Table 4.6 SUMMARY OF WORK QUANTITY (PANTAL-SINOCALAN RIVER;2ND STAGE)

WQ-PS-S2

Work Items	Type	Ref.No	Unit	Pantal-Sinocalan	Ingarela R.	Dagupan R.	Total
Earth Works							
Excavation	Common		10^3m3	254,700	1,187,000	663,700	2,105,400
		EX-1	10^3m3	78,750	948,450	199,110	1,226,310
Dredging		DW	10^3m3	0	20,000	0	20,000
Embankment			10^3m3	608,790	293,150	1,580,300	2,482,240
(Excavated)	Right	EM-1-R	10^3m3	1,550	112,900	748,600	863,050
	Left	EM-1-L	10^3m3	536,320	125,650	744,600	1,406,570
			10^3m3	70,920	54,600	87,100	212,620
Revetment				3,670	2,520	5,760	11,950
	River Mouth	PS.R-1	m	0	0	0	0
	Closing D'L	PS.R-2	m	0	0	0	0
	Closing D'H	PS.R-3	m	700	0	0	700
	Dike on R.-bed	PS.R-4	m	0	0	0	0
	Closing Dike	PS.R-5	m	130	360	600	1,090
	H.L.Revetmwnt.	PS.R-6	m	1,340	1,160	3,000	5,500
	L.W.R.(Type B)	PS.R-7	m	1,450	1,000	1,960	4,410
	L.W.R.(Type A)	AG.R-1	m	50	0	200	250
Groyne	L = 50 m	GR-1	pcs.	0	0	39	39
Sluice				3	3	24	30
	Type-A	PS.S-1	pcs.	1	0	15	16
	Type-B-1	PS.S-2-1	pcs.	1	1	3	5
	Type-B-2	PS.S-2-2	pcs.	0	1	4	5
	Type-B-3	PS.S-2-3	pcs.	0	1	1	2
	Type-C	PS.S-3	pcs.	1	0	1	2
Water Gate				1	1	3	5
	10mx 5mx 1	WG-1	pcs.	1	0	0	1
	20mx 5mx 1	WG-2	pcs.	0	0	0	0
	15mx 4mx 1	WG-3	pcs.	0	0	1	1
	5mx 3mx 1	WG-4-2	pcs.	0	1	2	3
				0	0	0	0
Graund Sill		PS.GS	pcs.	0	0	0	0
Others				0	0	0	0
Sodding		SO	m2	199,850	125,390	799,000	1,124,240
Pavement	Concrete	PC	m2	5,250	0	5,250	10,500
	Asphalt	PA	m2	0	0	0	0
	Gravel	PG	m2	41,810	78,000	124,500	244,310
Bridge		BC	m2	0	3,720	4,889	8,609
Demorishment	Concrete	DC	m3	0	1,500	2,000	3,500
	Metal	DM	ton	0	0	0	0

TABLE.5.1 COST COMPARISON OF ALTERNATIVES FOR DIVERSION FACILITIES

Particular	Unit Cost (₱)	Quantity	Amount (₱)*1,000
ALTERNATIVE-I			
1. Reinforced Concrete Wall	3,344 /m3	550	1,839
2. Reinforced Concrete Slub	3,130 /m3	1,395	4,366
3. Concrete Apron	3,028 /m3	120	363
4. RC Sheet Piling (L=4.0m * 24.0m * 4)	2,918 /m2	384	1,121
5. Gabion Mattres (t=0.5m)	419 /m2	920	385
6. Boulder Riprap (Dia.0.25-0.30)	292 /m3	230	67
7. Excavation	67 /m3	1,152	77
8. Embankment for Closing Dike	164 /m3	23,877	3,916
9. Revetment for Closing Dike	83,549 /m	97	8,104
		<TOTAL>	20,239
ALTERNATIVE-II			
1. Reinforced Concrete Wall	3,344 /m3	765	2,558
2. Concrete Slub	3,130 /m3	2,502	7,831
3. RC Fixed Weir	3,344 /m3	879	2,939
4. Gravel Filling	293 /m3	1,677	491
5. Steel Sheet Piling (Type-II,L=6.0m * 120 * 3)	3,774 /m2	2,160	8,152
6. Gabion Mattres (t=0.5m)	419 /m2	4,140	1,735
7. Boulder Riprap (Dia.0.25-0.30)	292 /m3	600	175
8. Excavation	67 /m3	23,040	1,544
		<TOTAL>	25,426

NOTE: ALTERNATIVE-I --> Diversion Channel Type
ALTERNATIVE-II --> Fixed Weir Type
The extention subject to the cost estimation is 120 m.

TABLE 5.2 COST COMPARISON OF ALTERNATIVES FOR BAYAMBANG CLOSING DIKE

PATICULAR	UNIT COST (₱)	QUANTITY	AMOUNT (₱) *1000
ALTERNATIVE-I			
1. Embankment for Closing Dike			
-High Water -Type(1)	164 /m3	253,500	41,574
-Low Water -Type(2)	164 /m3	38200	6,265
2. Diversion Channel		1	11,115
3. Protection Works for Closing Dike			
Revetment Type(1)	10,826 /m	3,250	35,185
Revetment Type(2)	83,549 /m	120	10,026
4. Low Water Channel Excavation	67 /m	490,000 (L=1,700m)	32,830
5. Revetment for Low Water Channel			
Type-A	11,941	1,500	17,912
Type-B	8,501	1,200	10,201
6. Groyne	132,255 /pc	12	1,587
		<TOTAL>	166,694
ALTERNATIVE-II			
1. Embankment for Closing Dike			
-High Water -Type(1)	164 /m3	96,000	15,744
-Low Water -Type(2)	164 /m3	47,800	7,839
2. Diversion Channel		1	11,115
3. Protection Works for Closing Dike			
Revetment Type(1)	10,826 /m	980	10,609
Revetment Type(2)	83,549 /m	120	10,026
4. Low Water Channel Excavation	67 /m	633,600 (L=2,200m)	42,451
5. Revetment			
for High Water Channel	10,826 /m	2,400	25,982
for Low Water Channel			
Type-A	11,941 /m	1,500	17,912
Type-B	8,501 /m	5,400	45,905
6. Raising of Existing Dike	164 /m	136,000	22,304
7. Groyne	132,255 /pc	12 (L=400m)	1,587
		<TOTAL>	211,475

TABLE 5.3 COST COMPARISON OF ALTERNATIVES FOR DIKING SYSTEM IN CARMEN STRETCH (10-YEAR FLOOD)

PATICULAR		UNIT COST (₱)		QUANTITY	AMOUNT (₱) *1000
ALTERNATIVE-I					
1. Embankment		164	/m3	126,000 (7,600 m)	20,664
2. Protection Works for Dike					
- Type I		5,269	/m	3,400	17,915
3. Revetment for Low Water Channel					
- Type B1		8,500	/m	1,300	11,050
- Type B2		14,229	/m	1,000	14,229
4. Groyne		132,255	/pc	10	1,323
5. Conpensation Works					
a.House Evacuation	-Small	16,000		145	2,320
	-Big	103,500		33	3,416
	-Public	175,000		6	1,050
b.Land Acquisition	-Residential	95	/m2	271,850	25,826
	-Agricultural	12	/m2	283,300	3,400
	-Others	1	/m2	0	0
c.Extention of Bridge				L=250m	49,110
				<TOTAL>	150,301
ALTERNATIVE-II					
1. Raising of Existing Dike		164	/m3	25,200 (L=2800m)	4,133
2. Protection Works for Dike					
-Revetment (Type A1)		12,761	/m3	3,400	43,387
-Steel Sheet Piling (Type III)		3,770	/m3	10,000 (10m*1000m)	37,700
3. Protection Works for Low Water Channel					
-Revetment (Type A1)		11,941	/m	1,300	15,523
-Revetment (Type A2)		18,946		1,000	18,946
4. Groyne		132,255		L=600m (20 pcs)	2,646
5. Riverbed Protection (Gabion Mattres t=0.5m)		419	/m2	7,500 (150m*150m)	3,143
6. Protection for High Water Channel-bed (Gabion Mattres)		419	/m2	20,000 (1000m*20m)	8,380
7. Groundsill				1	3,500
				<TOTAL>	137,358

TABLE 5.4 COST COMPARISON OF ALTERNATIVES FOR DIKING SYSTEM IN CARMEN STRETCH
(ALTERNATIVE I: 100-YEAR FLOOD)

Paticular	Unit Cost (₱)		Quantity (1/10)	Quantity (+a)	Quantity (1/100)	Amount (₱)*1000
1. Embankment for Setback Dike	164	/m3	126,000	0	126,000	20,664
Aditional Embankment (2.0 m Thick)	164	/m3		462,000	462,000	75,768
(AG343 to AG351 -- 7000 m)						
2. Protection Works for Rigt Dike				3400*0.6		
Revetment --Type I	5,269	/m	3,400	2,040	5,440	28,663
3. Protection Works for Left Dike				2500*0.6		
Revetment --Type I	5,269	/m	2,500	1,500	4,000	21,076
Flood Wall--Type A	24,886	/m	2,500	0	2,500	62,215
Flood Wall--Type B	28,000	/m	0	2,500	2,500	70,000
4. Protection Works for Low Water Channel						
Revetment --Type B1	8,500	/m	1,300	0	1,300	11,050
Revetment --Type B2	14,229	/m	1,000	0	1,000	14,229
5 Groin	132,255	/m	10	0	10	1,323
				****	Sub-Total	304,988
6. Compensation Works						
- Residential	95	/m2	271,850	0	271,850	25,826
(1) Land Acqusition - Agricultural	12	/m2	283,300	0	283,300	3,400
- Others	1	/m2	0	0	0	0
- Big House	103,500		33	0	33	3,416
(2) House Evacuationn - Small	16,000		145	0	145	2,320
- Public	175,000		6	0	6	1,050
(3) Extention of Bridge	4,911E4	/pc.	1			49,110
(4) Reconstruction of Bridge (L=900 m)	176,796			1	1	176,796
	*1000			****	Sub-Total	261,917
					<TOTAL>	566,905

TABLE 5.5 COST COMPARISON OF ALTERNATIVES FOR DIKING SYSTEM IN CARMEN STRETCH
(ALTERNATIVE II: 100-YEAR FLOOD)

Paticular	Unit Cost (₱)	Quantity (1/10)	Quantity (+a)	Quantity (1/100)	Amount (₱)*1000
1. Raising of Existing Dike	164 /m3	25,200	0	25,200	4,133
Aditional Embankment (2.4 m Thick)	164 /m3		574,000	574,000	94,136
(AG343 to AG351 -- 7000 m)					
2. Protection Works for Rigt Dike			3400*0.6		
Revetment --Type II	12,761 /m	3,400	2,040	5,440	69,420
Steel Sheet Piling --Type III	3,770 /m2	10,000		10,000	37,700
3. Protection Works for Left Dike			2500*0.6		
Revetment --Type II	12,761 /m	2,500	1,500	4,000	51,044
Flood Wall--Type A	24,886 /m	2,500	0	2,500	62,215
Flood Wall--Type B	32,000 /m	0	2,500	2,500	80,000
4. Protection Works for Low Water Channel					
Revetment --Type A1	11,941 /m	1,300	0	1,300	15,523
Revetment --Type A2	18,946 /m	1,000	0	1,000	18,946
5. Groin	132,255	20	0	20	2,645
6. Riverbed Protection (Gabion Mattres)	419 /m2	7,500	1,500	9,000	3,771
7. Protection for High Water Channel Bed					
(Gabion Mattres)	419 /m2	20,000		20,000	8,380
8. Groundsill	3,500 /pc.	1	1	4,200,000	4,200
----------	*1000			3500E3*1.2	
9. Compensation Works					
Reconstruction of Bridge (L=650 m)	127,686*1000		1	1	127,686
				<TOTAL>	579,799

TABLE 5.6 COST COMPARISON OF ALTERNATIVES FOR DIKING SYSTEM IN ASINGAN-SAN MANUEL STRETCH (ALTERNATIVE II)

PATICULAR	UNIT COST (₱)	QUANTITY	AMOUNT (₱) *1000
ALTERNATIVE-I			
1. Embankment	164 /m3	418000 (7,600 m)	68,552
2. Protection Works for Dike			
- Type I	5,269 /m	3,700	19,495
- Type II	12,761 /m	1,800	22,970
- Type III	18,795 /m	1,500	28,193
3. Protection Works for River Channel			
- Type C	11,692 /m	900	10,523
- Type D	19,867 /m	1,100	21,854
4. Conpensation Works			
House Evacuation -Small	16,000	690	11,040
-Big	103,500	20	2,070
-Public	175,000	2	350
Land Acquisition -Residential	80 /m2	90,000	7,200
-Agricultural	10 /m2	2,255,000	22,550
-Others	1 /m2	3,656,000	3,656
		<TOTAL>	218,452
ALTERNATIVE-II			
1. Embankment			
- Type 1	164 /m3	81,000	13284
- Type 2	164 /m3	147,200	24140.8
2. Protection Works for Dike			
- Type 1	12,761 /m	3,300	42,111
- Type 2	36,500 /m	5,200	189,800
3. Protection Work for Low Water Channel			
- Type D	19,867 /m	2,100	41,721
		<TOTAL>	311,057

FIGURES

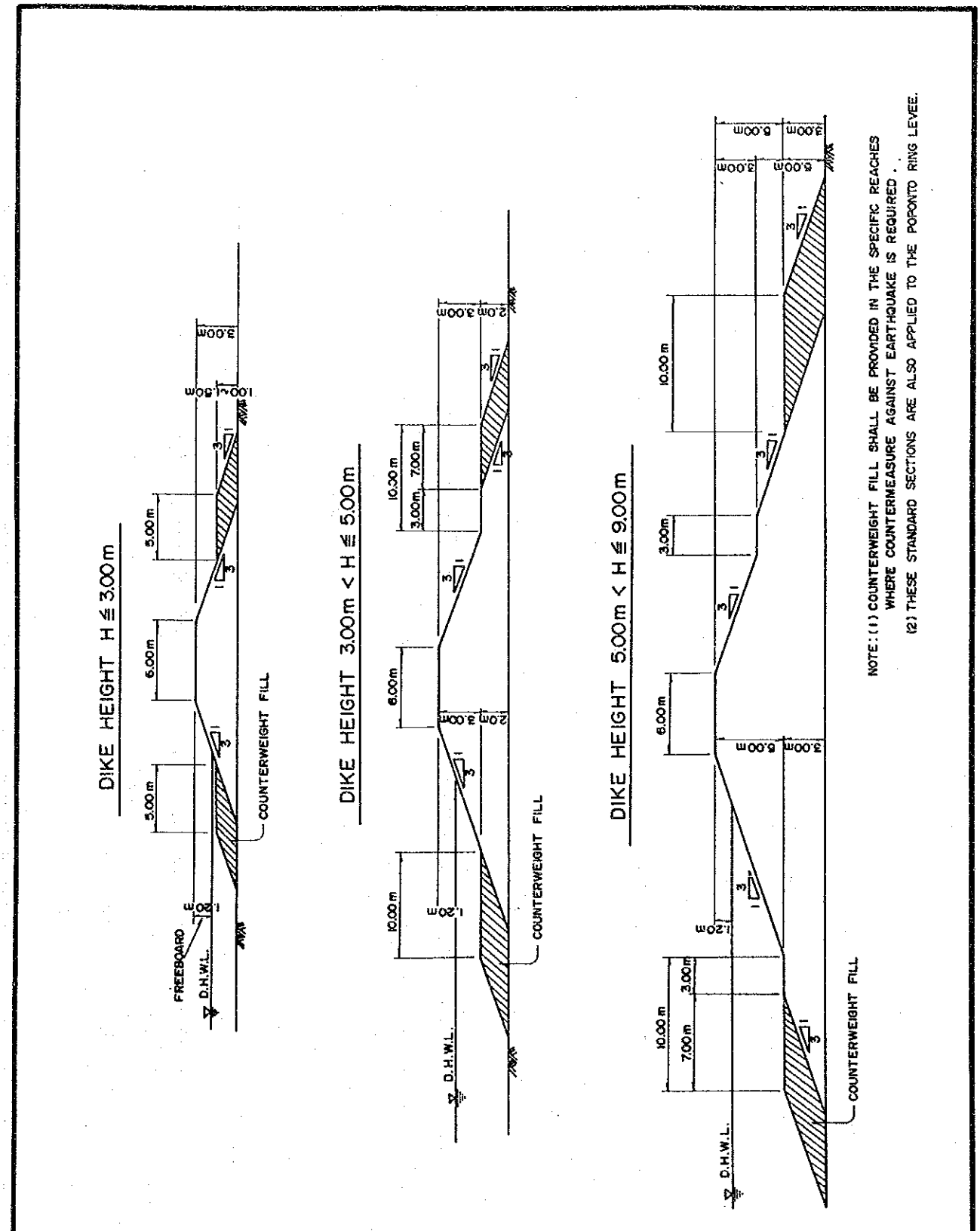


Fig. 3.1 STANDARD DESIGN SECTION OF AGNO RIVER EARTH DIKE

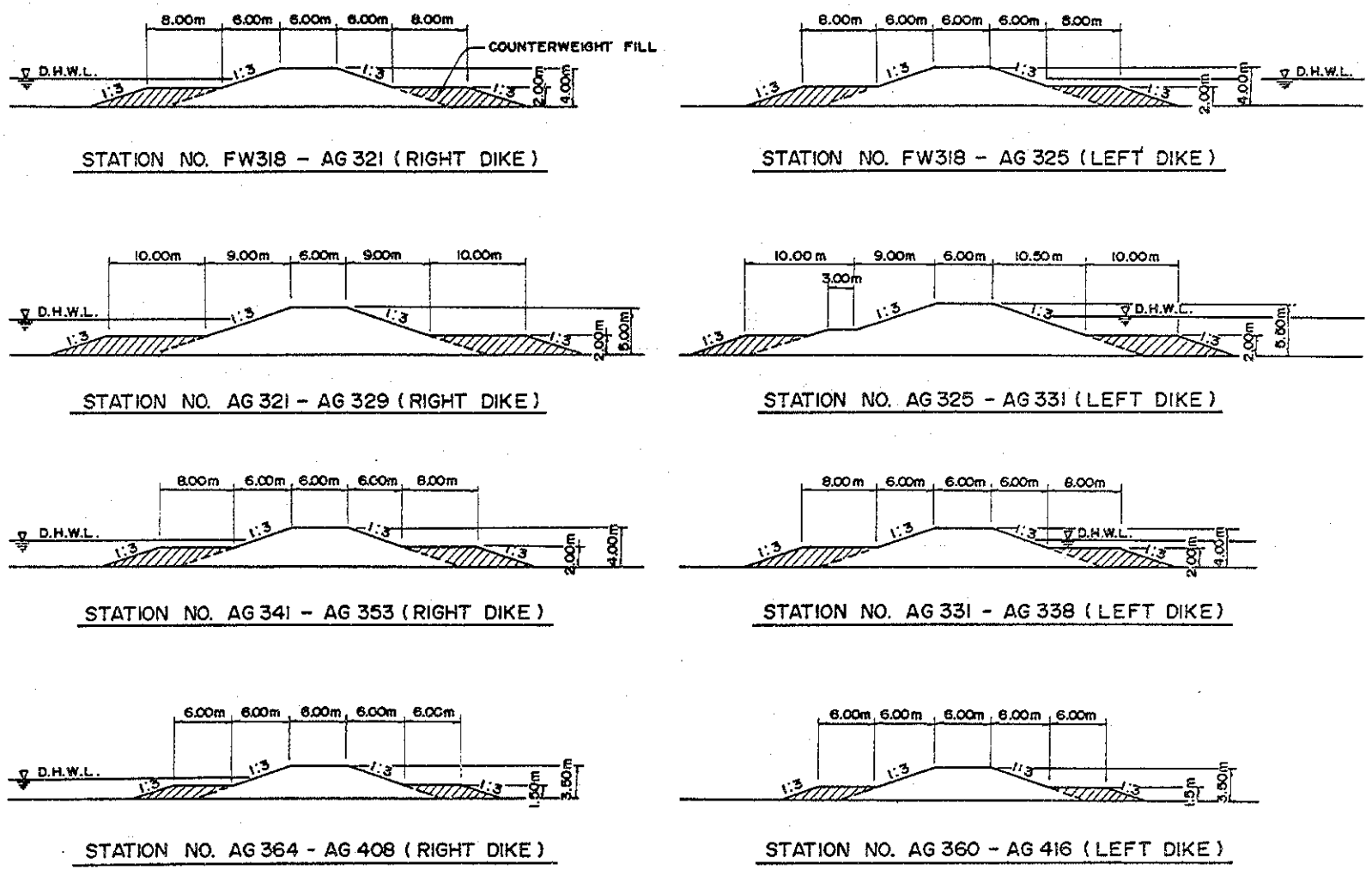


Fig. 3.2 STANDARD DESIGN OF COUNTERWEIGHT FILL AGAINST LIQUEFACTION (AGNO RIVER)

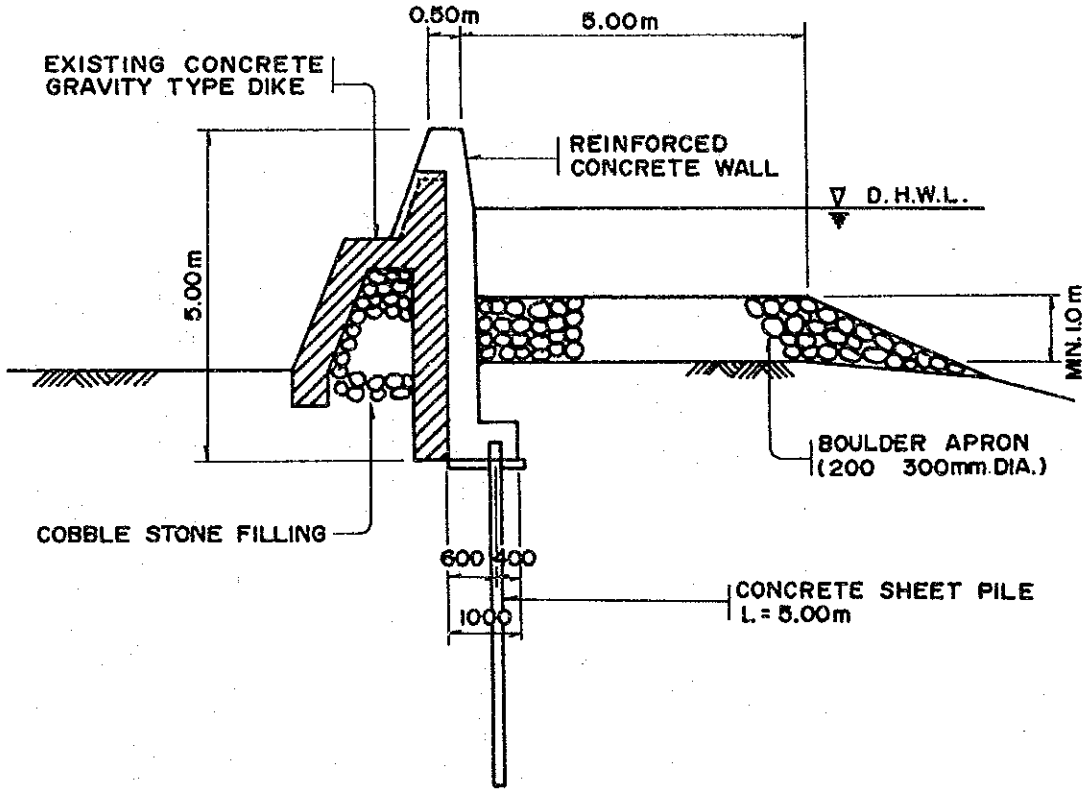


Fig. 3.3 DESIGN SECTION OF CONCRETE FLOODWALL DIKE

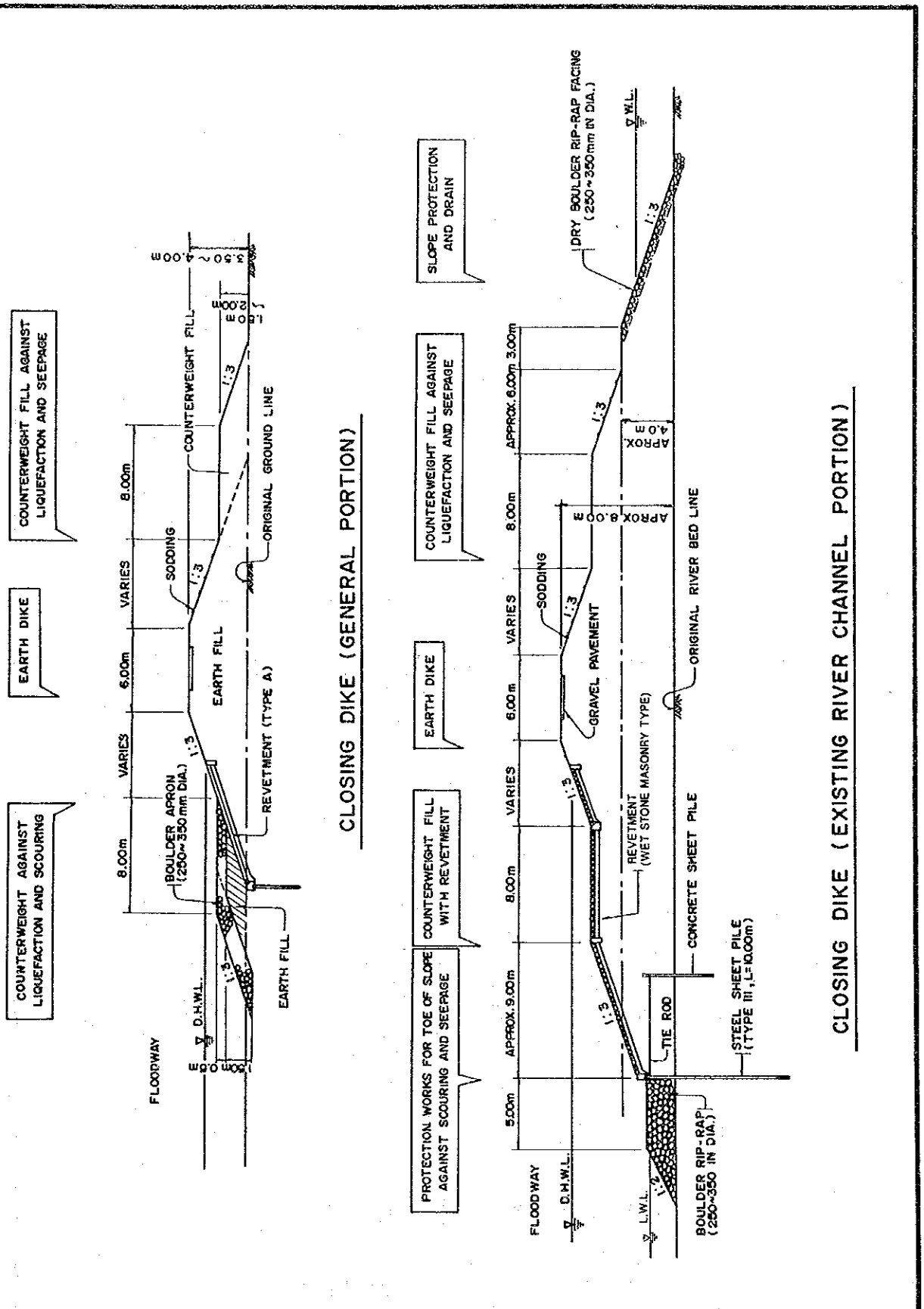
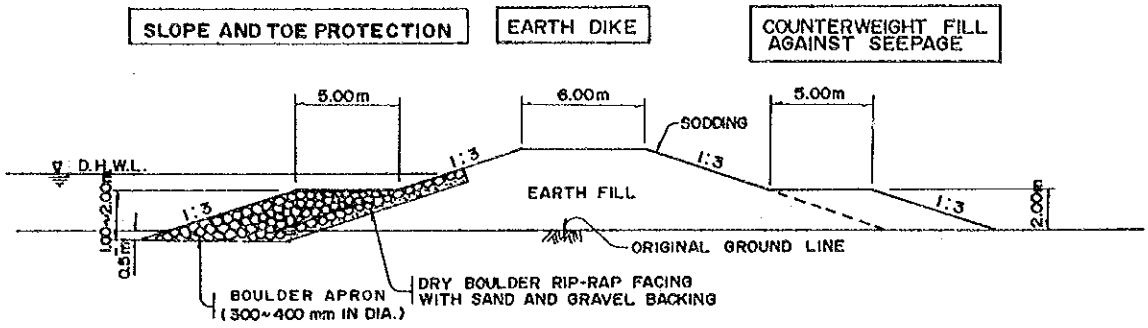
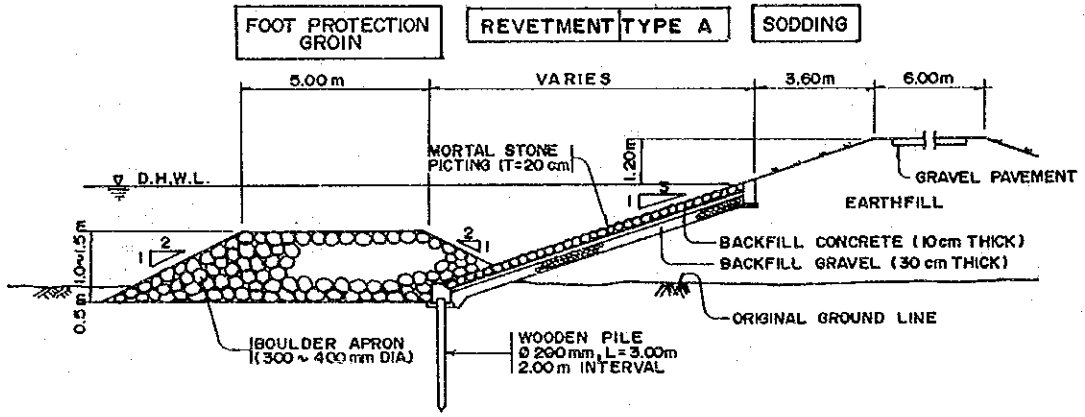


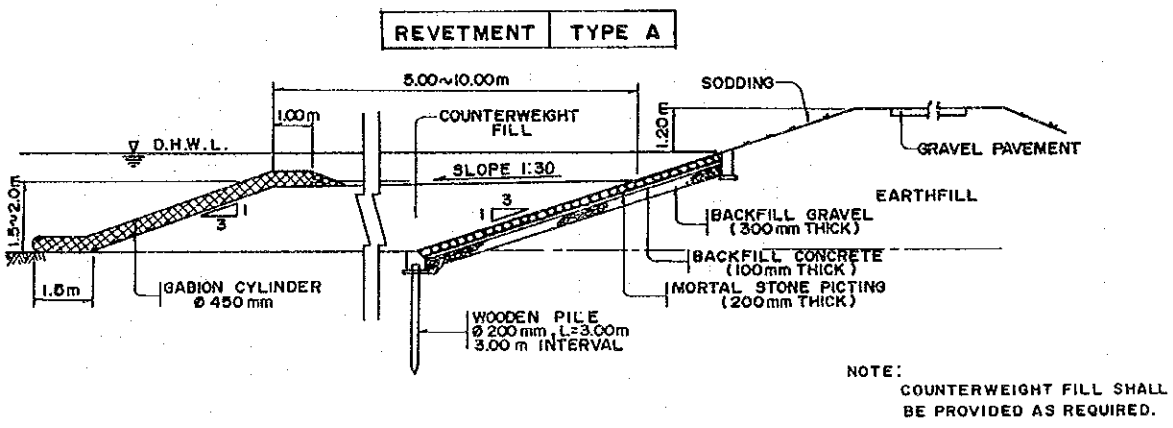
Fig. 3.4 STANDARD DESIGN SECTION OF BAYAMBANG CLOSING DIKE



PROTECTION WORKS FOR DIKE (TYPE - I)



PROTECTION WORKS FOR DIKE (TYPE - II)



PROTECTION WORKS FOR DIKE (TYPE - III)

Fig. 3.5 PROTECTION WORKS FOR RIVER DIKE (1)

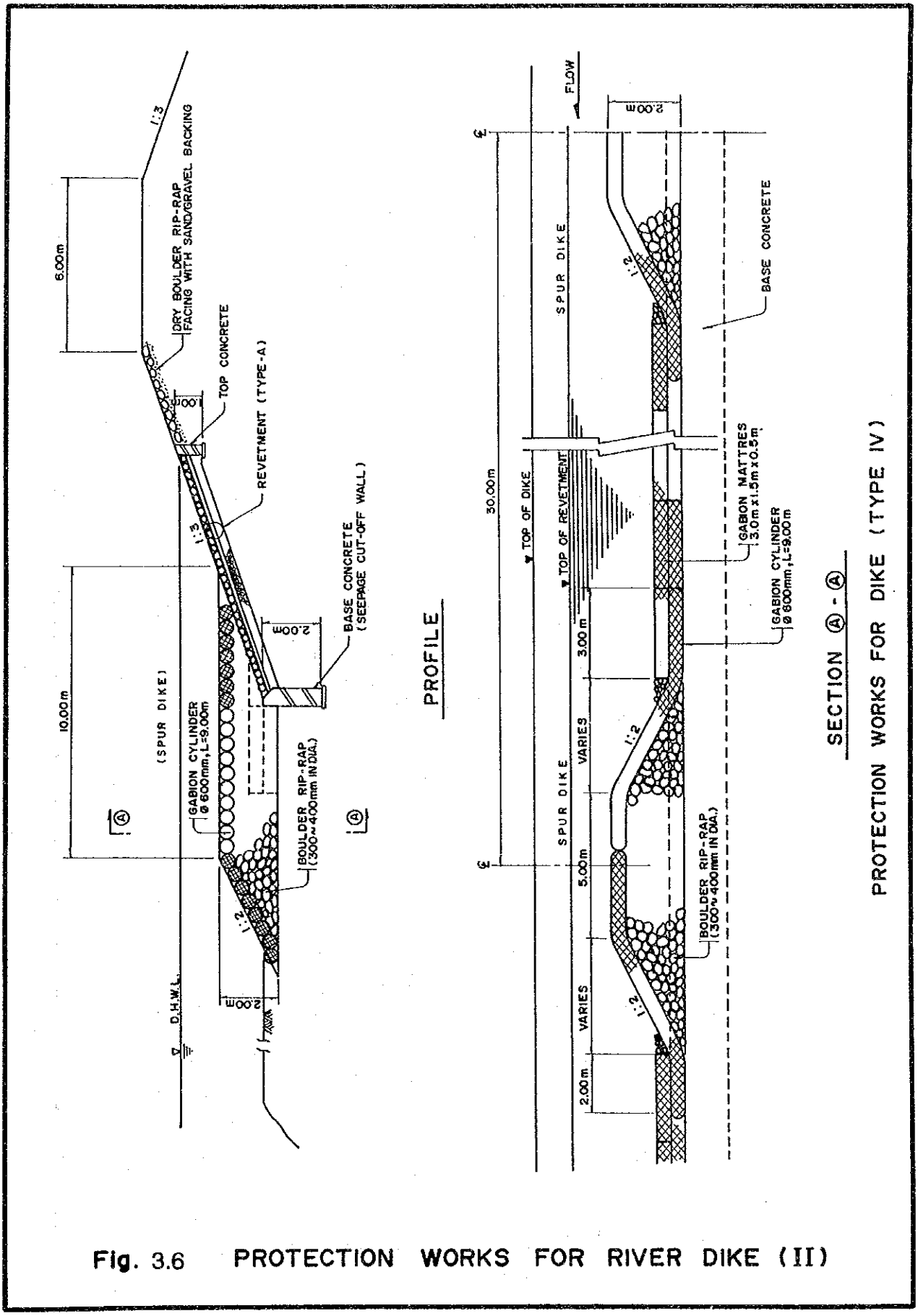
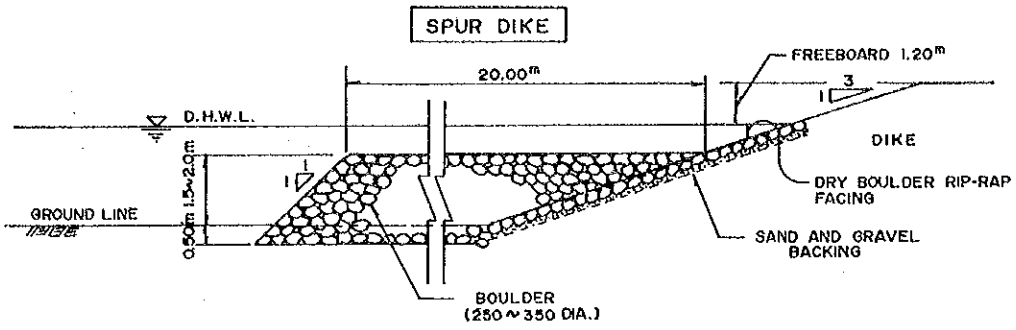
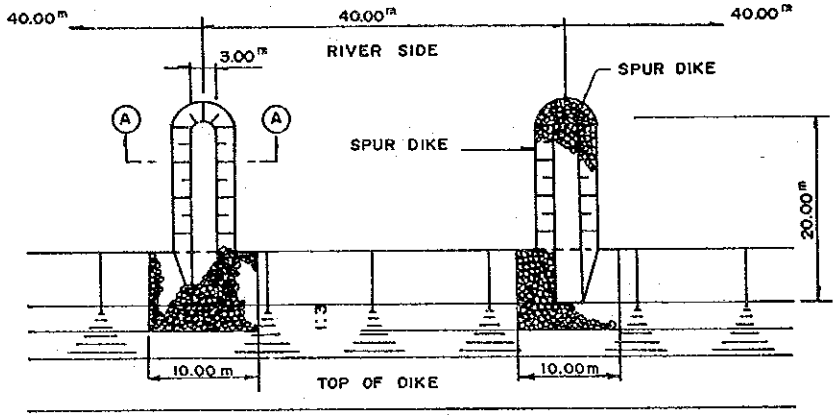


Fig. 3.6 PROTECTION WORKS FOR RIVER DIKE (II)



PROFILE



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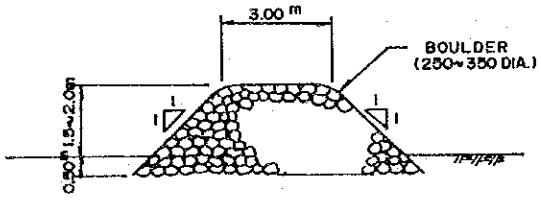
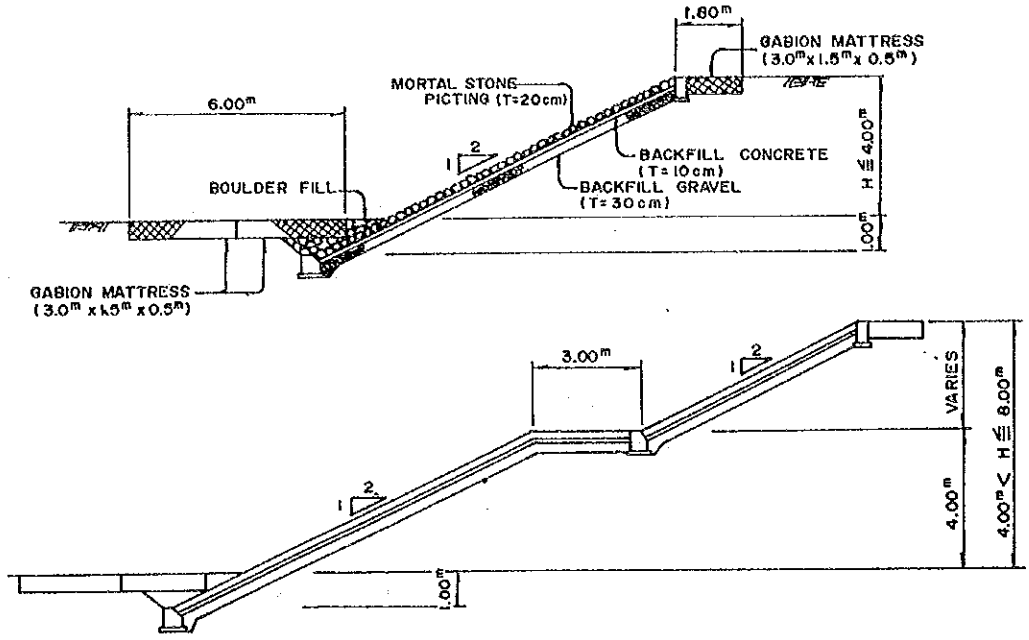


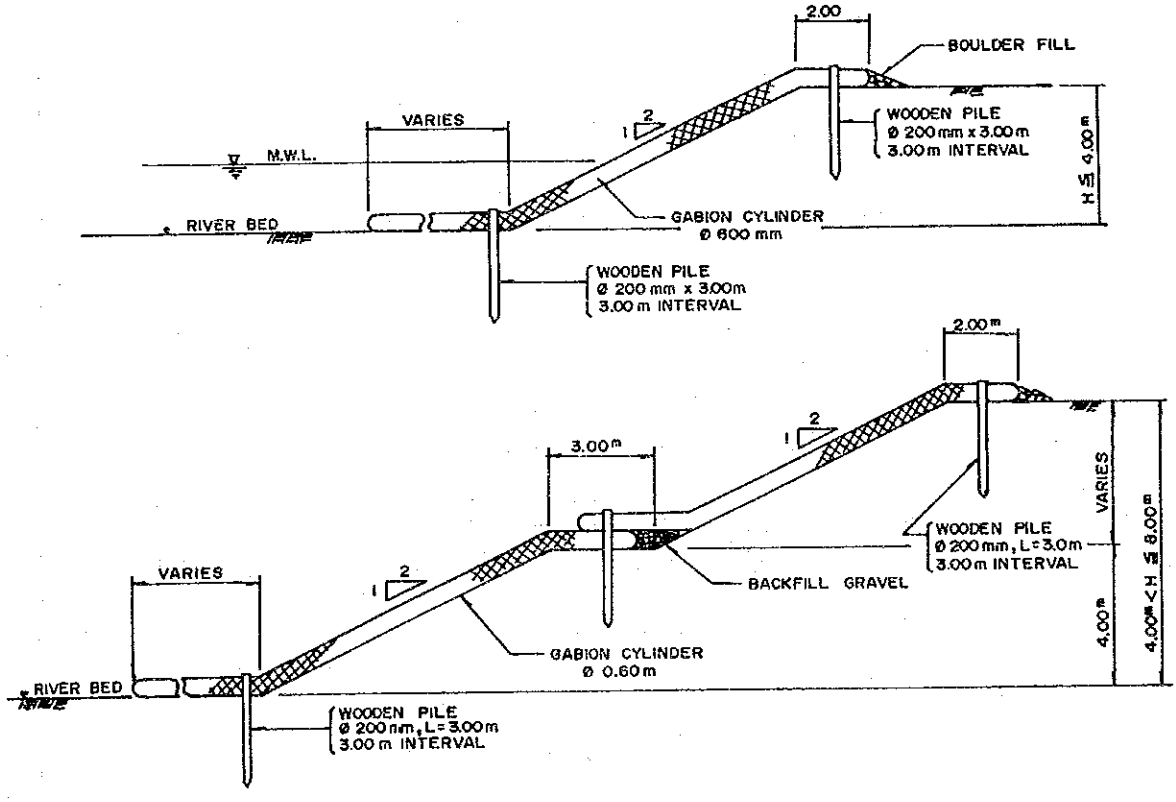
SECTION Ⓐ - Ⓐ

PROTECTION WORKS FOR DIKE (SPUR DIKE TYPE)

Fig. 3.7 PROTECTION WORKS FOR RIVER DIKE (III)

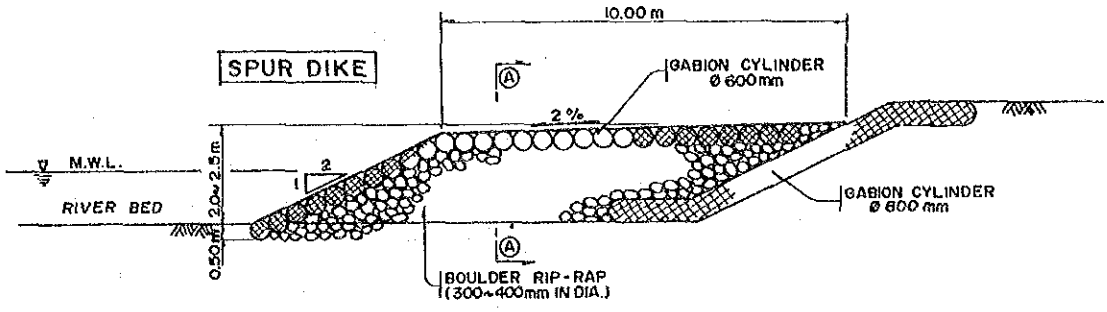


REVETMENT WORKS FOR LOW WATER CHANNEL (TYPE - A)



REVETMENT WORKS FOR LOW WATER CHANNEL (TYPE - B)

Fig. 3.8 PROTECTION WORKS FOR LOW WATER CHANNEL BANK (I)



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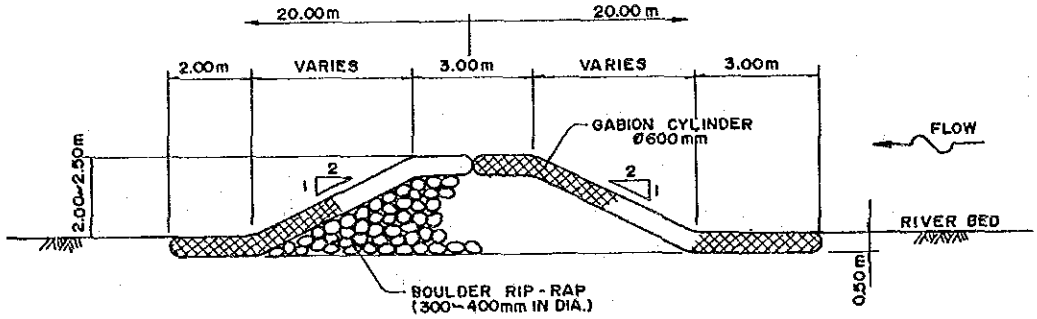

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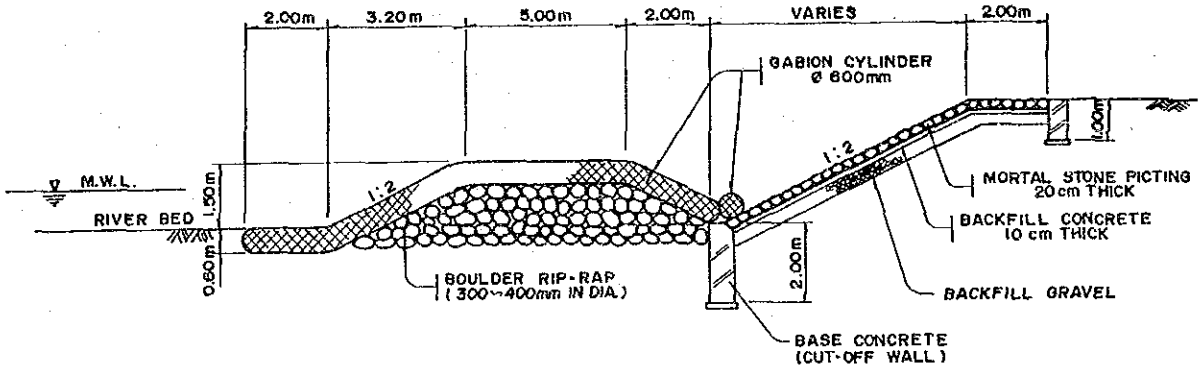
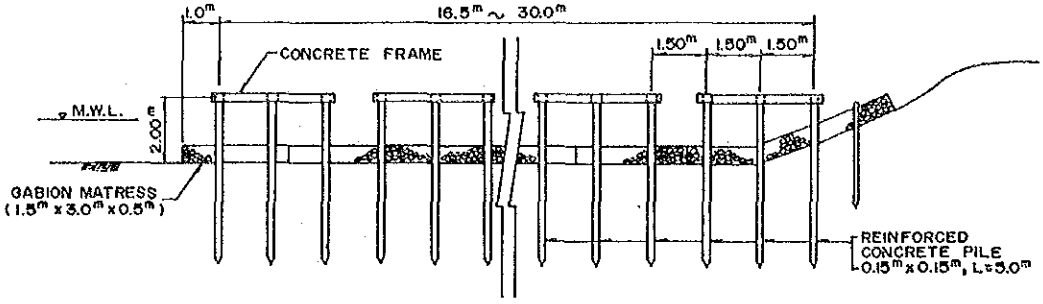
BANK PROTECTION WORKS (TYPE - C)



BANK PROTECTION WORKS (TYPE - D)

Fig. 3.9 PROTECTION WORKS FOR LOW WATER CHANNEL BANK (II)



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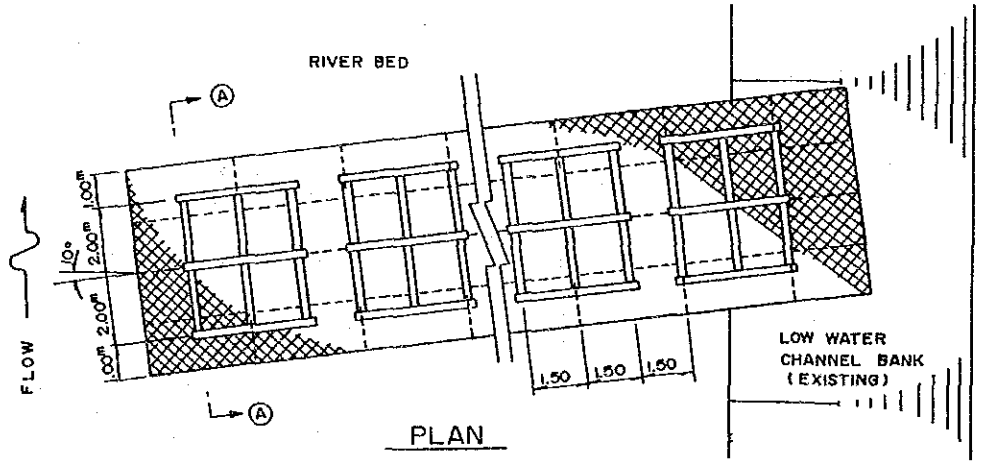

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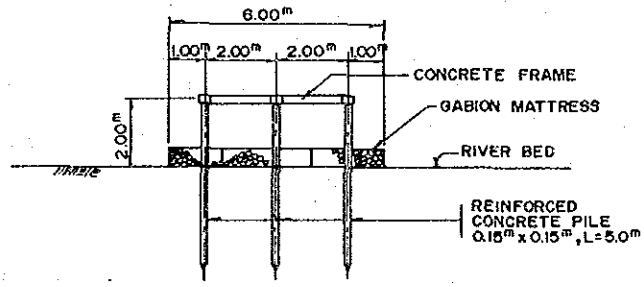


SECTION Ⓐ - Ⓐ

Fig. 3.10 STANDARD DESIGN OF GROYNE (PILE TYPE)

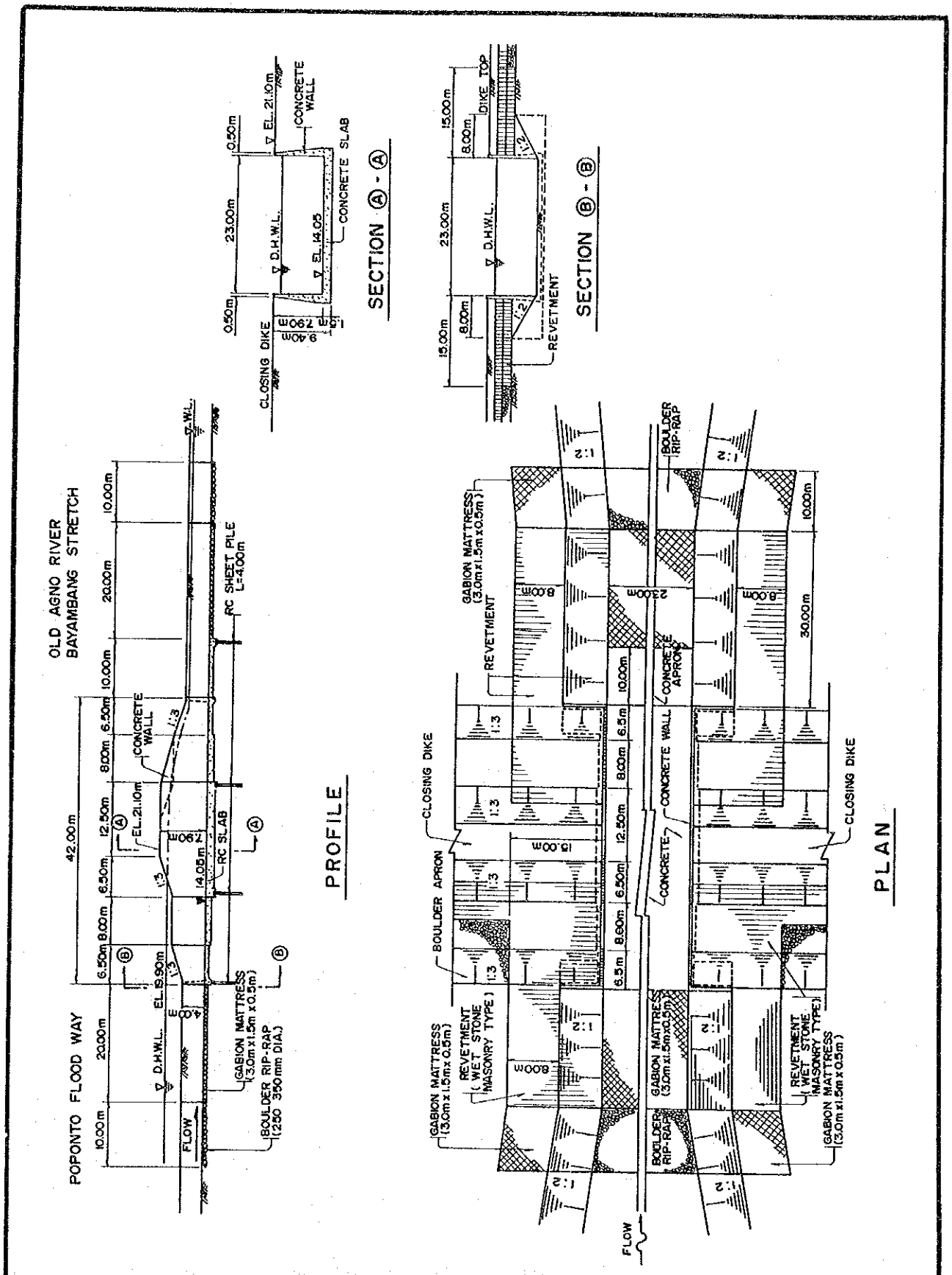


Fig. 3.11 BAYAMBANG DIVERSION CHANNEL

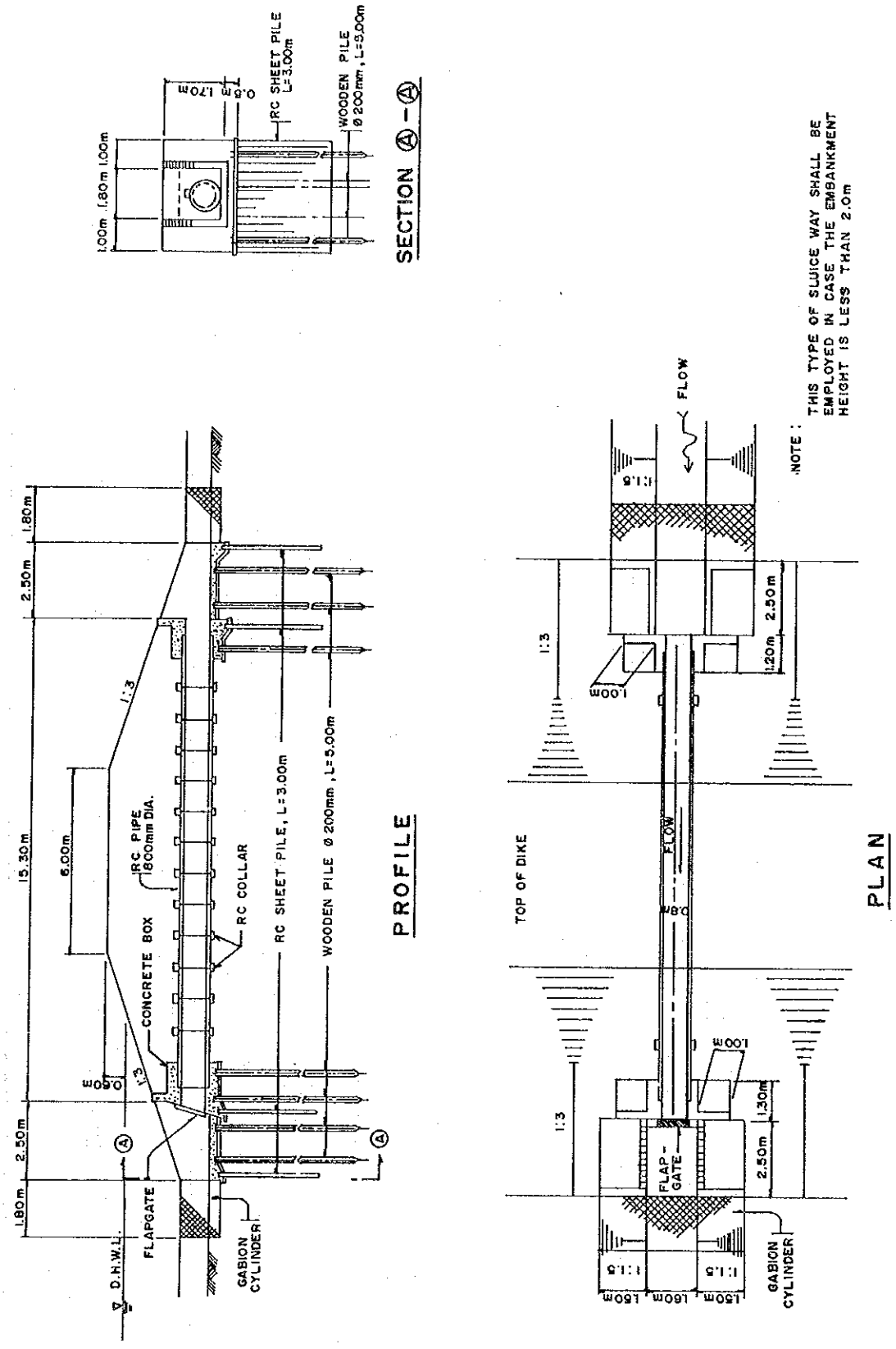


Fig. 3.12 STANDARD DESIGN OF SLUICE WAY IN POPONTO SWAMP (TYPE A1)

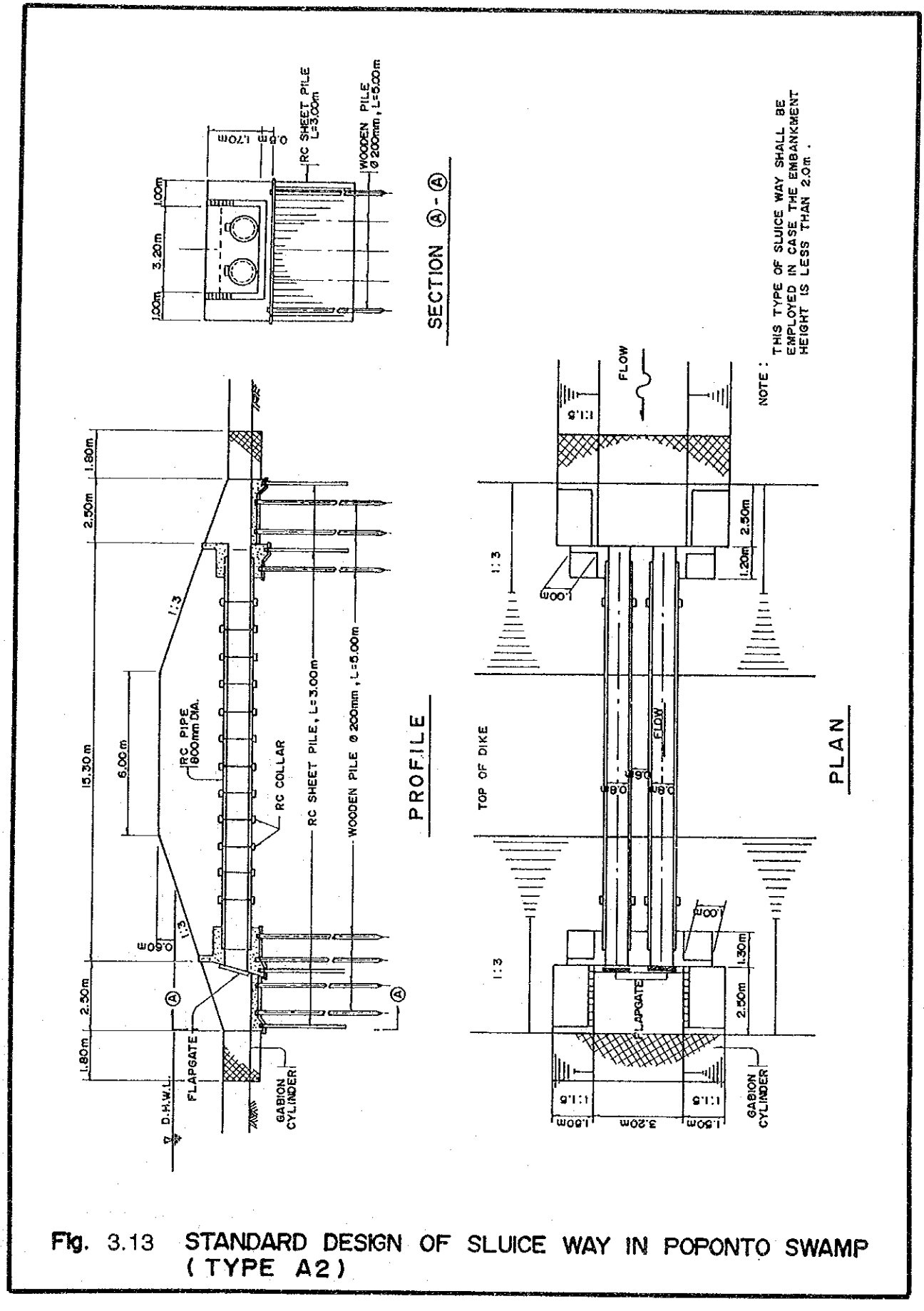


Fig. 3.13 STANDARD DESIGN OF SLUICE WAY IN POPONTO SWAMP (TYPE A2)

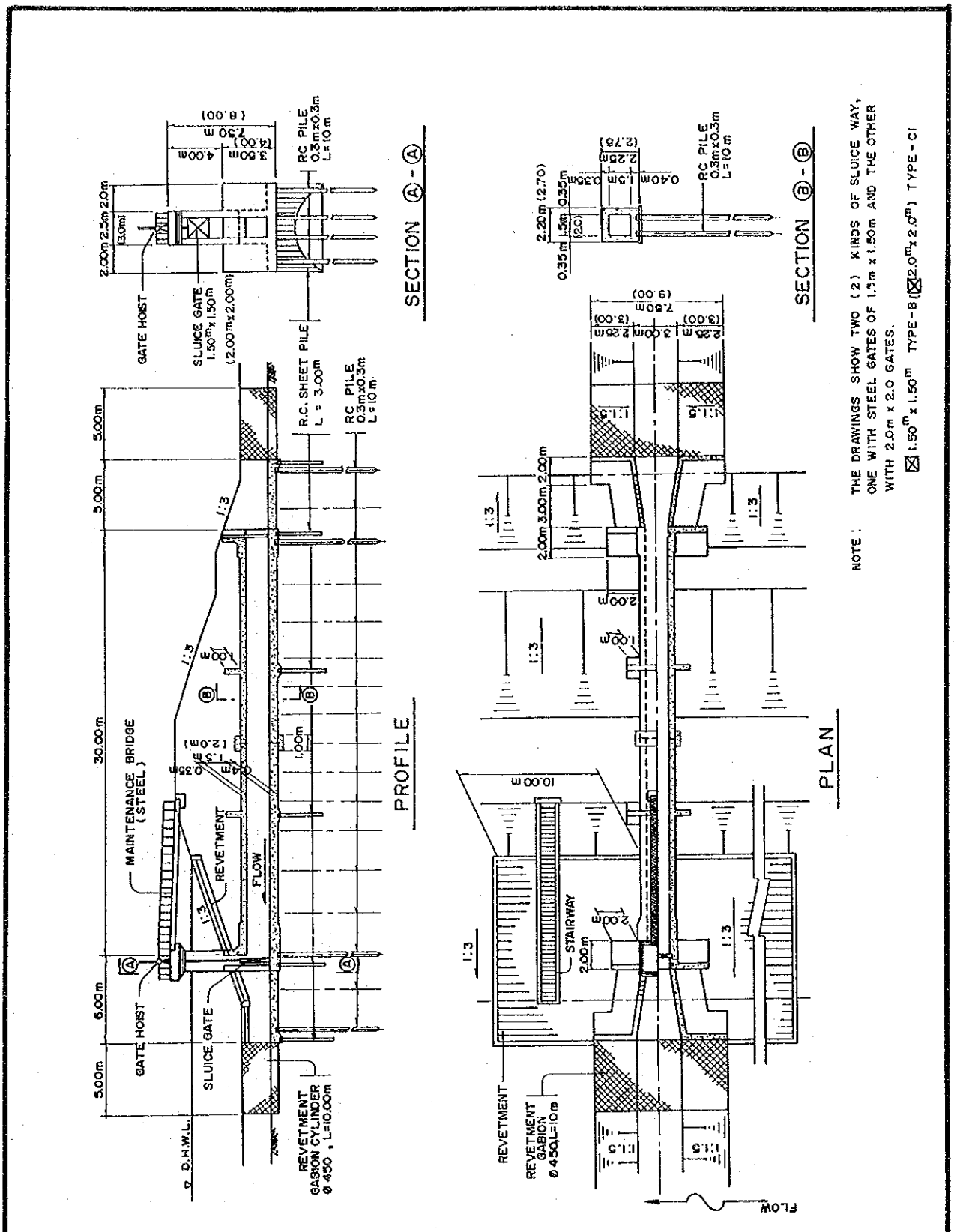


Fig. 3.14 STANDARD DESIGN OF SLUICE WAY (AGNO RIVER TYPE B&C1)

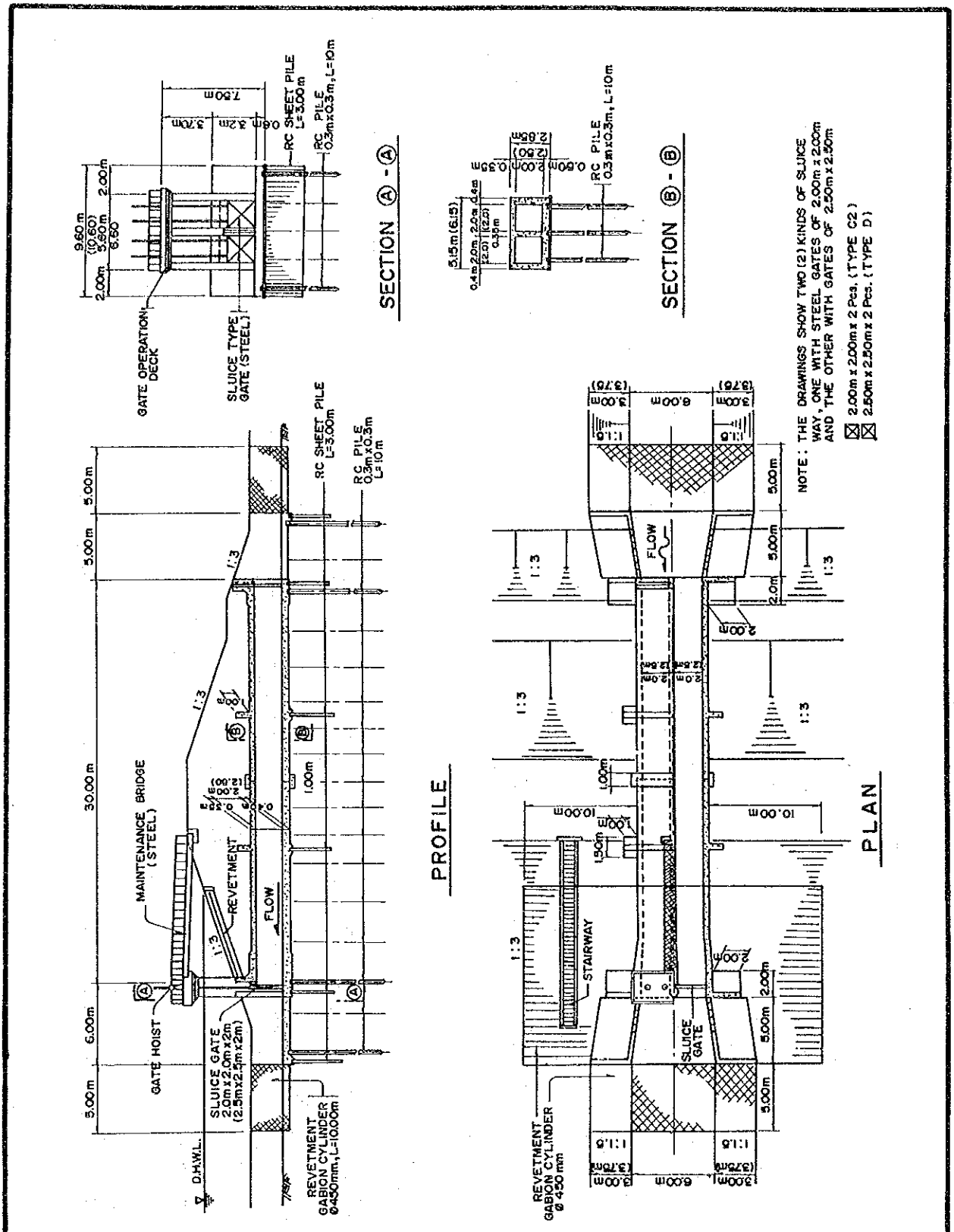


Fig. 3.15 STANDARD DESIGN OF SLUICE WAY
(AGNO RIVER TYPE C2 AND D)

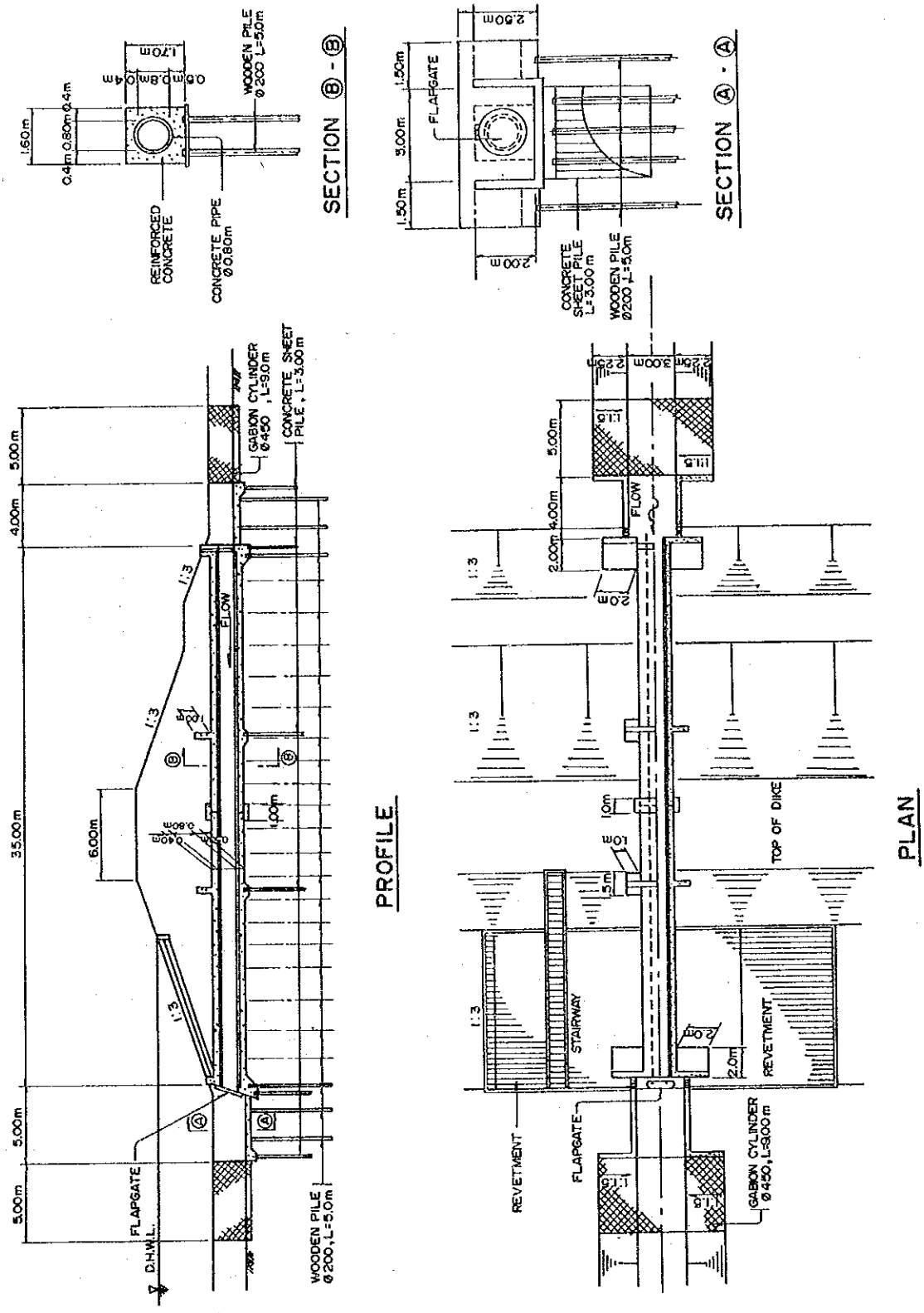
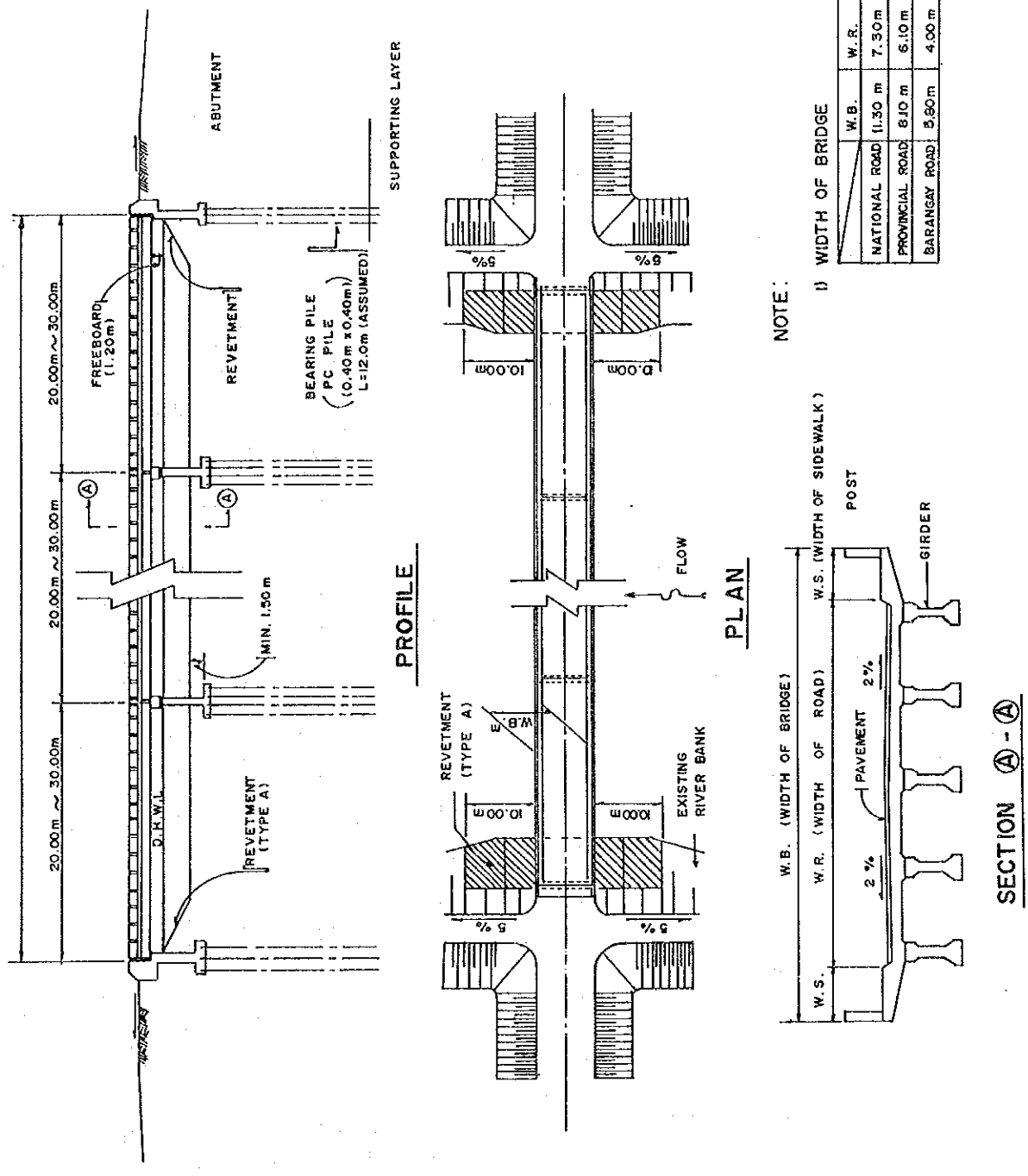


Fig. 3.16 STANDARD DESIGN OF SLUICE WAY (AGNO RIVER TYPE-E)



	W.B.	W.R.	W.S.
NATIONAL ROAD	11.30 m	7.30 m	2.00 m
PROVINCIAL ROAD	8.10 m	6.10 m	1.00m
BARANGAY ROAD	5.80m	4.00 m	0.90m

Fig. 3.17 STANDARD DESIGN OF BRIDGE (AGNO RIVER)

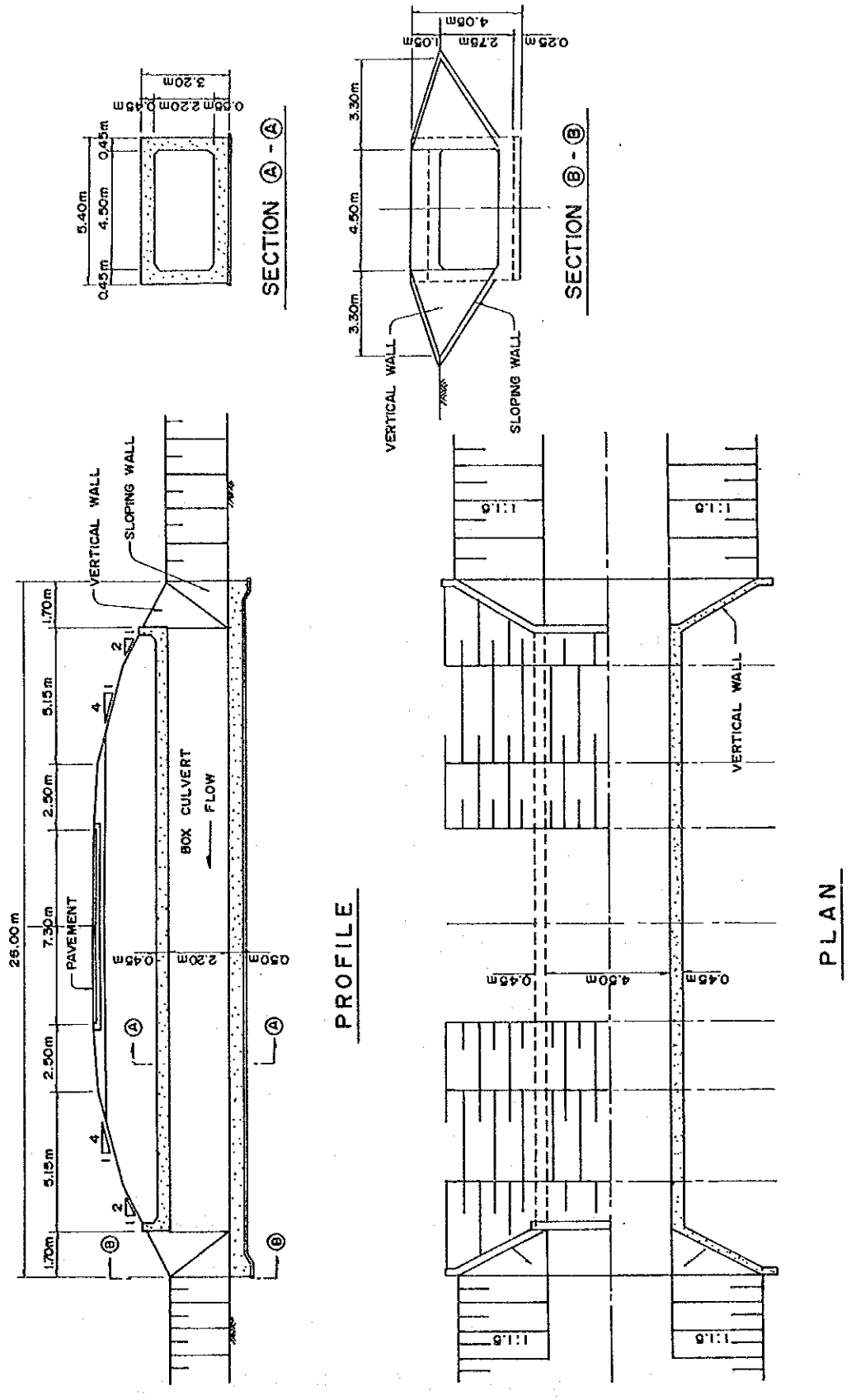
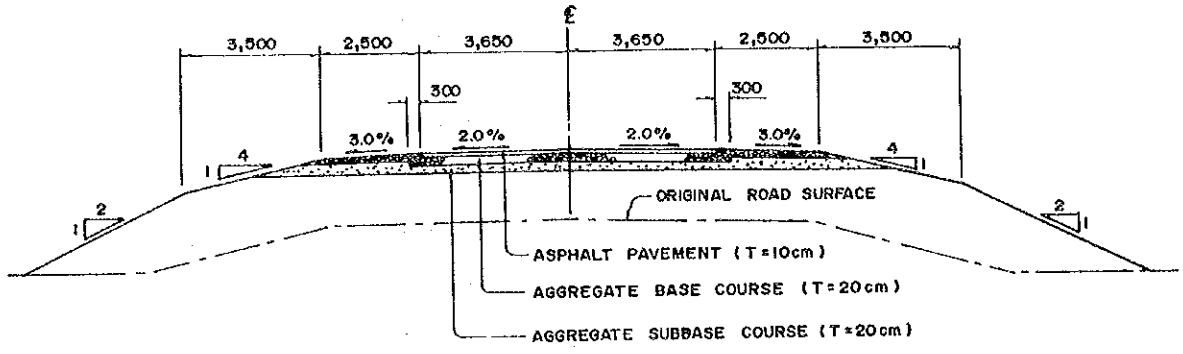
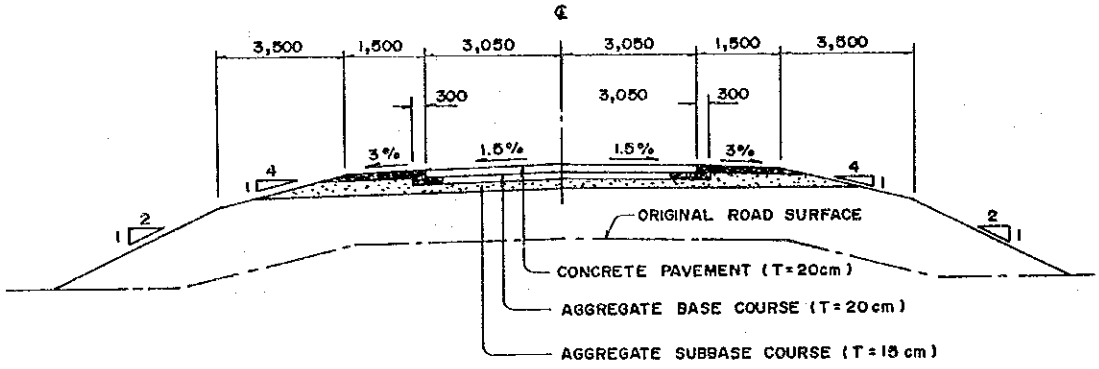


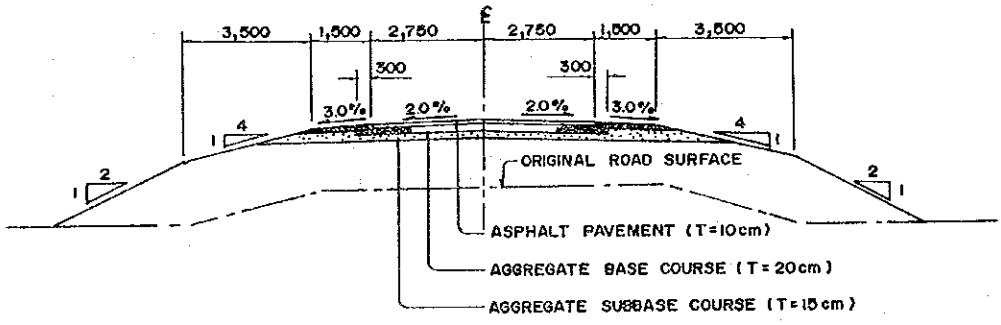
Fig. 3.18 STANDARD DESIGN OF BOX CULVERT



ROAD RAISING AND PAVEMENT (TYPE A)



ROAD RAISING AND PAVEMENT (TYPE B)



ROAD RAISING AND PAVEMENT (TYPE C)

NOTE : THE OTHER ROAD SUBJECT TO RAISING IS PAVED WITH GRAVEL.

Fig. 3.19 ROAD HEIGHTENING AND PAVEMENT

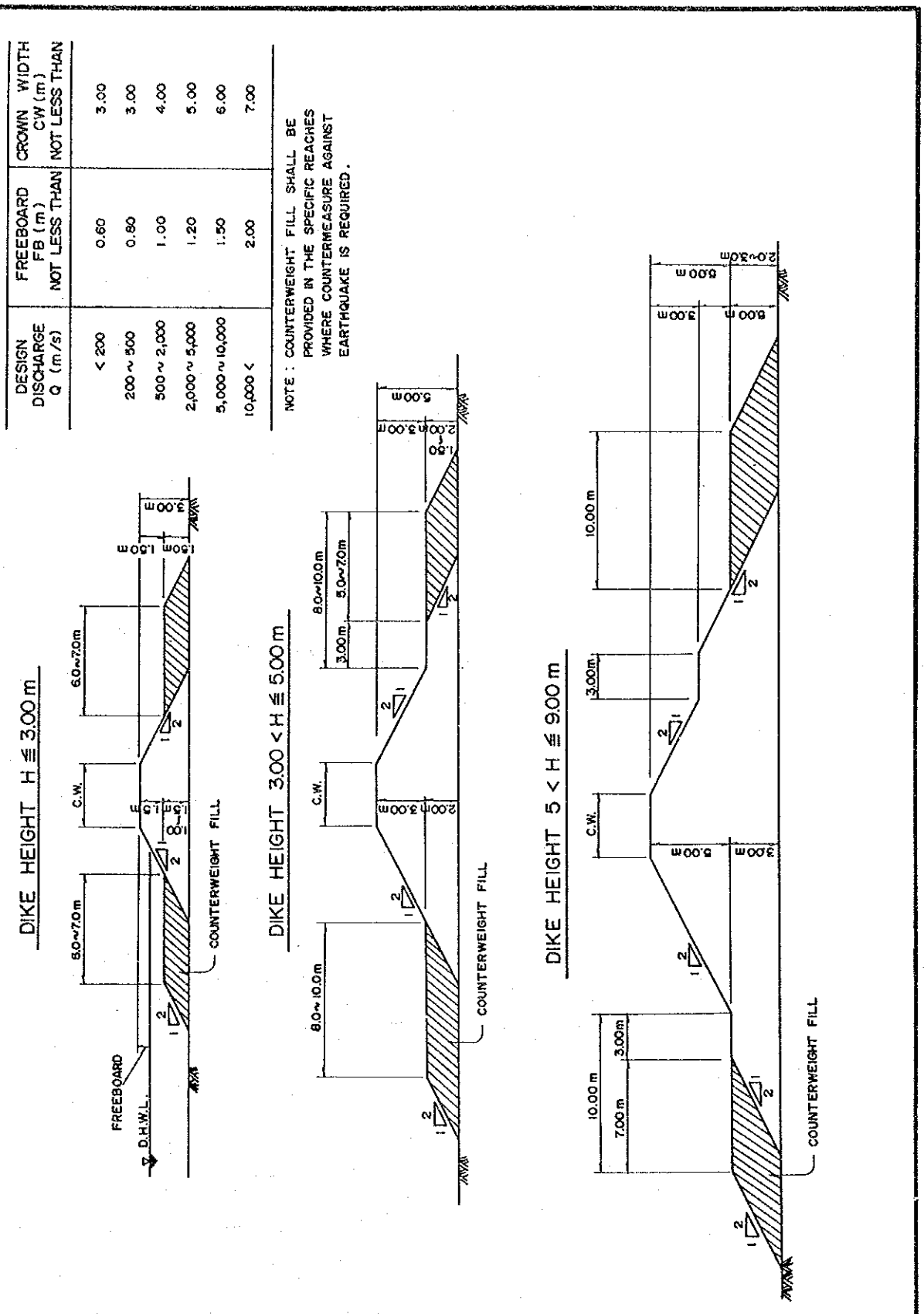


Fig. 3.20 STANDARD DESIGN SECTION OF PANTAL - SINOCALAN RIVER EARTH DIKE

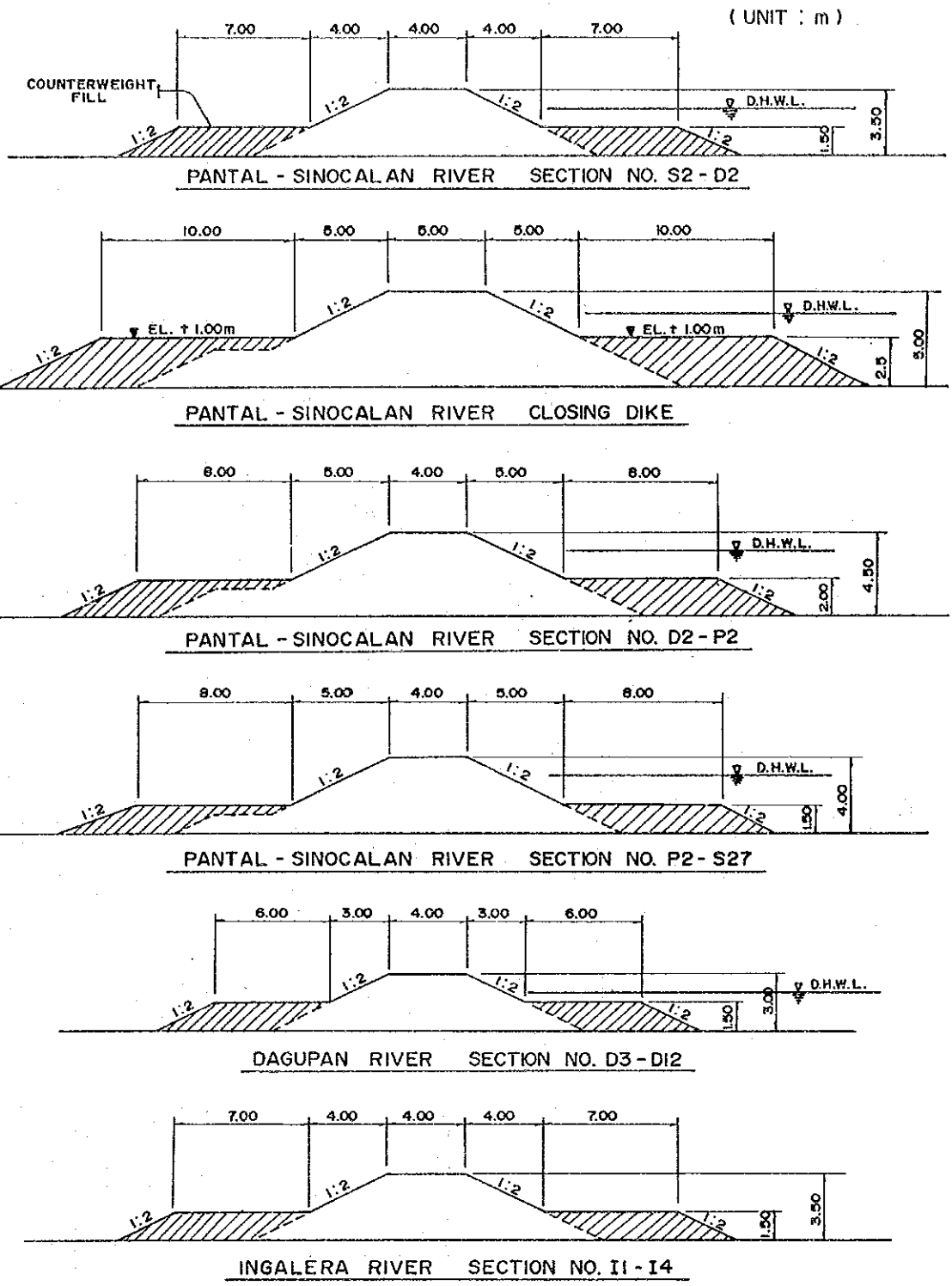


Fig. 3.21 STANDARD DESIGN OF COUNTERWEIGHT FILL AGAINST LIQUEFACTION (PANTAL-SINOCALAN RIVER)

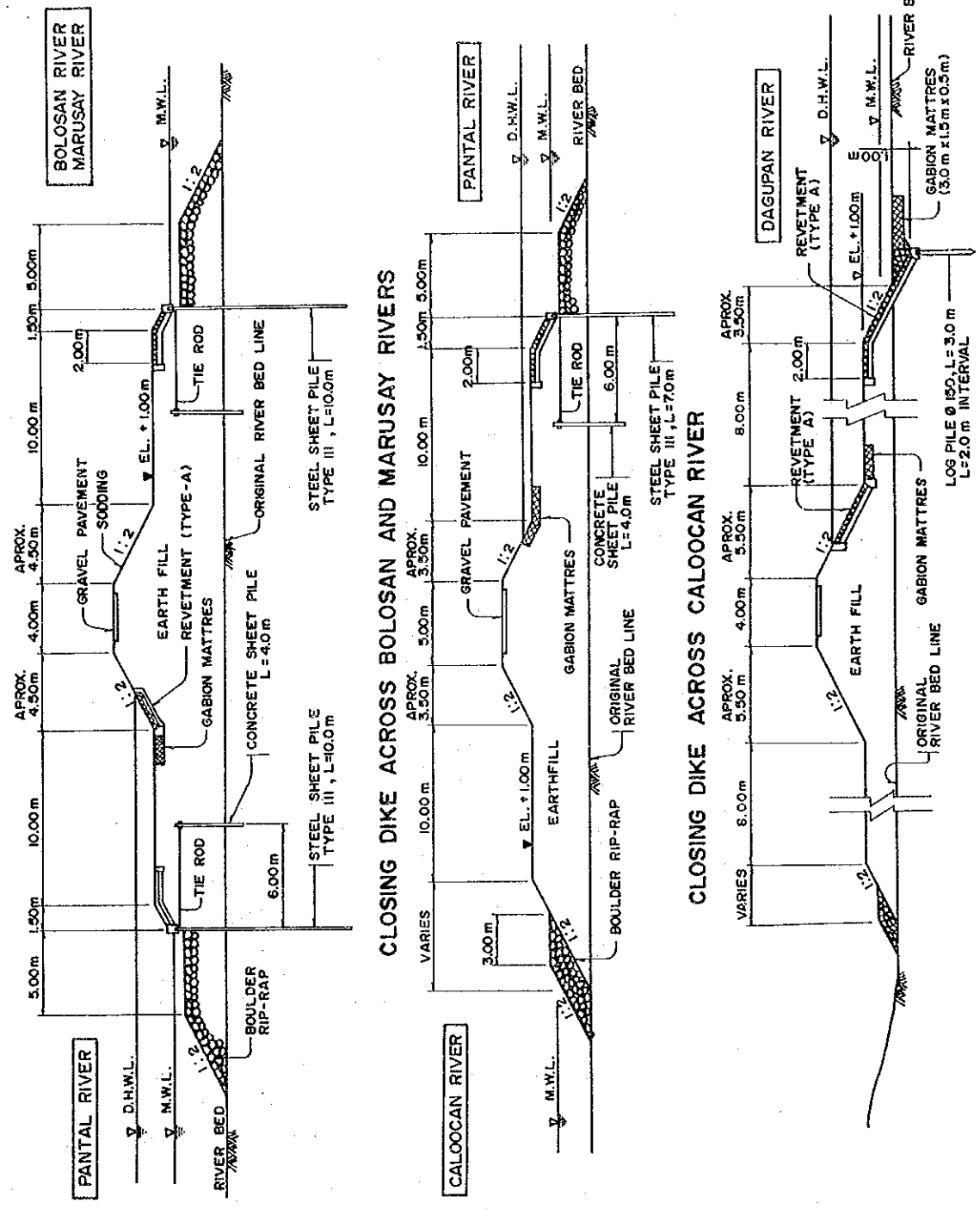


Fig. 3.22 STANDARD DESIGN OF CLOSING DIKE ACROSS BOLOSAN, MARUSAY & CALOOCAN RIVERS

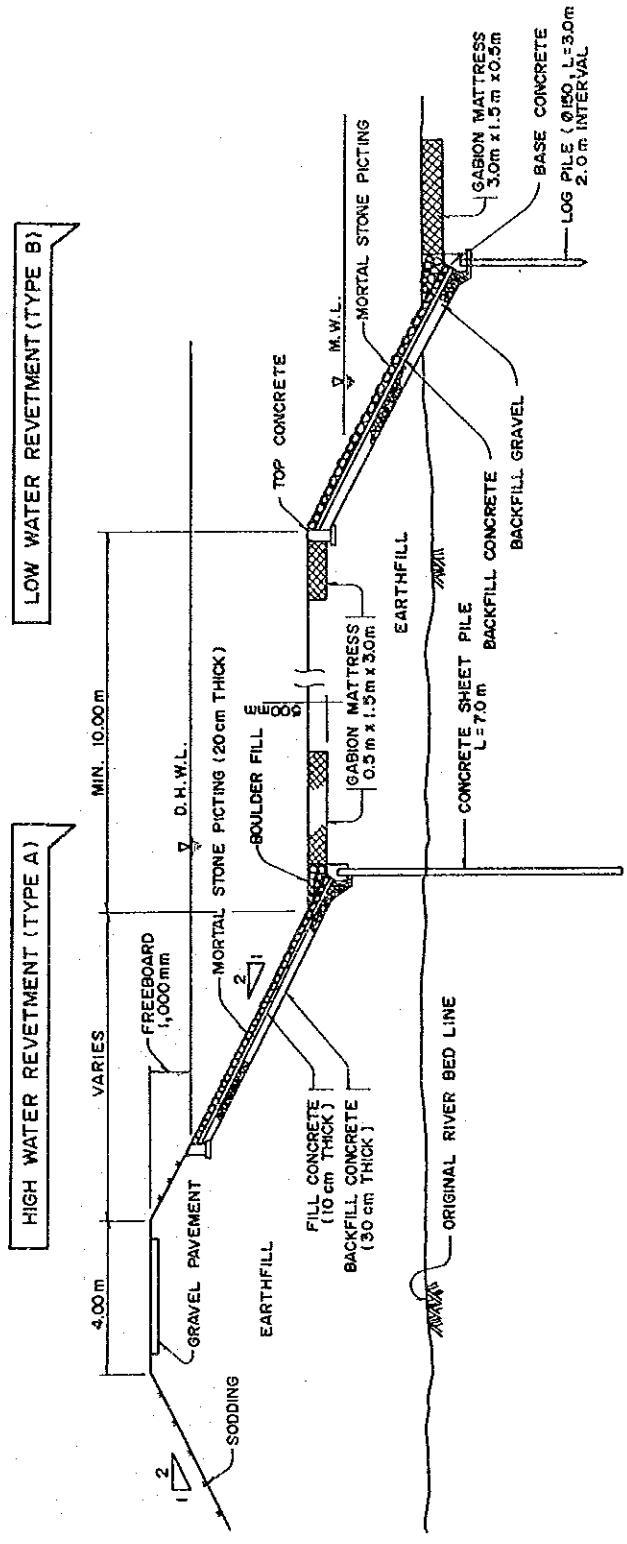


Fig. 3.23 PROTECTION WORKS FOR CLOSING DIKE IN SINOCALAN RIVER

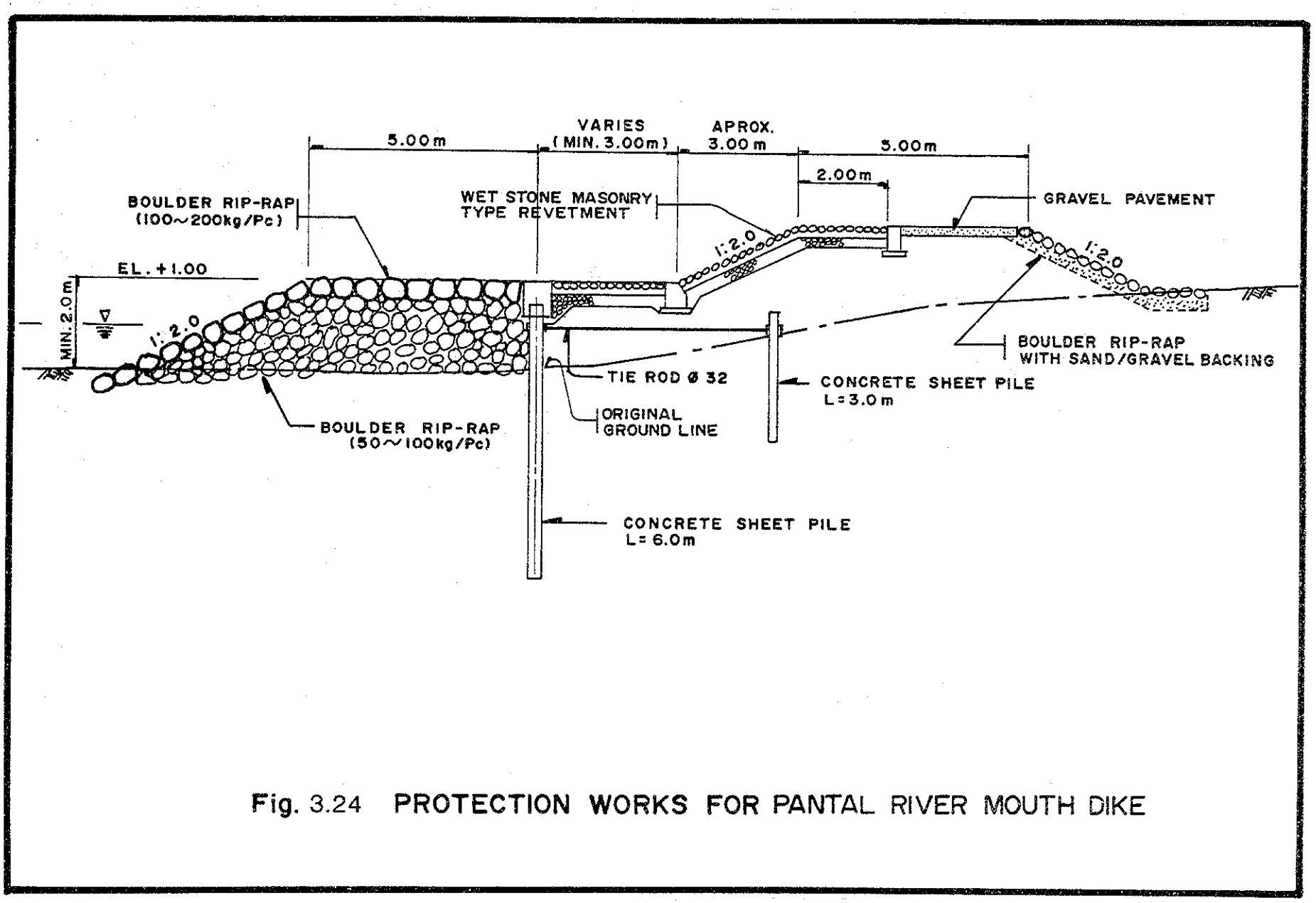
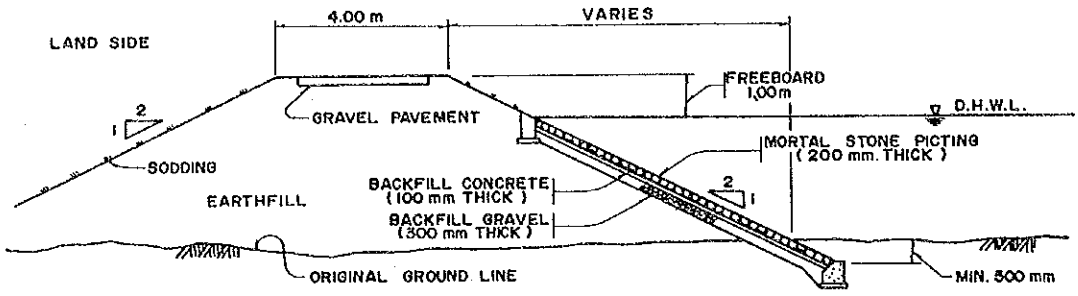
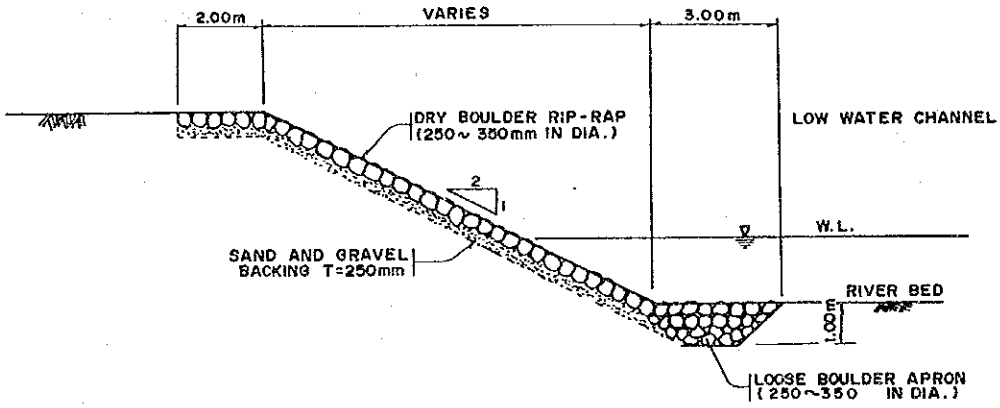


Fig. 3.24 PROTECTION WORKS FOR PANTAL RIVER MOUTH DIKE



HIGH WATER CHANNEL REVETMENT (TYPE A)



LOW WATER CHANNEL REVETMENT (TYPE A)

Fig. 3.25 STANDARD DESIGN SECTION OF REVETMENT

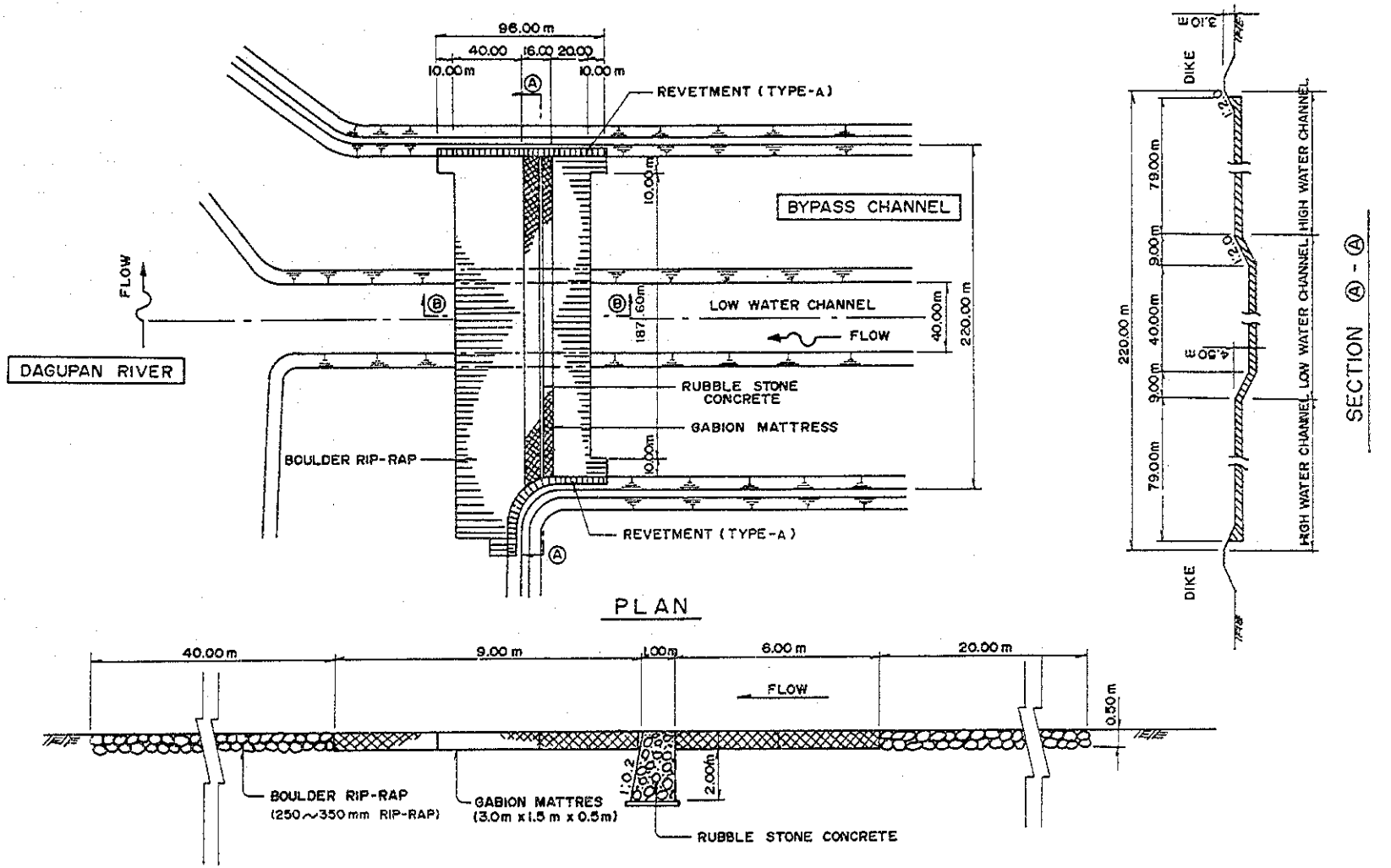


Fig. 3.26 GROUNDSILL ON BYPASS CHANNEL OF SINOCALAN RIVER

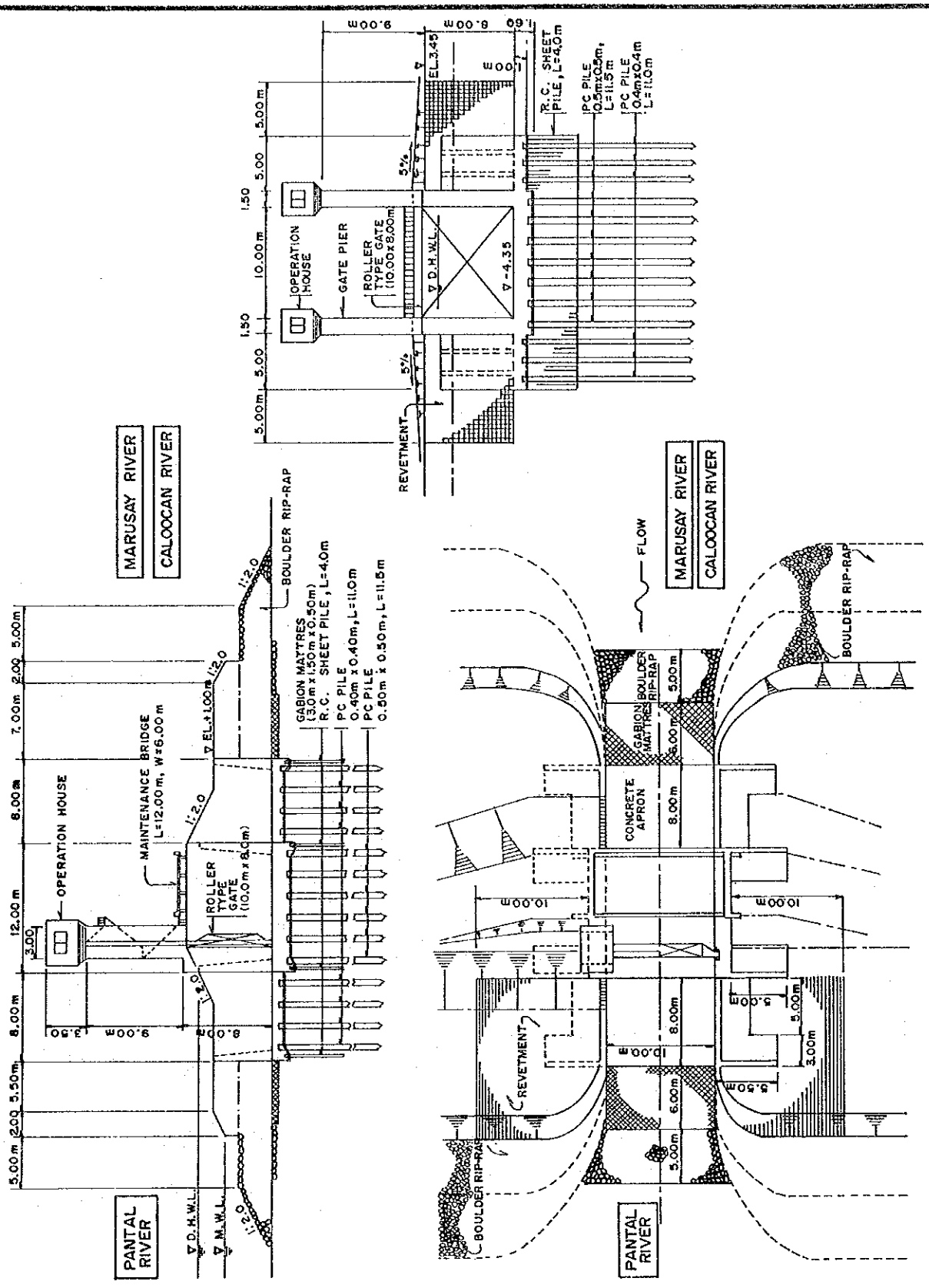


Fig. 3.27 STANDARD DESIGN OF WATER GATE
(PANTAL - SINOCALAN RIVER TYPE - I)

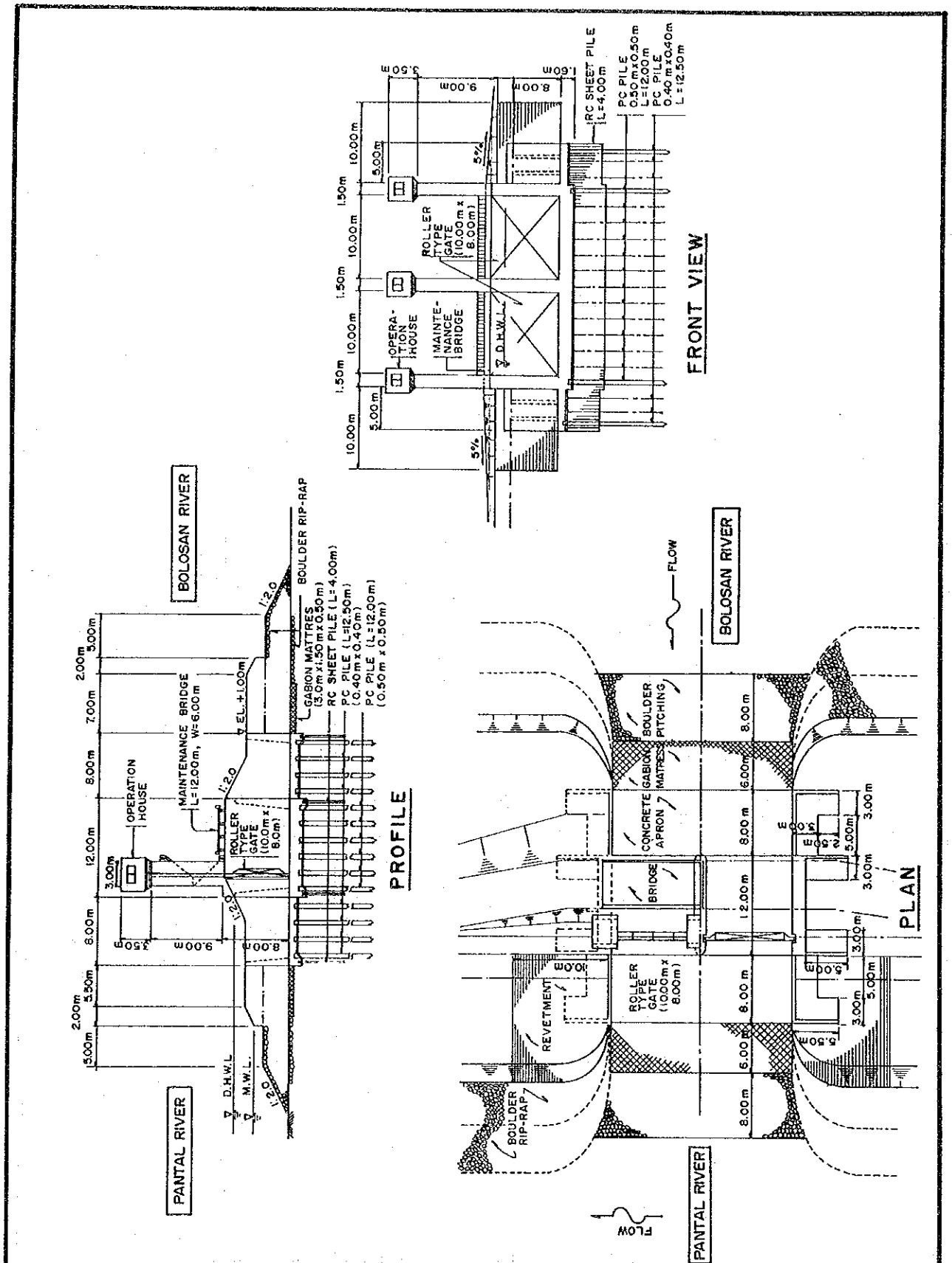


Fig. 3.28 STANDARD DESIGN OF WATER GATE
(PANTAL-SINOCALAN RIVER TYPE - II)

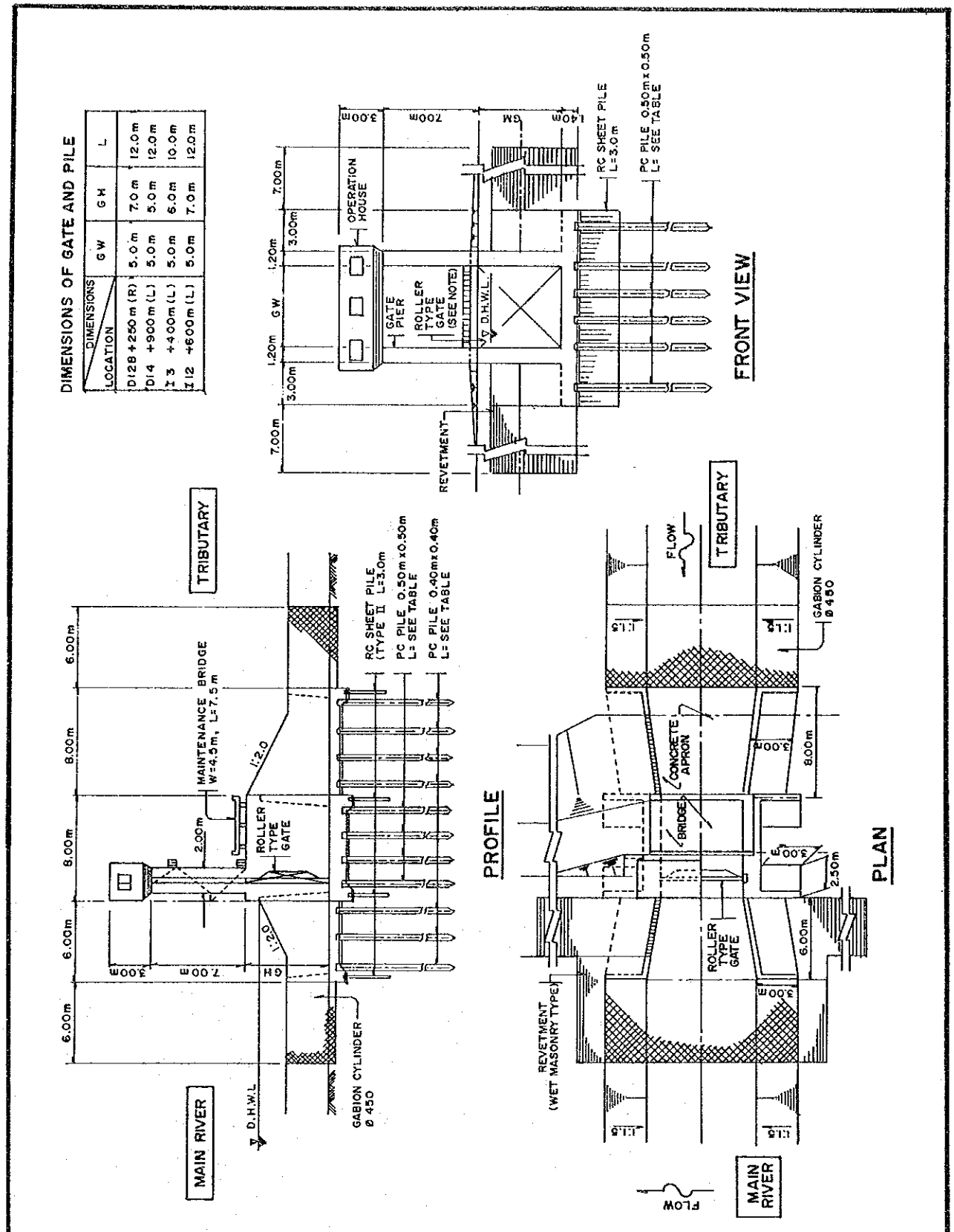
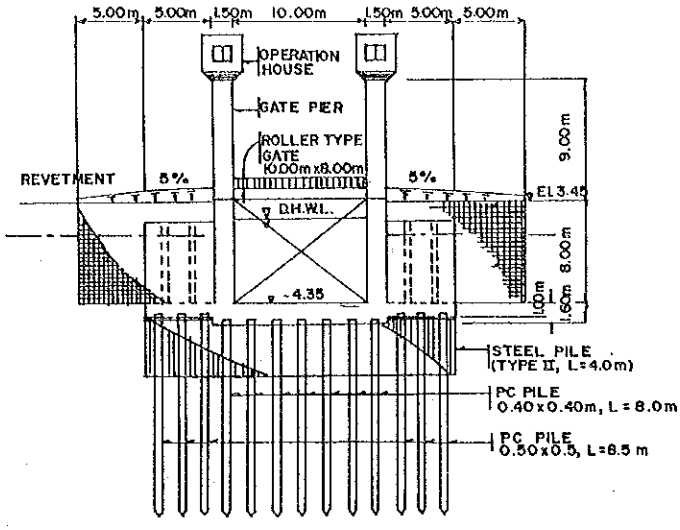
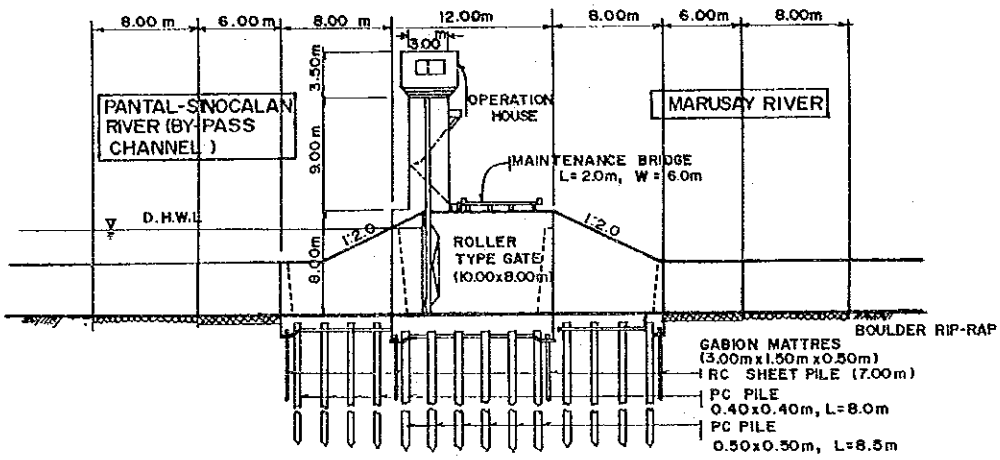


Fig. 3.29 STANDARD DESIGN OF WATER GATE
(PANTAL-SINOCALAN RIVER TYPE - III)



FRONT VIEW



PROFILE

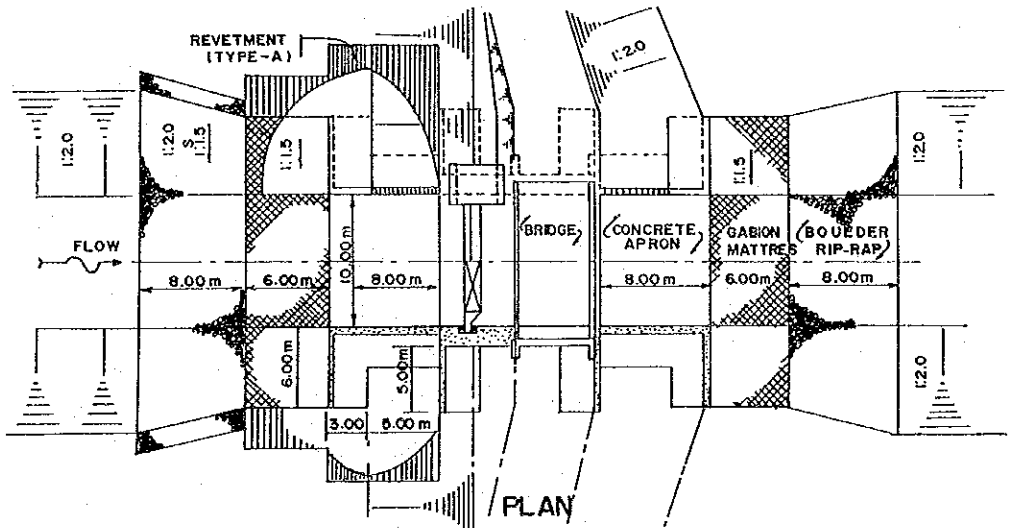


Fig. 3.30 STANDARD DESIGN OF INTAKE WATER GATE IN PANTAL-SINOCALAN BY-PASS CHANNEL

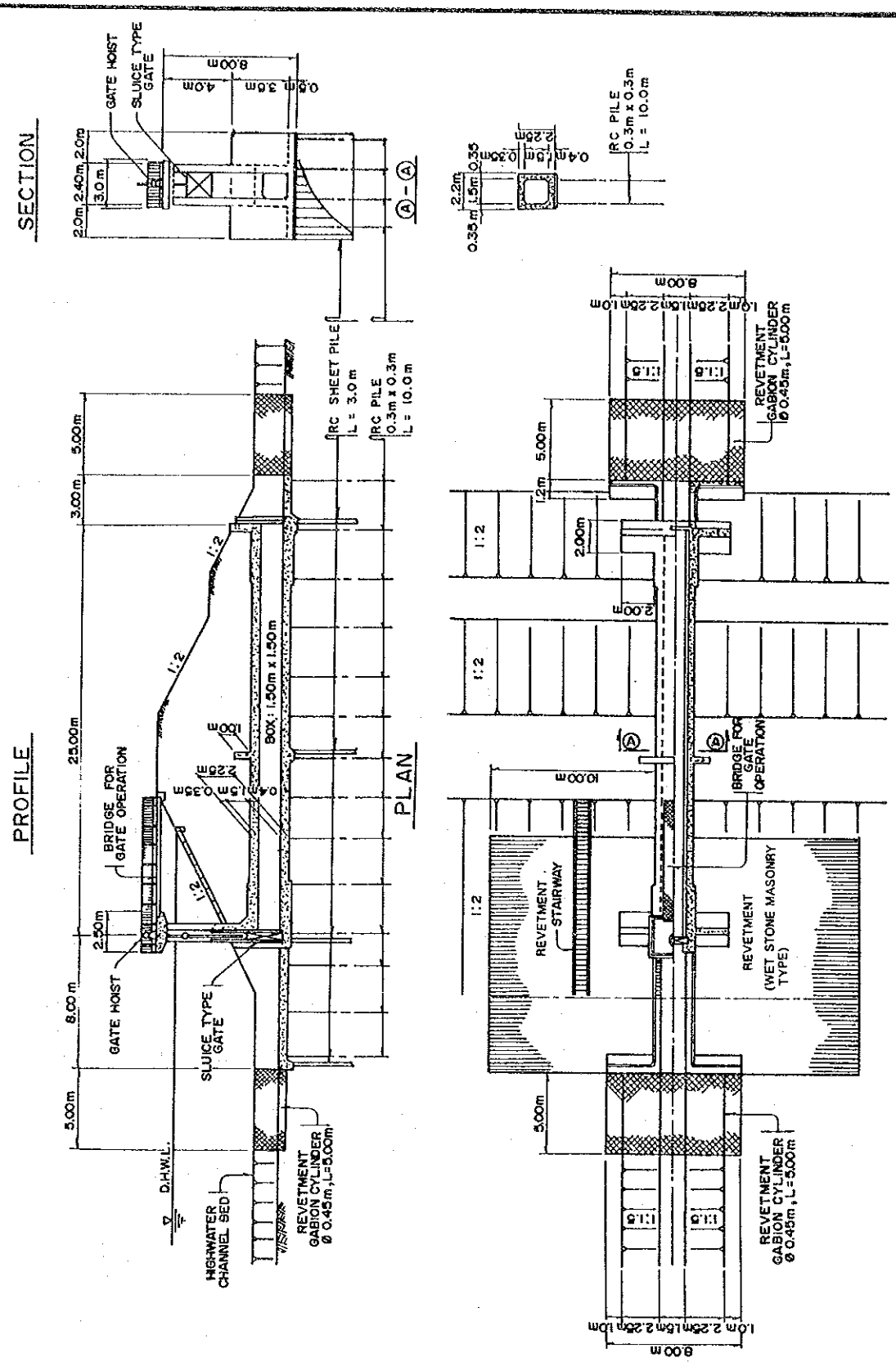


Fig. 3.31 STANDARD DESIGN OF SLUICE WAY IN PANTAL - SINOCALAN RIVER (TYPE A)

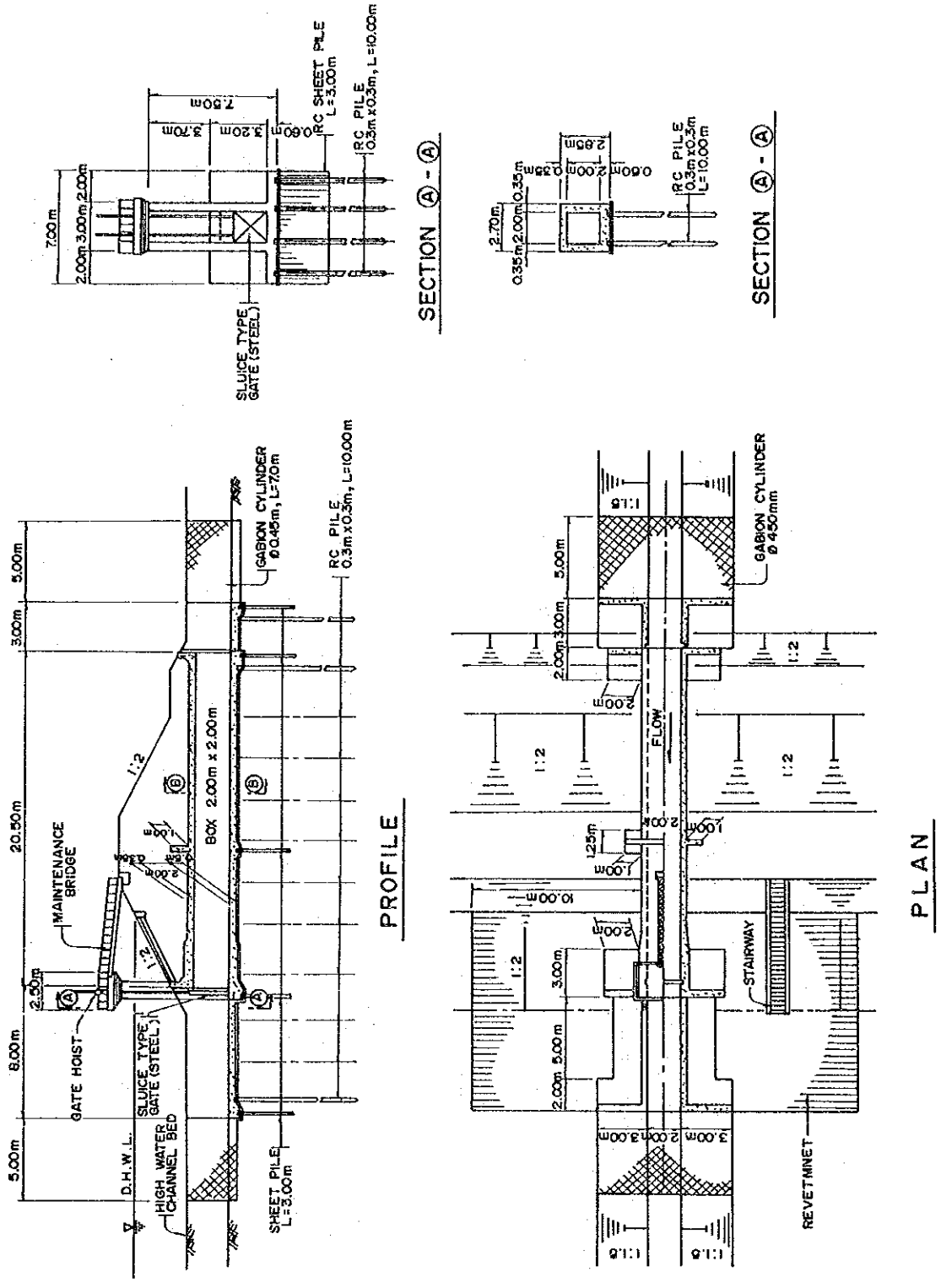


Fig. 3.32 STANDARD DESIGN OF SLUICE WAY IN PANTAL - SINOCALAN RIVER (TYPE B-I)

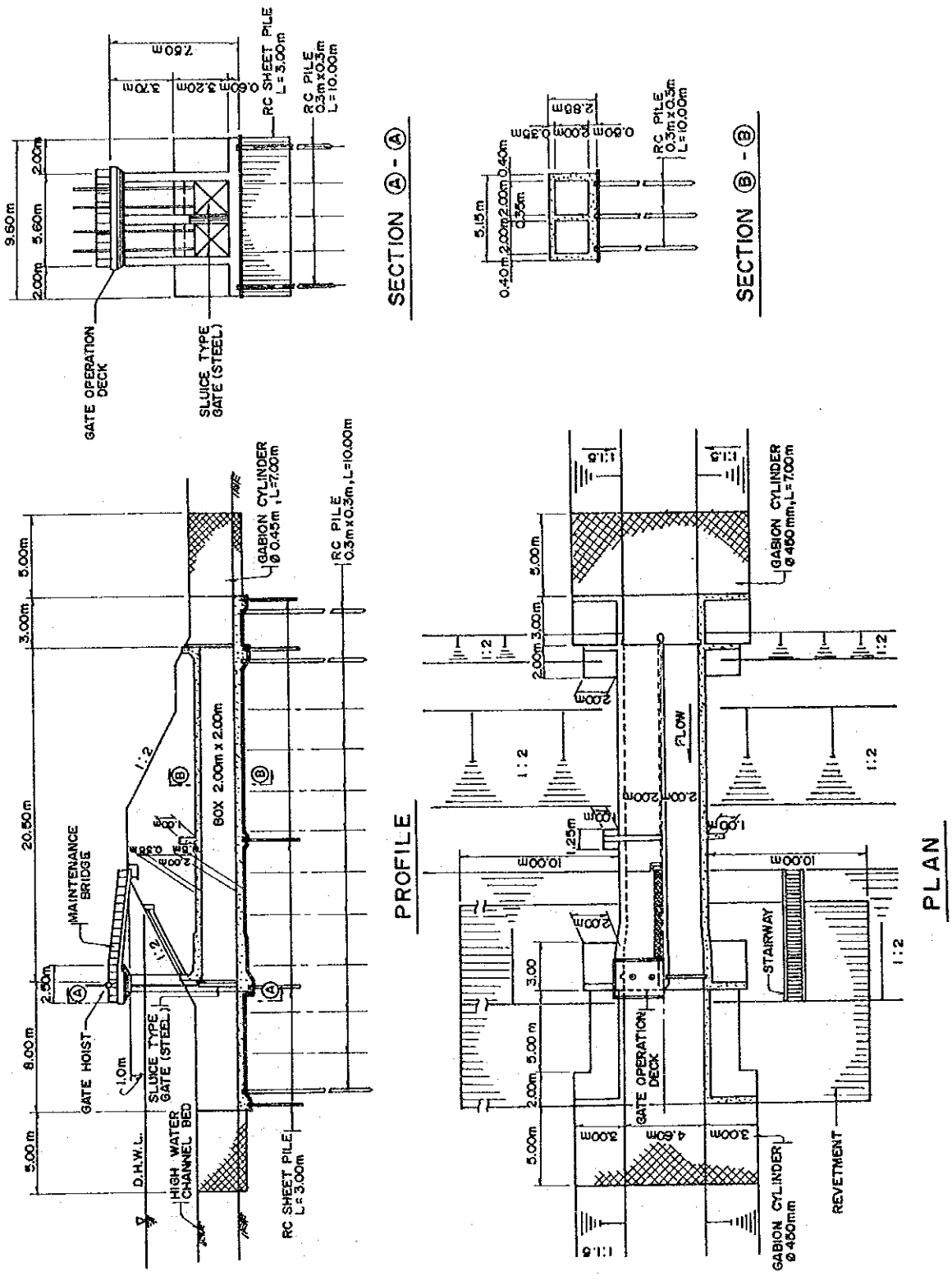


Fig. 3.33 STANDARD DESIGN OF SLUICE WAY IN PANTAL - SINOCALAN RIVER (TYPE B-2)

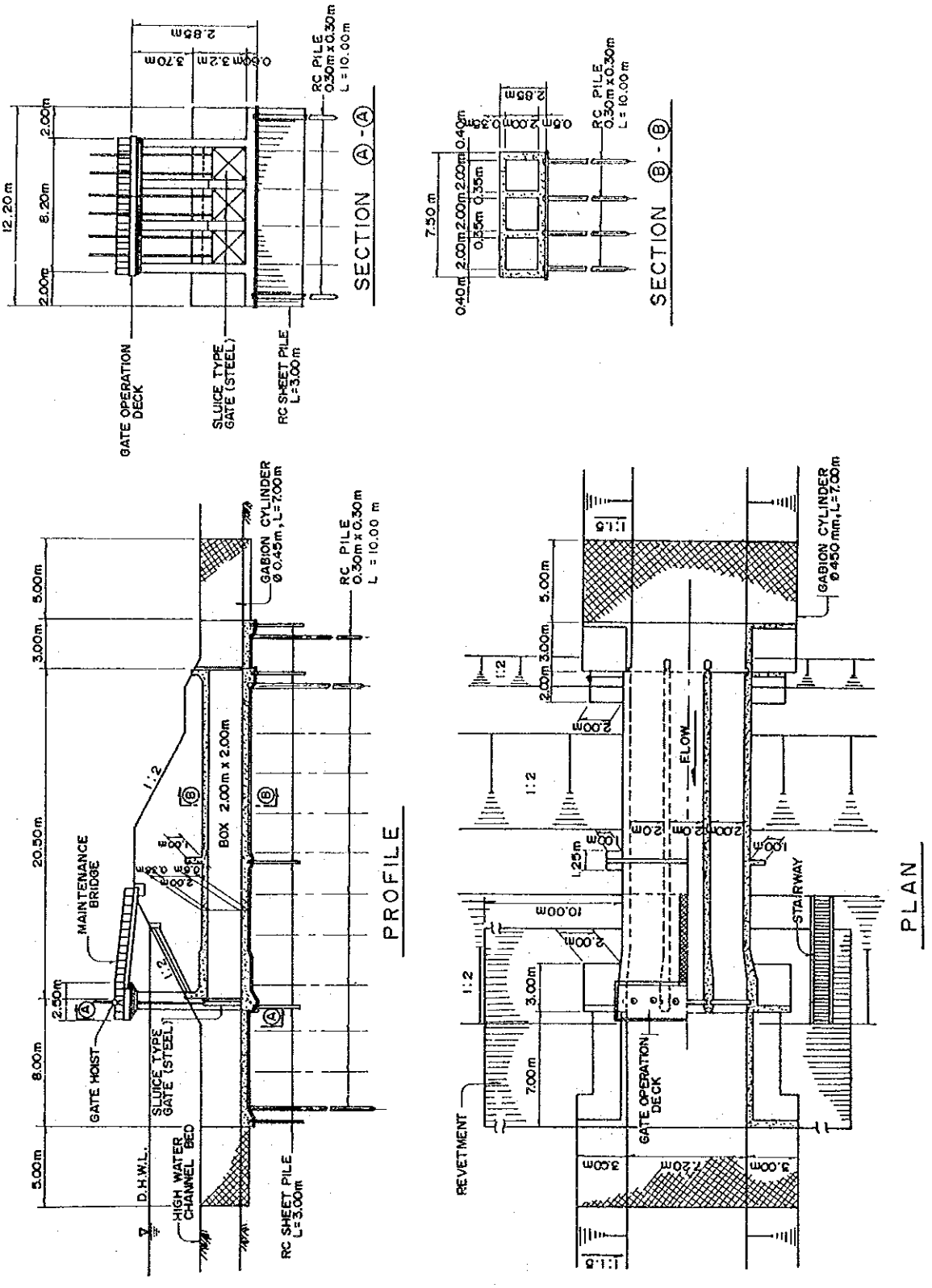


Fig. 3.34 STANDARD DESIGN OF SLUICE WAY IN PANTAL - SINOCALAN RIVER (TYPE B-3)

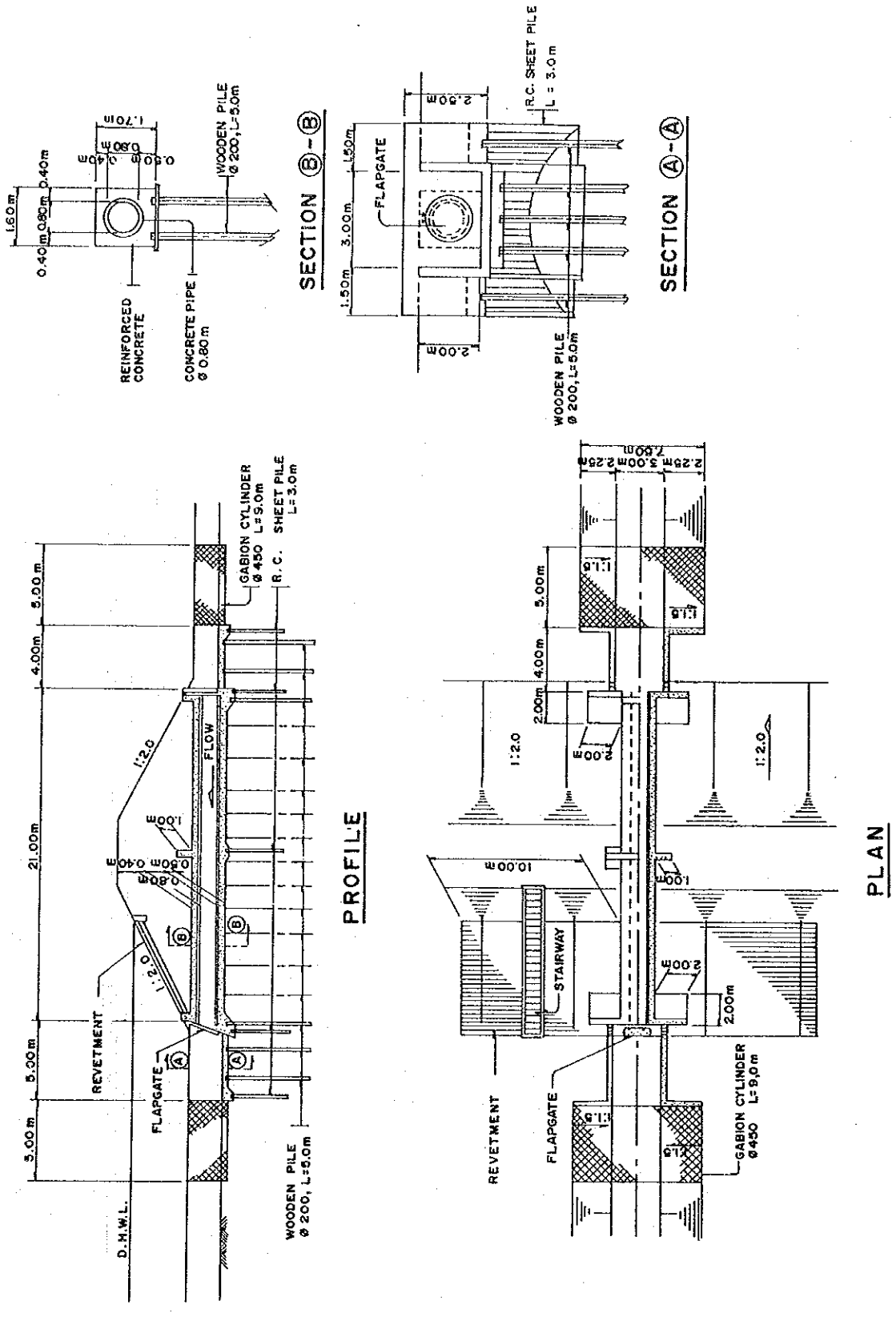


Fig. 3.35 STANDARD DESIGN OF SLUICE WAY IN PANTAL-SINOCALAN RIVER (TYPE C)

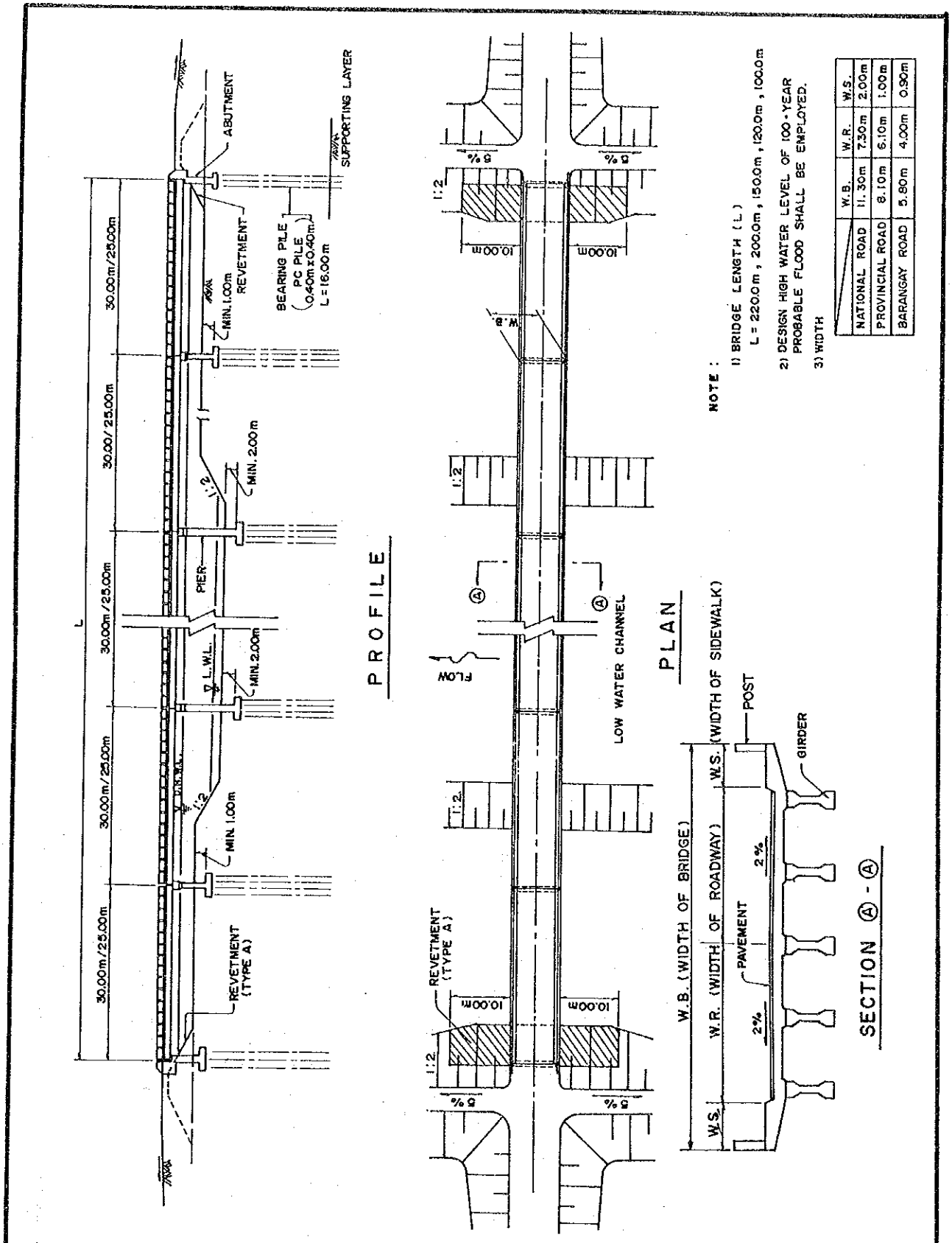
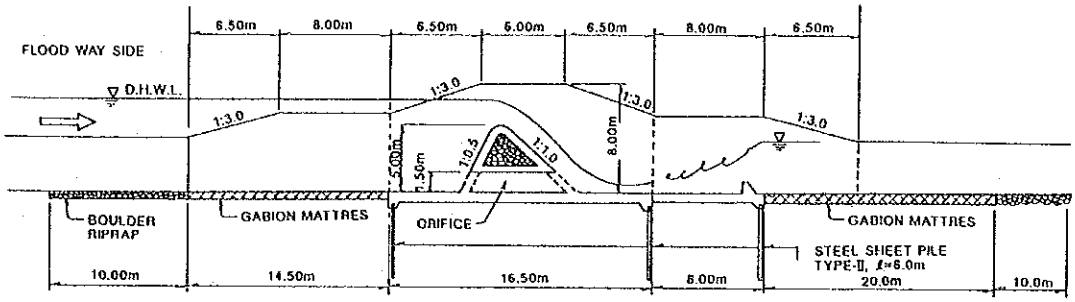
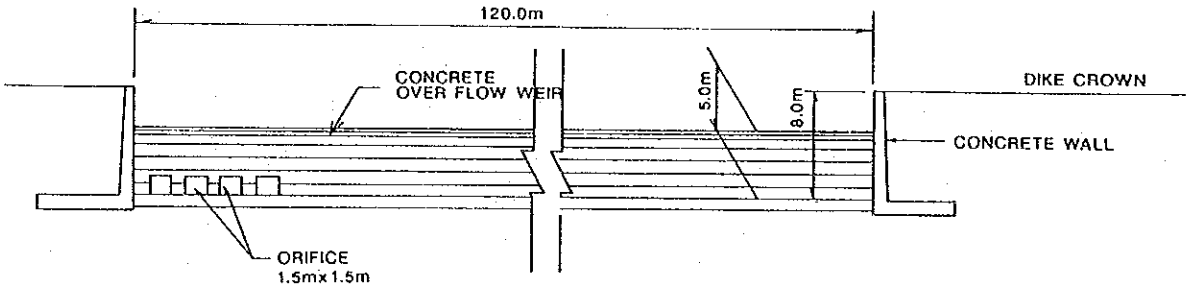


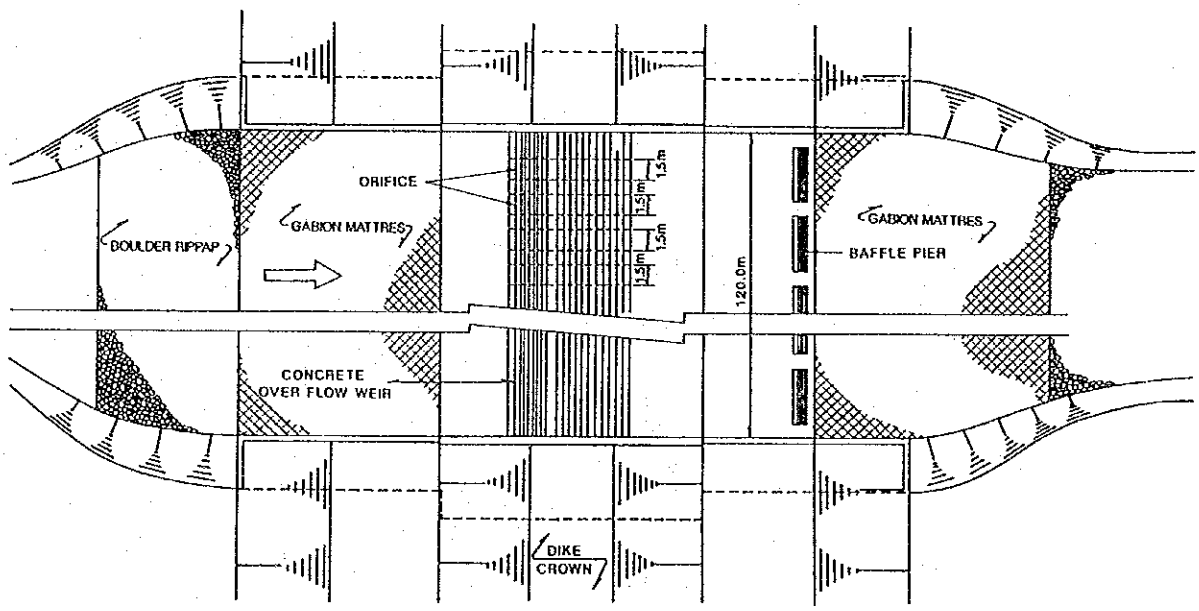
Fig. 3.36 STANDARD DESIGN OF BRIDGE



PROFILE



FRONT VIEW



PLAN

Fig. 5.1 ALTERNATIVE PLAN FOR DIVERSION FACILITIES (FIXED WEIR TYPE -- ALTERNATIVE Ⅱ)

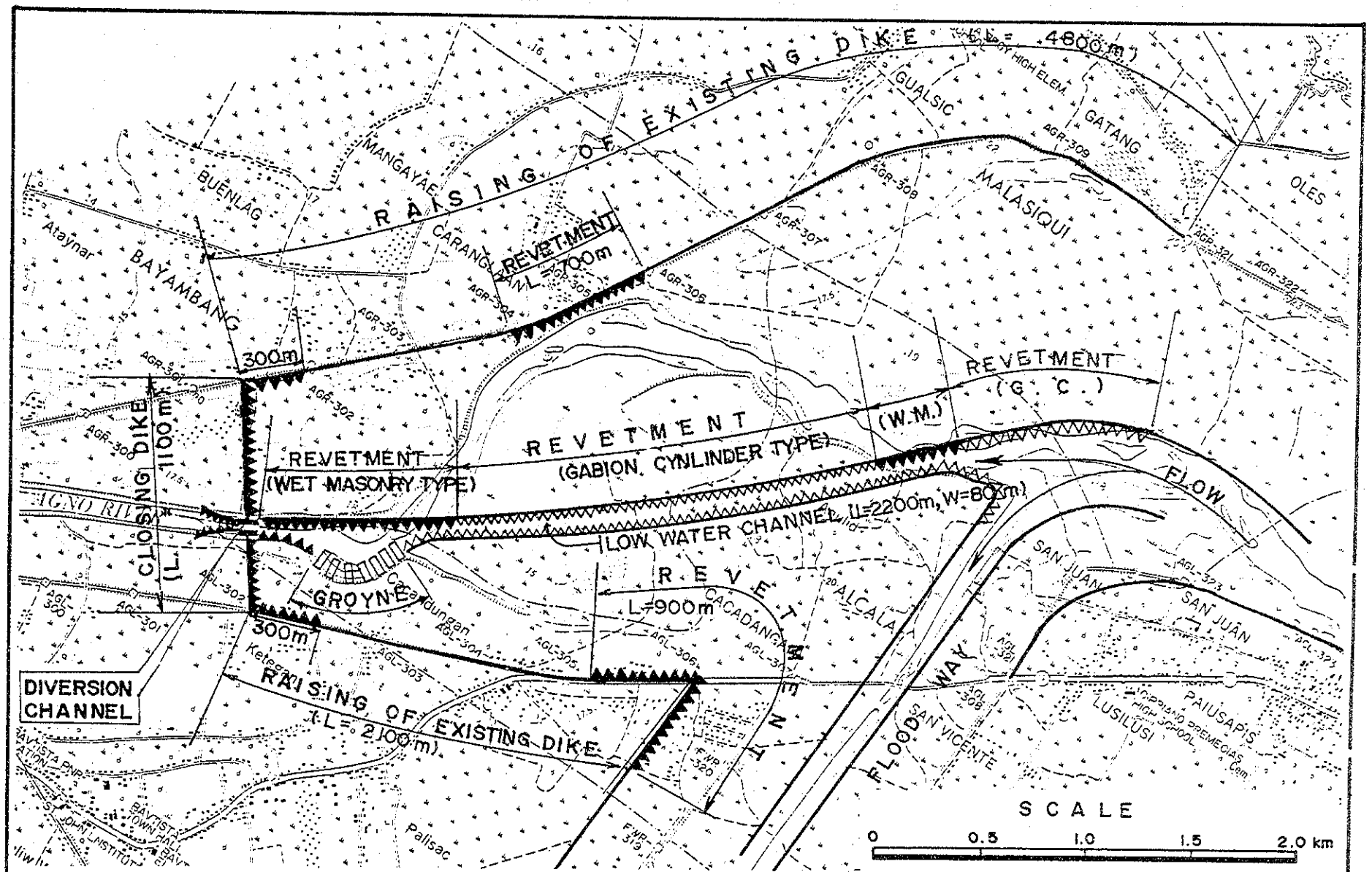


Fig. 5.2 BAYAMBANG CLOSING DIKE AND DIVERSION SYSTEM (ALTERNATIVE II)

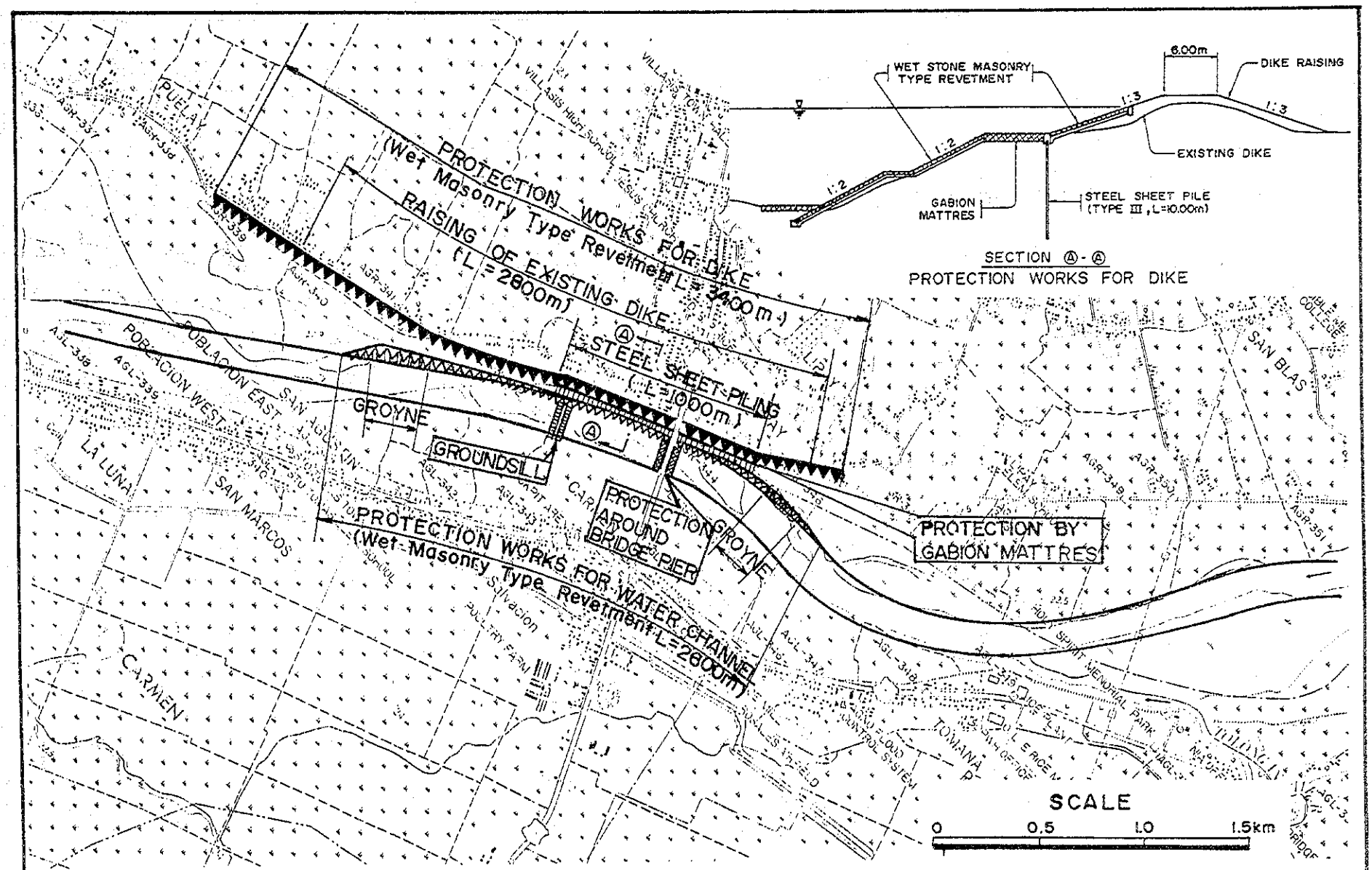


Fig. 5.3 DIKING SYSTEM IN CARMEN STRETCH (10 - YEAR FLOOD ALTERNATIVE II)

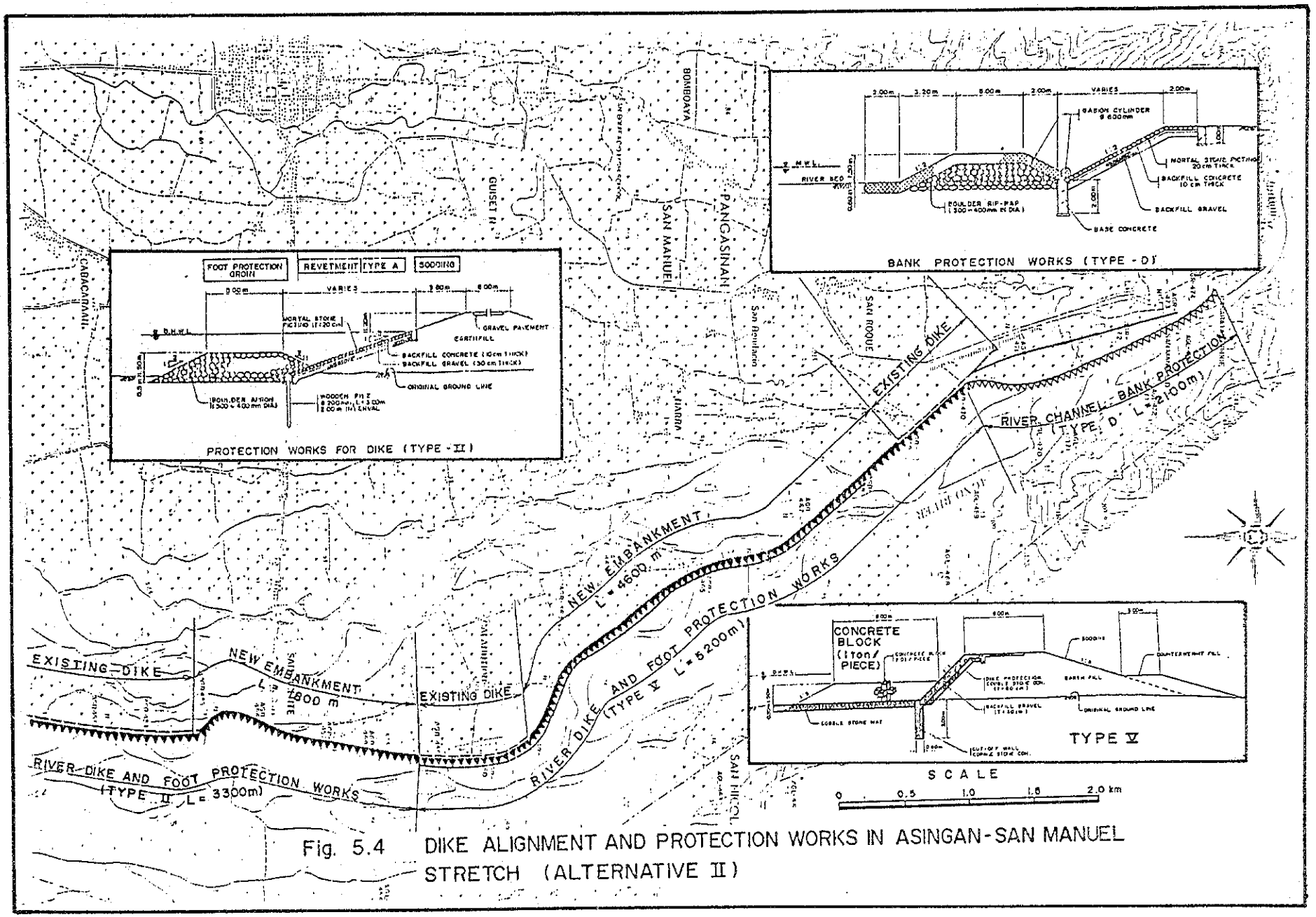


Fig. 5.4 DIKE ALIGNMENT AND PROTECTION WORKS IN ASINGAN-SAN MANUEL STRETCH (ALTERNATIVE II)

13. CP CONSTRUCTION PLAN AND COST ESTIMATES

CP: CONSTRUCTION PLAN AND COST ESTIMATES

SUMMARY

(1) The following implementation schedule of the priority projects were selected:

(a) Upper Agno River Project

First Stage	:	1995 to 1999
Second Stage	:	2000 to 2004

(b) Pantal-Sinocalan River Project

First Stage	:	2000 to 2004
Second Stage	:	2005 to 2009

(2) Project Cost was estimated on the following conditions:

(a) Procurement construction works are to be executed by bidding.

(b) Unit cost of each construction work item is estimated on the unit price basis, except for some items which are estimated on lump sum or percentage basis.

(c) Unit prices are based on the price level as of May, 1991.

(d) Foreign currency conversion rates are US$1.00 = ₱27.80 = ¥139.00.

(e) Cost estimation is made for the following seven (7) stretches:

- Upper Agno River Project

  (1) Bayambang-Alcala Stretch
  (2) Alcala-Asingan Stretch
  (3) Asingan-San Manuel Stretch
  (4) Poponto Swamp Retarding Basin

- Pantal-Sinocalan River Project

(1) Pantal-Sinocalan River Stretch
(2) Dagupan River Stretch
(3) Ingalera River Stretch

(3) The estimated project costs of each project and stage are as follows:

Agno River Project

The financial project cost and the economic project cost for the Upper Agno River are tentatively estimated at 3,911.6 million pesos and 3,474.5 million pesos, respectively.

Unit: Million Pesos

Item	First Stage	Second Stage	Total
Financial Cost	2,922.8	988.8	3,911.6
Economic Cost	2,522.1	922.4	3,474.5

Pantal-Sinocalan River Project

The financial project cost and the economic project cost for the Pantal-Sinocalan River are tentatively estimated at 3,895.7 million pesos and 3,306.9 million pesos, respectively.

Unit: Million Pesos

Item	First Stage	Second Stage	Total
Financial Cost	1,977.3	1,918.4	3,895.7
Economic Cost	1,628.3	1,678.6	3,306.9

CP: CONSTRUCTION PLAN AND COST ESTIMATES

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ABBREVIATIONS

1. NAME OF PHILIPPINE GOVERNMENT AGENCIES

AFCS	Agno River Flood Control System
ARIS	Agno River Irrigation System
DENR	Department of Environment and Natural Resources
DOTC	Department of Transportation and Communication
DPWH	Department of Public Works and Highways
GOP	Government of the Philippines
LATRIS	Lower Agno and Totonogen River Irrigation System
NAPOCOR	National Power Corporation
NAMRIA	National Mapping and Resource Information Authority
NIA	National Irrigation Administration
OCD	Office of Civil Defense
PENRO	Provincial Environment and Natural Resources Office
PM	Project Manager
PMO	Project Management Office
PNR	Philippine National Railways
TASMORIS	Tarlac River and San Miguel - O'Donnel River Irrigation System

2. NAME OF JAPANESE GOVERNMENT AND OTHER OFFICIAL AGENCIES AND ORGANIZATION

GOJ	Government of Japan
JICA	Japan International Cooperation Agency
MOC	Ministry of Construction, Japan
OECF	Overseas Economic Cooperation Fund, Japan
UN	United Nations

3. MEASUREMENT UNITS

(Length)		(Weight)	
mm	millimeter(s)	gr(grs)	gramme(s)
cm	centimeter(s)	kg(kgs)	kilogramme(s)
m	meter(s)	ton(s)	ton(s), eq'vt to 1,000kg
km	kilometer(s)		

(Area)

mm^2	square millimeter(s)
cm^2	square centimeter(s)
m^2	square meter(s)
km^2	square kilometer(s)
ha(has)	hectare(s)

(Time)

sec	second(s)
min	minute(s)
hr(hrs)	hour(s)
dy(dys)	day(s)
mth(mths)	month(s)
yr(yrs)	year(s)

(Volume)

cm^3	cubic centimeter(s)
m^3	cubic meter(s)
ltr	liter(s)

CP: CONSTRUCTION PLAN AND COST ESTIMATES

1. INTRODUCTION

Construction planning of the selected priority projects was performed to formulate the construction time schedule and to obtain the basic data for the cost estimates. In Section 3, Cost Estimates, both the financial and economic project costs were estimated to evaluate the priority projects from the economic viewpoint. The main study items are as follows:

a) Construction Plan

- To formulate the basic conditions for construction planning, i.e., workable days and materials.
- To select the standard construction method for major works.
- To formulate the construction time schedule.

b) Cost Estimates

- To review the basic concepts for the cost estimate and unit cost.
- To estimate the financial and economic project costs of the selected priority projects.

2. CONSTRUCTION PLAN

2.1 Outline of the Project

2.1.1 Implementation Schedule

The selected priority project is composed of two (2) projects; namely, the Upper Agno River Project and the Pantal-Sinocalan River Project. Each project is divided into two (2) construction stages as follows:

a) Upper Agno River Project

First Stage: To confine 10-year return period floods in the river channel, the following works are included in the First Stage:

- Completion of diking systems;
- Provision of revetment at urgent portion; and
- Excavation of low water channel for the Poponto Floodway.

Second Stage: To complete the project, the following works will be executed in the Second Stage:

- Excavation for low water channel;
- Installation of revetment; and
- Others

b) Pantal-Sinocalan River Project

First Stage: To protect the three municipalities (Dagupan City, Calasiao and Santa Barbara) from a 10-year return period flood, the following stretches are to be improved:

- Right bank of the Sinocalan River;
- Left Bank of the Sinocalan River in the Santa Barbara Stretch;
- Both banks of the Pantal River; and
- Bypass channel.

Second Stage: To complete the project, all stretches are to be improved, except the stretches included in the First Stage.

The Pre-Construction Stage including the detailed design and contracting procedures will be executed from 1992 to 1994. The time schedule of the construction stages is as follows, while the implementation schedule of the priority projects is shown in Fig. 2.1.

a) Upper Agno River Project

First Stage: 1995 to 1999
Second Stage: 2000 to 2004

b) Pantal-Sinocalan River Project

First Stage: 2000 to 2004
Second Stage: 2005 to 2009

2.1.2 Work Quantities

The major work quantities of both projects are summarized in the following table.

Work Item	Unit	Upper Agno			Pantal-Sinocalan		
		Stage1	Stage2	Total	Stage1	Stage2	Total
Excavation	$1000m^3$	4,784	3,634	8,418	1,243	2,105	3,348
Dredging	$1000m^3$	0	0	0	160	20	180
Embankment	$1000m^3$	4,852	446	5,298	1,806	2,482	4,288
Revetment	km	32	20	52	12	12	24
Groyne	pc.	54	61	115	0	39	39
Sluiceway	pc.	32	6	38	14	30	44
Water Gate	pc.	0	0	0	4	5	9
Bridge	m^2	8,524	2,046	10,570	11,048	8,609	19,657
Compensation							
House	unit	4,692	188	4,880	1,442	1,084	2,526
Land	ha	1,179	28	1,207	273	299	572

2.2 Basic Condition

2.2.1 Workable Days

Since construction of river improvement works especially earth works will be much influenced by rainfall and flooding, the workable days were estimated based on past rainfall records and the official holidays.

Official Holidays

Sunday (365/7)	=	53 days
National Holiday	=	11 days
Non-Working Holiday (Proclaimed by Government)	=	4 days
Total	=	68 days

Suspended Days

The number of annual average rainy days at Alcala (Upper Agno River) and Dagupan (Pantal-Sinocalan River) in 1975 to 1985 are shown in Table 2.1 and Table 2.2, respectively. The number of work days suspended by rainfall was calculated based on the following standards.

Daily Rainfall (mm)	Suspended Days	
	Embankment	Other Works
0 - 5	0	0
5 - 30	1	0.5
30 - 50	2	1
50 - 100	3	1.5
100 -	4	2

The results of calculation are as follows:

River	Earth Works	Other Works
Upper Agno	106 days	53 days
Pantal-Sinocalan	73 days	36 days

Workable Days

The workable days for each site is calculated as follows:

a) Upper Agno River Project

Earth Works	365 - 69 - 106	=	190 days
Others	365 - 69 - 53	=	243 days

b) Pantal-Sinocalan River Project

Earth Works	365 - 69 - 73	=	223 days
Others	365 - 69 - 36	=	260 days

2.2.2 Construction Materials

a) Embankment Materials

Riverbed materials in the project areas are mostly usable as embankment materials, except in the San Manuel Stretch (A-1). Therefore, the excavated soil of the low water channel, as well as barrow material, will be used as the embankment material.

Embankment materials from barrow pits TS-1 (San Manuel) and TS-2 (Rosales), as well as excavated materials from the nearby paddy land, will be used in the Asingan-San Manuel Stretch.

In this connection the average hauling distances from these sources to the embankment sites are estimated to be 500 m and 3 km, respectively.

b) Concrete Aggregates

Riverbed materials in the upper reaches of the Agno River Project, i.e., the materials from barrow pits TA-1 (San Manuel), TA-2 (Asingan) and TA-4 (Carmen), will be used as concrete aggregates. Barrow pits TA-9 (Manaoag) and TA-10 (San Jacinto) are available for the Pantal-Sinocalan River Project.

The hauling distances vary from 500 m to 3.5 km. The difference in hauling distances among the concrete aggregate sources does not significantly affect concrete cost, since the share of aggregate cost in concrete cost is small (about 5 to 6%). Therefore, the average hauling distance of 20 km is employed for the cost estimate.

c) Boulders

Barrow pits of boulders for the Agno River Stretch are located in San Manuel (B-1), Ambayaoan River (B-2) and Banila River (B-3). The barrow pits for the Pantal-Sinocalan River is located in the Bued River. These are presently used by the AFCS. The average hauling distance from these barrow pits to all the construction sites is around 30 km.

The location of these barrow pits are shown in Fig. 2.2.

2.3 Standard Construction Method

2.3.1 Excavation Works

Excavation works for the projects consist of the low water channel excavation. Excavated materials suitable in quality and available in quantity are to be used for dike embankment.

Unsuitable materials or materials in excess of the required embankment are to be dumped in the spoil bank area. The hauling distance of excavated materials to the spoil bank is assumed at 1,000 m on average.

Excavation works per group are planned to be carried out by a combination of the following major equipment:

Bulldozer, 11 tons	:	4 units/group
Pay Loader, 1.3 m^3	:	2 units/group
Backhoe, 0.66 m^3	:	1 unit/group
Dump Truck, 6 m^3	:	5 units/group

The work capacity of each group is 800 m^3/day.

2.3.2 Embankment Works

Embankment works for heightening of existing dike and construction of new dike are classified into the following categories:

Embankment 1 : Embankment materials to be obtained from river channel excavation.

Embankment 2 : Embankment materials to be obtained from barrow area.

a) Embankment 1

This works include the works of excavation in river channel, loading and hauling to the embankment site, materials moisture content control, stripping of surface soil of dike foundation, and spreading and compacting of the materials. The hauling distance of materials is assumed at 500 m on average.

Embankment works 1 is planned to be carried out by a combination of the following major equipment:

Bulldozer, 11 tons	:	4 units/group
Pay Loader, 1.3 m^3	:	2 units/group
Dump Truck, 6 m^3	:	5 units/group
Tire Roller, 8 tons	:	2 units/group
Water Tanker, 3,800 ltr.	:	2 units/group

The work capacity of each group is 800 m^3/day.

b) Embankment 2

Embankment Works 2 basically cover the same works as Embankment 1, except that the excavation, loading and hauling to the embankment site is from the barrow area instead of the river channel.

The works is to be carried out by the following equipment:

Bulldozer, 11 tons	:	6 units/group
Pay Loader, 1.3 m^3	:	4 units/group
Dump Truck, 6 m^3	:	15 units/group
Tire Roller, 8 tons	:	2 units/group
Water Tanker, 3,800 ltr.	:	2 units/group

The work capacity of each group is 640 m^3/day.

2.4 Construction Schedule

2.4.1 Work Volume

The kind and number of construction equipment are determined by the annual work volume of major work items. The annual and daily work volumes of major work items of the construction stages are given below in consideration of work quantities and the working condition in the study area.

a) Upper Agno River Project

First Stage -

Excavation	:	2,103,000 m^3/year	= 11,000 m^3/day
Embankment 1	:	820,000 m^3/year	= 4,316 m^3/day
Embankment 2	:	248,000 m^3/year	= 1,302 m^3/day

Second Stage -

Excavation	:	1,420,000 m^3/year	= 7,474 m^3/day

b) Pantal-Sinocalan River Project

First Stage -

Excavation	:	236,000 m^3/year	= 1,058 m^3/day
Embankment 1	:	532,000 m^3/year	= 2,386 m^3/day

Second Stage -

Excavation	:	547,000 m^3/year	= 2,453 m^3/day
Embankment 1	:	719,000 m^3/year	= 3,224 m^3/day

2.4.2 Number of Work Groups

The following numbers of work groups will be necessary to carry out the major works within the construction period.

a) Upper Agno River Project

First Stage -

Excavation	:	14 groups, 3.0 years
Embankment 1	:	5 groups, 5.0 years
Embankment 2	:	2 groups, 2.0 years

Second Stage -

Excavation	:	9 groups, 4.0 years

b) Pantal-Sinocalan River Project

First Stage -

Excavation	:	1 group, 4.0 years
Embankment 1	:	3 groups, 5.0 years

Second Stage -

Excavation	:	3 groups, 4.0 years
Embankment 1	:	4 groups, 5.0 years

3. COST ESTIMATES

3.1 Component of Project Cost

3.1.1 General

Basic Conditions

Project cost was estimated on the following assumptions:

a) Procurement of construction works are to be executed by bidding.

b) Unit cost of each construction work item is estimated on the unit price basis, except for some items which are estimated on lump sum or percentage basis.

c) Unit prices are based on the price level as of May, 1991.

d) Foreign currency conversion rates are US$1.00 = ₱27.80 = ¥139.00.

e) Cost estimation is made for the following seven (7) stretches which are shown in Fig. 3.1:

- Upper Agno River Project

  (1) Upper Agno River Stretch

    (1)-1 Bayambang-Alcala Stretch
    (1)-2 Alcala-Asingan Stretch
    (1)-3 Asingan-San Manuel Stretch

  (2) Poponto Swamp Retarding Basin

- Pantal-Sinocalan River Project

  (1) Pantal-Sinocalan River Stretch
  (2) Dagupan River Stretch
  (3) Ingalera River Stretch

Constitution of Project Cost

Project cost is composed of main construction cost, compensation cost, administration and engineering services costs, and contingencies. The basic constitution of project cost are as shown in Fig. 3.2.

Project cost is classified into two (2) categories: financial cost and economic cost. Financial cost is the budgetary cost required to implement the project and the economic cost is used for the economic evaluation of the project. The financial project cost consists of the main construction cost, compensation cost, administration and engineering services costs, and contingencies.

3.1.2 Main Construction Cost

The main construction cost consists of the costs of preparatory works, main works and miscellaneous works.

Preparatory Works

The cost of preparatory works for flood control and river improvement is usually within 5 to 10% of the cost of the main construction works depending on the project study status. Therefore, in this estimation, 10% which is the higher side of the range was applied.

Main Works

The cost of main works was computed by multiplying the unit cost with the work quantity. The unit cost of each item consists of direct cost and indirect cost. The direct cost consists of materials cost, equipment expenses and labor cost which were estimated on unit price based on the "Agno Flood Control System Regular Infrastructure Program" by the DPWH-PMO and on similar projects in the study area.

Indirect cost consists of (1) overhead, contingencies and miscellaneous expenses (OCM); (2) profit; (3) mobilization and demobilization expenses of contractor; and, (4) Value Added Tax (VAT). Each component of the indirect cost was computed in percent according to the guideline of DPWH, as follows:

(1) Overhead, Contingencies and Miscellaneous (OCM) : 9% of estimated direct cost

(2) Profit : 7% of estimated direct cost

(3) Mobilization and Demobilization : 5% of estimated direct cost

(4) Value Added Tax (VAT) : 10% of equipment expenses and labor cost in direct cost

Miscellaneous Works

The cost of miscellaneous works is, in general, to be accounted as a certain percentage of the sum of preparatory and main works depending upon the accuracy of the investigation and design. When the project is in the detailed engineering stage supported by survey and investigation, miscellaneous works are not required to be considered. Since this Study is in the master plan stage, 15% was applied to the miscellaneous works.

3.1.3 Compensation Cost

Compensation cost is composed of land acquisition cost and house resettlement cost. The number of houses and buildings to be resettled is estimated at 7,400 and the acreage of land to be acquired for right-of-way is almost 1,800 hectares.

Criteria for Right-of-Way

Land subject to right of way is delineated according to the following criteria:

a) The river area which is confined by existing dikes is not subject to compensation.

b) The river area which is planned to be confined by new dikes is subject to compensation. Therefore, the following river areas which are to be confined by the new setback levees are subject to compensation:

- Upper Agno River, Asingan-San Manuel Stretch

Right Bank	:	AG453 to AG470
		AG407 to AG417
Left Bank	:	AG408 to AG412

Right bank of the Poponto Floodway

c) All the river areas of the Pantal-Sinocalan River are subject to compensation.

d) In the Poponto retarding basin area, the land occupied by ring levees and mounds for resettlement is subject to compensation. The other retarding basin areas are donated as natural conditions and are not subject to compensation.

Unit Compensation Cost

The appraised value and transaction prices of land, buildings and residential houses were investigated and the following data were collected:

a) Schedule of Base Unit Market Values prepared annually by municipal assessors (called "Appraised Value" by the government).

b) Transaction Price of land and houses in the areas subject to compensation as gathered by interviews with residents, municipal assessors and realtors.

c) House depreciation is assumed at 50%.

The average values of these data were adopted as the unit compensation costs and are tabulated in Tables 3.1 and 3.2. The Transaction Price which is a private selling and buying price is about 2 to 15 times the government's appraised value. Price difference is higher in the urban areas.

The transaction values are adopted as the financial unit compensation costs, while the appraised values are adopted as the economic unit compensation costs in this study.

Both of the financial and economic compensation costs of each project were estimated as shown in Table 3.3 to Table 3.6.

3.1.4 Administration and Engineering Services

Administration cost for the government is computed at 5% of the sum of the main construction cost and compensation cost according to the standard criteria of DPWH.

The engineering of the flood control works is principally divided into master planning of the basinwide flood control scheme, feasibility study, detailed design and construction supervision. The objective and scope of works of the engineering services differ in each stage of study of each project.

The cost of engineering services herein estimated is to cover the detailed design and construction supervision. Therefore, 16% of the main construction work is adopted as the rate of engineering cost.

3.1.5 Project Contingency

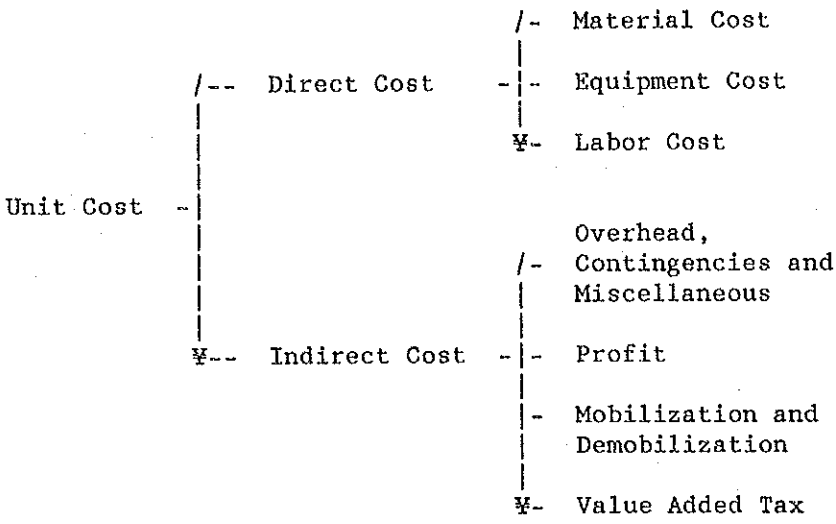
Project contingency consists of physical contingency and price escalation contingency. Physical contingency is usually estimated at 10 to 20% depending on the project study stage; hence, 15% is applied in this study.

The price escalation rates are adopted at 6% for the local currency component and 3% for the foreign currency component which are currently being used in projects financed by OECF loans.

3.2 Unit Cost

3.2.1 General

The unit cost for each work item is composed of direct cost and indirect cost as described in Section 3.1.2. Unit cost is schematically presented as follows:



Component of Unit Cost

a) Financial Unit Cost and Economic Unit Cost

Financial unit costs are estimated as real expenses of the project owner. On the other hand, project costs in economic evaluation are reckoned in terms of usage of real sources. Therefore, government taxes, contractor's profit and price escalation contingency are not considered in economic cost. In addition, market prices are converted to shadow/economic prices in the economic evaluation. Shadow prices are commonly used for unskilled labor and foreign exchange resources as these resources are characterized by price distortions. Based on NEDA guidelines, the shadow price of 60% is set for unskilled labor and 120% for foreign exchange component.

b) Foreign Currency Portion and Local Currency Portion

Foreign financing agencies are expected to extend assistance to the project. Therefore, the cost estimate consists of the Foreign Currency Portion (F/C) and the Local Currency Portion (L/C). In estimating the project cost, the following basic conditions are assumed:

Foreign Currency Portion

- All costs of construction equipment;
- Part of construction materials costs;
- Part of indirect cost such as OCM, profit and mobilization/demobilization; and
- Part of engineering services cost.

Local Currency Portion

- All labor costs;
- Part of construction materials costs;
- Part of indirect cost such as OCM, profit and mobilization/demobilization;
- Value Added Tax;
- All compensation costs for land acquisition and house evacuation;
- All costs of administration for the government staff; and
- Part of engineering services cost.

The components of unit cost are tabulated as follows:

Particulars	Portion of Unit Cost	
	F/C (%)	L/C (%)
(1) Labor Cost	0	100
(2) Equipment Cost	100	0
(3) Material Cost		
(a) Fuel	50	50
(b) Cement	65	35
(c) Reinforcing Bar	65	35
(d) Structural Steel	100	0
(e) Others	0	100
(4) Overhead (excl. VAT)	(2+3) x 21	(1+3) x 21
(5) Value Added Tax (VAT)	0	(1+3) x 10
(6) Compensation	0	100
(7) Administration	0	100
(8) Engineering Services	90	10

3.2.2 Basic Cost

Materials Cost

Data on the updated material costs were obtained from the AFCA office, the DPWH Region I office and the DPWH main office. Material price escalation in the period between 1989 and 1991 is about 50% as shown in Table 3.7.

Equipment Rental Rate

Cost of construction equipment is determined based on equipment rental rate. The equipment rental rates of "ACEL Equipment Guidebook" (Edition 19, Nov. 1989) which are adopted in the DPWH, were used as the basis for the equipment rental rate in this study. The price escalation of equipment rental rate is about 30% as shown in Table 3.8.

Labor Rate

The DPWH Pay Scale as of October 1990 is used as labor rate in 1991. Table 3.9 shows that the labor rate in 1991 is almost 1.80 times that in 1989.

3.2.3 Unit Cost for Construction Works

Unit costs for construction works are estimated by using the basic costs and actual unit costs adopted in the projects under construction in Pangasinan by AFCS/DPWH. The financial unit costs and the economic unit costs adopted are shown in Table 3.10 and Table 3.11, respectively.

3.2.4 Unit Price for River Structures

Based on the unit cost for construction works, the unit prices for river structures were estimated as shown in Table 3.12.

3.3 Project Cost

3.3.1 Agno River Project

The financial project cost and the economic project cost for the Upper Agno River are tentatively estimated at 3,913.2 million pesos and 3,475.9 million pesos, respectively, as shown in Table 3.13 and Table 3.14.

Unit: Million Pesos

Item	First Stage	Second Stage	Total
Financial Cost	2,923.4	989.8	3,913.2
Economic Cost	2,552.6	923.3	3,475.9

3.3.2 Pantal-Sinocalan River Project

The financial project cost and the economic project cost for the Pantal-Sinocalan River are tentatively estimated at 3,895.7 million pesos and 3,306.9 million pesos, respectively, as shown in Table 3.15 and Table 3.16.

Unit: Million Pesos

Item	First Stage	Second Stage	Total
Financial Cost	1,977.3	1,918.4	3,895.7
Economic Cost	1,628.3	1,678.6	3,306.9

Table 3.17 to Table 3.20 show the breakdown according to construction stretch for reference.

TABLES

Table 2.1 NUMBER OF RAINY DAYS AT DAGUPAN (1975-1985)

	Jan.	Feb.	Mar.	Apr.	May	June	July *1)	Aug.	Sept.	Oct.	Nov. *2)	Dec.	Total	Suspended Days Earth	Suspended Days Others
0 mm	29.7	27.4	29.2	24.7	18.0	12.4	8.5	6.1	10.5	19.0	26.5	29.5	241.5	0	0
0 mm- 5 mm	0.8	0.5	0.9	2.7	5.9	6.9	9.4	8.6	7.8	5.7	1.7	1.3	52.4	0	0
5 mm- 10 mm	0.4	0.0	0.3	0.7	1.8	2.8	3.6	3.5	2.9	1.5	0.5	0.3	18.3	18	9
10 mm- 20 mm	0.0	0.0	0.5	0.7	2.3	2.6	3.5	3.8	4.0	1.9	0.4	0.0	19.8	20	10
20 mm- 30 mm	0.0	0.1	0.1	0.5	1.2	1.9	1.6	2.2	2.1	1.2	0.4	0.0	11.2	11	6
30 mm- 50 mm	0.0	0.0	0.0	0.5	0.7	1.4	2.7	3.2	1.1	1.2	0.2	0.0	11.0	22	11
50 mm-100 mm	0.1	0.0	0.0	0.1	0.9	1.5	1.4	3.1	1.5	0.5	0.0	0.0	9.1	27	14
100 mm-	0.0	0.0	0.0	0.0	0.2	0.5	0.3	0.5	0.1	0.0	0.3	0.0	1.8	7	4
	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0	365.0	106	53

*1) July 1987; No Data
*2) Nov. 1978; No Data

Table 2.2 NUMBER OF RAINY DAYS AT ALCALA (1975-1985)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Suspended Days Earth	Suspended Days Others
0 mm	30.5	27.8	29.8	26.1	20.6	17.5	14.9	11.4	15.1	22.1	27.1	29.6	272.5	0	0
0 mm- 5 mm	0.5	0.2	0.5	2.0	3.6	3.9	5.9	6.9	6.3	4.2	1.3	1.1	36.4	0	0
5 mm- 10 mm	0.0	0.0	0.1	0.7	2.3	2.7	3.5	3.6	3.2	1.8	0.5	0.3	18.8	19	9
10 mm- 20 mm	0.1	0.0	0.4	0.6	1.9	2.9	3.1	4.4	3.1	1.3	0.5	0.0	18.3	18	9
20 mm- 30 mm	0.0	0.0	0.2	0.4	1.0	1.3	1.4	1.8	0.8	0.9	0.2	0.0	7.9	8	4
30 mm- 50 mm	0.0	0.0	0.0	0.2	0.8	0.8	1.5	1.6	0.9	0.5	0.3	0.0	6.6	13	7
50 mm-100 mm	0.0	0.0	0.0	0.0	0.5	0.6	0.6	1.2	0.6	0.2	0.0	0.0	3.7	11	6
100 mm-	0.0	0.0	0.0	0.0	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.0	0.8	3	2
	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0	365.0	73	36

Table 3.1 UNIT COMPENSATION COST FOR LAND ACQUISITION

Land	Class	Financial Cost (Pesos/m2)	Economic Cost (Pesos/m2)
Residential	Class 1	400.00	60.00
	Class 2	250.00	40.00
	Class 3	80.00	20.00
Farmland	Class 1	14.00	1.80
	Class 2	10.00	1.50
	Class 3	5.00	1.20
Fishpond	Class 1	38.00	3.00
	Class 2	35.00	1.50
	Class 3	30.00	1.00
Others	Agno	1.00	0.50
	Pantal-Sinocalan	8.00	1.00

Table 3.2 UNIT COMPENSATION COST FOR HOUSE RESETTLEMENT

Building/House		Floor Area (m2)	Financial Unit Cost (Pesos/m2)	Financial Unit Cost (Pesos/Unit)	Economic Unit Cost (Pesos/m2)	Economic Unit Cost (Pesos/Unit)
Building	3 storise	750.00	3,000.00	2,250,000.00	1,500.00	1,125,000.00
House	Class I	100.00	1,750.00	175,000.00	1,400.00	140,000.00
	Class II	90.00	1,400.00	126,000.00	900.00	81,000.00
	Class III	70.00	750.00	52,500.00	600.00	42,000.00
	Class IV	40.00	400.00	16,000.00	250.00	10,000.00

Note ; 50 % of house depreciaton is considered in the unit costs.

Table 3.3 TRANSACTION PRICE AND FINANCIAL COMPENSATION COST FOR AGNO RIVER

Description	Class	U.COST (Peso/m2)	Bayambang-Bypass Area (m2)	Bayambang-Bypass Cost (mil.Pesos)	Alcala-Asingan Area (m2)	Alcala-Asingan Cost (mil.Pesos)	Asingan-San Manuel Area (m2)	Asingan-San Manuel Cost (mil.Pesos)	Poponto Swamp Area (m2)	Poponto Swamp Cost (mil.Pesos)	Total Area (m2)	Total Cost (mil.Pesos)
1. Land Acquisition												
Residential	1	400.00	0	0	0	0	0	0	0	0	0	0
	2	250.00	0	0	0	0	0	0	0	0	0	0
	3	80.00	508,305	41	322,680	26	40,000	3	24,200	2	895,185	72
Farmland	1	14.00	0	0	0	0	0	0	0	0	0	0
	2	10.00	3,160,890	32	358,700	4	0	0	1,634,100	16	5,153,690	52
	3	5.00	0	0	98,970	0	2,253,500	11	0	0	2,352,470	12
Fishpond	1	38.00	0	0	0	0	0	0	0	0	0	0
	2	35.00	0	0	0	0	0	0	0	0	0	0
	3	30.00	9,000	0	0	0	0	0	0	0	9,000	0
Others		1.00	455,100	0	2,990	0	3,200,000	3	0	0	3,658,090	4
Sub-Total			4,133,295	73	783,340	30	5,493,500	18	1,658,300	18	12,068,435	139
2. House Evacuation												
Building		2,250,000	9	20	6	14	2	5	0	0	17	38
House(100m2*P3500)I		175,000	15	3	10	2	4	1	137	24	166	29
(90m2*P2800)II		103,500	60	6	36	4	14	1	806	83	916	95
(70m2*P1500)III		52,500	169	9	70	4	21	1	1,134	60	1,394	73
(40m2*P 800)IV		16,000	293	5	163	3	48	1	1,883	30	2,387	38
Sub-Total			546	43	285	25	89	9	3,960	197	4,880	273
Total				116		55		26		215		412

Table 3.4 TRANSACTION PRICE AND FINANCIAL COMPENSATION COST FOR PANTAL-SINOCALAN RIVER

Description	Class	U.COST (Peso/m2)	Pantal-Sinocalan Area (m2)	Pantal-Sinocalan Cost (mil.Pesos)	Dagupan River Area (m2)	Dagupan River Cost (mil.Pesos)	Ingalera River Area (m2)	Ingalera River Cost (mil.Pesos)	Total Area (m2)	Total Cost (mil.Pesos)
1. Land Acquisition										
Residential	1	400.00	121,500	49	0	0	0	0	121,500	49
	2	250.00	599,900	150	0	0	0	0	599,900	150
	3	80.00	0	0	218,100	17	378,000	30	596,100	48
Farmland	1	14.00	981,900	14	431,800	6	428,000	6	1,841,700	26
	2	10.00	383,360	4	0	0	0	0	383,360	4
	3	5.00	0	0	0	0	0	0	0	0
Fishpond	1	38.00	79,000	3	0	0	0	0	79,000	3
	2	35.00	236,500	8	0	0	0	0	236,500	8
	3	30.00	0	0	792,500	24	0	0	792,500	24
Others		8.00	938,000	8	14,000	0	0	0	952,000	8
Sub-Total			3,340,160	235	1,456,400	47	121,500	36	5,602,560	319
2. House Evacuation										
Building		2,250,000	37	83	0	0	13	29	50	113
House(100m2*P3500)I		175,000	98	17	10	2	18	3	126	22
(90m2*P2800)II		103,500	230	24	39	4	44	5	313	32
(70m2*P1500)III		52,500	413	22	130	7	69	4	612	32
(40m2*P 800)IV		16,000	964	15	302	5	159	3	1,425	23
Sub-Total			1,742	161	481	17	303	43	2,526	222
Total				396		65		80		541

Table 3.5 APPRAISED COMMERCIAL VALUE AND ECONOMIC COMPENSATION COST FOR AGNO RIVER

Description	Class	U.COST (Peso/m2)	Bayambang-Bypass		Alcala-Asingan		Asingan-San Manuel		Poponto Swamp		Total	
			Area (m2)	Cost (mil.Pesos)	Area (m2)	Cost (mil.Pesos)	Area (m2)	Cost (mil.Pesos)	Area (m2)	Cost (mil.Pesos)	Area (m2)	Cost (mil.Pesos)
1. Land Acquisition												
Residential	1	60.00	0	0	0	0	0	0	0	0	0	0
	2	40.00	508,305	20	322,680	13	40,000	2	0	0	870,985	35
	3	20.00	0	0	0	0	0	0	24,200	0	24,200	0
Farmland	1	1.80	0	0	0	0	0	0	0	0	0	0
	2	1.50	0	0	0	0	0	0	1,634,100	2	1,634,100	2
	3	1.20	3,160,890	4	457,670	1	2,253,500	3	0	0	5,872,060	7
Fishpond	1	3.00	0	0	0	0	0	0	0	0	0	0
	2	1.50	0	0	0	0	0	0	0	0	0	0
	3	1.00	9,000	0	0	0	0	0	0	0	9,000	0
Others		0.50	455,100	0	2,990	0	3,200,000	2	0	0	3,658,090	2
Sub-Total			4,133,295	24	783,340	13	5,493,500	6	1,658,300	3	12,068,435	47
2. House Evacuation												
Building		1,125,000	9	10	6	7	2	2	0	0	17	19
House(100m2*P3500)I		140,000	15	2	10	1	4	1	137	19	166	23
(90m2*P2800)II		81,000	60	5	36	3	14	1	806	65	916	74
(70m2*P1500)III		42,000	169	7	70	3	21	1	1,134	48	1,394	59
(40m2*P 800)IV		10,000	293	3	163	2	48	0	1,883	19	2,387	24
Sub-Total			546	27	285	16	89	5	3,960	151	4,880	199
Total				51		29		11		154		246

Table 3.6 APPRAISED COMMERCIAL VALUE AND ECONOMIC COMPENSATION COST FOR PANTAL-SINOCALAN RIVER

Description	Class	U.COST (Peso/m2)	Pantal-Sinocalan Area (m2)	Pantal-Sinocalan Cost (mil.Pesos)	Dagupan River Area (m2)	Dagupan River Cost (mil.Pesos)	Ingalera River Area (m2)	Ingalera River Cost (mil.Pesos)	Total Area (m2)	Total Cost (mil.Pesos)
1. Land Acquisition										
Residential	1	60.00	53,000	3	0	0	0	0	53,000	3
	2	40.00	668,400	27	0	0	378,000	15	1,046,400	42
	3	20.00	0	0	218,100	4	0	0	218,100	4
Farmland	1	1.80	1,028,100	2	0	0	428,000	1	1,456,100	3
	2	1.50	0	0	0	0	0	0	0	0
	3	1.20	337,160	0	431,800	1	0	0	768,960	1
Fishpond	1	3.00	315,500	1	0	0	0	0	315,500	1
	2	1.50	0	0	590,900	1	0	0	590,900	1
	3	1.00	0	0	201,600	0	0	0	201,600	0
Others		1.50	978,500	1	14,000	0	0	0	992,500	1
Sub-Total			3,380,660	35	1,456,400	6	806,000	16	5,643,060	56
2. House Evacuation					35		115		499	
Building		1,125,000	36	41	0	0	13	15	49	55
House(100m2*P3500)I		140,000	99	14	10	1	18	3	127	18
(90m2*P2800)II		81,000	235	19	39	3	44	4	318	26
(70m2*P1500)III		42,000	420	18	130	5	69	3	619	26
(40m2*P 800)IV		10,000	989	10	302	3	159	2	1,450	15
Sub-Total			1,779	101 0	481	13	303	25	2,563	139
Total				136		19		41		196

Table 3.7 UNIT COST OF CONSTRUCTION MATERIALS IN 1989 AND 1991

Unit: Pesos

Kind of Material	Unit	1989	May 1991	Increase (%)	Remarks
Cement(Portland), 40kg/bag	Pesos/bag	72.00	110.00	52.78	
Sand	Pesos/m3	74.00	127.07	71.72	Within 30 km
Gravel	Pesos/m3	103.00	164.38	59.59	Within 20 km
Boulder(20~40cm)	Pesos/m3	95.00	177.30	86.63	Within 20 km
Lumber	Pesos/bd.ft.	10.80	18.00	66.67	
Log	Pesos/bd.ft.	18.00	30.00	66.67	
Plywood (1/2"t)	Pesos/pc	350.00	400.00	14.29	
Wire	Pesos/kg	20.00	28.00	40.00	
Nail	Pesos/kg	20.00	28.00	40.00	
Re-Bar	Pesos/kg	18.70	20.00	6.95	Ave.cost
Steel Sheet Pile	Pesos/kg	19.50	20.00	2.56	Ave.cost
PC Pile 0.4*0.4*12m	Pesos/m		1,094.00	----	
Gasoline	Pesos/ltr	5.90	15.65	165.25	
Diesel Oil	Pesos/ltr	4.86	8.00	64.61	
Mobil Oil	Pesos/ltr	32.00	48.00	50.00	
Tie Rod d=36mm	Pesos/m		1,000.00	----	
Asphalt Wearing Course	Pesos/m2		2,065.00	----	

Table 3.8 LABOR RATES PER DAY IN 1989 AND 1991

Unit: Pesos/day

Category	1989	1991	Increase (%)
Foreman	78.65	153.00	94.53
Dredging Master	78.65	153.00	94.53
Asst. Foreman	67.04	131.00	95.41
Skilled Laborer	67.04	131.00	95.41
Heavy Equipment Operator	67.04	125.00	86.46
Dredging Crew	67.04	125.00	86.46
Dredging Mechanic	67.04	125.00	86.46
Carpenter	66.97	120.00	79.18
Mason	66.97	120.00	79.18
Plumber	66.97	120.00	79.18
Welder	66.97	120.00	79.18
Concrete Worker	66.97	120.00	79.18
Steel Worker	66.97	120.00	79.18
Electrician	66.97	120.00	79.18
Mechanic	66.97	120.00	79.18
Rigger	66.97	120.00	79.18
H.E. Asst. Operator	66.97	120.00	79.18
Driver	66.97	120.00	79.18
Warehouseman/Watchman	66.97	120.00	79.18
Timekeeper	66.97	120.00	79.18
Common Laborer	64.57	111.00	71.91

Source ; DPWH Pay Scale (as of Oct. 1991)

Table 3.9 BASIC EQUIPMENT RENTAL RATES IN 1989 AND 1991

Unit: Pesos/day

Equipment	Capacity	1989	May 1991	Increase (%)
Bulldozer	11t	2,560.00	3,542.00	38.36
Payloader		1,520.00	1,930.00	26.97
Grader		2,100.00	2,530.00	20.48
Road Roller		1,520.00	1,930.00	26.97
Dump Truck	6 m3/11t	775.00	970.00	25.16
Water Truck		660.00	1,237.00	87.42
Loader Front end		1,520.00	1,930.00	26.97
Concrete Mixer		115.00	180.00	56.52
Concrete Bagger Mixer		336.00	379.50	12.95
Concrete Vibrator		60.00	100.00	66.67
Bar Cutter		55.00	80.00	45.45
Concrete Truck Mounted		2,705.00	3,150.00	16.45
Drop Hammer		280.00	310.00	10.71
Delmag Hammer		1,500.00	1,900.00	26.67
Truck Crane		2,700.00	3,150.00	16.67
Dredger		1,500.00	1,900.00	26.67
Breaker		50.00	75.00	50.00
Air Compressor		360.00	400.00	11.11
Water Pump		60.00	85.00	41.67

Table 3.10 SUMMARY OF UNIT COST (FINANCIAL COST)

(Unit: Pesos)

No.	Work Item	Refer. No.	Unit	Direct Cost					Indirect Cost					Unit Cost	L.C. Portion	F.C. Portion	Remarks
				Material	Equipment	Labor	Total	L.C. Portion	Cont'cy & Misc.	Profit	Mob. & Demob.	VAT	Total				
1	Excavation 1	EX-1	m3	9.21	37.55	4.96	51.72	9.57	4.65	3.62	2.59	4.25	15.11	67	16	51	Common soil
2	Excavation 2	EX-2	m3	12.50	44.47	6.06	63.03	12.30	5.67	4.41	3.15	5.05	18.28	81	20	61	Gravel
3	Dredging	DW	m3	15.36	7.49	5.26	28.11	12.94	2.53	1.97	1.41	1.28	7.19	35	17	18	Fine Sand
4	Embankment 1	EM-1	m3	15.48	57.14	8.47	81.09	17.01	7.30	5.68	4.05	6.56	23.59	105	27	78	Excavated Mat.
5	Embankment 2	EM-2	m3	22.15	91.73	12.63	126.51	24.51	11.39	8.86	6.33	10.44	37.02	164	40	124	Blended Mat.
6	Stone Masonry	SM	m3	799.19	102.22	245.27	1,146.68	627.89	103.20	80.27	57.33	34.75	275.55	1,422	794	628	
7	Back Filling Gravel	BG	m3	25.53	57.60	142.48	225.61	155.75	20.30	15.79	11.28	20.01	67.38	293	208	85	
8	Stone Filling	SF	m3	40.30	72.00	113.91	226.21	135.81	20.36	15.83	11.31	18.59	66.09	292	183	109	
8	Sodding	SO	m2	1.00	0.00	10.65	11.65	11.65	1.05	0.82	0.58	1.07	3.52	15	15	0	
9	Concrete(210kg/cm3)	CN-A	m3	2,069.76	48.60	350.74	2,469.10	1,483.30	222.22	172.84	123.46	39.93	558.45	3,028	1,835	1,193	Type A
10	Concrete(140kg/cm3)	CN-C	m3	1,769.95	48.96	350.74	2,169.65	1,349.43	195.27	151.88	108.48	39.97	495.60	2,665	1,673	992	Type B
11	R.C Concrete(Atype)	FC	m3	2,427.43	46.74	263.57	2,737.74	1,177.35	246.40	191.64	136.89	31.03	605.96	3,344	1,456	1,888	
12	Gabion Cylinder 1	GC-1	m	109.79	0.00	52.80	162.59	107.44	14.63	11.38	8.13	5.28	39.42	202	135	67	d=45
13	Gabion Cylinder 2	GC-2	m	159.28	0.00	78.52	237.80	157.69	21.40	16.65	11.89	7.85	57.79	296	199	97	d=60
14	Gabion Mattress	GM	m2	278.87	0.00	62.14	341.01	200.73	30.69	23.87	17.05	6.21	77.82	419	249	170	3.0m*1.5m*0.5m
15	RC Pile	RP	m	699.59	237.79	197.18	1,134.56	430.99	102.11	79.42	56.73	43.50	281.76	1,416	565	851	0.4m*0.4m
16	RC Pile	RP-2	m	67.03	92.40	75.09	234.52	101.57	21.11	16.42	11.73	16.75	66.01	301	140	161	0.15m*0.15m
17	PC Pile 1	PP-1	m	1,158.40	142.16	43.13	1,343.69	359.77	120.93	94.06	67.18	18.53	300.70	1,644	454	1,190	0.4m*0.4m
18	PC Pile 2	PP-2	m	1,565.31	157.95	47.92	1,771.18	472.07	159.41	123.98	88.56	20.59	392.54	2,164	592	1,572	0.5m*0.5m
19	Wooden Pile 1	WP-1	m	54.58	5.72	39.08	99.38	82.74	8.94	6.96	4.97	4.48	25.35	125	105	20	d=15cm,L=5mBase
20	Wooden Pile 2	WP-2	m	96.60	8.01	54.71	159.32	131.99	14.34	11.15	7.97	6.27	39.73	199	166	33	d=20cm,L=5mBase
21	RC Sheet Pile	RSP	m2	1,230.59	539.41	551.71	2,321.71	1,041.70	208.95	162.52	116.09	109.11	596.67	2,918	1,370	1,548	L=4.5m Base
22	Steel Sheet Pile	SSP	m2	3,028.75	62.61	21.07	3,112.43	35.44	280.12	217.87	155.62	8.37	661.98	3,774	51	3,723	Type III,L=7m
22	Tie Rod	TR	m	277.57	112.00	362.70	752.27	371.53	67.70	52.66	37.61	47.47	205.44	958	497	461	d=35mm
23	C.Pipe Culvert	PCP	m	700.00			700.00	245.00	63.00	49.00	35.00	0.00	147.00	847	296	551	d=36"(80cm)
23	Flap Gate	FG	m2	60,000.00	4,200.00	1,800.00	66,000.00	7,800.00	5,940.00	4,620.00	3,300.00	600.00	14,460.00	80,460	10,038	70,422	
24	Slide Gate	SG	m2	170,000.00	11,900.00	5,100.00	187,000.00	22,100.00	16,830.00	13,090.00	9,350.00	1,700.00	40,970.00	227,970	28,441	199,529	
25	Steel Roller Gate	RG	m2	450,000.00	45,000.00	22,500.00	517,500.00	67,500.00	46,575.00	36,225.00	25,875.00	6,750.00	115,425.00	632,925	88,425	544,500	Water Head=10 m
26	Bridge	BC	m2	6,870.00	2,450.00	2,540.00	11,860.00	4,744.00	1,067.40	830.20	593.00	499.00	2,989.60	14,850	6,239	8,611	
27	Demolish't Concrete	DC	m3	138.00	380.16	726.72	1,244.88	418.25	112.04	87.14	62.24	110.69	372.11	1,617	617	1,000	
28	Demolish't Metal	DM	tons	56.09	1,600.29	96.40	1,752.78	525.83	157.75	122.69	87.64	169.67	537.75	2,291	806	1,485	

Table 3.11 SUMMARY OF UNIT COST (ECONOMIC COST)

(Unit: Pesos)

No.	Work Item	Refer. No.	Unit	Direct Cost					Indirect Cost					Unit Cost	L.C. Portion	F.C. Portion	Remarks
				Material	Equipment	Labor	Total	L.C. Portion	Cont'cy & Misc.	Profit	Mob. & Demob.	VAT	Total				
1	Excavation 1	EX-1	m3	8.29	37.55	3.97	49.81	9.22	4.48	0.00	2.49	0.00	6.97	57	11	46	Common soil
2	Excavation 2	EX-2	m3	11.25	44.47	4.85	60.57	11.82	5.45	0.00	3.03	0.00	8.48	69	14	55	Gravel
3	Dredging	DW	m3	13.82	7.49	4.21	25.52	11.75	2.30	0.00	1.28	0.00	3.58	29	14	15	Fine Sand
4	Embankment 1	EM-1	m3	13.93	57.14	6.78	77.85	16.33	7.01	0.00	3.89	0.00	10.90	89	20	69	Excavated Mat.
5	Embankment 2	EM-2	m3	19.94	91.73	10.10	121.77	23.59	10.96	0.00	6.09	0.00	17.05	139	29	110	Blended Mat.
6	Stone Masonry	SM	m3	719.27	102.22	196.22	1,017.71	557.27	91.59	0.00	50.89	0.00	142.48	1,160	674	486	
7	Back Filling Gravel	BG	m3	22.98	57.60	113.98	194.56	134.32	17.51	0.00	9.73	0.00	27.24	222	163	59	
8	Stone Filling	SF	m3	36.27	72.00	91.13	199.40	119.71	17.95	0.00	9.97	0.00	27.92	227	145	82	
8	Sodding	SO	m2	0.90	0.00	8.52	9.42	9.42	0.85	0.00	0.47	0.00	1.32	11	11	0	
9	Concrete(210kg/cm3)	CN-A	m3	1,862.78	48.60	280.59	2,191.98	1,316.82	197.28	0.00	109.60	0.00	306.88	2,499	1,593	906	Type A
10	Concrete(140kg/cm3)	CN-C	m3	1,592.96	48.96	280.59	1,922.51	1,195.72	173.03	0.00	96.13	0.00	269.16	2,192	1,447	745	Type B
11	R.C Concrete(Atype)	FC	m3	2,184.69	46.74	210.86	2,442.28	1,050.29	219.81	0.00	122.11	0.00	341.92	2,784	1,271	1,513	
12	Gabion Cylinder 1	GC-1	m	98.81	0.00	42.24	141.05	93.21	12.69	0.00	7.05	0.00	19.74	161	113	48	d=45
13	Gabion Cylinder 2	GC-2	m	143.35	0.00	62.82	206.17	136.71	18.56	0.00	10.31	0.00	28.87	235	165	70	d=60
14	Gabion Mattress	GM	m2	250.98	0.00	49.71	300.70	177.00	27.06	0.00	15.03	0.00	42.09	343	214	129	3.0m*1.5m*0.5m
15	RC Pile	RP	m	629.63	237.79	157.74	1,025.17	389.43	92.26	0.00	51.26	0.00	143.52	1,169	471	698	0.4m*0.4m
16	RC Pile	RP-2	m	60.33	92.40	60.07	212.80	92.16	19.15	0.00	10.64	0.00	29.79	243	112	131	0.15m*0.15m
17	PC Pile 1	PP-1	m	1,042.56	142.16	34.50	1,219.22	326.44	109.73	0.00	60.96	0.00	170.69	1,390	395	995	0.4m*0.4m
18	PC Pile 2	PP-2	m	1,408.78	157.95	38.34	1,605.07	427.80	144.46	0.00	80.25	0.00	224.71	1,830	518	1,312	0.5m*0.5m
19	Wooden Pile 1	WP-1	m	49.12	5.72	31.26	86.11	71.69	7.75	0.00	4.31	0.00	12.06	98	87	11	d=15cm,L=5mBase
20	Wooden Pile 2	WP-2	m	86.94	8.01	43.77	138.72	114.92	12.48	0.00	6.94	0.00	19.42	158	138	20	d=20cm,L=5mBase
21	RC Sheet Pile	RSP	m2	1,107.53	539.41	441.37	2,088.31	936.98	187.95	0.00	104.42	0.00	292.37	2,381	1,134	1,247	L=4.5m Base
22	Steel Sheet Pile	SSP	m2	2,725.88	62.61	16.86	2,805.34	31.94	252.48	0.00	140.27	0.00	392.75	3,198	39	3,159	Type III,L=7m
22	Tie Rod	TR	m	249.81	112.00	290.16	651.97	322.00	58.68	0.00	32.60	0.00	91.28	743	390	353	d=35mm
23	C.Pipe Culvert	PCP	m	630.00	0.00	0.00	630.00	220.50	56.70	0.00	31.50	0.00	88.20	718	267	451	d=36"(80cm)
23	Flap Gate	FG	m2	54,000.00	4,200.00	1,440.00	59,640.00	7,048.36	5,367.60	0.00	2,982.00	0.00	8,349.60	67,990	8,529	59,461	
24	Slide Gate	SG	m2	153,000.00	11,900.00	4,080.00	168,980.00	19,970.36	15,208.20	0.00	8,449.00	0.00	23,657.20	192,637	24,164	168,473	
25	Steel Roller Gate	RG	m2	405,000.00	45,000.00	18,000.00	468,000.00	61,043.48	42,120.00	0.00	23,400.00	0.00	65,520.00	533,520	73,863	459,657	Water Head=10 m
26	Bridge	BC	m2	6,183.00	2,450.00	2,032.00	10,665.00	4,266.00	959.85	0.00	533.25	0.00	1,493.10	12,158	5,162	6,996	
27	Demolish't Concrete	DC	m3	124.20	380.16	581.38	1,085.74	364.78	97.72	0.00	54.29	0.00	152.01	1,238	441	797	
28	Demolish't Metal	DM	tons	50.48	1,600.29	77.12	1,727.89	518.37	155.51	0.00	86.39	0.00	241.90	1,970	627	1,343	

Table 3.12 SUMMARY OF UNIT PRICES FOR RIVER STRUCTURES

Work Item	Ref.No.	Unit	Financial Unit Cost			Economic Unit Cost		
			L/C	F/C	Total	L/C	F/C	Total
Revetment							759056.11	759,056
River Mouth	PS.R-1	m	23,058	22,030	45,088	19,038	20,915	39,953
Cl.Dike L.W.	PS.R-2	m	27,798	99,512	127,311	22,759	99,477	122,236
Cl.Dike H.W.	PS.R-3	m	14,935	39,227	54,161	12,239	38,933	51,172
Dike on R-Bed	PS.R-4	m	7,722	5,737	13,459	6,546	5,289	11,835
Cl.Dike	PS.R-5	m	20,743	18,825	39,568	17,409	17,812	35,221
H.W.Revetment	PS.R-6	m	4,564	3,342	7,906	3,868	3,078	6,946
L.W.Revetment	PS.R-7	m	2,049	1,053	3,102	1,616	925	2,541
Type A-1	AG.R-1	m	6,974	4,967	11,941	5,932	4,556	10,488
Type A-2	AG.R-2	m	11,096	7,850	18,946	9,425	7,199	16,624
Type B-1	AG.R-3	m	5,809	2,692	8,500	4,816	2,318	7,134
Type B-2	AG.R-4	m	9,702	4,528	14,229	8,041	3,903	11,944
Type C	AG.R-5	m	7,757	3,935	11,692	6,411	3,424	9,836
Type D	AG.R-6	m	11,626	8,241	19,868	9,743	7,550	17,292
Type I	AG.R-7	m	3,383	1,886	5,269	2,675	1,683	4,358
Type II	AG.R-8	m	7,672	5,089	12,761	6,334	4,646	10,980
Type III	AG.R-9	m	6,569	4,257	10,827	5,551	3,853	9,404
Spurdike	AG.R-10	m	1,331	765	2,097	1,054	687	1,740
Type IV	AG.R-11	m	10,821	7,974	18,795	9,099	7,337	16,436
Concrete Dike	AG.R-12	m	13,011	11,875	24,886	10,908	11,269	22,177
Poponto R-1	AG.R-13	m	2,827	2,230	5,056	2,407	2,068	4,475
Poponto R-2	AG.R-14	m	14,941	10,092	25,032	12,668	9,210	21,877
Groin								
L=16.5 m	GR-1	pcs.	67,581	64,673	132,255	56,733	61,527	118,259
L=30.0 m	GR-2	pcs.	114,906	110,883	225,789	96,393	105,582	201,975
Sluice							ERR	ERR
Type A	PS.S-1	pcs.	887,989	1,429,156	2,317,145	754,984	1,399,208	2,154,192
Type B-1	PS.S-2-1	pcs.	979,351	1,824,615	2,803,966	833,947	1,796,722	2,630,669
Type B-2	PS.S-2-2	pcs.	1,378,624	2,992,857	4,371,481	1,174,707	2,963,512	4,138,219
Type B-3	PS.S-2-3	pcs.	1,798,280	4,187,530	5,985,810	1,533,260	4,155,720	5,688,980
Type C	PS.S-3	pcs.	647,787	786,114	1,433,901	548,433	759,056	1,307,489
Type A-1	AG.S-1-1	pcs.	332,056	317,284	649,340	281,523	300,345	581,868
Type A-2	AG.S-1-2	pcs.	385,655	411,705	797,360	326,712	393,281	719,993
Type B	AG.S-2	pcs.	962,703	1,524,088	2,486,791	818,319	1,491,145	2,309,465
Type C-1	AG.S-3-1	pcs.	1,093,281	1,974,788	3,068,069	930,534	1,942,564	2,873,098
Type C-2	AG.S-3-2	pcs.	1,600,524	3,286,159	4,886,683	1,364,220	3,247,819	4,612,039
Type D	AG.S-4	pcs.	1,872,648	4,364,433	6,237,081	1,597,561	4,331,036	5,928,597
Type E	AG.S-5	pcs.	743,459	919,532	1,662,992	629,640	889,134	1,518,774
Water Gate								
10x5mx1	WG-1	pcs.	10,524,615	48,931,313	59,455,928	8,897,063	49,374,864	58,271,927
10x5mx2	WG-2	pcs.	19,606,433	95,703,497	115,309,930	16,546,536	96,644,933	113,191,469
7.5x4mx1	WG-3	pcs.	15,508,204	72,998,578	88,506,782	13,107,409	73,673,884	86,781,293
5 x3mx1	WG-4-2	pcs.	4,304,857	18,854,733	23,159,590	3,647,591	19,005,673	22,653,264
Diversion Structures								
Dive. Channel	PDS	pcs.	5,239,017	5,875,940	11,114,957	4,523,502	5,605,443	10,128,945
Closing Dike	AG.R-15	m	25,166	58,383	83,549	20,798	57,676	78,474
Ground Sill	PS.GS	pcs.	3,832,745	2,587,883	6,420,629	3,190,852	2,362,794	5,553,647
Box Culvert	BXC	pcs.	447,824	580,695	1,028,519	390,923	558,427	949,350
Drainage Ditch	DT	m	265,350	194,700	460,050	226,950	183,780	410,730
Well	WL	pcs.	12,000,000	8,000,000	20,000,000	9,600,000	9,216,000	18,816,000

Table 3.13 SUMMARY OF FINANCIAL PROJECT COST FOR UPPER AGNO RIVER PROJECT

Work Items		1st Stage		2nd Stage		Total	
		Work Quantity	Cost (mill. P)	Work Quantity	Cost (mill. P)	Work Quantity	Cost (mill. P)
Excavation	1000m3	4,784.0	213.0	3,634.0	243.5	8,418.0	456.5
Dredging	1000m3	0.0	0.0	0.0	0.0	0.0	0.0
Embankment	1000m3	4,852.0	466.0	446.0	34.8	5,298.0	500.8
Revetment	km	32.0	343.0	20.0	175.7	52.0	518.7
Groin	pcs	54.0	12.2	61.0	13.8	115.0	26.0
Sluiceway	pcs	32.0	72.7	6.0	10.2	38.0	82.9
Water Gate	pcs	0.0	0.0	0.0	0.0	0.0	0.0
Bridge	m2	8,524.0	126.6	2,046.0	30.4	10,570.0	157.0
Others	Lot	1.0	178.8	1.0	54.2	1.0	233.0
Preparatory Works	Lot	1.0	141.1	1.0	56.2	1.0	197.3
Miscellaneous W.	Lot	1.0	232.9	1.0	92.7	1.0	325.6
Main Construction			1,786.3		711.5		2,497.8
Compensation			398.0		14.0		412.0
Adminstration			109.2		36.3		145.5
Contingency			344.0		114.3		458.3
Engneering Services			285.8		113.8		399.6
Project Cost			2,923.4		989.8		3,913.2

Table 3.14 SUMMARY OF ECONOMIC PROJECT COST FOR UPPER AGNO RIVER PROJECT

Work Items		1st Stage		2nd Stage		Total	
		Work Quantity	Cost (mill. P)	Work Quantity	Cost (mill. P)	Work Quantity	Cost (mill. P)
Excavation	1000m3	4,784.0	210.6	3,634.0	240.6	8,418.0	451.2
Dredging	1000m3	0.0	0.0	0.0	0.0	0.0	0.0
Embankment	1000m3	4,852.0	456.2	446.0	33.9	5,298.0	490.1
Revetment	km	32.0	294.3	20.0	149.7	52.0	444.0
Groin	pcs	54.0	10.9	61.0	12.3	115.0	23.2
Sluiceway	pcs	32.0	68.0	6.0	9.5	38.0	77.5
Water Gate	pcs	0.0	0.0	0.0	0.0	0.0	0.0
Bridge	m2	8,524.0	115.6	2,046.0	27.7	10,570.0	143.3
Others	Lot	1.0	155.3	1.0	53.2	1.0	208.5
Preparatory Works	Lot	1.0	131.1	1.0	52.6	1.0	183.7
Miscellaneous W.	Lot	1.0	216.2	1.0	86.8	1.0	303.0
Main Construction	mil.P		1,658.2		666.3		2,324.5
Compensation			236.0		10.0		246.0
Adminstration			94.7		33.8		128.5
Contingency			298.3		106.5		404.9
Engneering Services			265.3		106.6		371.9
Project Cost			2,552.6		923.3		3,475.9

Table 3.15 SUMMARY OF FINANCIAL PROJECT COST FOR PANTAL-SINOCALAN RIVER PROJECT

Work Items		1st Stage		2nd Stage		Total	
		Work Quantity	Cost (mill. P)	Work Quantity	Cost (mill. P)	Work Quantity	Cost (mill. P)
Excavation	1000m3	1,243.0	35.5	2,105.0	82.2	3,348.0	117.7
Dredging	1000m3	160.0	5.6	20.0	0.7	180.0	6.3
Embankment	1000m3	1,806.0	189.6	2,482.0	260.6	4,288.0	450.2
Revetment	km	12.0	171.0	12.0	141.2	24.0	312.2
Groin	pcs	0.0	0.0	39.0	5.2	39.0	5.2
Sluiceway	pcs	14.0	32.4	30.0	87.8	44.0	120.2
Water Gate	pcs	4.0	236.5	5.0	178.5	9.0	415.0
Bridge	m2	11,048.0	164.1	8,609.0	127.8	19,657.0	291.9
Others	Lot	1.0	76.0	1.0	80.5	1.0	156.5
Preparatory Works	Lot	1.0	91.1	1.0	96.4	1.0	187.5
Miscellaneous W.	Lot	1.0	150.2	1.0	159.1	1.0	309.4
Main Construction			1,151.9		1,220.0		2,371.9
Compensation			333.0		207.0		540.0
Adminstration			74.2		71.4		145.6
Contingency			233.9		224.8		458.6
Engneering Services			184.3		195.2		379.5
Project Cost			1,977.3		1,918.4		3,895.7

Table 3.16 SUMMARY OF ECONOMIC PROJECT COST FOR PANTAL-SINOCALAN RIVER PROJECT

Work Items		1st Stage		2nd Stage		Total	
		Work Quantity	Cost (mill. P)	Work Quantity	Cost (mill. P)	Work Quantity	Cost (mill. P)
Excavation	1000m3	1,243.0	35.1	2,105.0	81.2	3,348.0	116.2
Dredging	1000m3	160.0	5.1	20.0	0.6	180.0	5.7
Embankment	1000m3	1,806.0	185.6	2,482.0	255.2	4,288.0	440.8
Revetment	km	12.0	153.3	12.0	126.2	24.0	279.5
Groin	pcs	0.0	0.0	39.0	4.6	39.0	4.6
Sluiceway	pcs	14.0	30.2	30.0	82.3	44.0	112.5
Water Gate	pcs	4.0	238.7	5.0	180.1	9.0	418.8
Bridge	m2	11,048.0	149.8	8,609.0	116.7	19,657.0	266.5
Others	Lot	1.0	63.8	1.0	67.1	1.0	130.9
Preparatory Works	Lot	1.0	86.2	1.0	91.4	1.0	177.6
Miscellaneous W.	Lot	1.0	142.2	1.0	150.8	1.0	293.0
Main Construction			1,089.9		1,156.2		2,246.0
Compensation			114.2		80.8		195.0
Adminstration			60.2		61.8		122.0
Contingency			189.6		194.8		384.4
Engneering Services			174.4		185.0		359.4
Project Cost			1,628.3		1,678.6		3,306.9

Table 3.17 SUMMARY OF FINANCIAL PROJECT COST OF EACH STRETCH FOR UPPER AGNO RIVER PROJECT (1ST STAGE)

Work Items		Bayambang-Floodway		Alcala-Asingan		Asingan-Sanmanuel		Popont Swamp		Total	
		Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)
Excavation	1000m3	4,519.0	207.9	264.8	5.3	0.0	0.0	0.0	0.0	4,783.8	213.2
Dredging	1000m3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Embankment	1000m3	1,487.5	156.2	1,161.0	121.9	501.4	78.6	1,405.4	109.6	4,555.3	466.3
Revetment	km	9.9	104.6	10.4	82.1	14.8	153.2	0.1	3.0	35.2	343.0
Groin	pcs	15.0	3.4	30.0	6.8	9.0	2.0	0.0	0.0	54.0	12.2
Sluiceway	pcs	0.0	33.1	7.0	19.9	3.0	6.2	28.0	13.5	38.0	72.7
Water Gate	pcs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bridge	m2	5,344.0	79.4	3,180.0	47.2	0.0	0.0	0.0	0.0	8,524.0	126.6
Others	Lot	1.0	42.5	1.0	93.3	1.0	9.0	1.0	33.6	1.0	178.3
Preparatory Works	Lot	1.0	62.7	1.0	37.7	1.0	24.9	1.0	15.9	1.0	141.2
Miscellaneous W.	Lot	1.0	103.5	1.0	62.1	1.0	41.1	1.0	26.3	1.0	232.9
Main Construction			793.2		476.4		315.0		201.8		1,786.3
Compensation			116.0		55.0		26.0		201.0		398.0
Adminstration			45.5		26.6		17.0		20.1		109.2
Contingency			143.2		83.7		53.7		63.4		344.0
Engneering Services			126.9		76.2		50.4		32.3		285.8
Project Cost			1,224.7		717.8		462.1		518.7		2,923.4

Table 3.18 SUMMARY OF FINANCIAL PROJECT COST OF EACH STRETCH FOR UPPER AGNO RIVER PROJECT (2nd STAGE)

Work Items		Bayambang-Floodway		Alcala-Asingan		Asingan-Sanmanuel		Popont Swamp		Total	
		Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)
Excavation	1000m3	1,419.9	95.1	2,209.1	148.0	0.0	0.0	4.8	0.3	3,633.8	243.5
Dredging	1000m3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Embankment	1000m3	0.0	0.0	0.0	0.0	0.0	0.0	446.4	34.8	446.4	34.8
Revetment	km	0.2	1.9	16.6	126.9	2.7	43.8	0.6	3.0	20.1	175.7
Groin	pcs	0.0	0.0	61.0	13.8	0.0	0.0	0.0	0.0	61.0	13.8
Sluiceway	pcs	0.0	0.0	2.0	5.6	0.0	0.0	4.0	4.7	6.0	10.2
Water Gate	pcs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bridge	m2	1,171.0	17.4	0.0	0.0	0.0	0.0	875.0	13.0	2,046.0	30.4
Others	Lot	1.0	0.0	1.0	0.0	1.0	0.0	1.0	54.2	1.0	54.2
Preparatory Works	Lot	1.0	11.4	1.0	29.4	1.0	4.4	1.0	10.9	1.0	56.2
Miscellaneous W.	Lot	1.0	18.9	1.0	48.6	1.0	7.2	1.0	18.0	1.0	92.7
Main Construction			144.8		372.2		55.4		139.0		711.5
Compensation			0.0		0.0		0.0		14.0		14.0
Adminstration			7.2		18.6		2.8		7.7		36.3
Contingency			22.8		58.6		8.7		24.1		114.3
Engneering Services			23.2		59.5		8.9		22.2		113.8
Project Cost			198.0		509.0		75.8		207.0		989.8

Table 3.19 SUMMARY OF FINANCIAL PROJECT COST OF EACH STRETCH FOR PANTAL-SINOCALAN RIVER PROJECT (1ST STAGE)

Work Items		Pantal-Sinocalan		Dagupan River		Ingarela River		Total	
		Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)
Excavation	1000m3	1,243.3	35.5	0.0	0.0	0.0	0.0	1,243.3	35.5
Dredging	1000m3	159.8	5.6	0.0	0.0	0.0	0.0	159.8	5.6
Embankment	1000m3	1,705.7	179.1	99.8	10.5	0.0	0.0	1,805.5	189.6
Revetment	km	12.0	171.0	0.0	0.0	0.0	0.0	12.0	171.0
Groin	pcs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sluiceway	pcs	14.0	32.4	0.0	0.0	0.0	0.0	14.0	32.4
Water Gate	pcs	4.0	236.5	0.0	0.0	0.0	0.0	4.0	236.5
Bridge	m2	11,048.0	164.1	0.0	0.0	0.0	0.0	11,048.0	164.1
Others	Lot	1.0	76.0	1.0	0.0	1.0	0.0	1.0	76.0
Preparatory Works	Lot	1.0	90.0	1.0	1.0	1.0	0.0	1.0	91.1
Miscellaneous W.	Lot	1.0	148.5	1.0	1.7	1.0	0.0	1.0	150.2
Main Construction			1,138.7		13.3		0.0		1,151.9
Compensation			332.0		1.0		0.0		333.0
Adminstration			73.5		0.7		0.0		74.2
Contingency			231.6		2.2		0.0		233.9
Engneering Services			182.2		2.1		0.0		184.3
Project Cost			1,958.0		19.3		0.0		1,977.3

Table 3.20 SUMMARY OF FINANCIAL PROJECT COST OF EACH STRETCH FOR PANTAL-SINOCALAN RIVER PROJECT (2ND STAGE)

Work Items		Pantal-Sinocalan		Dagupan River		Ingarela River		Total	
		Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)	Work Quantity	Cost (mill.P)
Excavation	1000m3	254.7	5.3	663.7	13.3	1,187.0	63.5	2,105.4	82.2
Dredging	1000m3	0.0	0.0	0.0	0.0	20.0	0.7	20.0	0.7
Embankment	1000m3	608.8	63.9	1,580.3	165.9	293.2	30.8	2,482.2	260.6
Revetment	km	3.7	58.7	5.8	55.9	2.5	26.5	12.0	141.2
Groin	pcs	0.0	0.0	39.0	5.2	0.0	0.0	39.0	5.2
Sluiceway	pcs	3.0	6.6	24.0	68.1	3.0	13.2	30.0	87.8
Water Gate	pcs	1.0	48.9	3.0	110.7	1.0	18.9	5.0	178.5
Bridge	m2	0.0	0.0	4,889.0	72.6	3,720.0	55.2	8,609.0	127.8
Others	Lot	1.0	17.6	1.0	49.0	1.0	13.8	1.0	80.5
Preparatory Works	Lot	1.0	20.1	1.0	54.1	1.0	22.3	1.0	96.4
Miscellaneous W.	Lot	1.0	33.2	1.0	89.2	1.0	36.7	1.0	159.1
Main Construction			254.4		684.0		281.6		1,220.0
Compensation			64.0		63.0		80.0		207.0
Adminstration			15.9		37.4		18.1		71.4
Contingency			50.1		117.7		57.0		224.8
Engneering Services			40.7		109.4		45.1		195.2
Project Cost			425.1		1,011.5		481.7		1,918.4

Table 3-21 (1/6) COST ESTIMATE OF RIVER IMPROVEMENT WORKS (1/10 YEAR;FINANCIAL COST)

River :Agno River Stretch : AG-ALL

Work Items		Unit	Quantity	L.C.Portion Unit Cost (peso)	L.C.Portion Amount (P.1000)	F.C.Portion Unit Cost (peso)	F.C.Portion Amount (P.1000)	Total (P.1000)	Remarks
I Main Construction					999,553		1,498,238	2,497,791	
1. Preparatory Works					79,016		118,438	197,454	
2. Main Works									
(1) Excavation	1 Common	m3	6,815,804	16	109,053	51	347,606	456,659	EX-1
	2 Gravel	m3		20		61			EX-2
(2) Embankment	1 Left	m3	1,097,283	27	29,627	78	85,588	115,215	EM-1-L
	Right	m3	1,551,226	27	41,883	78	120,996	162,879	EM-1-R
	Popont	m3	1,851,810	21	38,888	57	105,553	144,441	EM-1-P
Embankment	2 Left	m3		40		124			EM-2-L
	Right	m3	479,081	40	19,163	124	59,406	78,569	EM-2-R
(3) Conc.Dike		m	2,500	13,011	32,528	11,875	29,688	62,216	AG.R-12
(4) Sodding		m2	2,773,499	15	41,602			41,602	SO
(5) Revetment &	Type A-1	m	3,560	6,974	24,828	4,967	17,682	42,511	AG.R-1
B.Protection	Type A-2	m	890	11,096	9,875	7,850	6,987	16,862	AG.R-2
	Type B-1	m	7,080	5,809	41,125	2,692	19,056	60,181	AG.R-3
	Type B-2	m	1,770	9,702	17,172	4,528	8,014	25,186	AG.R-4
	Type C	m	2,500	7,757	19,393	3,935	9,837	29,230	AG.R-5
	Type D	m	2,000	11,626	23,253	8,241	16,483	39,735	AG.R-6
	Type I	m	14,700	3,383	49,733	1,886	27,725	77,458	AG.R-7
	Type II	m	7,850	7,672	60,223	5,089	39,948	100,172	AG.R-8
	Type III	m	7,194	6,569	47,259	4,257	30,628	77,887	AG.R-9
	Spurdike	m	1,900	1,331	2,530	765	1,454	3,984	AG.R-10
	Type IV	m	2,100	10,821	22,723	7,974	16,746	39,470	AG.R-11
	PopontR-1m		600	2,827	1,696	2,230	1,338	3,034	AG.R-13
	PopontR-2m		119	14,941	1,778	10,092	1,201	2,979	AG.R-14
(6) Groin	L=30m		115	114,906	13,214	110,883	12,752	25,966	GR-2
(7) Sluice-Way	Type A-1	pc.	9	332,056	3,055	317,284	2,919	5,974	AG.S-1-1
	Type A-2	pc.	5	385,655	2,005	411,705	2,141	4,146	AG.S-1-2
	Type B	pc.	7	962,703	6,739	1,524,088	10,669	17,408	AG.S-2
	Type C-1	pc.	3	1,093,281	3,061	1,974,788	5,529	8,591	AG.S-3-1
	Type C-2	pc.	8	1,600,524	13,284	3,286,159	27,275	40,559	AG.S-3-2
	Type D	pc.	1	1,872,648	1,873	4,364,433	4,364	6,237	AG.S-4
	Type E	pc.		743,459		919,532			AG.S-5
(8) Box-Culvert	Popont	pc.	20	447,824	8,956	580,695	11,614	20,570	BXC
(9) Diversion C.		pc.	1	5,239,017	5,239	5,875,940	5,876	11,115	PDS
& Closing Dike		m	120	25,166	3,020	58,383	7,006	10,026	AG.R-15
(10)Demolishment	Concrete	m3	7,900	617	4,874	1,000	7,900	12,774	DC
	Metal	ton		806		1,485			DM
(11)Bridge	Newly	m2	10,570	6,239	65,946	8,611	91,018	156,965	BC
(12)Drainage Ditch		m2		265		195			DT
(13)Well	D=8m	pc.	793	12,000	9,516	8,000	6,344	15,860	WL
(14)Pavement	Concrete	m2	38,030	101	3,841	151	5,743	9,584	PC
	Asphalt	m2	53,482	64	3,423	572	30,592	34,015	PA
	Gravel	m2	216,147	36	7,781	31	6,701	14,482	PG
Total of Main Works					790,161		1,184,378	1,974,539	
3. Miscellaneous Works					130,376		195,422	325,799	
II. Compensation					412,000			412,000	COM-F
III. Administration					145,490			145,490	
IV. Physical Contingency					233,556		224,736	458,292	
Total of I,II,III and IV					1,790,599		1,722,974	3,513,573	
V. Enginnering Services					39,965		359,682	399,647	
Grand Total					1,830,564		2,082,656	3,913,220	

Table 3-21 (2/6) COST ESTIMATE OF RIVER IMPROVEMENT WORKS (1/10 YEAR;FINANCIAL COST)

River :Agno River Stretch : AG-1

Work Items		Unit	Unit Quantity	L.C.Portion Unit Cost (peso)	L.C.Portion Amount (P.1000)	F.C.Portion Unit Cost (peso)	F.C.Portion Amount (P.1000)	Total (P.1000)	Remarks
I Main Construction					323,223		614,720	937,942	
1. Preparatory Works					25,551		48,594	74,146	
2. Main Works									
(1) Excavation 1	Common	m3	4,522,448	16	72,359	51	230,645	303,004	EX-1
2	Gravel	m3		20		61			EX-2
(2) Embankment 1	Left	m3	298,133	27	8,050	78	23,254	31,304	EM-1-L
	Right	m3	1,189,370	27	32,113	78	92,771	124,884	EM-1-R
	Popont	m3		21		57			EM-1-P
Embankment 2	Left	m3		40		124			EM-2-L
	Right	m3		40		124			EM-2-R
(3) Conc.Dike		m		13,011		11,875			AG.R-12
(4) Sodding		m2	602,314	15	9,035			9,035	SO
(5) Revetment &	Type A-1	m	1,880	6,974	13,112	4,967	9,338	22,449	AG.R-1
B.Protection	Type A-2	m	470	11,096	5,215	7,850	3,690	8,905	AG.R-2
	Type B-1	m	2,920	5,809	16,961	2,692	7,859	24,820	AG.R-3
	Type B-2	m	730	9,702	7,082	4,528	3,305	10,387	AG.R-4
	Type C	m		7,757		3,935			AG.R-5
	Type D	m		11,626		8,241			AG.R-6
	Type I	m		3,383		1,886			AG.R-7
	Type II	m		7,672		5,089			AG.R-8
	Type III	m	3,694	6,569	24,267	4,257	15,727	39,993	AG.R-9
	Spurdike	m		1,331		765			AG.R-10
	Type IV	m		10,821		7,974			AG.R-11
	PopontR-1	m		2,827		2,230			AG.R-13
	PopontR-2	m		14,941		10,092			AG.R-14
(6) Groin	L=30m		15	114,906	1,724	110,883	1,663	3,387	GR-2
(7) Sluice-Way	Type A-1	pc.	1	332,056	332	317,284	317	649	AG.S-1-1
	Type A-2	pc.		385,655		411,705			AG.S-1-2
	Type B	pc.	2	962,703	1,925	1,524,088	3,048	4,974	AG.S-2
	Type C-1	pc.	1	1,093,281	1,093	1,974,788	1,975	3,068	AG.S-3-1
	Type C-2	pc.	5	1,600,524	8,003	3,286,159	16,431	24,433	AG.S-3-2
	Type D	pc.		1,872,648		4,364,433			AG.S-4
	Type E	pc.		743,459		919,532			AG.S-5
(8) Box-Culvert	Popont	pc.		447,824		580,695			BXC
(9) Diversion C.		pc.	1	5,239,017	5,239	5,875,940	5,876	11,115	PDS
& Closing Dike		m	120	25,166	3,020	58,383	7,006	10,026	AG.R-15
(10)Demolishment	Concrete	m3	5,000	617	3,085	1,000	5,000	8,085	DC
	Metal	ton		806		1,485			DM
(11)Bridge	Newly	m2	6,515	6,239	40,647	8,611	56,101	96,748	BC
(12)Drainage Ditch		m2		265		195			DT
(13)Well	D=8m	pc.		12,000		8,000			WL
(14)Pavement	Concrete	m2		101		151			PC
	Asphalt	m2		64		572			PA
	Gravel	m2	62,535	36	2,251	31	1,939	4,190	PG
Total of Main Works					255,512		485,944	741,456	
3. Miscellaneous Works					42,160		80,181	122,340	
II. Compensation					116,000			116,000	COM-F
III. Administration					52,697			52,697	
IV. Physical Contingency					73,788		92,208	165,996	
Total of I,II,III and IV					565,708		706,928	1,272,635	
V. Enginnering Services					15,007		135,064	150,071	
Grand Total					580,715		841,991	1,422,706	

Table 3-21 (3/6) COST ESTIMATE OF RIVER IMPROVEMENT WORKS (1/10 YEAR;FINANCIAL COST)

River :Agno River Stretch : AG-2

Work Items		Unit	Unit Quantity	L.C.Portion Unit Cost (peso)	L.C.Portion Amount (P.1000)	F.C.Portion Unit Cost (peso)	F.C.Portion Amount (P.1000)	Total (P.1000)	Remarks
I Main Construction					205,486		266,113	471,599	
1. Preparatory Works					16,244		21,037	37,281	
2. Main Works									
(1) Excavation 1	Common	m3	1,024,075	16	16,385	51	52,228	68,613	EX-1
2	Gravel	m3		20		61			EX-2
(2) Embankment 1	Left	m3	546,490	27	14,755	78	42,626	57,381	EM-1-L
	Right	m3	207,450	27	5,601	78	16,181	21,782	EM-1-R
	Popont	m3		21		57			EM-1-P
Embankment 2	Left	m3		40		124			EM-2-L
	Right	m3		40		124			EM-2-R
(3) Conc.Dike		m	2,500	13,011	32,528	11,875	29,688	62,216	AG.R-12
(4) Sodding		m2	621,563	15	9,323			9,323	SO
(5) Revetment &	Type A-1	m		6,974		4,967			AG.R-1
B.Protection	Type A-2	m		11,096		7,850			AG.R-2
	Type B-1	m	1,600	5,809	9,294	2,692	4,307	13,600	AG.R-3
	Type B-2	m	400	9,702	3,881	4,528	1,811	5,692	AG.R-4
	Type C	m		7,757		3,935			AG.R-5
	Type D	m		11,626		8,241			AG.R-6
	Type I	m	8,050	3,383	27,235	1,886	15,183	42,417	AG.R-7
	Type II	m	1,450	7,672	11,124	5,089	7,379	18,503	AG.R-8
	Type III	m		6,569		4,257			AG.R-9
	Spurdike	m	1,900	1,331	2,530	765	1,454	3,984	AG.R-10
	Type IV	m		10,821		7,974			AG.R-11
	PopontR-1m			2,827		2,230			AG.R-13
	PopontR-2m			14,941		10,092			AG.R-14
(6) Groin	L=30m		28	114,906	3,217	110,883	3,105	6,322	GR-2
(7) Sluice-Way	Type A-1	pc.	1	332,056	332	317,284	317	649	AG.S-1-1
	Type A-2	pc.		385,655		411,705			AG.S-1-2
	Type B	pc.	2	962,703	1,925	1,524,088	3,048	4,974	AG.S-2
	Type C-1	pc.		1,093,281		1,974,788			AG.S-3-1
	Type C-2	pc.		1,600,524		3,286,159			AG.S-3-2
	Type D	pc.		1,872,648		4,364,433			AG.S-4
	Type E	pc.		743,459		919,532			AG.S-5
(8) Box-Culvert	Popont	pc.		447,824		580,695			BXC
(9) Diversion C.		pc.		5,239,017		5,875,940			PDS
& Closing Dike		m		25,166		58,383			AG.R-15
(10)Demolishment	Concrete	m3	2,320	617	1,431	1,000	2,320	3,751	DC
	Metal	ton		806		1,485			DM
(11)Bridge	Newly	m2	3,180	6,239	19,840	8,611	27,383	47,223	BC
(12)Drainage Ditch		m2		265		195			DT
(13)Well	D=8m	pc.		12,000		8,000			WL
(14)Pavement	Concrete	m2	11,250	101	1,136	151	1,699	2,835	PC
	Asphalt	m2		64		572			PA
	Gravel	m2	52,815	36	1,901	31	1,637	3,539	PG
Total of Main Works					162,440		210,366	372,805	
3. Miscellaneous Works					26,803		34,710	61,513	
II. Compensation					52,000			52,000	COM-F
III. Administration					26,180			26,180	
IV. Physical Contingency					42,550		39,917	82,467	
Total of I,II,III and IV					326,216		306,030	632,246	
V. Enginnering Services					7,546		67,910	75,456	
Grand Total					333,762		373,940	707,701	

Table 3-21 (4/6) COST ESTIMATE OF RIVER IMPROVEMENT WORKS (1/10 YEAR;FINANCIAL COST)

River :Agno River Stretch : AG-3

Work Items		Unit	Unit Quantity	L.C.Portion Unit Cost (peso)	L.C.Portion Amount (P.1000)	F.C.Portion Unit Cost (peso)	F.C.Portion Amount (P.1000)	Total (P.1000)	Remarks
I Main Construction					168,957		208,037	376,994	
1. Preparatory Works					13,356		16,446	29,802	
2. Main Works									
(1) Excavation 1	Common	m3	1,264,481	16	20,232	51	64,489	84,720	EX-1
2	Gravel	m3		20		61			EX-2
(2) Embankment 1	Left	m3	252,660	27	6,822	78	19,707	26,529	EM-1-L
	Right	m3	154,406	27	4,169	78	12,044	16,213	EM-1-R
	Popont	m3		21		57			EM-1-P
Embankment 2	Left	m3		40		124			EM-2-L
	Right	m3		40		124			EM-2-R
(3) Conc.Dike		m		13,011		11,875			AG.R-12
(4) Sodding		m2	674,820	15	10,122			10,122	SO
(5) Revetment &	Type A-1	m	1,680	6,974	11,717	4,967	8,344	20,061	AG.R-1
B.Protection	Type A-2	m	420	11,096	4,660	7,850	3,297	7,957	AG.R-2
	Type B-1	m	2,560	5,809	14,870	2,692	6,890	21,760	AG.R-3
	Type B-2	m	640	9,702	6,209	4,528	2,898	9,107	AG.R-4
	Type C	m		7,757		3,935			AG.R-5
	Type D	m		11,626		8,241			AG.R-6
	Type I	m		3,383		1,886			AG.R-7
	Type II	m	2,200	7,672	16,878	5,089	11,196	28,074	AG.R-8
	Type III	m	3,500	6,569	22,992	4,257	14,901	37,893	AG.R-9
	Spurdike	m		1,331		765			AG.R-10
	Type IV	m		10,821		7,974			AG.R-11
	PopontR-1m			2,827		2,230			AG.R-13
	PopontR-2m			14,941		10,092			AG.R-14
(6) Groin	L=30m		63	114,906	7,239	110,883	6,986	14,225	GR-2
(7) Sluice-Way	Type A-1	pc.	1	332,056	332	317,284	317	649	AG.S-1-1
	Type A-2	pc.		385,655		411,705			AG.S-1-2
	Type B	pc.	2	962,703	1,925	1,524,088	3,048	4,974	AG.S-2
	Type C-1	pc.	1	1,093,281	1,093	1,974,788	1,975	3,068	AG.S-3-1
	Type C-2	pc.	1	1,600,524	1,601	3,286,159	3,286	4,887	AG.S-3-2
	Type D	pc.	1	1,872,648	1,873	4,364,433	4,364	6,237	AG.S-4
	Type E	pc.		743,459		919,532			AG.S-5
(8) Box-Culvert	Popont	pc.		447,824		580,695			BXC
(9) Diversion C.		pc.		5,239,017		5,875,940			PDS
& Closing Dike		m		25,166		58,383			AG.R-15
(10)Demolishment	Concrete	m3		617		1,000			DC
	Metal	ton		806		1,485			DM
(11)Bridge	Newly	m2		6,239		8,611			BC
(12)Drainage Ditch		m2		265		195			DT
(13)Well	D=8m	pc.		12,000		8,000			WL
(14)Pavement	Concrete	m2		101		151			PC
	Asphalt	m2		64		572			PA
	Gravel	m2	23,022	36	829	31	714	1,542	PG
Total of Main Works					133,563		164,456	298,019	
3. Miscellaneous Works					22,038		27,135	49,173	
II. Compensation					3,000			3,000	COM-F
III. Administration					19,000			19,000	
IV. Physical Contingency					28,643		31,206	59,849	
Total of I,II,III and IV					219,600		239,243	458,842	
V. Enginnering Services					6,032		54,287	60,319	
Grand Total					225,632		293,530	519,161	

Table 3-21 (5/6) COST ESTIMATE OF RIVER IMPROVEMENT WORKS (1/10 YEAR;FINANCIAL COST)

River :Agno River Stretch : AG-4

Work Items			Unit Quantity	L.C.Portion Unit Cost (peso)	L.C.Portion Amount (P.1000)	F.C.Portion Unit Cost (peso)	F.C.Portion Amount (P.1000)	Total (P.1000)	Remarks
I Main Construction					189,907		180,509	370,415	
1. Preparatory Works					15,012		14,269	29,282	
2. Main Works									
(1) Excavation 1	Common	m3		16		51			EX-1
2	Gravel	m3		20		61			EX-2
(2) Embankment 1	Left	m3		27		78			EM-1-L
	Right	m3		27		78			EM-1-R
	Popont	m3		21		57			EM-1-P
Embankment 2	Left	m3		40		124			EM-2-L
	Right	m3	479,081	40	19,163	124	59,406	78,569	EM-2-R
(3) Conc.Dike		m		13,011		11,875			AG.R-12
(4) Sodding		m2	397,429	15	5,961			5,961	SO
(5) Revetment &	Type A-1	m		6,974		4,967			AG.R-1
B.Protection	Type A-2	m		11,096		7,850			AG.R-2
	Type B-1	m		5,809		2,692			AG.R-3
	Type B-2	m		9,702		4,528			AG.R-4
	Type C	m	2,500	7,757	19,393	3,935	9,837	29,230	AG.R-5
	Type D	m	2,000	11,626	23,253	8,241	16,483	39,735	AG.R-6
	Type I	m	6,650	3,383	22,498	1,886	12,542	35,040	AG.R-7
	Type II	m	4,200	7,672	32,221	5,089	21,374	53,595	AG.R-8
	Type III	m		6,569		4,257			AG.R-9
	Spurdike	m		1,331		765			AG.R-10
	Type IV	m	2,100	10,821	22,723	7,974	16,746	39,470	AG.R-11
	PopontR-1m			2,827		2,230			AG.R-13
	PopontR-2m			14,941		10,092			AG.R-14
(6) Groin	L=30m		9	114,906	1,034	110,883	998	2,032	GR-2
(7) Sluice-Way	Type A-1	pc.	2	332,056	664	317,284	635	1,299	AG.S-1-1
	Type A-2	pc.		385,655		411,705			AG.S-1-2
	Type B	pc.		962,703		1,524,088			AG.S-2
	Type C-1	pc.		1,093,281		1,974,788			AG.S-3-1
	Type C-2	pc.	1	1,600,524	1,601	3,286,159	3,286	4,887	AG.S-3-2
	Type D	pc.		1,872,648		4,364,433			AG.S-4
	Type E	pc.		743,459		919,532			AG.S-5
(8) Box-Culvert	Popont	pc.		447,824		580,695			BXC
(9) Diversion C.		pc.		5,239,017		5,875,940			PDS
& Closing Dike		m		25,166		58,383			AG.R-15
(10)Demolishment	Concrete	m3		617		1,000			DC
	Metal	ton		806		1,485			DM
(11)Bridge	Newly	m2		6,239		8,611			BC
(12)Drainage Ditch		m2		265		195			DT
(13)Well	D=8m	pc.		12,000		8,000			WL
(14)Pavement	Concrete	m2		101		151			PC
	Asphalt	m2		64		572			PA
	Gravel	m2	44,775	36	1,612	31	1,388	3,000	PG
Total of Main Works					150,124		142,695	292,819	
3. Miscellaneous Works					24,770		23,545	48,315	
II. Compensation					26,000			26,000	COM-F
III. Administration					19,821			19,821	
IV. Physical Contingency					35,359		27,076	62,435	
Total of I,II,III and IV					271,086		207,585	478,672	
V. Enginnering Services					5,927		53,340	59,266	
Grand Total					277,013		260,925	537,938	

Table 3-21 (6/6) COST ESTIMATE OF RIVER IMPROVEMENT WORKS (1/10 YEAR;FINANCIAL COST)

River :Agno River Stretch : POPO

Work Items		Unit	Unit Quantity	L.C.Portion Unit Cost (peso)	L.C.Portion Amount (P.1000)	F.C.Portion Unit Cost (peso)	F.C.Portion Amount (P.1000)	Total (P.1000)	Remarks
I Main Construction					111,981		228,860	340,841	
1. Preparatory Works					8,852		18,092	26,944	
2. Main Works									
(1) Excavation	1 Common	m3	4,800	16	77	51	245	322	EX-1
	2 Gravel	m3		20		61			EX-2
(2) Embankment	1 Left	m3		27		78			EM-1-L
	Right	m3		27		78			EM-1-R
	Popont	m3	1,851,810	21	38,888	57	105,553	144,441	EM-1-P
Embankment	2 Left	m3		40		124			EM-2-L
	Right	m3		40		124			EM-2-R
(3) Conc.Dike		m		13,011		11,875			AG.R-12
(4) Sodding		m2	477,373	15	7,161			7,161	SO
(5) Revetment &	Type A-1	m		6,974		4,967			AG.R-1
B.Protection	Type A-2	m		11,096		7,850			AG.R-2
	Type B-1	m		5,809		2,692			AG.R-3
	Type B-2	m		9,702		4,528			AG.R-4
	Type C	m		7,757		3,935			AG.R-5
	Type D	m		11,626		8,241			AG.R-6
	Type I	m		3,383		1,886			AG.R-7
	Type II	m		7,672		5,089			AG.R-8
	Type III	m		6,569		4,257			AG.R-9
	Spurdike	m		1,331		765			AG.R-10
	Type IV	m		10,821		7,974			AG.R-11
	PopontR-1m		600	2,827	1,696	2,230	1,338	3,034	AG.R-13
	PopontR-2m		119	14,941	1,778	10,092	1,201	2,979	AG.R-14
(6) Groin	L=30m			114,906		110,883			GR-2
(7) Sluice-Way	Type A-1	pc.	4	332,056	1,395	317,284	1,333	2,727	AG.S-1-1
	Type A-2	pc.	5	385,655	2,005	411,705	2,141	4,146	AG.S-1-2
	Type B	pc.	1	962,703	963	1,524,088	1,524	2,487	AG.S-2
	Type C-1	pc.	1	1,093,281	875	1,974,788	1,580	2,454	AG.S-3-1
	Type C-2	pc.	1	1,600,524	2,081	3,286,159	4,272	6,353	AG.S-3-2
	Type D	pc.		1,872,648		4,364,433			AG.S-4
	Type E	pc.		743,459		919,532			AG.S-5
(8) Box-Culvert	Popont	pc.	20	447,824	8,956	580,695	11,614	20,570	BXC
(9) Diversion C.		pc.		5,239,017		5,875,940			PDS
& Closing Dike		m		25,166		58,383			AG.R-15
(10)Demolishment	Concrete	m3	580	617	358	1,000	580	938	DC
	Metal	ton		806		1,485			DM
(11)Bridge	Newly	m2	875	6,239	5,459	8,611	7,535	12,994	BC
(12)Drainage Ditch		m2		265		195			DT
(13)Well	D=8m	pc.	793	12,000	9,516	8,000	6,344	15,860	WL
(14)Pavement	Concrete	m2	26,780	101	2,705	151	4,044	6,749	PC
	Asphalt	m2	53,482	64	3,423	572	30,592	34,015	PA
	Gravel	m2	33,000	36	1,188	31	1,023	2,211	PG
Total of Main Works					88,522		180,917	269,439	
3. Miscellaneous Works					14,606		29,851	44,458	
II. Compensation					215,000			215,000	COM-F
III. Administration					27,792			27,792	
IV. Physical Contingency					53,216		34,329	87,545	
Total of I,II,III and IV					407,989		263,189	671,178	
V. Enginnering Services					5,453		49,081	54,535	
Grand Total					413,442		312,270	725,712	