

APPENDIX 8.2.1.B PROJECT COST WITH FOREIGN AND LOCAL CURRENCY
 BREAKDOWN (1986 Price Level, Bayombong-Solano)

SUMMARY

Phase I, Stage 1

	(Unit: thousand ₱)		
	<u>F.E.C</u>	<u>Local</u>	<u>Total</u>
Direct Construction Cost	10,903	8,816	19,719
Physical Cont. (8% of D.C.C.)	873	705	1,578
Sub Total	11,776	9,521	21,297
Leakage Detection	-	321	321
Detailed Design (10% of S.T. in Stage 1 & Stage 2)	2,002	2,001	4,003
Construction Supervision (4% of S.T.)	426	426	852
Total	14,204	12,269	26,473

Phase I, Stage 2

	(Unit: thousand ₱)		
	<u>F.E.C</u>	<u>Local</u>	<u>Total</u>
Direct Construction Cost	10,540	6,803	17,343
Physical Cont. (8% of D.C.C.)	843	544	1,387
Sub Total	11,383	7,347	18,730
Construction Supervision (4% of S.T.)	231	518	749
Total	11,614	7,865	19,479

Phase II

	(Unit: thousand ₱)		
	<u>F.E.C</u>	<u>Local</u>	<u>Total</u>
Direct Construction Cost	18,376	8,308	26,684
Physical Cont. (8% of D.C.C.)	1,470	665	2,135
Sub Total	19,846	8,973	28,819
Detailed Design (10% of S.T.)	1,441	1,441	2,882
Construction Supervision (4% of S.T.)	1,153	-	1,153
Total	22,440	10,414	32,854

The following tables show the breakdown of the project cost in each design year. The unit of all figures is thousand pesos. Project cost is further broken down into the Foreign Exchange Component and the Local Currency Component. Abbreviations in the tables are as follows:

COST	---	Construction Cost
C.FEC	---	Cost for Civil Work in the Foreign Exchange Component
C.DOM	---	Cost for Civil Work in the Local Currency Component
C.D.UNSKL	----	Cost for Unskilled Laborer of Civil Works in the Local Currency Component.
E.FEC	---	Cost for Equipments in the Foreign Exchange Component
E.DOM	---	Cost for Equipments in the Local Currency Component

$$\text{COST} = \text{C.FEC} + \text{C.DOM} + \text{E.FEC} + \text{E.DOM}$$

The exchange rates used in the cost estimates are as follows:

$$\text{₱}20 = \$1$$

$$\$1 = \text{₱}155$$

BAYUNGG-SULAWU		1988		1989		1990		1991					
No.	SOURCE FACILITY	COST	C.FEC	C.DUH	E.DUH	E.FEC	E.DUH	COST	C.FEC	C.DUH	E.DUH	E.FEC	E.DUH
1.0	1) Intake Box Rehabilitation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2) Drain Pipe #250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3) Valve #250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4) Radial Well	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5) Pumps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	6) Pump House	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.0	TRANSMISSION FACILITIES												
	1) Pipe Lines	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2) Valves	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	DISTRIBUTION FACILITIES												
	1) Reservoir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2) Pump Facility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3) Chlorination Facility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4) Electric Sub-station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5) Distribution Pipes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1) Main Pipes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2) River Crossing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3) River Crossing Material	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4) Valves	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5) Pressure Control Valve	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	6) Internal Network	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	7) Service Connections	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	8) Water Meter	524.0	2.7	27.8	6.4	66.9	9.6	107.0	2.7	27.8	6.4	66.9	9.6
	9) Lateral Rehabilitation	107.0	0.0	0.0	0.0	0.0	0.0	244.0	39.0	68.3	9.8	83.0	53.7
	10) Flow Meter	0.0	0.0	0.0	0.0	0.0	0.0	219.0	0.0	0.0	0.0	0.0	0.0
	11) Fire Protection	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SUB-TOTAL	637.0	2.8	28.4	6.6	596.0	9.8	630.0	868.5	1578.5	242.2	2684.4	1198.9
4.0	ADMINISTRATION BLDG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1) Administration Bldg	0.0	0.0	0.0	0.0	0.0	0.0	1090.0	98.1	445.9	54.5	392.4	152.6
	2) Operation Center	0.0	0.0	0.0	0.0	0.0	0.0	54.5	98.1	445.9	54.5	392.4	152.6
	SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	1090.0	98.1	445.9	54.5	392.4	152.6
5.0	LAND ACQUISITION	158.0	0.0	158.0	0.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Vehicle	300.0	0.0	300.0	0.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Stored Material & Equip.	12.0	0.0	12.0	0.0	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SUB-TOTAL	470.0	0.0	470.0	0.0	310.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	REPLACEMENT OF EQUIP.												
	1) Pumps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2) Chlorinator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3) Flow Meter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4) Water Meter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5) Operation Center	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	6) Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	7) Stored Material & Equip.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.0	LEAK DETECTION	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0
	SUB-TOTAL	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0
	GRAND TOTAL	1214.0	2.8	293.4	6.6	756.1	161.7	10710.0	1466.8	2915.8	411.7	3181.5	2145.9

BAYUNGG-SULAWU		1988		1989		1990		1991					
No.	SOURCE FACILITY	COST	C.FEC	C.DUH	E.DUH	E.FEC	E.DUH	COST	C.FEC	C.DUH	E.DUH	E.FEC	E.DUH
1	Spring Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Radial Well Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Electric Sub-station	0.0	0.0	0.0	0.0	0.0	0.0	2731.0	488.0	763.1	625.1	854.8	625.1
4	Transmission Facilities	0.0	0.0	0.0	0.0	0.0	0.0	58.0	4.9	34.3	14.7	15.1	14.7
5	Distribution Facilities	0.0	0.0	0.0	0.0	0.0	0.0	5139.0	854.0	1448.8	1143.9	1189.3	1124.3
6	Chlorination Facilities	0.0	0.0	0.0	0.0	0.0	0.0	793.0	9.6	96.4	37.0	9.6	96.4
7	Service Connection	637.0	2.8	28.4	6.6	596.0	9.8	1090.0	98.1	445.9	54.5	392.4	152.6
8	Land Acquisition	158.0	0.0	158.0	0.0	150.0	0.0	446.9	0.0	0.0	0.0	0.0	0.0
9	Admin Bldg & One-Ctr.	0.0	0.0	0.0	0.0	0.0	0.0	408.0	0.0	0.0	0.0	0.0	0.0
10	Vehicle & Stored Material	312.0	0.0	312.0	0.0	160.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Replacement of Equip.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SUB-TOTAL	1107.0	2.8	484.4	6.6	756.1	161.7	10003.0	1466.8	2808.8	411.7	4181.5	2145.9
12	Leak Detection	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0
	SUB-TOTAL	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0	107.0	0.0
	GRAND TOTAL	1214.0	2.8	293.4	6.6	756.1	161.7	10710.0	1466.8	2915.8	411.7	3181.5	2145.9

APPENDIX 8.2.1.C OPERATION AND MAINTENANCE COST (Bayombong-Solano)

(cost; thousand peso)

Item	Stage 1	Stage 2	Phase II
	Cost	Cost	Cost
Operation & Maintenance Cost			
Salary	920 p/M.M	475	541
Power	2.11 ₱/kWh	0	63
Chemical	31 ₱/kg	35	81
Miscellaneous		355	794
Maintenance		242	594
Total		1,107	2,073
			640
			409
			154
			1,441
			1,112
			3,756

APPENDIX 9.3.1 MARKET SURVEY

The market survey was conducted by interviews to the residents in the study area using the LWUA's interview sheet as per attached in the end of this section.

The total number of respondents and its estimated coverage ratio to the total number of households in the study area are as follows:

<u>Total Number of Respondents</u>	<u>Estimated Total Household</u>	<u>Coverage Ratio to Total Household</u>
5,808	14,276	41 %

The results of the market survey are obtained as shown in TABLEs 9.3.1.1 and 9.3.1.2.

From the market survey, the income distribution of the respondents is shown as follows:

<u>Income Bracket</u> ^{1/}	<u>Bayombong</u>		<u>Solano</u>		<u>Total</u>	
	<u>Ave. Pesos</u>	<u>Number</u>	<u>Ave. Pesos</u>	<u>Number</u>	<u>Ave. Pesos</u>	<u>Number</u>
₱900 and below	618	802	637	927	628	1,729
₱901 to ₱1500	1,233	737	1,215	899	1,223	1,636
₱1,501 to ₱2,500	2,040	396	2,089	445	2,066	841
₱2,501 to ₱4,500	3,339	321	3,363	319	3,351	640
₱4,501 and above	7,108	133	6,834	151	6,962	284

The existing sources of water of the respondents and their willingness to connect to each source of water are :

^{1/} Residential, excluding no-income and no-answer

TABLE 9.3.1.1 MARKET SURVEY SUMMARY
(Bayombong)

Total Number of Respondents: 2625

1. Distribution According to Building Type

	No.	%
a. Residential	: 2429	92.53
b. Commercial	: 196	7.47
c. Industrial	: 0	0.00

2. Distribution According to Source of Water

	No.	%
a. Connected to System	: 577	21.98
b. Neighbor's Connection	: 37	1.41
c. Public Faucet	: 10	0.38
d. Private System	: 1998	76.11
e. Water Vendor	: 0	0.00
f. Others	: 3	0.11

3. Average Persons Per Household

a. Residential / Number of Sample	: 5.85 /	2424
b. Commercial / Number of Sample	: 11.50 /	188
c. Industrial / Number of Sample	: 0.00 /	0

4. Willingness To Connect (%)

	Residential	Commercial	Industrial	Total
a. Yes	: 57.27	51.53	0.00	56.84
b. No	: 18.77	9.18	0.00	18.06
c. Undecided	: 3.17	2.55	0.00	3.12
d. W/ Own Conn.:	20.79	36.73	0.00	21.98

5. Average Monthly Water Needs

Type / Number of Sample	Residential	Commercial	Industrial
a. Kerosene Can / 2126	: 37.38	65.67	0.00
b. Drum / 202	: 4.92	6.82	0.00
c. Gallon / 42	: 16.00	132.50	0.00
d. Others / 197	: 46.85	18.33	0.00

6. Ave. Monthly Electric Bills for Residential Users (PESO): 72.31
Number of Effective Respondents : 1953

7. Income Distribution
(Residential, Excluding No-Income and No-Answer)

	AVE.PESO	NUMBER
a. P900 and Below :	618	802
b. P901 to P1500 :	1233	737
c. P1501 to P2500 :	2040	396
d. P2501 to P4500 :	3339	321
e. P4501 and Above :	7108	133

TABLE 9.3.1.2 MARKET SURVEY SUMMARY
(Solano)

Total Number of Respondents: 3183

1. Distribution According to Building Type

	No.	%
a. Residential	: 2827	88.82
b. Commercial	: 345	10.84
c. Industrial	: 11	0.35

2. Distribution According to Source of Water

	No.	%
a. Connected to System	: 409	12.85
b. Neighbor's Connection	: 44	1.38
c. Public Faucet	: 9	0.28
d. Private System	: 2636	82.81
e. Water Vendor	: 1	0.03
f. Others	: 84	2.64

3. Average Persons Per Household

a. Residential / Number of Sample	: 5.57 /	2823
b. Commercial / Number of Sample	: 5.54 /	337
c. Industrial / Number of Sample	: 10.60 /	10

4. Willingness To Connect (%)

	Residential	Commercial	Industrial	Total
a. Yes	: 49.17	56.23	27.27	49.86
b. No	: 34.21	18.26	0.00	32.36
c. Undecided	: 5.16	2.90	9.09	4.93
d. W/ Own Conn.:	11.46	22.61	63.64	12.85

5. Average Monthly Water Needs

Type / Number of Sample	Residential	Commercial	Industrial
a. Kerosene Can / 2824	: 37.05	43.61	57.22
b. Drum / 225	: 4.76	6.98	2.00
c. Gallon / 54	: 253.15	253.33	5.00
d. Others / 17	: 9.21	3.00	0.00

6. Ave. Monthly Electric Bills for Residential Users (PESO): 69.09
Number of Effective Respondents : 2322

7. Income Distribution

(Residential, Excluding No-Income and No-Answer)

	AVE. PESO	NUMBER
a. P900 and Below :	637	927
b. P901 to P1500 :	1215	899
c. P1501 to P2500 :	2089	445
d. P2501 to P4500 :	3363	319
e. P4501 and Above :	6834	151

<u>Sources of Water</u>	<u>Distribution</u>	<u>Willingness to Connect</u>	
		<u>Yes</u>	<u>No</u>
(1) Bayombong			
Connected to System	22	-	-
Private System	76	73	23
(2) Solano			
Connected to System	13	-	-
Private System	82	56	38
(3) Total			
Connected to System	17	-	-
Private System	80	63	31

The private system is the major source of water for the respondents. Only 1% of the respondents depend on neighbor's connection, public faucet, water vendors and others for water sources. From the above table, it is observed that the majority of the respondents are willing to connect to the waterworks system.

The following are the distribution of water sources and the respondent's willingness to connect according to income bracket also obtained from the market survey.

TABLE 9.3.1.3 DISTRIBUTION OF WILLINGNESS TO CONNECT BY INCOME BRACKET

Sources of Water	Income Bracket				
	P900 & below	P901- P1,500	P1,501- P2,500	P2,501- P4,500	P4,501- & above
(1) Bayombong					
Connected to System	11 %	20 %	28 %	34 %	36 %
Private System	86	78	71	64	64
Willingness to Connect					
Yes	56	58	61	55	53
No	30	18	9	8	7
Undecided					
With Own Connection					
(2) Solano					
Connected to System	6	10	14	22	30
Private System	88	87	83	73	66
Willingness to Connect					
Yes	43	51	58	57	50
No	46	34	24	17	15
Undecided	5	5	5	4	5
With Own Connection	6	10	13	22	30

From the above, it is observed that low income group mainly depends on private system while the high income group is gradually depending more on the existing system for water.

As the result of the market survey, the respondent's willingness to connect is summarized shown as follows :

<u>Answer</u>	<u>Bayombong</u>	<u>Solano</u>
Yes	57 %	50 %
No	18	32
Undecided	3	5
With own connection	22	13

Note : With respect to type of users, residential users account for 93% in Bayombong and 89% in Solano, respectively.

It is observed from the results of the survey that the over the half of respondents from all income brackets are willing to connect to the waterworks system.

Judging from the above, it seems that the majority of the residents are willing to connect to the new system when the expansion of the water supply system is completed in Bayombong-Solano.

INTERVIEW SHEET FORMAT USED IN THE MARKET SURVEY

Stop No.	Building Type		User Code	PPH	Willing to Connect	Ave. Water Needs	Ave. Elec. Bill	Average Monthly Family Income			Bldg. Cond. Code	Respondent
	Res	Com Ind						P900 and Below	P1,500 to P2,500	P2,501 to P4,500		
			City/Municipality	Barangay	Zone	Street						

1/ USER CODE
 C - Connected to System
 RC - Neighbor's Connection
 PF - Public Faucet
 PS - Private System (Elec./Hand Pump)
 V - Water Vendor
 O - Others, specify

2/ Consumption Code
 KC - Kero-Gan or Gray Container
 D - Drum
 G - Gallon
 O - Others

3/ Building Condition Code
 A - Very Good
 B - Good
 C - Fair
 D - Poor

I certify that the above information are true and correct.

Interviewer _____

APPENDIX 9.7.1 FINANCIAL INTERNAL RATE OF RETURN (FIRR)

In the calculation of Financial Internal Rate of Return (FIRR), the following two indicators are normally used to evaluate financial profitability of a project.

(1) Internal Rate of Return on Investment (IRROI)

The term IRROI indicates the internal rate of return on total capital investment, and assesses the profitability of the Project as a whole and the ability to recover funds invested in the Project.

The IRROI is calculated based on the assumption that the total capital investment is covered by its own capital. Therefore, the financial conditions such as the loan conditions on borrowed capital, changes on the ratio of equity to total capital requirement and others have no effect on the IRROI. Accordingly, the IRROI indicates the profitability of the Project itself.

(2) Internal Rate of Return on Equity (IRROE)

The term IRROE indicates the internal rate of return on equity, and assesses the profitability only with respect to equity and the ability to recover funds invested in the Project as equity. Here, the IRROE is calculated on the basis of such financial conditions proper to the Project as the loan conditions on borrowed capital and amount of capital owned.

In this study, the FIRR was calculated using the same method applied in the study report of the BACOLOD CITY WATER DISTRICT PHASE II WATER SUPPLY FEASIBILITY STUDY, DRAFT REPORT VOLUME 3 by LWUA.

APPENDIX 9.8.1 FINANCIAL RECOMMENDATION

The proposed water rates of 1/2 inch connections for commercial users, and 3/4 inch connections for domestic and commercial users to achieve financial self-sufficiency are as follows :

(1) Water rate for 1/2 inch connections of commercial users

<u>Period</u>	<u>Rate/ Unit</u>	<u>First 10cu.m</u>	<u>11-20cu.m</u>	<u>21-35cu.m</u>	<u>Above 35cu.m</u>
1988	P1.0	P 50.0	P 6.6	P 9.0	P12.0
1989	1.5	75.0	9.8	13.6	18.0
1990	2.0	100.0	13.0	18.0	24.0
1991	2.4	120.0	15.6	21.6	28.8
1992	2.6	130.0	17.0	23.4	31.2
1993	3.2	160.0	20.8	28.8	38.4
1994	3.4	170.0	22.2	30.6	40.8
1995	3.4	170.0	22.2	30.6	40.8
1996	4.2	210.0	27.4	37.8	50.4
1997	4.8	240.0	31.2	43.2	57.6

(2) Water rate for 3/4 inch connection of domestic users

<u>Period</u>	<u>Rate/ Unit</u>	<u>First 10cu.m</u>	<u>11-20cu.m</u>	<u>21-35cu.m</u>	<u>Above 35cu.m</u>
1988	P1.0	P 40.0	P 5.3	P 7.2	P 9.6
1989	1.5	60.0	7.8	10.9	14.4
1990	2.0	80.0	10.4	14.4	19.2
1991	2.4	96.0	12.5	17.3	23.0
1992	2.6	104.0	13.6	18.7	25.0
1993	3.2	128.0	16.6	23.0	30.7
1994	3.4	136.0	17.8	24.5	32.6
1995	3.4	136.0	17.8	24.5	32.6
1996	4.2	168.0	21.9	30.2	40.3
1997	4.8	192.0	25.0	34.6	46.1

(3) Water rate for 3/4 inch connection of commercial users

<u>Period</u>	<u>Rate/ Unit</u>	<u>First 10cu.m</u>	<u>11-20cu.m</u>	<u>21-35cu.m</u>	<u>Above 35cu.m</u>
1988	P1.0	P80.0	P10.6	P14.4	P19.2
1989	1.5	120.0	15.6	21.8	28.8
1990	2.0	160.0	20.8	28.8	38.4
1991	2.4	192.0	25.0	34.6	46.0
1992	2.6	208.0	27.2	37.4	50.0
1993	3.2	256.0	33.2	46.0	61.4
1994	3.4	272.0	35.6	49.0	65.2
1995	3.4	272.0	35.6	49.0	65.2
1996	4.2	336.0	43.8	60.4	80.6
1997	4.8	384.0	50.0	69.2	92.2

調査関係者リスト

LIST OF PERSONS CONCERNED

ADVISORY COMMITTEE MEMBERS

- | | |
|--|---|
| Dr. Kiyoshi Yamada | - Chairman of Committee,
Professor, Ritsumeikan University |
| Mr. Hisashi Watanabe | - Member, for Water Supply System Planning,
Nagoya City |
| Mr. Masahiro Takai | - Member, for Water Source Planning,
Kobe City |
| Mr. Tsutomu Sakagawa
(Predecessor:
Mr. Yoshiro Kaburagi) | - Member, for Water Supply System Planning,
Ministry of Health and Welfare |
| Mr. Shozo Matsuura
(Predecessor:
Mr. Yoichi Seki) | - Coordinator,
Japan International Cooperation
Agency (JICA) |

LWUA OFFICIALS

- | | |
|----------------------------|---|
| Mr. Porthos P. Alma Jose | - Administrator |
| Col. Carlos C. Leaño, Jr. | - Ex-General Manager |
| Mr. Salvador J. Rivera | - Sr. Deputy Administrator |
| Mr. Ibarra J. Olgado | - Deputy Administrator for Regulatory |
| Mr. Daniel I. Castillo | - Deputy Administrator for Finance |
| Mr. Vitaliano J. dela Vega | - Deputy Administrator for Engineering |
| Mr. Alfredo B. Espino | - Manager, Planning Department |
| Mr. Isidoro A. Yee | - Asst. Manager, Planning Department |
| Mr. Roberto B. Binag | - Manager, Water Systems Development
Division |
| Mr. Eriberto R. Calubaquib | - Manager, Water Resources Division |
| Mr. Antonio R. de Vera | - Project Manager IV |
| Mr. Armando T. Fernandes | - Manager, Construction Department |
| Mr. Arador R. Sambo | - Manager, Water District Formation/
Review Department |
| Mr. Francis C. Joven | - Manager, Formation of Water
District Division |

LWUA OFFICIALS (CONT'D)

Mr. Hector A. Dayrit - Manager, Rates Division
Mr. Teofilo R. Palaganas - Area Manager, Advisory Services Div.
Mr. Henry I. Pacis - Water District Development Officer
Mrs. Jean C. Leoncio - Manager, Loan Evaluation Division

OTHER AGENCIES

NIA CONSULTANTS INC.

Mr. Isidro Digal - Manager, Planning Division
Mr. Lorenzo N. Macaspac - Professional Mechanical Engineer

NWRC

Atty. Elena Luz J. Alojipan - Hearing Officer, IV

MWSS

Mr. Antonio E. Kaimo - Acting Department Manager, Planning and Design Department

ANGELES CITY

Mr. Francisco G. Nepomuceno - City Mayor
Atty. Filomeno Espiritu - City Treasurer
Mr. Filomeno M. Bonifacio, Jr. - City Engineer
Mr. Romeo P. Calara - Sr. Mechanical Engineer

DAGUPAN CITY

Mr. Liberato L. Reyna, Sr. - City Mayor
Mr. Cipriano M. Manaois - Ex-Mayor
Mr. Juanito A. Pajaro - City Treasurer
Mr. Silverio C. Coquia - Waterworks Superintendent
Mr. Manuel B. Ravanzo - City Development Coordinator

CABUYAO, STA. ROSA AND BINAN

Atty. Felicismo T. San Luis - Governor, Province of Laguna
Mr. Romeo G. Ballesteros - Provincial Civil Security Officer
Mr. Dante T. Reyes - Executive Assistant/Development
Coordinator
Mr. Catalino Caparas - Waterworks Supervisor, Province of
Laguna
Mr. Isidro T. Hildawa - Mayor, Municipality of Cabuyao
Mr. Cesar E. Nepomuceno - Mayor, Municipality of Sts. Rosa
Mr. Noe C. Zarate - Mayor, Municipality of Biñan
Mrs. Josefa L. Pradel - Municipal Development Coordinator,
Cabuyao
Mr. Felizardo P. Manto - Municipal Planning and Development
Coordinator, Sta. Rosa
Mr. Carito P. Torres - Municipal Census Officer, Sta. Rosa

BAYOMBONG AND SOLANO

Mrs. Belen F. Calderon - Governor, Province of Nueva Vizcaya
Mrs. Natalia F. Dumlao - Ex-Governor
Mr. Clamente G. Bacani - Provincial Secretary
Mr. Artemio P. Bahia - Provincial Attorney
Mr. Jesus M. Galata - Provincial Engineer
Mr. Tomas C. Garra - Supervising Project Analyst
Provincial Planning & Develop't
Office
Mr. Geoffrey B. Magday - Concurrent Provincial Waterworks Officer
Capt. Federico M. Bolusan - Provincial Waterworks Supervisor

Mr. John Bagasao - Mayor, Municipality of Bayombong
Mr. Lunbert Galima - Mayor, Municipality of Solano

STUDY TEAM MEMBERS

- | | |
|----------------------|---|
| Mr. Toru Hayashi | - Team Leader
Legistration/Organization
Nippon Jogesuido Sekkei Co., Ltd. (NJS) |
| Mr. Masatoshi Momose | - Water Supply System Planning, NJS |
| Mr. Chikara Amitani | - Water Supply System Planning, NJS |
| Mr. Masuomi Hiroyama | - Transmission/Distribution System Planning,
NJS |
| Mr. Hideaki Fukui | - Transmission/Distribution System Planning,
NJS |
| Mr. Takafumi Kiguchi | - Facility Design, NJS |
| Mr. Yukio Maejima | - Water Source Planning, NJS |
| Mr. Fumiaki Ichino | - Water Source Planning,
Richo Soil Investigation Co., Ltd. |
| Mr. Mitsuo Tsutsumi | - Well Development, NJS |
| Mr. Masaaki Awamoto | - Financial and Economic Analysis,
Techno Consultants, Inc. |

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MINUTES OF THE MEETING
MUNICIPAL WATER SUPPLY
PROJECT STUDY

Manila, March 25, 1986

Toru Hayashi

Toru Hayashi
Study Team Leader
Japan International
Cooperation Agency

[Signature]

Atty. Ibarra Oligado
Officer in charge
LWUA

[Signature]

J.H.

[Signature]

MINUTES OF THE MEETING

A series of meetings between JICA survey team and LWUA personnel regarding the Inception Report were held during March 18 to March 24, 1986 to confirm the objectives, scope of work and schedule for implementation of the study. Also discussed during the meetings were undertakings by both parties and approaches to the project.

The following are the items agreed upon:

1. Objective of the Study

The objective of the study is to prepare Basic Development Plan and Short Term Development Plan for the water supply projects in the following four project areas.

1. Angeles City, Pampanga
2. Dagupan City, Pangasinan
3. Cabuyao, Sta. Rosa and Binan, Laguna
4. Bayombong and Solano, Nueva Vizcaya

2. Scope of the Study

The study will be conducted in four (4) phases including works both in the Philippines and in Japan. The following are the outline of each phase:

2.1 Phase I: Formulation of Basic Development Plan

- a) Collection and review of data and information available
- b) Implementation of field survey
- c) Outline of Basic Development Plan
- d) Preparation of framework for the Feasibility Study
- e) Preparatory work for implementation of Phase II study

2.2 Phase II: Field Investigation for Preparation of Feasibility Study

- a) Field Investigation
 - o Geoelectric prospecting
 - o Test well drilling and pumping test
 - o Inventory of wells and pumping tests of selected existing wells
 - o Measurement of yield at springs

- o Testing of existing pumps
 - o Measurement of unaccounted-for-water and hydraulic survey
 - o Investigation of existing water supply facilities
- b) Study of availability of materials and equipment for construction and improvement of water supply facilities and capability of local contractors
 - c) Review of design criteria for design of proposed water supply facilities
 - d) Study of the alternative water supply schemes

2.3 Phase III: Preparation of Feasibility Study (Draft Final Report)

- a) Preliminary design of the recommended water supply systems among alternatives
- b) Recommendation on organization/management of the system and establishment of water districts
- c) Implementation schedule
- d) Cost estimation for construction, operation, and maintenance of the system
- e) Financial study

2.4 Phase IV: Preparation of Final Report

3. Approach to the Project

3.1 Development of Master Plan

- a) Study Area

Study of fundamentals for the development of Master Plan will be made covering the entire city/municipality. However, the plan for the water supply system should be limited to those areas to be covered by level II/III systems.

- b) Target Year

The base year for planning is 1986 in principle and target year is 2010. In addition, the years, 1990, 1995 and 2000 shall be considered although detailed study, such as breakdown of population by sub-area shall be only made for the present, 1990 and 2010.

J. H.

c) Plan of Water Supply System

Layout of the existing and proposed pipelines and other major facilities will be shown on the map

d) Rough Cost Estimates

Rough cost estimates will be made using cost data prepared by the LWUA for feasibility studies.

e) Water Sources

Based on the data on water resources collected during Phase I, applicable water sources will be recommended to meet the water demands and other conditions including socio-economic needs.

f) Establishment of the Water District

Information on the willingness by the cities and municipalities as well as present problem areas in management of the existing water supply systems will be collected and evaluated to make recommendations for implementation of the water supply project.

3.2 Preparation of Framework for the Short Term Development Plan

a) Previous reports, if any, prepared by the city/municipality will be reviewed. The subject area will be recommended in consideration of existing service area, potential water resources, needs and willingness of the inhabitants, and financial viability. Marketing surveys will be conducted by the LWUA financial specialists to support the study.

b) Target Year

The base year is 1986 in principle and target year is 1990 for the four project areas.

c) Water Sources

Existing water sources including springs and deep wells will be evaluated to their maximum safe capacities. Improvement of existing source facilities and new development requirements will also be studied.

- d) Preparatory work for the field survey during Phase II.

Most of the measurements in the field will be conducted during the Phase II. Since the work for test well drilling is critical, timely arrangement/procurement of equipment and material at the initial stage of the Phase II is indispensable. Detailed discussion to reach an agreement for the purpose between two parties will be made during the last two weeks of Phase I period reflecting the result of field survey and collected information. Responsibilities by each party for implementation of the field examination will be accomplished in accordance with the minutes exchanged on October 23, 1985.

4. Schedule for Implementation of the Study

4.1 Phase I

JICA team started field work from March 17 and is scheduled to finish its Phase I work on April 27. Discussions on the methodologies and required arrangements as well as collection and review of data will be conducted in Manila during first half of the study period. Field trip to the subject cities/municipalities will be done within two weeks during latter half of the study period. The outline of the basic development plan and framework of the short term plan will be prepared by the end of this Phase. Detailed schedule is attached herewith.

4.2 Phase II to Phase IV

Phase II field work is tentatively scheduled to start from the beginning of June 1986 and Final Report will be submitted at the end of February 1987 in Phase IV period.

5. Undertakings by JICA and LWUA

In accordance with the agreement between JICA and LWUA signed on October 23, 1985, each party will accomplish its responsibilities.

JICA

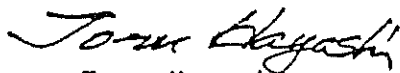
SCHEDULE FOR IMPLEMENTATION OF THE STUDY

<u>Date</u>	<u>Activities</u>
March 17 Mon	1st Group: Tokyo-Manila, visit to Japan Embassy & JICA.
18 Tue	A.M.: Courtesy call on LWUA, P.M.: Explanation of and discussions on Inception Report.
19 Wed	Discussions on Inception Report, data collection and required arrangements.
20 Thur	Preparation of minutes and data collection.
21 Fri	Exchange of minutes.
22 Sat	Inner meeting of Survey Team.
②③ Sun	- do -
24 Mon	Collection and review of data and information.
25 Tue	2nd Group: Tokyo-Manila, review of data and information.
26 Wed	. Analysis of data and information collected. . Preparatory work for the field survey
△27 Thur)	
△28 Fri)	
△29 Sat)	Analysis of data and information collected.
③⑩ Sun)	B Group: Manila-Dagupan/ C Group: Manila-Dagupan
31 Mon	A Group: Cabuyao, etc / Dagupan City
April 1 Tue	. Data collection . Data collection
2 Wed	. Field Survey . Field Survey
	. Discussions with officers . Discussions with officers
3 Thur	
4 Fri	
5 Sat	Preparation of Field/ Preparation of Field Report
⑥ Sun	- do - - do -
7 Mon	A Group: Angeles City / B Group: Bayombong & Solano
8 Tue	. Data collection . Data collection
9 Wed	. Field Survey . Field Survey
Thu	. Discussions with officers . Discussions with officers
11 Fri	

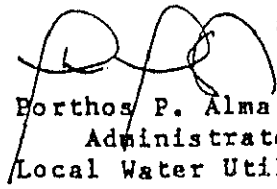
April 12	Sat	Preparation of Field Report	Preparation of Field Report
⑬	Sun	- do -	B Group: Dagupan-Manila
14	Mon	Review of data and information	
15	Tue	Preparation of Basic Development Plan and Framework of short term plan	
16	Wed	- do -	
17	Thur	- do -	
18	Fri	- do -	
19	Sat	- do -	
⑳	Sun	Preparation of Report	
21	Mon	Preparation of Report	
22	Tue	- do -	
23	Wed	- do -	
24	Thur	Meeting with LWUA	
25	Fri	Meeting with LWUA and visit to JICA and Embassy	
26	Sat	Inner meeting	
㉑	Sun	Manila - Tokyo	

MINUTES OF MEETING
MUNICIPAL WATER SUPPLY PROJECT STUDY

Manila, June 18, 1986



Toru Hayashi
Study Team Leader
Japan International
Cooperation Agency



Borthos P. Alma Jose
Administrator
Local Water Utilities
Administration

MINUTES OF THE MEETING

A series of meeting between the JICA study team and LWUA officials regarding the Phase II Study Program for the Municipal Water Supply Project were held from June 9 to June 18, 1986 to confirm the placement of the Progress Report, scope of work and schedule of implementation of the study. Also discussed during the meeting were undertakings by both parties and approaches to the Phase II Study.

The following are the items agreed upon:

1. Progress Report

The study team submitted ten (10) copies of the Progress Report to LWUA on June 8, 1986.

2. Contents of the Phase II Study

2.1. Plan of Water Supply System

A plan of water supply system for the years 2010 and 1995 shall be prepared showing relationship of the major facilities and shall be incorporated in the Final Reports.

2.2 Basic Development Plan

The Basic Development Plan (2010) is recommended in the Progress Report as a result of the alternative study including potential water sources and required facilities. Supplemental description and schematic drawings will be prepared. Cost comparison between alternatives will be made based on the present cost.

2.3 Short Term Development Plan

The water supply system for the immediate improvement (1995) should be planned considering the relation to the Basic Development Plan.

2.4 Hydraulic Calculation

Hydraulic calculation on the recommended water supply system should be carried out.

2.5 Target Year

The target year for the immediate improvement is 1995. Required study for the fundamentals will be made for the year 1986 (base year), 1995 (immediate improvement) and 2010 (long term development), respectively. Implementation schedule for the year 1990 may also be included as the stage 1 of the immediate improvement program.

J.H.



MM - 9



2.6 Design Criteria

Design criteria for feasibility study should follow the LWUA guidelines. To some extent, however, alternatives may be accepted if reasons are justifiable.

2.7 Composition of Reports

Composition of Interim Report and Draft Final Report will be finalized through the discussion between the Study Team and LWUA during the Phase II Study period.

3. Arrangement for Phase II Study

3.1 Land acquisition for Test Well Sites

LWUA shall at its own expense, be responsible for the land acquisition for test wells prior to the scheduled test well drilling.

3.2 Preparation for Drilling Equipment

In accordance with the Minutes of Meeting between JICA and LWUA dated October 23, 1985, LWUA shall at its own expense, be responsible for the provision of equipment for test well drilling.

One drilling rig shall be provided within the month of June, and another one beginning July.

Test well drilling in the three study areas shall be completed within the Phase II Study period.

3.3 Safekeeping of Materials for Test Wells

LWUA shall be responsible for safekeeping of materials for test wells which are supplied by JICA.

3.4 Field Survey

1. Schedule of the LWUA Engineers

Required arrangements be made by the LWUA according to the following schedule:

Rodolfo Oamil	:	6/16 - 7/15 (Angeles City)
Allen Lowe	:	7/16 - 8/15 (Cabuyao, Sta. Rosa, Biñan)
Abelardo Buencamino	:	6/16 - 7/13 (Dagupan)
Melchor Casil	:	7/13 - 8/16 (Bayombong & Solano)

Schedule for the two hydrogeologists will be decided after making arrangement of drilling machine.

J.H.

2. Living allowance and travel cost for LWUA Engineers

LWUA is responsible for LWUA Engineer and well drillers.

In accordance with the schedule, they may work on Saturday/Sunday, if necessary.

3. Vehicle arrangement

Land Cruiser : LWUA will provide a vehicle (Land Cruiser) for the survey in Dagupan and Bayombong and Solano from June 16 (Mon) to August 15, 1986.

4. Preparation of road map for Cabuyao, Sta. Rosa and Bifian.

LWUA (Allen) will prepare and confirm (in the area) the road network for the subject area planned in the progress report. Aerial photograph be utilized for this purpose. This work should be completed by the beginning of July.

3.5 Market Survey

LWUA shall conduct the Market Survey for Angeles City on the third week of June.

3.6 Water Quality Analysis

Necessary arrangements for water quality analysis will be made at the LWUA laboratory or other institutions.

3.7 Electric Logging Equipment

LWUA will provide the study team with a set of electric logging equipment.

3.8 Data on Unit Cost

LWUA shall assist the study team in the collection of necessary data for unit cost.

S.H.

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22 September 1986

MINUTES OF AGREEMENT BETWEEN LWUA AND JICA

Discussions on the Interim Report and the requirement for completion of the Draft Final Report were made between the two parties (JICA and LWUA) from September 18 to 22, 1986. Fundamentals for planning water supply system for the four study areas and basic approach/figures which were incorporated in the Interim Report were agreed upon discussions. In addition, the following major subjects were confirmed by the two parties:

(1) Completion of Test Well Construction

The scheduled test well construction at the three sites, Dagupan, Angeles, and Sta. Rosa is behind schedule due to the delay of procurement of well drilling equipment, repair of broken equipment, land acquisition for test well sites as well as unfavorable weather.

Under these circumstances, the parties agreed that LWUA will make all efforts to catch up with the delay of construction.


(2) Draft Final Report

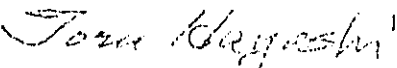
The major items to be included in the report are as follows:

- Chapter 1 Summary and Recommendations
- Chapter 2 General Background
- Chapter 3 Description of the Study Area
- Chapter 4 Existing System
- Chapter 5 Population and Water Demand Projections
- Chapter 6 Water Resources
- Chapter 7 Analysis and Evaluation of Alternatives
- Chapter 8 Recommended Plan
- Chapter 9 Financial Feasibility Analysis
- Chapter 10 Economic Feasibility Analysis
- Chapter 11 Organization and Management Study

Drawings to be prepared comprise general plan and standard drawings for major facilities.

Noted:


ALFREDO B. ESPINO
Planning Manager


TORU HAYASHI
Team Leader - JICA

MINUTES OF MEETING
MUNICIPAL WATER SUPPLY PROJECT STUDY

Manila, December 8, 1986

Toru Hayashi

Toru Hayashi
Study Team Leader
Japan International
Cooperation Agency

P. P. Alma Jose

Porthos P. Alma Jose
Administrator
Local Water Utilities
Administration

MINUTES OF THE MEETING

A series of meeting between JICA survey team and LWUA personnel regarding the Draft Final Report on Municipal Water Supply Project were held during the period December 2 to December 8, 1986 to present the report on the study and confirm its contents.

From Chapter 2 to Chapter 5, i.e., General Background, Description of the Study Area, Existing Water Supply and Sanitation Conditions, and Population and Water Demand Projections, no problem was noted since the contents of these chapters have already been discussed and concurred by both parties at the time the Progress Report and Interim Report were submitted.

The major items to be revised/supplemented are as follows:

Technical Aspect

1. Alternative study of transmission/distribution pipeline system

. Staged construction of pipeline:

An economic evaluation of staging construction of transmission and distribution mains will be studied and presented in the report. Two phases of construction should at least be considered taking into consideration the following recommended construction Phases:

Phase I	-	(1989-1995)
Phase II	-	(1996-2010)

. Alternative of pipeline routes: If there are available roads, 2 alternatives will be studied for major main routes. Others will be discussed and cancelled.

. Economic cost comparison

As per request of LWUA, economic evaluation will be made for the discount rate of 12 percent. The estimation using the rates of 10% and 15% will also be made for reference purpose.

2. Hydraulic calculation for the distribution network. The computation results of alternative and recommended distribution system will be incorporated in the Appendix.

3. Review and revise/supplement the alternative study, Chapter 7 with reference to the presentation.

4. Preparation of implementation schedule using bar-chart. Based on the implementation program shown in the Draft Final Report, bar-chart showing construction period by phase will be prepared for major facilities. That for Phase II is roughly prepared.

5. Preparation of a plan of water supply facilities showing the differences of construction phases. The scale of the plan may be approximately from 1/20,000 to 1/25,000.

6. Cost estimates

Required cost for the services of leakage detection and for repair/replacement of existing pipes and accessories will be added under the following conditions:

a) Old laterals: The subject length of the pipeline is 10-30% of the total length of existing laterals. Unit cost is that for new construction.

b) Service Connections: Required cost is estimated based on the unit cost given below

$\{ \text{P850 (material) + labor cost} \} \times \text{No. of existing connections}$

c) Cost for leak detection: P240/connect x No. of existing connections

7. Study of economical sizing of pump transmission mains.

Financial Aspect

1. Financial scheme should not include government grant since the policy of the LWUA changed two months ago. The soft loan may be utilized to supplement regular loan. LWUA can extend soft loans up to a maximum of 50% of the total project cost.

A certain percent of Water District equity to the total construction cost may be considered depending on the ability-to-pay of the W.D.

2. Per latest policy Engineering cost is computed as a fixed percentage of estimated construction cost (ECC). ECC is equal to the summation of basic construction cost, physical contingencies and price contingencies. The percentages are:

$\text{ECC} \leq \text{P20M} = \text{Engineering cost is 13\% of ECC}$

$\text{ECC} > \text{P20M} = \text{Engineering cost is 10\% of ECC}$

Construction supervision is 4% of ECC

3. Debt service table

a) Standard procedure = Regular loan can finance disbursements for the first four (4) years and soft loan for the next 4 years. However, the combination of the two types may be adopted.

b) Preparation of separate debt service tables for regular loan and for soft loan.

4. Preparation of a table for unescalated O & M costs

5. Equivalent volume of water sold

- Water consumption for the first 10 cu.m will be calculated using the total number of domestic connections and 10 cu.m/connection

- Range of water consumption maybe as follows:

- 1) First 10 cu.m,
- 2) 11-20
- 3) 21-35
- 4) over 35

The present percentages for the ranges from 11 cu.m to over 35 cu.m will be used for the calculation of the total equivalent volume.

6. Financial Internal Rate of Return (FIRR) computation

In conformance with LWUA procedure FIRR will be computed based on the total investment not just the portion funded by WD equity to measure the efficiency of the project as a whole.

The FIRR may at least be equal to the weighted average of the interest rates of the loans (regular and soft loans). The period for this analysis can be extended (20 to 40 years).

7. As per LWUA standards, fifteen (15%) percent inflation rate is used.

8. Economic Analysis

In consideration of the characteristics of the project, IERR may be lower than the desired level.

JICA