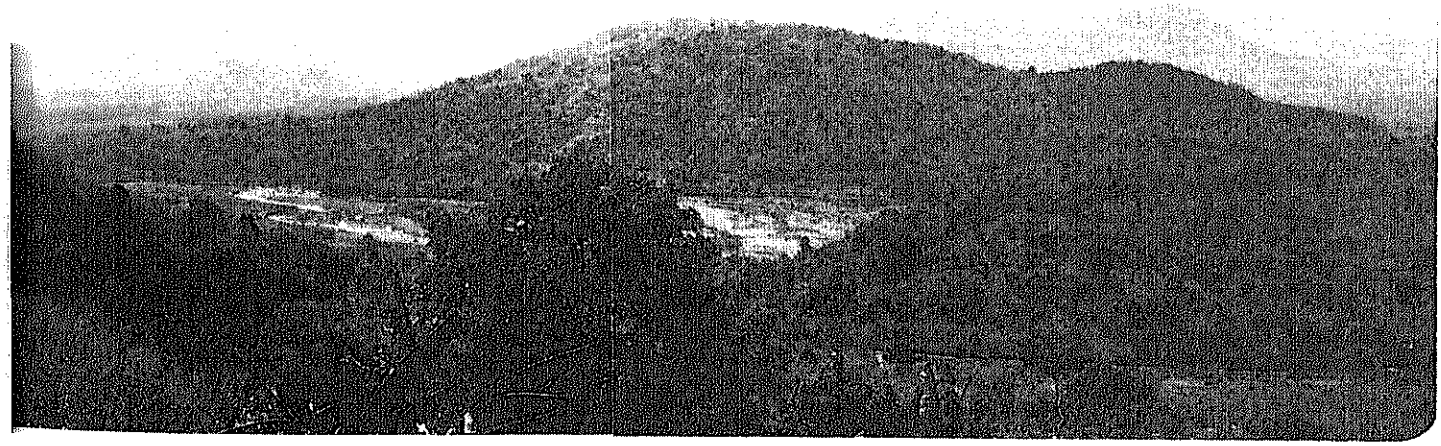
CHAPTER V

PROPOSED WATER SUPPLY SYSTEM



PROPOSED SITE OF THE BILI BILI DAM

CHAPTER V

PROPOSED WATER SUPPLY SYSTEM

1. GENERAL

This Chapter describes future water supply system in Ujung Pandang. It was worked out through an alternative study as detailed in the Supporting Reports. The study was carried out paying particular attentions to the findings of studies and investigation concerning existing water supply, water consumption patterns, future water requirements, natural and social conditions all described in the preceding Chapters.

Basic factors to be considered in developing the future water supply system are as follows.

1) To supply as many inhabitants as possible with safe water, in accordance with "GOI REPELITA IV Policy". To this end, extension of pipelines to the area where groundwater is scarce in the dry seasons and/or its quality is not suitable for drinking.
2) To reduce water losses in the transmission system and distribution system as early as practicable.
3) For stable and reliable water supply throughout the year, to take measures to supplement raw water in the dry season.
4) To take into consideration existing plans related to the development of the municipality, such as industrial estates, housing estates and others.

This Chapter first defines the target years to be adopted and the area to be served within each stage/phase of the Project. Secondly, it describes proposed water sources for the water supply system. Then, major facilities of the system to be constructed under each stage/phase are outlined with necessary information. Finally, operation and maintenance of the proposed system is described from viewpoints of effective control of the whole water supply systems.

2. TARGET YEAR AND SERVICE AREA

1) Target Year

The design period of the present water supply development project is up to the year 2005, as defined in the Scope of Work. The whole project is divided into two mains stages, namely, before and after the planned completion of Bili-Bili Dam in 1995, considering i) changes in circumstances of water sources, and ii) time period required for implementation of effective works.

Further, each stage is divided into two phases, as shown below, for convenience of execution. More detailed schedules and description are given in Chapter VI.

Stage I : Phase 1 --- 1985 to 1992
Phase 2 --- 1988 to 1995

Stage II: Phase 1 --- 1990 to 2000
Phase 2 --- 1994 to 2005

2) Service Area

The area to be served in each Stage is determined, as shown on Figure 5.1. In determining such service area, the following are considered.

i) Priority in extending pipelines is to be given to area where groundwater is hard to obtain and poor in quality (refer to Figure 3.4.).

ii) The present tendency of urbanization will continue in the future. The service area is to be determined to ensure that such urbanization and the development of housing estate and industrial estate are not checked by water supply (refer to Figure 5.2.).

iii) Service ratio as set forth in REPELITA IV in terms of population is to be followed. In this planning, the ratio taken for 1995, 2000 and 2005 is 80%, 85% and 90% respectively, and the planned service area covers such population.

Under Stage I project, the new system will supply water to the planned area of the housing and industrial estate and their surrounding areas where groundwater are scarce. It also improves the supply condition in the existing service area providing the people with more water.

Under Stage II project, the target directs to the suburban area where people are sparsely populated at present and groundwater is rather limited.

People resident outside the service area are recommended to use groundwater, in view of the groundwater availability and an economical shallow well construction cost. A sample design of shallow well is shown in Appendix V to this Report.

3. WATER SOURCES

Presently, there are two water sources tapped for the water supply of Ujung Pandang, that is, the Maros river and the Jeneberang river. The Maros river will be utilized continuously in the future at the present intake rate, since there is no possibility of increase in intake quantity. Regarding the Jeneberang river, the present intake at Sungguminasa will be used until the completion of Bili-Bili Dam which is now under planning.

As regards water sources for the future water requirement, the present study on water sources (refer to Supporting Reports) has recommended 1) to divert water from the Bili-Bili irrigation canal [1/], and 2) to take the impounded water of Bili-Bili Dam, because there are no other water sources available in and around Ujung Pandang. The Dam is planned to be constructed in the middle reaches of the Jeneberang river, and water will be available at the beginning of 1996 and onwards. When the Dam water becomes available, both the intake at Sungguminasa and the diversion from the above irrigation canal will be transferred to the intake from the Dam.

Summarizing all the above, the proposed water sources for the future water supply system are given in Table 5.1.

Regarding remedial measures for the water shortage suffered occasionally in the dry season, it is proposed, as recommended in "Water Sources Study" in Supporting Reports, to utilize the irrigation water diverted from the Bili-Bili irrigation canal. This diversion is intended not only to supplement the probable shortage in the dry season, but also to accomodate the increment of water requirement within the Stage I period.

1/ : Official letter regarding raw water management on Bili-Bili irrigation canal was issued by the Governor of the South Sulawesi Province, addressing permission of the raw water withdrawal by water supply as shown in Appendix III.

4. PROPOSED WATER SUPPLY SYSTEM

Water supply systems proposed for 2005 are shown on Figures 5.3 to 5.5 General Plan, Illustration and Profile of Future Water Supply System.

During the project period of Stage I, mainly three separate treatment plants at Ratulangi, Panaikang and Mangngasa (a new plant) supply treated water to the consumers. Under Stage II project, clear water is supplied from two systems at Panaikang and Mangngasa, as Ratulangi system will be abandoned after completion of Bili-Bili Dam construction.

The new Mangngasa system takes raw water from the Jeneberang river, transmits water by gravity to the treatment plant where raw water is clarified and pumps treated water into the distribution network. The new system, thus, adopts combination of gravity and pumping flow for whole project period.

Planned quantity of each facility is schematically portrayed on Figure 5.6. Major works proposed under each stage/phase are referred to in Table 5.2, which is prepared grouping all the works into each phase/stage and each facility.

In the succeeding sub-sections, further detailed technical particulars on each facility are described in order of water flow, i.e., intake and transmission facilities, treatment facilities, and distribution system and house meters.

4.1 Intake and Transmission Facilities

The proposed intake site and an alignment selected for the transmission pipeline are shown on Figure 5.3. Major works proposed are as follows.

1) Stage I (Phases 1 and 2)

(1) Rehabilitation of the existing transmission canal from Leko Pancing intake to Panaikang treatment plant.
Leakage of raw water amounts to 30% of the intake flow rate at present, that takes place especially at the lower span of the existing canal. To obtain effective results in a short-term period, it is recommended to start rehabilitation at the downstream of the canal near Panaikang.

(2) Works to raise the existing Bili-Bili irrigation weir to facilitate raw water diversion.

(3) Construction of intake facilities with a capacity of 1,000 l/sec at the Bili-Bili irrigation canal, 1,500 m downstream of the weir.
Raw water, after flowing down through the existing canal, is diverted to the intake chamber, from which raw water flows into the pipeline. Its elevation allows gravity flow in all processes from intake to the treatment facilities.

(4) Laying of the transmission pipeline, dia 1,100 mm and length 20.5 km.
Conveyance capacity of this line includes 40 l/sec for the Sungguminasa water supply. In general, there are two alternatives for raw water transmission. One is transmission by pipeline system and the other by open channel. The construction cost estimated as shown in the Supporting Reports does not show any significant difference between two alternatives. But pipeline system is considered rather appropriate in this case for the reasons: 1) it prevents raw water from biological contamination and 2) water losses by evaporation are not expected.

All the works listed above are planned to be carried out under Phase 1 program and the facilities constructed/ rehabilitated are utilized also during Phase 2 period.

2) Stage II (Phases 1 and 2)

(1) Construction of intake facilities with a capacity of 3,000 l/sec directly downstream of Bili-Bili Dam, including grit chamber and measuring devices. If raw water to meet water requirement in 2005 be available at Bili-Bili intake, grit chambers equipped with measuring devices should be constructed. It is reasonable to take raw water at Bili-Bili intake using the facilities constructed under Stage I project. This plan, however, would be possible only in case raw water management be ensured to be available at the Jeneberang river.

(2) Laying of another transmission pipeline, in addition to that laid in Stage I.
Pipelines from Bili-Bili Dam to the intake chamber near Bili-Bili canal, 1,350 mm in diameter and 2.9 km in length, and from the intake chamber to the treatment plant, 900 mm in diameter and 20.5 km in length are installed newly.

The above works are planned to be carried out under Phase 1 program and the facilities are utilized within Phase 2.

4.2 Treatment Facilities

Major works proposed are as follows. Regarding new facilities, their construction will be executed by phases as shown on Figure 5.7.

1) Stage I, Phase 1

(1) Rehabilitation works of Ratulangi plant:

- Replacement of the filter sand,
- Installation of flow measuring equipment, and
- Installation of chlorinator.

The dosage of chlorine is manually operated at the existing system. It sometimes happened that intermittent and uneven dosage caused no trace of residual chlorine in the supplied water. Generally, sophisticated devices for dosing chlorine require high level of maintenance. Devices selected here are simple ones.

(2) Upgrading of Panaikang plant.

An increase of its capacity by 100 l/sec is planned by installing additional pumps and chemical equipment as formerly done at the Panaikang treatment plant.

(3) Construction of a new treatment plant at Mangngasa with a capacity of 500 l/sec.

The location of the new treatment plant is determined near at Mangngasa considering municipal boundary and its elevation. Treatment processes are tentatively assumed for the purpose of cost estimates: pre-chlorination, chemical coagulation, sedimentation, filtration and post-chlorination. The required land space is also assumed at 75,000 m2 as shown on Figure 5.8.

The design of the treatment plant is to be made so as to allow for an over load operation to supplement possible decrease of the production of the other plants in the dry season.

2) Stage I, Phase 2

Construction of additional facilities to the plant at Mangngasa, up to the capacity of 1,000 l/sec. Treatment processes planned are all the same as Phase 1.

3) Stage II (Phases 1 and 2)

(1) Works to expand the capacity of the treatment plant at Mangngasa to 2,000 l/sec in total, in Phase 1.

On completion of the above work, the existing Ratulangi plant is proposed to be abandoned.

(2) Works for the same, to 3,000 l/sec in total, in Phase 2.

4.3 Distribution System and House Meters

Distribution system developed here aims to divide service area into several zones (largely by system) as shown on Figure 5.3. This zoning enables to identify volume of leaked water by zone as balance of distribution flow and consumption. To achieve this target, several valves and flow meters are strategically distributed over the networks. Valves are installed at the pipelines so as to control water flow between zones, and flow metering devices at the distribution trunk mains to be laid to supply water to each zone. Trunk mains have a conveyance capacity to meet water requirements at the target year of each stage.

Under Stage I project, major works are to rehabilitate the old distribution network by installing additional pipeline, to abate the water leakage (refer to Appendix IV) and to develop new pipe reticulation near at the housing estate and its surrounding area. Inhabitants of housing estate are served through house connections, while those of its surrounding area are majorly provided with public standpipes. The drawing of proposed public standpipe is shown on Figure 5.9.

Stage II project plans to expand this network supplying more water to the people and to form a new distribution network at the north-east area of the municipality. People sparsely populated in the north-east area are served mostly by public standpipes.

Major works to be carried out under each phase are enumerated below.

1) Stage I, Phase 1

(1) Rehabilitation work
- Replacement and installation of house meters : 5,600 nos.
- Rehabilitation of old distribution network: 75 mm to 350 mm in diameter and 55 km in length.

(2) Construction of clear water reservoir: 4,000 m3 of storage capacity, namely, 2.4 hours of daily maximum demand.

(3) Construction of distribution pump facilities: 170 kw x 3 units.

(4) Pipe-laying work of distribution trunk mains and secondary mains: 75 mm to 1,000 mm in diameter and 115 km in length.

(5) Installation of public standpipes and fire hydrants:
1,800 nos. of public standpipes and 80 nos. of hydrants.

(6) Installation of house meters: 40,000 nos.

2) Stage I, Phase 2

(1) Expansion work of clear water reservoir: 4,000 m3 of storage capacity

(2) Installation of distribution pumps: 340 kw x 2 sets.

(3) Pipe-laying work of distribution trunk mains and secondary mains: 75 mm to 800 mm in diameter and 111 km in total length.

(4) Installation of public standpipes and fire hydrants: 100 nos. and 30 nos. respectively.

(5) Installation of house meters: 12,000 nos.

3) Stage II, Phase 1

(1) Construction of clear water reservoir: 7,500 m3 of storage capacity.

(2) Construction of distribution pump facilities: 340 kw x 2 units.

(3) Pipe-laying work of distribution trunk mains and secondary mains: 75 mm to 900 mm in diameter and 142 km in length.

(4) Installation of public standpipes and fire hydrants: 100 and 40 nos. respectively.

(5) Installation of house meters: 31,000 nos.

4) Stage II, Phase 2

(1) Expansion of clear water reservoir: 7,500 m3 of storage capacity.

(2) Installation of distribution pumps: 340 kw x 2 sets.

(3) Pipe-laying work of distribution trunk mains and secondary mains: 75 mm to 800 mm in diameter and 84 km in length.

(4) Installation of public standpipes and fire hydrants: 100 and 30 nos. respectively.

(5) Installation of house meters: 37,000 nos.

5. OPERATION OF THE WATER SUPPLY SYSTEM

The water supply system proposed in the foregoing sections has been planned so as to satisfy the following three basic requirements for water supply:

1) Supply quantity to meet the demand
2) Water quality to be safe for drinking
3) Supply to be continuous

However, it depends on operation whether the system can meet the requirements all the time, or not, especially under abnormal conditions, such as abnormal decrease of source water, unforeseen suspension of water transmission, accidents in the treatment plant or distribution pipelines.

In connection with operation of the system, particular attention must be paid to the following:

1) Two independent systems, during a certain period three systems, are to be in operation. These systems are not connected with each other, except the distribution networks.

2) Each intake of the three independent systems is located far away from the treatment plant.

3) In the past dry seasons, abnormal decrease of supply source has been experienced time and again.

To meet the requirements mentioned above, and to cope with unforeseen happenings, the operation of the proposed water supply system is planned as follows:

Each Treatment Plant (at Panaikang and the proposed plant)

1) Under normal conditions, the plant operates on its own accord all the related facilities, from the intake down to the distribution for its supply area.

2) Under abnormal conditions, the plant operates under the direction of the operation control center.

Operation Control Center (at Ratulangi)

1) Under normal conditions, the center receives the following information:

   a. Intake quantity

   b. Production quantity

   c. Distribution quantity

2) Under abnormal conditions, the center directs the plants in the following:

   a. Production quantity

   b. Operation of valves on the connecting pipelines between supply areas.

As regards the above proposed operation, all necessary facilities are allowed for in the cost estimate. Connecting pipelines in particular are included in the plan of the distribution system.

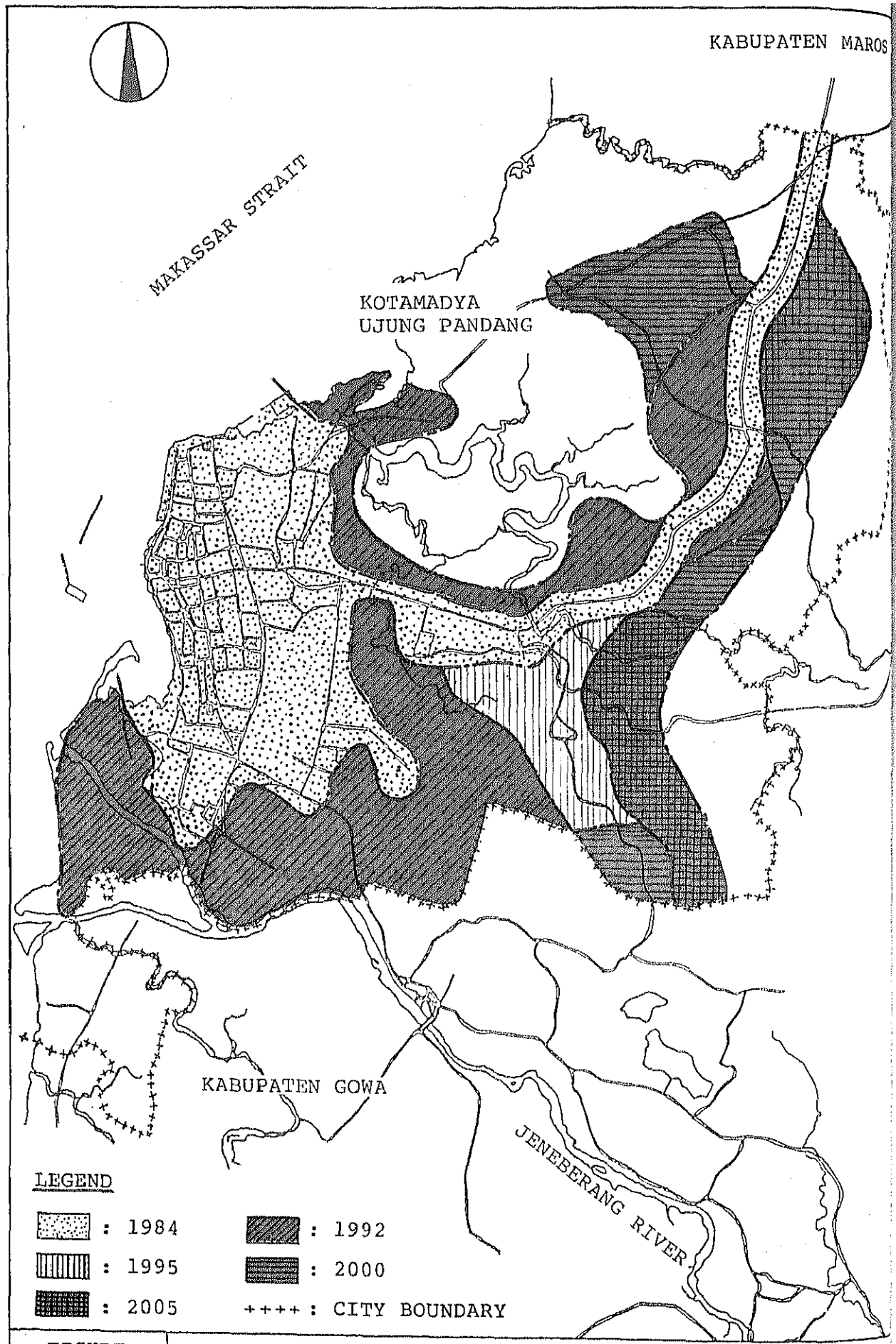
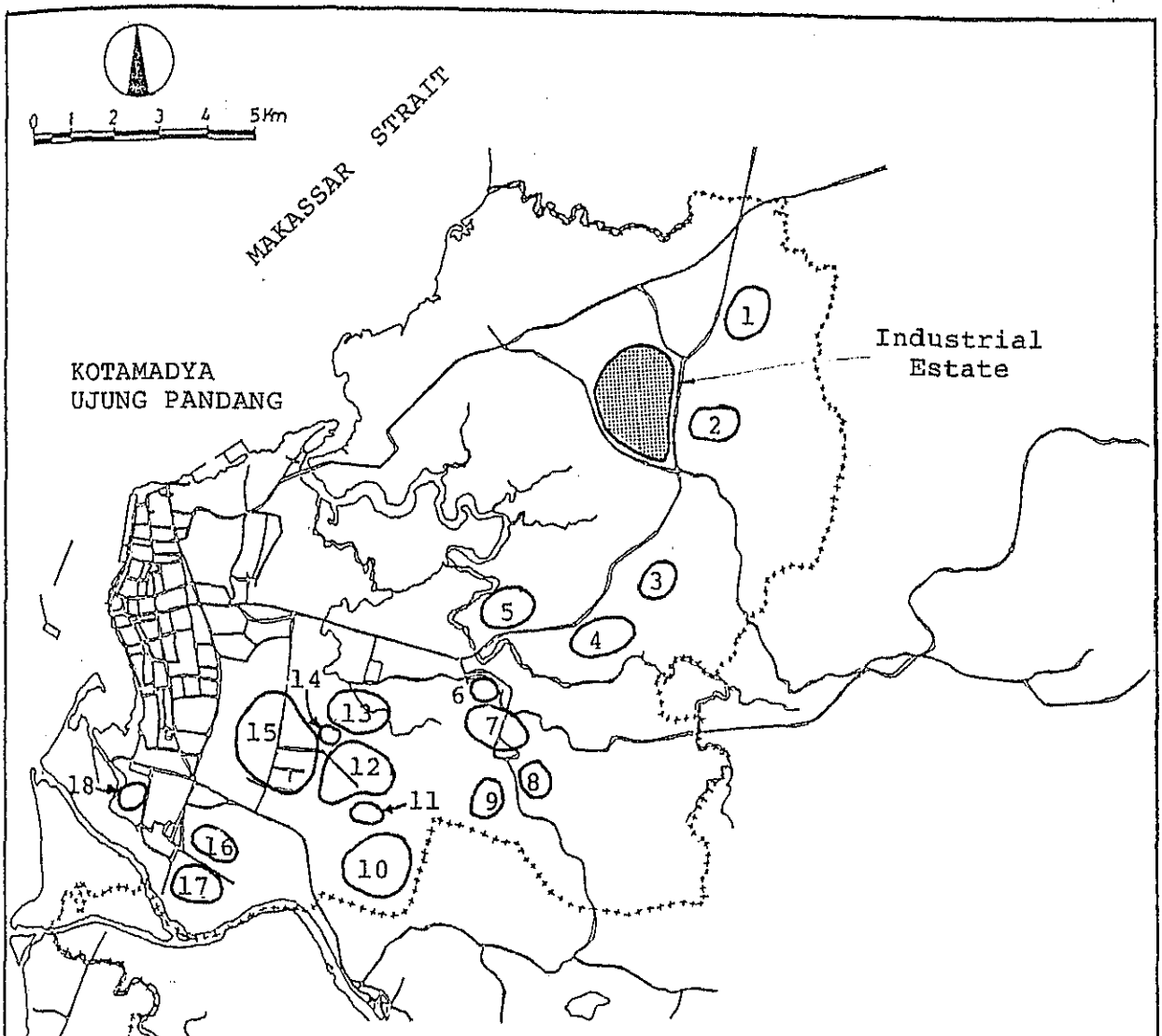


FIGURE	PLANNED SERVICE AREA
5.1	



Area	Planned House Units	Executing Agencies
1	3,000	PERUMNAS
2	400	B T N
3	330	B T N
4	220	B T N
5	700	B T N
6	60	B T N
7	100	B T N
8	3,000	PERUMNAS
9	300	B T N
10	3,000	P.T.TIMURAMA
11	300	B T N
12	5,000	PERUMNAS
13	770	P.T.DEWI SARANA INDAH
14	100	B T N
15	2,000	P.T.TIMURAMA
16	500	B T N
17	750	B T N
18	100	B T N

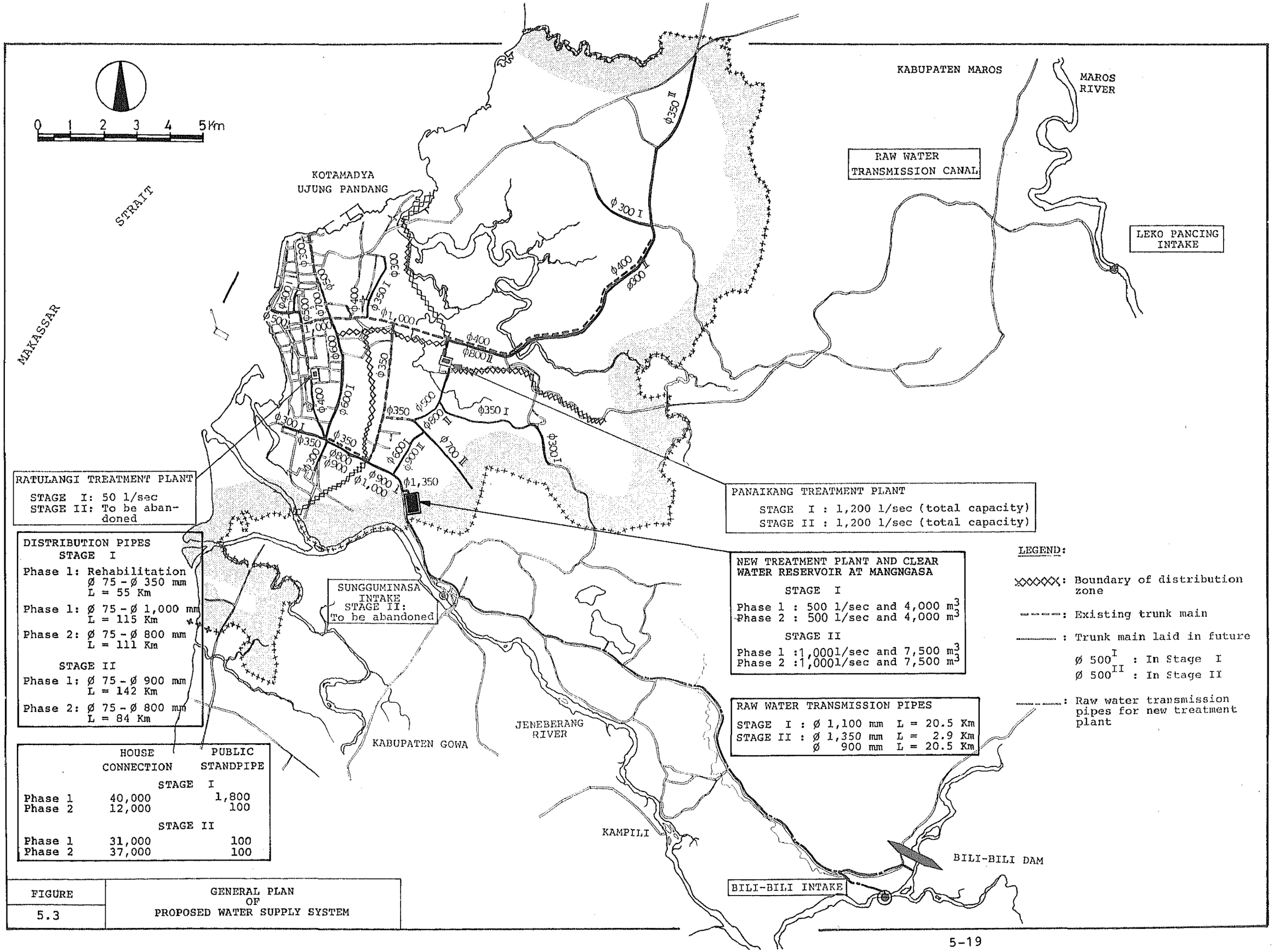
FIGURE 5.2 PLANNED AREA OF HOUSING AND INDUSTRIAL ESTATE

TABLE 5.1 INTAKE RATE

Item	Stage I		Stage II	
	Phase 1	Phase 2	Phase 1	Phase 2
The Maros River				
- Panaikang System	1,400 l/sec	1,400 l/sec	1,400 l/sec	1,400 l/sec
The Jeneberang River				
- Ratulangi System	75 l/sec	75 l/sec	-	-
- Proposed System	440 l/sec[1/]	960 l/sec[1/]	1,840 l/sec[2/]	2,790 l/sec[2/]
Total	1,915 l/sec	2,435 l/sec	3,240 l/sec	4,190 l/sec

1/ : Raw water diverted at Bili-Bili Intake.

2/ : Impounded water of Bili-Bili dam for water supply.



	HOUSE CONNECTION	PUBLIC STANDPIPE
STAGE I		
Phase 1	40,000	1,800
Phase 2	12,000	100
STAGE II		
Phase 1	31,000	100
Phase 2	37,000	100

FIGURE	GENERAL PLAN OF PROPOSED WATER SUPPLY SYSTEM
5.3	

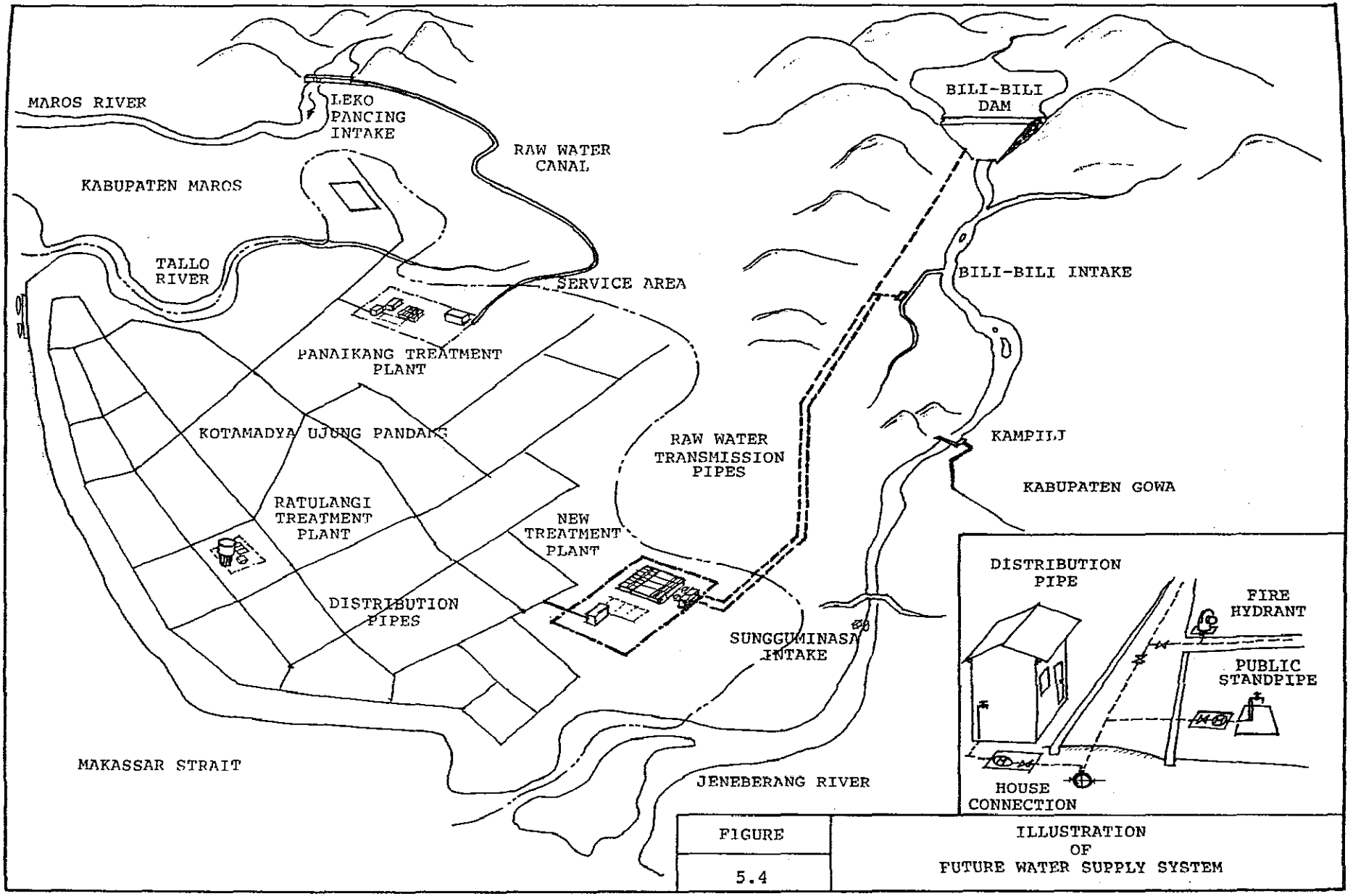


FIGURE	ILLUSTRATION OF FUTURE WATER SUPPLY SYSTEM
5.4	

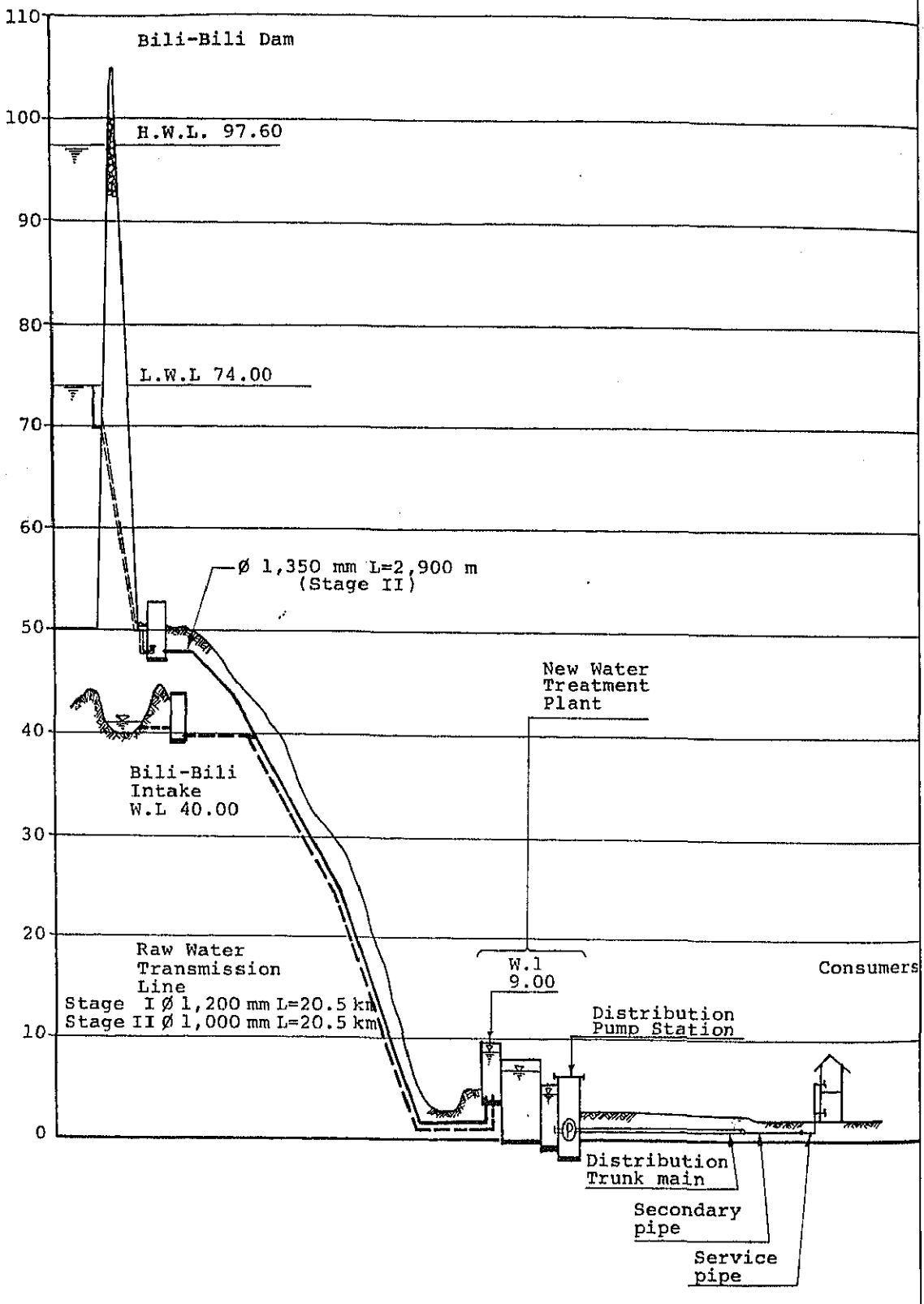
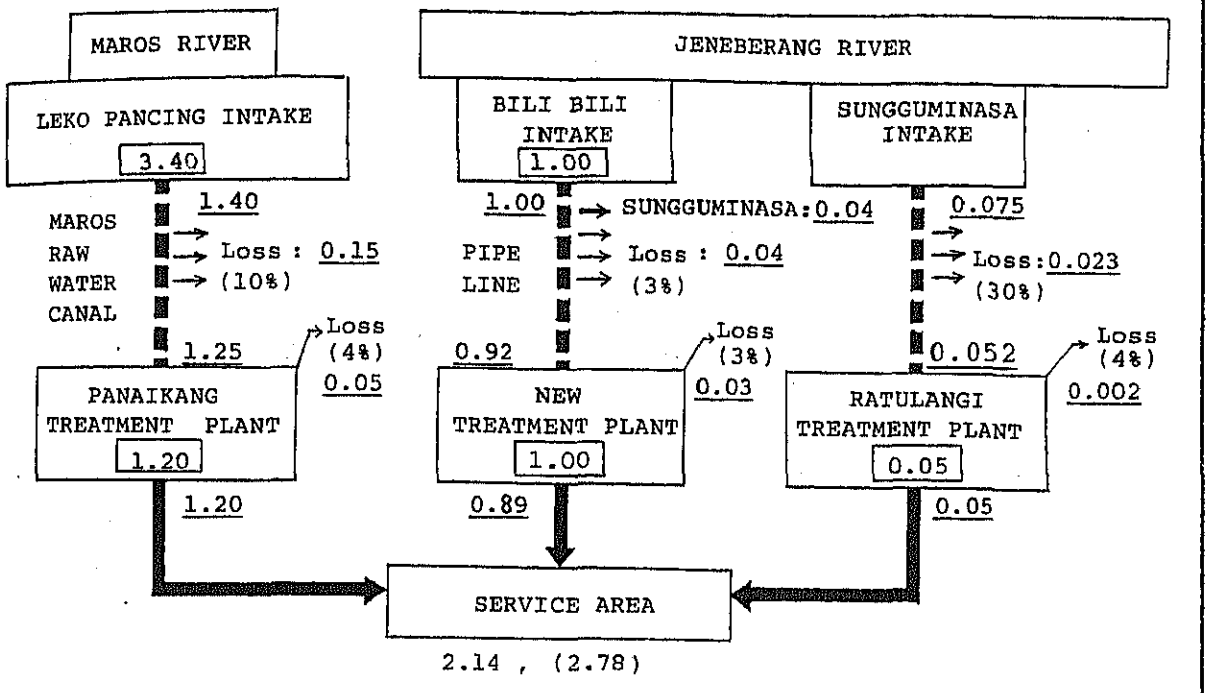
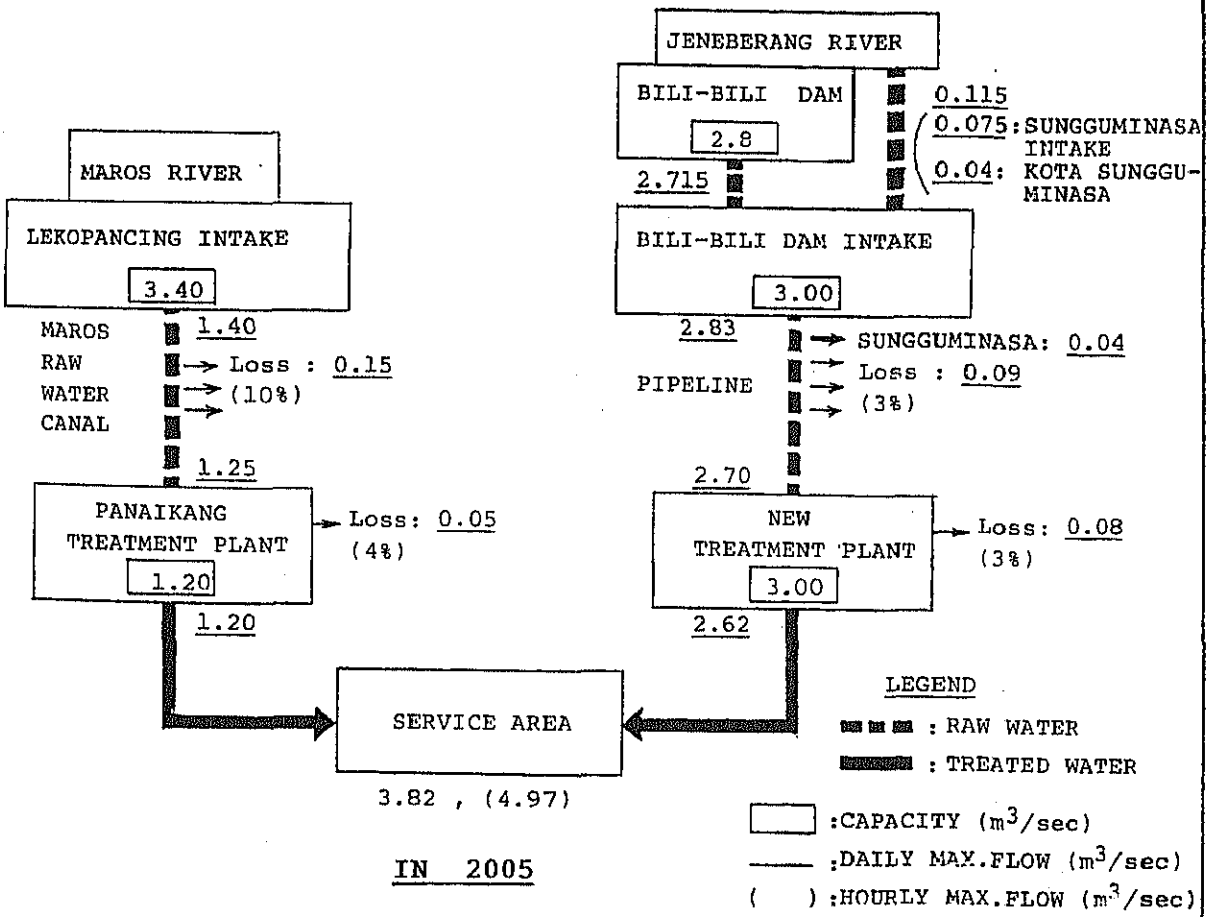


FIGURE	PROFILE OF FUTURE WATER SUPPLY SYSTEM
5.5	



IN 1995



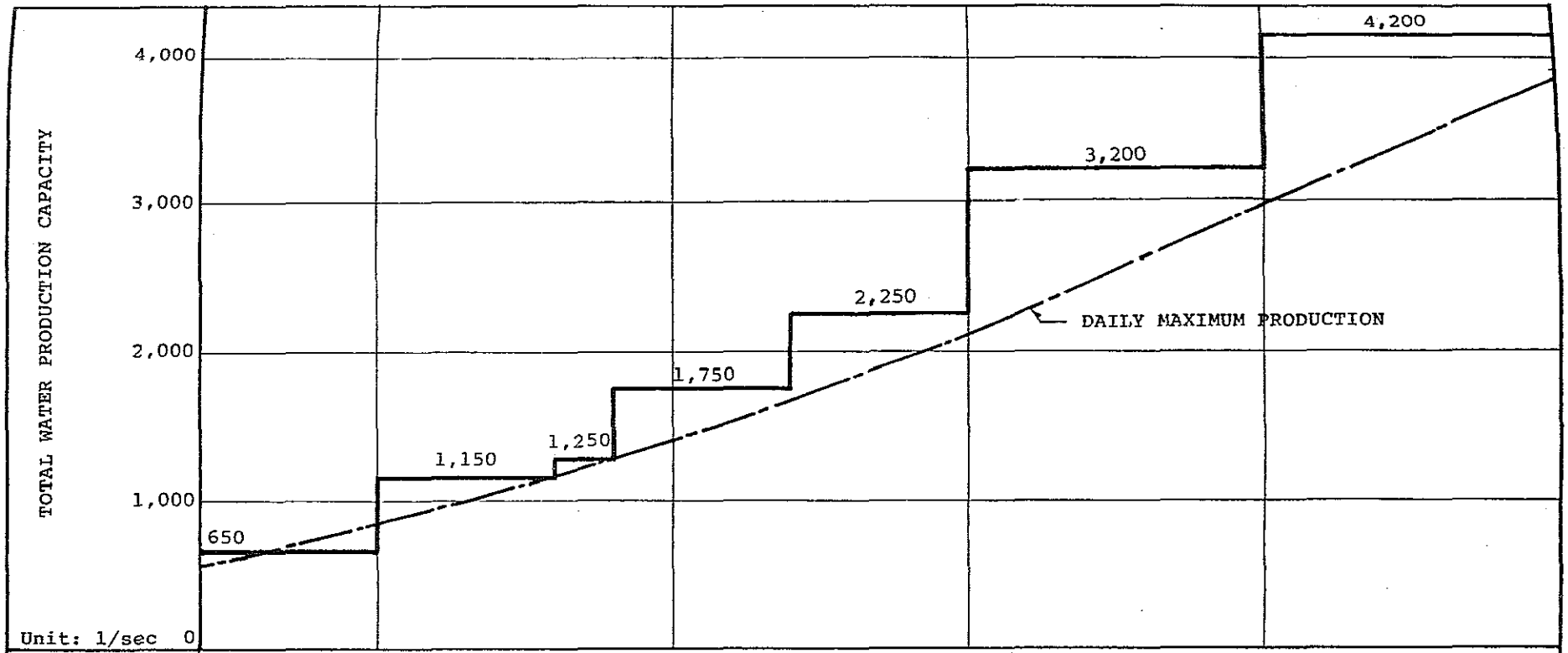
IN 2005

FIGURE 5.6

DAILY FLOW REQUIREMENTS FOR 1995 AND 2005

TABLE 5.2 FACILITIES TO BE CONSTRUCTED

Facilities	Stage I		Stage II	
	Phase 1	Phase 2	Phase 1	Phase 2
Rehabilitation Work	- Leakage Reduction Work of Transmission Channel of Panaikang System - Filter sand, Chlorinator, etc. of Ratulangi System - Leakage Reduction Work	-	-	-
Intake and Transmission Facilities	- Intake Facilities at Bili-Bili irrigation Channel (1,000 l/sec) - Transmission Pipes Dia.1,100 x 20.5 km	-	- Intake Facilities at Dam Site (3,000 l/sec) - Transmission Pipes Dia.1,350mm x 2.9 km Dia.900mm x 20.5 km	-
Treatment Facilities	- Upgrading of Panaikang System (100 l/sec) - New Treatment Plant (500 l/sec)	- Extension of New Treatment Plant (500 l/sec)	- Extension of New Treatment Plant (1,000 l/sec)	- Extension of New Treatment Plant (1,000 l/sec)
Distribution Facilities and House Meters	- Clear Water Reservoir (4,000 m^3) - Distribution Pumps (170 kw x 3 sets) - Distribution Pipes Dia.75mm to 1,000 mm x 115 km - Standpipes 1,800 nos. - House Meters 40,000 nos.	- Clear Water Reservoir (4,000 m^3) - Distribution Pumps (340 kw x 2 sets) - Distribution Pipes Dia.75mm to 800mm x 111 km - Standpipes 100 nos. - House Meters 12,000 nos.	- Clear Water Reservoir (7,500 m^3) - Distribution Pumps (340 kw x 2 sets) - Distribution Pipes Dia.75mm to 900mm x 142 km - Standpipes 100 nos. - House Meters 31,000 nos.	- Clear Water Reservoir (7,500 m^3) - Distribution Pumps (340 kw x 2 sets) - Distribution Pipes Dia.75mm to 800mm x 84 km - Standpipes 100 nos. - House Meters 37,000 nos.



Year	83	84	1985	86	87	88	89	1990	91	92	93	94	1995	96	97	98	99	2000	01	02	03	04	2005
Phase/Stage							1 / I				2 / I			1 / II					2 / II				
Ratulangi	50													To be abandoned									
Panaikang	600			1,100										1,200									
New	-							500			1,000			2,000					3,000				
Total Production	650			1,150			1,250	1,750			2,250			3,200					4,200				

FIGURE 5.7

WATER PRODUCTION CAPACITY

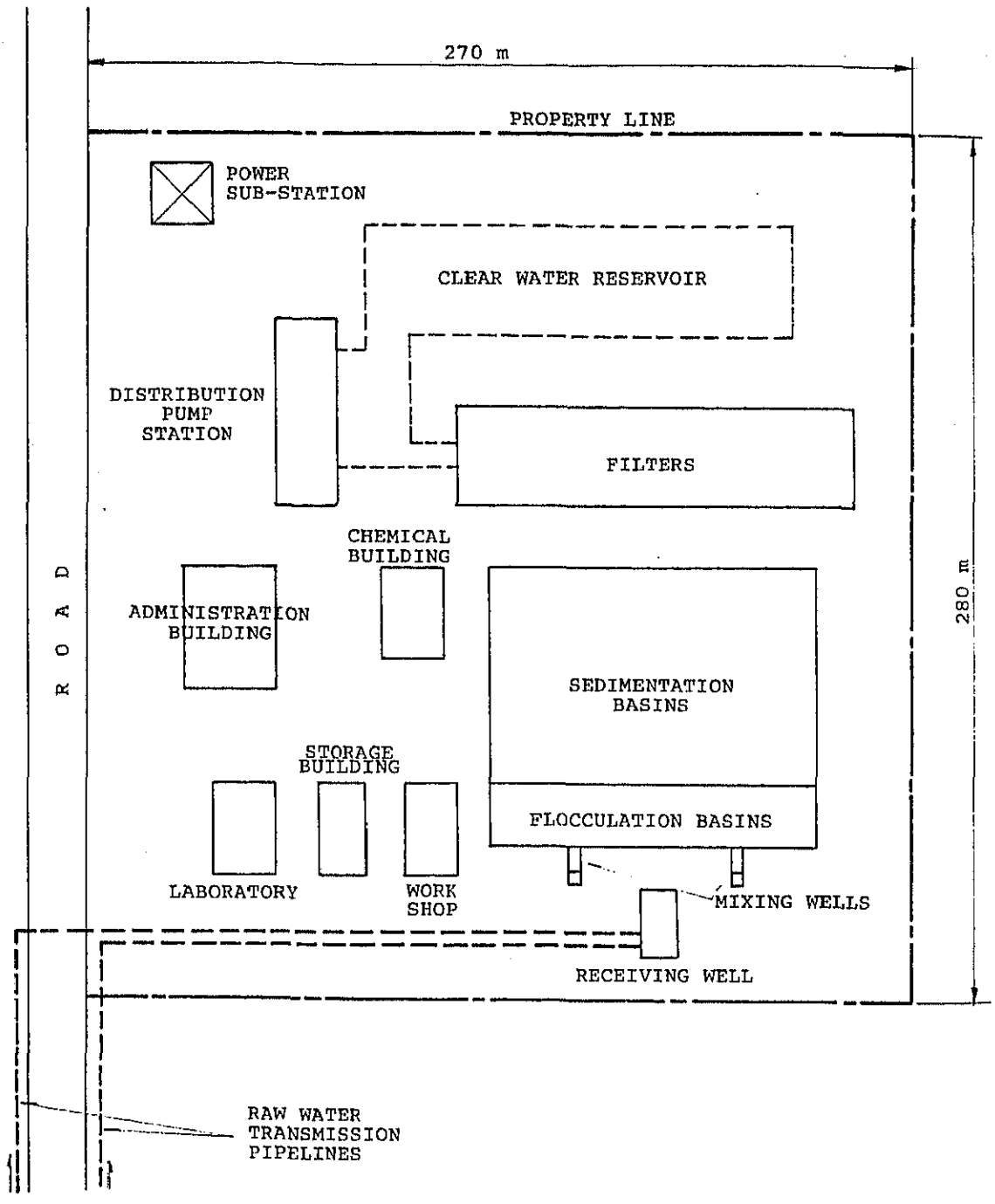
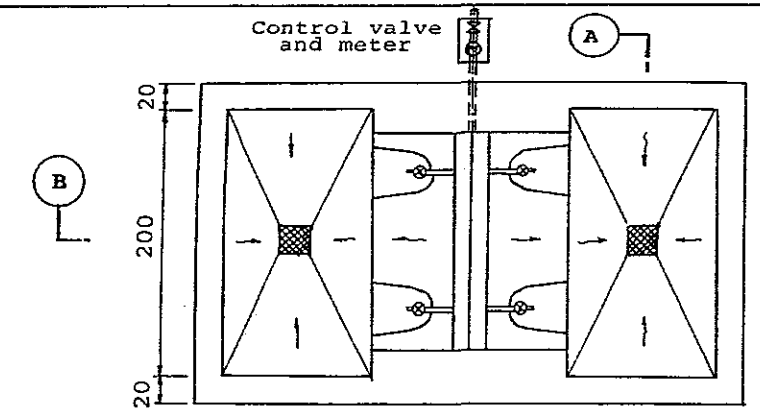
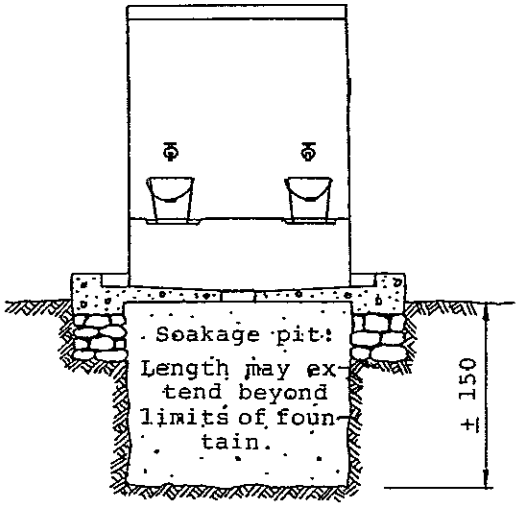


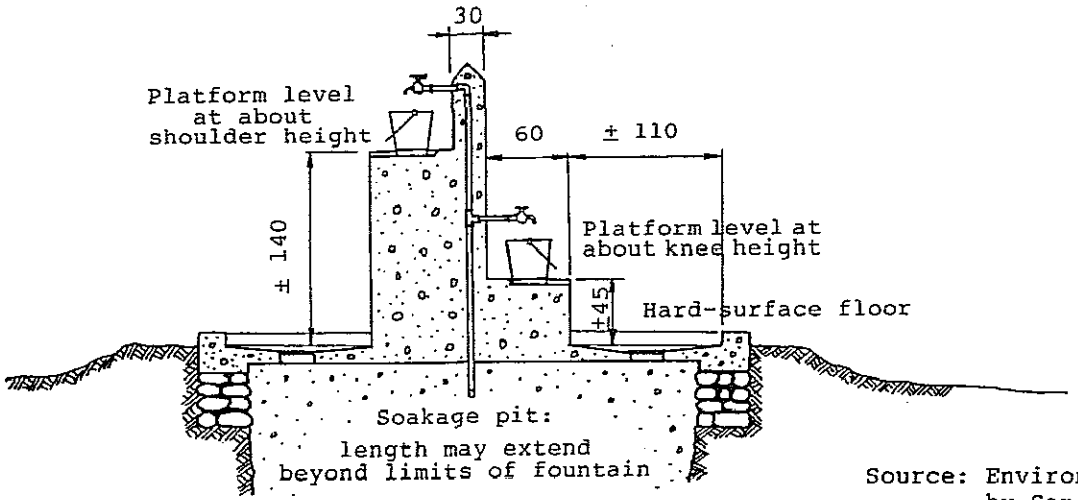
FIGURE	LAYOUT OF PROPOSED TREATMENT PLANT
5.8	



PLAN



Section A - A



Section B - B

Source: Environmental Health Engineering in the Tropics
by Sandy Cairncross and Richard G. Feachen

FIGURE	SAMPLE DESIGN OF STANDPIPE
5.9	

CHAPTER VI

IMPLEMENTATION SCHEDULE AND COST ESTIMATES

REPLACEMENT OF
THE EXISTING DISTRIBUTION PIPELINE

CHAPTER VI

IMPLEMENTATION SCHEDULE AND COST ESTIMATES

1. GENERAL

This chapter first describes implementation schedule worked out for the development of the whole projects up to 2005 stated in chapter V. Then, the cost estimates for each program specified in the above implementation schedule will be made based on the unit cost as of December 1984. Finally, initial portion of the project for feasibility study will be outlined including the immediate rehabilitation work.

2. IMPLEMENTATION SCHEDULE

Implementation schedule prepared is shown on Figure 6.1. In formulating this implementation schedule, the service ratio, population coverage, water sources, water supply systems, project cost, disbursement thereof, and time requirement for implementation are taken into consideration, which are described hereunder. Some items are recapitulated from previous descriptions and some others are taken from descriptions to be presented later. Further, to visualize a whole picture of future water supply plan including all the above, Figure 6.2 is presented.

1) Service Area

(1) The service area gradually expands, supplying treated water to the area of housing estate, and expanded area of existing networks where groundwater is hardly available by 1992 (Phase 1 of Stage I),

(2) Planned area of housing estate by 1995 (Phase 2 of Stage I), and

(3) The area where people are sparsely populated at present but supposed to be developed in the future by 2005 (Stage II).

2) Population served and coverage ratio
Population served is planned to increase:

(1) 695,000 persons or 75% of the total population by 1990,

(2) 752,000 persons or 77% by 1992,

(3) 840,000 persons or 80% by 1995, and

(4) 1,157,000 persons or 90% by 2005.

3) Water sources and system

Under each phase/stage, the systems depend on respective water sources as follows:

(1) Ratulangi system depends on the Jeneberang river water taken at Sungguminasa, Panaikang system on the Maros river and new Mangngasa system on the Jeneberang river water diverted at the existing Bili-Bili irrigation weir under phase 1 of Stage I,

(2) All the same as the above, under Phase 2 of Stage I, and

(3) Panaikang system depends on the Maros river and Mangngasa system on the impounded water of Bili-Bili Dam, under stage II project period, while Ratulangi system will be abandoned after completion of the Bili-Bili dam.

4) Cost and disbursement

Project costs (basic cost excluding price contingency) to be invested up to 2005 are Rp.137 billion, of which Rp.37 billion is for Phase 1, Rp.13 billion for Phase 2 of Stage I project and Rp.87 billion for Stage II project. The implementation schedule described above is developed to distribute the disbursement as evenly as possible.

5) Time requirement for each phase implementation

The period required for each step of project development such as detailed design, procedures for loan procurement, tendering and construction is determined considering that of on-going projects in Indonesia. To implement each Phase/Stage of the Project within the limited period, each Phase is assumed to start its implementation in the mid of the former phase.

3. COST ESTIMATES

Table 6.1 represents the estimated construction costs. All unit costs are valid as of December 1984, and were obtained from on-going projects in Indonesia. Engineering costs for detailed design, including supplemental surveys, and supervision work are provided with all allowance of 10% of the construction costs. In addition to the above, a physical contingency of 15% is provided.

4. SCOPE OF THE PROJECT FOR FEASIBILITY STUDY

To select a project out of the whole program of the proposed water supply system, due consideration is given to urgency and effect of such a project, required fund and financing its construction, and its construction period. Based on the above consideration, the Stage I project is recommended for feasibility study. The outline of the recommended project is as follows.

1) Study area and target year

The proposed study area corresponds to the service area under Stage I shown on Figure 5.1, and the proposed target year is set on 1995.

2) Construction works

Phase 1

a. Rehabilitation work

- Transmission channel from Leko Pancing intake to Panaikang treatment plant, to reduce leakage.
- Ratulangi treatment plant, to install measuring equipment, and to replace filter sand and chlorinator.
- Replacement and installation of house meters 5,600 nos.
- Replacement of old pipelines: dia. 75 mm to 350 mm, 55 km in total length.

b. Upgrading of Panaikang treatment plant

By upgrading equipment and operation, an increase of production by 100 l/sec is planned.

c. New intake facilities at Bili-Bili
   - Improvement of the existing Bili-Bili intake.
   - Installation of an intake facilities of 1,000 1/sec capacity at the existing irrigation channel.

d. Transmission line
   Installation of a new transmission pipeline from the intake site to the proposed treatment plant, 1,100 mm dia. x 20,500 m.

e. Construction of a new treatment plant
   At Mangngasa, with a capacity of 500 1/sec.

f. Distribution facilities at Mangngasa
   - Clear water reservoirs: 4,000 m3
   - Distribution pump facilities: 170 kw x 3 sets
   - Laying of distribution pipelines: dia. 75 mm to 1,000 mm, 115 km in total length.

g. House meters and standpipes
   - Installation of standpipes: 1,800 nos.
   - Installation of house meters: 40,000 nos.

Phase 2

a. Expansion of the new treatment plant
   At Mangngasa, with capacity of 500 1/sec.

b. Distribution facilities at Mangngasa
   - Clear water reservoirs: 4,000 m3
   - Distribution pump facilities: 340 kw x 2 sets
   - Laying of distribution pipelines: dia. 75 mm to 800 mm, 111 km in total length.

c. House meters and standpipes
   - Installation of standpipes: 100 nos.
   - Installation of house meters: 12,000 nos.

3) Implementation schedule

The proposed implementation schedule of the project is shown on Figure 6.3. Time periods of individual work items are also shown on the figure.

4) Cost estimates

Total estimated costs of construction including Phases 1 and 2 are Rp.37,128 x 10^6, as shown in Table 6.2.

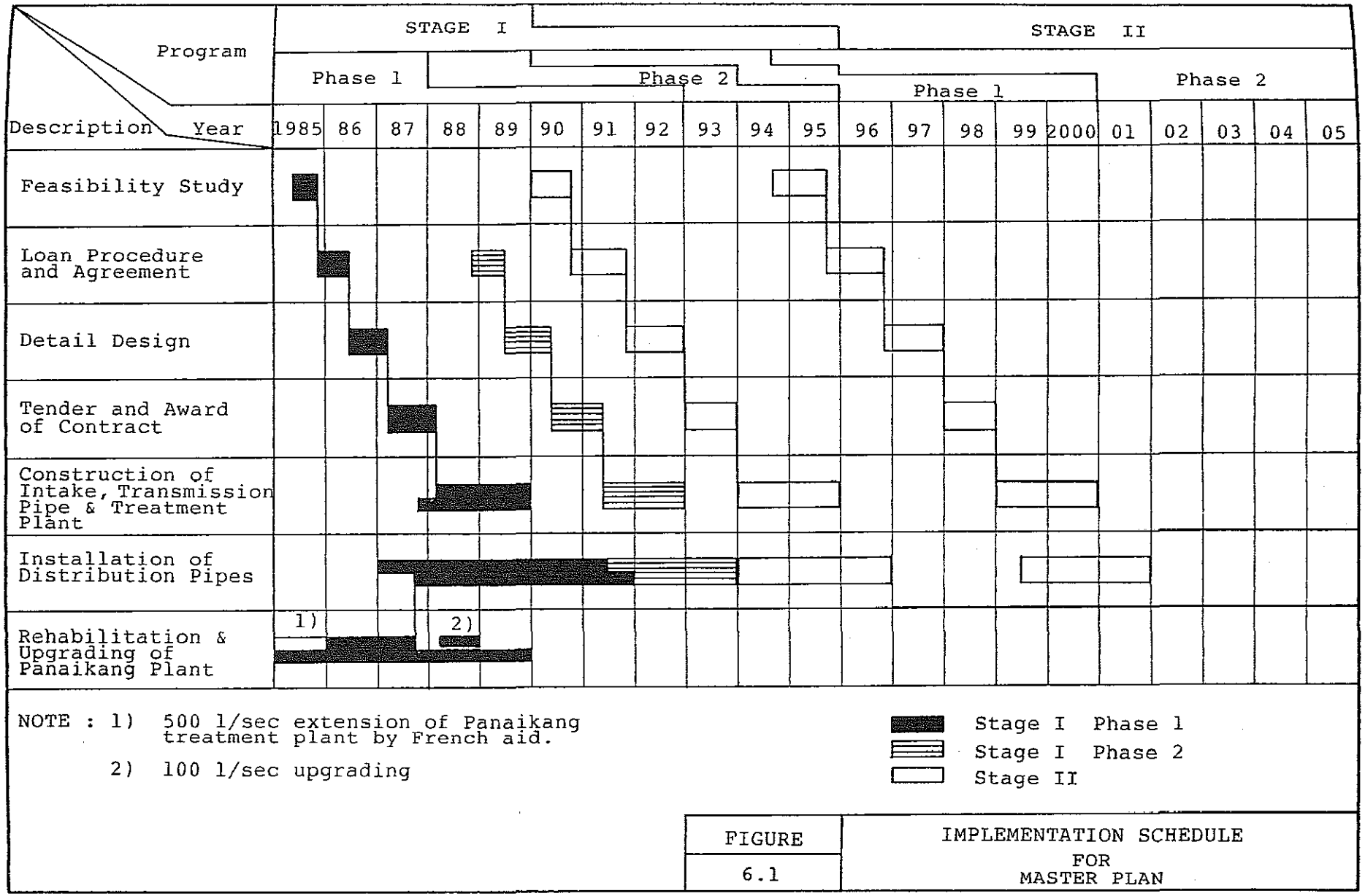
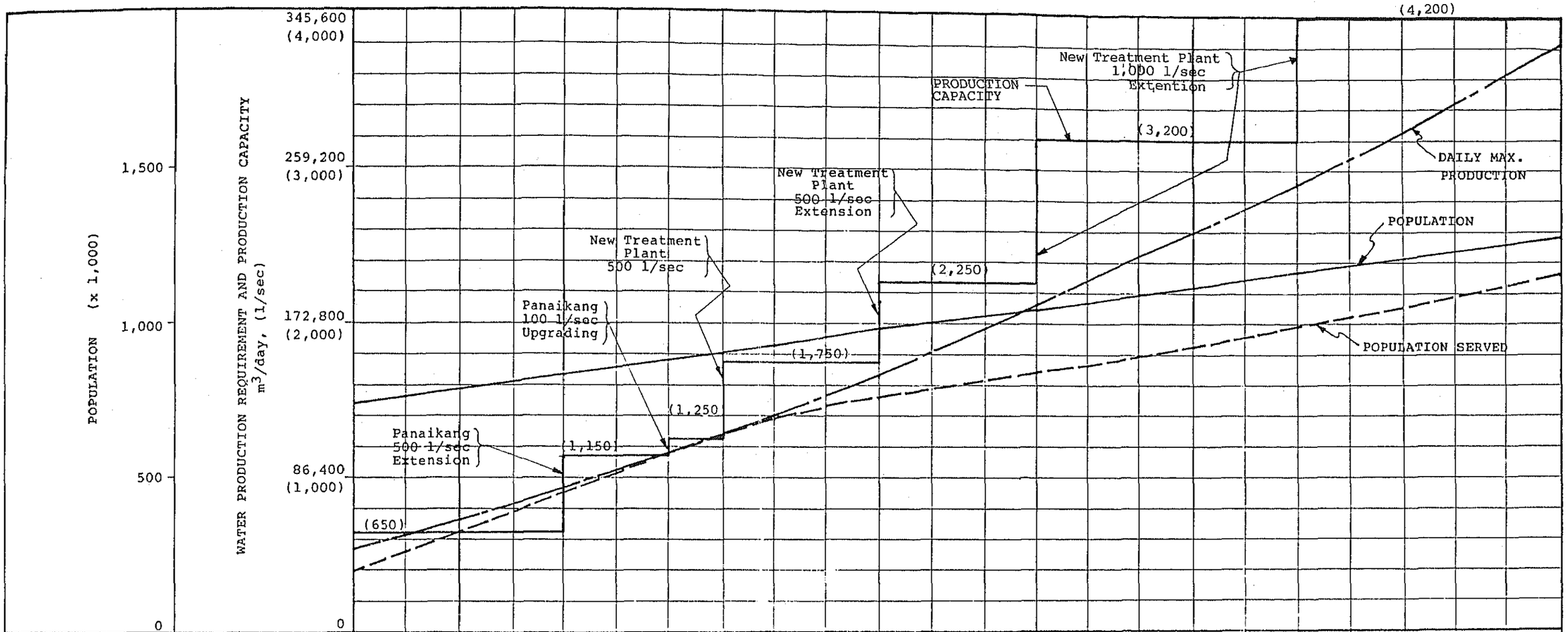


FIGURE	IMPLEMENTATION SCHEDULE FOR MASTER PLAN
6.1	



YEAR	83	84	85	86	87	88	89	1990	91	92	93	94	95	96	97	98	99	2000	01	02	03	04	05
CONSTRUCTION AND DISBURSEMENT SCHEDULE (Billion Rp.)			0.5	2.0	8.0	9.0	9.0	8...	0.5				72.7					14.6					
				STAGE I		Phase 1							STAGE II Phase 1					STAGE II Phase 2					
									STAGE I Phase 1	1.0	4.0	5.0	3.0										
STAGING AND PHASING			STAGE I Phase 1								STAGE I Phase 2			STAGE II Phase 1						STAGE II Phase 2		
POPULATION (x 1,000)	768							927		976			1,050					1,171					1,286
POPULATION COVERAGE (%)	34.1							75.0		77.0			80.0					85.0					90.0
POPULATION SERVED (x 1,000)	262							695		752			840					995					1,157
PER CAPITA DEMAND (DOMESTIC USE) (l/c/d)	65							100		113			127					147					162
TOTAL WATER REQUIREMENT (x 1,000 m^3/day)	27							97		117			147					202					261
ACCOUNTED-FOR WATER (%)	50							80		80			80					80					80
PRODUCTION (Daily Max. x 1,000 m^3/day)	54							121		146			184					253					326
RAW WATER REQUIREMENT(m^3/sec)	0.94							1.64		1.92			2.44					3.24					4.19

FIGURE 6.2

WATER SUPPLY PLAN TO 2005

TABLE 6.1 SUMMARY OF COST ESTIMATES

Description	Stage I - Phase 1			Stage I - Phase 2			Stage II - Phase 1			Stage II - Phase 2		
	F/C	L/C	Total	F/C	L/C	Total	F/C	L/C	Total	F/c	L/C	Total
Rehabilitation, leakage reduction and upgrading of Panaikang Plant	380 (420)	3,345 (3,700)	3,725 (4,150)	0	0	0	0	0	0	0	0	0
New Water Supply System	11,520 (12,670)	11,238 (12,530)	22,758 (25,200)	5,590 (6,150)	3,677 (4,100)	9,267 (10,250)	25,520 (28,072)	26,399 (29,435)	51,919 (57,507)	6,300 (6,930)	4,143 (4,620)	10,433 (11,550)
Physical Contingency (15 %)	1,601 (1,761)	2,370 (2,642)	3,971 (4,403)	559 (651)	828 (923)	1,387 (1,538)	3,136 (3,450)	4,641 (5,175)	7,777 (8,625)	630 (693)	993 (1,040)	1,563 (1,733)
Engineering Services (10 %)	2,148 (2,363)	908 (1,012)	3,056 (3,375)	750 (825)	317 (354)	1,067 (1,179)	4,208 (4,629)	1,779 (1,984)	5,987 (6,613)	845 (930)	357 (398)	1,202 (1,328)
Subtotal	15,649 (17,214)	17,861 (19,914)	33,510 (37,128)	6,899 (7,590)	4,822 (5,377)	11,721 (12,967)	32,864 (36,151)	32,819 (36,594)	65,683 (72,745)	7,775 (8,553)	5,433 (6,058)	13,208 (14,611)
Price Contingency	4,721 (5,193)	7,163 (7,987)	11,884 (13,180)	5,571 (6,128)	3,683 (4,106)	9,254 (10,234)	28,195 (31,014)	37,112 (41,380)	65,307 (72,394)	11,760 (12,936)	10,623 (11,845)	22,383 (24,781)
Grand Total	20,370 (22,407)	25,024 (27,901)	45,394 (50,308)	12,470 (13,718)	8,505 (9,483)	20,975 (23,201)	61,059 (67,165)	69,931 (77,974)	130,990 (145,139)	19,535 (21,489)	16,056 (17,903)	35,591 (39,392)

Note: The above costs based on the rate as of 1984 will be further reviewed in the course of the Feasibility Study.

Unit : 1,000 US$ (million Rp.)

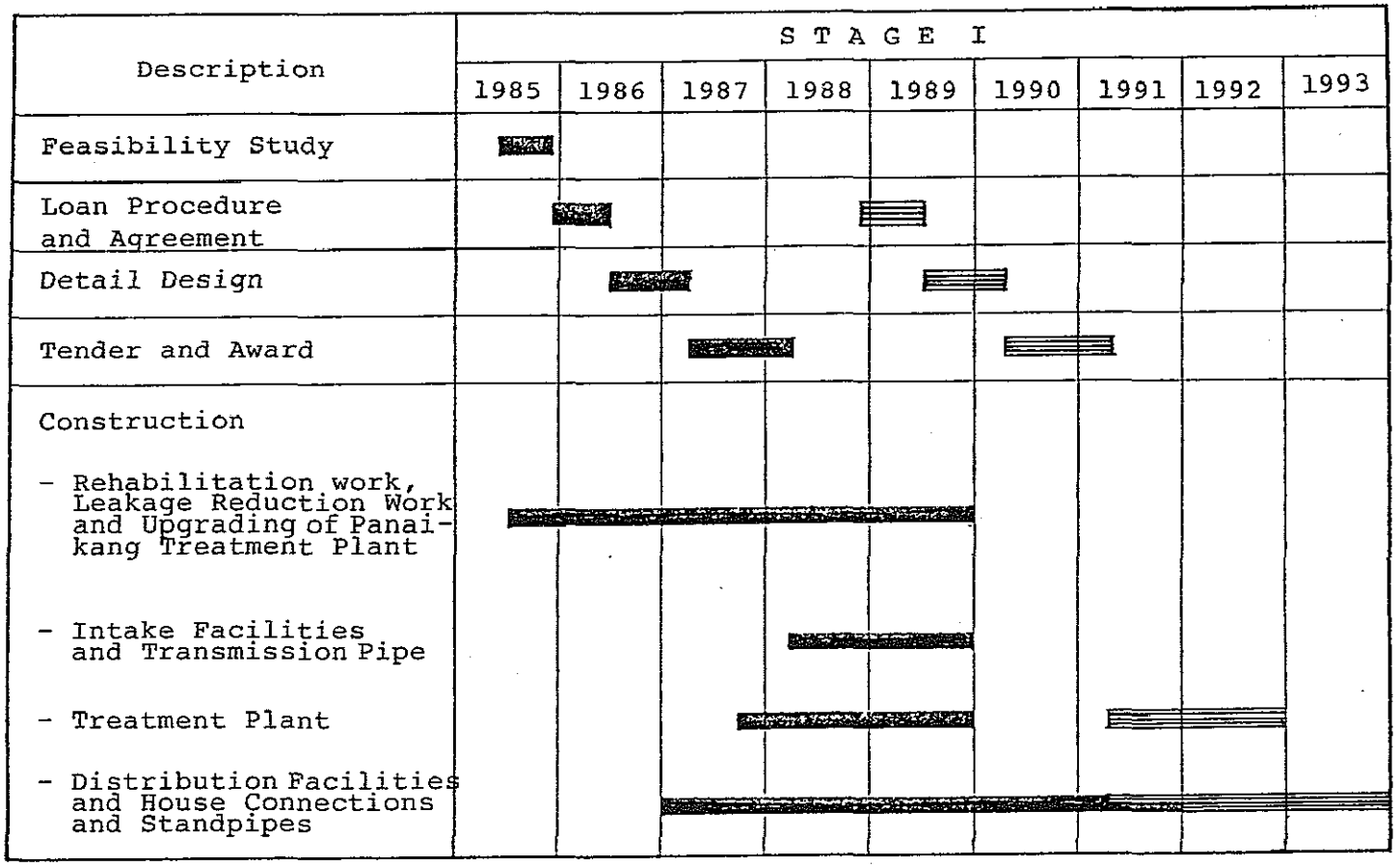


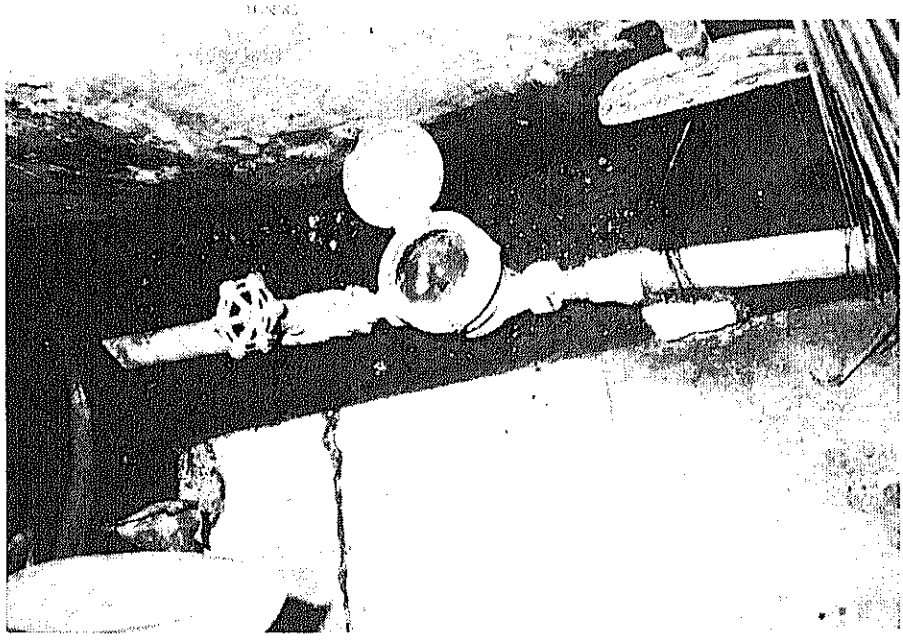
FIGURE	IMPLEMENTATION SCHEDULE OF PHASE 1 IN STAGE I
6.3	

TABLE 6.2 COST ESTIMATE OF STAGE I

Items	Foreign Currency US$x1,000 (million Rp.)	Local Currency million Rp.	Total million Rp.
PHASE 1			
- Rehabilitation Work, Leakage Reduction Work and Upgrading of Panaikang Treatment Plant	380 (420)	3,700	4,150
- Intake Facilities and Transmission Pipe	1,380 (1,520)	6,580	8,100
- Treatment Plant	3,400 (3,780)	2,510	6,290
- Distribution Facities and House Connections and Public Standpipes	6,700 (7,370)	3,440	10,810
- Contingencies (15%)	1,601 (1,761)	2,642	4,403
- Engineering Service (10%)	2,148 (2,363)	1,012	3,375
Subtotal	15,649 (17,214)	19,914	37,128
- Price Contingency	4,721 (5,193)	7,987	13,180
Total of Phase 1	20,370 (22,407)	27,901	50,308
PHASE 2			
- Treatment Plant	1,290 (1,440)	1,700	3,140
- Distribution Pipelines and House Connections and Public Standpipes	4,300 (4,170)	2,400	7,110
- Physical Contingency	559 (615)	923	1,538
- Engineering Services	750 (825)	354	1,179
Subtotal	6,899 (7,590)	5,377	12,967
- Price Contingency	5,571 (6,128)	4,016	10,234
Total of Phase 2	12,470 (13,718)	9,483	23,201
TOTAL OF STAGE I	32,840 (36,125)	37,384	73,509

CHAPTER VII

ORGANIZATION, OPERATION AND MANAGEMENT PLAN



A DEFECTIVE METER LEFT UNREPAIRED

CHAPTER VII

ORGANIZATION, OPERATION AND MANAGEMENT PLAN

1. GENERAL

PDAM Ujung Pandang, a public water enterprise was established on November 20, 1974 in accordance with the Regional Government Regulation No.6 - 1974, separated from a Division under the local Government. PDAM is an authorized and independent agency in Kotamadya Ujung Pandang to operate and manage the water supply systems.

In this chapter, first, the present organization, operation and management are described, and secondly an outline of future organization and staffing requirements is described in view of future task requirements and the present status of PDAM institution. Then, financial management and its stability is reviewed together with an overview of the future business of PDAM, on the understanding that financial projection and feasibility will be dealt with in the stage of feasibility study.

2. PRESENT ORGANIZATION, OPERATION AND MANAGEMENT

Since 1981, the organization of PDAM has been revised and reshaped several times under the direction of the President Director. Its structure as of July 1983, the latest authorized one, is shown on Figure 7.1. The actual structure is slightly developed from that so as to cope with rapid increase of task requirements. The major changes in the structure are new assignment of two directors, an assistant for President Director and a division chief for Bookkeeping Division. In this section, the actual structure of organization is described referring to the authorized one.

In order to direct PDAM policy and also to supervise its operation, a Supervisory Board is formed by the Mayor, which consists of 5 members as follows:

1) Mayor of Ujung Pandang	: Chairman
2) Secretary of Ujung Pandang	: Member
3) Chief, Health Dep. of Ujung Pandang	: Member
4) Chief, Law Dep. of Ujung Pandang	: Member
5) The former Officer of Armed Forces	: Member

The Supervisory Board meets in case need arises to discuss policy matters of PDAM and prepares short and long term programme for PDAM activities. Other function of the Board is to coordinate between the Municipality and PDAM.

PDAM is headed by President Director, assisted by two directors and one assistant at present. These two directors are responsible for coordination of the inside jobs such as administrative and financing activities of PDAM. The assistant to President Director takes charge of the activities related to the external agencies concerned and general affairs. As for the director for technical and operation, its position is not occupied at present. It was informed that a new director will be assigned in the near future after approval of Supervisory Board.

Under the directors stated above, there are five divisions presently: 1) Technical Division, 2) Administration Division, 3) Finance Division, 4) Bookkeeping Division, and 5) Planning Division. These Bookkeeping Division and Planning Division are derived from the separation of the former Planning and Control Division into two. Each division has respective heads.

Under the Technical Division, there are five sections: 1) Technical administration, 2) Technical data and planning, 3) Treatment plant I*), 4) Treatment plant II**), and 5) Transmission and distribution. There are 186 staff in the Technical Division.

The Administration Division has four sections: 1) Administration, 2) Personnel, 3) Meter reading, and 4) Customer service. There are 63 staff in this division.

The Finance Division has relatively large number of sections, i.e., 6 sections of 1) Cash, 2) Purchasing, 3) Ware-house, 4) Billing I, 5) Billing II, and 6) Billing III. The division is staffed with 81 personnel.

The Bookkeeping Division has merely one section of Bookkeeping. There are 14 staff in the division.

The Planning Division consists of three sections: 1) Accounting, 2) Planning, and 3) Inventory. There are 45 staff in the Planning Division.

Task assignment and job description of each division and section, although not yet formulated in a written form/regulation, are described in Appendix VII based on the Team's interviews to the relevant sections and division heads.

*) - Ratulangi
**) - Panaikang

To clarify further their task performance and distinctive aspects of PDAM organization, Figure 7.2 was prepared based on review of data and information obtained through the said interviews. The items listed in the figure indicates organizational and operational matters which are recommended to be improved/strengthened at early stage of the development. Since some items are closely related to each other, measures to be undertaken by PDAM are largely grouped into following four items:

i. Training of the staff and personnel regarding the maintenance of the facilities and equipment, the meter repairing and the standard designing for connections and public hydrants,

ii. Review of the staffing distribution in each division and section to rearrange and mobilize the task force,

iii. Purchasing of materials and equipment within the financial ability of PDAM to facilitate civil works such as meter repairing, installation of pipes and house connections and leakage detection, and

iv. The public relations regarding all activities of PDAM and the public cooperation with PDAM by the intensive campaign.

In the following section, the above institutional and managerial aspects will be reflected on the planning for future organization and its staffing.

3. FUTURE ORGANIZATION AND STAFFING REQUIREMENT

3.1 Future Organization

3.1.1 Short Term Improvement

In developing PDAM organization for short term future, the following are duly taken into account.

1) The revision and modification of present structure should be minimized.

2) Matters specified in the preceding section, which are salient features of the current PDAM structure, should be considered in all their aspects.

3) Proposed organization is to be based on identification of tasks: what should be strenghtened further and what should be supplemented.

4) Proposed organization should reflect all activities of PDAM in future.

5) The revision and modification should be consistent with the strategy developed by the Government.

In the meantime, PDAM plans to modify and improve the present structure in the near future prior to the computerization of financial procedures such as bookkeeping and accounting process. Mobilization of staff and personnel for computer analysis and data processing is to be also taken into consideration.

Regarding item 3) listed above, the Team prepared Table 7.1 on the basis of review of the present structure and task force. Major tasks to be strengthened/supplemented further are itemized below.

1) To conduct leakage reduction work,

2) To take prompt action for the consumer's complaints,

3) To install new connections and public standpipes,

4) To repair meters by mobilization of skilled staff through training,

5) To elaborate strategy for future management and operation of PDAM,

6) To develop data compilation method,

7) To establish management information system,

8) To conduct campaign for public understanding and public relations, and

9) To operate new system to be constructed by the year of 1989.

Based on all the above, future organization for short term improvement is proposed as shown on Figure 7.3. Major modification and revision will be explained further, as shown below.

1) Separation of the Present Technical Division into Technical Division and Operation and Maintenance Division.

The Technical Division is staffed with relatively large number of personnel at present. Considering the rapid expansion of task requirements to be shouldered by this division, it should be divided into two divisions.

2) Establishment of Water Meter Section

Number of staff assigned for meter repairing, meter control and meter installation is just 7 personnel, insufficient for present workload. In addition, customers will increase rapidly. If this section be strengthened and staffed with skilled personnel, the revenue generated from the water sales will be significantly increased.

3) Establishment of Technical Data Section and Technical Planning Section

In view of the importance of data compilation, the present Technical Data and Planning Section is recommended to be divided into two.

4) Establishment of Customer Division and Personnel Division

These two divisions deal with tasks related to customers and PDAM staff. Customer Division particularly should be strengthened in proportion to the increase of customers so as to improve the relation between PDAM and customers.

5) Unification of Billing Sections

Billing is made at three sections at present. One section is in charge of all customers in the Municipality except those of Housing Estate and Governmental institution who are billed by another section. The remaining section takes charge of delinquent bills. Establishment of branch offices at northern area and Housing Estate in addition to the computerization of the billing procedures will relieve this section from its hard work.

6) Establishment of Data Processing Section

Computerization of various data processing will yield another area of task requirement. At least, one section for data processing and computer operation should be established.

7) Establishment of Branch Offices

There are two depots for storage of tools and equipment. They are located at Kec. Ujung Pandang and Kec. Tamalate near Housing Estate. Staff of Ratulangi office visit occasionally these depots for bill collection and storage of tools and equipment. To avoid consumers from visiting Ratulangi office to pay water bills and to take immediate actions to the consumer's complaints, these depots/branches should be reinforced, stationing sufficient staff and personnel all the time.

3.1.2 Future Organization Requirement

For the improvement of PDAM's organization to meet the future requirement, targets to be achieved are described below.

1) Production and Supply of Safe Drinking Water

It is important for PDAM to produce and supply hygienically safe drinking water to consumers continuously supported by a reliable organization, management and legislation.

2) Minimum Costs

It is also important for PDAM to provide its customers with required services at the lowest possible costs.

3) Financial Independence

System of financial self-supporting that has the ability to maintain PDAM should be established.

As for long term future, PDAM is recommended to apply the standard organization set forth in the Guidelines. It is also recommended to review task performance of PDAM's staff and personnel periodically and to revise its structure, where necessary. These modification should be oriented toward the national guidelines and the targets described above.

3.2 Staffing Requirement

To overview the task force of PDAM, data on staffing of PDAM Jakarta and Waterworks in Japan, quoted from the Interim Report on Master Plan and Feasibility Study of Jakarta and Annual Statistics on Waterworks in Japan, are compared with the present staffing of PDAM as follows:

Municipality	Number of Connections	Number of staff	Connections /Staff
Ujung Pandang	26,300	388	67
Jakarta	133,974	1,023	66
Waterworks in Japan	-	-	492 1/

As shown in the above, PDAM Ujung Pandang has an almost same ratio of the number of connections to the number of staff as the PDAM Jakarta. But comparison with that of waterworks in Japan tells PDAM is staffed with a relatively large number of staff to render services to the customers, although the procedures adopted by waterworks for metering, billing and accounting differ completely from those of PDAM Ujung Pandang.

1/ : It shows an average figure of waterworks in Japan which have population served of 100,000 to 250,000.

The interviews to the section heads also gave significant information of staffing requirement. Table 7.1 suggests the present and future requirement of task force in each division and section, and an effect on the computerization to the staffing requirement.

Based on the above overview, future staffing requirement and distribution are worked out as presented in Table 7.2. It should, however, be noted that the number of staff and personnel and its distribution are the tentative estimates on supposition that the present project be implemented without delay along with the strategy and planning described in this Report.

TABLE 7.2 STAFFING REQUIREMENT

DIVISION	1992	1995	2000	2005
OPERATION & MAINTENANCE	219	248	293	338
TECHNICAL	31	33	36	39
PERSONNEL	27	29	32	35
CUSTOMER	68	77	93	109
FINANCE	108	117	133	149
BOOKKEEPING	22	24	28	32
ACCOUNTING	65	72	85	98
TOTAL	540	600	700	800
CONNECTION/STAFF	110	130	160	190

4. FINANCIAL MANAGEMENT AND STABILITY

4.1 Review of Meter Reading and Billing

Meter reading is done once every month. There are 25,000 connections installed at present, out of which metered connections are 21,500 or 86%. The remaining of 3,500 or 14% are unmetered connections. According to PDAM, old customers tend to have unmetered connections rather than the new. In addition, there is a number of defective meters. Such meters amount to about 1,700 or 7%. Furthermore, about 5,000 or 20% of the total customers are apt to remove meters from the service pipes. These figures were obtained from the results of households survey, public standpipe survey and interviews with the meter readers of PDAM.

There are 18 meter readers and they have a duty of reading 60 meters/day/person. Therefore, number of meters to be read by the meter readers in a month is about 27,000. The present meter reading as shown on Figure 7.4 is considered to be done efficiently in view of their daily work load. In the case of unmetered connections/defective meters, billing was made on the basis of standard tariff prepared by PDAM.

Reading of meters is recorded on a meter card prepared for each customer. This card filled up by the meter reader is sent to the Customer Section where the water charge for each customer is computed and recorded in the accounting sheet (KPR) according to the water tariff. Then this accounting sheet is sent to the Accounting Section to prepare bill (DRD) and receipt. The Billing Section, after receiving the bill and receipt from the Accounting Section, collects charges for the bills. When customers are absent at the time of collection, the customers will have to visit

office to pay for water bills within 10 days. The Billing Section also clarifies the delinquent bills, in the BPPL (table of receivables). Collectors report to cashier total money collected.

The amount receivable, which is to be paid by the customers for the delinquent bills accounts for 10% or 15% of the water bills.

This rather high delinquency rate appears to explain the present water supply condition in Ujung Pandang: People, due to the shortage of piped water in some area, are placed in a difficult circumstances. Unaccounted-for water and losses are shown on Figure 7.5.

As can be seen on Figure 7.5, the water losses such as 1) water leakage, 2) meter inaccuracy or meter error and 3) billing loss due to defect or lack of meters reduce PDAM's revenues by 35%, 10% and 5% respectively. The loss reduction schedule described in Appendix VI was elaborated taking duly into consideration the survey results stated above.

4.2 Review of Financial Performance

The water supply business is operated on the principle of self-supporting system, which was adopted at the beginning when PDAM was separated from Water Supply Department of the Municipality.

Financial records of Income Statement and Balance Sheet in the past five years are shown in Tables 7.3 and 7.4. In this sub-section, attention will be paid mainly to the Income Statement because of its importance to ascertain the financial standing of PDAM. The Team's comment and recommendation thereon will be summarized together.

4.2.1 PDAM Income

As given in Table 7.3, revenue from the water sales and service connections amounts to almost 100% of the total income, gradually increasing after 1978. Revenue from the service connections contains charges for service pipes, meters and public standpipes, and their installation costs.

Charge for a new house connection averages about Rp.150,000 although it changes widely depending on the location. It appears slightly expensive for the lower income groups. PDAM, considering the above and recommending monthly repayment, encourages people to connect to PDAM system.

As was described in the preceding sub-section, how to effectively generate revenue from water sales is to reduce both physical and administrative water losses as far as possible. If necessary steps recommended in Appendix VI be successfully undertaken by PDAM, the total revenue will surely increase to the extent more than twice of the present revenue.

Regarding deliquency of the bills, around 15% of the total bills are deliquent due to customer's absence when billing is made and somewhat troublesome procedures for it. To reduce the delinquency and improve the billing system, the Team recommends the following:

1) To establish branch offices to facilitate people for the convenience to pay water bills, and

2) To computerize the billing system to minimize the errors and mistakes during bookkeeping and accounting.

Water tariff is one of the key elements to have a vital effect on PDAM income. The water tariff structure employed by PDAM are illustrated on Figure 7.6. The review of the structure revealed the following:

1) PDAM applies the progressive rate structure for each classification of customers.

2) It is considered irrational that water rate levied on private hospitals for monthly consumption of 30 m3 - 50 m3 is rather higher than that on commercial industry. This is brought about by improper structuring of water tariff. Such irregular charges as the above is also seen in case of customers such as domestic and social/government. These should be reviewed as early as possible to establish a reasonable and adequate water tariff structure.

3) Water rate for public standpipes is Rp.75/m3 1/. It should, however, be noted that actual water rate imposed on the households differs very much from the PDAM's water tariff. Keeper of public standpipes levies a remarkable high water charge on the nearby customers. It range from a low of Rp.250/m3 to a high of Rp.30,000/m3 according to the Team's survey.

4) Water rate for water wagon is higher than other uses, and further water rate charged to the users by the water wagon owner is very high. In view of the purpose and the service area for water wagon supply, this must be remedied.

1/ Minimum charge is Rp.1,000 in case water consumption is less than 30 m3/month.

5) Standard water tariff structure set forth in the guideline shows that current water rate for commercial and industry is slightly cheap as compared to that for households. According to the Team's estimate, about 40% of revenue from water sales would be able to generate further if standard water tariff structure be applied by PDAM.

4.2.2 PDAM Expenditure

The records of expenditure in the past five years are shown in Table 7.5. Costs of depreciation, chemical, power, amortization and personnel salaries total Rp.1,069 million in 1982, about 90% of the total expenditure. Unit costs as remarked in the Table are computed based on the relevant data of PDAM. These figures explain some historical aspects of the operation and maintenance as follows:

1) The depreciation rate becomes high from 0.64% in 1978 to 2.37% in 1979. It is subject to the Panaikang system construction containing a large amount of long-life assets. The depreciation method and durable year for each asset adopted currently by PDAM are fully based on the national accounting regulations and summarized in Table 7.6.

2) Chemical expenses are gradually increasing despite its decreasing rate to the total operating cost. This means that the storage and dosage of chemicals are effectively controlled and improved year by year.

3) Expenditures for fuels and power and its percentage to the total are rising together. This may be attributable to the price hikes currently hit in Indonesia. Expenditures for fuels and power/water of sales are estimated at Rp.24.8/m3.

4) Ratio of wages and salaries/personnel is growing every year with an annual increase rate of 15% - 35%.

For reference, operation and maintenance cost of Jakarta PDAM and same-scaled waterworks in Japan are quoted from the financial records in 1982 as seen in Table 7.7.

4.2.3 Accounts Receivable

The balance sheet shows accounts receivable amount to Rp.1.86 billion or 94.1% of current assets in 1982. The amount and its percentage of the current asset are both increasing year by year. To clarify further, a breakdown of accounts receivable is prepared as shown below.

Unit: Million Rp.

Item	1978	1979	1980	1981	1982
Accounts Receivable					
- Water Sales	153	320	542	898	1,042
- Meter & Connections	118	212	299	400	325
- PEMDA	50	49	156	241	253
- Doubtful	-	-	51	74	115
- Employee of PDAM	-	-	-	1	26
- Advance Payment (Project)	-	-	-	-	70
- Advance Payment (Bonus)	-	-	-	-	28
T o t a l	321	591	1,408	1,614	1,859

Source: Accounting books issued by PDAM

Major portion of the accounts receivable is for water sales, which rapidly increased particularly in 1980 and 1981. It was informed that this increase was largely related to:

1) deferred payment by ABRI for water charge,

2) unforseeable outbursts against the Chinese community which took place in Ujung Pandang in April, 1980,

3) water tariff raised to cope with the increasing tariff for electricity, and

4) shortage of supplied water due to limited capacity of treatment plants.

As far as water supply is concerned, this unfavorable situation should be remedied as early as possible by grading up the service level of PDAM to customers.

Aboves are fully considered in preparing Appendix VI Abatement of Water Leakage.

4.3 Financial Capability and Projection

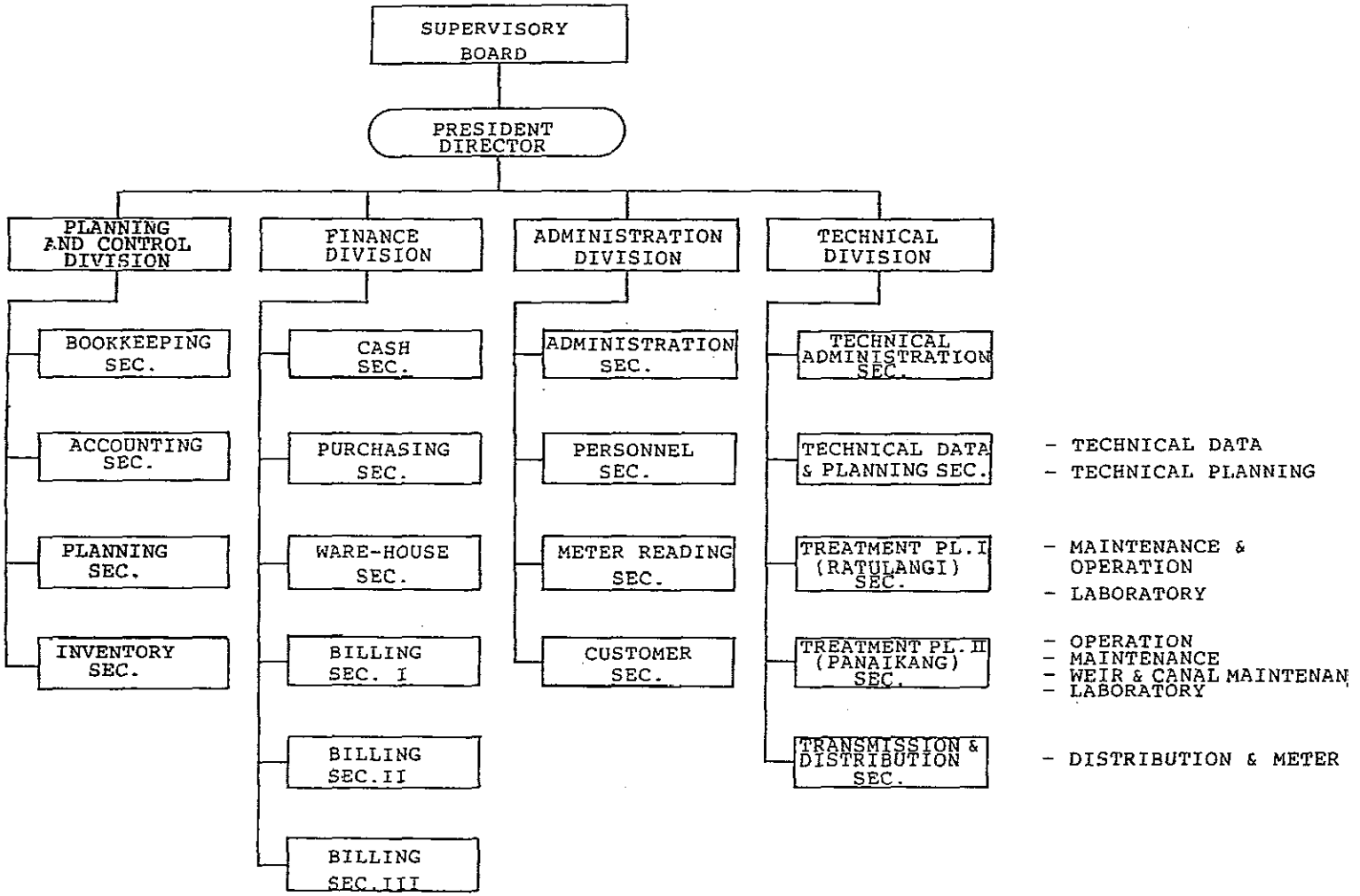
Under this heading, future financial standing of PDAM is broadly overviewed, provided, however, that further detailed study regarding financial feasibility and projection will follow at the stage of the Feasibility Study.

PDAM, although generating profits after 1978, does not necessarily retain financial capability for rehabilitating and improving water supply system. As a matter of fact, the existing canal to convey raw water is being currently rehabilitated under finance of the local Government although the amount of investment is not enough to repair all span of the transmission canal. It still needs financial and technical assistance of the Local and Central Governments in maintaining and improving the system.

Considering the PDAM financial standing, special attentions should be paid not only to the total project cost but also to the amounts of loan/equity from Central and Local Governments and its disbursement schedule. In addition, ability of the consumers to pay for water should be considered to determine future water tariff.

Disbursement schedule up to 2005 was prepared as shown in Table 7.8. Average water tariff in 1992 and 1995 was estimated as shown in Table 7.9 from the average household income obtained from the results of household survey and 1980 Census. This table also denotes financial standing of PDAM in 1992 and 1995.

As can be seen in this Table, PDAM can generate profits both in 1992 and 1995 which amounts to Rp.477 million and Rp.3,359 million respectively.



Note:
The above structure shows the latest one authorized in July 1983

FIGURE	PRESENT ORGANIZATION OF PDAM
7.1	

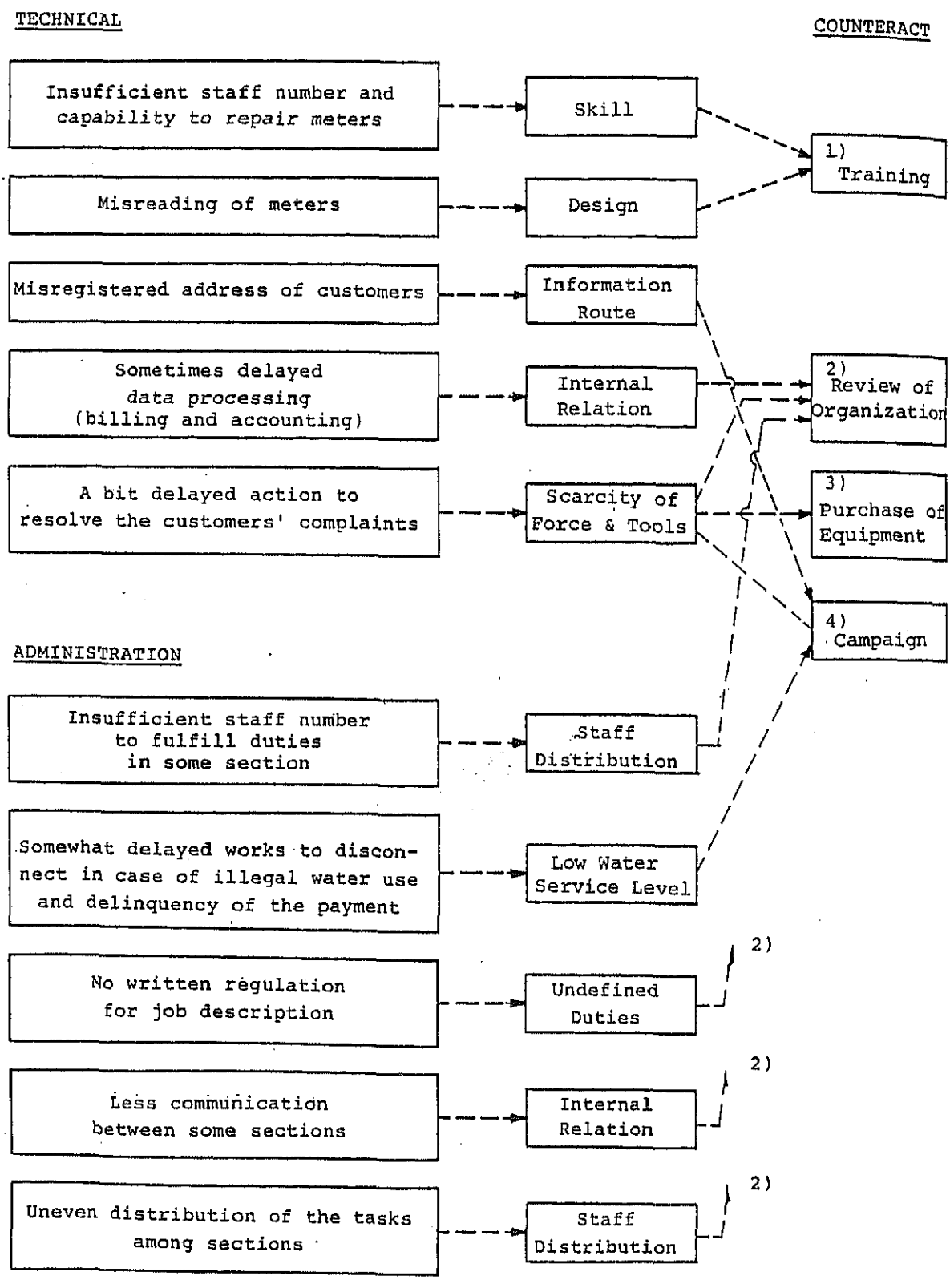


FIGURE	MEASURES TO BE TAKEN BY PDAM (Institution and Management)
7.2	

Note

1 : to be increased

2 : to be decreased

3 : to be staffed with engineer

TABLE 7.1

TASK REQUIREMENT

Division/Section	Team's Justification & Interview	Future Requirement	Computerization	Remarks
OPERATION & MAINTENANCE				
Treatment Plant I (Ratulangi & Mangngasa)	-	1	-	to be increased
Treatment Plant II (Panaikang)	2,3	-	-	-
Transmission & Distribution	1	1	-	to be increased
Water Meter	1,3	1	-	to be increased
TECHNICAL				
Technical Administration	-	-	-	-
Technical Data	3	1	2	to be staffed with engineer
Technical Planning	-	1	-	to be increased
PERSONNEL				
Administration	-	-	2	-
Personnel	-	-	2	-
CUSTOMER				
Meter Reading	-	1	-	to be increased
Customer Service	-	1	-	to be increased
FINANCE				
Cash	-	-	2	-
Purchasing	-	-	-	-
Ware-house	-	-	-	-
Billing	1	1	-	to be increased
BOOKKEEPING				
Bookkeeping	3	-	2	to be staffed with engineer
Data Processing	1,3	1	1	to be increased & staffed with engineer
ACCOUNTING				
Accounting	-	-	2	-
Planning	1,3	1	-	to be increased & staffed with engineer
Inventory	-	-	-	-

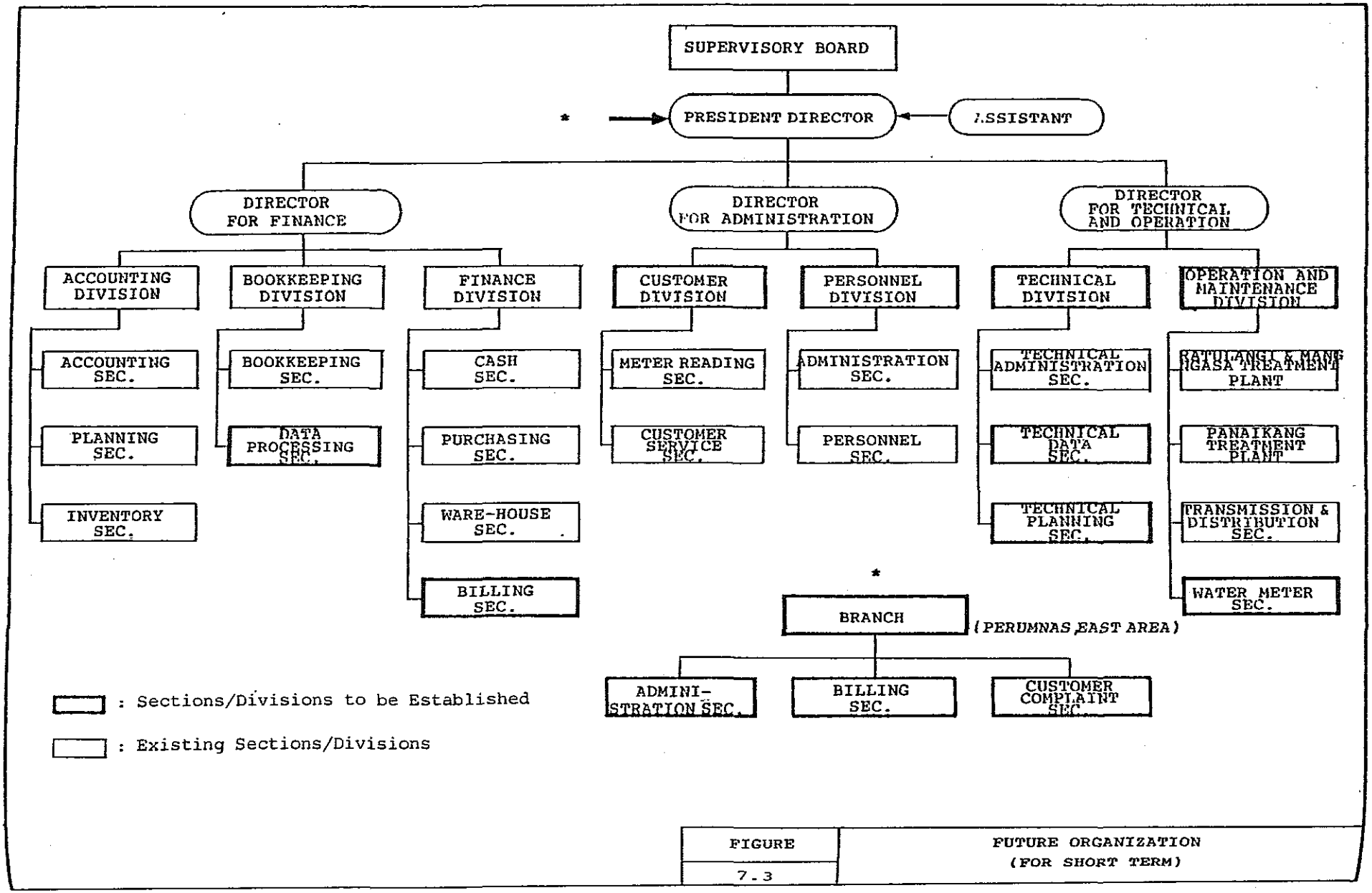


FIGURE	FUTURE ORGANIZATION (FOR SHORT TERM)
7.3	

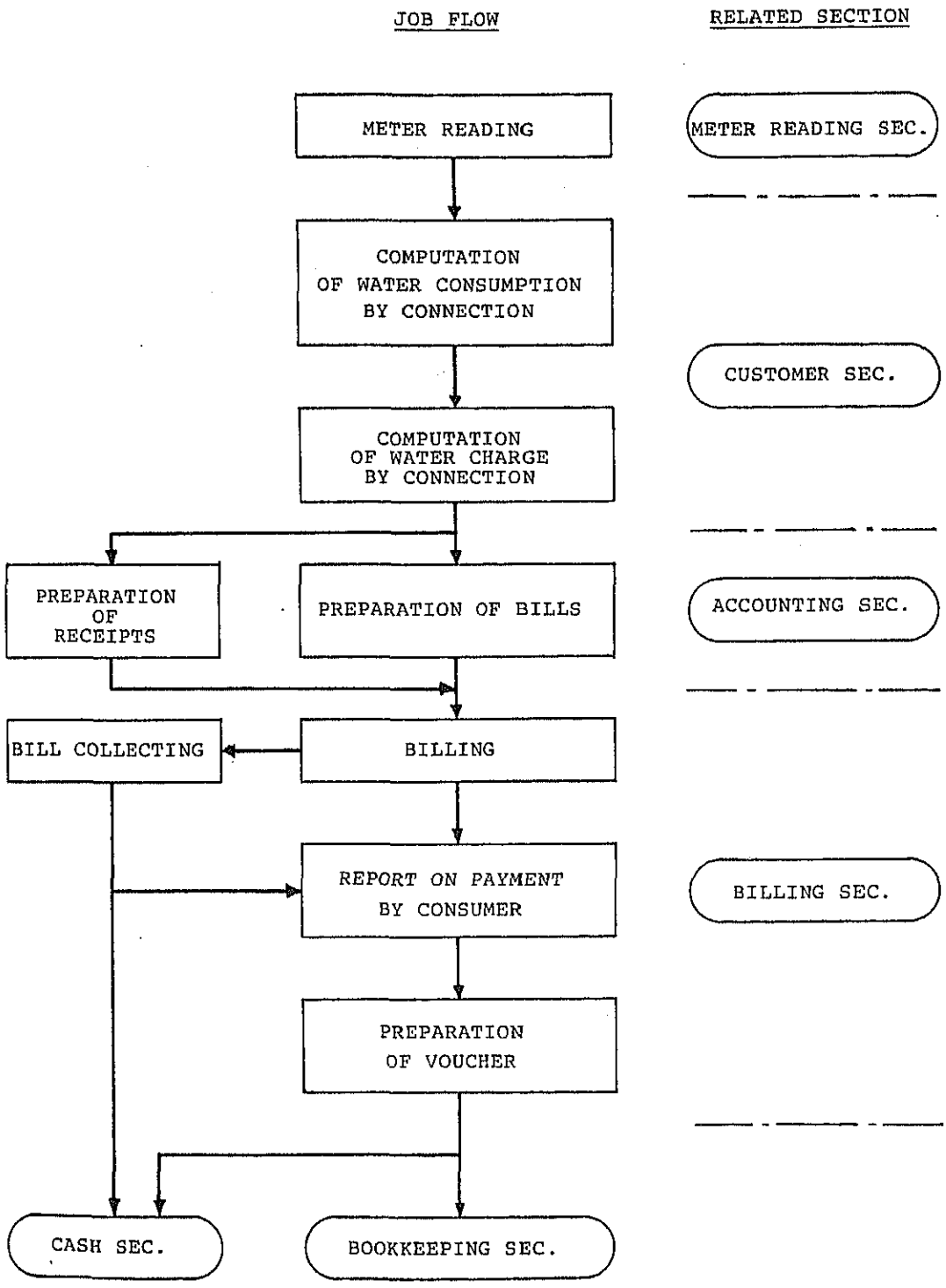
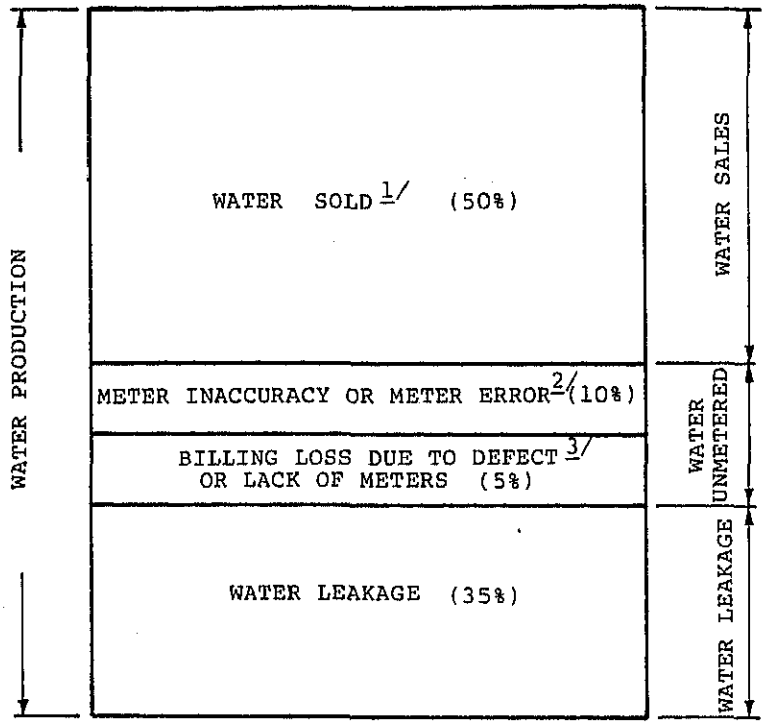


FIGURE 7.4	METERING & BILLING SYSTEM



(in monetary term)

1/ : The ratio is estimated from the records of water production and accounted-for water.

2/ : This includes undermetering water and water losses caused by meter error. This figure is tentatively estimated from the records of similar scaled waterworks in Japan due to the lack of data.

3/ : It contains billing loss such as water consumption by removing meters and by using defective meters and water consumption by unmetered connections that are not billed. It is roughly estimated as follows:

$$\frac{(3{,}500 + 1{,}700 + 5{,}000)}{\text{connections}} \times 0.10^{4/} / 25{,}000 = 0.04 \fallingdotseq 5\%$$

4/ : It shows the ratio of water consumption in monetary term (water payment) between the water users who are metered and unmetered.

Rp.3,867/Rp.3,510 = 1.10 (the results of household survey)

FIGURE	WATER PRODUCTION AND WATER SALES
7.5	

TABLE 7.3 INCOME STATEMENT PDAM KOTAMADYA UJUNG PANDANG IN THE LAST 5 YEARS (1978-1982)

I T E M	1978	1979	1980	1981	1982
I. REVENUES					
1. Revenues from Water Sales	258,996,576.85	518,758,654.15	671,316,812.75	868,517,432.25	972,870,078.75
2. Revenues from Water Connections	95,099,556.67	159,580,183.49	220,903,062.73	288,791,660.11	279,638,114.74
3. Other Revenues	560,350.12	3,615,871.00	923,375.00	468,725.00	2,412,369.00
Total Revenues	354,656,483.64	681,954,708.64	893,143,250.48	1,157,777,817.36	1,254,920,562.49
II. EXPENSES					
1. Operating Costs					
- Salaries & Wages	54,170,115.00	95,708,279.20	155,327,286.49	233,146,945.50	292,866,195.62
- Chemicals	38,472,555.00	89,262,000.00	121,769,123.00	129,778,315.00	135,909,870.00
- Electricity	20,676,818.75	74,224,351.00	122,188,458.00	162,521,611.25	199,649,185.00
- Maintenance	23,400,555.20	55,569,097.90	38,833,965.49	45,771,640.86	40,965,021.00
- Administration	2,551,324.88	24,919,008.25	39,292,350.35	37,161,659.00	37,582,767.25
- Other Operating Costs	104,153,258.40	115,358,093.71	159,892,858.42	208,277,673.42	212,936,316.90
Total Operating Costs (a)	243,424,627.23	455,040,830.06	637,304,041.75	816,657,845.03	919,909,355.77
2. Non-operating Costs					
- Depreciation of Fixed Assets	42,072,026.65	166,998,457.53	184,524,544.12	210,399,392.37	226,292,549.37
- Bad Debt	4,231,722.25	1,691,597.00	391,961.25	-	272,391.25
Total Non-operating Costs (b)	46,303,748.90	168,690,054.53	184,916,505.37	210,399,392.37	226,564,940.62
Total Expenses (a) + (b)	289,728,376.13	623,730,884.59	822,220,547.12	1,027,057,237.40	1,146,474,296.39
III. INCOME BEFORE TAX	64,928,107.51	58,223,824.05	70,922,703.36	130,720,579.96	108,446,266.10
- Provision for Tax	-	-	14,184,600.00	29,216,300.00	22,533,800.00
IV. SURPLUS	64,928,107.51	58,223,824.05	56,738,103.36	101,504,279.96	85,912,466.10

Source: LAPORAN NERACA LABA/RUGI TAHUN BUKU 1978-1982

TABLE 7.4 BALANCE SHEET OF PDAM KOTAMADYA UJUNG PANDANG IN THE LAST 5 YEARS (1978-1982)

I t e m	1978	1979	1980	1981	1982
I. ASSETS					
1. Current Asset					
1.1 Cash	13,526,834.63	14,423,044.60	396,611.35	28,195,154.75	16,685,995.80
1.2 Cash in Bank	3,062,645.47	2,571.02	9,556,271.27	4,507,985.81	669,377,97
1.3 Receivables	320,975,138.19	591,320,324.78	1,048,110,282.63	1,614,130,413.33	1,859,271,907.34
1.4 Inventories	114,220,611.00	115,111,890.00	78,209,475.00	91,091,151.00	99,877,809.00
TOTAL CURRENT ASSETS (a)	451,785,229.29	720,857,830.40	1,136,272,640.25	1,737,924,704.89	1,976,505,090.11
2. Fixed Asset					
- Land	1,229,273,750.00	1,229,273,750.00	1,229,273,750.00	1,229,273,750.00	1,229,273,750.00
- Building	1,128,757,812.00	1,128,757,812.00	1,128,757,812.00	1,129,890,507.00	1,129,890,507.00
- Pipes	4,303,760,990.10	4,670,410,211.07	5,357,375,859.07	5,781,494,169.32	5,988,101,921.07
- Mechanics	1,268,950,000.00	1,268,950,000.00	1,289,920,071.92	1,311,855,571.92	1,353,607,421.92
- Office Equipment	8,334,300.00	9,956,125.00	15,299,675.00	20,745,425.00	42,114,725.00
- Vehicles	11,399,900.00	16,349,900.00	19,624,900.00	34,974,000.00	38,124,000.00
- (Depreciation)	(97,619,970.57)	(264,618,428.10)	(449,142,972.22)	(659,542,369.59)	(885,834,913.96)
TOTAL FIXED ASSETS (b)	7,852,856,781.53	8,059,079,369.97	8,591,109,095.77	8,848,691,058.65	8,895,277,411.03
3. Other Assets (c)	66,449,182.68	140,621,131.00	238,802,168.58	273,402,895.16	167,856,930.42
TOTAL ASSETS (a) + (b) + (c)	8,371,091,193.50	8,920,558,331.37	9,966,183,904.60	10,860,018,658.70	11,039,639,431.56
II. LIABILITIES					
4. Current Liabilities					
- Debt (Operation)	17,747,356.75	92,369,601.75	133,480,224.75	142,813,549.80	239,550,881.15
- Debt (Office supplies)			73,582,130.00	190,082,502.00	169,600,229.00
- Advance Payment			-	163,359,387.50	81,553,100.00
- Unpaid	213,277,224.28	77,065,521.46	-	-	17,013,177.75
- Provision for Sales Tax			41,975,000.00	71,191,300.00	93,725,100.00
TOTAL CURRENT LIABILITIES (d)	231,024,581.03	169,435,123.21	249,037,354.75	567,446,739.30	601,442,487.90
5. Other Liabilities					
- Deposits Received (Customer)	256,820,000.00	441,650,000.00	565,289,000.00	716,009,000.00	848,417,000.00
- Deposits Received (Service Connection)	129,001,065.70	203,824,192.37	268,561,050.89	326,101,140.48	253,405,698.64
TOTAL OTHER LIABILITIES (e)	385,821,065.70	645,474,192.37	833,850,050.89	1,042,110,140.48	1,101,822,698.64
6. Capitals					
- Capitals from KMUP	2,067,170,080.75	2,067,170,080.75	2,067,170,080.75	2,151,610,080.75	2,151,610,080.75
- Capitals fron Central Government	5,668,446,319.10	6,002,382,640.07	6,655,529,640.07	6,836,750,640.07	6,836,750,640.07
- Retained Earnings	18,629,146.92	36,096,294.97	160,596,778.14	262,101,058.10	348,013,524.20
TOTAL CAPITALS (f)	7,754,245,546.77	8,103,649,015.79	8,883,296,498.96	9,250,461,778.92	9,336,374,245.02
TOTAL LIABILITIES (d) + (e) + (f)	8,371,091,193.50	8,920,558,331.37	9,966,183,904.60	10,860,018,658.70	11,039,639,431.56

Source: LAPORAN NERACA LABA/RUGI TAHUN BUKU 1978-1982

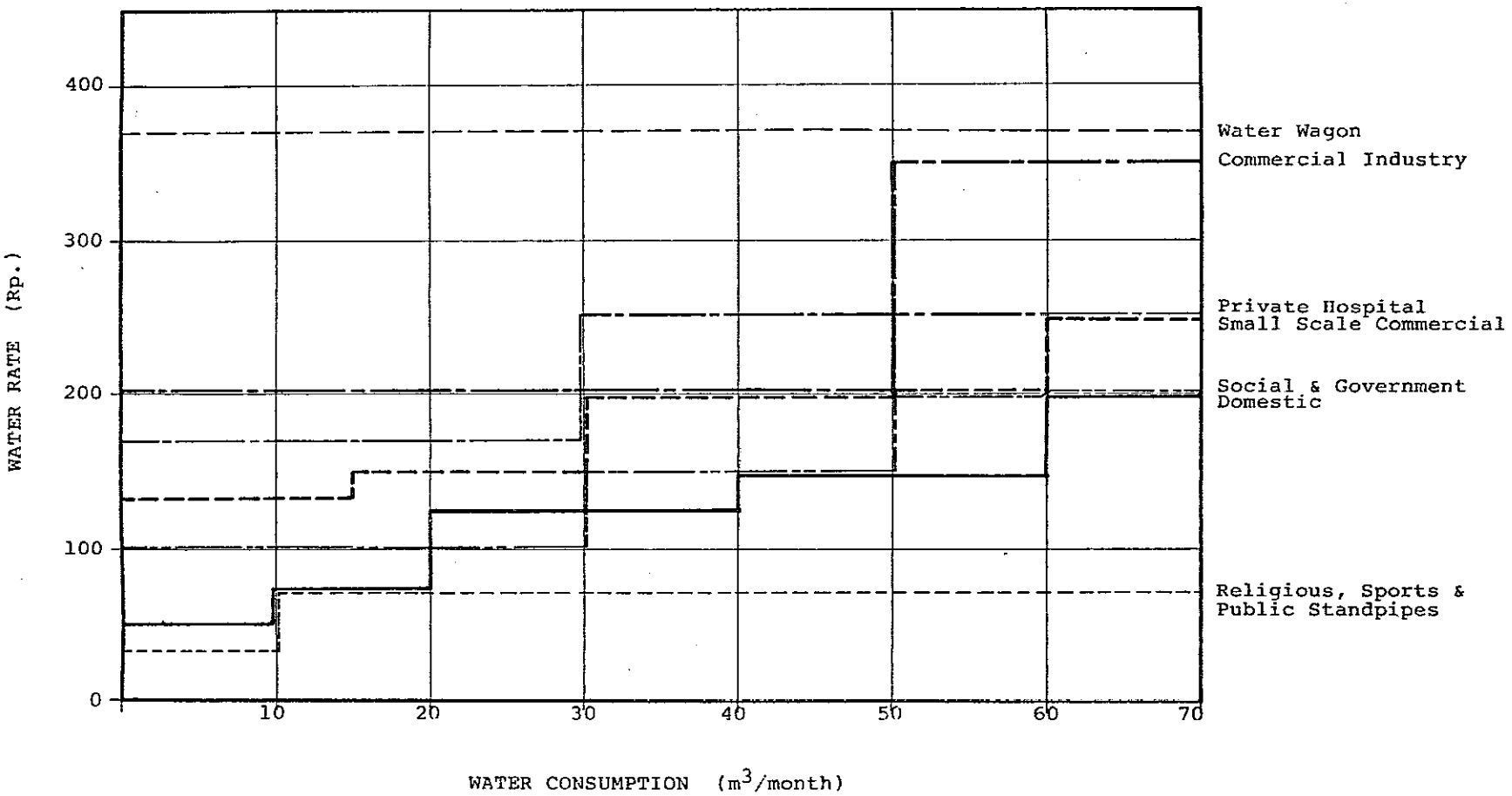


FIGURE	PRESENT WATER RATE
7.6	

TABLE 7.5 RECORDS OF EXPENDITURES

Unit : Rp.1,000

I t e m	Unit	1978	1979	1980	1981	1982
1. Depreciation	1.Rp(%) 2.Rp/Rp[1/]	Rp. 42,071 (14.5%) 0.64%	Rp.161,742 (25.9%) 2.37%	Rp.184,525 (22.3%) 2.51%	Rp.210,399 (19.9%) 2.76%	Rp.226,293 (19.4%) 2.74%
2. Chemicals	1.Rp(%) 2.Rp/m^3 [2/]	Rp. 38,473 (13.3%) -	Rp. 89,262 (14.3%) -	Rp.121,769 (14.7%) Rp.20.3	Rp.129,778 (12.3%) Rp.17.2	Rp.135,910 (11.6%) Rp.16.8
3. Fuel & Power	1.Rp(%) 2.Rp/m^3 [2/]	Rp. 20,677 (7.1%) -	Rp. 74,224 (11.9%) -	Rp.122,188 (14.8%) Rp.20.3	Rp.162,522 (15.4%) Rp.21.6	Rp.199,649 (17.1%) Rp.24.8
4. Salaries & Wages	1.Rp(%) 2.Rp/Staff[3/]	Rp. 54,170 (18.7%) -	Rp. 95,708 (15.3%) 560,000	Rp.155,327 (18.8%) 729,000	Rp.233,147 (22.1%) 992,000	Rp.292,867 (25.0%) 1,153,000
5. Others	1.Rp(%)	Rp. 134,338 (46.4%) -	Rp. 202,795 (32.6%) -	Rp. 243,498 (29.4%) -	Rp. 320,427 (30.3%) -	Rp. 314,289 (26.9%) -
T o t a l	1.Rp 2.Rp/m^3	Rp.289,729 (100%) -	Rp.623,731 (100%) -	Rp.827,307 (100%) Rp.137.7	Rp.1,056,273(100%) Rp.140.1	Rp.1,169,008(100%) Rp.145.1

1/ : Depreciation/(Fixed Assets - Land)

2/ : Chemicals/Water sold

3/ : Salaries & Wages/Number of Staff

TABLE 7.6 RATE OF DEPRECIATION

I t e m	Rate of Depreciation (%)	Durable Year
Land	0	not to be depreciated
Building & Facilities (made of concrete)	2.5	40
Building & Facilities (made of wood)	5	20
Pipes		
- CIP & DCIP	5	20
- PVC	12.5	8
- GIP	5	20
Pumps and Motors	5	20
Leko Pancing Weir	5	20
Transmission Channel	5	20
Type Writer & Calculator	20	5
Desks, Chairs, other office equipment	20	5
Vehicles	20	5

TABLE 7.7 PERCENTAGE OF EXPENDITURE ITEM AS OF 1982

Item	Ujung Pandang	Jakarta	Waterworks 1/ in Japan
1. Depreciation	19.4 %	17.2 %	13.8 %
2. Chemicals	11.6 %	10.4 %	-
3. Power	17.1 %	13.7 %	6.9 %
4. Salaries & Wages	25.0 %	22.9 %	24.5 %
5. Others	26.9 %	35.8 %	54.8 % 2/

1/ : Average figure of all waterworks in Japan in 1981.

2/ : This figure includes costs for chemicals, water sources, and others.

TABLE 7.8 DISBURSEMENT SCHEDULE (TENTATIVE)

Item	STAGE I											STAGE II	
	Phase 1						Phase 2					Phase 1	Phase 2
	1985	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'90-2000	'94-2005
PROJECT COST													
Phase 1, STAGE I	0,5	2.0	8.0	9.0	9.0	8.1	0.5	-	-	-	-	-	-
Phase 2, STAGE I	-	-	-	-	-	1.0	4.0	5.0	3.0	-	-	-	-
Phase 1, STAGE II	-	-	-	-	-	-	-	-	-	-	-	72.7	-
Phase 2, STAGE II	-	-	-	-	-	-	-	-	-	-	-	-	14.6
Total	0.5	2.0	8.0	9.0	9.0	9.1	4.5	5.0	3.0	-	-	72.7	14.6
Central Government (80%)	0.4	1.6	6.4	7.2	7.2	7.3	3.6	4.0	2.4	-	-	58.2	11.7
Local Government & PDAM (20%)	0.1	0.4	1.6	1.8	1.8	1.8	0.9	1.0	0.6	-	-	14.5	2.9

Note; Above figure are estimated excluding price contingency.

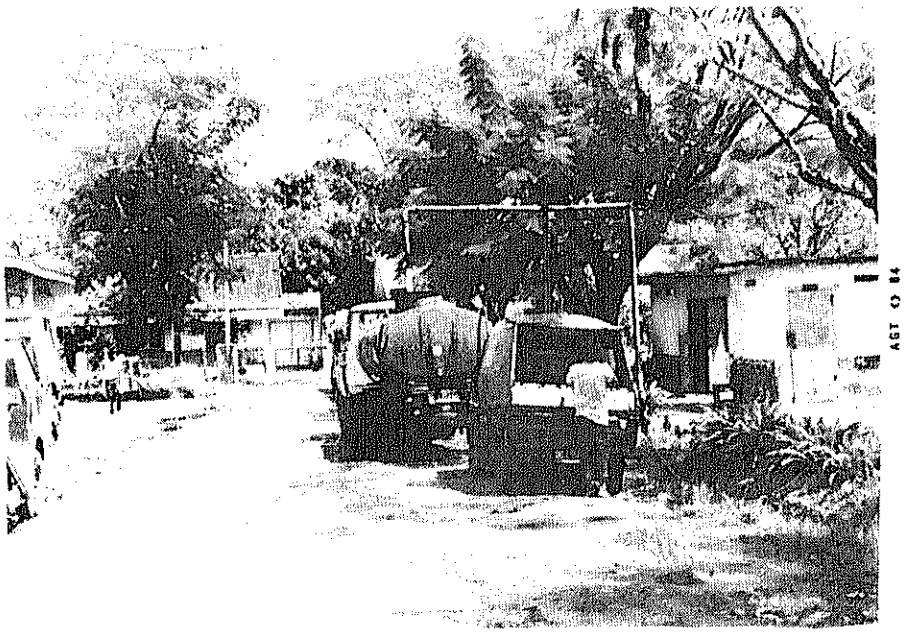
TABLE 7.9 AVERAGE WATER TARIFF AND FINANCIAL PROJECTION

Unit : Million Rp.

I t e m	1992	1995	R e m a r k s
- Water Rate for Domestic (Within ability to pay, Rp/m^3)	less than Rp. 85	less than Rp. 85	- 2.5% of household income
- Average Water Tariff (Rp/m^3)	Rp.195	Rp.195	- Domestic and non-domestic water consumption considered
REVENUE			
- Water Sales	Rp. 6,550	Rp. 8,420	- Water tariff x accounted-for water/year
- Connection Charge	Rp. 1,270	Rp. 4,360	- Unit cost x number of connections/year
Sub-total	Rp. 7,820	Rp.12,780	
EXPENDITURES			
- Depreciation	Rp. 1,200	Rp. 1,530	- 2.5% of Rate of depreciation
- Amortization (Interest)	Rp. 3,440	Rp. 4,580	- 80%, Central Government loan & 20%, Local Government equity
- Chemicals, Power, Salaries etc.	Rp. 1,940	Rp. 2,450	- Chemicals, Rp.16.8/water production and Power, Rp.78.5/KWH
- Administrative Costs	Rp. 750	Rp. 970	- Cost from existing records x Increase rate of production
Sub-total	Rp. 7,330	Rp. 9,530	
NET PROFIT	Rp. 490	Rp. 3,250	

CHAPTER VIII

BENEFITS OF THE PROJECT



TANK TRUCK TO SUPPLY WATER
TO THE REMOTE AREA

CHAPTER VIII

BENEFITS OF THE PROJECT

The present project will increase the number of served population and improve the deteriorated water supply facilities. In addition there are a number of benefits, direct and indirect, which can not be expressed in terms of amounts of money or numerical effect. They will be described as follows;

1) Elimination of Intermittent Supply

Present insufficient water pressure will be improved to a normal level and intermittent supply will be all eliminated. Tanks and pumps of the plumbing system which consumers have provided will be no more required.

2) Supply of Safe Water

The existing water supply facilities are vulnerable to contamination because the pipelines are sometimes under negative pressure. When the project is completed and the water pressure raised, consumers will be free from such contamination and the safety of water will be assured.

3) Improvement of Health Condition and Living Environment

Because of shortage of piped water, most of the population are inevitably using stored water in the house, which is not necessarily hygienic. These conditions can be rectified with the implementation of the project. And this will further promote the improvement activities of the living environment.

4) Promotion of Industries

Supply of clear water enough to the non-domestic portion contributes to the promotion of industries in the area, especially to the industrial estate located at the northern part of the city.

5) Employment Opportunity

Construction work of the present project has a fairly large share of civil work. For this civil work, both skilled and unskilled labors have to be mobilized. It will contribute greatly to an expansion of the earning of the public in the area.

APPENDIXES

CONSUMERS SUPPLIED THROUGH
THE PUBLIC STANDPIPES

APPENDIX I

SCOPE OF WORK

APPENDIX I

SCOPE OF WORK
FOR
MASTER PLAN AND FEASIBILITY STUDY
ON
WATER SUPPLY DEVELOPMENT PROJECT
IN
UJUNG PANDANG
IN
THE REPUBLIC OF INDONESIA

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia (hereinafter referred to as "Indonesia"), the Government of Japan has decided to conduct a master plan and feasibility study on Water Supply Development Project in Ujung Pandang City in the Republic of Indonesia (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the Directorate General of Housing, Building, Planning and Urban Development, Ministry of Public Works, (hereinafter referred to as "CIPTA KARYA") as well as other authorities concerned of the Government of Indonesia.

The present document sets forth the Scope of Work with regard to the above mentioned Study.

II. OBJECTIVE OF THE STUDY

The objectives of the Study are to prepare a master plan for the Water Supply Development Project in Ujung Pandang City with the target year 2005 and to carry out a feasibility study for a project selected from the result of the Master Plan Study.

III. SCOPE OF THE STUDY

1. Study Area

(i) The Study area of the Master Plan should be of Ujung Pandang City.

(ii) The Study area of the Feasibility Study will be selected from the result of the Master Plan Study.

2. Outline

The Study will be composed of field surveys and data collection in the Republic of Indonesia and of analysis works in both Indonesia and Japan.

The items to be covered by the Study are as follows :

(i) Phase I; Master Plan Study

a. Data collection and analysis
b. Definition of served areas for planning
c. Estimation of population
d. Estimation of water demand
e. Study of existing facilities
f. Study of water sources
g. Socio-economic evaluation
h. Rough estimation of cost for construction, operation and maintenance.
i. Planning of appropriate water supply system
j. Study of organization, operation and management plan
k. Preparation of implementation program
l. Identification of the project for the Feasibility Study.

(ii) Phase II; Feasibility Study

a. Definition of project area
b. Estimation of population to be served
c. Estimation of water demand
d. Study of improvement of existing facilities
e. Study of water sources
f. Design criteria
g. Layout of facilities
h. Study for alternative plans
i. Preliminary design
j. Study of construction materials, labour force and construction ability of local constructors
k. Preparation of construction method and procurement method of materials and equipment
l. Estimation of costs of construction, operation and maintenance.
m. Estimation of benefits
n. Economic Studies and Financial analysis
o. Study of Tariff System
p. Study of organization, operation and management plan
q. Preparation of implementation schedule.

IV. STUDY SCHEDULE

The whole Study will be conducted in accordance with the attached tentative schedule.

V. REPORTS

JICA will prepare and submit the following reports in English to the Government of Indonesia in the course of the Master Plan Study and Feasibility Study.

1. Inception Report, 35 copies, at the beginning of the field survey (Phase I).

2. Progress Report (I), 35 copies, at the end of the field survey (Phase I).

3. Interim Report, 35 copies, within three (3) months after completion of the field survey (Phase I) CIPTA KARYA will provide JICA with their comments within one (1) month after receipt of the Interim Report.

4. Progress Report (II), 35 copies, at the end of the field survey (Phase II).

5. Draft Final Report, 35 copies, within three (3) months after completion of the field survey (Phase II) CIPTA KARYA will provide JICA with their comments within one (1) month after receipt of the Draft Final Report.

6. Final Report, 50 copies, within two (2) months after receipt of comments on the Draft Final Report.

VI. UNDERTAKING OF THE GOVERNMENT OF INDONESIA

The Government of Indonesia shall accord privileges, immunities and other benefits to the JICA Study Team (hereinafter referred to as "the Team"), through the authorities concerned, take necessary measures to facilitate the smooth implementation of the Study.

1. CIPTA KARYA shall make necessary arrangements with the cooperation of other relevant organizations for the following:

1. to secure the safety of the Team

2. to permit the members of the Team to enter, leave and sojourn in Indonesia for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees.

3. to exempt the members of the Team from taxes, duties, fees and any other charges on equipment, machinery and other materials brought into Indonesia for the implementation of the Study.

4. to exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study.

5. to provide necessary facilities to the Team for the remittance as well as the utilization of funds introduced into Indonesia from Japan in connection with the implementaion of the Study.

6. to provide medical services as needed. Its expenses will be chargeable on the members of the Team.

7. to secure permission to transfer all data and documents related to the Study including photographs from Indonesia to Japan by the Team.

2. CIPTA KARYA shall, at its own expense, provide the Team during the Study period with the followings, in cooperation with other relevant organizations:

1. available data and information related to the Study.

2. counterpart personnel for smooth transfer of technology.

3. suitable office space with necessary equipment in Ujung Pandang City.

4. credentials or identification cards.

3. The Government of Indonesia shall bear claims, if any arises, against the members of the Team resulting from occuring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study in Indonesia, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Team.

VII. UNDERTAKING OF THE GOVERNMENT OF JAPAN

1. to dispatch, at its own expense, Japanese Study teams to the Republic of Indonesia.

2. to pursue technology transfer to the Indonesian counterpart personnel in the course of the Study.

3. to provide the necessary equipment and machinery for the implementation of the study, which will be the property of the Government of Japan unless otherwise agreed upon.

APPENDIX

TENTATIVE SCHEDULE

Items \ Months No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
									3	4	5	6	7	8	9	10	11	12	1	2
Preparation of Field Survey																				
Field Survey (Phase I)		△ (a)			△	(b)														
Home Work																				
Explanation of Interim Report									△ (c)											
Field Survey (Phase II)														△ (d)						
Home Work																				
Explanation of Draft Final Rep.																△ (e)				
Home Work																				
Presentation of Final Report																			△ (f)	

Remarks :

- : Preparation of Field Survey
- : Field Survey or Exp. of Reports
- : Analysis of Field Survey (Home Work)
- △ : Reports
- ○ : Comments on Report

(a) : Inception Report
(b) : Progress Report (I)
(c) : Interim Report
(d) : Progress Report (II)
(e) : Draft Final Report
(f) : Final Report

Phase I : Master Plan Study
Phase II : Feasibility Study

APPENDIX II

JICA PROJECT TEAM MEMBER

AND

LIST OF OFFICIALS

1. JICA Project Team

Advisory Committee

1.	Mr. Tsunao USAMI (Chairman)	Deputy Director of Planning Division, Kanagawa Water Supply Authority
2.	Mr. Toshiaki SHIMAZAKI (Water Resources and Intake Planning)	Planning Division, Water Resources Development Public Corporation
3.	Mr. Akira KOIZUMI (Facilities Planning)	Associate Professor, Dept. of Civil Eng., Faculty of Eng., Tokyo Metropolitan University
4.	Mr. Toshiaki KISHI (Distribution System Planning)	Planning Division, Yokohama Water Works
5.	Mr. Junji ISHIZUKA (Project Coordination)	Development and Survey Division, Dept. of Social Development Cooperation, Japan International Cooperation Agency (JICA)

Study Team

(1)	Mr. Fumihiro TABU Team Leader	Deputy General Manager, Domestic Water Supply Department, Nihon Suido Consultants Co., Ltd.
(2)	Mr. Hiroyasu YODA Co-Team Leader Water Supply Engineer	Chief, Water Supply Division, Overseas Services Department, Nihon Suido Consultants Co., Ltd.
(3)	Mr. Katsuhiro IKARI River Engineer	Chief, Water Resources Division, Overseas Department, CTI Engineering Co., Ltd.
(4)	Mr. Yosuke KOBAYASHI Hydrochemist	Water Supply Division, Central Laboratory, Nihon Suido Consultant Co., Ltd.
(5)	Mr. Hideki KONDO Water Supply Engineer	Water Supply Division, Overseas Service Department, Nihon Suido Consultants Co., Ltd.
(6)	Mr. Yuhei TOKUDA Water Supply Engineer	Water Supply Division, Overseas Service Department, Nihon Suido Consultants Co., Ltd.
(7)	Mr. Masayuki MORI Water Supply Engineer	Water Supply Division, Overseas Service Department, Nihon Suido Consultants Co., Ltd.

2. GOI Officials

CIPTA KARYA

(1)	Ir. Soenarjono Danoedjo	Director General of Cipta Karya
(2)	Ir. Soeratmo Notodipoero	Director of DWS
(3)	Ir. Hendropranoto Suselo	Direktur Dina Program Dit. Jen.
(4)	Ir. Prijono Salim Dipl.S.E	Kasubdit Technical Planning DAB
(5)	Drs.Soedirman Martodihardjo	Kabag Tata Usaha Directorat DWS
(6)	Ir. Chairul Safri Hatta	Planning and Programming Section of DWS
(7)	Ir. Prastoro Yuwono	Staff of Planning Div. DWS
(8)	Ir. Soegito RD	Staff of DWS
(9)	Mr. John Molyneaux	Advisor of DWS

PAB

(1)	Ir. Iing Parvanaraya	Project Manager PAB Sulawesi Selatan
(2)	Mr. Evi	Staff of PAB (Counterpart of the Study Team)

PDAM

(1)	Ir. Soebagijo H.	Director of PDAM Ujung Pandang
(2)	Ir. Rashyd	Chief Engineer of Technical Sec. (Counterpart of the Study Team)

Local Steering Committee

(1)	Ir. Iing Parvanaraya	Project Manager PAB Sulawesi Selatan (Sul.Sel)
(2)	Ir. Soebagijo H.	Director of PDAM Ujung Pandang
(3)	Ir. Yasir Baeda Dipl HE	Ka Bid. Teknik Kanwil P.U. Sul.Sel
(4)	Ir. Bonar P. Simanjuntak	Bid. Pengairan Dinas P.U. Sul.Sel.
(5)	Drs.Fattah Abdullah	Kepala Bidang Ekonomi BAPPEDA KMUP
(6)	Drs.I.M.Asrun Soeleiman	Kasubbid Tata Ruang & Tata Guna Tanah , BAPPEDA Sul.Sel

APPENDIX III

WORK SCHEDULE AND MINUTES OF MEETING

III-1 WORK SCHEDULE

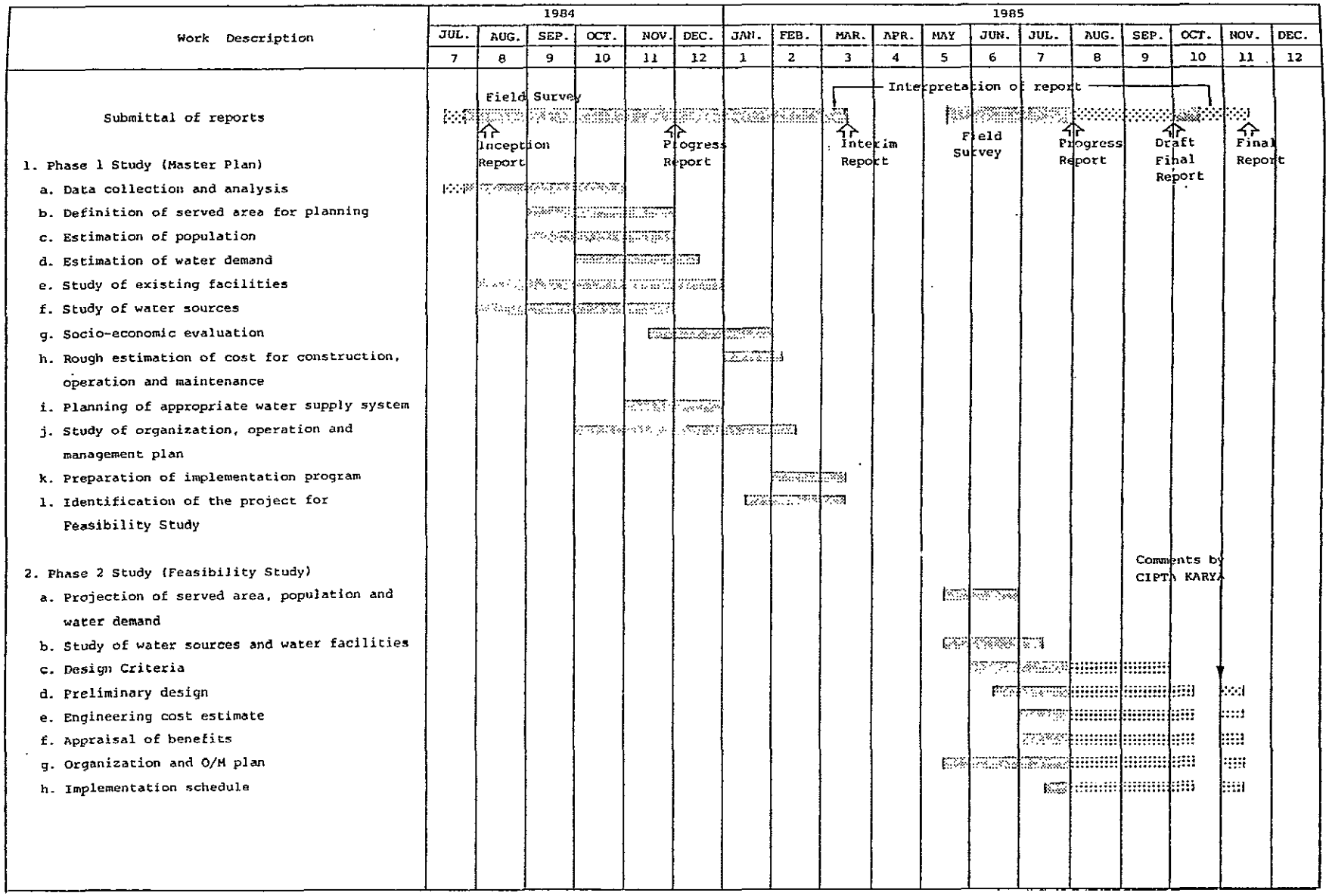
III-2 MINUTES OF MEETING FOR INCEPTION REPORT

III-3 MINUTES OF MEETING FOR PROGRESS REPORT (I)

III-4 MINUTES OF MEETING FOR INTERIM REPORT

III-5 OFFICIAL LETTER ISSUED BY GOVERNOR

WORK SCHEDULE



APPENDIX III-2

MINUTES OF MEETING

FOR

INCEPTION REPORT

OF

UJUNG PANDANG WATER SUPPLY

MASTER PLAN AND FEASIBILITY STUDY

IN

REPUBLIC OF INDONESIA

9TH AUGUST 1984 IN JAKARTA

MINUTES OF MEETING

The Japanese Study Team and the Advisory Committee organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") visited Jakarta and Ujung Pandang and had a series of discussions with the Authorities concerned of the Republic of Indonesia, in particular with Directorate General of Housing, Building, Planning and Urban Development, Ministry of Public Works (hereinafter referred to as "CIPTA KARYA").

As a result of the meetings, which were held in a most friendly atmosphere, both sides agreed upon the Inception Report for master Plan and Feasibility Study on Water Supply Development Project in Ujung Pandang in the Republic of Indonesia, as specified in the Record of Meeting attached herewith as Annex.

Jakarta August 9, 1984
For Japan International Cooperation Agency (JICA)

MR. TABU FUMIHIRO
JICA STUDY TEAM LEADER

MR. SOERATMO NOTODIPOERO
DIRECTOR WATER SUPPLY
DIRECTORATE GENERAL
CIPTA KARYA

MR. USAMI TSUNAO
JICA ADVISORY CO. CHAIRMAN

ANNEX

I. Cipta Karya's General comments on the Inception Report

II. Agreed items on both sides

III. Considerations requested by Cipta Karya

IV. Attendance list.

I CIPTA KARYA'S GENERAL COMMENTS ON THE JICA STUDY TEAM'S INCEPTION REPORT

1. Cipta Karya request that consideration be given to the following:

   (i) Increasing the distribution capacity to match our existing and proposed water production capacity. Some limited activities could be identified by the Study Team during the study period and implemented by the staff of the PDAM.

   (ii) Assisting the PDAM/PAB to increase the raw water availability at the treatment plants during the dry season. If the Study Team were to prepare Water Resources Management plans for the Maros and Jeneberang River Basins we could arrange for more water to be available.

   (iii) Advising the PDAM's Rehabilitation Task Force to define and implement a cheap but effective losses reduction program during the study period.

2. It is suggested that several alternative plans for water supply systems be drawn up in such a way to consider using alternative material and developing the systems in stages. Studying alternative types of equipment and materials is also in very important.

3. The Master Plan and Feasibility Studies should detail a losses reduction program and this program must be included in the first stage of implementation.

4. The Study Team should review:

   (i) the report on Water Supply and Sanitation Decade 1980 - 1990; as it sets out basic targets and criteria agreed to by all Indonesian authorities involved in the provision water supply.
   (ii) the Joint Decree on Operation and Maintenance of Water Supply facilities prepared by DPU and the Ministry of Internal Affairs.

   The Study Team should appreciate that the present GOI policy is to promote the use of local production. The studies should make a special analysis of the Indonesian materials available, then evaluate and recommend as appropriate.

5. The Study Teams attention is drawn to the Indonesian Public Standpipe Program. This Program should be reviewed and the particular problems/diffculties in Ujung Pandang identified and then to make recommendations on how to promote the local Public Standpost program in an effective way.

6. Regional development should be a Study consideration and the Plan on Ujung Pandang by Tata Kota Tata Daerah should be reviewed.

7. Cipta Karya has a policy on Integrated Urban Development where Water Supply and Sanitation facilities are introduced in a complementary package to ensure tangible health benefits are achieved. The studies should relate to this policy.

8. The Study Team should suggest how implementation can be expedited and identify what are the critical areas that need to be taken into account to ensure speedy implementation.

9. Cipta Karya has arranged one engineer from the PDAM and one engineer from the PAB to act as counterparts to the Study Team during the study period. Further arrangements may be made for these counterparts to participate in an overseas training program in Japan.

II. ITEMS AGREED UPON BETWEEN THE JICA TEAM AND CIPTA KARYA.

The items agreed upon between the Japanese and Indonesian sides during the stay of the JICA Advisory Team in the Republic of Indonesia are as follows :

1. The Master Plan and Feasibility Studies will prepare losses reduction schedules.

2. (i) the report on Water Supply and Sanitation Decade 1980-1990,
   (ii) the joint Decree on operation and Maintenance,
   (iii) Regional Development Plan,
   (iv) Integrated Urban Development plan, will be referred to in the course of the Study.

3. Based on the review of "Public Standpipe Program in Indonesia" and the particular problems regarding management of Public Standpipe in Ujung Pandang, the Study Team will make recommendations on how to promote the local Public Standpipe program.

4. The outline of the study will include the river basin and water resources management within the study of water resources.

5. Estimate the average tariffs for each year to the year 2005.

6. Page 8 add section 2 (d) Based on the water leakage observations, suggest where improvements can be achieved using existing PDAM facilities.

7. Page 8 section 3 will include a draft of the questionnaire to be used in the household survey. This will allow PAB to comment and provide guidance on the proposed approach.

8. Page 9 section 3.1.3 Planning of water supply system will include details of system storage provisions. The national policy on system storage is flexible and will reflect local conditions and economy.

9. Page 9 delete reference to "yard connections" in section (2) and (3) as it is not GOI policy to provide such connections.

10. Page 9 section 3 Estimation of Water Demand should include non-domestic usage, noting that Ujung Pandan has been proclaimed a national industrial development centre.

11. Availability of shallow groundwater will be considered as a component of the total water supply system. Area will be identified where shallow groundwater is not available to people during the dry season. The piped water supply coverage will be increased on those areas. Similarly in areas where abundant shallow groundwater is available, the piped water supply coverage can be reduced so that the overall piped water supply coverage target of around 75% is achieved.

12. Page 10 section 3 "Broadly" should be replaced by the word "adequate".

13. Operation costs will be investigated and the costs minimised where economically justifiable.

14. Page 13 section 3 Include recommend an appropriate financial management system.

15. The Study Team must recommend the equity component of the loan from the Local Government and make a recommendation on the ratio of central and local funds.

16. Cipta Karya requested the Study Team to carry out the feasibility study of Stage I Project of 10 year target. The Study Team replied that the Stage I Project should be selected from the findings of the Master Plan Study.

17. Cipta Karya suggested to assign 2 counterpart personnel each from PAB Sulawesi Selatan and PDAM Ujung Pandang during the whole period of the Study.

18. Cipta Karya was advised to prepare a letter of request for overseas training of local counterpart staff to be carried out in Japan by JICA. The formal letter will be proposed to the Government of Japan by the end of Sept. 1984.

19. The Study Team advised Cipta Karya to establish a committee consisting of the members from the agencies concerned for smooth implementation of the Project.

III CIPTA KARYA DESIRE FOR JICA TO CONSIDER THE FOLLOWING:

1. The Study Team's Progress Report should contain details of action carried out on the agreed changes to the Inception Report, especially the system losses reduction effort.

2. It is requested that arrangements be made for the Detailed Design of the accepted implemention program to be arranged as soon as possible after the Feasibility Study.

3. The Study Team should suggest how implementation can be expedited and identify what are the critical areas that need to be taken into account to ensure speedy implementation.

The following relate to specific sections of the Inception Report :

4. A covering letter for submission of each report with a brief summary of the report's contents should be prepared with a translation into the Indonesian Language where possible.

5. Page 2; The opening paragraph states that Ujung Pandang has been suffering from a severe water shortage. Under the proposal contained in the Inception Report this severe water shortage will continue for several years. It is considered appropriate that the Study Team should suggest and arrange some immediate action to rectify this undesirable situation.

6. Page 2; The third paragraph could include "and guidance on system rehabilitation" as a component of the assistance in the improvement of the existing system.

7. Page 2; Another objective of the study could be to assist the PDAM with system rehabilitation.

8. Page 6; Fig-1 Work Flow listing should include the items listed in the above comments. The study of existing facilities should be in conjunction with PDAM staff and suggesting improvements to specific problem areas where appropriate.

9. Page 8, Section 3.1.1 2c) include;"and the old pipe network that was installed in 1924."

10. Page 8 Section 3.1.2 (1) Future population projections, are available in one year increments. "district" should read "sub-district." This paragraph should be amended according and include a description the GOI's policy on Integrated Urban development, regional development considerations and a review of the Ujung Pandang Town Development Plans.

11. Page 9 Section 3.1.3 (1) delete: "Reasonable and.... facilities", insert "define a Losses Reduction Program to reduce the system losses to an acceptable level."

12. Page 10 Section (2) "recommend a source" should read "recommend source(s)" and include "field inspections as necessary"

13. Page 10 Section 3.1.4 Operation and Management: Operation costs should be investigated in detail and the costs minimised where economically justifiable. Include depreciation, the current situation regarding system operation and maintenance and future PDAM staff training requirements.

14. Page 11 Section (2) add "and staff training aspects."

15. Page 12 (4) Alternative local materials should be considered.

16. Page 13 (5) Speedy implementation should be an objective and inherent in the Study Team's proposals. It is necessary for the implementation phase to be completed within Pelita IV.

17. Page 13 (3) Include; recommend an appropriate financial management system and ensure PDAM staff are capable of undertaking the proposed activities, remembering that the PDAM will be responsible for repayment of loan funds over a 20 year period.

18. Page 14 (2) The PDAM will be responsible for repaying loan funds to the Central Government. This loan will be over 20 years with 5 year grace period, an estimated interest rate of 11%. The affordability and capacity of people to pay must be investigated.

19. The Study Team must recommend the equity component of the loan from the Local Government (from 0 - 30%) and make a recommendation on the ratio of central and local loan funds. This recommendation would be based on local financial capacity and it is expected to have a 70 - 80% Central Government component.

20. Regarding the PDAM income statement more discussions with the PDAM will be required through out the studies and the operation and maintenance costs and the assessment of the best figure for a depreciation rate should not be based on past experience, The appropriate figures should be identified and adopted after consultation with DAB.

DIREKTORAT AIR BERSIH

DAFTAR HADIR RAPAT

Undangan Rapat / Meeting Invitation : PEMBAHASAN INCEPTION REPORT UJUNG PANDANG W/S /JICA

Hari dan Tanggal / Day and Date : SELASA 7 AUGUSTUS 1984

Tempat / Place : LANTAI II WING 1

Jam / Time : 09.30 WIB

Pemimpin Rapat / Chairman : IR. SOERATMO NOTODIPOERO

Nomor	Nama / Name	Instansi / Office	Jabatan / Occupation	Tanda tangan / Signature
1.	Soeratmo Notodipoero	DWS	Director	
2.	Hendropranoto	DPlampro	Director	
3.	John Molyneaux	DWS (AAT)	Advisor	
4.	Widagdo	Bina Program Pengairan	Staf P_2WS	
5.	Rochyat	Bina Program CK	Staff	
6.	Sembiring E.K	Bina Program CK	Staff	
7.	Saptorini	Bina Program CK	Staff	
8.	Chairul	DAB	Staff	
9.	Iing	PAB SUL-SEL	Pimpro	
10.	Soegito RD	DAB	Staff	
11.	Djoko Rismianto	DAB	Staff	
12.	Harry Priatna	DAB	Staff	
13.	Risyana	DAB	Seksi Evaluasi	
14.	Nuraida MS	Bina Program	Staff ABLN	
15.	Budiman Malau	DAB	Staff	
16.	H. Kondo	JICA Survey Team	Civil Engineering	
17.	Y. Kobagashi	JICA Survey Team	Hydrochemist	
18.	Katsuhino Ikani	JICA Survey Team	Water Source	
19.	Akira Koizomi	JICA Advisor Committ	Civil Engineering	
20.	Tsuno Usami	------,,,,------	''	
21.	Fumihiro Tabu	JICA Survey Team	Water Supply Eng.	
22.	Hiroyasi Yoda	JICA Survey Team-	Water Supply Eng.	
23.	Junji Ishizuka	JICA	JICA Officer	

APPENDIX III-3

MINUTES OF MEETING

FOR

PROGRESS REPORT I

FOR

MASTER PLAN AND FEASIBILITY STUDY

OF

UJUNG PANDANG WATER SUPPLY

DEVELOPMENT PROJECT

IN

REPUBLIC OF INDONESIA

21ST NOVEMBER 1984 IN JAKARTA

The meeting between Cipta Karya and the JICA Team was held in Jakarta, November 19, 1984 with attendance of the Authorities concerned as shown in the sheet attached hereto.
The major issues discussed and agreed upon between the both parties are as follows :

1. Population Projection

   It was agreed population forcast proposed in the Progress Report should be employed as the input to the present Study.

2. Water Demand

   The Study Team proposed future water demand on the basis of the results of household survey. However, Cipta Karya has specified that the future water demand should be in accordance with "GOI PELITA IV POLICY".

3. Water Source

   Cipta Karya recommended in the meeting that raw water be extracted upstream of irrigation diversions of the Jeneberang River before Bili-Bili Dam is constructed. Directorate General of Cipta Karya and Directorate General of Water Resources Development at central and also provincial levels, including Kanwil PU, should discuss water sharing arrangement to ensure adequate raw water is available (in accordance with GOI Regulation No. 22-1982).

   After discussions the proposal should be submitted to the Governor for consideration.

4. Loss Reduction and Management

   The Study Team should define the loss reduction schedule and management improvement program of PDAM in the Master Plan Study.

   Cipta Karya desire that JICA consider dispatch of experts

to assist PDAM in conducting loss reduction work.

5. Cipta Karya desire that the Team will conduct the Study considering the following :

   (i) To study the existing water enterprises and make recommendations for further development of general management and operations.

   (ii) To study the cost of unaccounted for water from the financing aspects.

Jakarta, November 21, 1984.

Japan International Cooperation Agency (JICA)

Mr. TABU FUMIHIRO
JICA STUDY TEAM LEADER

Mr. SOERATMO NOTODIPOERO
DIRECTOR WATER SUPPLY
DIRECTORATE GENERAL
CIPTA KARYA

Mr. USAMI TSUNAO
JICA ADVISORY COMMITTEE
CHAIRMAN

DIREKTORAT AIR BERSIH

DAFTAR HADIR RAPAT

Undangan Rapat / Meeting Invitation : UJUNG PANDANG BANTUAN JICA

Hari dan Tanggal / Day and Date : 19 NOPEMBER 1984

Tempat / Place : RUANG RAPAT DIT. JEN. CIPTA KARYA

Jam / Time : 09.00 WIB

Pemimpin Rapat / Chairman : Ir. Suratmo. Dir. A.B./C.K.

Nomor	Nama / Name	Instansi / Office	Jabatan / Occupation	Tanda tangan / Signature
1.	Ir. Suratmo	Dir A.B		
2.	Ir. Prijono	D.A.B	- -	
3	J. ISHIZUKA	JICA	Project Office Engineer	石塚英夫
4.	F. TABU	JICA. STUDY TEAM		
5.	H. YODA	"	"	
6.	Y. TOKUDA	"	"	Y. Tokuda
7	K. IKARI	"	"	
8.	T. USAMI	JICA	"	
9.	T. SHIMAZAKI	JICA	"	
10.	[illegible]	[illegible]	-	
11	[illegible]	[illegible]	[illegible]	
12.	Bonar. Simanjuntak	Pengairan Sulsel	-	
13.	M. YASIR BAEDA	KANWIL DEP. PU SULSEL	Ang. St. Com	
14.	Sacbagijo.	Dir CK dan AB		
15	[illegible]	P.A.B. JT.	-"-	
16	Nana Rukmana	Dit. Bina Program Cipta Karya	Sub Dit PU	

DIREKTORAT AIR BERSIH

DAFTAR HADIR RAPAT

Undangan Rapat
Meeting Invitation :

Hari dan Tanggal
Day and Date :

Tempat
Place :

Jam
Time :

Pemimpin Rapat
Chairman :

Nomor	Nama / Name	Instansi / Office	Jabatan / Occupation	Tanda tangan / Signature
17	JOHN MOLYNEAUX	DAB Jakarta	Australian adviser DAB	[signature]
18	Rocngat	D. Bina Program	KSD. PEP	[signature]
19	[illegible]	DAB.	Staff	[signature]
√ 20	MOCHAMMAD NATSIR	DAB	STAFF	[signature]
21	SOEGIHO RD	DAB	STAFF	[signature]
22	RANI HERTRIONO	DTKTD	staff	[signature]
23	DWI MEINITA	ABLN, Bina Program	STAFF	[signature]
24	LINA MARLIA	PEP - BINA PROGRAM	staf	[signature]
25	HIDAJAT KAELANI	BPCK	staff PEP	[signature]
26	Iwan Sidarto	Bid. Perumahan	staff	[signature]
27	Bambang Heryadi	Bappeda KLK	Kepala	[signature]

SUMMARY OF MEETING
(JOINT MEETING)

1. Date : November 16, 1984

2. Place : PAB Sulawesi Selatan office

3. Attendant : Refer to the attached sheet

4. Issues (Confirmed)

4-1 Population Projection

Population forecast proposed in the Progress Report as it deemed appropriate should be employed as the input to the present Study. Proposed population in the future are as follows;

930,000	in	1990
1,050,000	in	1995
1,170,000	in	2000
1,290,000	in	2005

4-2 Raw Water Sharing

The Joint Meeting agreed that a water sharing plan should be developed for the Jeneberang River and submitted for the Governor's approval after discussion with all parties concerned.

The object of the water sharing plan is to ensure sufficient drinking water is available for the city of Ujung Pandang up until the construction of Bili-Bili Dam. It will be necessary to extract some water from the Jeneberang River currently used for irrigation. However, GOI Regulation Number 22 - 1982 suggests that such a plan should be introduced and supported by all authorities concerned.

The Joint Meeting recommended that raw water be extracted from the Jeneberang River upstream of Kampili Weir.

Pemimpin Proyek Air Bersih Sulawesi Selatan	Kabid Teknik, Kanwil PU Sulawesi Selatan
IR. IING PARVANARAYA	IR. M. YASIR BAEDA, Dipl.HE

MINUTES OF MEETING

FOR

INTERIM REPORT

ON

MASTER PLAN AND FEASIBILITY STUDY

OF

WATER SUPPLY DEVELOPMENT PROJECT

OF

UJUNG PANDANG

8TH MARCH, 1985 IN JAKARTA

The meeting between Cipta Karya and the JICA Team on the Interim Report on Master Plan and Feasibility Study of Ujung Pandang Water Supply Development Project was held in Jakarta March 6, 1985 with attendance of the Authorities concerned as shown in the sheet attached hereto. Major comments made by Cipta Karya and the Authorities concerned on the Interim Report are as follows :

1. Present water consumption pattern should be described also from the standpoints of household's income. Hourly water demand and maximum daily demand should be given on Figure 4.5 Water Requirements and Population.

2. It should be clearly stated in the footnote that the future population projected in the Interim Report is the one confirmed by BAPPEDA KMUP.

3. The service area planned in the present Interim Report should reflect the future land use plan proposed in the City Master Plan Report which will be issued at the end of March, 1985.

4. The ratio of population to be served by house connections and by public standpipes should be reassessed from the standpoint of consumer's ability to pay for the water.

5. Based on review existing data related to the reforestation at the upper reaches of the Maros River, hydrological analysis of the Maros River will be described in the report.

6. It should be stated in the footnote of Table 6.1 that the construciton cost is basic cost of 1984. The JICA Team will inform the breakdown cost of each item in the table mentioned above. Contingencies will be itemized in physical and price contingencies.

7. Project to be studied in its feasibility will cover Stage I (Phase I/II) with a design horizon of 1995.

8. Description regarding illegal connections should be given based on the surveys conducted so far by the Team. Cipta Karya considered the figures shown on unaccounted-for water in the Interim Report were not accurate enough.

9. Data and information regarding above should be summarized as supporting report and submitted to Cipta Karya at the early stage of Feasibility Study.

10. Item 4-3 of Summary of Joint Meeting held at Ujung Pandang on 2nd March, 1985 was reconfirmed at the meeting. (Summary of Joint Meeting is shown on the attached sheet).

11. Table 7.9 should be replaced by a financial projection to year 1997 showing annual calculation surplus/deficit. (Stage II is not included).

Jakarta, March 8, 1985.
FOR JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MR. TABU FUMIHIRO
JICA STUDY TEAM LEADER

MR. SOERATMO NOTODIPOERO
DIRECTOR WATER SUPPLY
DIRECTORATE GENERAL
CIPTA KARYA

MR. USAMI TSUNAO
JICA ADVISORY TEAM, CHAIRMAN

DIREKTORAT AIR BERSIH

DAFTAR HADIR RAPAT

Undangan Rapat / Meeting Invitation : JICA - UJUNG PANDANG

Hari dan Tanggal / Day and Date : Rabu , 6 Maret 1985

Tempat / Place : Borobudur Room DJCK

Jam / Time : 09 00 WIB

Pemimpin Rapat / Chairman : Ir. SUPARMO . N

Nomor	Nama / Name	Instansi / Office	Jabatan / Occupation	Tanda tangan / Signature
1				
2				
3	Soeratmo	Dit. AB	Dir	[signature]
4	[illegible]	[illegible]		
5	Chairul - S	DAB	Staff	[signature]
	Priyono	DAB.		[signature]
7	Gustiro	DAB	Staff	[signature]
8	Soebagijo.	P.D. All. M.P.	Dir.	[signature]
9	Iinto . P.	PAB [illegible].	Pimpro	[signature]
10	Sihono	Dit BPP	Staf	[signature]
11	HARJOYO	DIT PD	Kid wil II	[signature]
12.	Paripurno	DAB	staff.	[signature]
13.	Daman Aho.	BIPRO.	Staff.	[signature]
14.	Hidajat Koelani	Bina Program	- " -	[signature]
15	Toshiaki KISHI	JICA		[signature]
16	Tsunao USAMI	"		[signature]
17	Yuhei Tokuda	JICA STUDY TEAM		[signature]
18	Hiroyasu Yoda	"		[signature]
19	Fumihiro Tabu	"		[signature]
20	Junji Ishizuka	JICA	Jica Officer	[signature]
21	A. MACOUN	AAT	Adviser	[signature]

SUMMARY OF MEETING
(JOINT MEETING)

1. Date : March 2, 1985

2. Place : PAB Sulawesi Selatan Office

3. Attendants : Refer to the attached sheet

4. The major issues discussed and confirmed at the joint meeting are as follows:

4-1. Service Area:

The service area planned in the present Interim Report should reflect the future land use plan proposed in the City Master Plan Report which will be issued at the end of March, 1985.

4-2. Page R-4 2) of 3 in Recommendation:

It was suggested that this recommendation be hardly attained under the circumstances.

4-3. Raw Water Sharing:

The JICA Team recommended that necessary steps for raw water sharing at the Jeneberang River should be taken immediately based on the Summary of Meeting on November, 1984 and the supporting data submitted by the Team on January, 1985.

Pemimpin Proyek Air Bersih
Sulawesi Selatan

IR. IING PARVANARAYA

Direktur Perusahaan Daerah
Air Minum Ujung Pandang,

IR. SOEBAGIJO.H.-

APPENDIX III-5 OFFICIAL LETTER ISSUED BY GOVERNOR, SOUTH SULAWESI PROVINCE

GUBERNUR KEPALA DAERAH TINGKAT I

SULAWESI SELATAN

K e p a d a

Yth. Bapak Direktur Jenderal Cipta Karya
Departemen Pekerjaan Umum R.I.
Di - J A K A R T A.-

Nomor : 443.92/664/IV/Bangda
Lampiran :
Perihal : Izin Penggunaan air Sungai Jeneberang sebagai sumber air baku untuk penyediaan air bersih Kotamadya Ujung Pandang.-

Ujung Pandang, 22 Mei 1985.

Dengan hormat,

Menunjuk Surat Dir. Jen. Cipta Karya No. AH 01.03 DC/304, tertanggal 19 April 1985, tentang Izin Penggunaan air Sungai Jeneberang bersama ini kami sampaikan bahwa :

1. Kebutuhan air baku untuk tahap I (s/d tahun 1995) sebesar 1,50 m3/detik direncanakan diambil dari Bili-Bili Intake Sungai Jeneberang pihak Pemerintah Tingkat I Sulawesi Selatan dapat menyetujuinya.
2. Pemerintah Tingkat I Sulawesi Selatan sangat mengharapkan secepatnya mungkin Pembangunan Bili-Bili dam Sungai Jeneberang hal mana akan mengatasi penyediaan bahan baku air bersih yang sangat kritis menjelang tahun 2000 yang akan datang.

Demikian penyampaian kami atas Perhatian Bapak diucapkan terima kasih.

GUBERNUR KEPALA DAERAH

A. AMIRUDDIN.-
NIP. 130146146

TEMBUSAN :
1. Kakanwil PU Prop. Sul.Sel.
2. Kepala Dinas PU Daerah Tk. I Sul.Sel.
3. Direktur Air bersih.
4. Ka Sub Dit Perencanaan Teknis
5. Proyek Air Bersih Sulawesi Selatan ✓
6. Bagian Cipta Karya Kanwil PU Prop.Sul.Sel.
7. Bagian Pengairan Kanwil PU Prop.Sul.Sel.
8. A r s i p.-

RENCANA KEBUTUHAN AIR BERSIH UNTUK
KOTAMADYA UJUNG PANDANG DAN SUNGGUMINASA

TAHUN KEBUTUHAN / INSTALASI PENJER-NIHAN	S.D. 1985 (lt/det)	1986 / 1988 (lt/det)	1989 / 1989 (lt/det)	1990 /1992 (lt/det)	1993/1995 (lt/det)	1996/2000 (lt/det)	2001 / 2005 (lt/det)
I. UJUNG PANDANG							
1. Panaikang	600	1100	1200	1200	1200	1200	1200
2. Ratulangi	50	50	50	50	50	-	-
3. Instalasi Baru (Mangasa)	-	-	-	500	900	1800	2700
	650	1150	1250	1750	2150	3000	3900
II. SUNGGUMINASA							
1. Sungguminasa	20	20	20	40	40	80	80
Jumlah Total	670	1170	1270	1790	2190	3080	3980

RENCANA KEBUTUHAN AIR BAKU

UNTUK KOTAMADYA UJUNG PANDANG DAN SUNGGUMINASA

SUMBER AIR BAKU \ TAHUN KEBUTUHAN	S.D. 1985 (lt/det)	1986/1988 (lt/det)	1989/1989 (lt/det)	1990/1992 (lt/det)	1993/1995 (lt/det)	1996/2000 (lt/det)	2001 / 2005 (lt/det)
I. SUNGAI MAROS							
1. Bendung Lekopancing	865 (865)	1400 (900)	1400 (900)	1400 (900)	1400 (900)	1400 (900)	1400 (900)
II. SUNGAI JENEBERANG							
1. Intake Sungguminasa	95 (95)	95 (95)	95 (95)	75 (75)	75 (75)	-	-
2. Intake Bili-bili	-	-	-	590 (1090)	1000 (1500)	-	-
3. Dam Bili-bili	-	-	-	-	-	1920 (2420)	2870 (3370)
Jumleh Total	960 (960)	1495 (995)	1495 (995)	2065 (2065)	2475 (2475)	3320 (3320)	4270 (4270)

CATATAN : _____ : Kebutuhan pada musim hujan

( ) : Kebutuhan pada musim kemarau

Rencana Kebutuhan Air Baku dari Intake / Dam Bili-bili sudah termasuk untuk kebutuhan Kota Sungguminasa.

APPENDIX IV

RAW WATER AND DRINKING WATER QUALITY STANDARD

APPENDIX IV RAW WATER AND DRINKING WATER QUALITY STANDARD

TABLE 1
RAW WATER STANDARDS IN INDONESIA

Parameter	Unit	Maximum * Desirable	Maximum * Permissible
A. Chemical			
Total Iron	mg/l		1.0
Chromium	"		0,5
Cadmium	"		0,01
Cobalt	"		1.0
Manganese	"		0.5
Mercury	"		0.005
Copper	"		1.0
Lead	"		1.05
Ammonia	"	0.01	0.5
Nitrite and Nitrate	"	nil	10
B. Organic Chemical			
Oil and Grease			nil
Pesticides:			
a. Aldrin	mg/l	nil	0.03
b. Malthion	"		
c. D.D.T	"	nil	1.0
d. Lindan	"	nil	3.0
e. BHC	"		
f. Dieldrin	"	nil	
g. Endrin	"		
h. Parathion			
MBAS	mg/l	nil	0.5
BOD	"		3
DO	"	6	
pH		6.5	8.5
C. Microbiological			
Coliform	per 100 ml		10,000
Faecal Coli	"		2,000

Note: This water quality of Raw Water for water supply is taken from Article 2, No.173/Men.Kes./Per/VIII/77, Ministry of Health.

TABLE 2

DRINKING WATER QUALITY STANDARDS

Substances	(Unit)	Indonesian Standard		W H O International Standard	
		(Highest desirable level)	(Maximum permissible level)	(Highest desirable level)	(Maximum permissible level)
Chemical Substances					
Total Solids	(mg/l)	500	1,500	500	1,500
Colour (platinum cobalt)		5	50	5	50
Turbidity	(JTU)	2 (mg/l)	10 (mg/l)	5 (JTU)	25 (JTU)
Taste		unobjectionable		unobjectionable	
Odour		unobjectionable		unobjectionable	
Iron (Fe)	(mg/l)	0.1	1.0	0.1	1.0
Manganese (Mn)	(mg/l)	0.05	0.5	0.05	0.5
Copper (Cu)	(mg/l)	0.05	1.5	0.05	1.5
Zinc (Zn)	(mg/l)	1.0	15.0	5.0	15.0
Calcium (Ca)	(mg/l)	75	200	75	200
Magnesium (Mg)	(mg/l)	30	150	30	150
Sulphates (SO_4)	(mg/l)	200	400	200	400
Chlorides (Cl)	(mg/l)	200	600	200	600
pH	-	7.0-8.5	6.5-9.2	7.0-8.5	6.5-9.2
Total Hardness	(mg/l)		10^{o}D	100	500
Toxic Substances		(Upper limit of concentration)		(Upper limit of concentration)	
Lead (pb)	(mg/l)	0.10		0.1	
Arsenic (As)	(mg/l)	0.05		0.05	
Selenium (Se)	(mg/l)	0.01		0.01	
Chronium (hexaralent)(Cr^{+6})	(mg/l)	0.05		-	
Cyanide (CN)	(mg/l)	0.05		0.05	
Cadmium (Cd)	(mg/l)	0.01		0.01	
Barium (Ba)	(mg/l)	-		-	
Phonolic substances	(mg/l)	0.001	0.002	0.001	0.002
Substances which may affect Health					
Marcury (Hg)	(mg/l)	-		0.001	
Fluorides (F)	(mg/l)	2.0		0.6-1.7	
Nitrates (NO_3)	(mg/l)	20		-	
Chemical Indicators of Pollution					
COD	(mg/l)	-		-	
BOD	(mg/l)	-		-	
Total Nitrogen exclusive of NO_3	(mg/l)	-		-	
Ammonia	(mg/l)	0,0		-	
Carbon chloroform extract	(mg/l)	-		-	
Organic matter	(mg/l)	10		-	
Bacteriological					
Germs		0,0		-	
Pathogenic germs		0,0		-	
Faecal coli	N/100 ml	0,0		-	

APPENDIX V

RECOMMENDED SHALLOW WELL

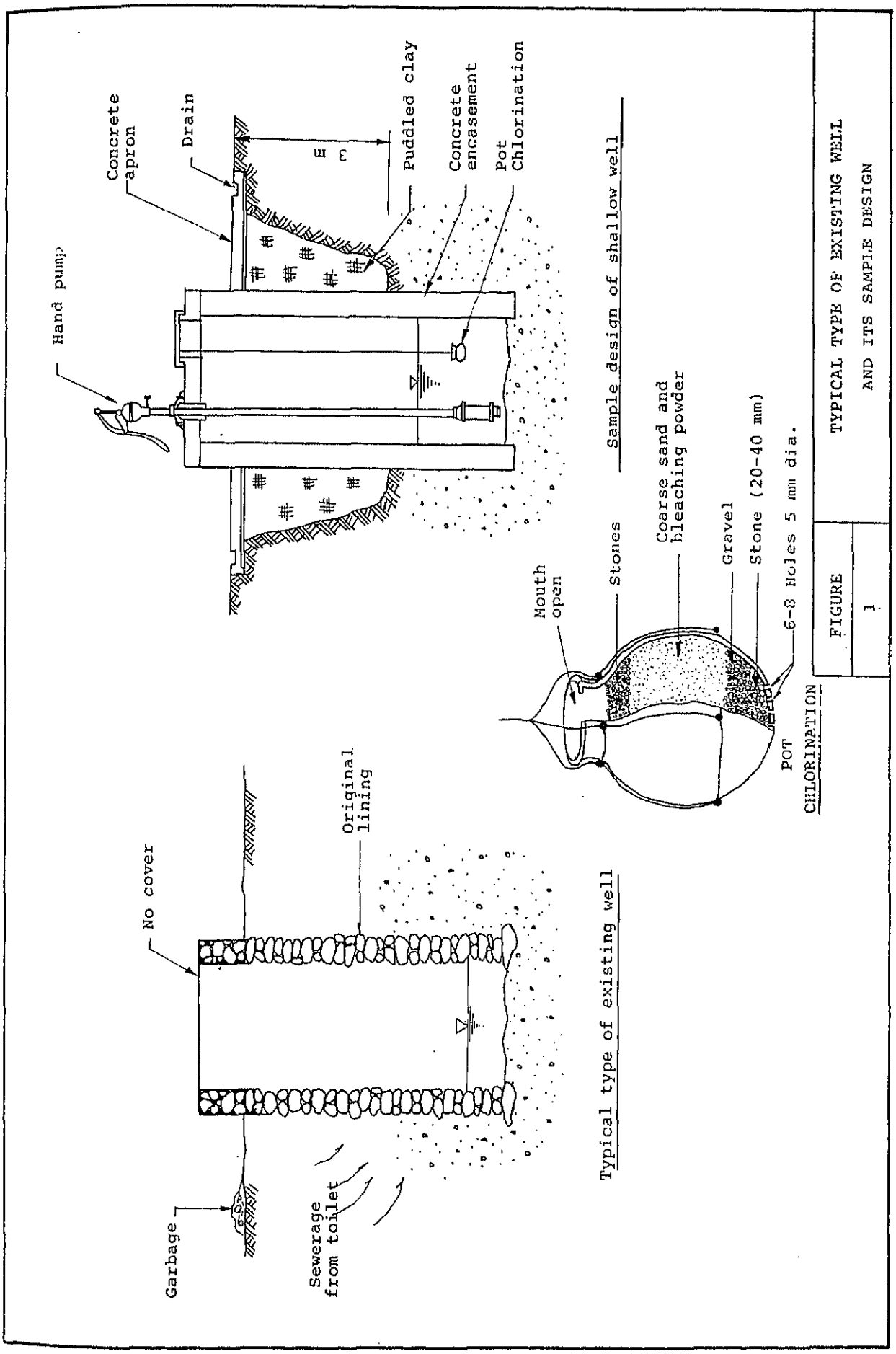


FIGURE	TYPICAL TYPE OF EXISTING WELL AND ITS SAMPLE DESIGN
1	

APPENDIX VI

ABATEMENT OF WATER LEAKAGE

APPENDIX VI ABATEMENT OF WATER LEAKAGE

1. General

Unaccounted-for water of Ujung Pandang Water Supply System is estimated at about 50% from available data of water sales. Leakage is supposed to account for most part of the unaccounted-for water. Leakage is wastage of valuable resources, and besides, it lowers the water pressure in the distribution pipelines resulting in poor supply. If reduction of leakage is attained, that will contribute greatly to the management of the water supply, since reduction of leakage means as much increase of the supply capacity.

2. Salient Conditions to Be Considered

There are very salient conditions prevailing in the water supply of Ujung Pandang, which are to be considered in planning the abatement of water leakage, as enumerated below.

1) Most of the served area is supplied under very low water pressure. One of the major causes for this is that the distribution pumps have been put out of operation to keep water pressure low and also leakage at minimum.

2) Measurement of production and consumption cannot be made in the existing water supply system. The distribution meter at Panaikang plant is out of order, and no meter is provided at Ratulangi plant. Regarding house connections, 3,500 out of 28,000 connections are unmetered, and a considerable number of the installed meters are out of order.

3) A sizable amount of water is, it is observed, being lost by leaks from distribution pipelines and house connections.

3. Measures to Be Taken

Measures to reduce unaccounted-for water are 1) to repair leaks, 2) to replace pipelines which have leaks or are apt to have leaks, and 3) to measure consumption correctly, by installing meters and repairing defective meters. As to the above three items, an outline implementation schedule for leakage abatement is suggested in the following section.

4. Suggested Implementation Schedule

1) Step I

During this Step, preparatory works for regular leakage prevention activities will be conducted in addition to repairing leaks and installing meters, as itemized below.

- To organize a special section for leakage reduction.
- To train the staff of the section in leak detection and all related works of leakage reduction.
- To compile necessary records and prepare maps of distribution networks.
- To repair leaks detected.
- To install new meters and replace defective meters.

2) Step II

During this Step, under a slightly higher water pressure, leakage reduction works will be carried out, in continuation to the Step I.

- To raise the distribution water pressure to a small extent, and detect leaks.
- To determine priority areas for leakage reduction from the raised water pressure, and pipelines to be replaced.
- To repair leaks detected.

3) Step III

During this Step, regular leakage reduction works will be carried out under normal water pressure.

- To raise the distribution water pressure to the normal level.
- To detect and repair leaks.

Suggested implementation schedule, covering all the work items, is shown on the attached figure. Estimated costs for the works within the above scheduled period are shown on the attached table.

5. Recommendation

The following are recommended to PDAM to produce fruitful results of water leakage reduction activities.

1) To organize the special section in charge of leakage reduction and start the work as early as possible.

2) To let the customers know that maintenance of their service connections downstream of the house meter is their responsibility .

3) To develop good public relations and educate the customers thereby so as to obtain their cooperation in reduction of leakage and elimination of illegal connections.

FIGURE 2 SUGGESTED IMPLEMENTATION SCHEDULE

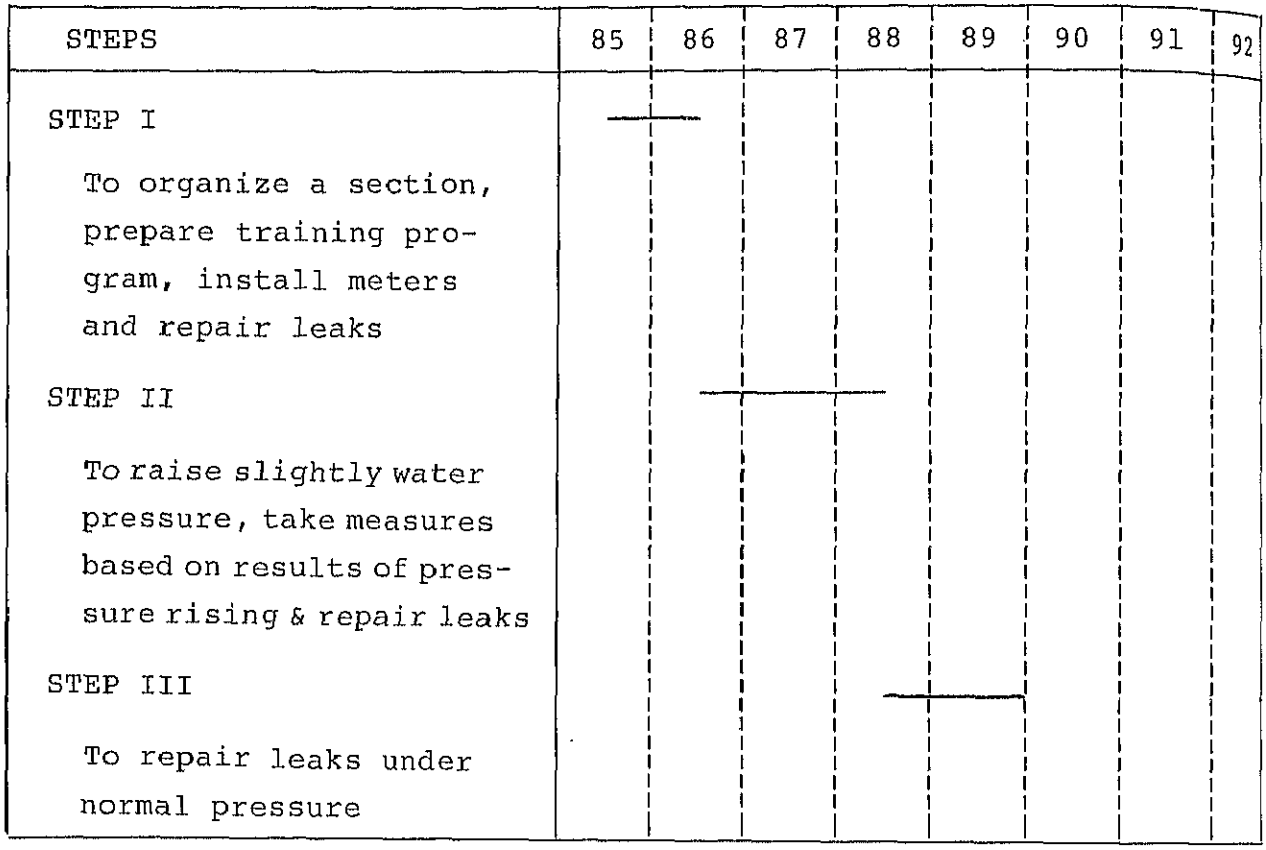


TABLE 3 COST OF LEAKAGE REDUCTION WORK
(up to 1989)

	Foreign currency (1,000 US$)	Local currency (Million Rp)	Total (Million Rp)
i. Custom meters	-	400	400
ii. Procurement of equipment	42	-	45
iii. Distribution pipe	330	1,750	2,100
Total	372	2,150	2,545

APPENDIX VII

JOB DESCRIPTION OF PDAM's SECTION

APPENDIX VII JOB DESCRIPTION OF PDAM's SECTION

1. PLANNING & CONTROL DIVISION

1-1. BOOK KEEPING SECTION

- to carry out book keeping related to all activities of PDAM

1-2. PLANNING SECTION

- to prepare reports on budgets and analysis of income and expenditures,
- to formulate draft concept of future activities of PDAM

1-3. ACCOUNTING SECTION

- to prepare receipts for water bills,
- to prepare billing table.

1-4. INVENTORY SECTION

- to prepare PDAM's inventories including tools, equipment, stationeries, and others.

2. FINANCE DIVISION

2-1. CASH SECTION

- to receive cash paid by the consumers and collected by bill collectors,
- to prepare cash table daily,
- to deposit cash into the bank,
- to endorse the evidence for depositing.

2-2. PURCHASING SECTION

- to purchase necessary items for PDAM such as piping materials, fittings, chemicals and stationeries at the request of WARE-HOUSE SECTION,
- to prepare list of purchased items monthly.

2-3. WARE-HOUSE SECTION

- to prepare inventory list,
- to prepare receipt for the materials delivered,

- to take necessary procedures to supply materials where needed.

2-4. BILLING SECTION I

- to prepare water bills,
- to prepare list of payment and receivables,
- to collect payment from consumers.

2-5. BILLING SECTION II (for housing estate and Government office)

- to collect payment from consumers,
- to prepare list of payment and receivables.

2-6. BILLING SECTION III

- to collect payment from consumers who has been overdue,
- to issue letters to demand payment of overdue bills,
- to inform the sections concerned of the house connections to be disconnected.

3. ADMINISTRATION DIVISION

3-1. ADMINISTRATION SECTION

- to make a file for outgoing and incoming letters regarding administration,
- to prepare payroll sheet.

3-2. PERSONNEL SECTION

- to prepare payroll sheet including its typing.

3-3. METER READING SECTION

- to perform meter reading at each customer,
- to inform the result of meter reading to CUSTOMER SERVICE SECTION.

3-4. CUSTOMER SERVICE SECTION

- to register new customer taking necessary procedures,
- to estimate water consumption of each customer.

4. TECHNICAL DIVISION

4-1 TECHNICAL ADMINISTRATION SECTION

- to make a file for outgoing and incoming letters related to technical matters,
- to receive complaints of customers.

4-2. TECHNICAL DATA & PLANNING SECTION

- to prepare drawing for installation of new connections and pipelines,
- to collect data regarding water production, chemicals, and other technical data.

4-3. TREATMENT PLANT I SECTION

- to operate water treatment plant I at Ratulangi,
- to maintain and repair mechanical equipment of treatment plant and Sungguminasa intake.

4-4. TREATMENT PLANT II SECTION

- to operate and maintain the system including Leko Pancing weir, transmission channel and the Panaikang treatment plant,
- to conduct water quality tests at Panaikang,
- to control dosage and stock of chemicals.

4-5. TRANSMISSION AND DISTRIBUTION SECTION

- to install house connections and meters,
- to replace broken meters and pipes,
- to repair meters in defect,
- to take actions for disconnection.

JICA