CHAPTER 8 CONSTRUCTION COST AND FINANCIAL SCHEDULE

CHAPTER 8

CONSTRUCTION COST AND FINANCIAL SCHEDULE

8-1 Construction Cost

8-1-1 Basis and Assumptions :

The approximate construction cost of the water supply was estimated depending on the water source and served area, assuming that the optimum feasible plan discussed in Chapter 7 would be adopted. The construction cost was divided into the domestic and foreign currency portions.

The domestic currency portion was estimated by referring the material and labor costs derived from the data collected by M.W.W.A., while the foreign currency portion was estimated by referring the Japanese market prices of main import items, such as pumps, machinery, electric apparatus, instruments and pipes (DCIP) plus ocean freight, import duties, and with 20% allowance for miscellaneous expenses.

In addition to the construction cost, administrative expenses, engineering fees and contingencies at the rates of 1.0%, 3.0% and 10.0% were added respectively to arrive at the total construction cost indicated Table 8-1 will be studied later in the discussion of financial schedule.

The above costs and prices do not include the cost escalation. The cost escalation will be considered later in the discussion of financial schedule.

8-1-2 Total Construction Cost and Scale of Main Facilities :

The total construction cost,basic construction cost(construction cost excluding administrative expenses, engineering fees and contingencies) depending on the water source and annual breakdown of the construction cost are shown in Tables 8-1 to 8-7; and the scale of the major facilities and the breakdown of their basic construction cost are presented in Tables 8-8 and 8-9.

Table 8-1 CONSTRUCTION COST FOR SEPARATE SYSTEM

(At 2000 AD)

Item	Construction Cost(฿)	Remarks
Basic Construction Cost	1,282,824,000	
Administration (1.0%)	12,828,000	
Engineering Fee(3.0%)	38,484,000	
Contingencies (10%)	128,282,000	
Grand Total	1,462,418,000	

Table 8-2 CONSTRUCTION COST IN ACCORDANCE WITH WATER SOURCE

(At 2000 AD)

Water Source	Construction Cost (฿)	Remarks
Well	413,953,000	(20,679,650 $)
Central System	1,048,465,000	(52,423,250 $)
Total	1,462,418,000	(73,120,900 $)

Table 8-3 BREAKDOWN OF CONSTRUCTION COST FOR SEPARATE SYSTEM

(UNIT : 1,000 ฿)

Water Source	District \ Construction Year (AD)		Existing Well	1981	1983	1984	1985	1986	1987	1988	1989	1992	1993	1994	Total	Remarks
Ground Water	Sai Noi	Ca		500							1,000				1,500	
		B.C.		14,800							5,780				20,580	
		C		16,872							6,589				23,461	
	Bang Bua Thong	Ca		3,000			1,100					1,100			5,200	
		B.C.		36,613			13,367					12,089			62,069	
		C		41,739			15,238					13,781			70,758	
	Bang Yai	Ca	1,200	1,000			1,100					1,100			4,400	
		B.C.	-	22,818			12,673					7,320			42,811	
		C	-	26,012			14,447					8,345			48,804	
	Nong Chok	Ca		1,890	870					870				870	4,500	
		B.C.		23,860	8,071					4,034				4,440	40,405	
		C		27,200	9,201					4,599				5,061	46,061	
	Min Buri	Ca		4,380				1,460					1,460		7,300	
		B.C.		44,587				9,588					6,359		60,534	
		C		50,829				10,930					7,249		69,008	
	Lat Krabang	Ca		4,560		1,520					1,510			1,510	9,100	
		B.C.		45,912		12,049					8,779			6,315	73,055	
		C		52,340		13,736					10,008			7,199	83,283	
	Bang Phli	Ca		1,400		1,400									2,800	
		B.C.		15,248		12,993									28,241	
		C		17,383		14,812									32,195	
	Bang Bo	Ca	1,000	-		1,000			1,000						3,000	
		B.C.	-	14,071		3,101			3,639						20,811	
		C	-	16,041		3,536			4,148						23,725	
	Bang Chan	Ca		5,100											5,100	
		B.C.		14,612											14,612	
		C		16,658											16,658	
	Sub Total	Ca	2,200	21,830	870	3,920	2,200	1,460	1,000	870	2,510	2,200	1,460	2,380	42,900	
		B.C.	-	232,521	8,071	28,143	26,040	9,588	3,639	4,034	14,559	19,409	6,359	10,755	363,118	
		C	-	265,074	9,201	32,084	29,685	10,930	4,148	4,599	16,597	22,126	7,249	12,260	413,953	(20,697,650 $)
Central System	Nong Khaem & Bang Khun Thian	Ca		22,900					11,200				11,200		45,300	
		B.C.		262,179					30,160				13,876		306,215	
		C		298,884					34,383				15,818		349,085	
	East 3 Development	Ca				25,680	12,840				12,830				51,350	
		B.C.				217,866	972				972				219,810	
		C				248,367	1,108				1,108				250,583	
	South 3 Development	Ca				82,500				27,500					110,000	
		B.C.				392,048				1,633					393,681	
		C				446,935				1,862					448,797	
	Sub Total	Ca		22,900	-	108,180	12,840	-	11,200	27,500	12,830	-	11,200	-	206,650	
		B.C.		262,179	-	609,914	972	-	30,160	1,633	972	-	13,876	-	919,706	
		C		298,884	-	695,302	1,108	-	34,383	1,862	1,108	-	15,818	-	1,048,465	(52,423,250 $)
Grand Total		Ca		44,730	870	112,100	15,040	1,460	12,200	28,370	15,340	2,200	12,660	2,380	249,550	
		B.C.		494,700	8,071	638,057	27,012	9,588	33,799	5,667	15,531	19,409	20,235	10,755	1,282,824	
		C		563,958	9,201	727,386	30,793	10,930	38,531	6,461	17,705	22,126	23,067	12,260	1,462,418	(73,120,900 $)

NOTE : Ca : Planned Construction Capacity (CMD) B.C. : Basic Construction Cost

C : Construction Cost (Incl. Administration, Engineering Fee and Contingencies)

Table 8-4 ESTIMATED CONSTRUCTION COST FOR EVERY SERVED AREA

(At 2000 AD)

	District / Cost	Basic Construction Cost (B)	Administration (1.0 %)	Engineering Fee (3.0 %)	Contingencies (10 %)	Estimated Construction Cost (B)
Right Bank	Sai Noi	20,580,000	206,000	617,000	2,058,000	23,461,000
	Bang Bua Thong	62,069,000	621,000	1,862,000	6,207,000	70,759,000
	Bang Yai	42,811,000	428,000	1,284,000	4,281,000	48,804,000
	Nong Khaem & Bang Khun Tian	306,215,000	3,062,000	9,187,000	30,621,000	349,085,000
	Sub Total	431,675,000	4,317,000	12,950,000	43,167,000	492,109,000
Left Bank	Nong Chok	40,405,000	404,000	1,212,000	4,041,000	46,062,000
	Min Buri	60,534,000	605,000	1,816,000	6,053,000	69,008,000
	Lat Krabang	73,055,000	731,000	2,192,000	7,306,000	83,284,000
	Bang Phli	28,241,000	282,000	847,000	2,824,000	32,194,000
	Bang Bo	20,811,000	208,000	624,000	2,081,000	23,724,000
	Bang Chan	14,612,000	146,000	438,000	1,461,000	16,657,000
	East Developments	219,810,000	2,198,000	6,595,000	21,981,000	250,584,000
	South Developments	393,681,000	3,937,000	11,810,000	39,368,000	448,796,000
	Sub Total	851,149,000	8,511,000	25,534,000	85,115,000	970,309,000
	Grand Total	1,282,824,000	12,828,000	38,484,000	128,282,000	1,462,418,000

Table 8-5 BREAKDOWN OF CONSTRUCTION COST IN ACCORDANCE WITH CONSTRUCTION SCHEDULE

Year \ Cost	Basic Construction Cost (฿)	Administration (1.0 %)	Engineering Fee (3.0 %)	Contingencies (10 %)	Estimated Construction Cost (฿)	Remarks
AD 1981	494,700,000	4,947,000	14,841,000	49,470,000	563,958,000	
1982	-	-	-	-	-	
1983	8,071,000	81,000	242,000	807,000	9,201,000	
1984	638,057,000	6,381,000	19,142,000	63,806,000	727,386,000	
1985	27,012,000	270,000	810,000	2,701,000	30,793,000	
1986	9,588,000	96,000	287,000	959,000	10,930,000	
1987	33,799,000	338,000	1,014,000	3,380,000	38,531,000	
1988	5,667,000	57,000	170,000	567,000	6,461,000	
1989	15,531,000	155,000	466,000	1,553,000	17,705,000	
1990	-	-	-	-	-	
1991	-	-	-	-	-	
1992	19,409,000	194,000	582,000	1,941,000	22,126,000	
1993	20,235,000	202,000	607,000	2,023,000	23,067,000	
1994	10,755,000	107,000	323,000	1,075,000	12,260,000	
Grand Total	1,282,824,000	12,828,000	38,484,000	128,282,000	1,462,418,000	

Table 8-6 SUMMARY OF BASIC CONSTRUCTION COST FOR EVERY SERVED AREA

(At 2000 AD)

	Item / District	Water Demand (CMD)	Basic Contract Cost (฿)	฿/CMD	Water Source
Right Bank	Sai Noi	1,500	20,580,000	13,720	Well
	Bang Bua Thong	5,200	62,069,000	11,936	"
	Bang Yai	4,400	42,811,000	9,730	"
	Nong Khaem & Bang Khun Tian	45,300	306,215,000	6,760	Central System
	Sub Total	56,400	431,675,000	7,654	
Left Bank	Nong Chok	4,500	40,405,000	8,979	Well
	Min Buri	7,300	60,534,000	8,292	"
	Lat Krabang	9,100	73,055,000	8,028	"
	Bang Phli	2,800	28,241,000	10,086	"
	Bang Bo	3,000	20,811,000	6,937	"
	Bang Chan	5,100	14,612,000	2,865	"
	East Developments	51,350	219,810,000	4,281	Central System
	South Developments	110,000	393,681,000	3,579	"
	Sub Total	193,150	851,149,000	4,407	
Grand Total		249,550	1,282,824,000	5,141	

Table 8-7 BREAKDOWN OF BASIC CONSTRUCTION COST FOR SEPARATE SYSTEM

(UNIT ฿)

Cost / Year	Foreign Currency	Local Currency	Total Cost	Remarks
AD 1981	195,721,000	298,979,000	494,700,000	
1982	-	-	-	
1983	1,728,000	6,343,000	8,071,000	
1984	378,071,000	259,986,000	638,057,000	
1985	6,289,000	20,723,000	27,012,000	
1986	2,544,000	7,044,000	9,588,000	
1987	11,204,000	22,595,000	33,799,000	
1988	3,016,000	2,651,000	5,667,000	
1989	4,229,000	11,302,000	15,531,000	
1990	-	-	-	
1991	-	-	-	
1992	3,904,000	15,505,000	19,409,000	
1993	3,968,000	16,267,000	20,235,000	
1994	2,761,000	7,994,000	10,755,000	
Total	613,435,000	669,389,000	1,282,824,000	

Table 8-8 BASIC CONSTRUCTION COST IN ACCORDANCE WITH FACILITIES (RIGHT BANK)

(At 2000 AD)

FACILITIES \ SERVED AREA		NORTH 3 DISTRICTS (AMPHOE)			AMPHOE	DEVELOPMENT PROGRAM	COST (1,000 ฿)
		SAI NOI	BANG BUA THONG	BANG YAI	NONG KHAEM	BANG KHUN THIAN	
WATER DEMAND (CMD)		1,500	5,200	4,400	40,000	5,300	
DEEP WELL		Q = 1,000 m^3/d x 1 unit Q = 500 m^3/d x 1 unit	Q = 1,500 m^3/d x 2 units Q = 1,100 m^3/d x 2 units	*Q = 1,200 m^3/d x 1 unit Q = 1,000 m^3/d x 1 unit Q = 1,100 m^3/d x 2 units	-		12,526
TRANSMISSION MAIN		DCIP ϕ100 - ϕ150 L = 2.4 km	DCIP ϕ150 - ϕ250 L = 5.0 km	DCIP ϕ150 - ϕ200 L = 4.2 km	-		13,677
CENTRAL SYSTEM	PUMPING FACILITIES	-			ϕ250 x ϕ200 x 8.6m^3/min x 35m x 76kw x 5sets		29,083
	TRANSMISSION MAIN	-			DCIP ϕ700 L = 13.2 km DCIP ϕ300 L = 7.6 km		98,904
DISTRIBUTION SYSTEM	SERVICE RESERVOIR	V = 520 m^3	V = 1,860 m^3	V = 1,520 m^3	V = 14,240 m^3	-	
	DISTRIBUTION PUMP	-			ϕ250 x ϕ200 x 10.42m^3/min x 49m x 128kw x 4 sets ϕ200 x ϕ150 x 5.21m^3/min x 49m x 64kw x 2 sets		
	LIFTING PUMP	3 sets	4 sets	4 sets	-		
	ELEVATED TANK	*V = 100 m^3	*V = 50 m^3	*V = 60 m^3	-		
	BOOSTER PUMP	3 units	6 units	5 units	-		
	PIPE	ACP ϕ100 - ϕ150 L = 22.0 km	DCIP ϕ400 ACP ϕ100 - ϕ300 L = 58.85 km	ACP ϕ100 - ϕ250 L = 38.4 km	DCIP ϕ400 - ϕ700 ACP ϕ100 - ϕ300 L = 79.09 km		277,485
COST (1,000 ฿)		20,580	62,069	42,811	306,215		431,675

* Existing

Table 8-9 BASIC CONSTRUCTION COST IN ACCORDANCE WITH FACILITIES (LEFT BANK)

(At 2,000 AD)

FACILITIES \ SERVED AREA		EAST 3 DISTRICTS (AMPHOE)			SOUTH 2 DISTRICTS (AMPHOE)		DEVELOPMENT PROGRAM			COST (1,000 ฿)
		NONG CHOK	MIN BURI	LAT KRABANG	BANG PHLI	BANG BO	BANG CHAN	EAST 3 DEVELOPMENTS	SOUTH 3 DEVELOPMENTS	
WATER DEMAND (CMD)		4,500	7,300	9,100	2,800	3,000	5,100	51,350	110,000	
DEEP WELL		Q = 945m³/d x 2 units Q = 870m³/d x 3 units	Q = 1,460m³/d x 5 units	Q = 1,520m³/d x 4 units Q = 1,510m³/d x 2 units	Q = 1,400m³/d x 2 units	*Q = 1,200m³/d x 1 unit oQ = 1,000m³/d x 1 unit Q = 1,000m³/d x 2 units	Q = 1,275m³/d x 4 units	-	-	38,310
TRANSMISSION MAIN		DCIP ϕ150 L = 3.2 km	DCIPϕ150 - ϕ250 L = 6.8 km	DCIPϕ150 - ϕ300 L = 6.0 km	DCIPϕ150 - ϕ200 L = 2.3 km	DCIPϕ150 L = 2.4 km	DCIPϕ150 - 200 L = 4.3 km	-	-	33,831
CENTRAL SYSTEM	PUMPING FACILITIES	-					-	8.9m³/min x 45m x 5 sets	19.1m³/min x 35m x 5 sets	67,788
	TRANSMISSION MAIN	-					-	DCIP ϕ800 L = 14.3km ϕ700 L = 5.6km ϕ500 L = 1.4km ϕ400 L = 8.0km ϕ300 L = 3.0km	DCIP ϕ900 L = 15.5km ϕ600 L = 23.0km ϕ500 L = 16.5km	526,299
	BOOSTER PUMP	-					-	-	7.2 m³/min x 50 m x 3 sets	19,404
DISTRIBUTION SYSTEM	SERVICE RESERVOIR	V = 1,520m³	V = 2,560m³	V = 3,040m³	V = 1,000m³	V = 1,000m³	-	-	-	
	LIFTING PUMP	5 sets	5 sets	5 sets	4 sets	4 sets				
	ELEVATED TANK	*V = 60m³	*V = 50m³,70m³	*V = 50m³,60m³	*V = 100m³	*V=100m³,120m³				
	BOOSTER PUMP	3 units	7 units	6 units	2 units	1 units				
		ACPϕ100 - ϕ300 L = 33.05 km	DCIP ϕ400 ACPϕ100 - ϕ300 L = 44.2 km	DCIP ϕ400 ACPϕ100 - ϕ300 L = 57.95 km	ACPϕ100 - ϕ200 L = 26.15 km	ACPϕ100 - ϕ200 L = 15.1 km				165,517
COST (1,000 ฿)		40,405	60,534	73,055	28,241	20,811	14,612	219,810	393,681	851,149

* Existing
o Existing New Well

8-1-3 Basic Construction Cost in Districts Using Groundwater:

The districts where wells are planned to be prepared for a water supply consist of 8 Amphoes (excluding Amphoe Nong Khaem) and Bang Chan. And the basic construction costs in districts using groundwater are estimated as shown in Tables 8-10 and 8-11. The breakdown of the basic construction cost of the major facilities in each district is shown in Tables 8-12 to 8-20.

Table 8-10 SUMMARY OF BASIC CONSTRUCTION COST

(At 2000 AD)

Item / Location	Water Demand (CMD)	Basic Construction Cost (฿)	฿/CMD	Remarks
Right Bank	11,100	125,460,000	11,303	
Left Bank	31,800	237,658,000	7,473	
Total	42,900	363,118,000	8,464	

Table 8-11 BREAKDOWN OF BASIC CONSTRUCTION COST IN ACCORDANCE WITH CONSTRUCTION SCHEDULE

(Unit ฿)

Year / Cost	Foreing Currency	Local Currency	Total Cost	Remaks
AD 1981	61,384,000	171,137,000	232,521,000	
1982	—	—	—	
1983	1,728,000	6,343,000	8,071,000	
1984	6,908,000	21,235,000	28,143,000	
1985	5,382,000	20,658,000	26,040,000	
1986	2,544,000	7,044,000	9,588,000	
1987	1,665,000	1,974,000	3,639,000	
1988	1,492,000	2,542,000	4,034,000	
1989	3,322,000	11,237,000	14,559,000	
1990	—	—	—	
1991	—	—	—	
1992	3,904,000	15,505,000	19,409,000	
1993	2,555,000	3,804,000	6,359,000	
1994	2,761,000	7,994,000	10,755,000	
Total	93,645,000	269,473,000	363,118,000	

Table 8-12 BREAKDOWN OF BASIC CONSTRUCTION COST - SAI NOI -

(UNIT 1,000 B)

Description \ Stage (AD)	Emergency Stage 1981			First Stage 1989			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Well & Pump	299	381	680	667	330	997	966	711	1,677
Transmission	47	39	86	759	782	1,541	806	821	1,627
Service Reservoir	262	1,220	1,482	-	-	-	262	1,220	1,482
Lifting Pump	848	48	896	-	-	-	848	48	896
Pumping Well & Ware House	-	708	708	-	-	-	-	708	708
Elevated Tank	-	531	531	-	-	-	-	531	531
Electric & Instrument	407	29	436	-	-	-	407	29	436
Disinfection	126	57	183	-	-	-	126	57	183
Distribution Pipe	-	6,922	6,922	-	2,174	2,174	-	9,096	9,096
Booster Pump	118	57	175	76	29	105	194	86	280
Sub Total	2,107	9,992	12,099	1,502	3,315	4,817	3,609	13,307	16,916
Miscellaneous Fee	422	1,998	2,420	300	663	963	722	2,661	3,383
Land Cost	-	281	281	-	-	-	-	281	281
Total	2,529	12,271	14,800	1,802	3,978	5,780	4,331	16,249	20,580

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-13 BREAKDOWN OF BASIC CONSTRUCTION COST - BANG BUA THONG -

(UNIT 1,000 ฿)

Description \ Stage (AD)	Emergency Stage 1981			First Stage 1985			Second Stage 1992			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Well & Pump	1,562	1,073	2,635	807	456	1,263	1,072	458	1,530	3,441	1,987	5,428
Transmission	1,536	1,320	2,856	1,025	679	1,704	565	467	1,032	3,126	2,466	5,592
Service Reservoir	379	1,876	2,255	72	1,309	1,381	-	-	-	451	3,185	3,636
Lifting Pump	1,235	62	1,297	168	12	180	-	-	-	1,403	74	1,477
Pumping Well & Ware House	-	864	864	-	-	-	-	-	-	-	864	864
Elevated Tank	-	-	-	-	-	-	-	-	-	-	-	-
Electric & Instrument	666	48	714	223	16	239	-	-	-	889	64	953
Disinfection	158	71	229	-	-	-	-	-	-	158	71	229
Distribution Pipe	1,540	17,278	18,818	-	6,122	6,122	-	7,512	7,512	1,540	30,912	32,452
Booster Pump	272	116	388	189	61	250	-	-	-	461	177	638
Sub Total	7,348	22,708	30,056	2,484	8,655	11,139	1,637	8,437	10,074	11,469	39,800	51,269
Miscellaneous Fee	1,470	4,541	6,011	497	1,731	2,228	327	1,688	2,015	2,294	7,960	10,254
Land Cost	-	546	546	-	-	-	-	-	-	-	546	546
Total	8,818	27,795	36,613	2,981	10,386	13,367	1,964	10,125	12,089	13,763	48,306	62,069

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-14 BREAKDOWN OF BASIC CONSTRUCTION COST - BANG YAI -

(UNIT 1,000 B)

Stage (AD) / Description	Emergency Stage 1981			First Stage 1985			Second Stage 1992			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Well & Pump	548	387	935	615	388	1,003	910	389	1,299	2,073	1,164	3,237
Transmission	857	571	1,428	706	754	1,460	707	583	1,290	2,270	1,908	4,178
Service Reservoir	366	1,537	1,939	73	1,037	1,110	-	-	-	439	2,610	3,049
Lifting Pump	1,175	62	1,237	168	12	180	-	-	-	1,343	74	1,417
Pumping Well & Ware House	-	864	864	-	-	-	-	-	-	-	864	864
Elevated Tank	-	-	-	-	-	-	-	-	-	-	-	-
Electric & Instrument	629	45	674	211	15	226	-	-	-	840	60	900
Disinfection	160	71	231	-	-	-	-	-	-	160	71	231
Distribution Pipe	-	10,989	10,989	-	6,266	6,266	-	3,511	3,511	-	20,766	20,766
Booster Pump	137	58	195	228	88	316	-	-	-	365	146	511
Sub Total	3,872	14,620	18,492	2,001	8,560	10,561	1,617	4,483	6,100	7,490	27,663	35,153
Miscellaneous Fee	775	2,924	3,699	400	1,712	2,112	323	897	1,220	1,498	5,533	7,031
Land Cost	-	627	627	-	-	-	-	-	-	-	627	627
Total	4,647	18,171	22,818	2,401	10,272	12,673	1,940	5,380	7,320	88	33,823	42,811

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-15 BREAKDOWN OF BASIC CONSTRUCTION COST - NONG CHOK -

(UNIT 1,000 ฿)

Description \ Stage (AD)	Emergency Stage 1981			First Stage 1983			Second Stage 1988			Third Stage 1994			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Well & Pump	1,157	778	1,935	449	385	834	390	388	778	537	387	924	2,533	1,938	4,471
Transmission	754	622	1,376	377	311	688	377	311	688	377	311	688	1,885	1,555	3,440
Service Reservoir	220	1,892	2,112	68	1,474	1,542	-	-	-	-	-	-	288	3,366	3,654
Lifting Pump	1,154	82	1,236	126	10	136	126	10	136	-	-	-	1,406	102	1,508
Pumping Well & Ware House	-	1,310	1,310	-	-	-	-	-	-	-	-	-	-	1,310	1,310
Elevated Tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electric & Instrument	910	65	975	154	11	165	154	11	165	-	-	-	1,218	87	1,305
Disinfection	159	73	232	-	-	-	-	-	-	-	-	-	159	73	232
Distribution Pipe	-	9,844	9,844	-	3,040	3,040	-	1,384	1,384	-	2,088	2,088	-	16,356	16,356
Booster Pump	363	74	437	266	55	321	196	14	210	-	-	-	825	143	968
Sub Total	4,717	14,740	19,451	1,440	5,286	6,726	1,243	2,118	3,361	914	2,786	3,700	8,314	24,930	33,244
Miscellaneous Fee	943	2,948	3,891	288	1,057	1,345	249	424	673	183	557	740	1,663	4,986	6,649
Land Cost	-	512	512	-	-	-	-	-	-	-	-	-	-	512	512
Total	5,660	18,200	23,860	1,728	6,343	8,071	1,492	2,542	4,034	1,097	3,343	4,440	9,977	30,428	40,405

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-16 BREAKDOWN OF BASIC CONSTRUCTION COST - MIN BURI -

(UNIT 1,000 ฿)

Description \ Stage (AD)	Emergency Stage 1981			First Stage 1986			Second Stage 1993			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C
Well & Pump	3,104	1,411	4,515	1,024	469	1,493	1,249	469	1,718	5,377	2,349	7,726
Transmission	2,888	2,119	5,007	857	571	1,428	565	467	1,032	4,310	3,157	7,467
Service Reservoir	262	4,032	4,294	57	1,291	1,348	-	-	-	319	5,323	5,642
Lifting Pump	1,627	116	1,743	-	-	-	189	14	203	1,816	130	1,946
Pumping Well & Ware House	-	1,310	1,310	-	-	-	-	-	-	-	1,310	1,310
Elevated Tank	-	-	-	-	-	-	-	-	-	-	-	-
Electric & Instrument	742	53	795	70	5	75	126	10	136	938	68	1,006
Disinfection	159	73	232	-	-	-	-	-	-	159	73	232
Distribution Pipe	880	16,773	17,653	-	3,502	3,502	-	2,210	2,210	880	22,485	23,365
Booster Pump	612	188	800	112	32	144	-	-	-	724	220	944
Sub Total	10,274	26,075	36,349	2,120	5,870	7,990	2,129	3,170	5,299	14,523	35,115	49,638
Miscellaneous Fee	2,055	5,215	7,270	424	1,174	1,598	426	634	1,060	2,905	7,023	9,928
Land Cost	-	968	968	-	-	-	-	-	-	-	968	968
Total	12,329	32,258	44,587	2,544	7,044	9,585	2,555	3,804	6,359	17,428	43,106	60,534

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-17 BREAKDOWN OF BASIC CONSTRUCTION COST - LAT KRABANG -

(UNIT 1,000 ฿)

Stage (AD) / Description	Emergency Stage 1981			First Stage 1984			Second Stage 1989			Third Stage 1994			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Well & Pump	2,815	1,405	4,220	1,463	474	1,937	508	463	971	822	470	1,292	5,608	2,812	8,420
Transmission	2,855	1,799	4,654	565	467	1,032	143	95	238	565	467	1,032	4,128	2,828	6,956
Service Reservoir	343	3,618	3,961	84	1,493	1,577	84	1,493	1,577	-	-	-	511	6,604	7,115
Lifting Pump	1,536	110	1,646	210	15	225	210	15	225	-	-	-	1,956	140	2,096
Pumping Well & Ware House	-	1,310	1,310	-	-	-	-	-	-	-	-	-	-	1,310	1,310
Elevated Tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electric & Instrument	658	47	705	140	10	150	140	10	150	-	-	-	938	67	1,005
Disinfection	190	75	265	-	-	-	-	-	-	-	-	-	190	75	265
Distribution Pipe	1,320	18,352	19,672	-	4,874	4,874	-	3,960	3,960	-	2,938	2,938	1,320	30,124	31,444
Booster Pump	461	153	614	196	50	246	182	13	195	-	-	-	839	216	1,055
Sub Total	10,178	26,869	37,047	2,658	7,383	10,041	1,267	6,049	7,316	1,387	3,875	5,262	15,490	44,176	59,666
Miscellaneous Fee	2,036	5,374	7,410	531	1,477	2,008	253	1,210	1,463	277	776	1,053	3,097	8,837	11,934
Land Cost	-	1,455	1,455	-	-	-	-	-	-	-	-	-	-	1,455	1,455
Total	12,214	33,698	45,912	3,189	8,860	12,049	1,520	7,259	8,779	1,664	4,651	6,315	18,587	54,468	73,055

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-18 BREAKDOWN OF BASIC CONSTRUCTION COST - BANG PHLI -

(UNIT 1,000 ฿)

Description \ Stage (AD)	Emergency Stage 1981			First Stage 1984			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Well & Pump	755	541	1,296	1,021	544	1,565	1,776	1,085	2,861
Transmission	785	524	1,309	565	467	1,032	1,350	991	2,341
Service Reservoir	192	1,382	1,574	52	1,072	1,124	244	2,454	2,698
Lifting Pump	934	67	1,001	126	10	136	1,060	77	1,137
Pumping Well & Ware House	-	1,188	1,188	-	-	-	-	1,188	1,188
Elevated Tank	-	-	-	-	-	-	-	-	-
Electric & Instrument	532	38	570	140	10	150	672	48	720
Disinfection	159	73	232	-	-	-	159	73	232
Distribution Pipe	-	4,974	4,974	-	6,718	6,718	-	11,692	11,692
Booster Pump	98	31	129	73	30	103	171	61	232
Sub Total	3,455	8,818	12,273	1,977	8,851	10,828	5,432	17,669	23,101
Miscellaneous Fee	691	1,764	2,455	395	1,790	2,165	1,086	3,534	4,620
Land Cost	-	520	520	-	-	-	-	520	520
Total	4,146	11,102	15,248	2,372	10,621	12,993	6,518	21,723	28,241

Note : F.C. : Foreign Currency S.C. : Sub Total Cost
L.C. : Local Currency T.C. : Total Cost

Table 8-19 BREAKDOWN OF BASIC CONSTRUCTION COST - BANG BO -

(UNIT 1,000 B)

Description \ Stage (AD)	Emergency Stage 1981			First Stage 1984			Second Stage 1987			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Well & Pump	-	-	-	557	387	944	557	387	944	1,114	774	1,888
Transmission	-	-	-	565	467	1,032	565	467	1,032	1,130	934	2,064
Service Reservoir	260	2,574	2,834	-	-	-	-	-	-	260	2,574	2,834
Lifting Pump	934	67	1,001	-	-	-	126	10	136	1,060	77	1,137
Pumping Well & Ware House	-	1,188	1,188	-	-	-	-	-	-	-	1,188	1,188
Elevated Tank	-	-	-	-	-	-	-	-	-	-	-	-
Electric & Instrument	532	38	570	-	-	-	140	10	150	672	48	720
Disinfection	159	73	232	-	-	-	-	-	-	159	73	232
Distribution Pipe	-	5,316	5,316	-	608	608	-	771	771	-	6,695	6,695
Booster Pump	112	32	144	-	-	-	-	-	-	112	32	144
Sub Total	1,997	9,288	11,285	1,122	1,462	2,584	1,388	1,645	3,033	4,507	12,395	16,902
Miscellaneous Fee	399	1,858	2,257	225	292	517	277	329	606	901	2,479	3,380
Land Cost	-	529	529	-	-	-	-	-	-	-	529	529
Total	2,396	11,675	14,071	1,347	1,754	3,101	1,665	1,974	3,639	5,408	15,403	20,811

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-20 BREAKDOWN OF BASIC CONSTRUCTION COST - BANG CHAN -

(UNIT 1,000 ฿)

Description \ Stage (AD)	Emergency Stage 1981			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Well and Pump	3,922	2,258	6,180	3,922	2,258	6,180
Transmission	3,282	2,641	5,923	3,282	2,641	5,923
Sub Total	7,204	4,899	12,103	7,204	4,899	12,103
Miscellaneous Fee	1,441	980	2,421	1,441	980	2,421
Land Cost	-	88	88	-	88	88
Total	8,645	5,967	14,612	8,645	5,967	14,612

F.C. : Foreing Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

8-1-4 Basic Construction Cost in Districts Using Water from Central System :

The districts which will be supplied with water diverted from the central system consist of Amphoe Nong Khaem and 7 districts (excluding Bang Chan) of the 8 adjacent development districts.

The basic construction costs in districts using water diverted from the central system (that for Amphoe Nong Khaem including the Basic Construction Cost of the distribution system)are shown in Tables 8-20 and 8-21, and the breakdown of the basic construction cost of the major facilities in each district is shown in Tables 8-22 to 8-25.

Table 8-21 SUMMARY OF BASIC CONSTRUCTION COST

(At 2000 AD)

Location \ Item		Water Demand (CMD)	Basic Construction Cost (฿)	฿/CMD	Remarks
Right Bank	Transmission	45,300	127,987,000	2,825	
	Distribution		178,228,000	3,784	Only Nong Khaem
	Sub Total	45,300	306,215,000	6,760	
Left Bank		161,350	613,491,000	3,802	
Total		206,650	919,706,000	4,451	

Table 8-22 BREAKDOWN OF BASIC CONSTRUCTION COST IN ACCORDANCE WITH CONSTRUCTION SCHEDULE

(Unit ฿)

Year \ Cost	Foreign Currency	Local Currency	Total Cost	Remarks
AD 1981	134,337,000	127,842,000	262,179,000	
1984	371,163,000	238,751,000	609,914,000	
1985	907,000	65,000	972,000	
1987	9,539,000	20,621,000	30,160,000	
1988	1,524,000	109,000	1,633,000	
1989	907,000	65,000	972,000	
1993	1,413,000	12,463,000	13,876,000	
Total	519,790,000	399,916,000	919,706,000	

Table 8-23 BREAKDOWN OF BASIC CONSTRUCTION COST FOR TRANSMISSION SYSTEM
(NONG KHAEM & BANG KHUN TIAN)

(UNIT 1,000 ฿)

Stage (AD) / Description	Emergency Stage 1981			First Stage 1987			Second Stage 1993			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Pumping Well & Ware House	685	3,974	4,659	-	-	-	-	-	-	685	3,974	4,659
Transmission Pump	2,148	154	2,302	374	27	401	374	27	401	2,896	208	3,104
Electric Equipment	1,036	65	1,101	299	21	320	299	21	320	1,634	107	1,741
Instrument	94	7	101	-	-	-	-	-	-	94	7	101
Power Receiving Apparatus	13,067	934	14,001	-	-	-	-	-	-	13,067	934	14,001
Transmission Pipe	52,351	30,069	82,420	-	-	-	-	-	-	52,351	30,069	82,420
Sub Total	69,381	35,203	104,584	673	48	721	673	48	721	70,727	35,299	106,026
Miscellaneous Fee	13,876	7,041	20,917	134	10	144	135	9	144	14,145	7,060	21,205
Land Cost	-	756	756	-	-	-	-	-	-	-	756	756
Total	83,257	43,000	126,257	807	58	865	808	57	865	84,872	43,115	127,987

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-24 BREAKDOWN OF BASIC CONSTRUCTION COST FOR DISTRIBUTION SYSTEM

(AMPHOE NONG KHAEM)

(UNIT 1,000 ฿)

Description \ Stage (AD)		Emergency Stage 1981			First Stage 1987			Second Stage 1993			Grand Total		
		F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Service Reservoir		-	7,206	7,206	-	3,603	3,603	-	3,603	3,603	-	14,412	14,412
Pumping Well		-	1,256	1,256	-	-	-	-	-	-	-	1,256	1,256
Pumping House		262	2,299	2,561	-	-	-	-	-	-	262	2,299	2,561
Distribution Pump		970	69	1,039	339	24	363	339	24	363	1,648	117	1,765
Chlorinator Equipment		2,100	950	3,050	2,100	150	2,250	-	-	-	4,200	1,100	5,300
Electric Equipment		1,245	89	1,334	622	44	666	-	-	-	1,867	133	2,000
Instrument		889	60	949	420	29	449	-	-	-	1,309	89	1,398
Power Receiving Apparatus		6,845	489	7,334	3,422	244	3,666	-	-	-	10,267	733	11,000
Ground Adjustment		-	1,886	1,886	-	-	-	-	-	-	-	1,886	1,886
Pipe & Valve		1,575	734	2,309	374	184	558	165	63	228	2,114	981	3,095
Distribution Pipe	A.C.P.	-	26,716	26,716	-	12,858	12,858	-	6,648	6,648	-	46,222	46,222
	D.C.I.P.	28,681	25,845	54,526	-	-	-	-	-	-	28,681	25,845	54,526
Sub Total		42,567	67,599	110,166	7,277	17,136	24,413	504	10,338	10,842	50,348	95,073	145,421
Miscellaneous Fee		8,513	13,520	22,033	1,455	3,427	4,882	101	2,068	2,169	10,069	19,015	29,084
Land Cost		-	3,723	3,723	-	-	-	-	-	-	-	3,723	3,723
Total		51,080	84,842	135,922	8,732	20,563	29,295	605	12,406	13,011	60,417	117,811	178,228

Note : F.C. : Foreign Currency S.C. : Sub Total Cost

L.C. : Local Currency T.C. : Total Cost

Table 8-25 BREAKDOWN OF BASIC CONSTRUCTION COST FOR TRANSMISSION SYSTEM

(LAT KRABANG In, Ho & NEW AIRPORT)

(UNIT 1,000 ฿)

Stage (AD) / Description	Emergency Stage 1984			First Stage 1985			Second Stage 1989			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Pumping Well & Ware House	722	3,977	4,699	-	-	-	-	-	-	722	3,977	4,699
Transmission Pump	2,428	174	2,602	420	30	450	420	30	450	3,268	234	3,502
Electric Equipment	1,008	72	1,080	336	24	360	336	24	360	1,680	120	1,800
Instrument	94	7	101	-	-	-	-	-	-	94	7	101
Power Receiving Apparatus	14,000	1,000	15,000	-	-	-	-	-	-	14,000	1,000	15,000
Transmission Pipe	90,341	66,996	157,337	-	-	-	-	-	-	90,341	66,996	157,337
Sub Total	108,593	72,226	180,819	756	54	810	756	54	810	110,105	72,334	182,439
Miscellaneous Fee	21,719	14,445	36,164	151	11	162	151	11	162	22,021	14,467	36,488
Land Cost	-	883	883	-	-	-	-	-	-	-	883	883
Total	130,312	87,554	217,866	907	65	972	907	65	972	132,126	87,684	219,810

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

Table 8-26 BREAKDOWN OF BASIC CONSTRUCTION COST FOR TRANSMISSION SYSTEM
(BANG PHLI - BANG BO, BANG POO & KLONG DAN)

(UNIT 1,000 ฿)

Stage(AD) / Description	Emergency Stage 1984			First Stage 1988			Grand Total		
	F.C.	L.C.	S.C.	F.C.	L.C.	S.C.	F.C.	L.C.	T.C.
Pumping Well & Ware House	1,123	5,113	6,236	-	-	-	1,123	5,113	6,236
Transmission Pump	4,481	320	4,801	934	67	1,001	5,415	387	5,802
Electric Equipment	1,344	96	1,440	336	24	360	1,680	120	1,800
Instrument	94	7	101	-	-	-	94	7	101
Power Receiving Apparatus	14,934	1,067	16,001	-	-	-	14,934	1,067	16,001
Transmission Pipe	165,582	115,663	281,245	-	-	-	165,582	115,663	281,245
Booster Pump	13,151	2,785	15,936	-	-	-	13,151	2,785	15,936
Sub Total	200,709	125,051	325,760	1,270	91	1,361	201,979	125,142	327,121
Miscellaneous Fee	40,142	25,010	65,152	254	18	272	40,396	25,028	65,424
Land Cost	-	1,136	1,136	-	-	-	-	1,136	1,136
Total	240,851	151,197	392,048	1,524	109	1,633	242,375	151,306	393,681

Note : F.C. : Foreign Currency
L.C. : Local Currency
S.C. : Sub Total Cost
T.C. : Total Cost

8-2 Financial Schedule

8-2-1 Basis and Cases for Financial Schedule :

(1) Loan Conditions :

This Section describes the financial schedule for 9 Amphoes and 8 adjacent development districts based on the construction cost as estimated in Sec. 8-1 and the loan conditions shown on Table 8-27.

Table 8-27 LOAN CONDITIONS

Bank	Interest (%)	Term of Loan (years)	Grace Period (years)
OECF	3.25	25	7
Local	7.25	35	5
ADB	8.25	20	4
IBRD	8.85	20	4

(2) Cases of Financial Schedule :

The cases of the financial schedule are 56 cases in total, when taken in various combinations of items as noted under Items 1), 2) and 3) below. These cases are as summarized in Tables 8-28-A and -B.

1) Government Fund : 25 % and 50 %.

2) Banks for Loan : OECF, Local, ADB and IBRD.

3) Water Charge (B/m^3): 2.0, 2.5, 3.0 and 3.5.

(3) Basic Data :

The 56 cases of the financial schedule are analyzed on the basis of conditions and assumptions as tabulated in Tables 8-29-A and -B, 8-30 ~ 8-33.

Table 8-28 CASES OF FINANCIAL SCHEDULE (A)

Case No.	Government Fund (%)	Loan (%)				Water Charge (₹/CMD)	Balancing Year(A.D.)
		OECF	Local	ADB	IBRD		
1	25	18.75	56.25	–	–	2.0	beyond 2,030
2	"	"	"	–	–	2.5	"
3	"	"	"	–	–	3.0	"
4	"	"	"	–	–	3.5	"
5	50	12.50	37.50	–	–	2.0	beyond 2,030
6	"	"	"	–	–	2.5	"
7	"	"	"	–	–	3.0	"
8	"	"	"	–	–	3.5	2,027
9	25	37.50	37.50	–	–	2.0	beyond 2,030
10	"	"	"	–	–	2.5	"
11	"	"	"	–	–	3.0	"
12	"	"	"	–	–	3.5	"
13	50	25.00	25.00	–	–	2.0	beyond 2,030
14	"	"	"	–	–	2.5	"
15	"	"	"	–	–	3.0	"
16	"	"	"	–	–	3.5	2,021
17	25	56.25	18.75	–	–	2.0	beyond 2,030
18	"	"	"	–	–	2.5	"
19	"	"	"	–	–	3.0	"
20	"	"	"	–	–	3.5	"
21	50	37.50	12.50	–	–	2.0	beyond 2,030
22	"	"	"	–	–	2.5	"
23	"	"	"	–	–	3.0	"
24	"	"	"	–	–	3.5	2,015
25	25	–	75.00	–	–	2.0	beyond 2,030
26	"	–	"	–	–	2.5	"
27	"	–	"	–	–	3.0	"
28	"	–	"	–	–	3.5	"

* Percentage is to the total construction cost (incl.cost escalation).

CASES OF FINANCIAL SCHEDULE (B)

Case No.	Government Fund (%)	Loan (%)				Water Charge (₹/CMD)	Balancing Year(A.D.)
		OECF	Local	ADB	IBRD		
29	50	–	50	–	–	2.0	beyond 2,030
30	"	–	"	–	–	2.5	"
31	"	–	"	–	–	3.0	"
32	"	–	"	–	–	3.5	"
33	25	75	–	–	–	2.0	beyond 2,030
34	"	"	–	–	–	2.5	"
35	"	"	–	–	–	3.0	"
36	"	"	–	–	–	3.5	2,024
37	50	50	–	–	–	2.0	beyond 2,030
38	"	"	–	–	–	2.5	"
39	"	"	–	–	–	3.0	2,026
40	"	"	–	–	–	3.5	2,011
41	25	–	–	75	–	2.0	beyond 2,030
42	"	–	–	"	–	2.5	"
43	"	–	–	"	–	3.0	"
44	"	–	–	"	–	3.5	"
45	50	–	–	50	–	2.0	beyond 2,030
46	"	–	–	"	–	2.5	"
47	"	–	–	"	–	3.0	"
48	"	–	–	"	–	3.5	2,021
49	25	–	–	–	75	2.0	beyond 2,030
50	"	–	–	–	"	2.5	"
51	"	–	–	–	"	3.0	"
52	"	–	–	–	"	3.5	"
53	50	–	–	–	50	2.0	beyond 2,030
54	"	–	–	–	"	2.5	"
55	"	–	–	–	"	3.0	"
56	"	–	–	–	"	3.5	2,022

* Percentage is to the total construction cost (incl.cost escalation).

Table 8-29 BASIC DATA FOR FINANCIAL SCHEDULE (A)

Item		Computation	Data
(1) Cost Escalation Ratio :		* 6% per annum, compound rate (Basic Year = 1978)	A Review of the Bangkok Water Supply Phase 2 Project.
(2) Effective Water Quantity for Revenue per year, (Q) :		* Q = Daily maximum water demand x 0.6667 x 365 days x 0.75 (m^3/year) where, 0.6667 = Coefficient of the daily average water demand 0.75 = Effective ratio	Table 3-16 & 3-32, Chapter 3
(3) Operation and Maintenance Expenditure :	① Repair Expenditure, (R.E.) :	* R.E.= Construction cost(incl.cost escalation x 0.003 (1,000 ฿/year) where, 0.003 = Repair expenditure ratio	Table 8-1 - 8-25, Chapter 8
	② Personnel Expenditure, (P.E.):	* From year 1982 to 1985 P.E.= 28 persons x 2,500Baht per person per month × 12 cost escalation ratio * On and after year 1985 P.E.= 35 persons x 2,500Baht per person per month × 12 cost escalation ratio (1,000 ฿/year)	Table 8-29, Chapter 8 Table 10-2, Chapter 9
	③ General Management Expenditure, (G.E.)	* G.E.= Personnel expenditure x 0.15 (1,000 ฿/year) where, 0.15 = General management expenditure ratio	
	④ Power Cost, (P.C.)	* P.C.= Average water demand per year x power consumption volume in KWH per cu.m x 0.6 Baht per KWH (1,000 ฿/year) where, 0.6 Baht per KWH = Basic power charge	Table 3-32, Chapter 3 Table 8-30, Chapter 8 Table 9-2, Chapter 9
	⑤ Chemical Cost, (C.C.):	* C.C.= Average water demand per year x 0.0015 kg per cu.m x 8.0 Baht per kg x cost escalation ratio (1,000 ฿/year) where, 0.0015 kg per cu.m = chemical feeding ratio 8.0 Baht per kg = Sodium Hypochlorite unit cost	Table 3-32, Chapter 3 Table 8-30, Chapter 8

BASIC DATA FOR FINANCIAL SCHEDULE (B)

Item	Computation	Data
(4) Depreciation, (D) :	* D = Accumulated construction cost (incl. cost escalation) x I (1,000₦/year) where, I = Depreciation ratio given by M.W.W.A, as follows	Table 8-1 - 8-25, Chapter 8 Table 9-4, Chapter 9

Item	Depreciation Ratio per Year, (I)
1) Submerged pumps for well :	0.100
2) Ductile cast iron pipes (D.C.I.P.):	0.031
3) Asbestos cement pipes (A.C.P.):	0.050
4) Structures :	0.020
5) Pumps :	0.050
6) Machinery :	0.040

Table 8-30 EXPENDITURE (1) OPERATION AND MAINTENANCE

(UNIT : 1,000 B/Year)

As Year Go By (x)	Year (AD)	Construction Cost (A)	Estimated Construction Cost (Incl. Cost Escalation) (B)=(A)x1.06^x	Repair Expenditure (C)=1/n(B)x0.003	Personnel Expenditure (D) (28/35)x2.5x12x1.06^x	General Management Expenditure (E)=(D) x 0.15	Sub Total (I) (C)+(D)+(E)
3	1981	563,958	671,685	-	-	-	-
4	1982	-	-	2,015	1,060	159	3,234
5	1983	9,201	12,313	2,015	1,124	169	3,308
6	1984	727,386	1,031,811	2,052	1,192	179	3,423
7	1985	30,793	46,301	5,147	1,263	189	6,599
8	1986	10,930	17,421	5,286	1,674	251	7,211
9	1987	38,531	65,097	5,200	1,774	266	7,240
10	1988	6,461	11,571	5,534	1,880	282	7,696
11	1989	17,705	33,609	5,569	1,993	299	7,861
12	1990	-	-	5,669	2,113	317	8,099
13	1991	-	-	5,669	2,240	336	8,245
14	1992	22,126	50,025	5,669	2,374	356	8,399
15	1993	23,067	55,281	5,819	2,516	377	8,712
16	1994	12,260	31,145	5,985	2,667	400	9,052
17	1995			6,079	2,827	424	9,330
18	1996				2,997	450	9,526
19	1997				3,177	477	9,733
20	1998				3,367	505	9,951
21	1999			Constant	3,570	536	10,185
22	2000				3,784	568	10,431
23	2001				4,011	602	10,692
24	2002				4,251	638	10,968
25	2003				4,506	676	11,261
26	2004				4,777	717	11,573
27	2005				5,063	759	11,901
28	2006				5,367	805	12,251
29	2007				5,689	853	12,621
30	2008				6,031	905	13,015
31	2009				6,393	959	13,431
32	2010				6,776	1,016	13,871
33	2011				7,183	1,077	14,339
34	2012				7,614	1,142	14,835
35	2013				8,070	1,211	15,360
36	2014				8,555	1,283	15,917
37	2015				9,068	1,360	16,507
38	2016				9,612	1,442	17,133
39	2017				10,189	1,528	17,796
40	2018				10,800	1,620	18,499
41	2019				11,448	1,717	19,244
42	2020				12,135	1,820	20,034
43	2021				12,863	1,929	20,871
44	2022				13,635	2,045	21,759
45	2023				14,453	2,168	22,700
46	2024				15,320	2,298	23,697
47	2025				16,239	2,436	24,754
48	2026				17,214	2,582	25,875
49	2027				18,246	2,737	27,062
50	2028				19,341	2,901	28,321
51	2029				20,502	3,075	29,656
52	2030				21,732	3,260	31,071
Total		1,462,418	2,026,259				

EXPENDITURE (2) OPERATION AND MAINTENANCE

Year (AD)	Average Water Demand Per Year	Power Cost		Chemical Cost			Sub Total (II) (1,000₱/Year)	Total (1,000₱/Year)
		Power Consumption Volume	Power Cost (1,000₱/year)	Feeding Volume (kg)	Unit Cost (₱/kg)	Chemical Cost (1,000₱/Year)		
	(A): (m^3/Year)	(B): (kw/m^3)	(C)=(A)x(B)x0.6₱	(D)=(A)x0.0015	(E)=80₱x1.06^X	(F)=(D)x(E)	(C) + (F)	(I) + (II)
1981	-	-	-	-	-	-	-	-
1982	21,534,999	0.309	3,993	32,302	10.1	326	4,319	7,553
1983	24,092,433	0.309	4,464	36,139	10.7	387	4,854	7,892
1984	26,652,299	0.309	4,941	39,978	11.3	452	5,393	8,816
1985	29,209,732	0.208	3,645	43,815	12.0	526	4,171	10,770
1986	32,246,532	0.208	4,024	48,370	12.8	619	4,643	11,854
1987	35,283,332	0.207	4,382	52,925	13.5	714	5,096	12,336
1988	38,322,566	0.207	4,760	57,484	14.3	822	5,582	13,278
1989	41,359,366	0.206	5,112	62,039	15.2	943	6,055	13,916
1990	44,396,166	0.206	5,487	66,594	16.1	1,072	6,559	14,658
1991	46,211,432	0.206	5,712	69,317	17.1	1,185	6,897	15,142
1992	48,026,699	0.206	5,936	72,040	18.1	1,304	7,240	15,639
1993	49,841,965	0.206	6,160	74,763	19.2	1,435	7,595	16,307
1994	51,657,232	0.206	6,385	77,485	20.3	1,573	7,958	17,010
1995	53,472,499	0.206	6,609	80,209	21.5	1,724	8,333	17,663
1996	54,922,765	0.206	6,788	82,384	22.8	1,878	8,666	18,192
1997	56,373,032	0.207	7,002	84,560	24.2	2,046	9,048	18,781
1998	57,823,299	0.207	7,182	86,735	25.7	2,229	9,411	19,362
1999	59,273,565	0.208	7,397	88,910	27.2	2,418	9,815	20,000
2000	60,723,832	0.208	7,578	91,086	28.0	2,623	10,201	20,632
2001	60,723,832	0.208	7,578	91,086	30.6	2,787	10,365	21,057
2002	↓	↓	↓	↓	32.4	2,951	10,529	21,497
2003	↓	↓	↓	↓	34.3	3,124	10,702	21,963
2004	↓	↓	↓	↓	36.4	3,316	10,894	22,467
2005	Constant	Constant	Constant	Constant	38.6	3,516	11,094	22,995
2006					40.9	3,725	11,303	23,554
2007					43.3	3,944	11,522	24,143
2008					45.9	4,181	11,759	24,774
2009					48.7	4,436	12,014	25,445
2010					51.6	4,700	12,278	26,149
2011					54.7	4,982	12,560	26,899
2012					58.0	5,283	12,861	27,691
2013					61.5	5,602	13,180	28,540
2014					65.2	5,939	13,517	29,434
2015					69.1	6,294	13,872	30,379
2016					73.2	6,667	14,245	31,378
2017					77.6	7,068	14,646	32,442
2018					82.3	7,496	15,074	33,573
2019					87.2	7,943	15,521	34,765
2020					92.5	8,425	16,003	36,037
2021					98.0	8,926	16,504	37,375
2022					103.9	9,464	17,042	38,801
2023					110.1	10,029	17,607	40,307
2024					116.7	10,629	18,207	41,904
2025					123.7	11,267	18,845	43,599
2026					131.2	11,950	19,528	45,403
2027					139.0	12,661	20,239	47,301
2028					147.4	13,426	21,004	49,325
2029					156.2	14,228	21,806	51,462
2030					165.6	15,084	22,662	53,733

Table 8-31 EXPENDITURE (3) BASIC DATA FOR DEPRECIATION

(UNIT : 1,000 ฿/Year)

Year	(AD)	Submerged Pump for Well	Pipe (D.C.I.P.)	Pipe (A.C.P.)	Structures	Pumps	Machinerry	Sub Total	Land Cost	Total	*Indirect Cost	Grand Total
1981	B.C.	9,899	201,681	137,676	66,135	19,012	50,292	484,695	10,005	494,700	69,258	563,958
	C	11,790	240,205	163,974	78,768	22,644	59,899	577,280	11,916	589,196	82,489	671,685
1982	-	-	-	-	-	-	-	-	-	-	-	-
1983	B.C.	389	825	3,648	2,284	548	377	8,071	-	8,071	1,130	9,201
	C	521	1,104	4,882	3,057	733	504	10,801	-	10,801	1,512	12,313
1984	B.C.	1,884	530,014	14,640	19,689	11,970	57,841	636,038	2,019	638,057	89,329	727,386
	C	2,672	751,835	20,767	27,929	16,980	82,049	902,232	2,864	905,096	126,715	1,031,811
1985	B.C.	876	3,797	14,866	4,082	1,323	2,068	27,012	-	27,012	3,781	30,793
	C	1,317	5,709	22,353	6,138	1,989	3,110	40,616	-	40,616	5,685	46,301
1986	B.C.	697	1,713	4,202	2,129	173	674	9,588	-	9,588	1,342	10,930
	C	1,111	2,730	6,697	3,393	276	1,075	15,282	-	15,282	2,139	17,421
1987	B.C.	431	1,908	16,355	4,757	1,080	9,268	33,799	-	33,799	4,732	38,531
	C	728	3,224	27,631	8,037	1,825	15,658	57,103	-	57,103	7,994	65,097
1988	B.C.	322	825	1,661	433	1,661	810	5,667	-	5,667	794	6,461
	C	577	1,477	2,975	775	2,894	1,451	10,149	-	10,149	1,422	11,571
1989	B.C.	914	2,135	7,361	2,808	1,104	1,209	15,531	-	15,531	2,174	17,705
	C	1,735	4,053	13,973	5,300	2,096	2,295	29,482	-	29,482	4,127	33,609
1990	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-
1992	B.C.	947	2,786	13,228	946	-	1,502	19,409	-	19,409	2,717	22,126
	C	2,141	6,299	29,907	2,139	-	3,396	43,882	-	43,882	6,143	50,025
1993	B.C.	698	1,513	10,630	4,835	1,161	1,398	20,235	-	20,235	2,832	23,067
	C	1,673	3,626	25,475	11,587	2,782	3,351	48,494	-	48,494	6,787	55,281
1994	B.C.	1,042	2,064	6,031	944	-	674	10,755	-	10,755	1,505	12,260
	C	2,647	5,243	15,321	2,398	-	1,712	27,321	-	27,321	3,824	31,145
Total	B.C.	18,099	749,261	230,298	109,042	37,987	126,113	1,270,800	12,024	1,282,824	179,594	1,462,418
	C	26,912	1,025,505	333,955	149,551	52,219	174,500	1,762,642	14,780	1,777,422	248,837	2,026,259

NOTE : B.C. : Basic Construction Cost C : Construction Cost (Incl. Cost Escalation at 6% Compound Rate Per Year

* Indirect Cost (Incl. Administration, Engineering Fee and Contingencies)

Table 8-32 NUMBER OF PERSONS FOR MAINTENANCE

	District	From year 1982 to 1985 (A.D.)	On and after year 1985 (A.D.)
Right Bank	Sai Noi	2	2
	Bang Bua Thong	3	3
	Bang Yai	3	3
	Nong Khaem and Bang Khun Thian	6	6
Left Bank	Nong Chok	3	3
	Min Buri	3	3
	Lat Krabang	4	4
	Bang Phli	2	2
	Bang Bo	2	2
Central System (Developments)		-	7
Total		28	35

Table 8-33 ELECTRIC POWER AND CHEMICAL COST

(i) Power Cost

Installation Fee (Basic Rate)		Cost
First	50 kw	60.00 ฿/kw/month
Next	150 kw	59.00 "
Over	200 kw	58.00 "

Actual Use Fee		Cost
First	50 kw	0.68 ฿/kwh
Next	150 kw	0.60 "
Next	200 kw	0.58 "
Over	400 kw	0.56 "

(ii) Chemical Cost

Item	Cost	Remarks
Alum	1,700 ฿/ton	$Al_2(SO_4)_3 \cdot 18\ H_2O$ $Al_2(SO_4)_3$ must not less than 50% Al_2O_3 must not less than 7.6% Density at 20°C must not less than 1.31 (Fiscal Year 1976 - 1977)
Lime	600 ฿/ton	(Fiscal Year 1976 - 1977)
Chlorine	11,690 ฿/ton	Liquid Chlorine (Fiscal Year 1977)
Sodium Hypochlorite	8,000 ฿/ton	(Fiscal Year 1977)

*** I N P U T *** (4) Input Data

YEAR	S.P.W (A)	D.C.I.P (B)	A.C.P (C)	STRUCT- (D)	P U M P (E)	MACHIN- (F)	L A N D (G)	(A+B+C+ D+E+F)	O AND M	WATER
	(1000 BAHT)									(1000 CUM)
1981	11790.	240206.	163975.	78768.	22644.	59999.	11916.	577282.	0.	0.
1982	0.	0.	0.	0.	0.	0.	0.	0.	7553.	16151.
1983	521.	1104.	4882.	3057.	733.	504.	0.	10801.	7892.	18069.
1984	2672.	751835.	20767.	27929.	16980.	82050.	2864.	902233.	8816.	19989.
1985	1317.	5709.	22353.	6138.	1989.	3110.	0.	40616.	10770.	21907.
1986	1111.	2730.	6697.	3393.	276.	1075.	0.	15282.	11854.	24185.
1987	728.	3224.	27631.	8037.	1825.	15658.	0.	57103.	12336.	26462.
1988	577.	1477.	2975.	775.	2894.	1451.	0.	10149.	13278.	28742.
1989	1735.	4053.	13973.	5330.	2096.	2295.	0.	29482.	13916.	31020.
1990	0.	0.	0.	0.	0.	0.	0.	0.	14658.	33297.
1991	0.	0.	0.	0.	0.	0.	0.	0.	15142.	34659.
1992	2141.	6299.	29907.	2139.	0.	3396.	0.	43882.	15639.	36020.
1993	1673.	3626.	25475.	11587.	2782.	3351.	0.	48494.	16307.	37381.
1994	2647.	5243.	15321.	2398.	0.	1713.	0.	27322.	17010.	38743.
1995	0.	0.	0.	0.	0.	0.	0.	0.	17663.	40104.
1996	0.	0.	0.	0.	0.	0.	0.	0.	18192.	41192.
1997	0.	0.	0.	0.	0.	0.	0.	0.	18781.	42280.
1998	0.	0.	0.	0.	0.	0.	0.	0.	19362.	43367.
1999	0.	0.	0.	0.	0.	0.	0.	0.	20000.	44455.
2000	0.	0.	0.	0.	0.	0.	0.	0.	20632.	45543.
2001	0.	0.	0.	0.	0.	0.	0.	0.	21057.	45543.
2002	0.	0.	0.	0.	0.	0.	0.	0.	21497.	45543.
2003	0.	0.	0.	0.	0.	0.	0.	0.	21963.	45543.
2004	0.	0.	0.	0.	0.	0.	0.	0.	22467.	45543.
2005	0.	0.	0.	0.	0.	0.	0.	0.	22995.	45543.
2006	0.	0.	0.	0.	0.	0.	0.	0.	23554.	45543.
2007	0.	0.	0.	0.	0.	0.	0.	0.	24143.	45543.
2008	0.	0.	0.	0.	0.	0.	0.	0.	24774.	45543.
2009	0.	0.	0.	0.	0.	0.	0.	0.	25445.	45543.
2010	0.	0.	0.	0.	0.	0.	0.	0.	26149.	45543.
2011	0.	0.	0.	0.	0.	0.	0.	0.	26899.	45543.
2012	0.	0.	0.	0.	0.	0.	0.	0.	27691.	45543.
2013	0.	0.	0.	0.	0.	0.	0.	0.	28540.	45543.
2014	0.	0.	0.	0.	0.	0.	0.	0.	29434.	45543.
2015	0.	0.	0.	0.	0.	0.	0.	0.	30379.	45543.
2016	0.	0.	0.	0.	0.	0.	0.	0.	31378.	45543.
2017	0.	0.	0.	0.	0.	0.	0.	0.	32442.	45543.
2018	0.	0.	0.	0.	0.	0.	0.	0.	33573.	45543.
2019	0.	0.	0.	0.	0.	0.	0.	0.	34765.	45543.
2020	0.	0.	0.	0.	0.	0.	0.	0.	36037.	45543.
2021	0.	0.	0.	0.	0.	0.	0.	0.	37375.	45543.
2022	0.	0.	0.	0.	0.	0.	0.	0.	38801.	45543.
2023	0.	0.	0.	0.	0.	0.	0.	0.	40307.	45543.
2024	0.	0.	0.	0.	0.	0.	0.	0.	41904.	45543.
2025	0.	0.	0.	0.	0.	0.	0.	0.	43599.	45543.
2026	0.	0.	0.	0.	0.	0.	0.	0.	45403.	45543.
2027	0.	0.	0.	0.	0.	0.	0.	0.	47301.	45543.
2028	0.	0.	0.	0.	0.	0.	0.	0.	49325.	45543.
2029	0.	0.	0.	0.	0.	0.	0.	0.	51467.	45543.
2030	0.	0.	0.	0.	0.	0.	0.	0.	53733.	45543.
	26912.	1025506.	333956.	149551.	52219.	174502.	14780.	1762646.	1274193.	1989856.

** DETAIL DEPRECIATION **

(1000 BAHT)

YEAR	S.P.W	D.C.I.P	A.C.P	STRUCT-	P U M P	MACHIN-	E.T.C	T O T A L
1981	1179.	7446.	8199.	1575.	1132.	2396.	0.	21928.
1982	1179.	7446.	8199.	1575.	1132.	2396.	0.	21928.
1983	1231.	7481.	8443.	1636.	1169.	2416.	0.	22376.
1984	1498.	30787.	9481.	2195.	2019.	5698.	0.	51678.
1985	1630.	30964.	10599.	2318.	2117.	5823.	0.	53451.
1986	1741.	31049.	10934.	2386.	2131.	5865.	0.	54106.
1987	1814.	31149.	12315.	2546.	2222.	6492.	0.	56539.
1988	1872.	31195.	12464.	2562.	2347.	6550.	0.	57009.
1989	2045.	31320.	13163.	2669.	2472.	6642.	0.	58310.
1990	2045.	31320.	13163.	2669.	2472.	6642.	0.	58310.
1991	2045.	31320.	13163.	2669.	2472.	6642.	0.	58310.
1992	2259.	31516.	14658.	2711.	2472.	6778.	0.	60394.
1993	2426.	31628.	15932.	2943.	2611.	6912.	0.	62452.
1994	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
1995	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
1996	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
1997	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
1998	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
1999	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2000	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2001	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2002	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2003	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2004	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2005	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2006	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2007	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2008	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2009	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2010	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2011	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2012	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2013	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2014	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2015	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2016	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2017	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2018	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2019	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2020	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2021	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2022	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2023	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2024	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2025	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2026	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2027	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2028	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2029	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
2030	2691.	31791.	16698.	2991.	2611.	6980.	0.	63762.
	122539.	1510879.	768530.	141122.	123392.	329513.	0.	2995975.

8-2-2 Results of Analyzing :

As a result of study on 56 cases, assuming that the existing water charge (2.0 ฿/m^3) will be hopefully raised in future, following case shown on Table 8-34 are recommended and for reasons as follows.

1) In cases where the water charge is 2.0 ฿/m^3 or 2.5 ฿/m^3, the balancing years of accumulated income and expenditure are all far beyond year 2030 as indicated in Tables 8-28-A and -B.(See Fig's 8-1 and 8-2)

2) The water charge of 3.5 ฿/m^3 (although there are half cases that the balancing years are before year 2030) is not practical, judging from the existing charge of 2.0 ฿/m^3.

Table 8-34 RECOMMENDED FINANCIAL SCHEDULE

Case No.	Water Charge (฿/m^3)	Government Fund (%)	Loan (%)	Balancing Year
Case-39	3.0	50	OECF 50.00	2026

The balance of income and expenditure of the above 4 cases are as shown in Fig's. 8-1 ~ 8-4.

*** O U T P U T *** CASE - 37 ~ 40 (Calculation of Debt Service)
CONDITION ;

OECF 50.00 % | 0. % Government Fund 50.00 %

INTEREST	0.0325	INTEREST	0.
TERM OF LOAN	25.0000	TERM OF LOAN	0.
GRACE PERIOD	7.0000	GRACE PERIOD	0.

** DEBT-SERVICE TABLE **

(1000 BAHT)

YEAR	DEBT OECF	DEBT	DEBT FUND	DEBT TOTAL	DEBT-SERVICE OECF	DEBT-SERVICE	DEBT-SERVICE TOTAL
1981	335843.	0.	335843.	671685.	10915.	0.	10915.
1982	0.	0.	0.	0.	10915.	0.	10915.
1983	6157.	0.	6157.	12313.	11115.	0.	11115.
1984	515906.	0.	515906.	1031811.	27882.	0.	27882.
1985	23151.	0.	23151.	46301.	29634.	0.	29634.
1986	8711.	0.	8711.	17421.	28917.	0.	28917.
1987	32549.	0.	32549.	65097.	29975.	0.	29975.
1988	5786.	0.	5786.	11571.	44186.	0.	44186.
1989	16805.	0.	16805.	33609.	44732.	0.	44732.
1990	0.	0.	0.	0.	44989.	0.	44989.
1991	0.	0.	0.	0.	66530.	0.	66530.
1992	25013.	0.	25013.	50025.	68310.	0.	68310.
1993	27641.	0.	27641.	55281.	69572.	0.	69572.
1994	15573.	0.	15573.	31145.	71437.	0.	71437.
1995	0.	0.	0.	0.	71679.	0.	71679.
1996	0.	0.	0.	0.	72380.	0.	72380.
1997	0.	0.	0.	0.	72380.	0.	72380.
1998	0.	0.	0.	0.	72380.	0.	72380.
1999	0.	0.	0.	0.	73425.	0.	73425.
2000	0.	0.	0.	0.	74579.	0.	74579.
2001	0.	0.	0.	0.	75229.	0.	75229.
2002	0.	0.	0.	0.	75229.	0.	75229.
2003	0.	0.	0.	0.	75229.	0.	75229.
2004	0.	0.	0.	0.	75229.	0.	75229.
2005	0.	0.	0.	0.	75229.	0.	75229.
2006	0.	0.	0.	0.	50291.	0.	50291.
2007	0.	0.	0.	0.	50291.	0.	50291.
2008	0.	0.	0.	0.	49836.	0.	49836.
2009	0.	0.	0.	0.	11526.	0.	11526.
2010	0.	0.	0.	0.	9807.	0.	9807.
2011	0.	0.	0.	0.	9160.	0.	9160.
2012	0.	0.	0.	0.	6747.	0.	6743.
2013	0.	0.	0.	0.	6314.	0.	6314.
2014	0.	0.	0.	0.	5066.	0.	5066.
2015	0.	0.	0.	0.	5066.	0.	5066.
2016	0.	0.	0.	0.	5066.	0.	5066.
2017	0.	0.	0.	0.	3209.	0.	3209.
2018	0.	0.	0.	0.	1156.	0.	1156.
2019	0.	0.	0.	0.	0.	0.	0.
2020	0.	0.	0.	0.	0.	0.	0.
2021	0.	0.	0.	0.	0.	0.	0.
2022	0.	0.	0.	0.	0.	0.	0.
2023	0.	0.	0.	0.	0.	0.	0.
2024	0.	0.	0.	0.	0.	0.	0.
2025	0.	0.	0.	0.	0.	0.	0.
2026	0.	0.	0.	0.	0.	0.	0.
2027	0.	0.	0.	0.	0.	0.	0.
2028	0.	0.	0.	0.	0.	0.	0.
2029	0.	0.	0.	0.	0.	0.	0.
2030	0.	0.	0.	0.	0.	0.	0.
	1013130.	0.	1013130.	2026259.	1594610.	0.	1594610.

*** O U T P U T *** CASE - 37
CONDITION :

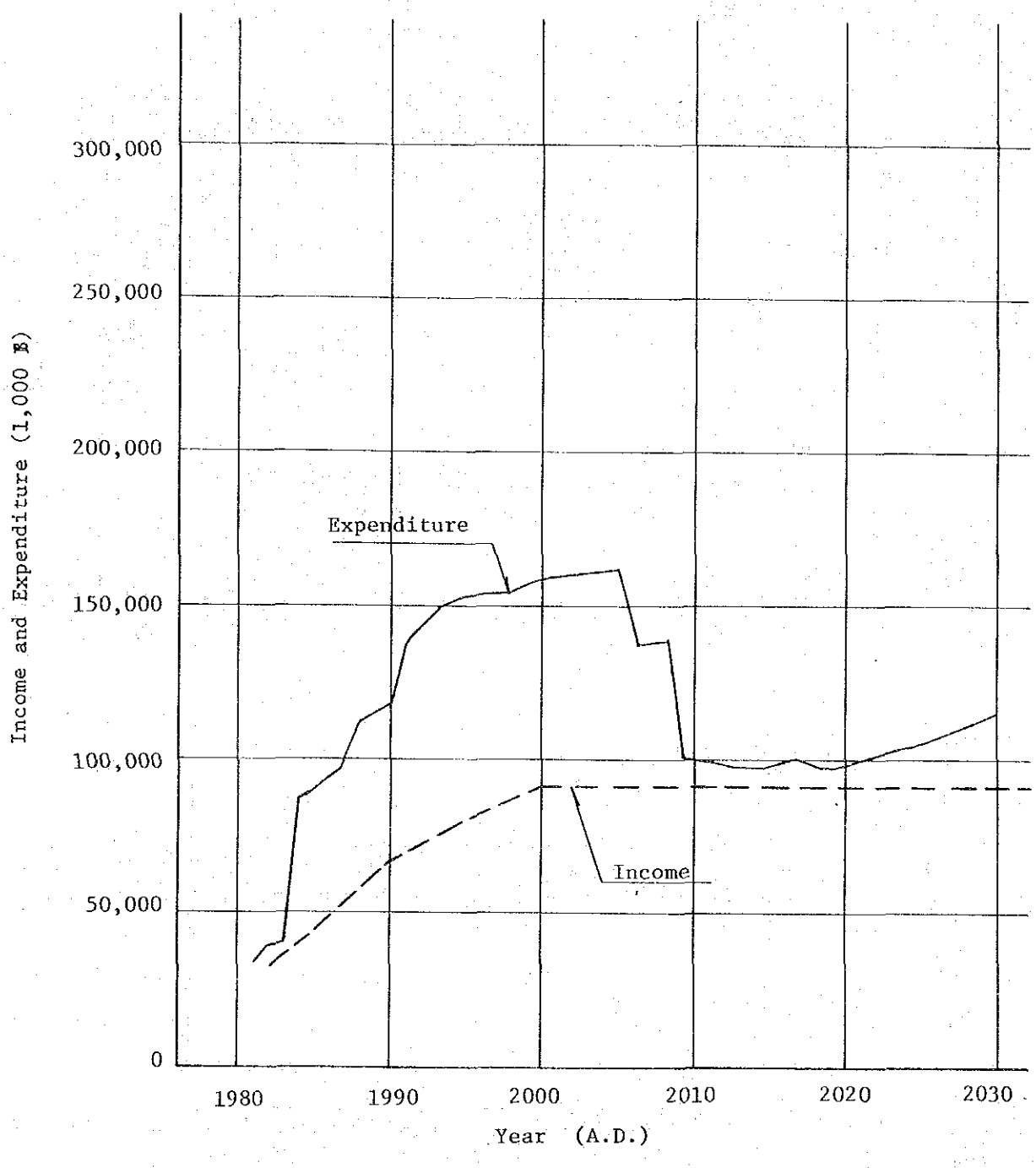
((WATER CHARGE)) OECF 50.00 % 0. % Government Fund 50.00 %

2.00 BAHT PER CUM INTEREST 0.0325 INTEREST 0.
TERM OF LOAN 25.0000 TERM OF LOAN 0.
GRACE PERIOD 7.0000 GRACE PERIOD 0.

** FINANCIAL SCHEDULE ** (1000 BAHT)

YEAR	INCOME (A)	LOAN (B)	(A + B)	CONSTR-COST (C)	O AND M (D)	DEPRECI- (E)	DEBT.S (F)	(C+D+E+F)	ANNUAL.B	ACCUMULATED.B
1981	0.	335843.	335843.	335843.	0.	21928.	10915.	368685.	-32843.	-32843.
1982	32302.	0.	32302.	0.	7553.	21928.	10915.	40396.	-8094.	-40936.
1983	36138.	6157.	42295.	6157.	7892.	22376.	11115.	47539.	-5245.	-46181.
1984	39978.	515906.	555884.	515906.	8816.	51674.	27882.	604281.	-48398.	-94579.
1985	43814.	23151.	66965.	23151.	10770.	53451.	28634.	116006.	-49041.	-143620.
1986	48370.	8711.	57081.	8711.	11854.	54136.	28917.	103588.	-46508.	-190128.
1987	52924.	32549.	85473.	32549.	12336.	56539.	29975.	131399.	-45926.	-236054.
1988	57484.	5786.	63270.	5786.	13278.	57009.	44186.	120259.	-56989.	-293043.
1989	62040.	16805.	78845.	16805.	13916.	58310.	44732.	133763.	-54918.	-347962.
1990	66596.	0.	66596.	0.	14658.	58310.	44989.	117958.	-51364.	-399325.
1991	69318.	0.	69318.	0.	15142.	58310.	66530.	139983.	-70665.	-469990.
1992	72040.	25013.	97053.	25013.	15639.	60396.	63310.	169355.	-72303.	-542293.
1993	74762.	27641.	102403.	27641.	16307.	62452.	69572.	175971.	-73569.	-615862.
1994	77486.	15573.	93059.	15573.	17010.	63762.	71437.	167781.	-74723.	-690585.
1995	80208.	0.	80208.	0.	17663.	63762.	71679.	153103.	-72895.	-763480.
1996	82384.	0.	82384.	0.	18192.	63762.	72380.	154334.	-71950.	-835430.
1997	84560.	0.	84560.	0.	18781.	63762.	72380.	154923.	-70363.	-905793.
1998	86734.	0.	86734.	0.	19362.	63762.	72380.	155504.	-68770.	-974563.
1999	88910.	0.	88910.	0.	20000.	63762.	73425.	157186.	-68276.	-1042840.
2000	91086.	0.	91086.	0.	20632.	63762.	74579.	158973.	-67887.	-1110726.
2001	91086.	0.	91086.	0.	21057.	63762.	75229.	160048.	-68962.	-1179688.
2002	91086.	0.	91086.	0.	21497.	63762.	75229.	160488.	-69402.	-1249090.
2003	91086.	0.	91086.	0.	21963.	63762.	75229.	160954.	-69868.	-1318958.
2004	91086.	0.	91086.	0.	22467.	63762.	75229.	161458.	-70372.	-1389330.
2005	91086.	0.	91086.	0.	22995.	63762.	75229.	161986.	-70900.	-1460229.
2006	91086.	0.	91086.	0.	23554.	63762.	50291.	137607.	-46521.	-1506751.
2007	91086.	0.	91086.	0.	24143.	63762.	50291.	138196.	-47110.	-1553861.
2008	91086.	0.	91086.	0.	24774.	63762.	49834.	138370.	-47284.	-1601145.
2009	91086.	0.	91086.	0.	25445.	63762.	11526.	100733.	-9647.	-1610791.
2010	91086.	0.	91086.	0.	26149.	63762.	9807.	99718.	-8632.	-1619423.
2011	91086.	0.	91086.	0.	26899.	63762.	9160.	99821.	-8735.	-1628158.
2012	91086.	0.	91086.	0.	27691.	63762.	6743.	98196.	-7110.	-1635268.
2013	91086.	0.	91086.	0.	28540.	63762.	6314.	98616.	-7530.	-1642798.
2014	91086.	0.	91086.	0.	29434.	63762.	5066.	98262.	-7176.	-1649974.
2015	91086.	0.	91086.	0.	30379.	63762.	5066.	99207.	-8121.	-1658095.
2016	91086.	0.	91086.	0.	31378.	63762.	5066.	100206.	-9120.	-1667214.
2017	91086.	0.	91086.	0.	32442.	63762.	3209.	99412.	-8326.	-1675541.
2018	91086.	0.	91086.	0.	33573.	63762.	1156.	98491.	-7405.	-1682946.
2019	91086.	0.	91086.	0.	34765.	63762.	0.	98527.	-7441.	-1690387.
2020	91086.	0.	91086.	0.	36037.	63762.	0.	99799.	-8713.	-1699099.
2021	91086.	0.	91086.	0.	37375.	63762.	0.	101137.	-10051.	-1709150.
2022	91086.	0.	91086.	0.	38801.	63762.	0.	102563.	-11477.	-1720627.
2023	91086.	0.	91086.	0.	40307.	63762.	0.	104069.	-12983.	-1733610.
2024	91086.	0.	91086.	0.	41904.	63762.	0.	105666.	-14580.	-1748189.
2025	91086.	0.	91086.	0.	43599.	63762.	0.	107361.	-16275.	-1764464.
2026	91086.	0.	91086.	0.	45403.	63762.	0.	109165.	-18079.	-1782543.
2027	91086.	0.	91086.	0.	47301.	63762.	0.	111063.	-19977.	-1802519.
2028	91086.	0.	91086.	0.	49325.	63762.	0.	113087.	-22001.	-1824520.
2029	91086.	0.	91086.	0.	51462.	63762.	0.	115224.	-24138.	-1848658.
2030	91086.	0.	91086.	0.	53733.	63762.	0.	117495.	-26409.	-1875067.
	3979712.	1013130.	4992842.	1013130.	1274193.	2995975.	1584610.	6867909.	-1875067.	-1875067.

Fig. 8-1 BALANCE OF INCOME AND EXPENDITURE



Case No.	Water Charge (₦/m³)	Government Fund (%)	Loan (%)	Balancing Year (A.D.)
Case-37	2.0	50	OECF-50.00	Beyond 2030

*** O U T P U T *** CASE - 38

CONDITION ;

((WATER CHARGE)) OECF 50.00 % 0. % Government Fund 50.00 %

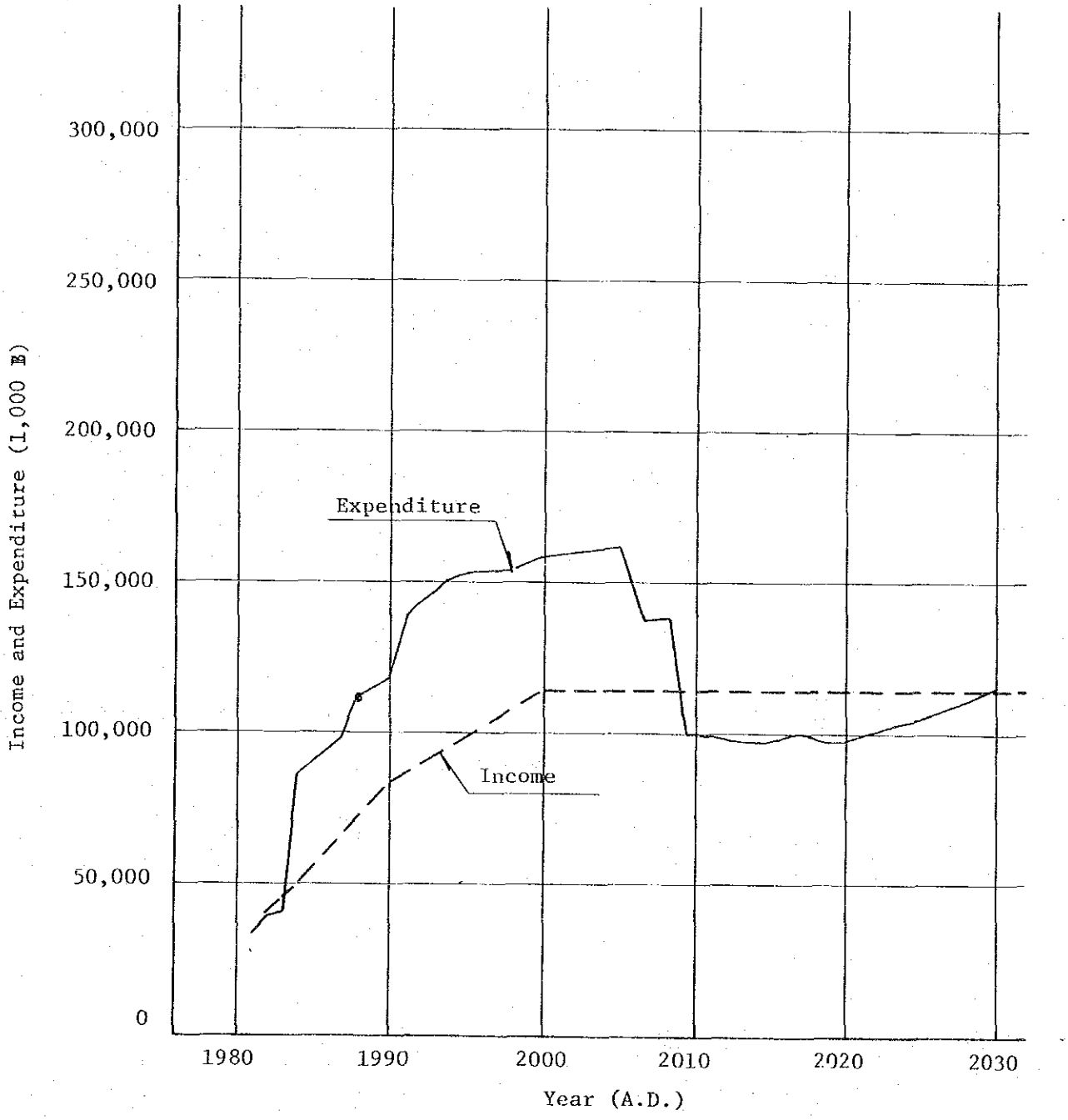
2.50 BAHT PER CUM INTEREST 0.0325 INTEREST 0.
TERM OF LOAN 25.0000 TERM OF LOAN 0.
GRACE PERIOD 7.0000 GRACE PERIOD 0.

** FINANCIAL SCHEDULE **

(1000 BAHT)

YEAR	INCOME (A)	LOAN (B)	(A + B)	CONSTR-COST (C)	O AND M (D)	DEPRECI- (E)	DEBT.S (F)	(C+D+E+F)	ANNUAL.B	ACCUMULATED.B
1981	0.	335843.	335843.	335843.	0.	21928.	10915.	368685.	-32843.	-32843.
1982	40378.	0.	40378.	0.	7553.	21928.	10915.	40396.	-18.	-32861.
1983	45173.	6157.	51329.	6157.	7892.	22376.	11115.	47539.	3790.	-29071.
1984	49973.	515906.	565878.	515906.	8816.	51678.	27882.	604281.	-38403.	-67475.
1985	54768.	23151.	77918.	23151.	10770.	53451.	28634.	116006.	-38088.	-105562.
1986	60463.	8711.	69173.	8711.	11854.	54106.	28917.	103588.	-34415.	-139977.
1987	66155.	32549.	98704.	32549.	12336.	56539.	29975.	131399.	-32695.	-172672.
1988	71855.	5786.	77641.	5786.	13278.	57009.	44186.	120259.	-42618.	-215291.
1989	77550.	16805.	94355.	16805.	13916.	58310.	44732.	133763.	-39408.	-254699.
1990	83243.	0.	83243.	0.	14658.	58310.	44989.	117958.	-34715.	-289414.
1991	86648.	0.	86648.	0.	15142.	58310.	66533.	139983.	-53335.	-342750.
1992	90050.	25013.	115063.	25013.	15639.	60394.	69310.	169355.	-54293.	-397042.
1993	93453.	27641.	121093.	27641.	16307.	62452.	69572.	175971.	-54878.	-451921.
1994	96858.	15573.	112430.	15573.	17010.	63762.	71437.	167781.	-55351.	-507272.
1995	100260.	0.	100260.	0.	17663.	63762.	71679.	153103.	-52843.	-560116.
1996	102980.	0.	102980.	0.	18192.	63762.	72380.	154334.	-51354.	-611470.
1997	105700.	0.	105700.	0.	18781.	63762.	72380.	154923.	-49223.	-660693.
1998	108418.	0.	108418.	0.	19362.	63762.	72380.	155504.	-47087.	-707779.
1999	111138.	0.	111138.	0.	20000.	63762.	73425.	157186.	-46049.	-753828.
2000	113858.	0.	113858.	0.	20632.	63762.	74579.	158973.	-45115.	-798943.
2001	113858.	0.	113858.	0.	21057.	63762.	75229.	160048.	-46190.	-845134.
2002	113858.	0.	113858.	0.	21497.	63762.	75229.	160488.	-46630.	-891764.
2003	113858.	0.	113858.	0.	21963.	63762.	75229.	160954.	-47096.	-938860.
2004	113858.	0.	113858.	0.	22467.	63762.	75229.	161458.	-47600.	-986461.
2005	113858.	0.	113858.	0.	22995.	63762.	75229.	161986.	-48128.	-1034589.
2006	113858.	0.	113858.	0.	23554.	63762.	50291.	137607.	-23750.	-1058339.
2007	113858.	0.	113858.	0.	24143.	63762.	50291.	138196.	-24339.	-1082677.
2008	113858.	0.	113858.	0.	24774.	63762.	49834.	138370.	-24512.	-1107190.
2009	113858.	0.	113858.	0.	25445.	63762.	11526.	100733.	13125.	-1094065.
2010	113858.	0.	113858.	0.	26149.	63762.	9807.	99718.	14140.	-1079925.
2011	113858.	0.	113858.	0.	26899.	63762.	9160.	99821.	14036.	-1065889.
2012	113858.	0.	113858.	0.	27691.	63762.	6743.	98196.	15661.	-1050227.
2013	113858.	0.	113858.	0.	28540.	63762.	6314.	98616.	15242.	-1034986.
2014	113858.	0.	113858.	0.	29434.	63762.	5066.	98262.	15596.	-1019390.
2015	113858.	0.	113858.	0.	30379.	63762.	5066.	99207.	14651.	-1004739.
2016	113858.	0.	113858.	0.	31378.	63762.	5066.	100206.	13652.	-991087.
2017	113858.	0.	113858.	0.	32442.	63762.	3209.	99412.	14445.	-976642.
2018	113858.	0.	113858.	0.	33573.	63762.	1156.	98491.	15366.	-961276.
2019	113858.	0.	113858.	0.	34765.	63762.	0.	98527.	15331.	-945945.
2020	113858.	0.	113858.	0.	36037.	63762.	0.	99799.	14059.	-931886.
2021	113858.	0.	113858.	0.	37375.	63762.	0.	101137.	12721.	-919166.
2022	113858.	0.	113858.	0.	38801.	63762.	0.	102563.	11295.	-907871.
2023	113858.	0.	113858.	0.	40307.	63762.	0.	104069.	9789.	-898082.
2024	113858.	0.	113858.	0.	41904.	63762.	0.	105666.	8192.	-889890.
2025	113858.	0.	113858.	0.	43599.	63762.	0.	107361.	6497.	-883393.
2026	113858.	0.	113858.	0.	45403.	63762.	0.	109165.	4693.	-878701.
2027	113858.	0.	113858.	0.	47301.	63762.	0.	111063.	2795.	-875906.
2028	113858.	0.	113858.	0.	49325.	63762.	0.	113087.	771.	-875135.
2029	113858.	0.	113858.	0.	51462.	63762.	0.	115224.	-1366.	-876501.
2030	113858.	0.	113858.	0.	53737.	63762.	0.	117495.	-3637.	-880139.
	4974640.	1013130.	5987770.	1013130.	1274193.	2995975.	1584613.	6867908.	-880139.	-880139.

Fig. 8-2 BALANCE OF INCOME AND EXPENDITURE



Case No.	Water Charge (₱/m3)	Government Fund (%)	Loan (%)	Balancing Year (A.D.)
Case-38	2.5	50	OECF-50.00	Beyond 2030

*** O U T P U T *** CASE - 39
CONDITION ;

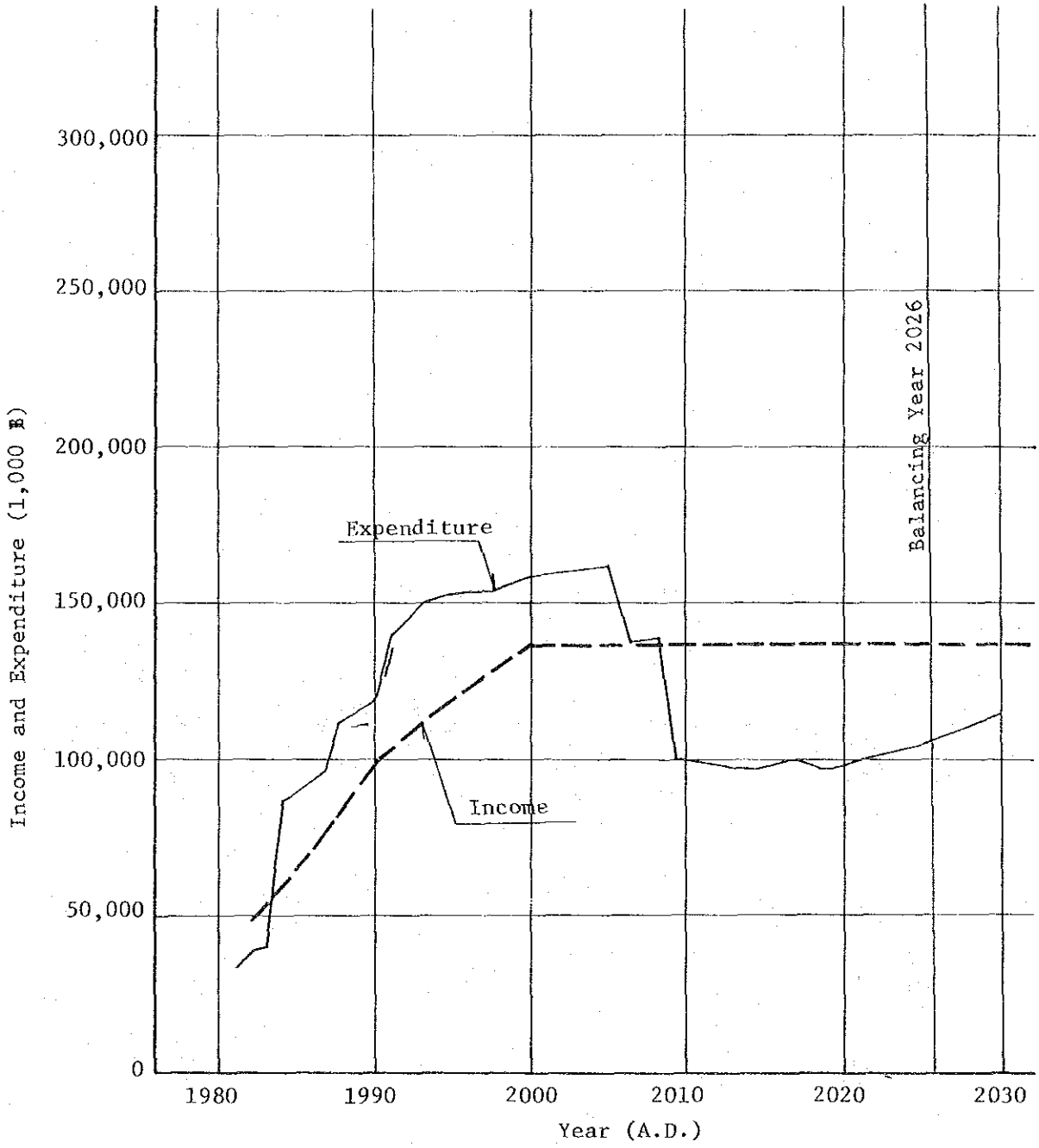
((WATER CHARGE)) OECF 50.00 % 0. % Government Fund 50.00 %

3.00 BAHT PER CUM INTEREST 0.0325 INTEREST 0.
TERM OF LOAN 25.0000 TERM OF LOAN 0.
GRACE PERIOD 7.0000 GRACE PERIOD 0.

** FINANCIAL SCHEDULE ** (1000 BAHT)

YEAR	INCOME (A)	LOAN (B)	(A + B)	CONSTR-COST (C)	O AND M (D)	DEPRECI- (E)	DEBT.S (F)	(C+D+E+F)	ANNUAL B	ACCUMULATED B
1981	0.	335843.	335843.	335843.	0.	21928.	10915.	368685.	-32843.	-32843.
1982	48453.	0.	48453.	0.	7553.	21928.	10915.	40396.	8057.	-24785.
1983	54207.	6157.	60364.	6157.	7892.	22376.	11115.	47539.	12824.	-11961.
1984	59967.	515906.	575873.	515906.	8816.	51678.	27832.	604231.	-28409.	-40370.
1985	65721.	23151.	88872.	23151.	10770.	53451.	29634.	116006.	-27134.	-67504.
1986	72555.	8711.	81266.	8711.	11854.	54136.	28917.	103588.	-22323.	-89827.
1987	79386.	32549.	111935.	32549.	12336.	56539.	29975.	131399.	-19464.	-109291.
1988	86226.	5786.	92012.	5786.	13278.	57009.	44186.	120259.	-28247.	-137538.
1989	93060.	16805.	109865.	16805.	13916.	58310.	44732.	133763.	-23898.	-161437.
1990	99891.	0.	99891.	0.	14658.	58310.	44949.	117958.	-18067.	-179503.
1991	103977.	0.	103977.	0.	15142.	58310.	66530.	139983.	-36006.	-215509.
1992	108060.	25013.	133073.	25013.	15639.	60394.	68310.	169355.	-36283.	-251792.
1993	112143.	27641.	139784.	27641.	16307.	62452.	69572.	175971.	-36188.	-287980.
1994	116229.	15573.	131802.	15573.	17010.	63762.	71437.	167781.	-35980.	-323960.
1995	120312.	0.	120312.	0.	17663.	63762.	71679.	153103.	-32791.	-356751.
1996	123576.	0.	123576.	0.	18192.	63762.	72380.	154334.	-30758.	-387509.
1997	126840.	0.	126840.	0.	18781.	63762.	72380.	154923.	-28083.	-415592.
1998	130101.	0.	130101.	0.	19362.	63762.	72380.	155504.	-25403.	-440995.
1999	133365.	0.	133365.	0.	20000.	63762.	73425.	157186.	-23821.	-464817.
2000	136629.	0.	136629.	0.	20632.	63762.	74579.	158973.	-22344.	-487160.
2001	136629.	0.	136629.	0.	21057.	63762.	75229.	160048.	-23419.	-510579.
2002	136629.	0.	136629.	0.	21492.	63762.	75229.	160488.	-23859.	-534438.
2003	136629.	0.	136629.	0.	21963.	63762.	75229.	160954.	-24325.	-558763.
2004	136629.	0.	136629.	0.	22467.	63762.	75229.	161458.	-24829.	-583592.
2005	136629.	0.	136629.	0.	22995.	63762.	75229.	161986.	-25357.	-608948.
2006	136629.	0.	136629.	0.	23554.	63762.	50291.	137607.	-978.	-609927.
2007	136629.	0.	136629.	0.	24143.	63762.	50291.	138196.	-1567.	-611494.
2008	136629.	0.	136629.	0.	24774.	63762.	49834.	138370.	-1741.	-613235.
2009	136629.	0.	136629.	0.	25445.	63762.	11526.	100733.	35896.	-577338.
2010	136629.	0.	136629.	0.	26149.	63762.	9807.	99718.	36911.	-540427.
2011	136629.	0.	136629.	0.	26899.	63762.	9160.	99821.	36808.	-503619.
2012	136629.	0.	136629.	0.	27691.	63762.	6743.	98196.	38433.	-465186.
2013	136629.	0.	136629.	0.	28540.	63762.	6314.	98616.	38013.	-427173.
2014	136629.	0.	136629.	0.	29434.	63762.	5066.	98262.	38367.	-388806.
2015	136629.	0.	136629.	0.	30379.	63762.	5066.	99207.	37422.	-351384.
2016	136629.	0.	136629.	0.	31378.	63762.	5066.	100206.	36423.	-314960.
2017	136629.	0.	136629.	0.	32442.	63762.	3209.	99412.	37217.	-277744.
2018	136629.	0.	136629.	0.	33573.	63762.	1156.	98491.	38138.	-239606.
2019	136629.	0.	136629.	0.	34765.	63762.	0.	98527.	38102.	-201504.
2020	136629.	0.	136629.	0.	36037.	63762.	0.	99799.	36830.	-164673.
2021	136629.	0.	136629.	0.	37375.	63762.	0.	101137.	35492.	-129181.
2022	136629.	0.	136629.	0.	38801.	63762.	0.	102563.	34066.	-95115.
2023	136629.	0.	136629.	0.	40307.	63762.	0.	104069.	32560.	-62555.
2024	136629.	0.	136629.	0.	41904.	63762.	0.	105666.	30963.	-31591.
2025	136629.	0.	136629.	0.	43599.	63762.	0.	107361.	29268.	-2323.
2026	136629.	0.	136629.	0.	45403.	63762.	0.	109165.	27464.	25141.
2027	136629.	0.	136629.	0.	47301.	63762.	0.	111063.	25566.	50708.
2028	136629.	0.	136629.	0.	49325.	63762.	0.	113087.	23542.	74250.
2029	136629.	0.	136629.	0.	51462.	63762.	0.	115224.	21405.	95655.
2030	136629.	0.	136629.	0.	53733.	63762.	0.	117495.	19134.	114789.
	5969568.	1013130.	6982698.	1013130.	1274193.	2995975.	1584613.	6867908.	114789.	114789.

Fig. 8-3 BALANCE OF INCOME AND EXPENDITURE



Case No.	Water Charge (฿/m3)	Government Fund (%)	Loan (%)	Balancing Year (A.D.)
Case-39	3.0	50	OECF-50.00	2026

*** O U T P U T *** CASE - 40
CONDITION :

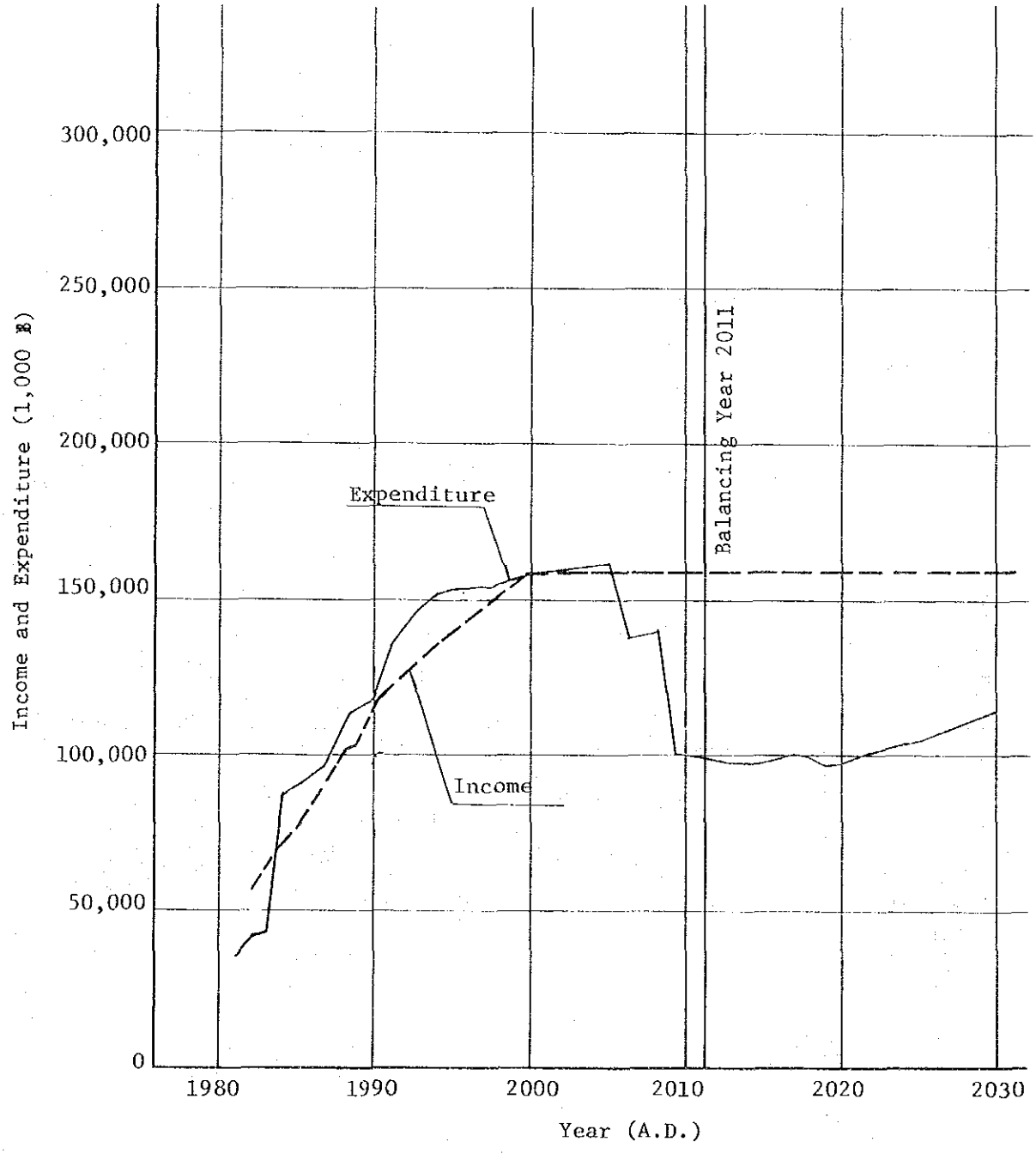
((WATER CHARGE)) OECF 50.00 % 0. % Government Fund 50.00 %

3.50 BAHT PER CUM INTEREST 0.0325 INTEREST 0.
TERM OF LOAN 25.0000 TERM OF LOAN 0.
GRACE PERIOD 7.0000 GRACE PERIOD 0.

** FINANCIAL SCHEDULE **

YEAR	INCOME (A)	LOAN (B)	(A + B)	CONSTR-COST (C)	O AND M (D)	DEPRECI- (E)	DEBT,S (F)	(C+D+E+F)	ANNUAL,B	(1000 BAHT) ACCUMULATED,B
1981	0.	335843.	335843.	335843.	0.	21928.	10915.	368685.	-32843.	-32843.
1982	56529.	0.	56529.	0.	7553.	21928.	10915.	40396.	16133.	-16710.
1983	63242.	6157.	69398.	6157.	7892.	22376.	11115.	47539.	21859.	5149.
1984	69962.	515906.	585867.	515906.	8816.	51678.	27882.	604281.	-18414.	-13266.
1985	76675.	23151.	99825.	23151.	10770.	53451.	28634.	116006.	-16181.	-29446.
1986	84648.	8711.	93358.	8711.	11854.	54106.	28917.	103588.	-10230.	-39676.
1987	92617.	32549.	125166.	32549.	12336.	56539.	29975.	131399.	-6233.	-45909.
1988	100597.	5786.	106383.	5786.	13278.	57009.	44186.	120259.	-13876.	-59786.
1989	108570.	16805.	125375.	16805.	13916.	58310.	44732.	133763.	-8388.	-68174.
1990	116540.	0.	116540.	0.	14658.	58310.	44989.	117958.	-1418.	-69592.
1991	121307.	0.	121307.	0.	15142.	58310.	66530.	139983.	-18676.	-88269.
1992	126070.	25013.	151083.	25013.	15639.	60394.	68310.	169355.	-18273.	-106541.
1993	130834.	27641.	158474.	27641.	16307.	62452.	69572.	175971.	-17497.	-124039.
1994	135601.	15573.	151173.	15573.	17010.	63762.	71437.	167781.	-16608.	-140647.
1995	140364.	0.	140364.	0.	17663.	63762.	71679.	153103.	-12739.	-153387.
1996	144172.	0.	144172.	0.	18192.	63762.	72380.	154334.	-10162.	-163549.
1997	147980.	0.	147980.	0.	18781.	63762.	72380.	154923.	-6943.	-170492.
1998	151785.	0.	151785.	0.	19362.	63762.	72380.	155504.	-3720.	-174211.
1999	155593.	0.	155593.	0.	20000.	63762.	73425.	157186.	-1594.	-175805.
2000	159401.	0.	159401.	0.	20632.	63762.	74579.	158973.	428.	-175377.
2001	159401.	0.	159401.	0.	21057.	63762.	75229.	160048.	-647.	-176025.
2002	159401.	0.	159401.	0.	21497.	63762.	75229.	160488.	-1087.	-177112.
2003	159401.	0.	159401.	0.	21963.	63762.	75229.	160954.	-1553.	-178665.
2004	159401.	0.	159401.	0.	22467.	63762.	75229.	161458.	-2057.	-180723.
2005	159401.	0.	159401.	0.	22995.	63762.	75229.	161986.	-2585.	-183308.
2006	159401.	0.	159401.	0.	23554.	63762.	50291.	137607.	21793.	-161515.
2007	159401.	0.	159401.	0.	24143.	63762.	50291.	138196.	21204.	-140310.
2008	159401.	0.	159401.	0.	24774.	63762.	49834.	138370.	21031.	-119280.
2009	159401.	0.	159401.	0.	25445.	63762.	11526.	100733.	58668.	-60612.
2010	159401.	0.	159401.	0.	26149.	63762.	9807.	99718.	59683.	-929.
2011	159401.	0.	159401.	0.	26899.	63762.	9160.	99821.	59579.	58650.
2012	159401.	0.	159401.	0.	27691.	63762.	6743.	98196.	61204.	119855.
2013	159401.	0.	159401.	0.	28540.	63762.	6314.	98616.	60785.	180639.
2014	159401.	0.	159401.	0.	29434.	63762.	5066.	98262.	61139.	241778.
2015	159401.	0.	159401.	0.	30379.	63762.	5066.	99207.	60194.	301972.
2016	159401.	0.	159401.	0.	31378.	63762.	5066.	100206.	59195.	361167.
2017	159401.	0.	159401.	0.	32442.	63762.	5209.	99412.	59988.	421155.
2018	159401.	0.	159401.	0.	33575.	63762.	1156.	98491.	60909.	482064.
2019	159401.	0.	159401.	0.	34765.	63762.	0.	98527.	60874.	542938.
2020	159401.	0.	159401.	0.	36037.	63762.	0.	99799.	59602.	602540.
2021	159401.	0.	159401.	0.	37375.	63762.	0.	101137.	58264.	660803.
2022	159401.	0.	159401.	0.	38801.	63762.	0.	102563.	56838.	717641.
2023	159401.	0.	159401.	0.	40307.	63762.	0.	104069.	55332.	772973.
2024	159401.	0.	159401.	0.	41904.	63762.	0.	105666.	53735.	826708.
2025	159401.	0.	159401.	0.	43599.	63762.	0.	107361.	52040.	878748.
2026	159401.	0.	159401.	0.	45403.	63762.	0.	109165.	50236.	928983.
2027	159401.	0.	159401.	0.	47301.	63762.	0.	111063.	48338.	977321.
2028	159401.	0.	159401.	0.	49325.	63762.	0.	113087.	46314.	1023635.
2029	159401.	0.	159401.	0.	51462.	63762.	0.	115224.	44177.	1067812.
2030	159401.	0.	159401.	0.	53733.	63762.	0.	117495.	41906.	1109717.
	6964496.	1013130.	7977626.	1013130.	1274193.	2995975.	1384610.	6867908.	1109717.	1109717.

Fig. 8-4 BALANCE OF INCOME AND EXPENDITURE



Case No.	Water Charge (฿/m^3)	Gogernment Fund (%)	Loan (%)	Balancing Year(A.D.)
Case 40	3.5	50	OECF-50.00	2011

CHAPTER 9 REFERENCE

Table 9-1 DATA FOR POPULATION (1966 - 1976)

(Given by Miss Thidachan Chaipruke)

Year (A.D.)	Nong Chok	Min Buri	Lat Krabang	Nong Khaem	Bang Bua Thong		Sai Noi	Bang Yai	Bang Phli	Bang Bo
					Municipality	Out of Municipality				
1966	41,291	36,290	27,692	17,000	6,607	23,436	25,477	29,060	56,633	54,070
1967	42,236	37,275	28,443	17,973	7,143	23,910	26,143	29,630	57,767	54,586
1968	42,995	38,114	29,263	19,521	8,367	23,661	26,633	30,349	58,905	55,500
1969	44,035	38,844	29,861	20,489	8,559	23,552	27,217	31,100	59,833	56,245
1970	44,980	39,589	30,496	22,374	8,964	23,031	27,175	31,627	60,703	56,728
1971	45,998	40,493	31,125	24,836	9,325	24,672	27,399	31,953	61,591	57,146
1972	46,650	41,186	31,730	25,671	9,408	25,100	26,055	32,264	65,503	57,700
1973	44,344	44,608	33,185	28,679	9,505	25,247	26,305	32,628	66,466	58,346
1974	46,197	45,309	33,959	30,519	9,646	28,584	26,568	30,649	67,056	49,354
1975	46,939	46,342	34,951	32,308	7,806	29,011	26,786	30,814	68,352	60,046
1976	47,666	47,115	36,065	34,015	7,959	29,492	28,463	31,385	69,977	61,051

Resource of Data 1966 - 1976 : Registration Division, Department of Local Administration.

Table 9-2 PERSONAL EXPENDITURE AND IMPORT TAX

Data for Personal Expenditure (Given by Mr. Prasat)

- Super Intendant	3,800 - 9,000 ฿/month
- Senior Engineer	3,100 - 7,500
- Junior Engineer	1,750 - 5,000
- Mechanical Engineer	1,750 - 5,000
- Worker	750 - 1,500
- Driver	750 - 1,500

Data for Import Tax (Given by Mr. Prasat)

- Pump -

CLF Cost 100 ฿

(1) Tariff ..... 100 x 0.1 = 10฿ 10%

(2) Standard Profit ...(100฿ + 10฿) x 0.16 = 17.6฿ 16%

(3) Business Tax .....(100฿ + 10฿ + 17.6฿) x 0.03 = 3.83฿ .. 3%

(4) Municiparity Tax...3.83 x 0.1 = 0.38฿ 10%

Therefore the total import duty of pump ..10 + 3.83 + 0.38 = 14.21฿

- Pipe -

CIF Cost 100฿

(1) Tariff..... 100 x 0.3 = 30฿ 30%

(2) Standard Profit... (100 + 30) x 0.11 = 14.3฿ 11%

(3) Business Tax ..... (100 + 30 + 14.3) x 0.03 = 4.33฿.... 3%

(4) Municipality Tax ..4.33 x 0.1 = 0.433฿ 10%

Therefore for the total import duty of pipe .. 30+4.33฿+0.433=34.76฿

Table 9-3 DATA FOR POWER COST

(1st August 1977)

Given by Mr. Varavut

Large Demand

Installation Fee :

First	1000 kw	@	฿56.00
Over	1000 kw	@	54.00

Actual Use Fee :

First	200 kw	@	฿ 0.59
Next	280 kw	@	0.57
Over	280 kw	@	0.52

Medium Demand

Installation Fee :

First	50 kw	@	฿60.00
Next	150 kw	@	59.00
Over	200 kw	@	58.00

Actual Use Fee :

First	50 kw	@	฿ 0.68
Next	150 kw	@	0.60
Next	200 kw	@	0.58
Over	400 kw	@	0.56

Table 9-4 MWWA UTILITY PLANT IN SERVICE
ACCOUNT 101 SERIES

Account Number	Description	Depreciation Rate,% * as of 30-9-1975
101-01	ENGINEERING SERVICES	6.67
101-02	CONSULTANT FEES	6.67
101-03	OTHER INTANGIBLE	—
101-11	SOURCE OF SUPPLY, STRUCTURES & IMPROVEMENTS	
A	Concrete Structure	2
B	Wooden Structure	5
101-12	COLLECTING & IMPOUNDING RESERVOIRS	
A	Dam (038-01)	2
1	Road (038-02)	2
	Bridge (038-03)	2
101-13	RIVER, CANAL, OTHER INTAKES	
	Canal (037)	2
101-14	WELLS	
A	Deep Wells (039-01)	2
	Deep Well Equipment (Already installed and awaiting transfer to deep well account) (039-02)	10
	Pumps Installed at Deep Wells(039-02-01)	10
	Line Shaft Engrossing Tube (039-02-03)	10
	Dead Weight Pressure Guage Testing Range (039-02-04)	10
	Monometer Range (039-02-05)	10

* Depreciation Rate of 2% implied the Life Expectancy of 50 years
5% implied the Life Expectancy of 20 years

Account Number	Description	Depreciation Rate,% as of 30-9-1975 *
	Hot Jet (039-02-06)	10
	Cast Iron Check Valve (039-02-07)	10
	Cast Iron Water Gate (039-02-08)	10
	Foot Valve (039-02-09)	10
	Brass for Central Controlling of Big Wells (039-02-10)	10
101-16	SUPPLY MAINS	-
101-17	OTHER WATER SOURCE PLANT	-
101-21	PUMPING STRUCTURES & IMPROVEMENTS	
A	Pump and Equipment	2
	Distillery Equipment	2
101-25	ELECTRIC PUMPING EQUIPMENT	
A	Pumps (High Pressure) (031-01)	5
B	Pumps (Low Pressure) (031-02)	4
	Pumps Motors (031-03)	4
	Meters (031-04)	4
	Automatic Switch Starter (031-05)	4
	Electrically Operated Tight-Scaling Butterfly Valve (031-06)	4
	Air Valve (031-07)	4
	Swing Check Valve (031-08)	4
	Reducing Valve (031-09)	4
	Digital Multiplier (031-10)	4
	Fuse (031-11)	4
101-26	DIESEL PUMPING EQUIPMENT	—
101-31	WATER TREATMENT STRUCTURES IMPROVEMENTS	
A	Concrete Structure	2
B	Wooden Structure	5

Account Number	Description	Depreciation Rate*, % as of 30-9-1975
101-32	WATER TREATMENT	
A	Chloring Distributor (032-01)	3
	Chloroscope (032-02)	3
	Chlorometer (032-03)	3
	Chlorometer Valve (032-04)	3
	Automatic Valve (032-05)	3
	Sedimentary Tank (033-01)	3
	Speed Variation Motor (033-03)	3
	Chemical Distributions (033-04)	3
	Magneter Switch Starter for Alum Feed Pumps (033-05)	3
	Distilling Tank (034-01)	3
	Water Gate Valve (034-02)	3
	Vacuum Meter (034-03)	3
	Vacuum Gauge (034-04)	3
	Pressure Gauge (034-05)	3
	Air Blower (034-06)	3
	Clean Water Tank (035-01)	3
	Pipe and Equipment in the Distillery (036)	3
101-41	TRANSMISSION & DISTRIBUTION STRUCTURES & IMPROVEMENT	
A	Concrete Structure	2
B	Wooden Structure	5
101-42	DISTRIBUTION RESERVOIRS & STANDPIPES	
	Tanks (041)	2
101-43	TRANSMISSION MAINS	
A	Cast Iron Pipe for 400 mm. (042-01)	2
	Pre-stressed Concrete 800 mm.	2
101-44	FIRE MAINS	
	Fire Hose (044)	2

Account Number	Description	Depreciation Rate*, % as of 30-9-1975
101-45	DISTRIBUTION	
A	Cast Iron Pipe for 100-300 mm. (042-02)	3
B	Anti-rust Iron Pipe (042-03)	2
C	Asbestos Pipe (042-04)	5
D	Zinc-Plated Iron Pipe	10
101-46	METERS IN SERVICE	
A	Budget Meters	20
	Free Meters	20
101-47	TUNNELS	-
101-48	HYDRANTS	-
101-49	OTHER TRANSMISSION & DISTRIBUTION PLANT	
A	Siphon Pipes (043)	2
101-81	GENERAL STRUCTURES & IMPROVEMENTS	
A	Material and Equipment Warehouse (021-01)	2
	Cable Room and Switch Room (021-04)	2
	Science Equipment Storage (021-05)	2
	MWWA Headquarters Building (022-01)	2
B	Officers Living Quarters (023-01)	5
101-82	OFFICE FURNITURE & EQUIPMENT	
A	Type-writers (064-01)	10
	Bill-Printing Machine (064-02)	10
	Roneo Machine (064-04)	10
	Xerox Machine (064-05)	10
	Manual Adding Machines (064-07)	10
B	Blue-Print Machine (064-03)	15
	Electric Adding Machines (064-06)	15
C	Office Furniture (064-08)	7 1/2
	Tables (064-08-100)	7 1/2

Account Number	Description	Depreciation Rate*,% as of 30-9-1975
	Meeting Table (064-08-101)	7 1/2
	Special officers Tables (064-08-102)	7 1/2
	First Grade Officers Tables (064-08-103)	7 1/2
	Second Grade Officers Tables (064-08-104)	7 1/2
	Third Grade Officers Tables (064-08-105)	7 1/2
	Fourth Grade Officers Tables (064-08-106)	7 1/2
	Table for 2nd Grade Draftsmen (064-08-107)	7 1/2
	Table for 3rd Grade Draftsmen (064-08-108)	7 1/2
	Table for 4th Grade Draftsmen (064-08-109)	7 1/2
	Typewriter Tables (064-08-110)	7 1/2
	Document Table (064-08-111)	7 1/2
	Long Tables (064-08-112)	7 1/2
	Stools (064-09-100)	7 1/2
	Benches (064-09-101)	7 1/2
	Chairs (064-09-102)	7 1/2
	Wall Clock (064-10)	7 1/2
	Draftsman Equipment (064-11)	7 1/2
	Printing Machine (064-12)	7 1/2
	Hoover Vacuum Cleaner (064-13)	7 1/2
	Meter Number Punching Machine (064-14)	7 1/2
	Cheque Number Punching Machine (064-15)	7 1/2
	Customer Name Punching Machine (064-16)	7 1/2
	Slide Projector (064-17)	7 1/2
	Slide Screen (064-18)	7 1/2
	Refrigerator (064-19)	7 1/2
	Air Conditioners (064-20)	7 1/2
	Fire Extinguishers (064-21)	7 1/2
	Oil Lamps (064-22)	7 1/2
	Furnace Lamps (064-23)	7 1/2
	Blinds (064-24)	7 1/2
	Aluminum Ladders (064-25)	7 1/2
	Fans (064-27-100)	7 1/2
	Ceiling Fans (064-27-101)	7 1/2

Account Number	Description	Depreciation Rate,* % as of 30-9-1975
	Floor Fans (064-27-102)	7 1/2
	Table Fans (064-27-103)	7 1/2
	Cabinets (064-32-100)	7 1/2
	Safe (064-32-101)	7 1/2
	Steel Document Cabinet (064-032-102)	7 1/2
	Wooden Document Cabinet (064-032-103)	7 1/2
	Mechanical Tool Cabinet (064-032-104)	7 1/2
	Card Cabinet (064-032-105)	7 1/2
	Bill Cabinet (064-032-106)	7 1/2
101-83	TRANSPORTATION EQUIPMENT	
A	Motor-cars (065-01)	15
B	Trucks (065-02)	20
C	Motorcycles (065-03)	25
	Boats (065-09)	25
D	Bicycles (065-08)	10
101-84	STORES EQUIPMENT	
A	Hand Truck (064-28)	7 1/2
101-85	TOOL, SHOP & GARAGE EQUIPMENT	
A	Pumps (061-03)	15
	Pipe-Cutting Machines (064-04)	15
	Perforator (061-05)	15
B	Pipe Stranding Machine (061-09)	10
	Pipe Pressor (061-11)	10
	Lathe (061-12)	10
	Gas Connecting Machine (061-13)	10
	Pulley and Winch (061-14)	10
	Pipe Adapter (061-15)	10
	Electric Measurement Tools (062-01)	10
	Electric Coil Winder (062-01-01)	10
	Ampere Volt Meter (062-01-02)	10

Account Number	Description	Depreciation Rate,* % as of 30-9-1975
101-85 B (Cont'd)	Wireless Current Testing Tools(062-01-03)	10
	Potential Transformer (062-01-04)	10
	Current Transformer (062-01-05)	10
	Motor Testing Tools (062-01-06)	10
	Testing Machinery for High Boiler Electricity (062-10-07)	10
	Telmetering (062-01-08)	10
	Movable Electric Testing Tool (062-01-09)	10
	Testing Tools for Transistor and Electronic Circle (062-01-10)	10
	Electric Adaptors (062-01-11)	10
	Electrical Drills (062-01-12)	10
	Electric Heater (062-01-13)	10
	Electric Stone Polishers (062-01-14)	10
	Electric Strander (062-01-15)	10
	Magazine Remover (063-04-103)	10
	Polishing Tools (063-04-104)	10
	Packing Tools (063-04-105)	10
	Tools for Tightening Oil Container Cap (063-04-106)	10
	Steel Tape Measure (063-04-017)	10
	Steel Pump Gasket (063-04-108)	10
	Filler (063-04-109)	10
	Wheel Barrows (065-07)	10
	Magnet (063-04-110)	10
	Cutting Iron (063-04-111)	10
	Iron Measuring Gauge (063-04-112)	10
	Flat Screw Drivers (063-04-113)	10
	Round Screw Drivers (063-04-114)	10
	Manual Drill (063-04-115)	10
C	Shelves Scientific Tools (064-29)	7 1/2
	Shelves for Water Pipe & Equipment (064-30)	7 1/2

Account Number	Description	Depreciation Rate,* % as of 30-9-1975
101-86	LABORATORY EQUIPMENT	
	Water Testing Equipment (063-01-01)	10
	Measurator (063-01-02)	10
	Residual Sediment Measure (063-01-03)	10
	Water Demmoralizer (063-01-04)	10
	Fisher Electrophoto Meter (063-01-05)	10
	Residual Chlorine Measure (063-01-08)	10
	Hydrocure Floculator (063-01-09)	10
	Mement Water Bath (063-01-10)	10
	Frogman Garments (063-02-01)	10
	Masks (063-02-02)	10
	Stop Watch Recorder (063-03-01)	10
	Scale (063-03-02)	10
	Degree Measure (063-03-03)	10
	Pipe Testing Tools (063-03-04)	10
101-87	POWER OPERATED EQUIPMENT	
A	Electric Generator (061-01)	20
	Air Compressor (061-02)	20
	Concrete Mixers (061-06)	20
	Soil Compressor (065-10-101)	20
B	Excavators (065-04)	15
C	Road Rollers (065-06)	10
	Road Drill (065-10-102)	10
	Crane (065-05)	15
	Pipe Holding Service (063-04-101)	10
	Lubricant Compressor (063-04-101)	10
	Hydraulic Compressor (061-10)	10
D	Lawn Mower (064-27)	7 1/2
101-88	COMMUNICATIONS EQUIPMENT	
A	Transmitter (062-02)	10

Account Number	Description	Depreciation Rate,* % as of 30-9-1975
101-89	OTHER EQUIPMENT	
A	Other Machinery of Value Lower than ฿ 10,000 (061-07)	10
	Asphalt Mixers (065-10-103)	20
	Medical Equipment (063-01-06)	10
B	Iron Plates (065-10-104)	2
C	Warning Traffic Lights (065-10-105)	7 1/2
	Nursing Beds (064-31)	7 1/2

REMARKS

Land will not be subject to any depreciation and will be listed under each functional caption.

Table 9-5 LABOR AND MATERIAL COST

(1) Wages by Occupation at Bangkok Separated System Area

Occupation	Unit (per day)	Cost (Baht)	Remarks
Carpenter	person	100	
Electrician	person	120	
Plasterer	person	150	
Welder	person	150	
Mason	person	150	
Steel Bending Worker	person	120	
Plumber	person	40	
Machine Operator	person	80	
Assistant	person	40	
Worker	person	30	

(2) Cost of Materials
(Including Customs Tariff)

Unit: Baht

Item	Unit	Foreign Currency	Domestic Currency	Remarks
DCIP ϕ100	1 m	250	135	Include Joint
" 150	"	358	193	"
" 200				"
" 250				"
" 300	1 m	740	399	"
" 350	"	851	459	"
" 400	"	1,096	579	"
" 450	"	1,280	689	"
" 500	"	1,490	805	"
" 600	"	1,963	1,057	"
" 700	"	2,590	1,394	"
" 800	"	3,203	1,725	"
DCIP ϕ100				
150				
200				
250				
300				
DCIP ϕ350	1 kg	14.7	7.9	Include Joint
400	"	15.1	8.3	"
450	"	15.0	8.1	"
500	"	14.8	7.9	"
600	"	14.4	7.8	"
700	"	14.8	8.0	"
800	"	14.6	7.8	"

Item	Unit	Foreign Currency	Domestic Currency	Remarks
DCIP Fitting ϕ100				
150				
200				
250				
300				
350	1 kg	32.2	14.5	
400	"	32.2	14.5	
450	"	32.2	14.5	
500	"	32.3	14.6	
600	"	32.3	14.6	
700	"	32.3	14.6	
800	"	32.3	14.6	
DCIP Gland ϕ100	1 set	130	56	
150	"	140	60	
200	"	236	101	
250	"	319	137	
300	"	335	143	
350	"	437	187	
400	"	715	307	
450	"	788	338	
500	"	883	378	
600	"	1,016	436	
700	"	1,577	676	
800	"	1,890	811	
SP ϕ350 x 6m	1 pc	6,413	3,454	Flange,Tar-Epoxy Coating
400 x 6m	"	7,216	3,885	"
450 x 6m	"	8,067	4,345	"
500 x 6m	"	8,854	4,768	"
600 x 6m	"	10,832	5,833	"
800 x 6m	"	14,977	8,065	"
SP ϕ350	1 kg	17.4	9.3	"
400	"	17.0	9.1	"
450	"	16.3	8.8	"
500	"	15.7	8.5	"
600	"	15.5	8.4	"
800	"	13.3	7.2	"
SP ϕ 12	1 m	-	17	GSP
20	"	-	22	"
25	"	-	32	"
32	"	-	42	"
35	"	-	48	Flange,Tar-Epoxy Coating
50	"	-	68	"
60	"	-	88	"
80	"	-	114	"
100	"	-	146	"
150	"	-	306	"
200	"	-	808	"
250	"	-	1,261	GSP
300	"	-	1,612	"

Item	Unit	Foreign Currency	Domestic Currency	Remarks
SP ϕ350	1 m	1,068	576	Tar-Epoxy Coating
400	"	1,203	647	"
450	"	1,344	724	"
500	"	1,475	795	"
600	"	1,805	972	"
800	"	2,496	1,344	"
SP Fitting	1 kg	-	40	
"	"	44.2	19.8	
ACP(20) ϕ100	1 m	-	71	Include Fitting
" 125	"	-		"
" 150	"	-	93	"
" 200	"	-	140	"
" 250	"	-	185	"
" 300	"	-	239	"
" 400	"	-		"
" 500	"	-	685	"
" 600	"	-		"
ACP(A) ϕ 80	1 m	-	15	"
" 100	"	-	17	"
" 150	"	-	26	"
Gibault ϕ 75	1 set	-	65	
" 100	"	-	71	
" 150	"	-	124	
" 200	"	-	187	
" 250	"	-	237	
" 300	"	-	304	
" 400	"	-	595	
" 500	"	-	730	
" 600	"	-	1,041	
ACP Fitting	1 kg	-	15	
"	"	44.2	19.8	
SV ϕ 75	1 set	4,084	1,086	Screw-Type
100	"	4,748	1,262	"
125	"			"
150	"	6,701	1,773	"
200	"	8,823	2,436	"
250	"	11,750	3,124	"
300	"	14,940	3,971	"
350	"	17,347	4,611	"
400	"	23,987	6,376	"
450	"	29,327	7,796	"
500	"	50,503	13,425	"

Item	Unit	Foreign Currency	Domestic Currency	Remarks
BV ϕ350	1 set	32,271	8,578	Screw-Type
400	"	38,556	10,249	"
450	"	42,555	11,312	"
500	"	45,222	12,019	"
600	"	53,256	14,156	"
700	"	76,586	20,358	"
800	"	86,968	23,916	"
Air Valve	1 set	8,518	1,964	
Angle Valve ϕ 13	1 set	-	395	
" 19	"	-	479	
" 35	"	-	1,032	
" 100	"	-	4,000	
PVCP ϕ 15	1 m	-	3	
18	"	-	4	
20	"	-	5	
25	"	-	7	
35	"	-	9	
40	"	-	12	
55	"	-	18	
65	"	-	29	
80	"	-	40	
100	"	-	64	
125	"	-	99	
Concrete Pipe ϕ100	1 m	-	30	
" 150	"	-	48	
" 200	"	-	58	
" 250	"	-	81	
" 300	"	-	100	
" 500	"	-	172	
" 600	"	-	230	
R.C.P. ϕ500	1 m	-	263	Reinforced
Bolt&Packing ϕ 75	1 set	-		
" 100	"	-	10	
" 150	"	-	14	
" 200	"	-	20	
" 250	"	-	32	
" 300	"	-	42	
" 350	"	-	58	
" 400	"	-	68	
" 450	"	-		
" 500	"	-	106	
" 600	"	-	140	
" 700	"	-	190	
" 800	"	-	250	

Item	Unit	Foreign Currency	Domestic Currency	Remarks
Steel Plate	1 kg	4.3	1.0	
L - Steel	"	6.1	1.2	
I - Steel	"	9.6	2.4	
C.H. Plate	"	5.8	1.0	
Steel Sheet Pile	"	6.5	1.5	
Trench Sheet Pile	"	6.1	1.9	

(3) Unit Cost Estimations for the Various Categories (Including Customs Tariff)

(unit : Baht)

Item	Unit	Materials		Labor D.Cost	Cost	Remarks
		F.Cost	D.Cost			
Excavation						
(a) By Hand	1 cum	-	-	27	27	
(b) By Bulldozer	"	-	10	1	11	10 ton
(c) Cost of Operating	1 hr	-	37	19	56	
(d) By Shovel	1 cum	-	20	1	21	Cap: 0.6cum
(e) By Dragline	"	-	57	1	58	"
(f) Cost of Operating	1 hr	-	49	19	68	
Surplus Soil						
(a) By Hand	1 cum	-	-	21	21	
(b) By Dump Trucks	"	-	32	3	35	
(c) Cost of Operating	1 hr	-	46	19	65	
Concrete Pile						
(a) 300mm L=6m	1 pc	-	975	62	1,037	
(b) Cost of Operating	1 day	-	13	32	45	
(c) 300m L=8m	1 pc	-	1,289	106	1,395	
(d) Cost of Operating	1 day	-	19	46	65	
Rubble Stone	1 cum	-	174	21	195	
Forms						
(a) Class-A	1 sqm	-	68	28	96	
(b) Class-B	1 sqm	-	56	15	71	
(c) Class-C	1 sqm	-	34	15	49	
Timbering	1 cum	-	7	3	10	
Staging	"	-	10	4	14	
Reinforcing						
(a) Round Bar less than ϕ9mm	1 ton	-	6,953	900	7,853	
(b) Round Bar ϕ12mm -- ϕ22mm	"	-	6,953	900	7,853	
(c) Deformed Bar ϕ12mm - ϕ23mm	"	-	6,926	750	7,676	
Concrete						
(a) 1:4:8	1 cum	-	350	147	497	
(b) 1:3:6	"	-	407	174	581	
(c) 1:2:4	"	-	522	222	744	
Mortar						
(a) 1:2	1 cum	-	849	27	876	
(b) 1:2 t=20m/m	1 sqm	-	17	17	34	
(c) 1:2 t=20m/m water Proof	"	-	129	17	146	
(d) Expansion Joint	1 m	340	60	14	494	Rubber

Item	Unit	Materials		Labor D.Cost	Cost	Remarks
		F.Cost	D.Cost			
Pump Drainage						
(a) Engine 10ps	1 day	-	62	95	157	
(b) Engine 5ps	"	-	27	80	107	
(c) By Hand Pump	"	-	-	60	60	
Walling						
(a) 1.6 x 2.2m both side	1 m	-	98	47	145	Wood
(b) 1.3 x 1.5m " "	"	-	66	44	110	"
(c) Trench Sheet Pile	"	173	234	272	679	
(d) Cost of Operating	1 day	-	80	304	384	
Revetment	1 m	-	4,640	214	4,854	
Concrete Slab Pitching	1 sqm	-	121	41	162	
Solding	1 sqm	-	13	2	15	
Paving						
(a) Concrete Pavement	1 sqm	-	73	52	125	
(b) Asphalt Pavement	1 sqm	-	126	30	156	
(c) Brick Pavement	1 sqm	-	65	5	70	
Planting	1 tree	-	305	60	365	
Fence						
(a) Silaraeng Fence	1 m	-	313	155	468	
(b) Barbed Wire Fence	"	-	74	38	112	
(c) Net Wire Fence	"	-	189	15	204	
Gutter & Open Channel						
(a) 500 x 735mm	1m	-	287	162	449	
(b) 800 x 1,220mm	"	-	353	195	548	
(c) 450 x 450mm	"	-	70	7	77	
(d) 200 x 200mm	"	-	35	2	37	
(e) Brick Gutter	"	-	4	15	19	
(f) Concrete Cutter	"	-	23	10	33	
(g) Drain Pit	1 set	-	119	64	183	
Coffering						
(a) Closing Dyke	1 m	-	262	62	324	
(b) Driving Sheet Pile	"	778	1,322	482	2,582	
(c) Removing Sheet Pile	"	-	19	257	276	
Stone Masonry	1 m	-	193	68	261	
Steel Bar Screen	1 set	6,385	812	6,437	13,634	
Sluice Gate	"	96,380	25,620	1,404	123,404	
Drain Pit (A)	"	-	2,470	2,435	4,905	
Drain Pit (B)	"	-	4,430	3,174	7,604	
Flow-Meter Chamber	"	-	17,750	4,239	21,989	
(Back Washing)						
Flow-Meter Chamber	1 set	-	21,318	9,076	30,394	
(Raw Water)						
Flow-Meter Chamber	1 set	-	24,535	9,579	34,114	
(Distribution)						
Laying Pipes						
75 Coupling	1 m	-	-	1.5	1.5	
100 "	"	-	-	2.0	2.0	
150 "	"	-	-	2.5	2.5	
200 "	"	-	-	3.9	3.9	

Item	Unit	Materials		Labor D.Cost	Cost	Remarks
		F.Cost	D.Cost			
250 Coupling	1 m	-	-	4.8	4.8	
300 "	"	-	-	6.1	6.1	
350 Mechanical	"	-	-	10	10	
400 "	"	-	-	12	12	
450 "	"	-	-	13	13	
500 "	"	-	-	17	17	
600 "	"	-	-	21	21	
700 "	"	-	-	26	26	
Angle Valve Box						
(a) Less than ϕ 75mm	1 set	-	58	14	72	
(b) More than ϕ100mm	"	-	88	15	103	
Cost of Jointing						
75 Gibault	1 set	-	65	6.2	71.2	
100 "	"	-	71	8.2	79.2	
150 "	"	-	124	10	134	
200 "	"	-	187	15	202	
250 "	"	-	237	19	256	
300 "	"	-	304	24	328	
350 Mechanical	"	437	187	60	684	
400 "	"	715	307	72	1,094	
450 "	"	788	338	83	1,209	
500 "	"	883	378	104	1,365	
600 "	"	1,016	436	131	1,583	
700 "	"	1,577	676	157	2,410	
Sluice Valve						
75 Screw	1 set	4,084	1,086	59	5,229	
100 "	"	4,748	1,262	62	6,072	
150 "	"	6,701	1,773	69	8,552	
200 "	"	8,823	2,436	93	11,262	
250 "	"	11,750	3,124	120	14,994	
300 "	"	14,940	3,971	150	19,061	
350 Hat	"	17,347	4,611	167	22,125	
400 "	"	23,987	6,376	222	30,585	
450 "	"	29,327	7,796	288	37,411	
500 "	"	50,503	13,425	387	64,315	
600 "	"	80,447	21,385	468	102,300	
700 "	"	108,428	28,822	549	137,799	
Butterfly Valve						
350 Screw	1 set	32,271	8,578	167	41,016	
400 "	"	38,556	10,249	222	49,027	
450 "	"	42,555	11,312	288	54,155	
500 "	"	45,222	12,019	387	57,630	
600 "	"	53,256	14,157	468	67,881	
700 "	"	76,586	20,358	549	97,493	
800 "	"	89,968	23,916	588	114,472	
Welding						
350	1 pc	-	319	129	448	
400	"	-	346	151	497	
450	"	-	372	173	545	
500	"	-	398	191	589	

Item	Unit	Materials		Labor D.Cost	Cost	Remarks
		F.Cost	D.Cost			
Laying Polyvinyl Chloride Pipe						
20	1 m	-	6.4	8.6	15	
25	"	-	8.4	9.4	18	
30	"	-	11.6	17.4	29	
40	"	-	15.0	18.0	33	
50	"	-	21.6	18.4	39	
75	"	-	46.8	27.2	74	
100	"	-	73.3	27.7	101	
Cutting of Asphalt P vement						
(a) Cost of Operating	1 hr	-	48	32	80	
Cost of Operating	1 hr	-	4	2.6	6.6	
Hand Rail	1 m	-	178	82	260	
Air Valve	1 set	8,281	2,855	391	11,527	
Fire Hydrant		-	1,379	51	1,430	
Gate						
(a) Proposed Plant	1 set	-	7,017	1,275	8,292	
(b) Intake Site	"	-	2,507	910	3,417	
Name Plate of W.T.P.	"	-	4,665	1,905	6,570	
Flag Pole of W.T.P.	"	-	9,614	3,684	13,298	
Brick Masonry	1 sqm	-	83	9	92	
Finishing Mortar	"	-	9	41	50	
Coping Finishing Mortar	"	-	51	54	105	
Window Frame Mortar	1 m	-	3	26	29	
Finishing Mortar Floor	1 sqm	-	11	21	32	
Finishing Mortar Wall	1 sqm	-	11	41	52	
I-Steel Beam 250mm	1 m	368	92	45	505	
Checkered Steel Plate	1 m	107	38	36	181	
Tile	1 sqm	-	291	66	357	
Artificial Stone Ground Finish	"	-	159	71	230	
Artificial Stone Wet Brush Texturing	1 sqm	-	159	71	230	
Wood Brackets for Ceiling	1 sqm	-	32	10	42	
Textile Finishing	1 sqm	-	170	3	173	
Leveling Mortar	"	-	14	21	35	
Silaraeng Masonry	"	-	22	57	79	
Folding Door	1 set	-	5,394	4,900	10,294	
I-Steel Beam 350mm	1 m	533	133	51	717	
Sub-Station Foundation	1 set	-	37,872	19,950	57,822	
Retaining Wall	1 m	-	257	130	387	

Item	Unit	Materials		Labor D.Cost	Cost	Remarks
		F.Cost	D.Cost			
Anchor Block (T)						
100 x 100	1 set	-	89	34	123	
200 x 100	"	-	141	55	196	
200 x 150	"	-	150	58	208	
200 x 200	"	-	162	63	225	
250 x 200	"	-	220	86	306	
300 x 300	"	-	286	112	398	
300 x 200	"	-	335	130	465	
350 x 250	"	-	367	143	510	
350 x 300	"	-	421	164	585	
450 x 450	"	-	768	304	1,072	
500 x 500	"	-	898	356	1,254	
600 x 600	"	-	967	381	1,348	
Anchor Block (H 90°)						
200	1 set	-	216	89	305	
250	"	-	338	139	477	
300	"	-	441	182	623	
350	"	-	720	296	1,016	
400	"	-	980	404	1,384	
450	"	-	1,296	532	1,828	
500	"	-	1,648	688	2,336	
Anchor Block (H 45°)						
100	1 set	-	85	34	119	
150	"	-	158	64	222	
200	"	-	269	109	378	
250	"	-	387	158	545	
300	"	-	570	232	802	
350	"	-	705	288	993	
400	"	-	980	401	1,381	
450	"	-	1,401	577	1,978	
500	"	-	1,762	726	2,488	
600	"	-	1,762	726	2,488	
Anchor Block (V,U,45°)						
200	1 set	-	230	93	323	
250	"	-	443	182	625	
300	"	-	686	285	971	
350	"	-	726	303	1,028	
400	"	-	1,532	643	2,175	
450	"	-	1,791	753	2,544	
500	"	-	2,212	930	3,142	
Anchor Block (V,L,45°)						
200	1 set	-	228	91	319	
250	"	-	313	126	439	
300	"	-	438	177	615	
350	"	-	489	197	686	
400	"	-	504	203	707	
450	"	-	617	249	866	
500	"	-	751	304	1,055	
Laying Plain Concrete Pile						
300 Socket	1 m	-	106	33	139	
500 "	"	-	184	63	247	
600 "	"	-	244	80	324	
800 "	"	-	383	124	507	
1000 "	"	-	629	173	802	