Ministry of Public Works
The Republic of Indonesia

No.

THE IMPLEMENTATION REVIEW STUDY REPORT

ON

THE PROJECT FOR WATER SUPPLY IN GUNUNGKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY

IN

THE REPUBLIC OF INDONESIA

DECEMBER 2006

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO.LTD.

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PREFACE

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct a basic design study on Water Supply in Gunungkidul Regency of Yogyakarta Special Territory and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Indonesia a study team from March 7 to July 8, 2006 and from September 4 to 8, 2006.

The team held discussions with the officials concerned of the Government of Indonesia, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Indonesia in order to discuss a draft implementation review study, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the teams.

December, 2006

Masafumi Kuroki

Vice-President
Japan International Cooperation Agency

December, 2006

Letter of Transmittal

We are pleased to submit to you the implementation review study report on Water Supply in Gunungkidul Regency of Yogyakarta Special Territory in the Republic of Indonesia.

This study was conducted by Nippon Koei Co., Ltd., under a contract to JICA, during the period from March, 2006 to December, 2006. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Indonesia and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

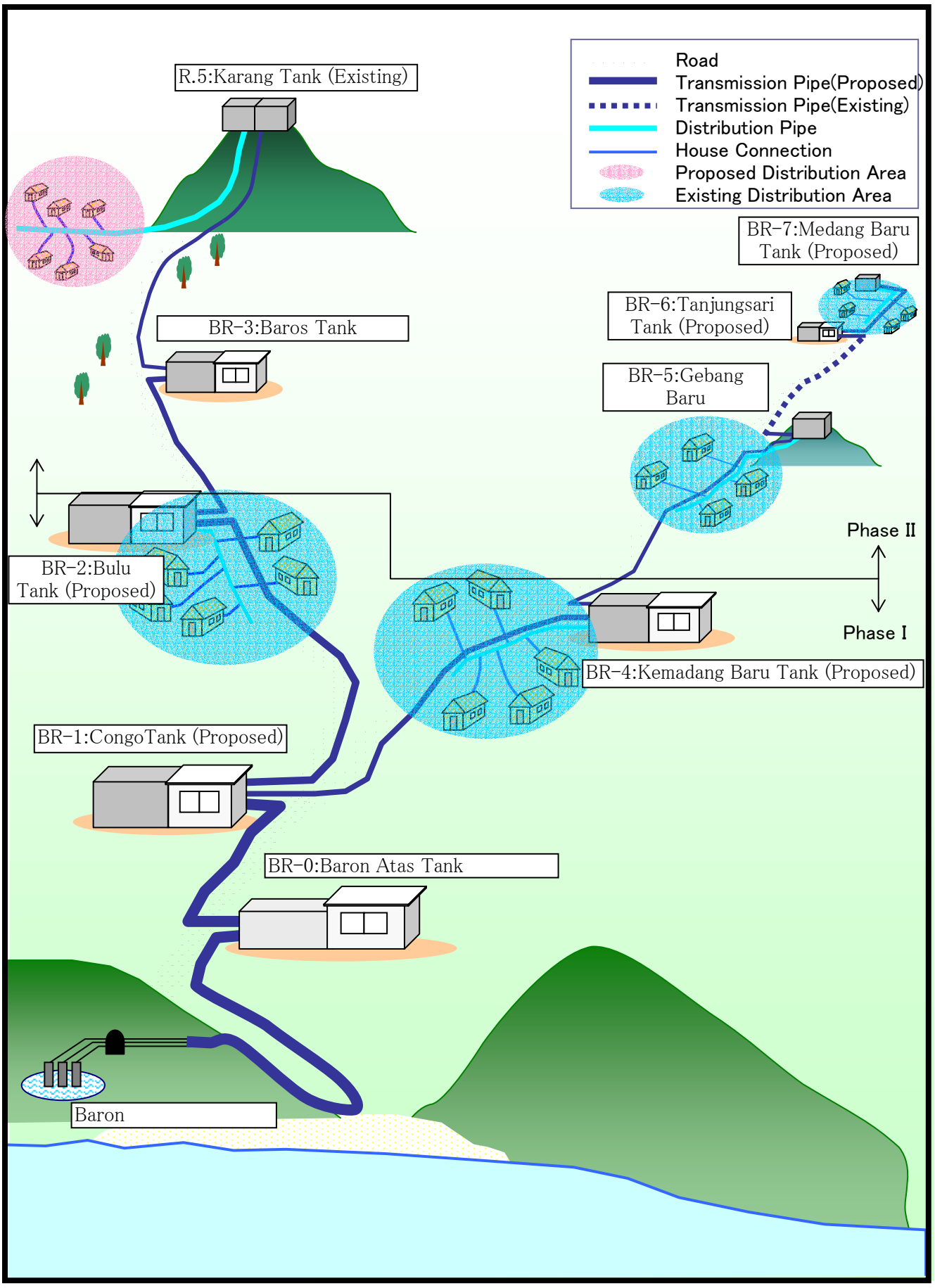
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Keisuke Okazaki

Project Manager
Basic design study team on
Water Supply in Gunungkidul Regency of
Yogyakarta Special Territory
Nippon Koei Co., Ltd.

LOCATION MAP OF THE PROJECT AREA



Perspective of Proposed Water Supply Facilities

ABBREVIATIONS

	Indonesian	English
ATP	-	Affordablity to Pay
AusAID	-	Australia's Overseas Aid Program
BAPEDA	*Badan Perencanaan Pembangunan Daerah*	Regional Development Planning Agency
BAPPEDA	*Badan Perencanaan Pembangunan Daerah*	Regional Development Planning Agency
BAPENAS	*Badan Perencanaan Pembangunan Nasional*	National Development Planning Agency
BPKD	*Badan Pengelolaan Kelayaan Daerah*	Regional Asset Management Agency
CVM	-	Contingent Valuation Method
Dinas KIMPRASWIL DIY	*Dinas Permukiman dan Prasarana Wilayah Daerah Istimewa Yogyakarta*	Settlement and Regional Infrastructure Agency in Yogyakarta Special Territory
DPUP-DIY	*Daerah Istimewa Yogyakarta*	The Provincial Department of Public Works in Yogyakarta Special Territory
Ecobang	*Bagian Perekonomian dan Pembangunan*	Economic and Development Department
E/N	-	Exchange of Note
GTZ	-	German Technical Corporation
JBIC	-	Japan Bank for International Cooperation
JICA	-	Japan International Cooperation Agency
KKN	*Kuliah Kerja Nyata*	Practical College Work
M/D	-	Minutes of Discussion
NGO	-	Non-Governmental Organization
O&M	-	Operation and Maintenance
PDAM	*Perusahaan Daerah Air Minum*	Regional Water Supply Enterprise
PLN	*PT. Perusahaan Listrik Negara*	State electricity company
PPAB	*Proyek Pengadaan Air Bersih*	The project for Water Supply
PROPENAS	*Program Pembangunan Nasional*	National Development Program
PVC	-	Polyvinyl Chloride
ROA	-	Return of Asset
SCADA	-	Supervisory Control and Data Acquisition
TDS	-	Total Dissolved Solid
UNICEF	-	The United Nations Children's Fund
WTP	-	Willingness to Pay

UNITS

Length

mm	=	millimeter
cm	=	centimeter
m	=	meter
km	=	kilometer
ft	=	feet

Area

cm^2	=	square centimeter
m^2	=	square meter
km^2	=	square kilometer

Volume

cm^3	=	cubic centimeter
m^3	=	cubic meter
l or lit	=	liter

Weight

mg	=	milligram
g	=	gram
kg	=	kilogram

Denominator

/s	=	per second
/min	=	per minute
/hr.	=	per hour
/d	=	per day
/c	=	per capita

Derived Measures

mg/L	=	milligram per liter

Money

Rp	=	Rupiah

Others

%	=	percent
Ph	=	potential of hydrogen
°C	=	degrees Celsius
ppm	=	parts per million
micro S/cm	=	micro siemens per centimeter
kV	=	kilo volt

Summary

Summary

This Project involves the construction of additional water supply facilities in the existing Ngobaran and Baron water supply systems in the Gunungkidul Regency. These two systems suffer from a constant water deficit. The facilities to be constructed under Grant Aid by the Japanese Government are the water intake, purification plant, transmission pipes, pumps and a portion of the primary distribution pipe network as well as implementation of a soft component program. This Grant Aid Project was originally requested in May, 2003.

In compliance with the request, a preliminary investigation was carried out in June 2004 with the aim of confirming the national plan, necessity for the Project, conditions of the existing facilities, and the current status of water resources. Based on the results of the investigation, it was confirmed that the Project is to be included in the “Regional Water Supply Development Program” of Indonesia stipulated in the National Five Year Plan (2000-2004) and the facilities requested are related to the utilization of the facilities, including connection pipes and public hydrant system, as well as identification of the requested Project costs and relevant organizations concerned.

Based on the results of the aforementioned preliminary investigation, the Basic Design Study was implemented from September 2004 to March 2005. In compliance with the results of the Basic Design Study, the proposed project was planned to be implemented under the Japanese Grant Aid Scheme under the budget of fiscal 2005. However, for various reasons it was postponed and subsequently the Implementation Review Study was carried out under the budget of 2006. This Implementation Review Study Report summarizes the review results of the Basic Design Report compiled in March 2005 including basic design, preliminary project cost estimate, construction plan and procurement schedule and detailed design which will allow tender documents to be provided in the later stages.

The Project will be implemented by the Project Implementation Unit together with the core organization of the Regional Development Planning Agency (BAPEDA). The major activities of the Project Implementation Unit are designing, construction supervision, budget procurement and the coordination with relevant Japanese organizations. The leading organization for the implementation of the entire project is the Ministry of Public Works and it works in cooperation with the provincial and local level organizations. The Project Management Unit, which is the controlling organization at the provincial level, will monitor and procure necessary budget for the provision and construction to be implemented by the Indonesian side in cooperation with the Project Implementation Unit. The operation and maintenance work will be carried out by PDAM as an O&M implementation unit.

The outline of the Project is summarized as follows.

	Main Items of Facilities	Location of the Facilities	Name and Type of Facilities	Specification
1	Intake	Baron Cave	Submersible Pump	Q=50l/s, H=46 m, Unit=2+1(stand-by)
2	Distribution Tank, Transmission Pump	BR-0 Baron Atas	Distribution Tank	V=1,858.5 m^3 with sedimentation
			Volute Pump	Q=50 l/s, H=93 m, Unit=2+1
		BR-1 Congo	Distribution Tank	V=253 m^3
			Volute Pump (to BR-2 Buru)	Q=36.5 l/s, H=111 m, Unit=2+1
			Volute Pump (to BR-4 Kemadang Baru)	Q=27 l/s, H=95 m, Unit=1+1
		BR-2 Bulu	Distribution Tank	V=196 m^3
			Volute Pump	Q=35 l/s, H=92 m, Unit=2+1
		BR-3 Baros	Distribution Tank	V=169 m^3
			Volute Pump	Q=35 l/s, H=92 m, Unit=2+1
		BR-4 Kemadang Baru	Distribution Tank	V=144 m^3
			Volute Pump	Q=20 l/s, H=101 m, Unit=1+1
		BR-5 Gebang Baru	Distribution Tank	V=92 m^3
		BR-6 Tanjunsari	Distribution Tank	V=53 m^3
			Volute Pump	Q=15 l/s, H=60 m, Unit=2+1
		BR-7 Mendang Baru	Distribution Tank	V=169 m^3
3	Transmission Pipe	Intake ～ BR-0	Galvanized Iron Pipe (GIP)	D=300 mm, L=1030 m, Q=100 l/s
		BR-0 ～ BR-1	GIP	D=300 mm, L=2,459 m, Q=100 l/s
		BR-1 ～ BR-2	GIP	D=300 mm, L=3,654 m, Q=73 l/s
		BR-2 ～ BR-3	GIP	D=300 mm, L=4,512 m, Q=70 l/s
		BR-3 ～ B-5	GIP	D=300 mm, L=5,436 m, Q=70 l/s
		BR-1 ～ BR-4	GIP	D=200 mm, L=2,318 m, Q=27 l/s
		BR-4 ～ BR-5	GIP	D=200 mm, L=2,868 m, Q=20 l/s
		Connection to the existing Bribin system	GIP	D=150 mm, L=656 m, Q=9.3 l/s
		BR-6 ～ BR-7	GIP	D=150 mm, L=3,033 m, Q=15 l/s
4	Distribution Pipe	From BR-2	GIP	D=50 mm, L=32 m, Q=185 m^3/day
		From BR-4	GIP	D=50 mm, L=53 m, Q=417 m^3/day
		From BR-5	GIP	D=50 mm, L=1,155 m, Q=266 m3/day
		From BR-7	GIP	D=50 mm, L=53 m, Q=804 m3/day
		Distribution Main from R5	GIP	D=50 mm, L=3,340 m D=100 mm, L=880 m D=200 mm, L=3,445 m Q=418 m^3/day
		7 Sub villages	GIP	D=50 mm, L=2,000 m
		Connection to exist. pipe	GIP	D=50 mm, L=11 m

The basic design policies are as follow.

1) Planning Year: The planning year is set at 2007 taking into account the Indonesian governmental policy, topographic configuration of the planning area, surrounding socio-economic conditions, magnitude of the Project, and the preliminary Project cost.

2) Extension of Water Supply Area: The supply area was established as area within a certain area to which water can be distributed from Ngobaran and Baron underground streams. The east end is set at the border with Bribin system, the west end is set at Pangang, the south end is set at the coast facing the Indian Ocean and the north end is set at the southern part of Wonosari.

3) Planning Service Population: On the basis of the current population of 132,342 as of October 2004, the planning population for the target year 2007 was projected at 134,000. The service ratio is basically requested at 80% according to the regional water supply policy established by the government, although it is envisaged that this is high compared with current water supply conditions. After discussion with PDAM, it was agreed to adopt 70%, so the service population was calculated at 93,800.

4) Unit Water Demand: The unit water demand per capita per day was divided into “domestic water demand” and “other water demand” such as livestock. The unit water demand for the case of house connections, 80% of the service population, was set at 60 l/c/d, and for the case of public hydrants, 20% of the service population, was set at 30 l/c/d. The other water demand was calculated assuming 10% of the domestic water demand equivalent. As a conclusion, the comprehensive water demand per capita per day for individual house connections was calculated at 94.3 l/c/d and 47.2 l/c/d for public hydrants.

5) Planning Water Supply Amount: The average water supply amount in 2007 was estimated at 8,000 m^3/d based on the unit water demand and service ratio of 70%. The existing Ngobaran water supply system is affordable to supply about 3,200 m^3/d on average and the supply amount for the new Baron system was therefore, estimated at 4,800 m^3/d on average.

6) The Water Quality: For treatment of the source water, sedimentation basin was adopted after comparison study between this method and sand filter; the decision was from the economic viewpoint of not only initial investment cost, but also operation and maintenance cost. Chlorine injection was selected as treatment for fecal coliform, which was detected at levels of 50 - 100 MPN/100 ml.

The individual work items to be implemented by each of the Japanese and Indonesian sides are shown as follows.

(1) Japanese responsibilities for construction

1) Detail design
2) Preparation of tender documents, evaluation and assistance of contracting
3) Construction works

(2) Indonesian responsibilities for construction

1) Land acquisition for building the facilities (sedimentation and distribution tanks, pumps and pipes)
2) Clearance and compensation within the private land along the road
3) Fences and parking lots around the sedimentation and distribution tanks, pumping units and transmission and distribution pipes.
4) Installation of individual connection pipes
5) Construction of access road
6) Customs duty, internal taxes and other taxes to be implied for payment
7) Approval of construction and building and payment of the necessary charges
8) Provision of necessary counterpart personnel

In the soft component program, the following targets were established to be achieved.

1) PDAM staff will become capable of managing the facilities to be constructed in this Project as well as the existing facilities by doing the training of maintaining works, repair and water quality controls.
2) Staff of PDAM and the relevant organizations will gain an understanding and skills for water charge collection, accounting procedures and for financial management.

Contents of the major activities for the soft component program are as follow.

1) Technical activities

i) Preparation stages

- Preparation works (explanation of the program technical aspects)

ii) Implementation stages

- Planning and designing guidance and education
- Training for inspection and operation for pumps, transmission and distribution pipes and guidance for control of facilities ledger
- Technical training for automatic operation devices

- Technical guidance for water quality control

iii) Monitoring stages

- Confirmation and verification of the above implementation items

2) Financial Activities

i) Preparation stages

- Preparation works (explanation of soft component program financial aspects and request for cooperation)

ii) Implementation stages

- Financial management guidance
- Implementing accounting programs and guidance
- Establishment of water charge collection systems
- Advancing of customer services

iii) Monitoring stages

- Confirmation and verification of above implementation items

The staff necessary for implementation of the soft component program is as follow.

1) Japanese consultant : 1 expert (O&M)
2) Japanese consultant : 1 expert (accounting and financial management)
3) Local consultant : 2 experts (O&M and accounting and financial management)

The implementation schedule for this Project is divided into two stages because the Baron and Ngobaran systems are closely connected to each other and so work will be congested. Also, various tests need to be carried out to ensure appropriate and effective works for works such as concreting and installation of pipes.

<u>Stage 1 work period</u>

1) Detail design : 3.5 months
2) Tender bidding : 3.5 months
3) Construction works : 13 months
4) Soft component : 4.5 months

<u>Stage 2 work period 2</u>

1) Detail design : 3.5 months
2) Tender bidding : 3.5 months
3) Construction works : 13 months

4) Soft component : 4.2 months

The necessary Project cost under the Japanese Grant Aid and the cost for the Indonesian financed portion are as follows. The Project cost shown here is still preliminary and does not imply a commitment to that amount for the Grant Aid at the time Exchange of Notes.

(1) The Project cost to be financed by the Japanese side 1,031 Mil. Yen
(2) The cost to be financed by the Indonesian side 4,376 Mil Rp.（53,392,000 Yen）

The points to be considered for the implementation of this Project are as follow.

(1) In coordination with the construction schedules, timely procedures for approval and land acquisition should be completed beforehand.
(2) Clearance, removal of plants and construction of access roads should be completed prior to the commencement of the construction of facilities.
(3) Provision of necessary cables and transformers for electricity supply should be completed prior to the commencement of the works.

At the same time, the following points should also be considered for operation and maintenance.

(1) As the existing distribution pipes have mostly not been identified in regards to their installation location, diameters, and lengths, the inventory surveys should be completed prior to the preparation of the facilities ledgers necessary for the soft component programs. The survey areas should cover the whole service areas.
(2) After the implementation of the soft component, the activities implemented should be summarized and compiled for checking at the time of defect inspection after one year.

The impact of the Project implementation is as follows.

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 is laid within severe topographic constraints and the average income of the residents is comparatively low. In addition, the area is underprivileged for water resources due to extremely low rainfall, particularly in the dry season. Therefore, the bare essential of water for maintaining safe and sanitary life is not obtainable unless the public water supply system is drastically improved or developed.	In order to provide a sufficient amount of water for 24 hours per day, the intake, transmission, distribution and connection pipe facilities shall be provided. In addition, turbidity management and disinfection facilities to obtain safe water shall be provided.	Out of the population of 134,000 in the Project area, 70% of the service population (93,800) will be able to obtain safe and sufficient water.
The water supply facilities development plan has been executed in Jogyakarta Province and Gunungkidul Regency up to this date, the magnitude and the extent of project implementation are extremely limited. Therefore, an appropriate operation and maintenance organization has not 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 conduct 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 computer shall be executed to establish water charge collection system.	• With 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.

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

- In the course of the construction, land acquisition, construction of access roads, acquisition of various approvals for the procedures, and provision of electric supply facilities should be completed prior to the commencement of the Project.
- After the completion of the facilities, the water intake, transmission and distribution facilities will be increased considerably. This increase will create new water leakage problems, which have not been evident for a long time when the water supply amount was extremely small. Therefore, prior to the commencement of the Project, the inventory surveys

should be carried out without question to grasp the existing condition of distribution pipes under the finance of the Indonesian side. The results of the inventory survey can be utilized for the preparation of the facilities ledger and will be also utilized for the training and acquisition of technical skills for the O&M works.

- Utilizing the technical skills obtained by the implementation of the soft component programs, effective operation and maintenance works will be expected in the future. At the same time, enlightenment of the residents on the province of a new system should be indispensable. Particularly, public hearings will contribute significantly to the disclosure of information to the consumers.

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 environmental is envisaged to be negligible.
- In the light of the Japanese regulations for implementing Grant Aid Projects, no obvious difficulties are envisaged.

The Project can supply safe and steady potable water to the residents, minimizing water related diseases and bringing comfortable life and good sanitary conditions as well as contributing to relief from poverty. Thus the implementation of the Grant Aid Project is verified.

Implementation Review Study Report
on
The Project for Water Supply in Gunungkidul Regency of
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in
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Background of the Project

Chapter 1 BACKGROUND OF THE PROJECT

This Project involves the construction of additional water supply facilities in the existing Ngobaran and Baron water supply systems in the Gunungkidul Regency. These systems suffer from constant water deficit. The facilities to be constructed under the Grant Aid by the Japanese Government are the water intake, transmission pipes, pumps and some of the primary distribution pipe network as well as implementation of a soft component program by Japanese experts. This Grant Aid Project was originally requested in May, 2003.

In compliance with the request, the preliminary investigation was carried out in June 2004 with the aim of confirming the national plan, necessity for the Project, conditions of the existing facilities, and the current status of the water resources. Based on the results of the investigation, it was confirmed that the Project is allocated in the "Regional Water Supply Development Program" concerning community base water supply and sanitary environment stipulated in the National Policy 2002 of Indonesia under the National Five Year Plan (2000-2004) and the facilities requested are concerned with the utilization of the facilities, including connection pipes and public hydrant system, as well as identification of the requested Project costs and relevant organizations concerned.

The outline of the Project is as follows:

1) Facilities Construction:

i) New water intakes 2 locations（Submersible pumps 75 l/s x 6 units）

ii) New distribution tanks and pumping facilities 7 locations

- 3000 m^3 x 1 location (Horizontal volute pump 55 l/s x 3 units, 20 l/s x 3 units）
- 500 m^3 x 1 location
- 300 m^3 x 3 locations (Submersible pumps 55 l/s x 3 units x 3 locations）
- 300 m^3 x 2 locations (Submersible pumps 20 l/s x 3 units x 2 locations）

iii) Installation of Transmission Pipe (Total length: 26,600 m)

- Diameter 12 inch : 17,400 m
- Diameter 8inch : 9,200 m

iv) Installation of Distribution Pipe (Total length: 13,600 m)

- Diameter 8~3 inch : 8,900 m
- Diameter 6inch : 4,700 m

2) Technical Assistance：

Operation and management, remote pump control system, financial management and technical

guidance for O&M works.

Chapter 2
Contents of the Project

Chapter 2 CONTENTS OF THE PROJECT

2.1 Basic Concept of the Project

Gunungkidul Regency, which includes the Project area, is one of the five regencies in the Jogjakarta Special Province in Java, and it currently has a population of 750,000. The residents in the regency are supplied with water from the public water supply system from the sources of wells, groundwater streams and springs, and some residents individually get water from such resources. The Project area has abundant rainfall with an amount varying from 1,700 mm to 3,600 mm per annum depending on the location. However, the difference in rainfall between the rainy season (October to April) and the dry season (May to September) is considerable. The driest period, in July and August, has a rainfall of only around ten to twenty millimeters per month on average.

The Project area comprises karstic topography, which mainly consists of a limestone layer with a thickness from 150 m to 200 m, and the configuration makes it difficult to conserve underground water in the layer. Due to this topographic and geologic condition, the residents in the area can only rely on limited water supply from the Water Cooperation (PDAM) or private water sellers using water tankers during the dry season. Consequently, only around 30% of the residents are served with water by PDAM, although substantial distribution pipe facilities are provided to supply water for more than 50% of the residents.

The Project is defined as one of the significant Regional Water Supply Development Programs in compliance with the National development plan (2000 – 2004) aiming at raising the living standard and sanitary circumstances of the people with provision of safe and sufficient water and by raising the water supply ratio. For this purpose, it has been requested that the intake capability be increased and transmission and distribution facilities provided to supply water to the residents who suffer from permanent water deficit. At the same time, it has also been requested that the operation and maintenance capability be raised and the capacity building of PDAM and relevant organizations be enhanced through implementation of the “soft component program”.

The water supply system in this Project was established from two systems: the existing Ngobaran system and a new Baron system. The proposed Ngobaran system for the future was planned with the maximum use of the existing facilities by increasing the intake capacity to 3,200 m^3/day. Meanwhile, the Baron system was planned providing new intake facilities with a maximum capacity of 5,280 m^3/day followed by new transmission facilities with pumps and new distribution tanks and pipes.

The project design matrix (PDM) and the outline of the proposed Project are summarized in Tables 2.1.1 and 2.1.2.

Table 2.1.1 Project Design Matrix (PDM)

Outline of the Project	Index	Method for Data Acquisition	Outer Condition
Main Target Living environment of the residents in the Gunungkidul south Project Area will be improved.	a. Water related disease in the Project Area will be minimized. b. Stable amount of water will be available all through the year.	a. Monitoring survey after implementation of the Project. b. Operation and maintenance records prepared by provincial, Regency and PDAM.	There should be no change to the regional water supply policy by the Indonesian Government.
Project Target To construct new intake facilities and provide safe and stable amount of water to the residents of the Project Areas.	a. Supply population of the Project Area shall be set at 93,800 (70% out of total population of 134,000). b. Operation and maintenance works shall be carried out making use of computers.	a. Monitoring survey after implementation of the Project. b. Operation and maintenance records by province, regency and PDAM.	Operation and maintenance system by the province, regency and PDAM will be carried out appropriately and continuously.
Performance a. Water supply facilities will be provided in the Project Area. b. Capability for operation and maintenance of the relevant organizations will be strengthened.	a. New water supply facilities will be provided. b. The staff of the relevant organizations will be strengthened in their managing capabilities. c. Operation and maintenance works will be carried out appropriately by using facilities ledgers.	a. As-built drawings after construction. b. Operation and maintenance records by the ledgers. c. Manuals, guidelines and monitoring reports.	• Potential flow rate of the groundwater streams will not be changed by climate alteration. • Operation and maintenance system will be maintained.
Activities A. Japanese Side 1. Construction of water supply facilities • Intake, purification plant conveyance, distribution, and individual house connections. 2. Implementation of the soft component program for the relevant organization. • Education and training for the relevant staff • Preparation of manual and guideline. • Implementation of monitoring. B. Indonesian Side 1. Construction of water supply facilities • Connection pipe works • Access road, clearing, parking and electric supply facilities. 2. Procedures for Construction • Tax exemption, procedures and relevant expenses. 3. Inventory survey and preparation of facilities ledger • Implementation of inventory surveys for the facilities. • Implementation of monitoring	**Input** A. Japanese Side Manpower（support for the soft component） a. Japanese O&M expert 0.9 man/month b. Indonesian technical and financial expert 3.5 man/month **Facility construction** a. Intake, treatment plant transmission and distribution facilities b. Material provision before individual water meter and construction of public hydrant. **Project Cost** 1.108 billion yen	B. Indonesian Side **Facility construction** a. Land acquisition b. Clearance and reclamation c. Access road d. Fence and gate e. Electric supply facilities f. Procedures and expense **Project Cost** 58 million yen	**Prerequisite** • Support and implementation by Province, regency and PDAM will be surely implemented. • Operation and maintenance works supported by the soft component program will be steadily and surely implemented.

Table 2.1.2 Outline of the Project Concept

	Main Items of Facilities	Location of the Facilities	Name and Type of Facilities	Specification
1	Intake	Baron Cave	Submersible Pump	Q=50l/s, H=39 m, Unit=2+1(stand-by)
			Steel Pipe with coating	D=200 mm, L=99m, Q=100 l/s
2	Distribution Tank, Transmission Pump	BR-0 Baron Atas	Treatment Plant (Slow Sand Filter) Distribution Tank	A=412.5 m^2 x 3 ponds V=253 m^3 with chlorination
			Volute Pump	Q=50 l/s, H=99 m, Unit=2+1
		BR-1 Congo	Distribution Tank	V=253 m^3
			Volute Pump (to BR-2 Buru)	Q=36.5 l/s, H=107 m, Unit=2+1
			Volute Pump (to BR-4 Kemadang Baru)	Q=27 l/s, H=100 m, Unit=1+1
		BR-2 Bulu	Distribution Tank	V=196 m^3
			Volute Pump	Q=35 l/s, H=104 m, Unit=2+1
		BR-3 Baros	Distribution Tank	V=169 m^3
			Volute Pump	Q=35 l/s, H=89 m, Unit=2+1
		BR-4 Kemadang Baru	Distribution Tank	V=144 m^3
			Volute Pump	Q=20 l/s, H=99 m, Unit=1+1
		BR-5 Gebang Baru	Distribution Tank	V=92 m^3
		BR-6 Tanjunsari	Distribution Tank	V=53 m^3
			Volute Pump	Q=15 l/s, H=74 m, Unit=2+1
		BR-7 Mendang Baru	Distribution Tank	V=169 m^3
3	Transmission Pipe	Intake ～ BR-0	Galvanized Iron Pipe (GIP)	D=300 mm, L=977 m, Q=100 l/s
		BR-0 ～ BR-1	GIP	D=300 mm, L=2,350 m, Q=100 l/s
		BR-1 ～ BR-2	GIP	D=300 mm, L=3,331 m, Q=73 l/s
		BR-2 ～ BR-3	GIP	D=300 mm, L=4,249 m, Q=70 l/s
		BR-3 ～ BR-5	GIP	D=300 mm, L=5,340 m, Q=70 l/s
		BR-1 ～ BR-4	GIP	D=200 mm, L=2,224 m, Q=27 l/s
		BR-4 ～ BR-5	GIP	D=200 mm, L=2,711 m, Q=20 l/s
		Connection to the existing Bribin system	GIP	D=150 mm, L=638 m, Q=9.3 l/s
		BR-6 ～ BR-7	GIP	D=150 mm, L=2,943 m, Q=15 l/s
4	Distribution Pipe	From BR-2	GIP	D=50 mm, L=32 m, Q=185 m^3/day
		From BR-4	GIP	D=50 mm, L=53 m, Q=417 m^3/day
		From BR-5	GIP	D=50 mm, L=120 m, Q=266 m3/day
		From BR-7	GIP	D=50 mm, L=53 m, Q=804 m3/day
		Distribution Main from R5	GIP	D=50 mm, L=3,340 m D=100 mm, L=880 m D=200 mm, L=3,445 m Q=418 m^3/day
		7 Sub villages	GIP	D=50 mm, L=2,000 m

2.2 Basic Design of the Requested Japanese Assistance

2.2.1 Design Policy

(1) Basic Policy for Selection of the Project Area

The Project area is located, as shown in the Location Map of the Project on the first page of this report, at the southwest of the Gunungkidul Regency and extends east to west for 34 km and south to north for 15 km. For implementation of the Project, the following basic policy was established to verify the adequacy of the Project and set up an appropriate Project area.

i) The Project area shall be the area most severely suffering from water deficit in the dry season, and subsequently urgent water resources development and water supply facilities improvement plans will be requested.
ii) All the population in the Project area concerned shall be served by the water sources that are situated in the Project area and it must be possible to implement economical development of water resources and water supply facilities plans.
iii) Although initial pumping of water from the water sources to the distribution tanks is indispensable, the water distribution service thereafter, from the tanks, shall be performed by gravity to all the supply area effectively and economically.

(2) Basic Policy for Natural Condition

Out of the natural conditions of the Project area, specific items which impact on the project implementation are: i) difference in rainfall amount between rainy and dry seasons, ii) topographic configuration that reveals a karstic hilly area with poor water conservation having an influence on surface water pollution to the groundwater streams, and iii) necessity of pumping water from the Baron groundwater stream to the distribution tanks due to extensive hilly topographic conditions. These conditions were fully taken into account in the Basic Design Study.

As the rainfall concentrates in the rainy season from November to April, attention was fully paid to the procurement of construction materials during the period and the preparation of supervising and implementation schedules. During the rainy season, surface water frequently infiltrates into underground streams through the gap in the rocks below the ground surface making the underground streams turbid and contaminated by coliform. Therefore, provision of facilities to reduce turbidity and remove coliform was considered.

(3) Policy for the Socio-economic Conditions

As the Project area has very little rainfall during the dry season and the water tank resource accumulated during the rainy season depletes in the dry season, the residents are only able to acquire expensive, privately sold water, or bring water themselves from the springs several kilometers away, if the public water supply is not functioning satisfactorily.

Under such conditions, it has been strongly requested that a steady and safe water supply be provided for the residents under the management of PDAM. However, the Project site is located in the mountainous and economically poor area in the south west of the Gunungkidul Regency. Therefore, provision of an appropriate and feasible water supply system considering residents' "affordability to pay" and "willingness to pay" the water charge, as well as economical operation and maintenance activities, are taken into account.

Meanwhile, 15.7% of the patients who visit hospitals, according to the report by the Gunungkidul Health Center, are suffering from water related diseases. In particular, reserve tanks in each house that contain rain water as a part of the main water source of the residents, as well as reserves of purchased water, are not in a good sanitary condition. Therefore, the sanitary environment shall be enhanced by providing safe water and monitoring the water quality constantly.

(4) Water Supply Development/Improvement Policy

1) Policy on Water Supply Planning

The water supply service ratio with respect to the provision of distribution facilities as of October, 2004 is approximately 50%. However, the practical service ratio under the condition of constant water supply including the dry season covers only around 30% due to reduction of the water intake amount, transmission capacity and deterioration of pipe facilities. In order to cope with the constraints, development of intake, transmission and distribution facilities to provide water supply up to 150 l/s at a maximum as well as installation of 40 km of pipes and eight new reservation tanks was initially planned and requested from the Japanese Government in 2002.

In compliance with the request, implementation of an inventory survey of existing facilities, review of details of the requested contents, comparative study of alternative water resources, and a social survey that was carried out in this Basic Design Study, were implemented in the field survey from October to November in 2004. Thereafter, preliminary design and quantitative analysis of the proposed facilities were carried out in the home work. For the implementation of the field survey and subsequent home work analysis, the following basic policy for the water supply development plans was established.

i) In compliance with the strategic plan defined by the Indonesian Government, a water supply

development plan shall be carried out to increase the service ratio as high as possible. In this context, existing supply facilities shall be utilized to the maximum extent in consideration of economic planning by reducing construction cost.

ii) The basic conditions for planning, such as the target year, planning population, unit water demand and design criteria, shall be reviewed and subsequently appropriate design parameters shall be established.

iii) Based on these planning conditions and the existing capacity of the facilities, the intake amount, size of facilities and their allocation shall be determined appropriately. The facility planning shall be followed by comparative analysis in order to achieve economic construction works.

iv) As for the facility planning, the rationality of the operation and maintenance and effectiveness after the completion of the construction together with economic aspects shall be considered.

2) Water Resource Development Policy

A water resources comparative study was carried out during the field work concerning the existing Ngobaran and Baron underground streams in the Project area, the Toto underground streams in the Bribin district, the tube wells in the Wonosari and Prayan districts, Bekah underground streams in the far western area, and the Oyo river as a representative surface water source.

With respect to alternative water sources other than the Baron and Ngobaran underground streams it was clarified that: i) these are located very far from the proposed service area requiring a lot of transmission pipes and pumps, and thus are not economical, ii) the tube wells in the Wonosari and Prayan districts have little potential of yielding groundwater and would incur a large construction cost, iii) surface water runoff discharge in the dry season is extremely small and water conservation is difficult, even after construction of dams, since the geology of the site comprises mainly limestone which easily allows infiltration of water into the ground.

Taking these into account, water source development analysis was carried out with the condition of having enough potential in flow rate and least initial investment and operation and maintenance cost. As a result, Ngobaran and Baron underground streams were selected as the main water sources. The Ngobaran groundwater stream was identified to have an average and minimum flow rates of 80 l/s and 60 l/s, respectively and able to be utilized continuously in the future, while the Baron water source has more than 5,000 l/s on average, even in the dry season, and was identified as sufficient for the future.

3) Establishment Policy for the Water Supply System

The Project area shall be served with water from the Ngobaran and Baron systems as mentioned

above. Both Ngobaran and Baron sources transmit water to the Kemadang distribution reservoir (R-5) situated at the highest altitude in the Project area and then the water is distributed by gravity. As for the water distribution, existing distribution pipes shall be utilized to a maximum extent in the future. Therefore, an analysis of the flow rate capacity is required and deterioration of pipes and frequency and magnitude of leakage are to be surveyed by PDAM as a prerequisite for proceeding with this Project successfully.

The target service ratio for the area has been established at 70%. Of this ratio, 80% is planned for direct connection from the distribution pipes and the remaining 20% is planned for use with public hydrants.

The water supply to the Project area shall be planned for continuous, 24 hour supply. In order to meet this requirement, provision of water level indicators and automatic pump switch operation are planned.

4) Policy for Facility Design

For designing the facilities, construction conditions in Indonesia as well as the Project area have been taken into consideration. At the same time, Japanese design standards and criteria have been used for design purposes for details of facilities. The policies applied for designing major facilities are shown as follows.

i) Selection of pipes: Under the conditions that inner water pressure is being placed on the pipes to 1.18 MPa（12 kgf/cm2）at a maximum and impact will be applied to the outer pipes at the time of transportation and installation, and for ease of local procurement of pipes, galvanized iron pipe was selected for transmission and distribution pipes.

ii) Distribution tank: Taking into account the magnitude and economy of the structure of tanks, a concrete type with water proofing was selected. As for the foundation, a simple structure like a “mat foundation” was selected.

iii) Pump facilities: A submersible pump was selected for the intake taking into accounts the site conditions, workability, and ease of operation and maintenance. Other pumps were selected from the horizontal type volute pumps.

(5) Policy for the Site Condition and Local Contractor

The Baron intake is located near a beach, which is famous for its recreational area for the neighboring cities. As the site is not designated as a national park, the construction in this area does not require any particular concurrence. However, environmental conservation should be carefully considered including being free from noise, vibration and discharging of wastewater.

The construction of water supply facilities in this area has been carried out by the contractors in Jog Jakarta or neighboring cities under the control of PDAM. It is envisaged that this project will be also implemented by the contractors in those areas as sub-contractors. The local contractors are not familiar with high level constructions, but they have sufficient capability to easily manage the work, such as distribution pipes, tanks and pump facilities. Therefore, utilizing the local contractors will be useful and economical.

(6) Policy for the Activities of Operation and Maintenance Organizations

Operation and maintenance works are supposed to be implemented by PDAM. The problems which PDAM has are: 1) ledgers for pump facilities and transmission and distribution pipes have not been provided yet, and subsequent periodical operation and maintenance works are not being implemented, 2) know how for operation and maintenance works for automatic pump control facilities has not been acquired, 3) knowledge for water quality control and monitoring is required, 4) water charges have not been constantly and appropriately collected, 5) accounting and financial management capability is not adequate, and 6) claims from the residents have not been replied to appropriately.

In order to solve these problems, efforts by the implementation organizations themselves should be indispensable. However, as far as the current operation and maintenance capability and financial management of PDAM are concerned, this self effort will be not be sufficient to continuously and appropriately manage the water business. Therefore, a “soft component program” should be implemented in parallel with this Project to strengthen the operation and maintenance capability together with financial management skill.

(7) Policy for Construction Works

For execution of the construction, the climate conditions of rainy and dry seasons, the hilly topographic configurations around the project site, and conditions of material procurement from Jogjakarta and Wonosari cities shall be taken into account to perform effective construction works.

Transmission and distribution pipes shall be basically installed under the road shoulder to avoid disturbance to traffic and to achieve workability. At the same time, procurement of pipes for the work sites shall be effectively managed since the transmission pipes extend for more than 30 km

and a lot of pipes should be provided at one time. In addition, an appropriate work schedule should be prepared to complete the work in a timely manner.

For the construction of pump stations and distribution tanks, access roads and parking lots shall be appropriately and suitably arranged for easy operation of the work as well as O&M works in the future.

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

The major items to be maintained are transmission and distribution facilities, including pipes, valves, pumps, meters and electric devices. PDAM as an operation and maintenance organization requested that the Japanese Government provide a grant for O&M machinery and repair tools as a part of “machinery and material grant aid”. These machinery items and repair tools are available to be procured domestically, and PDAM staff are familiar with the method of handling them. In addition, the water level gauges in the distribution tanks, cables between the tanks and control panels for automatic pump control devices are also available to be obtained in the local markets.

2.2.2 Basic Plan

(1) Plan of Water Supply Facilities

1) Water Supply Area

The water supply area is set as shown on the Location Map of the Project on top of this report. The source of water was determined as two underground steams at Ngobaran and Baron caves, and the supply area was established as that within which the available system could distribute water. The east end was set as the border line of the Bribin system, the west end on the edge of the Pangang district, the south end on the seashore of the Indian Ocean and the north end is set at the south of Wonosari.

2) Service Population

On the basis of the current population of 132,342 as of October 2004, the planning population for the target year 2007 was projected at 134,000. The service ratio is basically requested at 80% according to the regional water supply policy established by the government, although it is envisaged to be high to achieve as far as the current water supply condition is concerned. In compliance with the discussion with PDAM, it was agreed to adopt 70% and subsequent service population was calculated at 93,800.

3) Unit Water Demand

Unit water demand was estimated by dividing probable water demand into domestic water demand and other water demand, such as for livestock. Out of the domestic water demand, 60 l/c/d for the case of connection by pipe was applied to 80% of the service population and 30 l/c/d

for the public hydrants was applied to 20% of the service population. UFW at the target year was estimated to be settled at 30% and this amount was included in the unit water demand. The other water demand for livestock was counted as equivalent to 10% of the domestic water demand. The water demand computation is summarized in Table 2.2.1.

Table 2.2.1 Computation of Water Demand

	Service Population	Unit Water Demand (l/c/d)		Unaccounted for Water (l/d)	Water Demand (l/c/d)	Daily Water Demand (m^3/d)
	(A)	Domestic (B)	Livestock (C)	D=F x 30%	F=B+C+D F=(B+C)/0.7	G=A x F
House Connection (80%)	75,040	60	6	28.3	94.3	7,075
Public Hydrant (20%)	18,760	30	3	14.1	47.1	884
Total	93,800					7,960

Consequently, the substantial water demand per capita was set at 94.3 l/c/d for “connection pipe” and 47.2 l/c/d for “public hydrant”, respectively.

4) Planning Water Supply Amount

The average daily water supply requirement was counted at 8,000 m^3/d as is shown in the above table. The Ngobaran system has a capability of average daily water production at 3,200 m3/d according to the inventory survey carried out in the Basic Design in 2004. Whereas, the facilities in the Baron system has been deteriorated, so that renewal was necessitated requesting additional water production with the amount of 4,800 m3/d.

5) Water Quality Control

Currently, the Ngobaran and Baron systems have been supplying water without any treatment. During the period of the Basic Design in 2004, there was a report from PDAM that no serious problem was found on both water qualities. However, the Baron system is reported that rain water is frequently inflowing into the underground stream through the karstic rocks after occurrence of heavy rain resulting in contamination of the river water. In response to this issue, water quality sampling and laboratory testing were carried out during the Basic Design and the Implementation Review Study as shown in Table 2.2.2. Subsequently, turbidity and fecal coliform were identified that they sometimes exceed the WHO and Indonesian standards and a certain water treatment method was required to be conducted.

For the purposed of purifying water, sedimentation, slow sand filter and rapid sand filter methods are generally conducted depending on the level of water quality. Sedimentation method is not applicable for the case of more than 15 NTU although the construction and O&M cost is the cheapest. The rapid sand filter is applicable for higher turbidity than the slow sand filter method. However, it requires high O&M cost with high operation skill. Based on the level of turbidity and its frequency of occurrence, slow sand filter method was adopted in this Study to meet the requirement of Indonesian and WHO standard.

Table 2.2.2 Results of Water Quality Tests (Excerpts)

	Indonesian Water Quality Standard	WHO standard	Dry Season (Basic Design)	Rainy Season (Implementation Review Study)
Coliform (MPN/100 l)	0	0	23, 30	120
Turbidity (NTU)	5	5	1	16

(2) Facility Design

1) Intake

For water sources, the existing Ngobaran and Baron cave groundwater streams shall be used. The intake volume from the Baron source shall be 60 l/s for 15 hours and 3,200 m^3/d on average.

Because the existing facilities of the Baron water supply system are small in capacity and deteriorated due to age, new intake and transmission facilities were proposed. The maximum daily intake amount shall be 5,280 m^3/d.

i) Intake Pump

Flow rate of pump: Q = 50 l/s, Unit: 3 (1 standby),

Total pump head: H = 39 m

Type of pump: Submersible pump (detaching type)

ii) Plan of Intake Facilities

There is a narrow path from the entrance along the slope with a gradient approximately 40 degrees to the groundwater stream side down the cave. The height of the path is about 3 m and it is not easy to transport pumps, pipes, scaffold materials and excavated soil to and from the bottom of the cave. In order to improve the workability, the provision of a small trolley with steel rails was planned. At the water's edge down in the cave, a steel deck was provided to install 3 submersible pumps and to make for easy setting and detaching of pump units.

2) Transmission Pipe

For the transmission pipe, galvanized iron pipe was selected based on the experience of use by the O&M organization, the topographic configurations of the site where it is to be installed, ease of procurement locally, and economic aspects. The route of the transmission was divided into two sections; one from the intake site to BR-7 of the Baron system and the other one diverted from mid-way to BR-5 of the Ngobaran system. A velocity coefficient of 110 was adopted as the uniform parameter. The length, diameter, flow rate and head loss calculation results are summarized in Table 2.2.3.

Table 2.2.3 Result of Flow Rate Calculation

	Extension	Length (m)	Diameter (mm)	Flow (m^3/s)	Difference of Elevation (m)	Calculated Total Head Loss (m)
1.	Intake ～ Baron Atas	977	300	0.100	35.8	48.46
2.	Baron Atas ～ BR-1	2,350	300	0.100	69.5	94.34
3.	BR-1 ～ BR-2	3,331	300	0.073	95.5	116.00
4.	BR-2 ～ BR-3	4,249	300	0.070	66.6	90.08
5.	BR-3 ～ R-5	5,340	300	0.070	56.6	85.08
6.	BR-1 ～ BR-4	2,224	200	0.027	81.0	97.61
7.	BR-1 ～ BR-4	2,709	200	0.020	89.5	102.31
8.	BR-6 ～ BR-7	2,943	150	0.015	35.0	61.83
	Total	24,123				

3) Pump Facilities

Pump facilities were provided for each distribution tank to transmit water to the downstream distribution tank located up on a hill. The type of pump selected was the economical horizontal volute pump considering the conditions of easy handling and economic O&M works. For operation of the pumps, remote control facilities have been provided to save the maintenance works by operators.

4) Water Tank

The plan of each distribution tank was made depending upon the categories divided into two functions. One function is only to transmit water to the next tank, which is called a head tank, and the other function is to distribute water to the neighboring residents at the same time as transmitting water, which is called a distribution tank. The structure of the tank is concrete which is economical in construction and is water-tight. The foundation of the tank was planned as a mat foundation. At each water tank, water level indicators were provided, connected by cables to

pumps that have automatic control devices.

5) Purification Plant

The purification plant was planned to be established at Baron Atas with the “slow sand filter” method. In order to manage steady treatment, ease of operation without serious failures and easy management by the local engineers, a gravity flow system was employed as much as possible thus avoiding mechanical and electrical devices.

The receiving well is to receive water from the intake facility and subsequently divide the flow into the three series of filters. Three weirs are provided for division of flow without electric devices by adjusting manual control valves in the downstream thus enabling inflow to the filters independently.

The design flow of the filters has been set at 0.1 m^3/s (8,640 m^3/d) with percolating speed at 7 m/d. Three filters are to be provided having dimensions of length: 25m, width: 16.5m, depth: 2.5m and floor area: 411 m^2. The filter surface is to be covered with a microbiological film and will grow rapidly when the turbidity becomes high. When the thickness of the film has grown, the filter surface should be raked, usually once or twice a month.

For adjusting of the filtration flow rate and transmission and also for chlorine injection, a purification tank is to be provided after the filters. The structure of the tank includes water tank, pumping room and chemical store room. The chlorination facilities consist of a resolution tank (FRP) and gravity injector (float type). The injection itself is to be carried out by gravity flow. The density of bleaching powder is 30% in weight and injection ratio was set at 0.3 mg/l.

6) Distribution Pipes

A type of galvanized iron pipe was selected as the distribution pipe material based on topographic and geological conditions as well as the experience of use at the proposed site by PDAM and ease of procurement locally.

7) Temporary Works

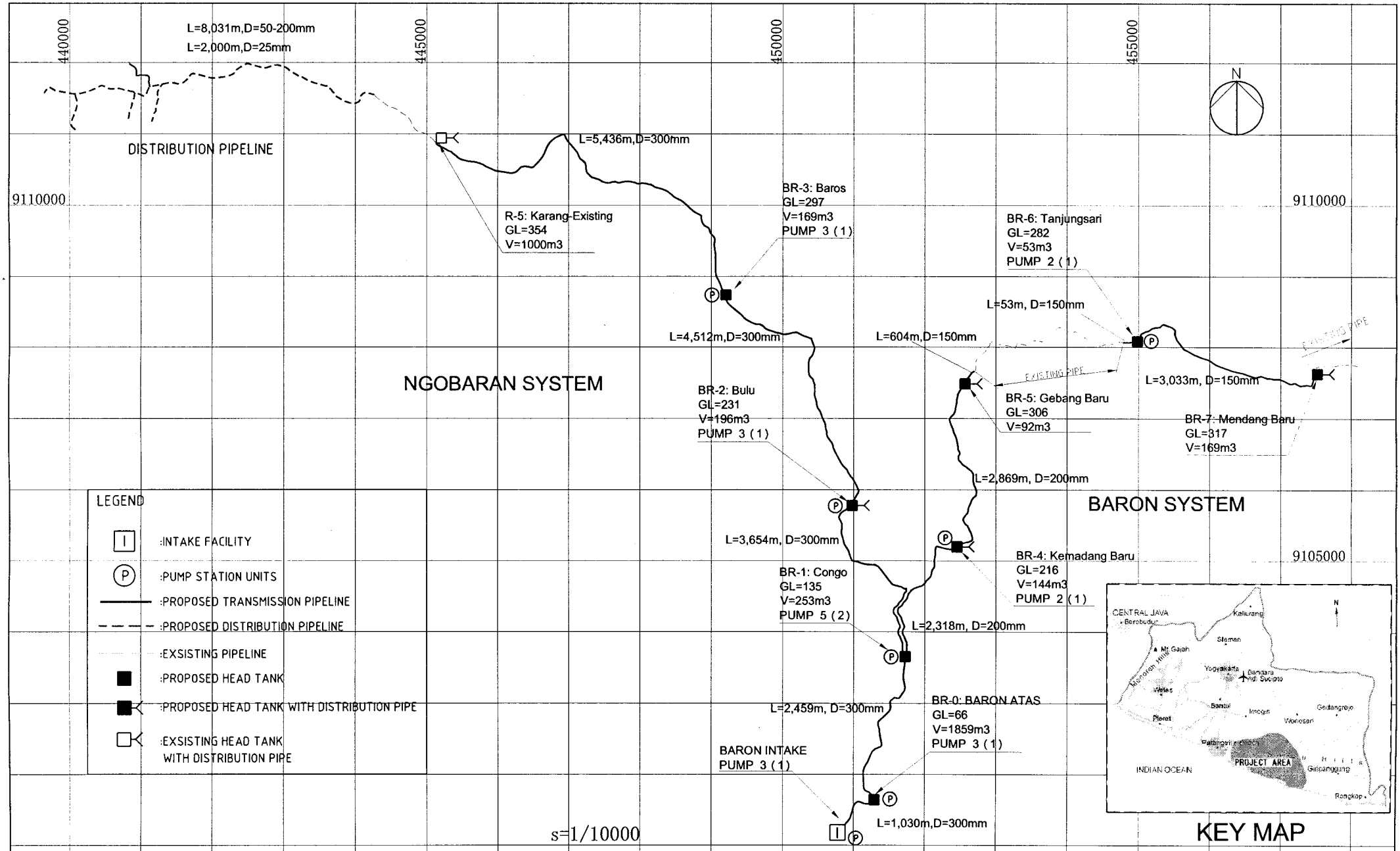
A temporary road was planned from the entrance of the intake cave to the beach where a stockyard for building materials and machines is provided. The temporary road is to be 3 m wide with an asphalt pavement for easy transportation by small pickup truck.

2.2.3 Basic Design Drawing

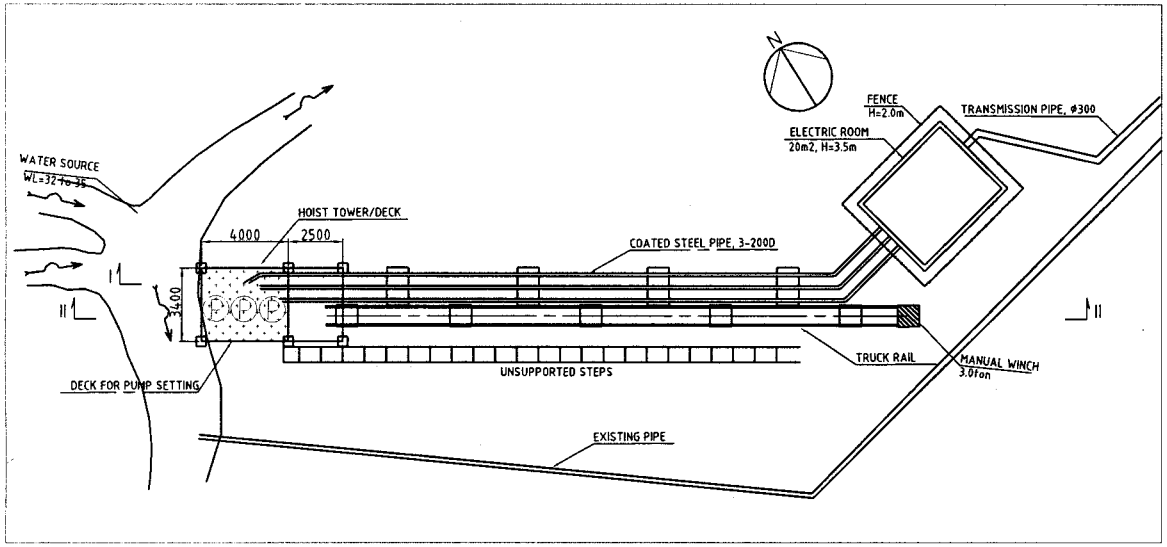
The design drawings prepared in the study are listed as follows.

Table 2.2.4 List of Basic Design Drawings

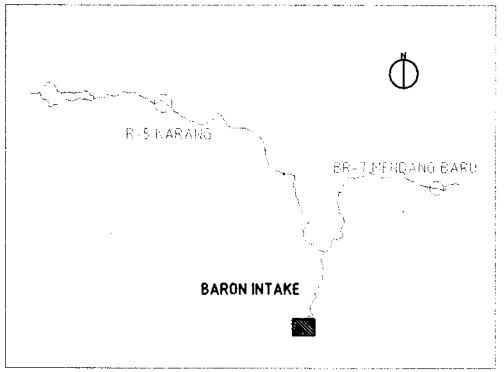
No. of Figure	Title of Drawings
BD-01	Location Map of the Project
BD-02	Intake Facility
BD-03	BR-0: Plan of Treatment Plant
BD-04	BR-1: Plan of Distribution Tank
BD-05	BR-2: Plan of Distribution Tank
BD-06	BR-3: Plan of Distribution Tank
BD-07	BR-4: Plan of Distribution Tank
BD-08	BR-5: Plan of Distribution Tank
BD-09	BR-6: Plan of Distribution Tank
BD-10	BR-7: Plan of Distribution Tank
BD-11	Plan of Distribution Pipe
BD-12	Installation of Pipe and Typical Cross Section
BD-13	Public Hydrant



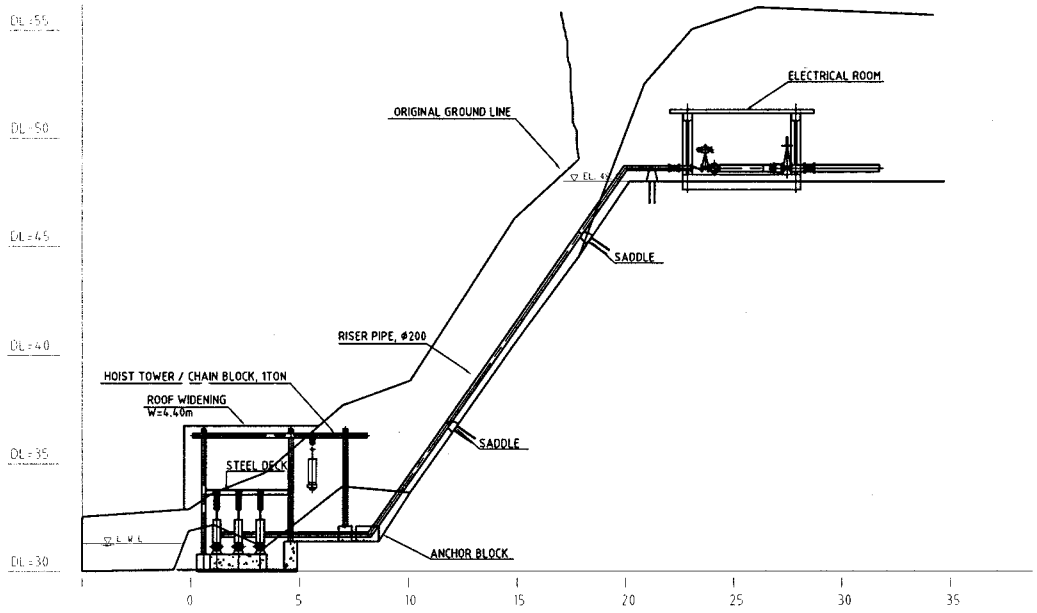
THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: Location Map of the Project		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD - 01



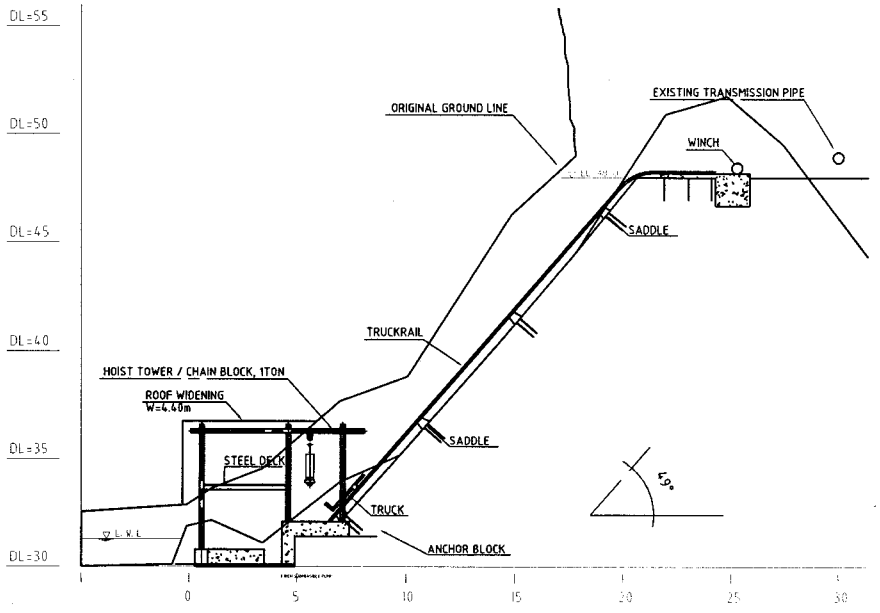
PLAN OF INTAKE FACILITIES



KEY PLAN

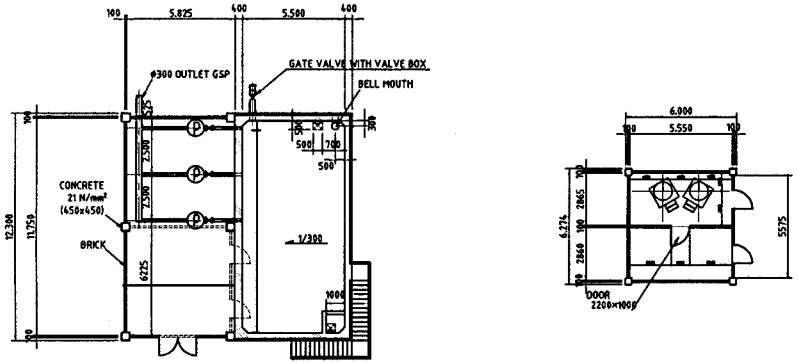


PROFILE I-I

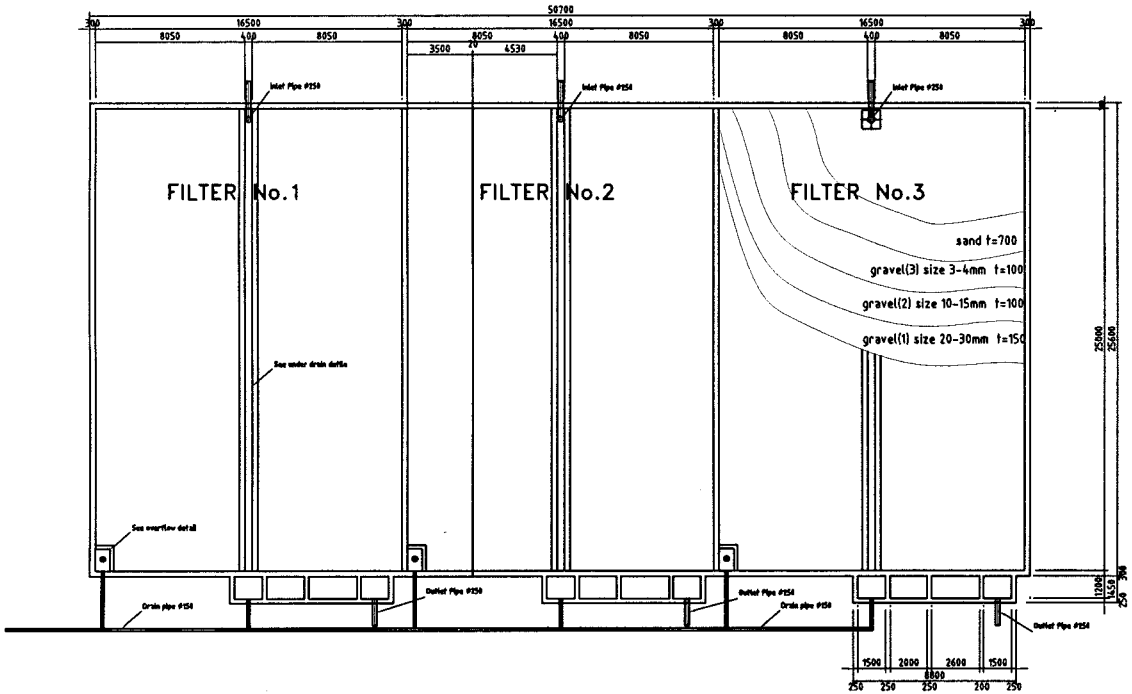


PROFILE II-II

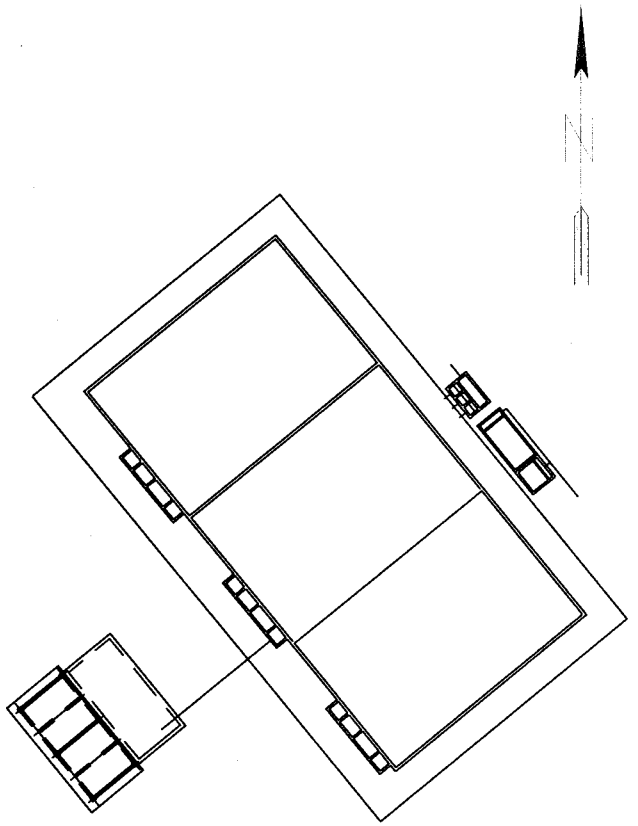
THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: Intake Facility		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD-02



PLAN - Tank and Pump room - s=1/200



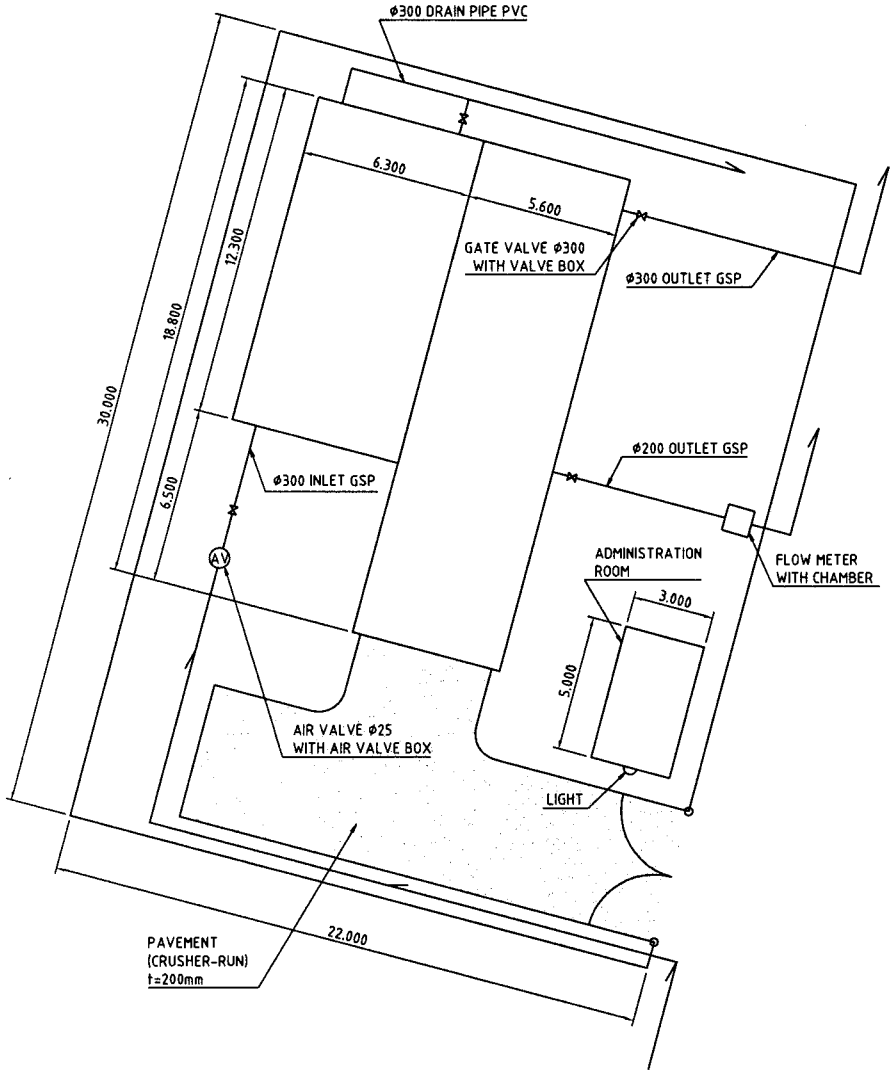
PLAN - Sand filter - s=1/200



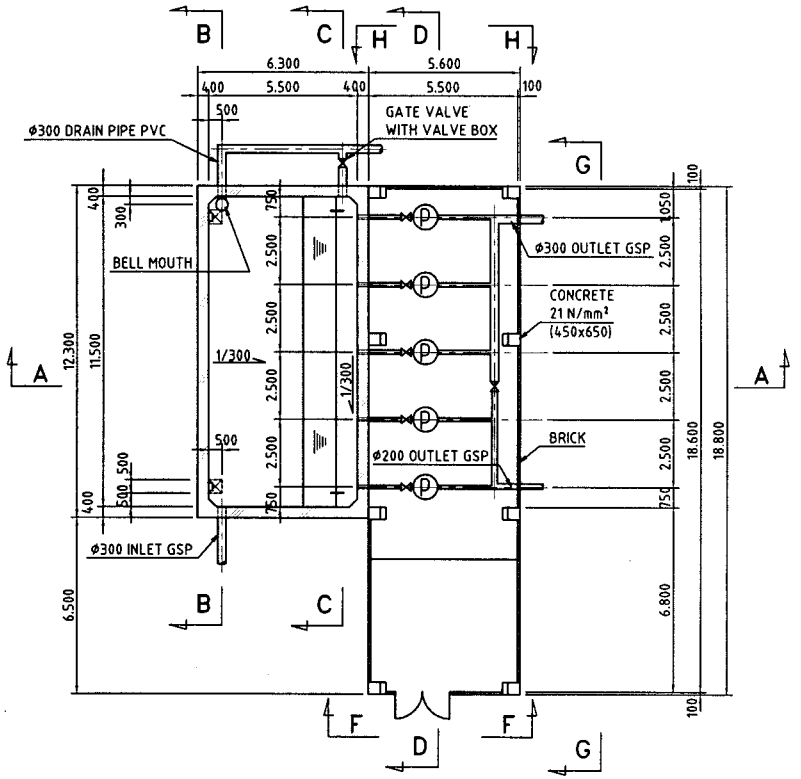
s=1/400

GENERAL LAYOUT

THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: BR-0: Plan of Treatment Plant		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD - 03

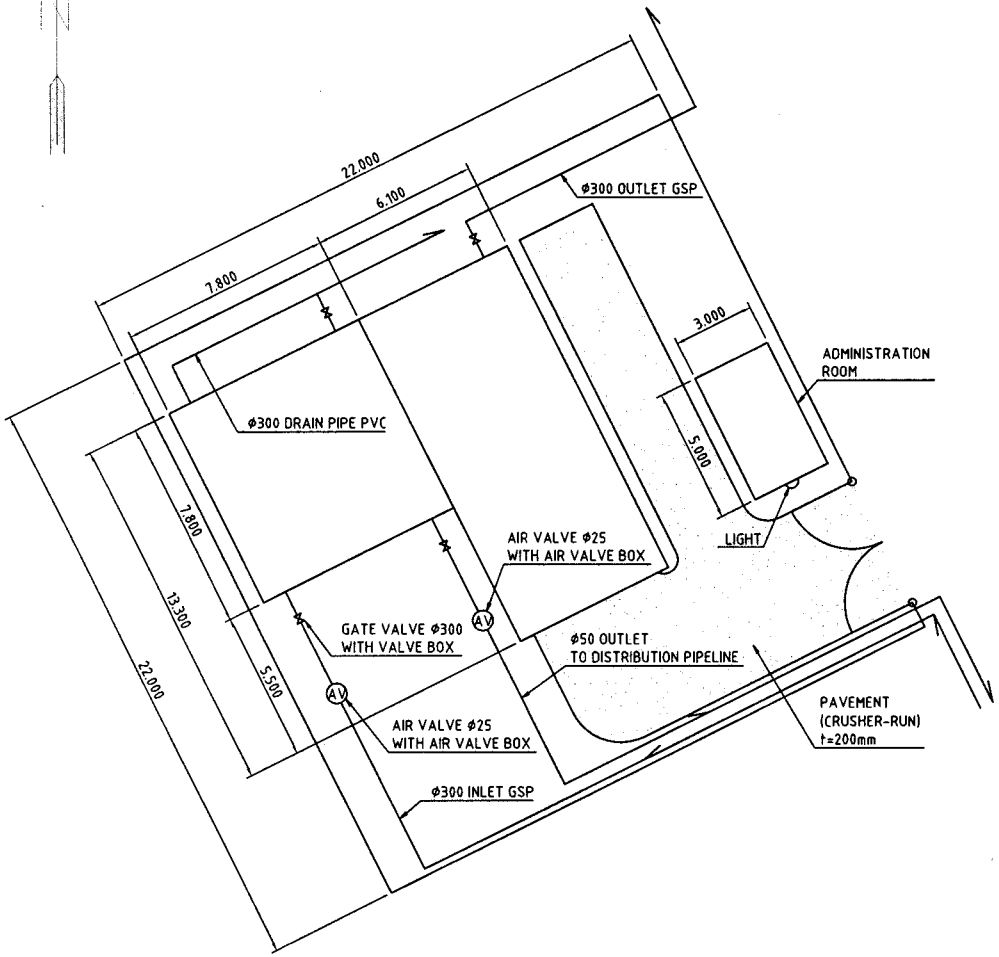


GENERAL LAYOUT s=1/200



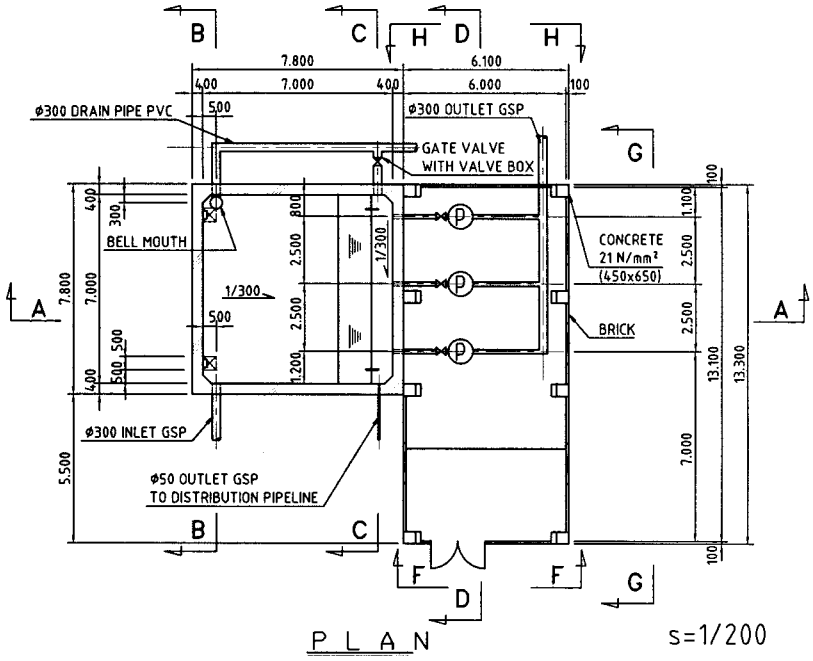
PLAN s=1/200

THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: BR-1: Plan of Distribution Tank		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD - 04



GENERAL LAYOUT

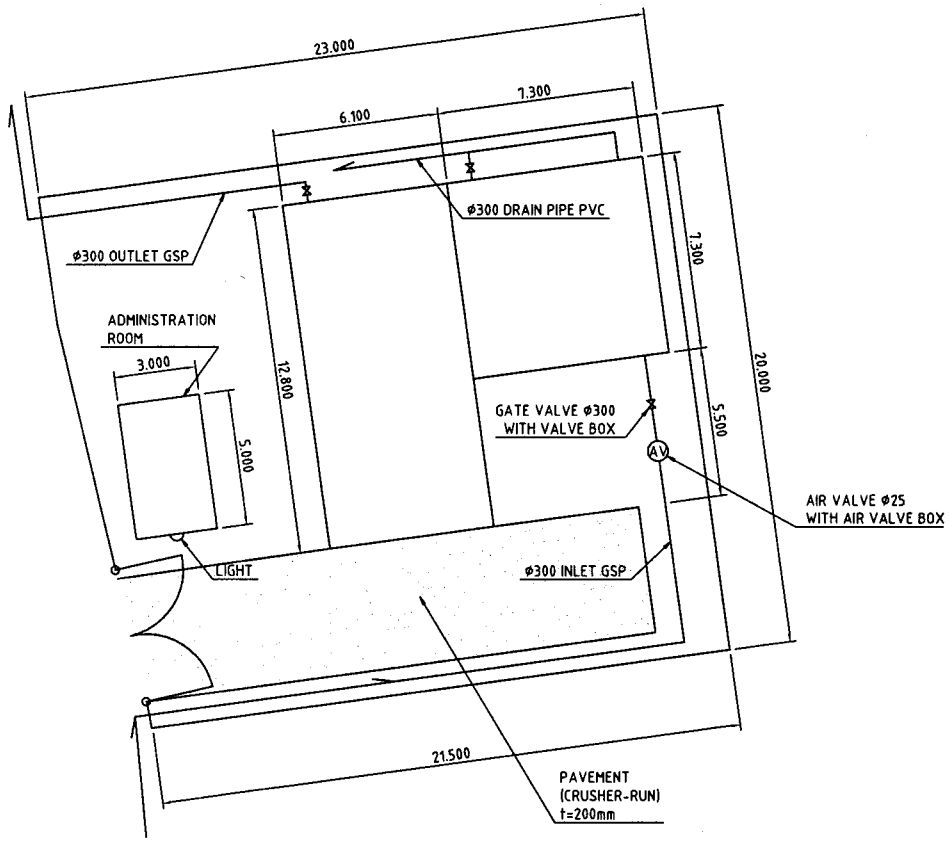
s=1/200



PLAN

s=1/200

THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: BR-2: Plan of Distribution Tank		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD - 05



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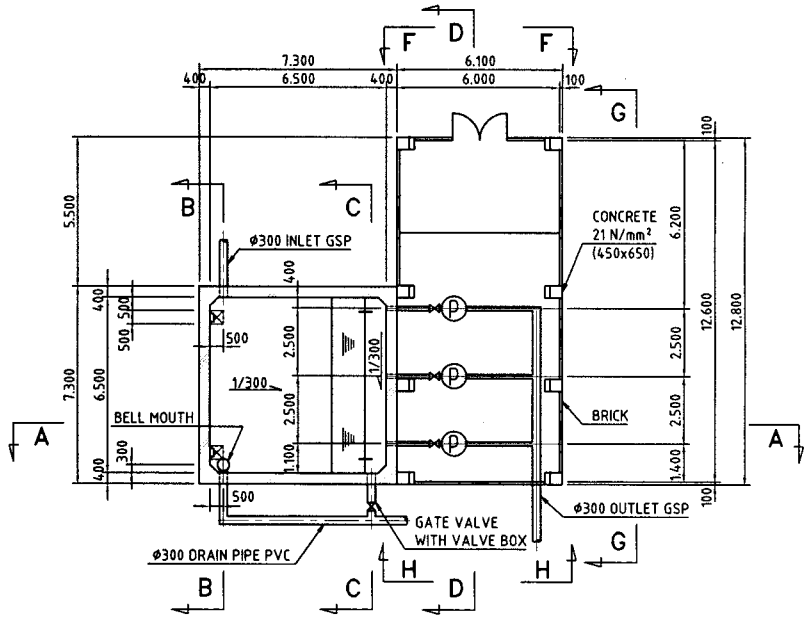

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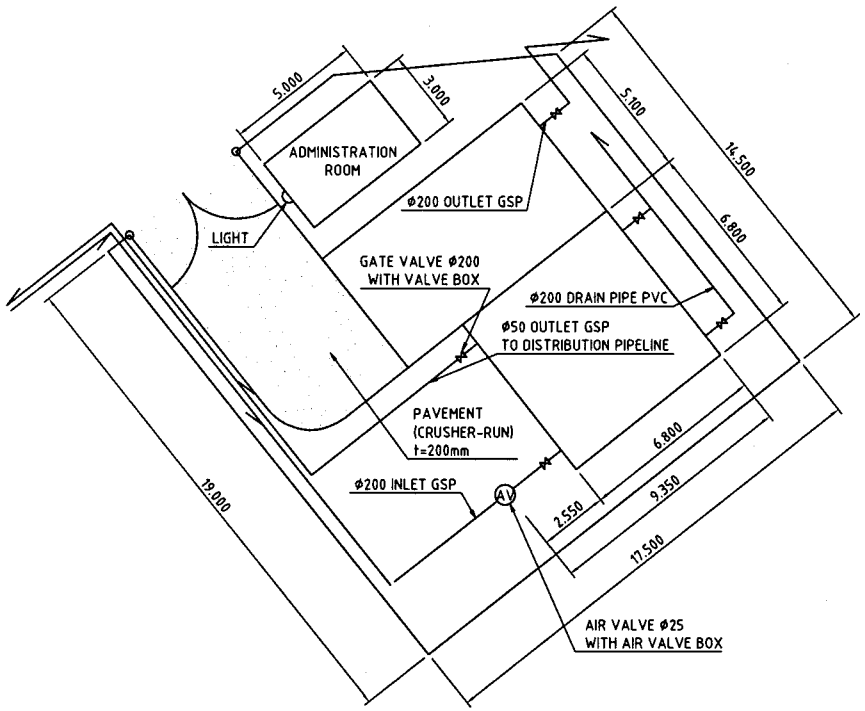
THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: BR-3: Plan of Distribution Tank		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD - 06



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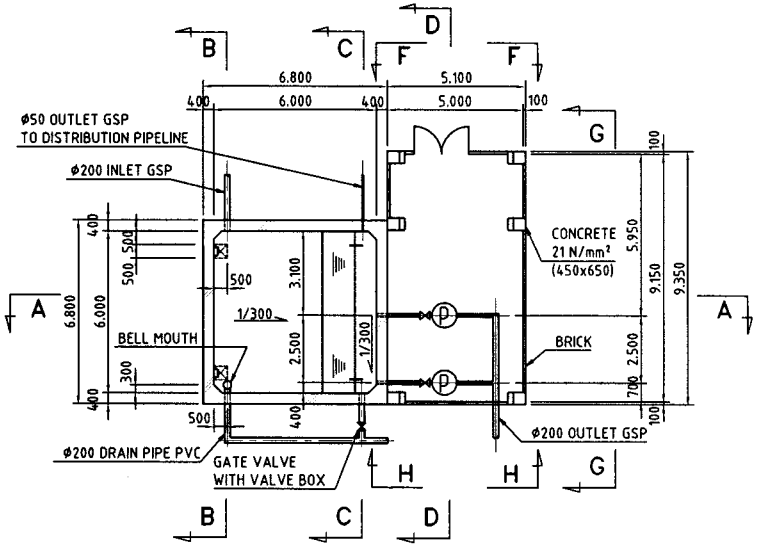

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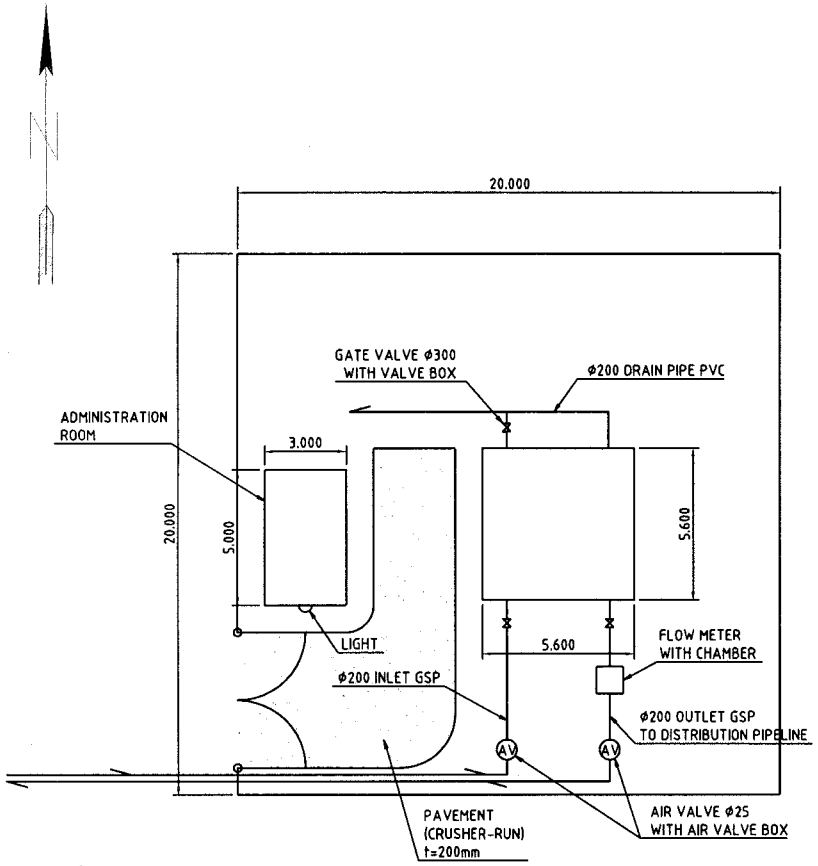
THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: BR-4: Plan of Distribution Tank		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD - 07



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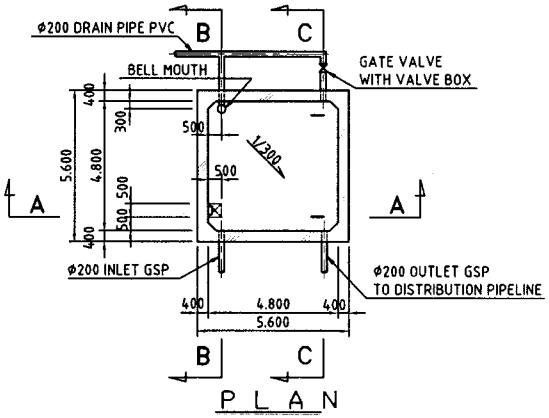

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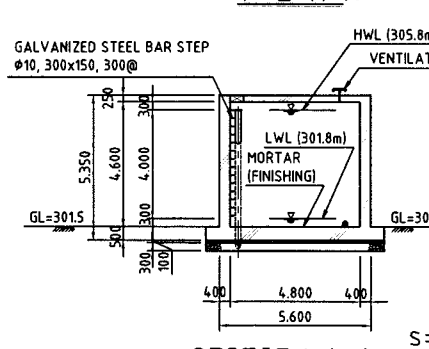

SECTION A A

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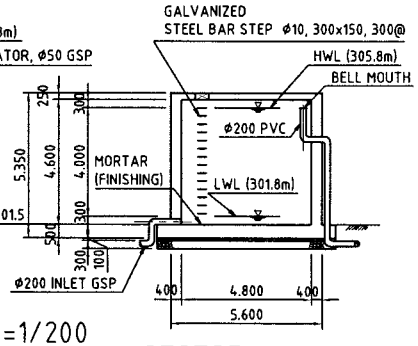

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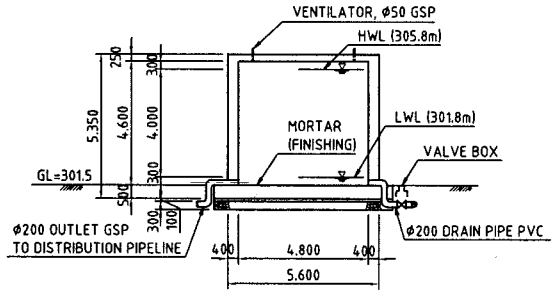

SECTION C C

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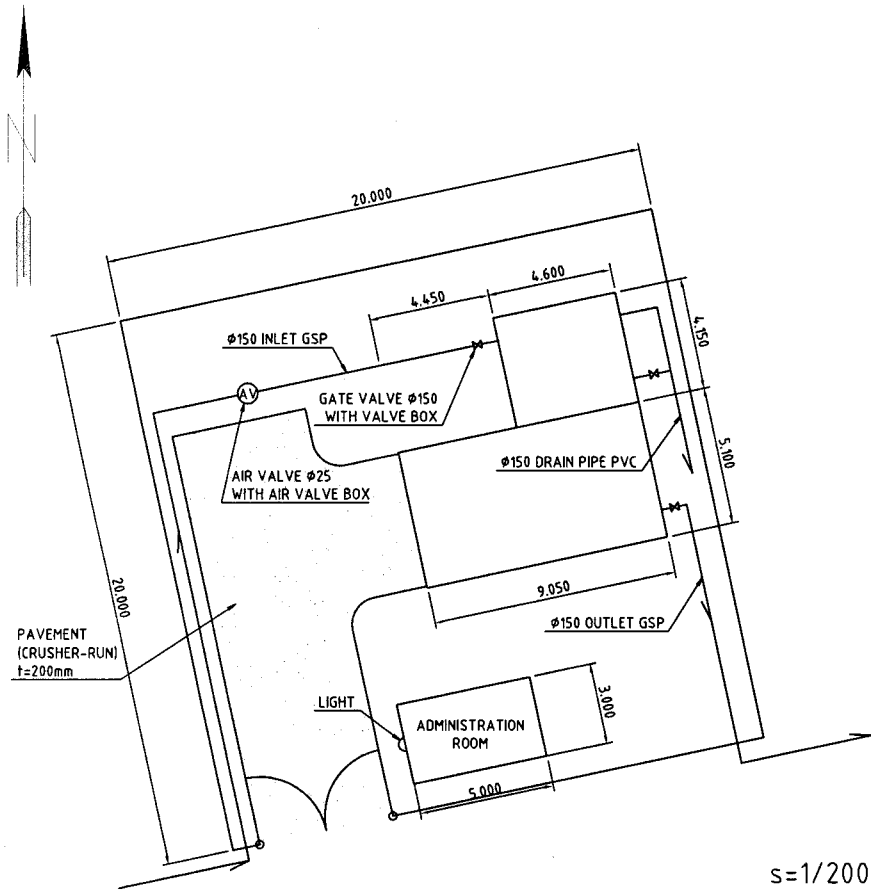
THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: BR-5: Plan of Distribution Tank		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD - 08



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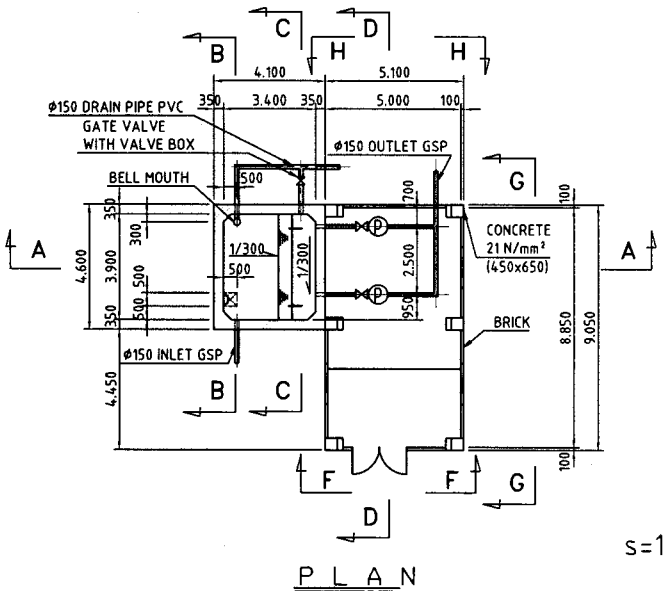

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P L A N

THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: BR-6: Plan of Distribution Tank		
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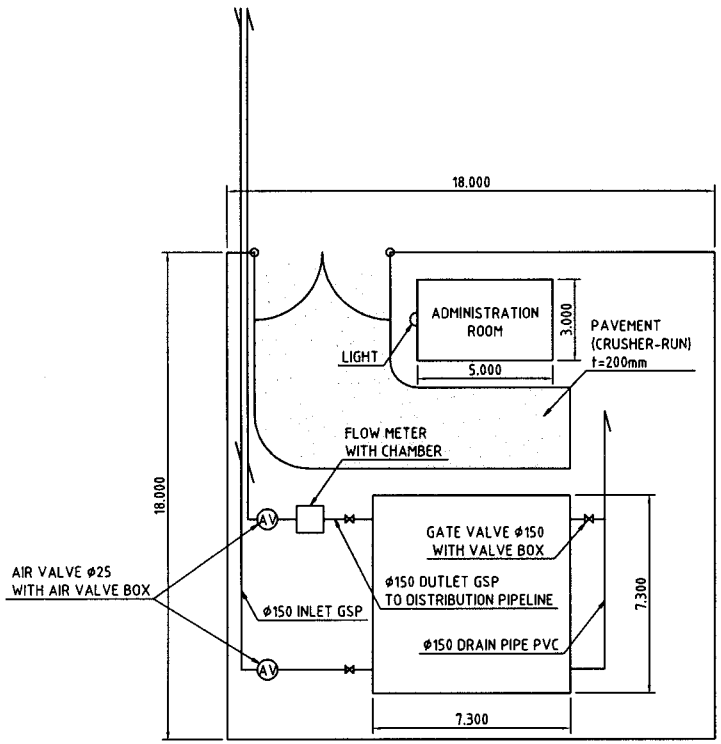

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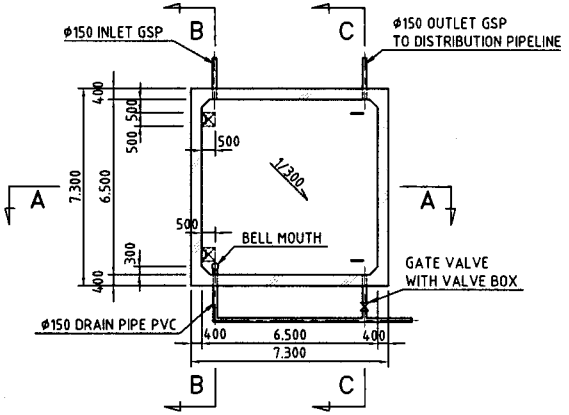

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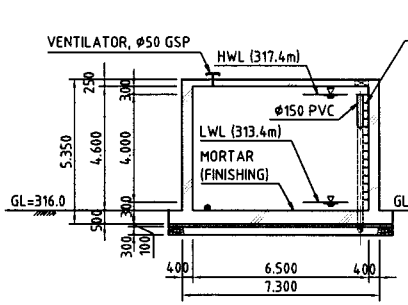

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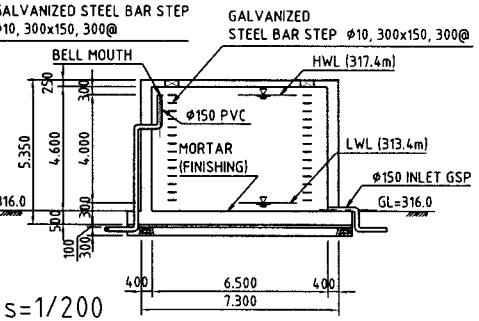

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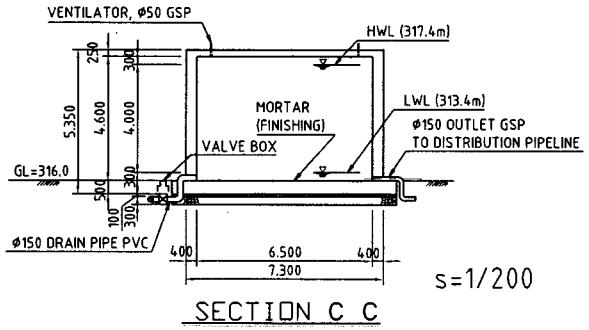

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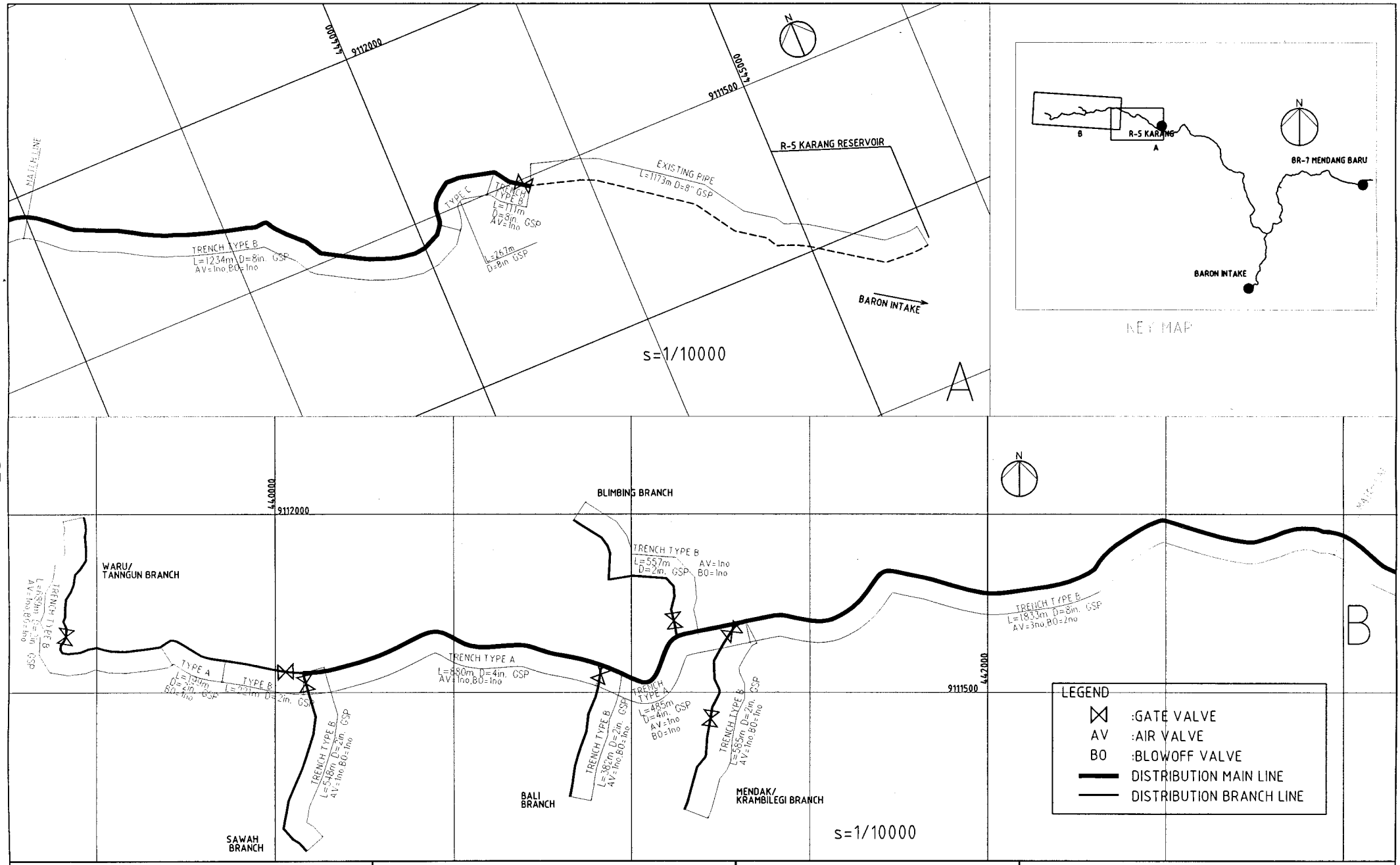
SECTION C C

THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: BR-7: Plan of Distribution Tank		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD - 10



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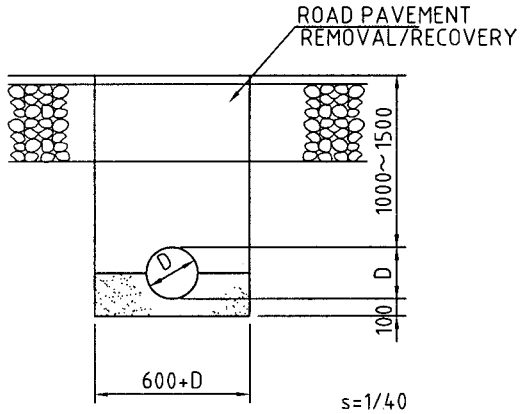
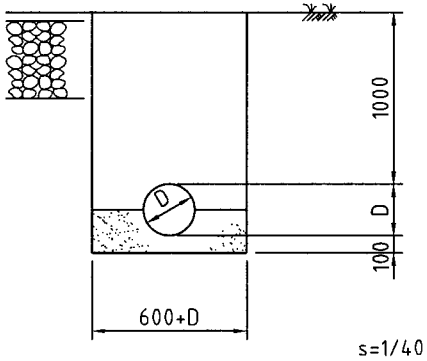
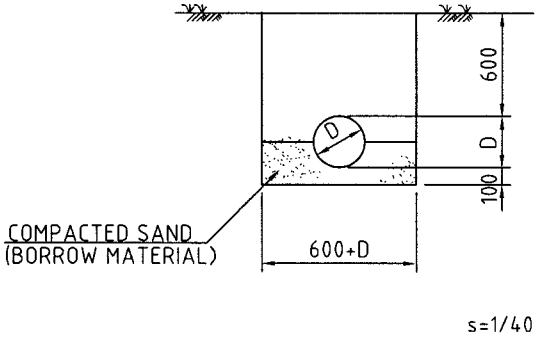
THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: Plan of Disribution Pipe SCALE DATE: SEP. 2006 DRAWING NO.: BD - 11



BELOW ROAD PAVEMENT
TRENCH TYPE A

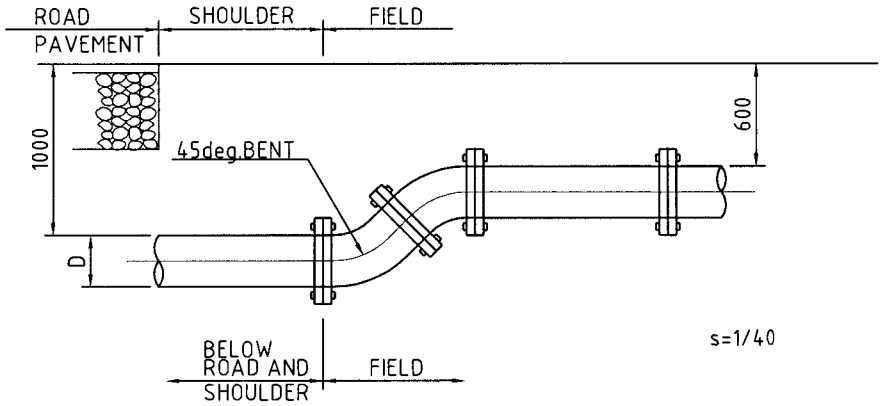


BELOW ROAD SHOULDER
TRENCH TYPE B

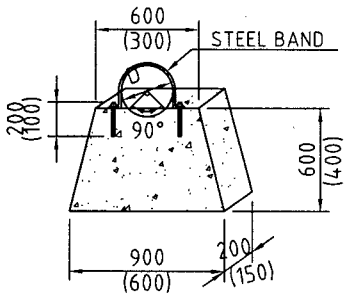


FIELD AREA
TRENCH TYPE C

TYPICAL SECTION OF TRENCH



TYPICAL VERTICAL BENT AT ROAD CROSSING



TYPICAL PIPE SUPPORT
( ): FOR DISTRIBUTION PIPE

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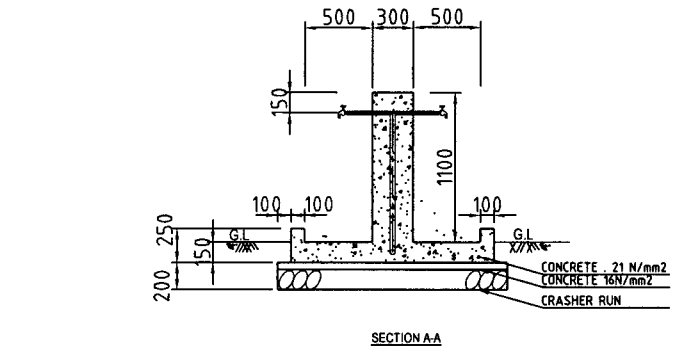
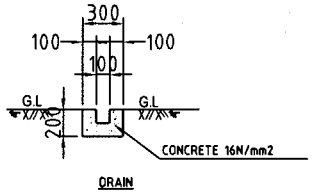
THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: Installation of Pipe and Typical Cross Section	
			SCALE	DATE: SEP. 2006 / DRAWING NO.: BD – 12



SECTION A-A



DRAIN

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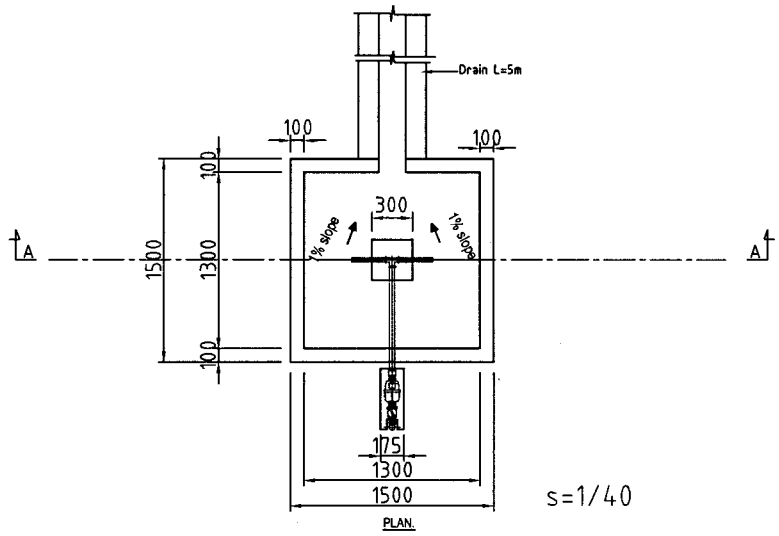

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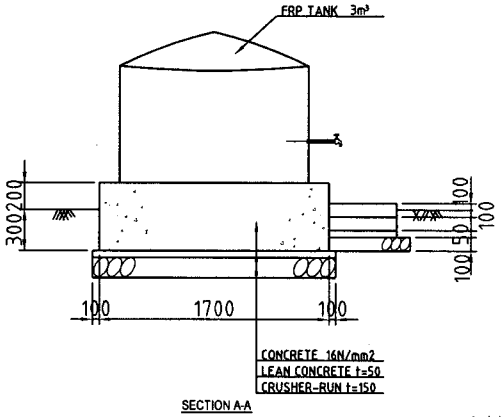
PUBLIC HYDRANT



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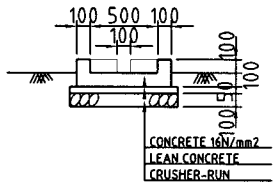
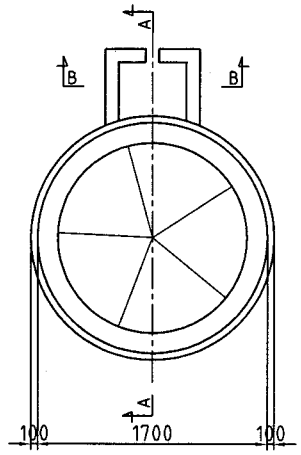


SECTION B-B



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PUBLIC WATER TANK

THE IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR WATER SUPPLY IN GUNUNKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY IN THE REPUBLIC OF INDONESIA	JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO.,LTD.	DRAWING TITLE: Public Hydrant		
			SCALE	DATE: SEP. 2006	DRAWING NO.: BD – 13

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

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.

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 2.2.5.

Table 2.2.5 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 implementation of the soft component targets support to PDAM in the following three key areas; 1) operation and maintenance of facilities, 2) technical aspects on operation and management of the purification plant, and 3) the management and financial aspects.

The details are given as follows.

1) Operation and Maintenance of Facilities

The Project is to plan and construct intake facilities, purification plant, transmission and partial distribution pipes, 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 them appropriately to achieve the target service ratio.

However, the existing water supply facilities have not been checked or repaired periodically or comprehensively, and the O&M system has not been in a desirable condition for a long time. In particular, no as-built drawings, indispensable for inspection and repair, have been retained in the office and no ledgers for carrying out maintenance work have been compiled, resulting in the poor condition of the facilities. Subsequently, the financial arrangements for the facilities renovation and extension have not been managed satisfactorily. Due to such conditions, PDAM strongly requests to have education and training guidance conducted for creation of sound operation and maintenance skills.

2) Technical Aspects on Operation and Management of the Purification Plant

As the turbidity of underground streams and coliform numbers drastically

increase during the rainy seasons, the slow sand filter method together with chlorine injection facilities have been proposed in this Project. This system is generally considered as low in O&M cost and easy for operation, however there is not much experience with this type of system in Indonesia, and particularly this is the first experience in Jogjakarta Special Province. Therefore, guidance and lectures for operation and maintenance skills for this system is strongly requested for PDAM.

3) Management and Financial Aspects

PDAM has chronic management and financial problems, since it has not been collecting suitable water charges with suitable frequency from the recipients. PDAM believes that it has been managing financial matters, however the data compiled is not always available when needed for the review and the results of analysis are not satisfactory for the intended subsequent use. It is generally said that the analysis for setting the water charge level is not adequate. All these accounting matters should be monitored and checked based on periodic water meter readings and subsequent mechanical compilation is indispensable.

For these reasons, PDAM has requested assistance to strengthen the capacity building for sound organization and operation by receiving accounting guidance and lectures, recommendations for setting suitable water tariffs, and assistance for management and financial improvement.

The target organization of the soft component implementation will be basically the PDAM; however, relevant provincial organizations such as Ecobang, BAPPEDA and Dinas PU shall also be included in the target soft component programs.

(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.

3) The management capability of PDAM will be strengthened by acquiring knowledge of financial and customer management and execute sure charge collection.

(3) Expected Effect

In the course of implementation of the soft component, provision of O&M manual for the facilities and accounting and financial management manuals as well as their guidance and lectures are proposed. At the same time, major role, function and responsibility shall be stipulated in each manual aiming at establishing firm organizational regimes as well as establishing sustainable management environment. By doing the soft component, it is believed that the Project will be able to keep sustainability and improvement and amendment will be given from now on as necessary.

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 periodical inspection and repair work will be entrenched.
    2) Skill in handling operation and maintenance of the purification plants will be acquired.

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 periodical 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.

2) Expected Effect on the Financial Aspects

i) Capability of handling of accounting procedures

Accounting procedures 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 comprehension using a check list and monthly accounting data and records.

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 2.2.6.

(6) Assignment of Implementing Staff

Assignment of Implementing Staff will be as follows:

1) Japanese Consultant Staff: 1 Engineer (purification plant operation and technical management staff)

One Japanese engineer responsible for purification plant operation and management of technical aspects will be adopted. Since there is a very few example of conducting a slow sand filter method in Indonesia, technical transfer and monitoring work should be made by Japanese engineer.

2) Local Consultant Staff: 3 Experts (purification plant operation, O&M,

management and financial staff)

One for plant operation which is not predominant in Indonesia needs technology transfer and manual preparation together with cordination, one for O&M, coordinating and reporting to the responsible organizations needs to be familiar with water business and one for management and financial expert needs well trained management and business skill will be conducted.

Table 2.2.6 Contents of Activities for Soft Component Program

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	Local consultant	1day	
Implementation Stage						
2. Exercise of Plan and Design of Facilities	Dinas PU, PDAM(Planning Section)	5+5	Lecture	Local consultant	4day	
a Abstraction of problems	PDAM (Planning, Production, Distribution Sections)	5+30+20	Discussion and exercise with PDAM	Local consultant	2day	
b Education for &M and economy	PDAM (Planning, Production, Distribution Sections)	30+20	Discussion and exercise with PDAM	Local consultant	2day	
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	Local consultant	5day	Facility ledger
b Preparation of O&Mrecord and exercise of monitoring	PDAM(Production)	30	Discussion and exercise with PDAM	Local consultant	5day	
4. Technical Guidance of Purification Plant						
a Preparation of manual	PDAM(Production)	30	Preparation of manual	Foreign/local consultant	10day	Opration manual (Indonesian)
b Technical Guidance	PDAM(Production)	30	Lecture and guidance along the manual	Foreign/local consultant	5day	
c Preparation, establishment of monitoring and managing	PDAM(Production)	30	Lecture, guidance at site	Foreign/local consultant	5day	Opreration record
Monotoring Stage						
5. Evaluation and Monitoring						
a Exercise	PDAM		Check of records for items 3,4	Foreign/local consultant	3day	
b Evaluation and amendment	PDAM, Dinas PU		Technical comprehension test and discussion	Foreign/local consultant	3day	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	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	Local consultant	2day	
b Confirmation fo Depreciation Item	PDAM(Accountant), Regency(Ekobang), Province(BPKP)	3+2+2	Study for depreciation ledger	Local consultant	2day	
c Confirmation of budget allocation(including subsidy)	PDAM(Accountant), Regency(Ekobang)	3+2	Discussion with PDAM and Regency	Local consultant	2day	
d Cash flow management study	PDAM(Accountant), Regency(Ekobang)	3+2	Discussion with PDAM and Regency	Local consultant	2day	
e Financial education and guidance	PDAM(Accountant), Regency(Ekobang)	3+3	Discussion with PDAM and Regency	Local consultant	2day	
3. Accounting Program Exercise						
a Discussion of program and basic planning	PDAM(Accountant),	10	Discussion with PDAM	Local consultant	3day	
b Accounting program and implementation	PDAM(Accountant),	10	Preparation for accounting program	Local consultant	3day	Accounnting program
c Orepation of accounting program manual	PDAM(Accountant),	10	Preparation of manual	Local consultant	6day	Accounnting program,manual
d Exercise of accounting program	PDAM(Accountant),	10	Guidance of manual	Local consultant	2day	
4. Water Charge Collection and Customer Service						
a Planning of charge collection schedule	PDAM(Distribution),	20	Discussion with PDAM, preparation of schedule	Local consultant	2day	
b Education, guidance and training of charge collection	PDAM(Distribution),	20	Lecture and guidance at site	Local consultant	4day	
c Preparation of management ledger and guidance	PDAM(Distribution),	20	Lecture and guidance at site	Local consultant	4day	
d Monitoring guidance and training	PDAM(Distribution),	20	Lecture and guidance at site	Local consultant	4day	
Monotoring Stage						
5. Evaluation and Monitoring						
a Exercise of accounting program	PDAM(Accountant),	10	Confirmation of comprehension	Foreign/local consultant	3day	Check list
b Evaluation and amendment	PDAM(Accountant), Regency(Ekobang)	3+2	Confirmation of contents	Foreign/local consultant	3day	

(7) Implementation Schedule

The implementation schedule for the soft component is shown in Figure 2.2.1.

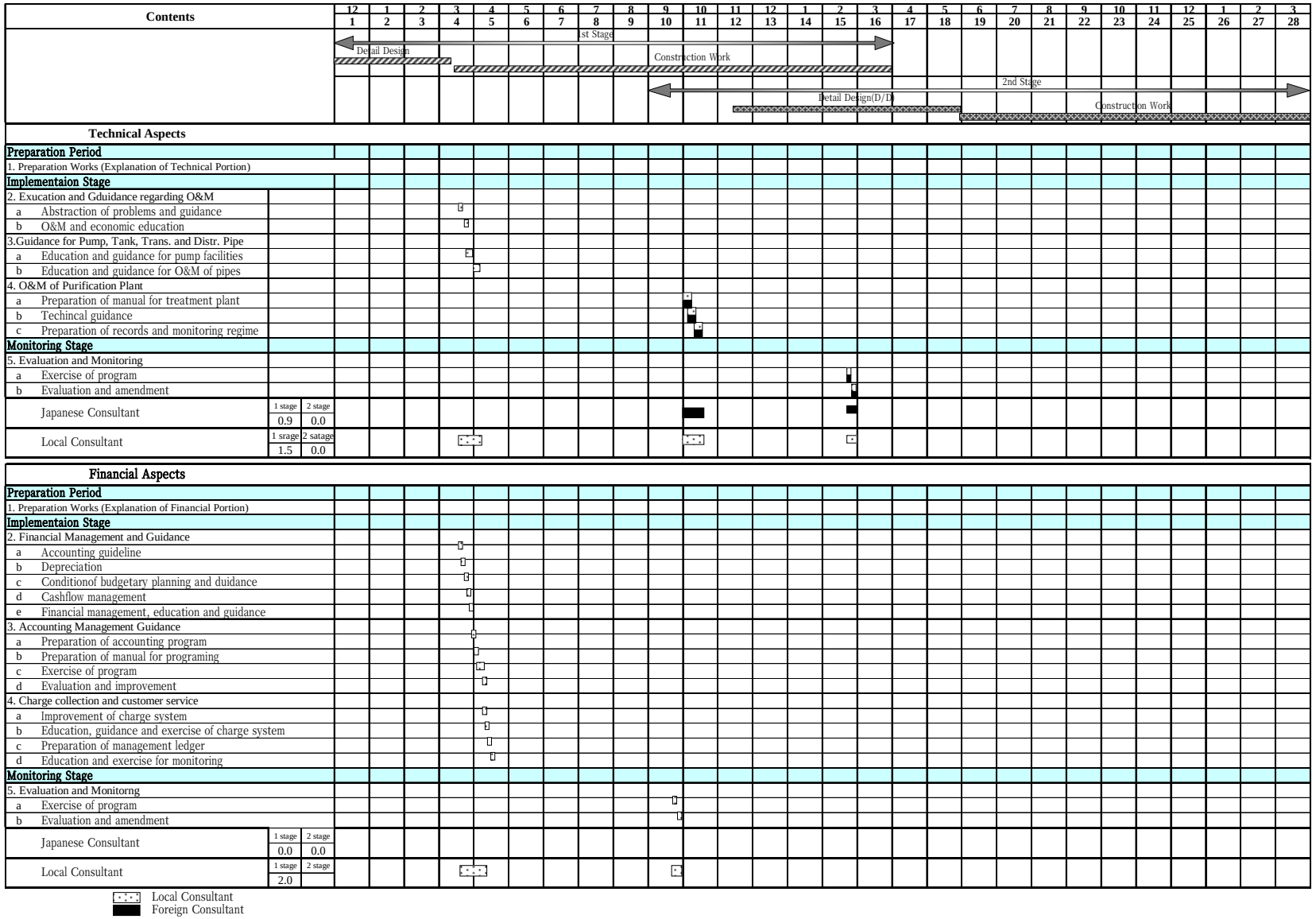


Figure 2.2.1 Implementation schedule for Soft Component program

(8) Reports

In addition to the completion reports to be submitted to both the Indonesian and Japanese sides, soft component implementation program (2 times), purification plant operation manual, accounting control manual, pomp operation and facility monitoring records, water supply facilities ledgers, checklist of these operational works and claim records should be submitted.

(9) Preliminary Cost Estimates for the Soft Component

Preliminary cost estimates for the soft component are shown in Table 2.2.7.

Table 2.2.7 Preliminary Cost Estimate for Soft Component

Unit: JP Yen

	Remuneration	Direct Expenses	Indirect Expenses	Total
1st stage	561,000	2,285,000	718,000	3,564,000
2nd stage	0	0	0	0
Total	561,000	2,285,000	718,000	3,564,000

The conditions for the cost estimate are as follows.

1) Condition

i) Period of cost estimate: May 2006
ii) Exchange rate: Rp 1 = Yen 0.0118
iii) Implementation period: 2 stages

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 purification plant, 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) Tendering, evaluation and contract	3.5 months
(2) Construction	9 months
(3) Soft Component	1.5 months
2nd Stage Period	
(1) Detail design	3.0 months
(2) Tendering, evaluation and contract	3.5 months
(3) Construction	12 months

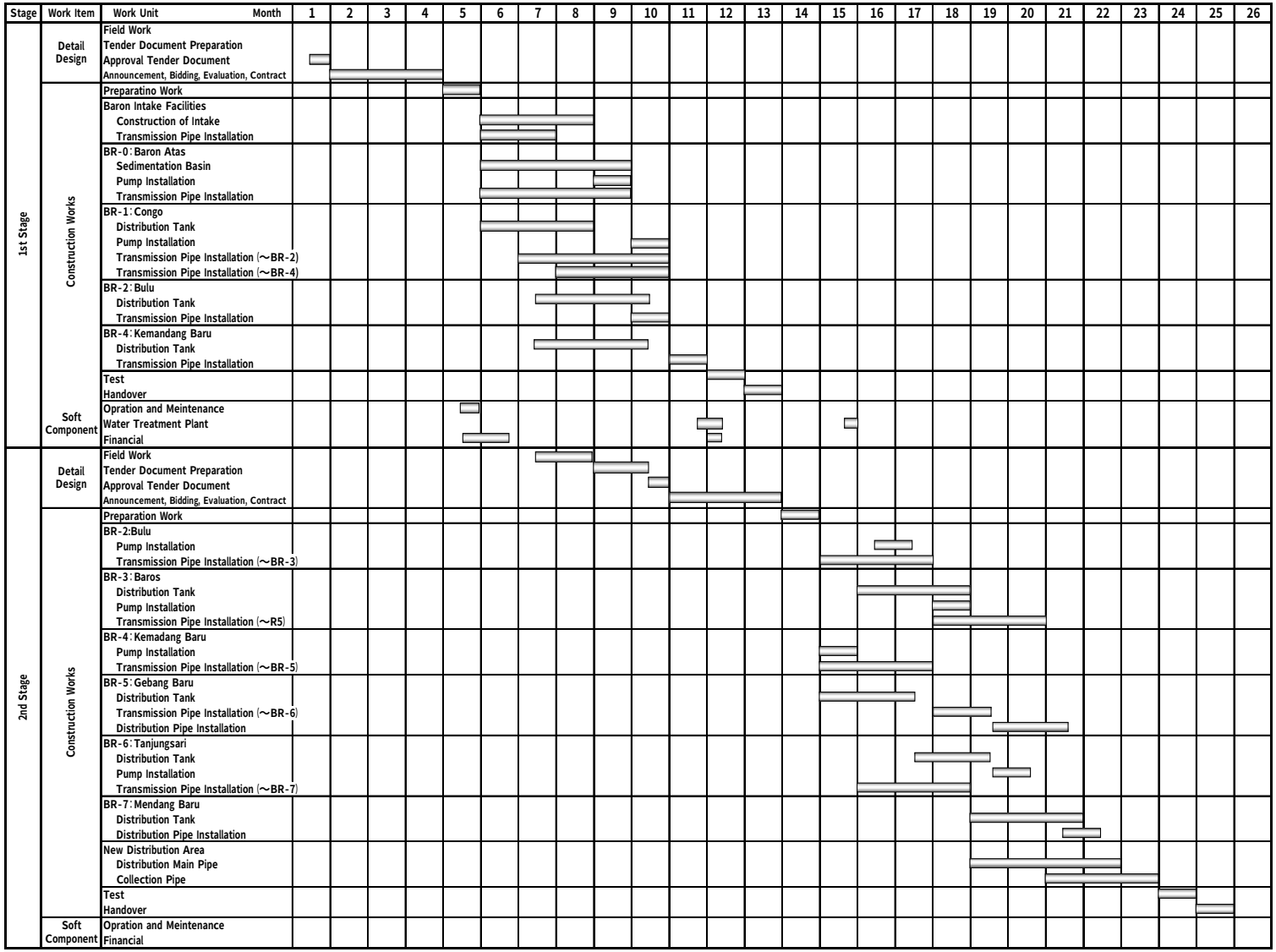


Figure 2.2.2 Project Implementation Schedule

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 2.3.1 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.

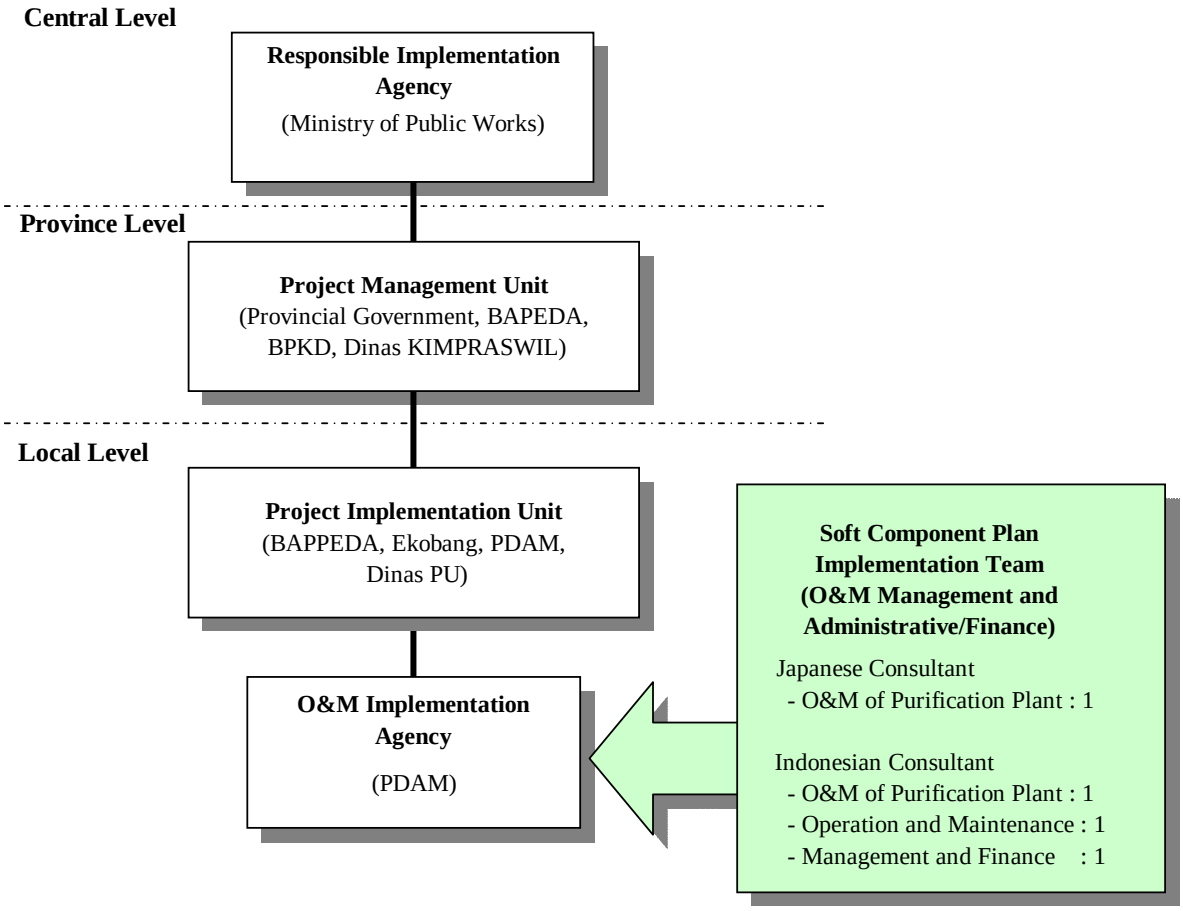


Figure 2.4.1 Operation and Maintenance Organization

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 1,166 million, comprised of JPY 1,108 million of Japanese Government and JPY 58 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 - 1,108 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	1,006
Procurement		0
Consulting Fee	D/D, S/V and soft component	102
Total		**1,108**

(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 Purification plant, distribution tanks, pump stations, etc.	538,804	6,358
2. Plants	Clearance, hoeing, reclamation	697,284	8,228
3. Construction and supervision	Fences, gates, access roads, parking in the yard, (8 locations) Connection pipe（575 units）	1,411,170	16,652
4. Electric facilities	Provision of cables to the facilities, breakers, transformers, etc.	2,301,681	27,160
Total		4,948,939	58,398

(3) Conditions for Cost Estimate

1) Date of estimate May 2006
2) Exchange rate 1 US$ = ¥117.58
1 Rp = ¥0.0118
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 5.2

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 5.2)

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 compared. (Details are shown in Table 5.6.2.12 of Appendix-5 5.2)

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 5.2)

Unit：Rp

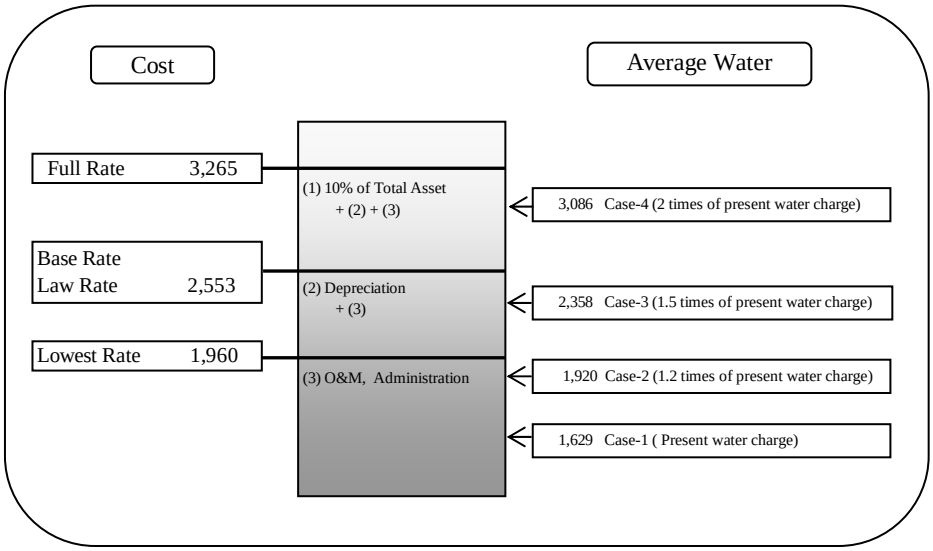


Figure 2.5.1 Comparison between average water charge and cost

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 5.2 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

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

Position in Charge	Name	Affiliation
Team Leader	KINOMOTO, Hiroyuki	Team Director, Water Resources Development and Environmental Management Team, Project Management Group III, Grant Aid Management Dept., JICA
Chief Consultant/ Water Supply Planner	OKAZAKI, Keisuke	Nippon Koei Co., Ltd.
Facility Planner	MIYAKE, Akihiro	Nippon Koei Co., Ltd.
Pipeline Planner/ Implementation Planner	ABE, Takatsugu	Nippon Koei Co., Ltd.
Electrical and Mechanical Engineer	SETO, Kenji	Nippon Koei Co., Ltd.
Cost Estimator/ Procurement Planner/ Tender Document Specialist	TSUBOI, Shigemasa	Nippon Koei Co., Ltd.

Appendix-2
Survey Itinerary

Appendix-2：Survey Itinerary

1. Explanation of Inception Report and Field Survey (March 7, 2006 to May 12, 2004)

No	Date		Member	Station	Activities
1	Mar. 7	Tue	Okazaki, Tsuboi	Jakarta	Move (Narita-Jakarta)
2	8	Wed		Jakarta	Courtesy call to Embassy of Japan Meeting with JICA Office Courtesy call to Ministry of Public Works
3	9	Thu	Okazaki, Tsuboi	Yogyakarta	Move (Jakarta-Yogyakarta)
4	10	Fri		Yogyakarta	Discussion with Counter Parts Field Investigation
5	11	Sat		Yogyakarta	Field Investigation
6	12	Sun	Miyake	Yogyakarta	Move (Narita-Jakarta) Field Investigation
7	13	Mon	Okazaki, Tsuboi	Jakarta/ Yogyakarta	Move (Yogyakarta-Jakarta) Field Investigation
8	14	Tue		Jakarta/ Yogyakarta	Field Investigation
9	15	Wed	Okazaki	Jakarta/ Yogyakarta	Report to Embassy of Japan and JICA Indonesia Office Discussion with Counter Parts Field Investigation Move (Jakarta-Narita)
10	16	Thu	Okazaki Abe Tsuboi	Yogyakarta	Arrive at Tokyo Move (Narita-Yogyakarta) Move (Jakarta-Yogyakarta) Field Investigation
11	17	Fri		Yogyakarta	Field Investigation Data Collection
12	18	Sat		Yogyakarta	Field Investigation Data Collection
13	19	Sun		Yogyakarta	Field Investigation Data Collection
14	20	Mon	Miyake	Yogyakarta	Move (Yogyakarta-Narita) Field Investigation Data Collection
15	21	Tue	Miyake	Yogyakarta	Arrive at Tokyo Field Investigation Data Collection
16	22	Wed	Tsuboi	Yogyakarta	Move (Yogyakarta-Narita) Field Investigation Data Collection
17	23	Thu	Tsuboi	Yogyakarta	Arrive at Tokyo Field Investigation Data Collection
18	24	Fri		Yogyakarta	Field Investigation Data Collection
19	25	Sat		Yogyakarta	Field Investigation Data Collection
20	26	Sun		Yogyakarta	Field Investigation Data Collection

No	Date		Member	Station	Activities
21	27	Mon		Yogyakarta	Field Investigation Data Collection
22	28	Tue		Yogyakarta	Field Investigation Data Collection
23	29	Wed		Yogyakarta	Field Investigation Data Collection
24	30	Thu		Yogyakarta	Field Investigation Data Collection
25	31	Fri		Yogyakarta	Field Investigation Data Collection
26	Apr. 1	Sat		Yogyakarta	Field Investigation Data Collection
27	2	Sun		Yogyakarta	Field Investigation Data Collection
28	3	Mon		Yogyakarta	Field Investigation Data Collection
29	4	Tue		Yogyakarta	Field Investigation Data Collection
30	5	Wed		Yogyakarta	Field Investigation Data Collection
31	6	Thu		Yogyakarta	Field Investigation Data Collection
32	7	Fri		Yogyakarta	Field Investigation Data Collection
33	8	Sat		Yogyakarta	Field Investigation Data Collection
34	9	Sun		Yogyakarta	Field Investigation Data Collection
35	10	Mon		Yogyakarta	Field Investigation Data Collection
36	11	Tue		Yogyakarta	Field Investigation Data Collection
37	12	Wed		Yogyakarta	Field Investigation Data Collection
38	13	Thu		Yogyakarta	Field Investigation Data Collection
39	14	Fri		Yogyakarta	Field Investigation Data Collection
40	15	Sat		Yogyakarta	Field Investigation Data Collection
41	16	Sun	Seto	Yogyakarta	Move (Narita-Yogyakarta) Field Investigation Data Collection
42	17	Mon		Yogyakarta	Field Investigation Data Collection
43	18	Tue		Yogyakarta	Field Investigation Data Collection
44	19	Wed		Yogyakarta	Field Investigation Data Collection
45	20	Thu		Yogyakarta	Field Investigation Data Collection

No	Date		Member	Station	Activities
46	21	Fri		Yogyakarta	Field Investigation Data Collection
47	22	Sat		Yogyakarta	Field Investigation Data Collection
48	23	Sun	Okazaki, Tsuboi	Yogyakarta	Move (Narita-Yogyakarta) Field Investigation Data Collection
49	24	Mon		Yogyakarta	Field Investigation Data Collection
50	25	Tue	Okazaki, Tsuboi	Jakarta/ Yogyakarta	Move (Yogyakarta-Jakarta) Field Investigation Data Collection
51	26	Wed	Tsuboi	Jakarta/ Yogyakarta	Move (Jakarta-Yogyakarta) Report to Embassy of Japan and JICA Indonesia Office Discussion with Counter Parts Field Investigation
52	27	Thu	Okazaki	Yogyakarta	Move (Jakarta-Narita) Field Investigation Data Collection
53	28	Fri	Abe	Yogyakarta	Move (Yogyakarta-Narita) Field Investigation Data Collection
54	29	Sat	Abe Seto	Yogyakarta	Arrive at Narita Move (Yogyakarta-Narita) Field Investigation Data Collection
55	30	Sun	Seto	Yogyakarta	Arrive at Narita Field Investigation Data Collection
56	May 1	Mon		Yogyakarta	Field Investigation Data Collection
57	2	Tue		Yogyakarta	Field Investigation Data Collection
58	3	Wed		Yogyakarta	Field Investigation Data Collection
59	4	Thu		Yogyakarta	Field Investigation Data Collection
60	5	Fri		Yogyakarta	Field Investigation Data Collection
61	6	Sat		Yogyakarta	Field Investigation Data Collection
62	7	Sun	Tsuboi	Jakarta	Move (Yogyakarta-Jakarta) Field Investigation Data Collection
63	8	Mon		Jakarta	Field Investigation Data Collection
64	9	Tue		Jakarta	Field Investigation Data Collection
65	10	Wed		Jakarta	Field Investigation Data Collection

No	Date		Member	Station	Activities
66	11	Thu	Tsuboi	Jakarta	Field Investigation Data Collection Move (Jakarta-Narita)
67	12	Fri	Tsuboi		Arrive at Tokyo

2. Investigation for the Influence of Earthquake (June 29, 2006 to July 8, 2006)

No	Date		Member	Station	Activities
1	June 29	Thu	Abe, Tsuboi	Yogyakarta	Move (Tokyo-Yogyakartai)
2	30	Fri		Yogyakarta	Field Investigation Data Collection
3	July 1	Sat		Yogyakarta	Field Investigation Data Collection
4	2	Sun		Yogyakarta	Field Investigation Data Collection
5	3	Mon.		Yogyakarta	Field Investigation Data Collection
6	4	Tue.	Tsuboi	Jakarta/ Yogyakarta	Move (Yogyakarta-Jakarta) Field Investigation Data Collection
7	5	Wed.	Tsuboi	Yogyakarta	Move (Jakarta-Yogyakarta) Discussion with Counter Parts Field Investigation Data Collection
8	6	Thu.		Yogyakarta	Discussion with Counter Parts Field Investigation Data Collection
9	7	Fri.	Abe, Tsuboi	Yogyakarta	Move (Yogyakarta-Narita)
10	8	Sat.	Abe, Tsuboi		Arrive at Tokyo

3. Explanation of Draft Final Report (September 3, 2006 to September 8, 2006)

No	Date		Member	Station	Activities
1	Sep. 3	Sun.	Kinomoto	Jakarta	Move (Tokyo-Jakarta)
2	4	Mon.	Okazaki, Abe, Tsuboi	Jakarta/ Yogyakarta	Move (Narita-Yogyakarta) Discussion on Draft Implementation Review Study Report with PDAM
3	5	Tue.	Okazaki, Abe, Tsuboi	Jakarta	Move (Yogyakarta-Jakarta) Discussion on Draft Implementation Review Study Report PU
4	6	Wed.		Jakarta	Discussion on Draft Basic Design Study Report with PU
5	7	Thu.	Okazaki, Abe, Tsuboi	Jakarta	Report to Embassy of Japan and JICA Indonesia Office Move (Jakarta-Narita)
6	8	Fri	Okazaki, Abe, Tsuboi		Arrive at Tokyo

Appendix-3
List of Parties Concerned in the Recipient Country

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

Jakarta

Ministry of Public Works

Agoes Widjanarko	Director General of Human Settlements
Poedjastanto Soemardono	Director for Drinking Water Management
Amirdin	Head, Subdirectorate of Region I
Togap H	Staff of Subdirectorate of Region I
Noeradhi Iskandar	Drinking Water Investment Sub-Sector
Oloan M.S.	Staff of Drinking Water Management Sector
Bambang Purwanto	Staff of Drinking Water Management Sector
Tonny Kartono	Staff of Drinking Water Management Sector
Suly Meilani H.	Drinking Water Investment Sub-Sector
Seiken Higa	JICA Expert

BAPPENAS

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

Yogyakarta

Ministry of Public Works

Bayudono	Head of Provincial Government (Planning Board)
Natsir Basuki	Head of Cipta Karya
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

Masahiro Sasaki	Second Secretary

JICA Indonesia Office

Keiichi Kato	Resident Representative
Shinji Totsuka	Deputy Resident Representative
Nobuo Iwai	Assistant Resident Representative
Katsuhiko Ohara	Assistant Resident Representative

Appendix-4
Minutes of Discussion

MINUTES OF DISCUSSIONS
ON IMPLEMENTATION REVIEW STUDY
ON THE PROJECT
FOR WATER SUPPLY PROJECT IN GUNUNGKIDUL REGENCY
OF YOGYAKARTA SPECIAL TERRITORY
IN REPUBLIC OF INDONESIA

In succession to the implementation of the Basic Design Study, the Government of Japan decided to conduct the Implementation Review Study on THE PROJECT FOR WATER SUPPLY PROJECT IN GUNUNGKIDUL 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 Indonesia the Implementation Review Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Shinji Totsuka, Deputy Resident Representative, Indonesia Office, JICA and was scheduled to stay in the country from March 7 to May 11, 2006. The Team held discussions with the officials concerned of the Government of Indonesia and conducted a field survey at the study area.

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

Jakarta, 26th April 2006

Mr. Shinji Totsuka
Leader
Implementation Review Study Team
Japan International Cooperation Agency
Japan

Ir. Poedjastanto Soemardono, CES
Directorate of Water Supply Development
Directorate General of CIPTA KARYA
Ministry of Public Works

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 Public Works, Directorate General of CIPTA KARYA (hereinafter referred to as " CIPTA KARYA").

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 Indonesia 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 JICA will prepare the draft report in English and dispatch a mission to Indonesia in order to explain its contents to Indonesia side towards the beginning of September, 2006.

6-2 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 November 2006.

7. **Other Relevant Issues**

The following issues were discussed and confirmed by both sides.

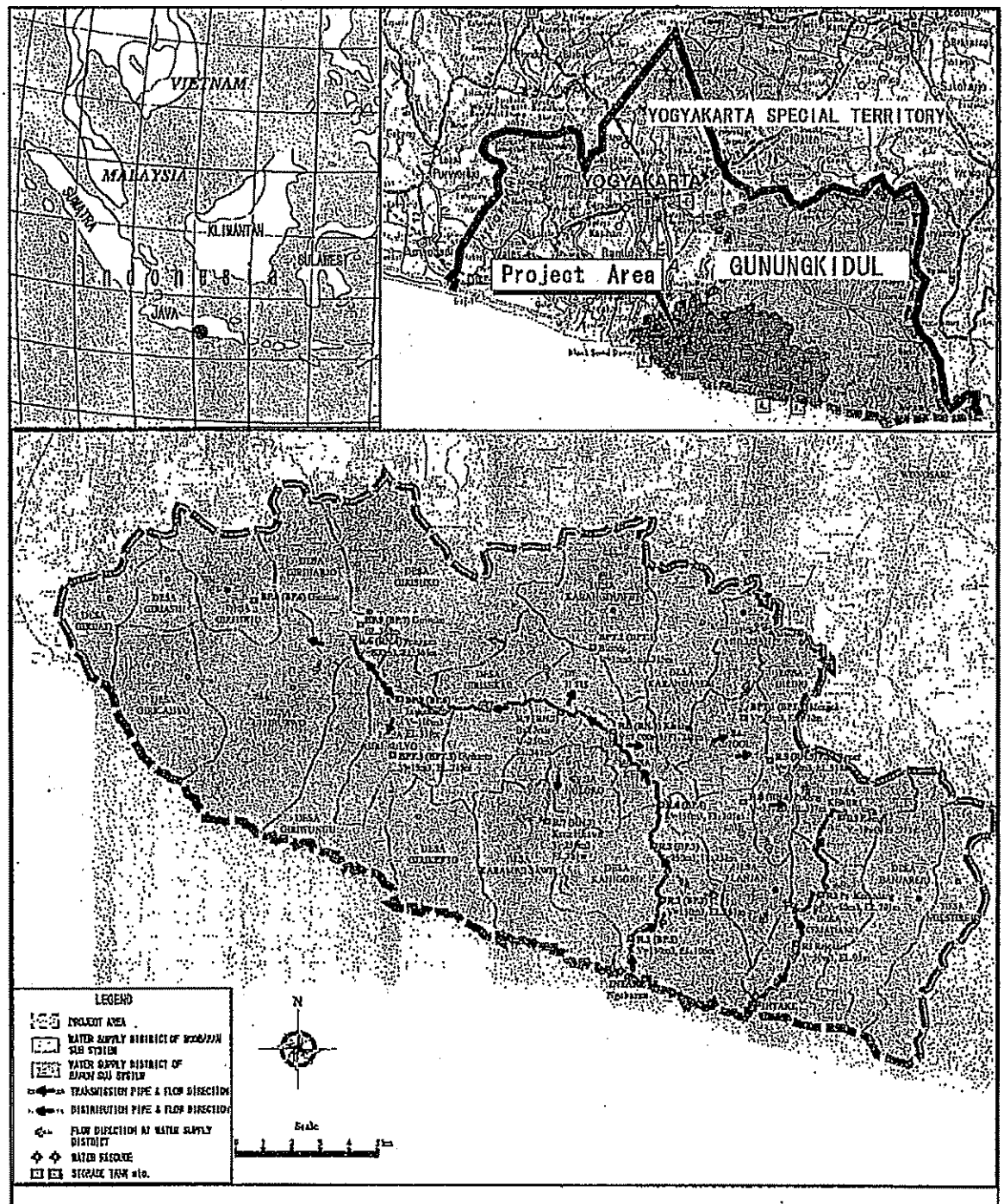
7-1 The contents of soft component program

The Japanese side suggested that the contents of soft component program which is described in the "Basic Design Study Report" on this project will be reconsidered, and the Indonesian side accepted the suggestion.

7-2 Procurement of multipurpose items

The Japanese side suggested that multipurpose items, that are truck including equipment tools for maintenance should be bought by the Indonesian side after completion of the construction work, and the personal computer should be provided during the construction period. The Indonesian side accepted the suggestion.

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 Program, 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.

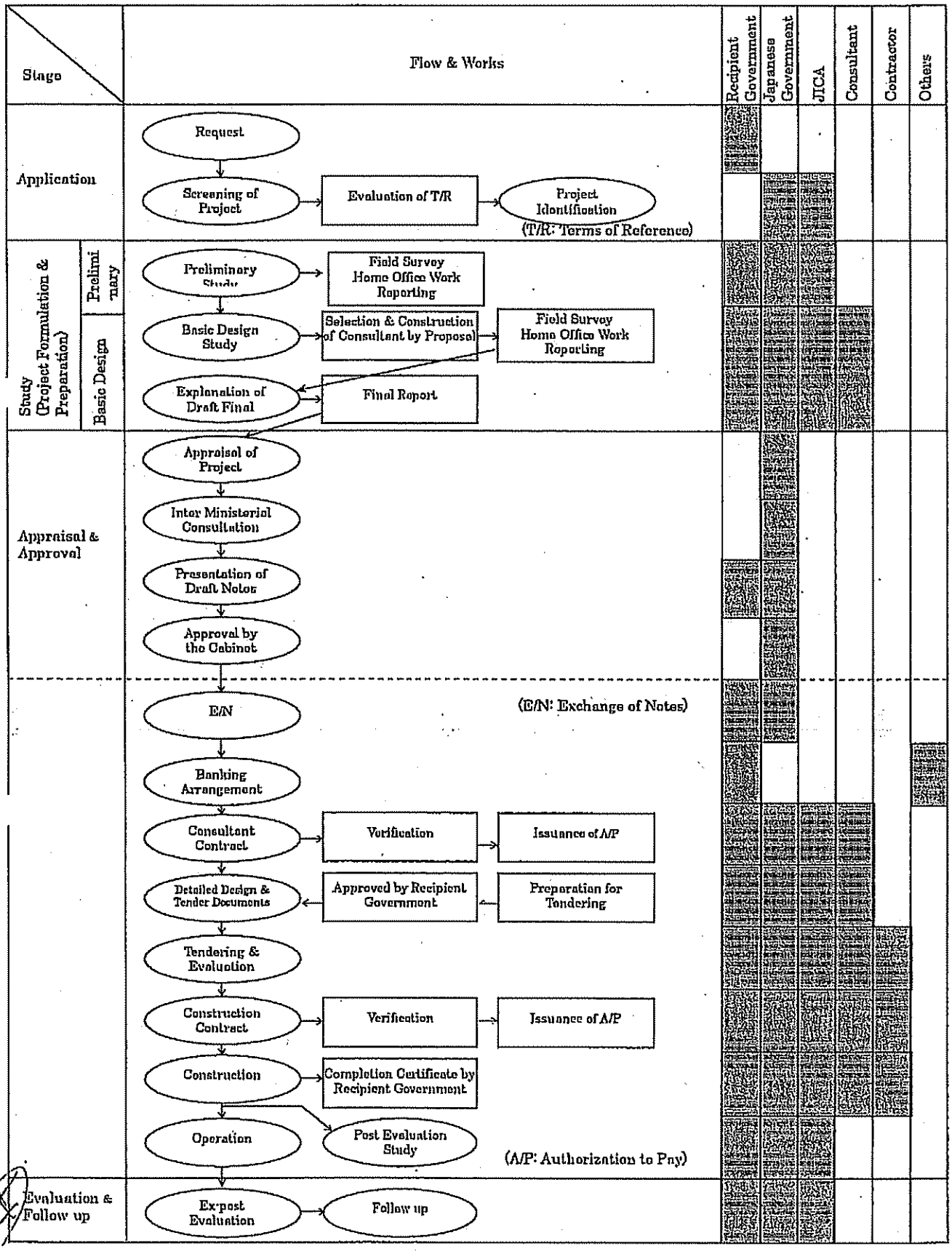
viii) "Re-export"
The products purchased under the Grant Aid shall not be re-exported from the recipient country.

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.		●

MINUTES OF DISCUSSIONS
ON THE IMPLEMENTATION REVIEW STUDY
ON THE PROJECT
FOR WATER SUPPLY PROJECT IN GUNUNG KIDUL REGENCY
OF YOGYAKARTA SPECIAL TERRITORY
IN THE REPUBLIC OF INDONESIA
(EXPLANATION ON DRAFT REPORT)

In April 2006, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Implementation Review Study Team on THE PROJECT FOR WATER SUPPLY PROJECT IN GUNUNGKIDUL REGENCY OF YOGYAKARTA SPECIAL TERRITORY (hereinafter referred to as "the Project") to the Republic of Indonesia (hereinafter referred to as "the Indonesia"), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the Indonesia on the components of the draft report, JICA sent to the Indonesia the Draft Report Explanation Team (hereinafter referred to as " the Team "), which is headed by Mr. Hiroyuki Kinomoto, Team Director of Water Resources Development and Environmental Management, Grant Aid Management Department, JICA, from 4th September to 6th September.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Jakarta, 6th September 2006

木野本浩之

Mr. Hiroyuki Kinomoto
Leader
Implementation Review Study Team
Japan International Cooperation Agency
Japan

Mr. Agoes Widjanarko
Directorate General of Human Settlements
Ministry of Public Works
Republic of Indonesia

ATTACHMENT

1. Components of the Draft Report

The Government of the Indonesia agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid scheme

The Indonesia side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of the Indonesia as explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both parties on 26th April 2006.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of the Indonesia by November 2006.

4. Other Relevant Issues

The following issues were discussed and confirmed by both sides.

4-1 Undertaking by the Indonesian side

The Indonesian side accepted the following work items to be prepared by the Indonesian side.

Work Item	Specification
1. Land	• Acquisition, compensation • Slow Sand Filter , distribution tanks, pump stations, etc.
2. Plants	• Clearance, hoeing
3. Design , Construction and Supervision	• Fences, gates, access roads, parking in the yard, (8 locations) • Connection pipe(575 units) • Cable line to facilities, breakers, transformer, control panel, extension line of 20kv to BR-6 Tanjunsari

4-2 House Connection

The Team requested that the Indonesian side implement house connection works properly so that the Project enables to attain the purpose of the Project.

4-3 Technical Service

The team explained that technical service is included as soft component of the Project. The soft component contains the followings,

- operation and maintenance,
- the technical aspect on operation of the purification plant,
- management and the finance

4-4 Draft Engineering Design

The team handed one copy of the draft engineering design of the facilities to Ir. Amirdin CES, Sub Directorate of Water Supply Development in Region I, Directorate General of CIPTA KARYA, Ministry of Public Works. Both sides agreed that this document is confidential and should neither be duplicated nor be released to any outside parties.

4-5 Responsibility for the result of the Project

Indonesian side shall be responsible for the results of the execution of the Project on the basis of all documents and drawings prepared as a result of this study.

Appendix-5 Other Relevant Data

5.1 Water Quality Test Results (March - April, 2006)

	Indonesian Drinking Water Quality Standard	March 15	March 18	March 21	March 28	March 31	April 5	April 8	April 11	April 18	April 23	Reference: October 2004 Dry Season
Coliform Bacteria (MPN/100ml)	**0**				120		2400			2400		23, 30
Viable Bacteria (colony/ml)					93		2400			2400		31
pH	**6.5-8.5**				7		7					6.9, 7.1
Turbidity (NTU)	**5**	14	9	243	16	9	102	101	12	12	14	1
Nitrate (NO3)	**10 mg/l**				0.196		1.556					1, 2
Nitrite (NO2)	**1 mg/l**				0.004		0.022					0

5.2 Maintenance and Management Costs

Table - 1 Labor 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 - 2 Operation and Maintenance Cost

	Consumer Powumber of Pun (kW)	(no.)	Operation Time (hour/day)	peration Deration 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 - 3 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 - 4 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 Chemical Costs

	Water Production Ai (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 - 6 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 - 7 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 - 8 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		

5.3 Automatic Operation Program for Pumping Facilities

Automatic pumping operation system without operator was planned to supply water for 24 hours. The supply water is transmitted from the intake by way of several head tanks or distribution tanks provided with a pump station to the ultimate R-5 distribution tank. The following key issues were taken into consideration.

i) Pump's on-off switch shall be operated in order to avoid water leakage from the downstream tanks.
ii) The system shall be simple and easy for operation and maintenance.
iii) Operation and maintenance cost shall be low and economical.

In general, either of remote control or on site control is selected for automatic control system. The former type generally needs wireless system or optical cable system making the system rather complicated and costly compared to the latter (on site control system). In the project site, therefore on site control system is superior to the other system. Namely, this system connects the two tanks by a cable to transmit the water level information to start and stop the pump facilities depending on the downstream water level.

Meanwhile, on-off switch of the pumps will be made in the following conditions.

<u>Turn on</u>

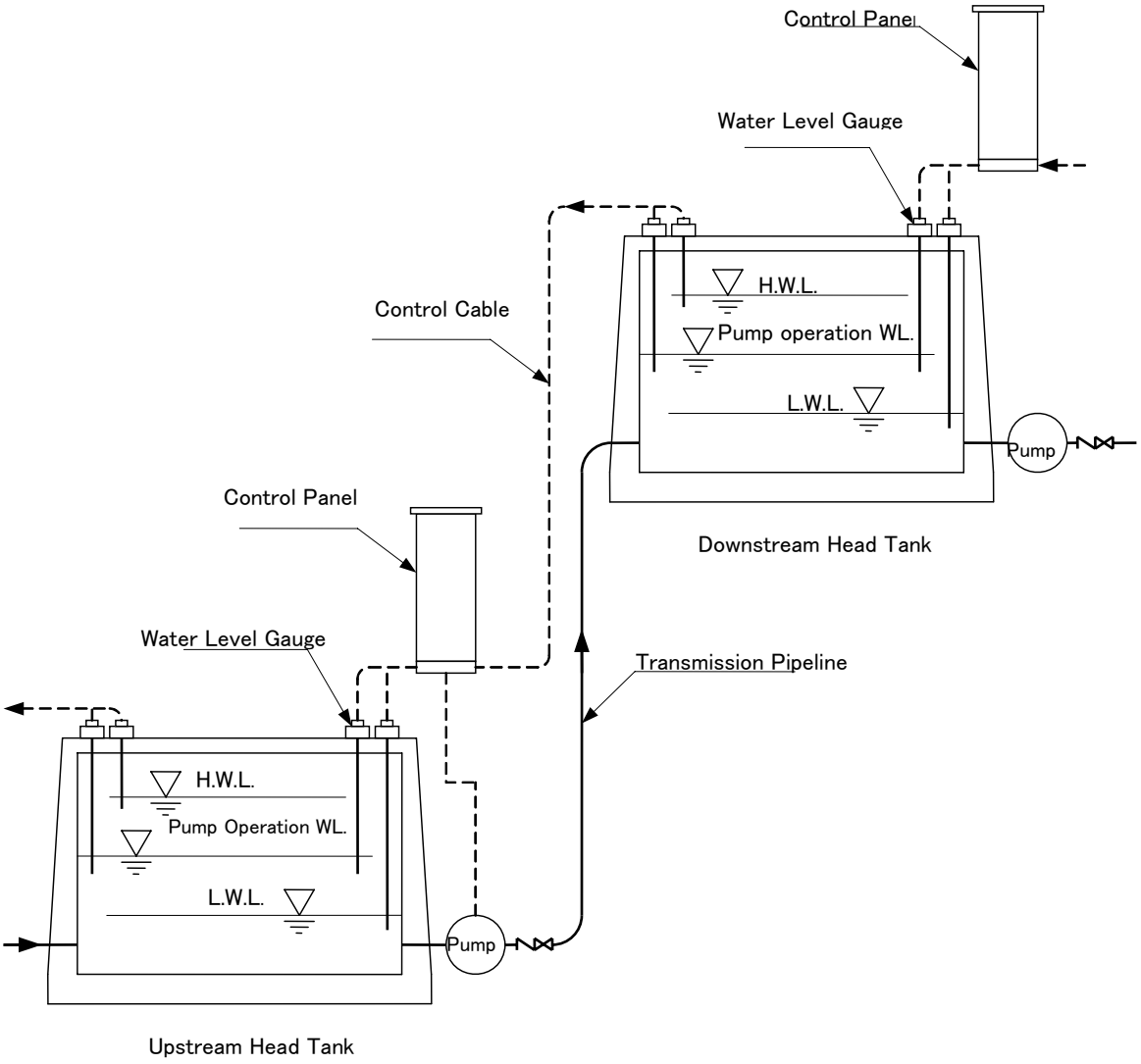
1. Starting condition of the pump
   The water level of the upstream tank should be above the pump operational level.
2. Automatic start up condition
   Above condition should be satisfied and the downstream water level should be lower than the pump operation level.

<u>Turn off</u>

Either condition below appears, the pump stops

1. When downstream water level reaches the high water level,
2. When upstream water level descends to low water level, and
3. When damages occur on the pump facilities or the control panel has been damaged.

The layout plan of detecting devices of water levels and tanks are shown below.


Control Panel
Water Level Gauge
H.W.L.
Pump operation WL.
L.W.L.
Pump
Control Cable
Control Panel
Downstream Head Tank
Water Level Gauge
Transmission Pipeline
H.W.L.
Pump Operation WL.
L.W.L.
Pump
Upstream Head Tank