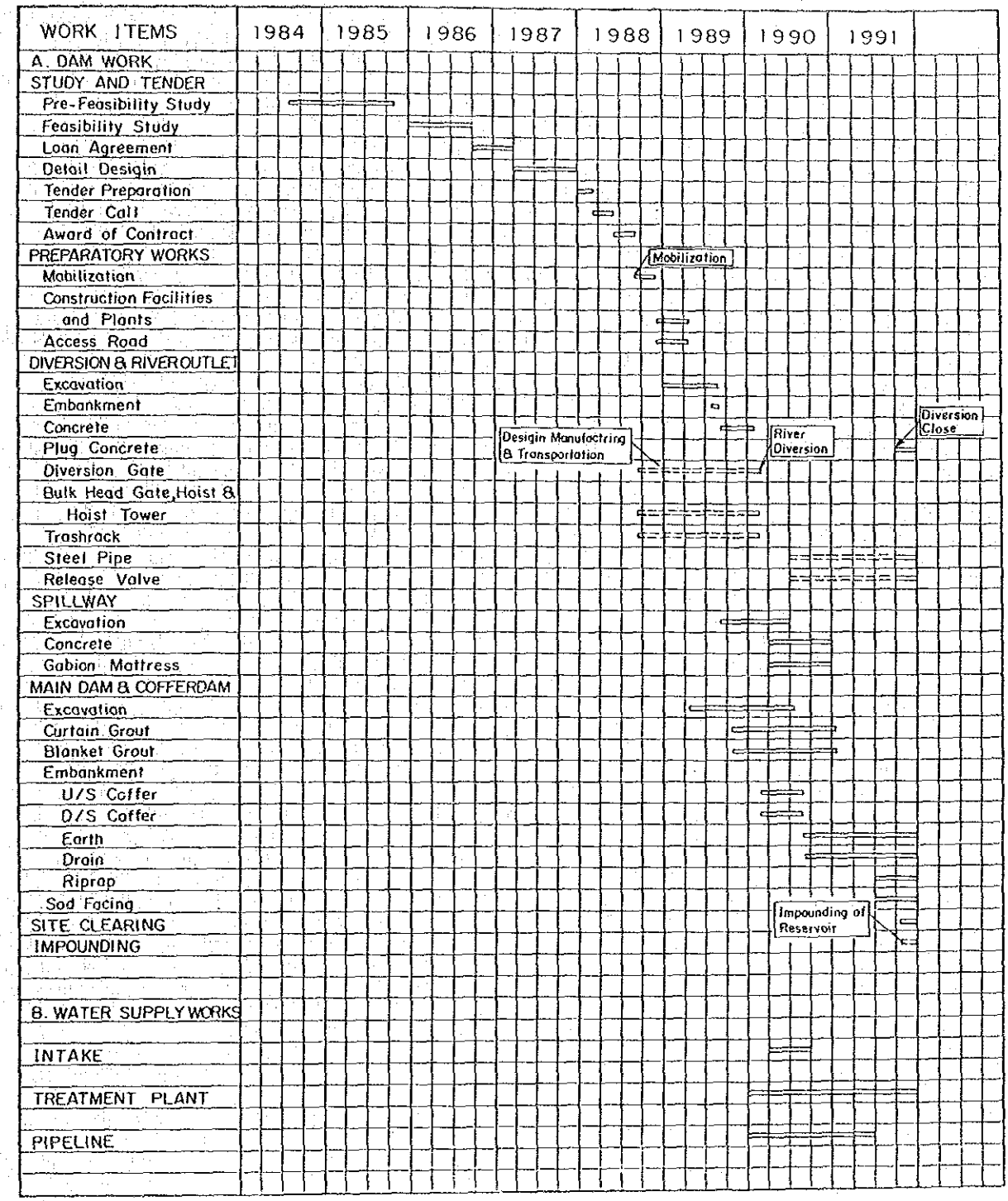

Fig.7 Construction Time Schedule for Sayong Dam and Water Supply Works

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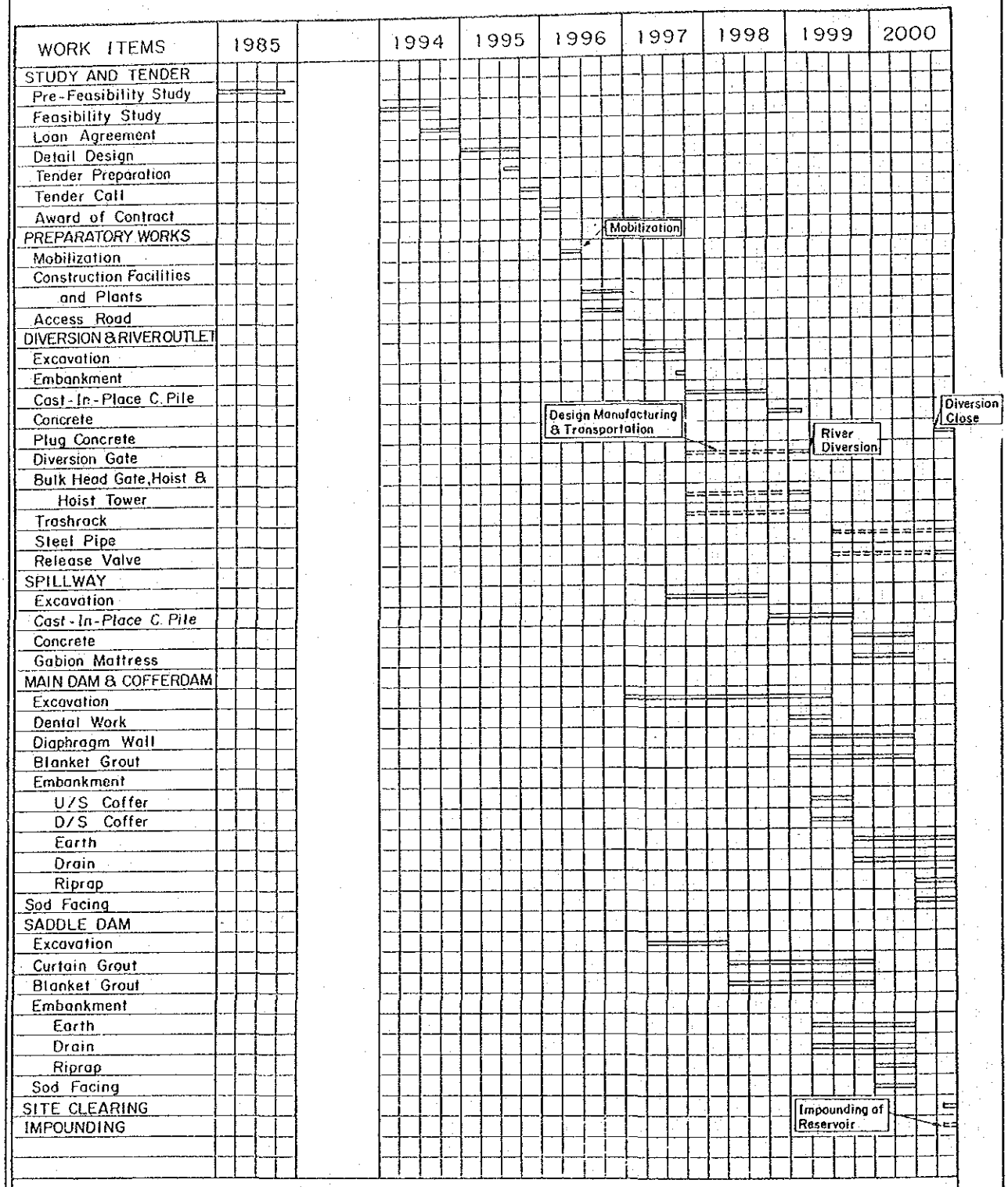

Remarks : Construction of a sadde dam is required only for the case of H.W.L. 40m.

Fig.8 Construction Time Schedule for Linggiu Dam

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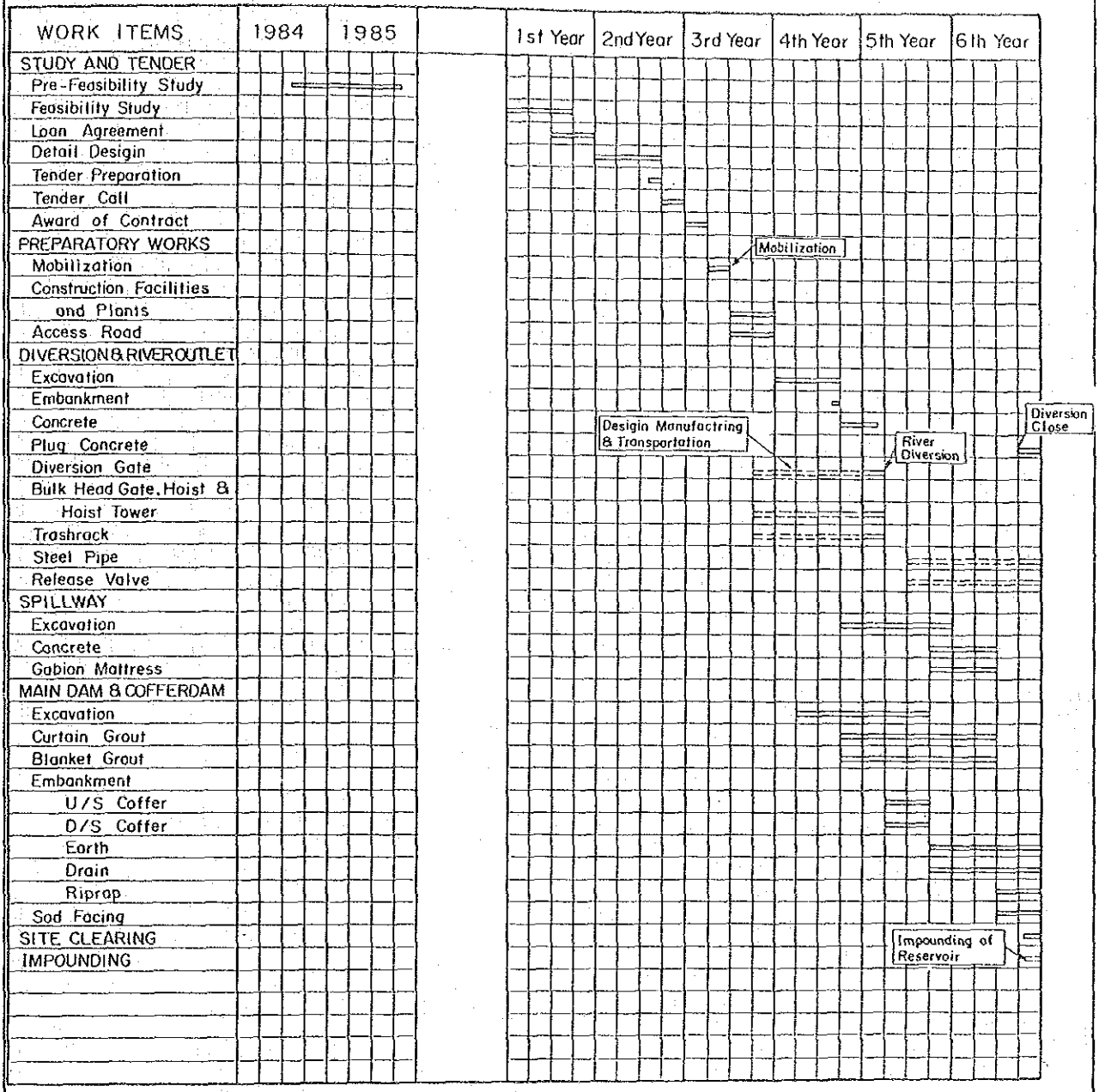

Fig.9 Construction Time Schedule for Sedili Dam

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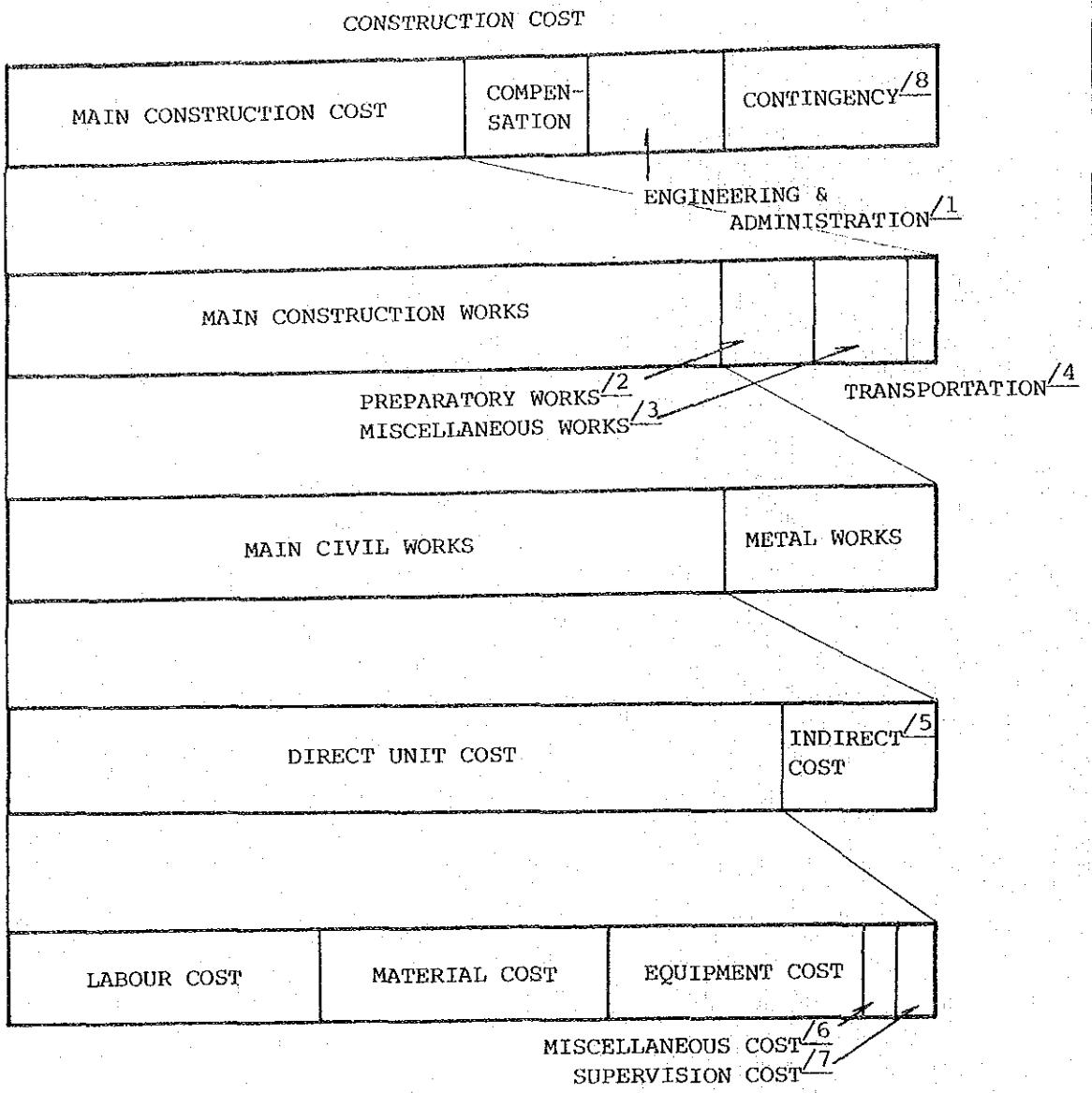

Remarks:
- /1: 27% to 33% of MAIN CONSTRUCTION COST
- /2: 10% of MAIN CONSTRUCTION WORKS
- /3: 10% of MAIN CONSTRUCTION & PREPARATORY WORKS
- /4: 2% of MAIN CONSTRUCTION, PREPARATORY & MISCELLANEOUS WORKS
- /5: 15% of DIRECT COST (PROFIT & OVERHEAD)
- /6: 3% of LABOUR & MATERIAL COST
- /7: 3% of LABOUR, MATERIAL, EQUIPMENT & MISCELLANEOUS COST
- /8: 30% of MAIN CONSTRUCTION COST, COMPENSATION & ENGINEERING

Fig. 10 Constitution of Construction Cost

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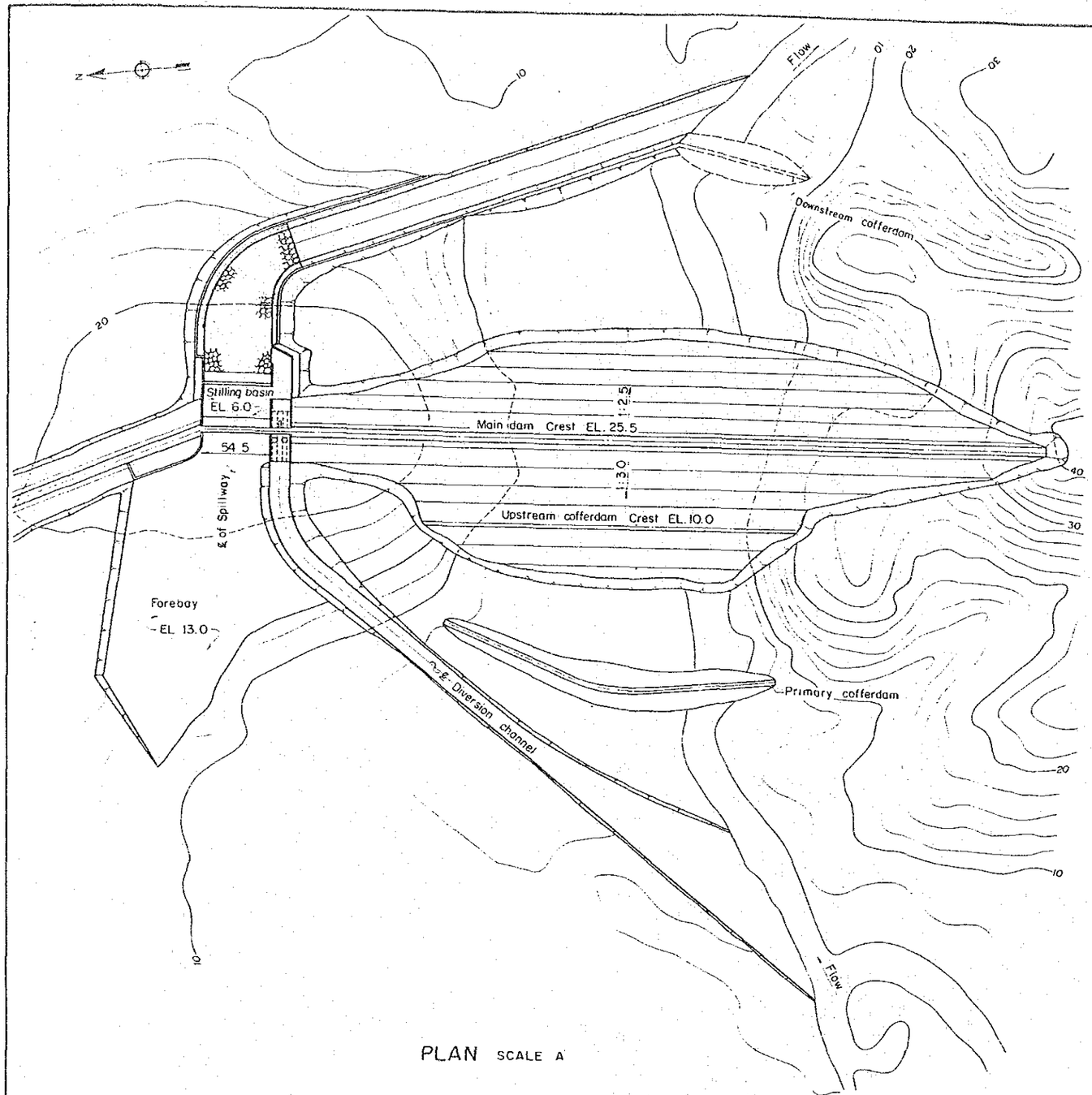
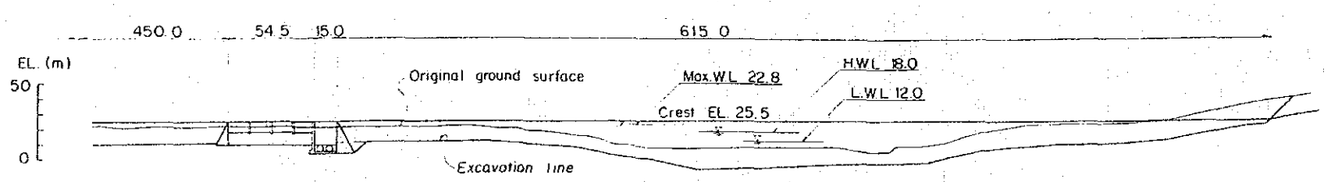
PLATES

PLATE NO. 1

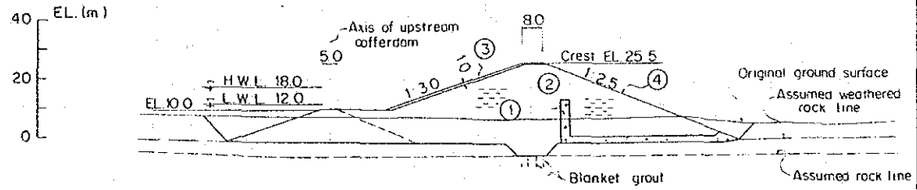


PLAN SCALE A

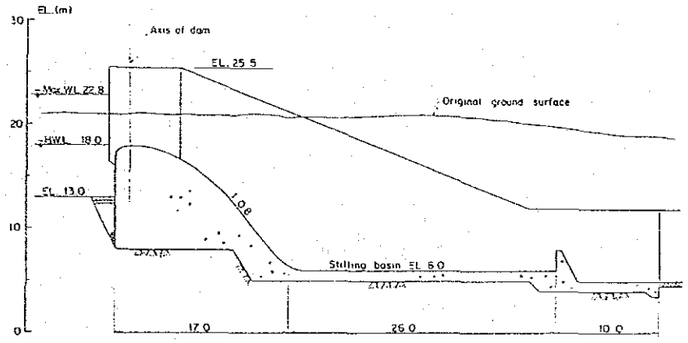


UPSTREAM ELEVATION OF DAM SCALE A

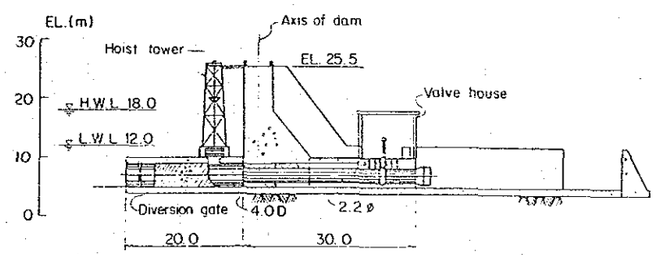
Zone	Material
(1)	Earthfill material
(2)	Interceptor drain
(3)	Riprap
(4)	Sod facing



TYPICAL SECTION OF DAM SCALE B



PROFILE OF SPILLWAY SCALE C



PROFILE OF DIVERSION AND RIVER OUTLET SCALE C

SCALE A 0 100 200m
SCALE B 0 50 100m
SCALE C 0 50m

Sayong Dam Scheme

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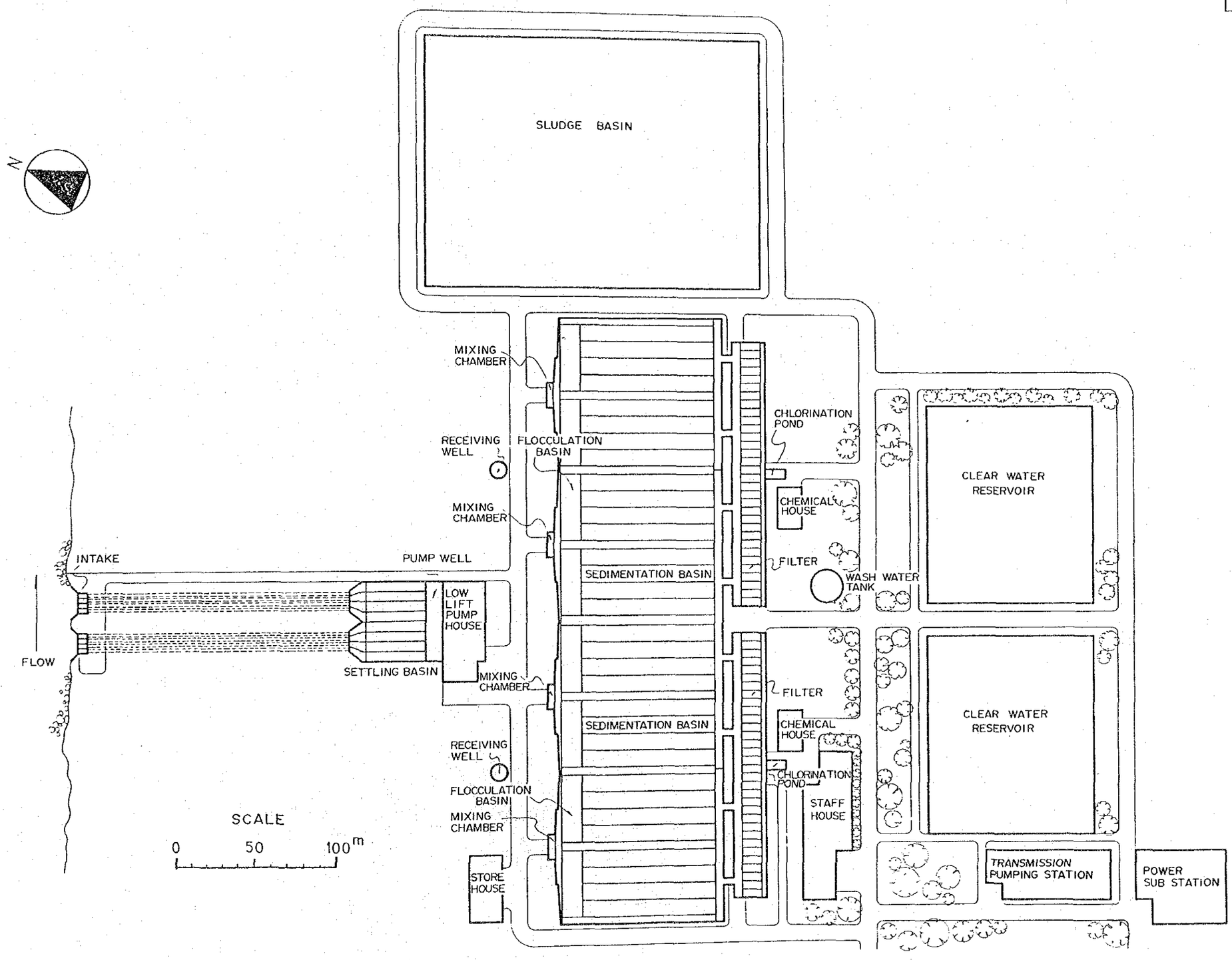
PLATE NO. 2



General Layout of Treatment Facilities

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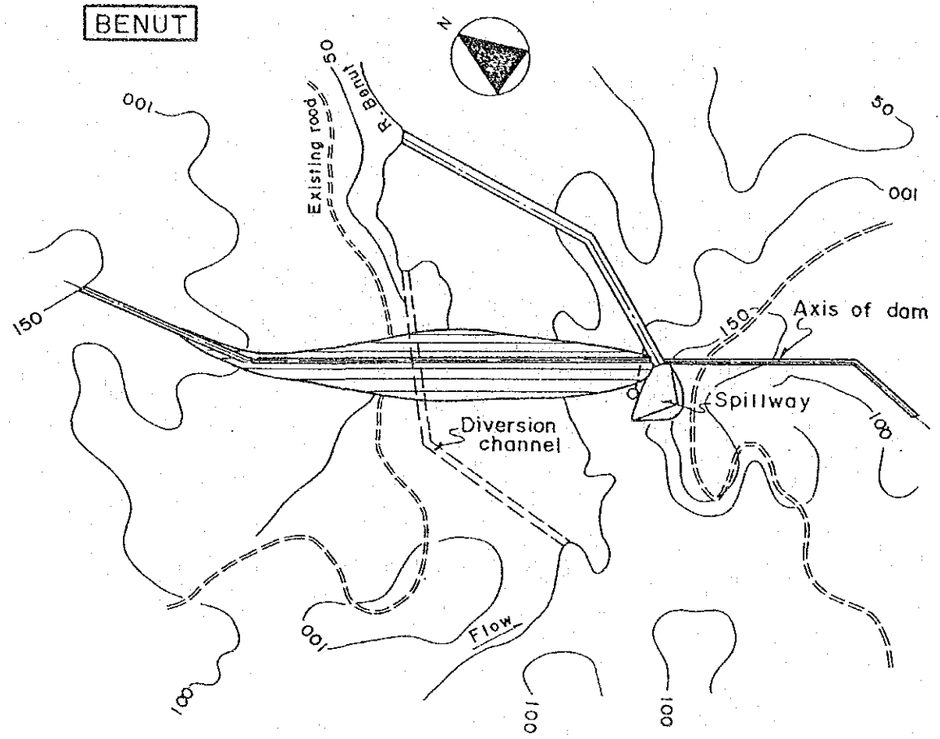
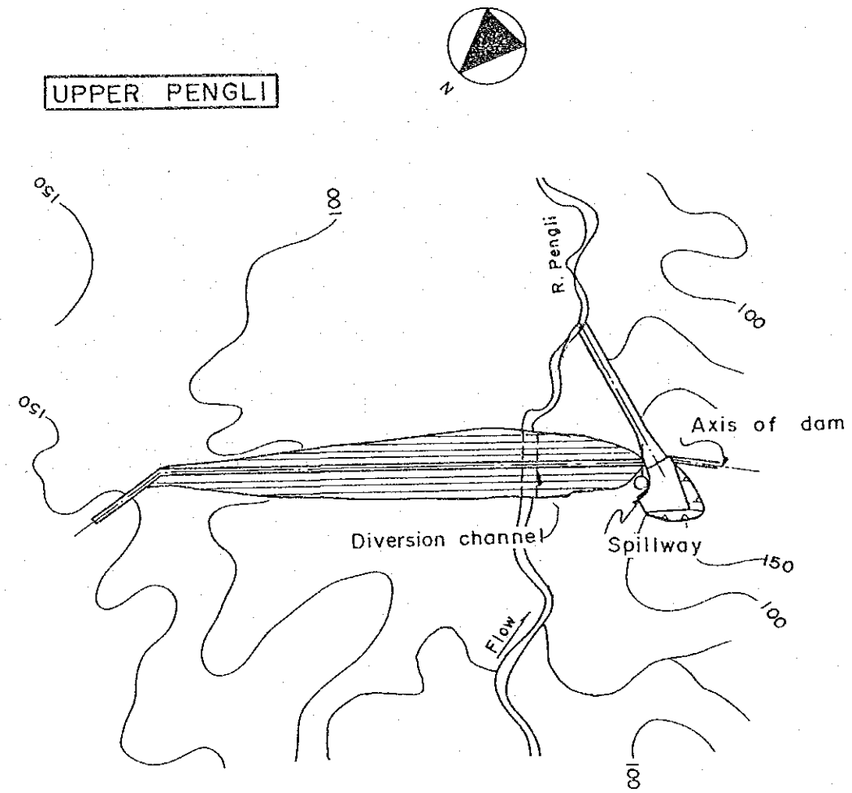
PLATE NO. 3

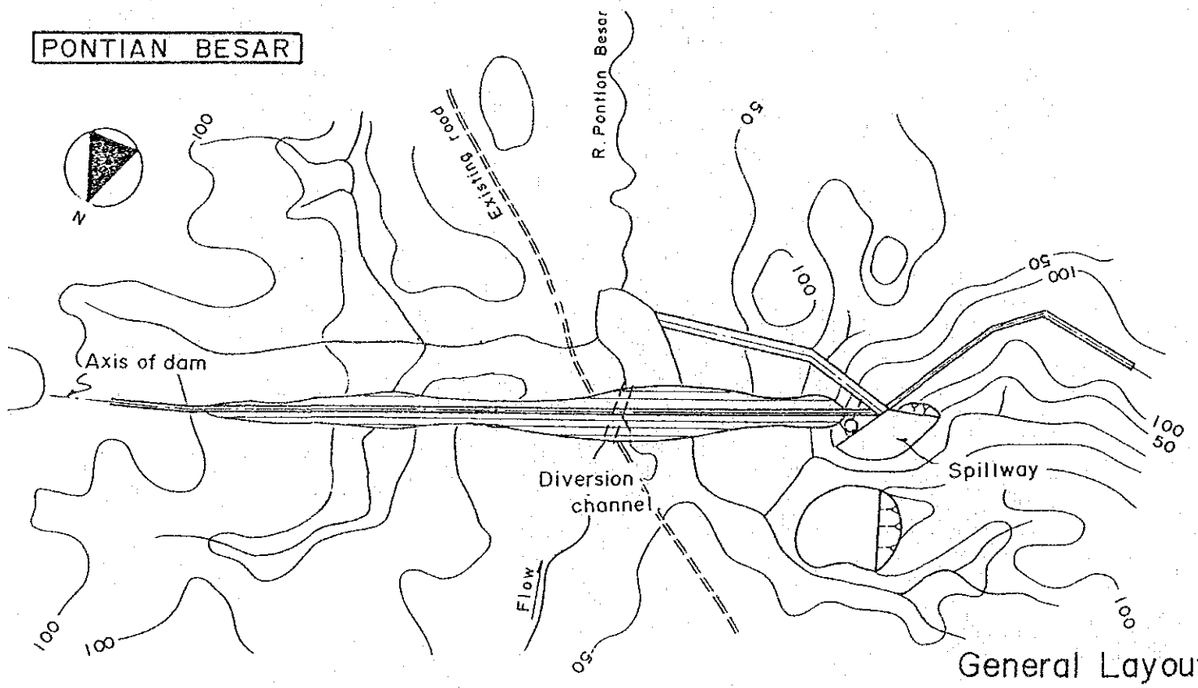
BENUT



UPPER PENGLI



PONTIAN BESAR



SCALE

0 500 m

General Layout of Benut, Pontian Besar and Upper Pengli Dams

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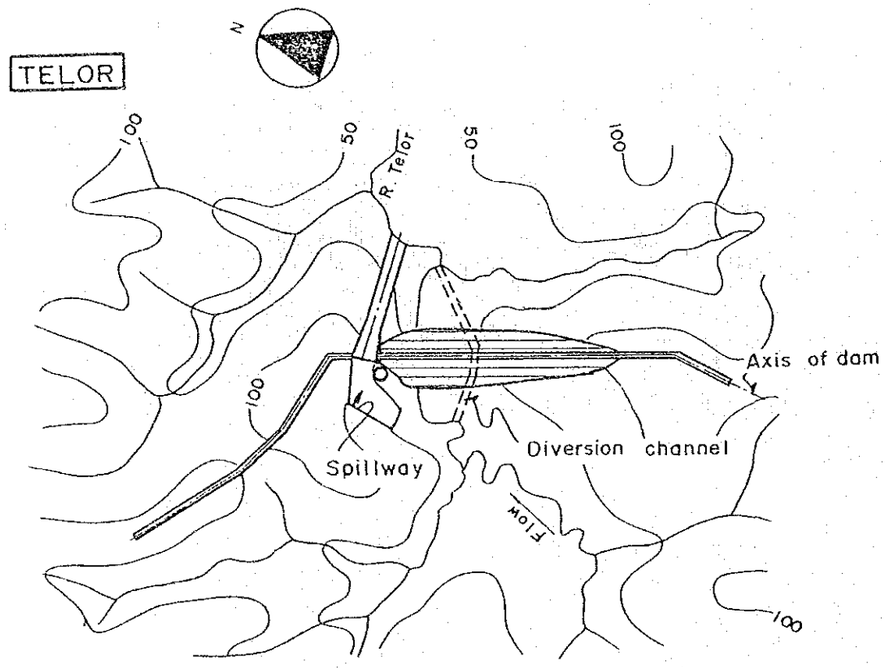

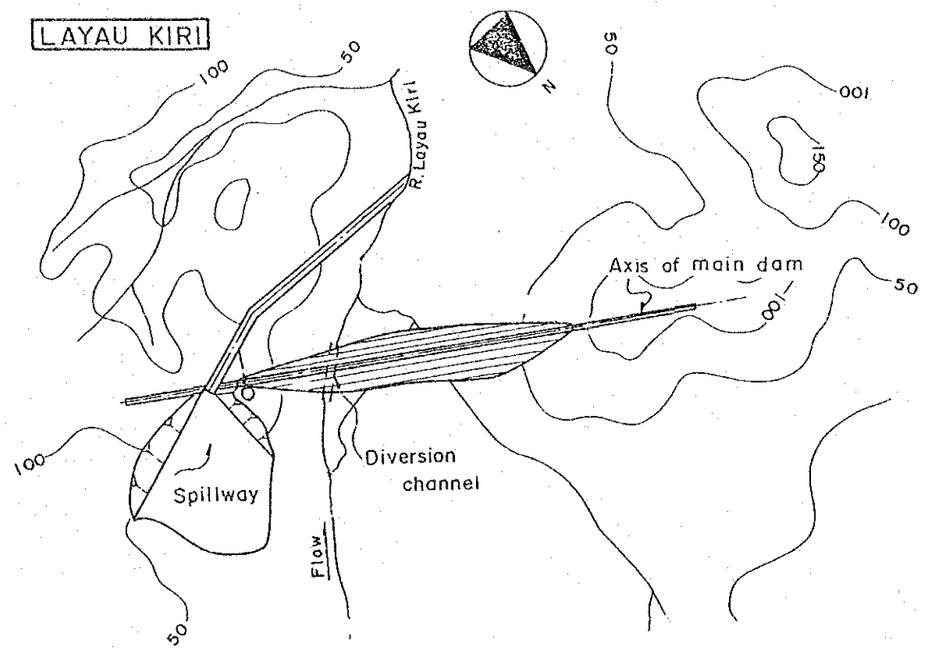

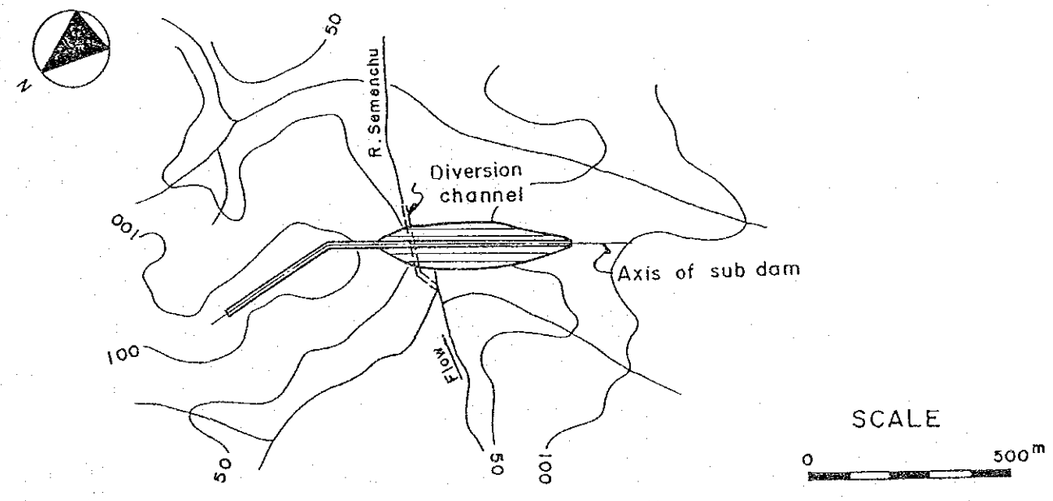

General Layout of Telor and Layau Kiri Dams

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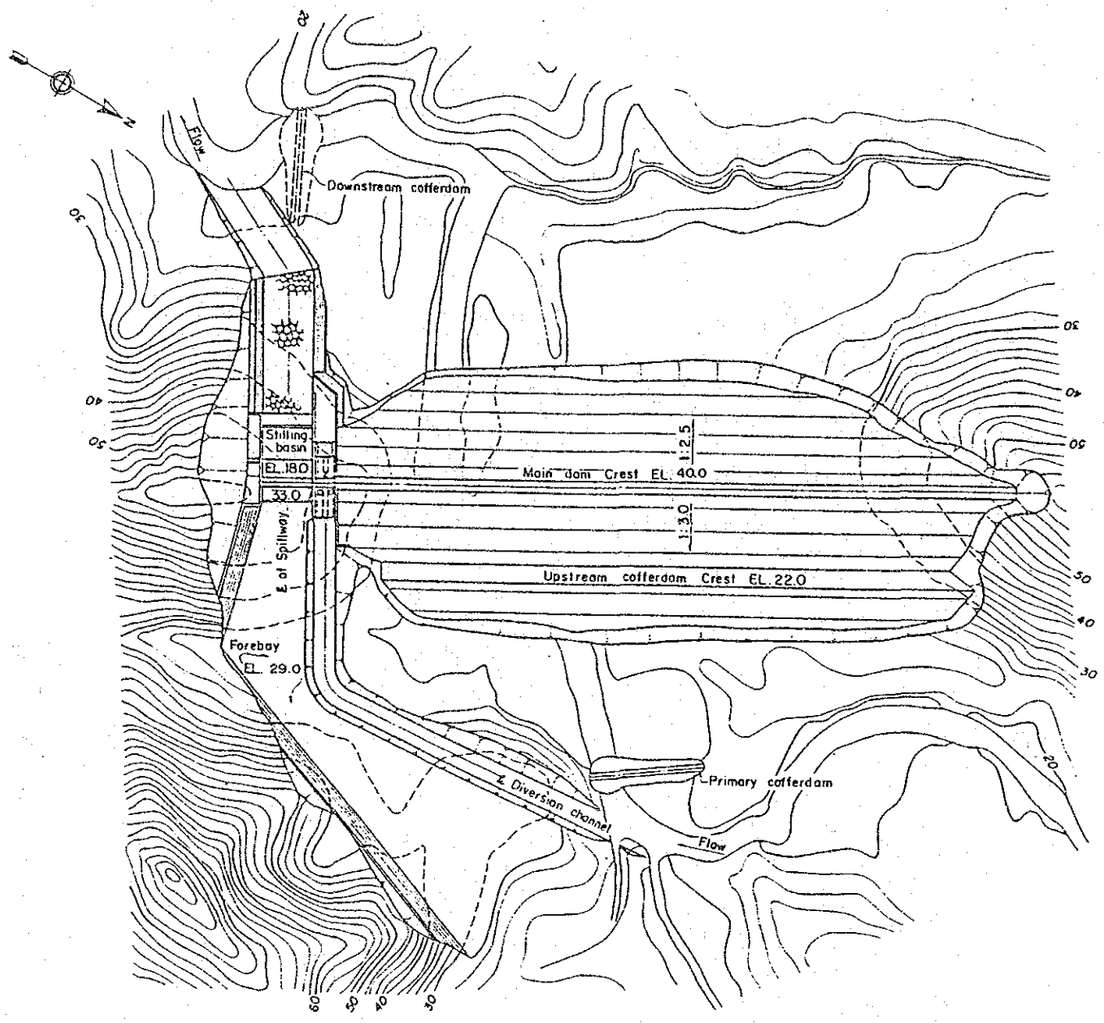
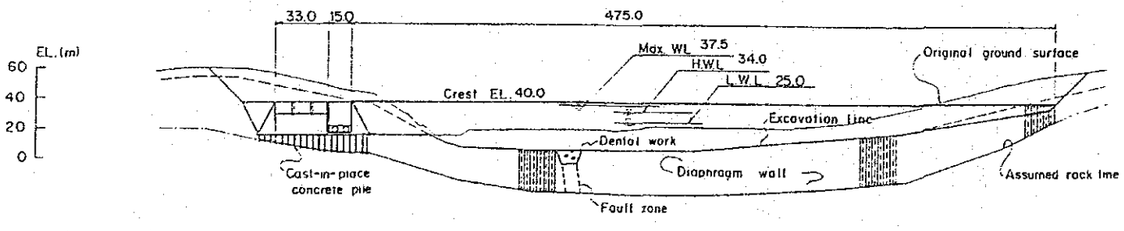
PLATE NO. 5

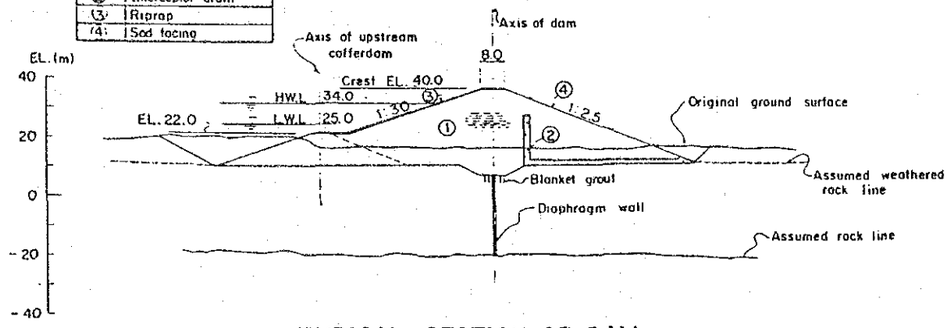


PLAN SCALE A

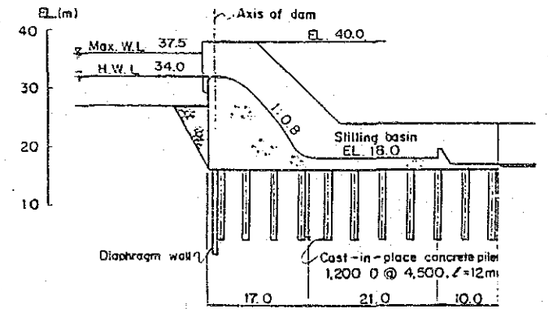


UPSTREAM ELEVATION OF DAM SCALE A

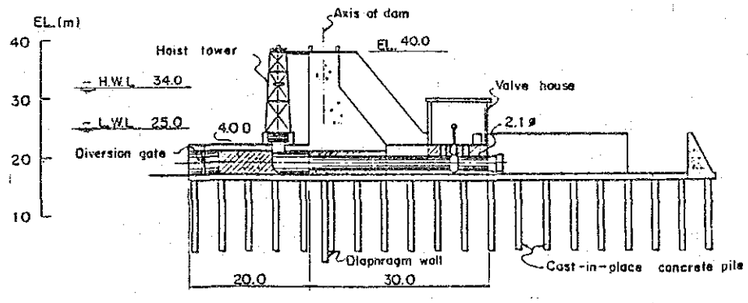
Zone	Material
①	Earthfill material
②	Interceptor drain
③	Riprap
④	Sod facing



TYPICAL SECTION OF DAM SCALE B



PROFILE OF SPILLWAY SCALE C



PROFILE OF DIVERSION AND RIVER OUTLET SCALE C

SCALE A 0 100 200 m
SCALE B 0 50 100 m
SCALE C 0 50 m

Linggiu Dam Scheme

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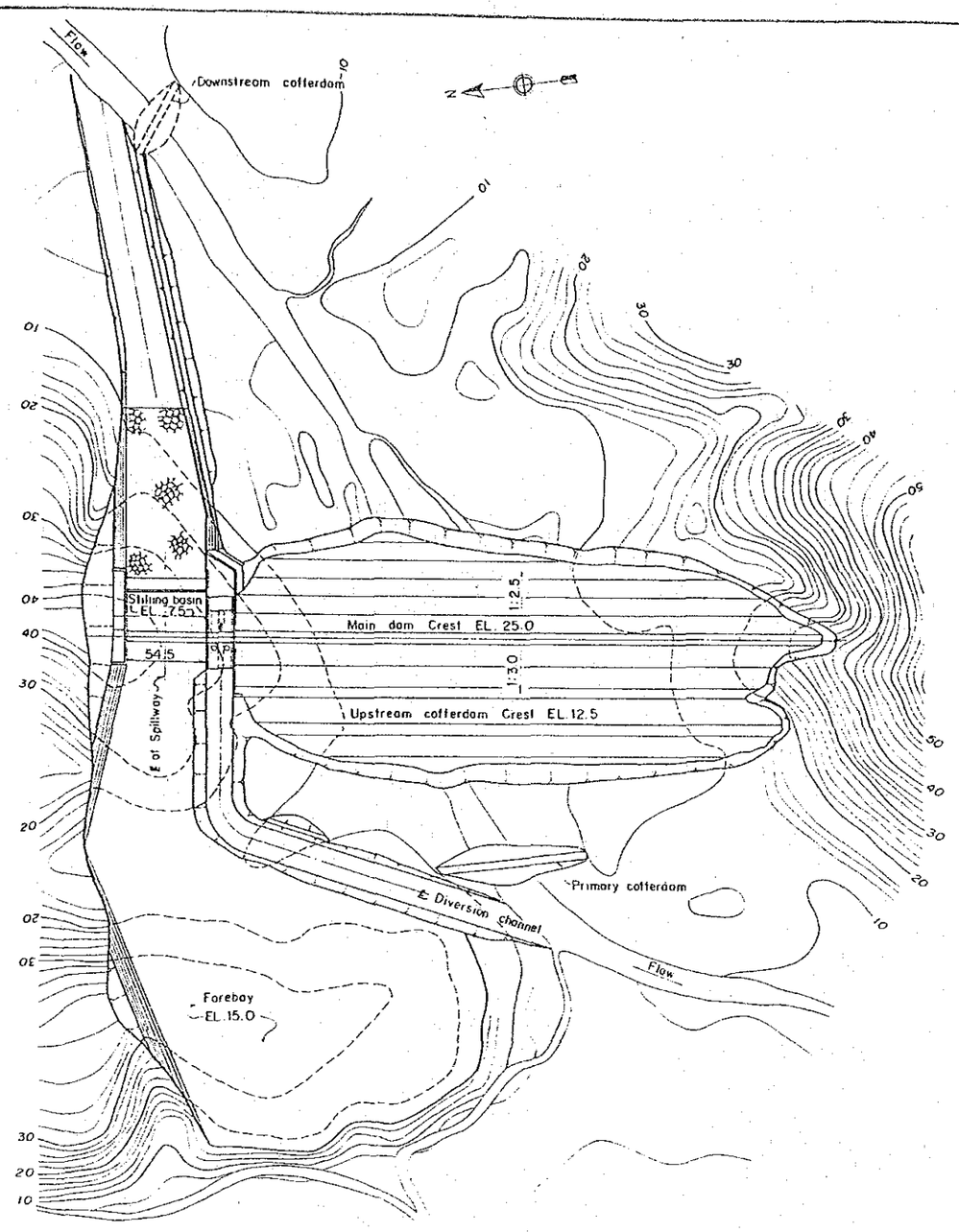
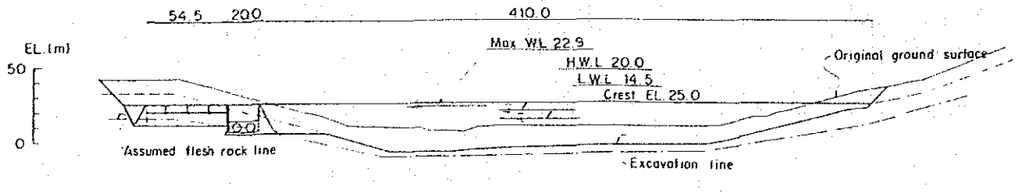
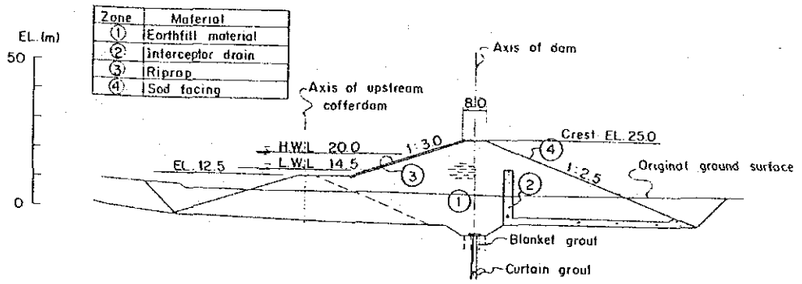
PLATE NO. 6



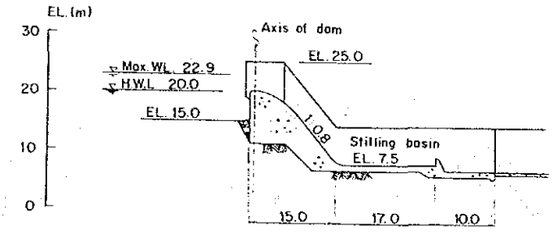
PLAN SCALE A



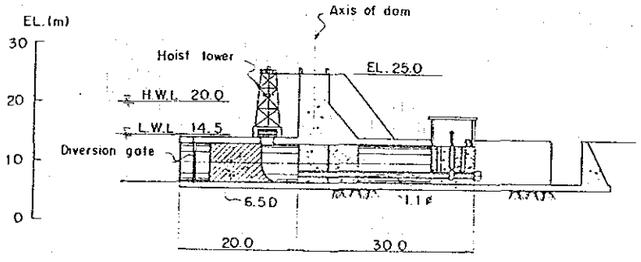
UPSTREAM ELEVATION OF DAM SCALE A



TYPICAL SECTION OF DAM SCALE B



PROFILE OF SPILLWAY SCALE C



PROFILE OF DIVERSION AND RIVER OUTLET SCALE C

SCALE A 0 100 200m
SCALE B 0 50 100m
SCALE C 0 50m

Sedili Dam Scheme

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REGIONAL WATER RESOURCES STUDY
JAPAN INTERNATIONAL COOPERATION AGENCY

ANNEX L
ECONOMIC EVALUATION OF PROPOSED DEVELOPMENT PLAN

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

This report was prepared to provide supporting information to understand the MAIN REPORT with regard to the evaluation of the proposed water resources development schemes. The schemes were selected under the least costly alternative criteria as mentioned in ANNEX K.

The first subject in this ANNEX is the optimization of dams. Sayong and Linggiu dam were optimized as the selected optimum and the next to optimum schemes. The second subject is the estimation of economic internal rate of returns.

And finally the report discusses the plan in the case that the stagnated economy depresses the growth of water demand.

2. Proposed Scheme

The water resources development of the Johor river was carried out for 4 cases designated by the Joint Steering Committee. The cases are briefed as follows:

Case 1: The water abstraction by Singapore reaches 1,137 Mld or 250 Mgd in 1995 and it is kept constant thereafter upto 2005. The water resources are developed to supplement deficit incurred by demands of Malaysia and Singapore.

Case 2: The water abstraction by Singapore reaches 728 Mld or 160 Mgd in 1990 and it is kept constant thereafter upto 2005. The water resources is developed to supplement deficit incurred by demands of Malaysia and Singapore.

Case 1-A: The water abstraction by Singapore is assumed to be the same with that in Case 1. The water resources is developed to supplement the deficit incurred by the demand of Malaysia.

Case 2-A: The water abstraction by Singapore is assumed to be the same with that in Case 1-A. The water resources is developed to supplement the deficit incurred by the demand of Malaysia.

The selected schemes for each case are as follows:

Case 1: In 1991 Sayong dam with the high water level of El. 18.0 is constructed and commences the operation in 1992. The dam and reservoir can meet the demand upto 2001. The second dam, Linggiu dam, with the high water level of El. 31 is constructed in 2001 and commences the operation in 1992.

The economic cost is estimated at M$113.9 x 10^6 with the time basis of 1986 and the discount rate of 10%. The economic benefit of M$289.3 is expected for the project life period of 50 years assuming the raw water value at

M¢19.0/m^3. The economic internal rate of return of 20.4% was entailed.

Case 2: In 1991 Sayong dam with the high water level of El. 18.0 is constructed and commences the operation in 1992. The dam and reservoir can meet the water demand beyond 2005. Sayong dam with HWL of El. 17.0 can also meet the water demand upto 2005. However, higher dam with higher cost is adopted as the scheme. The reason thereby the higher dam is selected is explained later. The economic cost is estimated at M$82.3 x 10^6 and benefit at M$130.1 x 10^6. The economic internal rate of return of 13.1% was entailed.

Case 1-A: In 1991 Sayong dam with the high water level of El. 18.0 is constructed and commences the operation in 1992. The dam and reservoir can meet the demand beyond 2005. The economic cost is estimated at M$82.3 x 10^6 and benefit at M$118.4 x 10^6. The economic internal rate of return of 12.5% was entailed.

Case 2-A: In 1991 Sayong dam with high water level of El. 16.0 is constructed and is operational in 1992. The dam and reservoir can meet the demand beyond 2005. The economic cost of M$69.3 x 10^6 and benefit of M$117.8 x 10^6 were estimated. The economic internal rate of return of 13.7% was entailed.

As described above, only Sayong and Linggiu dams were selected from the group of dams and barrages such as Sayong, Linggiu, Pengli and Telor dams and Seng Heng, Pendas and Layang estuary barrages.

Cash flows and economic analysis are summarized in Tables 1 to 4.

3. OPTIMIZATION OF DAMS

3.1 Assumptions

In order to examine the optimum development scales of Sayong and Linggiu dams, demands after 2005 were estimated assuming the same ratio of increase in the period between 2000 and 2005.

The unit value of raw water was assumed to be M¢19.0/m^3. The assumption was made referring to the raw water cost of Layang scheme Ic. The discount rate of 10% was assumed to obtain the cost in 1986. In addition to this, the unit water value of M¢15.0/m^3 and M¢10.0/m^3 were also assumed to see the sensitivity against benefit. The annual benefit is obtained as the summation of deficit supply against the existing intake capacity of 160 Mgd and the additional possibility for abstraction over 160 Mgd for Case 1 and Case 2.

The project life periods were assumed to be 50 years starting from 1986.

The benefit and cost for each scale of development were calculated as shown in Table 5 to 7. The maximum benefit minus cost criteria was adopted to find the optimum scale of dams. Accordingly the optimum scale is given obtained at a point which gives the incremental benefit minus incremental cost zero. The point is shown on the figure as the tangential point to a 45 degree line of a benefit and cost curves (see Figs. 1 to 4).

3.2 Benefit and Cost and Optimum Scale

Case 1: The optimum scale of Sayong dam is the high water level of El. 18.0 for the different unit water values of M¢19, 15 and 10. While Linggiu dam entails the maximum benefit minus cost if it is developed with the high water level of El. 36.0.

Case 2: The maximum benefit minus cost is obtained if Sayong dam is developed with the high water level of El. 18.0 for both unit water values of M¢19.0 and 15.0. While Linggiu dam is optimum if it is developed with the high water level of El. 36.0 for the unit water values of M¢19.0 and 15.0.

Case 1-A: Sayong dam is optimum if it is developed with the high water level of El. 18.0 for the unit water values of M¢19.0 and 15.0. While Linggiu dam is optimum if it is developed with the high water level of El. 36.0 for both unit water values of M¢19.0 and 15.0.

Case 2-A: Same with other 3 cases, Sayong dam with the high water level of El. 18.0 and Linggiu dam with the high water level of El. 36.0 are the optimum scales for the unit water values of M¢19.0 and 15.0.

Consequently it is concluded that Sayong dam with the high water level of El. 18.0 and Linggiu dam with the high water level of El. 36.0 are the optimum scales of development for all the cases mentioned above.

Since Sayong dam with the high water level of El. 18.0 is more advantageous to Linggiu dam and the optimum combination is Sayong dam with the high water level of El. 18.0 and Linggiu dam with the high water level of El. 31.0, the benefit and cost curves were developed for this combined cases. Fig. 1 shows the combined cases together with the Sayong dam. In this combined case, Linggiu dam was brought into operation in 2002 when demand is estimated to exceed the supply capacity of Sayong dam. Once the curve becomes flat but again it draws the curve steeper than 45 degree curve. It may be interpreted that Linggiu dam should come into operation in 2002 with higher water level than El. 31. The scale of the Linggiu should be determined after the review of demand projection. Benefit and cost for this case are presented in Table 8.

4. SENSITIVITY ANALYSIS

In accordance with the Scope of Works, the Steering Committee designated the water supply to Singapore in line with Case 2. The project sensitivity against the GDP growth rate was examined in terms of economic internal rate of return for Case 2.

In the original case, the GDP growth rates were assumed to be 7% for 1985-1990, 7% for 1990-1995, 6.5% for 1995-2000 and 6% for 2000-2005. In this study, the GDP growth rate were assumed to be 5% up to 2005 from 1985.

The water demand projected are presented in Table 9 for 1995 and 2005. The benefit was estimated at M$90.1 x 10^6 against the discount rate of 10%. And the economic internal rate of return of 10.6% was estimated. Since the economic internal rate of return of 10.6% is obtained even in the case of the lowest conceivable economic growth, the scheme is considered to be economically stable and feasible. The construction of Sayong dam with the high water level of El. 18.0 should be commenced as soon as possible.

TABLES

Table 1 ECONOMIC CASH FLOW AND EIRR FOR CASE 1

Unit: M$10⁶

Year	Financial Cost			Economic Cost			Economic Benefit		
	Construction Cost	OMR	Total	Construction Cost	OMR	Total	Water Supply	Flood Attenuation	Total
1986	0	-	0	0	-	0	-	-	-
1987	33.06	-	33.06	25.46	-	25.46	-	-	-
1988	36.86	-	36.86	28.38	-	28.38	-	-	-
1989	34.81	-	34.81	26.80	-	26.80	-	-	-
1990	17.19	-	17.19	13.24	-	13.24	-	-	-
1991	10.11	-	10.11	7.78	-	7.78	-	-	-
1992	-	0.35	0.35	-	0.27	0.27	17.92	0.46	18.38
1993	-	0.35	0.35	-	0.27	0.27	25.35	0.46	25.81
1994	-	0.35	0.35	-	0.27	0.27	32.78	0.46	33.24
1995	-	0.35	0.35	-	0.27	0.27	40.22	0.72	40.94
1996	8.14	0.35	8.49	6.51	0.27	6.78	41.86	0.72	42.58
1997	33.65	0.35	34.00	26.92	0.27	27.19	43.49	0.72	44.21
1998	9.95	0.35	10.30	7.96	0.27	8.23	45.13	0.72	45.85
1999	13.85	0.35	14.20	11.08	0.27	11.35	46.76	0.72	47.48
2000	35.86	0.35	36.21	28.69	0.27	28.96	48.39	0.72	49.11
2001	26.17	0.35	26.52	20.94	0.27	21.21	51.64	0.72	52.36
2002	-	1.01	1.01	-	0.87	0.87	54.91	0.86	55.77
2003	-	1.01	1.01	-	0.87	0.87	58.18	0.86	59.04
2004	-	1.01	1.01	-	0.87	0.87	61.45	0.86	62.31
2005	-	1.01	1.01	-	0.87	0.87	64.71	0.86	65.57
2006-2035	-	1.01	1.01	-	0.87	0.87	64.71	0.99	65.70
Total	259.65	37.84	297.49	203.76	32.28	236.04	2,574.09	39.56	2,613.65

Economic Benefit: 289.3 (Discounted by 10%)

Economic Cost : 113.9 (Discounted by 10%)

Economic B-C : 175.4 (Discounted by 10%)

Economic Internal Rate of Return (EIRR): 20.4%

Table 2 ECONOMIC CASH FLOW AND EIRR FOR CASE 2

Unit: M$10^6

Year	Financial Cost			Economic Cost			Economic Benefit		
	Construction Cost	OMR	Total	Construction Cost	OMR	Total	Water Supply	Flood Attenuation	Total
1986	0	-	0	0	-	0	-	-	-
1987	33.06	-	33.06	25.46	-	25.46	-	-	-
1988	36.86	-	36.86	28.38	-	28.38	-	-	-
1989	34.81	-	34.81	26.80	-	26.80	-	-	-
1990	17.19	-	17.19	13.24	-	13.24	-	-	-
1991	10.11	-	10.11	7.78	-	7.78	-	-	-
1992	-	0.35	0.35	-	0.27	0.27	5.22	0.46	5.68
1993	-	0.35	0.35	-	0.27	0.27	6.97	0.46	7.43
1994	-	0.35	0.35	-	0.27	0.27	8.72	0.46	9.18
1995	-	0.35	0.35	-	0.27	0.27	10.47	0.72	11.19
1996	-	0.35	0.35	-	0.27	0.27	12.11	0.72	12.83
1997	-	0.35	0.35	-	0.27	0.27	13.74	0.72	14.46
1998	-	0.35	0.35	-	0.27	0.27	15.37	0.72	16.09
1999	-	0.35	0.35	-	0.27	0.27	17.01	0.72	17.73
2000	-	0.35	0.35	-	0.27	0.27	18.64	0.72	19.36
2001	-	0.35	0.35	-	0.27	0.27	21.91	0.72	22.63
2002	-	0.35	0.35	-	0.27	0.27	25.17	0.72	25.89
2003	-	0.35	0.35	-	0.27	0.27	28.44	0.72	29.16
2004	-	0.35	0.35	-	0.27	0.27	31.70	0.72	32.42
2005	-	0.35	0.35	-	0.27	0.27	34.96	0.72	35.68
2006-2035	-	0.35	0.35	-	0.27	0.27	34.96	0.82	35.78
Total	132.03	15.40	147.43	101.66	11.88	113.54	1,220.63	33.90	1,254.53

Economic Benefit: 130.1 (Discounted by 10%)

Economic Cost : 82.3 (Discounted by 10%)

Economic B-C : 47.8 (Discounted by 10%)

Economic Internal Rate of Return (EIRR): 13.1%

Table 3 ECONOMIC CASH FLOW AND EIRR FOR CASE 1-A

Unit: M$10^6

Year	Financial Cost			Economic Cost			Economic Benefit		
	Construction Cost	OMR	Total	Construction Cost	OMR	Total	Water Supply	Flood Attenuation	Total
1986	0	-	0	0	-	0	-	-	-
1987	33.06	-	33.06	25.46	-	25.46	-	-	-
1988	36.86	-	36.86	28.38	-	28.38	-	-	-
1989	34.81	-	34.81	26.80	-	26.80	-	-	-
1990	17.19	-	17.19	13.24	-	13.24	-	-	-
1991	10.11	-	10.11	7.78	-	7.78	-	-	-
1992	-	0.35	0.35	-	0.27	0.27	4.12	0.46	4.58
1993	-	0.35	0.35	-	0.27	0.27	5.89	0.46	6.35
1994	-	0.35	0.35	-	0.27	0.27	7.64	0.46	8.10
1995	-	0.35	0.35	-	0.27	0.27	9.39	0.72	10.11
1996	-	0.35	0.35	-	0.27	0.27	11.02	0.72	11.74
1997	-	0.35	0.35	-	0.27	0.27	12.65	0.72	13.37
1998	-	0.35	0.35	-	0.27	0.27	14.29	0.72	15.01
1999	-	0.35	0.35	-	0.27	0.27	15.92	0.72	16.64
2000	-	0.35	0.35	-	0.27	0.27	17.56	0.72	18.28
2001	-	0.35	0.35	-	0.27	0.27	20.82	0.72	21.54
2002	-	0.35	0.35	-	0.27	0.27	24.09	0.72	24.81
2003	-	0.35	0.35	-	0.27	0.27	27.37	0.72	28.06
2004	-	0.35	0.35	-	0.27	0.27	30.61	0.72	31.33
2005	-	0.35	0.35	-	0.27	0.27	33.88	0.72	34.60
2006-2035	-	0.35	0.35	-	0.27	0.27	33.88	0.82	34.70
Total	132.03	15.40	147.43	101.66	11.88	113.54	1,251.62	33.90	1,285.52

Economic Benefit: 118.4 (Discounted by 10%)

Economic Cost : 82.3 (Discounted by 10%)

Economic B-C : 36.1 (Discounted by 10%)

Economic Internal Rate of Return (EIRR): 12.5%

Table 4 ECONOMIC CASH FLOW AND EIRR FOR CASE 2-A

Unit: M$10^6

Year	Financial Cost			Economic Cost			Economic Benefit		
	Construction Cost	OMR	Total	Construction Cost	OMR	Total	Water Supply	Flood Attenuation	Total
1986	0	-	0	0	-	0	-	-	-
1987	26.12	-	26.12	20.11	-	20.11	-	-	-
1988	30.86	-	30.86	23.76	-	23.76	-	-	-
1989	29.35	-	29.35	22.60	-	22.60	-	-	-
1990	15.96	-	15.96	12.29	-	12.29	-	-	-
1991	9.21	-	9.21	7.09	-	7.09	-	-	-
1992	-	0.33	0.33	-	0.26	0.26	4.12	0.39	4.51
1993	-	0.33	0.33	-	0.26	0.26	5.89	0.39	6.28
1994	-	0.33	0.33	-	0.26	0.26	7.64	0.39	8.03
1995	-	0.33	0.33	-	0.26	0.26	9.39	0.39	9.78
1996	-	0.33	0.33	-	0.26	0.26	11.02	0.63	11.65
1997	-	0.33	0.33	-	0.26	0.26	12.65	0.63	13.28
1998	-	0.33	0.33	-	0.26	0.26	14.29	0.63	14.92
1999	-	0.33	0.33	-	0.26	0.26	15.92	0.63	16.55
2000	-	0.33	0.33	-	0.26	0.26	17.56	0.63	18.19
2001	-	0.33	0.33	-	0.26	0.26	20.82	0.63	21.45
2002	-	0.33	0.33	-	0.26	0.26	24.09	0.63	24.72
2003	-	0.33	0.33	-	0.26	0.26	27.34	0.63	27.97
2004	-	0.33	0.33	-	0.26	0.26	30.61	0.63	31.24
2005	-	0.33	0.33	-	0.26	0.26	33.88	0.63	34.51
2006-2035	-	0.33	0.33	-	0.26	0.26	33.88	0.69	34.57
Total	111.50	14.52	126.02	85.85	11.44	97.29	1,251.62	28.56	1,280.18

Economic Benefit: 117.8 (Discounted by 10%)

Economic Cost : 69.3 (Discounted by 10%)

Economic B-C : 48.5 (Discounted by 10%)

Economic Internal Rate of Return (EIRR): 13.7%

Table 5 ASSUMED ECONOMIC BENEFIT AND COST BY DAM SCALE (1/4)

Unit price M¢ 19

H.W.L.	Economic Construction Cost ($M\$10^6$)	Benefit ($M\$10^6$)			
		Case-1	Case-2	Case-1-A	Case-2-A
Sayong Dam					
16.0	69.3	152.0	108.2	94.8	118.5
17.0	75.6	227.3	129.9	111.6	135.2
18.0	82.3	263.0	148.5	128.4	149.4
19.0	92.6	275.4	155.6	135.5	154.7
20.0	105.9	285.8	161.0	141.6	158.8
21.0	122.7	295.2	165.4	147.0	160.8
22.0	131.1	302.4	168.1	151.2	
Linggiu Dam					
30.0	79.7	-	-	53.0	76.4
31.0	81.0	-	87.9	79.6	102.0
32.0	82.3	145.5	104.4	91.3	114.8
33.0	83.5	177.3	113.9	98.4	122.3
34.0	85.0	224.7	127.3	109.1	132.6
35.0	86.3	243.5	136.5	116.9	139.6
36.0	87.6	254.3	142.3	122.2	144.0
37.0	100.2	263.4	147.6	127.4	148.0
38.0	113.3	272.3	152.5	132.4	151.6
39.0	118.0	279.6	156.1	136.5	154.3
40.0	122.6	283.2	159.3	140.4	156.5

Table 6 ASSUMED ECONOMIC BENEFIT AND COST BY DAM SCALE (2/4)

Unit price M¢ 15

H.W.L.	Economic Construction Cost (M10^6)	Benefit (M10^6)			
		Case-1	Case-2	Case-1-A	Case-2-A
Sayong Dam					
16.0	69.3	120.8	86.1	75.6	94.3
17.0	75.6	180.2	103.3	88.9	107.5
18.0	82.3	208.5	118.1	102.2	118.8
19.0	92.6	218.4	123.8	107.9	123.1
20.0	105.9	226.7	128.2	112.8	126.5
21.0	122.7	234.3	131.8	117.3	128.1
22.0	131.1	240.1	134.0	120.7	
Linggiu Dam					
30.0	79.7	-	-	42.0	60.5
31.0	81.0	-	69.6	63.0	80.7
32.0	82.3	115.0	82.6	72.2	90.8
33.0	83.5	140.1	90.1	77.9	96.7
34.0	85.0	177.7	100.8	86.4	105.0
35.0	86.3	192.5	108.0	92.6	110.5
36.0	87.6	201.0	112.6	96.8	114.0
37.0	100.2	208.3	116.8	100.9	117.1
38.0	113.3	215.3	120.7	104.8	120.0
39.0	118.0	221.1	123.5	108.1	122.1
40.0	122.6	224.5	126.1	111.1	123.8

Table 7 ASSUMED ECONOMIC BENEFIT AND COST BY DAM SCALE (3/4)

Unit price M¢ 10

H.W.L.	Economic Construction Cost ($M\$10^6$)	Benefit ($M\$10^6$)			
		Case-1	Case-2	Case-1-A	Case-2-A
Sayong Dam					
16.0	69.3	81.7	58.6	51.6	64.0
17.0	75.6	121.4	70.1	60.5	72.9
18.0	82.3	140.4	80.1	69.5	80.6
19.0	92.6	147.1	84.0	73.5	83.5
20.0	105.9	152.9	87.2	76.9	86.0
21.0	122.7	158.1	89.8	80.1	87.3
22.0	131.1	162.2	91.5	82.6	
Linggiu Dam					
30.0	79.7	-	-	28.3	40.6
31.0	81.0	-	46.7	42.3	54.1
32.0	82.3	77.0	55.3	48.4	60.8
33.0	83.5	93.7	60.4	52.3	64.8
34.0	85.0	118.8	67.6	58.0	70.4
35.0	86.3	128.8	72.4	62.1	74.1
36.0	87.6	134.5	75.5	65.0	76.4
37.0	100.2	139.3	78.3	67.7	78.5
38.0	113.3	144.0	80.9	70.4	80.4
39.0	118.0	147.8	82.8	72.5	81.9
40.0	122.6	151.6	84.5	74.6	83.0

Table 8 ASSUMED ECONOMIC BENEFIT AND COST BY DAM SCALE (4/4)

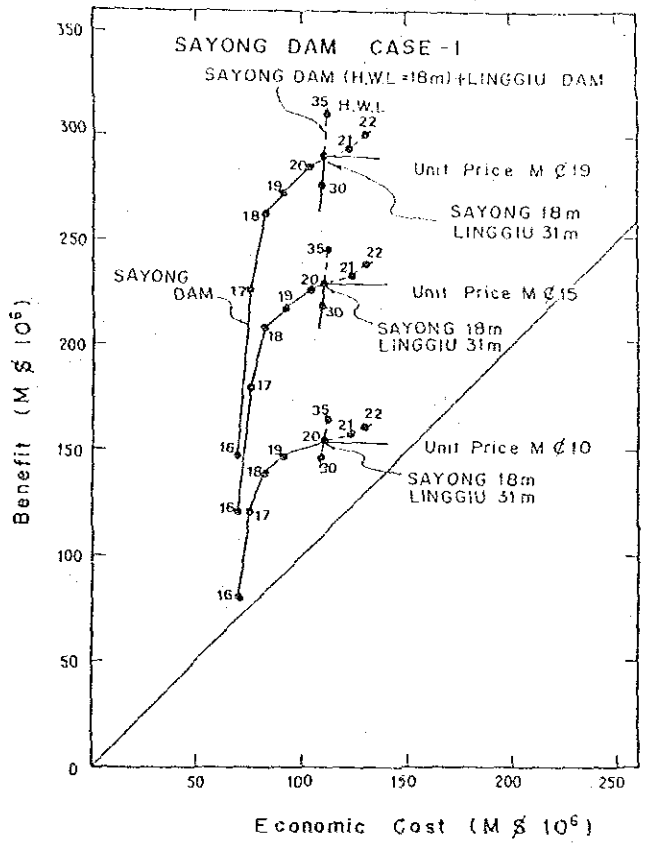
H.W.L. (m)		Economic Construciton Cost (M10^6)	Benefit: Unit Price MC19 (M10^6)	Benefit: Unit Price MC15 (M10^6)
Sayong Dam & Linggiu Dam (Sayong Dam H.W.L.=18.0 m)				
18.0	30.0	113.4	277.2	219.7
	31.0	113.9	289.5	229.6
	32.0	114.4	296.3	234.9
	33.0	114.9	300.5	238.3
	34.0	115.5	306.7	243.2
	35.0	116.0	311.6	247.1

Table 9 WATER DEMAND PROJECTION FOR THE LOWEST GROWTH CASE

Case	1995		2005	
	/1 Original	/2 Lowest	/1 Original	/2 Lowest
GDP of Malaysia (M$10^6)	69,360	57,430	127,160	93,540
GRP of the State of Johor (M$10^6)	7,740	6,410	14,170	10,420
Per Capita GDP (M$)	3,600	2,980	5,470	4,030
Per Capita GRP of the State of Johor (M$)	3,430	2,840	5,190	3,820
Urbanization Ratio of Malaysia (%)	49.9	45.3	61.6	52.6
Urbanization Ratio of the Region (%)	68.2	61.9	82.1	70.1
Share of VA of Manufacturing Sector in the State of Johor (%)	29.0	24.9	38.3	29.0
Public Water Demand (10^6 m^3/y)				
Domestic Water Demand (Region)				
Urban	88.1	79.9	160.7	140.3
Rural	20.4	24.4	25.7	35.4
D Water Total	108.5	104.3	186.4	175.7
Industrial Water Demand (Region)	87.5	62.2	179.6	99.8
D&I Water Demand (Region)	196.0	166.5	336.0	275.5
D&I Water Demand (Region & PUB)	315.1	288.5	444.0	366.0

Remarks: /1: Annual GDP growth rates for original case are 7.0% from 1985 to 1995, 6.5% from 1995 to 2000 and 6.0% from 2000 to 2005.
/2: Annual GDP growth rate for lowest case is 5% from 1985 to 2005.

FIGURES



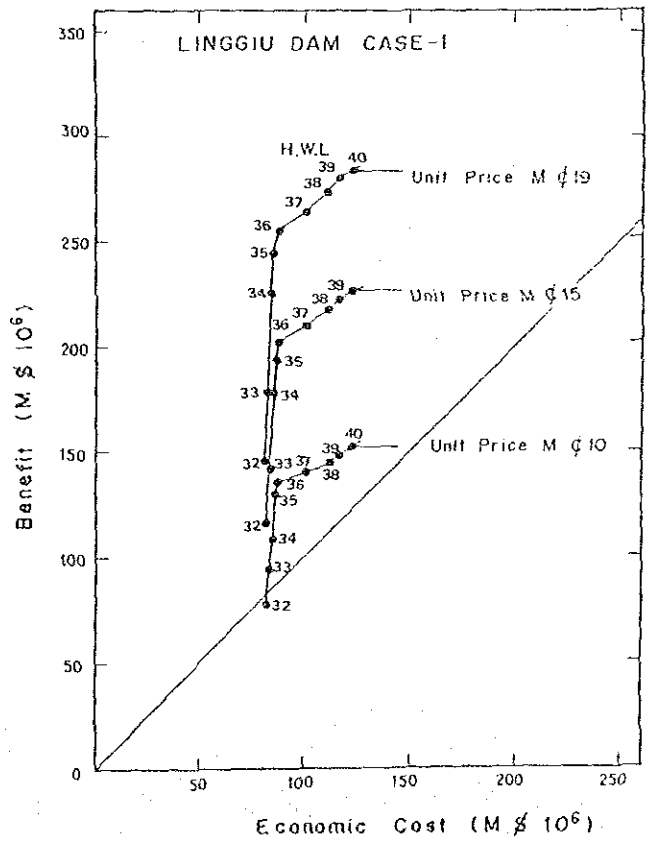


Fig. 1 Relationship between Economic Benefit and Cost by Dam Scale (1/4)

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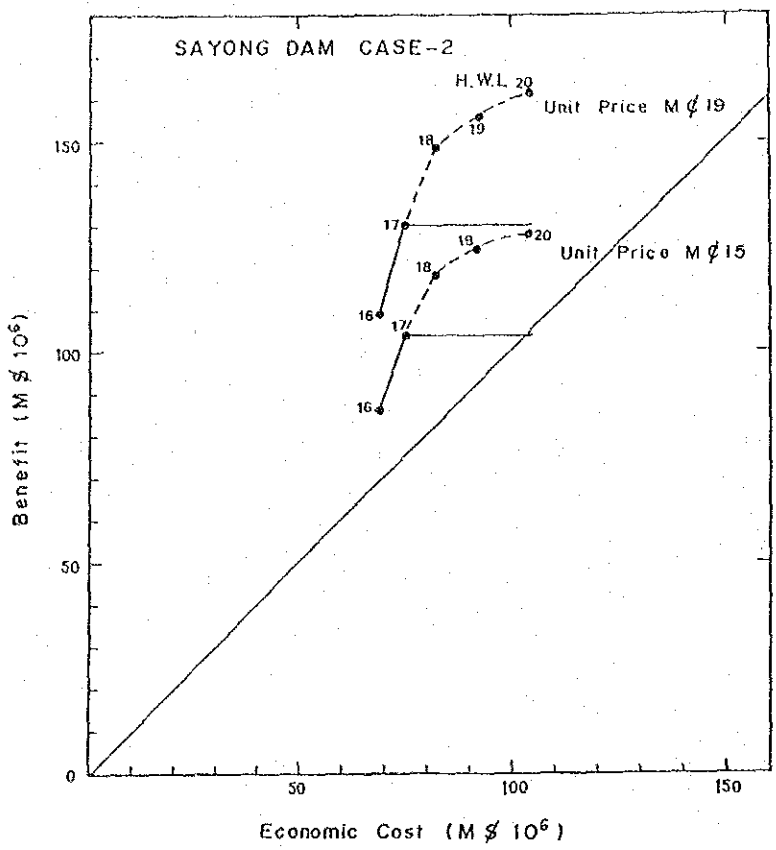

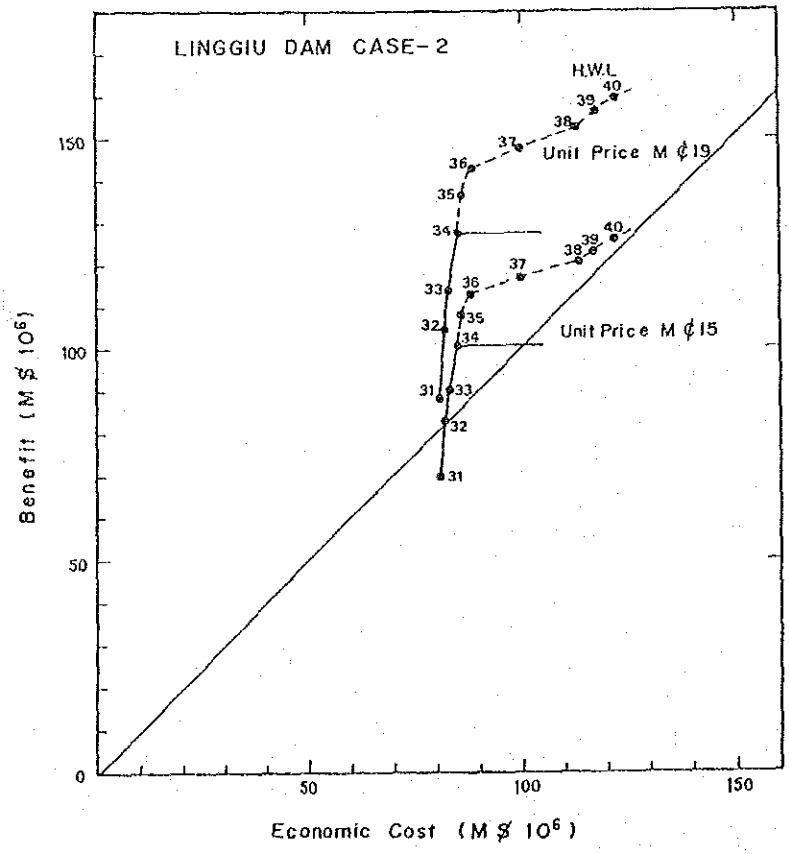

Fig. 2 Relationship between Economic Benefit and Cost by Dam Scale (2/4)

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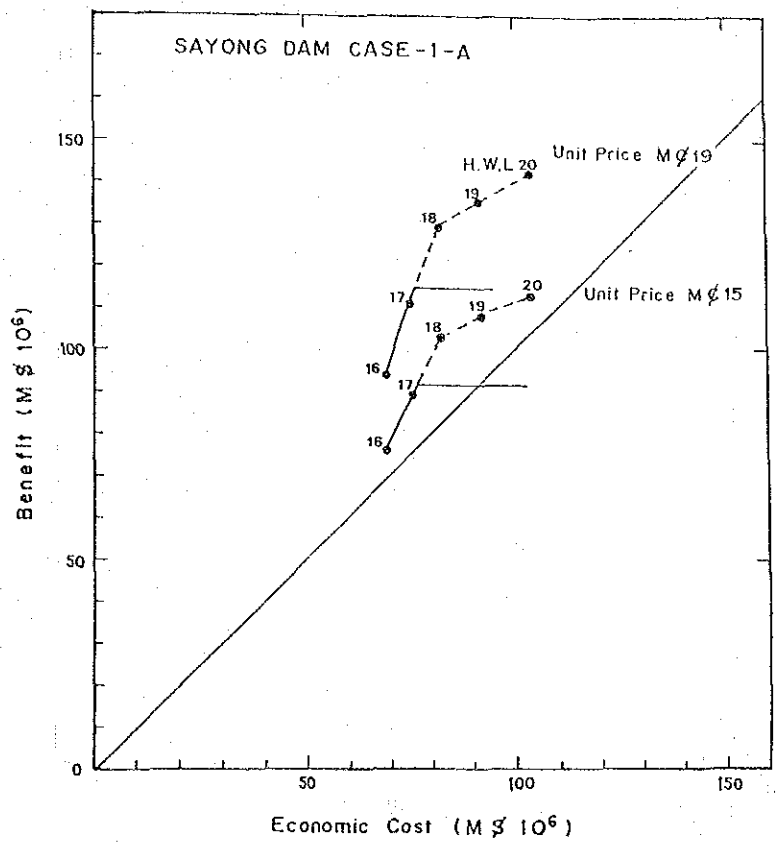

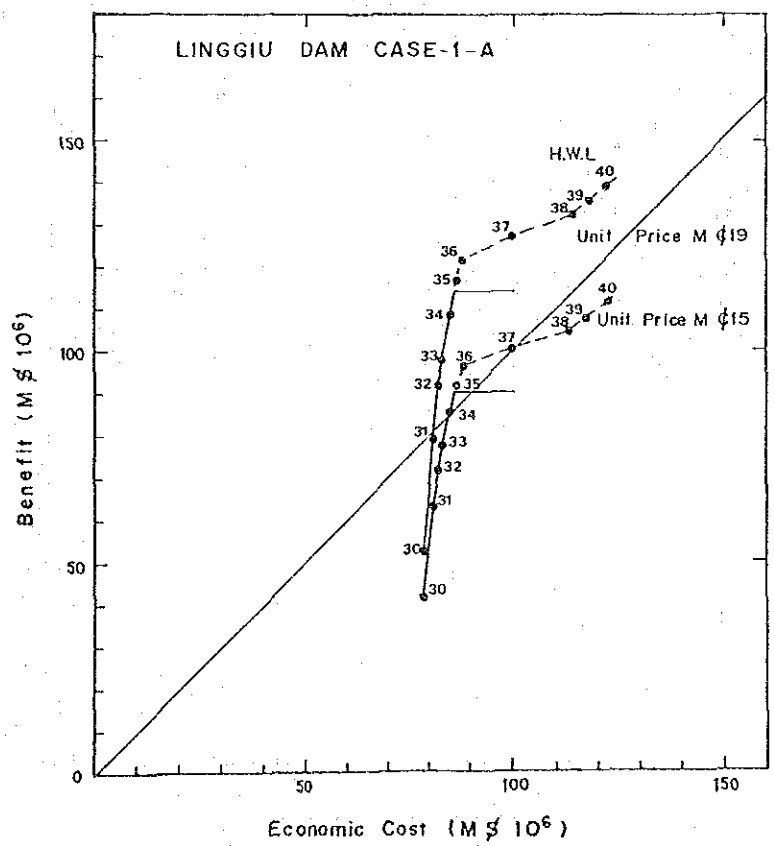

Fig. 3 Relationship between Economic Benefit and Cost by Dam Scale (3/4)

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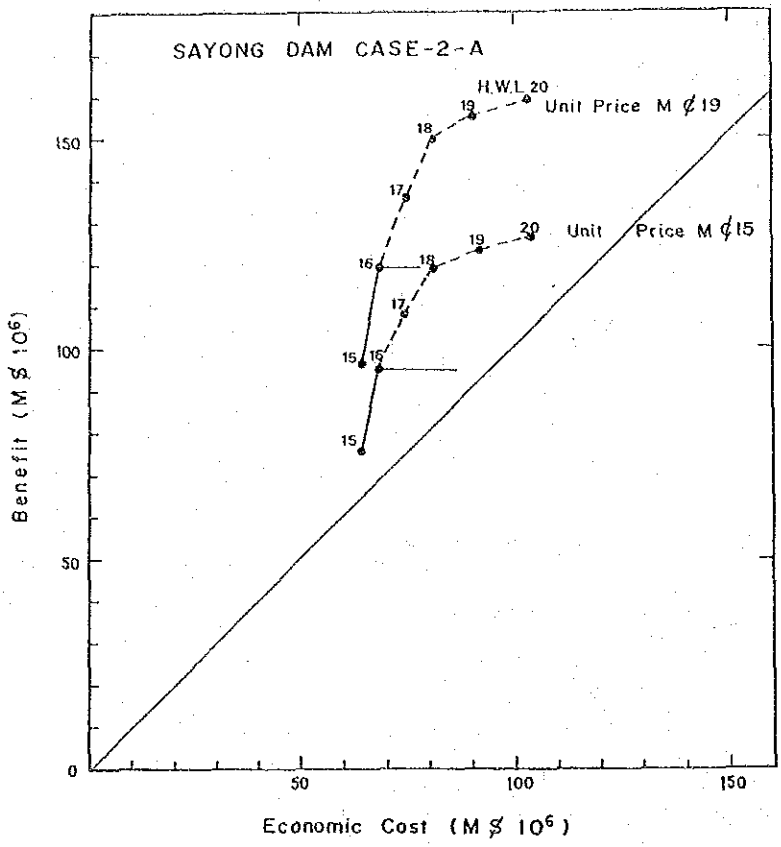

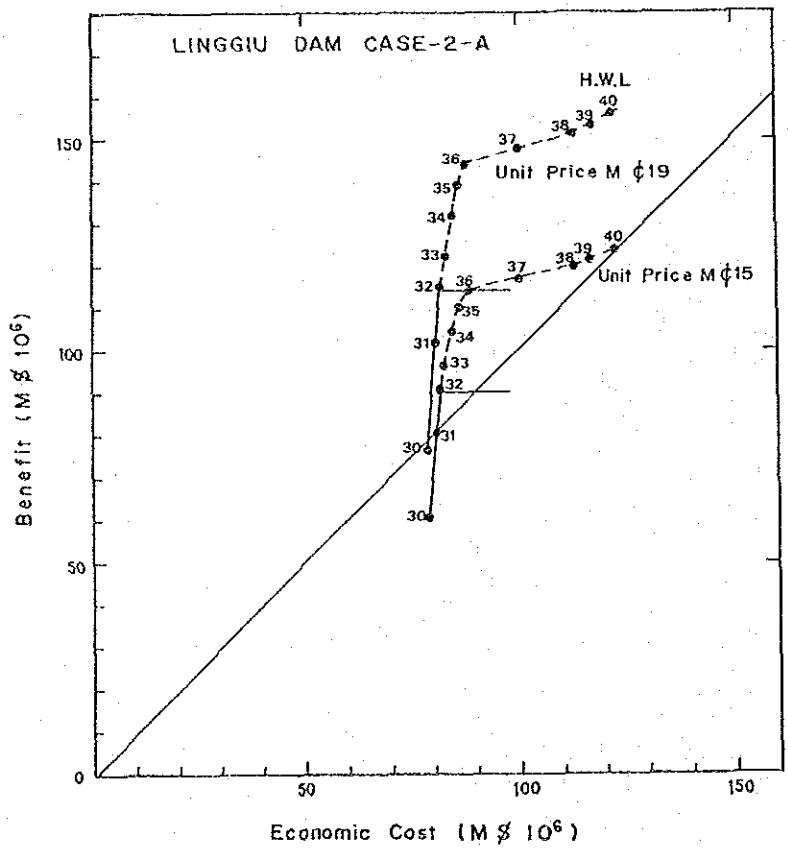

Fig. 4 Relationship between Economic Benefit and Cost by Dam Scale (4/4)

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