APPENDIX E DRAINAGE

APPENDIX E-1 DENSITY OF EXISTING CREEK, SWAMP AREA AND CATCHMENT AREA IN THE REAR MOUNTAIN SITE

Area	Gross Irrigable Area (ha)	Existing Length [1] (km)	Creek Density (m/ha)	Swamp Area (ha)	Rate of Swamp Area (%)	C.A. of Rear Mountain Area [3] (ha)	Rate of C.A. (%)
Iguig	690	5.1	7.4	-	-	700	101
Alcala-Amulung	1,570	7.0	4.5	140 [2]	8.9	3,400	217
Lower Cagayan							
Aparri	11,100	113.5	10.2	3,430 [1]	32.4	9,600	86
Lal-lo	1,290	9.1	7.1	240 [2]	18.6	6,900	535
Total	14,650	134.7	9.2	3,810	27.2	20,600	141

Npte: C.A. Catchment Area
[1] Based on Topo-Map prepared by NIA- 1976
[2] Based on the Soil map prepared by B.S., 1976
[3] Based on the Military map, Scale 1 : 50,000

APPENDIX E-2 DESIGN RAINFALL FOR DRAINAGE

1) Probable Rainfall of 5 years Return Period

(Unit: mm)

Station	Maximum Daily Rainfall	Maximum Continuous 2 days Rainfall	Maximum Continuous 3 days Rainfall	Application	Remarks
Aparri	231.3	298.6	329.5	Lower-Cagayan	
Tuguegarao	211.6	284.0	292.6	Alcala-Amulung Iguig	

Source: Basic data prepared by CIADP, 1975

2) Spot Rainfall and Areal Rainfall

(Unit: mm)

	Catchment Area (sq km)	Spot Rainfall			Areal Rainfall		
		Daily	2 days	3 days	Daily	2 days	3 days
Iguig	7	211.6	284.0	292.6	182.6	245.0	252.5
Alcala-Amulung	34	211.6	284.0	292.6	172.8	232.0	239.0
Lower Cagayan							
Aparri	96	231.3	298.6	329.5	178.1	231.2	255.1
Lal-lo	69	231.3	298.6	329.5	183.2	236.5	261.0

Note: Horton's equation has been applyed to converte into the areal rainfall

APPENDIX E-3 RUN-OFF

1) Unit Run-off

Due to absence of the unit hydrograph based on the observation records, the run-off from the paddy fields was estimated from the unit hydrograph derived from Dr. Mononobe's graphic analysis which was developed graphically from Ekhal's analysis. This is a method to estimate the water balance between inner and outer water levels, and the basic equation is shown as follows.

$$\left(\frac{I_1 + I_2}{2}\right)\Delta t - \left(\frac{Q_1 + Q_2}{2}\right)\Delta t = V_2 - V_1 \quad \text{---------- (1)}$$

where; I_1 : Inflow at time t_1

I_2 : Inflow at time t_2

Q_1 : Outflow at time t_1

Q_2 : Outflow at time t_2

Δt : So short time as changing states of inflow and outflow are considered linear.

V_1 : Field surface storage at time t_1

V_2 : Field surface storage at time t_2

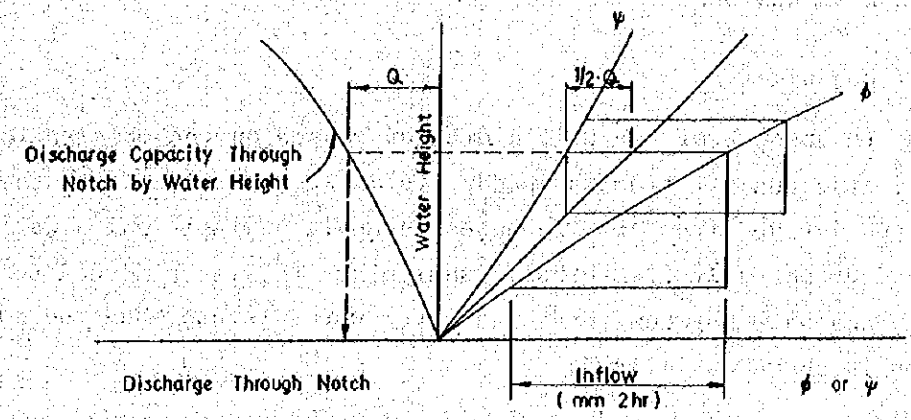
The above equation shall be transformed into

$$\phi = V + Q\cdot\frac{\Delta t}{2} \qquad \psi = V - Q\frac{\Delta t}{2}, \text{ and}$$

presented in a form of a general equation as below;

$$\phi_{n+1} = \psi_n + (I_n + I_{n+1})\frac{\Delta t}{2} \quad \text{---------- (2)}$$

Based on the above equation (2), the nomogram prepared as follows will be employed to easily make estimate of discharge through notches of the fields.



This method avails to obtain the discharge at every hour on the hour in a day, and the results are shown in Fig. E 3-1- 3, which revealed that the peak discharge from the paddy field was estimated at 6.41/s/ha in the Aparri area in the Lower Cagayan. The run-off for the mountain area was obtained from the following equation.

$$Q = R.f.A$$

Q : Discharge
R : Design rainfall
f : Run-off coefficient
A : Area of drainage basin

In estimate, 0.4 shall be applied as run-off coefficient as shown in Table E. The discharges by areas are shown in Table E 3-1.

TABLE E-3-1 UNIT RUN-OFF AND RUN-OFF

	Unit Run-off ($m^3/s/ha$)		Catchment (km^2)		(m^3/s)
	Lower Flat Area	Rear Mountain Area	Lower Flat Area	Rear Mountain Area	Run-off
Iguig	6.7	8.5	7.1	7.0	10.7
Alcala-Amulung	6.7	8.0	16.6	34.0	38.3
Lower Cagayan					
Aparri	6.4	8.3	115.0	96.0	153.3
Lal-lo	6.4	8.5	13.2	69.0	67.1

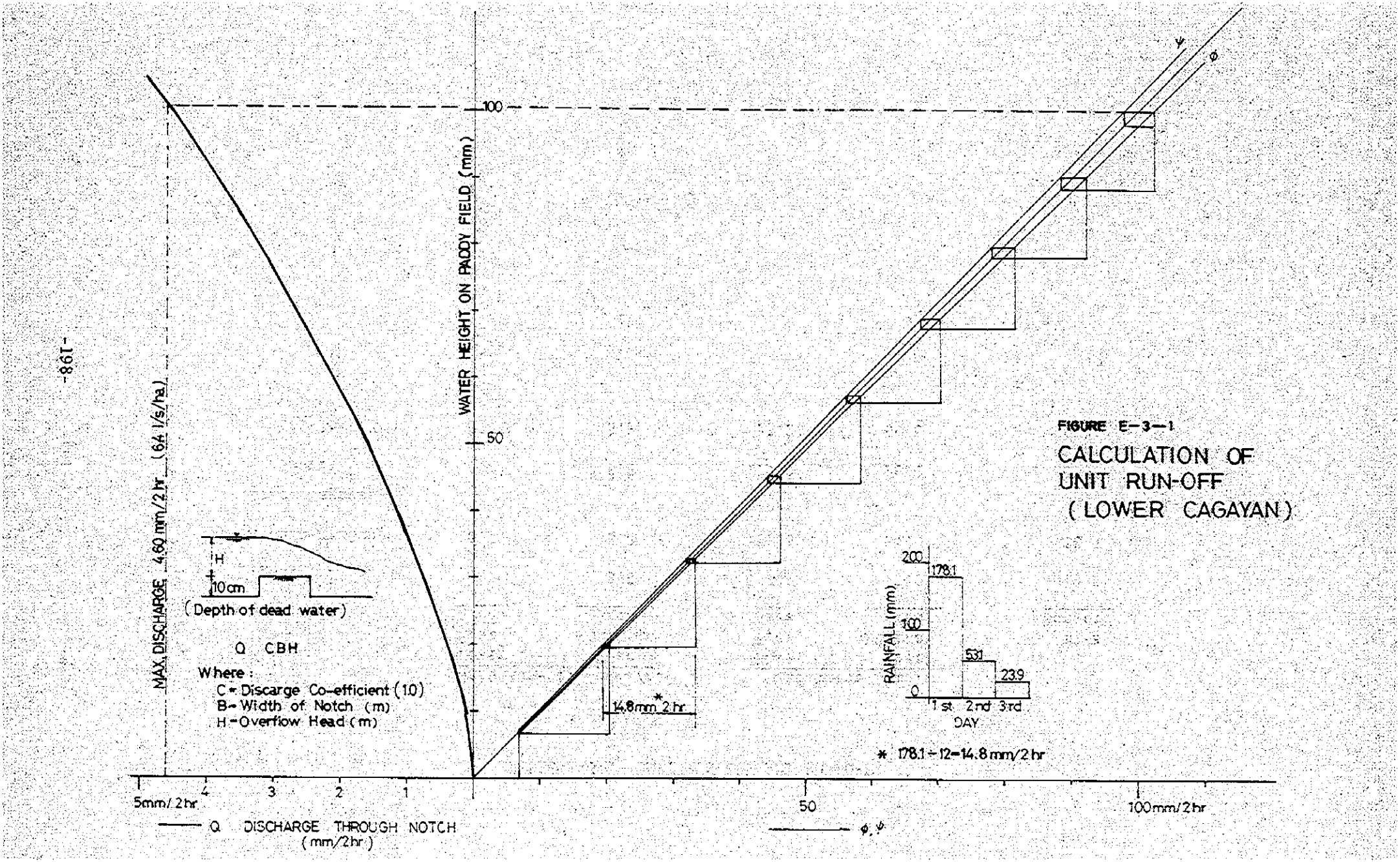


FIGURE E-3-1

CALCULATION OF UNIT RUN-OFF (LOWER CAGAYAN)

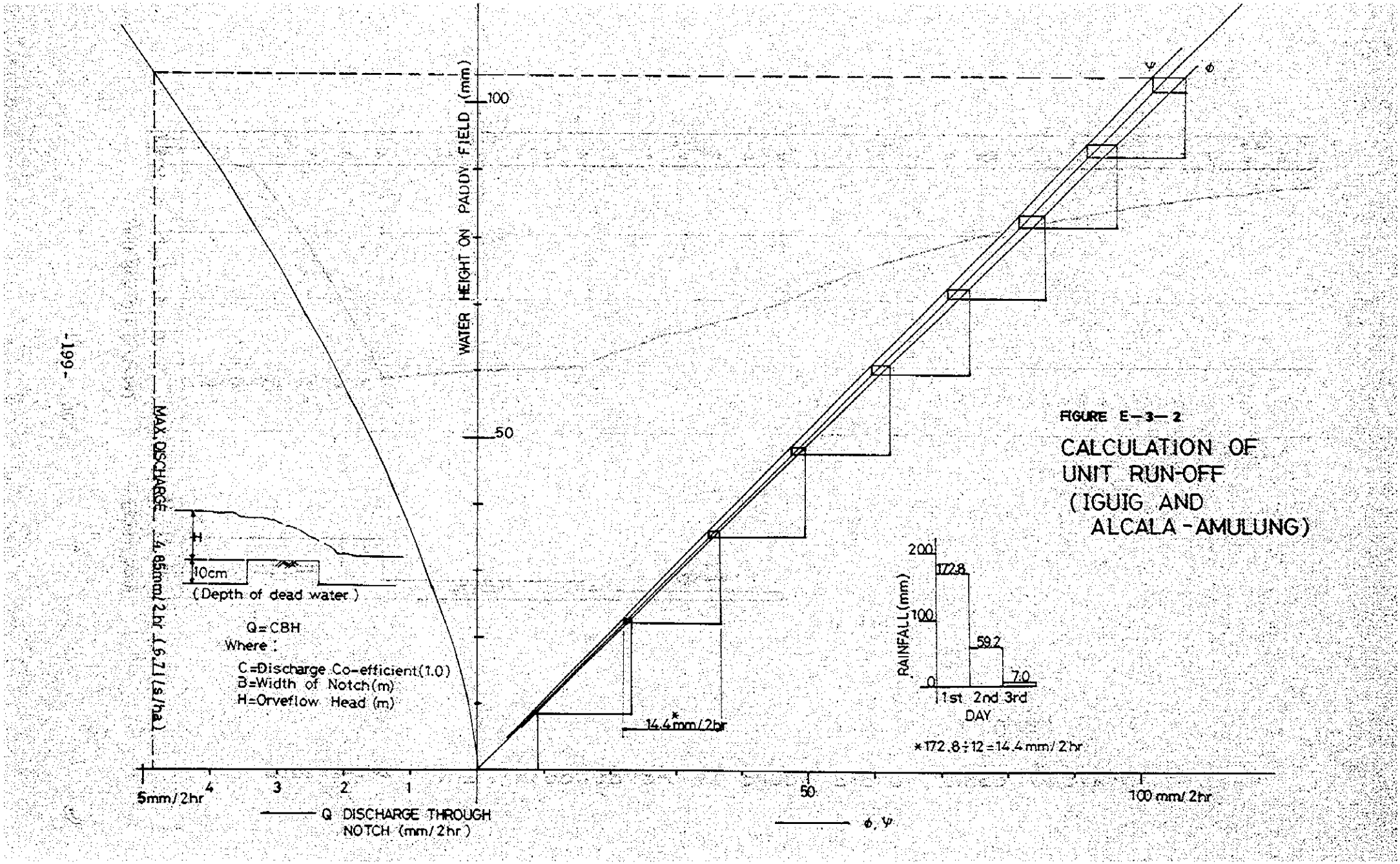
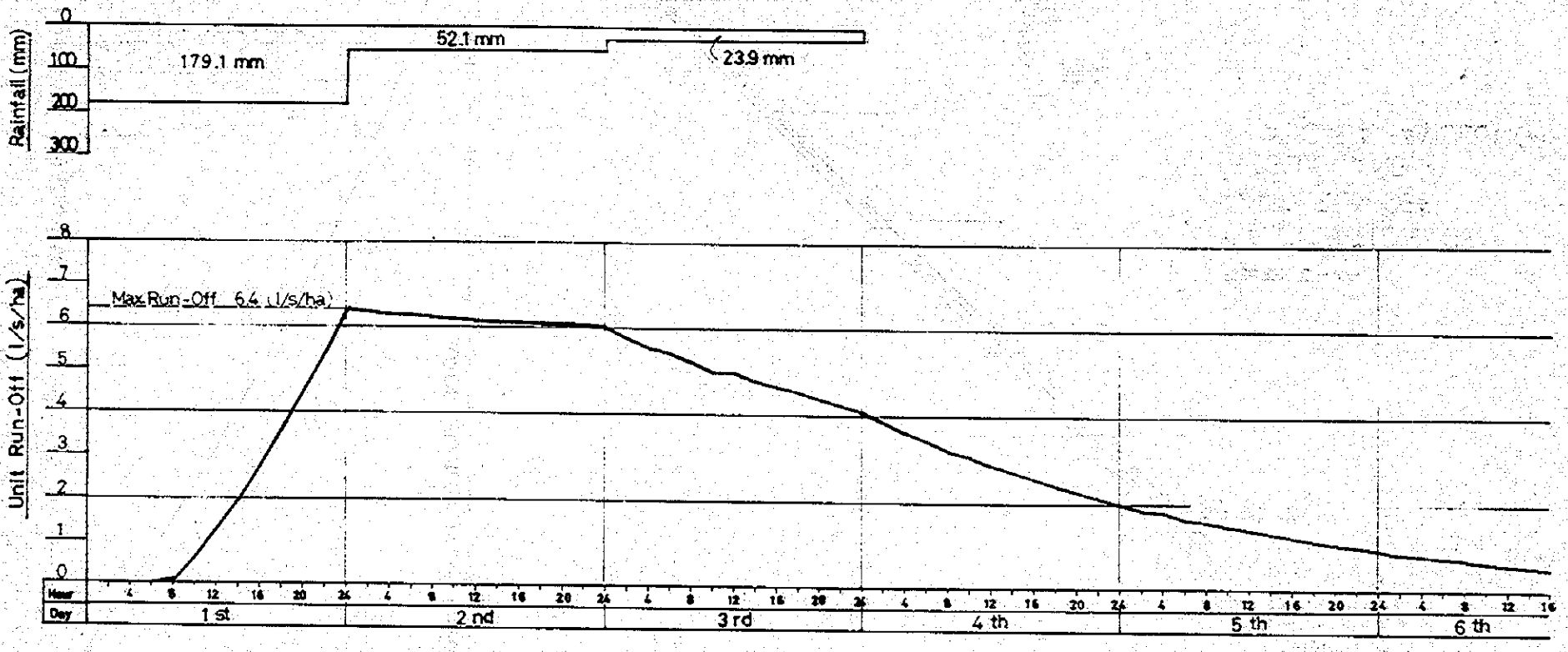


FIGURE E-3-2

CALCULATION OF UNIT RUN-OFF (IGUIG AND ALCALA-AMULUNG)

FIGURE E-3-3 UNIT HYDROGRAPH AT PADDY FIELD, LOWER CAGAYAN

(1.0 ha)



APPENDIX E-4 WATER BALANCE FOR DRAINAGE

The Aparri area in the Lower Cagayan is influenced by the sea water, and the difference between the outer and inner water levels bring about fluctuation of discharge. Then, the water balance was estimated to decide the width of the adverse tide gate to be provided accross the main canal along the seashore.

In the said estimate, the neap tide level was employed as the sea water level, and tidal curve of the Bugay river at neap tide was modified based on the observed records (observed from November to December, 1975). These results are shown in Table E-4-2. The estimate of water balance of the Aparri area was made in dividing the said area into three drainage basins and the results were illustrated in Figure E-4-3 and E-4-4.

The total innundated area counts to 456 hectares, about 90 percent of which (410 ha) shall be converted into the paddy fields. The permissible standing water depth shall be determined as 10 cm, in taking into account the fact that the second crop seedlings with about 10 cm height will be grown in the wet season.

FIGURE 8-4-1 LAYOUT MAP OF DRAINAGE SYSTEM, LOWER CAGAYAN

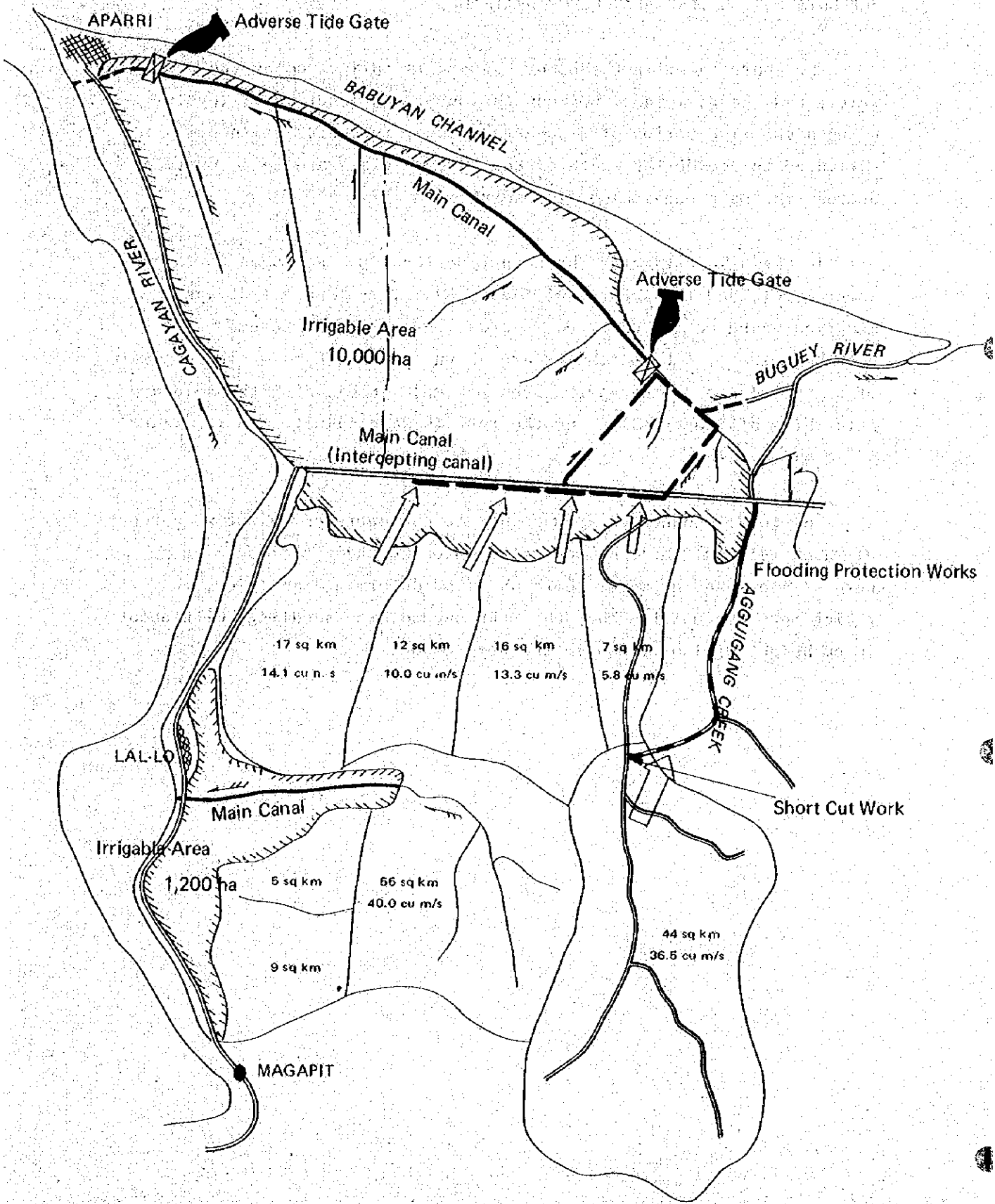
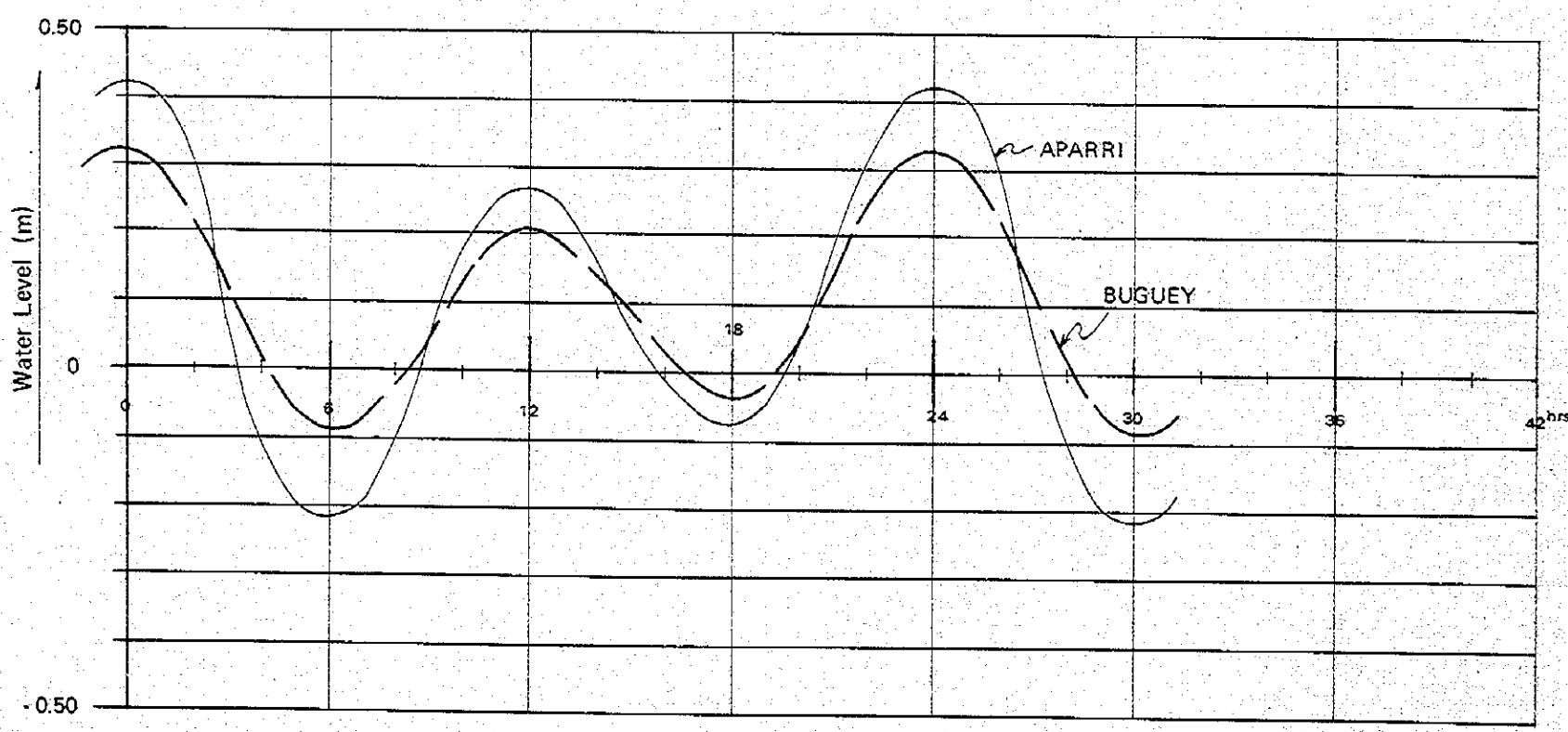


FIGURE E—4—2 TYPICAL TIDAL CURVE OF NEAP TIDE (APARRI PORT & BUGUEY)



Note: Based on Observation Data, Nov. to Dec. 1975

FIGURE E – 4 – 3 WATER HEIGHT OF FLOODING WITH PROJECT
(ACTUAL WIDTH OF GATE : 15.0 m)

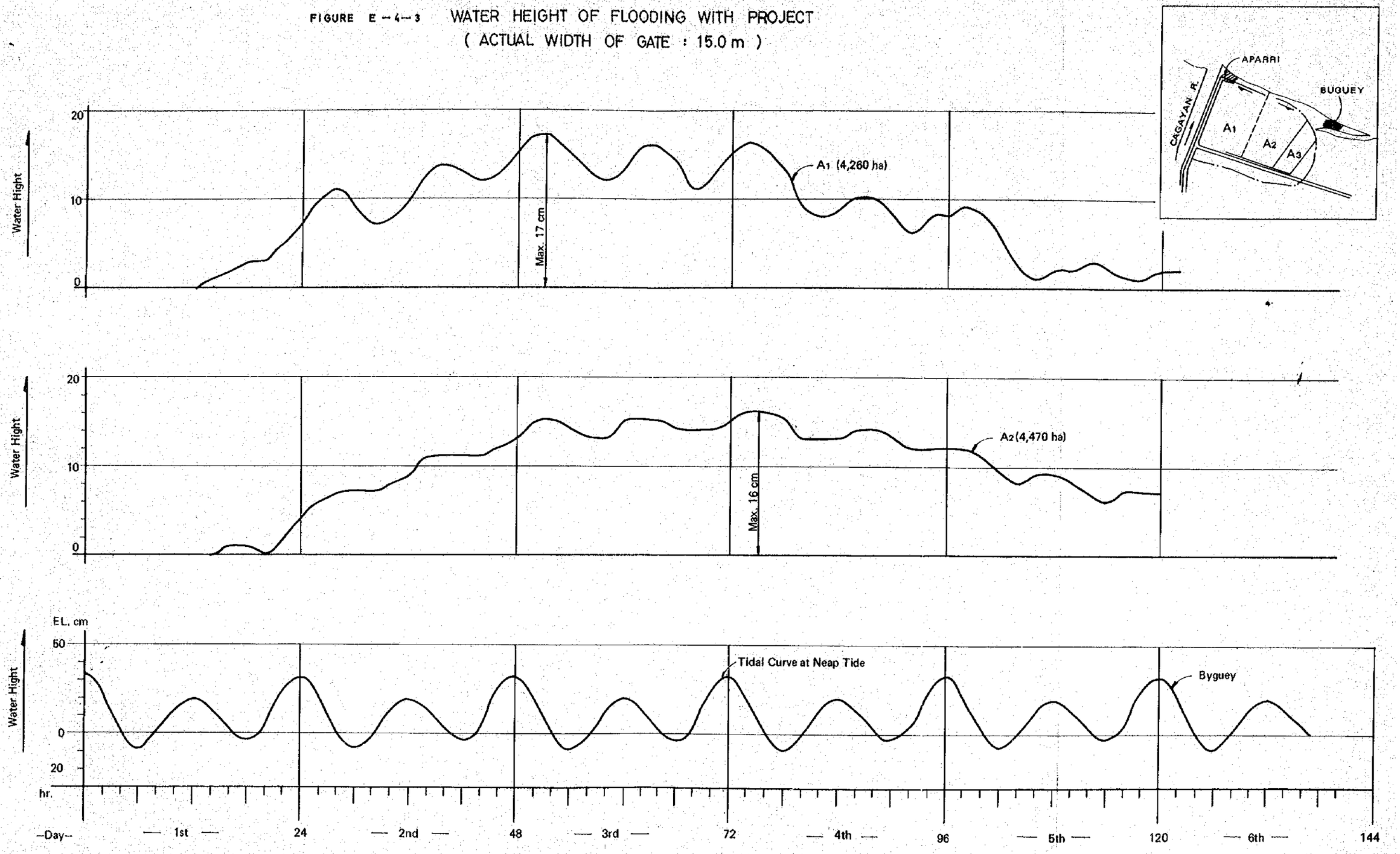
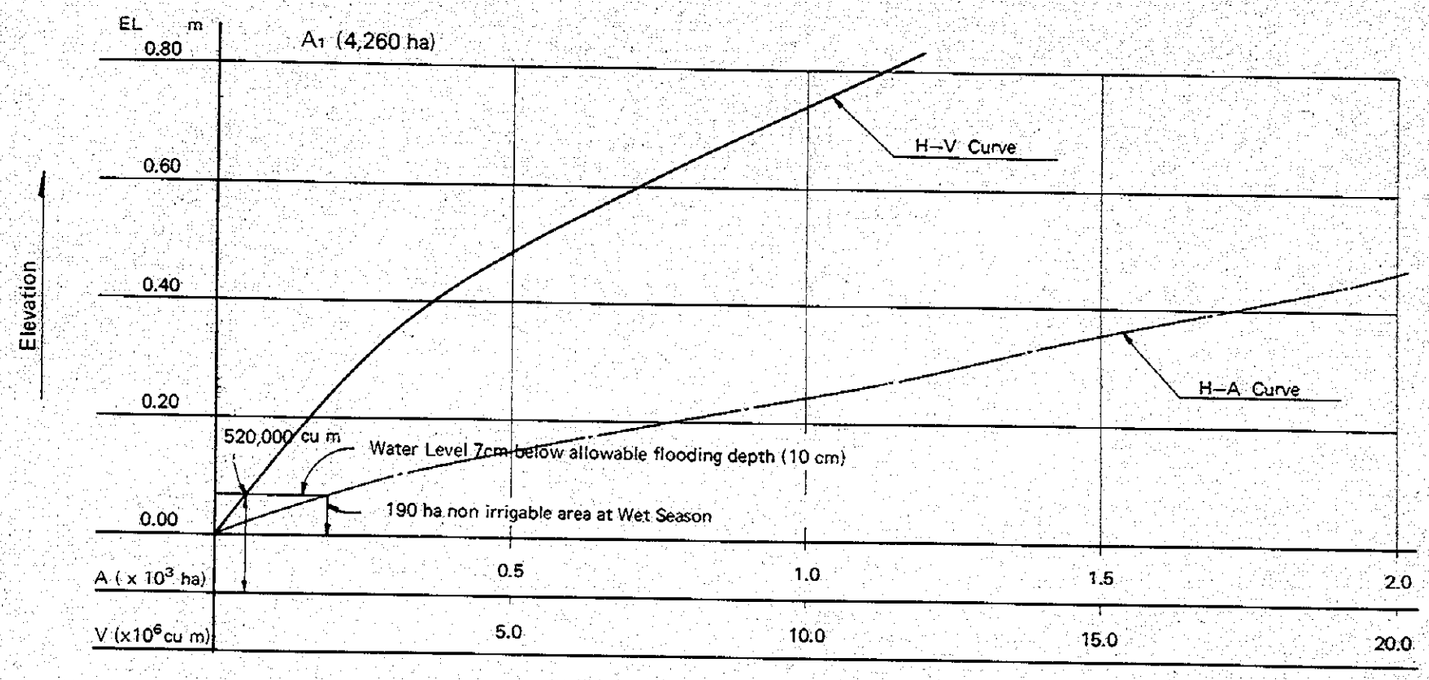
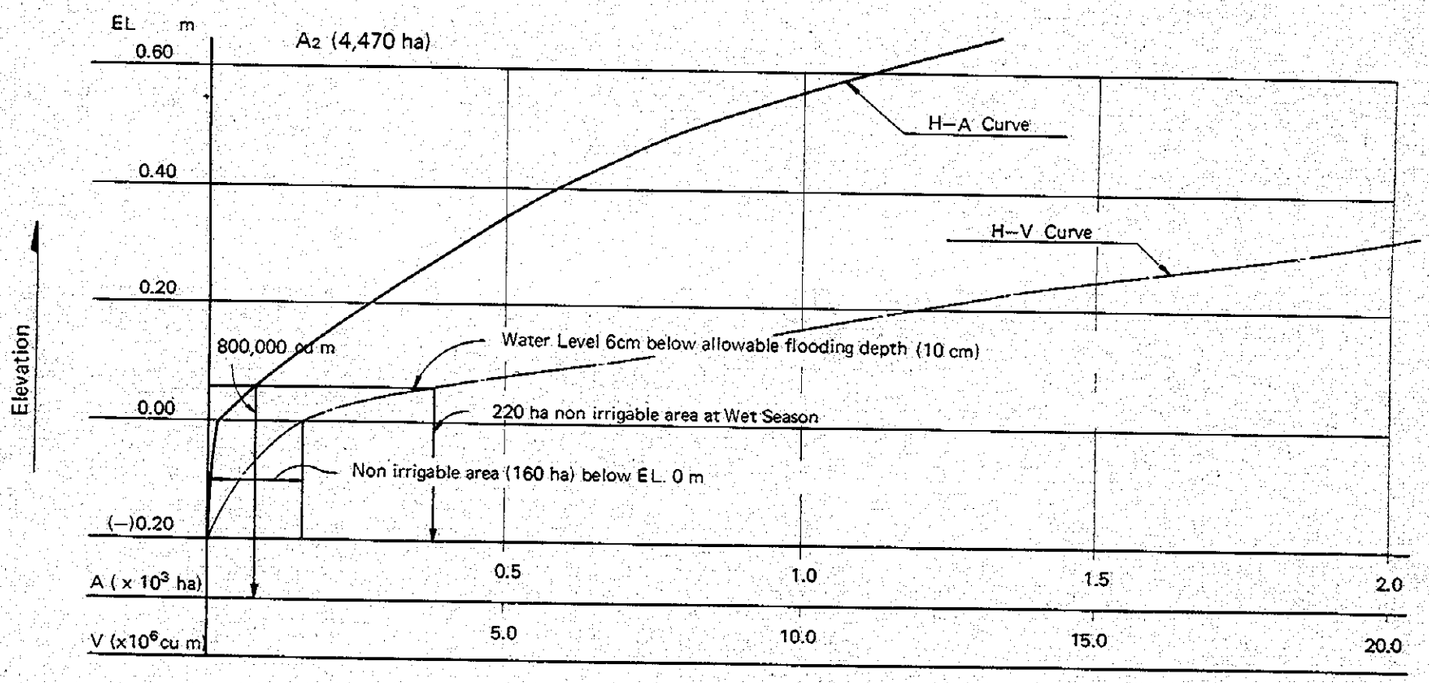
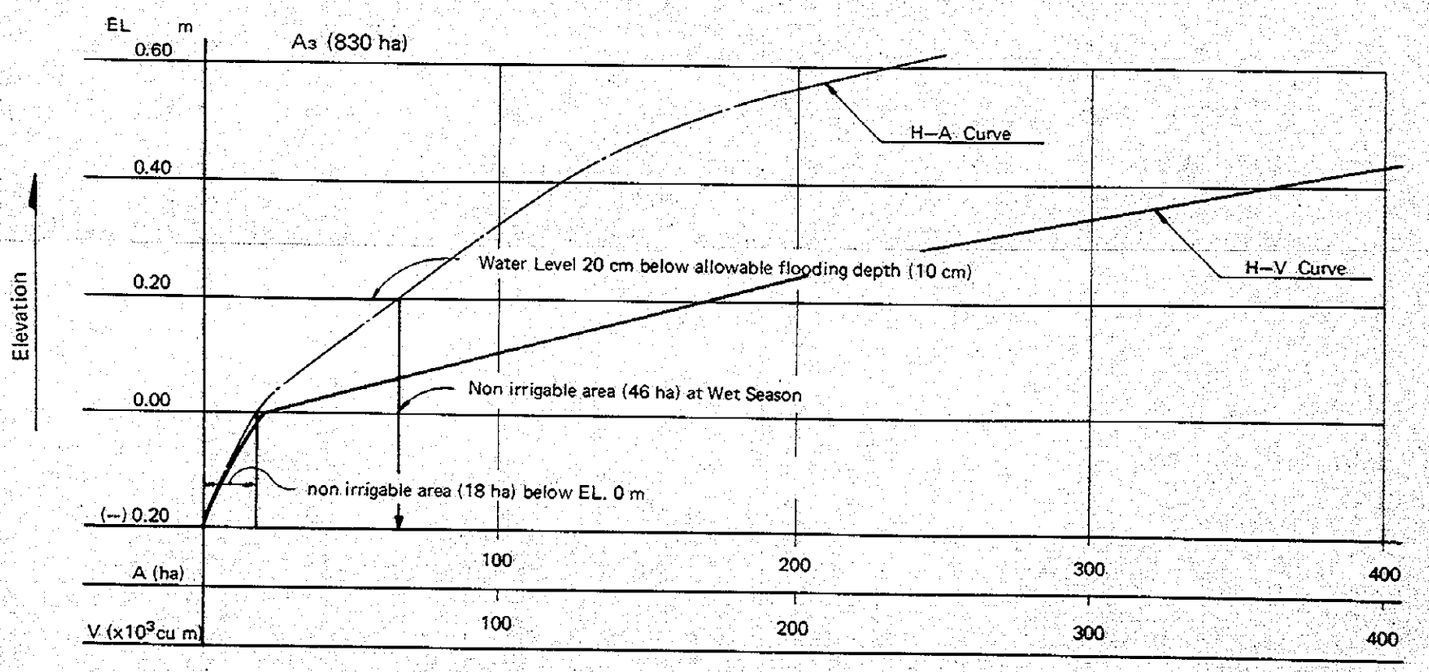


FIGURE E-4-4 SUBMERGED AREA WITH PROJECT







Notes:

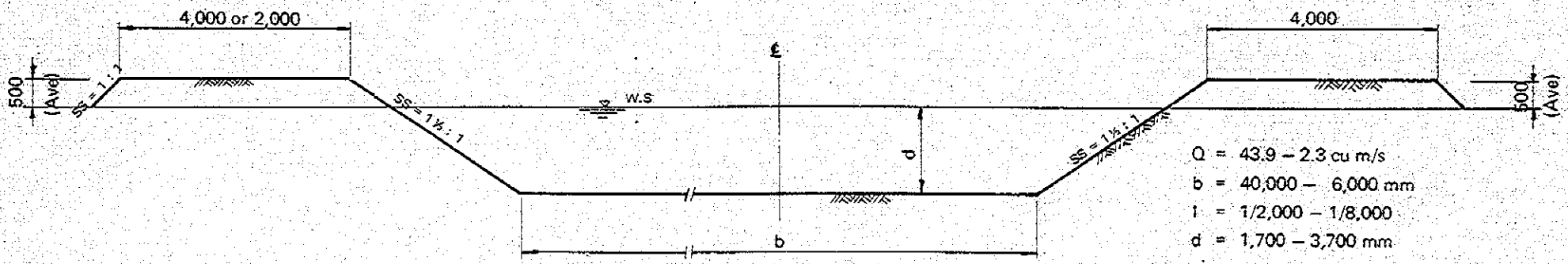
1) Based on topographic map W/0.5m counter prepared by NIA, 1976.
2) Excluding nonirrigable area below EL 0 m

APPENDIX E-5 DRINAGE SYSTEM

TABLE E-5-1 LENGTH AND DENSITY OF DRAINAGE CANAL

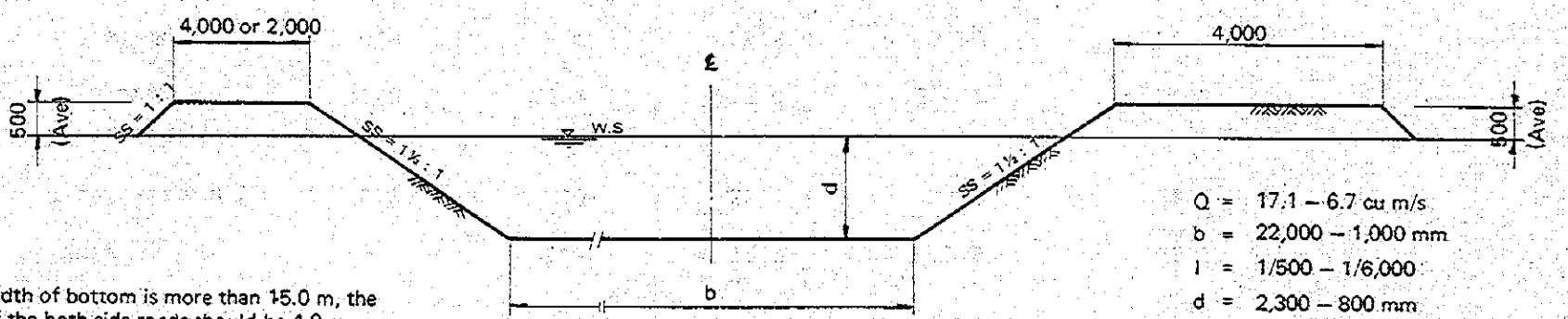
	Length (km)				Density (m/ha)
	Main	Lateral	Farm Drain	Total	
Iguig	-	6.6	12.9	19.5	32.5
Alcala-Amulung	9.9	7.8	30.1	47.8	34.1
Lower Cagayan					
Aparri	46.0	45.2	215.0	306.2	30.6
Lal-lo	4.0	9.4	25.8	39.2	32.7
Total	59.9	69.0	283.8	412.7	31.3

FIGURE E-5-1 TYPICAL SECTION OF DRAINAGE CANAL



Q = 43.9 – 2.3 cu m/s
b = 40,000 – 6,000 mm
I = 1/2,000 – 1/8,000
d = 1,700 – 3,700 mm

Main Canal

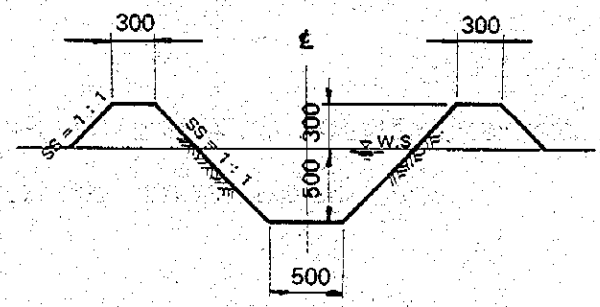


Q = 17.1 – 6.7 cu m/s
b = 22,000 – 1,000 mm
I = 1/500 – 1/6,000
d = 2,300 – 800 mm

Lateral Canal

Notes:

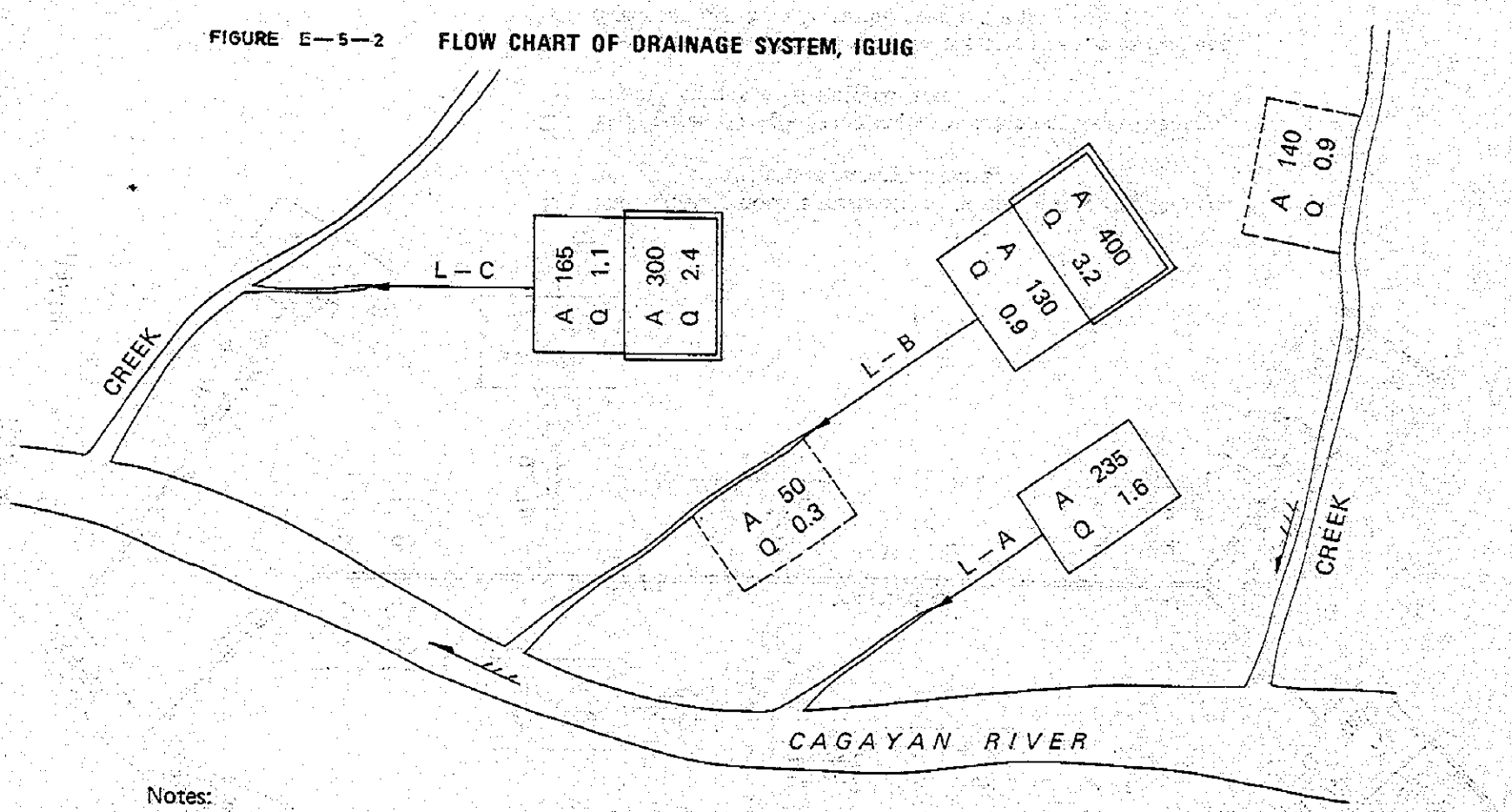
1. If the width of bottom is more than 15.0 m, the width of the both side roads should be 4.0 m for maintenance
2. If the width of bottom is less than 15.0 m, the width of the roads should be 2.0 m on one side, 4.0 m on the other.
3. For farm drain no roads are provided.



Q = 78.1 – 132.5 ℓ/s
I = 1/1,000 – 1/1,500

Farm Drain

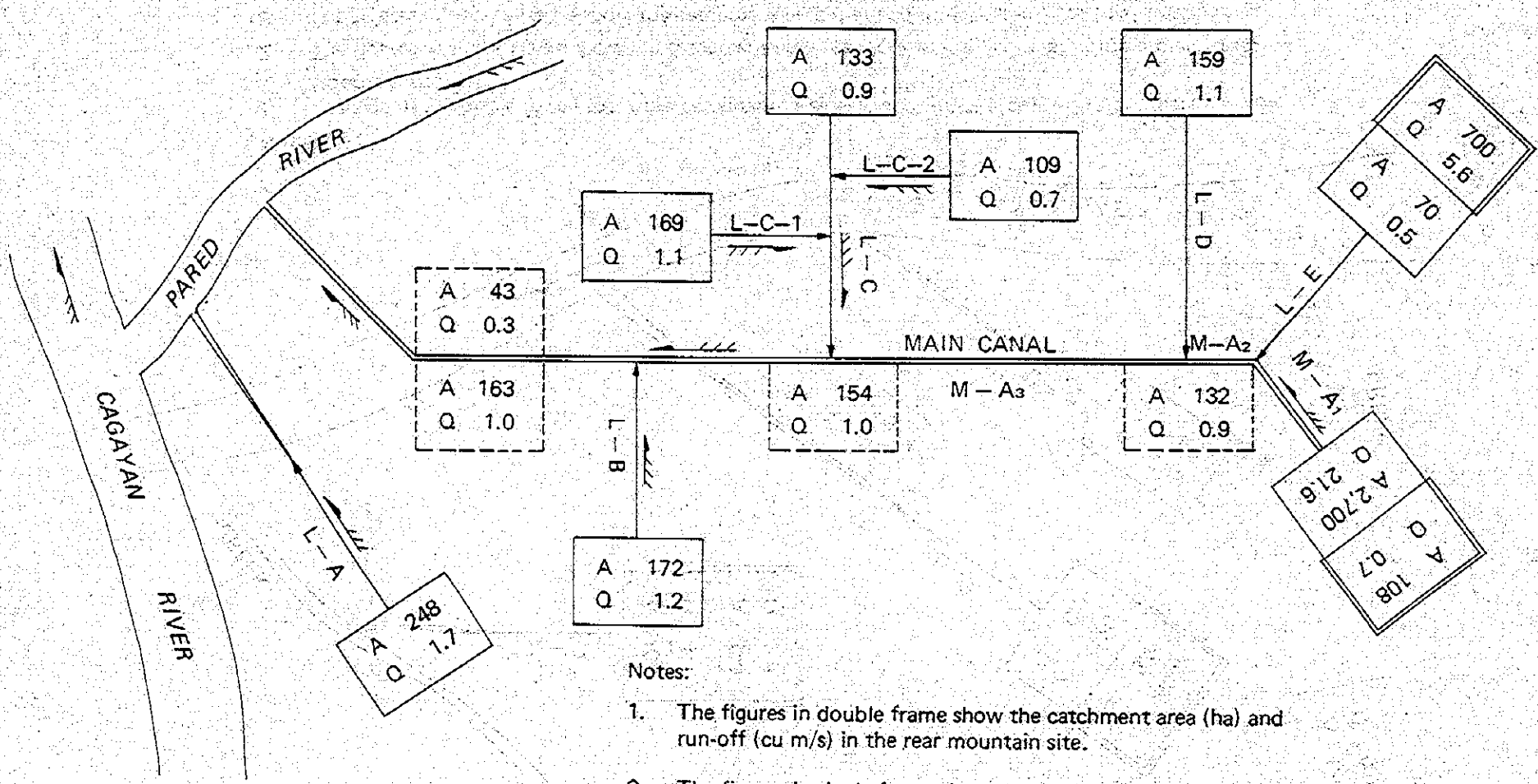
FIGURE E—5—2 FLOW CHART OF DRAINAGE SYSTEM, IGUIG



Notes:

1. The figures in double frame show the catchment area (ha) and run-off (cu m/s) in the rear mountain site.
2. The figures in single frame show the catchment area (ha) and run-off (cu m/s) in the project area.
3. The figures in dotted frame show the catchment area (ha) and direct run-off (cu m/s) to the river in the project area.

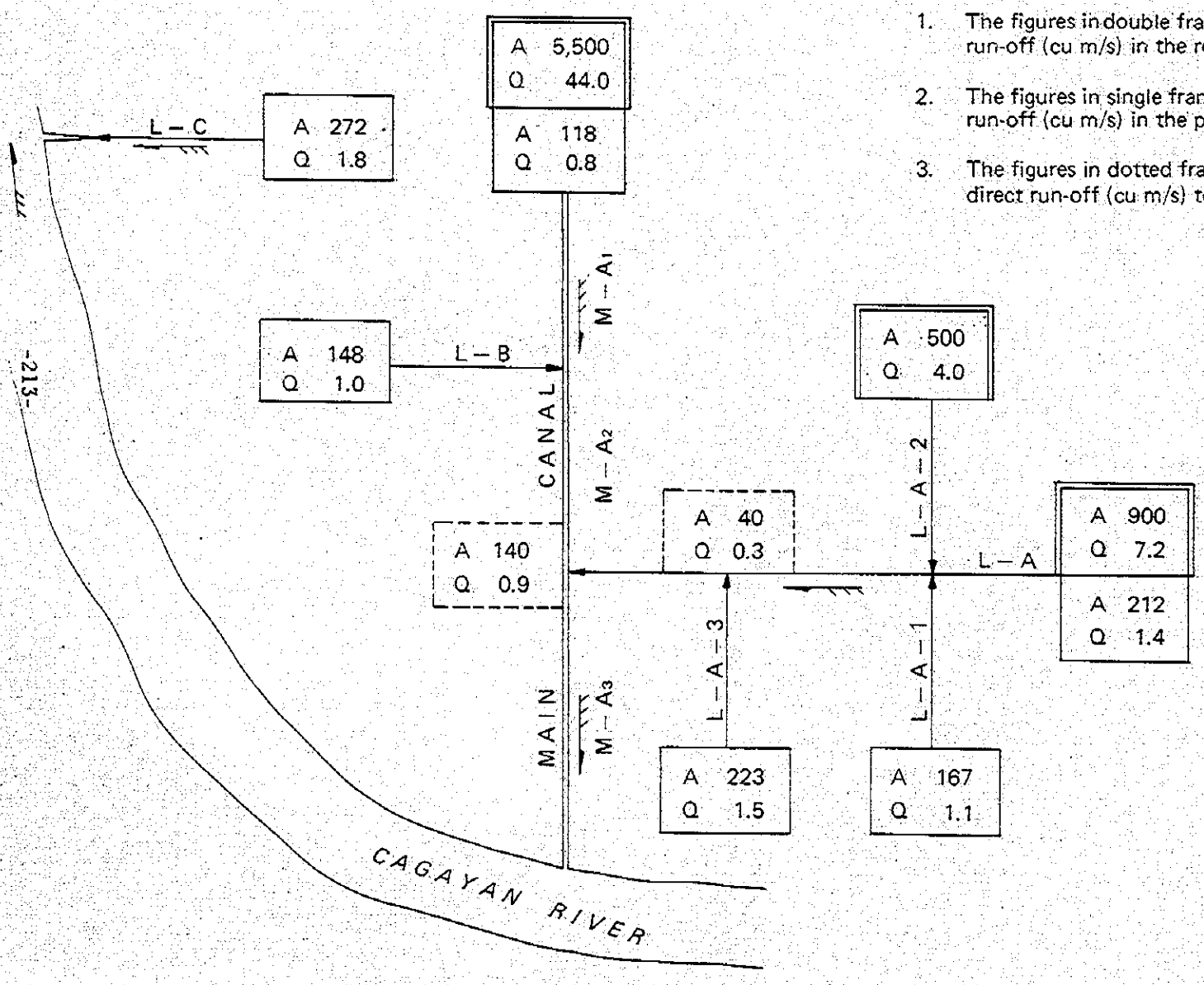
FIGURE E – 5 – 3 FLOW CHART OF DRAINAGE SYSTEM, ALCALA-AMULUNG



Notes:

1. The figures in double frame show the catchment area (ha) and run-off (cu m/s) in the rear mountain site.
2. The figures in single frame show the catchment area (ha) and run-off (cu m/s) in the project area.
3. The figures in dotted frame show the catchment area (ha) and direct run-off (cu m/s) to the river in the project area.

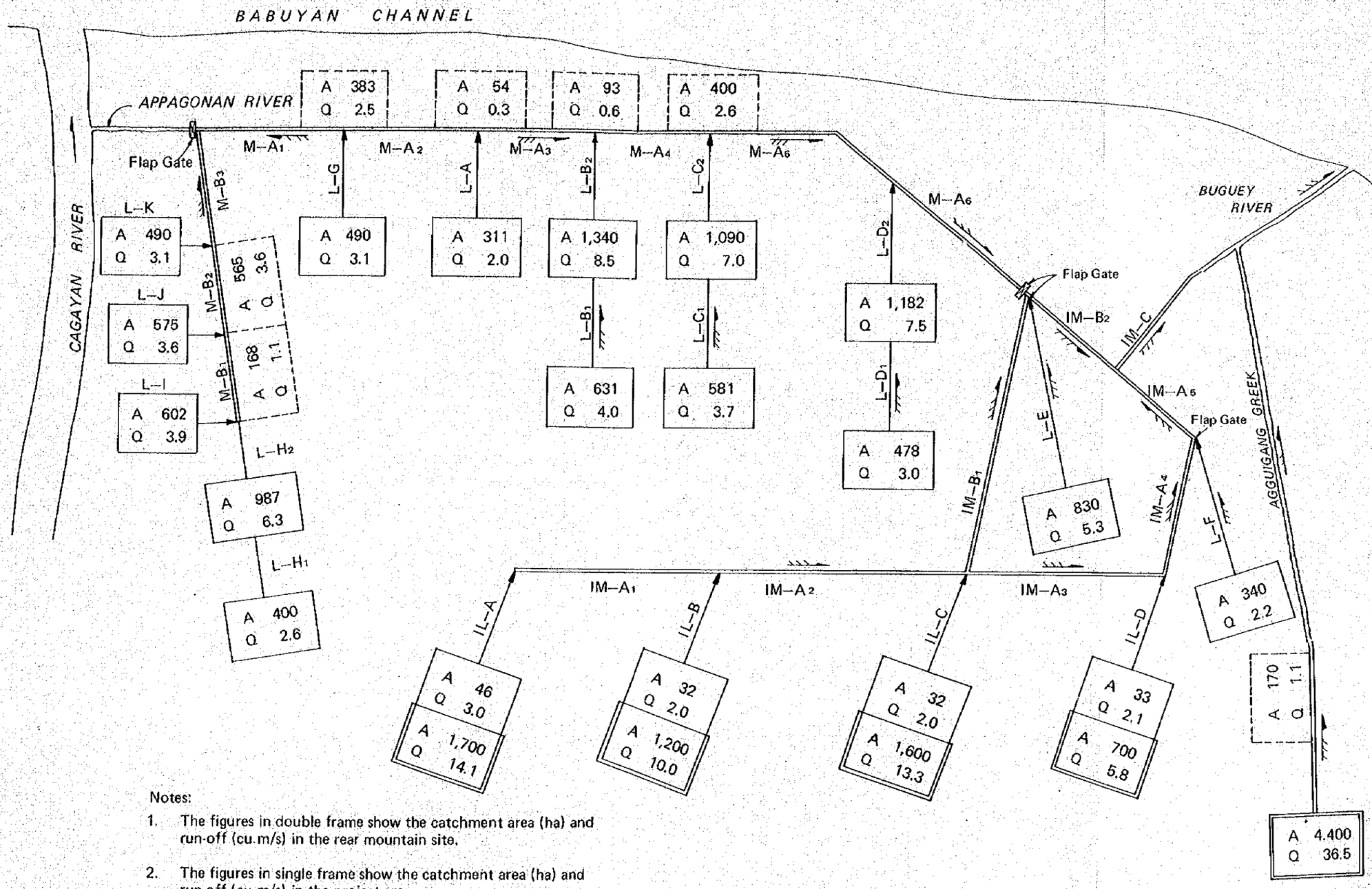
FIGURE E-5-4 FLOW CHART OF DRAINAGE SYSTEM, LOWER CAGAYAN (LAL-LO)



Notes:

1. The figures in double frame show the catchment area (ha) and run-off (cu m/s) in the rear mountain site.
2. The figures in single frame show the catchment area (ha) and run-off (cu m/s) in the project area.
3. The figures in dotted frame show the catchment area (ha) and direct run-off (cu m/s) to the river in the project area.

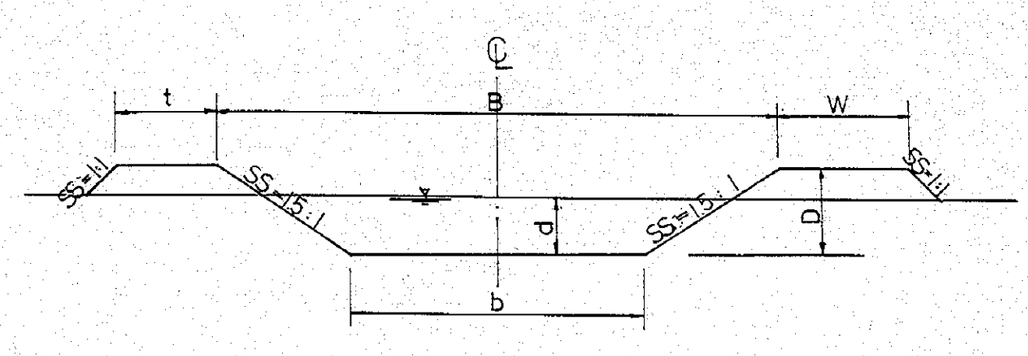
FIGURE E—5—5 FLOW CHART OF DRAINAGE SYSTEM, LOWER CAGAYAN (APARRI)



Notes:

1. The figures in double frame show the catchment area (ha) and run-off (cu.m/s) in the rear mountain site.
2. The figures in single frame show the catchment area (ha) and run-off (cu m/s) in the project area.
3. The figures in dotted frame show the catchment area (ha) and direct run-off (cu m/s) to the river in the project area.

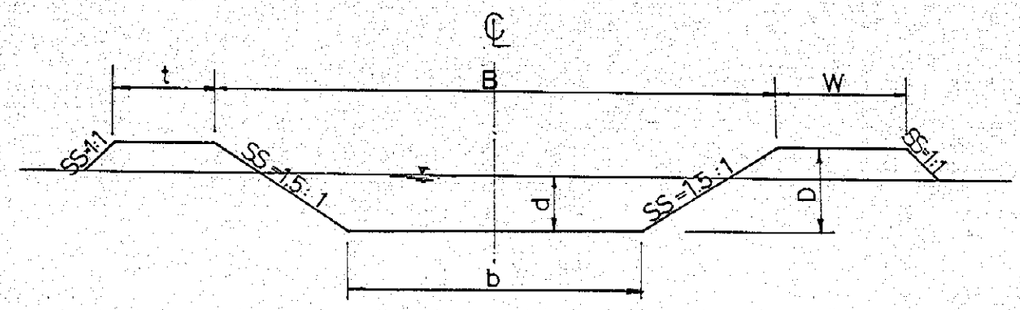
TABLE E-5-2 ELEMENTS OF MAIN DRAINAGE CANAL SECTION



Project Area	Name of Canal	Canal Length (m)	Drainage Area (1) (ha)	Drainage Area (2) (ha)	Total Run-off cu m/s	Slope of Canal	b (m)	d (m)	D (m)	τ (m)	B (m)	W (m)
IGUIG	–	–										
Total												
ALCALA-AMULUNG	M - A_1	1,200	108	2,700	22.3	1 : 1,400	9.0	1.8	2.3	2.0	15.9	4.0
	M - A_2	600	178	3,400	28.4	1 : 1,400	10.0	1.9	2.5	2.0	17.5	4.0
	M - A_3	8,050	1,412	3,400	36.6	1 : 1,400	12.0	2.0	3.0	2.0	21.0	4.0
Total		9,850										
LOWER CAGAYAN												
APARRI	IM - A_1	1,100	460	1,700	17.1	1 : 6,000	16.0	1.7	2.4	–	23.2	4.0
	IM - A_2	1,200	780	2,900	29.2	1 : 6,000	27.0	1.7	2.4	–	34.2	4.0
	IM - A_3	3,600	385	1,900	14.1	1 : 6,000	13.0	1.7	2.9	–	21.7	4.0
	IM - A_4	2,600	715	2,600	22.0	1 : 6,000	21.0	1.7	3.4	4.0	31.2	4.0
	IM - A_5	600	1,055	2,600	22.0	1 : 6,000	21.0	1.7	3.9	4.0	32.7	6.0
	IM - B_1	5,100	715	2,600	21.9	1 : 6,000	17.0	1.9	3.3	4.0	26.9	4.0
	IM - B_2	1,600	6,015	2,600	40.5	1 : 8,000	40.0	1.8	4.0	4.0	52.0	6.0
	IM - C	2,400	7,070	5,200	43.9	1 : 8,000	40.0	1.9	4.2	4.0	52.6	4.0
	M - A_1	5,300	873	–	5.6	1 : 5,500	12.0	1.0	3.0	2.0	21.0	6.0
	M - A_2	2,600	–	–	–	Level	6.0	–	3.0	2.0	15.0	6.0
	M - A_3	1,300	365	–	2.3	1 : 8,000	6.0	1.0	3.0	2.0	15.0	6.0
	M - A_4	2,000	1,798	–	11.4	1 : 8,000	24.0	1.2	3.0	4.0	33.0	6.0
	M - A_5	2,600	3,288	–	21.0	1 : 8,000	36.0	1.3	3.2	4.0	45.6	6.0
	M - A_6	2,000	4,470	–	28.5	1 : 8,000	36.0	1.6	4.0	4.0	48.0	6.0
	M - B_1	2,000	1,757	–	11.3	1 : 6,000	22.0	1.1	2.0	4.0	28.0	4.0
	M - B_2	3,400	2,897	–	18.5	1 : 6,000	27.0	1.3	2.4	4.0	34.2	4.0
	M - B_3	600	3,387	–	21.6	1 : 6,000	27.0	1.4	3.1	4.0	36.3	4.0
	Agguigan Creek	3,000	–	4,400	36.5	1 : 2,000	6.0	3.0	4.0	2.0	18.0	4.0
		3,000	–	4,400	36.5	1 : 4,000	10.0	3.0	4.0	2.0	22.0	4.0
Sub-total		46,000										
LAL-LO	M - A_1	1,400	118	5,500	44.8	1 : 2,000	7.0	3.2	6.0	2.0	25.0	4.0
	M - A_2	1,100	266	5,500	45.8	1 : 3,000	8.0	3.4	6.0	2.0	26.0	4.0
	M - A_3	1,500	1,040	6,900	62.2	1 : 3,000	10.0	3.7	6.0	2.0	28.0	4.0
Sub-total		4,000										
Total		50,000										
Ground Total		59,850										

Notes: Drainage Area (1) means the area in the project boundary
Drainage Area (2) means the area of the rear mountain site
The figure of D shows the average hight

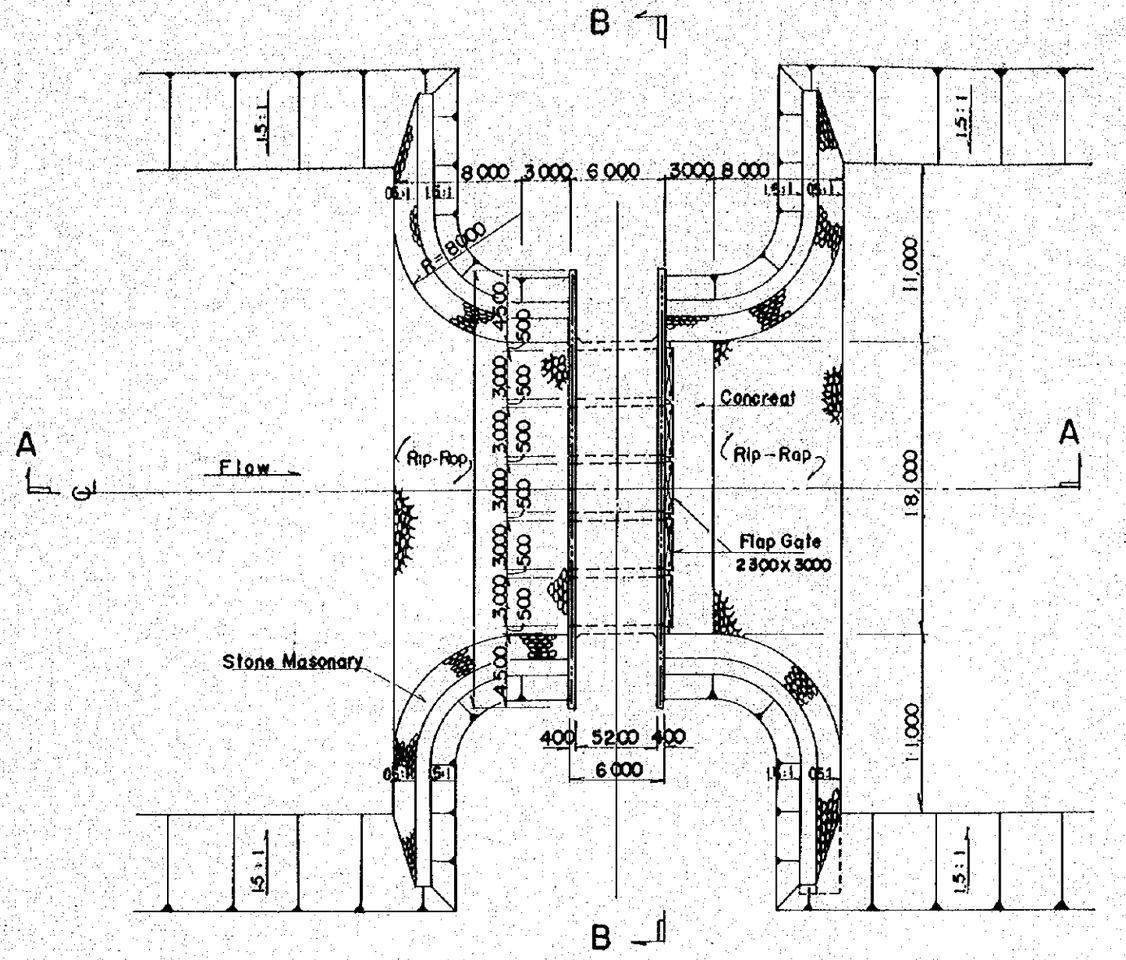
TABLE E—5—3 ELEMENTS OF LATERAL DRAINAGE CANAL SECTION



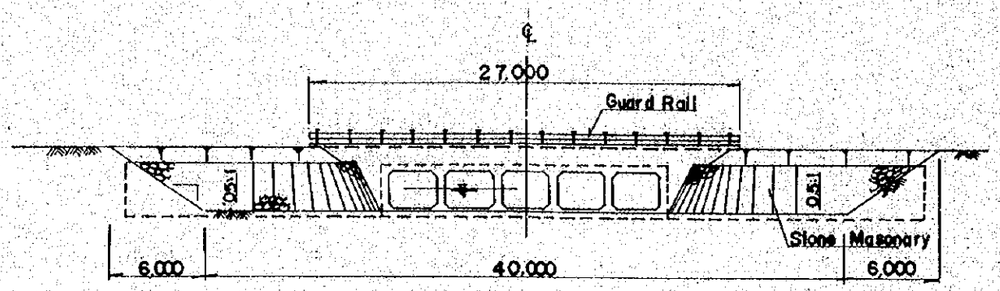
Project Area	Name of Canal	Canal Length (m)	Drainage Area (1) (ha)	Drainage Area (2) (ha)	Total Run-off cu m/s	Slope of Canal	b (m)	d (m)	D (m)	τ (m)	B (m)	W (m)
IGUIG	L - A	2,100	235	–	1.6	1 : 1,000	1.0	1.0	1.5	2.0	5.5	4.0
	L - B	1,400	130	400	4.1	1 : 1,500	3.0	1.2	1.7	2.0	8.1	4.0
	L - C	3,100	165	300	3.5	1 : 3,000	3.0	1.3	1.8	2.0	8.4	4.0
Total		6,600										
ALCALA-AMULUNG												
	L - A	1,200	248	–	1.7	1 : 1,000	2.0	0.8	1.5	2.0	6.5	4.0
	L - B	800	172	–	1.2	1 : 1,000	2.0	0.7	1.5	2.0	6.5	4.0
	L - C	1,700	411	–	2.7	1 : 1,000	2.0	1.0	1.5	2.0	6.5	4.0
	L - C - 1	1,100	169	–	1.1	1 : 500	1.0	0.7	1.5	2.0	5.5	4.0
	L - C - 2	600	109	–	0.7	1 : 1,000	1.0	0.6	1.5	2.0	5.5	4.0
	L - D	1,500	159	–	1.1	1 : 500	1.0	0.7	1.5	2.0	5.5	4.0
	L - E	900	70	700	6.1	1 : 500	5.0	0.9	1.5	2.0	9.5	4.0
Total		7,800										
LOWER CAGAYAN												
APARRI	IL - A	2,300	460	1,700	17.1	1 : 3,000	14.0	1.5	2.4	2.0	21.2	4.0
	IL - B	2,300	320	1,200	12.0	1 : 3,000	9.0	1.5	2.2	2.0	15.6	4.0
	IL - C	1,800	320	1,600	15.3	1 : 3,000	11.0	1.6	2.3	2.0	17.9	4.0
	IL - D	1,400	330	700	7.9	1 : 3,000	6.0	1.5	3.4	2.0	16.2	4.0
	L - A	1,300	311	–	2.0	1 : 6,000	6.0	0.8	1.7	2.0	11.1	4.0
	L - B_1	3,900	631	–	4.0	1 : 6,000	13.0	0.8	1.4	2.0	17.2	4.0
	L - B_2	3,400	1,340	–	8.5	1 : 6,000	22.0	0.9	1.7	2.0	27.1	4.0
	L - C_1	2,400	581	–	3.7	1 : 6,000	7.0	1.1	1.8	2.0	12.4	4.0
	L - C_2	3,200	1,090	–	7.0	1 : 6,000	14.0	1.1	2.0	2.0	20.0	4.0
	L - D_1	1,900	478	–	3.0	1 : 6,000	3.0	1.4	2.0	2.0	9.0	4.0
	L - D_2	2,500	1,182	–	7.5	1 : 6,000	8.0	1.5	2.5	2.0	15.5	4.0
	L - E	3,600	830	–	5.3	1 : 4,000	4.0	2.3	2.8	2.0	12.4	4.0
	L - F	1,400	340	–	2.2	1 : 3,000	3.0	1.5	2.2	2.0	9.6	4.0
	L - G	1,800	490	–	3.1	1 : 5,000	8.0	0.9	1.8	2.0	13.4	4.0
	L - H_1	1,900	400	–	2.6	1 : 5,000	4.0	1.4	1.9	2.0	9.7	4.0
	L - H_2	3,100	987	–	6.3	1 : 5,000	11.0	1.1	1.6	2.0	15.8	4.0
	L - I	2,700	602	–	3.9	1 : 3,000	5.0	1.1	1.7	2.0	10.1	4.0
	L - J	2,500	575	–	3.6	1 : 4,000	5.0	1.1	1.6	2.0	9.8	4.0
	L - K	1,800	490	–	3.1	1 : 5,000	3.0	1.3	2.4	2.0	10.2	4.0
Sub-total		45,200										
LAL-LO	L - A_1	1,700	212	900	8.6	1 : 2,000	4.0	1.7	2.6	2.0	11.8	4.0
	L - A_2	1,400	379	1,400	13.7	1 : 3,000	6.0	2.0	3.4	2.0	16.2	4.0
	L - A_3	800	642	1,400	15.5	1 : 3,000	8.0	1.9	2.7	2.0	16.1	4.0
	L - A - 1	600	–	500	4.0	1 : 1,000	1.0	1.5	2.2	2.0	7.6	4.0
	L - A - 2	900	167	–	1.1	1 : 1,000	1.0	0.8	1.5	2.0	5.5	4.0
	L - A - 3	1,000	223	–	1.5	1 : 3,000	1.0	1.2	1.5	2.0	5.5	4.0
	L - B	1,000	148	–	1.0	1 : 2,000	1.0	0.9	1.5	2.0	5.5	4.0
	L - C	2,000	272	–	1.8	1 : 5,000	1.0	1.5	2.2	2.0	7.6	4.0
Sub-total		9,400										
Total		54,600										
Grand Total		69,000										

Notes: Drainage Area (1) means the area in the project boundary
Drainage Area (2) means the area of the rear mountain site
The figure of D shows the average hight

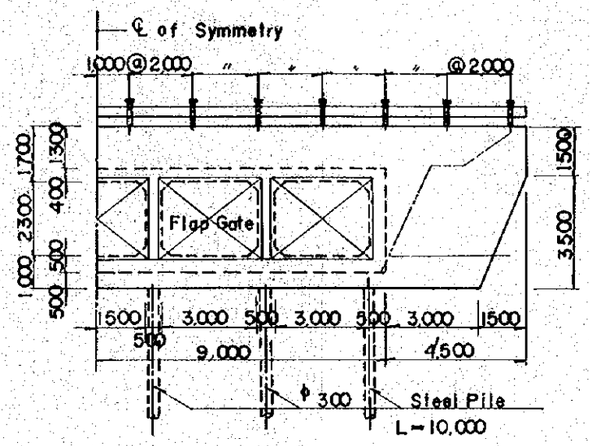
FIGURE E-5-6



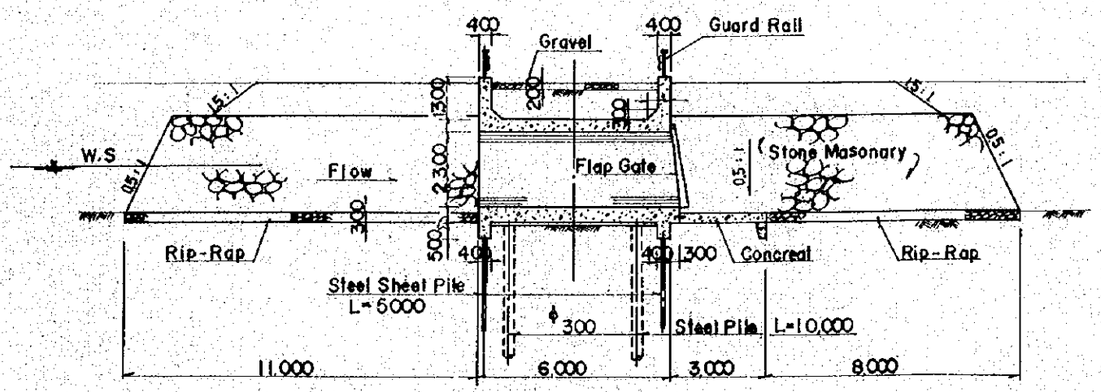
PLAN



FRONT VIEW



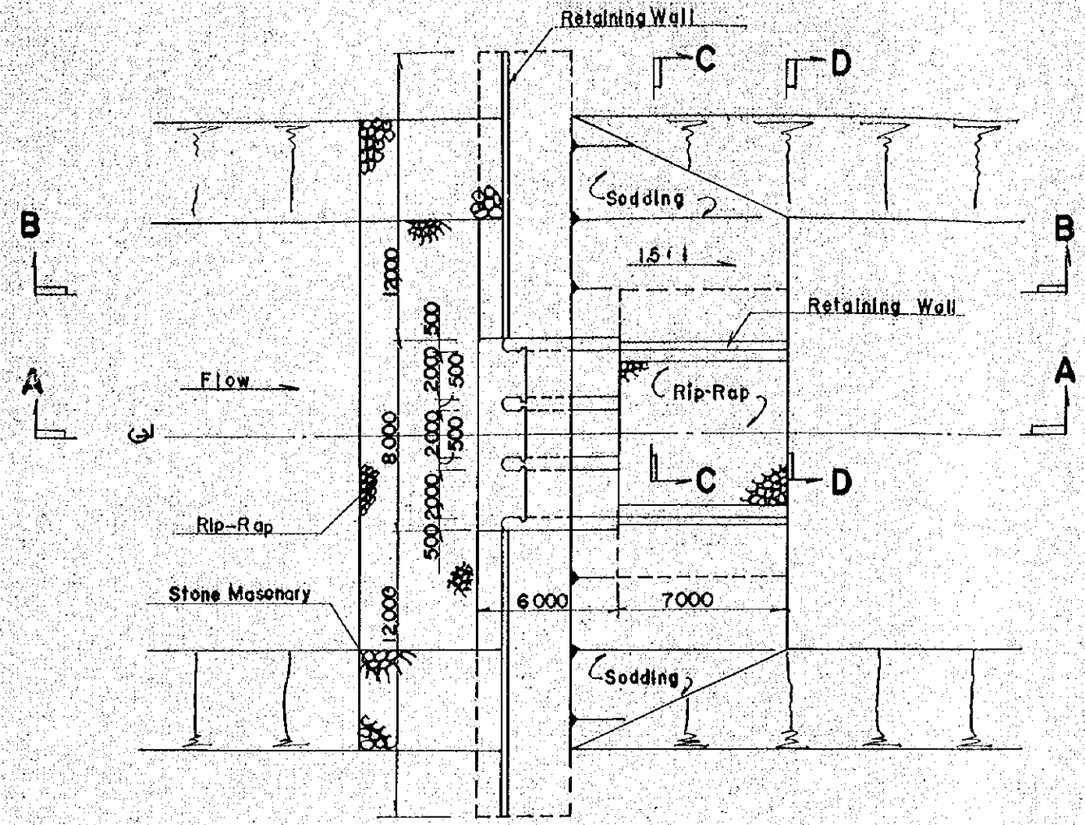
SECTION B B



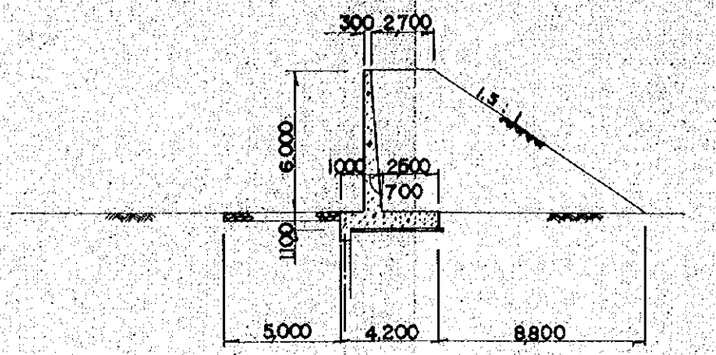
SECTION A A

CIADP	CAGAYAN PHILIPPINE
DRAINAGE CANAL FACILITY ADVERSE TIDE GATE	
JAPAN INTERNATIONAL COOPERATION AGENCY	

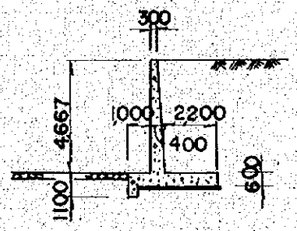
FIGURE E-5-7



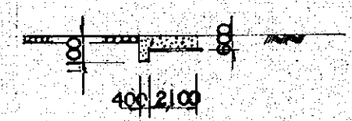
PLAN



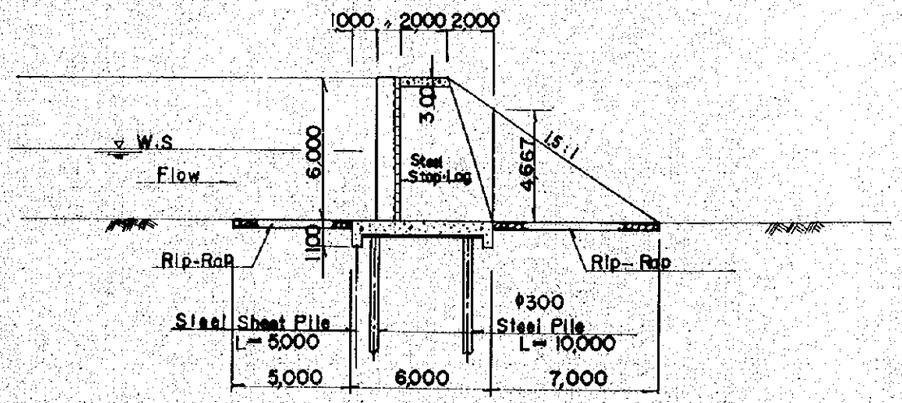
SECTION B-B



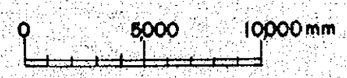
SECTION C-C



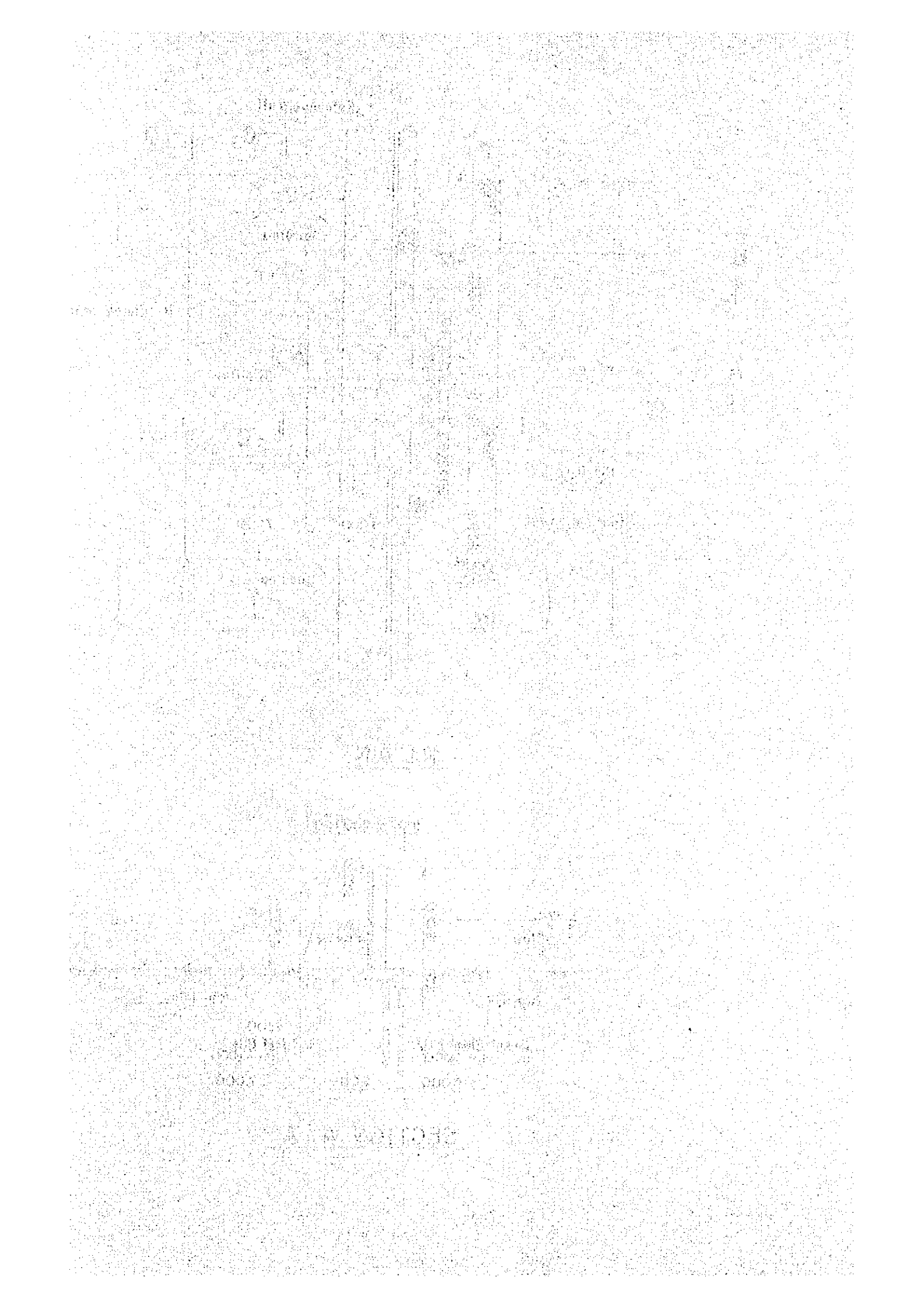
SECTION D-D



SECTION A-A



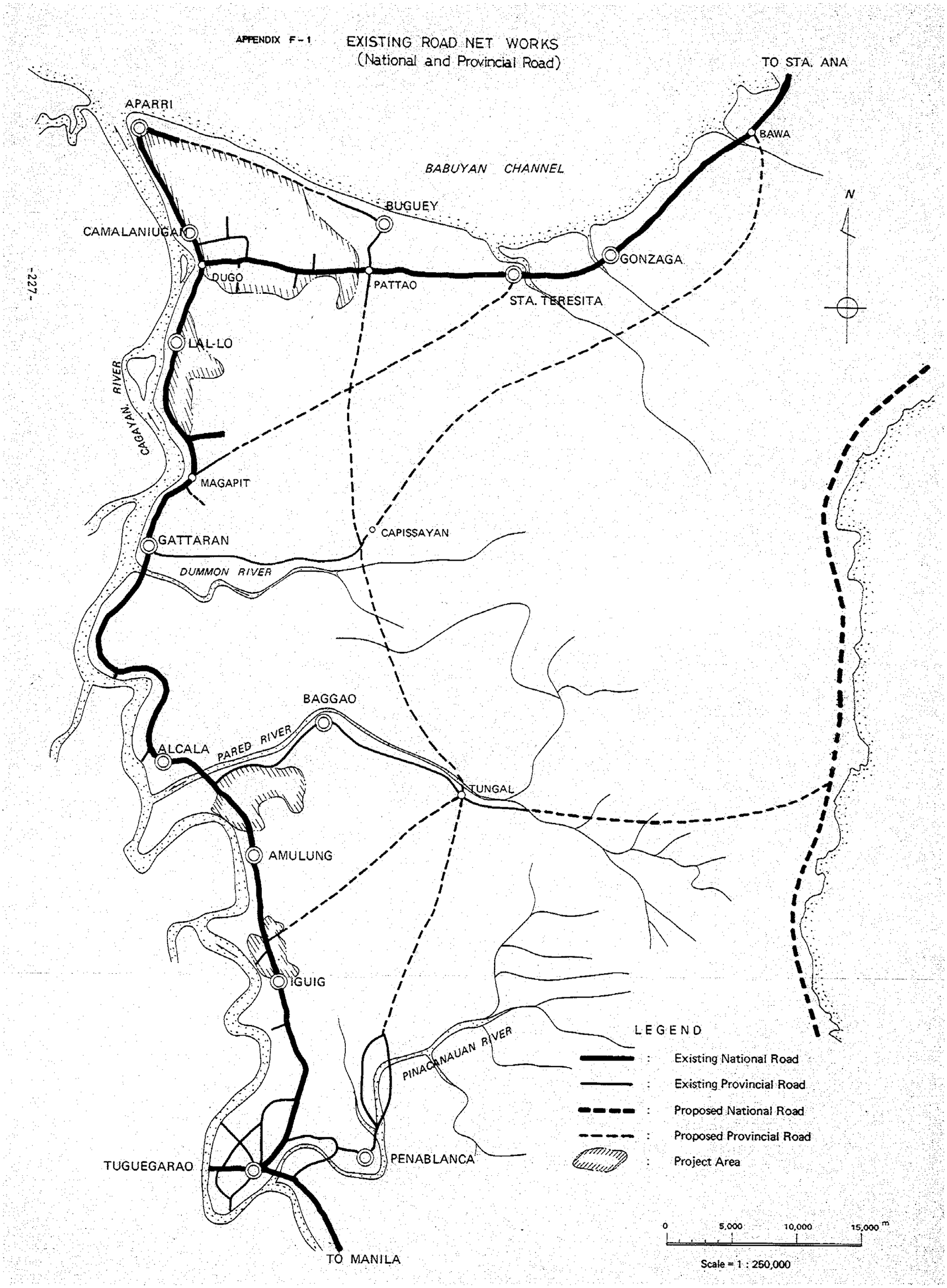
CIADP	CAGAYAN PHILIPPINE
DRAINAGE CANAL FACILITY SHORT CUT WORK	
JAPAN INTERNATIONAL COOPERATION AGENCY	



APPENDIX F ROAD

APPENDIX F - 1

EXISTING ROAD NET WORKS
(National and Provincial Road)



APPENDIX F-2 DENSITY OF EXISTING ROAD IN PROJECT AREA

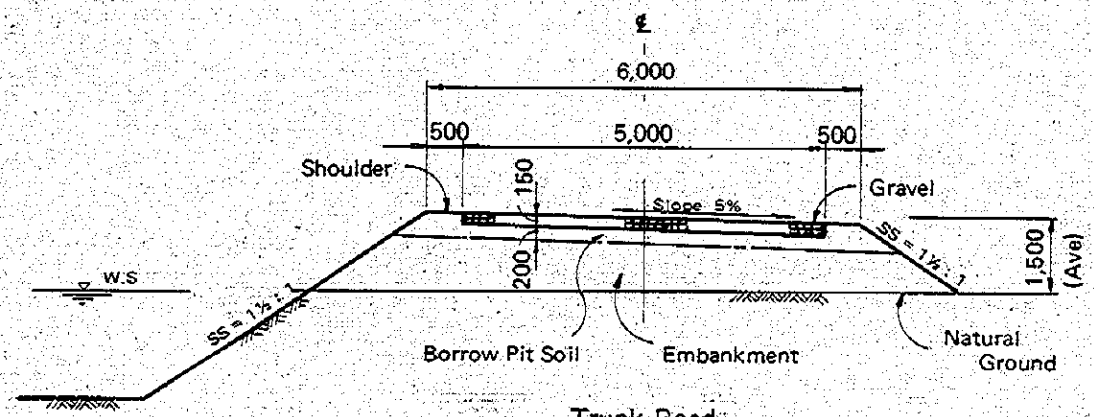
Area	Gross Irrigable Area (ha)	Length of Road (km)				Density of Road (m/ha)
		National Road	Provincial Road	Others*	Total	
Iguig	690	3	1	3	7	10.1
Alcala-Amulung	1,570	4	6	5	15	9.6
Lower Cagayan						
Aparri	11,100	24	12	8	44	4.0
Lal-lo	1,290	13	-	2	15	11.6
Sub-total	12,390	37	12	10	59	4.8
Total	14,650	44	19	18	81	5.5

Source: Based on the Topo-Map prepared by NIA, 1976

Note: *, Barrio road etc.

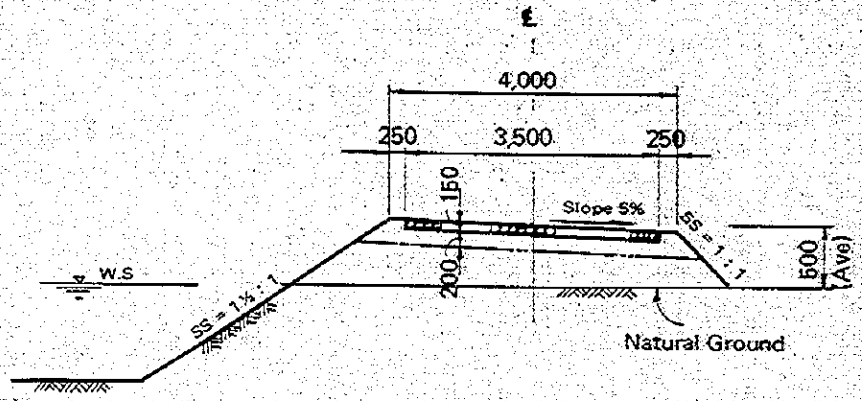
APPENDIX F-3 PROPOSED ROAD

FIGURE F— 3—1 PROPOSED TYPICAL SECTION OF ROAD



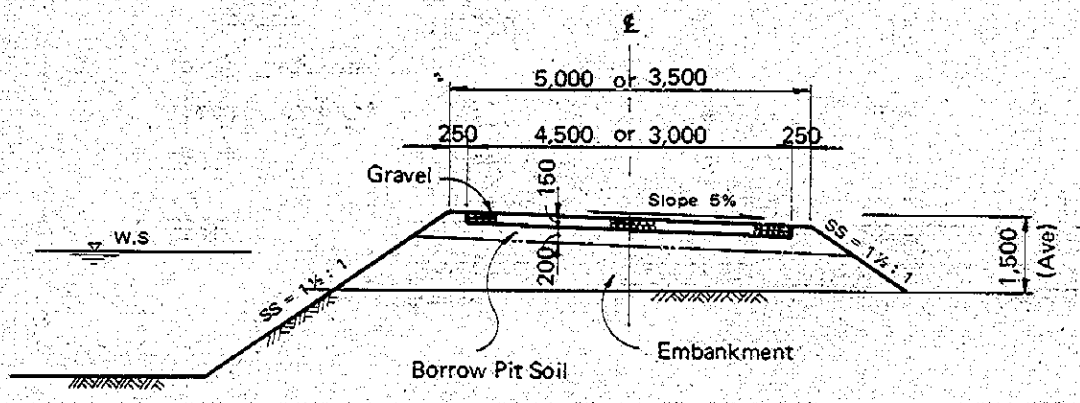
Trunk Road

(Along Main Irrigation and Drainage Canal)



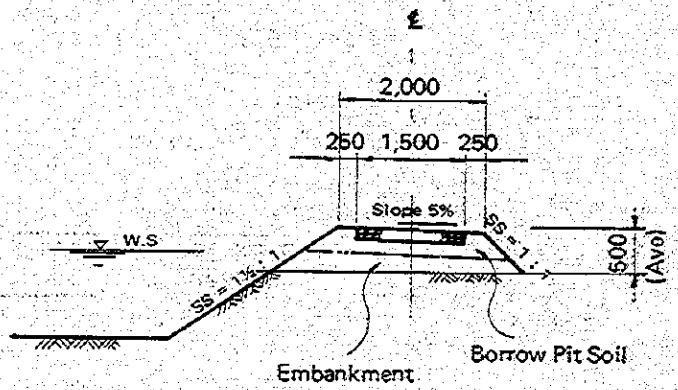
Farm Road

(Along Drainage Canal)



Farm Road

(Along Irrigation Canal)



Supplementary Farm Road

(Along Main Farm Ditch)

TABLE F — 3 — 1 LENGTH OF PROPOSED ROAD

(Unit: km)

Area	Net Irrigable Area (ha)	Trunk Road		Farm Road		Supplemental Farm Road 1/	Total
		Along Drainage Canal	Along Irrigation Canal	Along Drainage Canal	Along Irrigation Canal		
Iguig	600	-	-	13.2	12.5	10.3	36.0
Alcala-Amulung	1,400	-	-	35.3	32.1	24.1	91.5
Lower Cagayan							
Aparri	10,000	21.1	6.1	162.1	94.6	172.5	456.4
Lal-lo	1,200	-	-	26.8	45.9	20.7	93.4
Sub-Total	11,200	21.1	6.1	188.9	140.5	193.2	549.8
Total	13,200	21.1	6.1	237.4	185.1	227.6	677.3

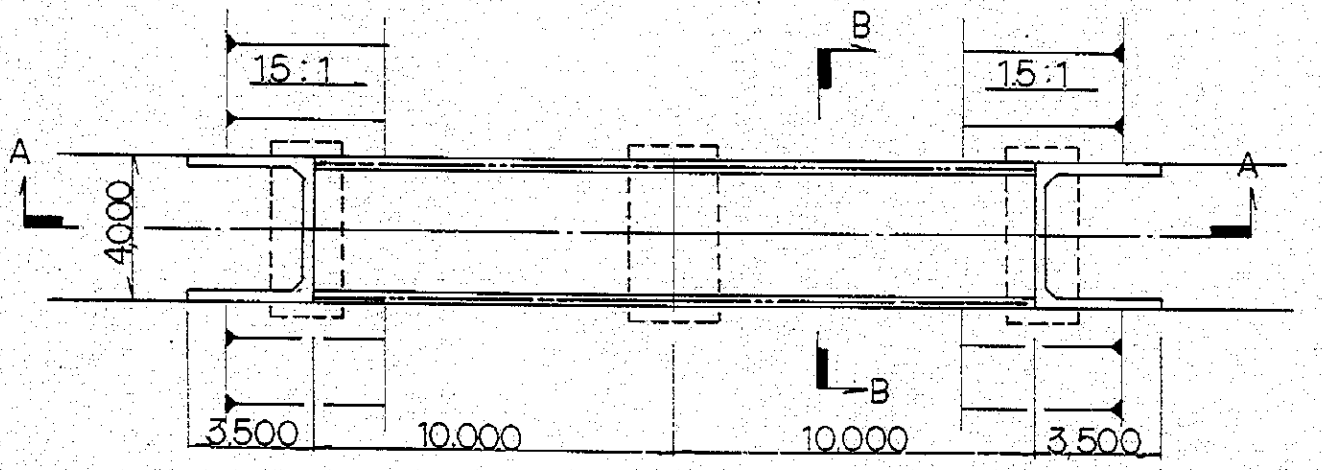
Note: 1/ This road is 2 m width along one side of the main farm ditch only. The density of main farm ditch is 17.25 m/ha

TABLE F—3—2 DENSITY OF PROPOSED ROAD

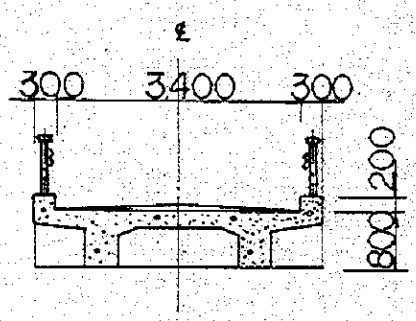
Area	Net Irrigable Area (ha)	Proposed Road Length (km)	Proposed Road Density (m/ha)	Existing Road Length (km)	Existing Road Density (m/ha)	Total Length (km)	Total Density (m/ha)	Remarks
Iguig	600	36.0	60.0	7.0	10.7	43.0	71.7	
Alcala-Amulung	1,400	91.5	65.4	15.0	11.7	106.5	76.1	
Lower Cagayan								
Aparri	10,000	456.4	45.6	44.0	4.4	500.4	50.0	
Lal-lo	1,200	93.4	77.8	15.0	12.5	108.4	90.3	
Sub-Total	11,200	549.8	49.1	59.0	5.3	608.8	54.4	
Total	13,200	677.3	51.3	81.0	6.1	758.3	57.4	

Note: 1/ Including national road 44km, provincial road 19km and others

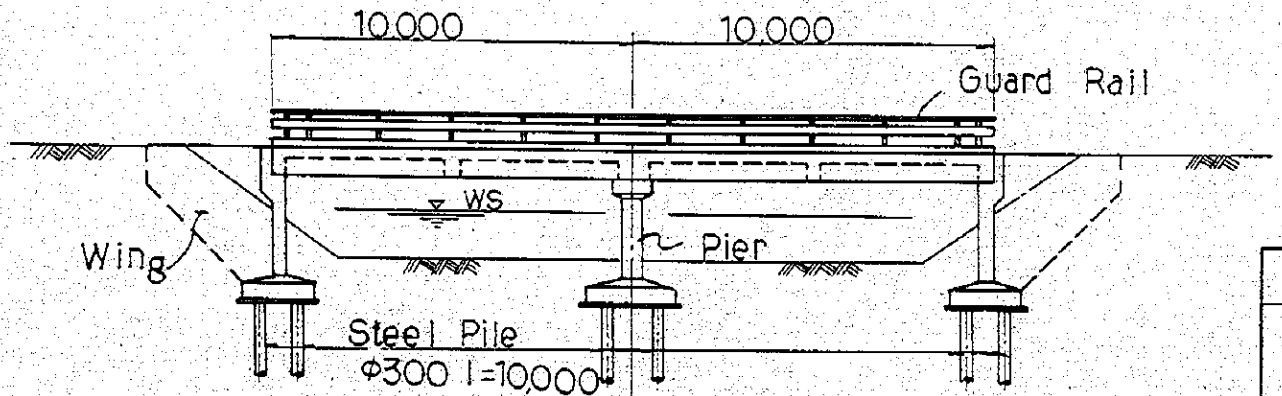
APPENDIX F-4 ROAD STRUCTURES



PLAN



SECTION B-B



SECTION A-A

CIADP	CAGAYAN PHILIPPINE
ROAD STRUCTURE, BRIDGE	
JAPAN INTERNATIONAL COOPERATION AGENCY	

APPENDIX G ELECTRIFICATION

FIGURE 6-1 KW LOAD DISTRIBUTION

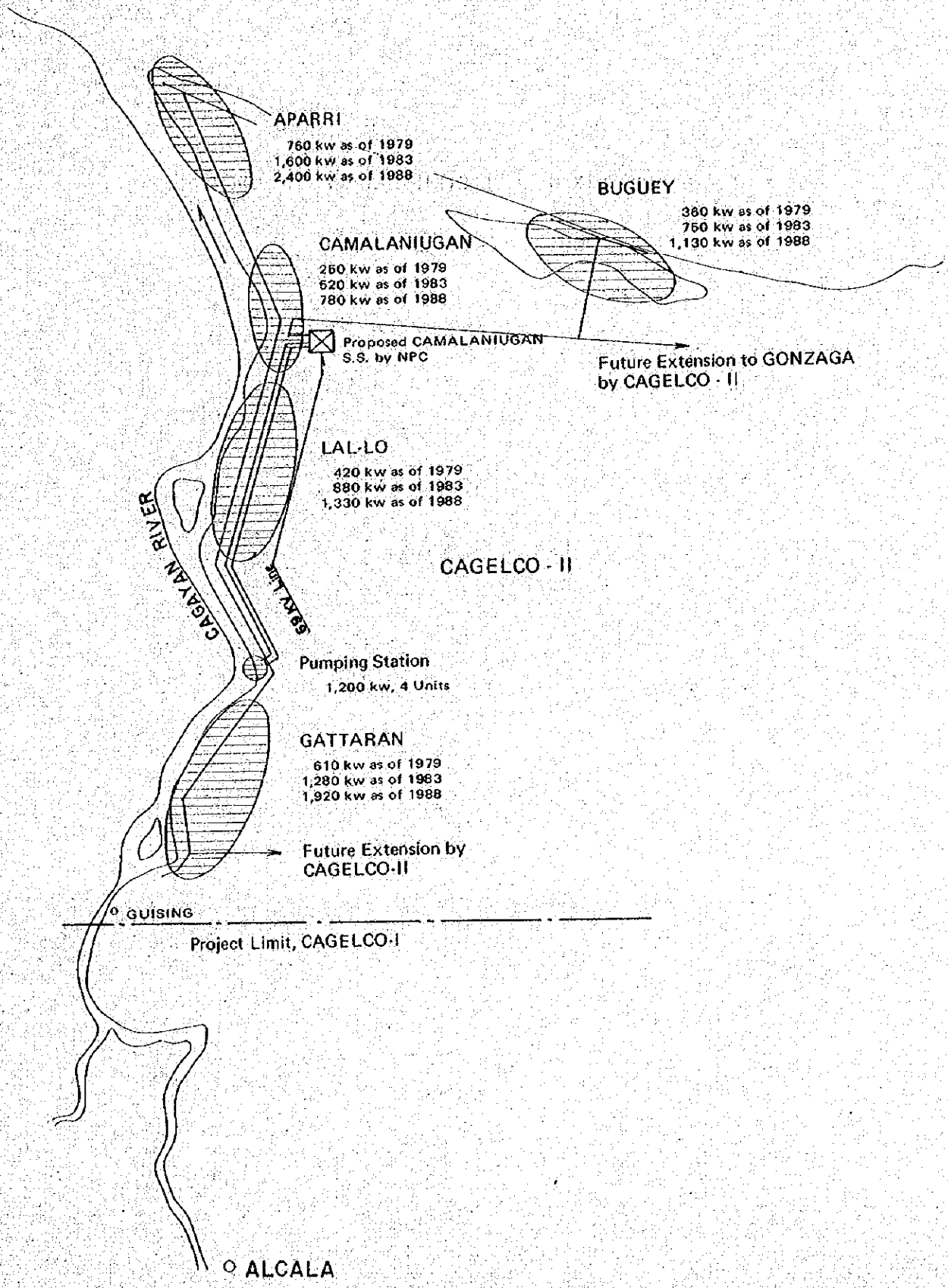
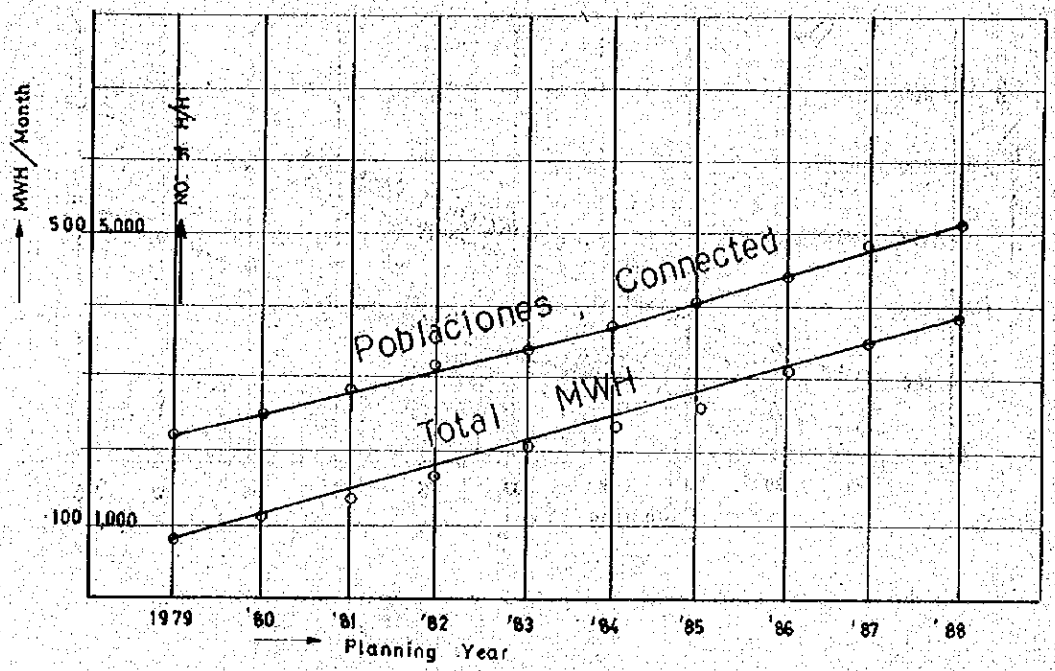


FIGURE G– 2 MWH LOAD FORECAST (FOR RESIDENTIAL HOUSES)



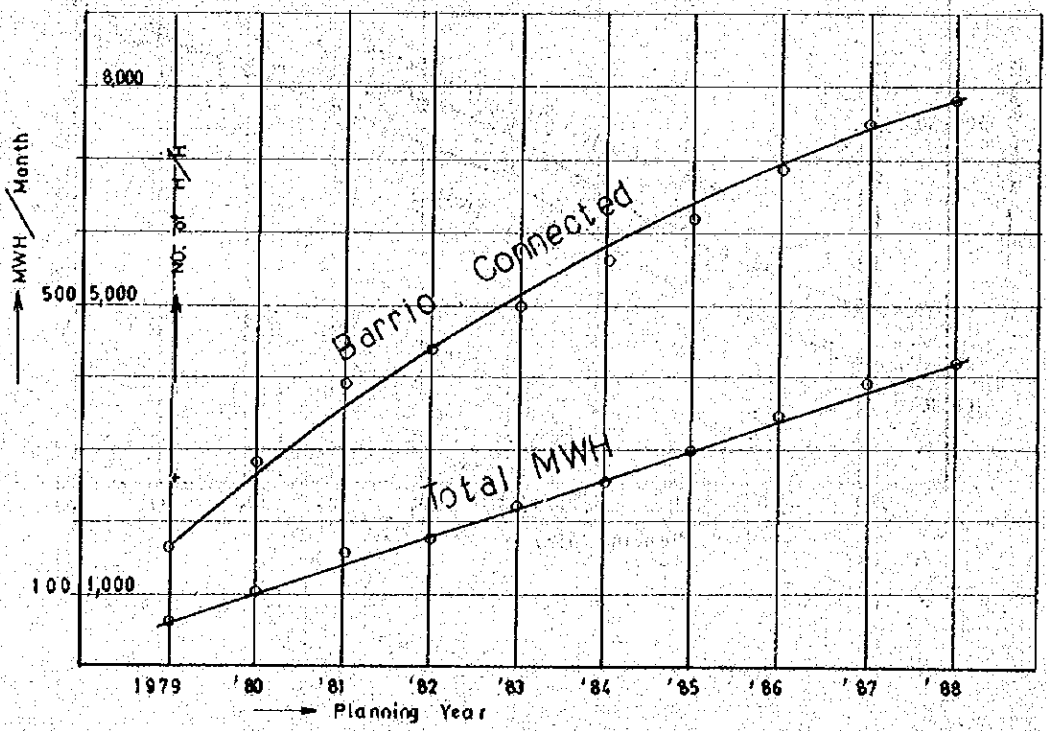
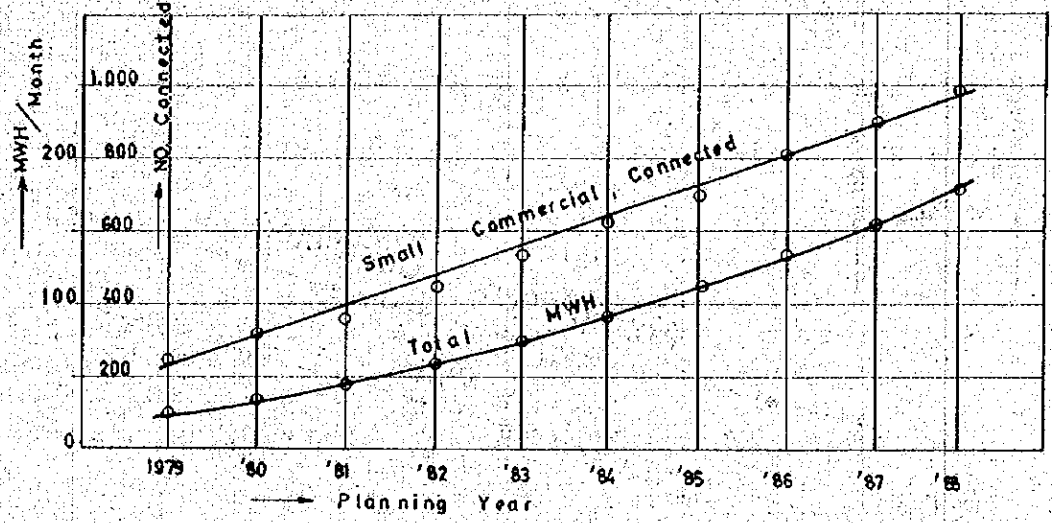


FIGURE 6 – 3 MWH LOAD FORECAST (FOR COMMERCIAL)



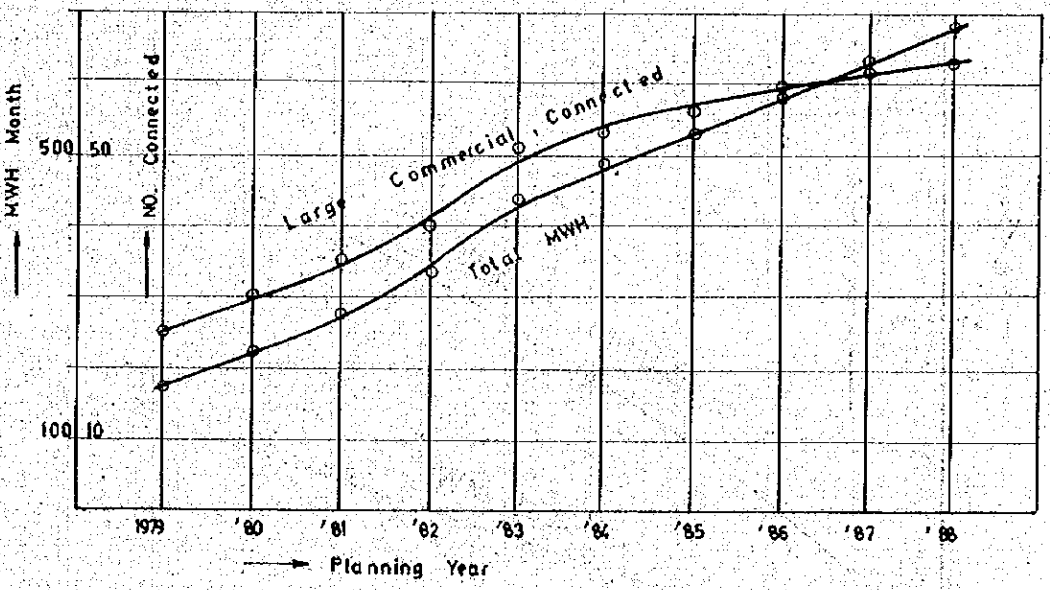
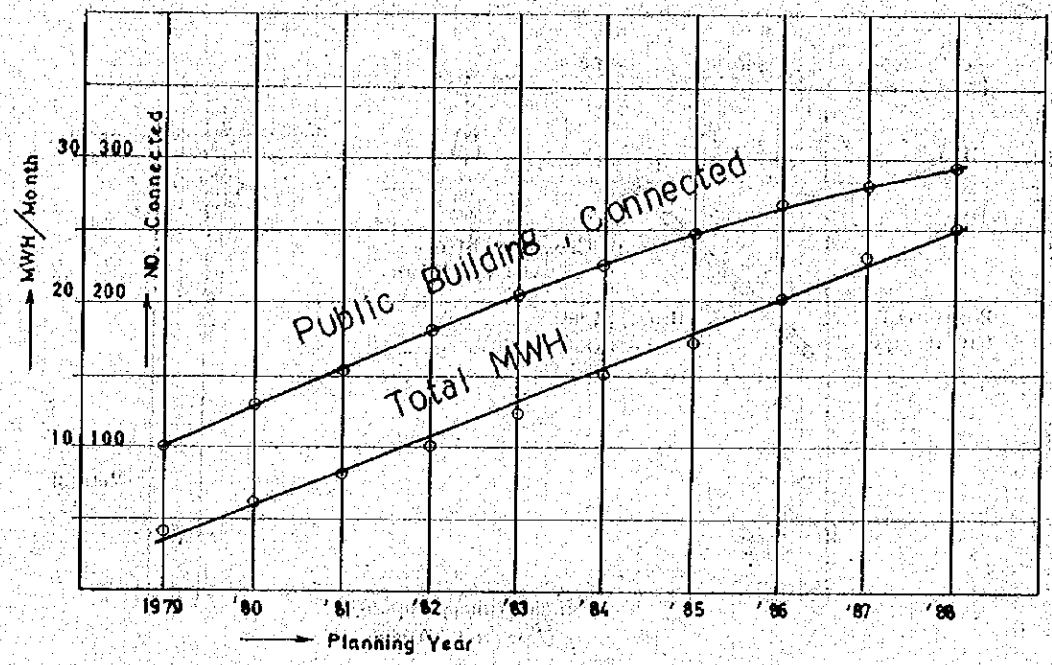


FIGURE G – 4 MWH LOAD FORECAST (FOR PUBLIC USE)



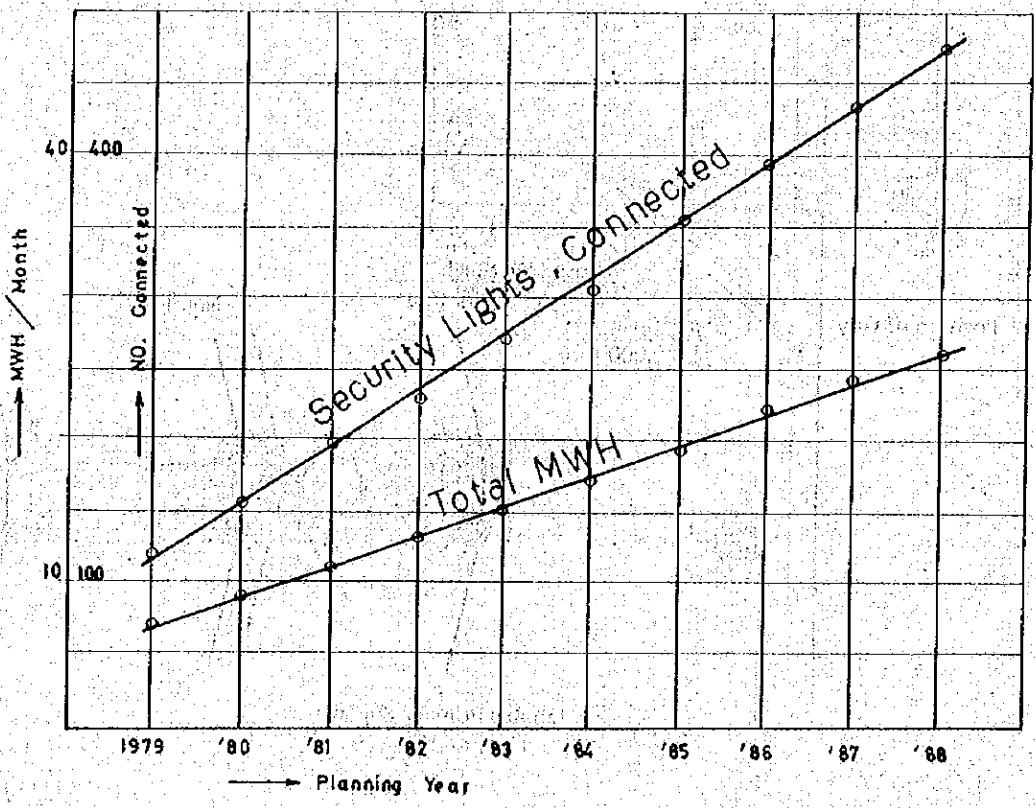
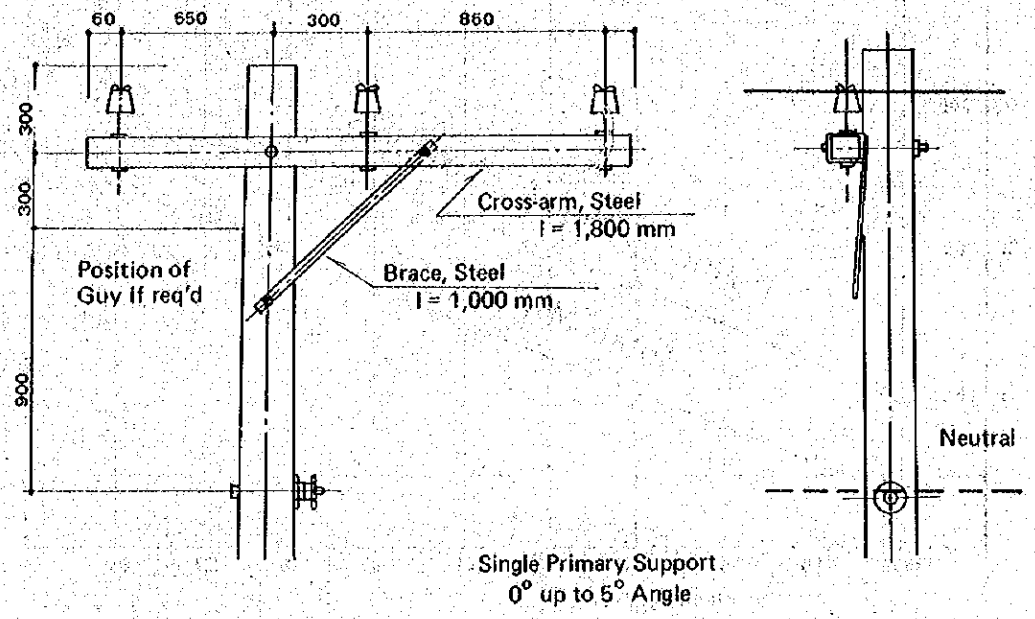
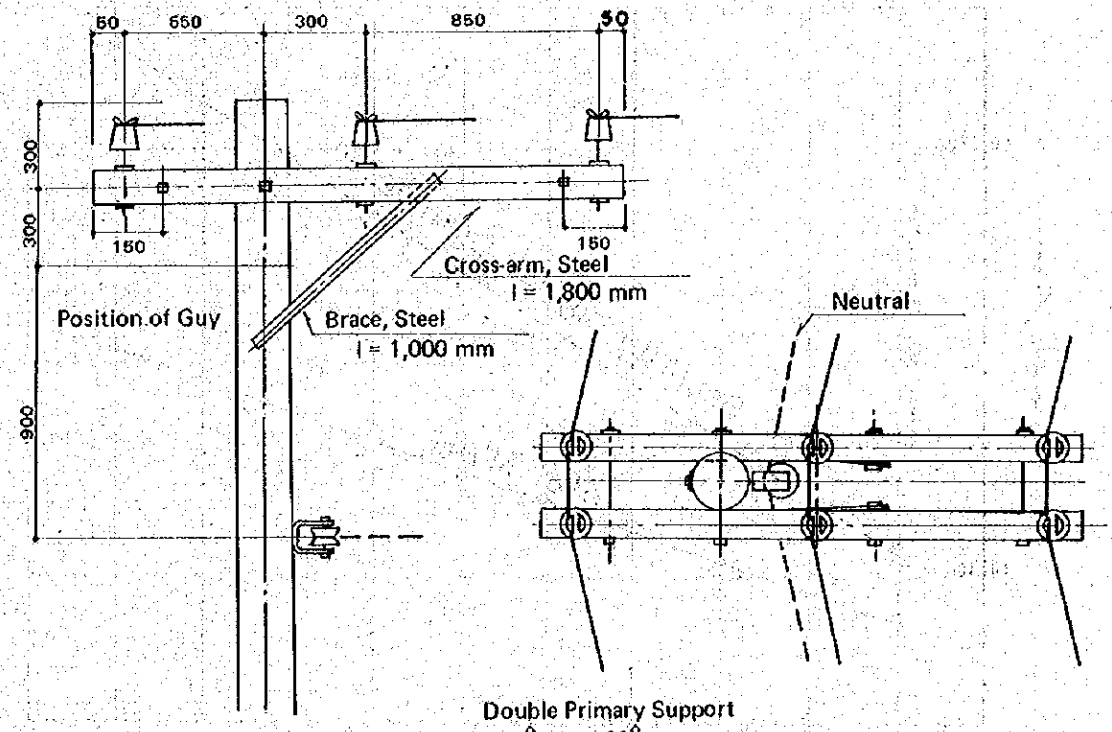


FIGURE 6— 6 **DETAILED DIMENSION OF POLE, TYPICAL**

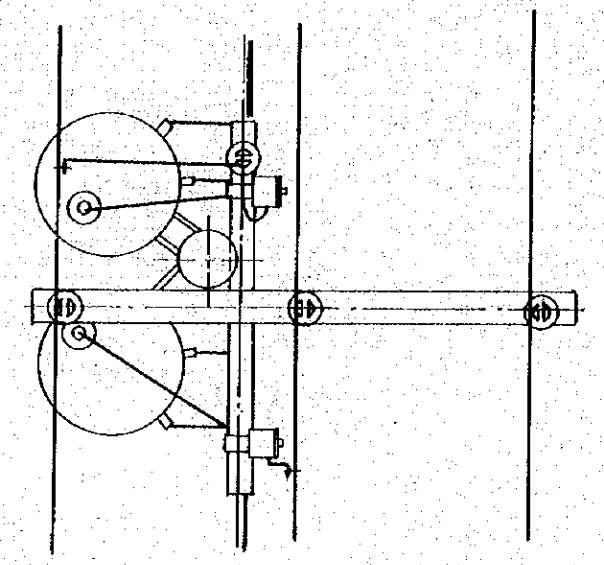


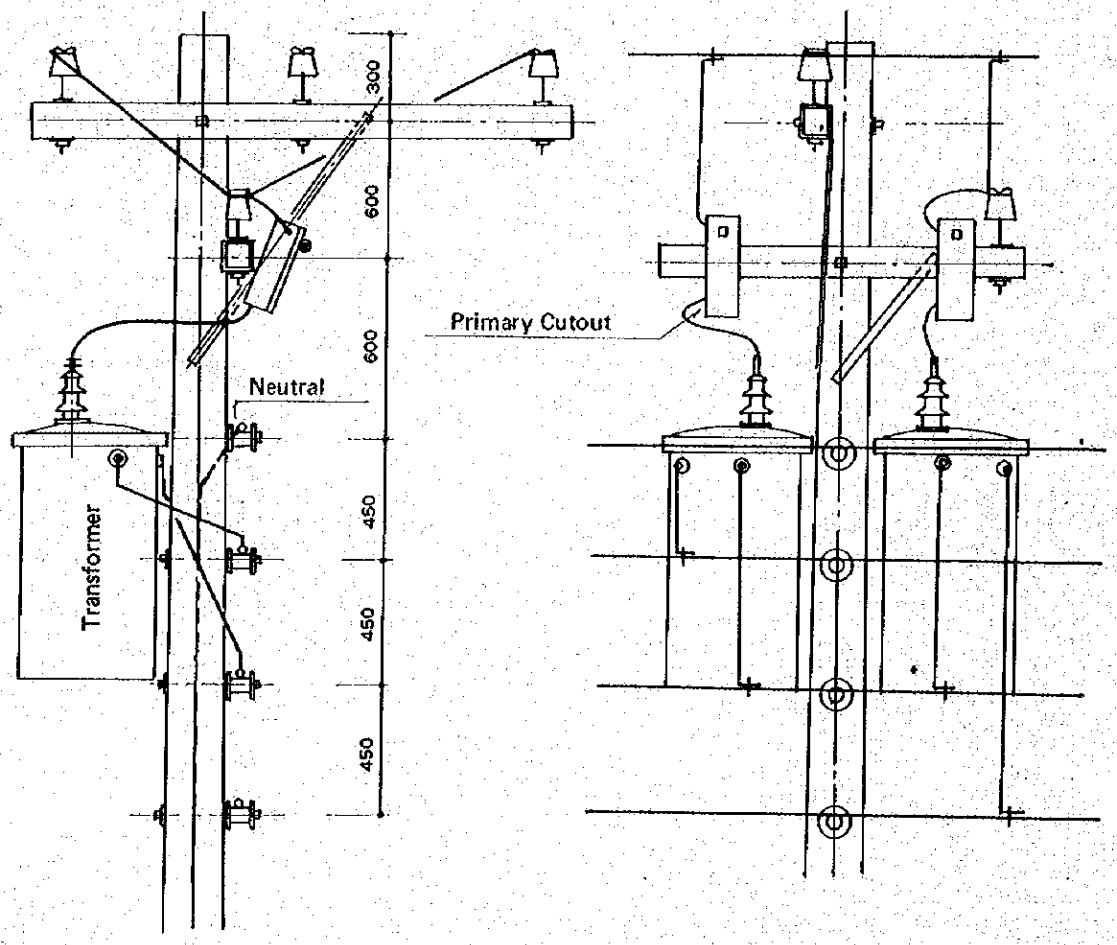
Single Primary Support
0° up to 5° Angle



Double Primary Support
5° up to 30°

FIGURE 3 — 6 DETAILED DIMENSION OF POLE,
TWO TRANSFORMERS, CLUSTER-MOUNTED
7.62/13.2 KV, 3ϕ, 4W





APPENDIX H AGRI-INSTITUTIONAL

APPENDIX II – 1 FARMERS' COOPERATIVE

1) Articles of Incorporation of the CAGAYAN-KALINGA-APAYAO KILUSANG BAYAN for Marketing, INC.

Know All Men by These Presents :

We, the undersigned, all of whom are of legal age, Filipino citizens, and residents of the Philippines, and duly authorized delegates of our SN/PBC/Cooperatives have on this SEVENTEENTH day of JANUARY, 1975 voluntarily organized ourselves in behalf of our SN/Cooperatives for the purpose of forming a Kilusang Bayan for Marketing under the laws of the Philippines, more particularly Presidential Decree No. 175 and Letter of Implementation No. 23.

and We Hereby Certify :

ARTICLE I

That the name of this Kilusang Bayan shall be CAGAYAN-KALINGA-APAYAO Kilusang Bayan for Marketing, Inc.

ARTICLE II

That the objectives and purposes for which this Kilusang Bayan is formed are :

SPECIFIC

1. To purchase and/or market the Samahang Nayan/Cooperatives members' produce at reasonable prices ;
2. To purchase and sell to members the following ;
   a. Production inputs such as fertilizers, insecticides, seeds, herbicides and other supplies needed in production ;
   b. Agricultural machinery, equipments and other implements ; and
   c. Prime commodities and household requirements needed by Samahang Nayon/Cooperative members.
3. To provide extension services in order to enable Samahang Nayon members to learn, acquire and employ skills and use modern methods of marketing.
4. To provide common facilities for marketing, storage, processing, grading and standardization, package transportation and other facilities.
5. To provide advances on deliveries made by Samahang Nayon/Cooperative members.

6. To borrow funds or otherwise secure credit needed to carry on the business of the KB.
7. To provide bookeeping, accounting, auditing and other services to members Samahang Nayon.
8. To do other things necessary suitable and proper for the accomplishment or attainment of its objectives and purposes.

GENERAL

1. To increase the income and purchasing power of Samahang Nayon/Cooperative members ;
2. To stimulate capital formation for marketing activities ;
3. To pool the resources of the members of Samahang Nayon through systematic and continuous savings ;
4. To advance the cooperative movement as a technique for improving the economic status of the people ;
5. To cooperate with the government of the Philippines, together with its instrumentalities, in the execution of government policies which will redound to the benefit of the general public ;
6. To undertake continuous educational activities for the officers, management staff, SN/ Cooperative members and the general public ;
7. To cooperate with existing Kilusang Bayan ; and
8. To undertake any lawful related activity for the members' self government, social growth growth and economic independence under a truly just and democratic society.

In furtherance of and not in limitation of the general powers conferred by the laws of the Philippines and to attain the objectives and purposes herein set forth, this Kilusang Bayan shall have the following powers :

1. To draw, make, accept, endorse, guarantee, execute and issue promissory notes, mortgages, bills of exchange, drafts, warrants, certificates and all kinds of obligations and negotiable instruments in connection with, and in furtherance of its business operations ;
2. To issue bond, debentures, and other obligations of the Kilusang Bayan, to contract indebtedness and to secure the same with a mortgage or deed of trust, or pledge or lien on any or all of the real and personal properties of the Kilusang Bayan ;
3. To acquire facilities, either by or through construction, purchase, lease, bequest or do-

nation, equipment machinery and supplies as are or may hereafter be required in the conduct of its business ; and to own, occupy, use or hold such real and personal properties as may be convenient and proper to achieve the purposes for which this Kilusang Bayan is formed ;

4. To conduct publicity and/or research work for the promotion of the Kilusang Bayan movement and for this purpose to issue from time to time suitable publication or literature on Kilusang Bayan ; and

5. To cooperate with other similar Kilusang Bayan in creating provincial, regional or national Katipunan ng Kilusang Bayan for any of the purposes for which this Kilusang Bayan is formed and to become a member to such Katipunan ng Kilusang Bayan as are or may hereafter be organized.

For the purpose of attaining or furthering any or all of the objectives and purposes herein stated, to do any other act and to exercise any other power which a natural person could do and exercise and which now or hereafter be authorized by law.

ARTICLE III

That the area of operation of this Kilusang Bayan shall be in Cagayan and Kalinga-Apayao and its principal office shall be established or located at Tuguegarao, Cagayan

ARTICLE IV

That the term for which this Kilusang Bayan shall exist is fifty (50) years from and after the date of its incorporation.

ARTICLE V

That the names, citizenships and residences of the incorporators and the SN/FBC/Cooperatives they represents are as follows :

Name of Representatives	Citizenship	Residence	SN/FBC/Cooperative Represented

ARTICLE VI

That the field of membership of this Kilusang Bayan shall be limited to duly registered Samahang Nayon and other Cooperative Organizations only.

ARTICLE VII

That the number of directors of this Kilusang Bayan shall be seven (7) and the names, citizenship and residences of the directors who are to serve until their successors are elected and qualified as provided in the by-laws are :

Name of Representatives	Citizenship	Residence	SN/FBC/Cooperative Represented

(As many as provided in By-Laws)

ARTICLE VIII

That the authorized capital stock of this Kilusang Bayan is Two Million and Five Hundred Thousand (P 2,500,000.00) PESOS and said capital is divided into Two Thousand Five Hundred shares with a par value of One Thousand (P 1,000.00) PESOS per share.

ARTICLE IX

That the amount of capital stock which has been actually subscribed is _____ _____ (₱ _____) PESOS, and that the following SN/FBC/ Cooperatives have subscribed and paid for the number of shares and amount of capital stock set out after their respective names :

Name	Number of Shares Subscribed	Amount Capital Stock Subscribed	Number of Shares Paid	Amount Paid

ARTICLE X

That _____ has been elected by the Board of Directors as Treasurer of this Kilusang Bayan to act as such until his/her successor is duly elected and qualified in accordance with the by-laws, and that as such Treasurer, he/she has been authorized to receive for the Kilusang Bayan and to receipt in its name for all subscriptions/shares paid in by the Subscribers/members.

IN WITNESS WHEREOF, we have hereunto set our hands this _____ day of _____, 197___ at _____

Name / Signature Address

2) Summary of Samahang Nayon in Each Municipality

Municipality	A Number of Barangay	B Number of Household	C Average Household Number per Barangay	D Number of Samhang Nayon	E Total Number of members belonging to SN	F Average Number of Members per SN	G Organized D/A x 100	H Organized F/C x 100	I Organized E/B x100	J Total Number of SN Registered to AMC
Aparri	42	7,349	174	8(0)	204	26	19.0	14.9	2.7	0(0)
Buguey	23	3,500	152	9(4)	320	36	39.0	23.6	9.1	0(0)
Camalaniugan	24	2,472	103	5(3)	201	40	21.0	38.8	8.1	0(0)
Lal-lo	35	4,334	129	6(3)	265	44	17.0	34.1	6.1	0(0)
Alcala	25	3,729	149	8(3)	471	59	32.0	39.6	12.6	0(0)
Amulung	47	4,185	89	11(2)	542	49	23.4	55.1	13.0	5(0)
Iguig	23	2,345	102	6(2)	233	39	26.0	38.2	9.9	0(0)
Total	219	27,914	127	53(17)						5(0)

Note : A : From Provincial Capital, Cagayan
B : From Bureau of Census and Statistics, Region II, Cagayan
D,E : From DLGCD Region II, Cagayan
J : From First Cagayan Kalinga-Apayao Area Marketing Cooperatives
( ) : Number of Samahang Nayon or Number of Resigtered Samahang Nayon in the Project area
G : Rate of Organized Samahang Nayon per Total Number of Barangay
H : Rate of Organized Number of Members to Samahang Nayon
I : Rate of Organized Number of Member to SN per Total Number of Household

3) Samahang Nayon Program Profile

The Samahang Noyon Program, as of July 31,1975, has been implemented in 72 among the 75 provinces, covering 22,964 barrios in 1,416 towns and cities. Some 2,212 fieldworkers of the Department (DLGCD) are directly involved and we utilized 9,197 volunteer barrio workers (public school teachers) in the initial organization. We have likewise trained and deputized some 831 trainors from the private sector to assist in Samahang Nayon organization.

As of July 31, 1975, 17,346 Samahang Nayon with 784,091 members have been organized of which 13,572 have been registered with a membership of 655,147.

SAVINGS OF SAMAHANG NAYON :

General Fund	₱ 10,339,533.25
Barrio Savings Fund	13,337,087.53
Barrio Guarantee Fund	11,340,461.85
Total	35,017,082.63

Source : The new cooperatives development program by DLGCD

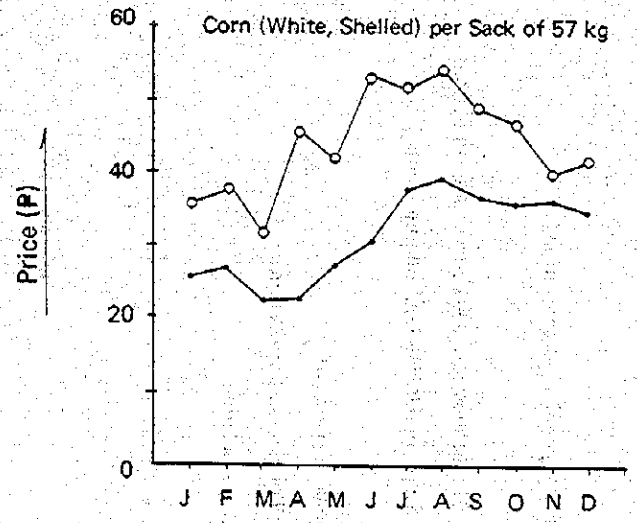
4) Pre-membership Education Training for Samahang Nayon

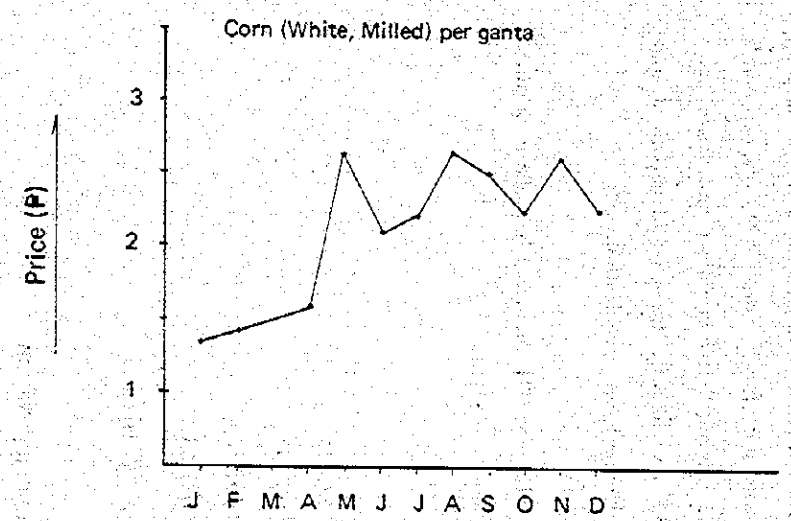
Lesson :	Subject :
1	Agrarian Reform and Cooperatives
2	Beginnings, Nature and Philosophy of Cooperative Organizations
3	Cooperative Principles and Practices
4	The Barrio Association I: Rationale, Characteresyics, Objectives and Functions
5	The Barrio Association 2: Structure, Steps in Organizing, Requirements and Precedures for Registration
6	The Barrio Association Ⅲ: Organizational Documents
7	The Barrio Association Ⅳ: Operating Policies and Procedures
8	Factors for the Success of the Barrio Association

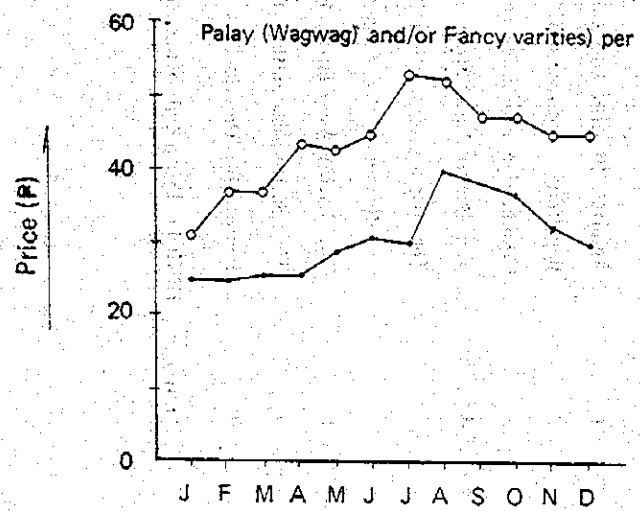
Source : DLGCD, Provincial office, Cagayan

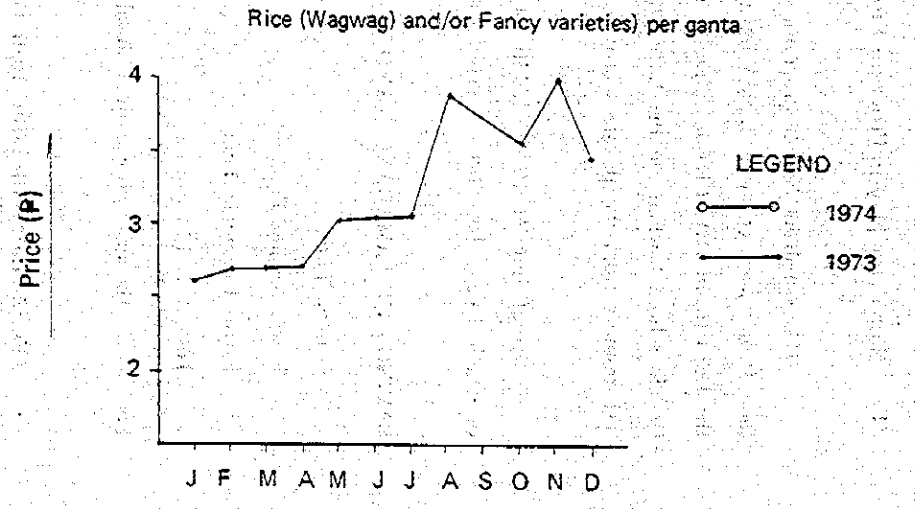
APPENDIX H–2 MARKETING

1) Price Fluctuation









Data Source: Baecon

2) Existing Facilities

a WAREHOUSE

MUNICIPALITY	NGA OWNED		LEASED WAREHOUSE: NGA LEASED		LEASED WAREHOUSE: NGA OWNED & LEASED		PRIVATE WAREHOUSE: PARTIALLY BONDED		PRIVATE WAREHOUSE: NON-BONDED		TOTAL: BONDED NON-BONDED		GRAND TOTAL: NGA OWNED LEASED & PRIV.	
	UNIT	CAP.	UNIT	CAP.	UNIT	CAP.	UNIT	CAP.	UNIT	CAP.	UNIT	CAP.	UNIT	CAP.
Amulung									2	21,000	2	21,000	2	21,000
Aparri									4	62,000	4	62,000	4	62,000
Ballesteros									4	14,500	4	14,500	4	14,500
Camalaniugan	1	150,000							6	25,000	6	25,000	7	175,000
Lal-lo									3	2,200	3	2,200	3	2,200

Source: NGA Cagayan

b RICE MILLS

	Cono Type: Number (sets)	Cono Type: Capacity (cavans/day)	Kiskisan Type: Number (sets)	Kiskisan Type: Capacity (cavans/day)
Alcala	–	–	25	1,044
Amulung	1	200	17	818
Aparri	4	690	42	1,574
Buguey	3	330	35	1,827
Camalaniugan	1	250	13	941
Iguig	–	–	4	116
Lal-lo	2	132	39	1,737
Total	11	1,602	175	8,057
Total in Cagayan Province	53	7,524	695	31,068

Source; NGA Cagayan

3) Abstracts from a Socio-economic Study of Farmers in Selected Towns of Cagayan

Membership in Organizations, 558 Palay Farms, Cagayan, 1975

Organization	Number reporting	Percent of total
Samahang Nayon	132	24
Selda	94	17
Pacoma	9	1
Other*	4	1
None	319	57
Total	558	100

* Farmer's Class of the Air, Bunga Communal Irrigation Association.

Is Credit Available when Needed ? 558 Palay Farms, Cagayan, 1975

Answer	Number reporting	Percent of total
Yes	355	64
No	203	36
Total	558	100

Sources and Amount of Credit, 558 Palay Farms, Cagayan, 1975

Source	Number	For farms reporting: Amount per farm (Pesos)	Loan period	Interest rate per year (Percent)	Repayment: Number reporting Yes	No	Average amount Paid* (Pesos)
RB	150	897	6 mos.[1]	12	81	69	524
PNB	64	3,158	6 mos.	12	25	39	918
DBP	8	19,788	1 yr.[2]	12	2	6	4,290
ACA	1	1,000	1 yr.	12	1	–	1,220
Relative	18	406	6 mos.	12	3	15	603
Total or average	241	2,088	–	–	112	129	687

* Includes interest and fees, if any.

1) month

2) year

Transportation Used, 558 Palay Farms, Cagayan Valley, 1975

(Unit ; sets)

Transportation used	Number reporting			
	For family		For produce	
	Owned	Hired	Owned	Hired
Jeep	4	3	3	254
Car	–	4	1	6
Tricycle	3	338	1	194
Cart/sled	39	44	64	51
Banca	19	22	13	14
Bus	1	242	2	136
Calesa [1]	5	55	2	34
Ford Fierra	1	109	–	80

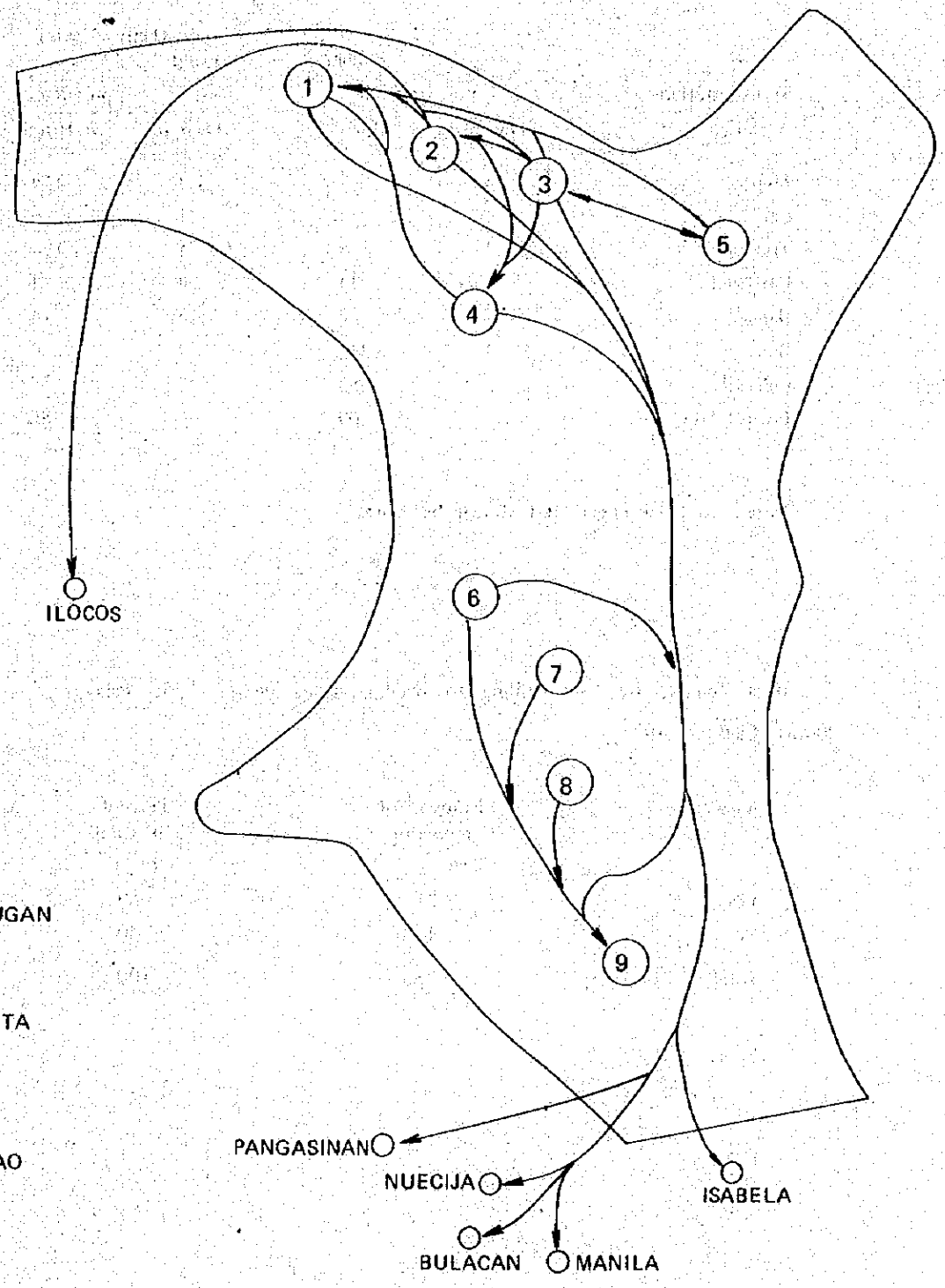
Note ; 1) Passenger' cart drawn by horse.

If a Tenant, are You Willing to become a Leasee ? 355 Palay Farms, Cagayan, 1975

Answer	Number of reporting	Percent of total (%)
Yes	212	60
No	143	40
Total	355	100

Source ; D.A

4) Geographic Flow of Palay/Rice, Cagayan, 1976

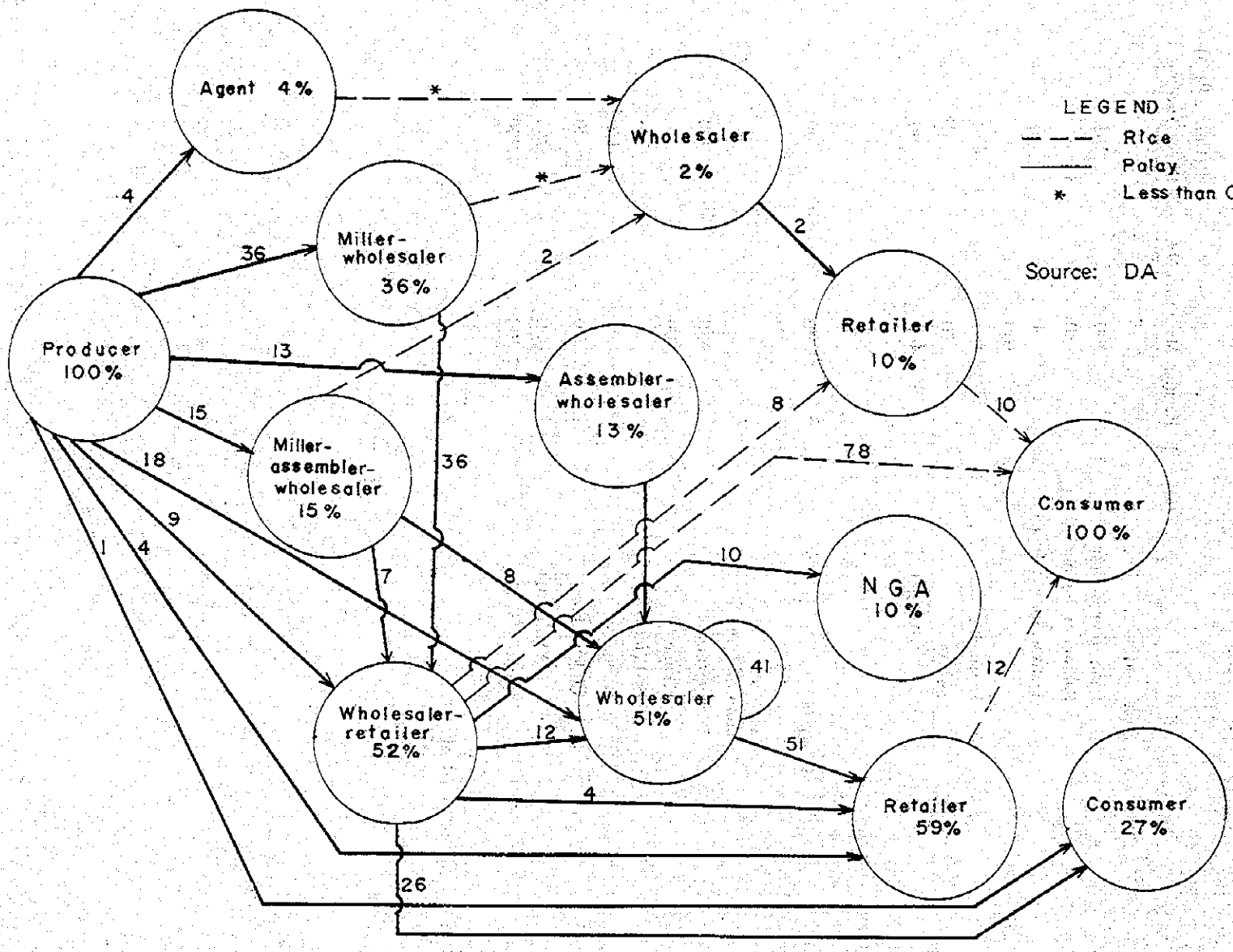


CAGAYAN

1 APARRI
2 CAMALANIUGAN
3 BUGUEY
4 LAL-LO
5 STA. TERESITA
6 ALCALA
7 AMULUNG
8 IGUIG
9 TUGUEGARAO

Data Source: DA

5) Market Channels, Palay/Rice, Cagayan, 1975



APPENDIX II - 3 AGRICULTURAL CREDIT

1) Loan Amount per Ha of Masagana 99, Phase VI

(Unit ; Peso)

Items	1. Regular Masagana 99	2. Direct Seeding
a. Cash portion		
Land preparation	300	185
Pulling of Seeding	30	
Transplanting (straight row)	100	–
Harrowing		150
Snacks	30	30
Sub-total	460	90
b. Seed	90	90
c. Input portion		
Fertilizers	430	400
Chemicals	200	
Pesticides	–	175
Herbicides	–	150
Rodenticides	20	20
Sub-total	650	745
Total	1,200	1,200

Source : NFAC

2) Masagana-99 Present Repayment Condition per Phase by Credit Institution, July, 1975

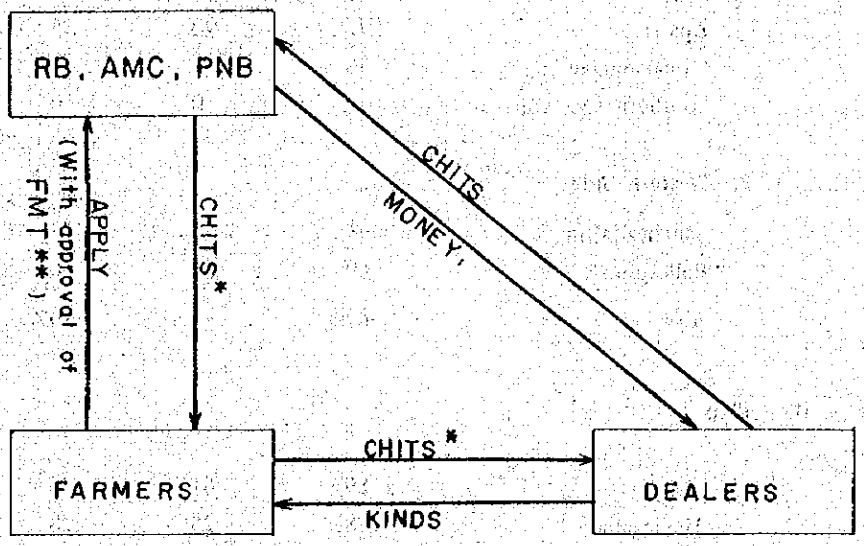
(Unit ; %)

BANKS	Phase I	Phase II	Phase III	Phase IV
A. Rural Banks				
1. Eastern Side				
Tuguegarao	0	27	6	2
Lal-lo	36	87	15	44
Amulung	13	17	NP	NP
Aparri	97	90	35	88
Camalaniugan	56	9	45	47
Southern Cagayan	0	0	0	7
2. Western Side				
Sanchez Mira	94	97	73	62
Ballesteros	69	82	36	2
Ave.	67%	71%	30%	32%
B. PNB				
Aparri	89	61	36	11
Tuguegarao	78	23	28	13
Tuao	79	29	29	1
Ave.	81%	45%	32%	11%
C. ACA	56	18	31	13
Ave.	79%	56%	31%	17%

Note ; NP - No Participation

Source : NFAC

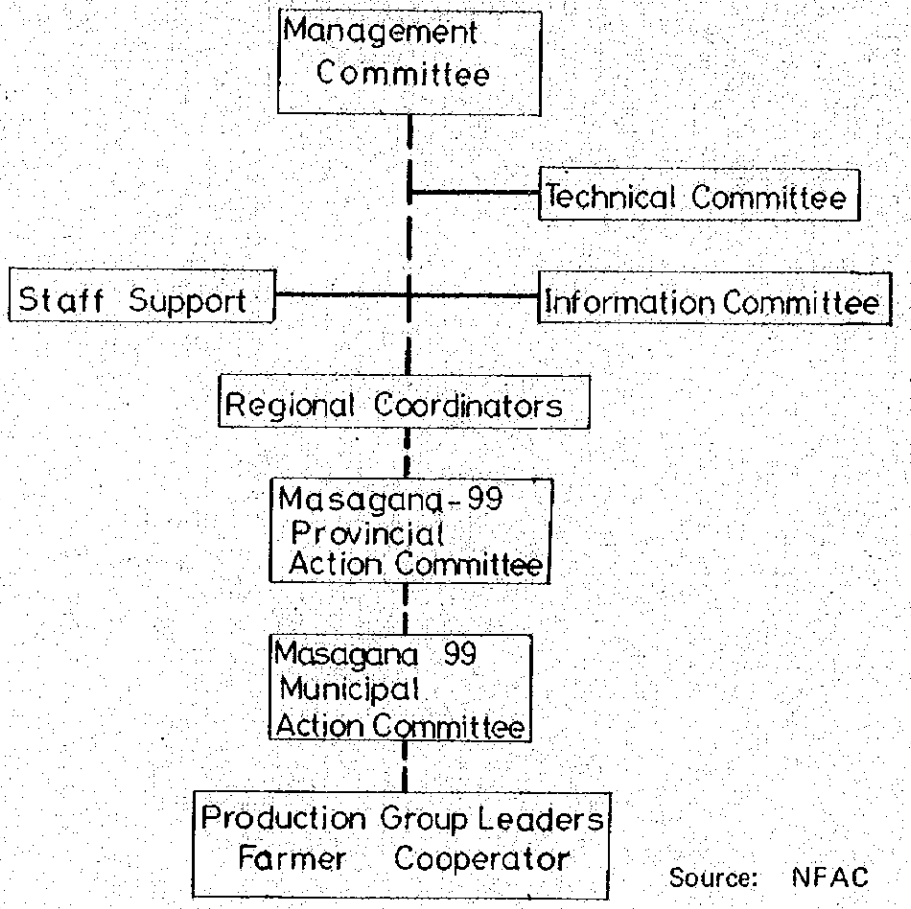
3) Masagana 99 Procedure



Note: * This chits have effective term of 15 days
** FMT; Farm Management Technician FMT

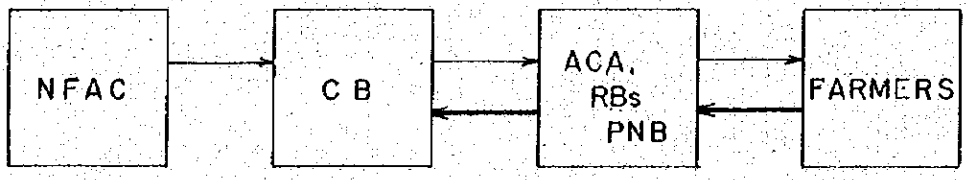
Source: NFAC

4) Functional Chart of Masagana 99



Source: NFAC

CAPITAL FLOW OF MASAGANA 99

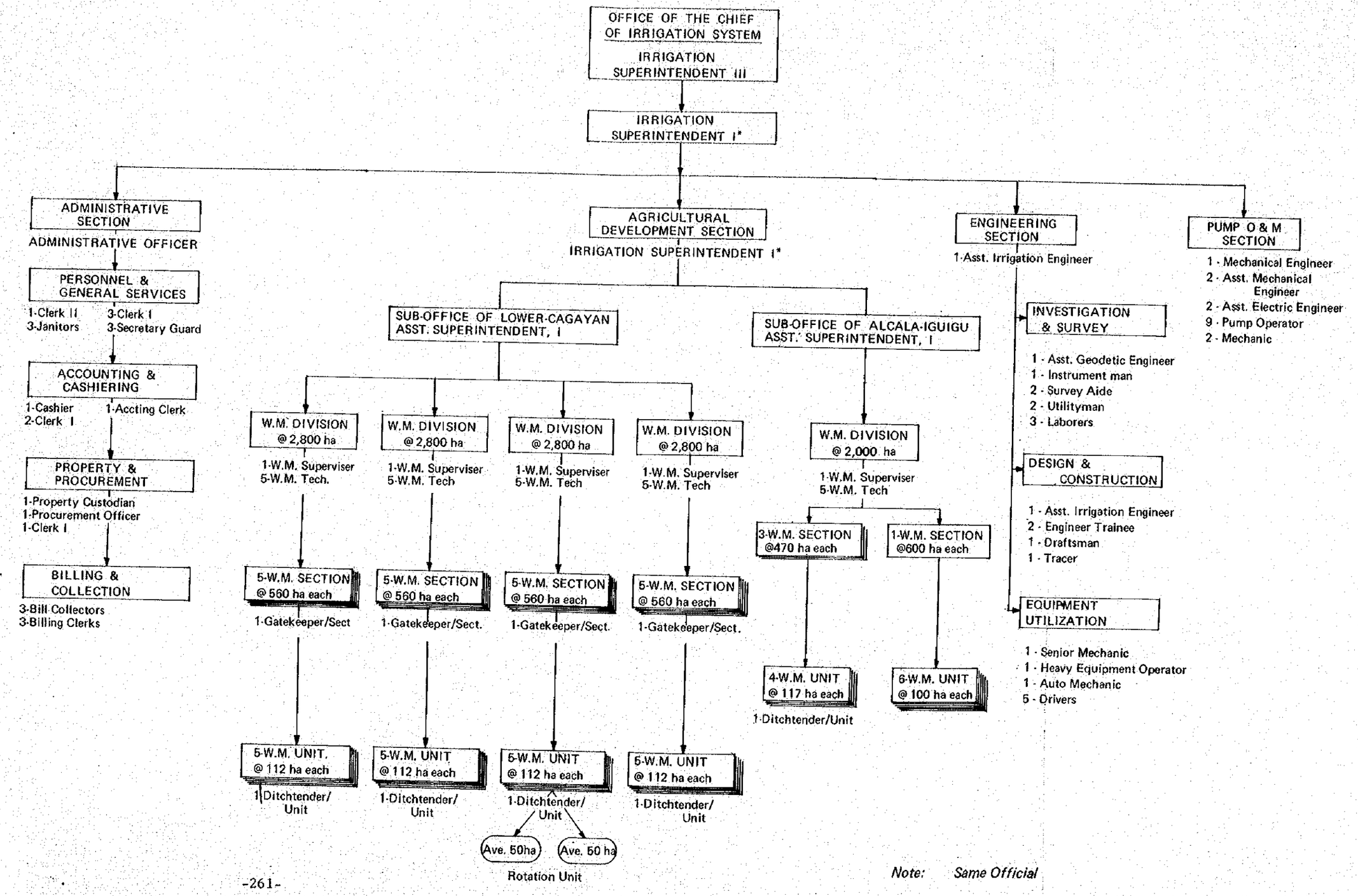


Legend: ——→ Loans

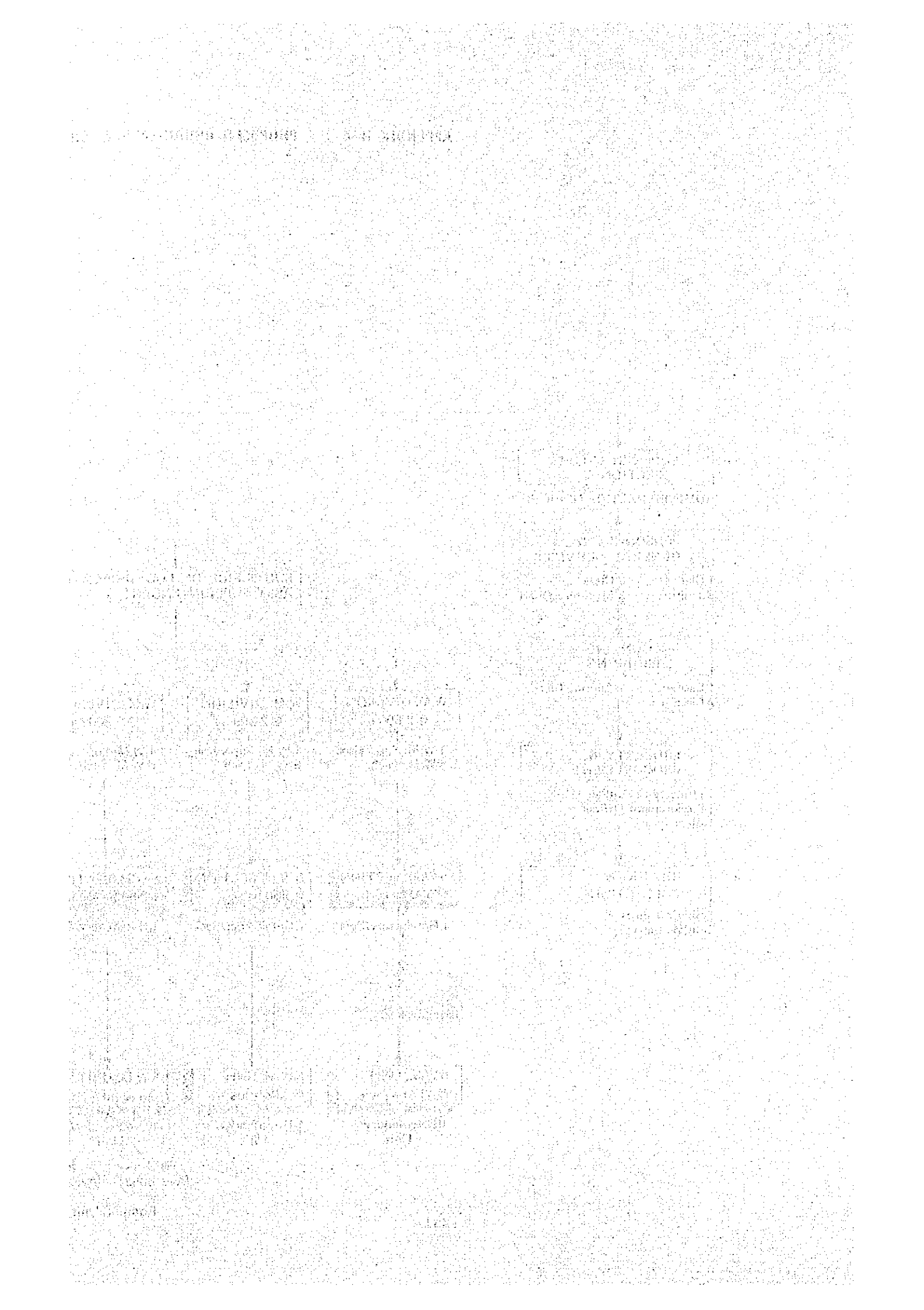
←—— Intrest

Source: NFAC

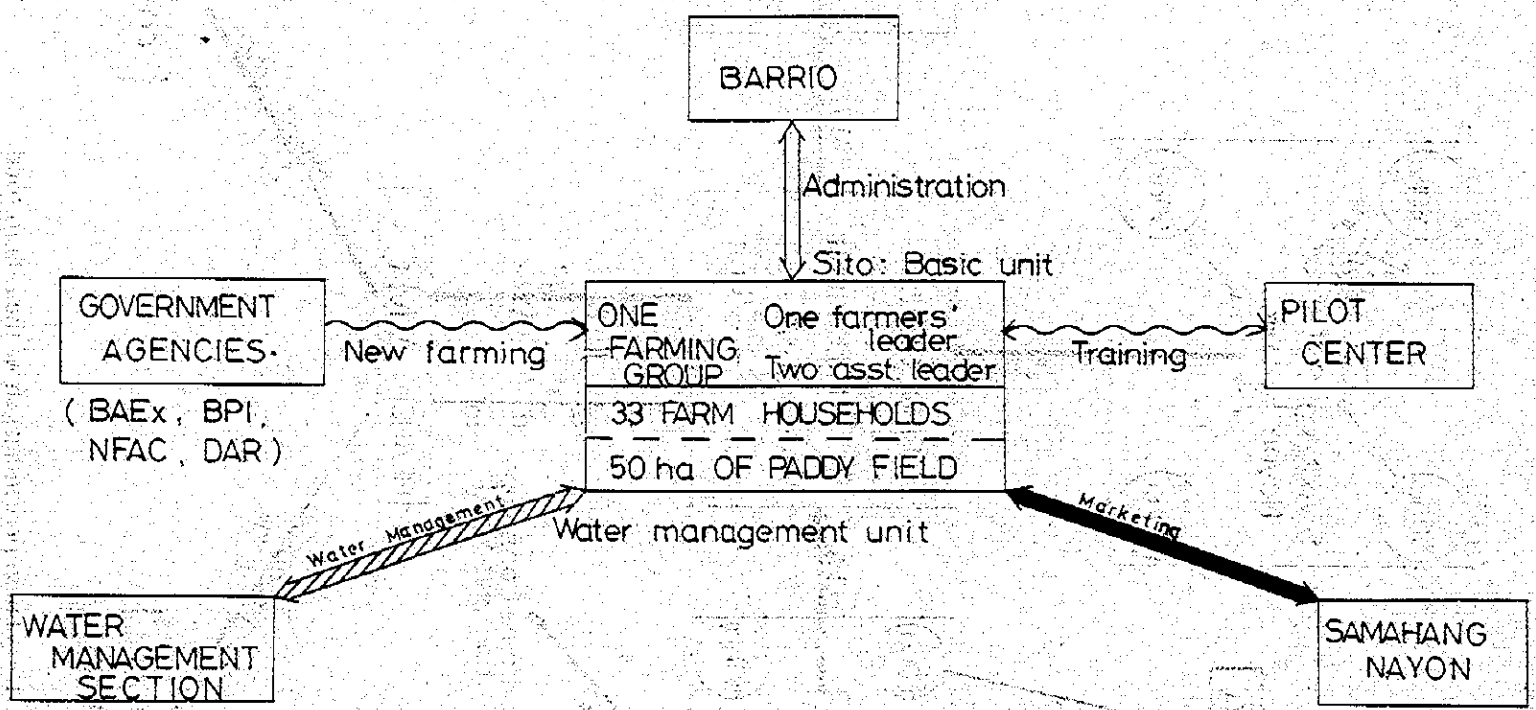
APPENDIX H-4 PROPOSED ORGANIZATION FOR OPERATION AND MAINTENANCE OF IRRIGATION SYSTEM



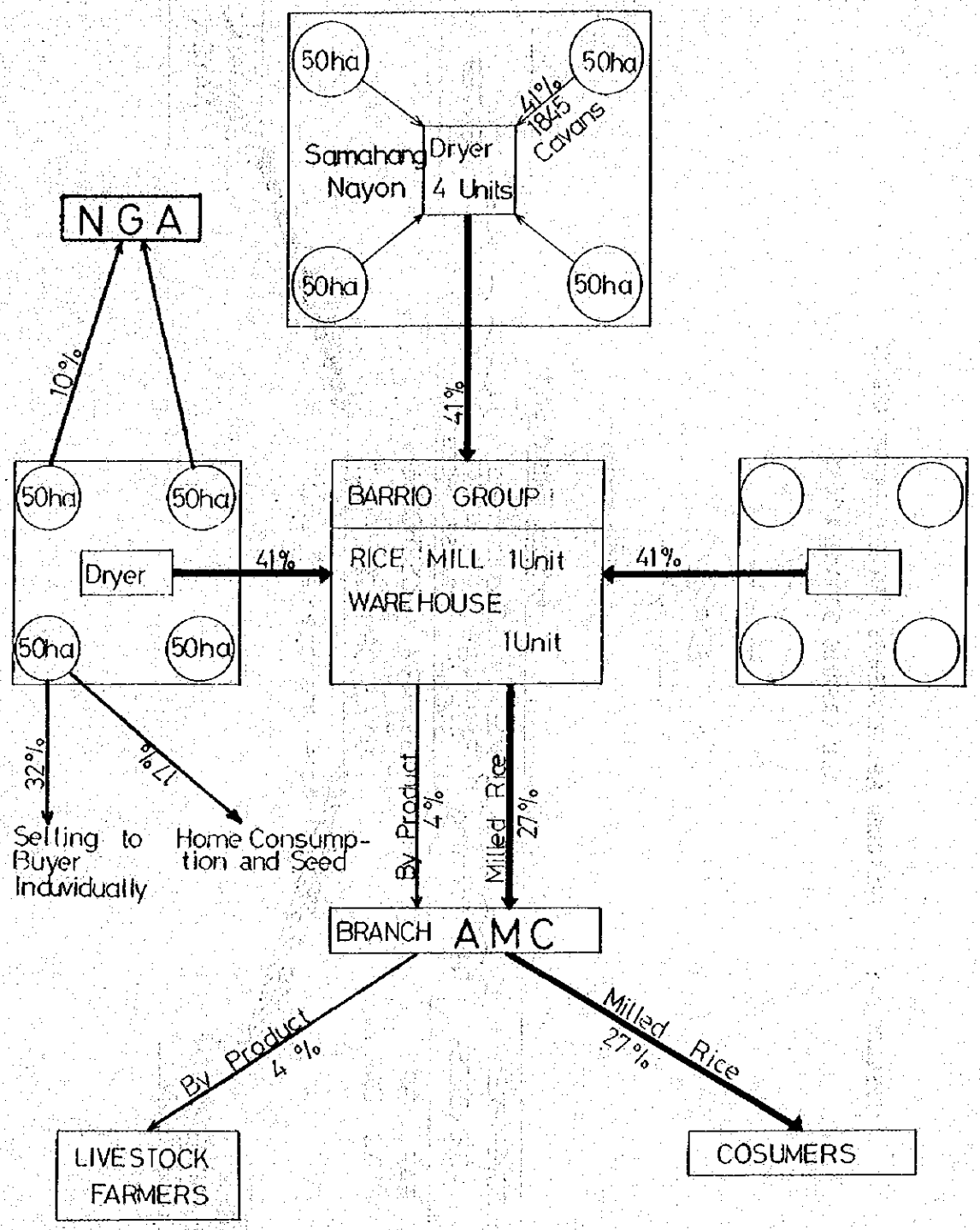
Note: Same Official



APPENDIX H-5 PROPOSED RELATIONSHIPS AMONG FARMING GROUPS AND VARIOUS ORGANIZATIONS



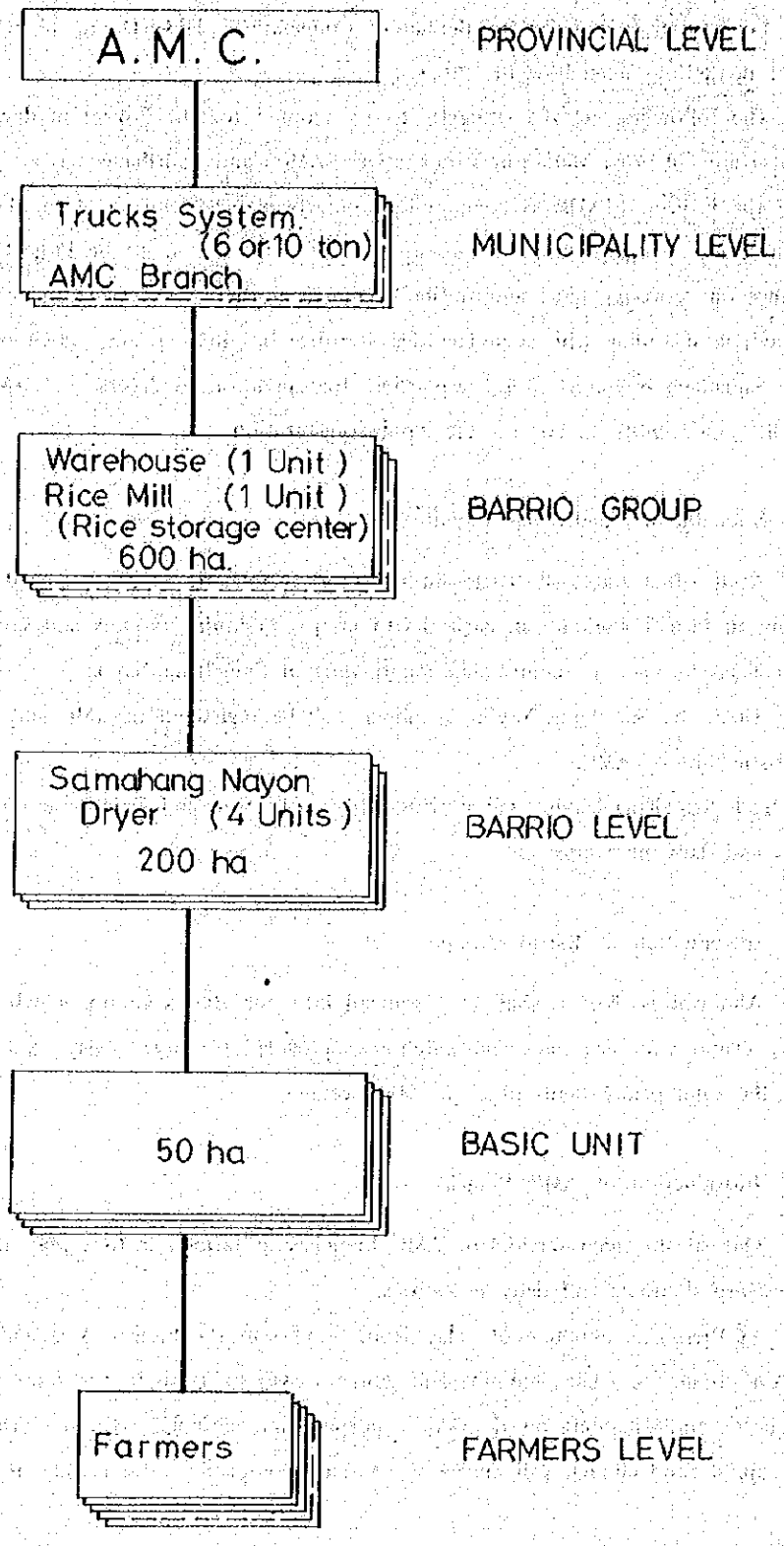
1) Proposed Rice Marketing Routes with Project



Note: 1. These percentages show the rate to total production.

2. The proposed yield is 90 cavans per ha.

2) Organization Chart of Cooperatives



APPENDIX II - 6 PROPOSED MARKETING SYSTEM

For overall cooperation of Bureau of Cooperatives, DLGCD, should be in a position to take care of marketings related to the Project.

The followings are the strategies to be adopted for the Project in due consideration of the present status of Area Marketing Cooperatives (AMC) and Samahang Nayons.

The Project, CIADP, is composed of objective areas being far from the AMC main office in Tuguegarao. Judging from the present level of motorization in the Project Area, two AMC branches, one covering Iguig and Alcala-Amulung, another Lower Cagayan, are proposed to be established, in providing with such facilities as office buildings, stores, warehouses and so forth.

Samahang Nayon is to be responsible for operation of dryers, and AMC main office should have all responsibility to control the whole organization.

1) Strengthening Samahang Nayon

At the first stage, all Barrios in the Project Area are to be organized in Samahang Nayon, involing all farm households in each Barrio in it. Trainning farmers and saving their funds will be realized through the course of strengthening of Samahang Nayon.

Then, the Samahang Nayon members shall be registered to AMC and shall play a vital role as a basic unit of AMC.

Such Samahang Nayon will provide with small store and warehouse for selling of agricultural inputs and daily necessities.

2) Introduction of Barrio Group

About three Barrios shall be organized into one Barrio Group, which will function as rice storage center with rice mills and warehouses provided for dryed palay. Such Barrio Group shall cover the total paddy fields of about 600 hectares.

3) Introduction of AMC Branch

One of the main services of AMC branches to farmers is to supply the necessary quantity of agricultural inputs and daily necessities.

Furthermore, purchase of palay from farmers in the Project Area will be also handled by the AMC branches, while trainning and guidance will be given to the farmers so that they may have better understanding on the AMC's purpose and activities. On the other hand, saving its own capital fund enough will enable the farmers to receive some credit for meeting their demands.

4) Strengthening of AMC

AMC will contribute to follwing activities under closest cooperation with Samahang Nayon and AMC branches.

i) Program of selling palay will be made in due consideration of market price fluctuation in consumers areas like the Greater Manila.

ii) Making long term contracts for direct purchase of agricultural inputs from producers, AMC will supply these inputs to related branches at possible low prices.

iii) The program for building up own capital funds will be formulated.

iv) To secure the well-qualified staff in each level of cooperatives, education program will be created and trainning of employee will be proposed.

v) Atidit system to ascertain own services in rational practices will be provided.

5) Recruit and securing of well qualified staff

For organizing marketing system based on Samahan Nayon, one of the most important clues is to provide the well-qualified and capable staff. It would be rather difficult, however, to recruit from growing private organization, the well-qualified personnel for serving as the cooperatives staff in remote places such as the Project Area. Then, the following points should be taken into account for recruiting the right personnel for shifting in the right place.

i) to improve working conditions including reasonable wages or salaries,

ii) to offer suitable positions to each employee so that every one may display his ability.

Especially, managers of respective AMC branches should be so much responsible for firm establishment and effective management of the organization that selection of suitable persons to the position should be made in due consideration of capability and personality of the candidates.

6) Outlets

For smooth distribution of palay produced in the Project Area through their own channels, many outlets in the consumers center should be established under the cooperation of the other AMCs.

To secure the reliable outlets in the large cities will permit AMC to return to farmers the more profit earned by direct handling of products.

7) Increase of agricultral inputs

Even with infrastructures improved and high yielding paddy varieties employed, the large yields cannot be expected without proper application of agricutural inputs.

It is inevitable to apply much more inputs for reaching the goal of higher yield than

before, and existing dealers of the line will not be able to supply the inputs sufficently to meet the farmers increased requirements. Thus, the cooperatives also will serve to supply the inputs to the farmers in the Project Area through its own routes.

APPENDIX H – 7 PROPOSED MARKETING FACILITIES

1) Dryer

Among processing facilities for the post-harvesting, special attention should be paid to dryers to obtain high quality palay. For first crop, it will be difficult to dry up palay by sunshine sufficiently due to wet season, and so the efficient dryers can keep the quality of palay high. It is considered, therefore, that the locally suitable dryers, that are developed by the University of the Philippines, Los Baños would be adopted in CIADP.

2) Rice Mill

Regarding 600 hectares as one unit area, a rice mill shall be introduced for more effective and efficient farming works. In the case, the Cono type husker, which has been produced in the Philippines, would be adopted due to the reasons as follows ;

i) Fairly high recovery rate of rice from palay.
ii) Considerably low price as compared with rubber roll type.
iii) Easy maintenance with quick supply of the local made spare parts at low costs.
iv) Easy operation.

Installation of milling facilities in the Project Area will bring about convenience and reduction of transportation cost from the Project Area to the Consumption areas.

3) Warehouse

Farmers who have their own storage facilities can ship their products at any time according to the market conditions. Such farmers can select the opportunity favourable to them for shipment of the products taking into account the market conditions more advantagous to them.

4) Transportation

In marketing, one of the vitally important aspects is mobilization of goods. In present less motorized Project Area, the Cooperatives will not be able to secure adequate transportation facilities in hiring from the private sector on their demands. In due consideration of the facts, it is desirable to provide some stake trucks to serve the purpose in the Project.

Stake trucks 10 t load. (Operated between Manila and Project site)
Stake trucks 6 t load. (Operated within the Project Area)

The large-sized 10 t stake trucks shall carry the milled rice from the Project Area to Manila, and carry back agricultural inputs and the daily necessities to the Project Area on the

return way.

The small-sized 6 t stake trucks shall carry dryed palay to the warehouses and rice-mill plants in teh Project Area at frequency 35 days for one harvesting season, two harvesting seasons in a year : subsequently, those trucks will be operated about 70 days per year, and they shall serve to transport various goods controlled by AMC branches within the Project Area for the remaining period of the year.

5) Replacement of Facilities

The facilities to be introduced in the Project will have their own life as shown below.

Dryer	5 years
Rice Mill	15 years
Warehouse	30 years
Truck	5 years

The life of the total Project will be estimated 50 years. Then, efficient and effective execution of the project requires to renew the facilities, subject to each life mentioned above.

It is natural, therefore, that the Project operating budget should involve the necessary costs for scrap-and-build of those facilities to smoothen the project execution.

TABLE H-7-1. **PROPOSED MARKETING FACILITIES AND COST**

(Unit; cost: '000P)

	Irrigable Area	Total Product	Marketable Palay through SN	No. of Management Unit	Marketing Facilities						Truck				Grand Total
					Dryer		Warehouse		Rice Mill						
					No.	Cost	No.	Cost	No.	Cost	Spec.	No.	Cost	Total	
	(ha)	(10^3 cavans)	(10^3 cavans)												
Iguig	600	54	22	1	11	77	1	240	1	20	6 t	1	67		
											10 t	2	160	227	564
Alcala-Amulung	1,400	126	52	2	26	182	2	480	2	40	6 t	2	134		
											10 t	5	400	534	1,236
Lower Cagayan	11,200	1,008	413	17	207	1,449	17	4,080	17	340	6 t	11	737		
											10 t	40	3,200	3,937	9,806
Total	13,200	1,188	487	20	244	1,708	20	4,800	20	400	6 t	14	938		
											10 t	47	3,760	4,698	11,606

Notes: No. ; Number
Spec.; Specification
Marketable palay through S.N. ; 41% of total Product
Unit yield is 90 cavans (of 44 kg) per ha.

TABLE H-7-2. **CAPACITIES OF MARKETING FACILITIES**

Facilities	Type	Capacity	Price (10^3 ₱)	Computation of Coverage
Dryer	Flat bed	2,000 (cavans per crop)	7	(1) 28 - 21%of moisture at harvest will be reduced to 20% by sunshine. Moisture of palay will be decreased from 20% to 14% by dryer (2) Operation period; 20 days per crop (3) Capacity per crop; 20 days x 40 cavans per 4 hr x 10 hr per day = 2,000 cavans per crop
Warehouse (Including space for rice mill)	512 sq m (32 x 16 m)	24,000 (cavans)	240	(1) Storage period; 6 month (maximum) (2) Space for stock; 480 sq m 20 layers, (50 cavans per sq m) (3) Space for rice mill; 20 sq m (4) Miscellaneous; 12 sq m
Rice Mill	Cone	24,000 (cavans/crop)	20	(1) Operation period; 6 month x 22 days/month = 132 days (2) Capacity per crop; 132 days x 200 cavans/day x 90% ≒ 24,000 cavans
Truck	Stake Truck (6 ton)	39,800 (Cavans/crop)	67	(1) The truck will be used on farm, from farm household to Rice mill. (2) Round trip time; 1.12 hr based on the average speed of 20 km/hr, Round distance of 2.3 km and loading and unload in time of 1.0 hr (3) Total operation time per crop; 35 days x 8 hr/day = 280 hr (4) Load capacity of truck; 6,000 kg x 70% = 4,200 kg (Palay) (280 hr ÷ 1.12 hr) x 4,200 kg ÷ 44 kg/cavan ≒ 23,900 cavans (5) Treatment volume of palay by SN; 60% by the truck and 40 % by private vehicle; 23,900 ÷ 0.6 ≒ 39,800 cavans

(cont'd)

Facilities	Type	Capacity	Price (10^3 ₱)
Truck	Stake truck (10 ton)	10,400 (cavans/crop)	80

Computation of Coverage

(1) The truck will be used to convey the milled rice from project area to Manila

(2) Average round distance; 1,140 km

(3) Necessary time for transportation;
1,140 ÷ 50 km/hr + 1.0 hr (loading and unloading time) + 2.0 hr (rest time)
= 25.8 hr

(4) Total operatin time per crop;
240 day/year x 8 hr/day ÷ 2 = 960 hr

(5) Load capacity of truck;
10,000kg x 80% ÷ 65% (milled rice recovery rate) ÷ 44 kg/cavan
= 280 cavan (as of play)

(6) Capacity of one set per crop;
280 x 960 ÷ 25.8 = 10,400 cavans (as of play)

APPENDIX II – 8 NEW COMMUNITY DEVELOPMENT SCHEME

1) New Community Development committee

a) Community Development Coordinate Committee (CDCC)

Community Development Coordinate Committee (CDCC), which will be established in Tugegarao, shall function to make coordination for the works to be undertaken by various agencies concerned. The representative of DAR regional office will be assigned to the chairman of the organization and also to the chief of Community Development Section of CIADP.

The members of CDCC will comprise the staff from DAR, DLGCD, BPI, BS, BAEx, NIA, DPWCT, Provincial government and municipal offices.

CDCC shall serve to evaluate and approve the plans to be formulated for community development and its implementation, and to execute inter-departments coordination works.

b) Community Development Section

The Community Development Section included in the CIADP organization shall be responsible practically for project execution of Community Development scheme in the following items.

i) to clear the land tenure status of post reclamation and land use conditions in the Project Area,

ii) to survey socio-economic conditions prevailing in the Project Area and its adjacent areas which will receive influence by Project realization, and list up the candidate farmers for immigration from Aparri, Camalaniugan and Buguey, and recruit may be necessary from other areas in Cagayan province, the candidate farmers are not enough in numbers to meet the project requirements,

iii) to make the detail design for transmigration,

iv) to make construction schedules for infrastructures required for transmigration,

v) to plan farming schedules and to guide farming practices to the settlers,

vi) to train home technology inhavitants,

vii) to establish Samahang Nayon, and register AMC after establishing Samahang Nayon, and to make supply schedules of agricultural inputs for smooth supply services.

c) Organization

The organization will be decided as follows taking into account the effective services for the project operation.

i) Planning sub-section

ii) Transmigration sub-section

iii) Life guidance sub-section

iv) Cooperatives sub-section

v) Farming sub-section

Among the above sub-sections, the Planning sub-section shall be in charge of coordinating and planning works to grasp the general progress of the scheme.

2) Criteria of Selecting Immigrants

Fundamentally, the subject criteria shall follow the standard criteria for resettlement prepared by DAR.

a) Order of priorities for selecting candidates

On selecting the candidates for immigrants, it is better to pay attention to the following priorities.

i) Farmers or farm labourers from barrios adjacent to the Project Area, as close as possible.

ii) Ilocano people in Cagayan province.

iii) Farm labourers in whole Cagayan province.

iv) Farmers from Ilcos provinces, if sufficient numbers of immigrants cannot be gathered/ from the above categories.

b) Following items should be taken into account for better implementation of the scheme.

i) to select families having some manpowers in their own,

ii) to select families having some capital for their own,

iii) to select people with education to a certain extent,

c) Some restrictions agter immigration

It is natural that the immigrants can enjoy their life in the newly developed area ; some restrictions, however, will have to be imposed for the rational operation of the scheme, and several items concering the case are shown below.

i) Farmers should accept guidelines prepared by Community Development for crops to be planted in the section fields.

ii) Land transfer between individuals shall be prohibited. If farmers want to quit farming, they shall sell their farm lands to CIADP.

d) Supporting system for immigration scheme

There are many transmigration projects being under way, in the Philippines, and various kinds and types of supporting systems for these projects have already been tried. It is considered essential, however, to set up the followings for CIADP.

The supporting system, which allows the farmers to receive grant and/or loan in goods or cash by government or banks, shall be established to encourage the farmers in their self-help mind as well as mutual cooperation spirit, so that they may overcome difficulties on the course of development works.

Too much support, however, will spoil them in losing their independent spirit but contrally little support will make farmers excape from the farming works within several years.

APPENDIX II – 9 STANDARD OPERATING PROCEDURE ON SETTLERS' AFFAIRS

1) How to Procure Loan Assistance form Subsistence Items

a) The Tean Leader, Resettlement Agency, shall organize a bidding committe for the procurement of subsistance items to be composed of the following :

i) Senioi Agrarian Reform Technologist (formerly, Agricultural Extension Supervisor), as chairman.

ii) Agrarian Reform Technologist (formerly, Home Management Technologist) member:

iii) Accountant, member ;

iv) Legal Officer, member ;

v) Physician or any member of the Medical Unit, Member ;

vi) Auditor, as witness ;

vii) Representative of the Settlers, as witness.

b) The Team Leader Shall

i) Based from the established ration standard, determine what items are to be procured ;

ii) Direct the preparation of the Request for Emergency Purchase ;

iii) Approve the Request for Emergency Purchase ;

iv) Direct the storekeeper to prepare a request for quotations stating there-in the time, date and place of bid.

c) The storekeeper or any employee, with written authority from the Team Leader shall serve a copy each of the request for quotations to at least three (3) reputable dealers who shall be advised to submit the quotations in sealed envelopes.

d) Upon receipt of the quotations from the dealers, the Bidding Committee shall open the sealed Request for Quotations in the Presence of the dealers or the respective representative on the time and date of bid.

e) The Conimittee shall prepare an abstract of quotations and shall determine the bid which is the most reasonable and advantageous to the settlers and the government based on the lowest quotations and/or conditions of delivery in point of time.

f) Thereafter, the abstract shall be forwarded to the Team Leader for approval or award.

The winning bidder shall be required to put up a performance bond in a amount which shall not be less than 20% of the total price.

g) Upon receipt of the abstract of quotations, the Storekeeper shall prepare the Purchase Order in favor of the winning bidder, indicating therein the specified trademark and/or brand of the item(s).

h) The Purchase Order shall be forwarded to the Accountant for the Certification of availability of funds and then to the Team Leader for Approval.

i) The storekeeper shall serve immediately the approved Purchase Order to the winning bidder.

j) Upon delivery of the item(s), the Auditor shall be notified of such delivery.

k) No issuance of any item shall be made prior to the inspection of the Auditor.

2) How to Distribute Subsistence Items

a) The storekeeper shall make the distribution of subsistence items to the settlers and shall prepare the Settler's Charge Invoice therefore.

b) He shall specify in the said Charge Invoice receipts the unit price for each item, number of items, trademarks, and the total amount of prices. Any error in the entry shall be a prima facie evidence of inefficiency and shall be a basis for administrative action against him.

c) After the distribution of items, the storekeeper shall submit the accomplished Settler's Charge Invoice duly signed by the settler-recipients and the storekeeper shall submit the accomplished Settler's Charge Invoice duly signed by the settler-recipients and the storekeeper as the issuing officer.

d) The abstract of the accomplished Settler's Charge Invoice shall be prepared by the Storekeeper and certified by the Team Leader, and then submitted to the Team Accountant. The abstract shall contain the following :

i) Date

ii) Names of Settlers

iii) Settler's Charge Invoice Number
iv) Names of items
v) Number of units
vi) Unit cost
vii) Total amount

3) How to Procure Medicines and Medical Supplies

a) The Project Physician or, if there is no physician, the Dentist, Nurse, or Midwife, as the case maybe, shall determine the quarterly requirement of medicines and medical supplies for the project or settlement and prepare the requisition thereof. Requistition for the replenishment of quarterly stock shall be accompanied by a report of daily dispositions of medical items with the name of the recipient-settlers properly certified by the Team Leader. The same shall be forwarded to the Office of the Secretary, attention the Settlers' Affairs Division through channels.

b) In case of emergency, like those involving imminent danger to life and limb, as determined or decided by the Physician, Nurse, Dentist, or Midwife, as the case maybe, the Team Leader shall authorize the disbursement of funds for the purchase of medicines and other expensed necessary to meet the emergency ; provided, however, that the Team Leader shall immediately report the case to the Secretary and request allotment for the amount disbursed, accompanied by a detailed history of the case singed by the physician.

c) A Committee to be composed of the Chief, Settler's Affairs Division, as Chairman, Medical Service Supervisor, Chief of the General Services Division, and the Senior Dentist, as members, shall review all requisitions. Requisitions passed upon the Committee shall be forwarded to the Secretary through the Director, Bureau of Resettlement, for approval.

d) The same shall be forwarded to the General Services Division for the preparation of request for quotation to be served to at least three (3) reputable dealers on medicines.

e) The Committee shall then prepare the abstract of quotation, and shall determine the lowest bidder and forward the same to the General Services Division for the preparation of the purchase order.

f) The General Services Division shall forward the Purchase Order to the Financial & Management Service (FIMAS) for proper funding and to the Secretary for approval.

g) The General Services Division shall serve the approved Purchase Order to the winning bidder.

h) Upon delivery of the medicines or medical supplies, the Medical Service Supervisor shall inspect the delivered item(s) insuring among other things that the medicines/medical supplies delivered have an expiration date of not less than two(2) years from the date of the purchase.

i) Before the medicines/medical supplies are shipped to the Resettlement Agency by the General Services Division, the word "Chargeable" shall be stamped or labeled clearly on each medicine item intended for issuance to settlers based on the requisition chargeable against their accounts. Those items intended for general clinic use shall bear no stamp or label.

Section c, d, & g are being suspended pursuant to Letter of Instruction No. 213, dated September 5, 1974, which provides, among other things, that the sale of drugs and medicines by pharmaceutical manufacturers/importers be made direct to hospitals and medical clinics at manufacturers/importers' prices heretofore charged to distribution/wholesalers.

4) How to Attend to the Medical Needs of the Settlers

a) After proper identification of settler, the physician or his representative shall prepare clinical records indicating thereon the name of the settler and other data.

b) The Physician or his duly authorized representative shall conduct the necessary medical treatment and shall prescribe the necessary medicines.

c) In case of medical emergency and when the Agrarian Reform Team Clinic lacks medical facilities in attending to the settler's medical needs, he shall be immediately referred to the nearest hospitals or clinic by the physician, nurse, midwife or dentist.

d) The Settler-patient shall present the Doctor's prescription to the nearest Storekeeper who in turn shall prepare the settler's charge invoice. The settler-patient shall be issued medicines provided that he is still within the three (3) year period of residence.

e) In case there is no project physician, the services of public hospitals and/or public health officer shall be availed of. In the advance of both public hospital and/or public health officer, the Agrarian Reform Team Leader shall enter into a contract with a private physician limited to the following conditions ;

i) Medical loan assistance rendered to settlers whose residence in the settlement area is not more than three years shall be charged to their accounts.

ii) Settlers-beneficiaries who gave stayed for more than three years can be extended medical/dental assistance if they can show a certification issued by the Agrarian Reform Team Leader that they are indigent.

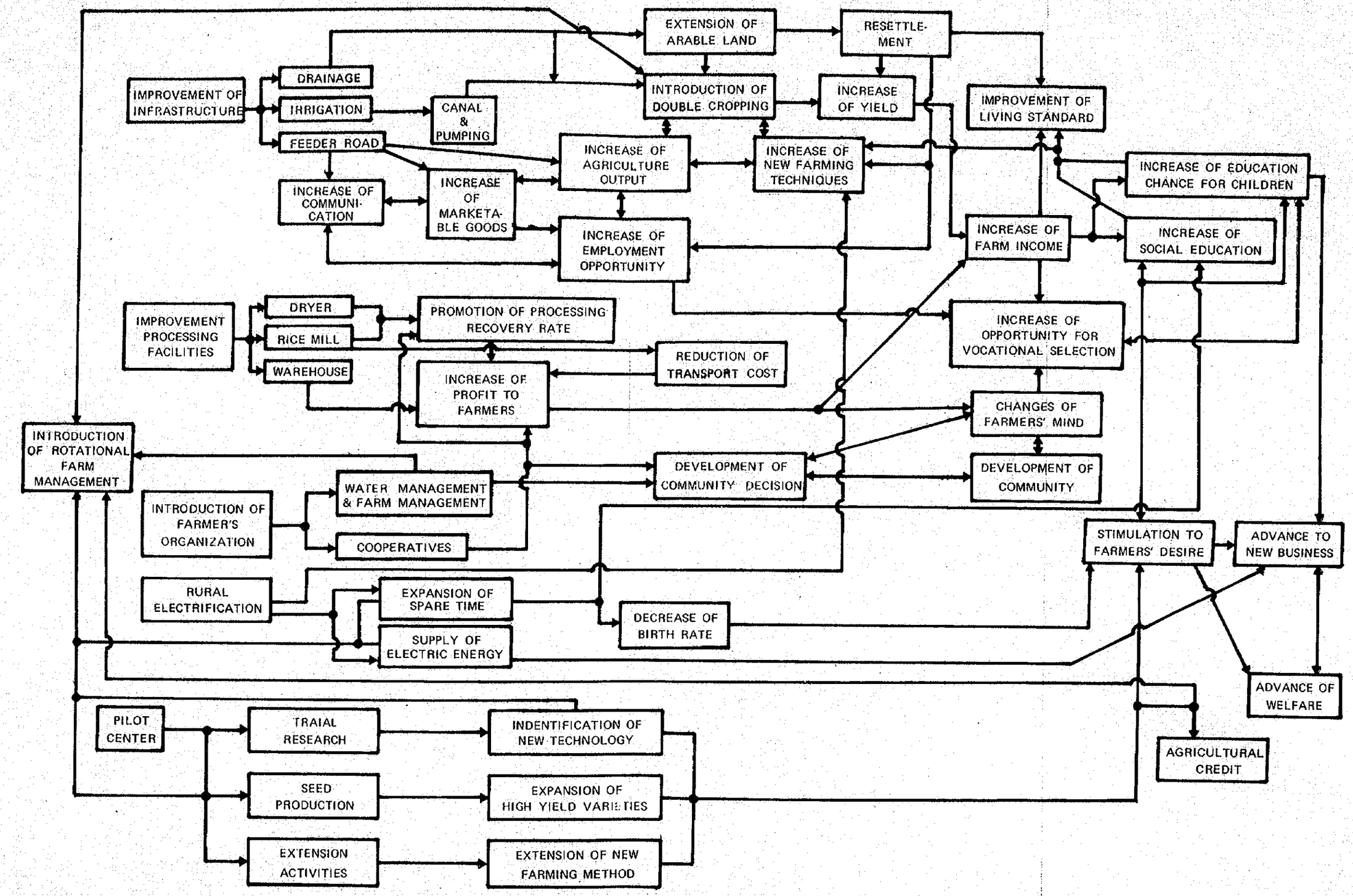
iii) The corresponding chargeable health aid receipt shall prepared by and signed by the settler-beneficiaries.

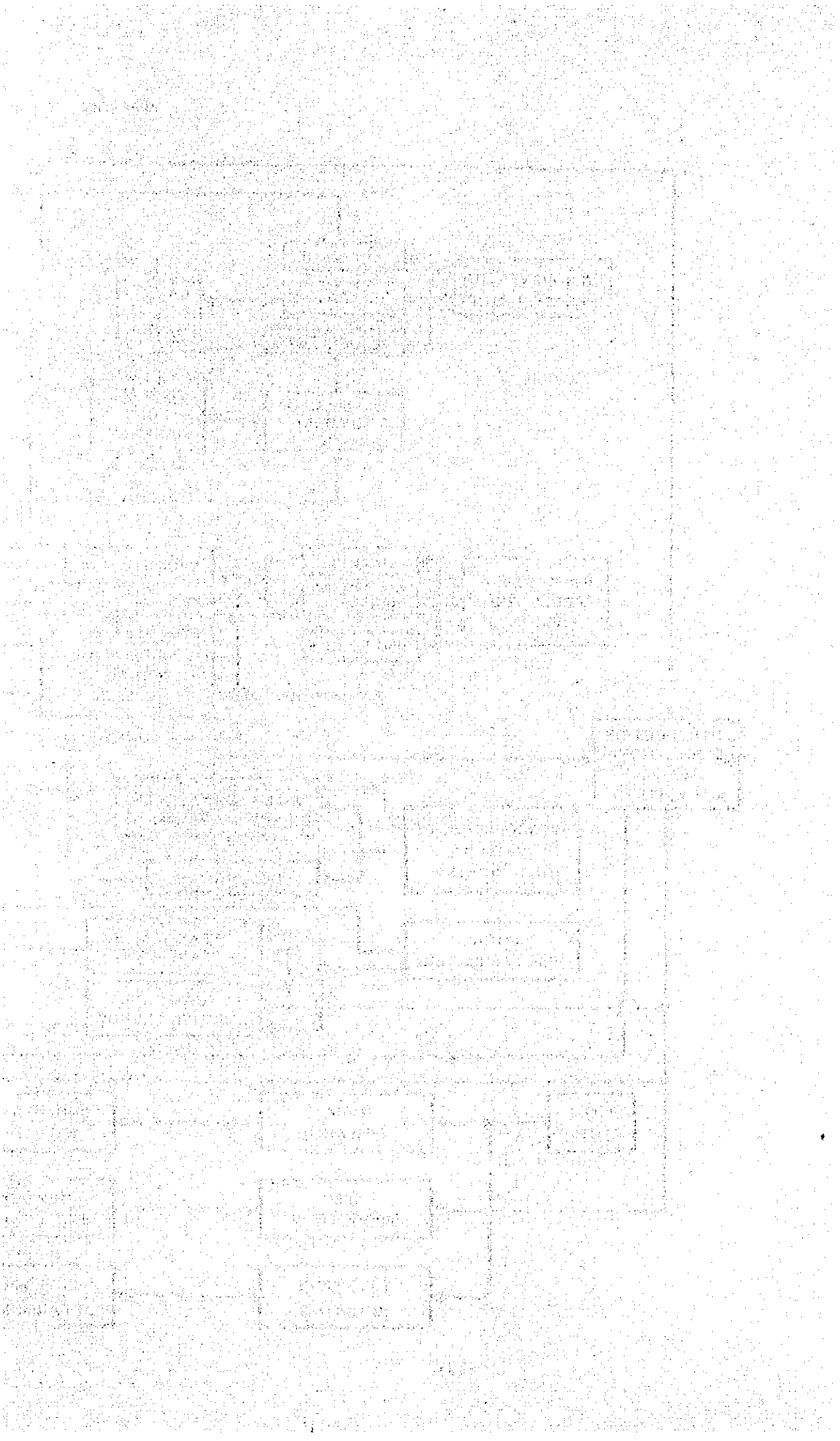
iv)	Consultation for out-patient	₱ 5.00
v)	Confinement, not to exceed	10.00/day
vi)	Surgical intervention fee, not to exceed	200.00
vii)	Laboratory examination fee, not to exceed	50.00

f) The Project Physician shall certify as to the reasonableness of the claim for medical assistance rendered to the settlers.

g) The Project Physician shall register in his log book the medical attendance he has rendered to the settlers.

APPENDIX H – 10 RELATIONSHIP OF IMPACT WITH PROJECT





APPENDIX I CONSTRUCTION METHODS

Appendix I-1. WORKABLE DAYS AND CONVERSION RATE OF EARTH VOLUME

1) Workable days

On deciding workable days in the construction sites, rainfall data recorded at Tuguegarao Station was used for Iguig and Alcala-Amulung and the data at Aparri Station for Aparri and Lal-lo areas. The data used covers the past ten (10) years from 1964 to 1973 and the following principles were applied for the study.

a) Concrete Work

Less than 10 mm	Workable
More than 10.1 mm	Non-workable

b) Other Works (excavation, embankment, etc.)

Less than 5 mm	Workable
5.1 mm to 30 mm	Non-workable on the day
30.1 mm to 100 mm	Non-workable for two days
More than 100.1 mm	Non-workable for three days

In case there were continuous rainfall days with the record of more than 5.1 mm in each day, the accumulative figure would be considered as a rainfall and the above was applied in the same manner.

Workable days were, then, computed as shown below:

Area	Work	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Ave.
Iguig	Concrete	26	24	25	25	26	25	26	26	26	25	23	24	(300) 301	25
Alcala-Amulung	Others	26	24	25	25	24	20	22	21	22	21	18	24	(276) 272	23
Aparri	Concrete	26	24	25	25	26	25	26	26	24	24	20	24	(300) 295	25
Lal-lo	Others	22	24	25	25	26	21	23	20	19	17	14	20	(252) 256	21

Note: The number of days shown in the above table represents the lesser one between the number of days in the month except holidays

( ) = Monthly average number of days x 12 months

2) Conversion rate of earth volume

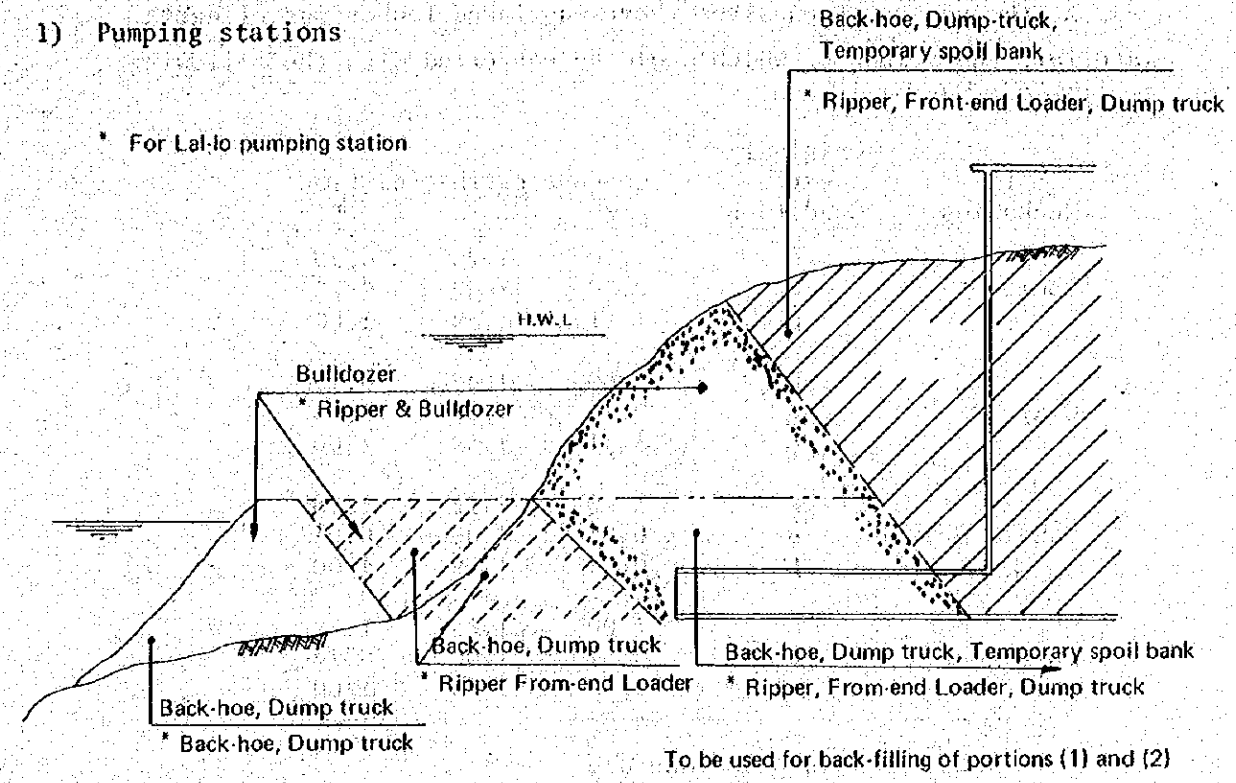
At the construction sites there was found four types of earth material, the volume of which would be converted with the following rates.

Spil Mechanics	Original earth Condition	Convert earth condition P	E	L
Common	P	1.00	1.25	0.90
	B	0.80	1.00	0.72
	L	1.11	1.39	1.00
Clay	P	1.00	1.43	0.90
	B	0.70	1.00	0.63
	L	1.11	1.59	1.00
Sand & Gravel	P	1.00	1.18	1.08
	B	0.85	1.00	0.91
	L	0.93	1.09	1.00
Soft rock	P	1.00	1.65	1.22
	B	0.61	1.00	0.74
	L	0.82	1.35	1.00

Note: P = in place measure
B = in bank measure
L = in loose measure

Appendix 1-2. CONSTRUCTION METHODS

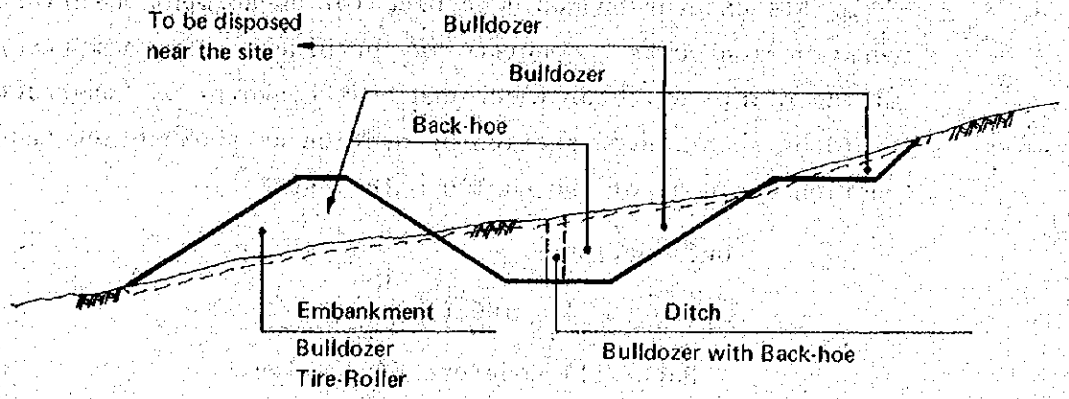
1) Pumping stations



Excavation shall be started for portion (1) first, so that portions (2) and (3) will be used as a cofferdam during the period. Next to this, the upper part of portion (2) would be excavated. It is necessary to start this excavation at the earliest possible time during dry season so as to complete it before wet season set in. Excavated material during this period should be hauled to the river side to be used for cofferdam embankment to form the upper part of (3) and portion (4). The remaining part of portions (2) and (3) will then be excavated. After completing various works for the pump house, portion (4) will finally be removed. It is to be noted that all works related to the portions (2), (3) and (4) shall be completed in one dry season only. Concrete placing work would be facilitated by using belt conveyor and concrete conveyor for the lower portion and higher portion, respectively, after transporting concrete by agitator-truck from where a temporary concrete mixing plant would be located somewhere near the pumping stations.

2) Canals and structures

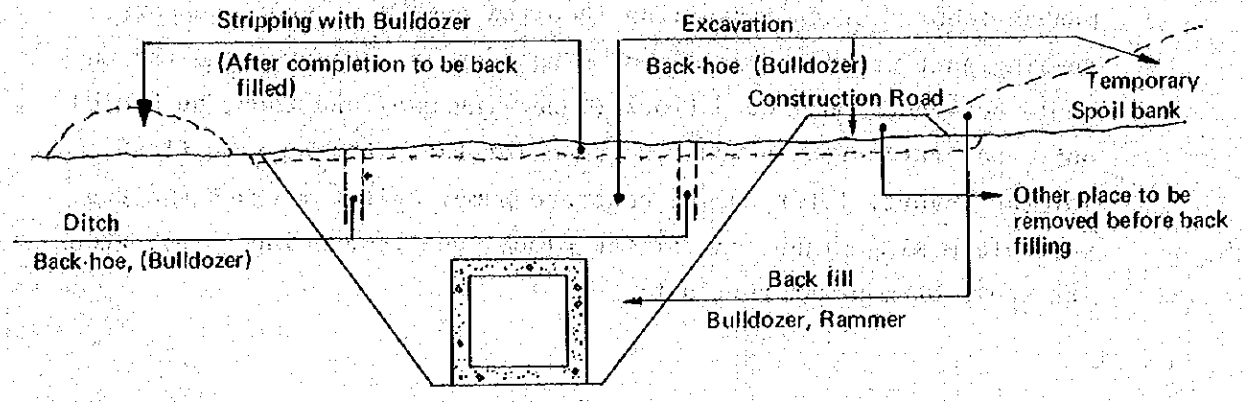
a) Open Canal



For lowland and/or swampy area, it is necessary that stripping be made first and drainage ditch would be excavated using bulldozer with back-hoe attachment. Then, canal section would be excavated by back-hoe simultaneously with pumping out excess water. As for the structures to be constructed in irrigation canals, such as turn-outs and drop structures, Portable pot mixer would be used for concrete placing, as required concrete volume is not so big.

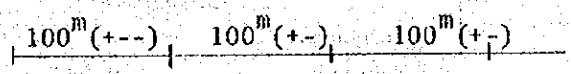
b) Structures

i) Siphon



First, clearing would be done for cultivated lands and excavation would be conducted using back-hoe and bulldozer after digging necessary drainage ditches. Those materials obtained from this excavation would be used for embankment material for construction works. Concrete may be placed using temporary mixing plant, agitator truck and belt conveyors. Construction would be so arranged section by section as shown below and one section would be of around 100 m in length.

One section



Back-fill Concrete Excavation

ii) Culvert

Culvert would be provided where new canal would either cross some existing structures such as road and canal or pass through residential areas. In the former case, temporary road and/or canal would be needed for detouring. Construction method is quite similar to the construction of siphon.

c) Tunnel

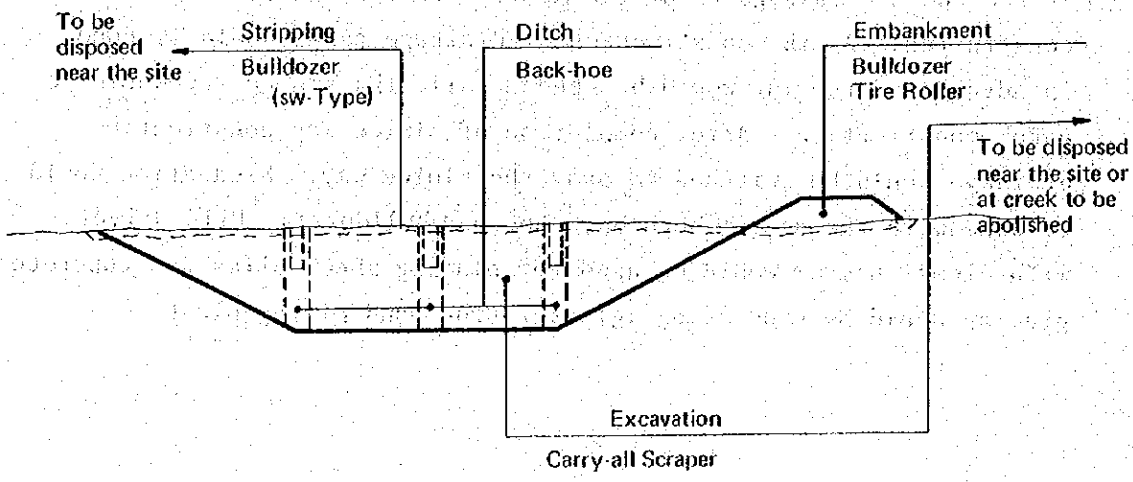
The geographical condition which would be encountered in tunneling operations under CIADP is a sand and silt comporisition. Excavation would be started from the upper stream site with non-rail system. A portable deck/home would be required for the first ring-cut by manual labor. After installing required number of steel support, remaing part would be excavated using machine excavator and the muck would be loaded on a dump truck (Tunneling use) and then, be hauled out. Concrete placing would be done for the arch and side first and for the invert, later, using concrete pump, agitator truck and the portable mixing plant. After the placed concrete being cured, grouting would be made at the last.

d) Drainage Canal

In all construction sites of CIADP, there are both work items of new construction and rehabilitation of existing drainage canal.

i) New Construction

As for Iguig, Alcala-Amulung and Lal-lo areas, construction would be carried on in the same manner as in the construction of open canal mentioned in Par. 2-a, considering the size and capacity of drainage canal. While for Aparri area, a manner as shown below would be recommended



One construction section would be around 80 m.
After stripping off the surface soil, Back-hoe would be employed then to deepen/widen the ditches and carry all scraper would preferably be used for excavation and hauling works. Excavated materials would be utilized for embankment of road along the canal or be disposed at the creeks to be ablished.

ii) Improvement

For this item, a combination usage of back-hoe and bull-dozer would be more effective. Disposal of excavated/dredged materials would be done in the same manner for new construction.

e) Roads

Most road could be constructed along canals using the materials from canal excavation. For the upper layer of around 20 centimeters, qualified material would be hauled from stock pile. Surfacing would then be provided with gravel after compaction of road bed.

f) Sluiceway

At the end of drainage canal for Aparri area, a sluice-way would be constructed. As the construction of drainage canal would be done in advance, detouring would be needed while the sluice-way would be under construction. After completion of sluice-way construction, drainage would be switched to pass the sluice-way. Excavation would be done with the use of both back-hoe and bulldozer. Pile driver with diesel hammer would be used for placing sheet piles and concrete placing would be made using agitator truck and mixing plant.

APPENDIX J CONSTRUCTION COST

APPENDIX J-1 CONSTRUCTION COST

(Unit: '000 ₱)

Description	Lower Cagayan F.C.	Lower Cagayan L.C. Cost	Lower Cagayan L.C. O.Head	Lower Cagayan L.C. Total	Alcala & Amulung F.C.	Alcala & Amulung L.C. Cost	Alcala & Amulung L.C. O.Head	Alcala & Amulung L.C. Total	Iguig F.C.	Iguig L.C. Cost	Iguig L.C. O.Head	Iguig L.C. Total	Total F.C.	Total L.C.	Remarks
1. Preparation	-	4,243	636	4,879	-	530	80	610	-	227	34	261	-	5,750	Grand Total 5,750
2. Pumping Facility															
Pump Equipment	23,963	424	64	488	4,465	-	-	-	3,016	-	-	-	31,444	488	" 31,932
Pumping Station	1,493	3,513	751	4,264	456	1,142	240	1,382	293	924	183	1,107	2,242	6,753	" 8,995
Sub-total	25,456	3,937	815	4,752	4,921	1,142	240	1,382	3,309	924	183	1,107	33,686	7,241	" 40,927
3. Canals															
Irrigation Canal	5,432	10,594	2,404	12,998	1,716	4,001	858	4,859	427	1,091	228	1,319	7,575	19,176	" 26,751
Drainage Canal	3,570	11,030	2,190	13,220	317	1,059	207	1,266	53	177	35	212	3,940	14,698	" 18,638
Sub-total	9,002	21,624	4,594	26,218	2,033	5,060	1,065	6,125	480	1,268	263	1,531	11,515	33,874	" 45,389
4. Road	1,843	6,261	1,216	7,477	137	859	150	1,009	56	405	70	475	2,036	8,961	" 10,997
5. Terminal Facility	876	7,971	1,328	9,299	308	1,712	303	2,015	24	344	56	400	1,208	11,714	" 12,922
6. Rural Electrification	10,275	2,747	413	3,160	-	-	-	-	-	-	-	-	10,275	3,160	" 13,435
7. Material	5,877	-	-	-	734	-	-	-	424	-	-	-	7,035	-	" 7,035
8. Land Acquisition	-	-	-	2,584	-	-	-	677	-	-	-	305	-	3,566	" 3,566
9. Engineering	4,903	-	-	1,922	613	-	-	241	263	-	-	103	5,779	2,266	" 8,045
10. Government Administration	-	-	-	3,921	-	-	-	781	-	-	-	265	-	4,967	" 4,967
11. Contingency	8,735	-	-	9,632	1,312	-	-	1,926	684	-	-	668	10,731	12,226	" 22,957
12. Equipment	44,276	-	-	-	10,273	-	-	-	1,838	-	-	-	56,387	-	" 56,387
Total	111,243			73,844	20,331			14,766	7,078			5,115	138,652	93,725	" 232,377

F.C. = 59.7%
L.C. = 40.3%

APPENDIX J-2 BREAKDOWN OF CONSTRUCTION COST

1) Preparation

(Unit: '000 Pesos)

Item	Description	Quantity	Unit	Rate F.C.	Rate L.C.	Amount F.C.	Amount L.C.	Remarks
1	Preparation							
	Temporary road	1	L.S.				2,500	
	Survey & Leading form	1	L.S.				150	
	Testing	1	L.S.				150	
	Temporary facility	1	L.S.				1,800	
	Clear away	1	L.S.				400	
	Total						5,000	
	Overhead	5,000 x 0.15					750	
	Grand Total						5,750	
	Lower Cagayan						4,879	
	Alcala & Amulung						610	
	Iguig						261	

2) Pumping Station

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
2	Pumping Facility							
2-1	Equipment							
	(a) Lower-Cagayan							
	Pump & others ϕ1,500mm	4	set			23,963	424	
	(b) Alcala & Amulung							
	Pump ϕ600mm	3	set			4,465	-	
	(c) Iguig							
	Pump ϕ400mm	3	set			3,016	-	
	Sub-total					31,444	424	
2-2	Pumping Station							
	(a) Lower-Cagayan							
	Excavation	37,600	m^3	1.78	5.11	66,928	192,136	
	Embankment	11,000	"	1.26	3.48	13,860	38,280	
	Concrete works	6,540	"	182.31	390.87	1,192,307	2,556,290	
	Others	1	L.S.			219,905	726,294	
	Sub-total					1,493,000	3,513,000	
	(b) Alcala & Amulung							
	Excavation	18,800	m^3	0.58	1.55	10,904	29,140	
	Embankment	13,500	"	0.78	2.37	10,530	31,995	
	Sand Bed	1,010	"	0.26	21.88	263	22,099	
	Concrete works	1,660	"	199.82	457.38	331,701	759,251	
	Others	1	L.S.			102,602	299,515	
	Sub-total					456,000	1,142,000	

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
	(c) Iguig							
	Excavation	12,200	m^3	0.55	1.59	6,710	19,398	
	Embankment	10,000	"	0.85	2.60	8,500	26,000	
	Sand bed	130	"	0.20	22.47	26	2,921	
	Concrete works	1,070	"	188.55	530.00	201,749	567,100	
	Others	1	L.S.			76,015	308,581	
	Sub-total					293,000	924,000	
	Total					2,242,000	5,579,000	
	Grand Total					33,686,000	6,003,000	

3) Irrigation and Drainage

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
3	Canals							
3-1	Irrigation Canal							
	(a) Lower Cagayan							
	Stripping	573,600	m^3	0.33	1.08	189,288	619,488	
	Excavation	288,400	"	0.52	1.34	149,968	386,456	
	- do - (tunnel)	10,500	"	162.24	79.41	1,703,520	833,805	
	Embankment	1,555,300	"	1.37	3.52	2,130,761	5,474,656	
	Backfill	9,300	"	0.34	2.83	3,162	26,319	
	Concrete works	2,510	"	211.76	477.38	531,518	1,198,224	
	- do - (tunnel)	460	m	365.09	1,636.95	167,941	752,997	
	Structure & others	1	L.S.			555,842	1,302,055	
	Sub-total					5,432,000	10,594,000	
	(b) Alcala & Amulung							
	Stripping	124,600	m^3	0.26	1.00	32,396	124,600	
	Excavation	58,300	"	0.51	1.70	29,733	99,110	
	Embankment	285,900	"	1.46	3.91	417,414	1,117,869	
	Backfill	38,600	"	0.38	2.66	14,668	102,676	
	Concrete works	5,490	"	197.44	407.46	1,083,946	2,236,955	
	Structure & others	1	L.S.			137,843	319,790	
	Sub-total					1,716,000	4,001,000	

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
	(c) Iguig							
	Stripping	55,400	m^3	0.28	0.94	15,512	52,076	
	Excavation	25,300	"	0.73	1.97	18,469	49,841	
	Embankment	76,600	"	1.07	3.14	81,962	240,524	
	Backfill	4,300	"	0.38	2.64	1,634	11,352	
	Concrete works	470	"	196.92	416.79	92,552	195,891	
	Structure & others	1	L.S.			216,871	541,316	
	Sub-total					427,000	1,091,000	
	Total					7,575,000	15,686,000	
3-2	Drainage Canal							
	(a) Lower Cagayan							
	Stripping	898,300	m^3	0.33	1.04	296,439	934,232	
	Excavation	2,941,400	"	0.59	2.07	1,735,426	6,088,698	
	Embankment	604,200	"	0.80	2.35	483,360	1,419,870	
	Removal of surplus soils	866,000	"	0.97	2.46	840,020	2,130,360	
	Structure & others	1	L.S.			214,755	456,840	
	Sub-total					3,570,000	11,030,000	
	(b) Alcala & Amulung							
	Stripping	63,900	m^3	0.21	0.78	13,419	49,842	
	Excavation	345,000	"	0.64	2.12	220,800	731,400	
	Embankment	84,300	"	0.53	1.86	44,679	156,798	

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
	Removal of surplus soils	94,700	m^3	0.40	1.27	37,880	120,269	
	Sub-total					≒ 317,000	≒ 1,059,000	
	(c) Iguig							
	Stripping	30,000	m^3	0.33	1.04	9,900	31,200	
	Excavation	33,200	"	0.92	3.09	30,544	102,588	
	Embankment	23,800	"	0.51	1.78	12,138	42,364	
	Sub-total					52,582	176,152	
						≒ 53,000	≒ 177,000	
	Total					3,940,000	12,225,000	
	Grand Total					11,515,000	27,911,000	

4) Road

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
4	Road							
	(a) Lower Cagayan							
	Embankment	54,200	m^3	1.45	3.63	78,590	196,746	
	Road bed	299,300	"	2.46	5.69	736,278	1,703,017	
	Paving (gravel)	143,400	"	0.06	20.26	8,604	2,905,284	
	Structure (bridge)	1	L.S.			1,019,000	1,455,000	
	Total					1,842,472	6,260,047	
						1,843,000	6,261,000	
	(b) Alcala & Amulung							
	Road bed	61,000	m^3	1.38	3.67	84,180	223,870	
	Paving (gravel)	27,900	"	0.06	20.26	1,674	565,254	
	Structure (brdige)	1	L.S.			51,000	69,000	
	Total					136,854	858,124	
						137,000	859,000	
	(c) Iguig							
	Embankment	3,100	m^3	1.31	3.73	4,061	11,563	
	Road bed	29,000	"	1.15	3.19	33,350	92,510	
	Paving (gravel)	13,700	"	0.06	20.26	822	277,562	
	Structure (bridge)	1	L.S.			17,000	23,000	
	Total					55,233	404,635	
						56,000	405,000	
	Grand Total					2,036,000	7,525,000	

5) Terminal Facilities

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C	Remarks
5	Terminal Facilities							
	(a) Lower Cagayan							
	Facilities	11,200	ha	39.60	572.40	443,520	6,410,880	
	Land reclamation	240	"	1,800	6,500	432,000	1,560,000	
	Total					875,520	7,970,880	
						876,000	7,971,000	
	(b) Alcala & Amulung							
	Facilities	1,400	ha	39.60	572.40	55,440	801,360	
	Land reclamation	140	"	1,800	6,500	252,000	910,000	
	Total					307,440	1,711,360	
						308,000	1,712,000	
	(c) Iguig							
	Facilities	600	ha	39.60	572.40	23,760	343,440	
	Total					23,760	343,400	
						24,000	344,000	
	Grand Total					1,208,000	10,027,000	

6) Rural Electrification

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
6	Rural Electrification							
	Pole	930	pls	-	635	-	590,550	
	Guy wire assembly	560	complete	225	50	126,000	28,000	
	Crossarm	1,200	"	127.5	34	153,000	40,800	
	Insulator (pin type)	1	L.S.			369,000	-	
	Conductor	1	L.S.			2,561,000	498,000	
	Transformer 15KVA	150	piece	2,250	230	337,500	34,500	
	-do- 25KVA	100	"	2,625	250	262,500	25,000	
	Primary cutout	1	L.S.			187,500	-	
	Lighting arrester	70	set	750	75	52,560	5,256	
	Sectionalizing switch	1	L.S.			240,000	4,500	
	Security light	1	"			150,000	4,000	
	Service drop wire	1	"			1,283,000	18,000	
	Substation	1	"			3,427,000	22,500	
	Headquarter facility	1	"			1,125,000	1,280,000	
	Miscellaneous	1	"			940	195,894	
	Grand Total					10,275,000	2,747,000	

7) Material

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
7	Material							
	(a) Lower Cagayan							
	Gate (pumping station)	1	L.S.			3,225,000	-	
	Gate (drainage canal)	1	"			1,035,000	-	
	Screen & others (pumping station)	1	"			492,000	-	
	Steel pile (road)	1	"			830,000	-	
	Steel pile (drainage canal)	1	"			81,000	-	
	Sheet pile (drainage canal)	1	"			180,000	-	
	Water stop (irrigation canal)	1	"			32,000	-	
	Water stop (drainage canal)	1	'			2,000	-	
	Total					5,877,000		
	(b) Alcala & Amulung							
	Gate (pumping station	1	L.S.			368,000	-	
	Screen & others (pumping station)	1	"			119,000	-	
	Steel pile (pumping station)	1	"			67,000	-	
	Steel pile (road)	1	"			61,000	-	
	Water stop (irrigation canal)	1	'			119,000	-	
	Total					734,000		
	(c) Iguig							
	Gate (pumping station)	1	L.S.			121,000	-	
	Screen & others (pumping station)	1	"			156,000	-	
	Steel pile (pumping station)	1	"			114,000	-	

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
	Steel pile (road)	1	L.S.			21,000	-	
	Water stop (irrigation canal)	1	"			12,000	-	
	Total					424.000	-	
	Grand Total					7,035,000		

8) Land Acquisition

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
8	Land Acquisition							
	(a) Lower Cagayan	861.1	ha	-	3,000		2,583,300	
							≒ 2,584,000	
	(b) Alcala & Amulung	135.4	ha	-	5,000		677,000	
	(c) Iguig	50.8	"	-	6,000		304,800	
							≒ 305,000	
	Grand Total						3,566,000	

9) Engineering

Item	Description	Quantity	Unit	Rate (₱) F.C.	Rate (₱) L.C.	Amount (₱) F.C.	Amount (₱) L.C.	Remarks
9	Engineering							
	(a) Final Design							
	Engineers	1	L.S.			1,900,000	525,000	
	Local Engineers	1	"				65,000	
	Survey	1	"				300,000	
	Boring	1	"				200,000	
	Copy machine & others	1	"			135,000	1,000	
	Total					2,035,000	1,091,000	
	(b) Supervision							
	Engineers	1	L.S.			3,744,000	1,055,000	
	Local Engineers	1	"			-	120,000	
	Total					3,744,000	1,175,000	
	Grand Total					5,779,000	2,266,000	

10) List of Equipment & Cost

(Unit: 1,000 Peso)

Name of Equipment	Specification	No.	Unit Price	Amount	Remarks
Bulldozer	11t 90ps class	19	280	5,320	
Bulldozer	12t 90ps class	29	309	8,961	Swampy type
Bulldozer	21t 180ps class	7	500	3,500	
Bulldozer	21t 180ps class	2	595	1,190	w/Ripper 1 foot
Backhoe	0.6m^3 class	6	354	2,124	
Backhoe	1.2m^3 class	11	740	8,140	
Pile Driver	Use diesel-hammer	1	150	150	without base machine only attachment
Dragline	1.2m^3 class	3	100	300	-do-
Diesel Pile Hammer	1.2t class	1	126	126	
Front end Loader	1.4m^3 class	16	295	4,720	Crawler type
Muck Loader	0.32m^3 class	1	263	263	-do-
Carryall Scraper	9.5m^3 class	2	195	390	
Dump truck	8t class	18	98	1,764	
Dump truck	10t class	64	100	6,400	
Dumptor	4t class	2	130	260	
Stake truck	6t class	4	80	320	w/crane 1.5t
Water truck	10,000ℓ class	2	120	240	
Fuel truck	8,000ℓ class	1	132	132	
Agitator truck	3.0m^3 class	4	154	616	
Agitator truck	1.6m^3 class	2	128	256	
Truck-tractor & Trailer	25t	1	500	500	
Motor Grader	3.6m class	2	285	570	
Tire roller	8.5 - 20t class	7	158	1,106	
Concrete mixing plant	1.0m^3 x 1	1	220	220	Portable type
Concrete mixing plant	0.5m^3 x 1	2	145	290	-do-
Concrete pot mixer	0.3m^3	10	25	250	
Air compressor	50ps class	1	60	60	portable type
Air compressor	100ps class	2	108	216	-do-

Name of Equipment	Specification	No.	Unit Price	Amount	Remarks
Generator	50KVA	2	68	136	
Generator	100KVA	2	110	220	
Portable belt conveyor	L = 7m	6	4.2	25	with engine
Concrete conveyor	L = 15m 5ps	2	21	42	-do-
Rammer	100kg class	18	5	90	
Vibrator	2.5 PS class	20	35	70	w/engine
Welder	20KVA class	2	15	30	
Pick hammer	7kg class	8	1	8	
Concrete pump	22KW class	1	25	25	
Water pump	3 PS	20	45	90	w/engine
Lubricating car		1	290	290	
Repair workshop car jeep		1 10	365 48	365 480	
Wagon type jeep		3	53	159	
Motorcycle	90cc class	20	45	90	
Telecommunication facility		L.S.		250	
Spare parts				5,075	10%
Transportation				558	1%
Total				56,387	

APPENDIX J-3 LABOR COST

Personnel	Cost ₱/day	Remarks
Common labor	12.67	
Head labor	16.34	Concrete worker
Foreman	17.34	
Foreman (Mason)	19.50	
Foreman (Construction)	19.50	
Mason	17.34	
Carpenter	17.34	
Steelman	17.34	
H.E. Operator	19.50	
Asst. H.E. Operator	16.34	
Driver	16.34	
Asst. Driver	11.10	
Power Plant operator	19.50	Generator
Mixer operator	17.34	Compressor
Pump operator	14.34	

APPENDIX J-4 MATERIAL COST

(Unit: Peso)

Description	Unit	Cost (₱) F.C.	L.C.	Total	Remarks
Portland cement (42.73 kg/bag)	kg	5.13	13.37	18.50	Gov't price ₱10.25 50% - 5.13 50% - 5.12 Transportation ₱8.25
Sand (for concrete)	cu.m.	-	25.00	25.00	F.C. 5.13 L.C. 5.12+8.25= 13.37
Gravel (for concrete)	cu.m	-	25.00	25.00	
Unscreened gravel	cu.m	-	20.00	20.00	
Timber	cu.m	-	432.00	432.00	
Plank & Square Timber	cu.m	-	480.00	480.00	
Deformed bar	t	1,600	1,900.00	3,500.00	
Round bar	t	3,200	300.00	3,500.00	
Miscellaneous	kg	5.2	0.2	5.40	
Steel pipe	t	3,800	-	3,800	
Steel sheet pile	t	3,600	-	3,600	
Water stop	m	55	-	55	
Vinyl chloride pipe	m	40	-	40	
Gasoline	l	0.74	0.74	1.48	
Light gasoline	l	0.65	0.64	1.29	