has a perennial flow and the discharge is usually over 150,000 cu m/day. The river water quality has no objectionable elements. The riverbed consists generally of coarse sand which is favorable for riverbed water abstraction. With regard to the implementation of the riverbed water system, it should be preceded by the Buyoan spring system. And also the timing of the implementation should be determined based on the development or the water demand in the District.

6. Design Criteria, Alternative Plans and Preliminary Design

6.1 Design Criteria

Design criteria to be used for the present feasibility study are detailed in Appendix6 Design Criteria for Planning.

6.2 Alternative Plans

There are some planning items which relate to technical appropriateness, or influence construction costs, etc. Before proceeding to the preliminary design, these planning items will be examined and optimal ones will be selected, as discussed below.

(1) Order of Water Source Development

In the master plan, the development of the Buyoan spring was proposed for Phase I and riverbed water for Phase II. The present feasibility study is also to take Phase I and II inclusively as the Case 2 study with an aim of implementation, practicability check as described earlier in this Part. Therefore, it would be proper to examine the order of development of the above two recommended water sources.

Timing of start-up of actual operation is the most important factor in the present project, because the water District lacks water sources at present. The Buyoan spring system can be put in service far earlier than the development of riverbed water, because the latter requires time-consuming detailed investigations in order to ascertain the available quantity and quality of riverbed water and determine design factors for the facility construction, and these investigations including exploratory borings need a fairly long time, at least more than one year.

On the other hand, the construction work of the riverbed intake requires a longer period than that of the spring water system. Regarding construction cost, that for the riverbed water system is costlier than that of the spring water system, as shown in Tables of Cost Estimate. Taking into account the prevailing financing constraints such as costly investment should be put off as much as possible.

From the above consideration, it is concluded that the spring system be taken up first.

(2) Location of Reservoir for the Buyoan System

For the Buyoan spring system, there are two possible locations siting the reservoir, i.e., Alternative 1) on the mountain slope near the spring and Alternative 2) in the served area of Legaspi. According to the siting, the construction cost varies, and therefore, a rough cost comparison is made as shown in Table 3.6.1. From the table, the first case is more economical; and the first case is concluded preferable and practicable.

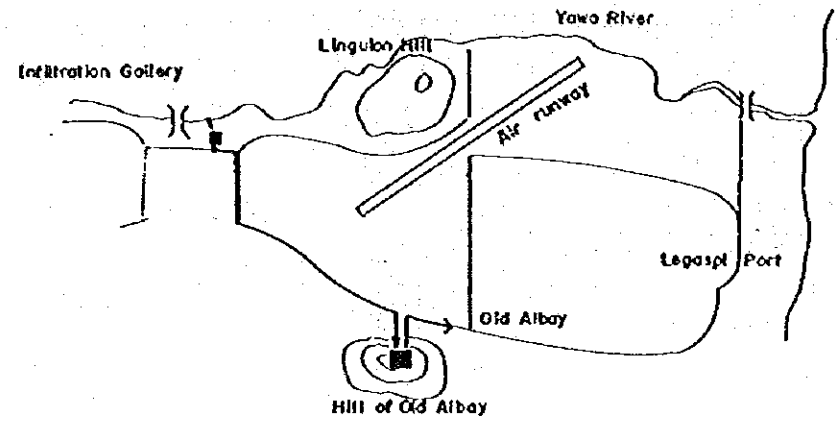
Table 3.6.1 Alternative Plan of Reservoir for Buyoan System

Item	Alternative 1	Alternative 2
Type of Reservoir	Ground Reservoir	Elevated Tank
Location	Near the spring	In Legaspi Port
Ground Elevation (m)	+ 60	+ 10
High Water Level (m)	+ 63	+ 35
Capacity (m^3)	2,000	2,000
Transmission pipe		
Diameter (mm)	ø 300	ø 300
Length (m)	500	6,000
Distribution pipe		
Diameter (mm)	ø 350	ø 350
Length (m)	5,500	0
Construction Cost ('000 Pesos)		
Reservoir	1,800	4,954 (H=25 m)
Transmission	488	488 3,575
Distribution	4,345	0
Total Cost	6,633	9,017

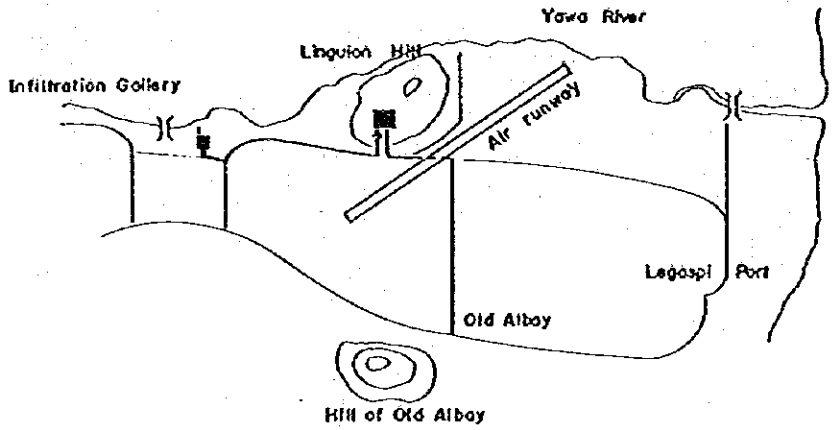
(3) Location of Reservoir for the Riverbed Water System

For this system, two locations with sufficient elevation for distribution are available, namely, one on the Linguion hill and the other on the hill near Old Albay, as schematically shown on Fig 3.6.1.

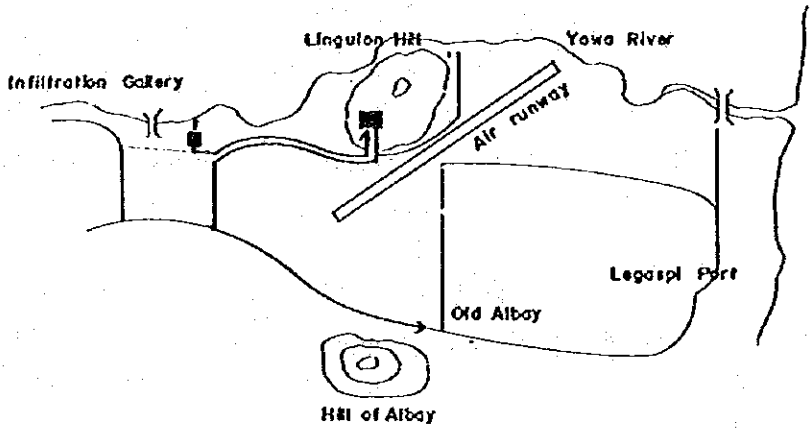
Both locations and type of reservoir do not have much difference from the technical standpoint. Therefore, a more economical one of pipelines should be selected. Rough cost estimates of the three cases show that the Alternative I is less expensive, as shown in Table 3.6.2. Therefore, the location near Old Albay will be employed.



a. Alternative I



b. Alternative II



c. Alternative III

Fig 3.6.1 Schematic Figure for Alternatives

Table 3.6.2 Construction Cost of Pipeline for the Riverbedwater System

Items	Alternative I	Alternative II	Alternative III
Transmission Pipeline			
Diameter (mm)	ø 300	ø 300	ø 300
Length (m)	3,800	1,500	1,500
Distribution Pipeline			
Diameter (mm)	ø 350	ø 350	ø 350
Length (m)	1,000	2,500	4,300
Air runway crossing work (m)	-	200	-
Construction Cost ('000 Pesos)			
Transmission Pipeline	3,710	1,463	1,463
Distribution Pipeline	790	1,975	3,397
Air runway crossing work	-	2,000	-
Total Cost	4,500	5,438	4,860

6.3 Preliminary Design

Dimensions, capacities and structural features of major facilities which are to be newly constructed to meet the water requirement in 1987 and 1993, are prepared in accordance with the above design criteria and the result of the study of alternative plan in the foregoing subsections, and shown below. Schematic figure for the preliminaly design is shown in Fig 3.6.2 through Fig 3.6.6.

1. Phase I Program

a. Buyoan Spring System (6,480 cu m/day)

(1) Construction of Collection Chamber:
Made of reinforced concrete
Capacity and Number: 500 m^3 x 1 unit; and
300 m^3 x 2 units

(2) Installation of Transmission Pipeline:
(From the Buyoan Spring, Collection Chamber, to the ground reservoir)
Diameter and Length : ø 300 mm x 500 m

(3) Construction of Ground Reservoir:
Made of reinforced concrete
Capacity: 2,000 m^3 (See Fig 3.6.3)
Number of basin: 1 basin

(4) Installation of Distribution Pipeline:
(From the reservoir to the entrance of Legaspi Port)
Diameter and Length : ø 350 mm x 5,500m

b. Reinforcement and Expansion of Distribution Pipelines:

(1) ø300 mm x 1,500 m
(2) ø150 mm x 500 m
(3) ø100 mm x 1,000 m
(4) ø 75 mm x 2,000 m
(5) ø 50 mm x 3,000 m

c. Other Equipment

(1) Service Meter
ø 13 mm x 1,331 pieces

(2) Bulk Meter:
ø350 mm x 1 piece
ø300 mm x 1 piece

(3) Valve:
21 pieces (ø300 mm - ø75 mm)

(4) Fire Hydrant:
32 pieces

(5) Chlorinator:
1 set

(6) Vehicle:
2 units

2. Phase II Program

a. Riverbed Water System on the Yawa River (7,000 cu m/day)

(1) Construction of Infiltration Gallery:
Material : Reinforced concrete pipe
Diameter and Length : ø1,000 mm x 350 m

Legaspi

(2) Intake Pump and Pump House:
Type of pump : Turbine pump
Capacity : 2.44 m^3/min x 60 m x 55 kw
Number of units : 2 units

(3) Installation of Transmission Pipeline:
(From the infiltration gallery to the ground reservoir)
Diameter and Length: ø300 mm x 3,800 m

(4) Construction of Ground Reservoir:
Made of reinforced concrete
Capacity : 2,300 m^3
Number of basin : 1 basin

(5) Installation of Distribution Pipeline:
(From the reservoir to the entrance of Old Albay)
Diameter and Length: ø350 mm x 1,000 m

b. Reinforcement and Expansion of Distribution Pipeline:

(1) ø200 mm x 700 m
(2) ø150 mm x 1,030 m
(3) ø100 mm x 2,420 m
(4) ø 75 mm x 12,300 m
(5) ø 50 mm x 56,400 m

c. Other Equipment

(1) Service Meter:
ø 13 mm x 8,869 pieces

(2) Bulk Meter:
ø350 mm x 1 piece
ø300 mm x 1 piece
ø100 mm x 1 piece

(3) Valve:

51 pieces (ø300 mm - ø75 mm)

(4) Fire Hydrant:

48 pieces

(5) Chlorinator:

1 set

(6) Vehicle:

1 unit

Legaspi

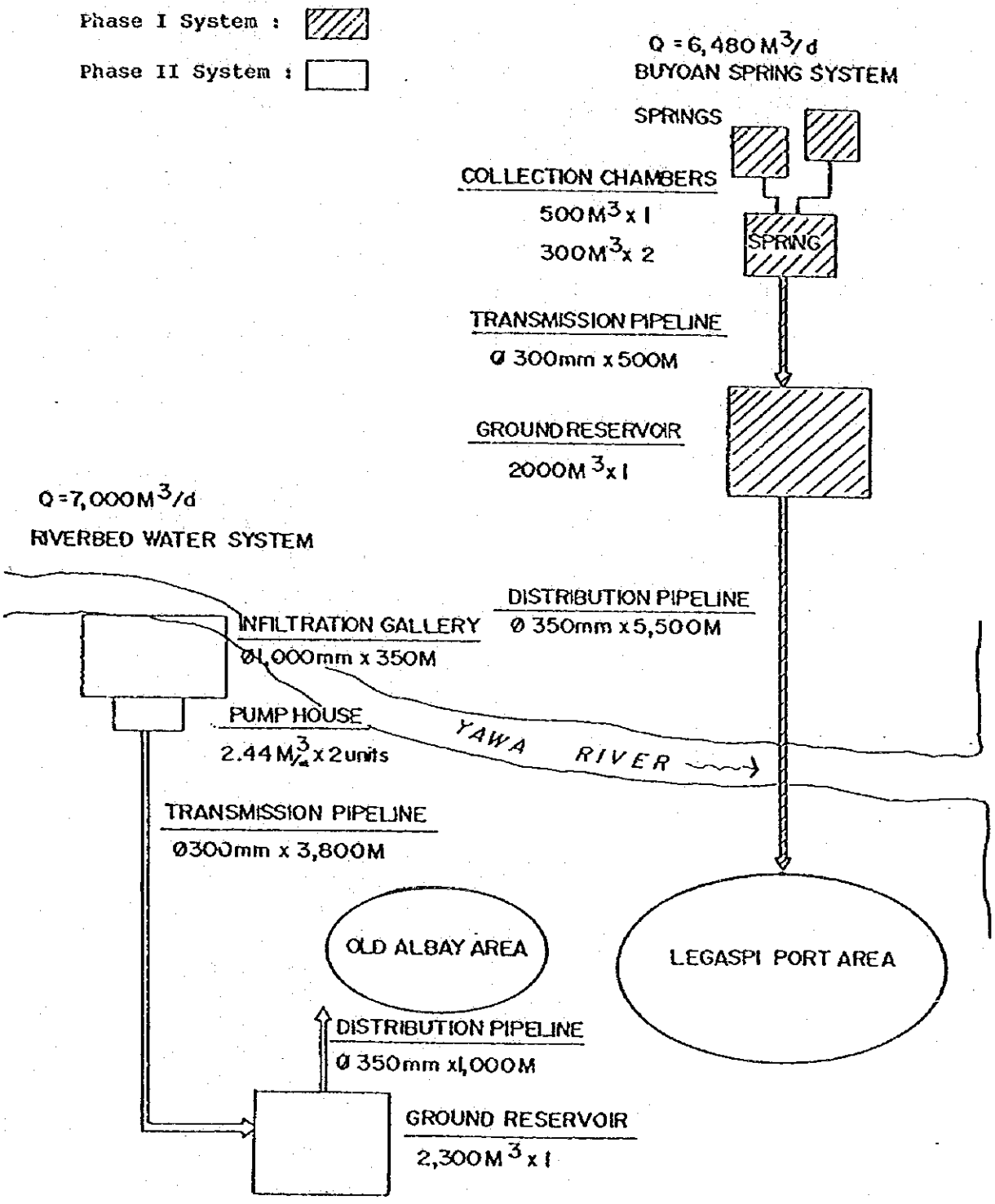


Fig 3.6.2 Schematic Figure for Preliminaly Design

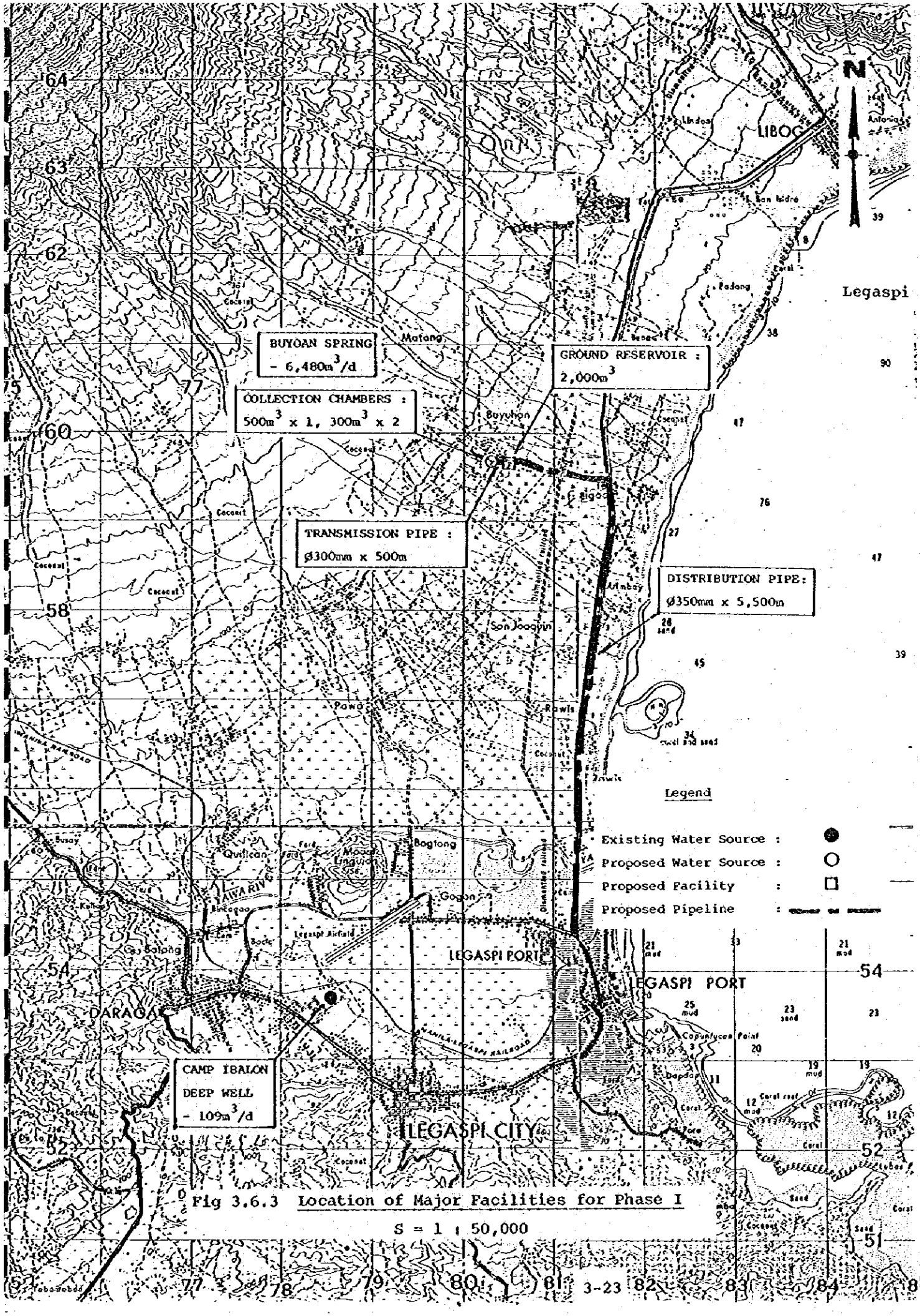
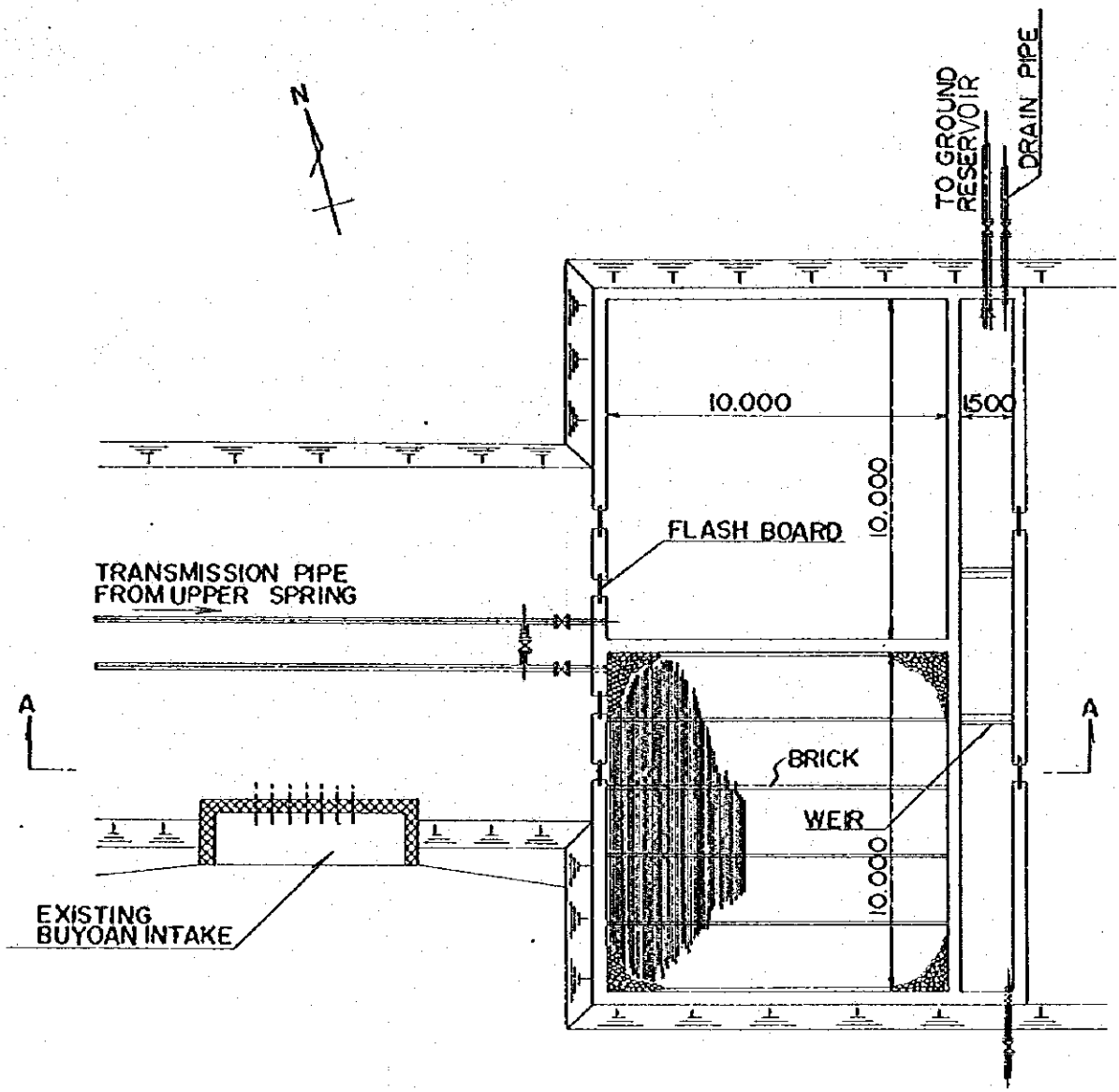
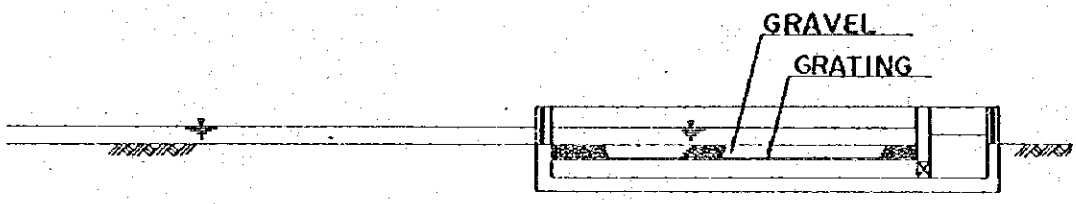


Fig 3.6.3 Location of Major Facilities for Phase I

S = 1 : 50,000



PLAN



A-A SECION

Fig 3.6.4 Collection Chamber

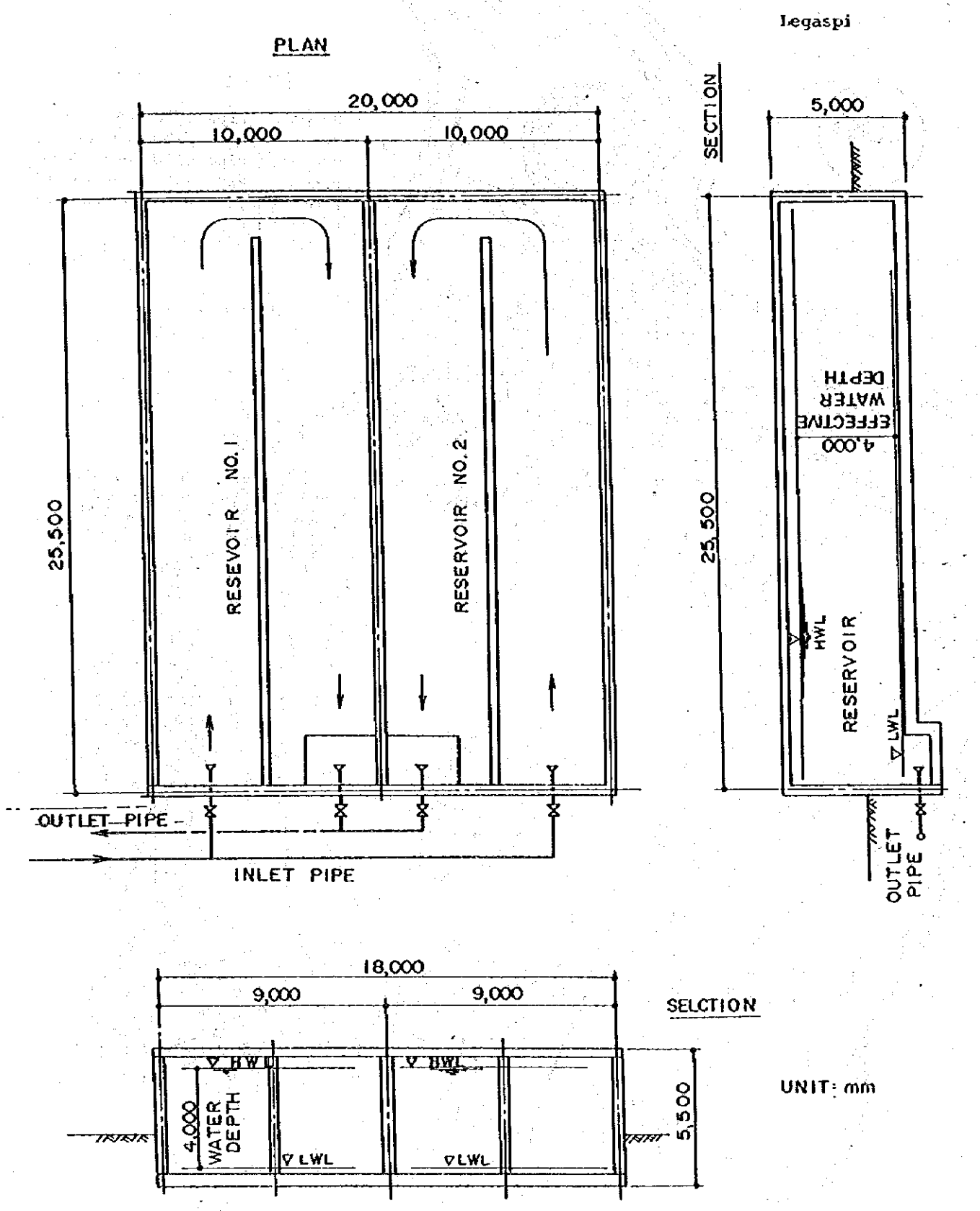


Fig 3.6.5 Ground Reservoir (V = 2,000 cu m)

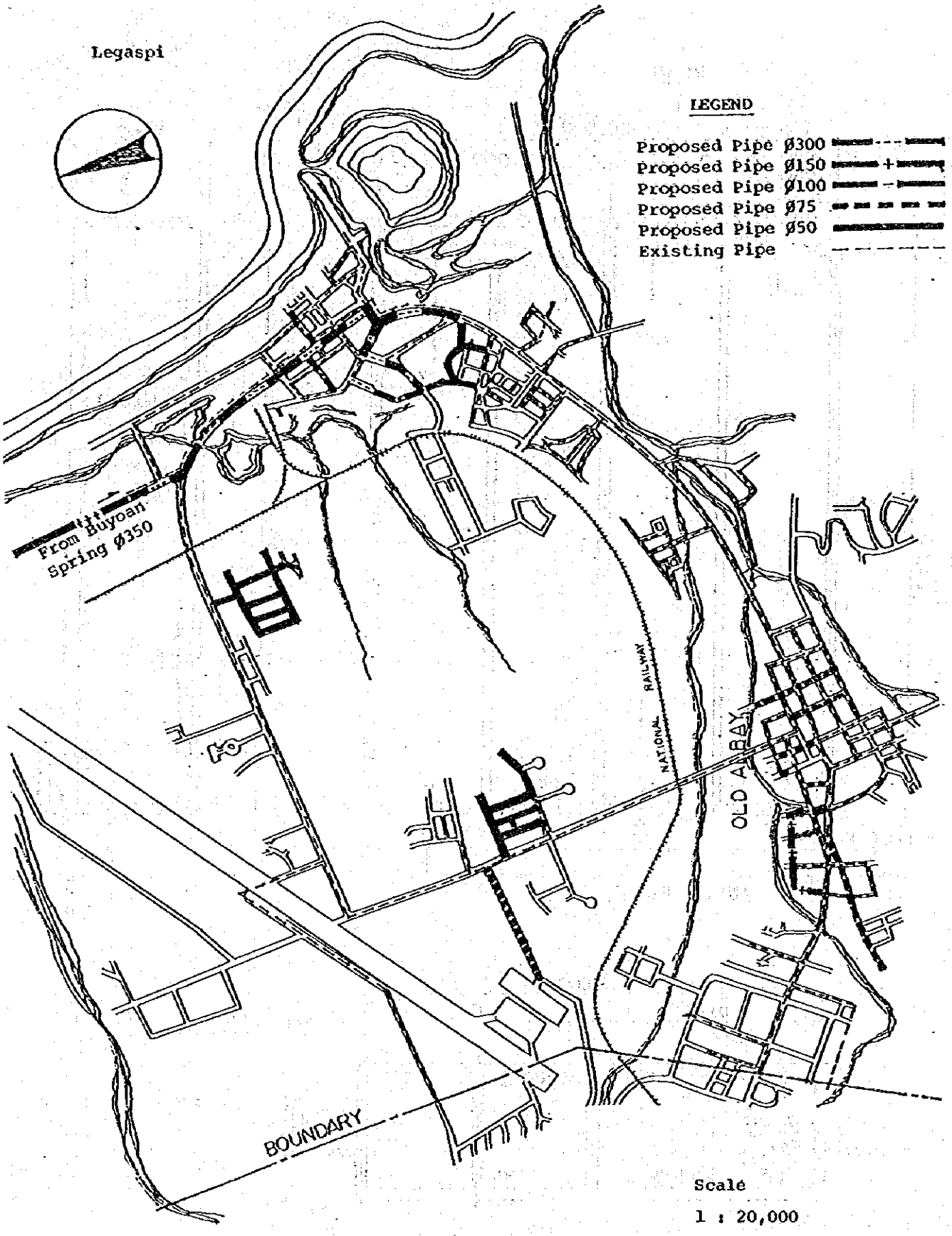


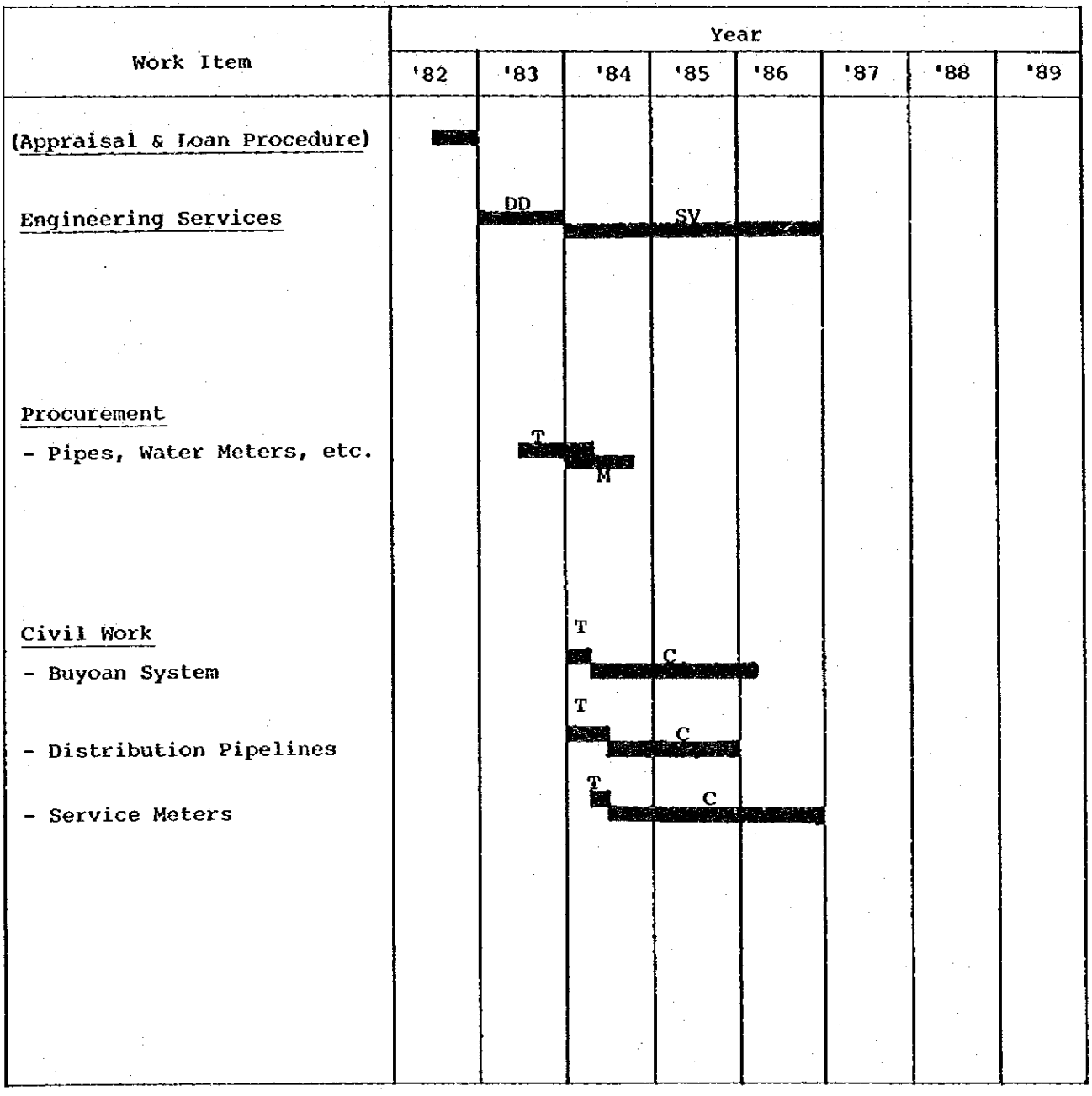
Fig 3.6.6 Proposed Distribution Pipe

7. Construction, Operation and Maintenance Schedule

7.1 Construction Schedule

The following Fig 3.7.1 shows the construction schedule for the project. In the chart, all timings of detailed design, tendering, manufacturing, shipping, construction and installation are indicated.

Fig 3.7.1 Construction Schedule



Note: DD = Detailed Design
SV = Supervision of Construction
T = Tendering Procedure (Advertisement/Tendering/Evaluation/Award)
M = Manufacturing & Shipping
C = Construction/Installation

7.2 Operation and Maintenance Schedule

Personnel of the Water District needed for operation and maintenance is scheduled, as shown in the following table.

Table 3.7.1 Staffing Schedule for Operation/ Maintenance

Staff \ Year	1982	1983	1984	1985	1986	1987
General Manager	1	1	1	1	1	1
Administrative Staff	3	4	4	4	5	6
Technical Staff	4	4	6	7	9	13
Commercial Staff	6	7	7	8	11	13
- Meter readers, bill collectors and inspectors	(3)	(4)	(4)	(5)	(7)	(8)
- Other employees	(3)	(3)	(3)	(3)	(4)	(5)
Total Staff	14	16	18	20	26	33
Number of Service Connections	1,367	1,463	1,592	1,872	2,262	2,698

8. Materials; Labor Force and Contractor's Ability

8.1 Materials

1) Sand and Gravel

Sand and gravel are locally available for concrete, aggregates pipe bedding, road surfacing and other works.

2) Cement

Cement is manufactured in large quantities in the Philippines. At present, there are 18 operating cement plants in the Philippines; 11 in Luzon; 2 in the Visayas and 5 in Mindanao. No serious or special problem is likely to arise with respect to cement requirements of any water supply project in the Philippines.

3) Reinforcing Steel

There are 27 steel mills in the country fabricating steel reinforcing bars. Steel manufacturing normally conforms to ASTM standards. Sizes of bars vary from 60 to 25 mm. For large sizes, bars are available in plain or deformed sections.

4) Pipe Materials

a) Asbestos Cement Pipe

Asbestos Cement Pipe is being manufactured by two manufacturers with factories in Metropolitan Manila; Eternit and Italit. The pipe is widely accepted in the Philippines and usually chosen for small diameter pipes (80 mm to 300 mm).

Pressure pipe is available in size from 80 mm to 600 mm for rated working pressure of 130 psi. Pipes are usually manufactured according to ISO R-160 specifications and supplied in 4-meters lengths. Asbestos pipe conforming the AWWA standard C-400 can be manufactured by the local plants but at higher cost than ISO pipes.

Locally produced asbestos cement are normally joined with a coupling of the same composition and strength as the pipe. Joints are sealed with double "O" rubber rings, though mechanical joints (Gibault joints) are also produced locally.

b) Steel Pipe

LWUA has accredited four steel pipe manufacturers in accordance with its standards for steel pipes and specials. Steel pipe is usually used in distribution and transmission lines as well as in plant system and usually available in different commercial sizes. Pipes can be cement lined according to AWWA standard C205.

c) Plastic Pipe

Early production of plastic pipes was in sizes below 50 mm and are used for service lines and household plumbing system.

To date, LWUA has accredited 5 local manufacturers of plastic pipes. Plastic pipe materials acceptable to LWUA are PVC, PE and PB. A tentative standards have been adopted by LWUA for the manufacture of these plastic pipes. Pipe sizes are from 10 mm to 300 mm in diameter.

d) Ductile Cast Iron Pipe, Valves and Hydrants

Ductile cast iron pipe, valves and hydrants are generally imported except gate valves of small sizes which are locally manufactured.

8.2 Labor Force

For any particular area in the Philippines, there is no immediate problem on the availability of common labor and skills in the construction work involved in water supply system development or improvement.

8.3 Contractor's Ability

Construction contractors with the competence and resource to undertake all or portions of a waterworks project are generally available in the province. In areas where local construction contractor's capabilities and expertise are not available or are deficient in some respects, several Metropolitan Manila-based firms can be utilized for any and almost all of the work required in the development and/or improvement of a water supply system. Certain work requires the use of specialized equipment not available in the locality nor owned by a particular construction contractor. In such cases, these specialized equipment may be available from government regional offices doing infrastructure projects and can be availed of by construction contractor on a rental basis.

9. Construction and Procurement Methods

The implementation of the project is the responsibility of the Water District under financing, supervision and guidance of LWUA. Funds necessary for the construction are to be financed through LWUA both for foreign and local currency sources. LWUA has prepared all procedures and manuals needed for construction and operation of the water supply system of the water districts, and in addition keep staff to supervise and guide works of the districts in the field. In case external technical resources are required to assist the water districts, local and foreign consultants are available, and have been widely used for similar works.

9.1 Construction Method

Legaspi City has a good sea port with seaway transportation connecting with major ports in the country, and there are paved highways linking Metro Manila and other major cities. Therefore, with regard to transportation of materials and equipment, the project will have no inconvenience.

Regarding power which will be required for the construction work of the project, electricity can be supplied by the existing power system, and, if required, some civil work machines can be operated with the power of engines. Therefore, the present project will not encounter any difficulty of power supply.

For civil works construction, contractors, including general contractors, will be selected by local competitive bidding after prequalification of bidders. Such qualified contractors with ability and construction equipment are sufficiently available in the country. The prequalifications and tendering will be carried out by the Water District under the guideance of LWUA. To assist the tendering and supervision of construction, consultants will be hired, and during the period of construction, engineers of the District will be trained in construction management and supervision

of construction works. And also the engineers and operators concerned of the Water District will be given knowledge and skill in operation of the completed facilities.

9.2 Procurement Method

Procurement of materials and equipment will be carried out, in principle, on a basis of open international competitive bidding. The procedures for the above will be in accordance with the guidelines of the foreign lending agency which may finance the foreign currency component of the project cost.

Major steps of the procurement procedures are as follows:

1) Advertisement of tenders
2) Bidding
3) Evaluation of the bids with assistance of consultants
4) Award of contracts
5) Manufacturing and shipping by the suppliers, and acceptance
6) Installation of equipment by the suppliers or contractors, and acceptance

Major items of materials and equipment to be imported are as follows:

1) Pipes, fittings, valves and fire hydrants
2) Pumps and motors
3) Electric equipment
4) Bulk meters and service meters
5) Chlorinators
6) Vehicles

10. Cost Estimate and Disbursement Schedule

10.1 Cost Estimate

Table 3.10.1 presents summary of the project cost for the proposed program which is detailed in the table of disbursement schedule. The costs are broken down into foreign and local currency components. Cost for engineering and contingencies for physical and price escalation are allowed in addition to the construction costs.

Conditions and assumptions on which the estimation is carried out are as below, and cost data relating to the estimation are attached to the Report as Appendix 4.

1) All of costs and prices presented in the Table are as of July 1981.
2) Unit costs, as far as available, are taken from the list of costs prepared by LWUA.[1/]
3) Unit costs not included in the above list are current prices in the market.
4) Some of the unit costs of LWUA are modified so as to fit for the present project.
5) Local currency portion for the above includes costs for handling, storage and local transportation.
6) Engineering cost is assumed as 10.5 percent of the basic construction cost for the detailed design and 3.5 percent of the basic construction cost for the construction supervision.
7) Physical contingency is allowed by 10 percent of the basic construction cost and engineering cost.
8) Foreign currency exchange rate applied is: US$1.00= ₱7.80.

1/ Addendum to Methodology Manual, 1981.

Table 3.10.1 Project Cost

Note: - Unit = One Thousand Pesos = '000 Pesos
- Prices as of 1st July 1981
- Foreign Exchange Rate: US $ 1.00 = Peso 7.80

Work Items	Cost		
	Total Cost	Foreign Currency Component	Local Currency Component
A. Buyoan System	8,413	4,133	4,280
B. Reinforcement/Expansion of Distribution Pipelines	1,773	1,188	585
C. Other Equipment	1,513	1,102	411
Sub Total	11,699	6,423	5,276
Detailed Design Cost (10.5%)	1,228	737	491
Supervision Cost (3.5 %)	409	246	163
Land Cost	78	-	78
Total	13,414	7,406	6,008
Physical Contingency (10 %)	1,342	741	601
Total	14,756	8,147	6,609
Price Contingency	8,681	4,626	4,055
Grand Total (Project Cost)	23,437 (Equivalent to US$3.01 M)	12,773 (Equivalent to US$1.64 M)	10,664 (Equivalent to US$1.37 M)

10.2 Disbursement Schedule

In accordance with the projected construction schedule as shown in Fig 3.7.1, the annual disbursement schedule of the construction cost of the project is prepared, and shown in Table 3.10.2. The above schedule also contains detailed cost estimates and their breakdowns for each major work.

Table 3.10.2 Disbursement Schedule

NOTE:
- F/C = Foreign Currency Component
- L/C = Local Currency Component
- Unit: One Thousand Pesos = '000 Pesos
- Prices: As of 1st July 1981
- Foreign Exchange Rate: US$1.00 = Pesos 7.80

(Thousand Pesos)

Description	Cost			Yearly Disbursement											
	Total Cost	Breakdown		1983		1984		1985		1986		1987		1988	
		F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C
A. Buyoan System															
a) Collection Chamber (500 m^3 x 1) (300 m^3 x 2)	1,780	445	1,335			445	1,335								
b) Transmission Pipeline (ø300 mm x 500 m)	488	327	161			327	161								
c) Distribution Pipeline (ø350 mm x 5,500 m)	4,345	2,911	1,434			1,941	717	970	717						
d) Ground Reservoir (2,000 m^3 x 1)	1,800	450	1,350					225	675	225	675				
B. Reinforcement/Expansion of Distribution Pipelines															
a) ø300 mm x 1,500 m	975	653	322			196	97	457	225						
b) ø150 mm x 500 m	138	92	46			37	18	55	28						
c) ø100 mm x 1,000 m	180	121	59			48	24	73	35						
d) ø 75 mm x 2,000 m	240	161	79			48	24	113	55						
e) ø 50 mm x 3,000 m	240	161	79			48	24	113	55						
C. Other Equipment															
a) Service Meter (ø13 mm x 1,331)	866	667	199			667	80	0	80	0	39				
b) Bulk Meter (ø350 mm x 1) (ø300 mm x 1)	20	16	4					16	4						
c) Valve (21)	126	92	34			92	17	0	17						
d) Fire Hydrant (32)	216	143	73			143	37	0	36						
e) Chlorinator (1)	10	9	1			9	1								
f) Vehicle (2)	140	70	70			70	70								
g) Spareparts and Equipment	135	105	30			105	30								

(to be continued)

NOTE: - F/C = Foreign Currency Component
- F/C = Local Currency Component
- Unit: One Thousand Pesos = '000 Pesos
- Prices: As of 1st July 1981
- Foreign Exchange Rate: US$1.00 = Pesos 7.80

NOTE: Price Escalation Rate (Price Contingency)
Present - 1984: 15% Annual both for F/C and L/C
1985 - 1989: 12% Annual both for F/C and L/C
1990 - : 10% Annual both for F/C and L/C

(Thousand Pesos)

Description	Cost			Yearly Disbursement											
	Total Cost	Breakdown		1983		1984		1985		1986		1987		1988	
		F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C
Sub-Total	11,699	6,423	5,276			4,176	2,635	2,022	1,927	225	714				
Detailed Design Cost (10.5%)	1,228	737	491	737	491										
Supervision Cost (3.5%)	409	246	163			98	65	98	65	50	33				
Land Cost	78	0	78			0	78								
Total	13,414	7,406	6,008	737	491	4,274	2,778	2,120	1,992	275	747				
Physical Contingency (10%)	1,342	741	601	74	49	427	278	212	199	28	75				
Total	14,756	8,147	6,609	811	540	4,701	3,056	2,332	2,191	303	822				
Price Contingency	8,681	4,626	4,055	262	174	2,449	1,591	1,640	1,544	275	746				
Grand Total (Project Cost)	23,437	12,773	10,664	1,073	714	7,150	4,647	3,972	3,735	578	1,568				

11. Organization, Operation and Management Plan

Success of the project depends largely on how well to operate the completed water supply system including the management of water supply business. From this standpoint, the following is recommended with special emphasis on earliest fulfillment.

(1) Organization

The Water District is a new organization which was formed in October 1981 taking over the facilities and some staff from the former Albay Provincial Waterworks System. The organization is expected to function efficiently as intended with staff to be strengthened from now on. In this connection, the precedence experienced in the days of the Provincial Waterworks should be reflected so as to obtain maximum efficiency of the organization. Major points are as follows:

1) Planned development of the water supply facilities was lacking. Engineering staff should be well provided.

2) Leakage and wastage were excessively large. Technical personnel together with necessary equipment and materials should be provided.

3) Funding for maintenance of the facilities was short. To recover the investment, metering and collection should be performed to the fullest extent, and to this end, enough staff should be provided.

(2) Operation

The following are essential for maintaining the water supply system in most efficiently working condition.

1) Repair of Leaks

Reduction of leakage and wastage is the most effective measure to substantially increase water supply. The Water District should concentrate its effort on reduction of leakage and wastage.

2) Improvement of Plumbing Systems

So far many irregular pumbing systems have been installed so as to take water from the extremely low water pressure. These will become causes for water leakage or wastage. Structure and materials of the service piping system must be controlled by the Water District before the project is completed and put in effect.

3) Prevention of Contamination

The area of the spring water source is easily accessible, and possibility of contaminating the water source is considered high. By way of fencing the area and watching out, contamination of the water source must be prevented.

(3) Management

The management aspects of the water supply will undergo the following: 1) the District is to sustain itself in the financial terms; 2) the burden of debt service increases to a great extent. To cope with this new situation, the District must strengthen itself financially by metering all connections and also revising the current water rate structure.

In order to realize the above purposes, it is recommended to put in force the following:

1) To strengthen the organization as shown in Fig 3.11.1.
2) To upgrade the ability of leading staff of the organization by participating in the training courses held by LWUA.
3) To train all the employees of the organization so as for every employee to perform his assignment efficiently and satisfactorily.

Legaspi

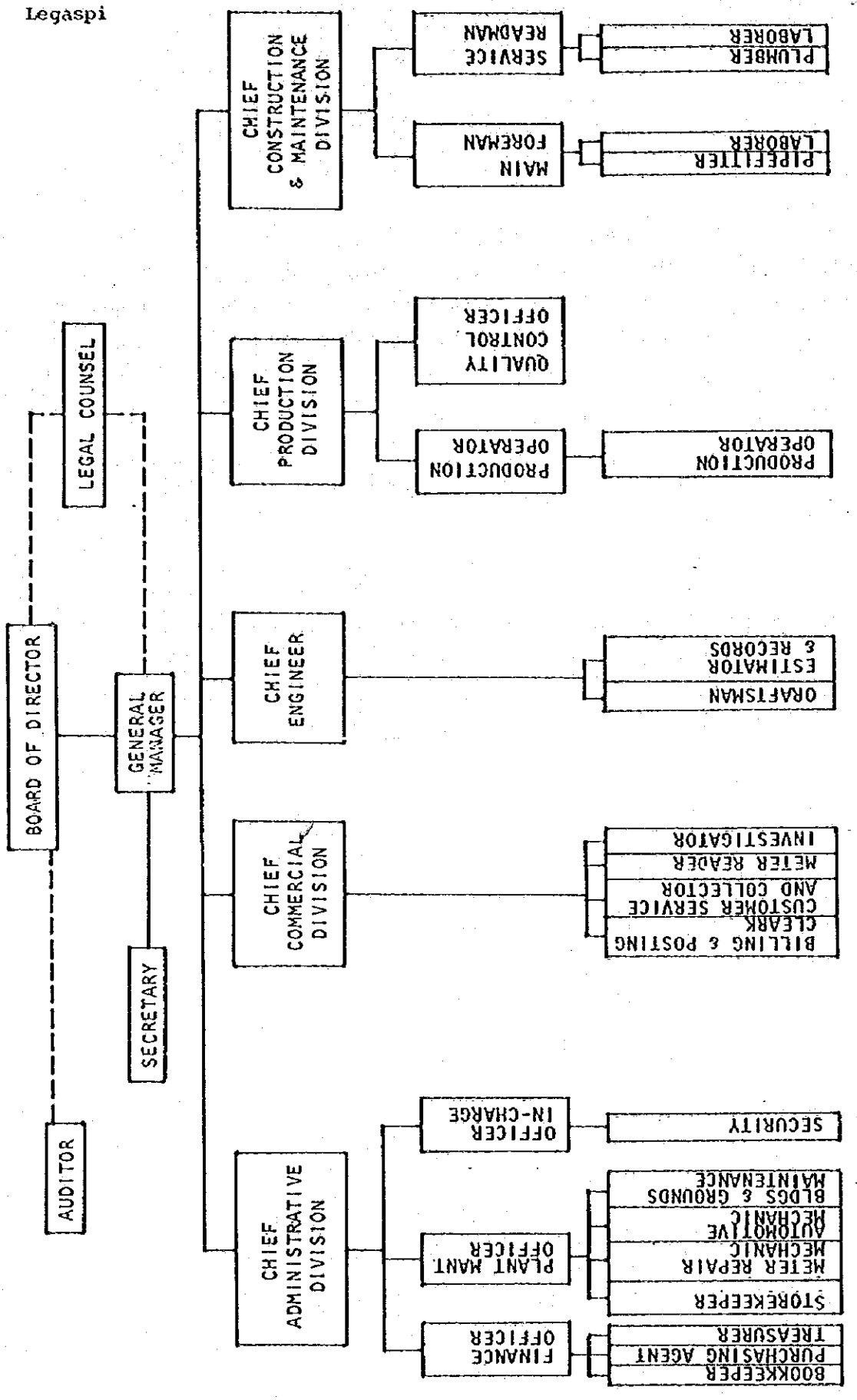


Fig 3.11.1 Proposed Organization Chart

12. Financial Feasibility Analysis

As in the case with all forecasts, many assumptions and estimates must be made concerning future financial conditions. In making these assumptions, efforts were made to comply with the methods and rules of feasibility study being practiced by the LWUA, but consideration was also paid to the practices prevailing in Japan as well as in other Asian countries.

Many of the assumptions deal with matters that can be controlled by management, and these assumptions represent guidelines for managing the project so as to achieve the predicted results.

12.1 Source of Funds and Rate of Interest on Borrowing

The length of the project period and the magnitude of the recommended capital investment program as shown in Financial Table I will require stable long-term borrowing.

In this financial feasibility study, forecasts are constructed on the assumption that 100% of the total capital investment is financed by government loans. Forecasts of loan disbursements and debt service are presented in Financial Table 3.

These estimates are based on the assumption that the Water District will be able to obtain loan funds through government sources (LWUA), which represent a blending of funds obtained locally and internationally.

The assumed interest rate is 9.0 percent per annum and other assumed terms include a four year period (construction period) of grace on principal payment, and twenty-six year instalment repayments.

Approximately 60% of the project cost is composed of foreign currency portions and the rest composed of local currency portions. In view of the magnitude of foreign currency requirements, the government is recommended to seek loans from foreign or international sources such as the Overseas Economic Cooperation Fund, Japan (OECF), the World Bank or the Asian Development Bank, though the effect of such borrowing will not directly affect the forecasts of the Water District's financial performance.

12.2 Financial Feasibility

Carefully constructed financial forecasts based on the above mentioned assumptions indicate that the recommended master plan program will be positively viable in financial terms.

12.3 Water Rate

In calculating revenue, water rates for domestic users were projected less than 5% of the average household income of the Water District area. Although major increases in water rates will be required, allocation of additional costs to non-domestic customers and progressive rate structuring allows the construction of cross-subsidized rates for basic household requirements. (See Financial Table 7)

One of the salient features of the recommended master plan program is that the revenue unit costs at 1981 constant prices of production toward the target year period 1990-1993, will be significantly lower than at present.

13. Economic Feasibility Analysis

13.1 Benefits

Major benefits, direct and indirect, of the project are as follows:

a. Increase of Served Population and Area
Served population in the target year is estimated at 24,520 which is a gain of 32 % over the present served population. And the served area will increase from 790 hectares to 1,130 hectares in the target year.

b. Rise of Water Pressure and Elimination of Intermittent Supply
Present insufficient water pressure will be rectified to a normal level and "dried up" areas and intermittent supply will be all eliminated. Tanks and pumps of the plumbing system which consumers have provided will be no more required.

c. 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 is raised, consumers will be free from such contamination and the safety of water will be assured.

d. Healthy Environment
Living environment in the whole poblacion will greatly be enhanced with 24-hour continuous water supply.

e. Employment Opportunity
The civil works of the project together with accompanying connection works on the part of consumers will increase employment opportunities in the area.

f. Increase in Land Values

Other than the generation of employment, the water supply improvement project will contribute to an increase in the land value of the service area.

g. Reduction in Fire Damage

The project includes the installation of fire hydrants, which with projected increase in water pressure will result in savings due to reduced fire damage.

13.2 Internal Economic Rate of Return

An attempt was made to determine the economic viability of the recommended master plan program through the mechanism of benefit-cost comparison. This mechanism considered only quantifiable benefits. It is however to be noted that the quantifiable benefits are not necessarily more important than the unquantifiable ones.

In this study, quantifiable benefits included (1) beneficial value of water, (2) water quality benefits; and (3) reduction in fire damage.

In addition these three items of quantifiable benefits , " benefits to the nation " were included as benefits in making benefit-cost comparison. National interest effects for the Legaspi Water Supply System were estimated to be equal to 10 percent of the total of volume, quality and fire loss reduction benefits.

The calculations of internal economic rates of return have been subjected to sensitivity analyses using various adjustments as follows:

1) Cost value without conversion

Calculation was made with cost values as used in financial forecasts.

2) Cost value with Conversion A

i. Foreign costs -- raised by use of 1.25 factor (Scarcity of foreign exchange)
ii. Common labor -- lowered by 0.5 factor (Unemployment alternative)
iii. Residual local cost -- reduced by 0.95 factor (Removal of hidden taxes)

3) Cost value with Conversion B

i. Foreign cost -- unconverted
ii. Common labor -- converted as 2), ii, above
iii. Residual local cost -- converted as 2), iii, above

4) Cost value with Conversion C

i. Foreign cost -- converted as 2), i, above
ii. Common labor -- unconverted
iii. Residual local cost -- unconverted

The internal economic rates of return thus calculated proved positive economic viability as to the recommended master plan as shown below.

1) Based on Cost Value without Conversion: 27 %
2) Based on Cost Value with Conversion A: 26 %
3) Based on Cost Value with Conversion B: 30 %
4) Based on Cost Value with Conversion C: 24 %

FINANCIAL TABLE 1

LEGASPI WATER SUPPLY PROJECT

PORJECT COSTS BY YEAR OF CONSTRUCTION

(P1,000's)

I

Project Components By Major Elements	Costs as of 7-1-81 By Construction Year						
	Total	1983	1984	1985	1986	1987	1988
1. Vehicle	140		140	-	-		
2. Chlorinator	10	-	10	-	-		
3. Meters	886	-	747	100	39		
4. Distribution	6,118	-	3,222	2,896	-		
5. Transmission	488	-	488	-	-		
6. Collection Chamber	1,780	-	1,780	-	-		
7. Reservoir	1,800	-	-	900	900		
8. Valve	126	-	109	17	-		
9. Spareparts & Equipment	135	-	135	-	-		
10. Fire Hydrant	216	-	180	36	-		
11. Engineering	1,228	1,228	-	-	-		
12. Supervision	409	-	163	163	83		
13. Lands	78	-	78	-	-		
14. Physical Cont.	1,342	123	705	411	103		
15.							
16.							
17.							
18.							
TOTAL, 7-1-81	14,756	1,351	7,757	4,523	1,125		
ESCALATION FACTORS		1.3225	1.520875	1.703380	1.907785		
ESCALATED COSTS	23,437	1,787	11,797	7,707	2,146		

FINANCIAL TABLE 2

LEGASPI WATER SUPPLY PROJECT

OPERATION AND MAINTENANCE COSTS I

(P1,000's)

Year	Fixed, 7-1-81 Costs				Escalated Costs	
	Power	Chemicals	Others	Total	Factor 1/	Amount
1981	22	34	140	196	1.000000	196
1982	22	34	159	215	1.150000	247
1983	22	34	179	235	1.322500	311
1984	22	35	198	255	1.520875	388
1985	--	68	217	285	1.703380	485
1986	--	73	275	348	1.907785	664
1987	--	78	343	421	2.136719	899
1988	--	78	343	421	2.393126	1,008
1989	--	78	343	421	2.680301	1,128
1990	--	78	343	421	2.948331	1,241
1991	--	78	343	421	3.243164	1,365
1992	--	78	343	421	3.567480	1,501
1993	--	78	343	421	3.924228	1,652
1994						
1995						
1996						
1997						
1998						

1/ Escalation currently 15 percent per year to 1984 (1981 = 1.00), 12 percent per year between 1985 and 1989 and 10 percent per year in 1990 and afterwards.

FINANCIAL TABLE 3

LEGASPI WATER SUPPLY PROJECT
LOAN DISBURSEMENTS AND DEBT SERVICE
(₱1,000's)

I

	(1)		(2)	(3)	(4)	(5)	(6)	(7)
Year	Disbursement 1/		Loans Outstanding		Interest Payments		Principal Payments 3/	Total Debt Service
	Grant	Loan	Beginning	Ending	First Year 2/	Later Years		
1981								
1982								
1983	-	1,787		1,787	80			80
1984	-	11,797	1,787	13,584	530	160		690
1985	-	7,707	13,584	21,291	347	1,223		1,570
1986	-	2,146	21,291	23,437	97	1,916		2,013
1987			23,437	23,366		2,109	71	2,180
1988			23,366	22,823		2,103	543	2,646
1989			22,823	21,971		2,054	852	2,906
1990			21,971	21,034		1,977	937	2,914
1991			21,034	20,097		1,893	937	2,830
1992			20,097	19,160		1,809	937	2,746
1993			19,160	18,223		1,724	937	2,661
1994			18,223	17,286		1,641	937	2,578
1995			17,286	16,349		1,556	937	2,493
1996			16,349	15,412		1,471	937	2,408
1997			15,412	14,475		1,387	937	2,324
1998			14,475	13,538		1,303	937	2,240

1/ From Financial Table 1.

2/ Disbursements assumed to be equally spread during year. Charge with 50 per cent of annual interest in first year.

3/ Principal payments according to LWUA year plan.

FINANCIAL TABLE 4

LEGASPI WATER SUPPLY PROJECT
CASH REQUIREMENTS PER REVENUE UNIT
(₱1,000's)

I

Year	Debt Service	O & M	Total Costs	Estimated Reserves 1/	Cost With Reserves	Revenue Units 2/	Cost Per Revenue Unit 3/
1981	-	196	196	-	196	843	0.23
1982	-	247	247	-	247	869	0.28
1983	80	311	391	-	391	921	0.42
1984	690	388	1,078	-	1,078	948	1.14
1985	1,570	485	2,055	-	2,055	1,734	1.18
1986	2,013	664	2,677	-	2,677	1,985	1.35
1987	2,180	899	3,079	-	3,079	2,268	1.36
1988	2,646	1,008	3,654	183	3,837	2,268	1.69
1989	2,906	1,128	4,034	202	4,236	2,268	1.87
1990	2,914	1,241	4,155	416	4,571	2,268	2.02
1991	2,830	1,365	4,195	420	4,615	2,268	2.03
1992	2,746	1,501	4,247	425	4,672	2,268	2.06
1993	2,661	1,652	4,313	431	4,744	2,268	2.09
1994							
1995							
1996							
1997							
1998							

1/ Reserve estimate equal to 10 per cent of total costs. (5 per cent for the first two years)

2/ Reserve units from Tables 9A, 9B and 9C.

3/ Reserve units divided into costs with reserves.

FINANCIAL TABLE 5 - A

LEGASPI WATER SUPPLY PROJECT

ABILITY TO PAY FOR WATER

I

1	2	3	4	5	6	7	8
Year	Ave. Monthly Family Income 1/	Available 5%	Average Family Size	Household Water Use		Revenue Units Per Month 2/	Max. Ability Per Rev. Unit
				lpcd	Cubic Meters/ Month		
1981	615.57	30.78	5.70	58	10	25	1.23
1982	707.91	35.40	5.69	58	10	25	1.42
1983	814.09	40.71	5.68	58	10	25	1.63
1984	936.21	46.81	5.67	58	10	25	1.87
1985	1,048.56	52.40	5.66	107	18	35	1.50
1986	1,174.38	58.72	5.65	113	19	36	1.63
1987	1,315.31	65.77	5.64	144	24	43	1.53
1988	1,473.14	73.66	5.63	144	24	43	1.72
1989	1,649.92	82.50	5.62	144	24	43	1.92
1990	1,814.91	90.75	5.61	144	24	43	2.11
1991	1,996.41	99.82	5.60	144	24	43	2.32
1992	2,196.05	109.80	5.59	144	24	43	2.55
1993	2,415.65	120.78	5.58	144	24	43	2.81

1/ Average monthly income escalated by 15 per cent per year to 1984, 12 per cent per year between 1985 and 1989, and 10 per cent in 1990 and afterwards.

2/ Assumed 1/2" service.

FINANCIAL TABLE 6 - A

LEGASPI WATER SUPPLY PROJECT

ILLUSTRATIVE CASH FLOW TABLE

₱1,000's EXCEPT CHARGES PER UNIT

Year	Revenue Units 1/	Charges Per Unit	Gross Revenues	Net Revenue 2/		Basic Costs 3/	Required Reserves 4/	Total Costs 5/	Net Income	
				%	Amount				Annual	Cumulative
1981	843	0.60	506	95	481	196	-	196	285	285
1982	869	0.60	521	95	495	247	-	247	248	533
1983	921	0.90	829	95	787	391	-	391	396	929
1984	948	1.45	1,375	96	1,320	1,078	-	1,078	-242	1,171
1985	1,734	1.45	2,514	96	2,413	2,055	-	2,055	358	1,529
1986	1,985	1.45	2,878	97	2,792	2,677	-	2,677	115	1,644
1987	2,268	1.50	3,402	97	3,300	3,079	-	3,079	221	1,865
1988	2,268	1.70	3,856	97	3,740	3,654	193	3,847	-107	1,758
1989	2,268	1.70	3,856	97	3,740	4,034	193	4,227	-487	1,271
1990	2,268	1.70	3,856	98	3,779	4,155	386	4,541	-762	509
1991	2,268	2.30	5,216	98	5,112	4,195	522	4,717	395	904
1992	2,268	2.50	5,670	98	5,557	4,247	567	4,814	743	1,647
1993	2,268	2.80	6,350	98	6,223	4,313	635	4,948	1,275	2,922

1/ From Tables 9A, 9B and 9C.
2/ Gross revenues from water sales reduced by bad debt allowance.
3/ Total of project debt service, operation and maintenance costs.
4/ Ten percent of gross water sales, after completion of construction. (5 percent for the first two years)
5/ Includes the costs of replacing the first complement of project components with seven years of life expectancy.

I

Legaspi

FINANCIAL TABLE 7

LEGASPI WATER SUPPLY PROJECT I

ILLUSTRATIVE RATE SCHEDULE

DOMESTIC AND GOVERNMENTAL SERVICE CONNECTIONS, 1/2"

Year	First 10 m^3 1/	Charge for Each Added m^3 2/			Charge 3/ per Revenue Unit
		11-20	21-45	over 45	
1981	15.00	0.72	0.84	1.02	0.60
1982	15.00	0.72	0.84	1.02	0.60
1983	22.50	1.08	1.26	1.53	0.90
1984	36.25	1.74	2.03	2.47	1.45
1985	36.25	1.74	2.03	2.47	1.45
1986	36.25	1.74	2.03	2.47	1.45
1987	37.50	1.80	2.10	2.55	1.50
1988	42.50	2.04	2.38	2.89	1.70
1989	42.50	2.04	2.38	2.89	1.70
1990	42.50	2.04	2.38	2.89	1.70
1991	57.50	2.76	3.22	3.91	2.30
1992	62.50	3.00	3.50	4.25	2.50
1993	70.00	3.36	3.92	4.76	2.80

Note: 1/ To obtain charge per m^3 for the first 10 m^3 classified by connection size, multiply R.U. charge shown in 3/ above by the following connection size factors.

Domestic : 1.0 for 3/8"; 2.5 for 1/2"; 4.0 for 3/4"; 8 for 1"
Commerical: 5.0 for 1/2"; 8.0 for 3/4"; 16.0 for 1"; 40.0 for 1 1/2"

2/ To obtain charge for each added m^3, multiply R.U. charges shown in 3/ by the following block factors.

Domestic : 1.2 for 11-20 m^3; 1.4 for 21-45 m^3; 1.7 for over 45 m^3
Commercial: 2.4 for 21-45 m^3; 2.8 for 45-100 m^3; 2.4 for over 100 m^3

FINANCIAL TABLE 8

LEGASPI WATER SUPPLY PROJECT

GROWTH IN POPULATION, SERVICE CONNECTIONS AND IN DELIVERED AND PROCURED WATER

Year	Ave. Number Service Connections	Number For Service	Persons Served	Daily Use lpcd 1/	Annual Water Supply (1,000 M^3)		
					Delivered	% Unacct.	Produced
1981	1,367	13.6	18,600	69	466	45	847
1982	1,411	13.6	19,200	69	483	43	847
1983	1,570	13.0	20,400	69	515	40	858
1984	1,716	12.1	20,900	69	526	40	877
1985	1,974	11.0	22,100	127	1,025	40	1,708
1986	2,322	10.0	23,300	135	1,151	37	1,827
1987	2,698	9.1	24,520	144	1,288	34	1,951
1988	2,698	9.1	24,520	144	1,288	34	1,951
1989	2,698	9.1	24,520	144	1,288	34	1,951
1990	2,698	9.1	24,520	144	1,288	34	1,951
1991	2,698	9.1	24,520	144	1,288	34	1,951
1992	2,698	9.1	24,520	144	1,288	34	1,951
1993	2,698	9.1	24,520	144	1,288	34	1,951

1/ Liters per capita per day.

FINANCIAL TABLE 9A

LEGASPI WATER SUPPLY PROJECT

CALCULATION OF REVENUE UNITS

I

A) AVERAGE NUMBER OF CONCESSIONAIRES

Year	Residential and Government					Commercial and Industrial					Total
	3/8"	1/2"	3/4"	1"	S-Total	1/2"	3/4"	1"	1 1/2"	S-Total	
1981	363	836	11	1	1,211	133	14	7	2	156	1,367
1982	363	836	11	1	1,211	133	14	7	2	156	1,367
1983	392	902	12	1	1,307	133	14	7	2	156	1,463
1984	428	985	13	1	1,427	141	15	7	2	165	1,592
1985	500	1,150	15	2	1,667	175	18	10	2	205	1,872
1986	587	1,350	18	2	1,957	260	27	15	3	305	2,262
1987	676	1,555	20	2	2,253	380	40	22	3	445	2,698
1988											
1989											
1990											
1991											
1992											
1993											

B) SERVICE REVENUE UNITS PER CUBIC METER

Year	Residential and Government					Commercial and Industrial					Total
	1.00	2.50	4.0	8.0	S-total	5.0	8.0	16.0	40.0	S-Total	
1981	363	2,090	44	8	2,505	665	112	112	80	969	3,474
1982	363	2,090	44	8	2,505	665	112	112	80	969	3,474
1983	392	2,255	48	8	2,703	665	112	112	80	969	3,672
1984	428	2,463	52	8	2,951	705	120	112	80	1,017	3,968
1985	500	2,875	60	16	3,451	875	144	160	80	1,259	4,710
1986	587	3,375	72	16	4,050	1,300	216	240	120	1,876	5,926
1987	676	3,888	80	16	4,660	1,900	320	352	120	2,692	7,352
1988											
1989											
1990											
1991											
1992											
1993											

FINANCIAL TABLE 9B1

LEGASPI WATER SUPPLY PROJECT

CALCULATION OF REVENUE UNITS

I

DOMESTIC

Year	Delivered Water (x1000 cum)	Service Connections (x 0.12)	Net	11 - 20 cum		21 - 45 cum		over 45 cum		Total CRU's
				cum	x 1.2	cum	x 1.4	cum	x 1.7	
1981	415	145	270	145	174	125	175	-	-	349
1982	430	145	285	145	174	140	196	-	-	370
1983	458	157	301	157	188	144	202	-	-	390
1984	468	171	297	171	205	126	176	-	-	381
1985	912	200	712	200	240	512	717	-	-	957
1986	1,024	235	789	235	282	554	776	-	-	1,058
1987	1,146	270	876	270	324	606	848	-	-	1,172
1988	1,146	270	876	270	324	606	848	-	-	1,172
1989	1,146	270	876	270	324	606	848	-	-	1,172
1990	1,146	270	876	270	324	606	848	-	-	1,172
1991	1,146	270	876	270	324	606	848	-	-	1,172
1992	1,146	270	876	270	324	606	848	-	-	1,172
1993	1,146	270	876	270	324	606	848	-	-	1,172

FINANCIAL TABLE 9B2

LEGASPI WATER SUPPLY PROJECT

CALCULATION OF WATER REVENUES UNITS

I

COMMERCIAL

Year	Delivered Water (x1000 cum)	Service Connections (x 0.12)	Net	11 - 45 cum		46 - 100 cum		Over 100 cum		Total CRU's
				cum	x 2.4	cum	x 2.8	cum	x 3.4	
1981	51	19	32	32	77	-	-	-	-	77
1982	53	19	34	34	82	-	-	-	-	82
1983	57	19	38	38	91	-	-	-	-	91
1984	58	20	38	38	91	-	-	-	-	91
1985	113	25	88	86	206	2	6	-	-	212
1986	127	37	90	90	216	-	-	-	-	216
1987	142	53	89	89	214	-	-	-	-	214
1988	142	53	89	89	214	-	-	-	-	214
1989	142	53	89	89	214	-	-	-	-	214
1990	142	53	89	89	214		-	-	-	214
1991	142	53	89	89	214	-	-	-		214
1992	142	53	89	89	214					214
1993	142	53	89	89	214					214

FINANCIAL TABLE 9C

SUMMARY OF REVENUE UNITS

I

Year	Residential and Governmental				Commercial and Industrial				Total All
	Service			Total R & C	Service			Total C & I	
	RU/Serv. Connection	Multiplied by 0.12	Commodity Rev. Units		RU/Serv. Connection	Multiplied by 0.12	Commodity Rev. Units		
1981	2,505	301	349	650	969	116	77	193	843
1982	2,505	301	370	671	969	116	82	198	869
1983	2,703	324	390	714	969	116	91	207	921
1984	2,951	354	381	735	1,017	122	91	213	948
1985	3,451	414	957	1,371	1,259	151	212	363	1,734
1986	4,050	486	1,058	1,544	1,876	225	216	441	1,985
1987	4,660	559	1,172	1,731	2,692	323	214	537	2,268
1988	4,660	559	1,172	1,731	2,692	323	214	537	2,268
1989	4,660	559	1,172	1,731	2,692	323	214	537	2,268
1990	4,660	559	1,172	1,731	2,692	323	214	537	2,268
1991	4,660	559	1,172	1,731	2,692	323	214	537	2,268
1992	4,660	559	1,172	1,731	2,692	323	214	537	2,268
1993	4,660	559	1,172	1,731	2,692	323	214	537	2,268

ECONOMIC TABLE 1

LEGASPI WATER SUPPLY PROJECT

SUMMARY OF PROJECT COST I

Costs as of July 1, 1981 in 1,000 Pesos

Components	Total Cost	Foreign Currency Portion	Local Currency Portion
1. Vehicle	140	70	70
2. Chlorinator	10	9	1
3. Meters	886	683	203
4. Distribution System	6,118	4,099	2,019
5. Transmission System	488	327	161
6. Collection Chamber	1,780	445	1,335
7. Reservoir	1,800	450	1,350
8. Valves	126	92	34
9. Spareparts & Equipment	135	105	30
10. Fire Hydrant	216	143	73
11. Engineering	1,228	737	491
12. Supervision	409	246	163
13. Lands	78	-	78
14.			
15.			
16.			
17.			

Source: From Cost Estimates

ECONOMIC TABLE 2

LEGASPI WATER SUPPLY PROJECT

ANNUAL DEMAND AND GROSS PRODUCTION IN 1,000 M^3

	1	2	3	5	6	7	8	9
Year	Average Connections	Persons Per Service Connection	Population Served	Average Water Use		Net Increase in Delivered Volume	Unacounted Percentage	Annual Production
				Liters/ Capita Per Day	Water Delivered Annually			
1981	1,367	13.6	18,600	69	466		45	847
1982	1,411	13.6	19,200	69	483		43	847
1983	1,570	13.0	20,400	69	515		40	858
1984	1,716	12.1	20,900	69	526	11	40	877
1985	1,974	11.0	22,100	127	1,025	510	40	1,708
1986	2,322	10.0	23,300	135	1,151	636	37	1,827
1987	2,698	9.1	24,520	144	1,288	773	34	1,951
1988								
1989								
1990								
1991								
1992								
1993								

ECONOMIC TABLE 3-A

LEGASPI WATER SUPPLY PROJECT

CONVERSION OF CONSTRUCTION COST TO ECONOMIC COST

Costs as of July 1, 1981 in 1,000 Pesos

Component	Foreign Costs	Local Costs	Common Labor Costs	Residual Local Cost	Converted Value			
					Foreign x 1.25	Labor x 0.5	Residual x 0.95	Total
1. Vehicle	70	70	-	70	87.5	-	66.5	154
2. Chlorinator	9	1	0.1	0.9	11.3	0.1	0.9	12.3
3. Meters	683	203	40.6	162.4	853.8	20.3	154.3	1,028.4
4. Distribution	4,099	2,019	807.6	1,211.4	5,123.8	403.8	1,150.8	6,678.4
5. Transmission	327	161	40.3	120.7	408.8	20.2	114.7	543.7
6. Collection Chamber	445	1,335	-	1,335	556.3	-	1,268.3	1,824.6
7. Reservoir	450	1,350	877.5	472.5	562.5	438.8	448.9	1,450.2
8. Valve	92	34	13.6	20.4	115	6.8	19.4	141.2
9. Spareparts & Equipment	105	30	-	30	131.3	-	28.5	159.8
10. Fire Hydrants	143	73	29.2	43.8	178.8	14.6	41.6	235
11. Engineering	737	491	-	491	921	-	466.5	1,387.5
12. Supervision	246	163	-	163	307.5	-	154.9	462.4
13. Lands	-	78	-	78	-	-	74.1	74.1
14.								
15.								
16.								
17.								

ECONOMIC TABLE 3-B

LEGASPI WATER SUPPLY PROJECT
CONVERSION OF CONSTRUCTION COST TO ECONOMIC COST
Costs as of July 1, 1981 in 1,000 Pesos

I

Component	Foreign Costs	Local Costs	Common Labor Costs	Residual Local Cost	Converted Value			
					Foreign x 1.0	Labor x 0.5	Residual x 0.95	Total
1. Vehicle	70	70	-	70	70	-	66.5	136.5
2. Chlorinator	9	1	0.1	0.9	9	0.1	0.9	10
3. Meters	683	203	40.6	162.4	683	20.3	154.3	857.6
4. Distribution	4,099	2,019	807.6	1,211.4	4,099	403.8	1,150.8	5,653.6
5. Transmission	327	161	40.3	120.7	327	20.2	114.7	461.9
6. Collection Chamber	445	1,335	-	1,335	445	-	1,268.3	1,713.3
7. Reservoir	450	1,350	877.5	472.5	450	438.8	448.9	1,337.7
8. Valve	92	34	13.6	20.4	92	6.8	19.4	118.2
9. Spareparts & Equipment	105	30	-	30	105	-	28.5	133.5
10. Fire Hydrants	143	73	29.2	43.8	143	14.6	41.6	199.2
11. Engineering	737	491	-	491	737	-	466.5	1,203.5
12. Supervision	246	163	-	163	246	-	154.9	400.9
13. Lands	-	78	-	78	-	-	74.1	74.1
14.								
15.								
16.								
17.								

ECONOMIC TABLE 3-C

LEGASPI WATER SUPPLY PROJECT

CONVERSION OF CONSTRUCTION COST TO ECONOMIC COST

Costs as of July 1, 1981 in 1,000 Pesos

I

Legaspi

Component	Foreign Costs	Local Costs	Common Labor Costs	Residual Local Cost	Converted Value			
					Foreign x 1.25	Labor x 1.0	Residual x 1.0	Total
1. Vehicles	70	70	-	70	87.5	-	70	157.5
2. Chlorinator	9	1	0.1	0.9	11.3	0.1	0.9	12.3
3. Meters	683	203	40.6	162.4	853.8	40.6	162.4	1,056.8
4. Distribution	4,099	2,019	807.6	1,211.4	5,123.8	807.6	1,211.4	7,142.8
5. Transmission	327	161	40.3	120.7	408.8	40.3	120.7	569.8
6. Collection Chamber	445	1,335	-	1,335	556.3	-	1,335	1,891.3
7. Reservoir	450	1,350	877.5	472.5	562.5	877.5	472.5	1,912.5
8. Valve	92	34	13.6	20.4	115	13.6	20.4	149
9. Spareparts & Equipment	105	30	-	30	131.3	-	30	161.3
10. Fire Hydrants	143	73	29.2	43.8	178.8	29.2	43.8	251.8
11. Engineering	737	491	-	491	921	-	491	1,412
12. Supervision	246	163	-	163	307.5	-	163	470.5
13. Lands	-	78	-	78	-	-	78	78
14.								
15.								
16.								
17.								

ECONOMIC TABLE 4-0

LEGASPI WATER SUPPLY PROJECT I

ECONOMIC COSTS DISTRIBUTED TO YEARS

₱ x 1,000

Value without CONVERSION

Components	Total	1983	1984	1985	1986	1987	1988
1. Vehicle	140	-	140	-	-		
2. Chlorinator	10	-	10	-	-		
3. Meter	886	-	747	100	39		
4. Distribution	6,118	-	3,222	2,896	-		
5. Transmission	488	-	488	-	-		
6. Collection Chamber	1,780	-	1,780	-	-		
7. Reservoir	1,800	-	-	900	900		
8. Valve	126	-	109	17	-		
9. Spare parts & Equipment	135	-	135	-	-		
10. Fire Hydrants	216	-	180	36	-		
11. Engineering	1,228	1,228	-	-	-		
12. Supervision	409	-	163	163	83		
13. Lands	78	-	78	-	-		
14.							
15.							
16.							
17.							
18.							
Total	13,414	1,228	7,052	4,112	1,022		

ECONOMIC TABLE 4-A

LEGASPI WATER SUPPLY PROJECT

ECONOMIC COSTS DISTRIBUTED TO YEARS

₱ x 1,000

I

Value with CONVERSION A

Components	Total	1983	1984	1985	1986	1987	1988
1. Vehicle	154	-	154	-	-		
2. Chlorinator	12.3	-	12.3	-	-		
3. Meter	1,028.4	-	863.9	113.1	51.4		
4. Distribution	6,678.4	-	3,539.6	3,138.8	-		
5. Transmission	543.7	-	543.7	-	-		
6. Collection Chamber	1,824.6	-	1,824.6	-	-		
7. Reservoir	1,450.2	-	-	725.1	725.1		
8. Valve	141.2	-	122.8	18.4	-		
9. Spare parts & Equipment	159.8	-	159.8	-	-		
10. Fire Hydrants	235	-	195.1	39.9	-		
11. Engineering	1,387.5	1,387.5	-	-	-		
12. Supervision	462.4	-	185	185	92.4		
13. Lands	74.1	-	74.1	-	-		
14.							
15.							
16.							
17.							
18.							
Total	14,151.6	1,387.5	7,674.9	4,220.3	868.9		

ECONOMIC TABLE 4-B

LEGASPI WATER SUPPLY PROJECT
ECONOMIC COSTS DISTRIBUTED TO YEARS
₱ x 1,000

I

Value with CONVERSION B

Components	Total	1983	1984	1985	1986	1987	1988
1. Vehicle	136.5	-	136.5	-	-		
2. Chlorinator	10	-	10	-	-		
3. Meter	857.6	-	720.4	94.3	42.9		
4. Distribution	5,653.6	-	2,996.4	2,657.2	-		
5. Transmission	461.9	-	461.9	-	-		
6. Collection Chamber	1,713.3	-	1,713.3	-	-		
7. Reservoir	1,337.7	-	-	668.9	668.9		
8. Valve	118.2	-	102.8	15.4	-		
9. Spareparts & Equipment	133.5	-	133.5	-	-		
10. Fire Hydrants	199.2	-	165.3	33.9	-		
11. Engineering	1,203.5	1,203.5	-	-	-		
12. Supervision	400.9	-	160.4	160.4	80.1		
13. Lands	74.1	-	74.1	-	-		
14.							
15.							
16.							
17.							
18.							
Total	12,300	1,203.5	6,674.6	3,630.1	791.9		

ECONOMIC TABLE 4-C

LEGASPI WATER SUPPLY PROJECT

ECONOMIC COSTS DISTRIBUTED TO YEARS I

₱ x 1,000

Value with CONVERSION C

Components	Total	1983	1984	1985	1986	1987	1988
1. Vehicle	157.5	-	157.5	-	-		
2. Chlorinator	12.3	-	12.3	-	-		
3. Meter	1,056.8	-	887.7	116.3	52.8		
4. Distribution	7,142.8	-	3,785.7	3,357.1	-		
5. Transmission	569.8	-	569.8	-	-		
6. Collection Chamber	1,891.3	-	1,891.3	-	-		
7. Reservoir	1,912.5	-	-	956.3	956.3		
8. Spareparts & Equipment	161.3	-	161.3	-	-		
9. Fire Hydrants	251.8	-	209	42.8	-		
10. Engineering	1,412	1,412	-	-	-		
11. Supervision	470.5	-	188.2	188.2	94.1		
12. Lands	78	-	78	-	-		
13. Valves	149	-	129.6	19.4	-		
14.							
15.							
16.							
17.							
18.							
Total	15,265.6	1,412	8,070.4	4,680.1	1,103.2		

ECONOMIC TABLE 5

LEGASPI WATER SUPPLY PROJECT

OPERATION AND MAINTENANCE EXPENSES

Costs as of July 1, 1981 in 1,000 Pesos

I

Year	Power	Chemicals	Others	Total	Net Costs
1981	22	34	140	196	
1982	22	34	159	215	
1983	22	34	179	235	20
1984	22	35	198	255	40
1985	-	68	217	285	70
1986	-	73	275	348	133
1987	-	78	343	421	206
1988	-	78	343	421	206
1989	-	78	343	421	206
1990	-	78	343	421	206
1991	-	78	343	421	206
1992	-	78	343	421	206
1993	-	78	343	421	206

Base Year = 1983

ECONOMIC TABLE 6-0

LEGASPI WATER SUPPLY PROJECT I
LIFE EXPECTANCY AND REPLACEMENT SCHEDULES
₱ x 1,000

Value without CONVERSION

Components	Life Expectancy of Components				
	7 Years	15 Years	50 Years	Infinite	Total
1. Vehicle	140				140
2. Chlorinator	10				10
3. Spareparts & Equipment	135				135
4. Meters		886			886
5. Distribution			6,118		6,118
6. Transmission			488		488
7. Fire Hydrants			216		216
8. Collection Chamber			1,780		1,780
9. Reservoir			1,800		1,800
10. Lands				78	78
11. Valve			126		126
12.					

7 Year Items	Years of Installation					Years of Replacement				
1. Vehicle	1984					1991	1998	2005	2012	
2. Chlorinator	1984					1991	1998	2005	2012	
3. Spareparts & Equipment	1984					1991	1998	2005	2012	
4.										

15 Year Items	Years of Installation					Years of Replacement				
1. Meters	1984	1985	1986			1999	2000	2001		
2.										
3.										
4.										

ECONOMIC TABLE 6-A

LEGASPI WATER SUPPLY PROJECT
LIFE EXPECTANCY AND REPLACEMENT SCHEDULES
₱ x 1,000

I

Value with CONVERSION A

Components	Life Expectancy of Components				
	7 Years	15 Years	50 Years	Infinite	Total
1. Vehicle	154				154
2. Chlorinator	12.3				12.3
3. Spare parts & Equipment	159.8				159.8
4. Meters		1,028.4			1,028.4
5. Distribution			6,678.4		6,678.4
6. Transmission			543.7		543.7
7. Fire Hydrants			235		235
8. Collection Chamber			1,824.6		1,824.6
9. Reservoir			1,450.2		1,450.2
10. Land				74.1	74.1
11. Valve			141.2		141.2
12.					

7 Year Items	Years of Installation					Years of Replacement				
1. Vehicle	1984					1991	1998	2005	2012	
2. Chlorinator	1984					1991	1998	2005	2012	
3. Spare parts & Equipment	1984					1991	1998	2005	2012	
4										

15 Year Items	Years of Installation					Years of Replacement				
1. Meters	1984	1985	1986			1999	2000	2001		
2.										
3.										
4.										

ECONOMIC TABLE 6-B

LEGASPI WATER SUPPLY PROJECT I

LIFE EXPECTANCY AND REPLACEMENT SCHEDULES

₱ x 1,000

Value with CONVERSION B

Components	Life Expectancy of Components				
	7 Years	15 Years	50 Years	Infinite	Total
1. Vehicle	136.5				136.5
2. Chlorinator	10				10
3. Spare parts & Equipment	133.5				133.5
4. Meters		857.6			857.6
5. Distribution			5,653.6		5,653.6
6. Transmission			461.9		461.9
7. Fire Hydrants			199.2		199.2
8. Collection Chamber			1,713.3		1,713.3
9. Reservoir			1,337.7		1,337.7
10. Land				74.1	74.1
11. Valves			118.2		118.2
12.					

7 Year Items	Years of Installation					Years of Replacement				
1. Vehicle	1984					1991	1998	2005	2012	
2. Chlorinator	1984					1991	1998	2005	2012	
3. Spare parts & Equipment	1984					1991	1998	2005	2012	
4.										

15 Year Items	Years of Installation					Years of Replacement				
1. Meters	1984	1985	1986			1999	2000	2001		
2.										
3.										
4.										

ECONOMIC TABLE 6-C

LEGASPI WATER SUPPLY PROJECT I
LIFE EXPECTANCY AND REPLACEMENT SCHEDULES
₱ x 1,000

Value of CONVERSION C

Components	Life Expectancy of Components				
	7 Years	15 Years	50 Years	Infinite	Total
1. Vehicle	157.5				157.5
2. Chlorinator	12.3				12.3
3. Spare parts & Equipment	161.3				161.3
4. Meters		1,056.8			1,056.8
5. Distribution			7,142.8		7,142.8
6. Transmission			569.8		569.8
7. Fire Hydrants			251.8		251.8
8. Collection Chamber			1,891.3		1,891.3
9. Reservoir			1,912.5		1,912.5
10. Land				78	78
11. Valve			149		149
12.					

7 Year Items	Years of Installation					Years of Replacement				
1. Vehicle	1984					1991	1998	2005	2012	
2. Chlorinator	1984					1991	1998	2005	2012	
3. Spare parts & Equipment	1984					1991	1998	2005	2012	
4.										

15 Year Items	Years of Installation					Years of Replacement				
1. Meters	1984	1985	1986			1999	2000	2001		
2.										
3.										
4.										

I

ECONOMIC TABLE 7-0

LEGASPI WATER SUPPLY PROJECT
CALCULATION OF SALVAGE VALUES
₱ x 1,000

Value without CONVERSION

Components	Base Year Value	Percentage of Base Year Value	31st Year Salvage Base Year Values
Infinite Life, Year Purchased			
1984	78	75%	59
50 Year Life, Year Constructed			
1 1984	5,779	42%	2,427
2 1985	3,849	44%	1,694
3 1986	900	46%	414
15 Year Life, Year of Replacement			
1 1999	747	7%	52
2 2000	100	13%	13
3 2001	39	20%	8
7 Year Life, Years of Final Replacement			
1 2012	285	86%	245
Total			4,912

ECONOMIC TABLE 7-A

LEGASPI WATER SUPPLY PROJECT
CALCULATION OF SALVAGE VALUES
₱ x 1,000

Value with CONVERSION A

Components	Base Year Value	Percentage of Base Year Value	31st Year Salvage Base Year Values
Infinite Life, Year Purchased			
1984	74	75%	56
50 Year Life, Year Constructed			
1 1984	6,226	42%	2,615
2 1985	3,922	44%	1,726
3 1986	725	46%	334
15 Year Life, Year of Replacement			
1 1999	864	7%	60
2 2000	113	13%	15
3 2001	51	20%	10
7 Year Life, Years of Final Replacement			
1 2012	326	86%	280
Total			5,096

I

ECONOMIC TABLE 7-B

LEGASPI WATER SUPPLY PROJECT

CALCULATION OF SALVAGE VALUES

₱ x 1,000

Value with CONVERSION B

Components	Base Year Value	Percentage of Base Year Value	31st Year Salvage Base Year Values
Infinite Life, Year Purchased			
1984	74	75%	56
50 Year Life, Year Constructed			
1 1984	5,440	42%	2,285
2 1985	3,375	44%	1,485
3 1986	669	46%	308
15 Year Life, Year of Replacement			
1 1999	720	7%	50
2 2000	94	13%	12
3 2001	43	20%	9
7 Year Life, Years of Final Replacement			
1 2012	280	86%	241
Total			4,446

I

ECONOMIC TABLE 7-C

LEGASPI WATER SUPPLY PROJECT

CALCULATION OF SALVAGE VALUES

₱ x 1,000

Value with CONVERSION C

Components	Base Year Value	Percentage of Base Year Value	31st Year Salvage Base Year Values
Infinite Life, Year Purchased			
1984	78	75%	59
50 Year Life, Year Constructed			
1 1984	6,585	42%	2,766
2 1985	4,376	44%	1,925
3 1986	956	46%	440
15 Year Life, Year of Replacement			
1 1999	888	7%	62
2 2000	116	13%	15
3 2001	53	20%	11
7 Year Life, Years of Final Replacement			
1 2012	331	86%	285
Total			5,563

ECONOMIC TABLE 8-0

LEGASPI WATER SUPPLY PROJECT I

SUMMARY OF ALL PROJECT COSTS

Costs as of July 1, 1981 in 1,000 Pesos

Value without CONVERSION

Year	Cost of Facilities	Net O & M	Replace-ment Costs	Total	Salvage	Net Cost
1982						
1983	1,228	20		1,248		
1984	7,052	40		7,092		
1985	4,112	70		4,182		
1986	1,022	133		1,155		
1987		206		206		
1988		206		206		
1989		206		206		
1990		206		206		
1991		206	285	491		
1992		206		206		
1993		206		206		
1994		206		206		
1995		206		206		
1996		206		206		
1997		206		206		
1998		206	285	491		
1999		206	747	953		
2000		206	100	306		
2001		206	39	245		
2002		206		206		
2003		206		206		
2004		206		206		
2005		206	285	491		
2006		206		206		
2007		206		206		
2008		206		206		
2009		206		206		
2010		206		206		
2011		206		206		
2012		206	285	491		
Total	13,414	5,619	2,026	21,059	(4,912)	16,147

ECONOMIC TABLE 8-A

LEGASPI WATER SUPPLY PROJECT I

SUMMARY OF ALL PROJECT COSTS

Costs as of July 1, 1981 in 1,000 Pesos

Value with CONVERSION A

Year	Cost of Facilities	Net O & M	Replace-ment Costs	Total	Salvage	Net Cost
1982						
1983	1,388	20		1,408		
1984	7,675	40		7,715		
1985	4,220	70		4,290		
1986	869	133		1,002		
1987		206		206		
1988		206		206		
1989		206		206		
1990		206		206		
1991		206	326	532		
1992		206		206		
1993		206		206		
1994		206		206		
1995		206		206		
1996		206		206		
1997		206		206		
1998		206	326	532		
1999		206	864	1,070		
2000		206	113	319		
2001		206	51	257		
2002		206		206		
2003		206		206		
2004		206		206		
2005		206	326	532		
2006		206		206		
2007		206		206		
2008		206		206		
2009		206		206		
2010		206		206		
2011		206		206		
2012		206	326	532		
Total	14,152	5,619	2,332	22,103	(5,096)	(17,007)

ECONOMIC TABLE 8-B

LEGASPI WATER SUPPLY PROJECT I

SUMMARY OF ALL PROJECT COSTS

Costs as of July 1, 1981 in 1,000 Pesos

Value with CONVERSION B

Year	Cost of Facilities	Net O & M	Replace-ment Costs	Total	Salvage	Net Cost
1982						
1983	1,204	20		1,224		
1984	6,675	40		6,715		
1985	3,630	70		3,700		
1986	792	133		925		
1987		206		206		
1988		206		206		
1989		206		206		
1990		206		206		
1991		206	280	486		
1992		206		206		
1993		206		206		
1994		206		206		
1995		206		206		
1996		206		206		
1997		206		206		
1998		206	280	486		
1999		206	720	926		
2000		206	94	300		
2001		206	43	249		
2002		206		206		
2003		206		206		
2004		206		206		
2005		206	280	486		
2006		206		206		
2007		206		206		
2008		206		206		
2009		206		206		
2010		206		206		
2011		206		206		
2012		206	280	486		
Total	12,301	5,619	1,977	19,897	(4,446)	(15,451)

ECONOMIC TABLE 8-C

LEGASPI WATER SUPPLY PROJECT I

SUMMARY OF ALL PROJECT COSTS

Costs as of July 1, 1981 in 1,000 Pesos

Value with CONVERSION C

Year	Cost of Facilities	Net O & M	Replace-ment Costs	Total	Salvage	Net Cost
1982						
1983	1,412	20		1,432		
1984	8,070	40		8,110		
1985	4,680	70		4,750		
1986	1,103	133		1,236		
1987		206		206		
1988		206		206		
1989		206		206		
1990		206		206		
1991		206	331	537		
1992		206		206		
1993		206		206		
1994		206		206		
1995		206		206		
1996		206		206		
1997		206		206		
1998		206	331	537		
1999		206	888	1,094		
2000		206	116	322		
2001		206	53	259		
2002		206		206		
2003		206		206		
2004		206		206		
2005		206	331	537		
2006		206		206		
2007		206		206		
2008		206		206		
2009		206		206		
2010		206		206		
2011		206		206		
2012		206	331	537		
Total	15,265	5,619	2,381	23,265	(5,563)	17,702

ECONOMIC TABLE 9

I

LEGASPI WATER SUPPLY PROJECT

BENEFITS AT 1981 PRICES

(₱ x 1,000)

Year	Volume	Qualitative	Fire Loss Reduction	Total	National Interest Adjustment
1982					
1983					
1984	41	191	67	299	329
1985	1,887	381	89	2,357	2,593
1986	2,353	572	116	3,041	3,345
1987	2,860	572	148	3,580	3,938
1988	2,860	572	148	3,580	3,938
1989	2,860	572	148	3,580	3,938
1990	2,860	572	148	3,580	3,938
1991	2,860	572	148	3,580	3,938
1992	2,860	572	148	3,580	3,938
1993	2,860	572	148	3,580	3,938
1994	2,860	572	148	3,580	3,938
1995	2,860	572	148	3,580	3,938
1996	2,860	572	148	3,580	3,938
1997	2,860	572	148	3,580	3,938
1998	2,860	572	148	3,580	3,938
1999	2,860	572	148	3,580	3,938
2000	2,860	572	148	3,580	3,938
2001	2,860	572	148	3,580	3,938
2002	2,860	572	148	3,580	3,938
2003	2,860	572	148	3,580	3,938
2004	2,860	572	148	3,580	3,938
2005	2,860	572	148	3,580	3,938
2006	2,860	572	148	3,580	3,938
2007	2,860	572	148	3,580	3,938
2008	2,860	572	148	3,580	3,938
2009	2,860	572	148	3,580	3,938
2010	2,860	572	148	3,580	3,938
2011	2,860	572	148	3,580	3,938
2012	2,860	572	148	3,580	3,938
Total	78,641	16,016	4,120	98,777	108,655

ECONOMIC TABLE 10-0

LEGASPI WATER SUPPLY PROJECT

INTERNAL RATE OF RETURN COMPUTATION

Cost Value without CONVERSION

Year	Total Cost	Total Benefit	Net Benefit	Present Net Benefit
1982				
1983	1,248	-	-1,248	-1,248
1984	7,092	329	-6,763	-5,304
1985	4,182	2,593	-1,589	-977
1986	1,155	3,345	2,190	1,057
1987	206	3,938	3,732	1,412
1988	206	3,938	3,732	1,108
1989	206	3,938	3,732	869
1990	206	3,938	3,732	681
1991	491	3,938	3,447	494
1992	206	3,938	3,732	419
1993	206	3,938	3,732	329
1994	206	3,938	3,732	258
1995	206	3,938	3,732	202
1996	206	3,938	3,732	159
1997	206	3,938	3,732	124
1998	491	3,938	3,447	90
1999	953	3,938	2,985	61
2000	306	3,938	3,632	58
2001	245	3,938	3,693	47
2002	206	3,938	3,732	37
2003	206	3,938	3,732	29
2004	206	3,938	3,732	23
2005	491	3,938	3,447	16
2006	206	3,938	3,732	14
2007	206	3,938	3,732	11
2008	206	3,938	3,732	9
2009	206	3,938	3,732	7
2010	206	3,938	3,732	5
2011	206	3,938	3,732	4
2012	491	3,938	8,359*	7*
Salvage(-)	4,912			
Total	16,147	108,655	92,508	1

Rate of Return = 0.27

ECONOMIC TABLE 10-A

LEGASPI WATER SUPPLY PROJECT
INTERNAL RATE OF RETURN COMPUTATION

Cost Value with CONVERSION A

Year	Total Cost	Total Benefit	Net Benefit	Present Benefit
1982				
1983	1,408	-	-1,408	-1,408
1984	7,715	329	-7,386	-5,872
1985	4,290	2,593	-1,697	-1,073
1986	1,002	3,345	2,343	1,178
1987	206	3,938	3,732	1,491
1988	206	3,938	3,732	1,186
1989	206	3,938	3,732	943
1990	206	3,938	3,732	750
1991	532	3,938	3,406	544
1992	206	3,938	3,732	474
1993	206	3,938	3,732	377
1994	206	3,938	3,732	300
1995	206	3,938	3,732	238
1996	206	3,938	3,732	189
1997	206	3,938	3,732	151
1998	532	3,938	3,406	109
1999	1,070	3,938	2,868	73
2000	319	3,938	3,619	73
2001	257	3,938	3,681	59
2002	206	3,938	3,732	48
2003	206	3,938	3,732	38
2004	206	3,938	3,732	30
2005	532	3,938	3,406	22
2006	206	3,938	3,732	19
2007	206	3,938	3,732	15
2008	206	3,938	3,732	12
2009	206	3,938	3,732	10
2010	206	3,938	3,732	8
2011	206	3,938	3,732	6
2012	532	3,938	8,502*	11*
Salvage(-)	5,096			
Total	17,007	108,655	91,648	1

* Values include salvage.

Rate of Return = 0.26

ECONOMIC TABLE 10-B

LEGASPI WATER SUPPLY PROJECT

INTERNAL RATE OF RETURN COMPUTATION

I

Cost Value with CONVERSION B

Year	Total Cost	Total Benefit	Net Benefit	Present Benefit
1982				
1983	1,224	-	-1,224	-1,224
1984	6,715	329	-6,386	-4,923
1985	3,700	2,593	-1,107	-658
1986	925	3,345	2,420	1,109
1987	206	3,938	3,732	1,318
1988	206	3,938	3,732	1,016
1989	206	3,938	3,732	784
1990	206	3,938	3,732	604
1991	486	3,938	3,452	431
1992	206	3,938	3,732	359
1993	206	3,938	3,732	277
1994	206	3,938	3,732	213
1995	206	3,938	3,732	164
1996	206	3,938	3,732	127
1997	206	3,938	3,732	98
1998	486	3,938	3,452	70
1999	926	3,938	3,012	47
2000	300	3,938	3,638	44
2001	249	3,938	3,689	34
2002	206	3,938	3,732	27
2003	206	3,938	3,732	21
2004	206	3,938	3,732	16
2005	486	3,938	3,452	11
2006	206	3,938	3,732	9
2007	206	3,938	3,732	7
2008	206	3,938	3,732	6
2009	206	3,938	3,732	4
2010	206	3,938	3,732	3
2011	206	3,938	3,732	3
2012	486	3,938	7,898*	4*
Salvage(-)	4,446			
Total	15,451	108,655	93,204	1

* Values include salvage.

Rate of Return = 0.30

ECONOMIC TABLE 10-C

LEGASPI WATER SUPPLY PROJECT

INTERNAL RATE OF RETURN COMPUTATION

Cost Value with CONVERSION C

Year	Total Cost	Total Benefit	Net Benefit	Present Benefit
1982				
1983	1,432	-	-1,432	-1,432
1984	8,110	329	-7,781	-6,272
1985	4,750	2,593	-2,157	-1,402
1986	1,236	3,345	2,109	1,105
1987	206	3,938	3,732	1,576
1988	206	3,938	3,732	1,270
1989	206	3,938	3,732	1,024
1990	206	3,938	3,732	826
1991	537	3,938	3,401	606
1992	206	3,938	3,732	536
1993	206	3,938	3,732	432
1994	206	3,938	3,732	349
1995	206	3,938	3,732	281
1996	206	3,938	3,732	227
1997	206	3,938	3,732	183
1998	537	3,938	3,401	134
1999	1,094	3,938	2,844	90
2000	322	3,938	3,616	93
2001	259	3,938	3,679	76
2002	206	3,938	3,732	62
2003	206	3,938	3,732	50
2004	206	3,938	3,732	40
2005	537	3,938	3,401	30
2006	206	3,938	3,732	26
2007	206	3,938	3,732	21
2008	206	3,938	3,732	17
2009	206	3,938	3,732	14
2010	206	3,938	3,732	11
2011	206	3,938	3,732	9
2012	537	3,938	8,964*	17*
Salvage(-)	5,563			
Total	17,702	108,655	90,953	-1

* Values include salvage.

Rate of Return = 0.24