
	50 x 75 x 1828 S4S	pcs.	2	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
35.2	FRAMES			
	50 x 50 x 1828 S4S	pcs.	4	Coco wood, grade A, kiln dried
	50 x 50 x 2438 S4S	pcs.	8	-do-
	50 x 75 x 1828 S4S	pcs.	6	-do-
	50 x 75 x 2438 S4S	pcs.	4	-do-
	50 x 75 x 3048 S4S	pcs.	6	-do-
35.3	COUNTER NOSING			
	25 x 100 x 3048 S4S	pcs.	2	-do-
35.4	SUB-COUNTER TOP, (FORMICA FINISH) & CABINET FLOORING			
	Ex 25 x 100 x 1828 T&G	pcs.	24	Coco wood, grade A, profiled, kiln dried.
35.5	V-CUT PANEL BOARD			
	Fin. 19 x 100 x 2438 V-CUT	pcs.	15	Coco wood, grade A&B, profiled, kiln dried
35.6	CABINET DOOR			
	FRAME			
	50 x 75 x 1828 S4S	pcs.	6	Coco wood, grade A, kiln dried
	PANEL BOARD			
	Fin. 19 x 100 x 1828 V-cut	pcs.	11	Coco wood, grade A&B, profiled, kiln dried

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
35.7	SUB SPLASH BOARD			
	NAILERS			
	25 x 50 x 1828 S4S	pcs.	2	Coco wood, gradeB, air dried
	25 x 50 x 2438 S4S	pcs.	1	-do-
	SUB-SPLASH BOARD (FORMICA FIN.)			
	Ex 25 x 100 x 1828 T&G	pcs.	8	Coco wood, grade A, profiled. kiln dried
	CAP			
	50 x50 x 2438 S4S	pc.	2	Coco wood, grade A, kiln dried
36.0	BEDROOM CLOSET			
36.1	BASE BOARD			
	50 x 100 x 2438 S4S	pcs.	7	Coco wood, grade A, kiln dried
	50 x 75 x 2438 S4S	pcs.	2	-do-
36.2	FRAMES			
	50 x 75 x 2438 S4S	pcs.	50	-do-
36.3	V-CUT PANELING BOARD			
	Fin. 19 x 100 x 3657 V-CUT	pcs.	122	Coco wood, grade A&B, profiled, kiln dried
36.4	CLOSET FLOORING			
	Fin. 19 x 100 x 2438 T&G	pcs.	32	-do-

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
36.5	SHELVES			
	FRAMES			
	50 x 50 x 2438 S4S	pcs.	16	Coco wood, grade A, kiln dried
	FLOORING			
	Finish 19 x 100 x 2438 T&G	pcs.	24	Coco wood, Grade A&B, PROFILED kiln dried
36.6	HANGER POLE SUPPORT			
	50 x 50 2438 S4S	pcs.	4	Coco wood, grade A, kiln dried
36.7	CLOSET DOOR			
	FRAMES			
	50 x 75 x 2438 S4S	pcs.	26	Coco wood, Grade A, kiln dried
	PANELING BOARD			
	Fin. 19 x 100 x 2438 V-CUT	pcs.	56	Coco wood, grade A&B, profiled, kiln dried
36.8	FORMICA (KITCHEN COUNTER TOP AND SPLASH BOARD)			
	1219 x 2438 mm FORMICA SHEETS	pcs.	2	
F.	HARDWARES			
1.0	NAILS			
	50mm G.I. or COPPER NAILS	keg	1	
	100mm CW NAILS	kg.	50	
	76mm CW NAILS	kg.	50	

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
	63mm CW NAILS	kg.	67	
	50mm CW NAILS	kg.	20	
	38mm CW NAILS	kg.	20	
	38mm FINISHING NAILS	kg.	5	
	25mm FINISHING NAILS	kg.	5	
2.0	MACHINE BOLTS WITH NUTS & WASHERS			
	12mm ϕ x 127mm	pcs.	10	
	12mm ϕ x 152mm	pcs.	10	
	16mm ϕ x 76mm	pcs.	16	
	16mm ϕ x 152mm	pcs.	30	
	16mm ϕ x 178mm	pcs.	468	
	16mm ϕ x 220mm	pcs.	120	
	16mm ϕ x 254mm	pcs.	18	
	19mm ϕ x 127mm	pcs.	82	
	19mm ϕ x 178mm	pcs.	30	
	19mm ϕ x 203mm	pcs.	10	
	19mm ϕ x 254mm	pcs.	2	
	16mm ϕ x 127mm	pcs.	4	
	19mm ϕ x 300mm	pcs.	8	

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
3.0	STEEL STRAPS			
	6 x 50 x 350mm U-STEEL ANCHOR			
	STRAPS	pcs.	18	
	6 x 50 x 825mm SPECIAL FABRICATED			
	U-STEEL ANCHOR STRAPS	pcs.	6	
	6 x 50 x 400mm TWISTED STEEL STRAP	PCS.	2	
	4.5 x 50 x 300 mm TWISTED STEEL			
	STRAP			
	4.5 x 50 x 300 mm STRAP	pcs.	10	
	6 x 150 x 76 x 76 mm L - STRAP			
	PLATE	PCS.	4	
	6 x 200 x 76 x 76 mm L-- STRAP			
	PLATE	pcs.	4	
4.0	LOG SCREWS			
	6mm ø x 76 mm WOOD SCREW	pcs.	252	
5.0	WELDWOOD GLUE	quarts	1	

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
G.	FINISHING HARDWARE			
	90mm x 90mm LOOSE PIN HINGES	pairs	36	
	EXTERIOR DOOR LOCKSETS	sets	4	
	BEDROOM DOOR LOCKSETS	sets	4	
	T & B DOOR LOCKSETS	sets	4	
	DEAD LOCK	sets	2	
	BARREL BOLT (HEAVY DUTY)	sets	6	
	CLOSET DOOR LOCK	sets	4	
	CATCHES	sets	32	
	CLOSET DOOR HANDLE	pcs.	8	
	CABINET DOOR HANDLE	pcs.	8	
	76mm x 76mm CABINET DOOR HINGES	Pcs.	40	
	BARREL BOLT (FOR CLOSET & CABINET)	pcs.	4	
H.	PLUMBING WORKS			
1.0	FIXTURES & ACCESSORIES			
	WATER CLOSETS (INCL. ACCESSORIES)	sets	2	
	LAVATORIES (INCL. ACCESSORIES)	sets	2	
	ENAMEL COATED KITCHEN SINK(.40x.60	sets	2	

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
	SHOWER HEADS, CHROME FINISH	sets	2	PRICE PISTER, U.S. BRAND
	SHOWER VALVES	sets	2	-do-
	KITCHEN FAUCET, WASHER TYPE	sets	2	-do-
	FLOOR DRAINS (102mm x 102mm)	sets	4	
	FAUCETS	sets	2	PRICE PISTER, U.S. BRAND
	LAVATORY FAUCET	sets	2	-do-
	HOSE BIBBS	sets	4	
	SOAP HOLDERS	sets	2	
	TISSUE PAPER HOLDERS	sets	2	
	TOWEL BAR, CHROME FINISH	sets	2	
2.0	PIPES AND FITTINGS (PVC)			
	WASTE LINE			
	100mm ø BRASS CLEANOUT	sets	6	
	100mm ø x 1520mm SINGLE HUB	pcs.	4	
	100mm ø x 1520mm DOUBLE HUB	PC.	1	
	50mm ø x 1520mm SINGLE HUB	pcs.	17	
	100mm ø x 90° ELBOW	pcs.	2	
	100mm x 100mm WYE	pcs.	4	
	100mm x 50mm WYE	pcs.	4	

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
	50mm x 90° ELBOW	pcs.	2	
	50mm S-TRAP	pcs.	2	
	50mm P-TRAP	pcs.	4	
	100mm x 50mm WYE	pcs.	5	
	50mm x 50mm WYE	pcs.	6	
	50mm TEE	pcs.	4	
	50mm CLEANOUT	pcs.	4	
	100mm TEE	pcs.	3	
	WATER LINE			
	25mm ø x 6.00 M. G.I. PIPE	pc.	1	
	19mm ø x 6.00 M. G.I. PIPE	pcs.	6	
	19mm ø COUPLING	pcs.	22	
	19mm ø TEE	pcs.	10	
	19mm GATE VALVE	sets	2	
3.0	MISCELLANEOUS			
	EPOXY A & B	gallon	1	
	RED LEA~	quart	1	
	TEFLON TAPE	rolls	4	

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
I.	ELECTRICAL WORKS			
1.0	FIXTURES			
	LAMP RECEPTACLE	pcs.	12	
	INCANDESCENT BULB 100 W	pcs.	12	
	FLUORESCENT LIGHT 40 W	sets	18	
	CONVENIENCE OUTLETS	sets	14	
	REFRIGERATOR OUTLET	sets	2	
	RANGE OUTLET	sets	2	
	SINGLE SWITCH	sets	4	
	DUPLEX SWITCH	sets	4	
	THREE GANG SWITCH	sets	6	
2.0	WIRES			
	# 12 TW ELECTRICAL WIRE	rolls	4	
	# 8 THW ELECTRICAL WIRE	meters	48	
	# 4 THW ELECTRICAL WIRE	meters	100	
3.0	CONDUITS			
	12.7mm ϕ x 3.0 M. PVC CONDUIT	length	94	
	32mm ϕ x 3.0 M. PVC CONDUIT	length	14	
	UTILITY BOX, 50mm x 100mm	pcs.	32	

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNIT	QTY.	REMARKS
	JUNCTION BOX, 100mm x 100mm	pcs.	30	
	LOCKNUT & BUSHING, 12.7mm ø	pairs	74	
	12.7mm ø PVC ADAPTOR	pairs	74	
	PULL BOX, 250mm x 200mm x 150mm	pcs.	4	
	TAPES, 19mm x 8 oz.	kg.	20	
	#16 G.I. WIRE	rolls	20	
	32mm ø PVC ADAPTORS	pairs	4	
4.0	SERVICE ENTRANCE			
	2/0 THW WIRE	meters	20	
	50mm ø RSC CONDUIT	length	1	
	50mm ø RSC COUPLING	pc.	1	
	50mm ø LOCKNUT & BUSHING	pairs	1	
	RUBBER TAPE, BIG	rolls	2	
	G.I. WIRE # 10	kg.	1	

ERECTION PROCEDURE

1. STAKING AND EXCAVATION

Source of Materials : See Bill of Materials

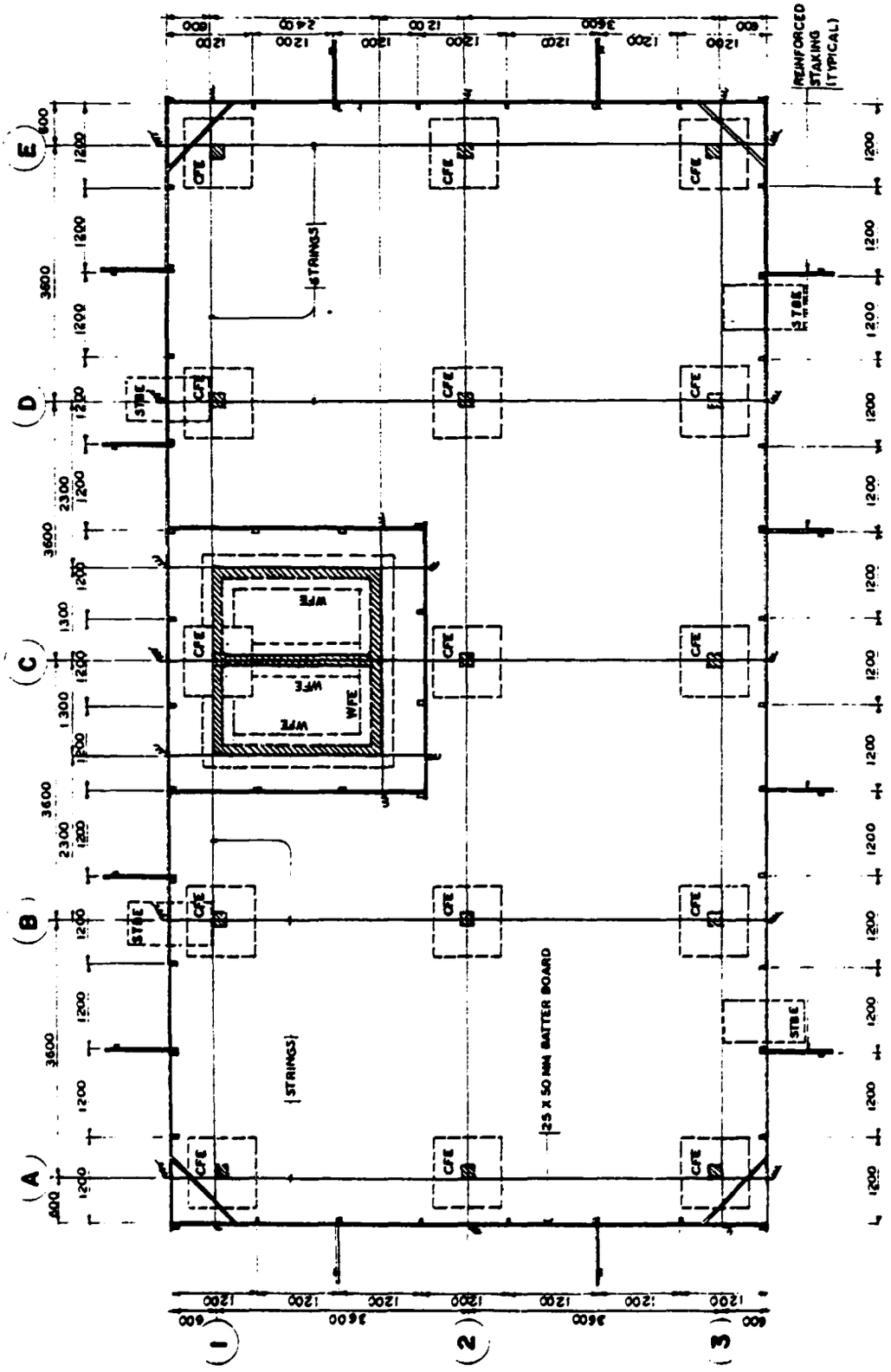
Reference : Figures 1, 2, 3 and 4

Scrap wood maybe utilized for batter boards and stakes.

The ground should be cleared of grass and other things not designated to be preserved.

Stake out the foundations, place the wooden stakes, batter boards and cross bracings as shown in figures 1, 2, 3 and 4. The top of the batter boards must be level throughout, and this will be attained by means of straight edge and spirit level. The exact location of the excavation are determined by the actual measurement on the fifteen intersecting strings sotied to conform with the lay-out as shown in the excavation staking plan. Use plumb bob to transfer measurement on the strings to the ground.

Trim excavation bottoms to required lines and grades.



STAKING & EXCAVATION PLAN

FIGURE 1

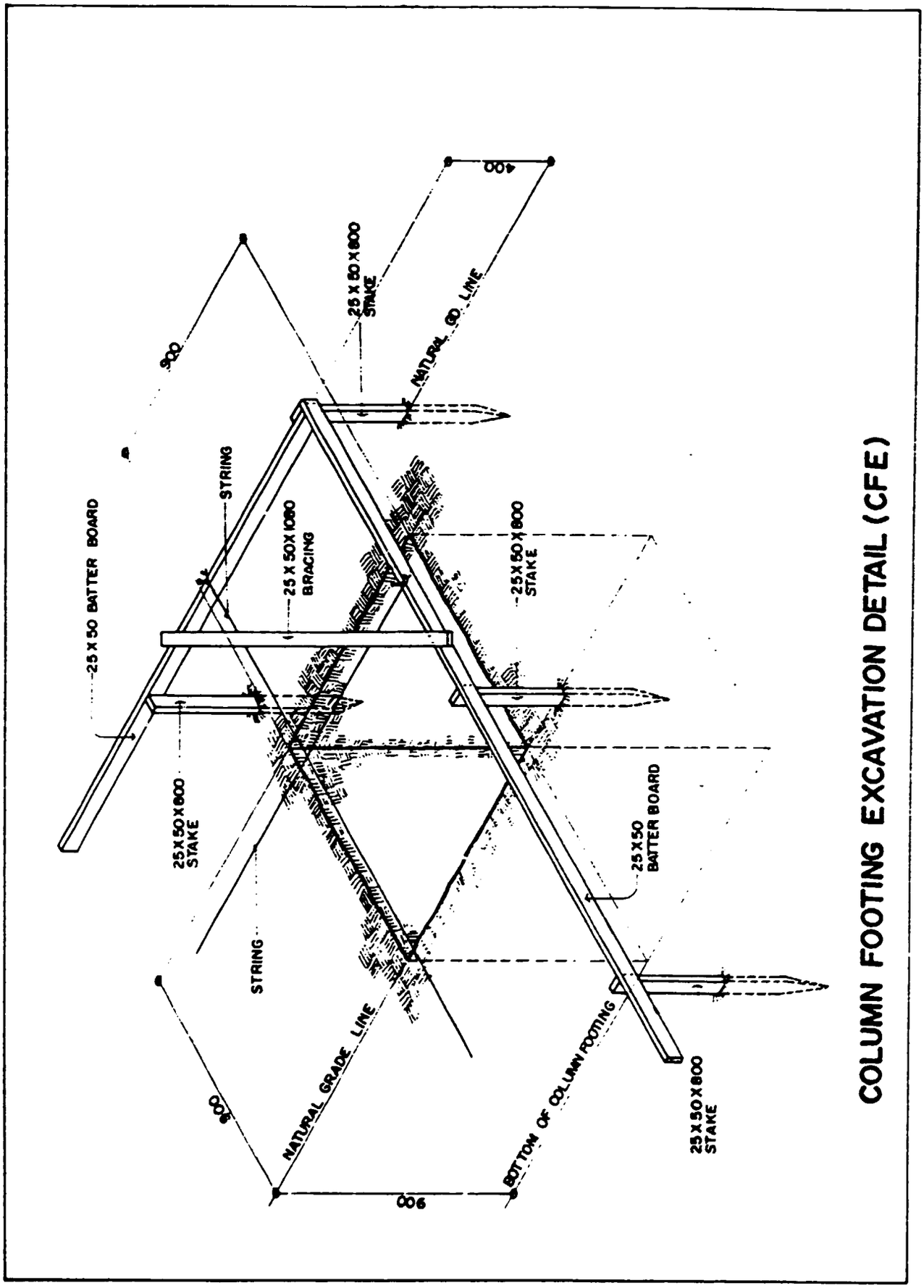
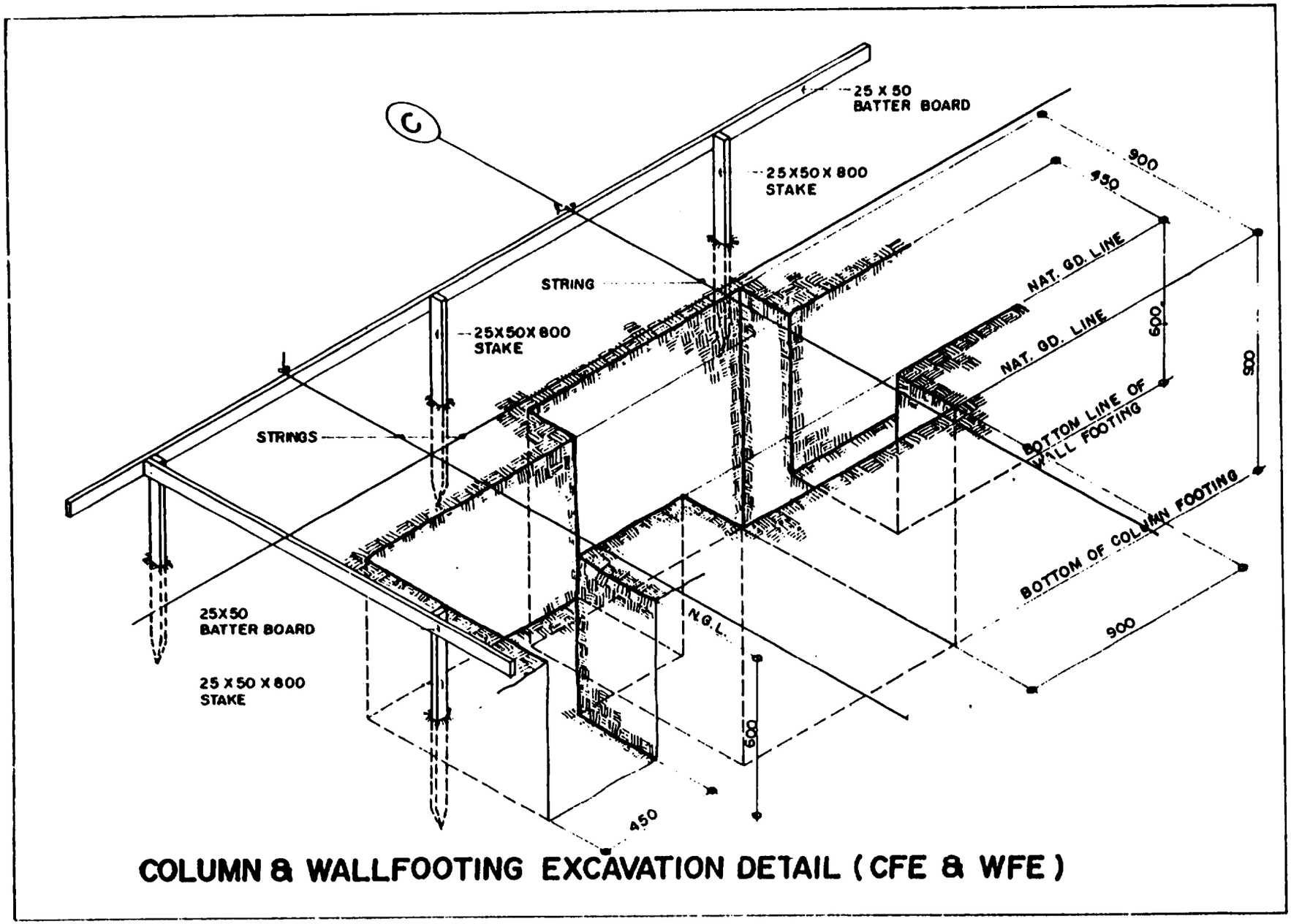
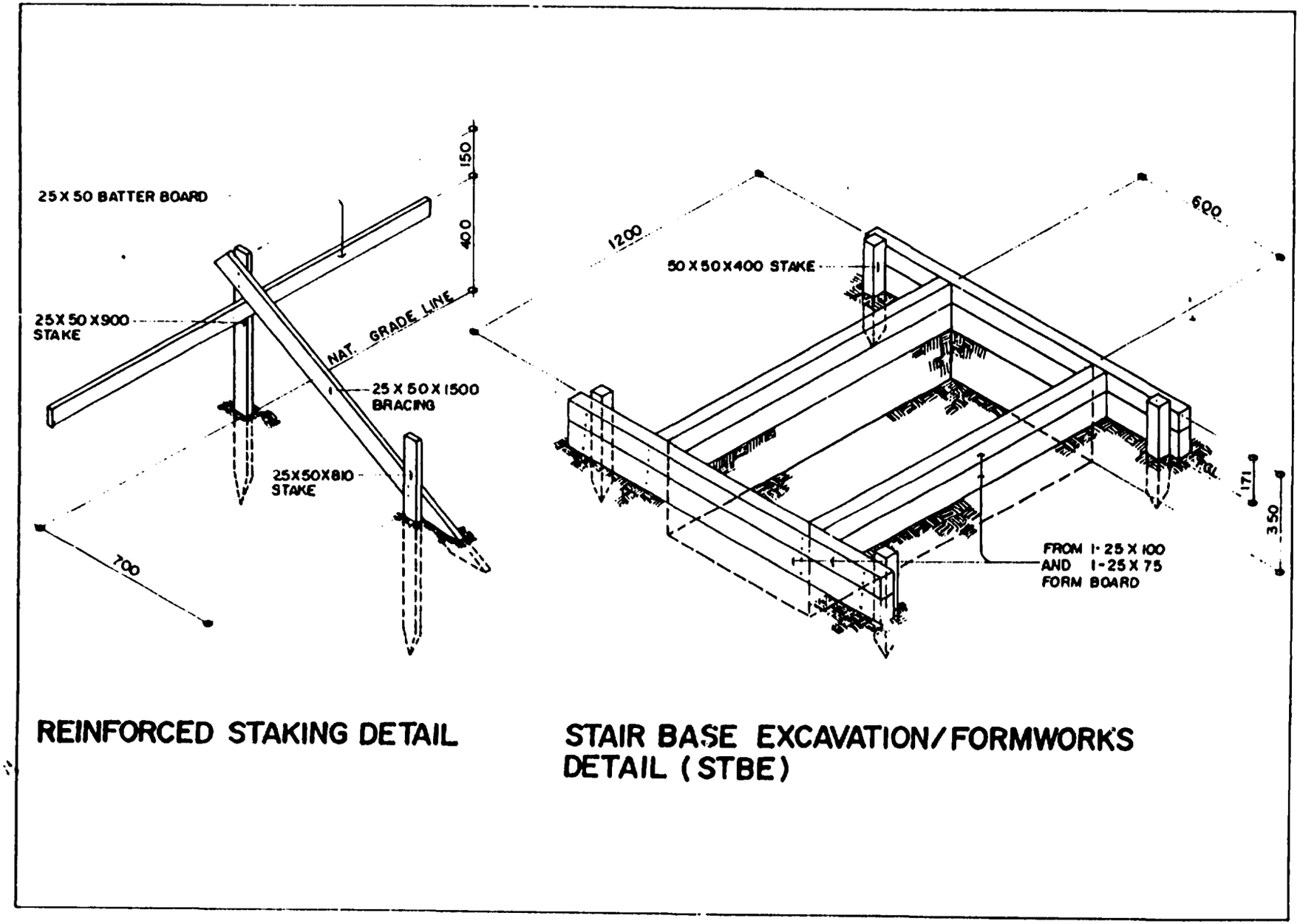

COLUMN FOOTING EXCAVATION DETAIL (CFE)
25 X 50 BATTER BOARD
STRING
25 X 50 X 1080 BRACING
25 X 50 X 800 STAKE
NATURAL GRADE LINE
25 X 50 X 600 STAKE
25 X 50 BATTER BOARD
STRING
NATURAL GRADE LINE
BOTTOM OF COLUMN FOOTING
25 X 50 X 800 STAKE
900
900
600

FIGURE 2



COLUMN & WALLFOOTING EXCAVATION DETAIL (CFE & WFE)

FIGURE 3



REINFORCED STAKING DETAIL

STAIR BASE EXCAVATION/FORMWORKS DETAIL (STBE)

FIGURE 4

2. INSTALLATION OF REBARS FOR COLUMN FOOTINGS AND WALL FOOTINGS

Source of Materials : See Bill of Materials

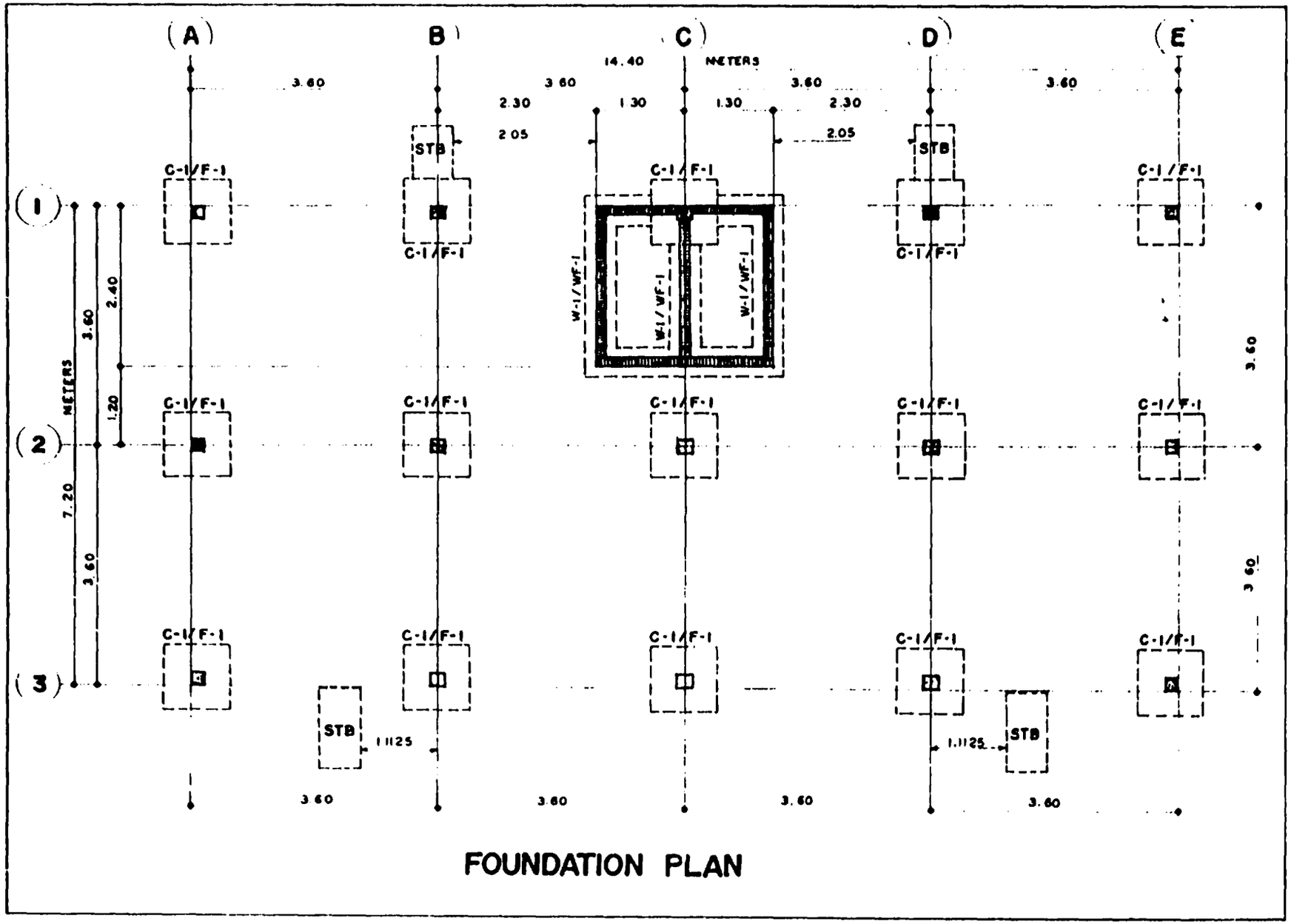
Reference : Figures 5, 7 and 8

Bottom of excavation for columns and wall footings should be fairly level.

Gravel fill for 100 mm thick should be fully compacted.

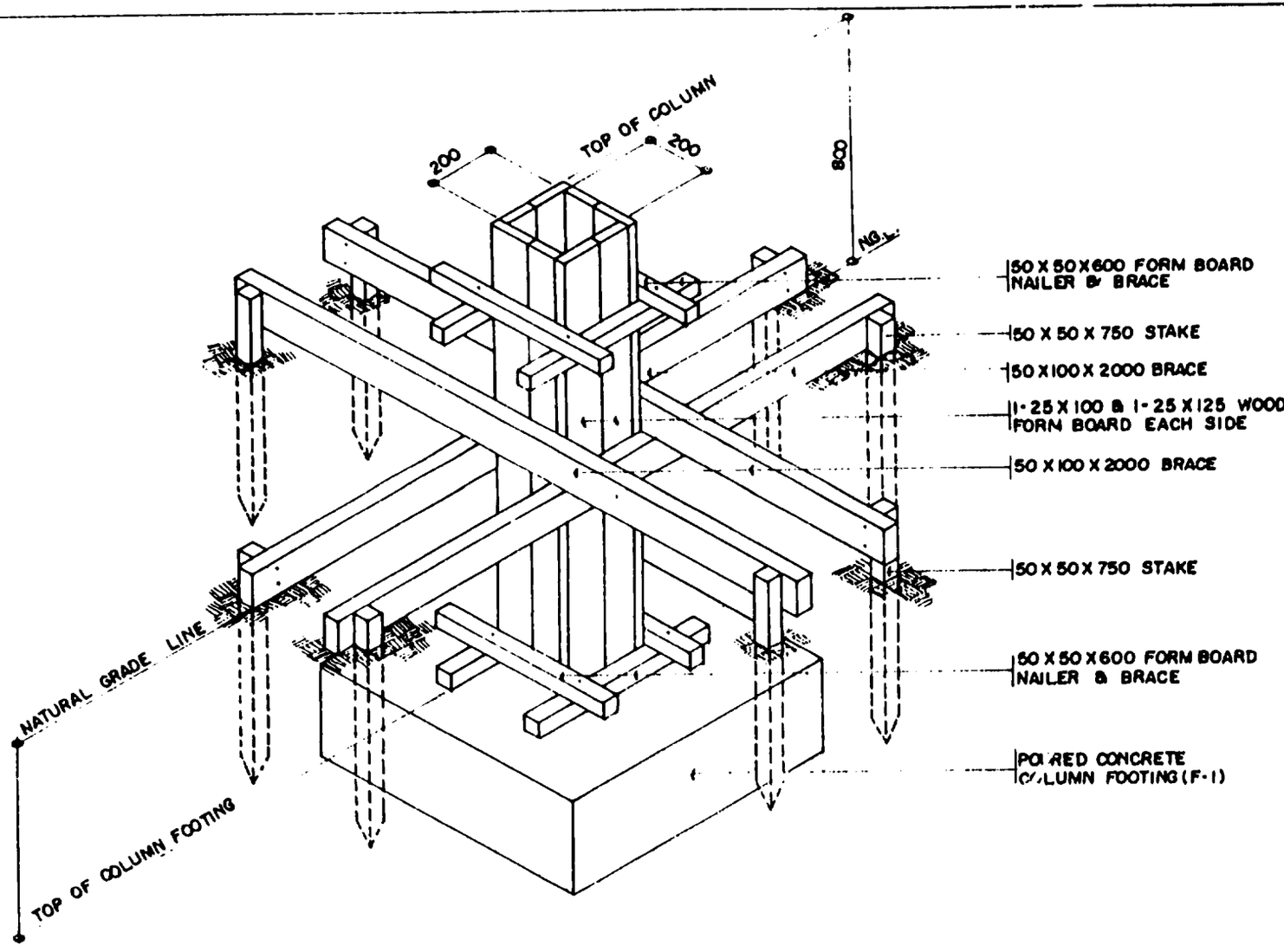
Install rebars with tie wires at every intersection then interconnect wallfooting dowels and wall footing rebars. Erect the column vertical bars on the installed column footing rebars and interconnect with tie wires at every intersection. Rebar installation/erection should conform with the dimensions as shown in the column and wall system rebars detail, figures 7 and 8.

After rebars installation, provide necessary stone block spacer with the minimum of 75 mm to attain sufficient clearance between rebars and gravel fill.



FOUNDATION PLAN

FIGURE 5



CONCRETE COLUMN (C-1) FORMWORKS DETAIL

FIGURE 6

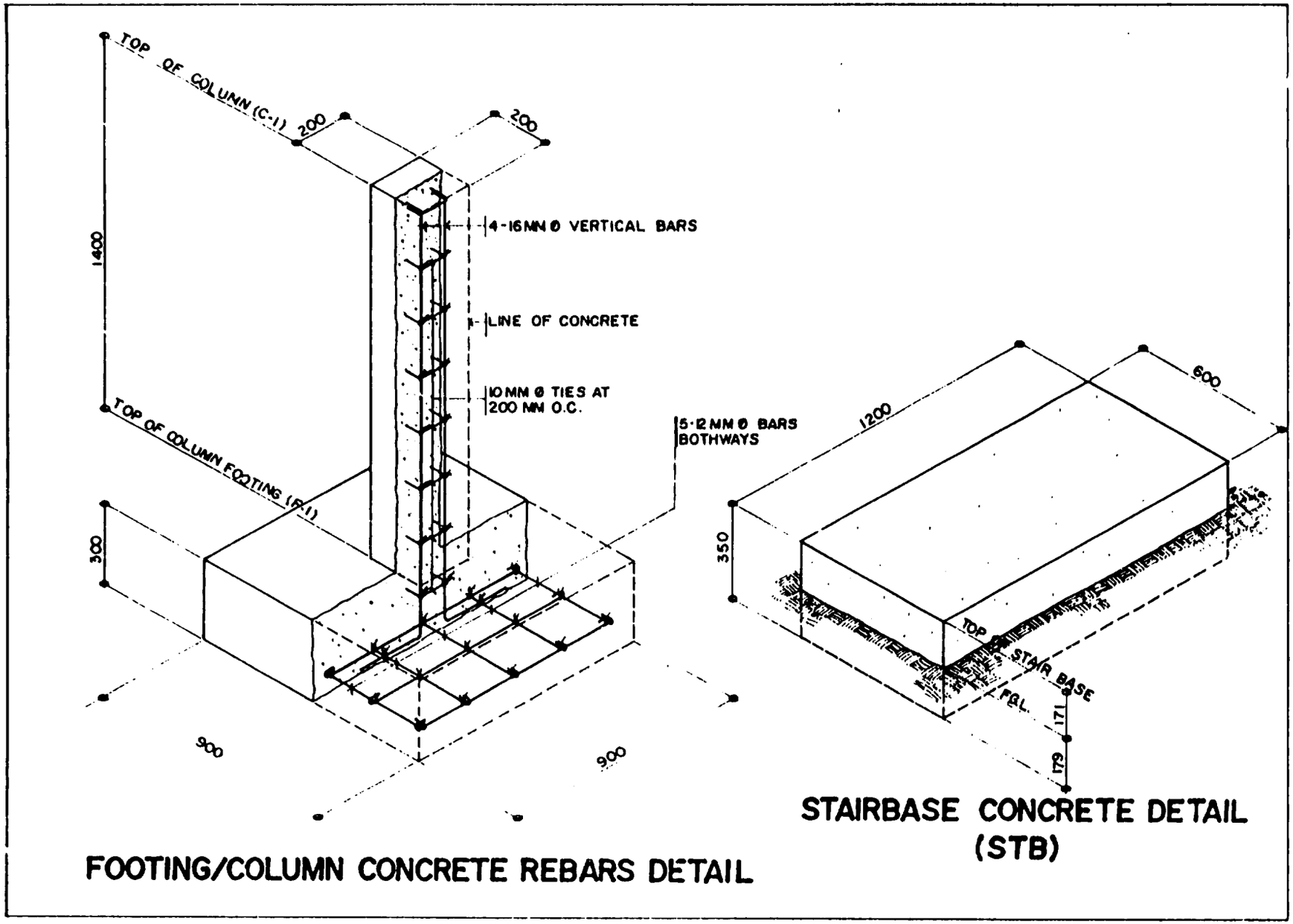
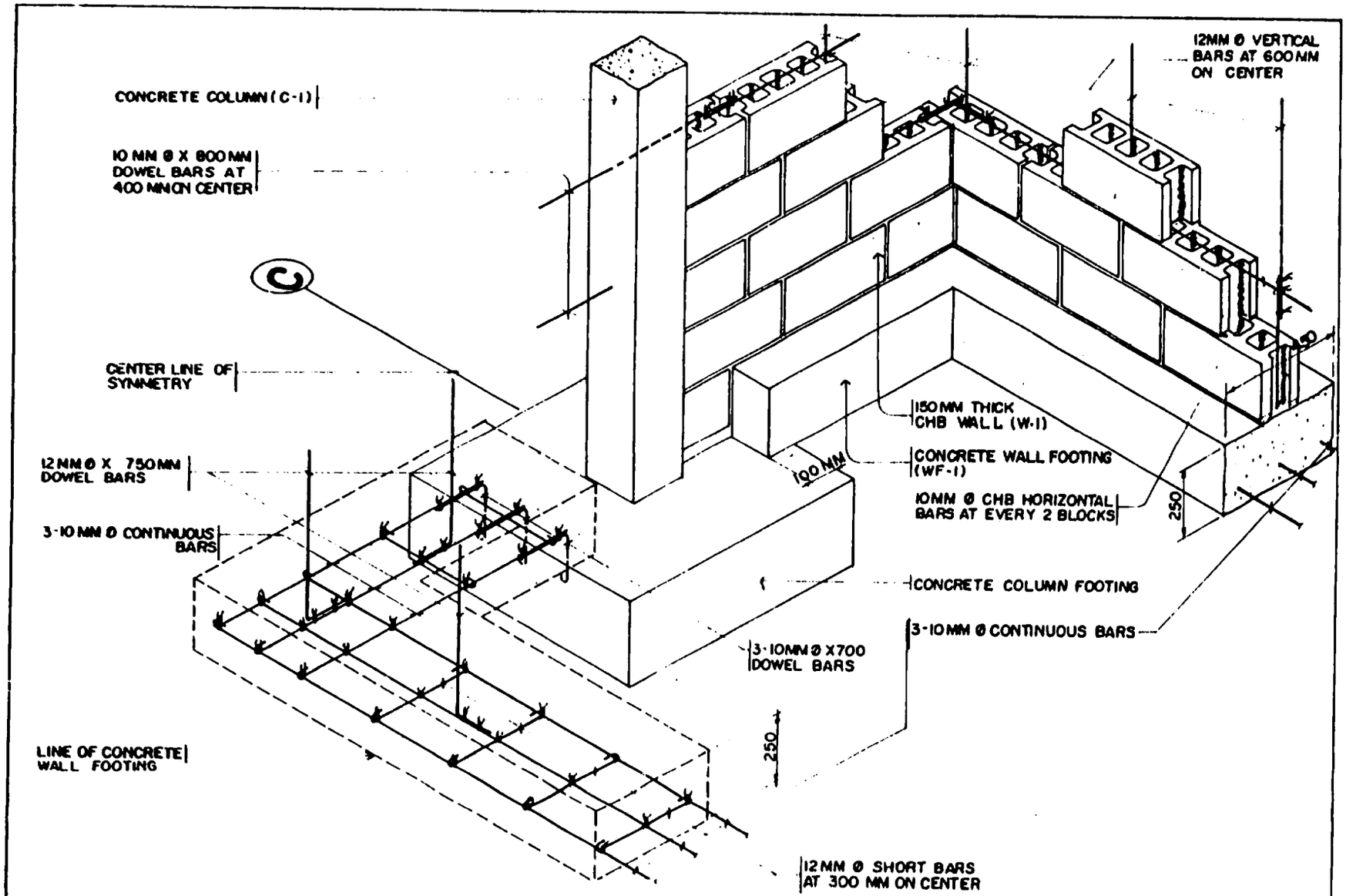

TOP OF COLUMN (C-1)
200
200
1400
4-16MM Ø VERTICAL BARS
LINE OF CONCRETE
10 MM Ø TIES AT
200 MM O.C.
TOP OF COLUMN FOOTING (F-1)
5-12MM Ø BARS
BOTHWAYS
300
900
900
FOOTING/COLUMN CONCRETE REBARS DETAIL
1200
600
350
TOP
STAIR BASE
FGL
171
171
STAIRBASE CONCRETE DETAIL
(STB)

FIGURE 7



WALL SYSTEM (W-1/ WF-1) CONCRETE/REBARS DETAIL

FIGURE 8

3. MIXING AND POURING OF CONCRETE FOR FOOTINGS (F-1 and WF-1)

Conduct soil poisoning by spraying all surfaces of excavations for footing with approved soil poisoning chemicals.

Use Class A concrete, for every bag of cement, mic 0.057 cubic meters of sand, 0.113 cubic meters of gravel and approximately 23 to 27 liters of water.

Measure the sand and gravel. Spread them on the mixing board and add the cement. Turn the mixture with the use of shovel until it is fully mixed and of the same color. Add water to the mixture intermittently while mixing until the entire mixture is uniform throughout. Place the concrete mix into its final position.

Compact the mix throughout by layers.

4. INSTALLATION OF FORMS, DOWEL BARS, STRAP PLATES AND ANCHOR BOLTS

Source of Materials : See Bill of Materials

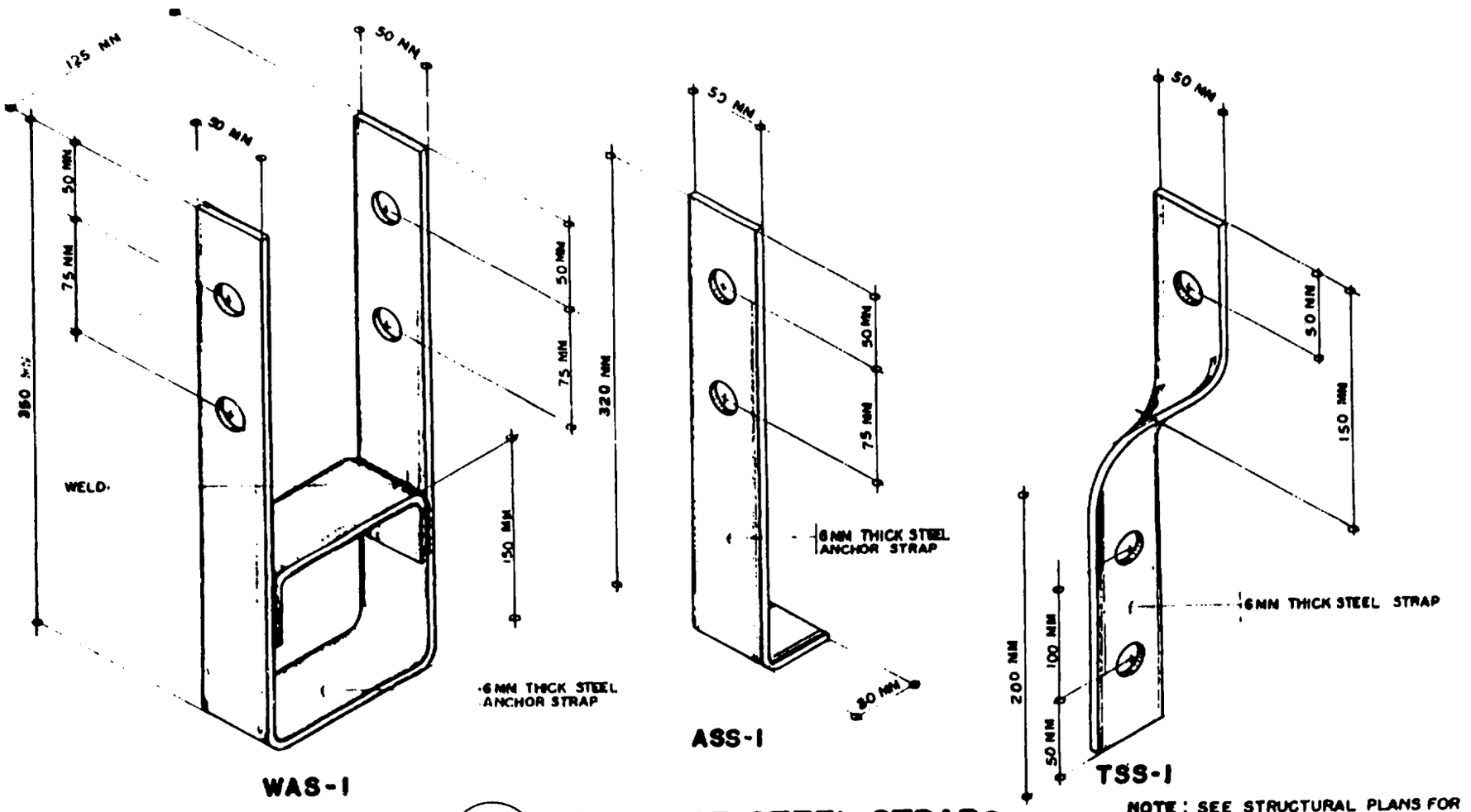
Reference : Figures 4, 6 and 9

Cut the necessary forms to sizes and lenghts as required based on the dimensions of concrete structures as shown in the plans.

Construct the forms for columns and stairs base. Erect the necessary support such as stakes, nailers and cross bracings as shown in figures 4, 6 and 8. After completion of formworks, install dowel bars for CHB wall through drilled holes on the forms at every 400 mm. The hooked end of the dowel bars shall be inserted through the drilled holes on the forms.

Place the post strap plate and anchor bolts over the formed structure where they are indicated in plan. Since all wall shall be pre-fabricated, all dimensions should be checked and strictly followed. Install the straps and anchor bolts at precise places and positions with the use of 25mm x 50mm wood strap holder.

See figures 13, 14, 15, 16 and 17 for precise location and orientation of straps and anchor bolts.

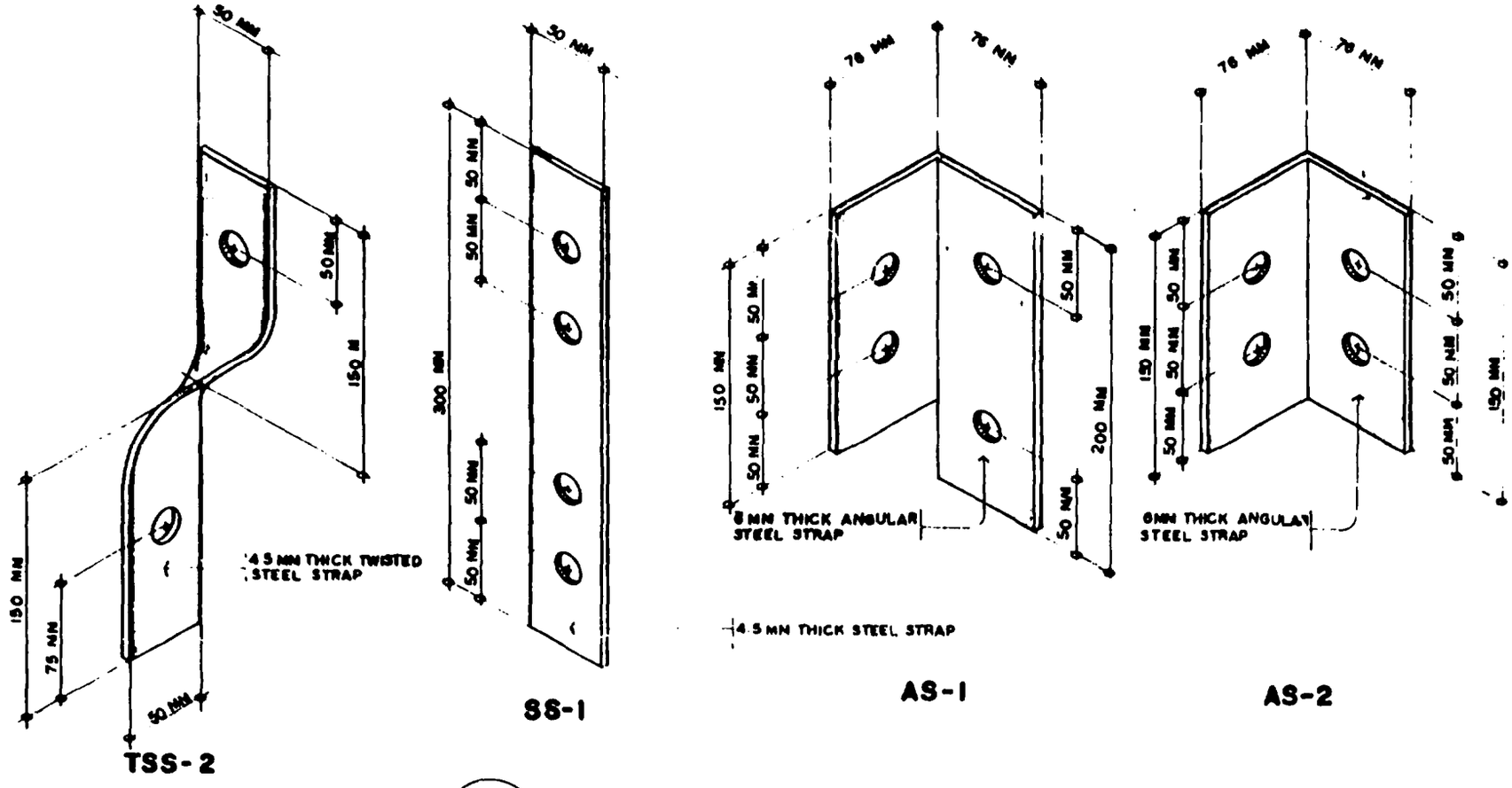


3/S-4 DETAIL OF STEEL STRAPS

SCALE 1:03 MTS

NOTE : SEE STRUCTURAL PLANS FOR SIZES OF HOLES TO RECEIVE BOLTS AND FOR EXACT ORIENTATION OF TWIST FOR TWISTED STRAPS.

FIGURE 9



NOTE : SEE STRUCTURAL PLANS FOR SIZES OF HOLES TO RECEIVE BOLTS & FOR EXACT ORIENTATION OF TWIST AND ANGLES FOR TWISTED & ANGULAR STRAPS

4/S-4 DETAIL OF STEEL STRAPS

SCALE 1:03 MTS

FIGURE - 10

5. MIXING AND POURING OF CONCRETE FOR COLUMNS AND STAIRBASE

Use Class A concrete. Follow the same mixture and direction as given in procedure 3.

Remove the forms after 7 days.

6. LAYING OF 150mm THICK CONCRETE HOLLOW BLOCKS

Mortar mixture, for every one bag of cement, use 0.085 cubic meters of sand.

Lay the concrete hollow blocks layer by layer with the required reinforcing bars and spacing. Fill the cell with mortar and tamper until fully compacted, then proceed to another layer. See wall system concrete/rebar detail, figure 8.

Rebar splicing should be with a minimum of 300 mm with three sets of tie wires.

All vertical bars should be protruded to the suspended slab of toilet and bathroom for proper connection shown in the TOILET & BATH CONCRETE SLAB/REBARS & WALL SYSTEM DETAIL, figure 12.

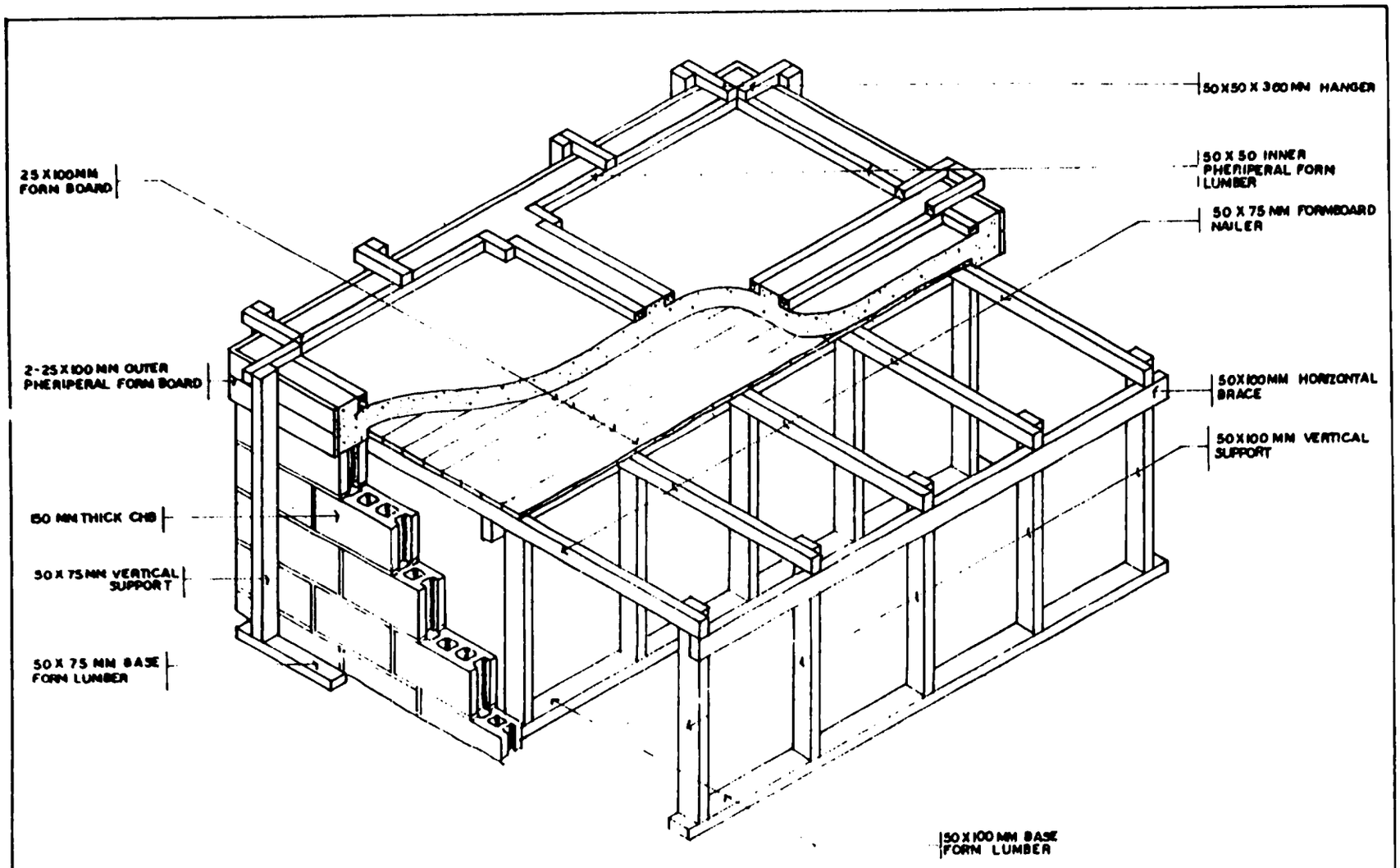
7. PLACING OF SCAFFOLDING, FORMS AND REBARS FOR REINFORCED CONCRETE TOILET AND BATH FLOOR SLAB

Source of Materials : See Bill of Materials

Reference : Figure 11 and 12

Construct the required number and sizes of wooden scaffoldings and forms for reinforced concrete toilet and bath slab as shown in figure 11. All siding forms should be done after the rebars installation of toilet and bath floor slab is completed. It should be noted that tie wire is required for every intersection. See figure 12.

Install the anchor strap for the 50mm x 200mm floor girt along line C. See figure 17 for exact position and orientation.



TOILET & BATH CONCRETE SLAB FORMWORKS DETAIL

FIGURE 11

8. PLUMBING ROUGHING AND INSTALLATION

Source of Materials : See Bill of Materials

Install all pipes to be embedded in concrete along with the 150mm thick CHB installation and the rebar installation of the Toilet and Bath reinforced concrete floor slab.

See plans for the details on the installation of pipes.

Pitch all pipes 6mm every 300mm. Provide correctly located openings of proper sizes when required in the walls and floors for the passage of pipes. All items to be embedded in concrete shall be thoroughly clean and free from rust, scale and paint.

Run vent pipes in roof spaces as close as possible to the underside of roof, with horizontal piping pitched down to the stacks without forming traps. Vertical vent pipes maybe connected into one main vent riser above the highest vented figures. Where an end or circuit vent pipes from any fixture or line fixtures is connected to a vent line serving other fixtures, the connection shall be at least 1200mm above the floor on which the fixtures are located to prevent the use of any vent line as a waste line.

Horizontal waste line receiving the discharge from two or more fixtures shall be provided with end vents unless separate venting of fixtures is noted.

The water piping shall be extended to all fixtures, outlets and equipments from the gate valves installed in the branch near the riser.

The cold water system shall be installed with a fall toward a main shut off valve and drains. End of pipes and outlets shall be copped or plugged and left ready for future connections.

All pipes should be cut accurately to measurements and shall be worked into place without springing or forcing. Service pipes, valves and fittings shall be kept at sufficient distance from other work to permit finished covering not less than one-half inch from such work or from finished covering on the different service.

All changes in pipes sizes on soil waste and drain lines shall be made with reducing fitting or reducers. All joints should be air and water tight.

9. MIXING AND POURING OF CONCRETE FOR TOILET AND BATH FLOOR SLAB

Use Class A concrete. Follow the same mixture and direction as given in procedure 3. Prior to concrete pouring make sure that all embedded pipes are in place.

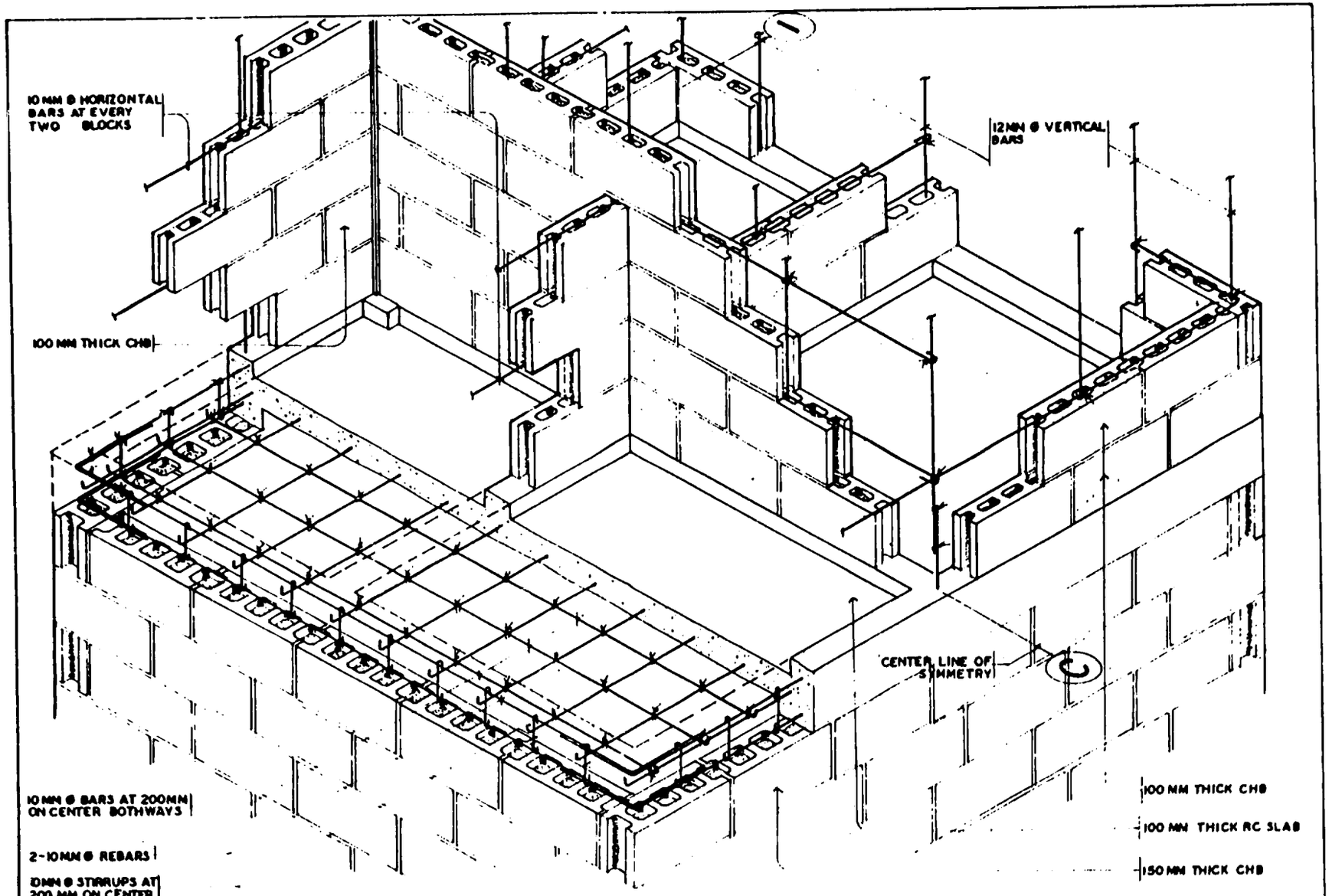
Remove the forms after seven (7) days.

10. LAYING OF 100mm THICK CHB WALL OF TOILET AND BATH

Source of Materials : See Bill of Materials

Reference : Figure 12

Follow the same mortar mixture and procedure of installation as given in procedure 6.



TOILET & BATH CONCRETE SLAB/REBARS & WALL SYSTEM DETAIL

FIGURE 12

11. ERECTION OF POST AND INSTALLATION OF FLOOR GIRTS

Source of Materials : See Bill of Materials

Reference : Figure 13, 14, 15, 16 and 17

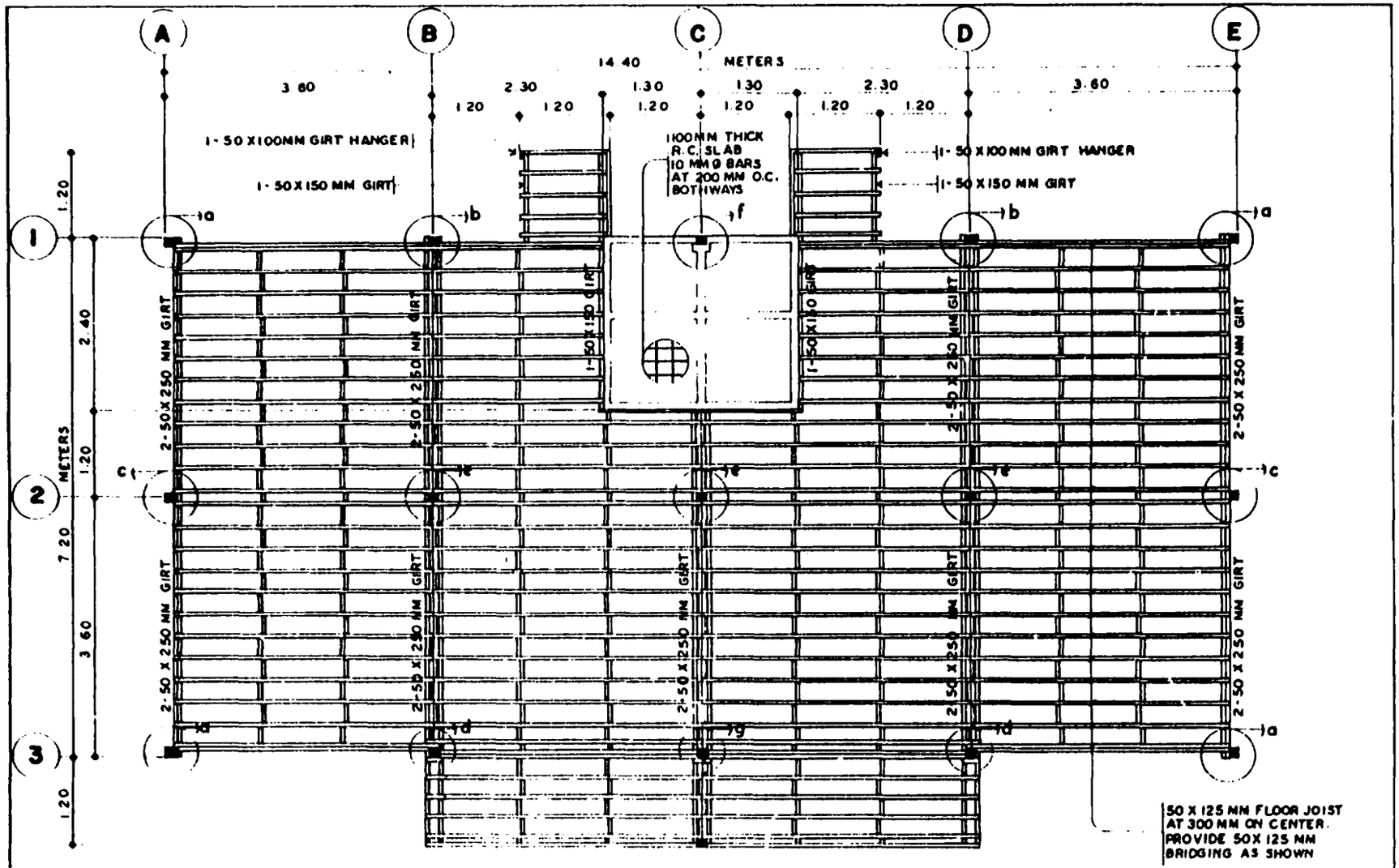
Erect the fifteen posts using 16mm ϕ x 152mm machine bolts for anchorage to R. C. Column post strap plate. They should be braced for lateral movement. For bracing, use temporary the floor joists materials available on site.

After checking the alignment and plumbness of posts, install and connect the floor girts to the posts. Secure anchorage of girts to wood post by means of 16mm ϕ machine bolts, see figures 14 and 15 for complete dimensions of bolts and for installation details.

Along line C, use 2-6mm x 50 x 350mm twisted steel strap with 2-19mm ϕ x 254mm machine bolts for girt and toilet and bath slab abutment anchorage. Take note of the pre-embedded 2-19mm x 300 mm anchor bolt to toilet and bath floor slab.

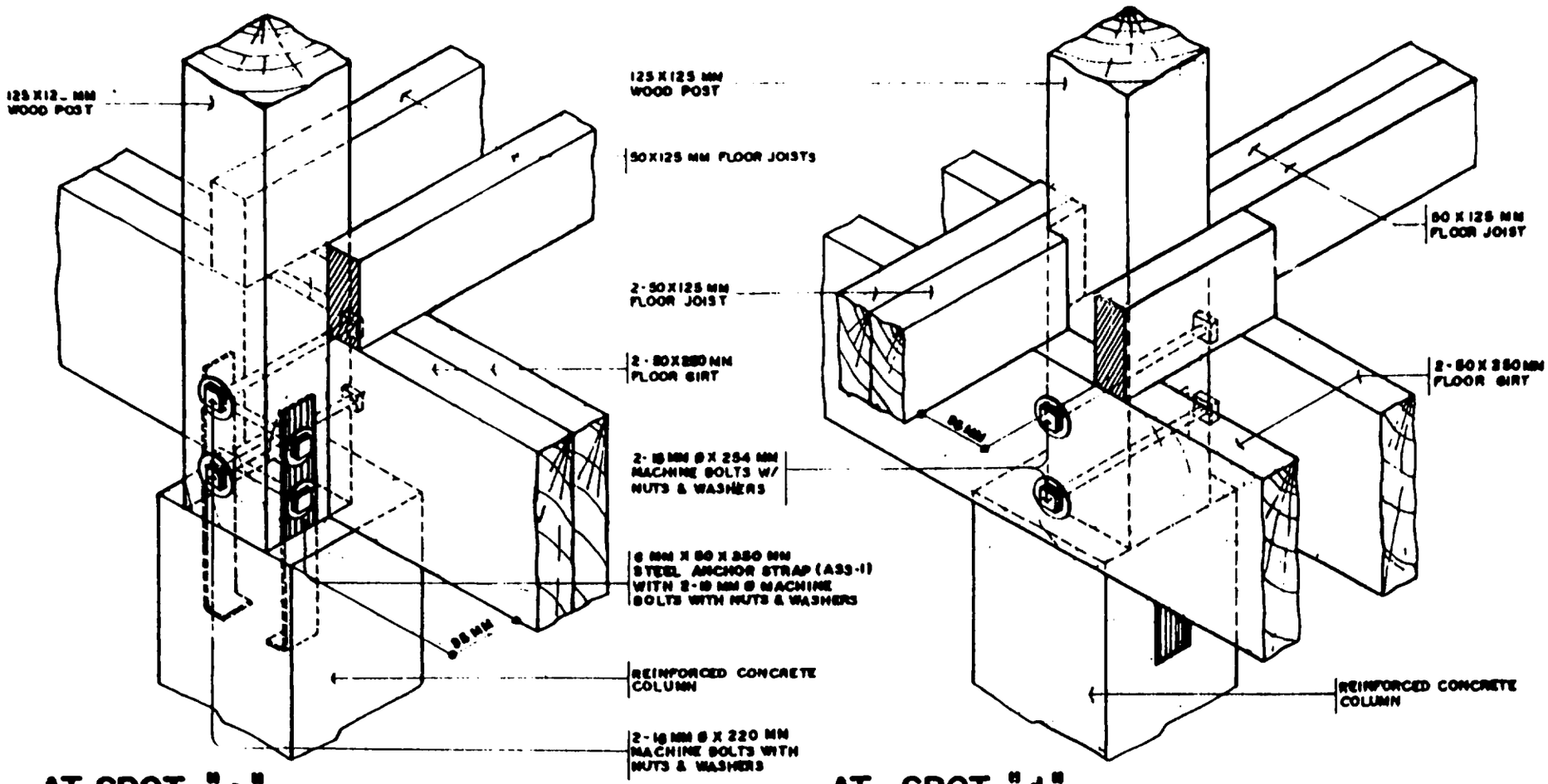
For floor girts to be anchored to toilet and bath floor slab check installation of 19mm ϕ anchor bolts which are pre-embedded prior to placement of 50 x 150 mm girts.

Girt at service stair which is to be hung to truss bottom chord shall be installed after installation of trusses. See figures 71 and 44.



FLOOR FRAMING PLAN

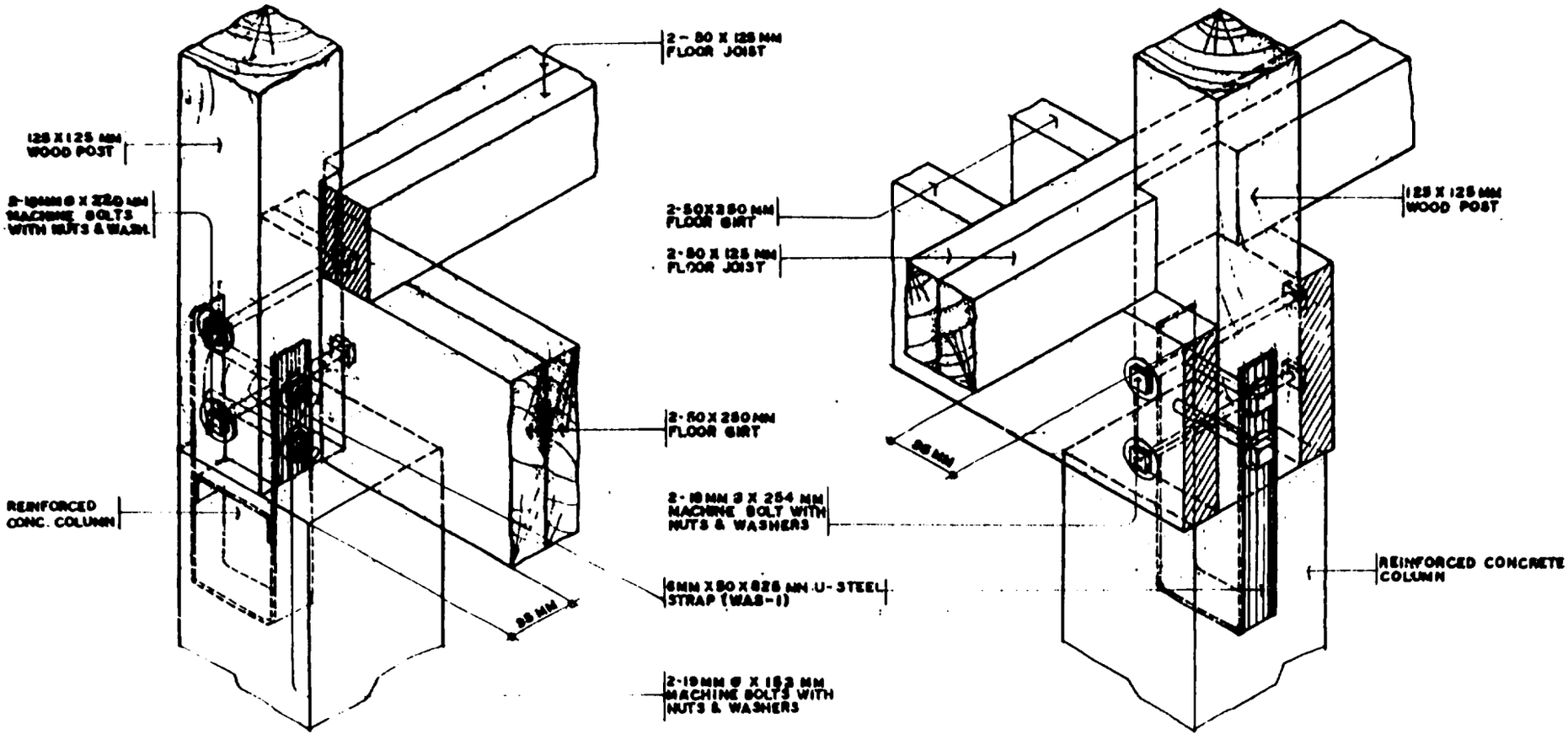
FIGURE 13



3/S-2 **DETAIL OF POST, FLOOR GIRT, & FLOOR JOIST CONNECTION**

SCALE 1:06 MTS.

FIGURE 14

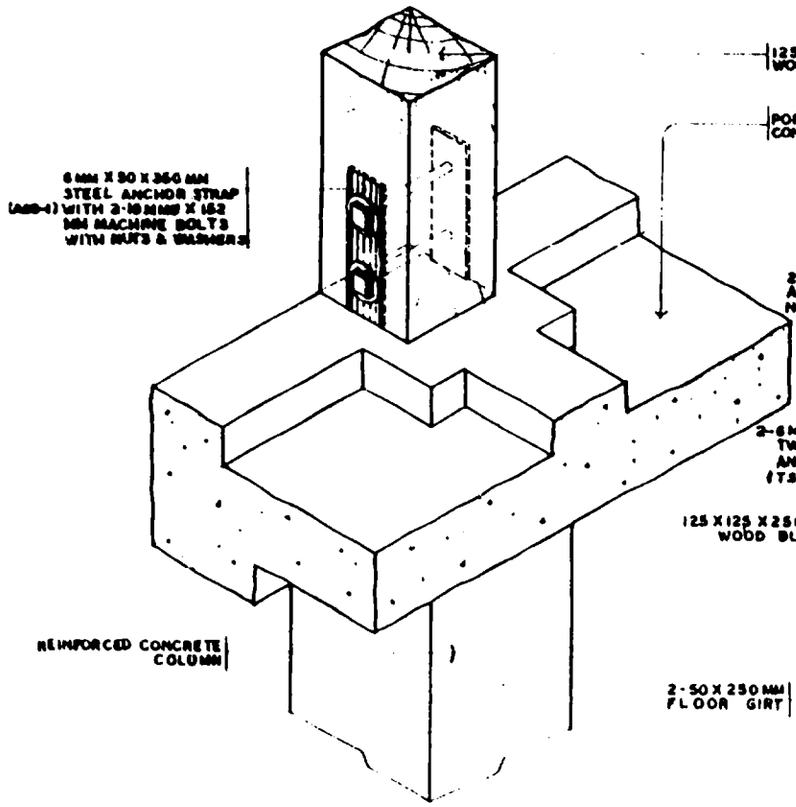


4
8-2

DETAIL OF POST, FLOOR GIRT & FLOOR JOIST CONNECTION

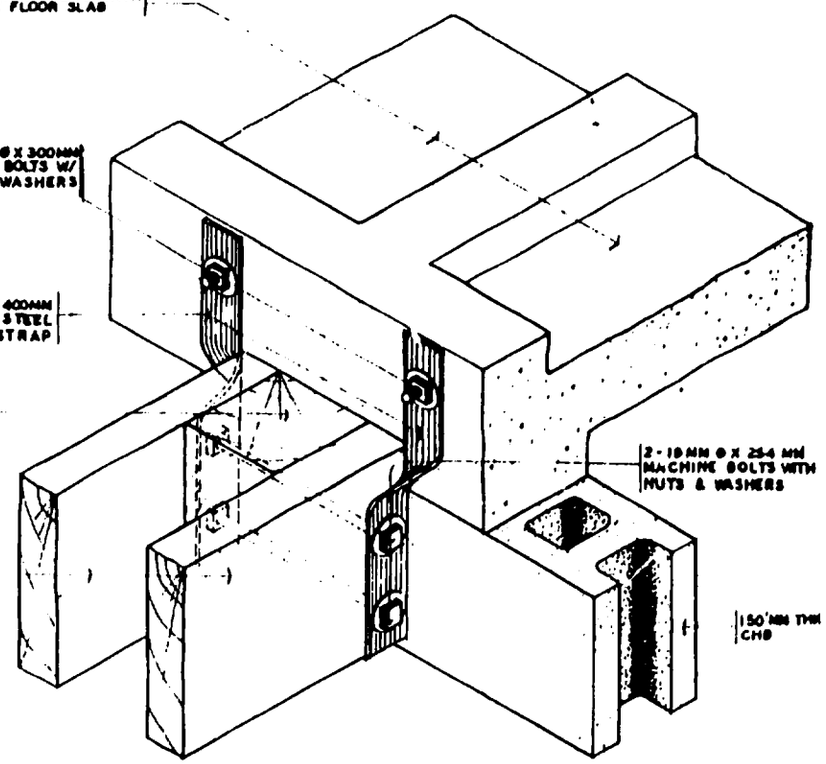
SCALE 1:08 MTS.

FIGURE 15



5 / S-2 POST CONNECTION AT SPOT "f"
SCALE 1 06 MTS

FIGURE 16



6 / S-2 FLOOR GIRT CONNECTION AT SPOT "H"
SCALE 1 06 MTS

FIGURE 17

12. INSTALLATION OF FLOOR JOISTS AND BRIDGINGS

Source of Materials : See Bill of Materials

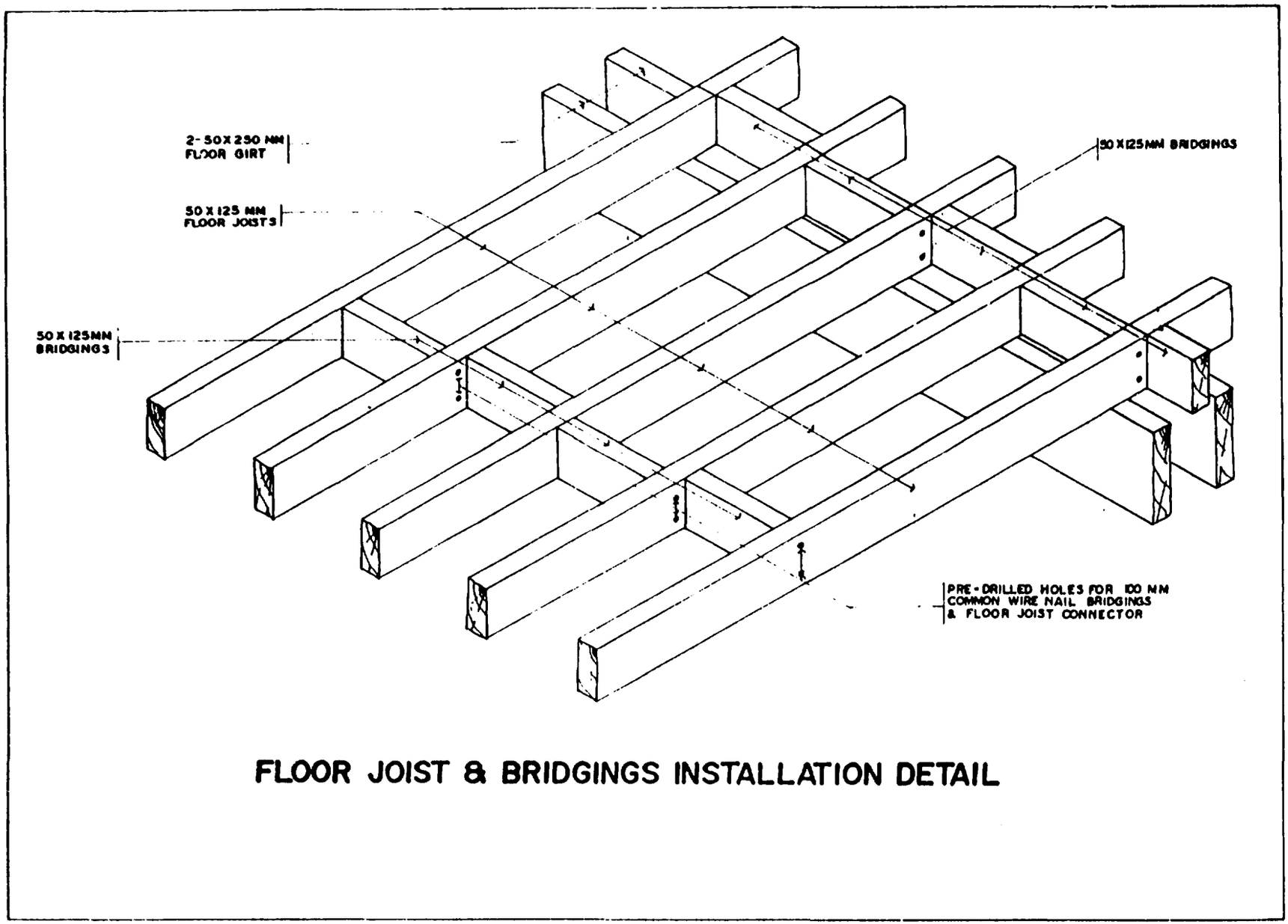
Reference : Figures 13 and 18

Check elevation of installed floor girts. Install floor joists in accordance with the floor framing plan and installation detail of floor joists bridgings figures 13 and 18.

For any variance in the elevation considered to be minimal which would not need readjustment of the installation of the girsts, adjustment should be made on the floor joist and not on the girts. Install floor joists with 75mm long CW nails at every intersection.

Insert the bridgings between two floor joists and fixed the bridgings with 100mm long CW nails at both ends. Take note that bridgings shall also be installed along lines A, B, C, D and E.

Install floor joist at balcony with 25mm depression from the elevation of the enclosed areas. To attain the required depression adjust the thickness of the floor joists in contact with the 50 x 250 mm cantilever floor girts. No adjustment shall be made on the thickness of the floor girts. See figure 43 for details.



FLOOR JOIST & BRIDGINGS INSTALLATION DETAIL

FIGURE 18

13. FABRICATION OF TRUSSES (T-1)

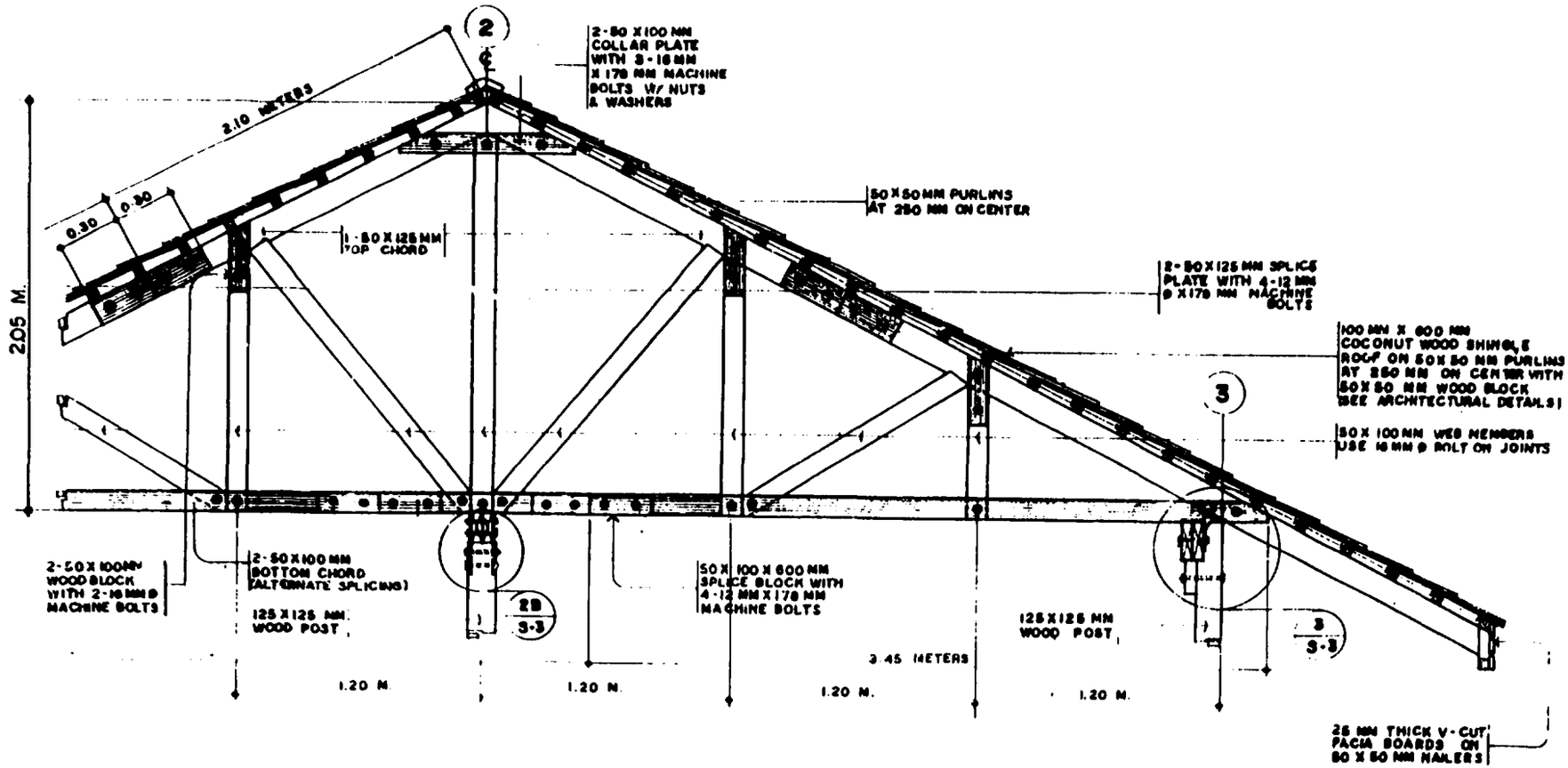
Reference : Figure 19

Prepare the lumber requirements for the fabrication of the required thirteen trusses. Fabricate trusses in accordance with the roof framing plan and details. All holes for bolts and nails shall be pre-drilled. Bottom chord shall have alternate splicing. See figure 19 for fabrication details.

13A. FABRICATION OF TRUSSES WITH NAIL ON PLATE CONNECTIONS (T-1a)

References : Figures 19-A, 19-B, 19-C, 19-D, 19-E
19-F, 19-M, 19-G

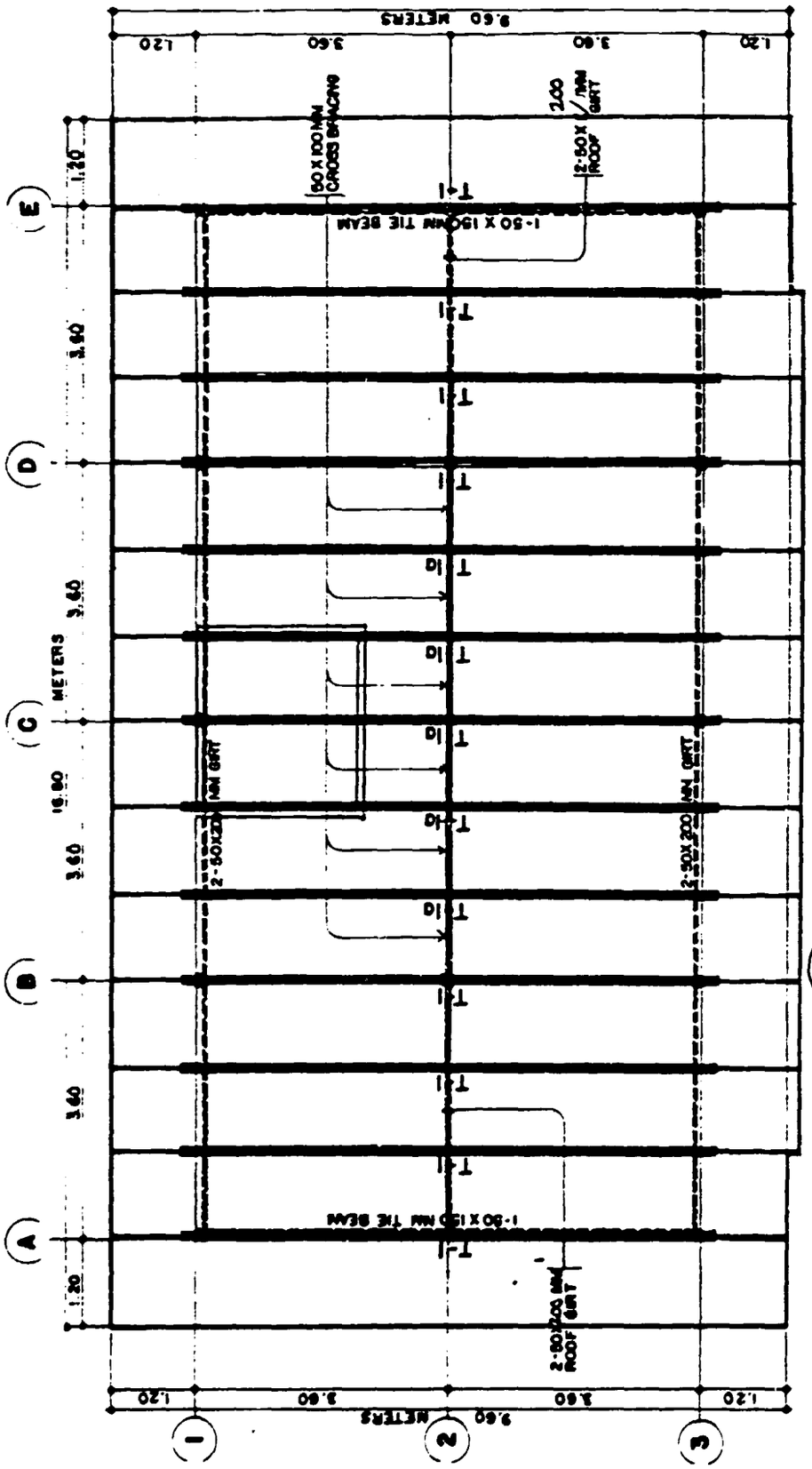
Prepare the lumber requirements for the required trusses (T-1a). Fabricate the plain gauge 18 galvanized iron (GI) plates. Cut the required lumber lenghts for the trusses and mount the truss members by joining them temporarily with nails. Secure all the joints using the gauge 18 galvanized iron (GI) plate. Mount the plates and drill pilot holes for the nails. Nail the plate to secure the truss joints. All joints should be rigidly connected.

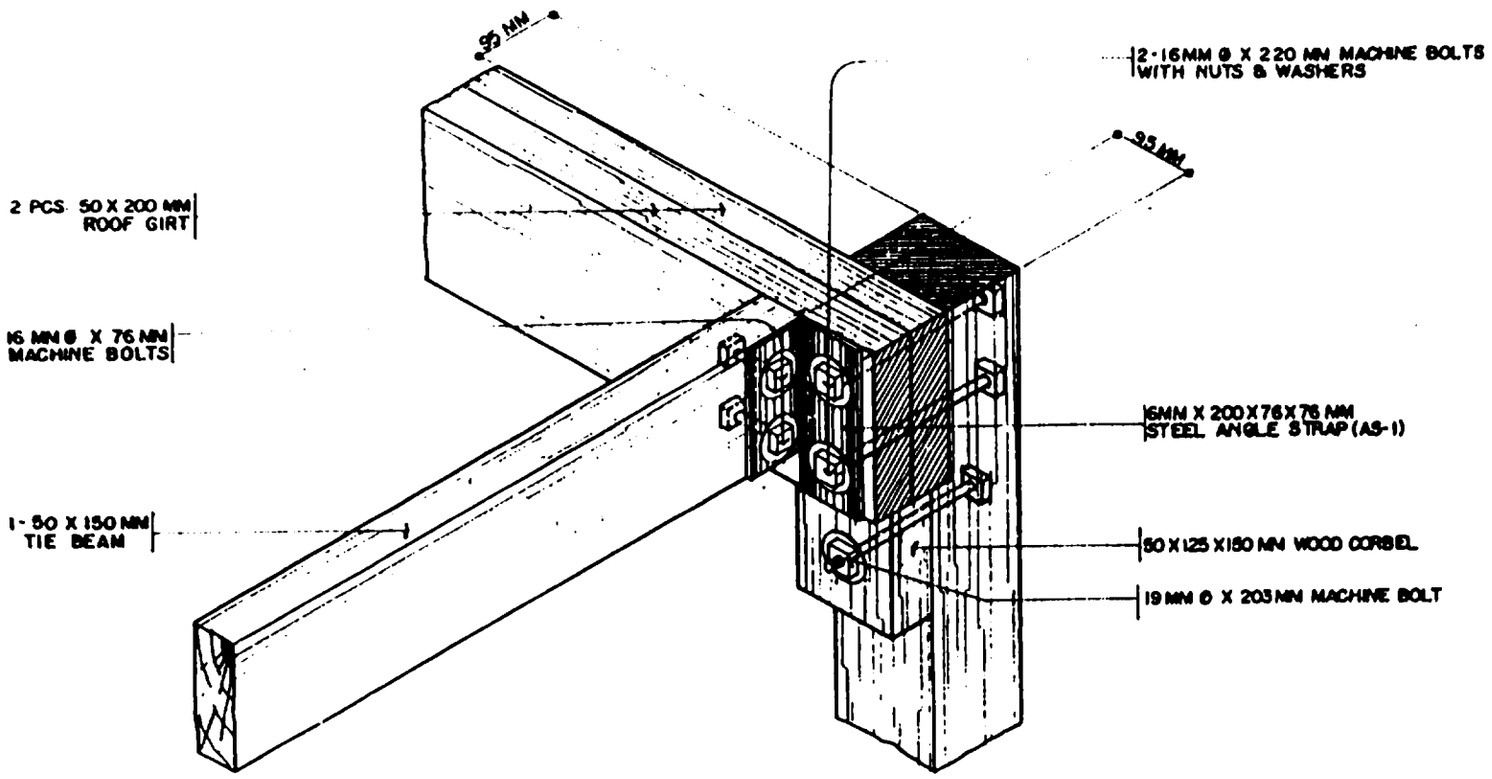


5 / 3-3 ROOF DETAIL SHOWING T-1

SCALE 1 : 20 MTS.

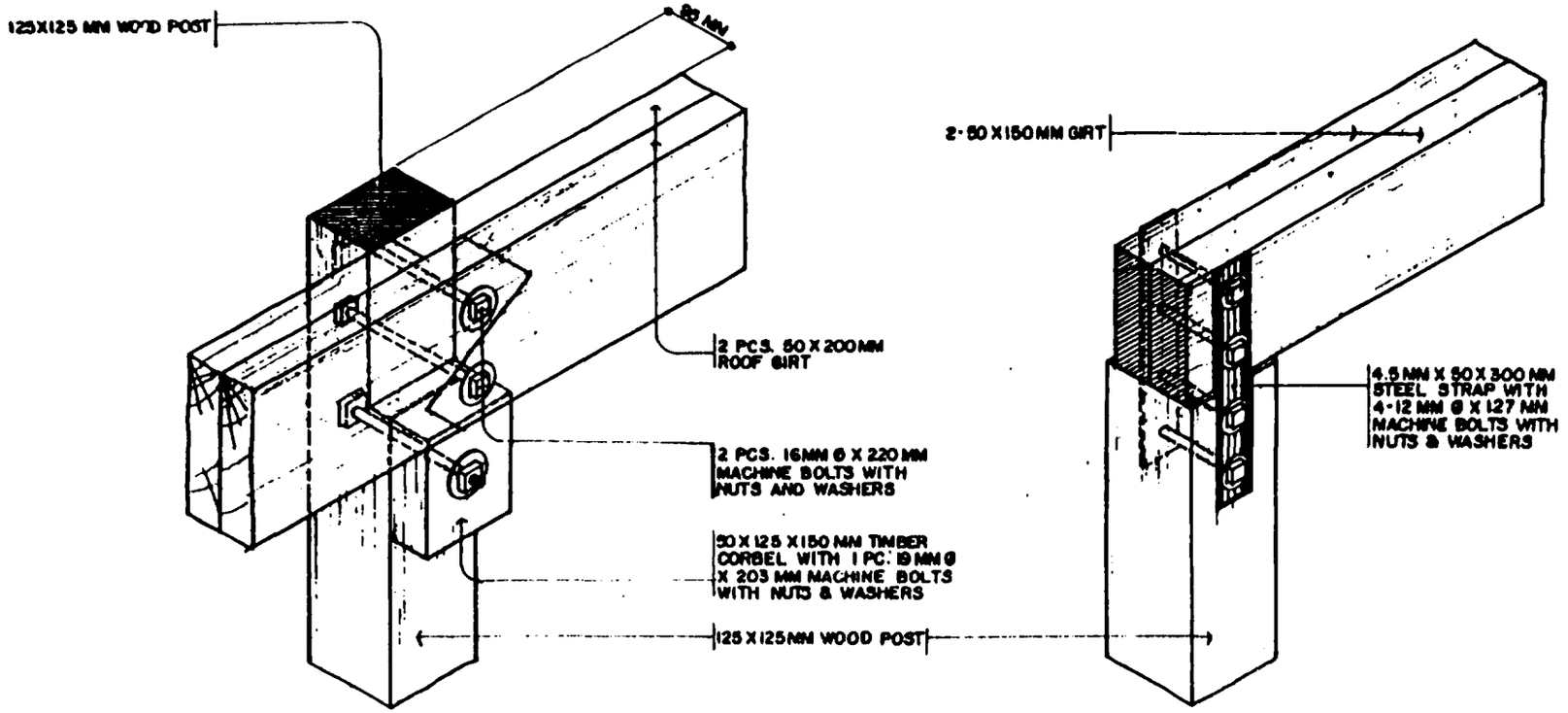
FIGURE 19


ROOF FRAMING PLAN
1:60 MTS
SCALE
1
S-3A
FIGURE 19 A
9.60 METERS
3.60
1.20
1-50 X 150 MM TIE BEAM
2-50X200 MM GIRT
2-50X200 MM ROOF GIRT
50 X 100 MM CROSS BRACING
METERS
16.80



2 / S-3A **DETAIL OF TIE BEAM CONNECTION TO GIRT AT CORNERS**
SCALE 1:06 MTS.

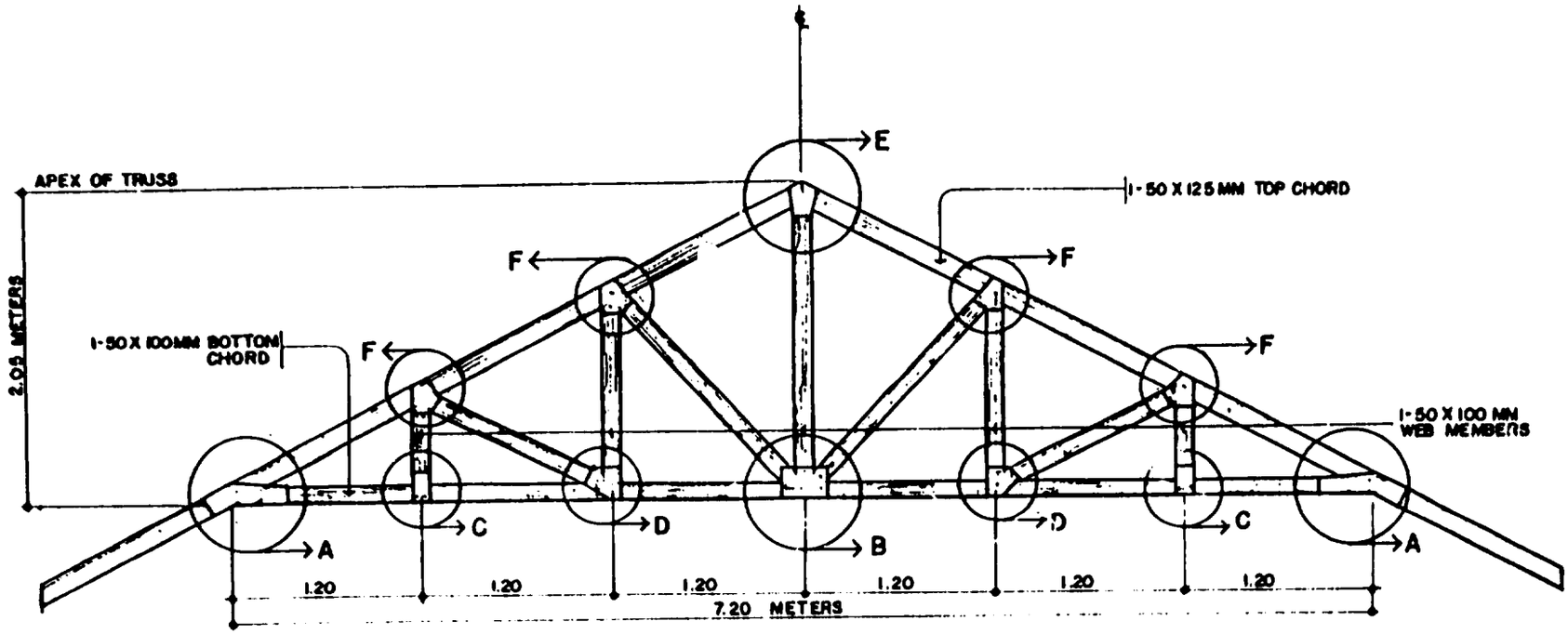
FIGURE 19 B



3 / S-3A TYPICAL ROOF GIRT CONNECTION TO WOOD POST SCALE 1:06 MTS

4 / S-3A ROOF GIRT CONNECTION TO WOOD POST ALONG LINE 2 SCALE 1:06 MTS.

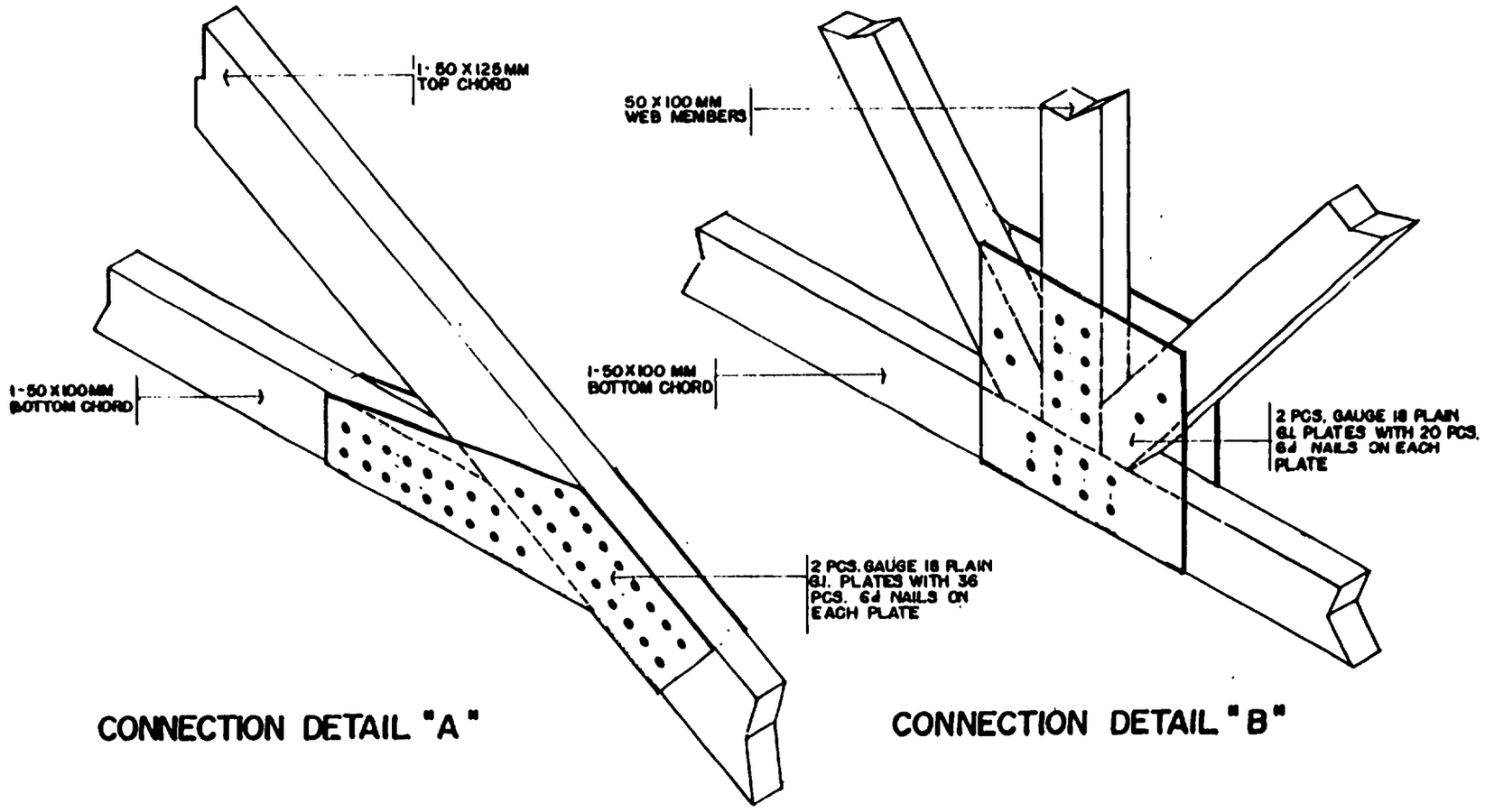
FIGURE 19 C



5/S- DETAIL OF T-1a

SCALE 1:50 MTS

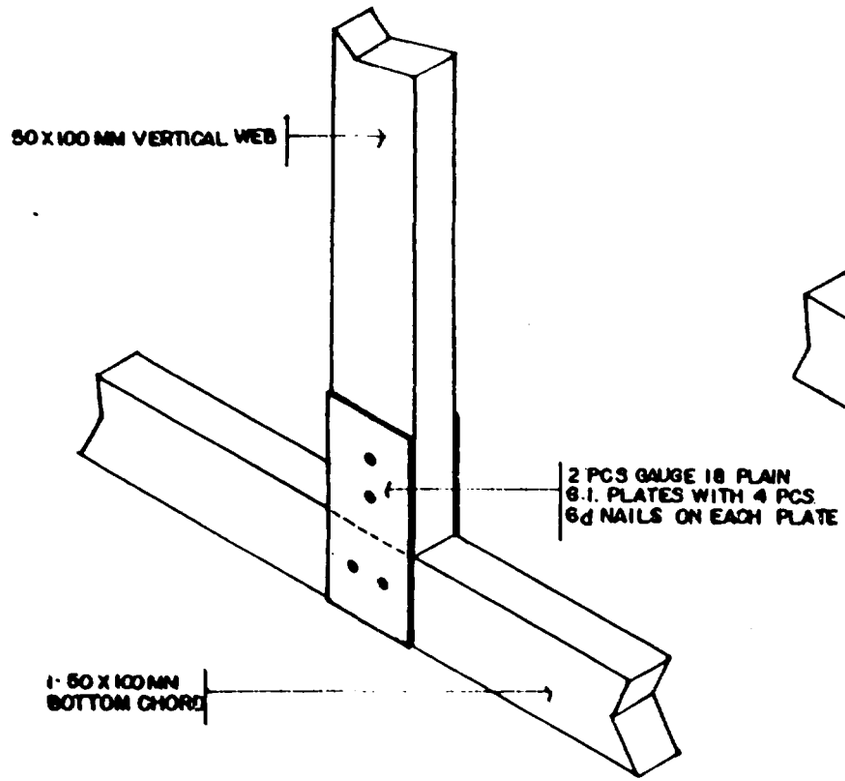
FIGURE 19 D



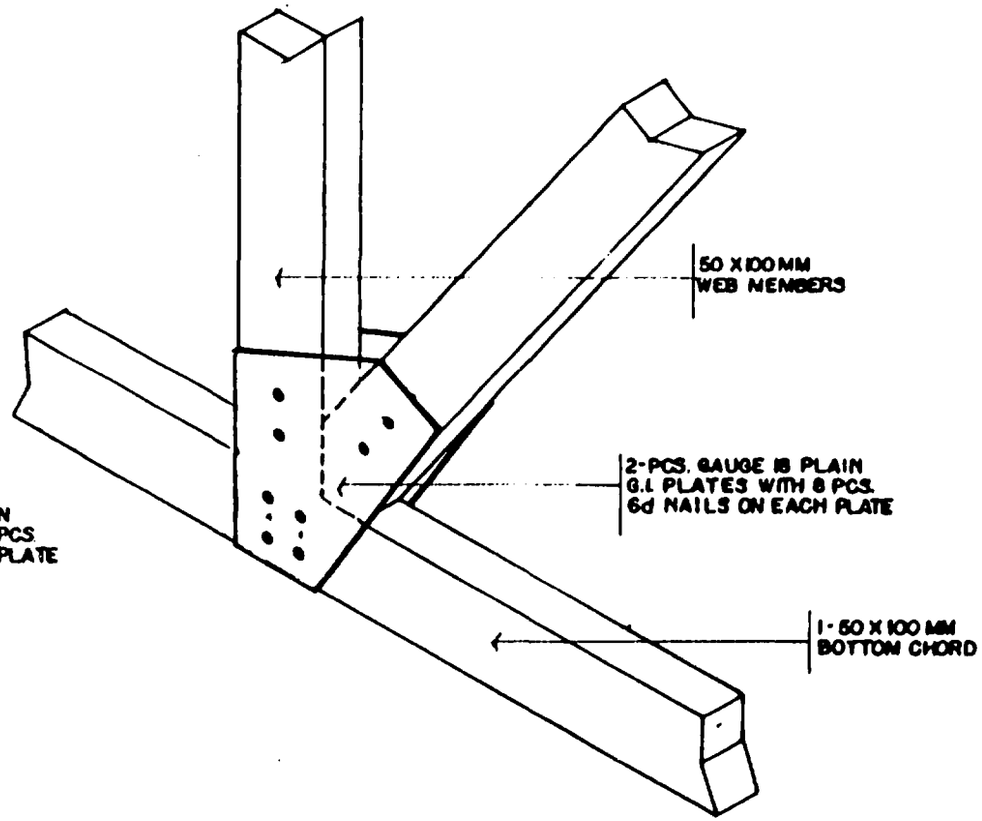
CONNECTION DETAIL "A"

CONNECTION DETAIL "B"

FIGURE 19 E

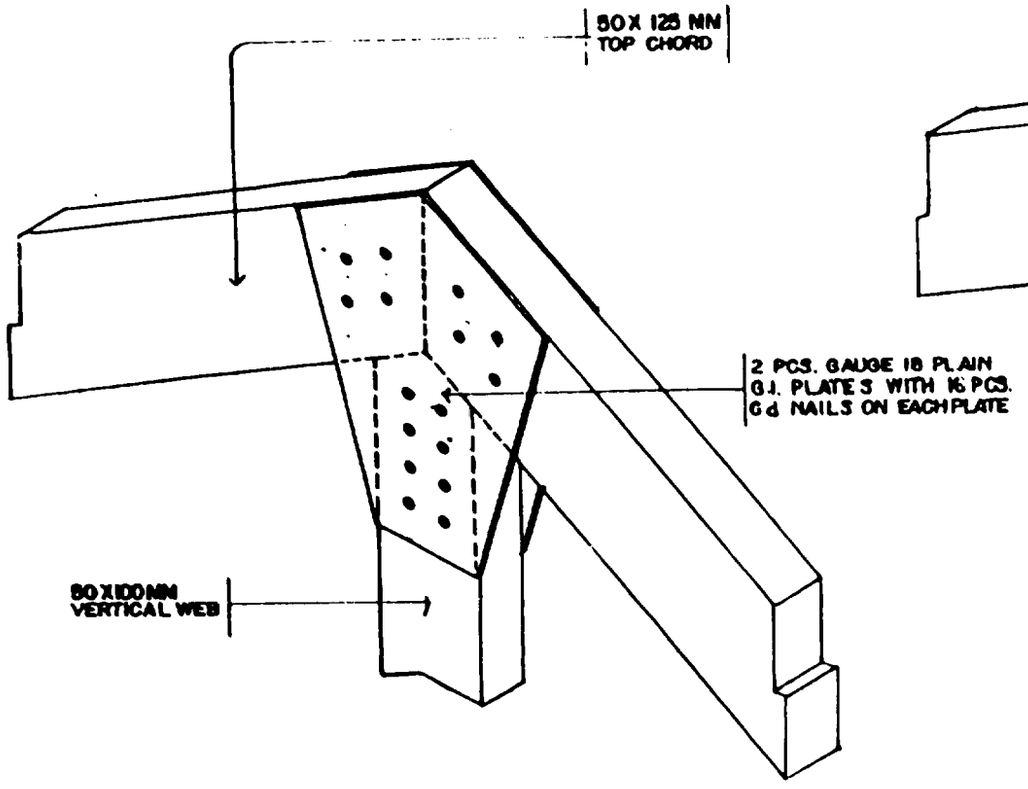


CONNECTION DETAIL "C"

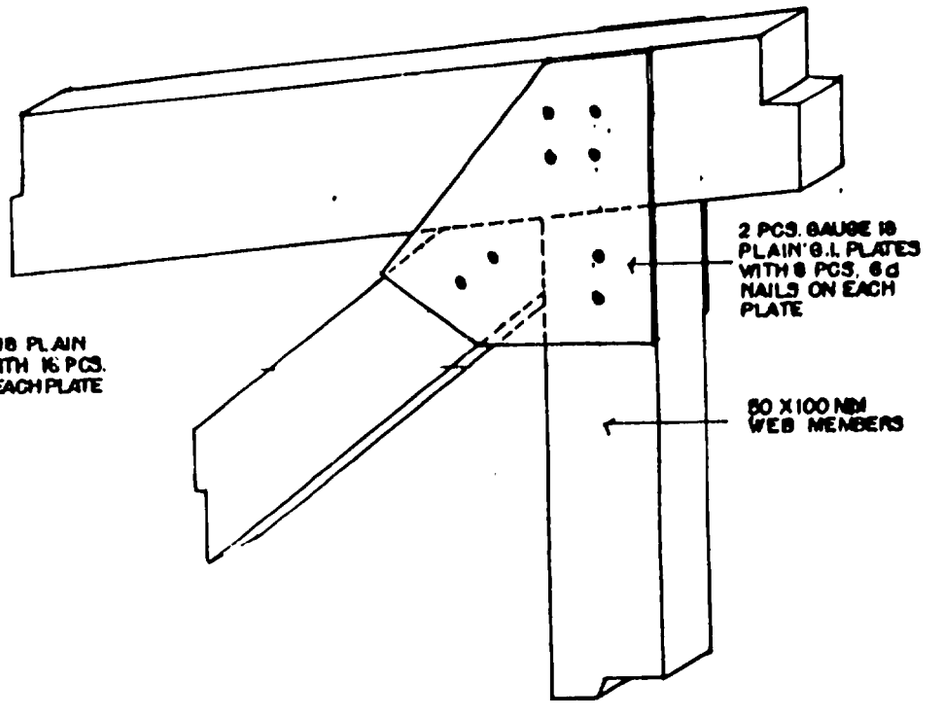


CONNECTION DETAIL "D"

FIGURE 19 F

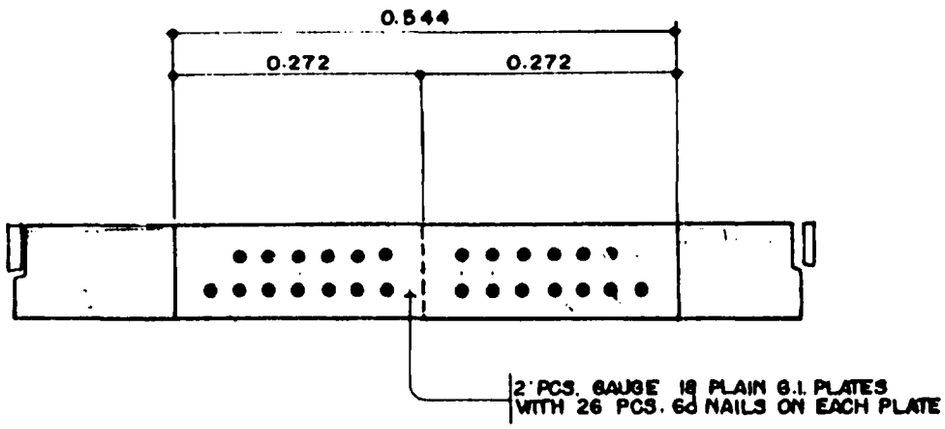


CONNECTION DETAIL "E"



CONNECTION DETAIL "F"

FIGURE 19 G



SPLICE CONNECTION DETAIL

FIGURE 19 H

14. FABRICATION OF PT-1 AND PT-2

Source of Materials : Pre-fabricated trusses (T-1), three sets. For panel boards and nailers, see Bill of Materials.

Reference : Figures 20 and 21

Check pre-fabricated truss (T-1). Make sure that all dimensions conform with the roofing details. Fabricate wood louver vents for PT-1. Install nailers and frames for the 19mm thick V-cut paneling and louver vents. Mount louver vents on the truss system as indicated in the details. Proceed with the installation of the panel boards. See figures 20 and 21 for fabrication details.

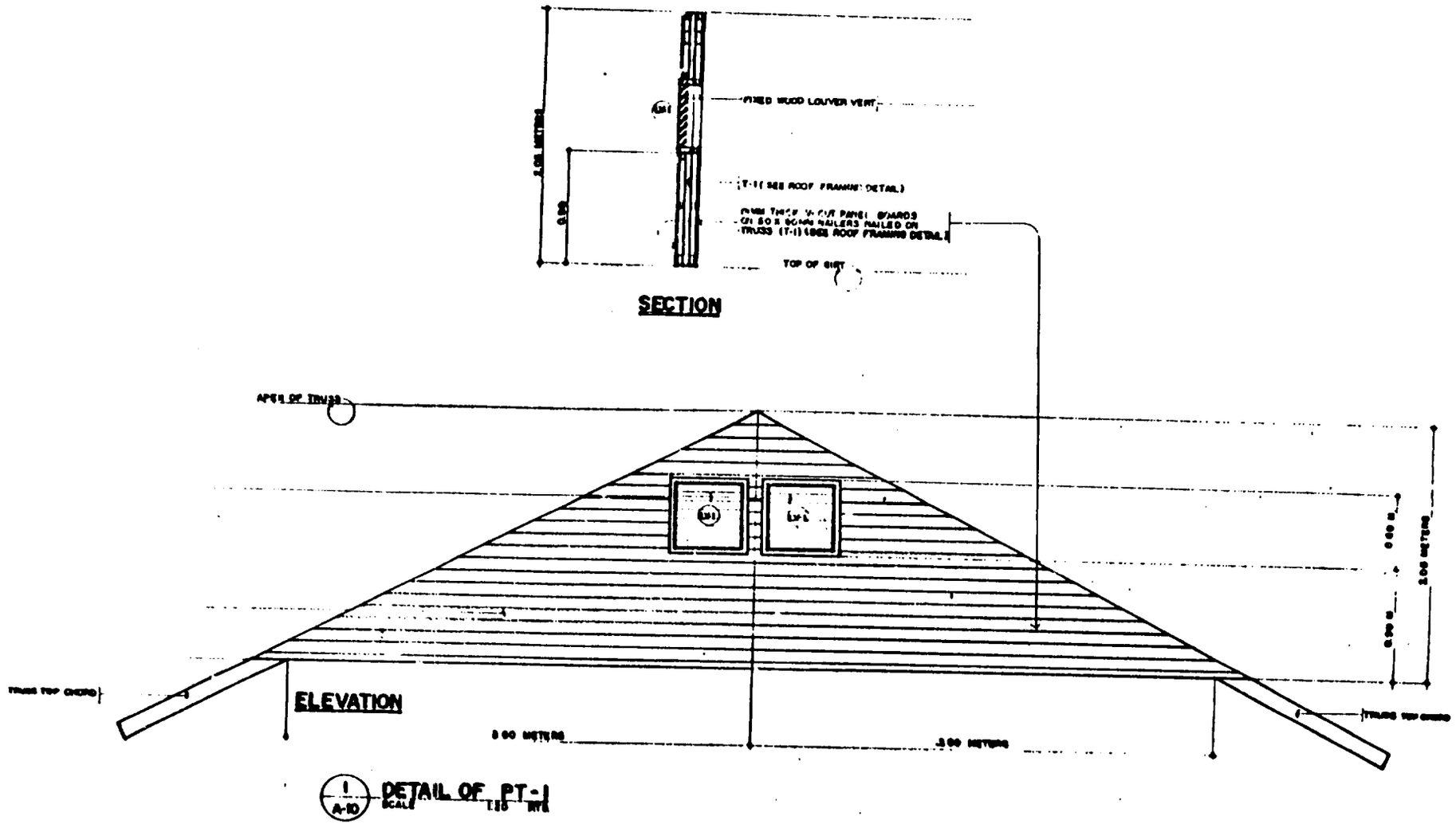
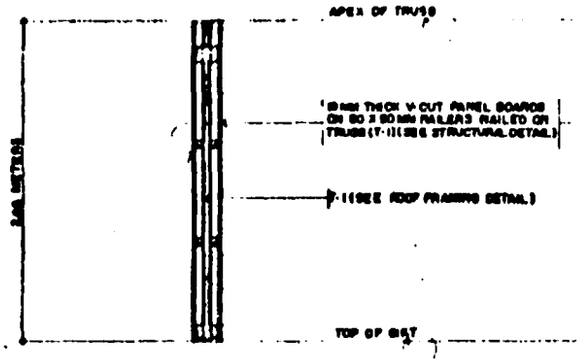
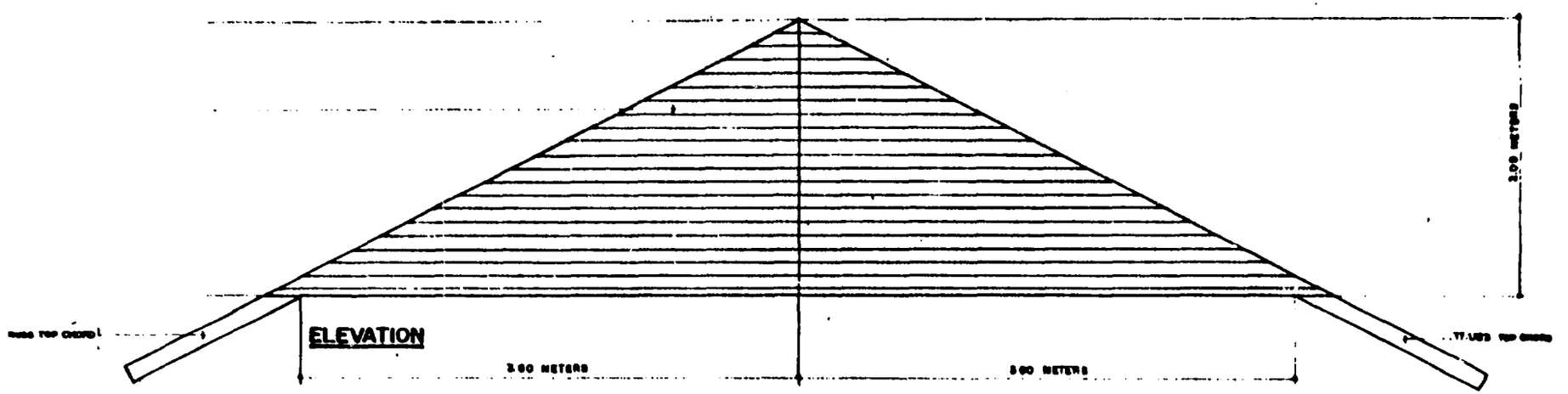


FIGURE 20



SECTION



2 / A-H DETAIL OF PT-2
SCALE 1:50 MTS

FIGURE 21

15. INSTALLATION OF ROOF GIRTS AND TIE BEAMS

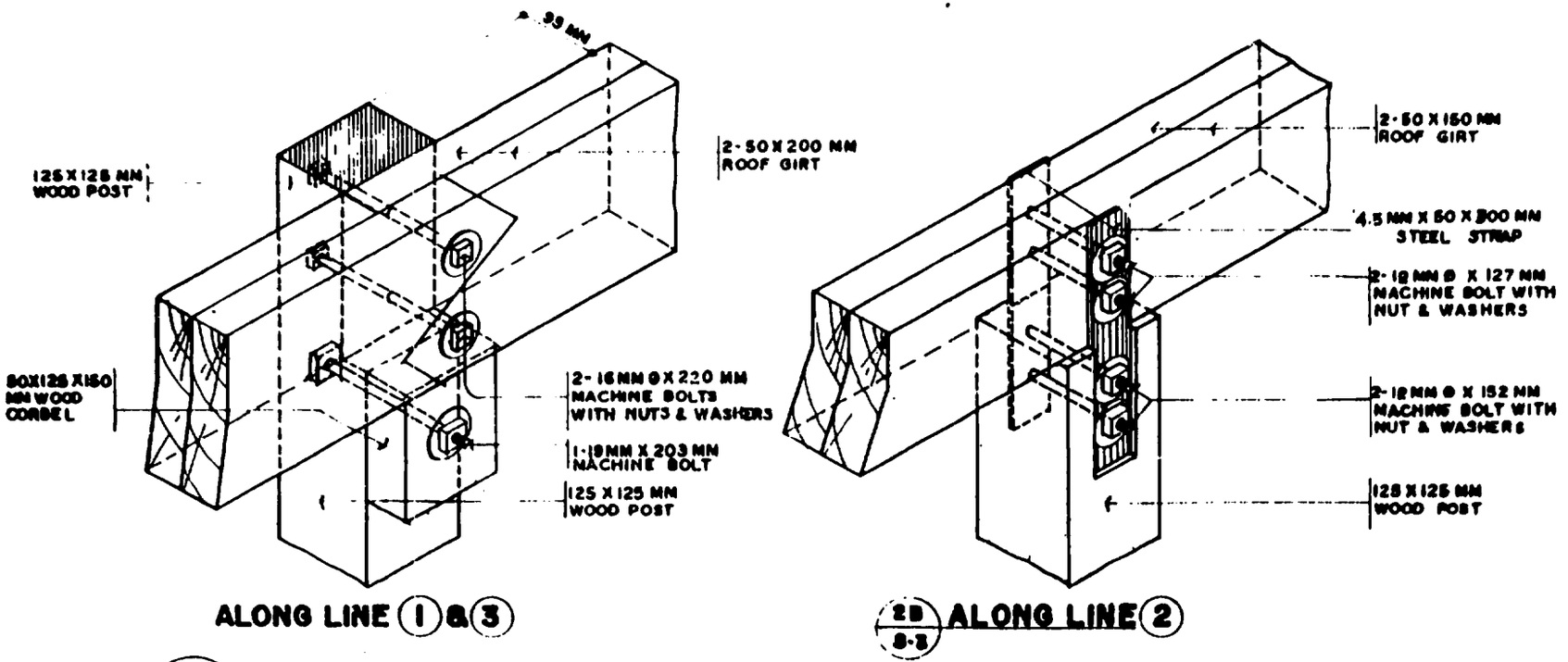
Source of Materials : See Bill of Materials

Reference : Figures 22, 23 and 24

Along line 1 and 3, install and connect the 50mm x 200mm roof girts to the posts. Use 16mm ϕ x220mm machine bolts to secure the girts to the posts. Place the 50mm x 125mm x 150mm wood corbel directly below the roof girt on the wood post. See Figure 22. Secure the wood corbel with 1-19mm x 203mm machine bolts.

Along line 2, 50mm x 150mm girts shall be installed on top of the wood posts. The girts shall be secured to the wood post by two sets 4.5mm x 50mm x 300mm steel strap with 12mm ϕ x 127mm machine bolts.

After complete installation of the roof girts proceed with the installation of the wood tie beam. Secure the tie beam to the wood post and roof girts with 6mm x 76mm x 76mm x 200mm and 6mm x 76mm x 76mm x 150mm steel angle strap with 16mm ϕ x 76mm and 16mm ϕ x 127 machine bolts. See figures 23 and 24 for details of installation. Take note of the space dimentsions provided for the pre-fabricated wall panels. This should be strictly observed to avoid DIFFICULTY in the installation of the wall panels.

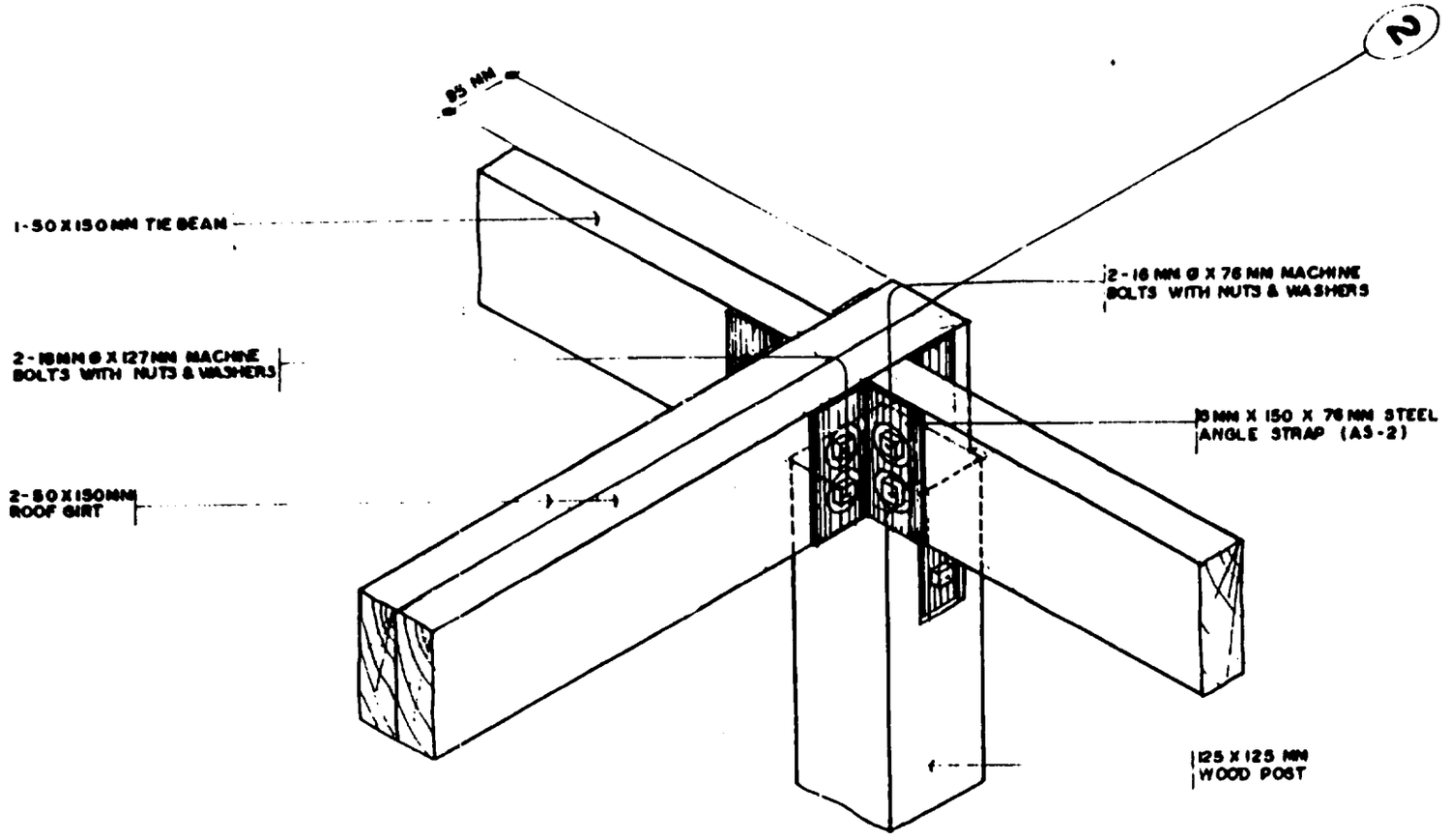


2B / S-3 ALONG LINE (2)

2 / S-3 **DETAIL OF ROOF GIRT CONNECTION TO WOOD POST**

SCALE 1:06 MTS.

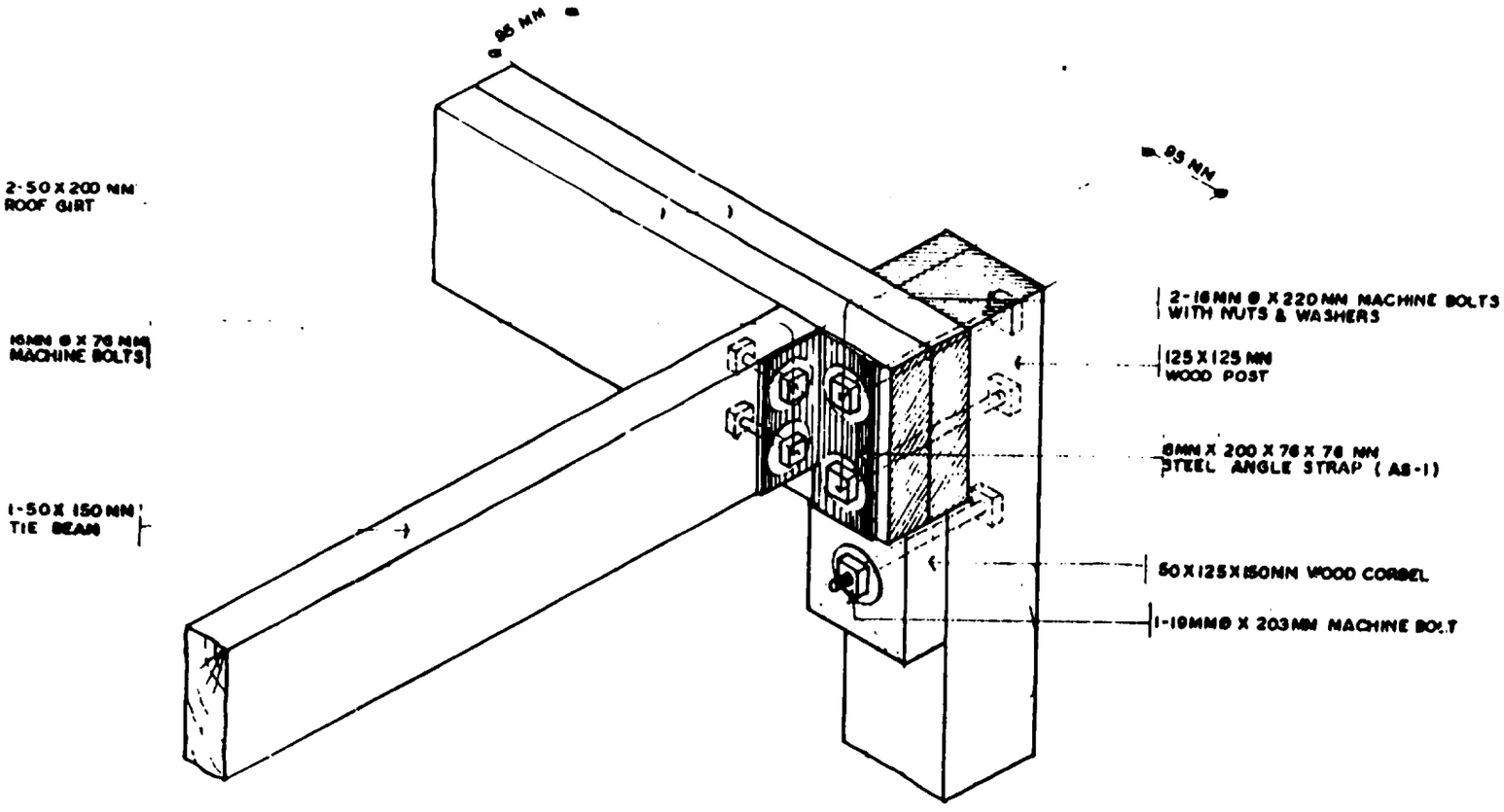
FIGURE 22



2 / S-4 DETAIL OF TIE BEAM CONNECTION TO GIRT ALONG LINE 2

SCALE 1.00 MTS

FIGURE 23



1/S-4 SCALE **DETAIL OF TIE BEAM CONNECTION TO GIRT AT CORNERS**

1'-0" MTS

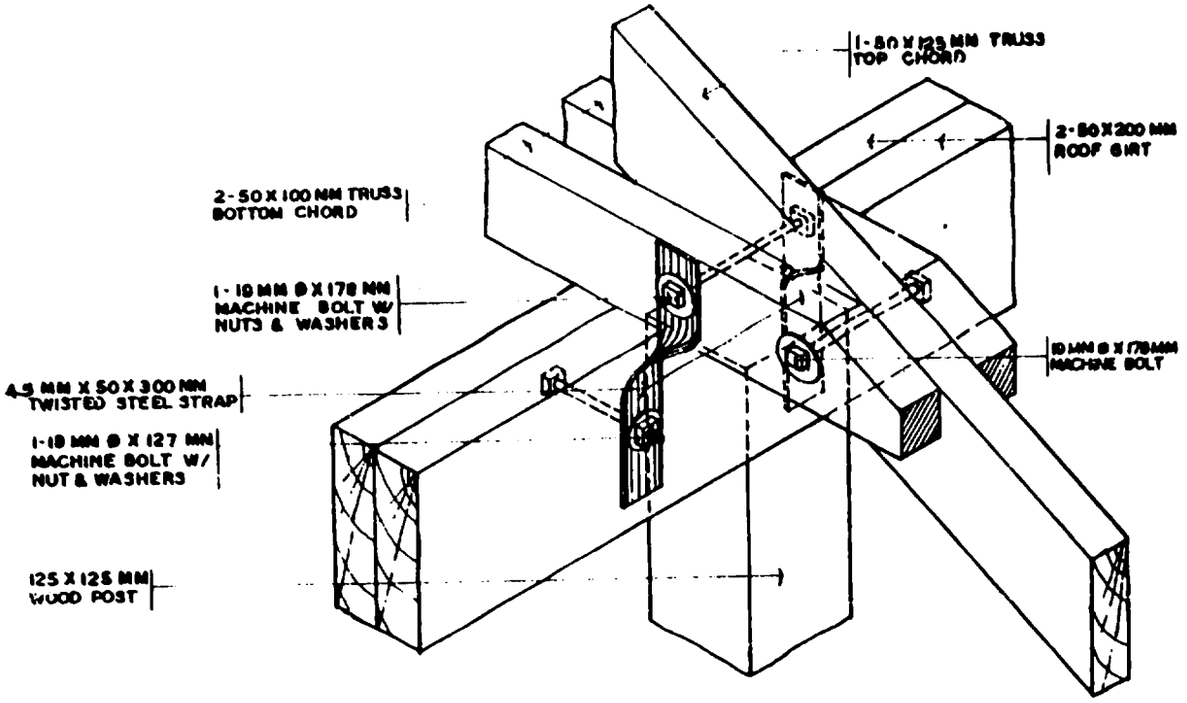
FIGURE 24

16. INSTALLATION OF PRE-FABRICATED ROOF TRUSSES, PT-1 & PT-2

Source of Materials : Pre-fabricated roof trusses (T-1), PT-1 & PT-2

Reference : Figure 16

Mark points on the roof girts where trusses and pre-fabricated frames shall be installed. Install the trusses and frames, provide bracing from materials available at site. Drill holes on girts, trusses and frames for the strap and bolts anchorage system. Bolt the straps to the girts through the drilled holes. Secure the trusses and frames to the girts with the use of 4.5mm x 50 x 300mm steel strap with 19mm ϕ x 178mm and 19mm ϕ x 127mm machine bolts.



3/S-3 TRUSS TO GIRT CONNECTION DETAIL

SCALE 1:08 MTS.

FIGURE 25

17. PRE-FABRICATION OF ROOF PANELS

Source of Materials : See Bill of Materials

Reference : Figures 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36 and 37

Prepare the braces to receive the purlins. Braces shall be spaced to fit the truss' top chord.

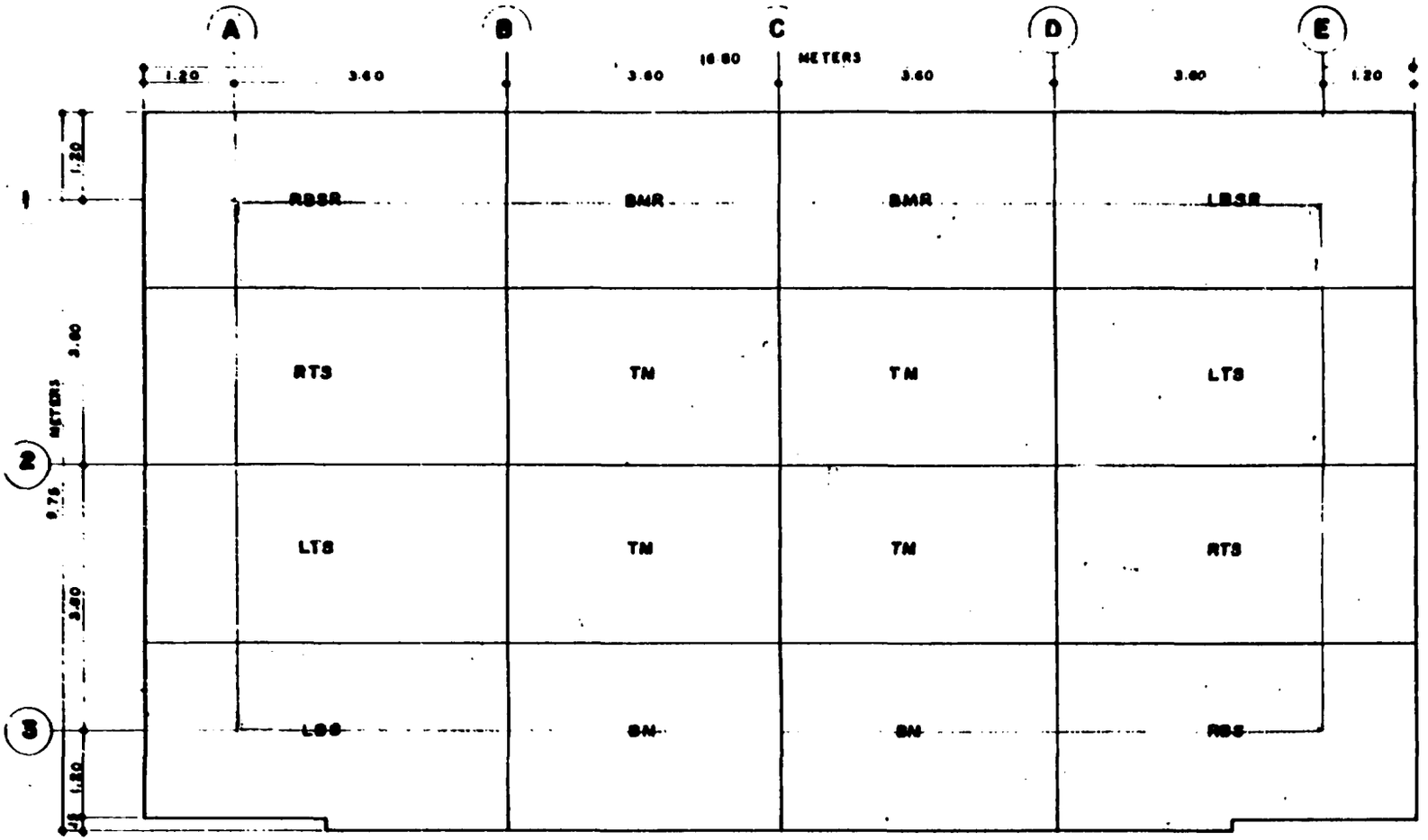
Prior to mounting of braces, cut notches on the brace as shown on the detail. Follow the spacings indicated. Take note that the notches to receive the purlins for the roof above the enclosed areas are depressed by 6mm from the notches to receive the purlins for the roof above the eaves. Basis of measurement for the depth of the notches shall be the bottom of the brace. Mount the brace for the installation of the purlins. Notches should be precisely aligned. Nail the purlins to the brace through the notch joint. Purlins spacing should be precised.

After completing the installation of the purlins, nail the 6mm thick marine plywood sheathing to the pre-fabricated roof panel framing where required as indicated in the pre-fabricated roof panel detail. Note that only the roof above the enclosed areas shall be covered with marine plywood sheathing.

After completing the installation of the sheathing, proceed with the installa-

tion of the wood shingles. For all the roof panels covering the roof eaves, provide 2 layer starter course. Butts of the first course shingles covering the roof eaves shall project 75mm from the roof eaves,as shown on the detail. Each shingle shall be nailed to the purlins with 2-50mm long G.I. or copper nails at mid-lenght with the exception of the first layer starter course which shall be nailed at one end. Shingles shall be spaced not less than 6mm apart nor more than 9mm.

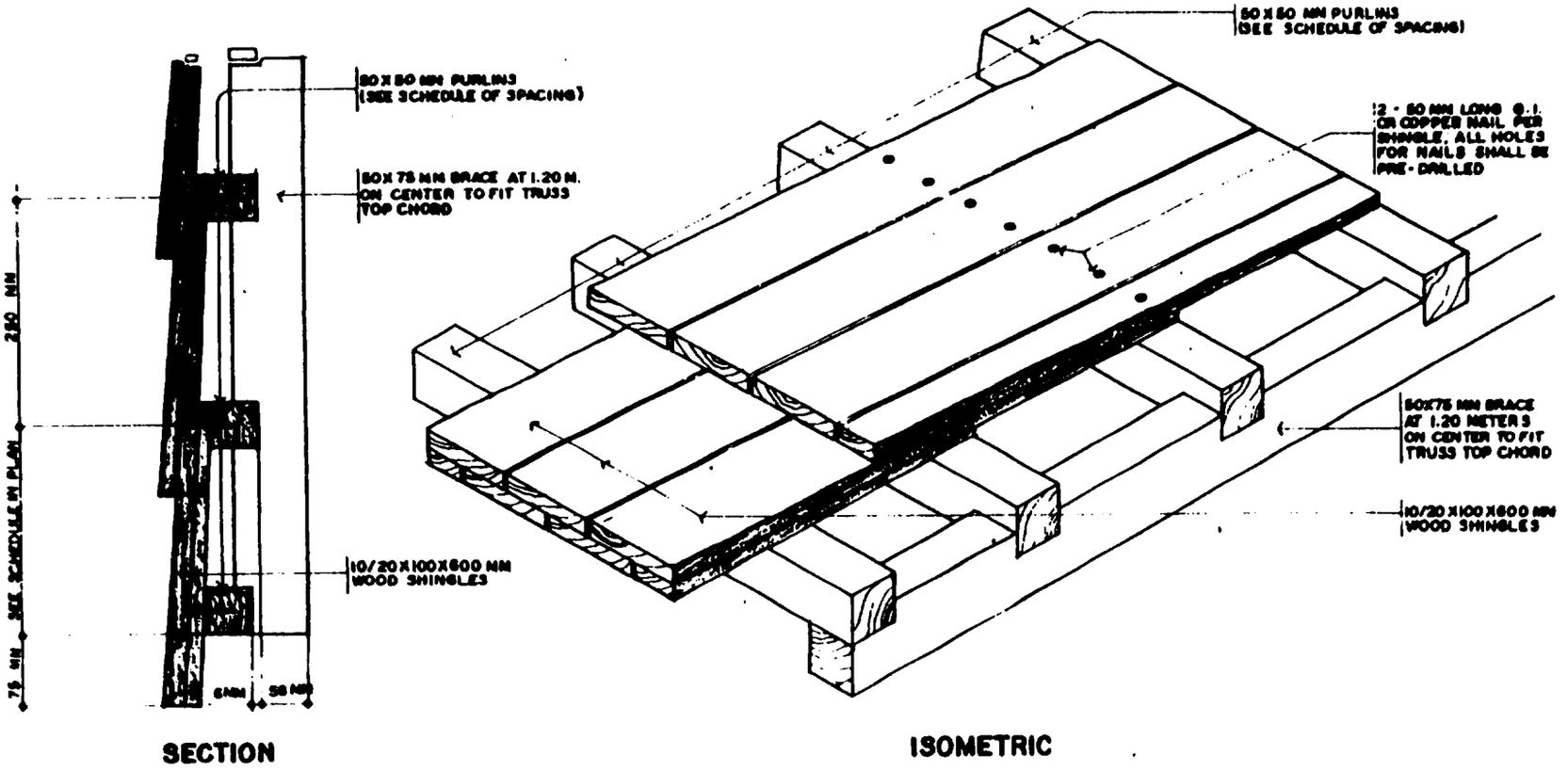
All nailing operation shall be pre-drilled.



ROOF KEY PLAN

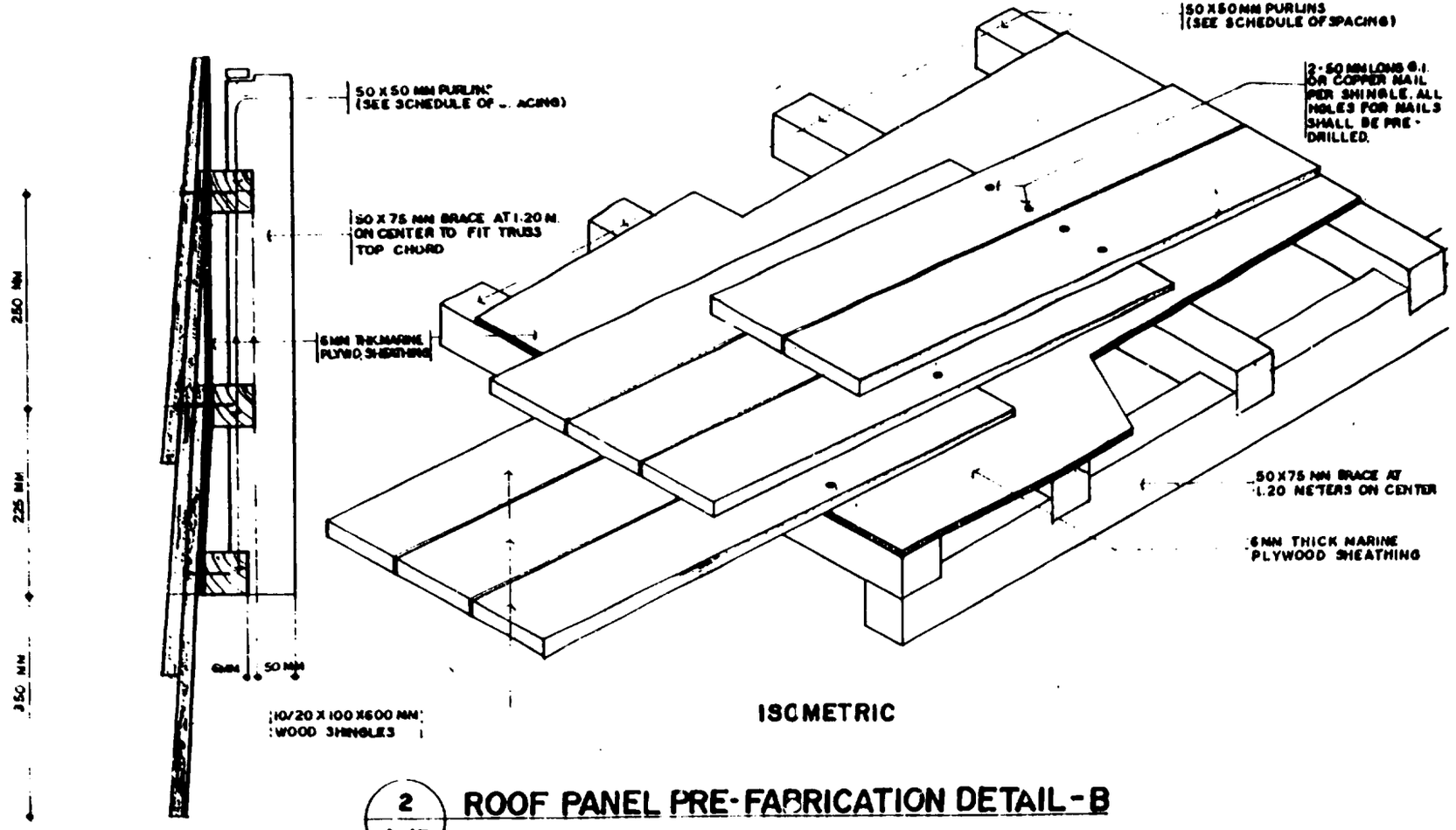
NOTE: ONLY SHADED PORTION SHALL BE COVERED WITH MARINE PLYWOOD SHEATHING.

FIGURE 26



1 / A-17 ROOF PANEL. PRE-FABRICATION DETAIL-A

FIGURE 27



2 / A-17 ROOF PANEL PRE-FABRICATION DETAIL-B

FIGURE 28

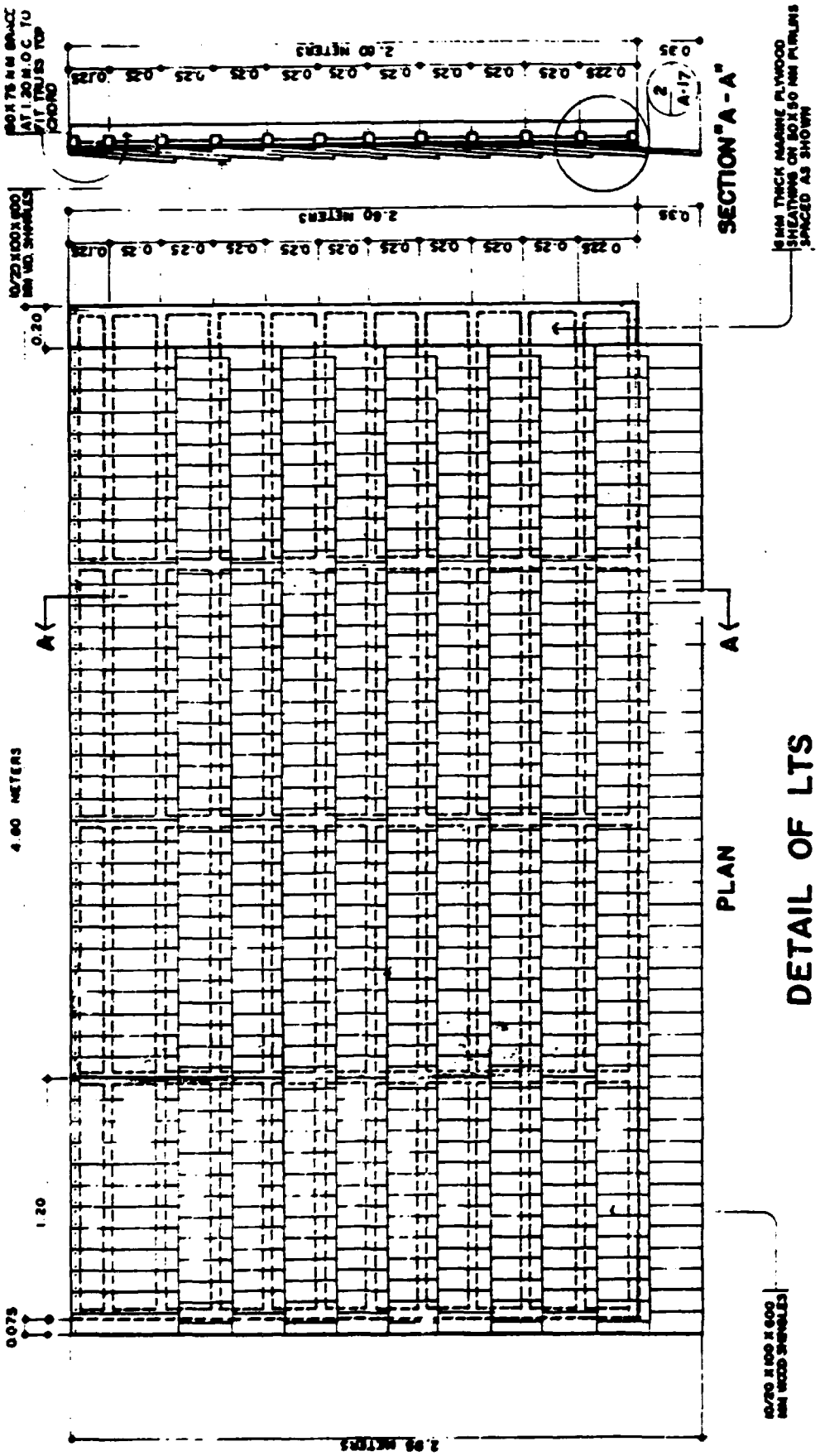
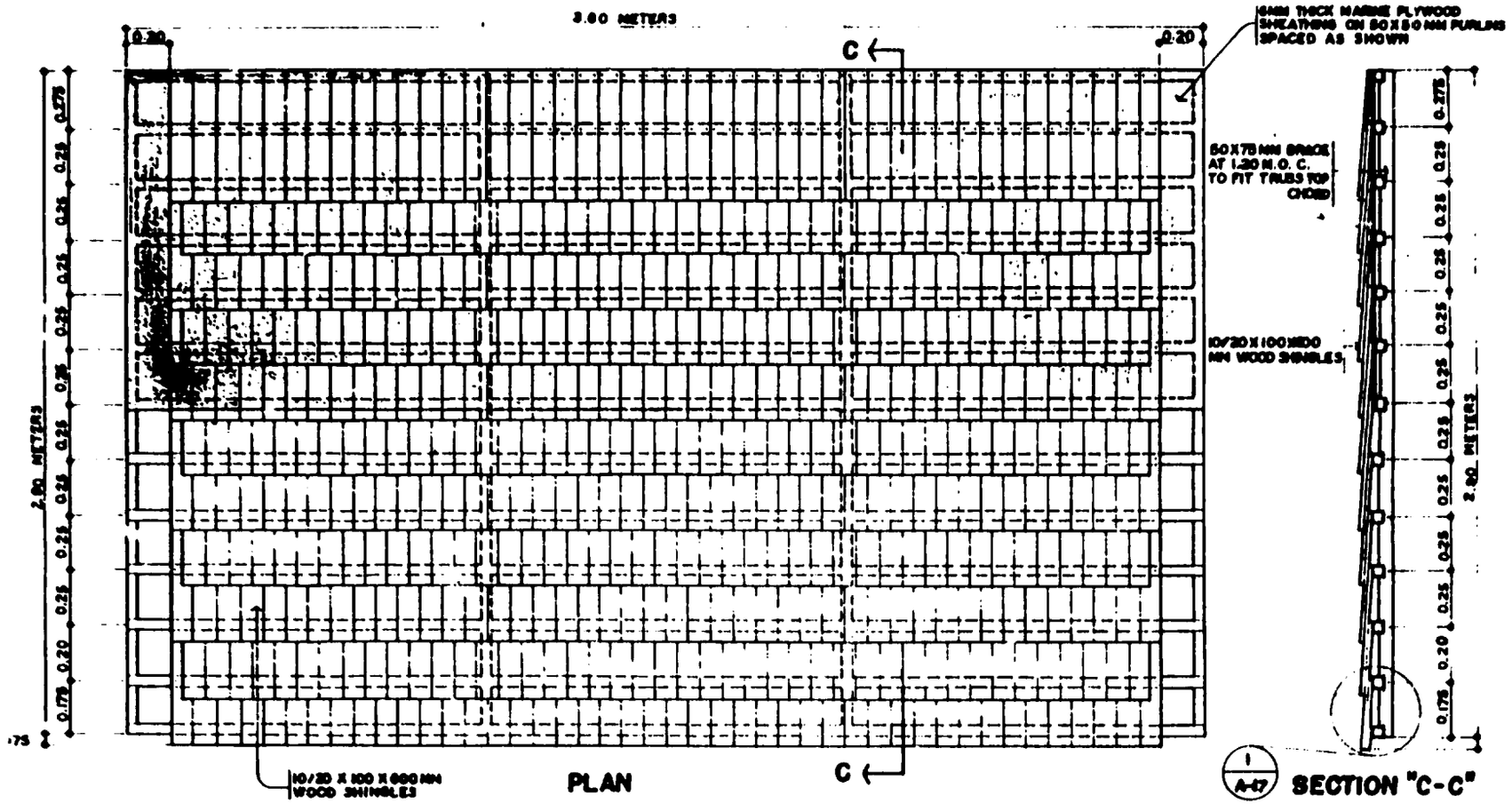

SECTION "A - A"
PLAN
DETAIL OF LTS
NOTE: ONLY SHADED PORTION SHALL BE COVERED WITH MARINE PLYWOOD SHEATHING.

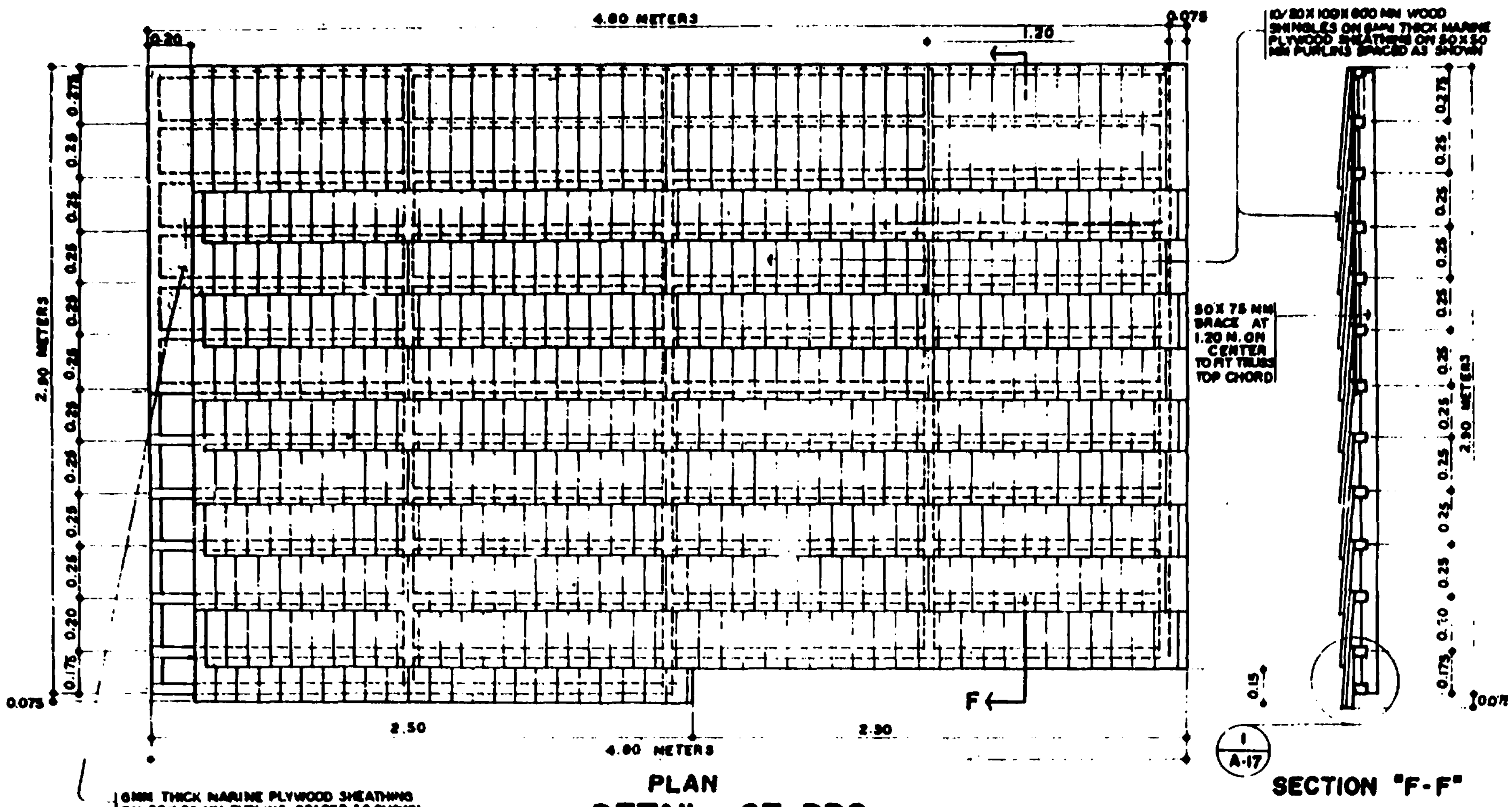
FIGURE 29



DETAIL OF BM

NOTE: ONLY SHADED PORTION SHALL BE COVERED WITH MARINE PLYWOOD SHEATHING

FIGURE 30

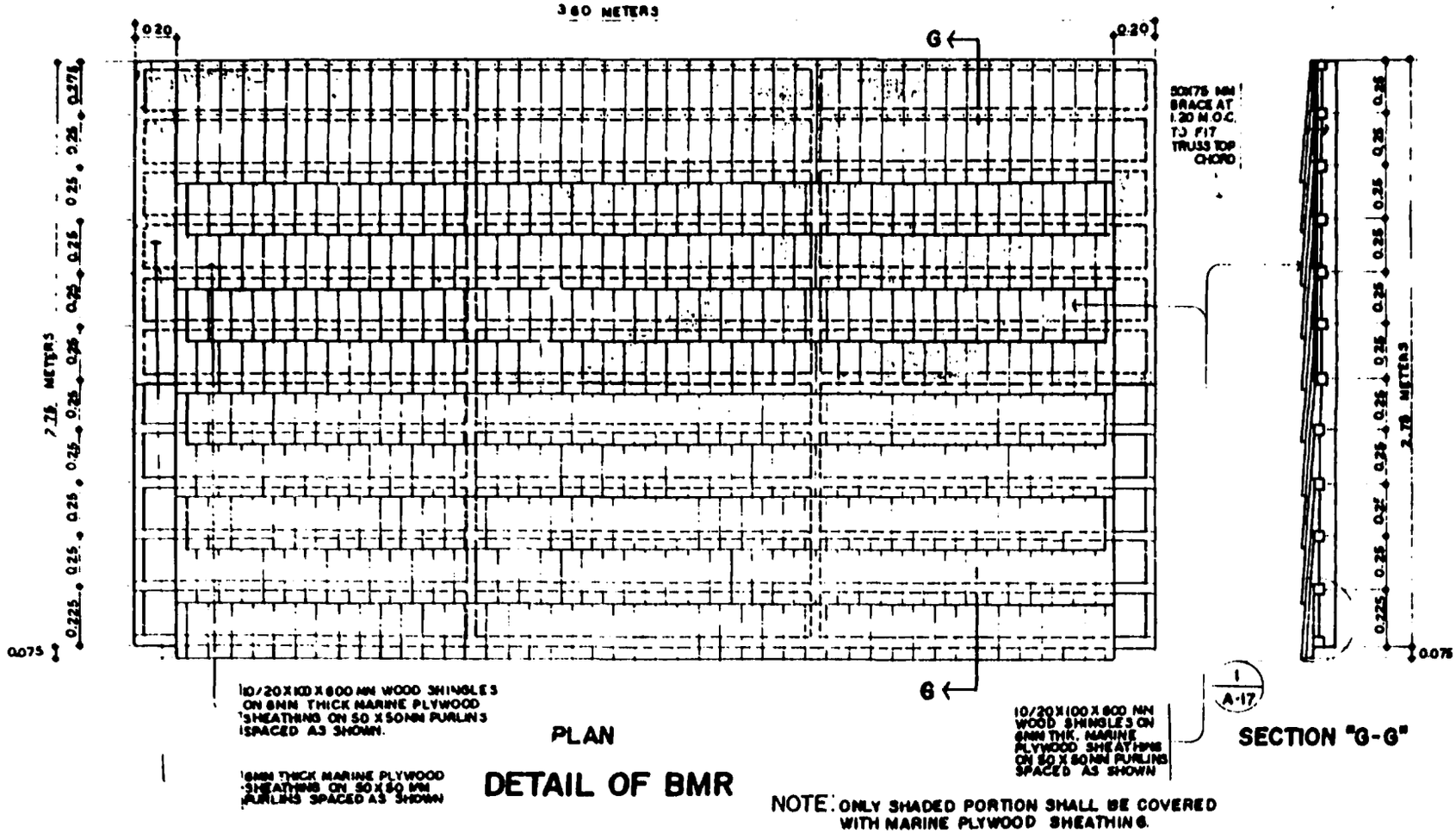


PLAN

DETAIL OF RBS

NOTE: ONLY SHADED PORTION SHALL BE COVERED WITH MARINE PLYWOOD SHEATHING.

FIGURE 31



DETAIL OF BMR

NOTE: ONLY SHADED PORTION SHALL BE COVERED WITH MARINE PLYWOOD SHEATHING.

FIGURE 32

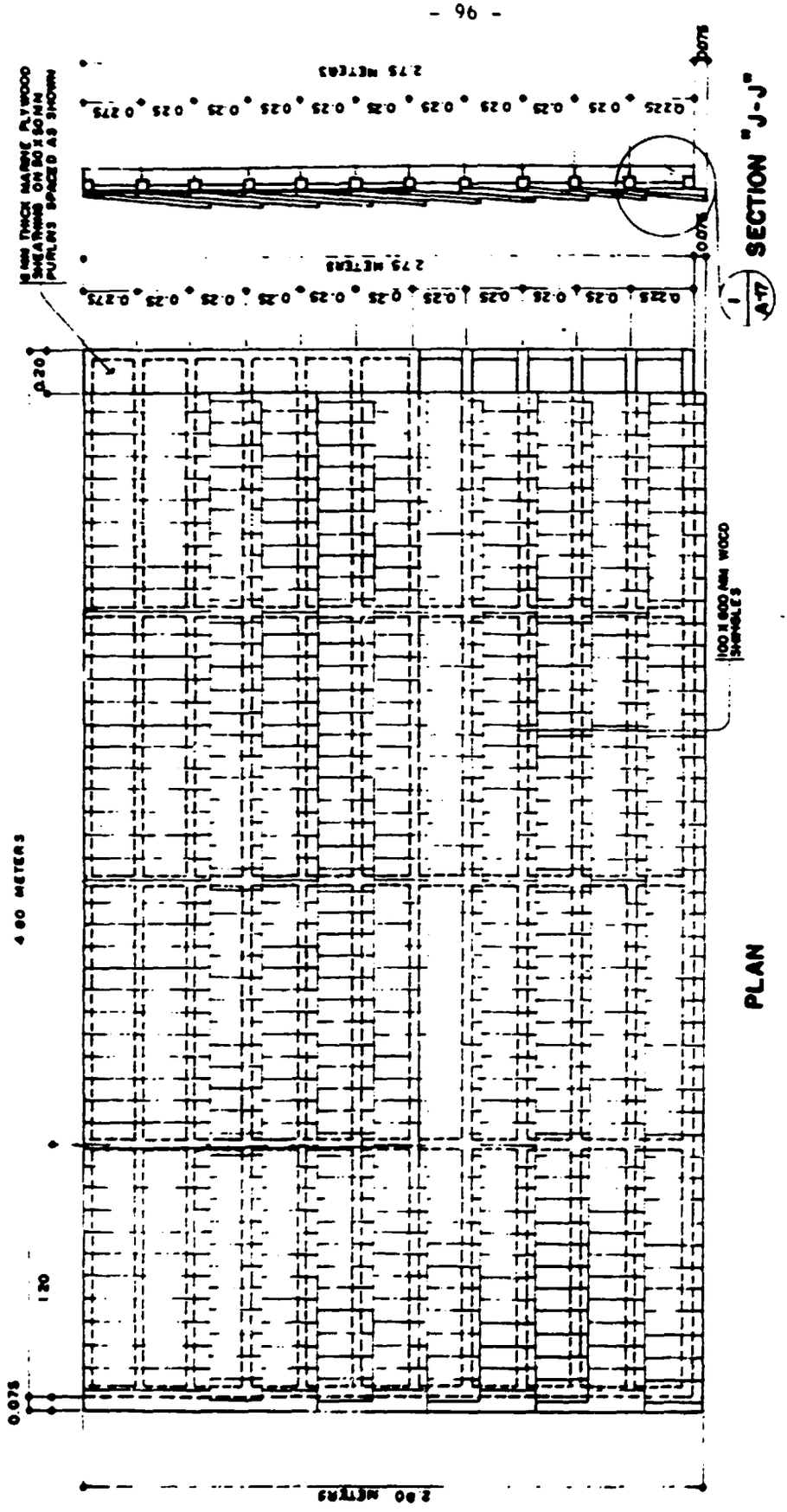
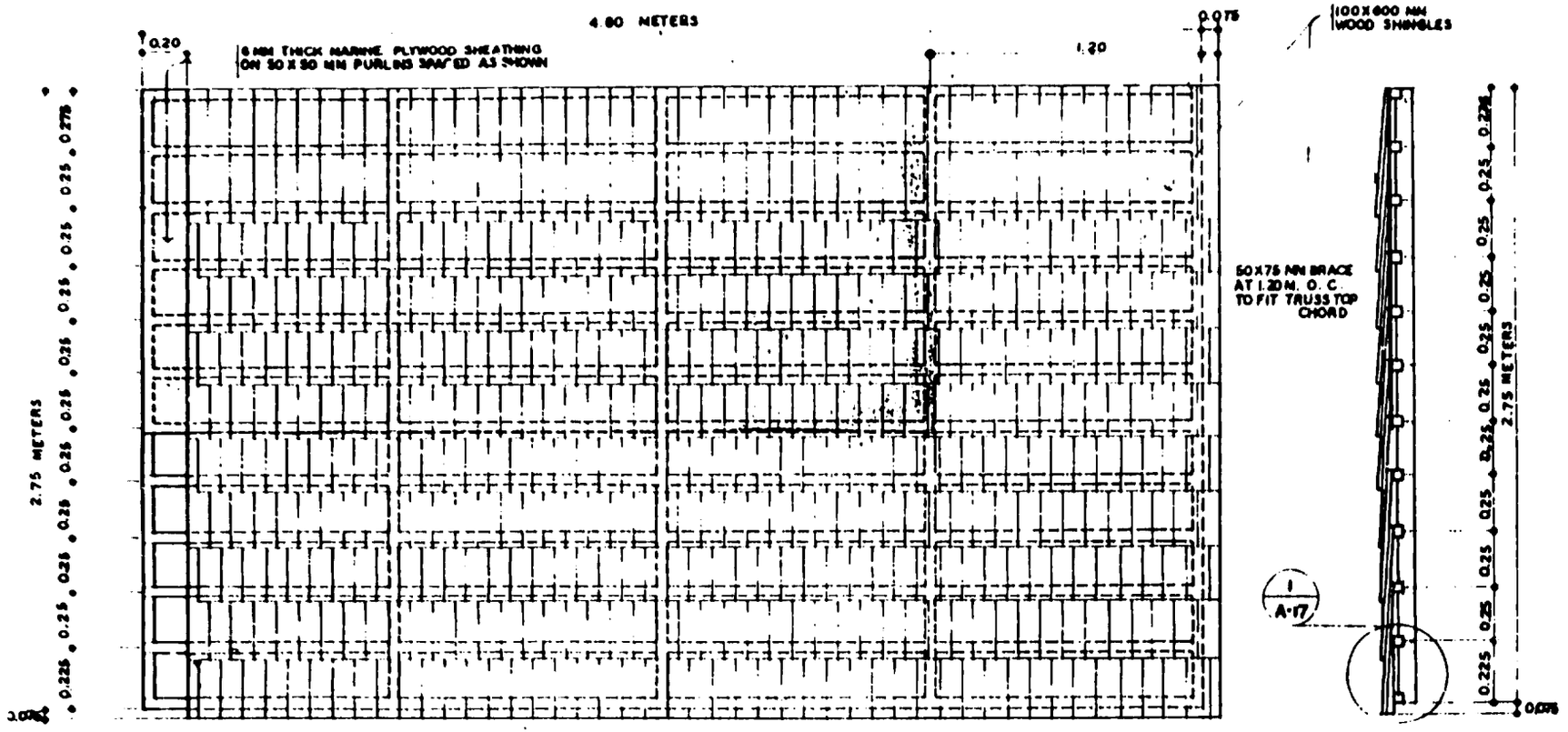
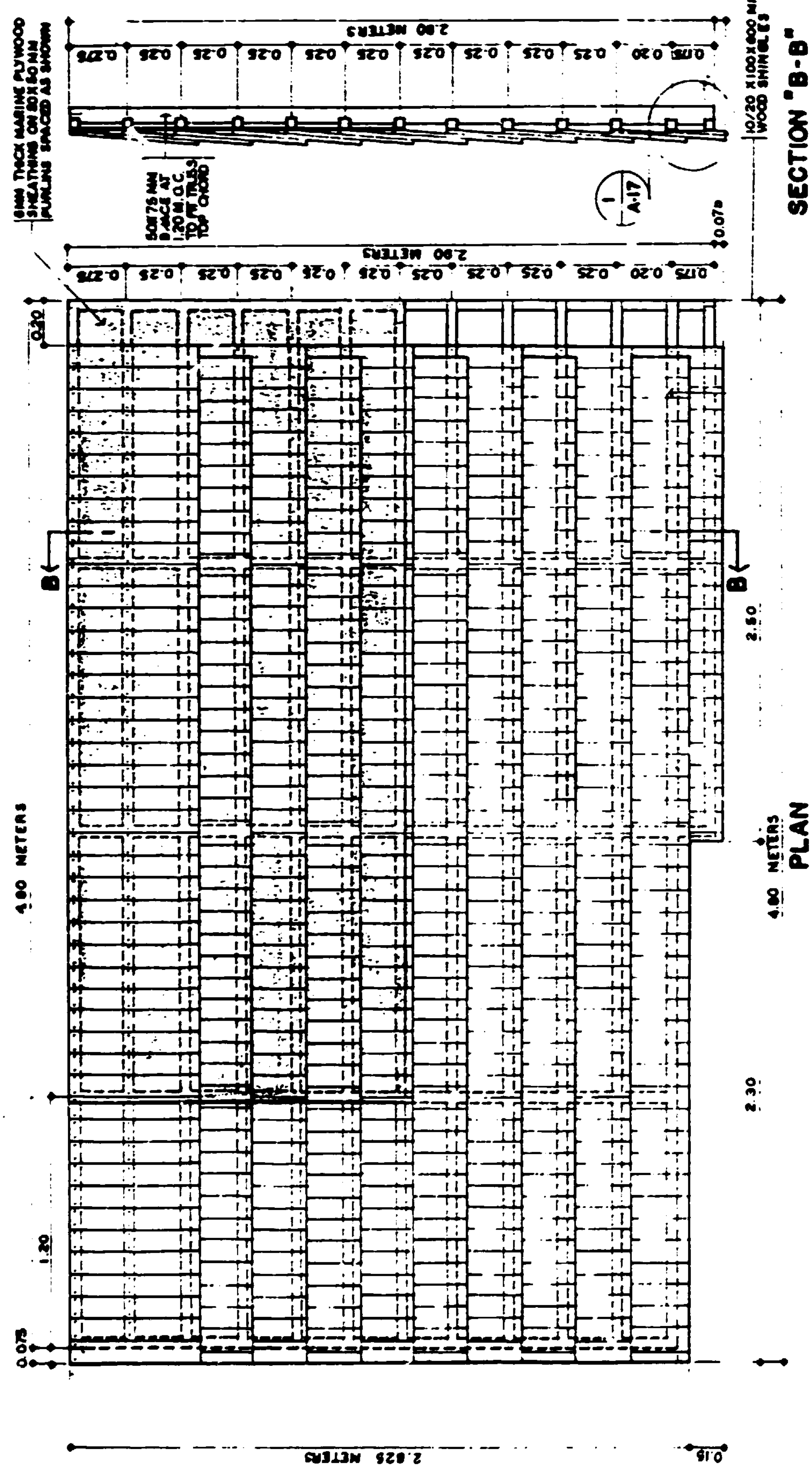

SECTION "J-J"
PLAN
DETAIL OF LBSR
2.80 METRES
4.60 METERS
2.75 METRES
2.75 METRES
0.20
1.20
0.075
0.275 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.275
0.275 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.275
8 MM THICK MARINE PLYWOOD SHEATHING ON BOISO MM PURLINS SPACED AS SHOWN
100 X 600 MM WOOD SHINGLES
1/A-17

FIGURE 33



DETAIL OF RBSR

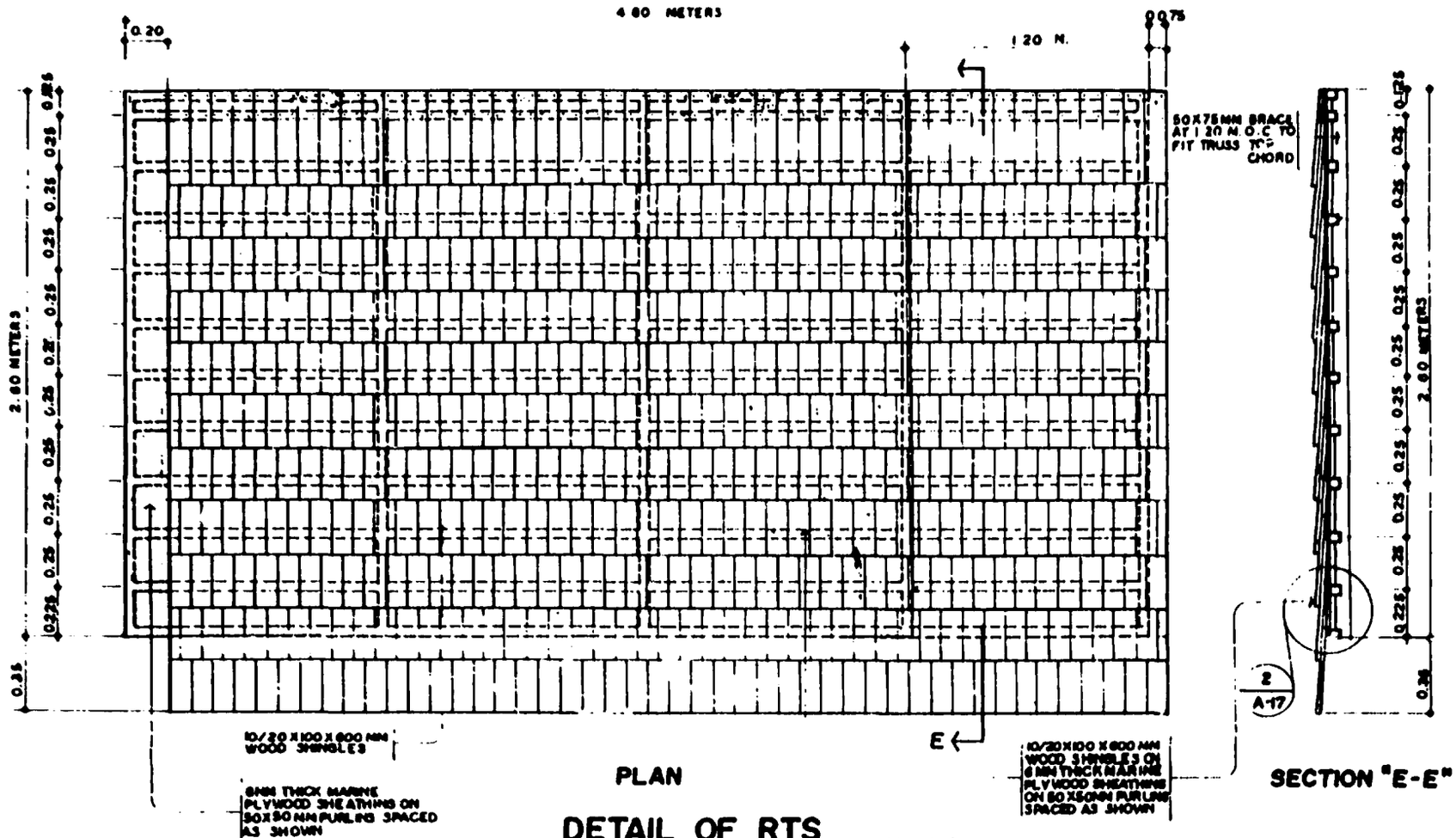
FIGURE 34



NOTE: ONLY SHADED PORTION SHALL BE COVERED WITH MARINE PLYWOOD SHEATHING.

DETAIL OF LBS

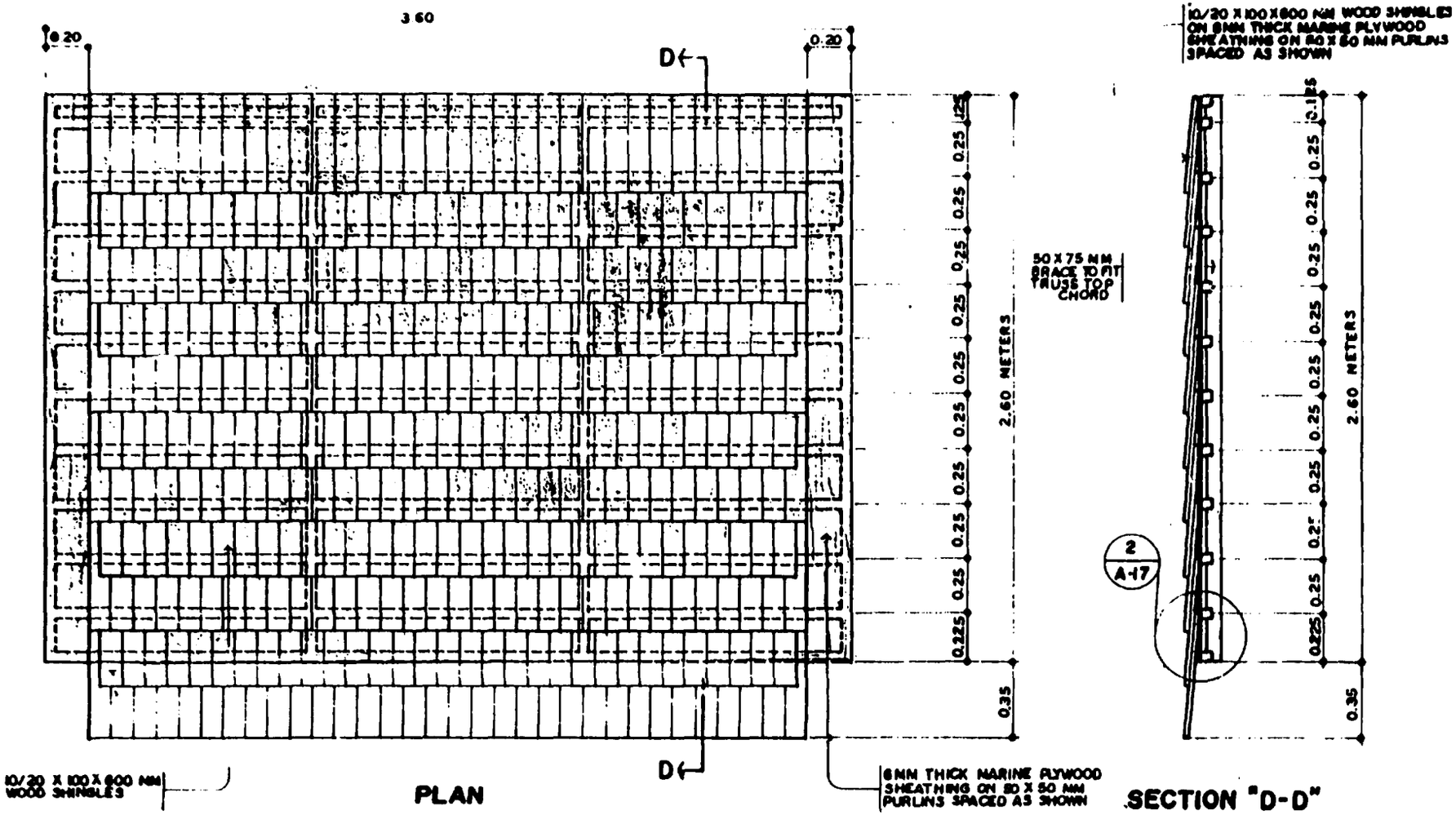
FIGURE 35



DETAIL OF RTS

NOTE: ONLY SHADED PORTION SHALL BE COVERED WITH MARINE PLYWOOD SHEATHING.

FIGURE 36



DETAIL OF TM

NOTE: ONLY SHADED PORTION SHALL BE COVERED WITH MARINE PLYWOOD SHEATHING.

FIGURE 37

18. INSTALLATION OF THE PRE*FABRICATED ROOF PANELS

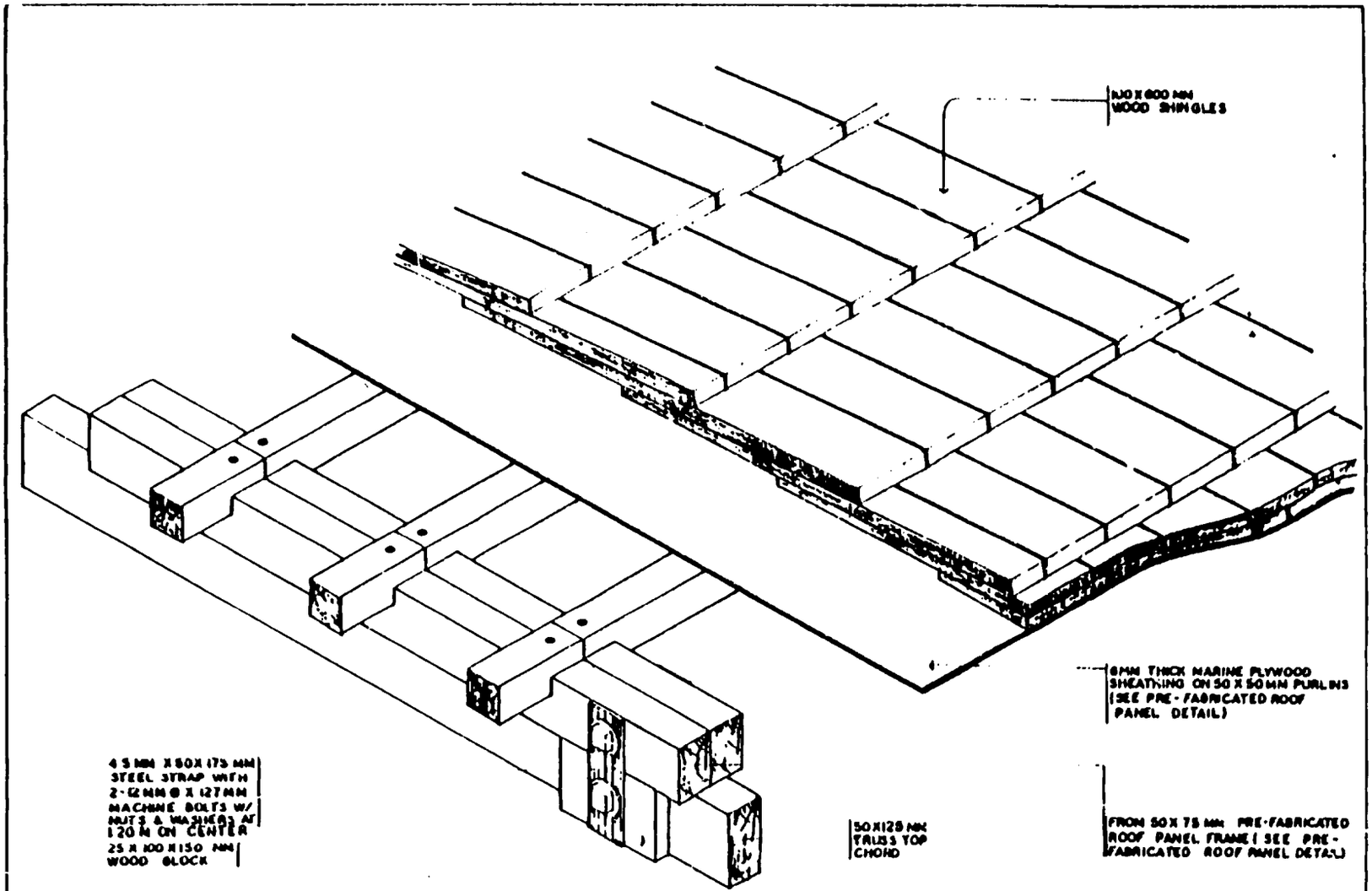
Source of Materials : See Bill of Materials

Reference : Figures 26, 38 and 39

Check spacing of trusses and make sure that they coincide with the spacing of the braces of the pre-fabricated roof panels.

Prior to lifting of the pre-fabricated roof panels for installation, determine the location of the 12mm ϕ machine bolts. The bolts shall be spaced at 1200mm on center. Holes for bolts on the panel bracing shall be pre-drilled before lifting of the panels.

Lift the panels LBS, BM, RBS, LBSR, BMR abd RBSR to its position. The braces shall rest on the truss' top chord. Drill the bolt holes on the truss' top chord to coincide with the pre-drilled holes on the pre-fabricated roof panel bracing. Secure the panels to the truss with 2-4.5mm x 50mm x 175mm steel strap with 2-12mm ϕ x 127mm machine bolts. Then install panels TM, RTS and LTS respectively. Complete the roofing system by completing the installation of the wood shingles along the pre-fabricated roof panels joints. See figures 38 and 39 for details of installation.



DETAIL OF PRE-FABRICATED ROOF PANELS CONNECTION AND ANCHORAGE AT TRUSS TOP CHORD

FIGURE 38

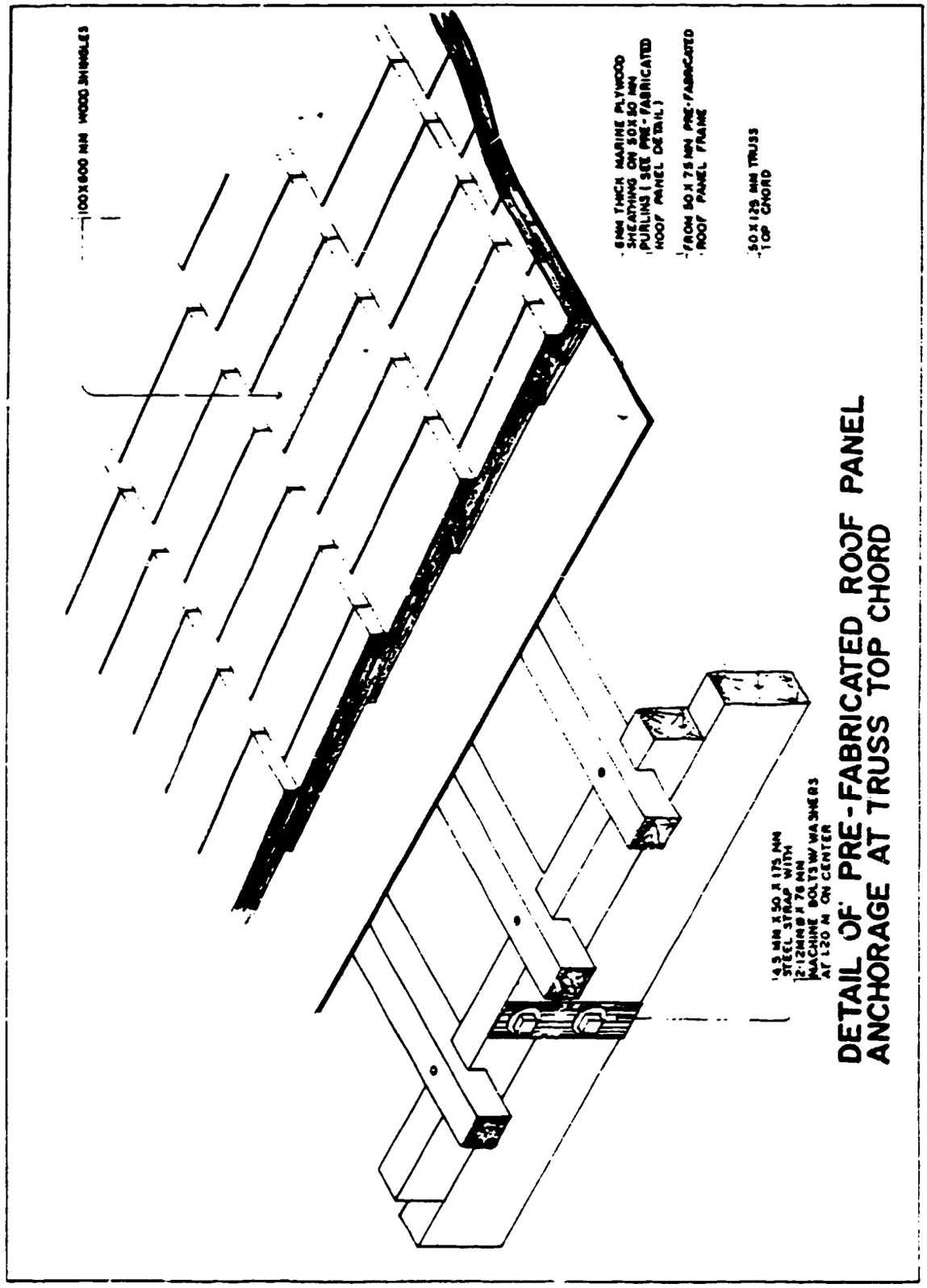

100 X 600 MM WOOD SHINGLES
6MM THICK MARINE PLYWOOD SHEATHING ON 50X50 MM PURLINS (SEE PRE-FABRICATED ROOF PANEL DETAIL)
FROM 50 X 75 MM PRE-FABRICATED ROOF PANEL FRAME
50 X 125 MM TRUSS TOP CHORD
45 MM X 50 X 175 MM STEEL STRAP WITH 2-12MM Ø X 75 MM MACHINE BOLTS W/ WASHERS AT 1200 M ON CENTER
DETAIL OF PRE-FABRICATED ROOF PANEL ANCHORAGE AT TRUSS TOP CHORD

FIGURE 30

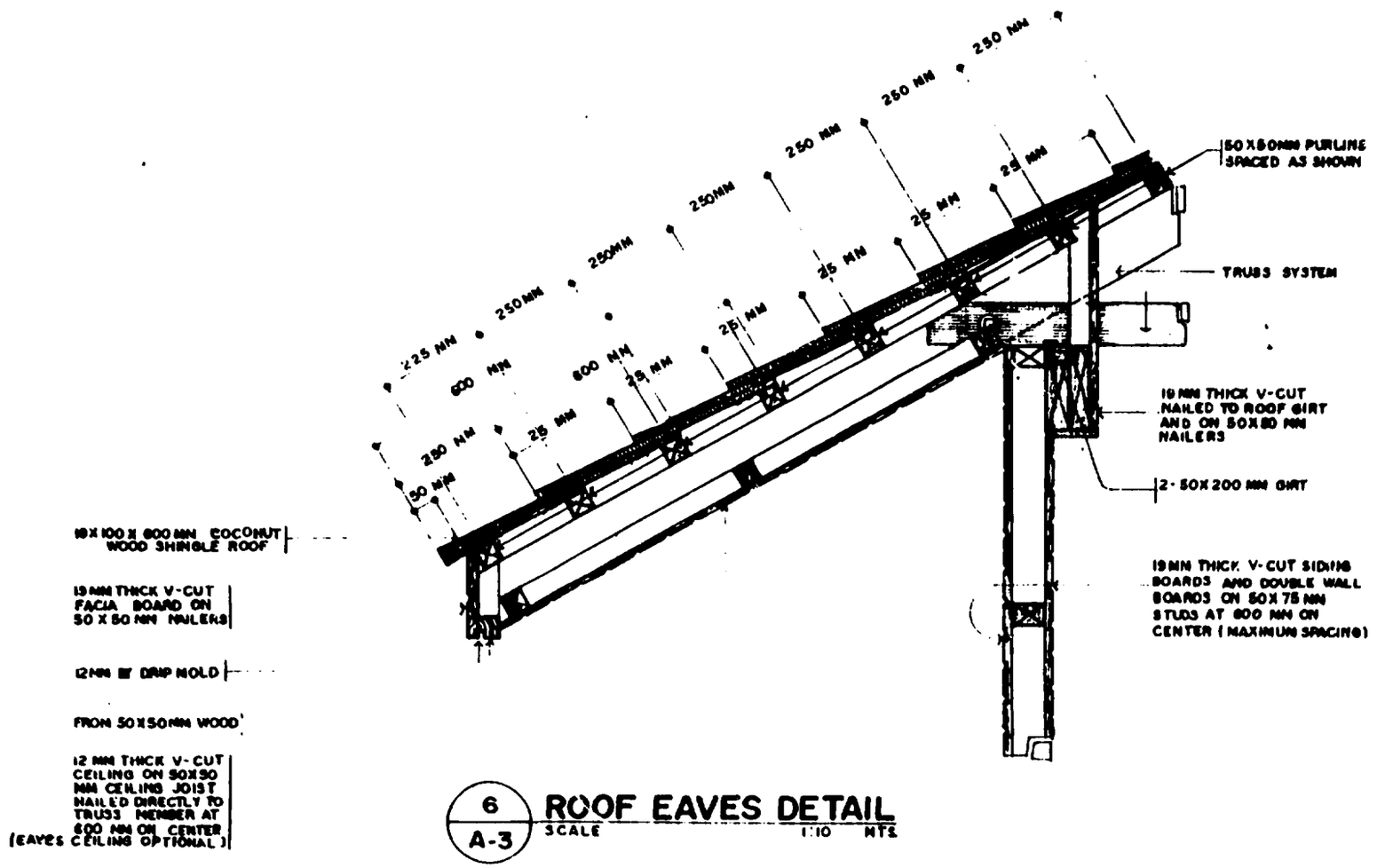
19. INSTALLATION OF FACIA BOARDS

Source of Materials : See Bill of Materials

Reference : Figures 40 and 41

Check alignment of the edge of the installed pre-fabricated roof panels. Make sure that all panels are rigidly in place. Install nailers.

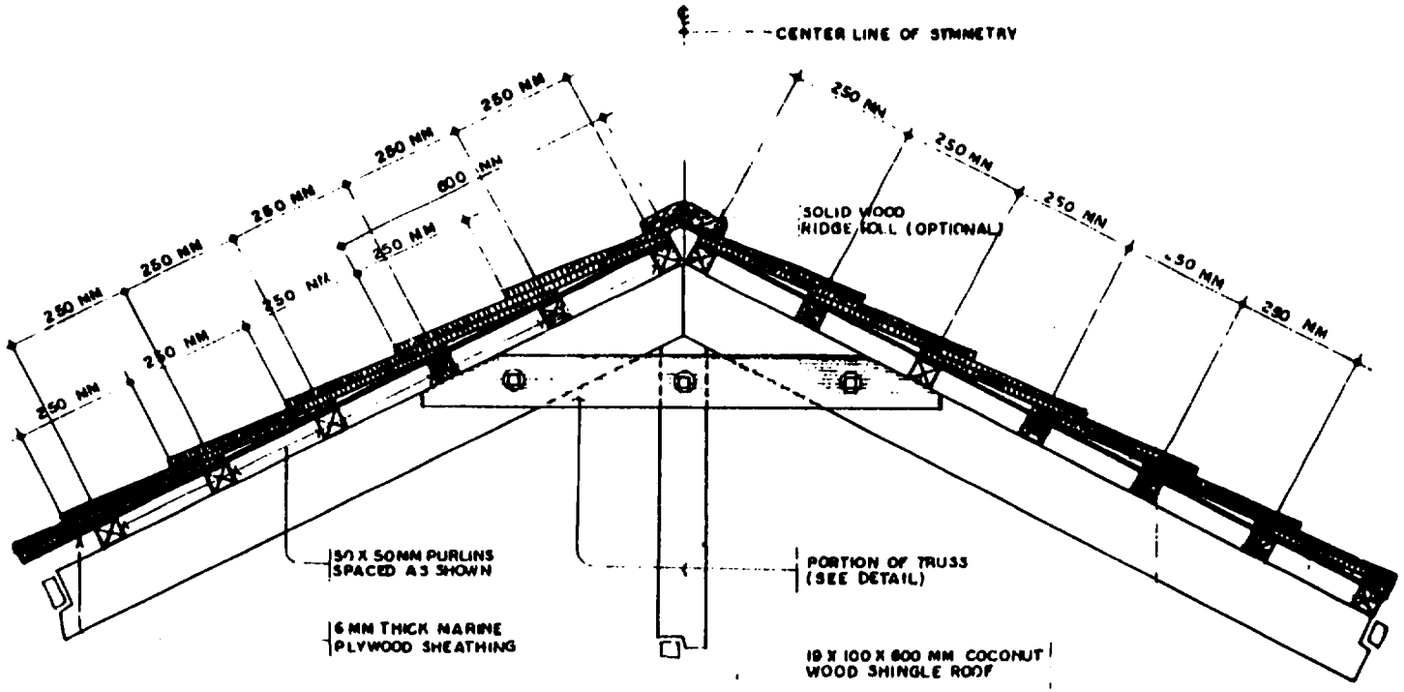
After installation of the nailers, proceed with the installation of the 19mm thick V-cut facia boards. End joints of facia boards shall be scarf jointed. Nail the boards to the nailers and to the end purlins. Facia board joints should be weather tight.



6/A-3 ROOF EAVES DETAIL

SCALE 1:10 MTS.

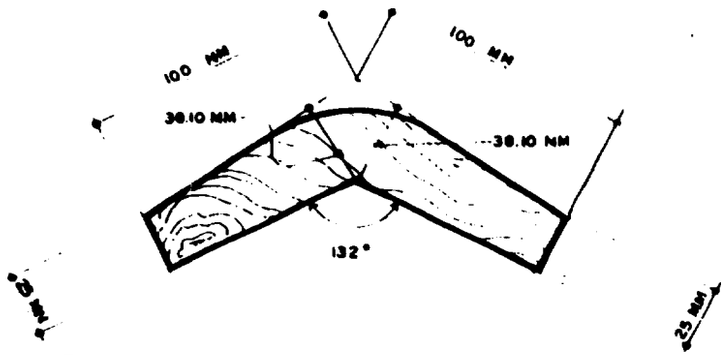
FIGURE 40



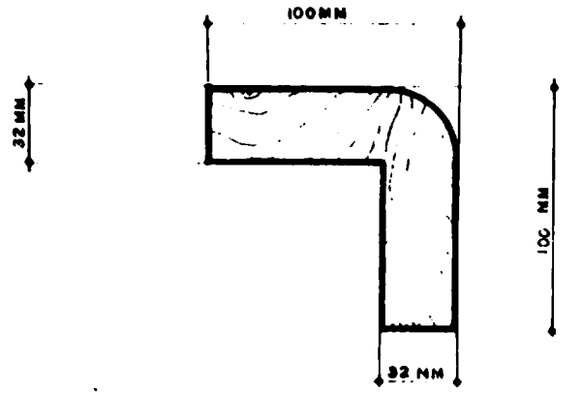
2 / A-3 **ROOF RIDGE DETAIL**

SCALE 1:10 MTS

FIGURE 41



3 / A-3 WOOD RIDGE ROLL DETAIL (OPTIONAL)
SCALE 1:02 MTS



4 / A-3 WOOD FLASHING DETAIL (OPTIONAL)
SCALE 1:02 MTS

FIGURE 42

20. INSTALLATION OF SOLID COCONUT WOOD RIDGE ROLL AND FLASHING

Source of Materials : See Bill of Materials

Reference : Figures 41 and 42

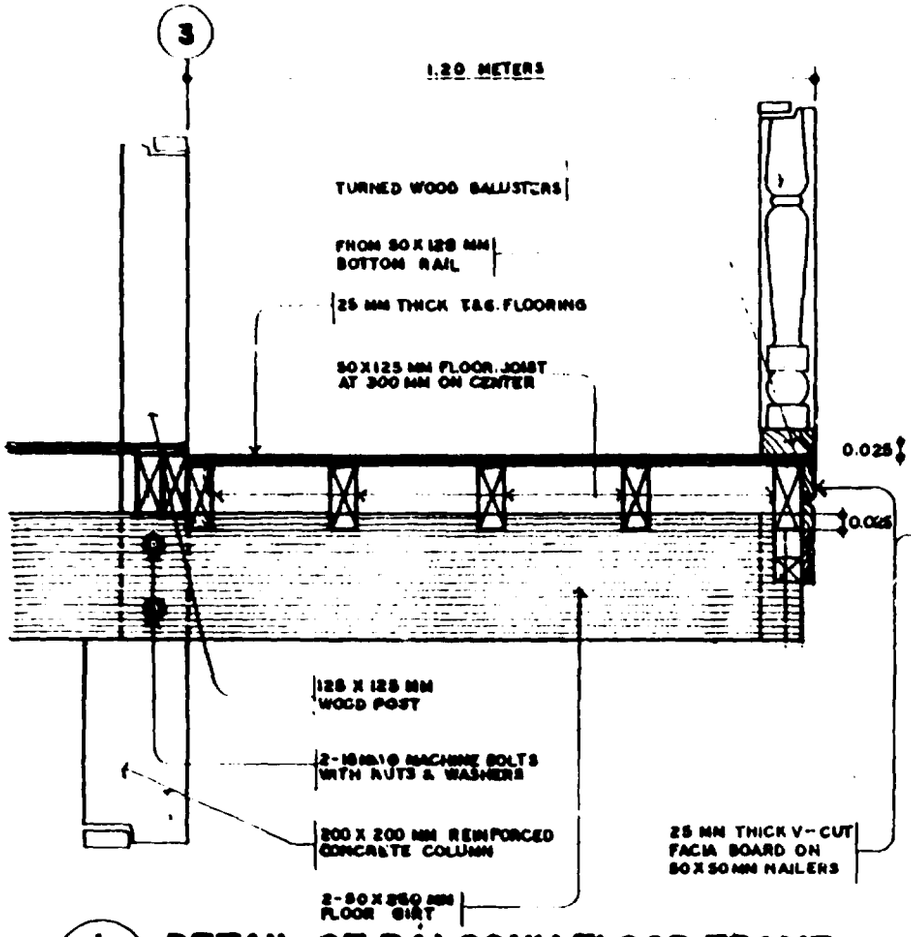
Install flashing after completion of facia board installation. The solid coconut wood flashing shall cover portion of the facia board where it shall be attached with the use of G. I. or copper nails. Installation shall be from the lower portion of the roof up to the higher portion of the roof slope. Flashing joints shall be half lap joints with the higher portion covering the lower part. After the installation of the flashing, proceed with the installation of rdge roll. Attach the ridge roll to the roof framing with galvanized iron strap with lead washers. Ridge roll joints shall be half lap joints with a minimum lenght of 50mm. Ridge roll and flashing joints shall also be the half lap joint type with the ridge roll on top of the falshing. Nails on the joints shall be G. I. or copper nails with provisions of lead washers.

21. INSTALLATION OF SERVICE STAIR LANDING FRAME

Source of Materials : See Bill of Materials

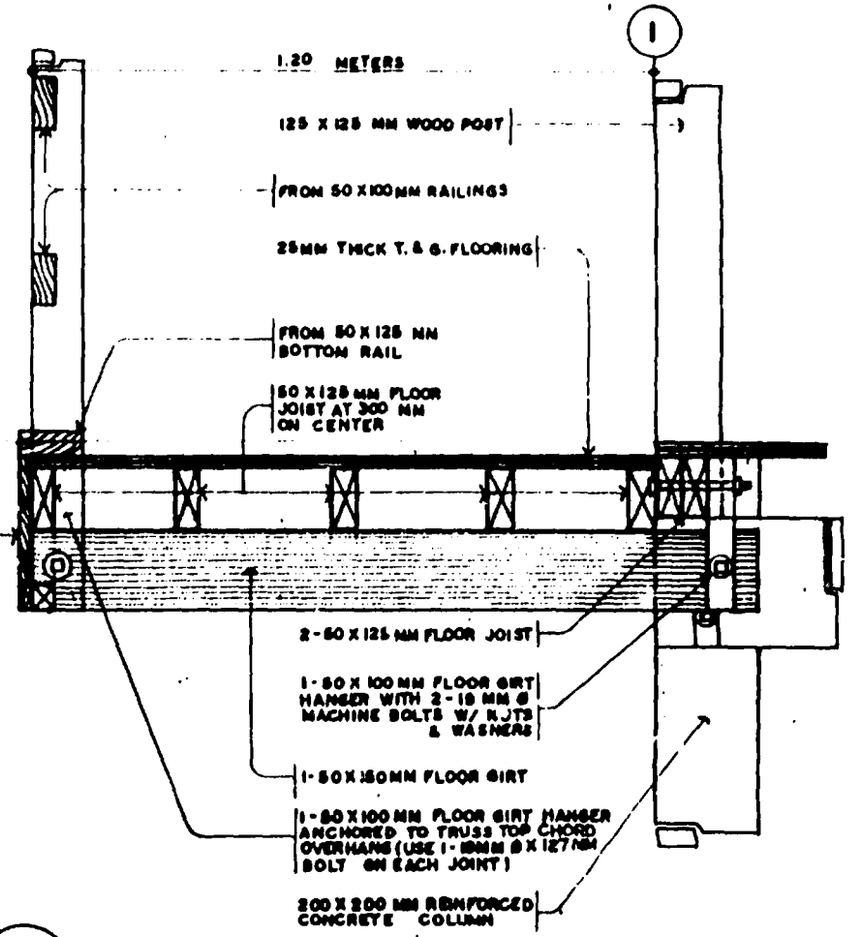
Reference : Figure 44

Install the 50mm x 150mm girts. Hang the girt from the truss' top chord to the floor joist with 50mm x 100mm hangers. See figure44. Use 19mm ϕ x 127mm machine bolts on joints with truss ' top chord and 19mm ϕ x 178mm on joints with floor joists. After securing the girts with hangers, place the floor joists at equal spacing. The service stair floor joists shall be depressed by 25mm from the floor joists of the enclosed areas. To attain the required depression, adjust the thickness of the joist in contact with the floor girts. No adjustment shall be made on the thickness of the floor girts.



1/S-2 DETAIL OF BALCONY FLOOR FRAME
SCALE 1:10 MTS

FIGURE 43



2/S-2 SERVICE STAIR LANDING FRAME DETAIL
SCALE 1:10 MTS.

FIGURE 44

22. INSTALLATION OF TOUNGE AND GROOVE FLOOR BOARDS

Source of Materials · See Bill of Materials

Check top elevation of the floor joists and bridgings to ensure common elevation. Run a piece of string from one end to the other and correct uneven portion by chipping off. Make sure that floor joist and bridgings are rigidly in place.

Start flooring installation from the mid span of the floor framing system towards both ends. Install floor boards in continuous lenght and avoid staggered joints as much as possible. Keep the joints along the line of partitions to conceal them. Nailing of floor board shall be pre-drilled. The nail holes shall be counter sunk.

Floor board joints should be neat and precise.

23. FABRICATION OF DOORS

Source of Materials : See Bill of Materials

Reference : Figure 45

Assemble the 50mm x 125mm stile and the 50mm x 100mm rail for the door frames. All corners of the frames should be at right angles. Use wooden dowels for the frame connection. Install nailers for the V-cut door facing. Nailers shall be from 25mm x 50mm wood nailed to the door framing. After complete installation of the nailers, proceed with the installation of the 12mm thick V-cut door facing. Door facing should be flushed with the stiles and rail. After fabrication of the doors, fabricate the door jambs from 50mm x 125mm wood. Dimensions shall be based from the actual size of the fabricated doors.

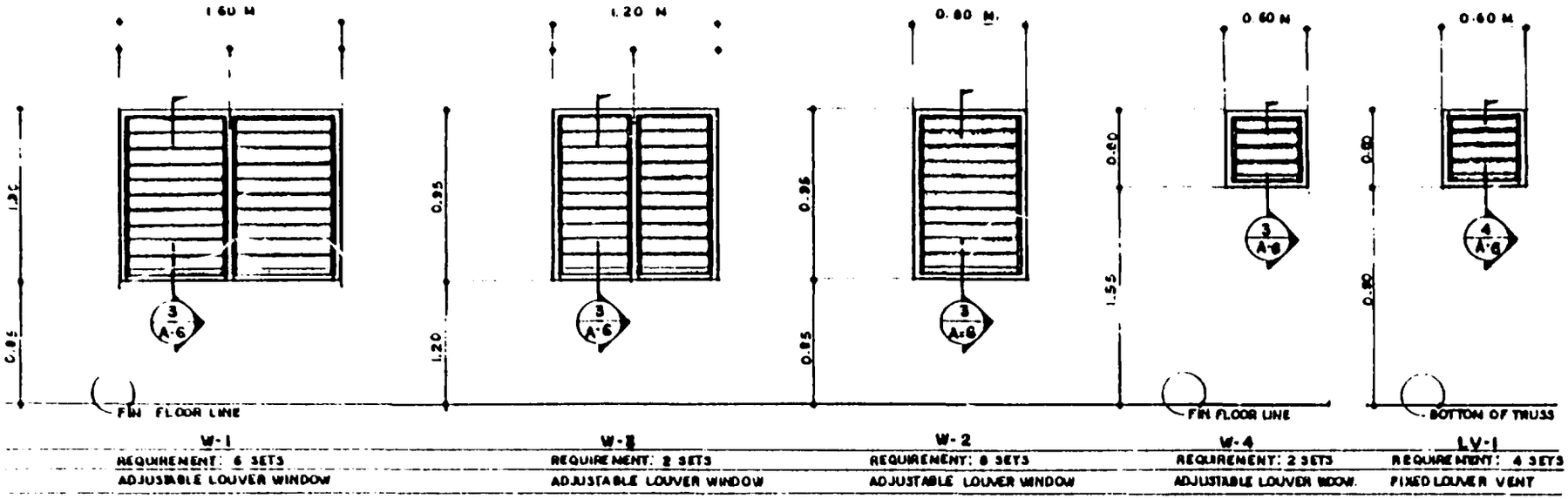
All door frames and facing shall be true to profile and made perfectly smooth on exposed surfaces. Scribing, metering and joining shall be done accurately and neatly to conform to details.

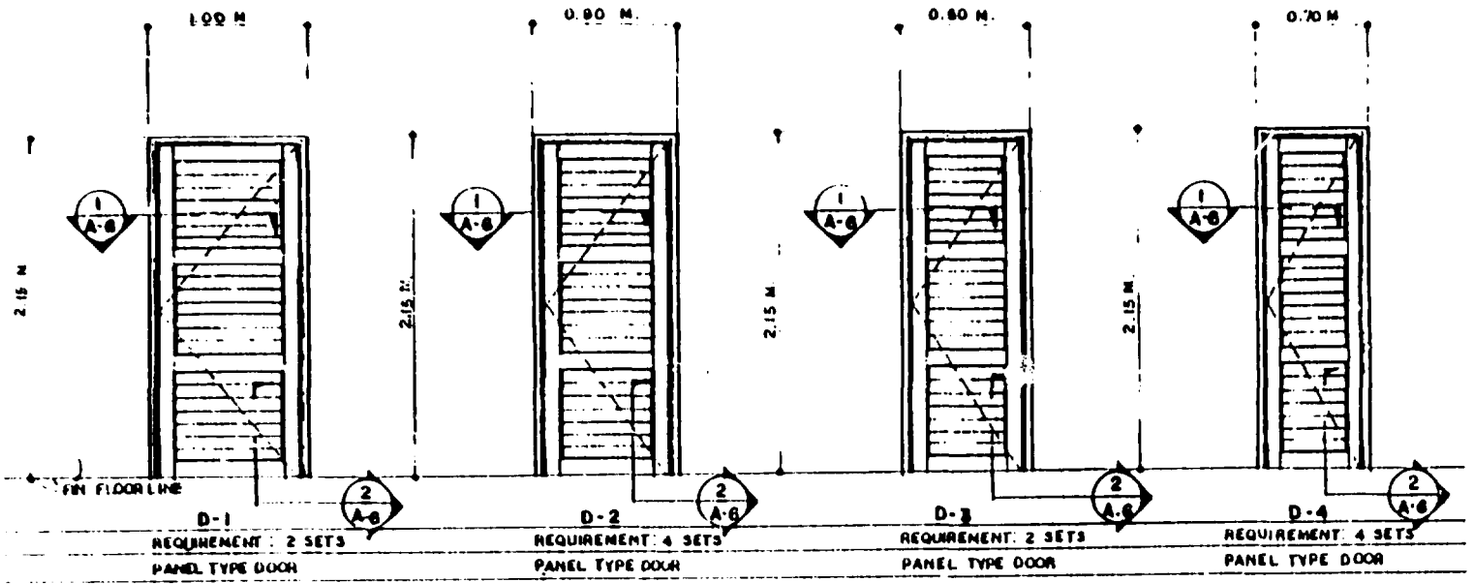
24. FABRICATION OF WINDOWS

Source of Materials : See Bill of Materials

Reference : Figure 45

Assemble the wood jambs from 50mm x 125mm wood. Fabricate the louver zigzag from 25mm x 75mm wood. Mount the 19mm thick V-cut louver blades on the louver zigzag. Jambs, zigzag and louvers should be true to profile and should be smooth on exposed surfaces. After completing the assembly of the louvers and the louver zigzag, install them on the wood jamb.





SCHEDULE OF DOORS & WINDOWS

FIGURE 45

25. FABRICATION OF WALL PANELS

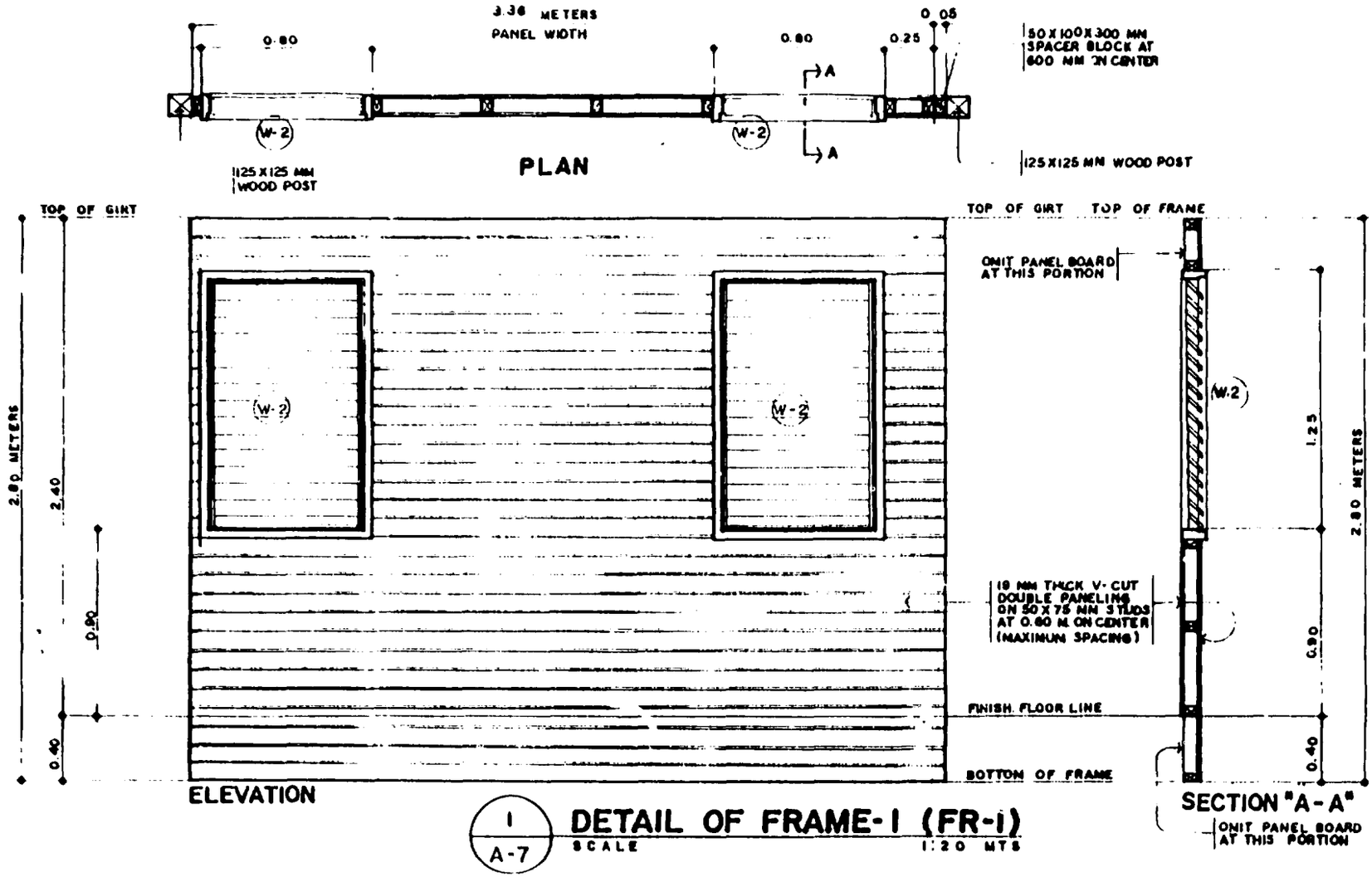
Source of Materials : See Bill of Materials

Reference : Figures 46, 47, 48, 49, 50,51, 52, 53, 54, 55, 56, 57 and 58

Construct the wall frames. For interior wall panels, omit the floor separator and the base board from the fabrication of the panels which shall be installed later with the pre-fabricated panels. Construction of the frames and installation of the fabricated doors and windows shall be done simultaneously with the fabrication of wall panels. Doors and windows shall be installed rigidly in place where they are indicated in plan. After securing the doors and windows to the frames, install the 19mm thick V-cut paneling on the frames. Prior to the installation, make sure that dimensions conform with the working drawings.

Take note that exterior wall panels are anchored to girts, floor joists and tie beams with 16mm ϕ machine bolts spaced at 1000mm. Determine the location of the bolts on the frames and where they are to be located, provide continuous vertical studs or wood blocks. Pre-drill bolt holes only at portions where continuous vertical studs are located or at portions where wood blocks had been applied.

Dimensions should be strictly followed and all corners should be at right angle to avoid difficulty in the installation o. the pre-fabricated wall panels.



1/A-7 DETAIL OF FRAME-1 (FR-1)

SCALE 1:20 MTS

FIGURE 46

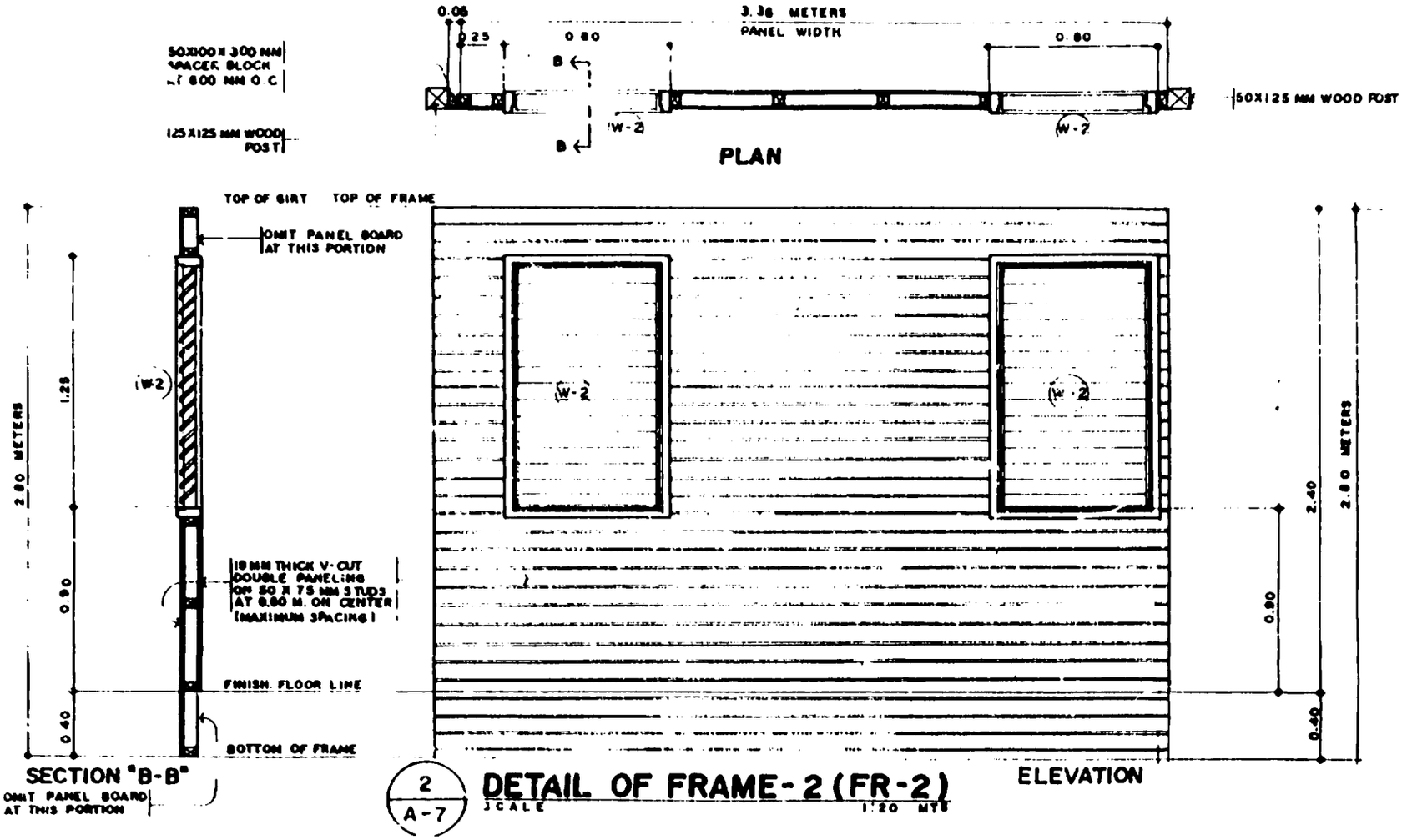
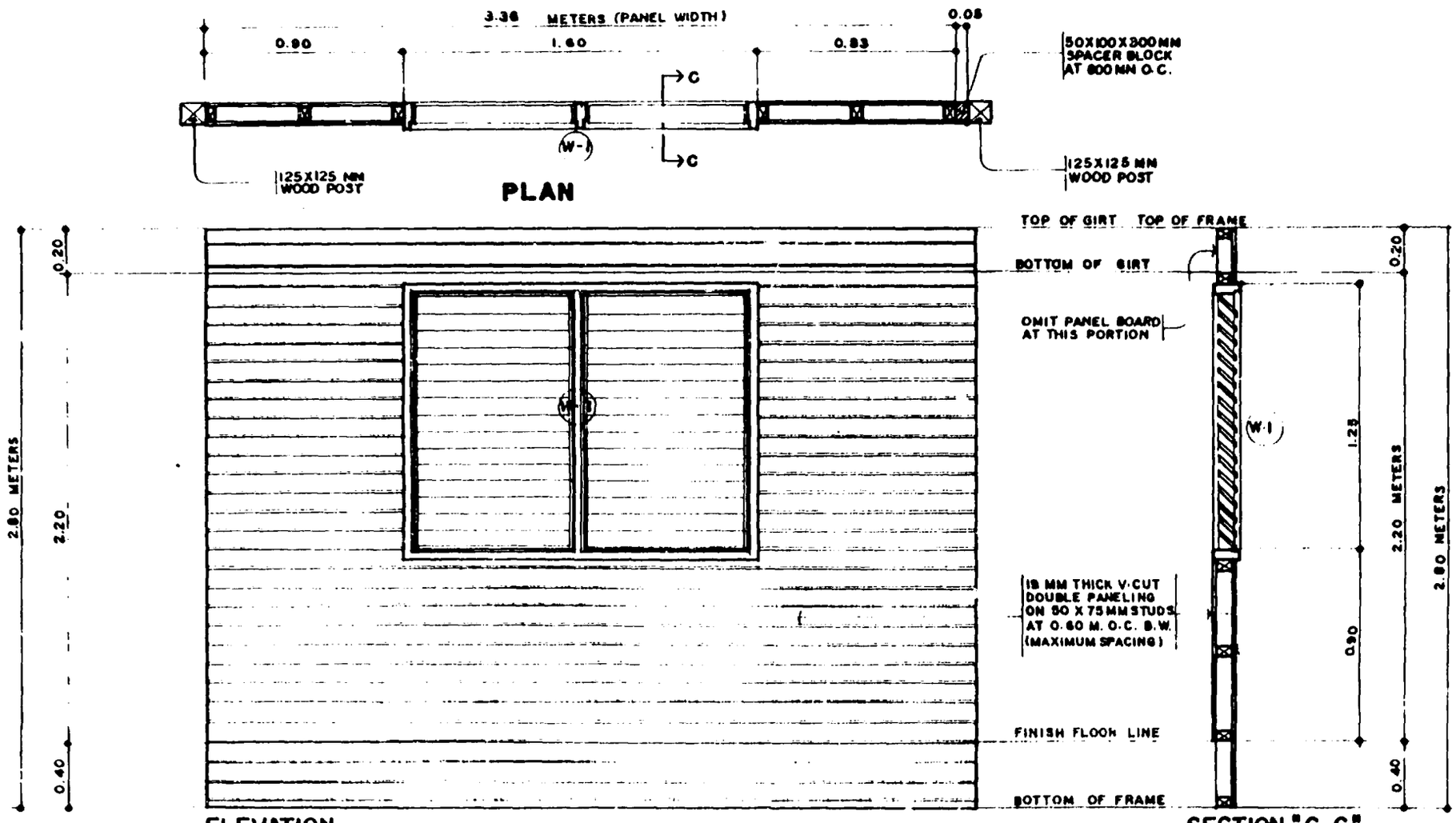

0.05
0.25
0.60
3.36 METERS
PANEL WIDTH
0.60
B
B
W-2
W-2
50X100 X 300 MM SPACER BLOCK AT 600 MM O.C
125X125 MM WOOD POST
50X125 MM WOOD POST
PLAN
TOP OF GIRT
TOP OF FRAME
OMIT PANEL BOARD AT THIS PORTION
W-2
W-2
W-2
2.80 METERS
1.28
0.90
0.40
19 MM THICK V-CUT DOUBLE PANELING ON 50 X 75 MM STUDS AT 0.60 M. ON CENTER (MAXIMUM SPACING)
FINISH FLOOR LINE
BOTTOM OF FRAME
2.40
0.90
0.40
2.80 METERS
SECTION "B-B"
OMIT PANEL BOARD AT THIS PORTION
ELEVATION
2
A-7
DETAIL OF FRAME-2 (FR-2)
SCALE 1:20 MTS

FIGURE 47



3 / A-7 **DETAIL OF FRAME-3 (FR-3)**

SCALE 1:20 MTS

FIGURE 48

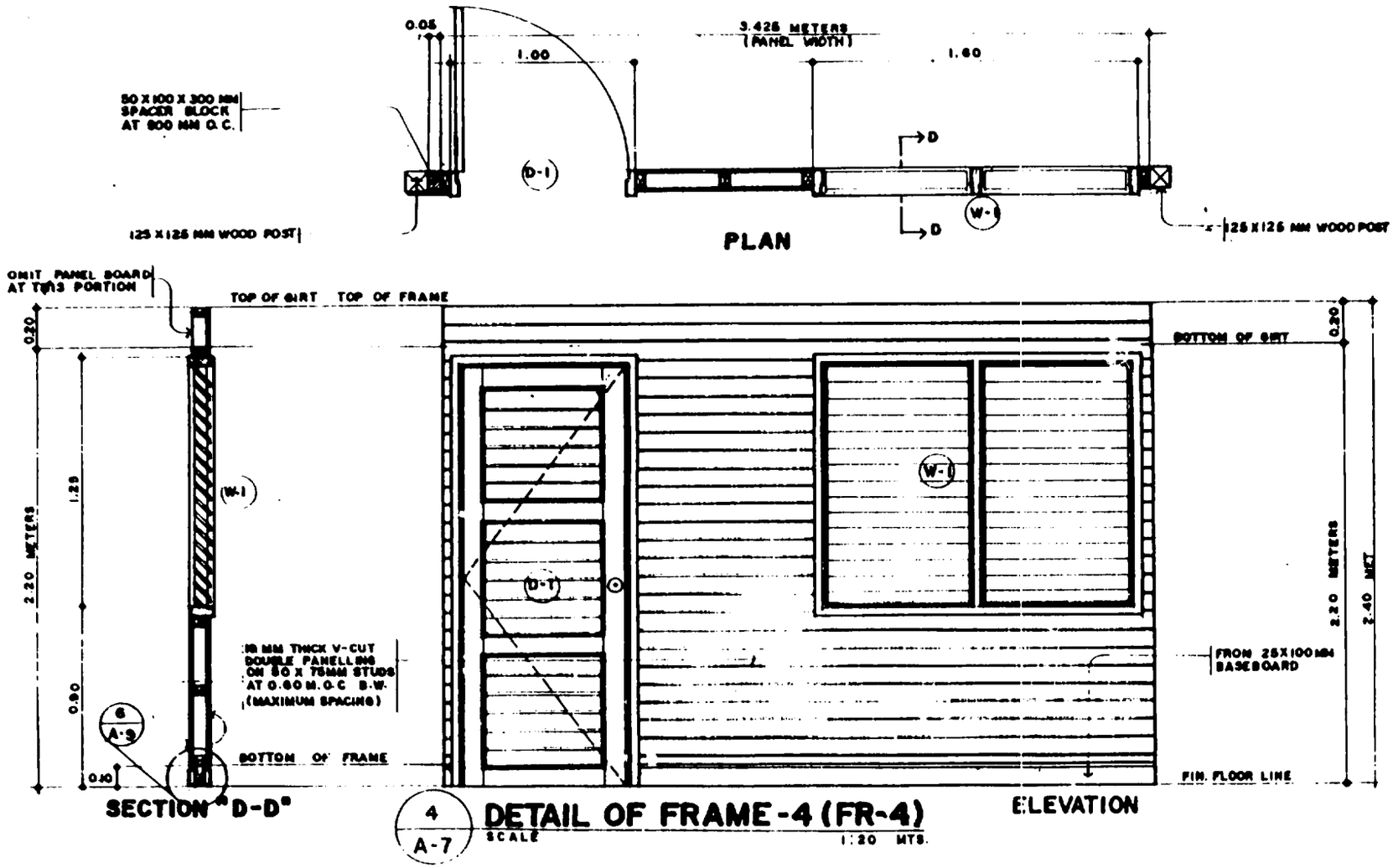
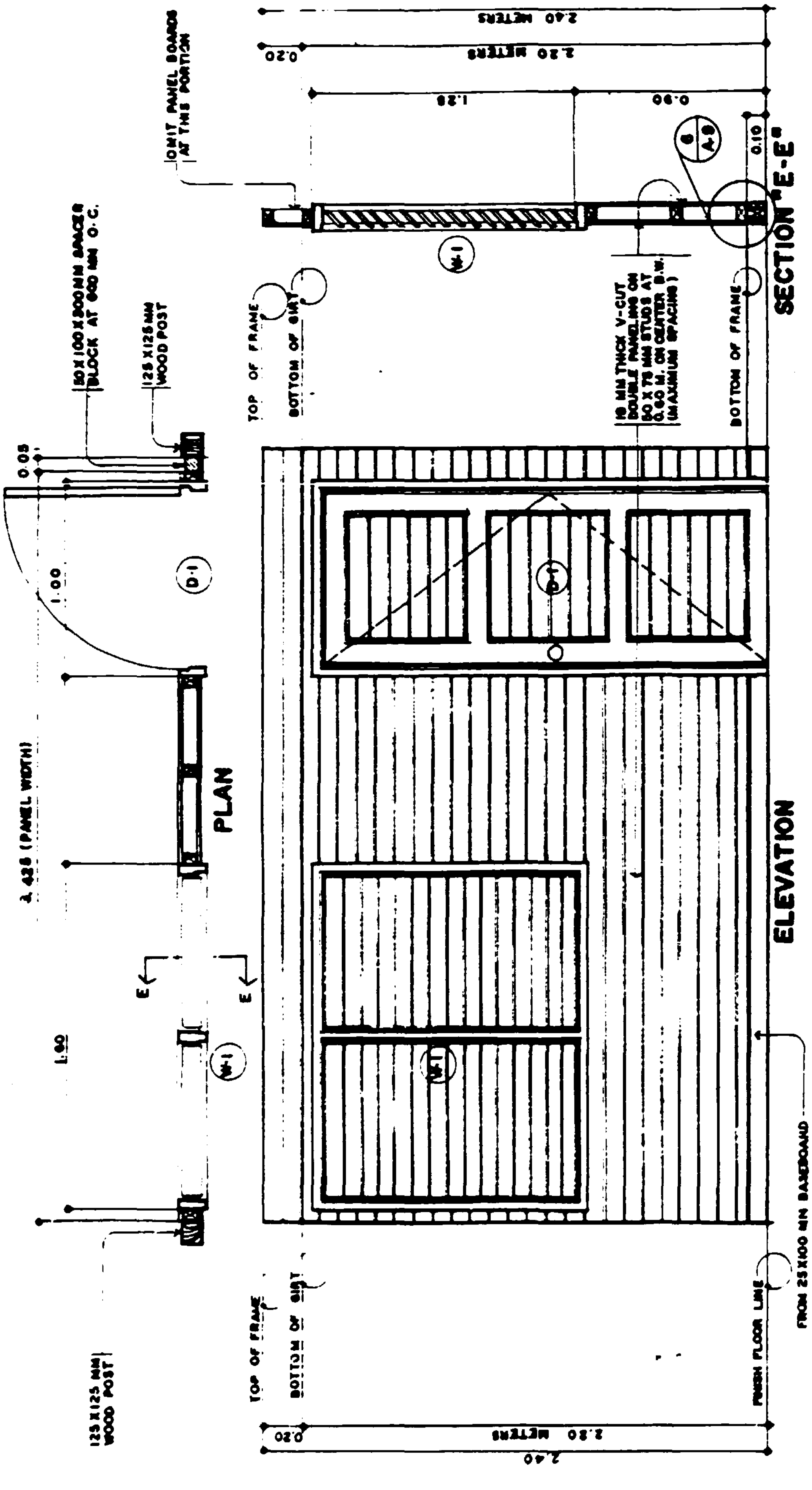
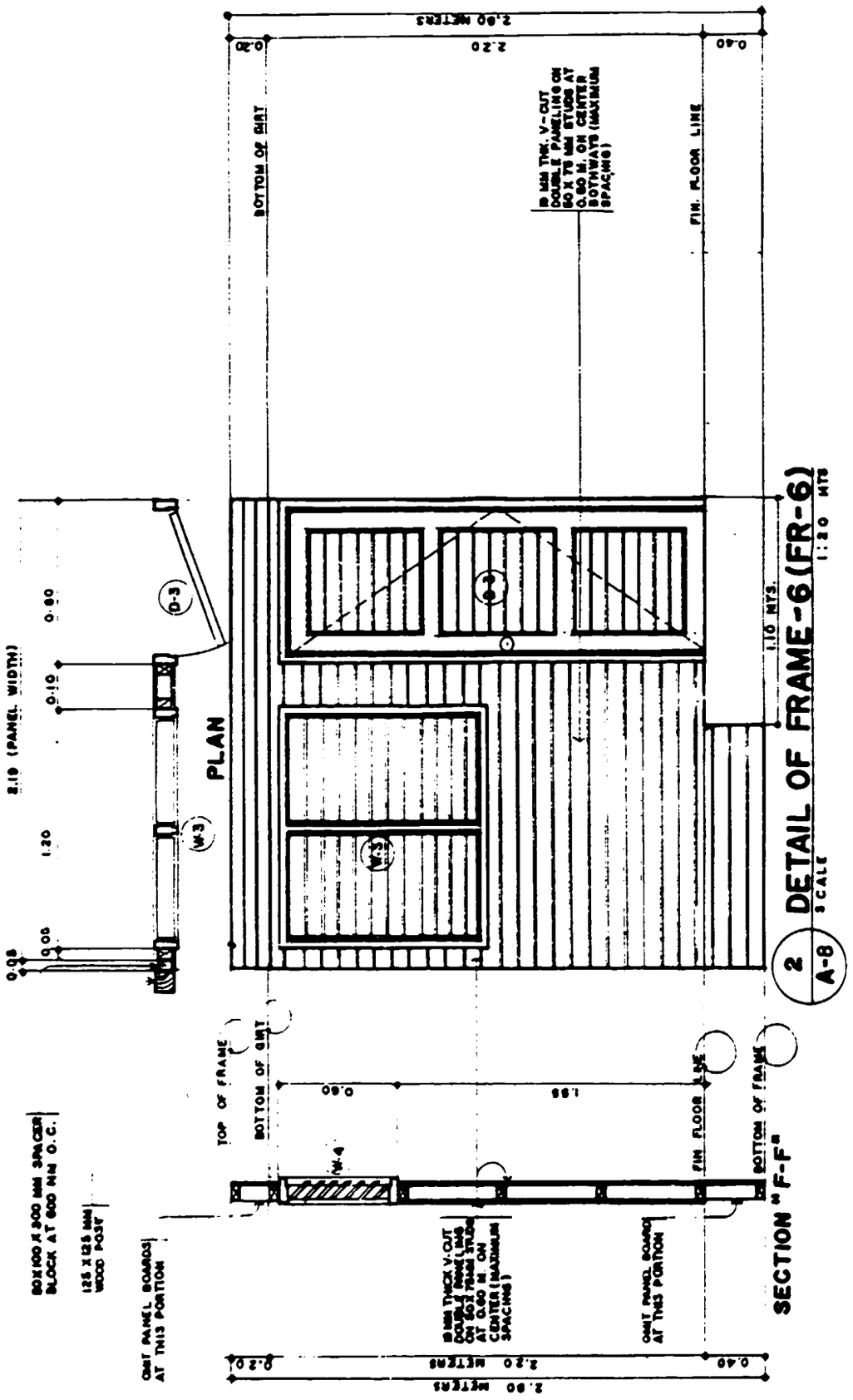

0.05
1.00
3.425 METERS
(PANEL WIDTH)
1.60
50 X 100 X 300 MM
SPACER BLOCK
AT 900 MM O.C.
D-1
D
D
W-1
125 X 125 MM WOOD POST
125 X 125 MM WOOD POST
PLAN
OMIT PANEL BOARD
AT THIS PORTION
TOP OF GIRT
TOP OF FRAME
BOTTOM OF GIRT
0.20
0.20
2.20 METERS
1.20
0.90
0.10
W-1
D-1
W-1
2.20 METERS
2.40 MET
6
A-9
10 MM THICK V-CUT
DOUBLE PANELLING
ON 50 X 75MM STUDS
AT 0.60 M.O.C B.W.
(MAXIMUM SPACING)
BOTTOM OF FRAME
FROM 25X100MM
BASEBOARD
FIN. FLOOR LINE
SECTION "D-D"
ELEVATION
4
A-7
DETAIL OF FRAME-4 (FR-4)
SCALE
1:20 MTS.

FIGURE 49


PLAN
ELEVATION
SECTION "E-E"
3.425 (PANEL WIDTH)
1.00
1.80
0.05
20 X 100 X 300 MM SPACER BLOCK AT 600 MM O.C.
125 X 125 MM WOOD POST
125 X 125 MM WOOD POST
D-1
W-1
E
E
TOP OF FRAME
BOTTOM OF SIGT
BOTTOM OF FRAME
FINISH FLOOR LINE
FROM 25 X 100 MM BASEBOARD
OMIT PANEL BOARDS AT THIS PORTION
10 MM THICK V-CUT DOUBLE PANELING ON 50 X 75 MM STUDS AT 0.60 M. ON CENTER B.W. (MAXIMUM SPACING)
2.40 METERS
2.20 METERS
0.20
1.28
0.90
0.10
6
A-8
2.80 METERS
0.20
2.40

1 / A-8 **DETAIL OF FRAME 5 (FR-5)**
SCALE 1:20 MTS.

FIGURE 50



2 DETAIL OF FRAME-6(FR-6) 1:20 MTS
A-8 SCALE

FIGURE 51

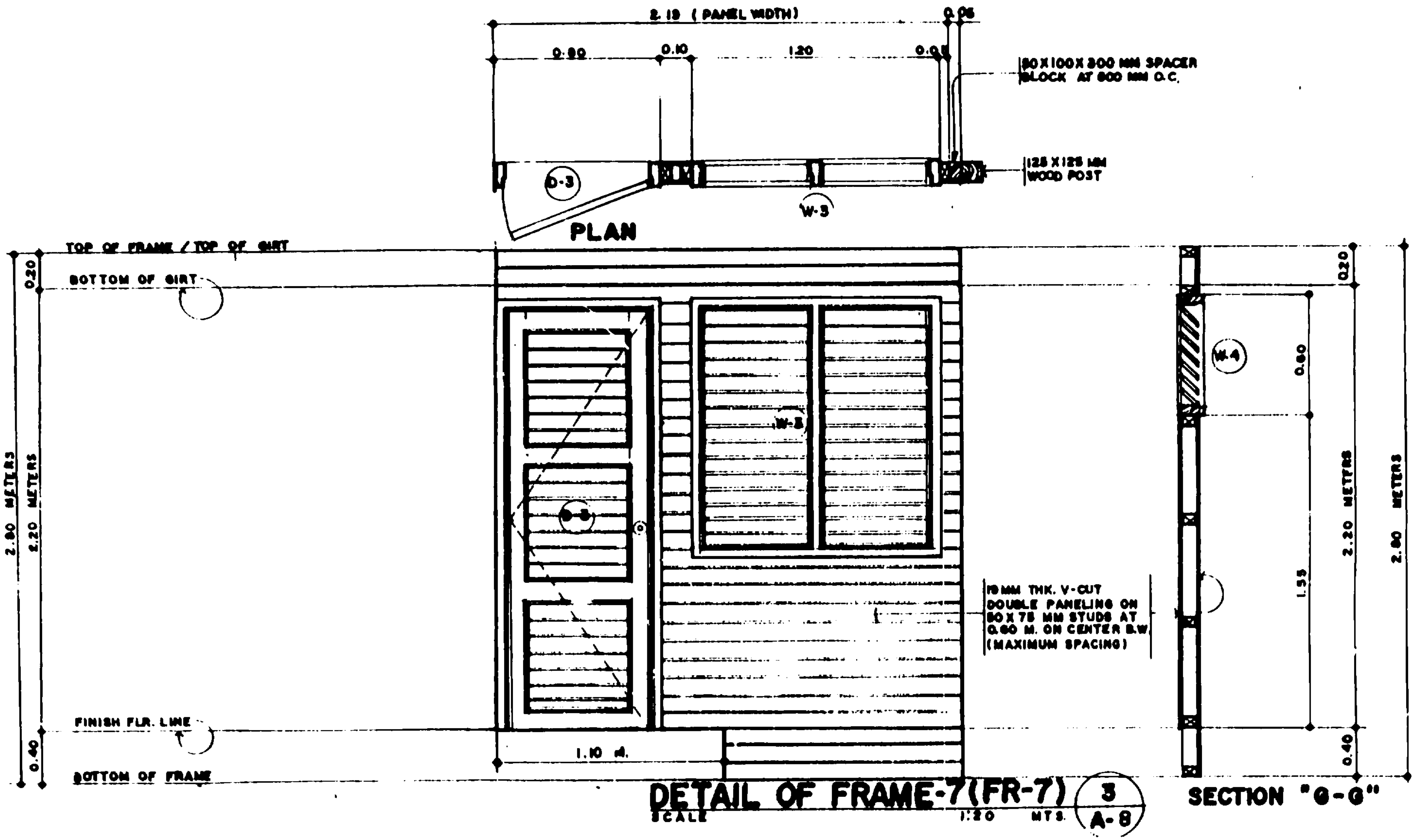
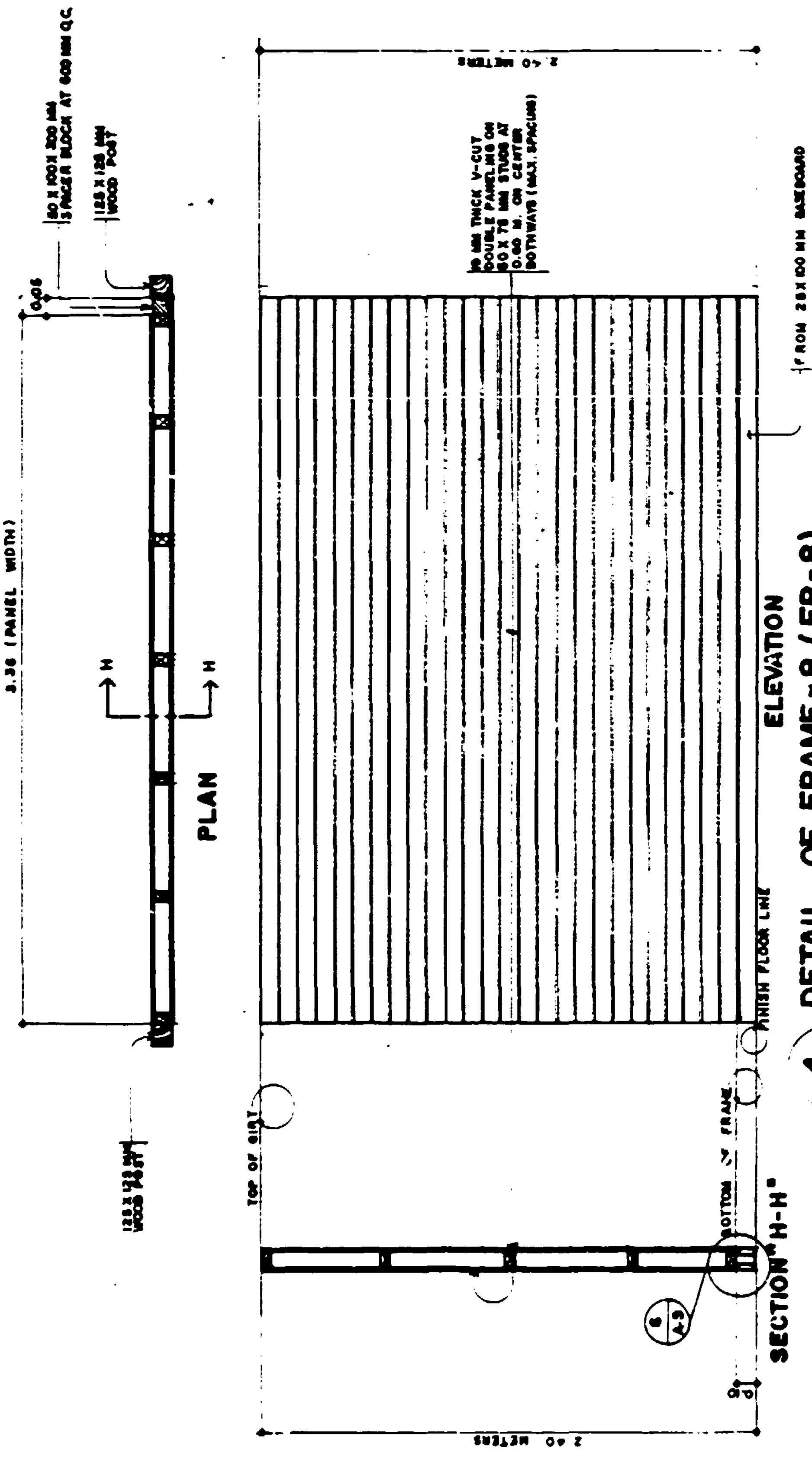
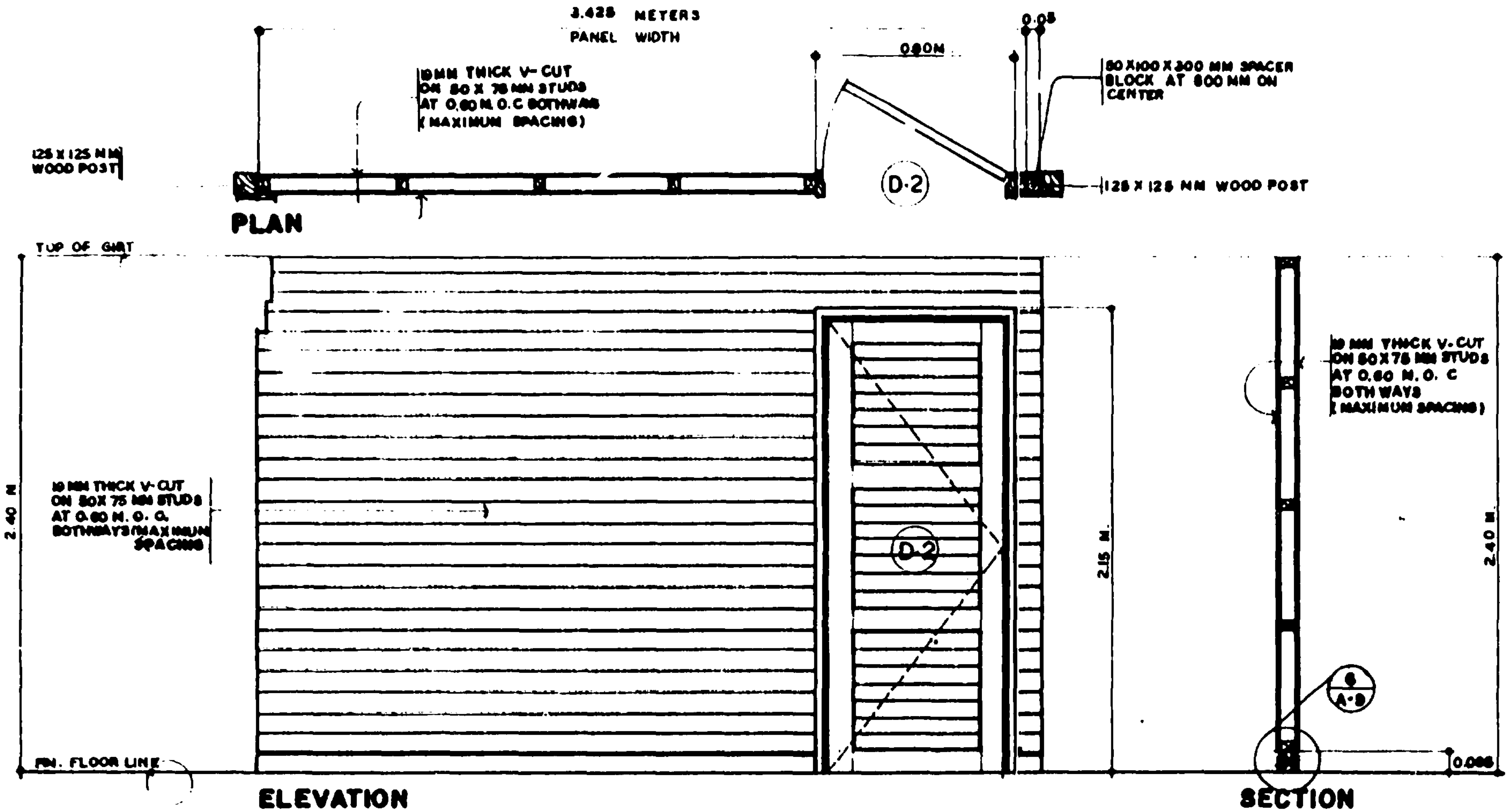

2.19 (PANEL WIDTH)
0.05
0.80
0.10
1.20
0.05
50X100X300 MM SPACER BLOCK AT 600 MM O.C.
125 X 125 MM WOOD POST
D-3
W-3
PLAN
TOP OF FRAME / TOP OF GIRT
BOTTOM OF GIRT
FINISH FLR. LINE
BOTTOM OF FRAME
0.20
0.40
2.80 METERS
2.20 METERS
1.10 M.
19 MM THK. V-CUT DOUBLE PANELING ON 50 X 75 MM STUDS AT 0.60 M. ON CENTER B.W. (MAXIMUM SPACING)
W-4
0.60
1.55
DETAIL OF FRAME-7(FR-7)
SCALE 1:20 MTS.
3
A-8
SECTION "G-G"

FIGURE 52



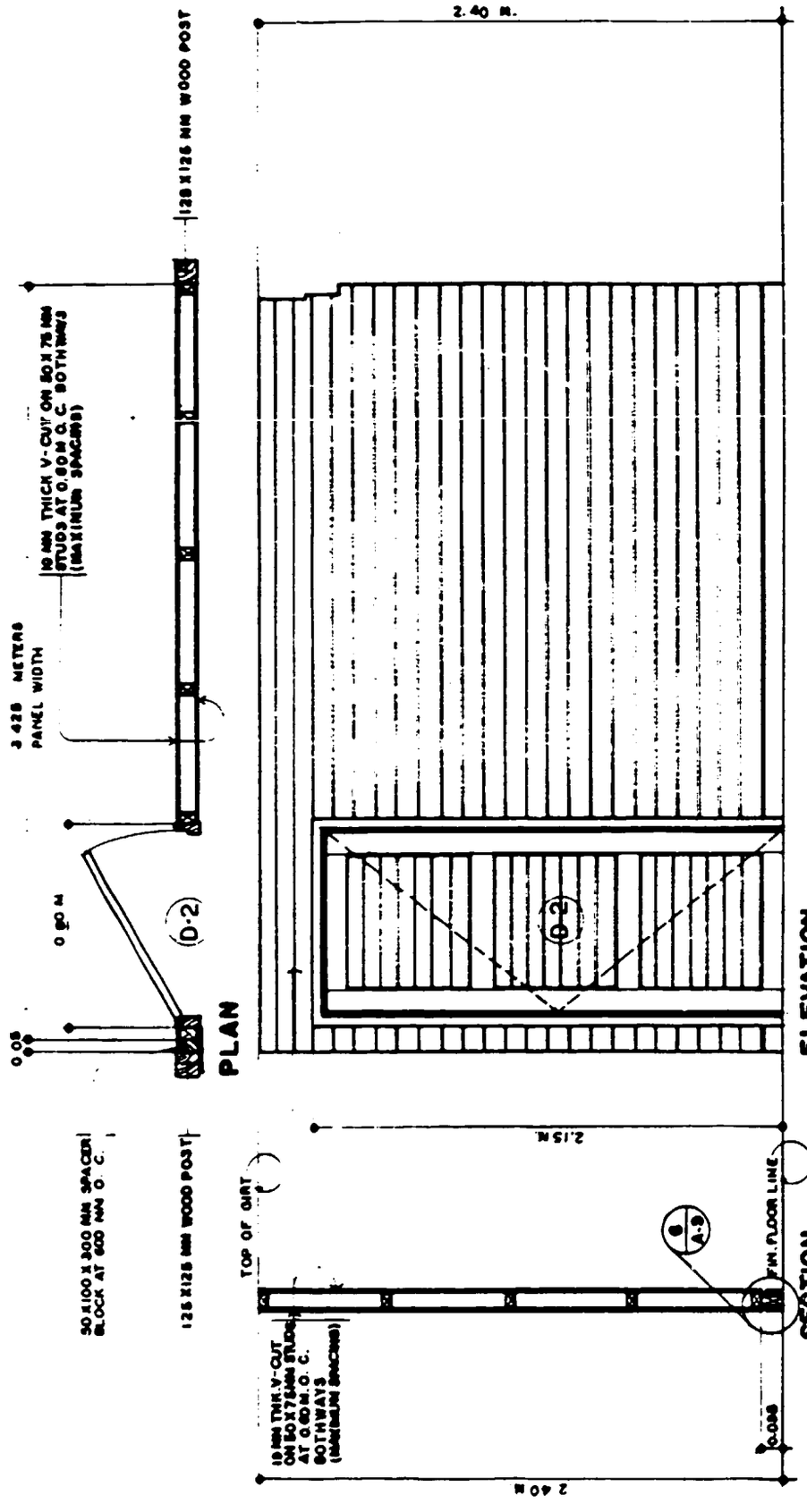
4
A-8
DETAIL OF FRAME-8 (FR-8)
SCALE 1:20 MTS.

FIGURE 53


3.425 METERS
PANEL WIDTH
10MM THICK V-CUT
ON 50 X 75 MM STUDS
AT 0.60 M. O.C BOTHWAYS
(MAXIMUM SPACING)
0.80M
0.05
50 X100 X 300 MM SPACER
BLOCK AT 600 MM ON
CENTER
125 X 125 MM
WOOD POST
D-2
125 X 125 MM WOOD POST
PLAN
TOP OF GIRT
10 MM THICK V-CUT
ON 50X 75 MM STUDS
AT 0.60 M. O. C.
BOTHWAYS(MAXIMUM
SPACING
2.40 M
2.15 M
FIN. FLOOR LINE
ELEVATION
10 MM THICK V-CUT
ON 50X75 MM STUDS
AT 0.60 M. O. C
BOTH WAYS
(MAXIMUM SPACING)
2.40 M
0.085
SECTION

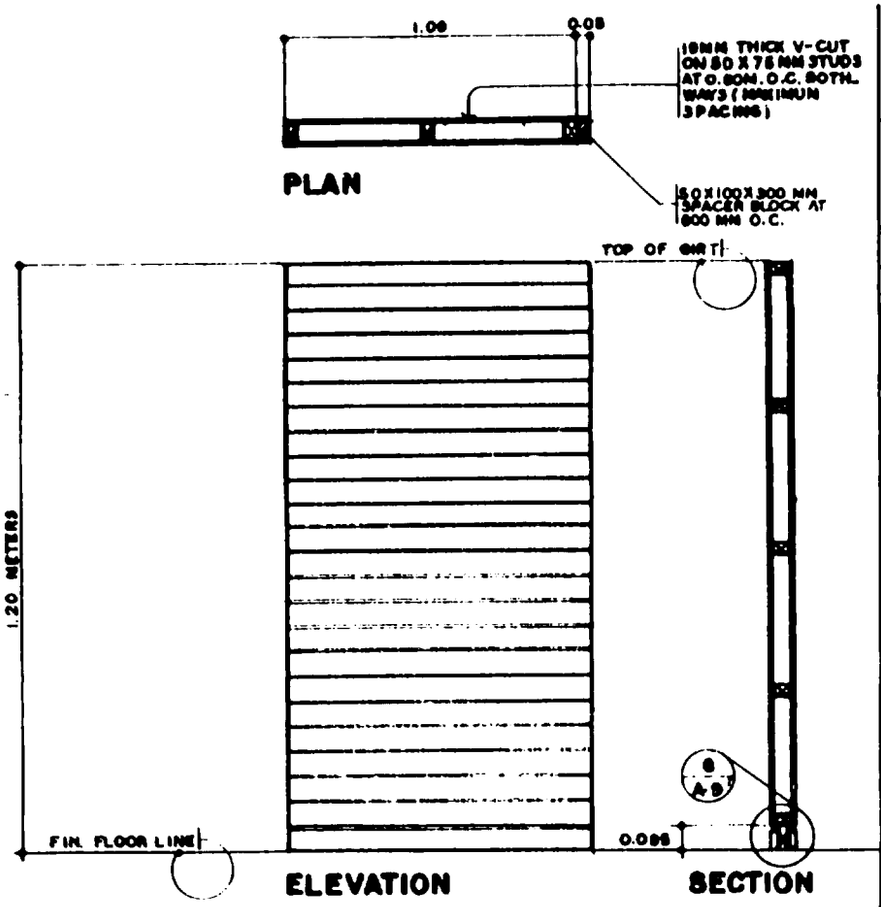
1 / A-9 **DETAIL OF FRAME-9 (FR-9)**
SCALE 1:20 MTS.

FIGURE 54



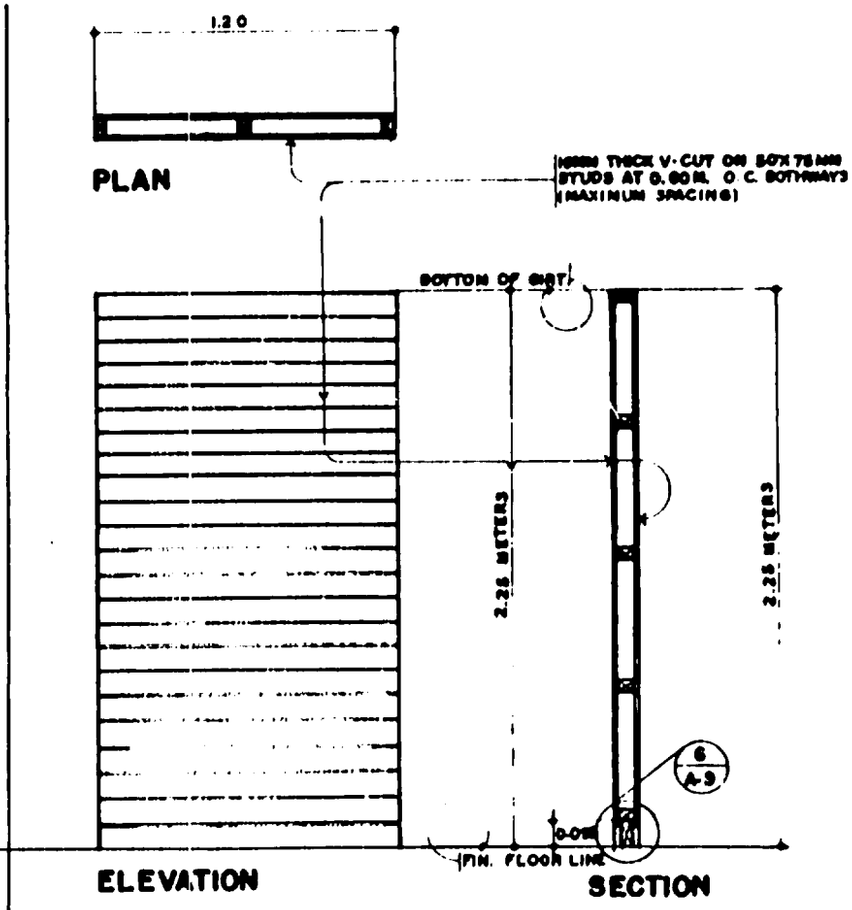
2 / A-9 DETAIL OF FRAME-10 (FR-10)
SCALE 1:20 MTS

FIGURE 55



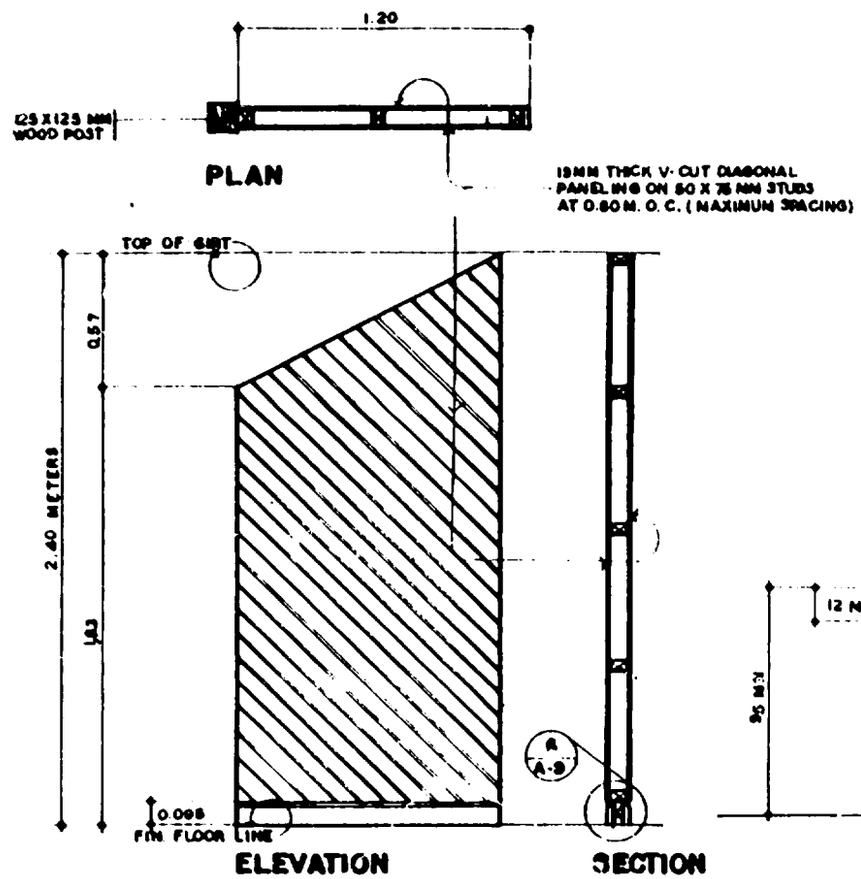
8 / A-9 DETAIL OF FRAME-II (FR-II)
SCALE 1:20 MTS

FIGURE 56



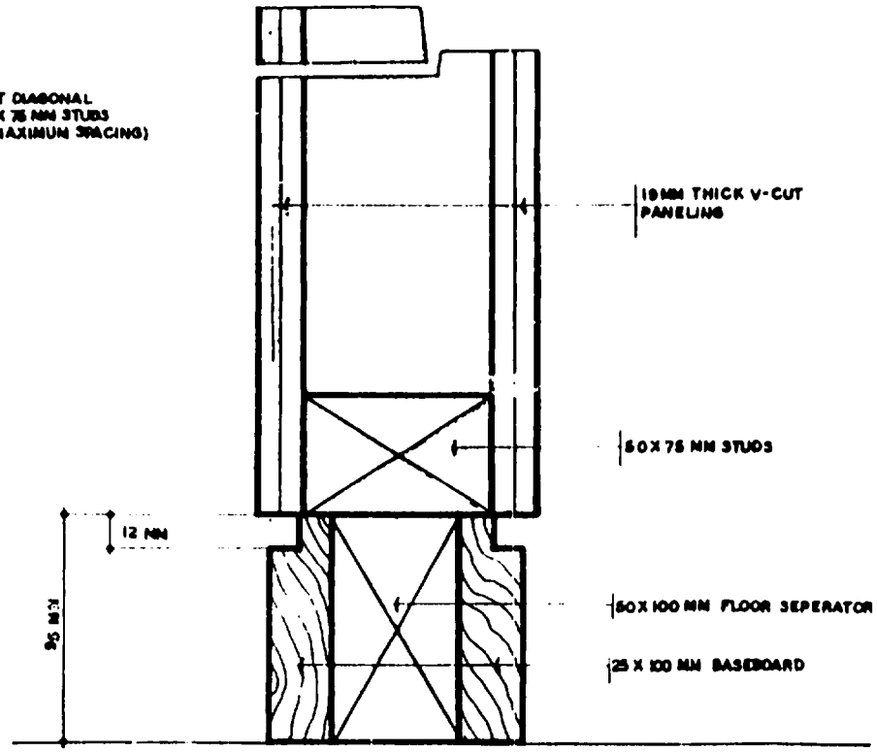
4 / A-9 DETAIL OF FRAME-IIA (FR-IIA)
SCALE 1:20 MTS

FIGURE 57



5 / A-9 DETAIL OF FRAME-12(FR-12)
SCALE 1:20 MTS

FIGURE 58



6 / A-9 DETAIL OF BASEBOARD
HALF FULL SCALE

FIGURE 59

26. INSTALLATION OF THE PRE-FABRICATED INTERIOR WALL PANELS

Source of Materials : See Bill of Materials

Reference : Figures 59 and 60

Check actual dimensions at site with the dimension of the pre-fabricated panels. Prepare the floor separator from 50 x 100mm wood. Adjust the thickness of the floor separator to fit the pre-fabricated panels and install it at the floor portion where the pre-fabricated panels are to be installed. See figure 60 for details of the floor separator installation.

Erect the panels right on top of the separator. In some instances where the panels don't fit the receiving frame space, adjust the thickness of the of the floor separator and the wood spacer block. Secure the panels to the wooden post with log screws. Complete the wall system with the installation of the vertical panels to cover the wood spacer block. All erected panels should be plumbed and leveled.

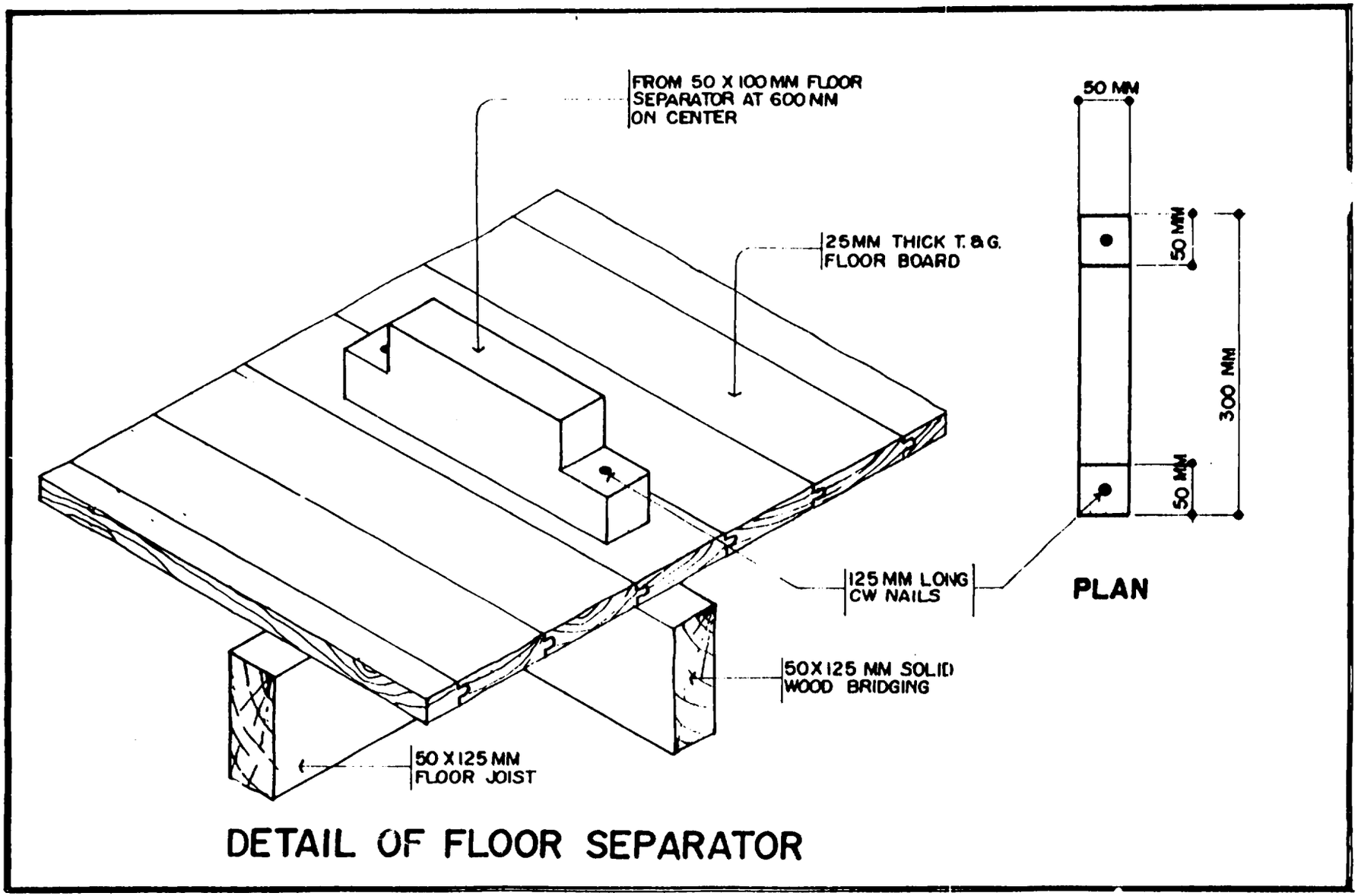

FROM 50 X 100 MM FLOOR SEPARATOR AT 600 MM ON CENTER
25MM THICK T. & G. FLOOR BOARD
125 MM LONG CW NAILS
50X125 MM SOLID WOOD BRIDGING
50 X 125 MM FLOOR JOIST
50 MM
50 MM
300 MM
50 MM
PLAN
DETAIL OF FLOOR SEPARATOR

FIGURE 60

27. INSTALLATION OF THE PRE-FABRICATED EXTERIOR WALL PANELS

Source of materials : See bill of materials

Reference : Figures 61, 62, 63, and 64

Make sure that roof girts, tie beams and side floor joists are rigidly installed with all the required bolts. Check the dimension of the receiving space frame with the pre-fabricated exterior wall panels. Make adjustments on the thickness of the wood spacer block. Lift the panels to its final positions. Provide support at the bottom and braces at the sides from the materials available at the site.

Drill bolt holes through the pre-drilled holes on the panels towards the girt, tie beam and or floor joists where the panels shall be anchored. Place the required bolts, tightening them at once to secure the pre-fabricated panels in place. For connection of the pre-fabricated frames with the wooden posts, use 76mm long log screws. Insert the wood spacer block at one side of the panel securing them to the panel and post with 76mm long log screws.

Complete the wall system with the installation of the 25mm thick vertical boards at the interior and post wrap boards at the exterior side.

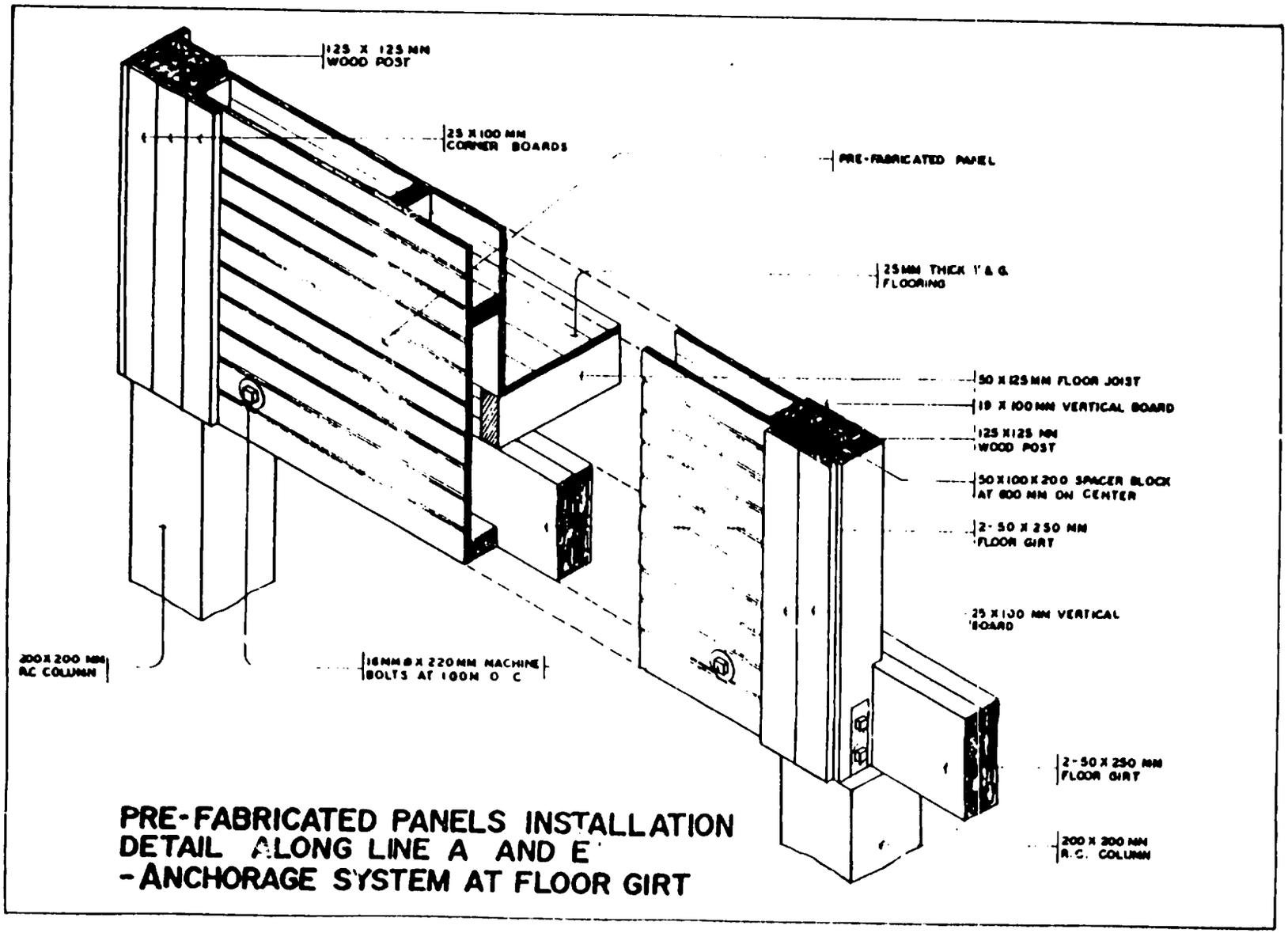

125 X 125 MM
WOOD POST
25 X 100 MM
CORNER BOARDS
PRE-FABRICATED PANEL
25MM THICK T & G
FLOORING
50 X 125 MM FLOOR JOIST
19 X 100 MM VERTICAL BOARD
125 X 125 MM
WOOD POST
50 X 100 X 200 SPACER BLOCK
AT 600 MM ON CENTER
2-50 X 250 MM
FLOOR GIRT
25 X 150 MM VERTICAL
BOARD
200 X 200 MM
R.C. COLUMN
16MM Ø X 220MM MACHINE
BOLTS AT 100M O C
2-50 X 250 MM
FLOOR GIRT
200 X 200 MM
R.C. COLUMN
PRE-FABRICATED PANELS INSTALLATION
DETAIL ALONG LINE A AND E
-ANCHORAGE SYSTEM AT FLOOR GIRT

FIGURE 61

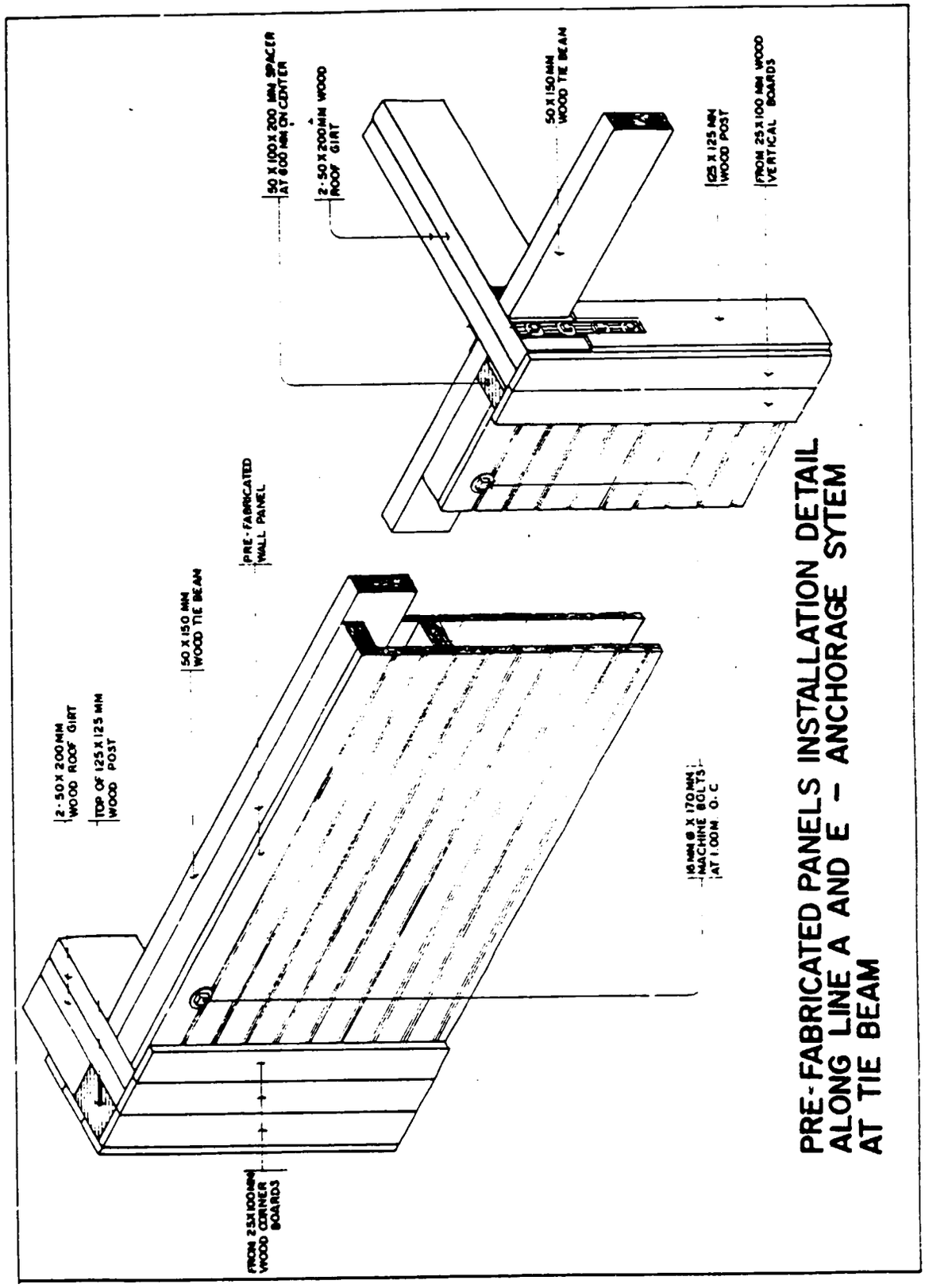

PRE-FABRICATED PANELS INSTALLATION DETAIL
ALONG LINE A AND E - ANCHORAGE SYTEM
AT TIE BEAM
50 X 100 X 200 MM SPACER AT 600 MM ON CENTER
2-50 X 200MM WOOD ROOF GIRT
50 X 150 MM WOOD TIE BEAM
125 X 125 MM WOOD POST
FROM 25 X 100 MM WOOD VERTICAL BOARDS
PRE-FABRICATED WALL PANEL
50 X 150 MM WOOD TIE BEAM
2-50 X 200 MM WOOD ROOF GIRT
TOP OF 125 X 125 MM WOOD POST
16 MM Ø X 170 MM MACHINE BOLTS AT 1.00M O.C
FROM 25 X 100MM WOOD CORNER BOARDS

FIGURE 62

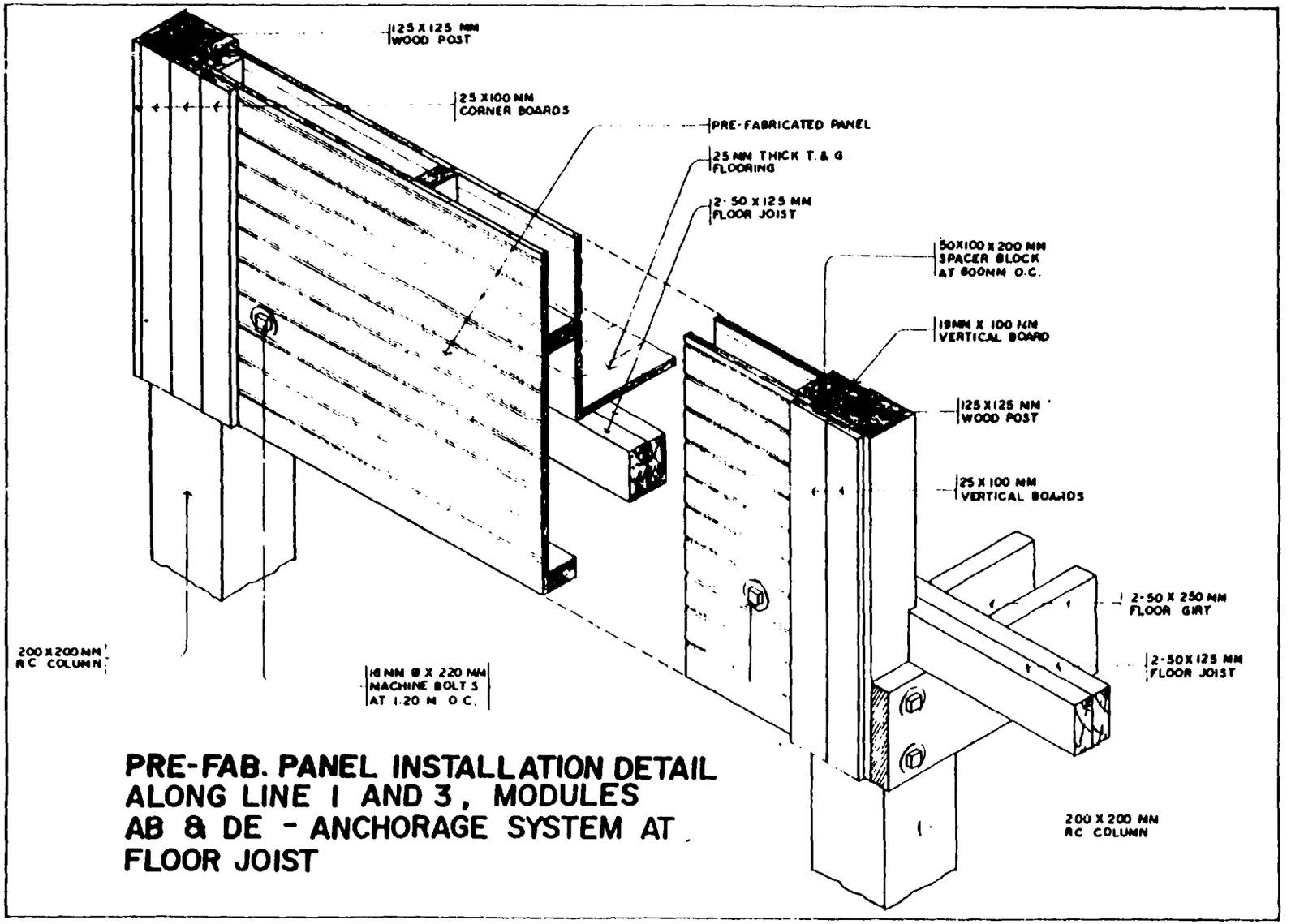

125 X 125 MM
WOOD POST
25 X 100 MM
CORNER BOARDS
PRE-FABRICATED PANEL
25 MM THICK T. & G.
FLOORING
2-50 X 125 MM
FLOOR JOIST
50X100 X 200 MM
SPACER BLOCK
AT 600MM O.C.
19MM X 100 MM
VERTICAL BOARD
125 X 125 MM
WOOD POST
25 X 100 MM
VERTICAL BOARDS
2-50 X 250 MM
FLOOR GIRT
2-50 X 125 MM
FLOOR JOIST
200 X 200 MM
RC COLUMN
16 MM Ø X 220 MM
MACHINE BOLTS
AT 1.20 M O.C.
200 X 200 MM
RC COLUMN
PRE-FAB. PANEL INSTALLATION DETAIL
ALONG LINE 1 AND 3, MODULES
AB & DE - ANCHORAGE SYSTEM AT
FLOOR JOIST

FIGURE 63

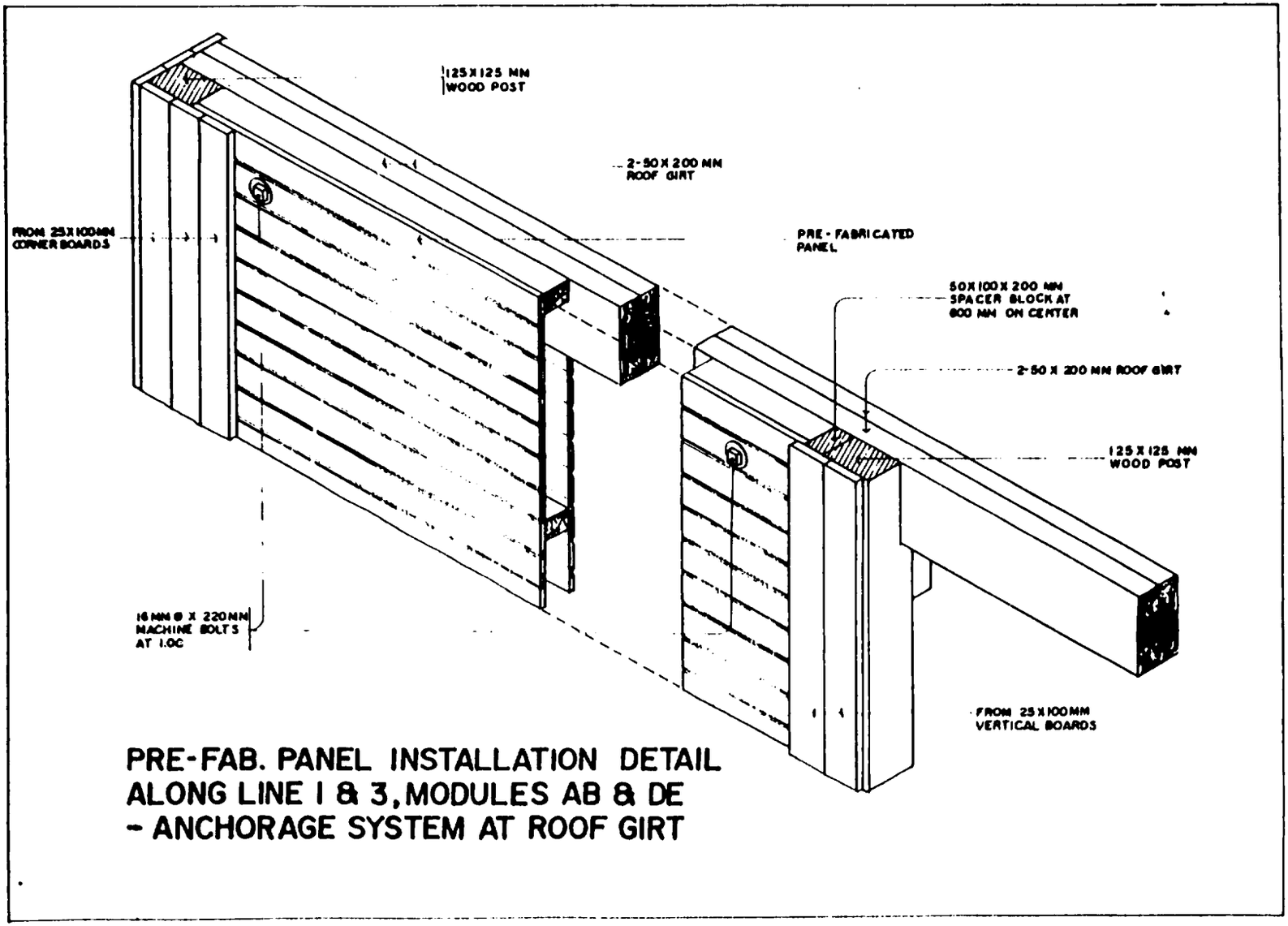

125X125 MM
WOOD POST
2-50 X 200 MM
ROOF GIRT
FROM 25X100MM
CORNER BOARDS
PRE-FABRICATED
PANEL
50X100X 200 MM
SPACER BLOCK AT
600 MM ON CENTER
2-50 X 200 MM ROOF GIRT
125X125 MM
WOOD POST
16 MM Ø X 220MM
MACHINE BOLTS
AT 1.0C
FROM 25X100MM
VERTICAL BOARDS
PRE-FAB. PANEL INSTALLATION DETAIL
ALONG LINE 1 & 3, MODULES AB & DE
- ANCHORAGE SYSTEM AT ROOF GIRT

FIGURE 64

28. FABRICATION AND INSTALLATION OF CANOPY

Source of materials : See Bill of Materials

Reference : Figure 65

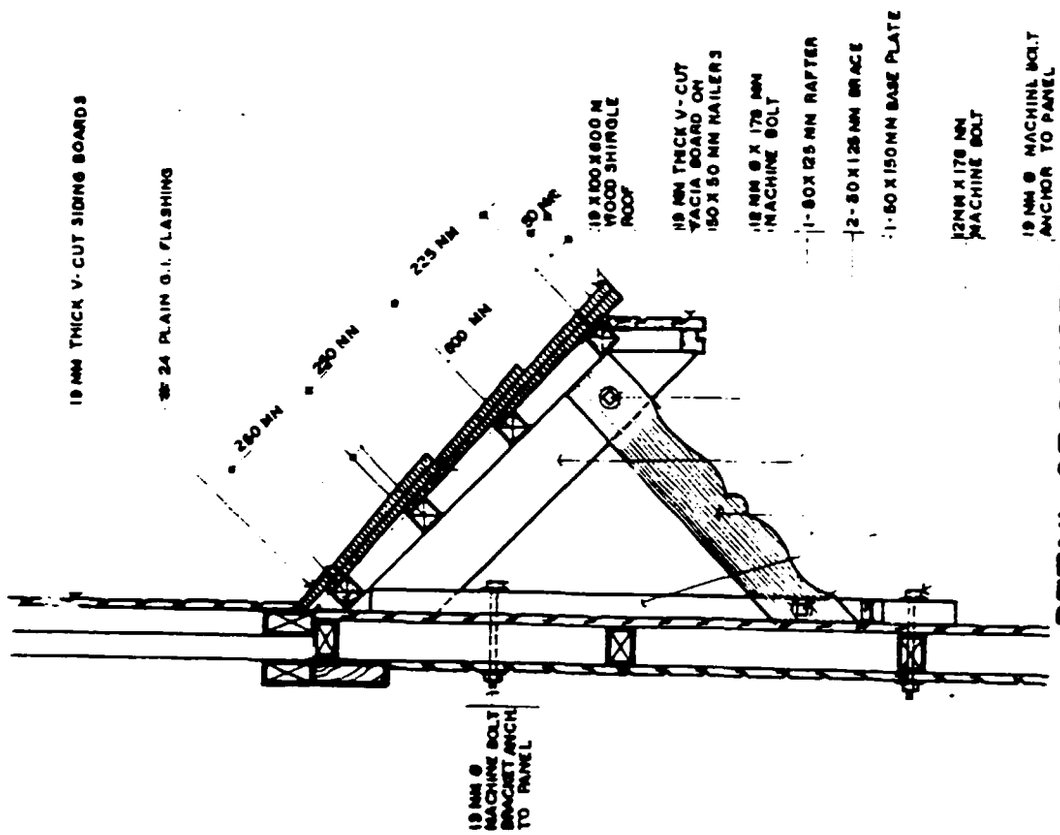
Prepare the 50 x 125mm rafter. Nail the purlins to the rafter, spacing as shown in figure 65. Install the wood shingle roofing . Provide two (2) layers starter course. Nail the first layer at one end to the purlins with two pieces 50mm long G.I. or copper nails. The next layers shall be nailed at mid-length also with two pieces G.I. or copper nails. Shingles spacing shall be not less than 6mm nor more than 9mm.

Install the 50mm x 50mm nailers for facia board. Then nail the 19mm thick v-cut facia board to the nailers. Corner joints for facia board must be weather tight.

After fabrication of the canopy, prepare the 50mm x 125mm brace and the 50 x 150mm baseplate for the brace. Anchor the baseplate to the wall panels with 19mm ϕ machine bolts. Pre-drill bolt holes on the brace where indicated on the drawing for the 12mm ϕ machine bolts. Attach one end of the brace to the baseplate with 12mm ϕ x 178mm machine bolts. Install the pre-fabricated canopy on top of the

installed baseplate. Secure the rafter to the baseplate with two (2) pieces 127mm long CW nails, with holes predrilled prior to nailing . Connect the end of the rafter to the end of the brace . Secure with one piece 12mm Ø x 178mm machine bolt at each joint

Tighten all bolts and check if installation is rigid.



DETAIL OF CANOPY

FIGURE 65

29. INSTALLATION OF MAIN STAIRS

Source of materials : See Bill of materials

Reference : Figure 66 and 67

Fabricate the stair carriage. Cut notches on the carriage to fit the ends of the treads for the notch joint. Install the ledgers along the girt and the kicker plate to the lean concrete stair base. Assemble the stair carriage, risers and treads, fitting the tread to the notches cut on the carriage. Nail all joints with CW nails applying the pre-drilled nailing operation. Check assembly of the stair making sure all joints are rigid and dimensions precise.

Mount the atir assembly to its final position. Connect the assembly to the ledger and to the kicker plate to rest on the lean concrete stair base. Secure all joints with CW nails and log screws.

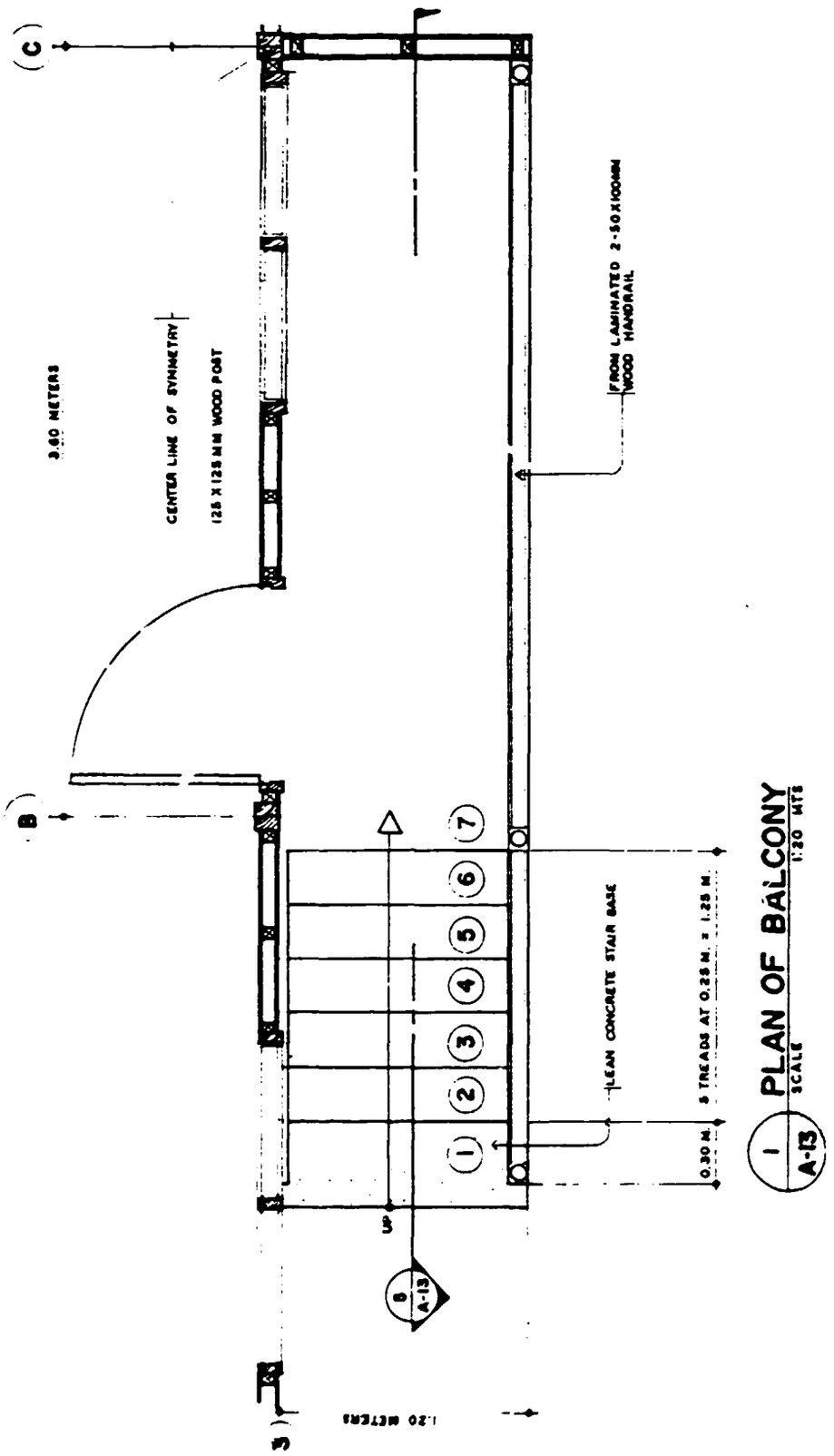
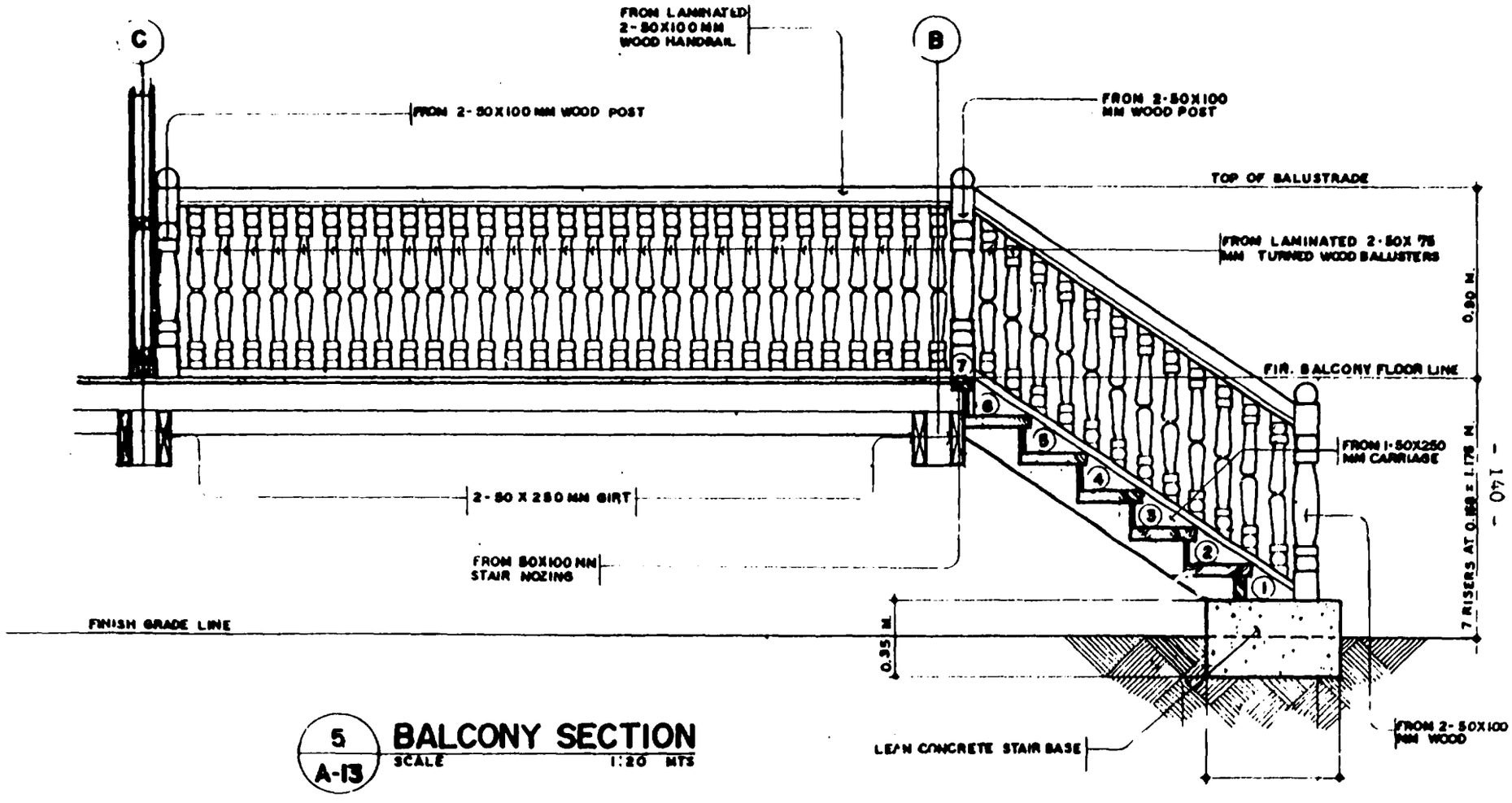

3.60 METERS
CENTER LINE OF SYMMETRY
125 X 125 MM WOOD POST
FROM LAMINATED 2-50 X 100MM WOOD HANDRAIL
LEAN CONCRETE STAIR BASE
5 TREADS AT 0.25 M. = 1.25 M.
0.30 M.
1.20 METERS
1 A-13 PLAN OF BALCONY SCALE 1:20 MTS

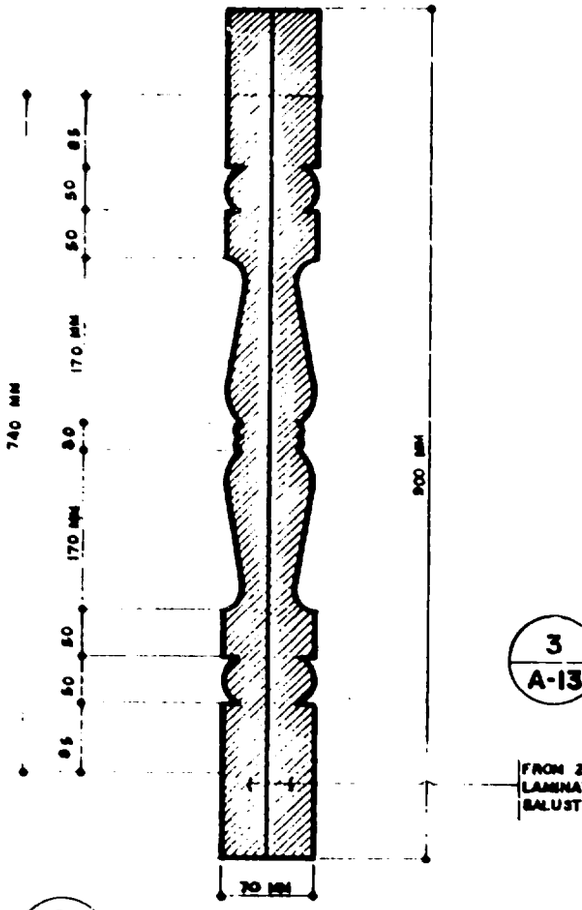
FIGURE 66



5 / A-13 **BALCONY SECTION**

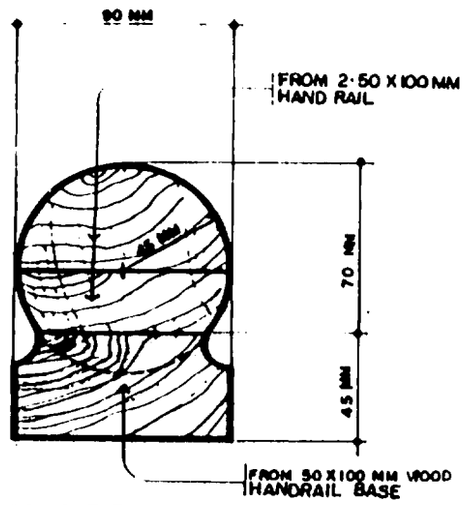
SCALE 1:20 MTS

FIGURE 67

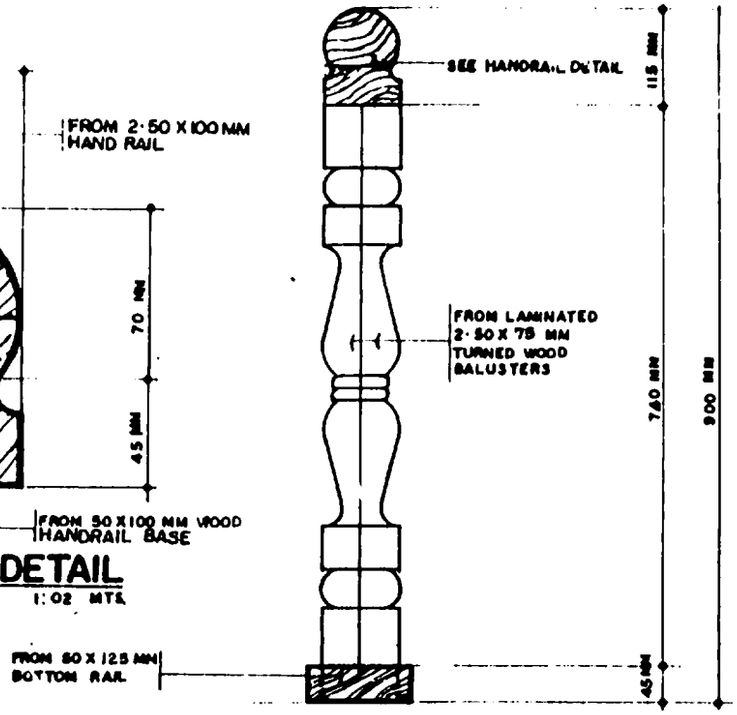


2 A-13 **WOOD BALUSTER DETAIL**
SCALE 1:05 MTS

FIGURE 68



3 A-13 **HANDRAIL DETAIL**
SCALE 1:02 MTS



4 A-13 **BALUSTRADE DETAIL**
SCALE 1:06 MTS

FIGURE 69

30. FABRICATION AND INSTALLATION OF BALUSTRADE FOR MAIN STAIRS AND BALCONY

Source of materials : See Bill of Materials

Reference : Figures 67, 68 and 69

Prior to the fabrication of the balustrade, All profiled balusters, balustrade post and handrail should be turned at the wood turning shop. Profiling should conform with the fabrication drawings and with the dimensions stated.

Connect the bottom rail to the turned baluster post. Lay the balusters to its position as shown in plan. Then nail the bottom of the balusters to the bottom rail with CW nails. Install the handrail base at the top nailing the handrail base to the top of the balusters. Connect the handrail to the top of the handrail base. Screw the handrail with log screws from the bottom of the handrail base upward to conceal the screws. After securing the balustrade with all the connections rigidly in place, mount the balustrade to its position as shown in plan. Connect the balustrade to the floor portion along the line of the floor joists. Use CW nails and log screws and secure anchorage through the bottom rail and balustrade post. On the main stair portion, connect the balustrade to the top of the stair carriage. After completing installation of the balustrade, install nailers for facia board below the balustade. For facia board installation, follow directions as in procedure no. 19.

31. INSTALLATION OF SERVICE STAIR

Source of materials : See bill of materials

Reference : Figures 70 and 71

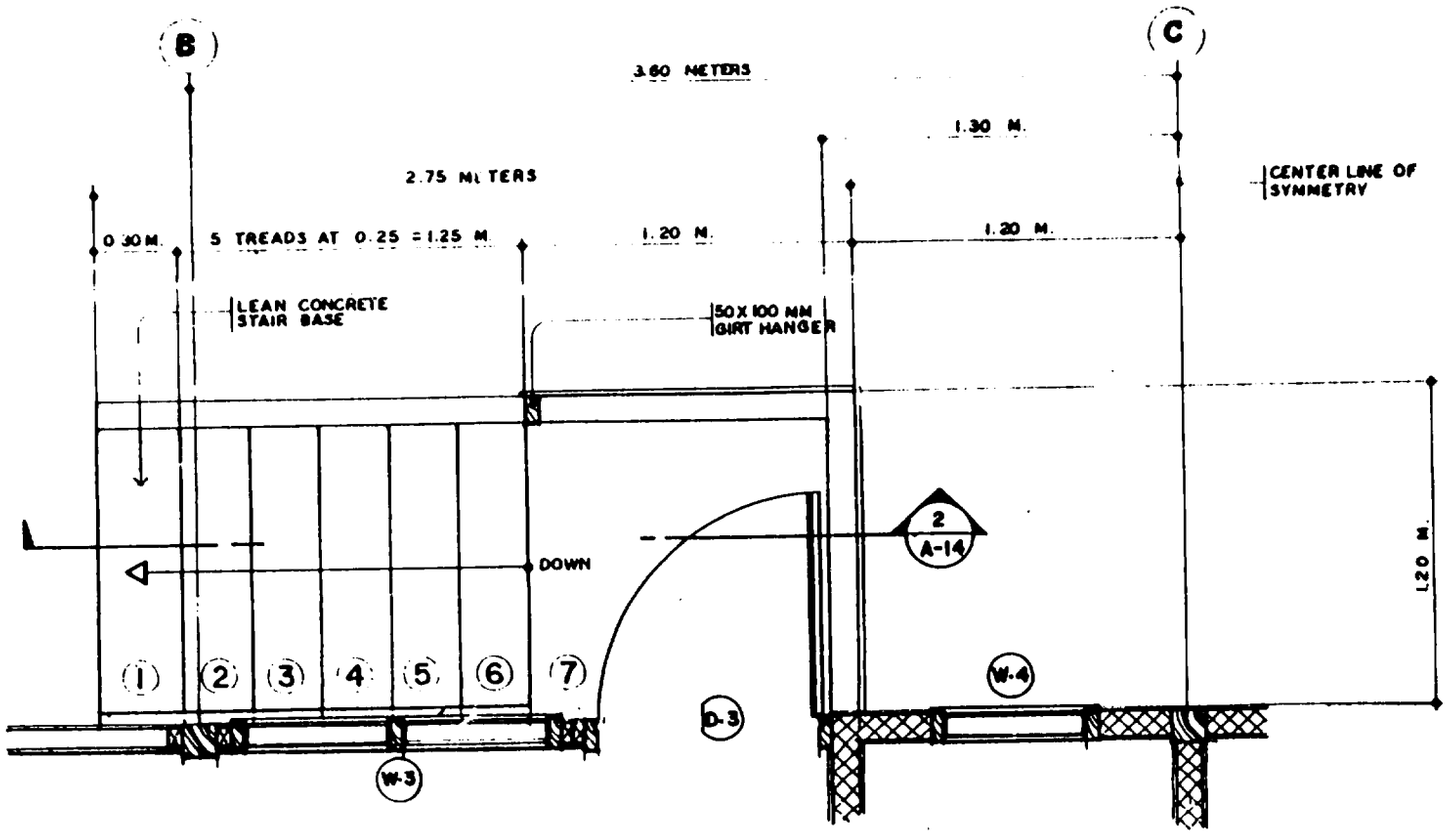
Follow the same direction as in procedure no.29.

32. INSTALLATION OF RAILINGS AT SERVICE STAIR

Source of materials : See bill of materials

Reference : Figure 71

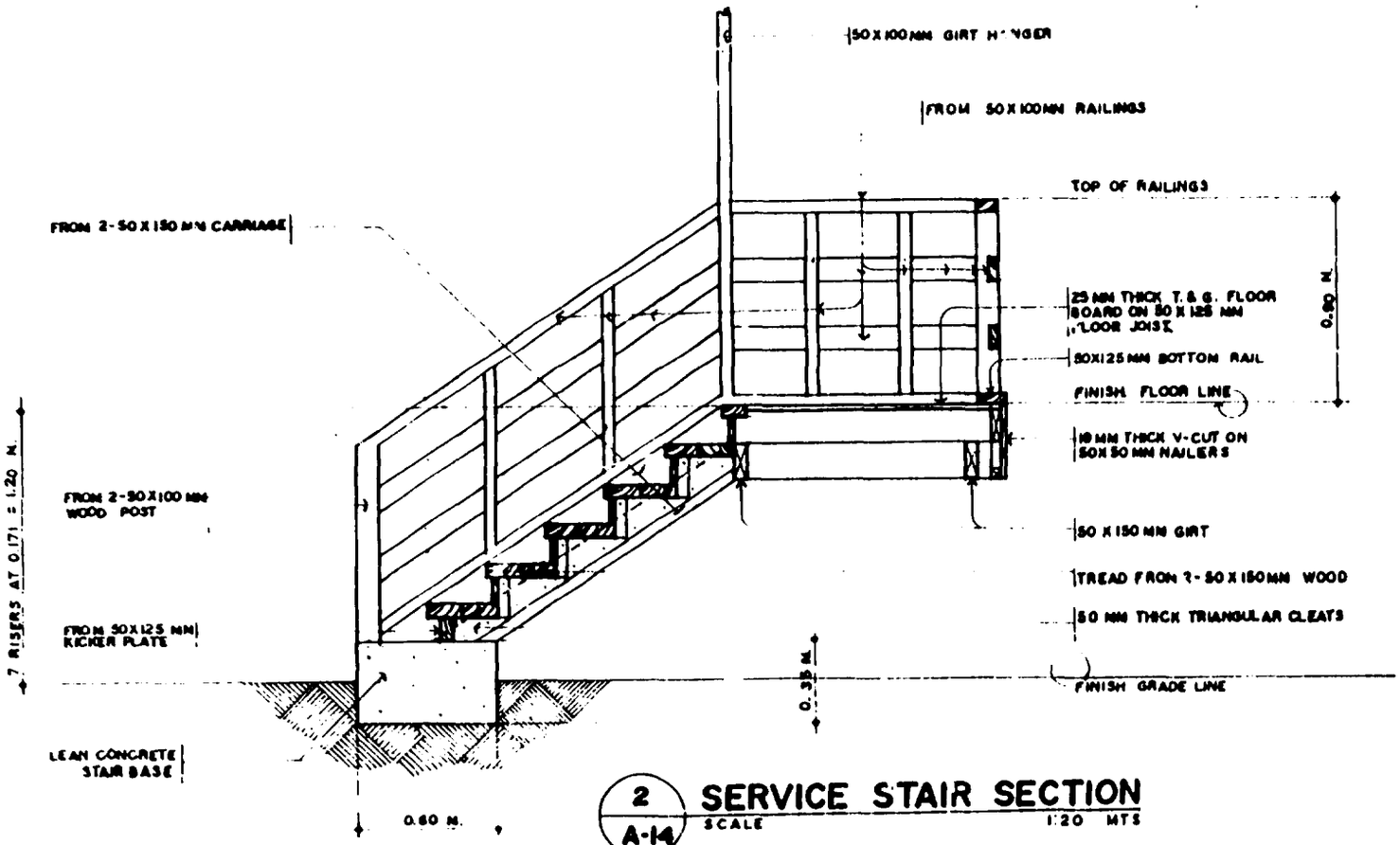
Erect the built up 100mm x 100mm wood post at the stair base. Install the 50mm x 50mm bottom rail. Itshould rest on the flooring directly above the the floor framing. Along the service stair, nail the bottom rail directly on top of the carriage. Erect the vertical railings on the bottom rail. Install the top rail, nailing it directly to the vertical rail, to the girt hanger and to the rail post. Then nail the horizontal railings to the vertical rail, Secure all connections.



1 / A-14 PLAN OF SERVICE STAIRS

SCALE 1:20 MTS.

FIGURE 70



2 / A-14 **SERVICE STAIR SECTION**

SCALE 1:20 MTS

FIGURE 71

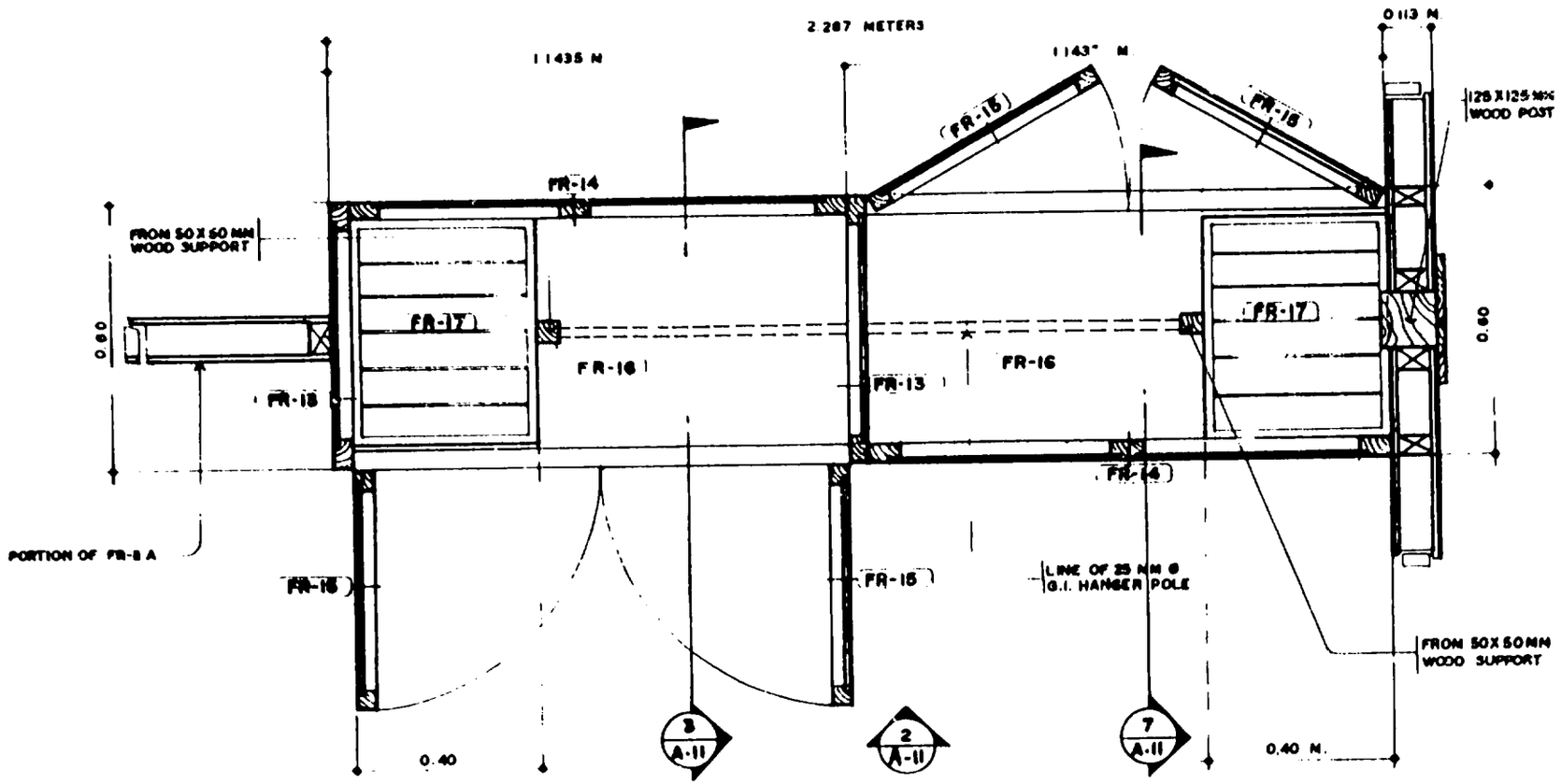
33. FABRICATION OF CLOSET COMPONENTS

Source of Materials : See Bill of Materials

Reference : Figures 73, 74 and 75

Prepare the closet framings and panels. Assemble the frames of the components as shown in figure 73, 74 and 75. Frame joints should be done neatly and accurately to conform to details. After the assembly of the frames, nail the paneling to the frames. The panels should be nailed neatly to the frames.

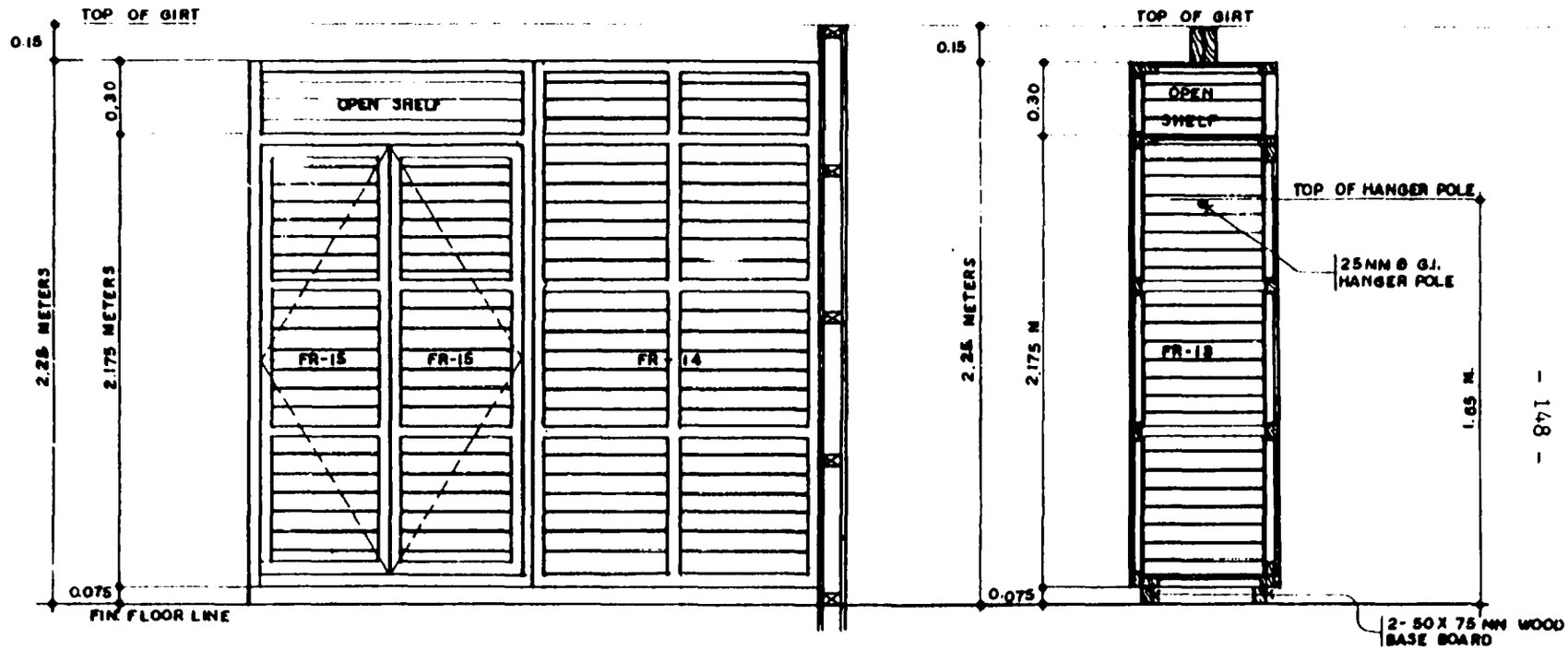
Use glue and nails for panel joints.



1 / A-11 PLAN OF CLOSET AT BEDROOMS

SCALE 1:10 MTS

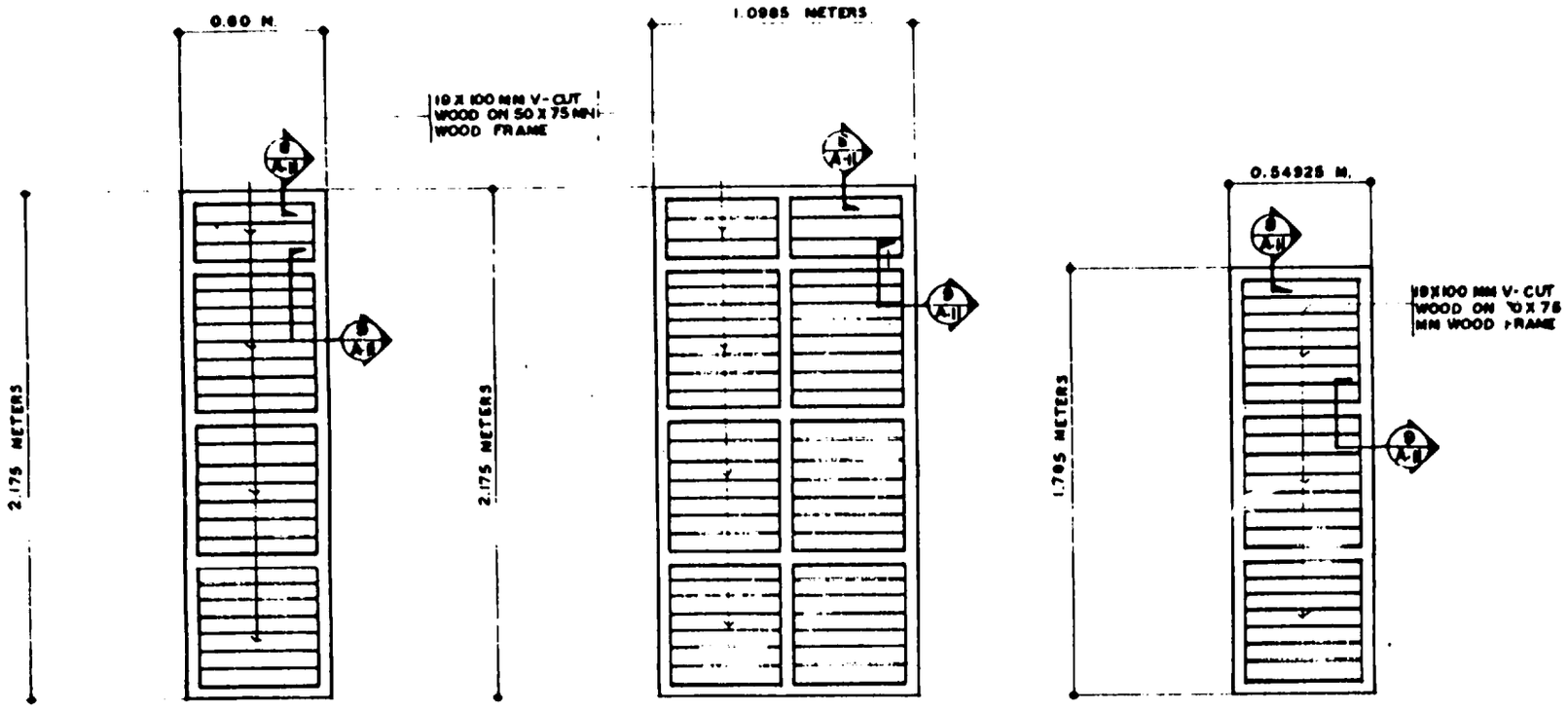
FIGURE 72



2 / A-11 CLOSET ELEVATION
SCALE 1:20 MTS

3 / A-11 CLOSET SECTION
SCALE 1:20 MTS

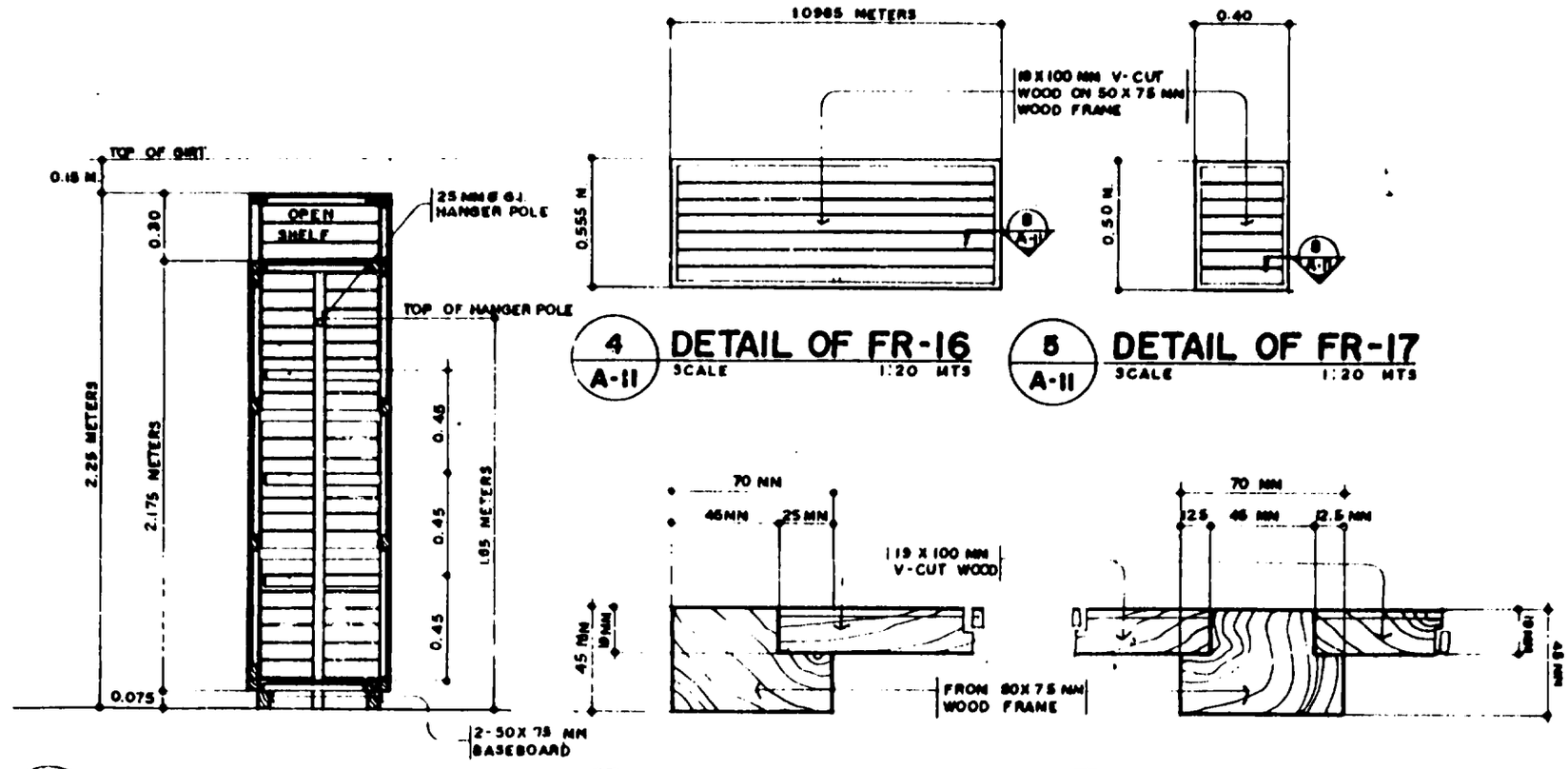
FIGURE 73



FR-13 FR-14 FR-15

6/A-11 DETAIL OF PANELS
SCALE 1:20 MTS

FIGURE 74



7 / A-11 CLOSET SECTION
SCALE 1:20 MTS

8 / A-11 FRAME DETAIL-A
SCALE 1:02 MTS

9 / A-11 FRAME DETAIL-B
SCALE 1:02 MTS

4 / A-11 DETAIL OF FR-16
SCALE 1:20 MTS

5 / A-11 DETAIL OF FR-17
SCALE 1:20 MTS

FIGURE 75

34. INSTALLATION OF CLOSET

Source of Materials : See Bill of Materials

Reference : Figures 72, 73, 74 and 75

Install the closet baseboard to the flooring applying nails only at the floor portion directly above the floor framing. Then erect FR-13 and FR-14 to rest directly on FR-16. Install FR-16 at the open shelves. Erect the 50mm x 50mm wood support. Then, install FR-17. After securing all joints of the pre-fabricated panels, install FR-15 to the assembled panels with the use of 76mm x 76mm cabinet door hinges.

All edges of the installed panels should be true to profile and all exposed surfaces should be sanded smooth.

35. INSTALLATION OF KITCHEN COUNTER

Source of Materials : See Bill of Materials

Reference : Figures 76 and 77

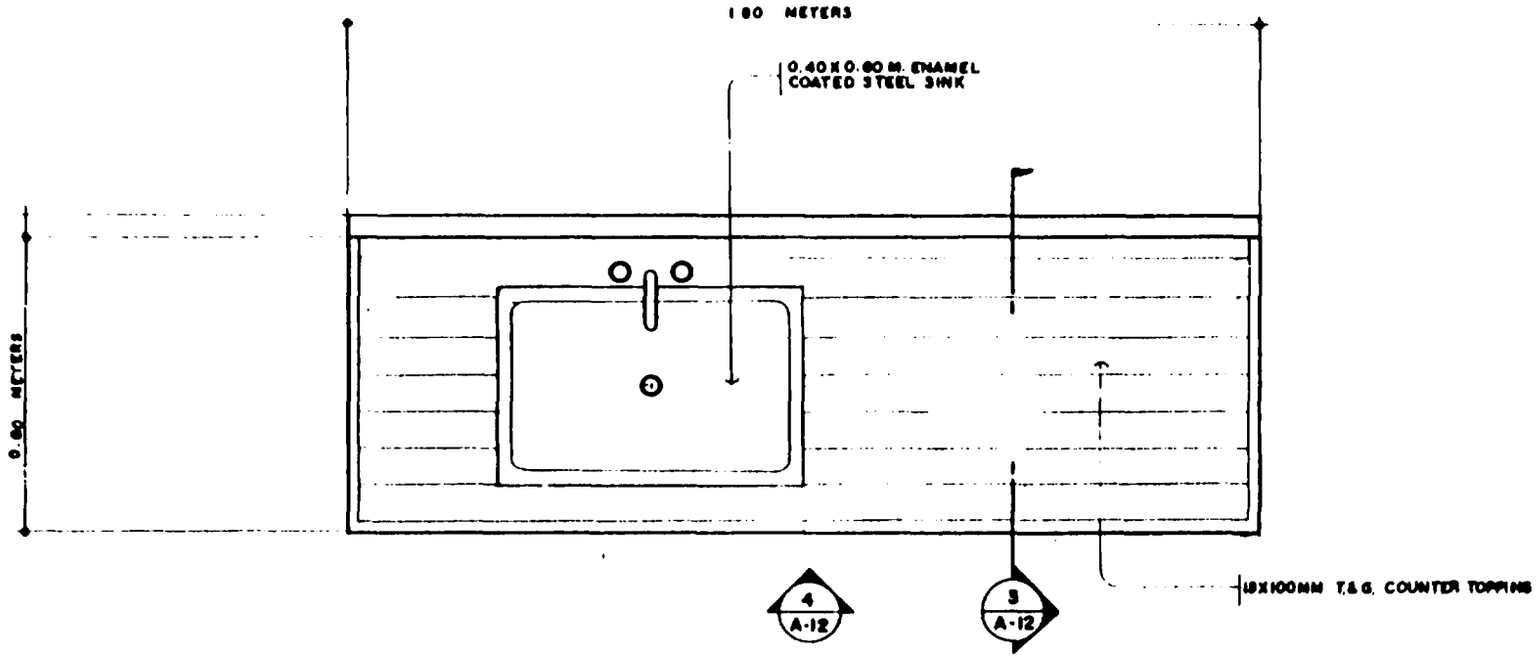
Install the 50mm x 100mm and the 50mm x 75mm kitchen counter baseboard. Nail the baseboard to the flooring directly above the floor framing. Construct the vertical cabinet frames. Install the cabinet floor frames and nailers and the frames of the splash board. After completing the framing system, nail the V-cut and tounge and groove panels to the frames. Then nail the nozing to the counter edge.

Fabricate the cabinet doors. See figures 76 and 77 for details.

Connect the fabricated door frame to the installed counter with 76mm x 76mm cabinet door hinge.

After completing the counter, sand all exposed surfaces to a smooth finish. Use disk sander on the counter topping and the sub splash board and prepare it to receive the formica counter topping and splash board. Wipe all dust and other foreign materials from the surface to receive the topping. Apply rubber glue both on the formica and the wood surface. Allow the glue to dry on the surfaces. Then install the formica.

After installation of formica, install kitchen sink and faucet and complete plumbing connections.



1 / A-12 TYPICAL PLAN OF KITCHEN COUNTER
SCALE 1:10 MTS

FIGURE 76

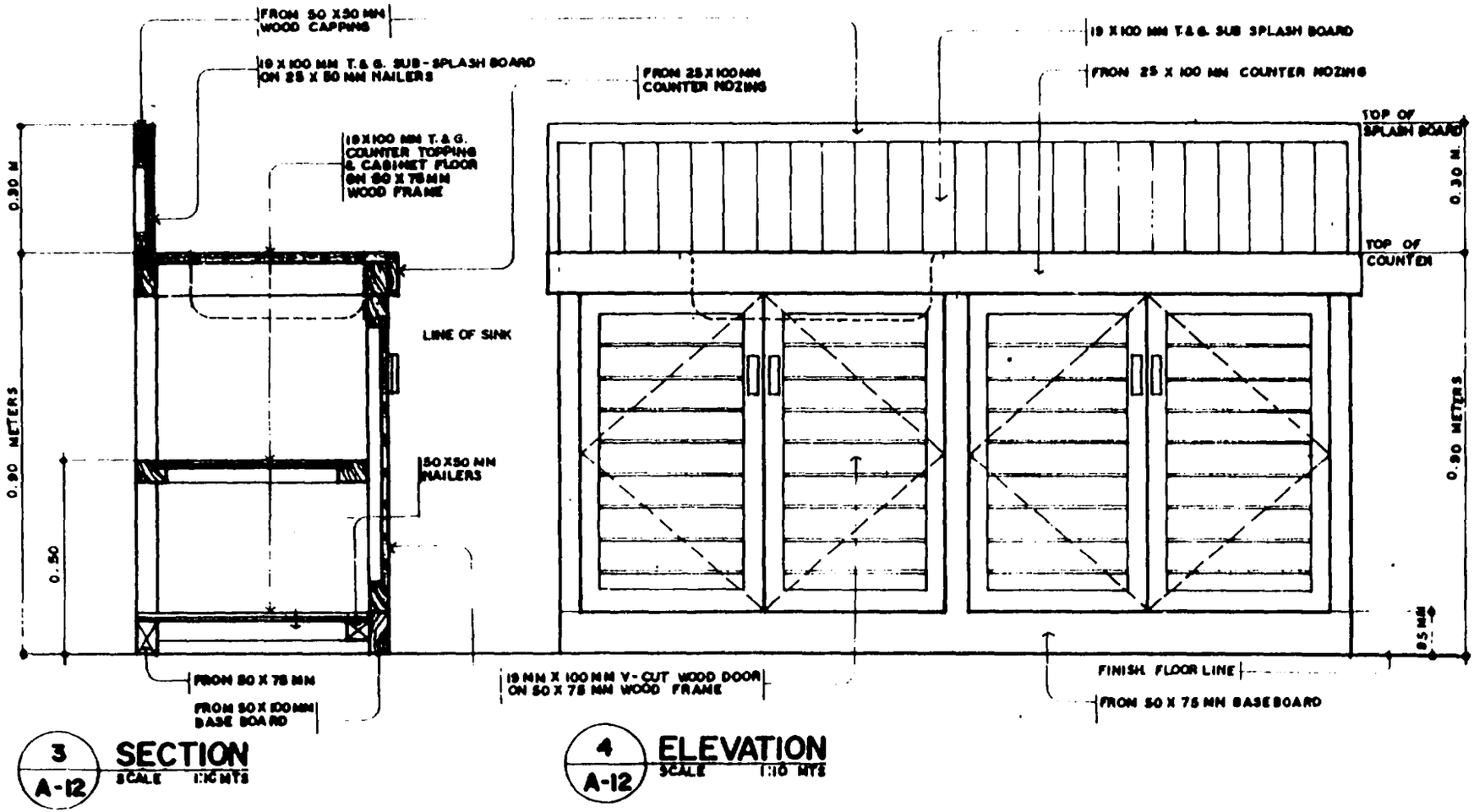

FROM 50 X 50 MM WOOD CAPPING
19 X 100 MM T. & G. SUB - SPLASH BOARD ON 25 X 50 MM NAILERS
19 X 100 MM T. & G. COUNTER TOPPING & CABINET FLOOR ON 50 X 75 MM WOOD FRAME
LINE OF SINK
50 X 50 MM NAILERS
0.30 M
0.90 METERS
0.50
FROM 50 X 75 MM
FROM 50 X 100 MM BASE BOARD
3
A-12
SECTION
SCALE 1:10 MTS
FROM 25 X 100 MM COUNTER NOZING
19 MM X 100 MM V-CUT WOOD DOOR ON 50 X 75 MM WOOD FRAME
19 X 100 MM T. & G. SUB SPLASH BOARD
FROM 25 X 100 MM COUNTER NOZING
TOP OF SPLASH BOARD
TOP OF COUNTER
0.30 M.
0.90 METERS
85 MM
FINISH FLOOR LINE
FROM 50 X 75 MM BASEBOARD
4
A-12
ELEVATION
SCALE 1:10 MTS

FIGURE 77

36. CEMENT PLASTERING OF THE CONCRETE HOLLOW BLOCK WALLS

Source of Materials : See Bill of Materials

The total thickness on the masonry shall be 15mm. For a three coat plastering, the scratch coat and the brown coat should have at least 6.3mm thickness and the hard finish is 3.2mm. thick with a minimum of 1.6mm thickness at any point. For a two coat work, the base coat is 12.7mm thick and the hard finish is the same as for a three coat work.

Level the lath for plastering, It must be plumbed and wall secured to the backing materials. Include in the leveling instrument the grounds and screeds. For walls install the screed at the base of the wall with its top about 102mm above the finished floor. The screed is run horizontally, leveled and set at the exact thickness of the finished plaster. Around all openings and at the intersection with ceiling, install the grounds.

Do not proceed with plastering work if the temperature is below 49° F.

37. INSTALLATION OF TOILET FLOOR AND WALL TILES

Source of Materials : See Bill of Materials

Reference : Figures 78 and 79

All surfaces to receive tiles should be structurally sound, plumbed, level, true, free from dust, dirt, grease or other foreign materials. Wall and floor surfaces with minor variations of 3.2mm or less shall be trued and smooth with a skim coat of adhesive applied with a flat trowel. Allow to dry before spreading more adhesive for setting the tiles. Tiles may be set dry or pre-soaked depending on methods to be used. Prepare wall tiles by soaking in clear water for not less than 5 minutes but not longer than 15 minutes. If pre-soaked method is used, excess water on tiles shall be drained before setting.

After floor and wall tiles has been in place for not less than four (4) hours, all joints shall be grouted and cleaned. Tiles which become dry after setting shall be soaked at the joints with a wet sponge, or sprayed with water before grouting to prevent cracking of the grouting compound. Grout used with floor tiles must be kept moist until properly poured.

After completion of the tile work, clean out joints between tiles and other built in fixtures and apply caulking compound tooled slightly below the tile surface.

38. INSTALLATION OF TOILET AND BATH FIXTURES

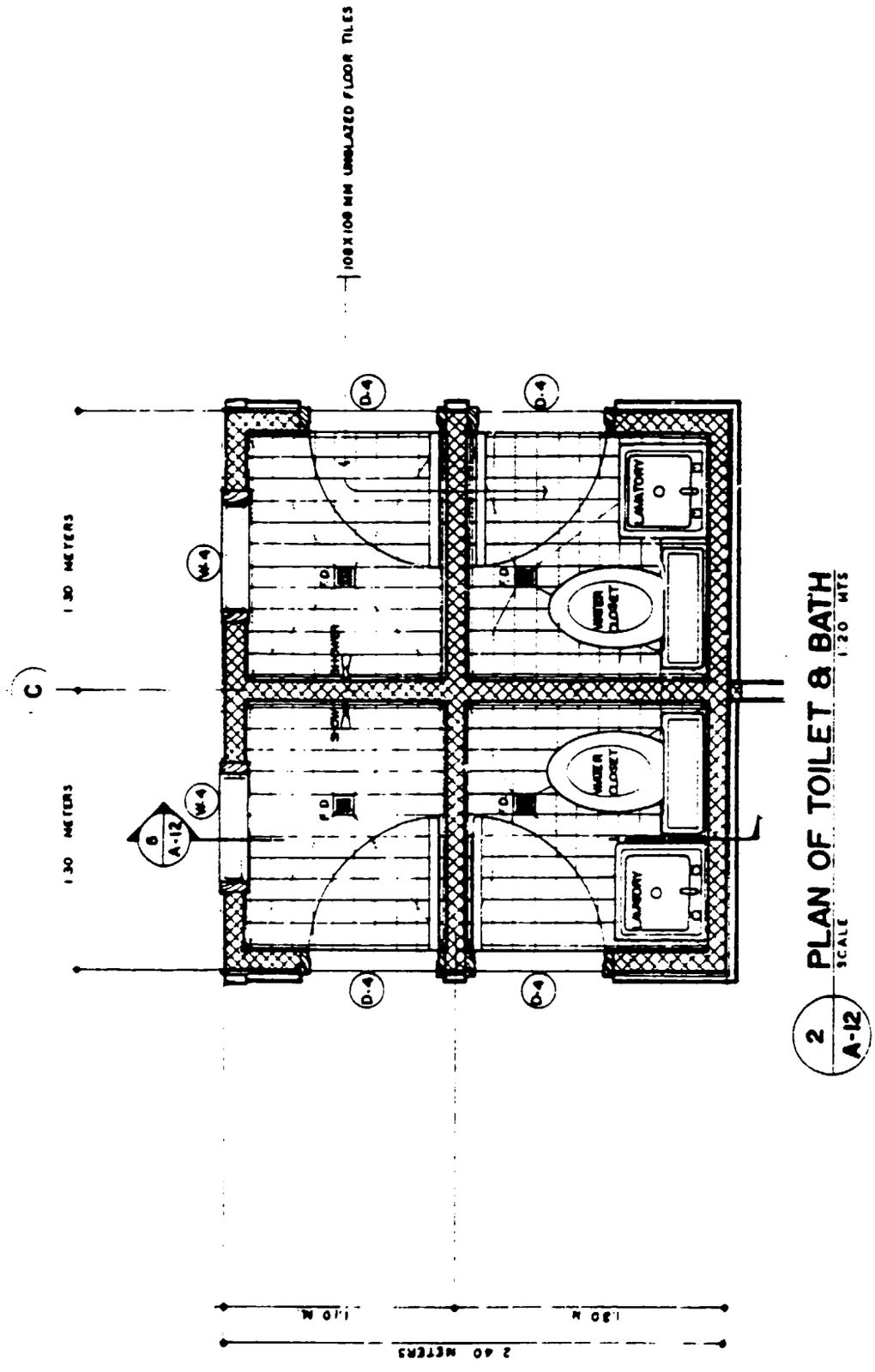
Source of Materials : See Bill of Materials

Reference : Figures 78 and 79

All plumbing fixtures and fittings must bear the trademark of the manufacturer.

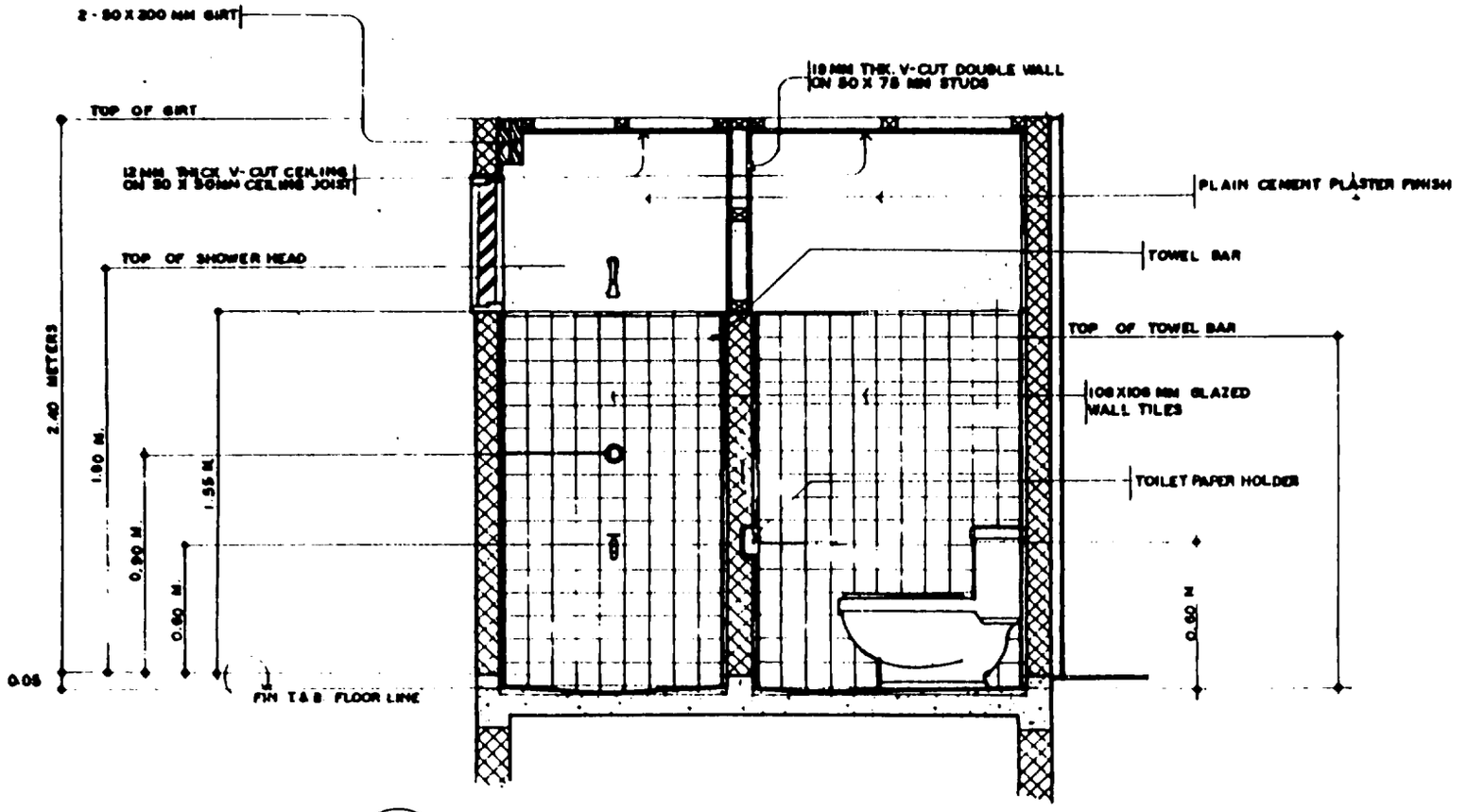
Install plumbing fixtures free and open in a manner to afford access for cleaning. Furnish and place in a rigid manner all brackets, cleats, plates and anchors required to support the fixtures.

Joints between tiles and toilet and bath fixtures and accessories should be cleaned and should be neat.



2 / A-12 PLAN OF TOILET & BATH
SCALE 1:20 MTS

FIGURE 78



5 / A-12 SECTION OF TOILET & BATH

SCALE 1.20 MTS

FIGURE 79

39. CONSTRUCTION OF SEPTIC VAULT

Source of Materials : See Bill of Materials

Excavate at designated location in plan for septic vault up to the required level. Level the bottom of the excavation and fill with gravel to a minimum thickness of 100mm. Install rebars for the septic vault flooring/footing. Provide stone or concrete spacer with a minimum diameter of 75mm to provide required clearance between rebars and gravel fill. With rebars installation of the flooring, erect all required dowel bars for the CHB wall and partition of the septic vault.

Mix and pour concrete as in procedure no. 3.

After drying of the poured concrete, proceed with the installation of the CHB wall and partitions. Follow the same direction as in procedure no. 6. Along with the CHB installation, install all embedded pipes, for the outlet, inlet and cleanouts. At the top of the completed CHB wall of the septic vault, install rebars for the reinforced concrete septic vault cover. Together with the rebar installation, mount all embedded pipes for the cleanouts. Mix and pour concrete as in procedure no. 6.

Complete septic vault connection to plumbing system and sewer lines.

40. ELECTRICAL INSTALLATION

Source of Materials : See Bill of Materials

Employ wiring system in polyvinyl chloride pipe or rigid steel conduit. Electrical roughing in should be done along with the concreting works and CHB laying for any conduit to be embedded in concrete or CHB wall.

All bends should be free from dents or flattening. Not more than the equivalent of three quarter bends shall be used in any run between terminals, cabinets, junction or full boxes, and shall enter and be secured to all boxes in such manner that each system shall be electrically continuous from point of service to all outlets. Terminals of conduits shall be furnished with locknuts and bushings. The end of each conduits shall be plugged with an approved cap or disk to prevent the entrance of foreign materials until such time when the conduits are used.

During installation, due precaution shall be taken to protect the conduits and threads from mechanical injury. The ends of the conduits shall be sealed in an approved manner during installation whenever the work is interrupted and upon completion.

Joints between lenghts of conduits and threaded connection to boxes fittings and equipment enclosures shall be made water tight by use of PVC cement, red

lead, oil or other approved compound applied to conduits.

All electrical devices, such as panel boards, convenience and power outlets, boxes, fittings and accessories, safety switches, shall be properly grounded to the nearest water pipe.

All lighting fixtures and mounting accessories shall be furnished and installed in strict accordance with the accompanying plans and manufacturers instruction manual.

41. INSTALLATION OF BEDROOM AND TOILET CEILING

Source of Materials : See Bill of Materials

Nail the ceiling joist directly to the bottom of the truss bottom chord. Secure the joist rigidly with all the necessary connections. Nail the 12mm thick ceiling board, with CW nails applying the pre-drilled nailing operation. Ceiling board joints should be neat and tightly laid.

42. PAINTING, VARNISHING AND WOOD PRESERVATION

Source of Materials : See Bill of Materials

Prior to painting and varnishing, all surfaces to be painted should be sanded smooth and cleansed of all foreign materials. Allow all surfaces to dry before proceeding to painting and varnishing works.

For complete details on the painting and varnishing works, see manufacturers instruction and architect's specification for the project.