2.2.4 Implementation Plan

2.2.4.1 Implementation Policy

(1) Coordination with the Indonesian Implementation Organization

The overall responsible Indonesian organization is the Ministry of Settlement and Regional Infrastructure, which has a headquarters in Jakarta. This organization negotiates with financial source countries, controls overall aspects for the project implementation, performs the political aspects of the project, advises the regional counterpart organizations, and indicates and supports technical and financial aspects.

The local implementation organizations are Dinas Kimpraswil DIY, BAPEDA (Regional Development Planning Agency), BPKD (Regional Asset Management Agency), Dinas PU (Public Works), PDAM (Regional Water Supply Enterprise), etc.

(2) Project Implementation Procedure

For project implementation, the following are the main procedures performed:

① Conclusion of Exchange of Notes (E/N) between the Japanese Government and the Indonesian Government

② Conclusion of a contract between the Japanese consultant and the Ministry of Settlement and Regional Infrastructure

③ Preparation/execution of detail design, tender documentation, tendering and tender evaluation

④ Conclusion of contract between Japanese contractor and the Ministry of Settlement and Regional Infrastructure

⑤ Implementation of construction by the Japanese contractor and construction supervision by the consultant

⑥ Inspection, handover and evaluation after the completion of construction

(3) Basic Policy on Construction

① Construction of facilities shall be implemented in two stages due to the magnitude of the Project. Taking into account the construction completion period, subsequent pressure and flow tests on the pipes, and

other tests and the inspection period of the work, appropriate grouping and division of work units shall be made for the preparation of a work schedule.

② Registered and qualified local contractors shall be selected as sub-contractors in order to prepare an appropriate work schedule after splitting the work units and implementation effectively.

③ Access roads and approach roads within the properties for distribution tanks shall be constructed by Indonesian contractors. However, temporary roads and temporary works shall be carried out by a contractor assigned for this project to enable utilization of Japanese construction experience. The temporary works shall be restored immediately after completion of the work.

④ Out of the major facilities, installation of the transmission and distribution pipes shall be basically made on the shoulder of the road taking into account safety with the traffic as well as durability of the installed pipe against over loading. At the same time, as most of the working site will be on the road, care shall be taken with the traffic during the construction.

(4) Policy on Procurement of O&M Machinery and Material

As PDAM that is operating and maintaining water supply facilities everyday does not have a sufficient number of maintenance machines, satisfactory repair work has not been done in recent years. In order to cope with such a situation, the Government of Indonesia requested that the Japanese Government provide a grant for O&M machines and tools, including pick up trucks for carrying them (which are the so called “Mobile Workshops”), aiming at strengthening O&M capability as well as capacity building. Taking into account such background, the basic design study concluded that these machines should be procured as a part of the Project.

After the completion of this Project, expanded operation and maintenance works should be implemented appropriately and smoothly. However, the current technical and physical capability of PDAM for this O&M work is not sufficient. If the O&M work is not carried out satisfactorily, the Project will not be completed with success. For example, i) no O&M ledger has been prepared, ii) no O&M work and material procurement record has been prepared, and iii) these data are not available to see at the appropriate time. This work should be

in operation by the time of completion of the Project. For this purpose, the most effective method is to fully utilize personal computers, and education and training to obtain the necessary skills is indispensable.

An O&M ledger needs to be prepared using a computer to prepare files with facility drawings in the computer and to save information including the location's name, history of repair, contents of works, dates, costs and staff involved. When the repair work has been newly carried out, the data should be saved in the right place in the file as soon as possible. Another problem, as mentioned in ii) above, is that the list and data concerning O&M works are not appropriately filed in the computer. The files should be found and identified at the right time when PDAM plans new O&M works and also when it plans to procure budget for O&M works.

For such effective O&M work implementation with a ledger, a personal computer is indispensable. In the course of this Project, the procurement of a personal computer was planned to improve the future O&M implementation system. The start of O&M works using computer is scheduled at the end of the first phase of construction work and the above i) to iii) shall be performed as a part of "On the job training". The detailed method of education and training are shown in sub-section 2.5 - Implementation of Soft Component.

The education and training as a part of the soft component will be monitored by the consultant until the end of the second phase of construction work and also until the "Defect Inspection" is finished one year after the completion of the construction work.

The procurement of the personal computer will be made together with the procurement of machinery and materials needed for the Project by the contractor.

2.2.4.2 Implementation Conditions

(1) Utilizing Local Contractors

The Japanese contractor will utilize local contractors for the construction of this Project. The local contractors are registered at national, provincial and regional levels. For selection on this Project, the work unit concerned, its construction capacity, and experience of similar projects in the past, should be

scrutinized for effective and smooth operation of the Project. These local contractors will be used extensively and effectively to achieve the desired effect in keeping communication, negotiation and solving problems with the local residents.

(2) Tax Exemption

Application and arrangement of tax issues are complicated concerned with relevant governmental authorities and organizations as well as various types of laws and regulations, and a lot of time will be consumed to solve these matters. The initial action will be taken by the Ministry of Settlement and Regional Infrastructure. However, the taxation issue is not always smooth due to many difficulties with importing activities. Therefore, timely action and response will be necessary by the consultant and the contractor. In this respect, both the consultant and contractor should have adequate knowledge concerning the taxation system to deal with problems and prior to application of the necessary documents.

(3) Consideration on Environmental Issues

In the Basic Design Study, Initial Environmental Examination (IEE) was implemented by the Study team in accordance with Guideline of JICA and it was identified that there is no serious environmental impact which necessitates implementation of EIA. During the construction, occurrence of noise, dust, vibration, water contamination and traffic problems will be only anticipated. In order to cope with these problems, adequate countermeasures and monitoring should be undertaken before and after starting the construction. At the same time, remedial action to comply with laws and regulations, informing the police office, provision of instructors at the construction site and reporting and coordination with the relevant organizations for this Project should be considered.

Meanwhile, Environmental Monitoring/Management Effort is required in accordance with the Indonesian laws and regulation. The implementation organization will perform this study of Environmental Monitoring/Management Effort and submit the results to JICA prior to the conclusion of Exchange of Notes.

2.2.4.3 Scope of Works

(1) Responsibility of Japanese Side

i) Detail design
ii) Preparation of tender documents, evaluation and support of contract activities
iii) Construction of water supply facilities

(2) Responsibility of Indonesian Side

i) Land acquisition for the facilities (sedimentation, distribution tanks, pumping facilities, transmission and distribution pipes, etc.)
ii) Sweeping and compensation for plants in private land along the road
iii) Provision of fences and parking lots around the area of the sedimentation basins, distribution tanks, pumping stations, etc.
iv) Installation work with house connection pipes
v) Access roads to the major facilities
vi) Importing and value added taxes, surcharge and budget allocation
vii) Application for construction permission and authorization and payment of necessary fees
viii) Provision of necessary counterpart staff.

2.2.4.4 Consultant Supervision

As for the construction supervision, it has been divided into two parts: pre-construction and construction periods as shown below. The pre-construction period comprises the detail design, tendering and support for the tender evaluation. The construction period comprises supervision and arrangements.

(1) Detail Design and Tendering

1) Detail Design

In compliance with the Basic Design Study, detail design and tender documents will be prepared.

- Execution of detail design of major facilities
- Preparation of design report and design drawings

- Preparation of bill of quantities and cost estimates
- Preparation of construction plans and tender documents

2) Tendering

Prior to selection of the contractor, pre-qualification of tenderers will be executed. The announcement for the tender will be made on the Japanese major construction/economic newspapers in the name of the Ministry of Settlement and Regional Infrastructure. The consultant will prepare the tender documents and deliver them to selected contractors. The contractors (registered in Japanese nationality) selected through the pre-qualification will receive tender documents from the consultant.

The consultant will receive tender documents and open them in front of responsible Indonesian governmental staff. The selected contractor will negotiate with the consultant and conclude the contract with the Indonesian Government. The consultant will be involved in the following works by assisting the Ministry of Settlement and Regional Infrastructure.

- Tender announcement
- Preparation of Pre-qualification document, delivery and evaluation
- Delivery and receiving of Tender documents, evaluation of them, and negotiation for contract

(2) Construction Supervision

With the approval of the Japanese Government for the contract, the consultant will issue a notice to proceed and start construction supervision. After starting the construction, the inspector responsible for the supervision will stay at the construction site till the end of the work supervising the construction, reporting to the Embassy of Japan, the JICA Indonesian office and the Ministry of Settlement and Regional Infrastructure.

The inspector will play a significant role by communicating and coordinating with relevant organizations together with the contractor. The major activities of the inspector are as follows:

1) Evaluation of construction drawings : Obtaining construction drawings from the contractor, checking permission and authorization, checking specimens, evaluation and approval of specifications of machinery,

2) Supervision of work : Supervising work schedules, checking procedures of work units, analysis and indication, inspection of tests, trouble shooting,

3) Approval of payment : Issue of certificates for payment, completion certificates and confirmations of fee-for-service,

4) Defect inspection : Inspection after one year.

2.2.4.5 Quality Control Plan

Quality control plan for the project applies to concrete work, pipe laying work and equipment. The quality control items are shown in Table 2.2.3.

Table 2.2.3 Quality Control Plan

Item	Test	Method
1. Concrete work	- Slump test - Compression test	- one time per 50m^3 - ditto (7 days and 28 days)
2. Pipe laying work	- Hydraulic test	- 1.5 times maximum dynamic water pressure of pipes
3. Equipment	- Shop inspection	- Witness of inspection - Check/review of test report

2.2.4.6 Procurement Plan

The machinery and materials necessary for this Project shall be procured in Indonesia. Civil machines will be basically procured in Jogjakarta and Gunungkidul, and the materials such pipes, valves and pumps, which are largely required in quantity, will be procured in the major large cities such as Jakarta and Surabaya.

The major machines for the construction will be back hoes, bulldozers, track cranes, breakers, etc. and are comparatively small in their sizes except for the

trailers for carrying them. The machine supply shall be a leasing contract provided from Jogjakarta.

For the provision of concrete, there is an alternative way by acquiring ready mixed concrete in Jogjakarta. However, due to economics, concrete plant will be provided at site using a batch mixer, and pressure testing for sample pieces will be carried out at the same place.

2.2.4.7 Soft Component Program

(1) Background of the Implementation

The Project is to plan and construct intake facilities, transmission and part of the distribution pipe system, and pumping facilities aiming at expanding and renovating Ngobaran and Baron water supply systems. The existing facilities, such as distribution pipes, are planned for continuous utilization in the future, so it is important to operate and maintain these current facilities appropriately to achieve the target supply ratio.

However, water supply facilities have not been checked or repaired periodically and comprehensively, and the O&M system has not been in a desirable condition for a long time. In particular, “as built” drawings, indispensable for inspection and repair, have not been retained in the office and the ledgers for carrying out maintenance work have not been compiled, resulting in the current poor condition of the facilities.

Furthermore, as the maintenance work on the pumping facilities and distribution tanks in the Project area is being maintained manually by PDAM staff, an automatic pump operation device was planned for this Project. However, PDAM has no experience in handling the device and technical education and training as a part of this Project have become necessary. In addition, it was identified that the turbidity of the source water rises during rainy seasons and the water contains more coliform than the drinking water standard allows. Therefore, education and training for water quality control technology is also necessary.

Meanwhile, for continuous operation and maintenance work after completion of the Project, a suitable water charge collection by PDAM is indispensable. However, in the past, periodic meter reading, calibration, and management of

claims from the residents have not been dealt with in a timely manner, and delay of collection of water charges and lowering of the collection ratio are often observed. Furthermore, PDAM staff have not acquired full knowledge of financial management, bringing about a chronic budget deficit, so a remedy is essential to create financial health, including increasing the water charge, introducing a subsidy and acquiring management skills.

In order to solve technical and financial problems with the operation and maintenance work of the facilities, it is judged that PDAM's own effort will not be enough. Therefore, it was decided to conduct a soft component activity to strengthen technical skill for operation and maintenance and also increase financial management capability. In this regard, the organizations that belong to the Project Implementation Unit other than PDAM also play key roles in the project management and monitoring activities. Therefore, these organizations should also be included in the target group for the soft component program. In a like manner, the organizations, such as the Ecobang and the Dinas PU, which belong to Gununkidle regency, are also deeply related in the financial activities, and these organizations should also be included in the target group for the soft component program.

(2) Implementation Target

In the plan for the soft component, the following target was established.

1) The water supply facilities to be constructed under this Project are to be appropriately and effectively operated and maintained by PDAM staff by inspecting and repairing the facilities and controlling water quality by themselves.

2) By implementing water charge collection and correct accounting management in compliance with accurate knowledge of financial management by PDAM staff, their financial management capability will be strengthened.

In the selection procedure for the necessary staff, the specific conditions were taken into consideration. Generally speaking, it is not an easy task to find competent financial and accounting specialists for this soft component program in Indonesia, particularly in the Gununkidle regency. The Project is planned to be implemented under the Japanese Grant Aid Scheme and some Japanese

technical experts are supposed to be dispatched in the course of the Project. In this regard, the Indonesian counterpart strongly wishes to make use of this opportunity and wishes to learn Japanese technology and financial and accounting skill in parallel with the Project execution. Taking into account such circumstance, it was determined to select Japanese technical and financial experts as the main staff in the soft component program.

(3) Expected Effect

In the course of execution of the soft component program, the achievement of satisfactory technical settlement to the recipient is targeted including preparation of the implementation manual for the accounting program, the operation manual for automatic control devices and the water quality control manual. In each manual, strengthening of the capacity building of the responsible organizations and clarification of each responsibility will be requested. At the same time, establishment of preferable circumstances for the sustainable operation and maintenance regimes will also be targeted and programmed. Throughout such activities, it is duly believed that the resultant effect of the soft component will become sustainable.

The expected effect of implementing the soft component will be as follows:

1) Expected Effect on the Technical Aspects

① The Ledger for the facilities, including pumps and pipes, etc., will be appropriately managed and activities of periodic inspection and repair work will be entrenched.

② Skill in handling an automatic pumping control system will be entrenched.

③ Water quality control and O&M skill will be entrenched.

2) Expected Effect on the Financial Aspects

① Capability of handling accounting procedures will be advanced.

② Meter reading and water charge collection will be periodically implemented.

③ Claims on issues from residents will be smoothly addressed.

(4) Confirmation of Accomplishment of Performance

1) Expected Effect on the Technical Aspects

i) Appropriate management of the ledger and entrenchment of periodic inspection and repair works

Prior to inspection and repair of facilities, the procedure of preparing the ledger should be exercised. In the soft component, the ledger for the facilities to be implemented in the Project will be prepared. Other facilities will be clarified by an inventory survey undertaken with Indonesian finance and thereafter PDAM staff will complete the ledger by themselves. Achievement of performance will be confirmed by evidence of preparation of the ledger and subsequent progress of inspection and repair work activities.

ii) Skill of handling the automatic pumping control system

An operation manual for the automatic pumping control system will be prepared first. Then a practical method of operating and recording will be introduced. Achievement of technical entrenchment will be confirmed by using a check list and subsequent monitoring activities.

iii) Water quality control and O&M skill

After preparation of manuals for water quality control and facility O&M, the exercise of monitoring by the staff of PDAM using a computer will be implemented. Achievement of the entrenchment of skills will be confirmed by using a checklist.

2) Expected Effect on the Financial Aspects

In the course of the Project implementation within the period of two years, the frequency of visiting Indonesia by the experts was planned at three times providing that the implementation of the financial soft component will be performed after the computer devices have been delivered.

i) Capability of handling of accounting procedures

Current accounting procedures done by manual calculation will be improved by using a computer. For that purpose, an accounting program and operational manual will be prepared and introduced. The performance achievement will be confirmed by using a check list and monthly accounting data and records. The computer processing will include only the basic programs such as using Excel spreadsheet software. Many of the trainees from the relevant organizations in the Gunungkidul regency are

to be invited to this training course.

ii) Meter reading and water charge collection

The present method of meter reading and water charge collection will be renewed and a system of monitoring implementation will be established. Achievement will be confirmed by monitoring compliance of meter reading and water charge collection.

iii) Addressing claims from residents

The records of previous claims will be compiled into the computer. The facilities repaired in compliance with the claims will be input on the facility ledger. Performance achievement will be confirmed by monitoring the activities of addressing the issues and comparison with the ledger entries.

(5) The Contents of Main Activities

1) Activities on Technical Aspects

① Preparation Stage

- Preparation of works (Explanation of soft component on technical aspects and request for cooperation)

② Execution Stage

- Exercise for facilities planning and design
- Inspection and repair of pump and pipe facilities and ledger management exercise
- Technical exercise for automatic control devices
- Technical exercise for water quality control

③ Monitoring Stage

- Confirmation and verification of above items

2) Financial Activities

① Preparation Stage

- Preparation of works (Explanation of soft component on financial aspects and request for cooperation)

② Execution Stage

- Financial management guidance
- Introduction of accounting program and exercise
- Establishment of water charge collection system

- Advancement of customer service

③ Monitoring Stage

- Confirmation and verification of above items

Details of activities, content of activities, trainees, methods, lecturers, periods and results performed are shown in Table 2.2.4.

(6) Assignment of Implementing Staff

For the procurement of the staff for preparation, implementation and performance of the program, experts from Japan were selected considering the fact that in the past, the endeavors of the Indonesian side working alone did not bring successful achievement, and the necessary number of competent experts could not be found in Indonesia. The number and necessary man/months for the Japanese experts however are limited to a minimum, while the involvement of the local consultants is expected as much as possible.

Assignment of Implementing Staff will be as follows:

1) Japanese Consultant Staff: 1 Engineer

Preparation of technical planning, implementation schedule and overall control program as well as reporting to relevant Japanese organizations and coordination with relevant Indonesian implementation organizations will be carried out. In parallel, a facilities ledger and manuals for automatic pumping control devices and water quality control with technical guidance will be prepared. Technical instruction will be given to a local consultant who will take the position while the Japanese expert is away from the assignment.

2) Japanese Consultant Staff: 1 Economic/financial Expert

Preparation of financial planning, implementation schedule and overall control program, as well as reporting to relevant Japanese organizations and coordination with relevant Indonesian implementation organizations will be carried out. In particular, preparation of an accounting program and strengthening of guidance have been intensively requested by the Indonesian side, so importance will be attached to this point. Technical instruction will be given to a local consultant who will take the position while the Japanese expert is away from the assignment.

3) Local Consultant Staff: 2 Experts

One technical and one financial expert from local consultants will be selected. They will assist the above mentioned Japanese experts in the work and act in place of Japanese experts while they are away from the assignment.

Table 2.2.4 Contents of Activities for Soft Component Program

Technical Aspect

Work Item	Target Organization	Person	Implementation Method	Person in Charge	Duraition	Report
Preparation Period						
1. Preparation Works (Explanation of Technical Portion)	PDAM, Recenvy(Dinas PU, BAPPEDA, Ekobang)	5+10	Explanation and discussion	Foreign/local consultant	1day	
Implementation Stage						
2. Exercise of Plan and Design of Facilities	Dinas PU, PDAM(Planning Section)	5+5	Lecture	Foreign/local consultant	3 day	
3. Inspection and Repair of Pumps and Pipes						
a Preparation of ledgers, exercise of operation	PDAM(Planning, Production, Distribution Sections)	5+30+20	Discussion and exercise with PDAM	Foreign/local consultant	1 week	Facility ledger
b Preparation of O&Mrecord and exercise of monitoring	PDAM(Production)	30	Discussion and exercise with PDAM	Local consultant	5 day	Operation record
c Inspection of pumps, exercise of preparation of ledger	PDAM(Production)	30	Discussion and exercise with PDAM	Local consultant	5 day	
d Inspection of pipes and meter, repair and preparation of ledger	PDAM(Distribution)	20	Discussion and exercise with PDAM	Local consultant	10 day	
4. Exercise of Autoatic Pump Control Devices						
a Preparation of manual	PDAM(Production)	5	Preparation of manual	Foreign/local consultant	1 week	Opration manual (Indonesian)
b Technical Guidance	PDAM(Production)	5	Lecture and guidance along the manual	Foreign/local consultant	3 day	
c Preparation, establishment of monitoring and managing	PDAM(Production)	30	Lecture, guidance at site	Foreign/local consultant	2 day	Opreration record
5. Exercise of Water Quality Control						
a Preparation of manual	PDAM(Production)	30	Discussion with PDAM and preparation of manual	Foreign/local consultant	1 week	Water sulity manual (Indonesian)
b Exercise of Watr Quality and O&M	PDAM(Production)	30	Lecture and guidance at site	Foreign/local consultant	3 day	
c Preparation of water quality record and system	PDAM(Production)	30	Lecture and guidance at site	Local consultant	2 day	Water quality record
Monotoring Stage						
6. Follow up of above items						
a Record, monotor, confirm procedure	PDAM		Check of records for items 3,4,5	Foreign/local consultant	2 week	
b Confirm entrenchment of auto. pump device and quality control	PDAM, Dinas PU		Technical comprehension test and discussion	Foreign/local consultant	2 week	Check list

Financial Aspect

Work Item	Target Organization	Person	Implementation Method	Person in Charge	Duration	Report
Preparation Period						
1. Preparation Works (Explanation of Financial Portion)	PDAM, Regency (Dinas PU, BAPEDA, Ekobang)	5+10	Explanation and discussion with the organization	Foreign/local consultant	1day	
Implementation Stage						
2. Exercise of Financial Management						
a Confirmation of Indonesian guideline	PDAM(Accountant), Regency(Ekobang), Province(BPKP)	3+2+2	Discussion for guideline	Foreign/local consultant	1week	
b Confirmation fo Depreciation Item	PDAM(Accountant), Regency(Ekobang), Province(BPKP)	3+2+2	Study for depreciation ledger	Foreign/local consultant	1week	
c Confirmation of budget allocation(including subsidy)	PDAM(Accountant), Regency(Ekobang)	3+2	Discussion with PDAM and Regency	Foreign/local consultant	3day	
d Cash flow management study	PDAM(Accountant), Regency(Ekobang)	3+2	Discussion with PDAM and Regency	Foreign/local consultant	3day	
3. Accounting Program Exercise						
a Discussion of program and basic planning	PDAM(Accountant),	10	Discussion with PDAM	Foreign/local consultant	1week	
b Accounting program and implementation	PDAM(Accountant),	10	Preparation for accounting program	Foreign/local consultant	2week	Accounnting program
c Orepation of accounting program manual	PDAM(Accountant),	10	Preparation of manual	Foreign/local consultant	2 week	Accounnting program,manual
d Exercise of accounting program	PDAM(Accountant),	10	Guidance of manual	Local consultant	2.5Month	
4. Estabblishment of Water Charge Collection						
a Review of charge collection schedule	PDAM(Distribution),	20	Discussion with PDAM, preparation of schedule	Foreign/local consultant	3day	
b Establishment of charge collection and monitoring	PDAM(Distribution),	20	Lecture and guidance at site	Foreign/local consultant	3day	
5. Improvement of Customer Service						
a Prelaration of claim ledger and exercise	PDAM(Customer Service),	5	Preparatio of ledger, guidance for claim dealing	Foreign/local consultant	3day	Claim ledger
b Establishment of monitoring system	PDAM(Customer Service),	5	Lecture and guidance at site	Foreign/local consultant	3day	
Monotoring Stage						
6. Follow up of above items						
a Confirmation of comprehension	PDAM(Accountant),	10	Confirmation of comprehension	Foreign/local consultant	3week	Check list
b Confirmation of accounting procedure	PDAM(Accountant), Regency(Ekobang)	3+2	Confirmation of contents	Foreign/local consultant	2week	
c Confirmation of data and monitoring procedure	PDAM(Distribution),	2-+5	Charge collection, claim data filing	Foreign/local consultant	3week	

(7) Implementation Schedule

The implementation schedule for the soft component is shown in Figure 2.2.1. The advancement of accounting treatment and financial capabilities will not be expected in the short term. At the end of first and second fiscal year, a Japanese financial consultant will be dispatched again to confirm the achievement of performance.

The engineering consultant for the technical soft component will be dispatched at the time of completion of the first and the second stages of construction at the end of fiscal year.

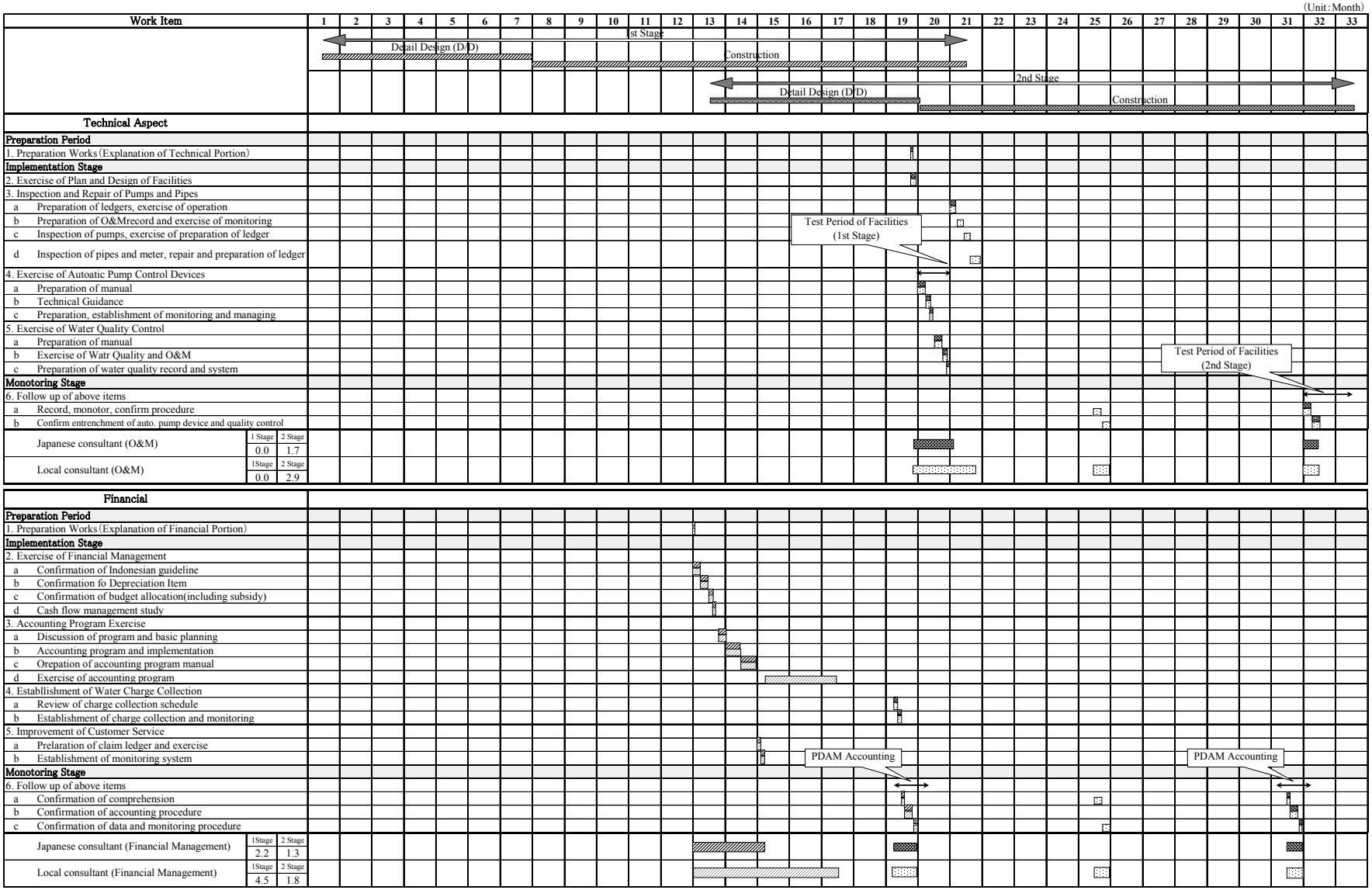


Figure 2.2.1 Implementation schedule for Soft Component program

(8) Reports

Resulting output for the soft component activities are shown in Table 2.2.4. In addition to the completion reports to be submitted to both the Indonesian and Japanese sides, two monitoring reports and other reports are to be prepared including reference data comprising pump control records and inspection monitoring, a facilities ledger, an operation manual for automatic pump control devices and its operation records, a water quality control manual and records, an accounting program and execution manual, a comprehension check list, and claim records.

(9) Preliminary Cost Estimates for the Soft Component

Preliminary cost estimates for the soft component are as follows.

Unit: JP Yen

	Remuneration	Direct Expenses	Indirect Expenses	Total
1st stage	1,386,000	3,319,000	1,774,000	6,479,000
2nd stage	1,890,000	4,448,000	2,419,000	8,757,000
Total	3,276,000	7,767,000	4,193,000	15,236,000

The conditions for the cost estimate are as follows.

1) Condition

i) Period of cost estimate: November 2004
ii) Exchange rate: Rp 1 = Yen 0.0122
iii) Implementation period: 2 stages as shown in Figure 2.5.1

2) Cost Items

i) Direct expenses

a. Travel fees, hotel accommodation and per diem
b. Transportation
   Leasing fees for 2 vehicles for the Japanese and local experts during the period
c. Domestic travel fees in Indonesia
   Domestic air fares between Jakarta and Jogjakarta
d. Local staff fees
   Remuneration of local consultant

e. Other submission documents

Manuals and records

f. Translation

For suitable translation of the manuals from English to the Indonesian language, the staff of the local consultant is not generally suitable. Thus, a bi-lingual translation fee is included.

ii) Remuneration

Grade of Japanese experts are based on JICA's classification

iii) Indirect expenses

General overhead: 90% of remuneration

Technical overhead (Remuneration + general overhead) x 20%

(10) Responsibility of Indonesian Side

To achieve the objectives of the soft component there needs to be continuous operation and maintenance of facilities and financial management by the relevant implementation organizations, and it is the responsibility of the Indonesian side to do so. The problems and countermeasures to be considered and to be taken in the future in order to establish a healthy water supply business are as follows.

1) The supply area will expand drastically through increasing the volume of the water supply by implementing the Project. On the other hand, complicated, extensive and multidisciplinary operation and maintenance activities will become indispensable. In order to meet this requirement it will be duly necessary to maintain the bare minimum stocks of construction materials, to achieve timely procurement of goods from the market, appropriate arrangement of manpower, and allocation of the necessary budget.

2) Inventory surveys necessary for preparation of a facilities ledger need to be implemented at the expense of the Indonesian side. However, there is a fear that some parts of the ledger will be incomplete due to lack of inventory surveys in some areas. Therefore, the inventory surveys, as well as preparation of the ledger, should be commenced as soon as possible and completed prior to the completion of the Project by obtaining finance from the relevant organizations on the Indonesian side.

2.2.4.8 Implementation Schedule

In this project, Baron and Ngobaran water supply areas are close to each other. Therefore, the proposed construction work will be congested at the site and similar work such as concrete casting, laying of pipes and testing should be carried out in a timely manner and effectively. For these reasons, the implementation of the Project was divided into two stages. The construction works of the first stage comprise the Baron intake facilities, Baron Atas sedimentation basin, Congo, Bulu, and Kemadang Baru distribution tanks and transmission and distribution pipes. In this connection, the work on Bulu and kemadang Baru distribution tanks are supposed to be spread over the stages, and only the pump station building will be completed in the 1st stage. The pump unit will be installed in the 2nd stage. The remaining works will also be carried out in the 2nd stage.

The implementation schedule, including the detail design, tendering and above mentioned construction, is shown in Figure 2.2.2. The necessary periods for the major works are shown as follows:

1st Stage Period	
(1) Detail design	3.5 months
(2) Tendering, evaluation and contract	3.5 months
(3) Construction	13 months
(4) Soft Component	4.5 months
2nd Stage Period	
(1) Detail design	3.5 months
(2) Tendering, evaluation and contract	3.5 months
(3) Construction	13 months
(4) Soft Component	4.2 months

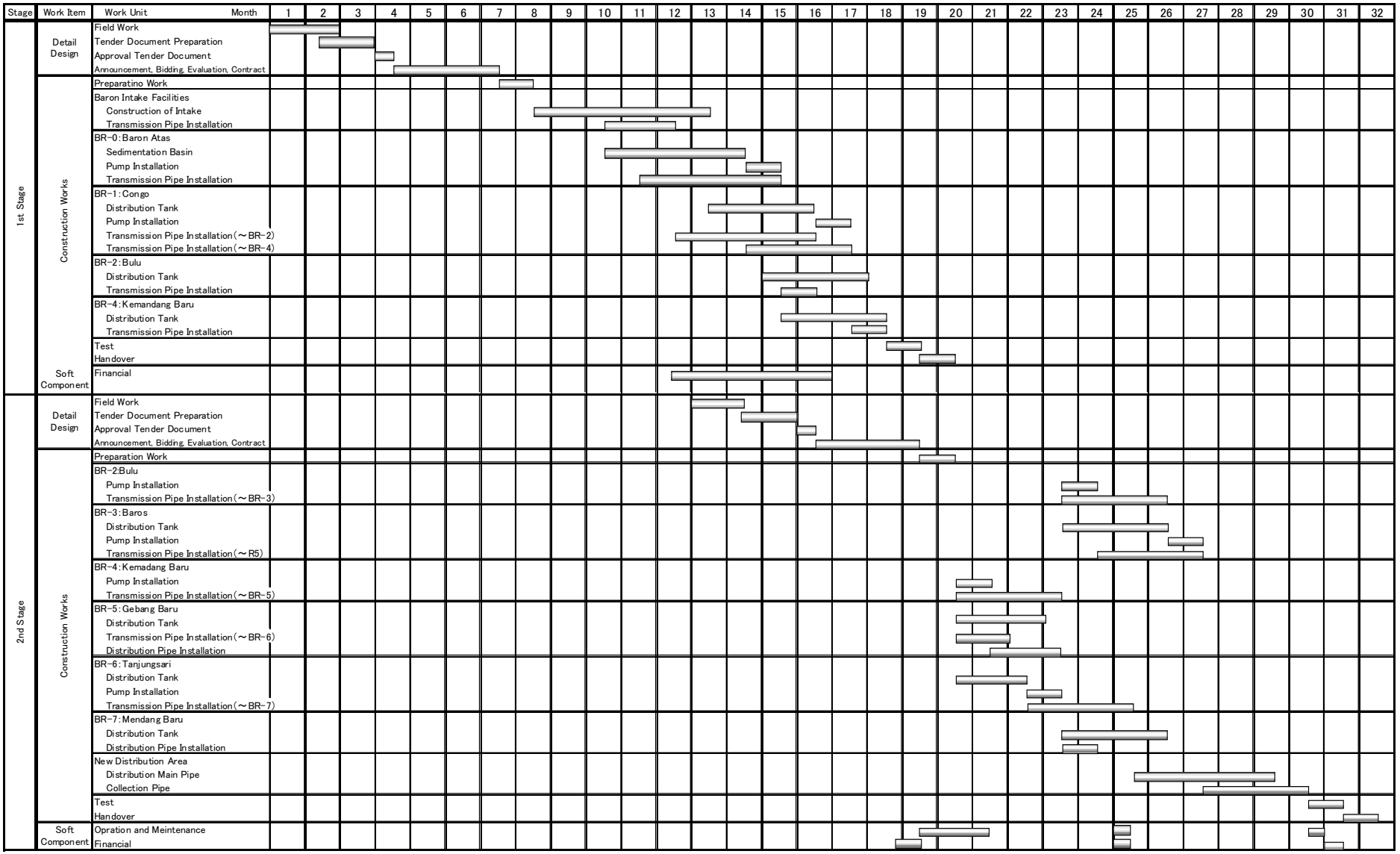


Figure 2.2.2 Project Implementation Schedule

2.3 OBLIGATION OF RECIPIENT COUNTRY

The role of the Indonesian side shall be as follows:

1) Land acquisition
2) Clearance, hoeing and reclamation
3) Gates, fences
4) Parking
5) Road construction
6) Installation of house connection pipes
7) Inlet of electric cable for facility operation
8) Breakers, transformers
9) Expense for legal procedure for construction
10) Tax exemption for imported goods
11) Domestic transportation fee
12) Other relevant expense (except this Project).

Table 2.2.5 Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by GOI			
			KPW	DIY	GK	PDAM
1	To Secure land				●	
2	To clear, level and reclaim the site when needed				●	
3	To construct gates and fences in and around the site				●	
4	To construct the parking lot				●	
5	To construct roads					
	1) Within the site				●	
	2) Outside the site (depend on the road status)				●	
6	To procure pipes, materials and equipment for the project	●				
7	To construct intake, transmission/distribution mains, storage tanks and public hydrants	●				
8	To construct house connections					●
9	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities					
	1) Electricity					
	a. The distributing line to the site				●	
	b. The drop wiring and internal wiring within the site	●				
	c. The main circuit breaker and transformer				●	
10	To bear the following commissions to be Japanese foreign exchange bank for the banking services based upon the B/A					
	1) Advising commission of A/P		●			
	2) Payment commission		●			
11	To ensure unloading and customs clearance at port of disembarkation in recipient country					
	1) Marine (Air) transportation of the products from Japan to the recipient country	●				
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●			
	3) Internal transportation from the port of disembarkation to the product site	●	●	●	●	
12	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contact such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●	●		
13	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts		●			
14	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant				●	
15	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment				●	

2.4 PROJECT OPERATION PLAN

(1) Operation and Maintenance Organization

The operation and maintenance plan for this Project is supported by the project implementation unit at the regency level and the practical implementation unit by PDAM. The implementation unit for operation and maintenance is shown in Figure 2.4.1.

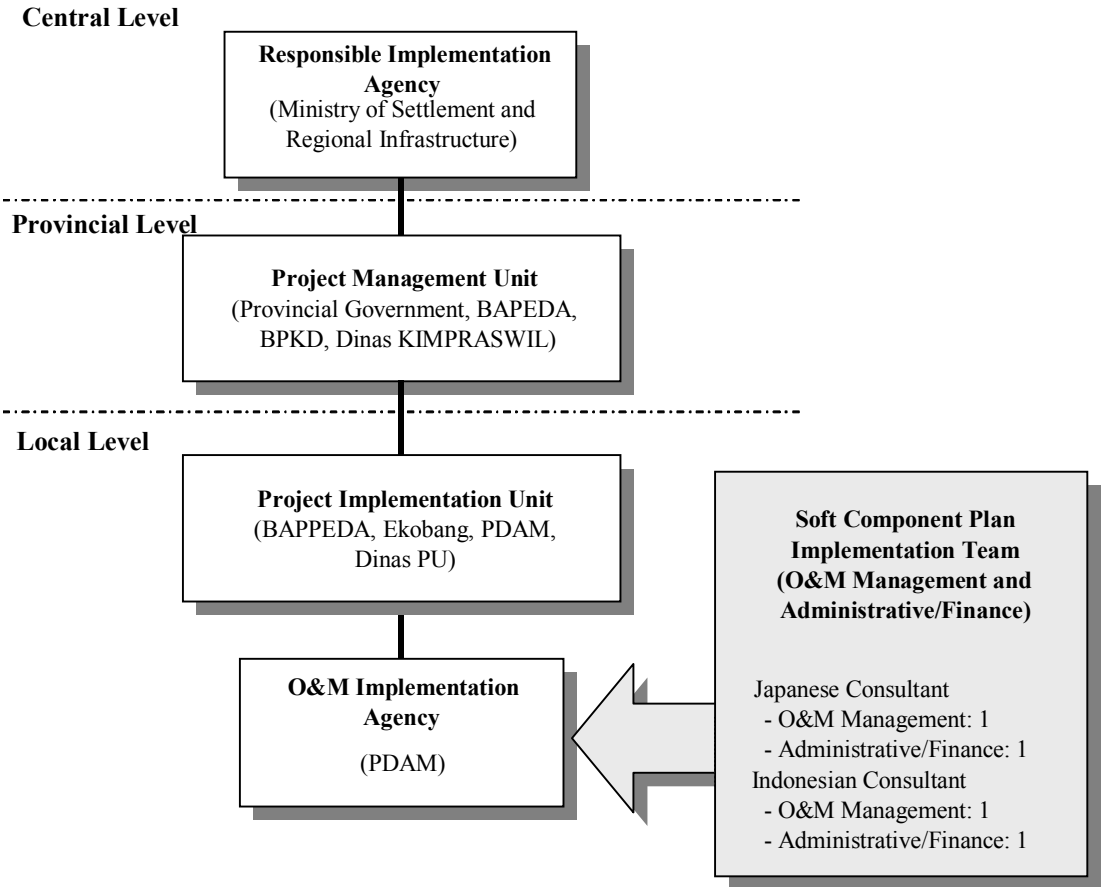


Figure 2.4.1 Operation and Maintenance Organization

1) Project Implementation Regimes

The Project will be implemented based on a project implementation unit with the major organization of the Regional Development Planning Agency. The main activities of the implementation unit are the design, supervision, financial procurement and assistance to the works to be executed by the Japanese side. The major organization of the Project is the Ministry of Settlement and Regional Infrastructure. To support the necessary procedures it incorporates the project management unit. The project management unit is the managerial unit of this project controlling management, monitoring progress during the project period

and performing necessary procedures as well as financing the works to be carried out by the Indonesian side.

2) Operation and Management Regimes

After the implementation of the Project the facilities will be transferred to PDAM and maintained. The project unit at the regency level will give necessary advice to PDAM and support it financially. If the financial support is not adequate from the regency level alone, provincial and national levels will provide support.

(2) Operation and Maintenance Plan

In order to keep operation and maintenance works within the PDAM organization after the project implementation, the necessary technical skills, manpower and healthy financial management capabilities are indispensable. However, the condition of the present inspection and repair work is not sufficient. In addition, there is also insufficient manpower for pump operation and water charge collection. Taking these into account, the necessary countermeasures to be taken to strengthen the capability of PDAM are as follows.

1) Strengthening of Operation and Maintenance Capability

For the operation and maintenance works, periodical inspection and rehabilitation is essential. However, the necessary drawings or ledgers are not provided at present. Therefore, PDAM should first of all execute an inventory survey and prepare facility ledgers, and subsequently enhance monitoring activities. In this respect, PDAM does not have the “know how” to prepare the ledgers, so the soft component as mentioned before will be fully utilized by obtaining guidance from the Japanese consultant.

In parallel with increasing the transmission and distribution facilities, a sufficient number of staff to operate and repair should be acquired. The acquisition of staff should be started during the Project implementation period in order to take effect immediately after the completion of the Project. The staff who will engage in the operation of the automatic pump control devices and water quality management should acquire technology with the soft component, since there is no expert at present in PDAM.

2) Strengthening of Financial Management Capability

Meter reading and water charge collection have not been carried out regularly and this has brought about financial constraint. As the water supply area will be expanded after the implementation of the Project, a schedule of water charge collection should be newly established together with strengthening of the monitoring system for these procedures.

Meanwhile, accounting procedures have been carried out manually, including calculation mistakes, and the subsequent handling of files is complicated. Therefore, accounting procedures and data filing should be improved by using a computer. The number of staff for accounting procedures in PDAM is inadequate, so strengthening of financial capability should be achieved in the course of the soft component activities as mentioned previously.

2.5 COST ESTIMATE OF THE PROJECT

2.5.1 Preliminary Cost Estimate

Under Japan's Grant Aid Scheme, the Project cost is estimated at JPY 1,084 million, comprised of JPY 1,031 million of Japanese Government and JPY 53 million of the Indonesian Government in accordance with the work demarcation between the Japanese and Indonesian sides and based on the conditions outlined below. This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

(1) Japanese Side

Preliminary Cost - 1,031 Million Yen

Table 2.5.1 Breakdown of Expense of Japanese Side

Work Item		Cost (Mil. Yen)
Construction Cost	Water Supply Facilities Intake facilities Distribution tanks, pumping facilities Transmission, distribution pipes Public hydrants Connection pipe material	879
Procurement		3
Consulting Fee	D/D, S/V and soft component	149
Total		**1,031**

(2) Indonesian Side

Table 2.5.2 Breakdown of Expense by Indonesian Side

Work Item	Specification	Cost	
		L/C (1000 Rp)	Equivalent Yen (1000 Yen)
1. Land	Acquisition, compensation Sedimentation basins, distribution tanks, pump stations, etc.	468,525	5,716
2. Plants	Clearance, hoeing	606,334	7,397
3. Construction and supervision	Fences, gates, access roads, parking in the yard, (8 locations) Connection pipe（575 units）	1,227,104	14,971
4. Stock yard for material	Acquisition or leasing	-	-
5. Electric facilities	Provision of cables to the facilities, breakers, transformers, etc.	1,503,612	18,344
6. Project manager, coordinator, etc.	Project manager, coordinator, assistants, etc.	570,836	6,954
Total		4,376,411	53,392

(3) Conditions for Cost Estimate

1) Date of estimate November 2004
2) Exchange rate 1 US$ = ¥111.09
1 Rp = ¥0.0122
3) Construction Period 2 stages
4) Others Based on Japanese Government Regulation for Grant Aid Project.

2.5.2 Operation and Maintenance (O&M) Cost

(1) O&M Cost Items

1) Manpower

The fee for manpower was calculated based on the number of staff for pumping facilities with 15 hours operation and two shifts a day, the staff for pipe facilities with doubled numbers and additional staff for water quality control expertise.

2) Electricity Consumption

An electricity consumption fee was calculated based on the total pump units with 15 hours operation per day. The estimation was made based on the currently prevailing daytime unit cost.

3) Fuel

The fuel fee was calculated for the diesel engine that is currently used in the Ngobaran system. The operation hours were increased from the current 6.2 to 15 hours a day.

4) Oil

The oil fee was counted for the above diesel engine with the same operation hours.

5) Repair

Repair work was calculated based on the following 4 items and by estimating a future increase.

- Pumps : Parts, repair work and repair tools
- Distribution tanks : Repair for tanks
- Pipes : Pipe and water meter repair
- Others : Tools and cables

PDAM calculates some repair works in the items of depreciation. Future repair cost was calculated demarcating appropriately for the calculation using an increase parameter (current pipe length / future pipe length) in this report as shown in Table 2.5.3.

Table 2.5.3 Repair Cost as of 2003

	Cost（Rp）
Consumable item	
・Pumps	21,649,100
Parts	20,918,100
Others	731,000
・Pipes	11,473,874
Pipe repair	11,473,874
Sub-total	**33,122,974**
Depreciation item	
・Pumps	13,918,328
Parts, repair tools	8,820,371
Repair	5,097,957
・Pipes	5,672,331
Pipe repair	5,263,750
Meters, valves	122,400
Connection pipes	286,181
・Other tools	286,657
Sub-total	**19,877,316**
Total	**53,000,290**

6) Chemicals (chlorine)

1.0 kg was assumed per 1,000m^3 water production.

7) Administrative Fee

10% of the total of (1) to (6) was considered.

(2) Computation of O&M Cost and Cash Flow

1) Calculation of O&M Cost

O&M costs and administration costs were calculated based on the above conditions as shown in Table 2.5.4. Further detail calculations are given in Table 5.6.2.6 to 5.6.2.10 of Appendix-5.6

Table 2.5.4 Future O&M and Administration Cost

Item	Cost（Rp）	Remarks
O&M Cost		
1. Manpower	397,800,000	See Table 5.6.2.6
Pump operation	285,600,000	
Pipe management	102,000,000	
Water quality control	10,200,000	
2. Electricity	3,859,211,782	See Table 5.6.2.7
LWBP（daytime cost）	2,868,011,782	
WBP（night time cost）	0	
Basic charge	991,200,000	
3. Fuel	56,245,161	See Table 5.6.2.8
4. Oil	2,637,097	See Table 5.6.2.8
5. Repair	73,670,403	See Table 5.6.2.9
Pumps	49,438,725	
Tanks	0	
Pipes	23,833,225	
Others	398,453	
6. Chemicals	29,200,000	See Table 5.6.2.10
Sub-total	4,418,764,443	
7. Administration	441,876,444	10% of total O&M cost
Total	4,860,640,888	

It is the electricity cost which occupies the largest portion at more than 80% of the total O&M cost.

2) Income analysis

The income analysis was made based on 70% supply ratio and the current water charge. (See details in Table 5.6.2.11 of Appendix-5.6)

Table 2.5.5 Water Supply Income

Unit：Rp

	Water Charge	Meter use charge	Commission	Total Income
Present	666,885,660	76,518,000	38,259,000	781,662,660
Plan	2,728,263,224	280,620,000	140,310,000	3,149,193,224

3) Cash Flow Analysis of PDAM

Four scenarios were assumed for cash flow analysis. The cases taken were where the present water charge is kept (Case-1), the water charge is increased to 1.2 times (Case-2), the water charge is increased 1.5 times (Case-3) and the water charge is doubled (increased to 2 times the present water charge) (Case-4) and these are are compared. (Details are shown in Table 5.6.2.12 of Appendix-6)

Table 2.5.6 Balance Sheet

Unit : Rp

Case-1(Keep Present Water Charge)

	Present	2005	2006	2007	2008
Total Revenue (A)	6,646,024,753	7,584,919,637	8,942,314,062	10,706,144,810	9,107,444,964
Income by water charge	5,858,454,200	6,253,052,571	7,042,249,312	8,226,044,424	8,234,894,424
Connection fee	577,590,281	1,080,732,205	1,609,394,129	2,138,056,053	577,070,281
Others	209,980,272	251,134,861	290,670,621	342,044,332	295,480,259
Total Expenditure (B)	6,331,254,869	6,910,530,325	8,105,147,931	9,897,074,340	9,897,074,340
Balance (C)=(A-B)	314,769,884	674,389,312	837,166,132	809,070,470	**-789,629,376**
Depreciation (D)	2,568,680,337	2,568,680,337	2,765,362,241	2,962,044,145	2,962,044,145
Balance(E)=(C-D)	**-2,253,910,453**	**-1,894,291,025**	**-1,928,196,109**	**-2,152,973,675**	**-3,751,673,521**

Case-2 (Increasing at 1.2 times from Jan. 2006)

	Present	2005	2006	2007	2008
Total Revenue (A)	6,646,024,753	7,584,919,637	10,220,344,622	12,195,031,224	10,597,876,378
Income by water charge	5,858,454,200	6,253,052,571	8,310,051,725	9,698,561,259	9,708,911,259
Connection fee	577,590,281	1,080,732,205	1,609,394,129	2,138,056,053	577,070,281
Others	209,980,272	251,134,861	300,898,767	358,413,911	311,894,838
Total Expenditure (B)	6,331,254,869	6,910,530,325	8,105,147,931	9,897,074,340	9,897,074,340
Balance (C)=(A-B)	314,769,884	674,389,312	2,115,196,691	2,297,956,884	700,802,038
Depreciation (D)	2,568,680,337	2,568,680,337	2,765,362,241	2,962,044,145	2,962,044,145
Balance(E)=(C-D)	**-2,253,910,453**	**-1,894,291,025**	**-650,165,550**	**-664,087,261**	**-2,261,242,106**

Case-3 (Increasing at 1.5 times from Jan. 2006)

	Present	2005	2006	2007	2008
Total Revenue (A)	6,646,024,753	7,584,919,637	12,137,390,460	14,428,360,845	12,833,523,500
Income by water charge	5,858,454,200	6,253,052,571	10,211,755,343	11,907,336,511	11,919,936,511
Connection fee	577,590,281	1,080,732,205	1,609,394,129	2,138,056,053	577,070,281
Others	209,980,272	251,134,861	316,240,987	382,968,280	336,516,707
Total Expenditure (B)	6,331,254,869	6,910,530,325	8,105,147,931	9,897,074,340	9,897,074,340
Balance (C)=(A-B)	314,769,884	674,389,312	4,032,242,529	4,531,286,505	2,936,449,160
Depreciation (D)	2,568,680,337	2,568,680,337	2,765,362,241	2,962,044,145	2,962,044,145
Balance(E)=(C-D)	**-2,253,910,453**	**-1,894,291,025**	1,266,880,289	1,569,242,360	**-25,594,985**

Case-4 (Increasing at 2 times from Jan. 2006)

	Present	2005	2006	2007	2008
Total Revenue (A)	6,646,024,753	7,584,919,637	15,332,466,858	18,150,576,881	16,559,602,035
Income by water charge	5,858,454,200	6,253,052,571	13,381,261,375	15,588,628,599	15,604,978,599
Connection fee	577,590,281	1,080,732,205	1,609,394,129	2,138,056,053	577,070,281
Others	209,980,272	251,134,861	341,811,354	423,892,229	377,553,155
Total Expenditure (B)	6,331,254,869	6,910,530,325	8,105,147,931	9,897,074,340	9,897,074,340
Balance (C)=(A-B)	314,769,884	674,389,312	7,227,318,927	8,253,502,541	6,662,527,695
Depreciation (D)	2,568,680,337	2,568,680,337	2,765,362,241	2,962,044,145	2,962,044,145
Balance(E)=(C-D)	**-2,253,910,453**	**-1,894,291,025**	4,461,956,686	5,291,458,396	3,700,483,550

If the water charge is kept at the present level (Case-1), the balance sheet will decline to deficit in 2008 resulting in difficulty of management under the current water charge.

In Case-2, the O&M fee and administration fee can be covered even after 2008. For Case-3, the depreciation fee can be also covered. Case-4 can cover all the expenses including all the depreciation. The relation ship is summarized in Figure 2.5.1. (Details are given in Table 5.6.2.12 of Appendix-5.6)

Unit : Rp

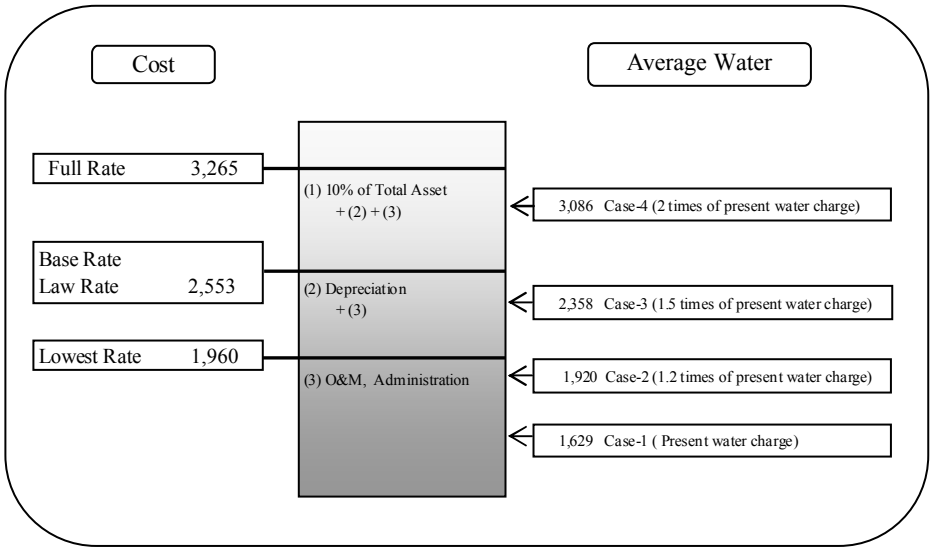


Figure 2.5.1 Comparison between average water charge and cost

According to the evaluation criteria of PDAM, it is generally said that if the income from the water charge covers the O&M cost and administration, the financial condition will become healthy. It signifies that at least Case-3 should be implemented for healthy management.

A base line survey was conducted in the course of this Basic Design Study including an "Affordability to Pay" survey (assumed to be 3% of the average monthly income) and a "Willingness to Pay" survey as summarized in Table 2.5.7. (See Table 5.6.2.13 in Appendix-5.6 for reference.)

Table 2.5.7 Comparison between Water Charge and ATP and WTP

Unit : Rp

Charge Level	Unit Water Charge (per m^3)	Monthly Water Charge	ATP	WTP
Present	1,250	14,750	23,897	32,288
1.2 times	1,500	17,250		
1.5 times	1,875	21,000		
2.0 times	2,200	24,250		

As shown in the table, "1.5 times" covering almost all the costs will be easily managed by the residents since the charge is lower than both the ATP and WTP. If "2.0 times" is selected, all the cost including depreciation can be covered. Although it is higher than the ATP the difference is small and it is less than the WTP. Therefore, it may not be impossible to increase up to "2.0 times".

In the physical comparison analysis, it will be easily increased to the above level for healthy water management. However, this report only indicates the possibility of increasing and the final decision will be made by the relevant Indonesian organization.

(3) Financial Control Measures

As shown above, if the water charge is increased to 2 times the present level, financial health will be retained in the future. However, there may still exist or continue some problems relating to the absence of constant water meter reading or appropriate water charge collection. At the same time, operation and maintenance work as well as data compilation by computer will be improved. In this Project, implementation of the soft component was proposed in order to meet this requirement and strengthen the capability of the operation and maintenance of PDAM. By conducting the soft component as shown below, financial and accounting management will be further improved.

1) Accounting Management Guidance

Guidance from an accounting management guideline, particularly for handling of depreciation cost management, will be inspected. In addition, a budget allocation including a subsidy will be proposed and discussed with PDAM and the regency office to establish an effective financial management system.

2) Implementation of Accounting Program and Education

Accounting management carried out manually will be improved by using a computer. For that purpose, a program and manual for execution should be prepared, and at the same time, education and transmission of "know how" should be carried out.

3) Establishment of Water Charge Collection System

A water charge collection system will be established by improving meter reading and collection schedules, and monitoring of these should be established.

4) Improvement of Customer Service

The claims from customers should be compiled into the computer and monitored thereafter. After the necessary repair work, the improved part should be input into the computer using the facilities ledgers. Updating of ledgers from time to time is also indispensable.

Chapter 3 Project Evaluation and Recommendation

3.1 Project Effect

The impact of the Project implementation is as follows.

Table 3.1.1 The Effect and Improvement by the Project Implementation

Present Conditions and Problems	Measures to be taken in the Grant Aid Project	Effect and Improvement by the Project Implementation
The Project area in the Gunungkidul Regency has severe topographic constraints and the average income of the residents is comparatively low. In addition, the area is impoverished in water resources due to extremely low rainfall, particularly in the dry season. Therefore, unless the public water supply system is drastically improved or developed, the essential requirement for sustaining life, access to safe and sanitary water, is not obtainable.	In order to provide sufficient amount of water for 24 hours, intake, transmission, distribution, and connection pipe facilities shall be provided. In addition, turbidity management and disinfection facilities to obtain safe water shall be provided.	From the population in the Project area of 134,000, 70% (93,800) will be able to obtain safe and sufficient water.
The water supply facilities development plan has been executed in Jogjakarta Province and Gunungkidul Regency up to this date. The magnitude and extent of project implementation are extremely limited. Therefore, no operation and maintenance organization has yet been built. In order to meet this requirement, the capacity building for "hardware side" such as facilities improvement and "software side" such as water charge collection and financial management have become indispensable.	Supporting the soft component. • For the operation and maintenance of the facilities, water supply ledger, strengthening of technical capabilities, training, preparation of manual and guidelines and conduction of monitoring system shall be performed. • For the operation and maintenance aspects, the financial guidance, conduct of programs, and monitoring system in parallel with the utilization of computers shall be executed to establish a water levy collection system.	• With the training and guidance, the staff of the public works of the regency and PDAM will be strengthened in their capability for operation and maintenance. • After the completion of the facilities, appropriate operation and maintenance activities will be established.

3.2 Recommendations

In the course of the project implementation, the following aspects should be taken into account for the smooth and effective operation of water supply facilities.

- Prior to the commencement of the Project, measures should be completed for land acquisition, construction of access roads, acquisition of various approvals for the procedures, and provision of electric supply facilities.

- After completion of the facilities, there will be a large increase in the capacity of the water intake, transmission, and distribution facilities. This increase will bring increase the water leakage problem, which had been invisible for a long time while the water supply amount has been extremely small. Therefore, prior to the commencement of the Project, inventory surveys to grasp the existing condition of distribution pipes should be carried out under the resources of the Indonesian side without question. The results of the inventory surveys can be utilized for the preparation of the facilities ledger and will also be utilized for the training and acquisition of technical skills for the O&M works.

- The technical skills to be obtained by the implementation of the soft component programs are expected to ensure effective operation and maintenance works in the future. At the same time, enlightenment of the residents on the province of a new system should be indispensable. In particular, public hearings will be a significant vehicle for disclosing information to the consumers.

3.3 Project Justification

For the following reasons, the implementation of the Grant Aid Project based on this Basic Design Study is verified as worth doing:

- The objective of the Project is to bring the residents safe, steady and sufficient amount of potable water. This is a major contribution from the view point of basic human needs.

- The implementation of the Project, including the technical assistance for the soft component program, will enable the organization to perform appropriate operation and maintenance under the domestic budget and technology in the future.

- The Project corresponds to the National Plan of 2000-2004 (PROPENAS), which is the basic policy of the Indonesian Government.

- The impact on the environment is envisaged to be negligible.

- In the light of the Japanese regulations for implementing Grant Aid Projects, no obvious difficulties are envisaged.

3.4 Conclusions

The Project as described above will provide for safe and steady potable water to be supplied to the residents, minimizing water related diseases and bringing comfortable life and good sanitary conditions as well as contributing to the alleviation of poverty. Thus the implementation of the Grant Aid Project is verified.

Appendixes

1. Member List of Study Team
2. Survey Itinerary
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions
5. Other Relevant Data

Appendix-1
Member List of Study Team

Appendix-1 : Member List of the Study Team

1. Explanation of Inception Report and Field Survey (September 29, 2004 to November 11, 2004)

Position in Charge	Name	Affiliation
Team Leader	FUKUDA, Yoshio	Team Director, Water and Sanitation Team, Project Management Group I, Grant Aid Management Dept., JICA
Project Coordinator	YOSHDA, Sanae	Water and Sanitation Team, Project Management Group I, Grant Aid Management Dept., JICA
Chief Consultant/ Water Supply Planner	OKAZAKI, Keisuke	Nippon Koei Co., Ltd.
Facility Planner	HIRUTA, Takashi	Nippon Koei Co., Ltd.
Water Sources/ Groundwater Specialist	HIGUCHI, Masao	Nippon Koei Co., Ltd.
Social Condition Survey/ O & M Specialist	NANAKUBO, Mitsuru	Nippon Koei Co., Ltd.
Procurement Planner/ Cost Estimator	KITANO, Tomoyuki	Nippon Koei Co., Ltd.
Coordinator / Water Supply Pipeline Planner	YAMADA, Tomoyuki	Nippon Koei Co., Ltd.

2. Explanation of Draft Final Report (March. 8, 2004 to March. 16, 2004)

Position in Charge	Name	Affiliation
Team Leader	FUKUDA, Yoshio	Team Director, Water and Sanitation Team, Project Management Group I, Grant Aid Management Dept., JICA
Chief Consultant/ Water Supply Planner	OKAZAKI, Keisuke	Nippon Koei Co., Ltd.
Procurement Planner/ Cost Estimator	KITANO, Tomoyuki	Nippon Koei Co., Ltd.

Appendix-2
Survey Itinerary

Appendix-2 : Survey Itinerary

1. Explanation of Inception Report and Field Survey (September 29, 2004 to November 12, 2004)

No	Date		Member	Station	Activities
1	Sep. 29	Wed	Yoshida, Okazaki	Jakarta	Move (Narita-Jakarta)
			Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Move (Narita-Yogyakarta)
2	30	Thu	Yoshida, Okazaki	Jakarta/ Yogyakarta	Courtesy call to Embassy of Japan Meeting with JICA Office Courtesy call to Ministry of Settlement and Regional Infrastructure Move (Jakarta-Yogyakarta)
			Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation
3	Oct. 1	Fri	Fukuda	Yogyakarta	Move (Narita-Yogyakarta)
			Yoshida, Okazaki, Hiruta, Higuchi, Nanakubo, Yamada		Field Investigation
4	2	Sat	Fukuda, Yoshida, Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation
5	3	Sun	Fukuda, Yoshida, Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation
6	4	Mon	Fukuda, Yoshida, Okazaki	Jakarta	Courtesy call to BAPPENAS Courtesy call to KIMPRASWIL Discussion with KIMPRASWIL
			Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation
7	5	Tue	Fukuda, Yoshida, Okazaki	Jakarta	Discussion with KIMPRASWIL on draft of Minutes of Discussions Signing Minutes of Discussions at Jakarta
			Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
8	6	Wed	Fukuda, Yoshida Okazaki	Jakarta	Courtesy call to BAPPENAS Report to JICA office Report to Embassy of Japan
			Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
9	7	Thu	Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
10	8	Fri	Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
11	9	Sat	Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
12	10	Sun	Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
13	11	Mon	Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
14	12	Tue	Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
15	13	Wed	Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
16	14	Thu	Okazaki, Hiruta, Higuchi, Nanakubo, Yamada	Yogyakarta	Field Investigation Data Collection
			Kitano		Move (Narita-Yogyakarta)

No	Date		Member	Station	Activities
17	15	Fri	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
18	16	Sat	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
19	17	Sun	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Meeting with counterpart. Field Investigation Data Collection
20	18	Mon	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
21	19	Tue	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
22	20	Wed	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
23	21	Thu	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
24	22	Fri	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
25	23	Sat	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
26	24	Sun	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
27	25	Mon	Okazaki, Hiruta, Higuchi, Nanakubo, Kitano, Yamada	Yogyakarta	Meeting with counterpart. Field Investigation Data Collection
28	26	Tue	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
			Higuchi	On board	Move (Yogyakarta-Narita)
29	27	Wed	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
			Higuchi		Arrive at Tokyo
30	28	Thu	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
31	29	Fri	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
32	30	Sat	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
33	31	Sun	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
34	Nov. 1	Mon	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Meeting with counterpart. Field Investigation Data Collection
35	2	Tue	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
36	3	Wed	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
37	4	Thu	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
38	5	Fri	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
39	6	Sat	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection

No	Date		Member	Station	Activities
40	7	Sun	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
41	8	Mon	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Meeting with counterpart. Field Investigation Data Collection
42	9	Tue	Okazaki, Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
43	10	Wed	Okazaki,	Jakarta	Report to KIMPRASWIL, Embassy of Japan and JICA Indonesia Office
			Hiruta, Nanakubo, Kitano, Yamada	Yogyakarta	Field Investigation Data Collection
44	11	Thu	Okazaki,	On board	Move (Jakarta-Narita)
			Hiruta, Nanakubo, Kitano,Yamada		Move (Yogyakarta-Narita)
45	12	Fri	Okazaki, Hiruta, Nanakubo, Kitano, Yamada		Arrive at Tokyo

2. Explanation of Draft Final Report (March 8, 2005 to March 16, 2005)

No	Date		Member	Station	Activities
1	March 8	Tue.	Okazaki, Kitano	Yogyakarta	Move (Tokyo-Yogyakartai)
2	9	Wed.	Okazaki, Kitano	Yogyakarta	Discussion on Draft Basic Design Study Report with PDAM
3	10	Thu..	Okazaki, Kitano	Yogyakarta	Discussion on Draft Basic Design Study Report with PDAM Field survey
4	11	Fri.	Okazaki, Kitano	Yogyakarta	Discussion on Draft Basic Design Study Report with PDAM
5	12	Sat.	Okazaki, Kitano	Yogyakarta	Field survey
6	13	Sun	Fukuda	Jakarta	Move (Narita-Jakarta)
			Okazaki, Kitano		Move(Yogyakarta-Jakarta)
7	14	Mon.	Fukuda, Okazaki, Kitano	Jakarta	Courtesy call on Embassy of Japan, and BAPENAS Discussion with Kimpraswil
9	15	Tue.	Fukuda, Okazaki, Kitano	On board	M/D signing Report to Embassy of Japan, JICA Indonesia Office, Move (Jakarta-Narita)
9	16	Wed.	Fukuda, Okazaki, Kitano	Tokyo	Arrive at Narita

Appendix-3
List of Parties Concerned in the Recipient Country

Appendix-3 : List of Parties Concerned in the Recipient Country

Jakarta

Kimpraswil

Patana Rantetoding	Director General
Rachmat Karnadi	Director for Central Region
Dadan Krisnandar	Subdirector for Technical Planning
Dwityo A. Soeranto	Chief of Programming Section
Bahrudddin Ahmad	Chief of Yogyakarta & Central Java Section
Tamin MZ Amin	Subdirector for Water Supply and Sanitation
Maliki Moeraid	Section Head of Directorate Technical Guidance
Sri Murni Edi	Staff of Programming and Budgeting
Ajiarti	Staff of Water Supply and Sanitation
Shimazaki Toshiaki	JICA Expert for Water Supply Development
Deddy Roosadiono	Head of Bureau
Firman Mulia Hutapea	Head of Program 2 and Bilateral Cooperation
Endong S	Staff
Susmono	Head of Sub-directorate for Central Region II
BAhruddin	Head for Central Region II Section

BAPPENAS

Basuki Yusuf Iskandar	Director of Water Resources and Irrigation
Basah Hernowo	Director of Housing and Settlement

Yogyakarta

Kimpraswil

Bayudono	Head of Provincial Government (Planning Board)
Sutrisno	Chief of Planning Section
Tri Harjun	Head of the Agency
Purnomo	Technical and Planning of Cipta Karya Sub Agency
M. Mansur	Staff of Technical and Planning of Cipta Karya Sub Agency
Natsir Basuki	Chief of Cipta Karya Sub Agency
Nono Cahyono	Staff of Planning Unit
Djoko Sasongko	Chief of Irrigation and Water Resources Sub Agency
Djaswadi	Staff of Irrigation and Water Resources Sub Agency
Prijambodo	Staff of Irrigation and Water Resources Sub Agency
Marjono	Staff of Data and Reporting Section
Hananto	Sub Project Manager of P2-SP
Kusumastuti	Staff of P2-SP
A.N. Rofiq	Staff of P2-SP

Endang Sudarman	Sub Project Manager of PPAB

BAPPEDA

Sangidu Umar	Staff of BAPPEDA Yogyakarta

Gunungkidul Regency

BAPPEDA

Eko Subiantoro	Chief of BAPPEDA Gunungkidul Regency
YD. Nugroho	Staff of BAPPEDA Gunungkidul Regency
Eddy Praptono	Staff of BAPPEDA Gunungkidul Regency

PDAM

Moedjiyo	President Director of PDAM of Gunungkidul Regency
Wudiyanto	Director of Technic of PDAM of Gunungkidul Regency
Pratomo Hadi	Chief of Technical Planning Department of PDAM of Gunungkidul Regency

EKOBANG

Asti Wijayanti	Chief of Economy and Development Section
I Ketut Santoso	Staff of Economy and Development Section

DINAS PU

Tjiptomulyono	Staff of Public Work Agency
Khairuddin	Staff of Public Work Agency
Sutomo	Staff of Public Work Agency
Sutrisno	Staff of Public Work Agency

PEMDA GUNUNGKIDUL

Nurhidayati	Staff of Finance Division

Embassy of Japan in Indonesia

Koshin Kiyohara	Second Secretary

JICA Indonesia Office

Keiichi Kato	Resident Representative
Shinji Totsuka	Deputy Resident Representative
Shiro Nakasone	Assistant Resident Representative
Teruo Shigesato	Technical Adviser on Grant Aid Project
Katsuhiko Ohara	Assistant Resident Representative

Appendix-4
Minutes of Discussion

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY ON THE PROJECT
FOR WATER SUPPLY PROJECT IN GUNUNG KIDUL REGENCY
OF YOGYAKARTA SPECIAL TERRITORY
IN THE REPUBLIC OF INDONESIA

In the response to a request from the Government of the Republic of Indonesia (hereinafter referred to as "the Indonesia"), the Government of Japan decided to conduct a Basic Design Study on THE PROJECT FOR WATER SUPPLY PROJECT IN GUNUNG KIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Indonesia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Yoshio Fukuda, Team Director, Water and Sanitation Team, Project Management Group I, Grant Aid Management Department, and is scheduled to stay in the country from 29th September to 11th November 2004.

The Team held discussions with the officials concerned of the Government of Indonesia and conducted field surveys at the study area.

In the course of discussions and field surveys, both parties have confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Jakarta, 5th October 2004

福田義天

Mr. Yoshio Fukuda
Leader
Basic Design Study Team
Japan International Cooperation Agency
Japan

Rachman

Ir. Rachmat Karnadi, MT
Director for Central Region
Directorate General of Urban and Rural Development
Ministry of Settlement and Regional Infrastructure
Republic of Indonesia

ATTACHMENT

1. Objective of the Project

The objective of the Project is to construct water supply facilities and establish an appropriate operational system in order to provide sufficient and safe water and improve the standard of living of the inhabitants in the southern area of Gunung Kidul Regency.

2. Project Sites

The Project sites requested by Indonesia side are located in Ngobaran sub system, in the southern area of Gunung Kidul Regency as shown in Annex-1.

3. Responsible and Implementing Agency

3-1 The Responsible Agency is the Ministry of Settlement and Regional Infrastructure (hereinafter referred to as " KIMPRASWIL").

3-2 The Implementing Agency is the Local Government of Gunung Kidul Regency (hereinafter referred to as " Gunung Kidul Regency ").

4. Items Requested by the Government of Indonesia

After discussions with the Team, the items described in Annex-2 were finally requested by the Indonesian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

5. Japan's Grant Aid Scheme

5-1 The Indonesian side understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-3.

5-2 The Indonesian side will take the necessary measures, as described in Annex-4 for smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented.

6. Schedule of the Study

6-1 The consultants will proceed to further studies in the Indonesia until 11th November.

6-2 JICA will prepare the draft report in English and dispatch a mission to Indonesia in order to explain its contents in February, 2005.

6-3 In case that the contents of the report is accepted in principle by the Government of Indonesia, JICA will complete the final report and send it to the Government of Indonesia by April 2005.

7. Other Relevant Issues

The following issues were discussed and confirmed by both sides.

7-1 Role of Central government, Provincial government and Local government

KIMPRASWIL promised to make necessary coordination and arrangement to Gunung Kidul Regency in close collaboration with the Provincial Government of Yogyakarta Special Territory for the successful implementation of the Project.

The Provincial Government of Yogyakarta Special Territory will undertake monitoring, supervising and controlling for successful implementation of the Project.

The Gunung Kidul Regency constructs portion of the Indonesian side, operates and manages water supply facilities of the Project through PDAM Gunung Kidul (Regional Drinking Water Enterprise) belonging to itself.

7-2 Proposed components of the Project

Both sides agreed that the Project would be composed of the items described in Annex-2. However, the final components of the Project shall be determined according to the result of further studies and analysis taking into consideration capacity building like management, operation and maintenance of the Gunung Kidul Regency.

7-3 Land for the Project

The Indonesian side promised to prepare lands for the project and agreed to allocate budget to clear, level and reclaim the sites for the Project prior to commencement of the works if the Japanese Grant Aid is approved.

7-4 Questionnaire

The Indonesian side promised to reply to the questionnaire submitted to the Indonesian Side by 16th October, 2004.

7-5 Technical Assistance

The Indonesian side requested that technical assistance for the capacity building of PDAM Gunung Kidul should be included in the Project so that it would be very essential for the Project's management.

The capacity building will include the training for Operation and Maintenance, Mechanical/Electrical system and Transmission/Distribution, while the Management improvement will include review and recommendation:

a. operation and maintenance implementation,
b. organizational structure,
c. tariff structure.

The Japanese side explained that necessary technical assistance including technical cooperation will be examined in the Study for sustainability of the Project.

7-6 House Connection

The Indonesian side agreed that it will carry out house connection by itself and that pipe material for house connection except water meters and indoor piping would be supplied under the Project and their installation work would have to be carried out by the Indonesian side.

7-7 Turbidity of Raw Water

The Indonesian side requested the Japanese side to examine the way of improving turbidity of raw water particularly in the rainy season.

The Japanese side explained that necessary measures of improving turbidity might be examined in the Study for ensuring water quality.

7-8 Remote Control System

The Indonesian side requested the Japanese side to include remote control system for the purpose to efficiently operate facilities scattered in the project area.

The Japanese side explained that appropriateness of this matter would be examined and verified.

7-9 Maintenance Tools

The Indonesian side requested the Japanese side maintenance tools including truck.

The Japanese side answered that items necessary for proper maintenance works would be included in the Project.

7-10 Computerized Billing System

The Indonesian side requested the Japanese side computerized billing system.

The Japanese side answered that necessity should be examined in the Study.

7-11 Tax Exemption of Custom Duties

The Japanese side requested that KIMPRASWIL should take proper action to the related Ministries and Agencies for tax exemption of custom duties to ensure the schedule in the implementation stage of the Project.

The Indonesian side promised to take necessary action for this point.

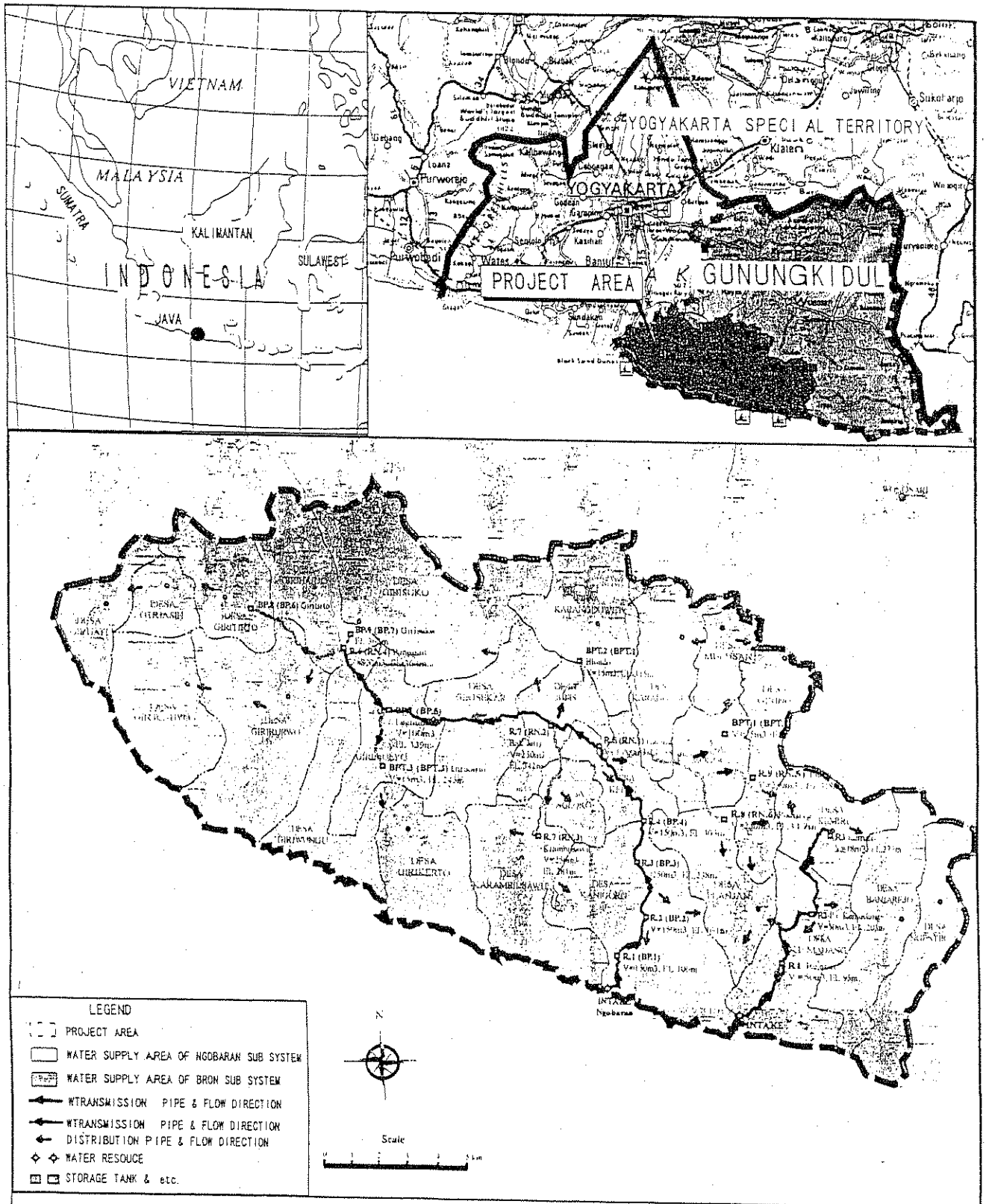
7-12 The Place of explanation for Draft Report

Both sides agreed that explanation of the draft report will be basically held at Yogyakarta for the purpose to achieve mutual understanding on the project.

7-13 Participants in the Meetings

This minutes of discussions has been made through the discussions with participants shown in Annex-5.

Annex-1



LOCATION MAP OF THE PROJECT

Annex-2

Requested components

(1) Construction of new water intake(s) with submersible pumps

(2) Construction of 7 service reservoirs with transmission pumps

(3) Construction of water transmission pipelines with approximate total length of 27km

(4) Construction of water distribution networks with approximate total length of 14km

(5) Technical assistance in capacity building in order to enable PDAM to operate and manage the water supply facilities properly

(6) Remote Control System

(7) Maintenance Tools including a truck

(8) Computerized Billing System

Annex-3

JAPAN'S GRANT AID

1. Japan's Grant Aid System

(1) Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

- Application (Request made by a recipient country)
- Study (Basic Design Study conducted by JICA)
- Appraisal & Approval
  (Appraisal by the Government of Japan and Approval by the Cabinet)
- Determination of the implementation
  (The Notes exchanged between the Governments of Japan and the recipient country)
- Implementation (Implementation of the Project)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Programme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

(2) Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

i) Confirmation of the background, objectives and benefits of the Project and also institutional
capacity of agencies concerned of the recipient country necessary for the Project's implementation;
ii) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme
from a technical, social and economic points of view;
iii) Confirmation of items agreed on by both parties concerning the basic concept of the Project;
iv) Preparation of a basic design of the Project; and
v) Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a registered consulting firm. JICA selects a firm based on proposals submitted by interested firms. The firm selected carries out a Basic Design Study and writes a report, based upon terms of reference set by JICA.

The consultant firm used for the Study is recommended by JICA to the recipient country to also work in the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be prepared.

(3) Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)
Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.
However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"
The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

6) Undertakings required to the Government of the recipient country
In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the followings:

i) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction;

ii) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the site;

iii) To secure buildings prior to the procurement in case the installation of the equipment;

iv) To ensure all the expenses and prompt execution for unloading, customs clearance at

the port of disembarkation and internal transportation of the products purchased under the Grant Aid;

v) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;

vi) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;

vii) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

viii) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

ix) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.

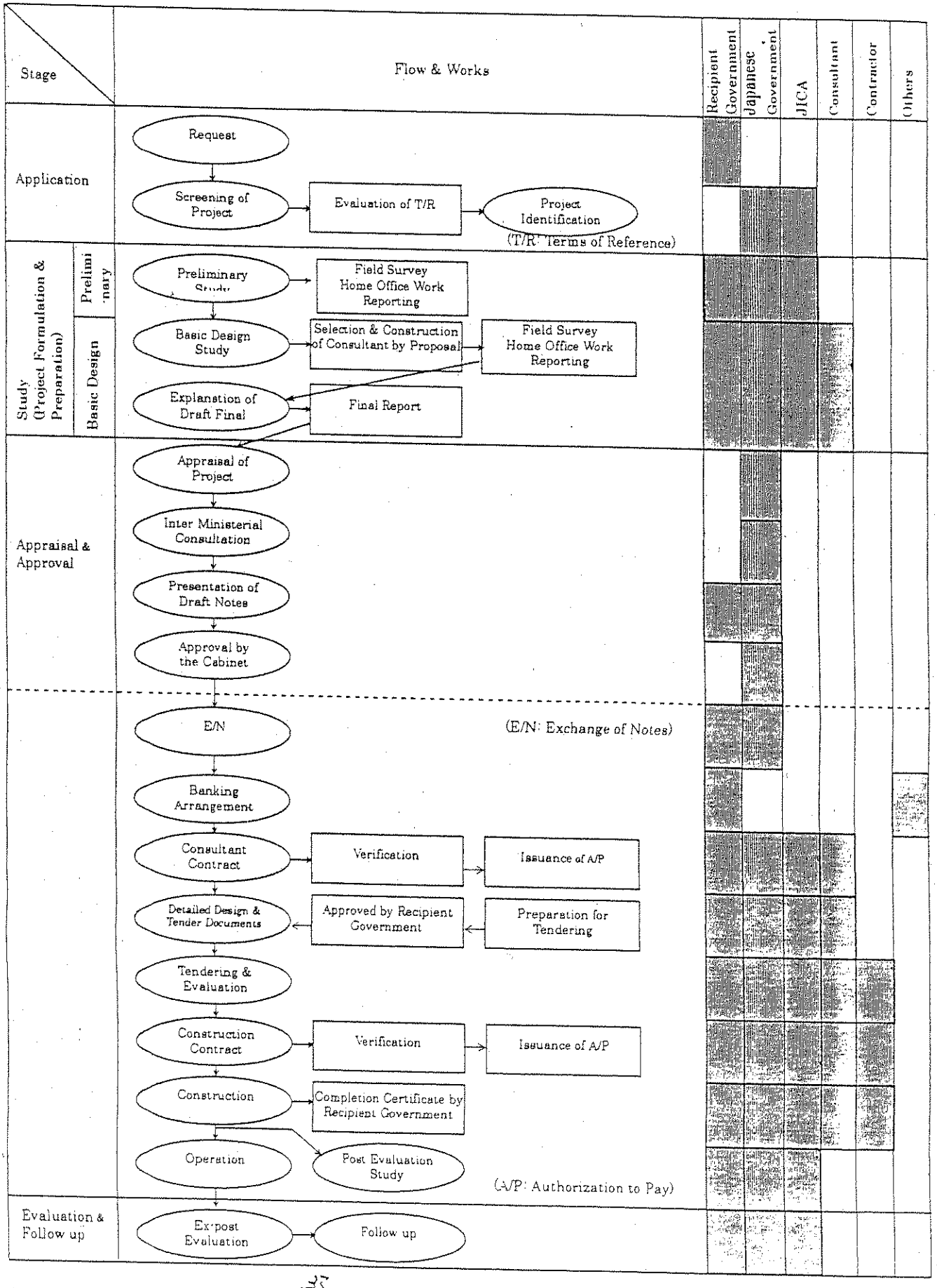
b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

x) Authorization to Pay

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commission to the Bank.

Annex-4

Flow Chart of Japan's Grant Aid Procedures



Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot		●
5	To construct roads		
	1) Within the site		●
	2) Outside the site		●
6	To procure pipes, materials and equipment for the project	●	
7	To construct intake, transmission/distribution mains, storage tanks and public hydrants	●	
8	To construct house connections		●
9	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer		●
10	To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
11	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the product site	(●)	(●)
12	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contact such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		●
13	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts.		●
14	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant.		●
15	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.		●

Annex-5

The Participants List of the Meetings

	INSTITUTION	NAME	TITLE
JAKARTA	KIMPRASWIL		
	-Directorate General of Urban & Rural Development	Mr. Patana Rantetoding	Director General
	-Directorate of Central Region	Mr. Rachmat Karnadi	Director for Central Region
		Mr. Dadan Krisnandar	Subdirector for Technical Planning
		Mr. Dwityo A. Soeranto	Chief of Programming Section
		Mr. Bahrudddin Ahmad	Chief of Yogyakarta & Central Java Section
	-Directorate of Technical Development	Mr. Tamin MZ Amin	Subdirector for Water Suply and Sanitation
		Mr. Maliki Moersid	Section Head of Directorate Technical Guidance
		Ms. Sri Murni Edi	Staff of Programming and Budgeting
		Ms. Ajiarti	Staff of Water Supply and Sanitation
		Mr. Shimazaki Toshiaki	JICA Expert for Water Supply Development
	-Bureau of Planning and International Cooperation	Mr. Deddy Roosadiono	Head of Bureau
		Mr. Firman Mulia Hutapea	Head of Program 2 and Bilateral Cooperation
		Ms. Endong S	Staff
YOGYAKARTA	BAPPEDA	Mr. Bayudono	Head of Provincial Government (Planning Board)
	Provincial Government at Yogyakarta	Mr. Sutrisno	Chief of Planning Section
	KIMPRASWIL Agency at Yogyakarta	Mr. Tri Harjun	Head of the Agency
		Mr. Purnomo	Staff
		Mr. Natsir Basuki	Staff
	- P2SP	Mr. Hananto	Sub Project Manager
		Mr. Kusumastuti	Staff
		Mr. A.N. Rofiq	Staff
GUNUNG KIDUL	PDAM	Mr. Moedjiyo	President Director
		Mr. Wudiyanto	Technical Planning
		Mr. Pratomohadi	Planning Board
	BAPPEDA	Mr. Eko Subiantoro	Chief of BAPPEDA
		Mr. Y.A. Nugroho	Staff
JAPAN	JICA	Mr. Yoshio Fukuda	Leader
		Ms. Sanae Yoshida	Project Coordinator
	Consultant Team (Nippon Koei)	Mr. Keisuke Okazaki	Chief Consultant/ Water Supply Planner
		Mr. Takashi Hiruta	Facility Planner
		Mr. Masao Higuchi	Water Sources/Groundwater Specialist
		Mr. Mitsuru Nanakubo	Social Condition Survey/O&M Specialist
		Mr. Tomoyuki Yamada	Coordinator/ Water Supply Pipeline Planner

KIMPRASWIL : Ministry of Settlement and Regional Infrastructures
P2-SP : Project of Urban and Rural Infrastructure Improvement
PDAM : Regional Drinking Water Enterprise of Gunungkidul Regency
BAPPEDA : Regional Development Planning Board
BAPPENAS : Ministry of National Development Planning/ National Development Planning Agency

Appendix-5 Other Relevant Data

5.1 Results of Social Survey

5.2 Results of Natural Survey

5.3 Results of Water Source Survey

5.4 Results of Water Quality Survey

5.5 Results of Survey for Alternative Water Source

5.6 Maintenance and management Costs

Appendix-5.1

Results of Social Survey

5.1 Social Survey

5.1.1 Survey Method

The baseline survey by interview as a part of the Study was carried out for social economic investigation in the Project area. The survey was undertaken at 26 villages in the Project area, 12 samples per a village, and 312 samples (households) in total were collected. The random sampling was conducted to prevent bias errors.

5.1.2 Results of Baseline Survey

Table 5.1.1 shows the results of the baseline survey. In the question regarding the water source for potable water (question no.10), the percentage of house connection and public hydrant was only 26.6% compared to 50% of residents who are supplied by private water tanker in the dry season. In the rainy season, the ratio of storm water use was 74.7% and the ratio of water use by house connection and public hydrant was decreased at 12.2%. The current daily water use (question no.11) was estimated at approximately 47 l/c/d. But the supply amount does not meet to the desired amount because the residents require approximately 70 l/c/d.

The items no.12-18 are questions regarding the water supply service from PDAM. Forty five percent of the households have house connection and/or public hydrant (question no.12), and out of it, 85% of the households use house connection pipe with poor supply conditions (question no.14). The households supplied with water every day is only 19%, and 50% of the households are supplied once a month or none. The amount of average water supply from PDAM in the dry season is 54.2 l/c/c for house connection and 25.8l/c/d for public hydrant (question no.15).

Regarding the satisfaction for PDAM's services (question no.16), the percentage of the consumer who answered 'Good' or 'Moderately good' for the water quality is high, but the percentages of 'Poor' and 'Not able to answer since there is no water service' amounted at nearly 60%. Regarding the answer to the water charge, many of the residents replied 'Unsatisfactory'. This shows that the collection of water charge is not reasonable, despite that the service is not acceptable.

Many residents answered that they need stable water (question no.21). In the poor income area, they did not want the high rate of water charge. However, as far as 'Affordable To Pay' and 'Willingness To Pay' are concerned, they showed position answer to a certain level of water charge.

Table 5.1.1 Results of Baseline Survey (1/2)

1) General

1 Survey Area	26	village
	312	households
2 Average of Population per Household	4.70	head/household
3 Occupation		
Agriculture	75%	
Self-employed	9%	
Resident Laborer	3%	
Employee Laborer	3%	
Government Laborer	8%	
Unemployed	1%	
4 Average of Land Own Area	1.69	ha/household
5 Ratio of Livestock Own Household		
Cattle	66%	
Fowl	53%	
Goat	62%	
6 Income Average	796,552	Rp/month/household
7 Expenses Average	616,106	Rp/month/household

2) Present Water Use Condition

8 Ratio of Water Purchasing Household	87%			
(Number of household to pay for PDAM, Water Tanker and others)				
9 Average Purchasing Price of Water	47,275	Rp/month/household		
	5.94%	(equivalent for income average)		
	7.67%	(equivalent for expense average)		
10 Water Source	Drinking Water		Other Water	
	Dry Season	Rainy Season	Dry Season	Rainy Season
Individual Service	24.7%	12.2%	19.2%	9.3%
Public Hydrant	1.9%	0.0%	1.3%	0.0%
Well	7.4%	7.1%	8.3%	7.1%
Spring	6.7%	4.5%	6.1%	3.2%
Storm Water (storage tank)	5.4%	**74.7%**	4.5%	**73.4%**
River Water	0.6%	0.0%	1.9%	0.3%
Water Tanker	**50.0%**	0.3%	**51.3%**	0.6%
Reservoir	0.0%	0.0%	4.2%	4.8%
Purchase from neighbors	3.2%	1.3%	3.2%	1.3%
Total	100.0%	100.0%	100.0%	100.0%
11 Water Use per Day	Present Amount		Desired Amount	
	per household	per head	per household	per head
Drinking	27.4		40.1	
Livestock	23.8		37.9	
Bath	86.2		127.2	
Laundry	69.8		100.7	
Others	1.6		10.0	
Total	208.8	47.3	315.9	69.6

Table 5.1.1 Results of Baseline Survey (2/2)

3) Water Supply form PDAM

12 Provision of Facilities	Provided	Not Provided	Total	
Household Number	139	173	312	
Ratio	45%	55%	100%	
13 Items of Facility	House Connection	Public Hydrant	Unknown	Total
Household	118	13	8	139
Ratio	85%	9%	6%	100%
14 Service Condition by PDAM	Number of Reply	Ratio		
Everyday	26	19%		
More than once a week	21	15%		
More than once a month	22	16%		
Less than once a month	29	21%		
No supply	41	29%		
Total	139	100%		
15 Service Amount from PDAM	House Connection		Public Hydrant	
	Dry Season	Rainy Season	Dry Season	Rainy Season
Average monthly supply (m^3/household)	7.0	6.4	3.4	0.0
Average daily supply (liter/day/head)	54.2	49.1	25.8	0.0
16 Service of PDAM	Quantity	Quality	Charge	
Fair	13.7%	**33.1%**	16.5%	
Good	18.7%	19.4%	24.5%	
Reasonable	7.9%	6.5%	10.1%	
Poor	**43.2%**	20.1%	**27.3%**	
No answer	0.0%	4.3%	5.0%	
Unknown due to no supplying	16.5%	16.5%	16.5%	
17 Improving of PDAM facility				
Agree		96%		
Not agree		4%		
18 Required Water Supply after improvement				
Less than 6 hours		42%		
Between 6 and 12 hours		17%		
Between 12 and 18 hours		2%		
Between 18 and 24 hours		0%		
Constant		40%		

4) ATP/WTP

19 Affordablity to pay (ATP)	Income	Expenses
Average Income / Expenditure	796,552	616,106
Affordable Amount (3% of average income)	23,897	18,483
20 Willingness to pay (WTP)	3,407	Rp/m3

5) Others

21 Comments to the Project (plural answers)	Number	Ratio
To supply stable water	163	52%
To wish not high water rate	118	38%
To commence the Project as earlier	89	29%
To improve PDAM's services	83	27%
To supply clean water	52	17%
To supply water for poor household	12	4%
Regardless of high cost	12	4%
Others	4	1%

22 Status for going to draw water		
Ratio of household for going to draw water	6.1	%
Distance average to water source	0.89	km
Time average on both ways (min.)	38	min.

23 Boiled drinking water status	Number
Yes	311
No	1 *1

*1: Purchasing of drinking water from market

5.1.3 Affordability To Pay/Willingness To Pay

Affordability To Pay (ATP) is generally assumed as 3% of the average monthly income as calculated in table 5.1.2. (The World Bank generally suggests the figure of 3-5 %.)

Table 5.1.2 Results of Calculation of ATP

	Rp/Month/household
Average monthly income	796,552
ATP (3% of average income)	23,897

Willingness To Pay (WTP) is obtained by interview survey to the residents in the Project area based on the Contingent Valuation Method (CVM).

As the time of interview survey, the surveyor explained to the residents the outline of this Project, resulting betterment after the construction and a slight possible increase of water charge due to increase of O&M cost, and also requested to reply the question with respect to affordable amount of water charge per month.

Four figures of WTP (700, 1,250, 3,000 and 7,000 Rp/m^3) were prepared to prevent the bias errors in advance. Consequent to the interview survey, WTP was identified at 3,407 Rp/m^3 per month.

The comparison of the probable monthly water charge using proposed unit water charge and Affordability To Pay (ATP) and Willingness To Pay (WTP) is shown in Table 5.1.3 as follows.

Table 5.1.3 Comparison of Water Charge and ATP/WTP

Unit: Rp

Charge	Unit Water Rate (Rp/m^3)	Monthly Water Charge (Rp)	Affordability To Pay (ATP)	Willingness To Pay (WTP)
Present Status	1,250	14,750	23,897	32,288
1.2 times	1,500	17,250		
1.5 times	1,875	21,000		
2.0 times	2,200	24,250		

The monthly water charge at present is calculated multiplying the water rate of 1,250 Rp by the consumption amount of 10m^3 in addition to the meter fee of 750 Rp and the commission of 1,500 Rp. In this regard, water consumption amount was assumed to be 10m^3 in average.

On the above comparison study, it is obviously possible to pay the amount 1.5 times of the present status, because ATP exceeds this figure. While, WTP is higher the figure of ATP even after the water charge has been increased two times as the current water charge.

This signify that the residents rather prefer the amounts of water charge higher than the figure of ATP, since many of the residents pay for the extraordinary expensive water by tanker.

Appendix-5.2

Results of Natural Survey

5.2. Results of Natural Survey

5.2.1 Meteorological Condition

(1) Temperature, Humidity, Wind Speed, Sunshine and Rainfall Days

The Project Area is exposed by the wet northwesterly monsoon from December to February and the dry easterly monsoon from June to September. The average yearly temperature is 25.9°C and the minimum and maximum temperatures are 24.6°C on July and 27.1°C on March, respectively. The relative humidity is 89.2% and maximum and minimum humidity are 93.3% on April and 80.3% on November, respectively. The wind speed is usually low, the yearly average is 0.47 m/s, the minimum is 0.28 m/s on April and May, and the maximum is 0.84 m/sec on September. The average sunshine average days amount to 53.4% in a year, and the minimum and maximum rates are 32.1% on February and 70.3% on September, respectively. At the Playan, the total days of rainfall count for 103 days per year, and 18 days on January and February in the rainy season and less than 1 day on August in the dry season. The meteorological data in the Project area is shown in Table 5.2.1.

Table5.2.1 Meteorological Data

Meteorological Phenomena	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Temperature (°C)	25.8	25.3	27.1	26.5	26.9	26.1	24.6	24.8	25.0	26.2	26.3	25.6	25.9
Relative Humidity (%)	91.4	92.4	92.6	93.3	91.1	92.2	91.4	89.8	89.4	86.7	80.3	80.4	89.2
Wind Speed (m/sec)	0.35	0.35	0.31	0.28	0.28	0.32	0.45	0.64	0.84	0.79	0.55	0.45	0.47
Rate of Sunshine (%)	39.2	32.1	43.2	53.1	63.8	66.4	66.3	61.3	70.3	57.6	45.9	41.7	53.4
Rainfall Days	17.7	18.5	13.8	11.5	4.0	4.0	2.0	0.5	1.1	6.1	11.1	14.4	102.2

Above data are averaged from 1992 to 2003.

(2) Rainfall

The yearly rainfall extends from 1,734mm to 3,600mm as shown in Table 5.2.2 (those observation stations are shown in Figure 5.2.1). In general, the rainy season is from November to April and the dry season is from May to October. Approximately 80% of the yearly rainfall is concentrated in the rainy season.

Table 5.2.2 Rainfall Data

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Panggan[1)]	763	359	232	236	40	51	63	3	403	394	478	389	3600
Playen[2)]	426	421	363	211	159	92	24	16	41	136	299	326	2522
Wonosari[3)]	309	262	295	140	99	59	16	11	25	79	179	259	1734

Reference: DPUP-DIY. 1) Lacking data from 1985 to 2001 (3 years), 2) Lacking data from 1970 to 2003 (7 years), 3) Lacking data from 1970 to 2000 (18 years)

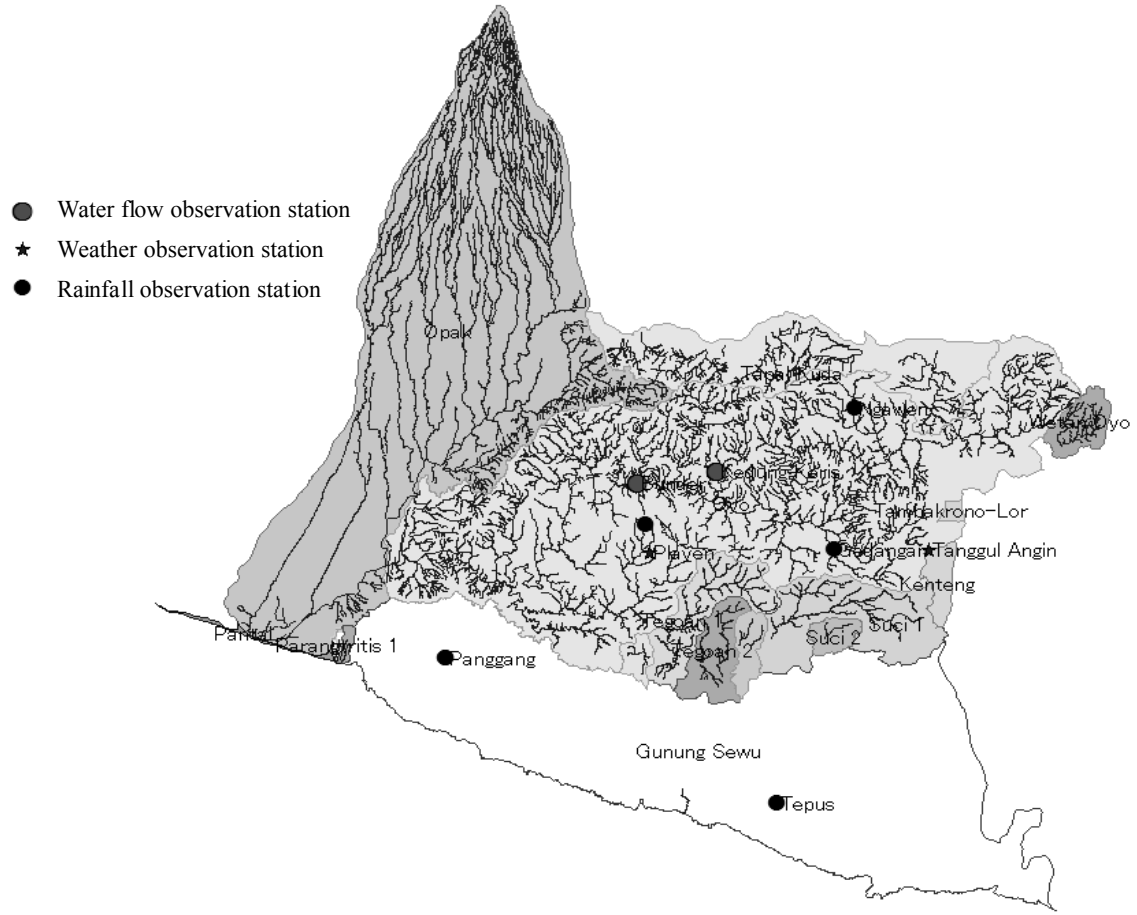


Figure 5.2.1 Meteorological Observation Station and River Discharge Measurement Station

5.2.2 River Hydraulics

The Oyo river passing through the Gunungkidul regency and having a catchment area of 710km^2 flows from the northwest to the southeast and meets the Opak River at the foot of the Mt. Merapi in the Buntul regency.

The River flow varies in the dry and rainy seasons. An example is shown in Figure 5.2.2. The flow rate measured at Bunder gauging station in the middle of the river course came to less than 0.5m^3/s in the dry season. Due to this reason, a dam construction scheme in the Kali Progo Basin study by Sir M. Macdonald & partners in 1972 to 1975 was proposed. However, it was identified to be difficult to use the Oyo river water based on the dam construction in the catchment area, because the limestone deposits will leak water extensively.

The Tegoan and Suci rivers that run through the villages and suburban areas in the Project area originate from the Wonosari plateau and pass the Gunung Sewu area and flow into reach many caves. According to the experiment of groundwater flow using dyestuff, the above river flows run into the caves that reach the Baron cave. The observation 1998-1999

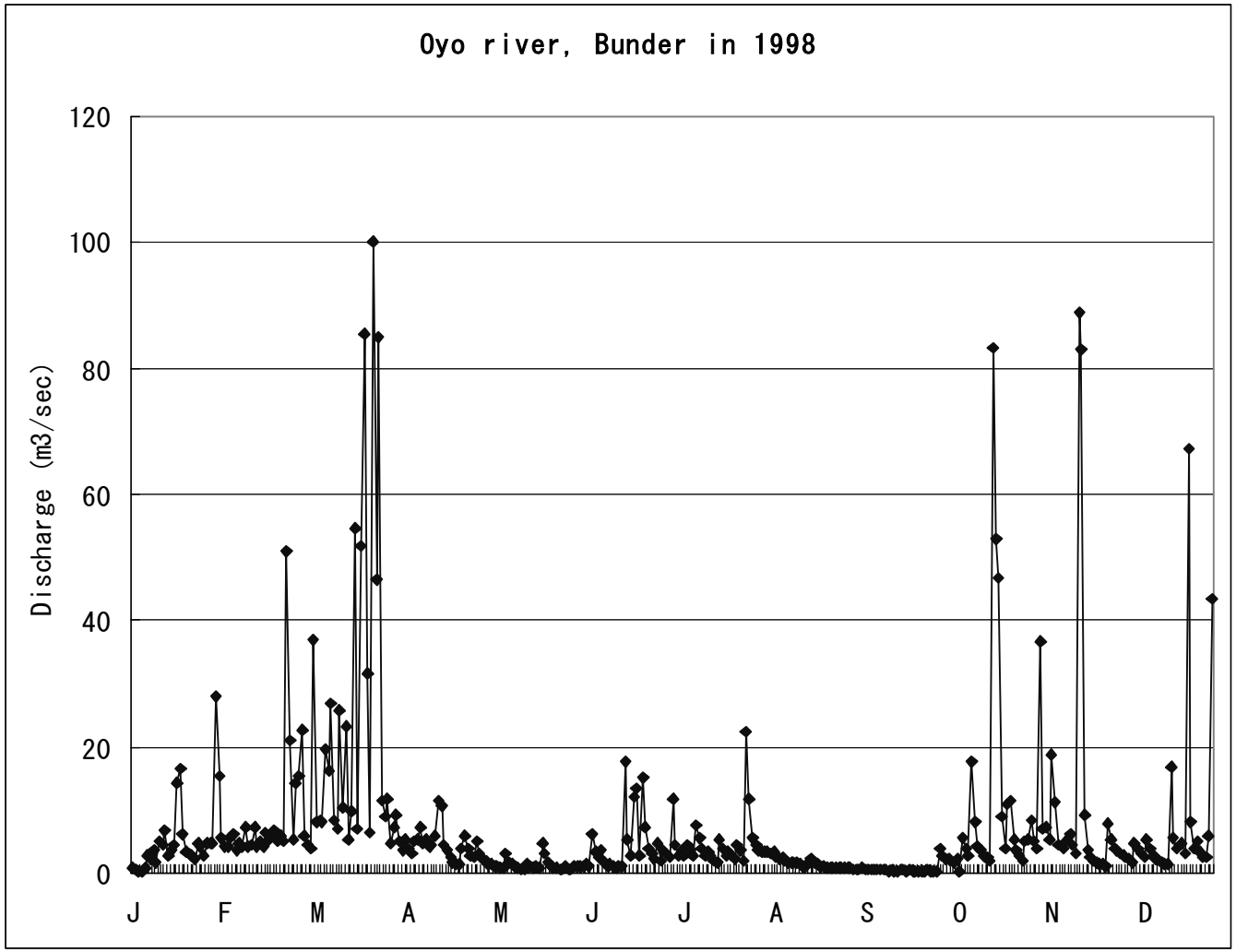


Figure 5.2.2 Hydrograph of Oyo River

5.2.3 Tide Level

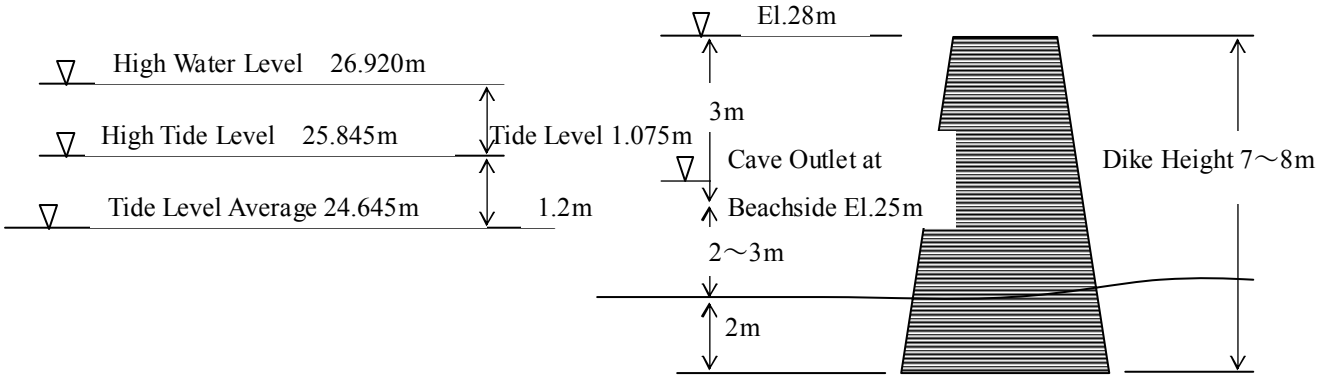
Data for tide level was collected from the outskirt of Baron cave to study the backwater of the sea water to the intake site. The tide level in the Project area was measured by the Agency for the Assessment and Application Technology – Coastal Dynamic Research Centre in terms of Wave Power Generation Scheme at the existing intake station of Ngobaran.

The tidal level data from 1996 to 1997 is shown in Table 5.2.3.

Table 5.2.3 Tidal Level Data

Survey Year	1996					1997							Average
	8	9	10	11	12	1	2	3	4	5	6	7	
Wave Hight (m)	1.8	1.7	1.6	1.5	1.5	1.5	1.8	1.5	1.3	1.8	2.1	2.0	1.6

Basis of the data, the level at the high tide is assumed as follows.



A dike or weir construction is required for the water intake at the outlet of Baron cave because its elevation is about 25m which is lower than the high water level at 27m. However, those facilities are not agreeable to construct because the tourism of Baron beach will be environmentally deteriorated and the landscape will become worse by the construction of dike or weir with a height of approximately 7 to 8m including foundation.

On the contrary, the water level at the Baron cave intake site is approximately 30m and 3m higher than the sea water level. Therefore, there is no fear of saline intrusion to the intake site.

Appendix-5.3

Results of Water Source Survey

5.3. Results of Water Source Survey

5.3.1 Groundwater

Deep well drilling in Gunungkidul Regency started for the development of potable water supply and irrigation purpose 1961, and the full scale of drilling for underground water exploitation was executed from 1970s to 1980s. The comprehensive groundwater source investigation was executed from 1971 to 1978 by drilling tube wells at 116 locations (from 4 to 8 inch in diameter) in the Gunungkidul Groundwater Project (1979) by Sir M. Macdonald & Partners, and 28 wells out of them were made in use as the productive wells. It means that only 25% was achieved successfully. This rate can be said considerably low even if the topographic condition that the area comprises of karstic hilly area is taken into consideration. As shown in Figure 5.3.1, 18 test wells were constructed in Gunung Sewu located in the karstic topography, and the groundwater was identified only in one tube well. Besides, the water was not used as the productive well due to extremely low safe yield. As a conclusion, the groundwater yield in Gunun Sewu in the karstic area concluded without success at all.

Although, the groundwater development has become much more successful by the survey results with the contribution of Sir M. Macdonald & Partners in 1979, the developed wells successfully, according to the data of PPAB were only 89 wells out of whole 225 wells performed in the entire Gunungkidul Regency since 1961. It means that the rate of success comes to only 40%.

It is generally said in the Gunungkidul Regency that the productive well of more than 5 l/s for potable water and 30 l/s for irrigation use are successful wells. In the Project area, there is only one well succeeded for potable water supply in Paliyan area. According to the hydro-geological map of the Gununkidul Regency, there area is divided into 6 groundwater conservation units and the Wonosari Plateau in the north end of the area has a safe yield of 2-10 l/s and water quality is fair.

Monitoring of the groundwater level, water quality and the water intake amount is indispensable to appropriately control the groundwater. However, surveys and comprehensive groundwater intake amount monitoring have not been carried in Gunungkidul Regency. The monitoring of water level and quality has been implemented once in a year since 2003, it is limited to underground water in 2 caves and 7 shallow wells, but not for tube wells. In the Project area concerned, there is no monitoring wells.

The laws regarding the groundwater are individually regulated by the National Constitution, the Government Ordinances of the Central Government/the Ministry of Energy for Underground Resource, the Provincial Department of Public Works in Yogyakarta Special Territory and Gunungkidul District. The water resources belong to the Government as stipulated in the National Constitution established in 1945. The laws for water rights

(Undang-Undang RI No.7, Apr. 2004) were enacted on April, 2004. However, the regional offices still follow the Government Ordinance (1451/K/10/MEM/2000) of the Ministry of Energy for Underground Resource established in 2000. According to this ordinance, the amount of abstraction shall not exceed 50 l/s per 10 ha and when the actual abstraction exceed this figure, the owner of the wells should construct monitoring wells by his own expense.

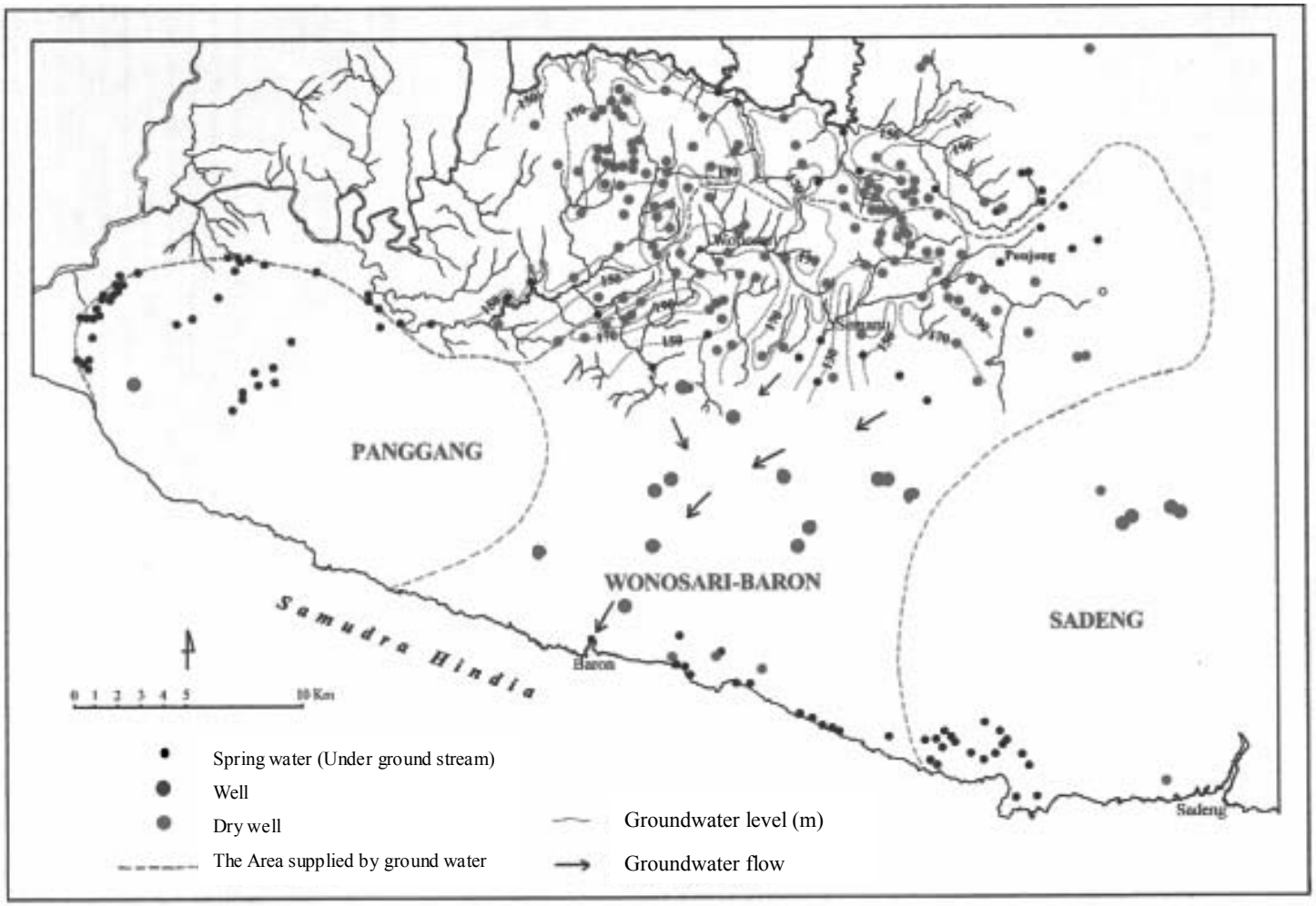


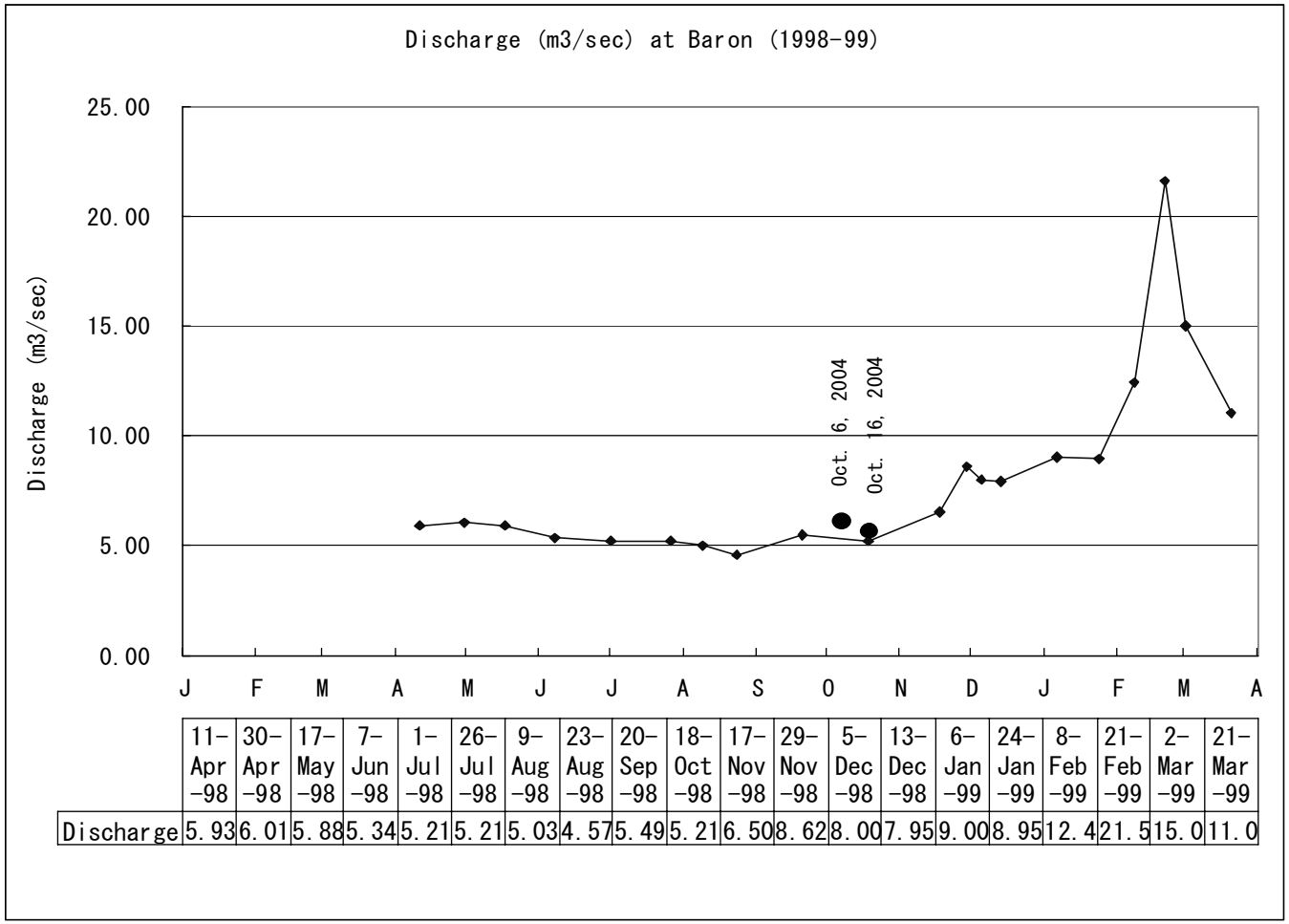
Figure 5.3.1 Location Map of Springs (including underground streams in caves) and Tube Wells

5.3.2 Underground Stream at Caves

The study for the 'doline' and the corrosive caves distributed in the Project area was carried out on the basis of the report of the Greater Yogyakarta Groundwater Resources Study, 1984 by Sir M. Macdonald & Partners and the information from the 'cave association' of University in Yogyakarta. The caves with underground streams which yield a large amount discharge are distributed in the regions of Semanu (Bribin and ToTo caves), Tepus (Baron and Ngobaran caves) and Purwosari. The Lebak cave with 4 l/s and Soga cave with 7 l/s located in the high altitude generate low amount of water and they have already been utilized by PDAM in Bamyyumeneng and Guritirto areas. It has been identified that the underground stream at Barron cave has the largest catchment area of 500km^2 and is a stable water source having a flow rate of approximately 5 m^3/s at maximum in Gunungkidul District.

The outline of main underground streams at caves is shown as follow (refer to Figure 5.3.3).

Underground Stream at Cave	Region	Outflow Discharge (l/s)	Difference of Elevation between cave and R5 Tank m)	Present Status
Baron	Tepus	5000 (1982, 1998/99, 2004)	350	In use in Baron system
Toto	Semanu	260 (1982), 150 (2004)	250	Not in use
Grubug	Semanu	680 (1982)	320	Not in use
Bribin	Semanu	1500 (1982)	250	In use in Bribin system
Bekah	Purwosari	780 (2004)	350	Not in use
Sundak	Tepus	200 (1982)	350	Not in use
Semurup	Tepus	260 (1982)	350	Not in use



	11-Apr-98	30-Apr-98	17-May-98	7-Jun-98	1-Jul-98	26-Jul-98	9-Aug-98	23-Aug-98	20-Sep-98	18-Oct-98	17-Nov-98	29-Nov-98	5-Dec-98	13-Dec-98	6-Jan-99	24-Jan-99	8-Feb-99	21-Feb-99	2-Mar-99	21-Mar-99
Discharge	5.93	6.01	5.88	5.34	5.21	5.21	5.03	4.57	5.49	5.21	6.50	8.62	8.00	7.95	9.00	8.95	12.4	21.5	15.0	11.0

Figure 5.3.2 Discharge of Underground Stream at Baron Cave

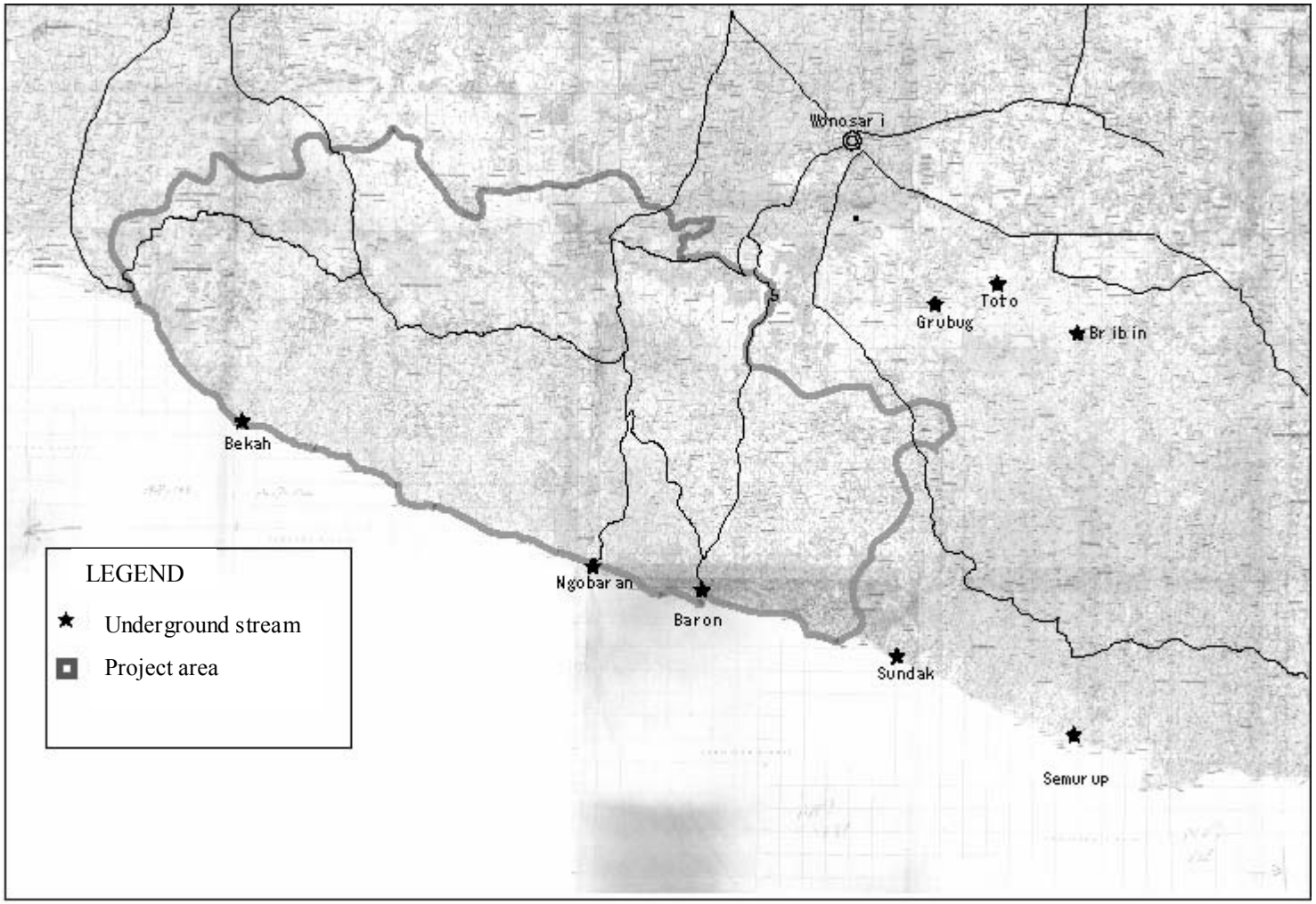


Figure 5.3.3 Location of Underground Stream

Appendix-5.4

Results of Water Quality Survey

5.4. Results of Water Quality Survey

Coliform bacteria and variable bacteria were detected from the underground streams at Baron, Ngobaran and Toto caves by sampling and tests carried out by the study team under the Basic Design Study. They are summarized in Table 5.4.1. Furthermore, the study team also carried out the additional tests of Coliform bacteria and variable bacteria entrusting at the public institution in Jogjakarta.

Table 5.4.2 shows the result of the tests sampled in the dry season and tested by the water quality testing institution in Jakarta together with the national standard of Indonesia. The drinking water standard is regulated in the Ordinance of Ministry of Sanitation (No.907 / Men Kes / Per / VII / 2002).

The bacteriological results are not reliable due to the difficulty of temperature control during long time transportation between Jakarta and Jogjakarta. Regarding the coliform bacteria, only those data tested in Jogjakarta should be used. Other water quality items are identified lower than the figure stipulated in the Indonesian standard.

Table 5.4.1 Results of Simple Water Quality Tests by Study Team

Underground Stream at Caves	**Indonesia Drinking Water Quality Standard**	Baron Oct. 7	Baron Oct. 16	Baron Oct. 23	Baron Oct. 26	Ngobaran Oct. 7	Ngobaran Oct. 20	Ngobaran Oct. 23	Ngobaran Oct. 26	Toto Oct. 9	Toto Oct. 20	Toto Oct. 23	Toto Oct. 26
Coliform Bacteria (MPN/100ml)	**0**	600	800	30**	23**	100	100	50**	70**	300	300	1600*	500**
Viable bacteria (colony/ml)		1	1		31**	2	3		32**	1	1		140**
pH	**6.5 – 8.5**	7.1	6.9			7.1	7.8			6.1	6.3		
EC (microS/cm)	**1000 (TDS)**	508	511			450	461			541	545		
Temperature (^{o}C)		27.3	27.3			27.6	27.6			27.4	27.8		
Turbidity (NTU)	**5**	1	1			1	1			1	1		
Nitrate (NO3)	**10**	1	2			1	1			1	1		
Nitrite (NO2)	**1**	0	0			0	0			0	0		

Note: * reference data

**test results at public institution in Jogjakarta

Table 5.4.2 Test Results of Water Quality by the Organization in Jakarta

Item	Unit	Alternative Water Source			Indonesian Drinking Water Quality Standard	Japanese Drinking Water Quality Standard
		Ngobaran	Toto	Baron		
Bacteriological:						
Viable bacteria	mL	1.4×10^4	1.1×10^4	2.1×10^4	-	100
E-coli	100mL	Positive	Positive	Positive	0	0
Physical & Chemical:						
Color	Pt-Co	0	0	0	15	5
Turbidity	NTU	1.16	1.65	1.24	5	2
TDS	mg/l	282	344	306	1000	500
Organic matter	mg/l	0	0	0	10	5
Copper (Cu)	mg/l	<0.02	<0.02	<0.02	1	1
Iron (Fe)	mg/l	<0.01	<0.01	<0.01	0.3	0.3
Fluoride (F)	mg/l	0.22	0.24	0.20	1.5	0.8
Nitrate (NO_3)	mg/l	9.25	9.25	9.17	10	10
Nitrite (NO_2)	mg/l	<0.005	<0.005	<0.005	1	
Manganese (Mn)	mg/l	<0.01	<0.01	<0.01	0.1	0.05
Cyan (CN)	mg/l	<0.01	<0.01	<0.01	0.1	0.01
Chrome (Cr)	mg/l	<0.01	<0.01	<0.01	0.05	0.05
Lead (Pb)	mg/l	<0.01	<0.01	<0.01	0.05	0.01
Mercury (Hg)	mg/l	<0.001	<0.001	<0.001	0.001	0.0005
Hardness ($CaCO_3$)	mg/l	262	279	238	500	-
Cadmium (Cd)	mg/l	<0.001	<0.001	<0.001	0.005	0.01
Ammonia (NH_4)	mg/l	<0.02	<0.02	<0.02	-	-
Arsenic (As)	mg/l	<0.005	<0.005	<0.005	0.05	0.01
Selenium (Se)	mg/l	<0.005	<0.005	<0.005	0.01	0.01
Sodium (Na)	mg/l	5.56	3.66	3.01	200	200
Potassium (K)	mg/l	1.29	1.35	1.34	-	-
Calcium (Ca)	mg/l	102	103	83.90	-	300
Magnesium (Mg)	mg/l	1.79	5.20	6.87	-	
Chloride (Cl)	mg/l	6.17	5.40	5.55	250	200
Total Alkalinity (HCO_3)	mg/l	201	246	221	-	-
Sulfate (SO_4)	mg/l	3.13	2.97	3.64	400	-
Hydrated silica (SiO_4)	mg/l	32.46	32.70	25.94	-	-

Appendix-5.5

Results of Survey for Alternative Water Source

5.5 Results of Survey for Alternative Water Source

It is estimated that the pumping capacity at the Ngobaran cave is approximately 60 l/s on average on account of the site structure, though the flow rate in the cave are measured by the study team with the extent of 110-120 l/s (the maximum: 160 l/s). If the existing facilities have been renovated after expanding the cave, the intake capacity will be enlarged. However, the existing maximum pumping capacity is limited to 80 l/s and necessary to provide new pumps and transmission pipes if the expansion of intake amount is required. It means that if the Baron intake amount will be enlarged with new pump and pipe facilities that can cover the water supply for the entire area as requested by the Indonesian Government, there is no meaning of expanding the Ngobaran system. Due to this reason, the Ngobaran system was determined to be remained with the same capacity.

For other water source alternatives, Toto groundwater stream in the Bribin system was nominated as a high potential source. However, for the transmission of water to the highest tank of R-5, provision of pipeline installation for the length of 1.6 times as the case from the Baron cave together with an access road for approximately 1 km is neccessary. Therefore, there is no merit for this case. Furthemore, Bekah groundwater stream also needs to install pipelines for more than 2 times as the case of Baron cave, so that this alternative does not also have a merit.

Regarding the tube wells at the south of Wonosari and Playan regions, existing pumping capacity is too small to cover the entire area, additional test drilling and abstraction tests are required for the case of provision of new tube wells and not economical, and probability of success of well drilling is too low as 40% according to the past experience, new development of tube wells will not be advantageous.

The surface water is not applicable as the water resource because of possible large water leakages due to the limestone deposits underneath.

As stated above, Baron cave was determined as the best location and best water source for the Project area. Table 5.5.1 shows the results of comparison of alternative water sources.

Table 5.5.1 Comparison of Alternative Water Sources

Water Source	Flow rate surveyed in the Study (l/sec)	Difference between Water Source and R5 (m)	Transportation Method between Water Source and R5	Water Quality	Hydraulic Survey	Groundwater Survey	Additional access Road	Cost Comparison against the one of Baron cave
Groundwater at Baron cave	5000	350	Proposed Pipeline	E-coli. was detected. Turbidity in the rainy season is expected to be large.	Completed	—	No need	—
Groundwater at Ngobaran	160	350	Existing Pipeline	E-coli. was detected. Turbidity in the rainy season is expected to be large.	Completed	—	No need	—
Groundwater at Toto	150-260	250	New Pipeline (1.6 times of pipe length as the case between Baron-R5)	E-coli. was detected. Turbidity in the rainy season is expected to be large.	Necessary in future	—	New road of 1km	Cost increase for 20%
Tube well at the south of Wonosari	4 l/sec/tube well	200	Pipeline length to the neighboring village is comparatively small.	Necessity of drilling and abstraction test. (40% of the success ratio of groundwater development)	Necessity of pumping test	Necessary	New road of 0.5km	Limited to only village water supply due to small potential
Tube well at Playan and Wonosari	20-30 l/sec/tube well	200	New Pipeline (1.2 times of pipe length as the case between Baron-R5)	Necessity of drilling and abstraction test. (40% of the success ratio of groundwater development)	Necessity of pumping test	Necessary	New road of 0.5km	Limited to only village water supply due to small potential
Groundwater at Bekah	780	350	New Pipeline (1.2 times of pipe length as the case between Baron-R5)	Necessity of detail survey in future	Necessary in future	—	New road of 1 km	Cost increase for 40%
Oyo river	Necessary to construct a dam, but it is not advantageous due to possible water leakage through the limestone.							

Appendix-5.6

Maintenance and Management Costs

Table 5.6.2.6 Labour Costs

unit: staff

	State	Plan	Remarks
Pump Operation	**11**	**28**	
Baron	2	28	Two Staffs per Pumping Station (14 stations x 2 staffs = 28 staffs)*1
Ngobaran	9		
Manager of Transportation	**5**	**10**	
Baron	1	2	Increase to Twice its Staffs
Ngobaran	4	8	Increase to Twice its Staffs
Water Quality Manager	**0**	**1**	One Full Time Staff at Baron Atas (BR-0)
Total	**16**	**39**	

*1: The number of pumping station is as follows;

unit: station

	State	Plan	Remarks
Existing	9	6	
Baron	3	0	Abolition after the Project
Ngobaran	6	6	Maintenance of the Status
Newly construction	0	8	
Total	9	14	

Table 5.6.2.7 Electric Costs

	Consumer Powumber of Pum (kW)	(no.)	Operation Time (hour/day)	peration Daeration Time per Y (day/year)	(kWh)	Remarks
Existing		6			**2,372,056**	
Baron		0			0	Abolition of 3 pumps after the Project
Ngobaran		6			2,372,056 *1	
Newly Construction					**4,161,000**	
Baron Intake	50	2	15	365	547,500	
Baron Atas (BR-0)	85	2	15	365	930,750	
Congo (BR-1A)	75	2	15	365	821,250	
Bulu (BR-2)	60	2	15	365	657,000	
Baros (BR-3)	60	2	15	365	657,000	
Congo (BR-1B)	45	1	15	365	246,375	
Kemadang Baru (BR-4)	35	1	15	365	191,625	
Gebang Baru (BR-5)	20	1	15	365	109,500	
Total					**6,533,056**	

*1: The consumer power operating by 6 pumps is 980,450kWh at the present time. The operation time per year, when the daily operation time is changed from 6.2 hours to 15 hours, is estimated as follows;
980,450 x 15/6.2 = 2,372,056 (kWh)

Note) The electric cost is divided into night time (WBP from 18:00 to 22:00) and normal time (LWBP).

Unit Cost of Electricity

	Unit Price	Unit	Operation Time
Normal Time (LWBP)	439	Rp/kWh	0:00~18:00, 22:00~24:00
Night Time (WBP)	615	Rp/kWh	18:00~22:00

The operation in the Project is assumed as the low priced time of LWBP.

Table 5.6.2.8 Fuel/Oil

unit: liter

	State	Plan	Remarks
Fuel	**11,624**	**28,123**	
Baron	0	0	To be not in use
Ngobaran	11,624	28,123 *1	
Oil	**50**	**121**	
Baron	0	0	To be not in use
Ngobaran	50	121 *1	

*1: The daily operation time is changed from 6.2 hours at the present time to 15 hours.

Table 5.6.2.9 Maintenance Costs

unit: Rp

	State[*1]	oefficient	Plan	Remarks
For Pump	**35,567,428**		**49,438,725**	
Electromotor Tool	29,663	1.39	41,232	Extraction form Depreciation Costs
Magnetic Pick Part	959,062	1.39	1,333,096	Extraction form Depreciation Costs
Pump Cable	165,996	1.39	230,734	Extraction form Depreciation Costs
Pump Tools	1,888,973	1.39	2,625,673	Extraction form Depreciation Costs
Spare Parts of Diesel	1,045,853	1.39	1,453,735	Extraction form Depreciation Costs
Spare Parts of Engine	4,195,518	1.39	5,831,769	Extraction form Depreciation Costs
Spare Parts of Pump	507,436	1.39	705,336	Extraction form Depreciation Costs
Switch of Ohm	27,871	1.39	38,740	Extraction form Depreciation Costs
Overhaul of Diesel	138,879	1.39	193,042	Extraction form Depreciation Costs
Overhaul of Pump	46,464	1.39	64,585	Extraction form Depreciation Costs
Repair of Diesel	375,960	1.39	522,585	Extraction form Depreciation Costs
Repair of Dinamo	7,435	1.39	10,335	Extraction form Depreciation Costs
Repair of Electromotor	139,171	1.39	193,448	Extraction form Depreciation Costs
Repair of Generator	1,234,679	1.39	1,716,204	Extraction form Depreciation Costs
Repair of Pump	322,049	1.39	447,648	Extraction form Depreciation Costs
Repair of Pump Panel	21,555	1.39	29,961	Extraction form Depreciation Costs
Repair of Radiator	388,388	1.39	539,859	Extraction form Depreciation Costs
Repair of Relay	134,150	1.39	186,468	Extraction form Depreciation Costs
Repair of Submersible Pump	676,849	1.39	940,821	Extraction form Depreciation Costs
Rewinding of Electromotor	8,810	1.39	12,246	Extraction form Depreciation Costs
Rewinding of Generator	1,042,192	1.39	1,448,647	Extraction form Depreciation Costs
Rewinding of Stator	561,374	1.39	780,310	Extraction form Depreciation Costs
Pump Gear	20,918,100	1.39	29,076,159	Appropriation of Consumption
Other Costs	731,000	1.39	1,016,090	Appropriation of Consumption
For Storage Tank	**0**		**0**	
Maintenance	0		0	
For Transportation and Distribution Pipe	**17,146,205**		**23,833,225**	
Transportation and Distribution Pipe				
Pipe Discharge	4,741,706	1.39	6,590,971	Extraction form Depreciation Costs
Pipe Tapping	21,450	1.39	29,816	Extraction form Depreciation Costs
Repair of Pipe	500,595	1.39	695,827	Extraction form Depreciation Costs
Water Meter	72,050	1.39	100,150	Extraction form Depreciation Costs
Water Valve	50,350	1.39	69,987	Extraction form Depreciation Costs
Transmission Pipe Maintenance	11,473,874	1.39	15,948,684	Appropriation of Consumption
Individual Service, Public Tap				
Rehabilitation of House Connection	286,181	1.39	397,791	
Others	**286,657**		**398,453**	
Electric Adaptor 10 Ampere	30,796	1.39	42,806	Extraction form Depreciation Costs
Automatic Voltage Regulation	60,364	1.39	83,906	Extraction form Depreciation Costs
Compressor	6,052	1.39	8,412	Extraction form Depreciation Costs
NYY Cable	7,364	1.39	10,235	Extraction form Depreciation Costs
Ohm Electric Switch	7,396	1.39	10,280	Extraction form Depreciation Costs
Pipe Key	7,031	1.39	9,773	Extraction form Depreciation Costs
Pump Cable	45,402	1.39	63,109	Extraction form Depreciation Costs
Stamper (Mikasa)	6,401	1.39	8,897	Extraction form Depreciation Costs
Test Bench	88,340	1.39	122,792	Extraction form Depreciation Costs
Tool Set	27,512	1.39	38,242	Extraction form Depreciation Costs
Total	**53,000,290**		**73,670,403**	

*1 The state costs are estimated by the equipments/maintenance costs in the Project Area.
*2 The coefficient is estimated by the proportion of total pipe length (future / state = 227km / 164km = 1.39).

Table 5.6.2.10 Chemical Costs

	Water Production Amount (m3/day)	Amount (kg/1000m3)	Yearly Amout (kg/year)	Remarks
Existing (Ngobaran)	3,200	1.0	1,168	
Newly Construction	4,800	1.0	1,752	
Total	**8,000**	**1.0**	**2,920**	

*1: Planned Production Amout

Table 5.6.2.11 Service Income in the Project Area

Service Income (State)

		Facilities	Water Rate	Meter Rental Fee	Commission	Service Income	Remarks
I	Public Social	1	610,500	18,000	9,000	637,500	
	Special Social	80	15,400,660	1,440,000	720,000	17,560,660	
II	Household A	4,022	592,812,850	72,396,000	36,198,000	701,406,850	
	Household B	18	3,525,100	324,000	162,000	4,011,100	
	Government Agency	35	15,807,000	630,000	315,000	16,752,000	
III	Big Business	0	0	0	0	0	
	Small Business	13	9,309,900	234,000	117,000	9,660,900	
V	Stand Point	82	29,419,650	1,476,000	738,000	31,633,650	
Total Consumption			666,885,660	76,518,000	38,259,000	781,662,660	

Note: The actual number of facilities supplied with water is indicates in the above column of "Facilities".

Service Income (Plan)

		Facilities	Water Rate	Meter Rental Fee	Commission	Service Income	Remarks
I	Public Social	1	610,500	18,000	9,000	637,500	Maintenance of the Status
	Special Social	80	15,400,660	1,440,000	720,000	17,560,660	Maintenance of the Status
II	Household A	15,252	2,287,800,000	274,536,000	137,268,000	2,699,604,000	
	Household B	18	3,525,100	324,000	162,000	4,011,100	Maintenance of the Status
	Government Agency	35	15,807,000	630,000	315,000	16,752,000	Maintenance of the Status
III	Big Business	0	0	0	0	0	Maintenance of the Status
	Small Business	13	9,309,900	234,000	117,000	9,660,900	Maintenance of the Status
V	Stand Point	191	395,810,064	3,438,000	1,719,000	400,967,064	
Total			2,728,263,224	280,620,000	140,310,000	3,149,193,224	

Note: The service charge system is assumed to maintain the present status.
Only the individual service and public tap are assumed to add the facilities.

Table 5.6.2.12 Comparison of Average Water Rate and Cost

unit: Rp/m3

	Plan (Year of 2007)	Remarks
Cost		
Full Rate	3,265	Maintenance and management costs, overhead, depreciation cost, 10% of total assets
Base Rate	2,553	Maintenance and management costs, overhead, depreciation cost, loan return
Low Rate	2,553	Maintenance and management costs, overhead, depreciation cost
Lowest Rate	1,960	Maintenance and management costs, overhead
Average Water Rate		
Plan-4	3,086	Increasing of 2.0 times as the status
Plan-3	2,358	Increasing of 1.5 times as the status
Plan-2	1,920	Increasing of 1.2 times as the status
Plan-1	1,629	Maintenance of the status

The average water rate is calculated as the division of total service income into used amount.

Table 5.6.2.13 Comparison of ATP and WTP

Charge	Water Rate (Rp/m3)	Used Amount (m3)	Meter Rental Fee (Rp)	Monthly Used Fee (Rp)	Affordable To Pay (ATP)	Willingness To Pay (WTP)
Maintenance	1,250	10	2,250	14,750	23,897	32,288
1.2 times	1,500	10	2,250	17,250		
1.5 times	1,875	10	2,250	21,000		
2.0 times	2,200	10	2,250	24,250		