

MINISTRY OF LANDS AND WATER RESOURCES
THE REPUBLIC OF ZIMBABWE

BASIC DESIGN STUDY REPORT
ON
THE RURAL WATER SUPPLY PROJECT
IN BINGA DISTRICT IN MATABELELAND NORTH PROVINCE
IN
THE REPUBLIC OF ZIMBABWE

JUNE 1997

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SANYU CONSULTANTS INC.

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PREFACE

In response to a request from the Government of the Republic of Zimbabwe, the Government of Japan decided to conduct a basic design study on the Rural Water Supply Project in Binga District in Matabeleland North Province and entrusted the study to the Japan International Cooperation Agency (JICA).

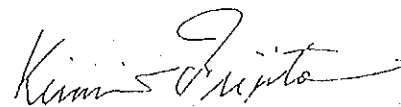
JICA sent to Zimbabwe a study team from January 20 to February 24, 1997.

The team held discussions with the officials concerned of the Government of Zimbabwe, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, the team was sent to Zimbabwe in order to discuss a draft basic design study report, 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 Zimbabwe for their close cooperation extended to the teams.

June, 1997



Kimio Fujita
President

Japan International Cooperation Agency

June, 1997

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Rural Water Supply Project in Binga District in Matabeleland North Province in the Republic of Zimbabwe.

This study was conducted by Sanyu Consultants Inc., under a contract to JICA, during the period from January to June, 1997. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Zimbabwe and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

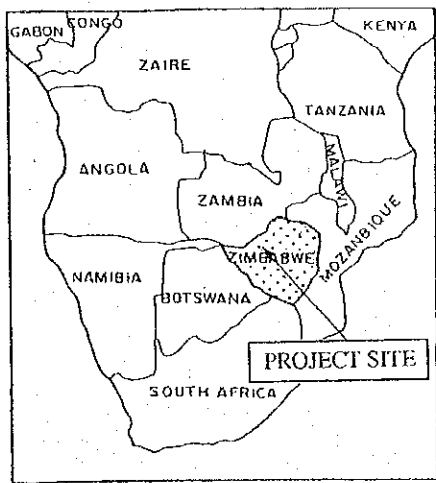
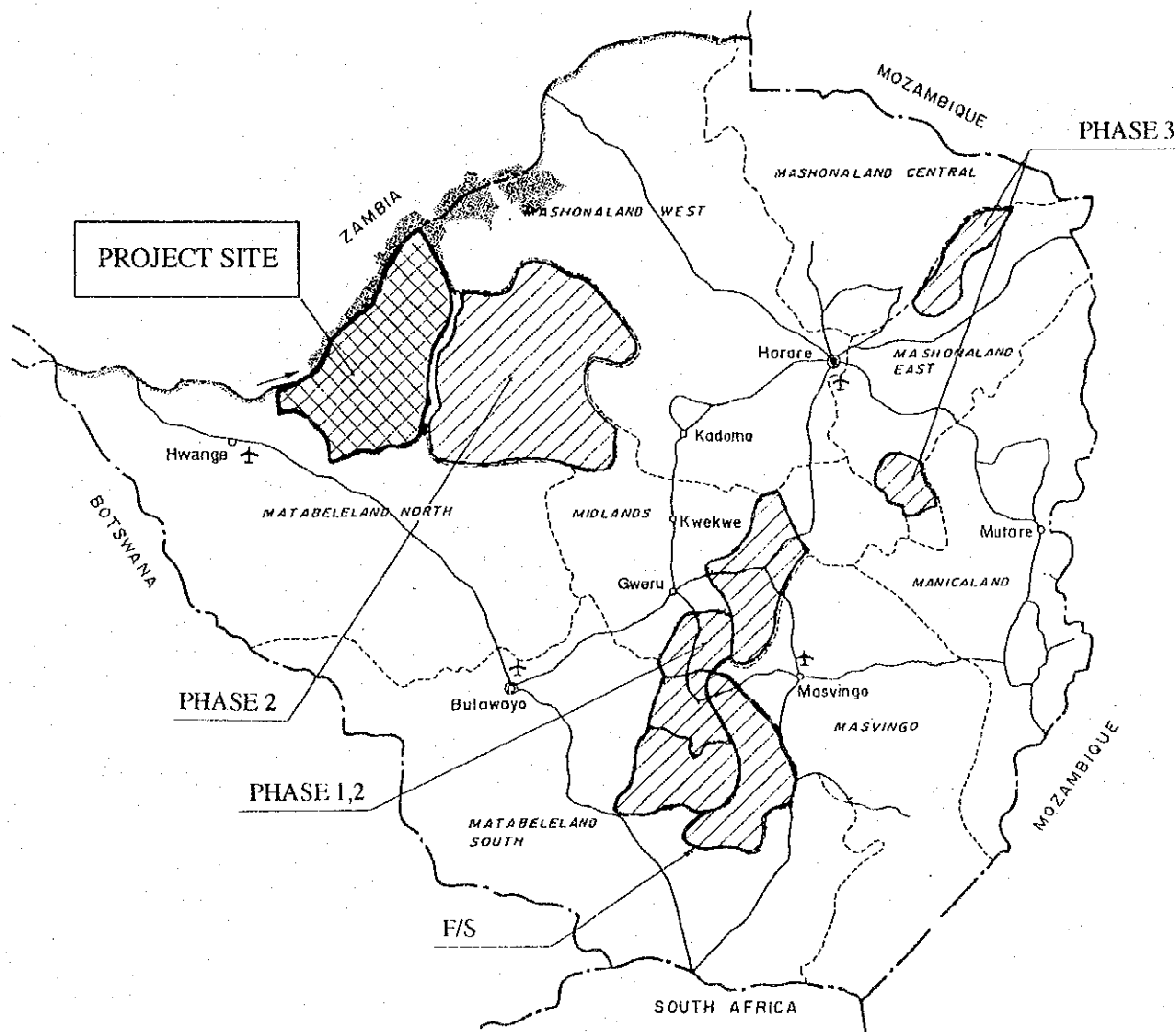
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

魚 存 信

Makoto Uotani
Project manager,
Basic design study team on
The Rural Water Supply Project
in Binga District in Matabeleland
North Province
Sanyu Consultants Inc.

LOCATION MAP OF PROJECT SITE



RURAL WATER SUPPLY PROJECT

- F/S
- PHASE 1
- PHASE 2
- PHASE 3



Abbreviations

DDF	: District Development Fund
DTH	: Down-the-Hole Hammer
DWR	: Department of Water Resources
E / N	: Exchange of Notes
GDP	: Gross Domestic Product
GNP	: Gross National Product
GOZ	: Government of Zimbabwe
IRWSSP	: Integrated Rural Water Supply and Sanitation Project
JICA	: Japan International Cooperation Agency
MLGRUD	: Ministry of Local Government, Rural and Urban Development
MLWR	: Ministry of Lands and Water Resources
MNAECC	: Ministry of National Affairs, Employment Creation and Cooperatives
NGO	: Non Governmental Organization
NRWSSP	: National Rural Water Supply and Sanitation Programme
RDC	: Rural District Council
SCF	: Save the Children Fund
WPC	: Water Point Committee

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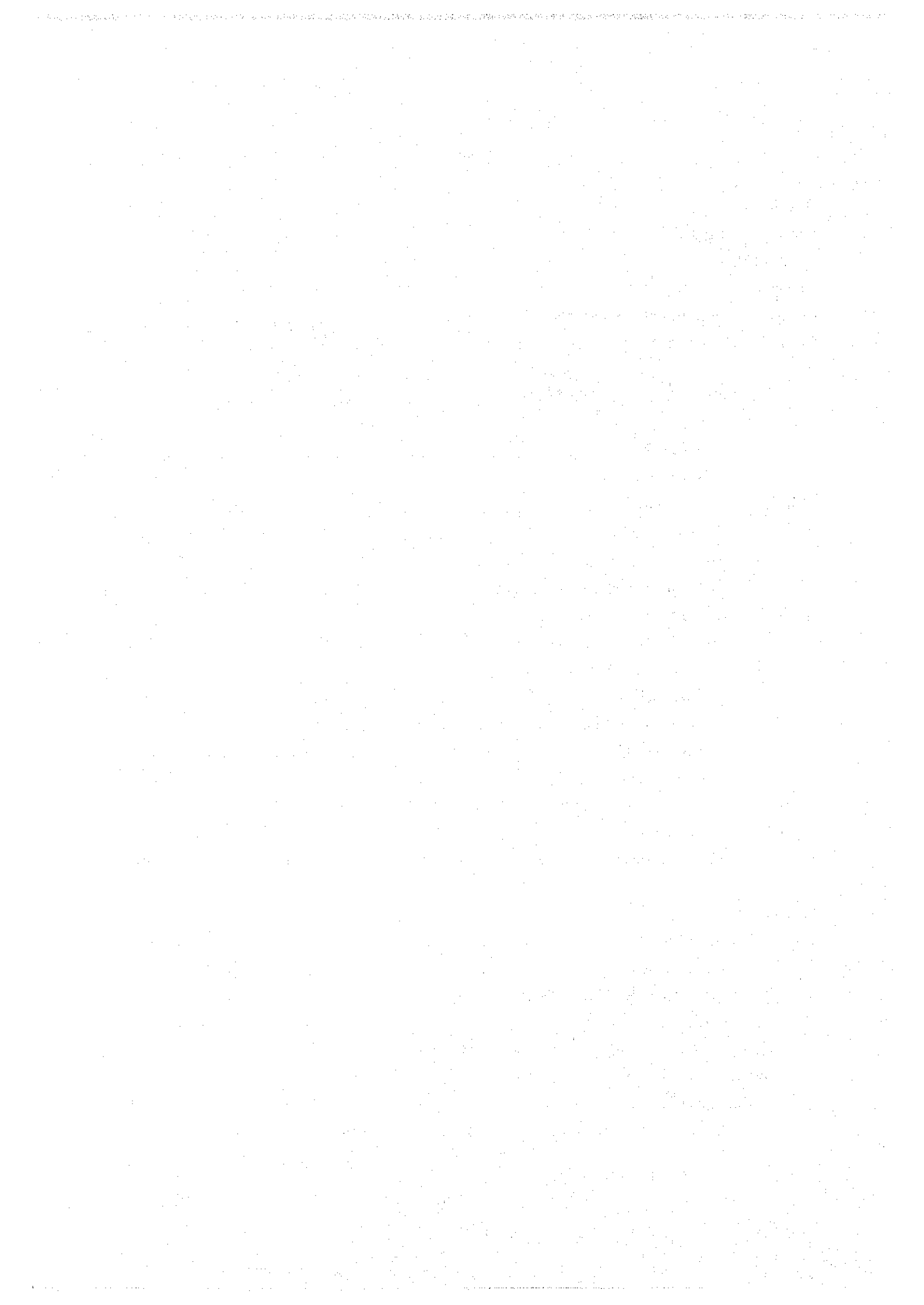
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Chapter 1. Background of the Project

The Republic of Zimbabwe is situated in southern Africa and is surrounded by Zambia at the north, Botswana at the west, South Africa at the south and Mozambique at the west. It stretches for 800 km and 740 km in east-west and north-south direction, respectively. It has a total land area of 391 thousand square km and a total population of 11.1 million as of 1995. The country's GNP per capita is 500 US\$ in 1994. The industry of the country is based on the agricultural products such as tobacco and maize. Development of rural area is one of most urgent national policies in Zimbabwe because about 70% of the country's population live in rural area. Therefore, the Government of Zimbabwe (hereinafter referred to as the "GOZ") launched formulation of the "National Master Plan for Rural Water Supply and Sanitation" (the Master Plan) in 1982 and completed in 1986. Following the Master Plan, The GOZ embarked on the "National Rural Water Supply and Sanitation Programme" (NRWSSP) for implementation of water and sanitation projects throughout i.e. all the 57 districts. The NRWSSP is being conducted as the "Integrated Rural Water Supply and Sanitation Project" (IRWSSP) on a district basis and started to provide safe and adequate water for rural people in 1987. However shortage of skillful staff and limited budget interfere in implementation the project of the IRWSSP.

About 35% of the rural population in Zimbabwe depended on traditional water resources which includes stagnant pools, rivers and unprotected wells. Therefore, many inhabitants are usually affected by water-related diseases such as dysentery, diarrhea and scabies due to difficulty in obtaining safe water. It is reported that 55% of deep wells dried up during the drought seasons in Binga District in Matebeleland North Province and many inhabitants in the area have been affected by water-related diseases. Although highest proportion of households who need to cover a distance of more than one kilometer in order to reach main sources of water for drinking. Fetching water from a long distance is too hard for women and children.

Thus, it is very desirable to improve the above situation through the provision of safe and stable supply of water by construction of boreholes in Binga District.

In February 1996, the GOZ requested a grant aid to the Government of Japan for the Rural Water Supply Project which consists of construction of 150 boreholes in Binga District in Matebeleland North Province.

The request consists of the following components:

- 1) Construction of 40 boreholes which aims on-the-job training in Binga District.
- 2) Procurement of equipment and materials required for the construction of 150 boreholes i.e. drilling rig, supporting vehicles, borehole logger, geophysical equipment and workshop equipment etc.

In response to a request from the GOZ, the Government of Japan decided to conduct a preliminary study on the Rural Water Supply Project in Binga District in Matabeleland North Province (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent a study team to Zimbabwe from September to October 1996. As the results of the study, the team confirmed shortage of safe and adequate water supply facilities in Binga District, therefore, it was decided that construction of about 120 boreholes in the area may be appropriate target for the Project.

Chapter 2. Contents of the Project

2-1 Objectives of the Project

The GOZ had formulated the "National Rural Water Supply and Sanitation Program" (NRWSSP) in 1987 in order to improve the shortage of water as well as to maintain safe and sufficient water supply in rural areas. The NRWSSP is actually being conducted as the "Integrated Rural Water Supply and Sanitation Program" (IRWSSP) throughout all the countries covering 57 districts. The definite plan of the IRWSSP is to provide safe potable water of 30 liters per capita per day by borehole (250 persons per borehole) and 20 liters per capita per day by deep well (150 persons per deep well) to the rural people.

Inhabitants in Binga District, live in poor productive area of water sources, are often affected by water-borne disease such as dysentery, diarrhea, scabies, etc. due to difficulty in obtaining safe water. The hard work fetching water is ordinary required for women and children, hence their activities and even the education of their children are always retarded by this task. In this context, the Binga District is setting up as one of most urgent area to improve such unfavorable conditions in the IRWSSP. In the actual scheme in the IRWSSP, 157 boreholes have been planned to be constructed in this district.

The Project consists of procurement of equipment and materials required for the implementation of the Project and construction of borehole facilities. The objectives of the Project are to supply safe potable water to inhabitants who have no adequate water supply facilities in Binga District and to improve their health conditions and quality of life.

2-2 Basic Concept of the Project

The request by the GOZ was composed of:

- the procurement of equipment and materials, and
- the construction of borehole facilities aiming at on-the-job training.

The details on basic concepts of the Project are as follows.

2-2-1 Construction of Boreholes

(1) Quantities of planned borehole facilities

Based on substantial conditions extracted from result of the basic design study on the Project, a total of 124 sites have been selected as planned sites among 157 localities proposed by the IRWSSP in 12 wards of Binga District. These are all facing difficulties of fetching water and affected by water-related diseases such as dysentery, diarrhea, scabies, etc. resulting in lack of water sources such as either boreholes or protected deep wells.

The conditions applied in this selection are listed as below:

- availability of existing water supply facilities;
- overpopulated water point i.e. more than 250 peoples per water point;
- accessibility to the locality;
- location of locality confirmed by the survey team, and
- incidence of water-related disease.

As a result of the site investigation, 33 localities out of 157 proposed were excluded from the Project for the following reasons

- existence of water supply facilities ; 14 localities
- poor accessibility to the locality ; 2 localities
- location of locality was not confirmed by the survey team ; 17 localities

Consequently, the Project will be planned to construction of 124 borehole facilities at each locality confirmed in Binga District. The number of boreholes planned are arranged in each ward and geological formation as given in Table 2-2-1, 2.

Table 2-2-1 Planned Boreholes in each Ward

Ward No.	Ward	No. of Village	Population	Required B/H*	Existing B/H	Planned B/H	To be constructed by Japan side
1	SIANZYUNDU	6	9,262	28	13	15	
5	MUCHESU	3	4,514	10	2	8	8
9	SINAMAGONDE	8	13,751	50	28	7	
11	DOBOLA	4	9,926	31	18	13	
13	TINDE	3	4,576	16	9	7	
14	SABA-LUBANDA	6	7,006	22	4	16	
15	SINANSENGWE	5	3,940	13	7	4	
16	SINAKOMA	5	5,039	12	7	5	5
17	SIKALENGWE	5	6,381	15	2	13	13
18	MANJOLO	5	4,550	18	4	5	4
19	CHUNGA	6	8,301	24	3	21	
21	SINAMAPANDE	6	6,951	20	10	10	
Total		62	84,192	259	107	124	30

* ; Binga primary water supply village level based inventory in 1994

Table 2-2-2 Planned Boreholes in each Geological Formation

Ward No.	Ward	Lower Karoo Group	Upper Karoo Group	Gneiss and Granites	Planned B/H
1	SIANZYUNDU		15		15
5	MUCHESU	8			8
9	SINAMAGONDE	6	1		7
11	DOBOLA	6	7		13
13	TINDE		2	5	7
14	SABA-LUBANDA		16		16
15	SINANSENGWE	4			4
16	SINAKOMA		5		5
17	SIKALENGWE		13		13
18	MANJOLO		5		5
19	CHUNGA		21		21
21	SINAMAPANDE	10			10
	Total	34	85	5	124

(2) Necessity of the Technical Cooperation

It might be thought DWR already possess enough experience and technical knowledge to complete adequate construction, siting and maintenance techniques regarding to drilling works. Unfortunately, the drilling teams organized in the Matabeleland Provincial Office, which actually execute the construction works of the Project, has few experience about mud-water drilling method even though they are accustomed of air-hammer drilling method. While in the territory of Project area, soft sedimentary rocks are overlying with considerable extent. For these formation, mud-water drilling is essentially required.

Siting team engaged in Provincial Office is not thought to be sufficient experience to process the various type of resistivity sounding data derived form various geological conditions of the Project area. Therefore, it is considered that some on-the-job training is necessary for mud-water drilling method and siting work as well.

The request by the GOZ was 40 boreholes construction for the on-the-job training. The construction of 30 boreholes, however, is to be considered enough duration for the technical transfer because the drilling team in the Provincial Office has already experienced about the common process on drilling through air-hammer method.

Japan side will construct the borehole facilities to four wards i.e. Muchesu, Sinakoma, Sikalengwe and Manjolo near Binga township considering of geological conditions and construction schedule.

(3) Construction Plan by Zimbabwe Side

After the completion of borehole construction by Japan side, Zimbabwe side will construct the remaining number of borehole facilities i.e. 94 boreholes by the own resources within four years.

2-2-2 Procurement of Equipment and Materials

The equipment and materials will be procured as necessary items for the construction of 124 borehole facilities on the request by the GOZ.

A set of drilling rig will be planned for the Project due to the current condition related to the drilling operation in DWR Matabeleland Office. The Office will be engaged for the Project, and has 14 percussion and air-hammer drilling rigs. All the rigs were procured before 1984, and are hence already worn-out or out of work. Furthermore, these rigs have no capability for actual works of mud-water drilling in the soft formation. For smooth implementation of the Project, a set of drilling rig, which have enough capacity to drill in the soft formation, will be required.

Necessary numbers of supporting vehicles for the rig will be also procured for implementation of the Project.

The number of hand-pumps to be supplied within the Project will be decided on the basis of their capacity and the availability of procuring their spare parts.

Casing pipes will be prepared as both of PVC and SGP type casing. PVC type will be used for shallower horizon less than 100 m, while SGP casing pipes will be installed for the deeper from more than 100 m. One-third of all casing pipes is allocated to SGP type according to the existing borehole data and other result of survey by the team.

The quantity and type of necessary equipment for the workshop will be determined by the existing condition, which type of materials and tools are short in workshop in the Provincial Office.

For other equipment involving resistivity meter, pumping test equipment, GPS etc., necessary numbers to implement the Project will be procured.

The volume of spare parts for all the equipment described above to be procured in the Project will be planned for satisfying two years of operation.

2-2-3 Community Mobilization

The community mobilization requested by the GOZ is an essential factor to maintain borehole facilities by the beneficiaries. The GOZ promotes maintenance system from the GOZ to beneficiaries. As the result of a field survey, actual maintenance system is not functioning well because it was found that there are many broken borehole facilities in the target area. Accordingly, this Project is planned to incorporate the community in mobilization and maintenance to sustain borehole facilities.

The Japan side will construct 30 numbers of borehole facilities and will cover the mobilization for a total of 40 localities, considering to continue borehole construction by Zimbabwe side.

The contents of community mobilization cooperated are below;

- health and hygiene education for villagers
- setting up and training water point committees
- training councilors and community leaders
- training pump-minders

In case of conducting community mobilization, it is necessary to use local language to inhabitants to ensure understanding of the Project and the mobilization. There is no local consultants for conducting the mobilization in Zimbabwe, so that NGO have executed the mobilization in Zimbabwe. In the Project it is recommended to cooperate with NGO which have many experiences on the mobilization. Save the Children Fund (SCF) has conducted deep well construction in Binga district since ten years ago, and also have enough experience to carry out the mobilization. Besides, SCF has agreed to assist with the Project mobilization.

2-3 Basic Design

2-3-1 Design Concept

The basic design of the Project will be conducted in line with the following basic policies and concepts taking into consideration of the particular condition of the country, the Project area and the system of Japan's grant aid.

(1) Natural Conditions

The borehole construction works will be carried out under severe climate conditions, various rock faces of a variety of hydrogeological conditions, and an undeveloped infrastructures. The progress rate of drilling works is to be strongly affected by rainfall which makes accessibility by heavy vehicles such as drilling rig and cargo trucks difficult particularly during rainy season in early December to late March. Therefore, 2.5 months during early January to middle March, drilling works will be suspended for 2.5

months. Both mud-water and air-hammer methods are required for drilling works in the Project area which is composed of various rocks such as sedimentary rocks, basalt and granite.

(2) Social Conditions

The water supply and hygiene conditions in the area is far behind the average of the country, and water supply program is urgent matter for the area. Therefore, the Project aims at the construction of boreholes for the villages which have no water supply facilities. Most users of borehole facilities are women and children, so that facility design must be easy to operate by such users. The standard designed type in Zimbabwe may satisfy this condition.

(3) Construction Circumstances

The engineers and workers may be forced to work on Saturdays in the case of construction works instead of two-days off a week which is usually adopted in the country. In addition to the above, the infrastructure in the Project area are very poor, and this area is also affected by malaria disease. Considering the construction circumstances, a base camp for the engineers and workers must be comfortable to maintain their health condition.

(4) Availability of Local Equipment and Materials

The local equipment and materials, such as hand-pump, cement, reinforced bar, tools, PVC casing, gravel, etc. are available in Zimbabwe. These equipment and materials will be procured as much as possible in the country.

(5) Maintenance and Management by the Executing Agency

The Binga Rural District Council in conjunction with the DDF are responsible for the maintenance of borehole facilities, mobilizing beneficiaries and organizing water point committees in the each target villages. However the budget and personnel for the mobilization is not sufficient. Accordingly, Zimbabwe side requested assistance on the activities from Japan side. The probability concerning to the cooperation about the mobilization will be studied.

(6) Policies for the Application and Grade of Facility and Equipment

The design of the borehole and their supplementary facility will be to the Zimbabwe standard. A drilling rig, supporting vehicles and pump test equipment, etc. were requested by GOZ for the implementation of the Project. Zimbabwe side strongly emphasized the procurement of Japan made rig because these rigs manufactured in Japan are of excellent quality and are performing very well. However, on the selection of rig to be procured, the evaluation in terms of capacity, price and after service will be made through a properly comparison between plural products, consisting of third countries' rig and Japan made rig. Other equipment and materials are to be selected to satisfy the required construction work of the Project and also of future rural water projects of the country.

(7) Policies for the Implementation Schedule

The Project is composed of the procurement of equipment including a set of drilling rig and materials for the construction of a total of 124 boreholes i.e. 94 boreholes by GOZ and 30 boreholes facilities which aims at on-the-job training by Japan side. For implementation stage, two years are necessary, within this period, two stages must be divided due to their type of works. The Project will be in two stages, stage one will be procurement of the equipment and materials and a part of construction works. Stage two is the remaining construction works.

2-3-2 Basic Design

(1) Examination of Design Criteria

i) Water Demand and Population

The basic figures shown in the NRWSSP are as follows;

- Water demand : 30 liters per capita
- Served Population : 250 persons / borehole
- Water demand per borehole : $30 \text{ l/cd} \times 250 \text{ persons} = 7,500 \text{ l/day} (7.5 \text{ m}^3/10 \text{ hours})$

Therefore the yield for a successful borehole should be over 12.5 liters per minutes considering of 10 hours of pumping.

ii) Groundwater Capacity

Average borehole yield in the Project area is given as $3.17 \text{ m}^3/\text{hour}$ ($31.7 \text{ m}^3/10 \text{ hours}$). While the lowest yield from gneiss and granites formations is estimated at $2.43 \text{ m}^3/\text{hour}$ ($24.3 \text{ m}^3/10 \text{ hours}$) of which all are above the required yield of 12.5 liters.

iii) Borehole success Rate

Borehole success rates in the Project area vary according to the their hydrogeologic conditions and range from 40.8 to 74.5% with 57.9% in average. However, the improvement of the rate may be accomplished by the adoption of mud-water drilling and resistivity sounding. In Gokwe district which has same geological conditions the rate achieved was 70% by using mud-water drilling. Hence 70 % of the success rate can be adapted in the area.

Table 2-3-1 Summary of Hydrogeological Conditions

Geology	Existing Borehole Record							Groundwater level (m)
	Total No.	Success No.	Unsuccess No.	Success rate (%)	Average Depth (m)	Maximum depth (m)	Yield (m ³ /hr)	
Lower Karoo	55	41	14	74.5	75.2	105.0	3.99	Av. 20.2 Max.83.0
Upper Karoo	49	20	29	40.8	82.4	150.0	3.08	
Gneiss/Granites	10	5	5	50.0	70.3	95.0	2.43	
Total	114	66	48	57.9	73.2	150.0	3.17	

iv) Borehole Depth

Based on the analysis of borehole data in Binga, the average borehole depth in the area is 73.2 m, deepest is 82.4 m in the Upper Karoo Group and shallowest is 36.6 m in gneiss and granites. The average depth of Upper and Lower Karoo Group is 78.9 m. Most of proposed sites are located on Karoo Group, therefore 80 m is applied as an average in the design depth. Otherwise, the maximum depth in the basic plan is taken as 150 meters from the economical point of view.

(2) Basic Design of Facilities, Equipment and Materials

i) Design of Borehole and Headworks

The proposed localities are almost located on the Upper and Lower Karoo Group consisting of soft formation continued to 50 m below the ground. Therefore, borehole diameter in soft formation is to be 216 mm in consideration of mud water drilling. The borehole design is to be as follows :

- Borehole depth; avg. 80 m, max.150 m,
- Drilling diameter; 216 mm in upper 50 m, 152 mm in lower 30 m,
- Borehole diameter; ID 100 mm

Borehole facilities should be ensured to give safe and stable water source for long time; i.e. boreholes are to be protected by casing and gravel and grout sealing. Grout sealing will be construct at the surface zone with 6 m long and act as a barrier to protect water quality from contamination caused by the undesirable infiltration of surface water. The typical borehole type is shown in Figure 2-3-1.

The design of headworks for boreholes are standardized in Zimbabwe. The headworks of a borehole will be required with concrete slab, drainage canal, fence as shown in Figure 2-3-2 to 2-3-6 for clean and easy operation and maintenance of facility. A washing stand and a cattle trough will also be constructed around the borehole.

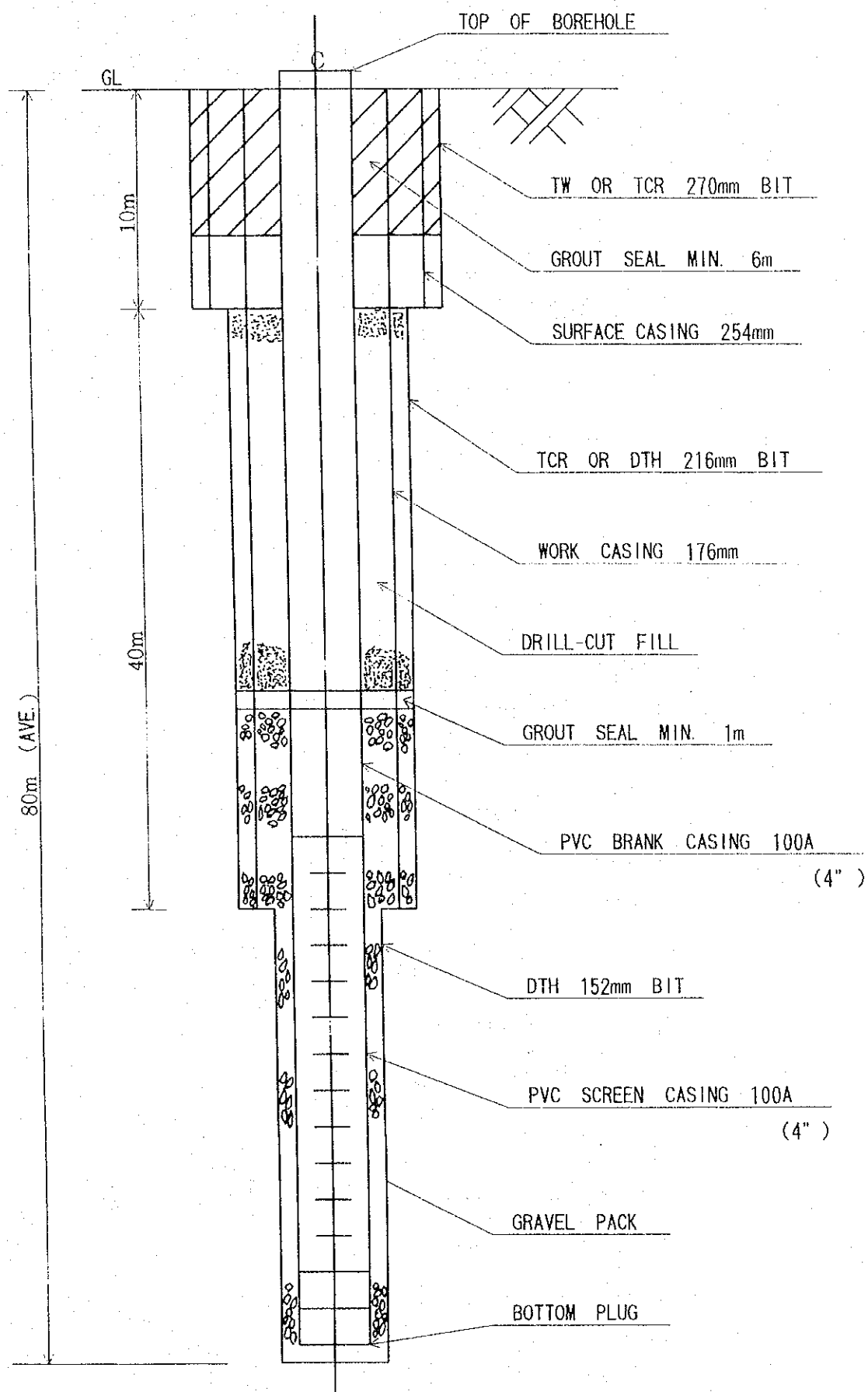


Figure 2-3-1 DESIGN OF BOREHOLE

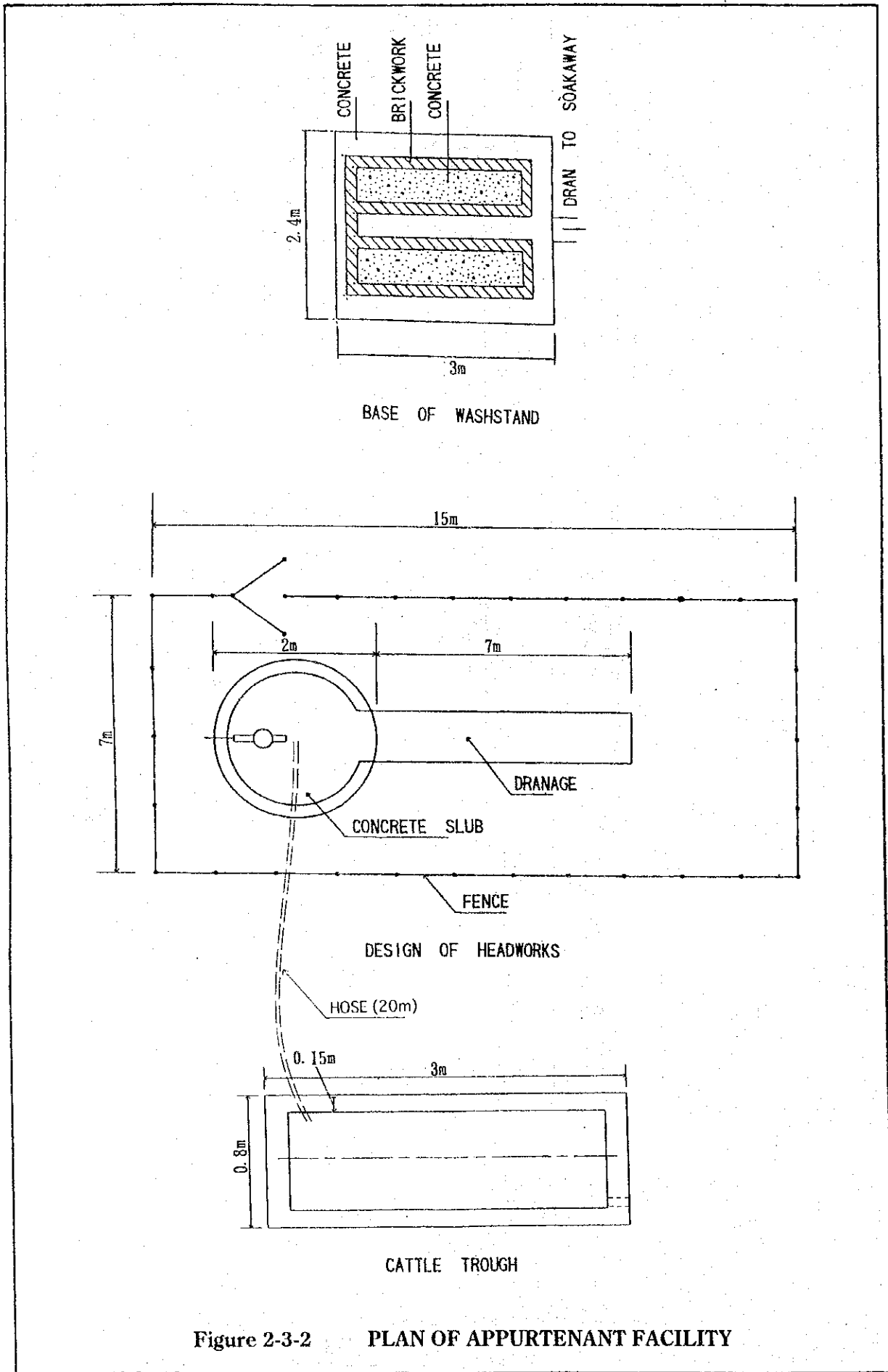


Figure 2-3-2 PLAN OF APPURTENANT FACILITY

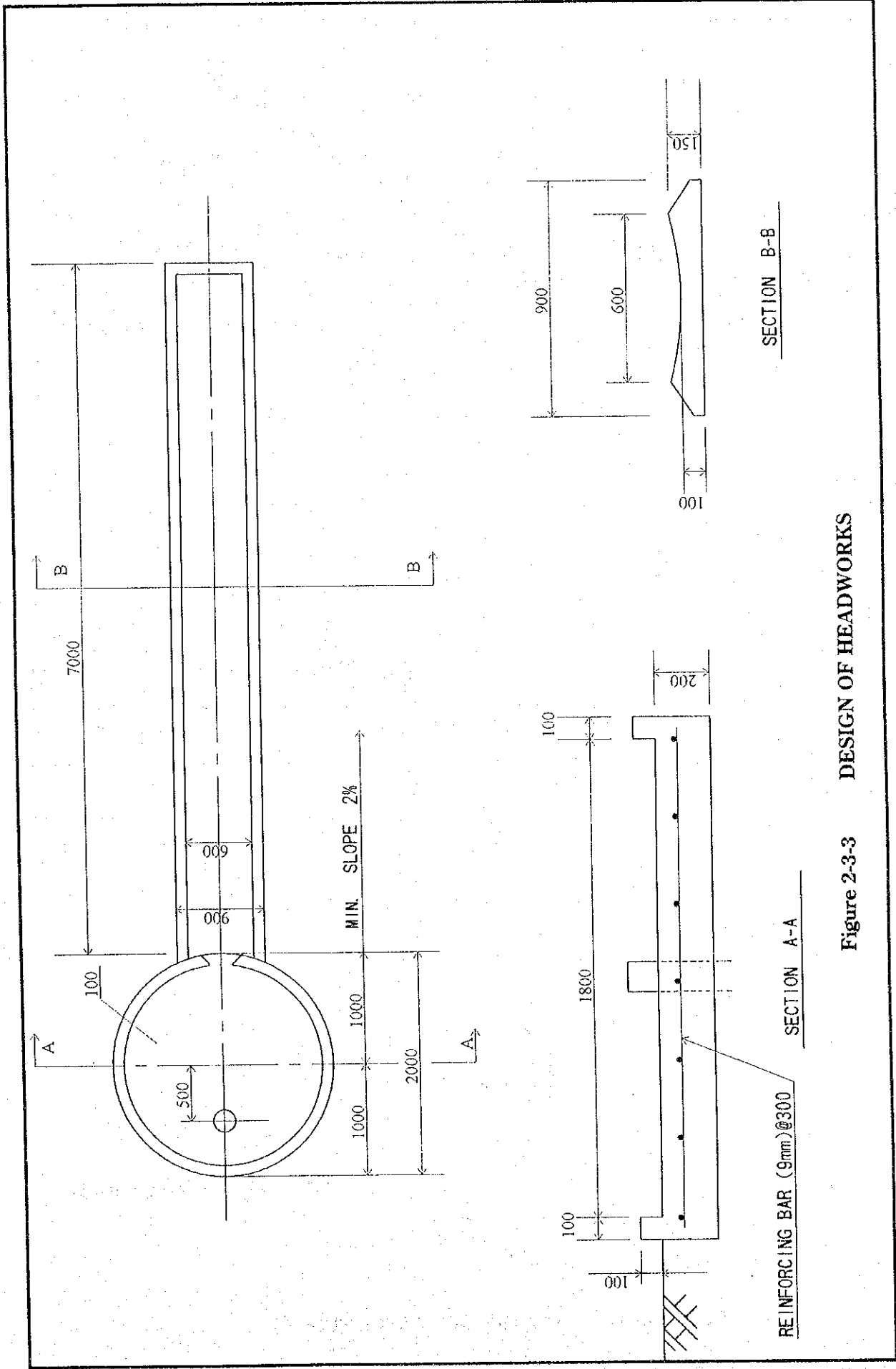


Figure 2-3-3 DESIGN OF HEADWORKS

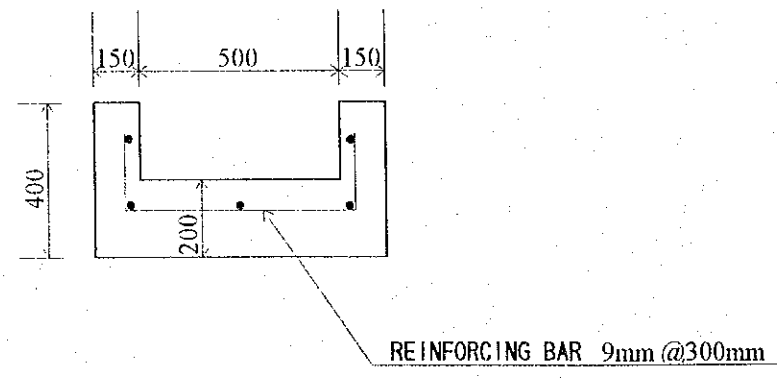
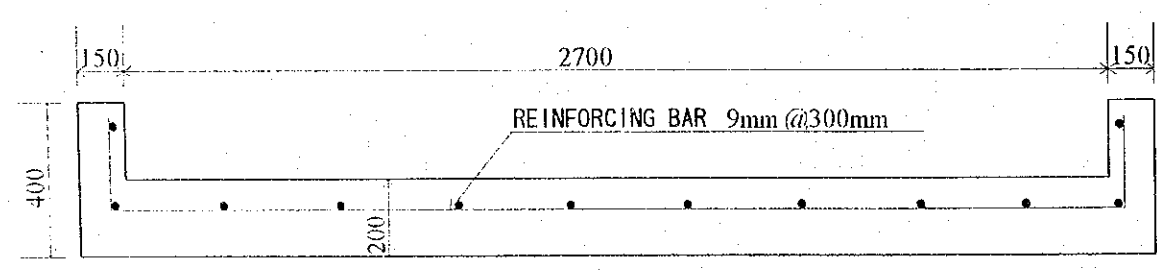
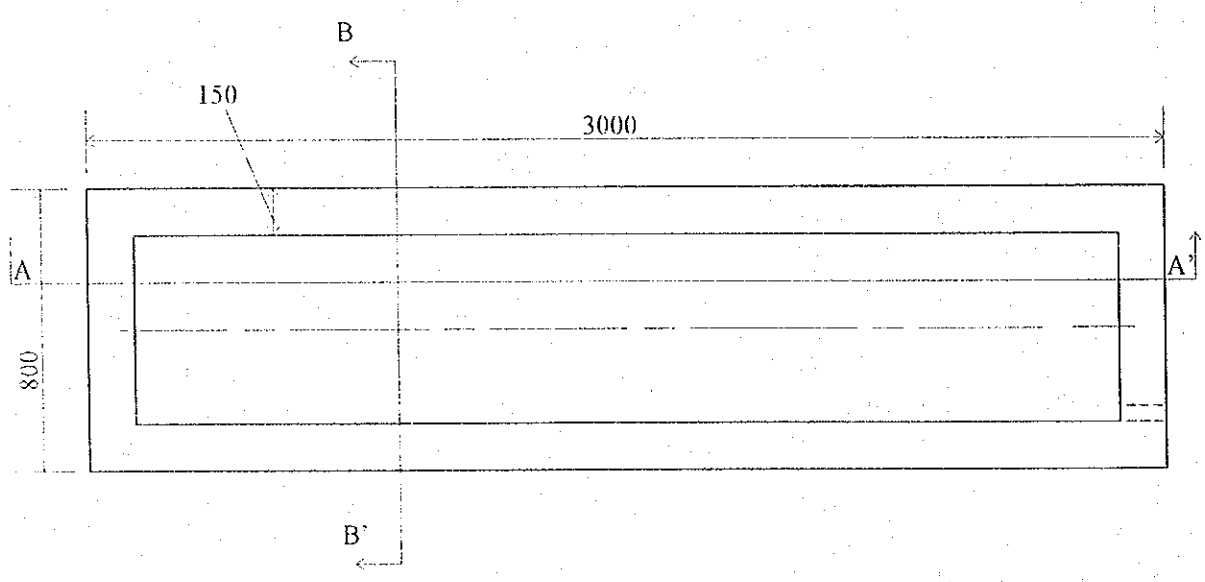


Figure 2-3-4 DESIGN OF CATTLE TROUGH

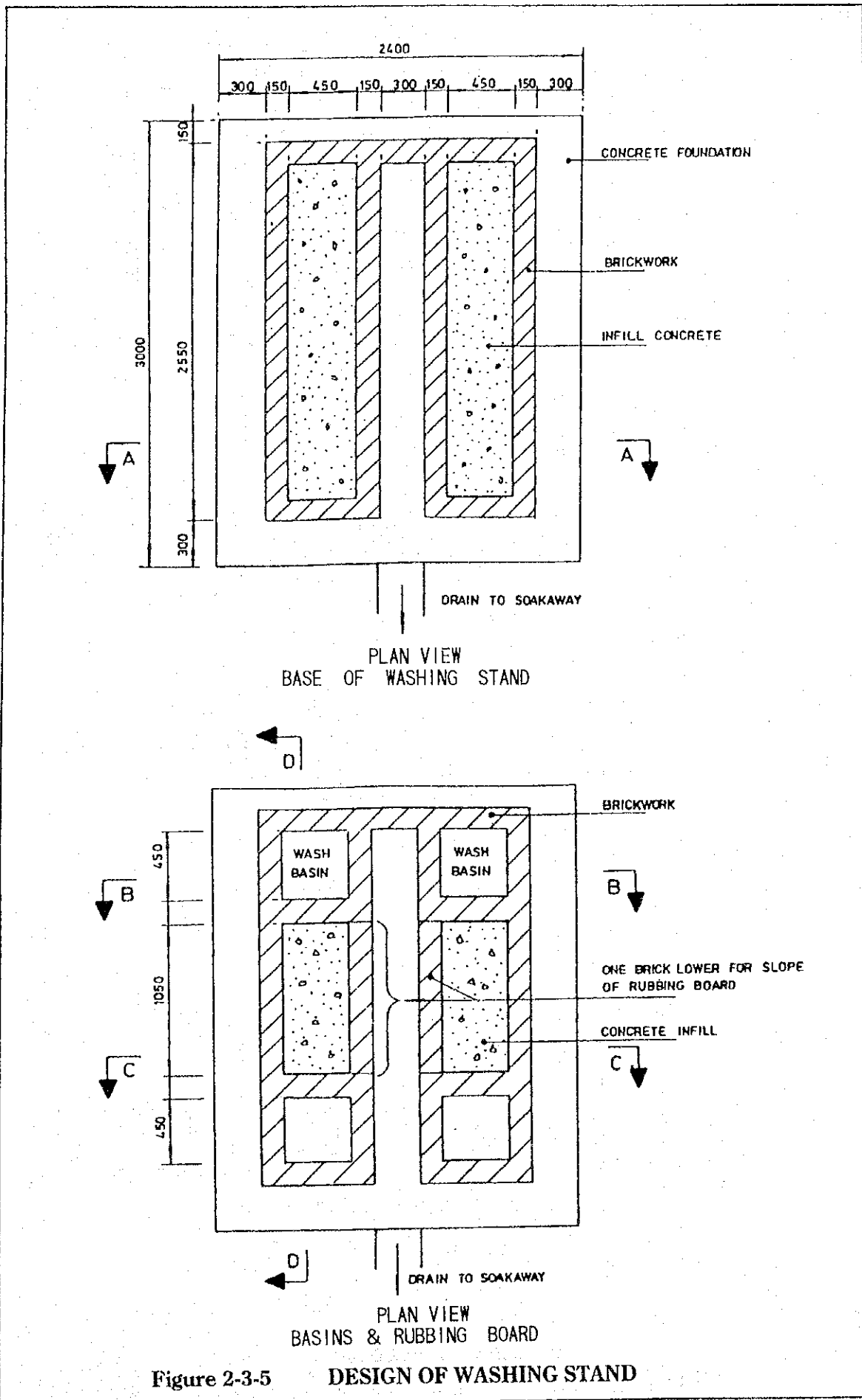
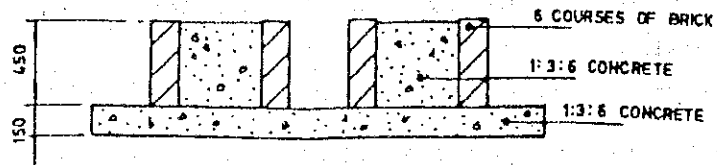
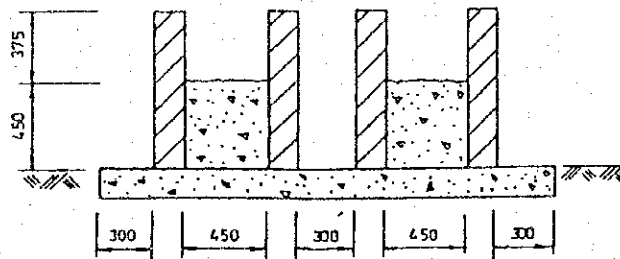


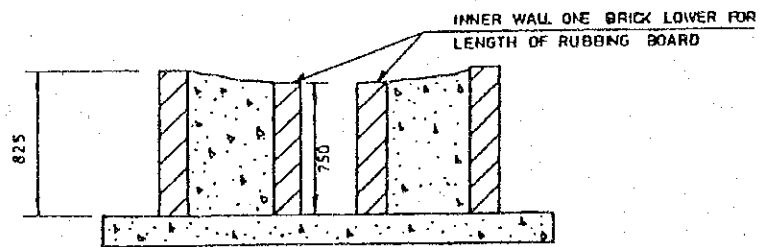
Figure 2-3-5 DESIGN OF WASHING STAND



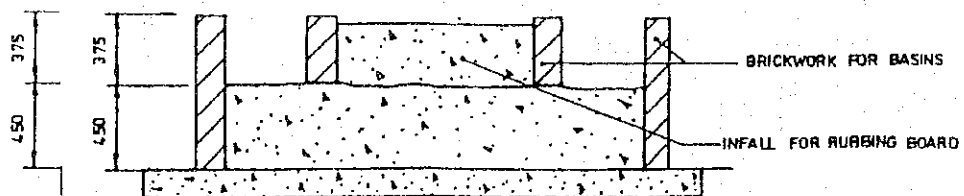
SECTION A-A



SECTION B - B



SECTION C - C



SECTION D - D

Figure 2-3-6 SECTION OF WASHING STAND

ii) Equipment and Materials

The specifications and quantities of the major equipment and materials to be procured for the Project are as follows.

(a) Drilling Rig: 1 unit

A drilling rig which is capable of mud-water drilling will be procured for the Project due to non availability of such kind of rig at Matabeleland Provincial Office.

The specifications of the rig are as follows:

- a) Top-drive Rotary and DTH type;
 - Hold back capacity; 6,000 kg, rated capacity, 150 m drilling depth with 117 mm drill pipes,
 - Mud pump capacity; 600 lit/min.,
- b) Standard accessories and tools;
- c) Carrier truck for the rig: Right hand steering, 4 x 4, Diesel engine.

(b) Air-compressor: 1 unit

An air-compressor will be provided for DTH drilling:

- a) Capacity; 22.0 m³/min. at 20 kg/cm²,
- b) Type; Trailer mounted.

(c) Supporting Vehicles: 1 lot

The drilling section in Matabeleland Provincial office has two trucks, a station wagon and five tractors, but all the vehicles which have been used for more than seven years and have become too old to work well. The Binga DDF has no vehicle since three years ago when it broken-down and it is difficult to provide new one because of shortage of budget. Accordingly, it is too hard to maintain properly the borehole facilities. For this reason, it is necessary to procure new vehicles for the Project. The supporting vehicles to be used for the Project are summarized as follows:

Table 2-3-1 List of Supporting Vehicles

Type/Model	No.	Specification	Purpose	Organization
Truck with 3-ton crane	1	GVW;15ton,4x4	Tools transport, B/H test	DWR
-do-	1	-do-	Material transportation, headwork	DWR
Tractor	1	Traction:10ton, 4x4	Water tank / Compressor	DWR
Pick-up with canopy	1	4x4, capacity 1 ton	Drilling staff	DWR
Pick-up with canopy	1	4x4, capacity 1 ton	Siting staff	DWR
Pick-up	1	4x4, capacity 1 ton	Material transportation, Drilling staff	DWR
Pick-up	1	4x4, capacity 1 ton	Mobilization, Maintenance	RDC/DDF

(d) Water Tank : 1 unit

A trailer mounted water tank with 5 ton capacity is required for mud water drilling.

(e) Borehole Construction Materials: 1 lot

- a) Casing and screen pipes; 100 mm PVC type for 83 boreholes; 1 lot,
100 mm SGP type for 41 borehole; 1 lot.
- b) Mud agents ; 13,100 kg,
- c) Air-foam; 2,500 kg.

(f) Hand-pump: 124 units

Considering supply of spare-parts, a Zimbabwe made hand-pump will be procured for the Project.

(g) Geo-electric equipment: 1 unit

The existing geo-electric equipment of the provincial office often gets broken-down because it is too old for works. A new equipment for siting is required for the Project.

- a) Prospecting depth; 200 m, with standard accessories.

(h) Global Positioning System (GPS): 2 units

Two GPS instruments are necessary for the positioning of siting and borehole points.

- a) Portable type of GPS with accuracy of 150 m.

(i) Borehole Logger: 1 unit

A borehole logger will be procured for programming of screen position due to short of this kind of equipment in the Matabeleland Provincial Office.

- a) Items to be measured; resistivity, spontaneous potential, caliper and temperature,
- b) Recording method; automatic recorder,
- c) Depth to be measured; 150 m.

(j) Borehole Test Equipment: 1 lot

Following borehole test equipment will be procured due to the short of the existing equipment.

- a) Submersible motor pump; 1.5 kW for 100 mm diameter,
- b) Diesel generator: 20 PS, 50 Hz, 380V,
- c) Water Level Detector for 100 m.

(k) Water Analysis Instrument: 1 lot

Following water analysis instrument will be procured.

- a) Water analysis kit; 200 samples ; turbidity, color, odour, taste, potassium per manganate demand, pH, nitrate, ammonium N, nitrite N, Cl, Cr, total Fe, Cu, Zn, total hardness, chloride, micro-organisms, coliforms
- b) Portable pH Meter; 1 no,
- c) Portable EC Meter; 1 no.

(l) Equipment and Tools for Workshop: 1 lot

The equipment and tools for workshop will be procured to strengthen the workshop of the Provincial Office. A cargo container will be supplied as a warehouse due to small space of the stock place. A trailer mounted workshop is necessary to repair the equipment and vehicles at drilling site because there is no workshop in Binga which is about 450 km from the provincial office.

- a) Equipment and tools for repairs; air compressor, engine service tools, welding equipment,
repair tools for hand-pump, etc.,
- b) Warehouse for spare parts; container 2 units,
- c) Mobile workshop; trailer mounted container 1 unit.

(m) Radio-telephone System: 1 lot

To ensure communication between the Provincial Office, base-camp and working sites, a radio-telephone system will be procured.

- a) Radio-telephone system; Output, 100 W.
- b) Frequency; 5810 kHz, 3383 kHz.

(n) Spare parts: 1 lot

Spare parts for the above equipment will be procured for two years operation.

Contents of the Project are shown in Table 2-3-2.

Table 2-3-3 Contents of the Project

Item	Specification	Quantity
1. Borehole Facility	Average depth 80 m	30 Facilities
2. Equipment and Materials		
Drilling rig	capacity 150 m, Rotary and DTH type	1 unit
Air-compressor	22.0 cum./min. at 20 kg/cm ² , Trailer mounted	1 unit
Truck with 3-ton crane	GVW; 15 ton, 4x4	2 units
Tractor	Traction: 10 ton, 4x4	1 unit
Pick-up with canopy	4x4, diesel, capacity 1 ton	2 units
Pick-up	4x4, diesel, capacity 1 ton	2 units
Water tank	Trailer mounted, 5 ton	1 unit
Borehole Construction Materials	Casing pipe, mud agents, air foam	1 lot
Handpump	Bushpump B type	124 units
Geoelectric equipment	Prospecting depth ; 200 m	1 unit
GPS	Portable type	2 units
Borehole Logger	Depth to be measured ; 150 m	1 unit
Borehole Test Equipment	Submersible motor pump, Diesel generator	1 lot
Water Analysis Instrument	Water analysis kit, pH Meter, EC Meter	1 lot
Equipment and Tools for Workshop	Mobile workshop, welding equipment etc.	1 lot
Radio-telephone System	Output, 100 W	1 lot
Spare parts	two years operation	1 lot
3. Community mobilization		40 localities

Chapter 3. Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

A most effective and economical implementation plan will be formulated to achieve the objectives of the Project.

(1) Basic Items

- The professional staff of both Japanese and Zimbabwean sides will be effectively assigned to works and their responsibilities will be clearly demarcated to achieve the objectives of the Project through mutual cooperation.
- Working groups consisting of required minimum numbers of staff will be planned to reduce the cost and period of the Project.
- Community mobilization and borehole siting will be started as early as possible, and the construction schedule will be effectively formulated during the dry season.
- Taking into consideration of the labor laws, local customs and natural conditions, the implementation plan will be formulated.

(2) Field where local contractors' participation

- The main issue of this Project is procurement of equipment to be used by staff of DWR for their construction works. The construction works aim at on-the-job training to staff of DWR will be done by Japanese contractor.

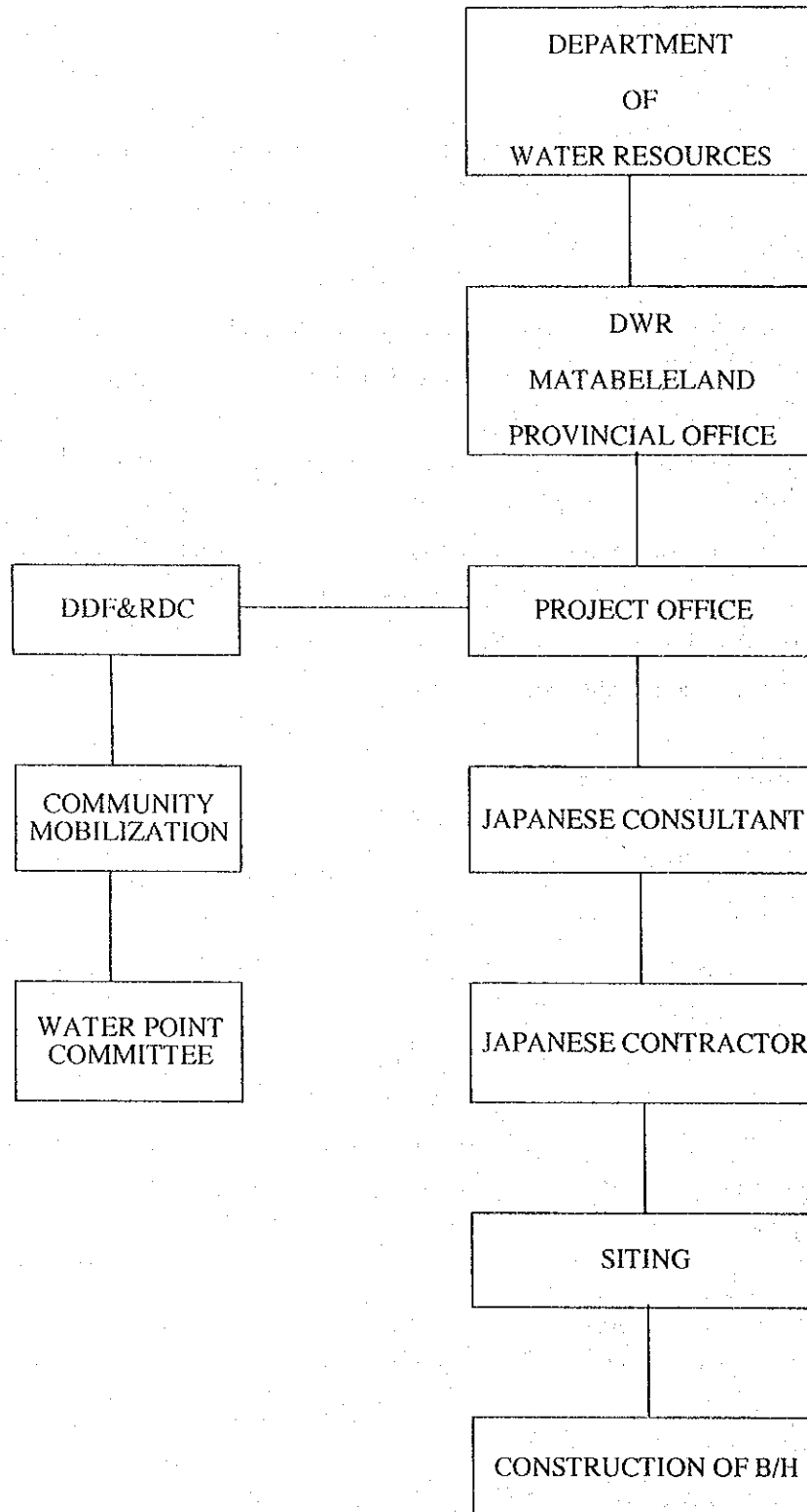
(3) Necessity of Dispatch of Japanese Engineers

- A Japanese drilling expert will be dispatched to Zimbabwe for technical transfer of mud-water drilling because the drilling staff of the DWR Provincial Office are less experience for such kind of drilling method. A Japanese mechanical expert will be dispatched for guidance of maintenance of the procured equipment. A Japanese prospecting engineer will be also dispatched for supervision of prospecting works.

(4) Implementation Structure of Zimbabwe

The Implementation structure of Zimbabwe is shown in Figure 3-1-1 and the responsibilities of each item will be as follows:

Figure 3-1-1 Implementation Structure of Binga Water Supply Project



- Supervision of the community mobilization : RDC and DDF
- Maintenance of the equipment : DWR Provincial Office
- Supervision of the construction works and schedule : Japanese Consultant /(Project manager)

3-1-2 Implementation Conditions

- (1) Because the main objective of the project is to construct borehole facilities for villagers, the borehole sites should be located within the locality or 500 m or less from the residential area of target villages. Considering the above mentioned restriction, the site selection needs prospecting engineers who have sufficient experience and able to properly judge hydrogeological conditions of the target point.
- (2) In conducting community mobilization, understanding between the staff charged and the villagers is very important. It is, therefore, required that well skilled are accustomed to local language, local customs and so forth are engaged.
- (3) Implementation will be considered suspended during rainy season due to an accessibility problem.

3-1-3 Scope of Works

An organization system of the project execution is to be composed of the following 6 parties including administrative staff. The site preparation, improvement of access road and so forth will be carried out by the villagers under supervision by DWR.

The responsibilities of each party are as follows:

- (1) Supervision and general coordination (DWR, RDC, DDF and the Consultant);
 - supervision for community mobilization; RDC/DDF/MNAECC,
 - coordination with related authorities; DWR/MLGRUD,
 - supervision for construction works and schedule; Consultant/(DWR),
 - arrangement of construction report and quantity of works done; Consultant
 - Inspection of equipment and facilities; Consultant/(DWR).
- (2) Management of Construction Works:
 - Management and coordination of construction works; Japanese Contractor,
 - Management of staff; Japanese Contractor,
 - Procurement and supply of equipment and materials; Japanese Contractor,
 - Operation and maintenance of site office and base camp; Japanese Contractor,
 - Preparation of construction report; Japanese Contractor.

(3) Management of Equipment and Materials:

- Management; Japanese Contractor/(DWR),
- Inspection and repair; Japanese Contractor.

(4) Borehole Drilling:

- Siting Works; Japanese Contractor/(DWR),
- Preparation Works; Japanese Contractor/(DWR),
- Transportation of rig, etc.; Japanese Contractor/(DWR),
- Borehole Construction; Japanese Contractor/(DWR),
- Borehole Logging; Japanese Contractor/(DWR),
- Borehole Development; Japanese Contractor/(DWR).

(5) Borehole Test:

- Borehole Test; Japanese Contractor/(DWR),
- Analysis of Water Quality; Japanese Contractor/(DWR),
- Decision of pump depth; Japanese Contractor/(DWR).

(6) Construction of Headworks:

- Concrete Works; Japanese Contractor,
- Pump Installation; Japanese Contractor.

3-1-4 Construction Plan

The Project will be progressed with two stages, consisting of the procurement of equipment and materials and the construction of 30 boreholes aiming at on-the-job training. The construction amount for each stage is given in Table 3-1-1.

Table 3-1-1 Contents of the Project for each stage

Item	Contents of the Project	Stage 1	Stage 2
Procurement of Equipment & Materials	one set	one set	
Community mobilization	40 localities	25 localities	15 localities
Siting works	30 localities	18 localities	12 localities
Construction of boreholes	30 boreholes	5 boreholes	25 boreholes

(1) Procurement of equipment and materials

Six months are needed for the procurement and manufacture of the equipment and materials. As transportation period of these, other three months, estimating two months for marine transport and one

month for inland transportation are required. Furthermore, a half month must be prepared for their inspection and handing over.

(2) Community mobilization

The necessary contents and duration designed for the community mobilization assisted by Japan side are as follows:

- | | |
|--|--------------|
| a) Setting up water point committees; | 2 days (A), |
| b) Health and hygiene education for villagers; | 5 days (B), |
| c) Training community leaders; | 2 days (A), |
| d) Training councilors; | 2 days (A), |
| e) Pump-minders training; | 21 days (C). |

Respective items mentioned above involving community mobilization will be executed by each party under local experts. Among all the sectors, the health and hygiene education will take longest time for its accomplishment as shown below:

- health and hygiene education : 5 days x 40 localities = 200 days (about 8 months)

(3) Resistivity sounding

Resistivity sounding for borehole sites will take 3.5 days per site.

- Resistivity sounding : 3.5 days x 30 sites = 105 days (about 4.2 month)

(4) Borehole construction works

Borehole construction works consist of drilling works, pumping test and headwork. Days required for each work are as follows:

- drilling including unsuccessful borehole (average depth 80 m);
8.8 days x 30 = 264 days (10.5 month),
- pumping test;
4.5 days x 30 = 135 days (5.4 months),
- headwork;
6.0 days x 30 = 180 days (7.2 months).

3-1-5 Consultant Supervision

In the Project, the Consultant recommended by JICA will conduct the following design and supervision in accordance with the agreement between the Government of Zimbabwe and the Consultant.

(1) Design Supervision

- Detail design for procurement of the equipment and materials, implementation of the construction; works and the preparation of tender documents for the Project;
- Execution of the tender procedures and the tender evaluation on behalf of DWR;

- Witnessing and advising on the contract negotiation between the successful tenderer and DWR;
- Supervision of the procurement of the equipment and materials, and
- Other Consultant's works related to the Contract between DWR and the Contractor.

(2) Construction Supervision

Throughout the construction period, the Consultant will perform the following works:

- Coordination and management with the related authorities in Zimbabwe;
- Confirmation of the communities related to the Project;
- Supervision and approval of the construction reports submitted by the Contractor;
- Supervision of the construction schedule, and
- Inspection of the procured equipment and materials and the constructed facilities.

3-1-6 Procurement Plan

Among the necessary equipment and materials for the borehole construction works, i.e. hand-pumps, tank, lorry, PVC casing pipes and a tractor will be procured in Zimbabwe for the reason of the availability of local manufactures and agents. The other equipment such as a drilling rig, supporting vehicles, equipment and tools for the workshop, etc. will be procured from Japan, considering accordance with the existing equipment and tools and their better performance. The equipment procured from Japan will be shipped to the Matabeleland Provincial Office in Bulawayo through Durban port in South Africa.

3-1-7 Implementation Schedule

(1) Responsibilities of Japanese and Zimbabwean Sides

The responsibilities of both Japanese and Zimbabwean sides are listed in Table 3-1.

Table 3-1 Responsibilities to be borne by Japanese and Zimbabwean Side

by Japanese Side	by Zimbabwean Side
<ol style="list-style-type: none"> 1. Detail Design. 2. Procurement, transportation and delivery of equipment and materials. 3. Siting works for 30 localities 4. Assistance of community mobilization for 40 localities 5. Construction of 30 borehole facilities. except soakaway. 6. Dispatch of supervising engineer and supervising services. 7. Transfer of technology 8. Provision of Bushpumps, screens and casings for 94 boreholes. 	<ol style="list-style-type: none"> 1. Provision of reference materials and information necessary for the project. 2. Provision and leveling of the sites and preparation of access roads. 3. Execution of community mobilization. 4. Construction of the remaining 94 borehole facilities with own resources. 5. Supervision of headworks for soakaway to be performed by villagers. 6. Provision of project staff with their expenses. 7. Tax exemption for the equipment and materials to be procured.

(2) Implementation Schedule for each Stage

As shown in item-7, in section 2-3-1, Design Concept, the Project schedule will be divided into two stages, consisting of first and second stage.

The schedule for the first stage will take about 4.5 months for the detail design and about 12 months for the procurement of equipment and the construction works, given about 16.5 months in total.

E/N for the second stage will be signed during the first stage. The schedule for the second stage will also take about 4.5 months for the detail design and another 12 months for the construction works including maintenance of procured equipment and hand over of completed facilities, so it will also take about 16.5 months in total. The construction will be suspended for 2.5 months during the rainy season.

The above implementation schedule is shown in Figure 3-1-2.

Figure 3-1-2 Implementation Schedule

Stage	Item	Number of Month													
		1	2	3	4	5	6	7	8	9	10	11	12		
First Stage	Detail Design	 (Total 4 months)													
	Procurement/Construction	 (Total 12 months)													
Second Stage	Detail Design	 (Total 4 months)													
	Construction	 (Total 12 months)													

3-1-8 Obligation of Recipient Country

The undertakings of the Government of Zimbabwe for the project are as follows;

- 1) To provide necessary data and information for the Project.
- 2) To secure the site for the Project.
- 3) To clear, level and reclaim the site prior to the commencement of the construction.
- 4) To construct the access road to the site prior to the commencement of construction.
- 5) To undertake incidental works such as constructing walls around the wells if necessary.
- 6) To bear commissions of Authorization to Pay (A/P) and payment commission to a Japanese foreign exchange bank for banking services based on the Banking Arrangement (B/A).
- 7) To exempt taxes and duties and to take necessary measures for the customs clearance of the materials and equipment brought for the Project at the port/airport of disembarkment. To exempt taxes on materials and equipment bought from within the country for the Project.
- 8) To accord Japanese nationals, whose services may be required in connection with the supply of products and the services under the verified contracts, such facilities as may be necessary for their entry into Zimbabwe and stay therein for the execution of the Project.
- 9) To maintain and use properly and effectively facilities constructed and equipment purchased under the Grant.
- 10) To bear all the expenses other than those covered by the Grant, necessary for the construction of facilities as well as for the transportation and the installation of equipment. This should cover work permits for Japanese experts and are to be obtained when the experts are in Zimbabwe.

3-2 Operation and Maintenance Plan

(1) Operation and Maintenance Plan

DDF have been responsible for maintenance of constructed water supply facilities in Zimbabwe. There are a total of 402 existing water supply facilities, 224 boreholes and 178 deep wells, in Binga District, however all maintenance costs of the facilities have been covered by the DDF's budget. The past three years budgets of Binga DDF are shown in Table 3-2-1.

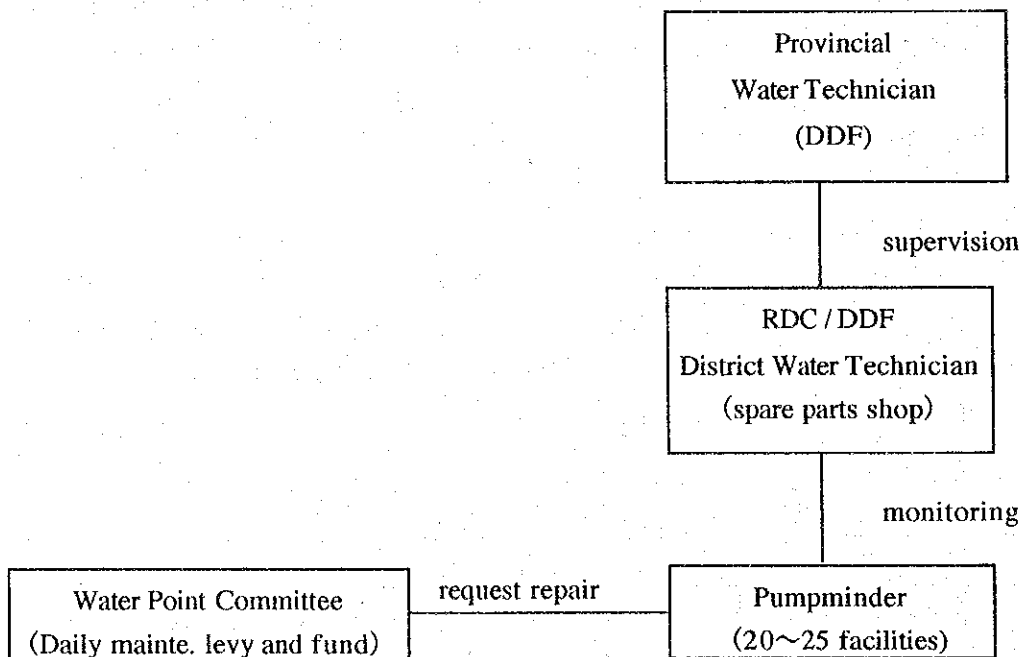
Table 3-2-1 Maintenance costs of Binga DDF

Item	1994/95	1995/96	1996/97
Cost of spare parts	22,500Z\$	42,750 Z\$	43,777 Z\$
Cost of vehicle(fuel)	7,500 Z\$	14,250 Z\$	14,593 Z\$
Personnel cost of pump-minder	95,268 Z\$	95,268 Z\$	114,240 Z\$
Total	125,268 Z\$	152,268 Z\$	172,610 Z\$

Average maintenance cost of a hand-pump is only 110 Z\$ per year. The budget for maintenance is not sufficient to maintain hand-pumps properly as compared with required spare parts costs of 620 Z\$ per year. DDF is no longer able to deliver an adequate service since their maintenance budget has decreased in real terms. At the same time, the current decentralization of local government functions will result in more responsibility for maintenance being transferred from the government to beneficiaries. RDC and DDF will plan to change from the existing maintenance system to community based management (CBM) system for the existing water point. This CBM system, maintained by the beneficiaries, is essential for the Project.

The operation and maintenance of the borehole facilities will be carried out voluntarily and continuously by the water point committee (WPC) organized by villagers. The WPC which will be in charge of daily inspection, cleaning, collection of water fee and fund is to be established on the premise of borehole construction. A defect discovered by daily inspection will be informed to a pump-minder for repair. Cost for repair inclusive of spare parts will be paid from the fund. Necessary spare parts will be purchased at spare parts shop established in the DDF. The monitoring and guidance for the WPC will be periodically performed by the District Water Officer of RDC and/or DDF. The organization structure of operation and maintenance is shown in Figure 3-2-1.

Figure 3-2-1 organization structure of operation and maintenance



Maintenance costs of the facilities have been covered by the DDF's budget in Zimbabwe, therefore community mobilization for villagers mentioned below is essential to establish the CBM system. As the

mobilization activities are planned to perform for 25 localities per year the same as the borehole construction works, four years are required to complete the mobilization for 84 localities.

- Setting up water point committees
- Health and hygiene education for villagers
- Training community leaders
- Training councilors
- Pump-minders training

Because the WPC of the existing water supply facilities has not collected maintenance costs from the beneficiaries, it is necessary that RDC and DDF will conduct the community mobilization for the WPC on collection of maintenance costs and daily maintenance of a hand-pump. The mobilization will be performed for 100 existing WPCs per year. As the CBM system is a new approach in Binga District, the monitoring and guidance by RDC and DDF will be necessary for the first about 4 years.

(2) Operation and Maintenance Costs

Annual maintenance costs per borehole covered by users are estimated as below. The number of users per borehole is planned to be 250 users, so the annual cost per user is 4.3 Z\$. In consideration of the annual income of the inhabitants in Binga District, the cost will be covered by them.

1) Spare parts fee:	620 Z\$
2) Personnel cost of pump-minder:	180 Z\$
<u>3) Spare parts fee:</u>	<u>270 Z\$</u>
Total :	1,070 Z\$

Operation and maintenance cost will be the responsibility of the users, however the monitoring and guidance by RDC and DDF will be necessary for the first about 4 years as mentioned above. The monitoring costs for the above activities by RDC and DDF are estimated as below:

- Monitoring days; for once a year monitoring with 5 villages per day progress;

$$124 \div 5 \hat{=} 25 \text{ days (new facilities)}$$

$$402 \div 5 \hat{=} 80 \text{ days (existing facilities)}$$

- Operation cost ; 250 km running per patrol may be required with estimated expenses 450 Z\$ for fuel and others.

$$450 \text{ Z\$} \times 25 \text{ days} \times 4 \text{ years} = 45,000 \text{ Z\$}$$

$$450 \text{ Z\$} \times 80 \text{ days} \times 4 \text{ years} = 144,000 \text{ Z\$}$$

$$\text{Total} \qquad \qquad 189,000 \text{ Z\$}$$

Operation and maintenance cost will be paid by the users, therefore the above cost can be covered by the DDF's budget.

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

The Project is a part of IRWSSP which aims at providing portable water through constructing boreholes to the rural people who have no adequate water supply facilities. The following effects of the Project are expected.

- 1) After completion of 124 boreholes in the target area of Binga District, water supply coverage will be increased from 31.7% as of 1997 to 61.5% as of 2003. The direct beneficiaries will be the population of 31,000 which is 36.8% of the population of 84,192 in target area.
- 2) The high occurrence rates (10%) of water-related diseases will be reduced due to adequate water supply facilities.
- 3) The Project will lead to the reduction of the labor force of women and children required for fetching water from a long distance of more than one kilometer and putting more energy in cultivation and education.
- 4) After completion of the Project, the drilling rig supplied under the Project will greatly contribute to further borehole construction in rural area.
- 5) The WPC will be establish to maintain borehole facilities at each target locality by community mobilization. The concept of community hygiene will be rapidly improved through the mobilization activities.
- 6) Borehole facilities constructed under the Project will be maintained and managed continuously by the WPC.

It is judged that the grant aid assistance for the Project is justifiable from both benefits and effects of the Project described the above.

4-2 Recommendation

The following would be recommended to the GOZ as a result of the basic design study for the Project.

- 1) Japanese side will cover the community mobilization for a total 40 out of 124 target localities on the establishment of WPC. RDC and DDF should prepare necessary staff and budget for the execution of the mobilization activities for the remaining 84 localities.
- 2) As the activities of the existing WPCs have been insufficient, RDC and DDF should ensure personnel and the expenses necessary for the mobilization on the existing WPCs.
- 3) After the organizing WPC, the monitoring for the WPCs will be required at periodic intervals, so both RDC and DDF should ensure personnel and the expenses necessary for the monitoring

1. Member List of the Survey Team

(1) Basic Design Team

IN CHARGE	NAME	POSITION / FIRM
Leader	Yuji MARUO	Senior Development Officer, Institute for International Cooperation, JICA
Project Coordinator	Maki MARUYAMA	1st Project Study Division, Grant Aid Project Study Department, JICA
Chief Engineer, Operation & Maintenance Management Planner	Makoto UOTANI	Sanyu Consultants Inc.
Water Supply / Equipment Planner	Haruhiko NAKAMURA	Sanyu Consultants Inc.
Hydrogeologist	Iwao HAMADA	Sanyu Consultants Inc.
Geophysical Prospecting	Masaki KINEMUCHI	Sanyu Consultants Inc.

(2) Team for Consultation on Draft Report

IN CHARGE	NAME	POSITION / FIRM
Leader	Shokichi SAKATA	1st Project Study Division, Grant Aid Project Study Department, JICA
Chief Engineer, Operation & Maintenance Management Planner	Makoto UOTANI	Sanyu Consultants Inc.
Water Supply / Equipment Planner	Haruhiko NAKAMURA	Sanyu Consultants Inc.

2. Survey Schedule

Survey schedule for Basic Design Study (1/3)

No.	Date	Day	Activities	Stay
1	1/20	Mon	A-E: Left Tokyo	in Air
2	1/21	Tue	A-E: Arrived at Harare, Courtesy call on Embassy, JICA Office and Ministry of Lands and Water Resources	Harare
3	1/22	Wed	A-E: Discussion on Inception Report with DWR, Courtesy call on Save the Children Fund	Harare
4	1/23	Thu	A-E: Discussion on Inception Report with DWR	Harare
5	1/24	Fri	A-D: Move to Binga, Field Inspection E: Meeting with DWR F: Left Tokyo	Binga Harare in Air
6	1/25	Sat	A-D: Field Inspection E: Data collection F: Arrived at Harare	Binga Harare Harare
7	1/26	Sun	A-D: Move to Bulawayo E,F: Preparation for resistivity sounding	Bulawayo Harare
8	1/27	Mon	A-D: Discussion with DWR Matabeleland Provincial Office E,F: Move to Bulawayo	Bulawayo Bulawayo
9	1/28	Tue	A-D: Discussion with DWR Matabeleland Provincial Office E,F: Move to Binga	Bulawayo Binga
10	1/29	Wed	A-D: Move to Harare E,F: Field survey for target villages	Harare Binga
11	1/30	Thu	A-D: Discussion on Minutes E,F: Field survey for target villages	Harare Binga
12	1/31	Fri	A-D: Signing on the Minutes of Discussions, reporting to Embassy and JICA office B: Left Harare E,F: Field survey for target villages	Harare in Air Binga
13	2/1	Sat	A,C,D: Inner meeting B: Arrived Paris E,F: Field survey for target villages	Harare Paris Binga
14	2/2	Sun	A: Left Harare B: Left Paris C,D: Data arrangement E,F: Field survey for target villages	in Air Harare Binga

Note : A; Leader, B; Project Coordinator, C; Chief Engineer, D; Water Supply/ Equipment Planner
E; Hydrogeologist, F; Geophysical Prospecting

Survey schedule for Basic Design Study (2/3)

No.	Date	Day	Activities	Stay
15	2/3	Mon	C,D: Meeting with DWR E,F: Field survey for target villages	Harare Binga
16	2/4	Tue	C,D: Site investigation for phase III E,F: Field survey for target villages	Harare Binga
17	2/5	Wed	C,D: Site investigation for phase II E,F: Field survey for target villages	Harare Binga
18	2/6	Thu	C,D: Site investigation for phase I E,F: Field survey for target villages	Harare Binga
19	2/7	Fri	C,D: Site investigation for phase I E,F: Field survey for target villages	Harare Binga
20	2/8	Sat	C,D: Data arrangement E,F: Field survey for target villages	Harare Binga
21	2/9	Sun	C,D: Move to Binga E,F: Field survey for target villages	Binga Binga
22	2/10	Mon	C,D: Discussion with Binga DDF E,F: Field survey for target villages	Binga Binga
23	2/11	Tue	C,D: Discussion with Binga DDF E,F: Field survey for target villages	Binga Binga
24	2/12	Wed	C,D: Move to Bulawayo, data collection E,F: Field survey for target villages	Bulawayo Binga
25	2/13	Thu	C,D: Data collection, move to Harare E,F: Field survey for target villages	Harare Binga
26	2/14	Fri	C,D: Data collection E,F: Field survey for target villages	Harare Binga
27	2/15	Sat	C,D: Data collection E,F: Field survey for target villages	Harare Binga
28	2/16	Sun	C,D: Data arrangement E,F: Data arrangement	Harare Binga
29	2/17	Mon	C,D: Data collection E,F: Field survey for target villages	Harare Binga
30	2/18	Tue	C,D: Data collection E,F: Field survey for target villages	Harare Harare
31	2/19	Wed	C,D: Data collection E,F: Move to Harare	Harare Harare
32	2/20	Thu	C-F: Meeting with DWR	Harare

Survey schedule for Basic Design Study (3/3)

No.	Date	Day	Activities	Stay
33	2/21	Fri	C-F: Reporting to Embassy and JICA office	Harare
34	2/22	Sat	C-F: Left Harare	In air
35	2/23	Sun	C-F: Arrived at Singapore	Singapore
36	2/24	Mon	C-F: Arrived in Tokyo	

Survey schedule for Consultation on Draft Report

No.	Date	Day	Activities	Stay
1	4/20	Sun	A-C: Left Tokyo	In air
2	4/21	Mon	A-C: Arrived at Harare, Courtesy call on Embassy, JICA Office, Discussion on the draft report with DWR	Harare
3	4/22	Tue	A-C: Discussion with DWR	Harare
4	4/23	Wed	A-C: Discussion with Save the Children Fund	Harare
5	4/24	Thu	A-C: Field Inspection for phase III	Harare
6	4/25	Fri	A-C: Signing on the Minutes, reporting to Embassy	Harare
7	4/26	Sat	A: Left Harare B,C: Inner meeting	In air Harare
8	4/27	Sun	A: Left London B,C: Data arrangement	In air Harare
9	4/28	Mon	A: Arrived in Tokyo B,C: Meeting with SCF and NCU	Harare
10	4/29	Tue	B: Left Harare	In air
11	4/30	Wed	B: Left London	In air
12	5/1	Thu	B: Arrived in Tokyo	

Note : A; Leader, B; Chief Engineer, C; Water Supply/ Equipment Planner

3. List of Party Concerned in the Recipient Country

Ministry of Lands and Water Resources

Mr. C. Mathema	Deputy Minister
Mr. A. D. MASHANYARE	Acting Permanent Secretary
Mr. V. H. CHOGA	Director Operations, Department of Water Resources (DWR)
Mr. S. SUNGURO	Chief Hydrogeologist (DWR)
Mr. A. SIBANDA	Provincial Water Engineer, DWR Matabeleland
Mr. S. Z. MHLANGA	Hydro/Drills Engineer, DWR Matabeleland
Mr. J. NXUMALO	Technical Assistant, DWR Matabeleland

Ministry of Local Government, Rural and Urban Development

Mr. G. NHUNHAMA	National Co-ordinator, National Co-ordination Unit (NCU)
Mr. H. R. MASHINGAIDZE	Program Planner, NCU
Mr. N. T. MURIMIRADZOMBA	Senior Administration officer, NCU
Mr. A. GOPOZA	Senior Field officer, DDF Bulawayo
Mr. D. KHUMALO	Field officer, DDF Binga
Mr. M. SITHOLE	District Administrator, Binga

Save the Children Fund

Mr. C. SAUNDERS	Country Director
Mr. S. NDLOVU	Deputy Country Director
Mr. R. A. SAMANEKA	Technical Adviser-Water
Mr. J. MOYO	Program Manager (Binga)

4. Minutes of Discussion

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON
THE RURAL WATER SUPPLY PROJECT
IN BINGA DISTRICT IN MATABELELAND
NORTH PROVINCE
IN
THE REPUBLIC OF ZIMBABWE

Based on the results of the Preliminary Study, the Japan International Cooperation Agency (JICA) decided to conduct a Basic Design Study (hereinafter referred to as "the Study") on the Rural Water Supply Project in Binga District in Matabeleland North Province in the Republic of Zimbabwe (hereinafter referred to as "the Project").

JICA sent to the Republic of Zimbabwe a study team (hereinafter referred to as "the Team"), which is headed by Dr. Yuji Maruo, Developing Specialist, Institute for International Cooperation, JICA, and is scheduled to stay in the country from January 21 to February 21, 1997.

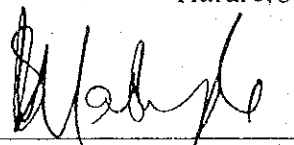
The Team held discussions with the officials concerned of the Government of Zimbabwe and conducted a field survey at the study area.

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

Harare, 31 January, 1997

丸尾祐治

Dr. Yuji. Maruo
Leader
Basic Design Study Team
JICA



Mr. ASSANIEL D. Mashanyare
Acting Permanent Secretary
Ministry of Lands and Water Resources



Mr. A.C. Mpamhanga
NAC Chairman and Director of
Development Planning and Coordination
Ministry of Local Government, Rural and
Urban Development

ATTACHMENT

1. Objective

The objective of the Project is to provide safe drinking water for people living in Binga district by constructing boreholes equipped with handpumps.

2. Project site

The site of the Project is Binga district in Matabeleland North Province as shown in ANNEX I.

3. Executing organization

The Ministry of Lands and Water Resources is responsible for administration of the Project. Department of Water Resources (DWR) is responsible for the implementation of the Project. The Binga Rural District Council (RDC) in conjunction with the District Development Fund (DDF) in the Ministry of Local Government, Rural and urban Development are responsible for maintenance of constructed facilities.

4. Items requested by the Government of Zimbabwe

After discussions with the Team, the justifiable items by Zimbabwe side is equipment and materials for constructing about 120 boreholes, which is shown in ANNEX II, however exact number of boreholes and other items will be decided later as a result of the Study.

5. Japan's Grant Aid system

- (1) The Government of Zimbabwe has understood the System of Japanese Grand Aid explained by the Team, as described in ANNEX III
- (2) The Government of Zimbabwe will take the necessary measures described in Annex IV, for smooth implementation of the Project on condition that the Grand Aid assistance by the Government of Japan is extended to the Project

6. Schedule of the study

- (1) The Team will continue the investigation in Zimbabwe until February 21, 1997.
- (2) Based on the Minutes of Discussions, JICA will prepare the draft report in English and dispatch a mission in order to explain its contents in April, 1997.
- (3) In case that the contents of the report are accepted in principle by the Government of

Zimbabwe, JICA will complete the final report and send it to the Government of Zimbabwe by the end of May, 1997.

7. Other relevant issues

(1) Zimbabwe side requested Japan side to provide a set of drilling rig with tools for both DTH and mud water drilling together with necessary accessories and supporting vehicles (ANNEX II) on the following bases.

a) The equipment will belong to Matabeleland Provincial Office of DWR

b) About 40 boreholes among the total number of required boreholes will be drilled under the on the job training scheme of transferring technology from Japanese experts to a team of Zimbabwean technicians. The training will be particularly focused on mud water drilling technique. While remaining number of boreholes will be drilled by Zimbabwe side within a planned period. Zimbabwe side will take necessary measures of budgetary allocation for smooth execution of above mentioned activities.

c) After the completion of the present project, the rig and other equipment will be efficiently deployed at other community water supply projects of the Matabeleland Provincial office.

d) The DWR, Harare will provide necessary support to Provincial Office in order to effectively utilize and properly maintain the rig and other equipment.

(2) Japan side requested Zimbabwe side to clarify the exact water supply condition in the Binga district, and to duly justify the required number of boreholes. The Team came to know that the figures shown by the Zimbabwe side as the number of existing boreholes and deep wells include substantial number of abandoned and broken wells. Detailed break down of boreholes and deep wells should be presented to the Team during the course of the Study, in terms of working boreholes, not working boreholes (repairable), abandoned boreholes (not repairable), working deep wells, not working deep wells (repairable), dried up deep wells (not repairable).

(3) Japan side expressed their serious concern on the maintenance of facilities to be constructed under the Project. Binga RDC and DDF Binga is responsible for mobilizing beneficiaries, organizing water point committee, training caretakers, and repair and replacement of damaged parts etc. After discussion and initial investigation both sides came to a conclusion that the capacity of Binga RDC and

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DDF Binga is not strong enough to operate necessary activities in attaining sustainability in the community water supply, and certain measures of external support must be required to strengthen the capacity. Provincial office of DDF requested Japan side to provide a means of transportation and training for caretakers, although actual component of requirement will be further discussed during the course of the Study.

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ANNEX II
LIST OF ITEMS

Items		Unit	No.
Construction of borehole facilities		unit	40
Casing, hand pump and other materials for drilling		unit	120
Rig with tools for DTH and mud water drilling and standard accessories		unit	1
Air compressor		unit	1
Watertank		unit	1
Supporting vehicle	Truck with crane	unit	2
	Tractor	unit	1
	Pick-up	unit	3
Pick-up for maintenance and beneficiary mobilization		unit	1
Geoelectric equipment		unit	1
G.P.S		unit	2
Borehole logger		unit	1
Pump test equipment		unit	1
Water analysis kit		unit	1
pH and conductivity meter		unit	1
Equipment and tools for workshop		lot	1
Radio telephone system		unit	1

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ON JAPAN'S GRANT AID PROGRAM

I. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid Program is executed by the following procedures.

- Application
(request made by a recipient country)
- Study
(Preliminary Study / Basic Design Study conducted by JICA)
- Appraisal & Approval
(Appraisal by the Government of Japan and Approval by the Cabinet of Japan)
- Determination of Implementation
(Exchange of Notes between the both Governments)
- Implementation
(Implementation of the Project)

(2) Firstly, an application or a request for a project made by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to see whether or not it is suitable for Japan's Grant Aid. If the request is deemed suitable, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

Secondly, JICA conducts the Study (Basic Design Study), using a Japanese consulting firm. If the background and objective of the requested project are not clear, a Preliminary Study is conducted prior to a Basic Design Study.

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

Fourthly, the Project approved by the Cabinet becomes official when pledged by the Exchange of Notes signed by the both Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

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2. Basic design Study

(1) Contents of the Study

The purpose of the Study (Preliminary Study/Basic Design Study) conducted on a project requested by JICA is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

- a) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation,
- b) to evaluate appropriateness of the Project for the Grant Aid Scheme from a technical, social and economical point of view,
- c) to confirm items agreed on by the both parties concerning a basic concept of the project,
- d) to prepare a basic design of the project,
- e) to estimate cost involved in the project.

Final project components are subject to approval by the Government of Japan and therefore may differ from an original request.

Implementing the project, the Government of Japan requests the recipient country to take necessary measures involved which are itemized on Exchange of Notes.

(2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency and also to avoid possible undue delay in implementation caused if a new selection process is repeated.

(3) Status of a Preliminary Study in the Grant Aid Program

A Preliminary Study is conducted during the second step of a project formulation & preparation as mentioned above.

A result of the study will be utilized in Japan to decide if the Project is to be suitable for a Basic Design Study.

Based on the result of the Basic Design Study, the Government would proceed to the stage of decision making process (appraisal and approval).

It is important to notice that at the stage of Preliminary Study, no commitment is made by the Japanese side concerning the realization of the Project in the scheme of Grant Aid Program.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation or such.

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(2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant etc. are confirmed.

(3) "The period of the Grant Aid" means one Japanese fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

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

However the prime contractors, namely, consulting, contractor and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

(6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

- ① to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,
- ② to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
- ③ to secure buildings prior to the installation work in case the Project is providing equipment,
- ④ 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,
- ⑤ to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

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- (6) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) Proper Use

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

(8) Re-export

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

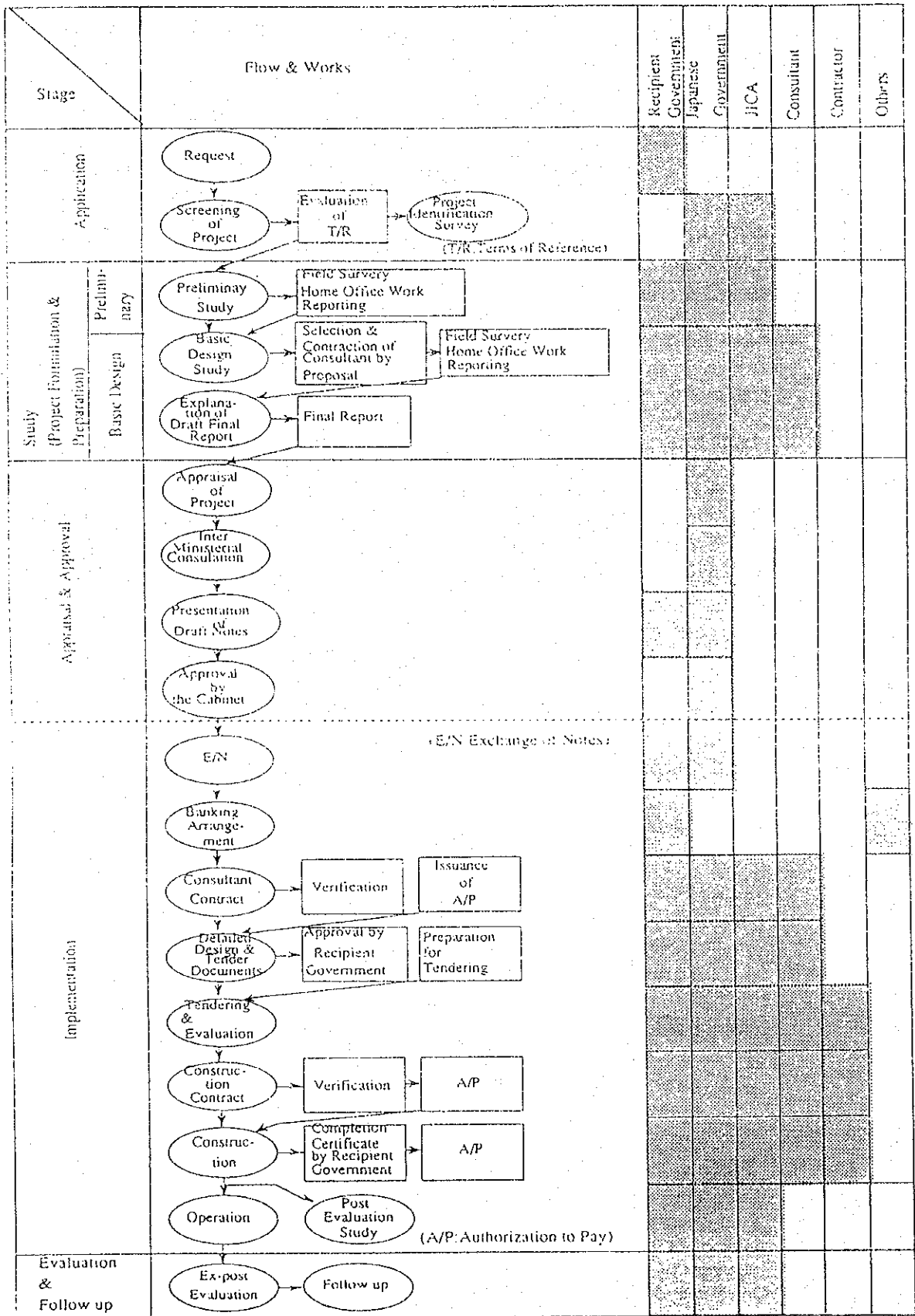
(9) Banking Arrangement (B/A)

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

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[Signature]

Flow Chart of Japan's Grant Aid Procedures



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Major Undertaking 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 construct the buildings	•	
7	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	•	
	2) Water Supply		
	a. The city water distribution main to the site		•
	b. The supply system within the site (receiving and elevated tanks)	•	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		•
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	•	
	4) Gas Supply		
	a. The city gas main to the site		•
	b. The gas supply system within the site	•	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		•
	b. The MDF and the extension after the frame/panel	•	
	6) Furniture and Equipment		
	a. General furniture		•
	b. Project equipment	•	
8	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		•
9	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 project site		•
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		•
11	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.		•
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant.		•
13	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.		•

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ANNEX IV

Necessary measures to be taken by the Government of the Republic of Zimbabwe on condition that Japan's Grant Aid is executed;

1. To provide necessary data and information for the Project.
2. To secure the site for the Project
3. To clear, level and reclaim the site prior to the commencement of the construction.
4. To construct the access road to the site prior to the commencement of construction.
5. To undertake incidental works such as constructing walls around the wells if necessary.
6. To bear commissions of Authorization to Pay (A/P) and payment commission to a Japanese foreign exchange bank for the banking services based on the Banking Arrangement (B/A).
7. To exempt taxes and duties and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port /airport of disembarkment.
8. To accord Japanese nationals, whose services may be required in connection with the supply of products and the services under the verified contracts, such facilities as may be necessary for their entry into Zimbabwe and stay therein for the execution of the Project.
9. To maintain and use properly and effectively facilities constructed and equipment purchased under the Grant
10. To bear all the expenses other than those covered by the Grant, necessary for the construction of facilities as well as for the transportation and the installation of equipment.

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MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE RURAL WATER SUPPLY PROJECT
IN BINGA DISTRICT IN MATABELELAND NORTH PROVINCE
IN
THE REPUBLIC OF ZIMBABWE
(CONSULTATION ON DRAFT REPORT)

In January 1997, the Japan International Cooperation Agency (JICA) dispatched the Basic Design Study Team on the Rural Water Supply Project in Binga District in Matabeleland North Province (hereinafter referred to as "the Project") to the Republic of Zimbabwe, and through discussions, field survey and technical examination of the results in Japan, has prepared the draft report of the study.

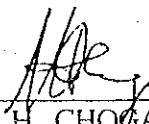
In order to explain and to consult with the Zimbabwe side on the components of the draft report, JICA sent to Zimbabwe a study team (hereinafter referred to as "the Team") headed by Mr. Shokichi SAKATA, 1st Project Study Division, Grant Aid Project Study Department, JICA, which is scheduled to stay in the country from April 21 to 29, 1997.

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


Harare, April 25, 1997

坂田 章吉

Mr. Shokichi SAKATA
Leader,
Draft Report Explanation Team,
JICA



Mr. V.H. CHOBA
Director,
Department of Water Resources,
Ministry of Lands and Water Resources



Mr. A. C. MPAMHANGA
NAC Chairman and Director of
Development Planning and Coordination,
Ministry of Local Government, Rural and
Urban Development

ATTACHMENT

1. Components of the Draft Report

The Government of the Republic of Zimbabwe has agreed and accepted in principle the components of the draft report proposed by the Team.

2. Japan's Grant Aid System

- (1) The Government of the Republic of Zimbabwe has understood the system of Japan's Grant Aid explained by the Team as described in ANNEX-I .
- (2) The Government of the Republic of Zimbabwe will take the necessary measures described in ANNEX- II for smooth implementation of the Project, on condition that the Japan's Grant Aid is extended to the Project.

3. Schedule of the Study

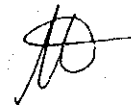
JICA will complete the final report in accordance with the confirmed items, and send it to the Government of the Republic of Zimbabwe by June 1997.

4. Other Relevant Issues

(1) Zimbabwe side promised the followings.

- 1) Department of Water Resources(DWR) prepares the necessary staff and budget for the technology transfer, during the siting and construction of 30 boreholes by Japan side.
- 2) DWR prepares necessary staff and budget for the siting and construction of 94 boreholes.
- 3) DWR is responsible for the implementation of the Project, and Rural District Council (RDC) in conjunction with District Development Fund(DDF) will be responsible for the maintenance of constructed facilities.
- 4) RDC and DDF prepare necessary staff and budget for the technology transfer, during community mobilization for 40 localities by Japan side.
- 5) Community mobilization and monitoring of 84 localities are performed by RDC in conjunction with Ministry of National Affairs , Employment Creation and Co-operatives (MNAECC) and DDF.
- 6) Community mobilization and monitoring of existing water point committees are performed by RDC in conjunction with MNAECC and DDF.

(2) Zimbabwe side requested that double cabin pickups should change to single cabin ones as these have more load room.



ANNEX I

ON JAPAN'S GRANT AID PROGRAM

1. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid Program is executed by the following procedures.

- **Application**
(request made by a recipient country)
- **Study**
(Preliminary Study / Basic Design Study conducted by JICA)
- **Appraisal & Approval**
(Appraisal by the Government of Japan and Approval by the Cabinet of Japan)
- **Determination of Implementation**
(Exchange of Notes between the both Governments)
- **Implementation**
(Implementation of the Project)

(2) Firstly, an application or a request for a project made by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to see whether or not it is suitable for Japan's Grant Aid. If the request is deemed suitable, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

Secondly, JICA conducts the Study (Basic Design Study), using a Japanese consulting firm. If the background and objective of the requested project are not clear, a Preliminary Study is conducted prior to a Basic Design Study.

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

Fourthly, the Project approved by the Cabinet becomes official when pledged by the Exchange of Notes signed by the both Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.



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2. Basic design Study

(1) Contents of the Study

The purpose of the Study (Preliminary Study/Basic Design Study) conducted on a project requested by JICA is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

- a) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation,
- b) to evaluate appropriateness of the Project for the Grant Aid Scheme from a technical, social and economical point of view,
- c) to confirm items agreed on by the both parties concerning a basic concept of the project,
- d) to prepare a basic design of the project,
- e) to estimate cost involved in the project.

Final project components are subject to approval by the Government of Japan and therefore may differ from an original request.

Implementing the project, the Government of Japan requests the recipient country to take necessary measures involved which are itemized on Exchange of Notes.

(2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency and also to avoid possible undue delay in implementation caused if a new selection process is repeated.

(3) Status of a Preliminary Study in the Grant Aid Program

A Preliminary Study is conducted during the second step of a project formulation & preparation as mentioned above.

A result of the study will be utilized in Japan to decide if the Project is to be suitable for a Basic Design Study.

Based on the result of the Basic Design Study, the Government would proceed to the stage of decision making process (appraisal and approval).

It is important to notice that at the stage of Preliminary Study, no commitment is made by the Japanese side concerning the realization of the Project in the scheme of Grant Aid Program.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation or such.

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(2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant etc. are confirmed.

(3) "The period of the Grant Aid" means one Japanese fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

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

However the prime contractors, namely, consulting, contractor and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

(6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

- ① to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,
- ② to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
- ③ to secure buildings prior to the installation work in case the Project is providing equipment,
- ④ 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,
- ⑤ to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,

- ⑥ to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) Proper Use

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

(8) Re-export

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

(9) Banking Arrangement (B/A)

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



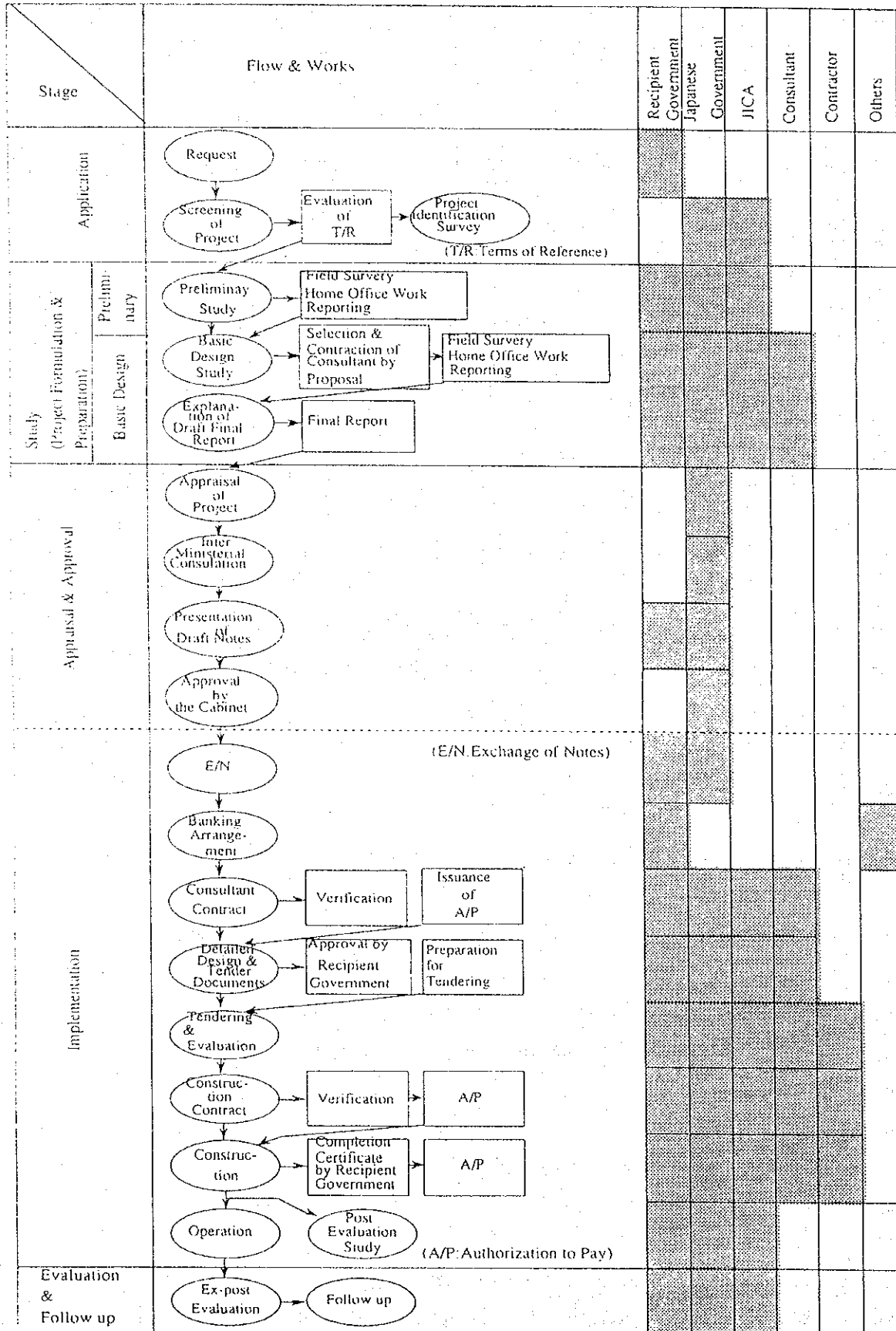


ANNEX II

Necessary measures to be taken by the Government of the Republic of Zimbabwe on condition that Japan's Grant Aid is executed;

1. To provide necessary data and information for the Project.
2. To secure the site for the Project
3. To provide office space and necessary land space for the Project.
4. To clear, level and reclaim the site prior to the commencement of the construction.
5. To construct the access road to the site prior to the commencement of construction.
6. To undertake incidental works such as construction of soak way and drain pit.
7. To bear commissions of Authorization to Pay (A/P) and payment commission to a Japanese foreign exchange bank for the banking services based on the Banking Arrangement (B/A).
8. To exempt taxes and duties and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port /airport of disembarkment.
9. To exempt taxes on materials and equipment bought from within the country for the Project.
10. To accord Japanese nationals, whose services may be required in connection with the supply of products and the services under the verified contracts, such facilities as may be necessary for their entry into Zimbabwe and stay therein for the execution of the Project. This should cover work permits for Japanese experts and the permits should be obtained when the experts are in Zimbabwe.
11. To maintain and use properly and effectively facilities constructed and equipment purchased under the Grant.
12. To bear all the expenses other than those covered by the Grant, necessary for the construction of facilities as well as for the transportation and the installation of equipment.

Flow Chart of Japan's Grant Aid Procedures



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Major Undertaking 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 construct the buildings	•	
7	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	•	
	2) Water Supply		
	a. The city water distribution main to the site		•
	b. The supply system within the site (receiving and elevated tanks)	•	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		•
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	•	
	4) Gas Supply		
	a. The city gas main to the site		•
	b. The gas supply system within the site	•	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		•
	b. The MDF and the extension after the frame/panel	•	
	6) Furniture and Equipment		
	a. General furniture		•
	b. Project equipment	•	
8	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		•
9	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 project site		•
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		•
11	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.		•
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant.		•
13	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.		•

5. Cost Estimation Borne by Recipient Country

The Project implementation costs for Zimbabwean side are roughly estimated as follows:

(1) Conditions of cost estimation

- a) Date of estimate: March, 1997
- b) Exchange rate: 1 US\$ = 10.61 Z\$

(2) Estimated costs

1) Construction of 94 boreholes : (DWR)

a) Siting;	94 x 1,500 Z\$ =	141,000 Z\$
b) Successful boreholes;	94 x 55,000 Z\$ =	5,157,000 Z\$
c) Dry boreholes;	28 x 45,000 Z\$ =	1,260,000 Z\$
d) Headworks;	94 x 5,000 Z\$ =	470,000 Z\$
	Sub-total	7,028,000 Z\$
e) 10 % Contingency;		702,800 Z\$
f) 15% Price Increase;		1,159,620 Z\$
	Total	8,890,420 Z\$

Note : Success rate is estimated at 70% for the overall Project

2) Maintenance cost : (RDC/DDF)

Running costs of pick up for maintenance for 124 borehole facilities are estimated as follows:

- a) Monitoring days: once a year patrol with 5 localities per day;
 $124 \text{ localities} \div 5 \text{ localities / day} = 25 \text{ days}$
- b) Running costs: 450 Z\$ for fuel and others with 250 km running per monitoring;
 $450 \text{ Z\$} \times 25 \text{ days} \times 4 \text{ years} = 45,000 \text{ Z\$}$
- c) For the existing facilities of water point
 $402 \text{ localities} \div 5 \text{ localities / day} = 80 \text{ days}$
 $450 \text{ Z\$} \times 80 \text{ days} \times 4 \text{ years} = 144,000 \text{ Z\$}$

3) Community mobilization cost : (RDC/DDF)

- a) For 124 localities
 $18,100 \text{ Z\$} \times 84 \text{ localities / day} = 1,520,400 \text{ Z\$}$
- b) For the existing facilities of water point
District Level : 115,000 Z\$
Ward Level : 26,200 Z\$ / ward x 21 wards = 550,200 Z\$
Total 665,200 Z\$

The staffs required to complete the remaining 94 borehole facilities and the community mobilization for all the facilities after the Japanese cooperation should be procured under full responsibility of

Zimbabwean authorities concerned and supplied without any undue delay to the schedule with appropriate budgetary support shown in Table A-1.

Table A-1. ROUGH COST ESTIMATION BORNE BY ZIMBABWE SIDE IN EACH YEAR

(Z\$)

YEAR	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
NO. OF YEAR	1	2	3	4	5	6	7	8	9	10	11
NEW B/H FACILITIES											
NO. OF B/H CONSTRUCTION	5	25	25	25	25	19					
NO. OF COMMUNITY MOBILIZATION	6	34	21	21	21	21					
COST OF THE MOBILIZATION			380,100	380,100	380,100	380,100					
MONITORING COST			2,700	4,950	7,200	9,450	8,550	6,300	4,050	1,800	0
B/H CONSTRUCTION COST			2,364,500	2,364,500	2,364,500	1,797,020					
SUBTOTAL			2,747,300	2,749,550	2,751,800	2,186,570	8,550	6,300	4,050	1,800	0
EXISTING FACILITIES											
NO. OF COMMUNITY MOBILIZATION			100	100	101	101					
COST OF THE MOBILIZATION*			166,300	166,300	166,300	166,300					
MONITORING COST			0	9,000	18,000	27,000	36,000	27,000	18,000	9,000	0
SUBTOTAL			166,300	175,300	184,300	193,300	36,000	27,000	18,000	9,000	0
THE MOBILIZATION and MONITORING COST**			549,100	560,350	571,600	582,850	44,550	33,300	22,050	10,800	0
B/H CONSTRUCTION COST***			2,364,500	2,364,500	2,364,500	1,797,020					
GRAND TOTAL			2,913,600	2,924,850	2,936,100	2,379,870	44,550	33,300	22,050	10,800	0

CONSTRUCTION PER B/H 94,580 Z\$

MONITORING COST PER LOCALITY 18,100 Z\$ (NEW FACILITY)

MONITORING COST PER DAY 450 Z\$

Source : * Evaluation report of CBM in Chibi district 1995

Note : ** Budget will be covered by DDF and RDC

*** Budget will be covered by DWR

6. Other Relevat Data

6-1 LIST OF TARGET LOCALITIES (1/4)

No.	WARD	WARD No.	VILLAGE	VILLAGE No.	B/H No.	Locality	PLANNED B/H
1	SIANZYUNDU	1	Siauwando	1	1.1.1	Makobole 1	1
2	SIANZYUNDU	1	Siauwando	1	1.1.2	Makobole 2	1
3	SIANZYUNDU	1	Siauwando	1	1.1.3	Mangani 1	1
4	SIANZYUNDU	1	Siauwando	1	1.1.4	Mangani 2	1
5	SIANZYUNDU	1	Sianzyundu	2	1.2.1	Sianzyundu	1
6	SIANZYUNDU	1	Sianzyundu	2	1.2.2	Siamwel	1
7	SIANZYUNDU	1	Kadika	3	1.3.1	Kadika 1	1
8	SIANZYUNDU	1	Kadika	3	1.3.2	Kadika 2	1
9	SIANZYUNDU	1	Siafugamo	4	1.4.1	Junamina School	1
10	SIANZYUNDU	1	Siafugamo	4	1.4.2	Junamina	1
11	SIANZYUNDU	1	Ljinji	5	1.5.1	Minbo	1
12	SIANZYUNDU	1	Siameja	6	1.6.1	Siameja I	1
13	SIANZYUNDU	1	Siameja	6	1.6.2	Siameja II	1
14	SIANZYUNDU	1	Siameja	6	1.6.3	Siameja III	1
15	SIANZYUNDU	1	Siameja	6	1.6.4	Sonko	1
16	MUCHESU	5	Lubu	1	5.1.1	Malala	1
17	MUCHESU	5	Lubu	1	5.1.2	Chimkonba	1
18	MUCHESU	5	Lubu	1	5.1.3	Makamba	1
19	MUCHESU	5	Macha	2	5.2.1	Kasika	1
20	MUCHESU	5	Macha	2	5.2.2	Muchesu school	1
21	MUCHESU	5	Macha	2	5.2.3	Machinga	1
22	MUCHESU	5	Macha	2	5.2.4	Macha	1
23	MUCHESU	5	Macha	2	5.2.5	Dhimbo	1
24	SINAMAGONDE	9	Chibila	4	9.4.2	Mashona	1
25	SINAMAGONDE	9	Chibila	4	9.4.3	Pepetu	1
26	SINAMAGONDE	9	Chibila	4	9.4.4	Gwagwa 2	1
27	SINAMAGONDE	9	Chibila	4	9.4.5	Gwagaw 3	1
28	SINAMAGONDE	9	Chibila	4	9.4.6	Sanbane	1
29	SINAMAGONDE	9	Chibila	4	9.4.7	Mdenda	1
30	SINAMAGONDE	9	Chibila	4	9.4.8	sianfoko	1
31	DOBOLA	11	Mulindi	1	11.1.2	Mulindi-2	1
32	DOBOLA	11	Mulindi	1	11.1.3	Mulinde school	1
33	DOBOLA	11	Siadindi	2	11.2.1	Siyambola II	1
34	DOBOLA	11	Siadindi	2	11.2.2	Siyambola Gravel	1
35	DOBOLA	11	Siadindi	2	11.2.3	Siadindi Growth P	1

LIST OF TARGET LOCALITIES (2/4)

No.	WARD	WARD No.	VILLAGE	VILLAGE No.	B/H No.	Locality	PLANNED B/H
36	DOBOLA	11	Siadindi	2	11.2.4	Siadindi III	1
37	DOBOLA	11	Siadindi	2	11.2.5	Siadindi Gate	1
38	DOBOLA	11	Siadindi	2	11.2.6	Chinouge school	1
39	DOBOLA	11	Siadindi	2	11.2.7	Chikmena-1	1
40	DOBOLA	11	Siadindi	2	11.2.8	Chikmena-2	1
41	DOBOLA	11	Siadindi	2	11.2.9	Chikmena-3	1
42	DOBOLA	11	Twakachibona	3	11.3.1	Dobola	1
43	DOBOLA	11	Twakachibona	3	11.3.2	Mabonbo	1
44	TINDE	13	Tinde Centre	1	13.1.1	Bonzo	1
45	TINDE	13	Tinde Centre	1	13.1.2	Farai	1
46	TINDE	13	Manzasiya	2	13.2.1	Manzasiya	1
47	TINDE	13	Susumbe	3	13.3.1	Malalya	1
48	TINDE	13	Susumbe	3	13.3.2	Tatatongwe	1
49	TINDE	13	Susumbe	3	13.3.3	Makwala	1
50	TINDE	13	Susumbe	3	13.3.4	Malalya school	1
51	SABA-LUBANDA	14	Chabumbulukwa	1	14.1.1	Pukumwa	1
52	SABA-LUBANDA	14	Chabumbulukwa	1	14.1.2	Bakuli	1
53	SABA-LUBANDA	14	Chabumbulukwa	1	14.1.3	Mampata	1
54	SABA-LUBANDA	14	Chabumbulukwa	1	14.1.4	Mangonya	1
55	SABA-LUBANDA	14	Chabumbulukwa	1	14.1.5	Saba school	1
56	SABA-LUBANDA	14	Chabumbulukwa	1	14.1.6	Kenjobo	1
57	SABA-LUBANDA	14	Chumba	2	14.2.1	Mahule 2	1
58	SABA-LUBANDA	14	Chumba	2	14.2.2	Mahule 3	1
59	SABA-LUBANDA	14	Chumba	2	14.2.4	Pukumwa 2	1
60	SABA-LUBANDA	14	Siamusale	4	14.4.1	Sicimvare	1
61	SABA-LUBANDA	14	Mupambe	5	14.5.1	Makunku	1
62	SABA-LUBANDA	14	Mupambe	5	14.5.2	Mupambe	1
63	SABA-LUBANDA	14	Lubanda	6	14.6.1	Lubanda school	1
64	SABA-LUBANDA	14	Lubanda	6	14.6.2	Kenkili	1
65	SABA-LUBANDA	14	Lubanda	6	14.6.3	Lubanda	1
66	SABA-LUBANDA	14	Lubanda	6	14.6.4	Nzovunde	1
67	SINANSENGWE	15	Chitete	1	15.1.1	Chitete	1
68	SINANSENGWE	15	Mucheni	2	15.2.1	Mucheni I	1
69	SINANSENGWE	15	Mucheni	2	15.2.2	Mucheni school	1
70	SINANSENGWE	15	Malinda	5	15.5.1	Malinda	1

LIST OF TARGET LOCALITIES (3/4)

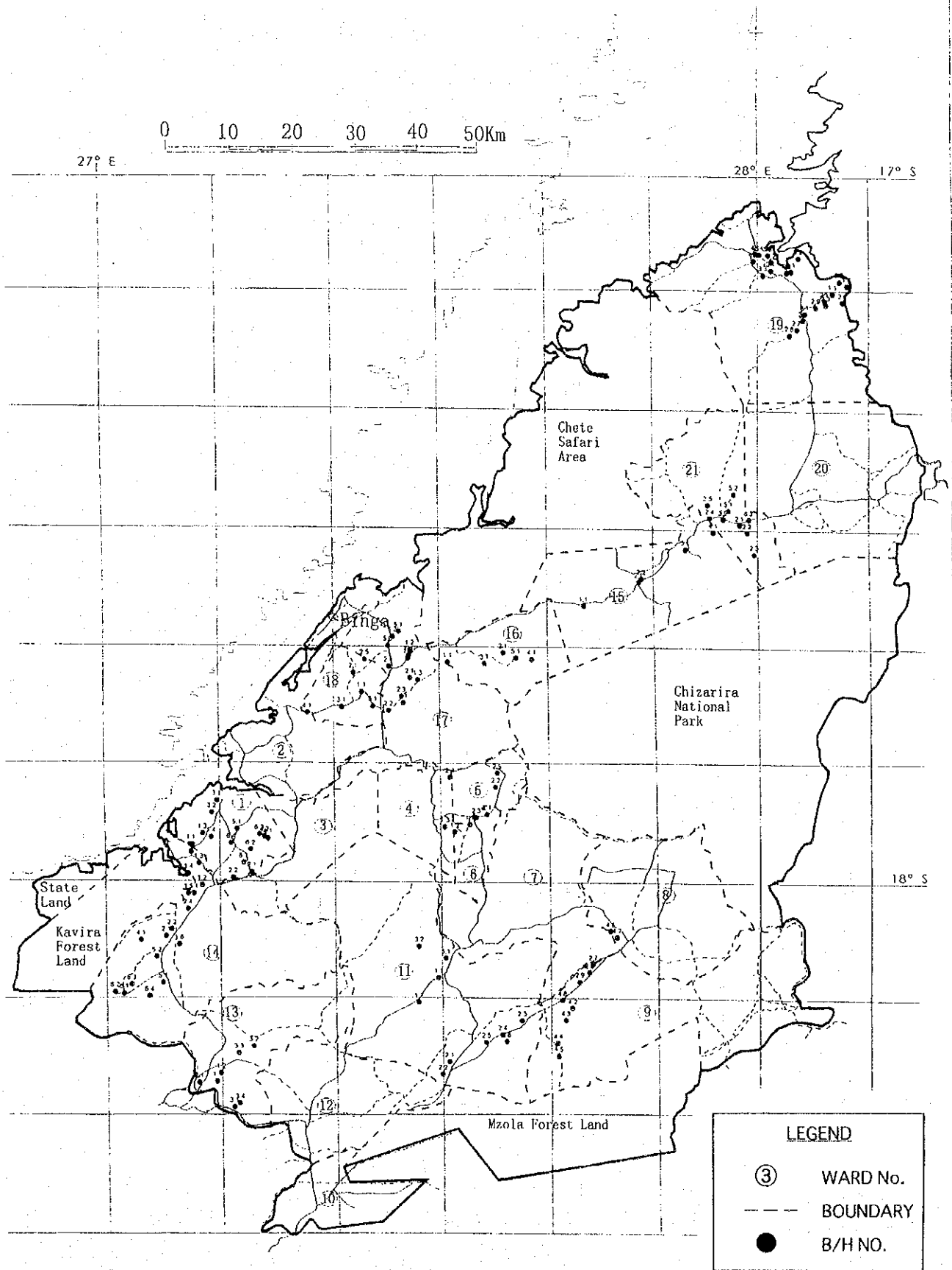
No.	WARD	WARD No.	VILLAGE	VILLAGE No.	B/H No.	Locality	PLANNED B/H
71	SINAKOMA	16	Gande	1	16.1.1	Gande	1
72	SINAKOMA	16	Nampande	2	16.2.1	Nampande	1
73	SINAKOMA	16	Chuvwepu	3	16.3.1	Chuvwepu	1
74	SINAKOMA	16	Chininga	4	16.4.1	Chininga	1
75	SINAKOMA	16	Dongamuzi	5	16.5.1	Dongamuzi	1
76	SIKALENGE	17	Manongo	1	17.1.1	Monogo 1	1
77	SIKALENGE	17	Manongo	1	17.1.2	Manogo 2	1
78	SIKALENGE	17	Manongo	1	17.1.3	Manogo 3	1
79	SIKALENGE	17	Manongo	1	17.1.4	Samende school	1
80	SIKALENGE	17	Damba	2	17.2.1	Damba 1	1
81	SIKALENGE	17	Damba	2	17.2.2	Damba 2	1
82	SIKALENGE	17	Damba	2	17.2.3	Damba 3	1
83	SIKALENGE	17	Damba	2	17.2.4	Siabhanga 1	1
84	SIKALENGE	17	Damba	2	17.2.5	Siabhanga 2	1
85	SIKALENGE	17	Delampuli	4	17.4.1	Delampuli	1
86	SIKALENGE	17	Musenapongo	5	17.5.1	Musenampongo Sch.	1
87	SIKALENGE	17	Musenapongo	5	17.5.2	Java	1
88	SIKALENGE	17	Musenapongo	5	17.5.3	Driver Dube	1
89	MANJOLO	18	Siangwemu	1	18.1.1	Siyangwemu	1
90	MANJOLO	18	Nalubuya	2	18.2.1	Nalubuya	1
91	MANJOLO	18	Dumbwe	3	18.3.1	Dambwe	1
92	MANJOLO	18	Bulawayo Kraal	4	18.4.1	Siyazumbe	1
93	MANJOLO	18	Manjolo	5	18.5.1	Manjolo School	1
94	CHUNGA	19	Luzeva	1	19.1.1	Kabuyu	1
95	CHUNGA	19	Luzeva	1	19.1.3	Maleziya 1	1
96	CHUNGA	19	Luzeva	1	19.1.4	Maleziya 2	1
97	CHUNGA	19	Bbotela	2	19.2.1	Botela 1	1
98	CHUNGA	19	Bbotela	2	19.2.2	Siyamupa 1	1
99	CHUNGA	19	Bbotela	2	19.2.3	Botela 2	1
100	CHUNGA	19	Bbotela	2	19.2.4	Botela 3	1
101	CHUNGA	19	Bbotela	2	19.2.7	Siyamupa 2	1
102	CHUNGA	19	Bbotela	2	19.2.8	Siyamupa 3	1
103	CHUNGA	19	Bbotela	2	19.2.9	Siyamupa 4	1
104	CHUNGA	19	Bbotela	2	19.2.10	Siyamupa school	1
105	CHUNGA	19	Sinamusange	3	19.3.1	Siyankuze	1

LIST OF TARGET LOCALITIES (4/4)

No.	WARD	WARD No.	VILLAGE	VILLAGE No.	B/H No.	Locality	PLANNED B/H
106	CHUNGA	19	Sinamusange	3	19.3.2	Gonya	1
107	CHUNGA	19	Sinamusange	3	19.3.3	Ndowe	1
108	CHUNGA	19	Sinamusange	3	19.3.4	Mukolwe	1
109	CHUNGA	19	Sinamusange	3	19.3.5	Sinamsange school	1
110	CHUNGA	19	Siyakancele	4	19.4.1	Chabasokwe	1
111	CHUNGA	19	Siyakancele	4	19.4.2	Makunga	1
112	CHUNGA	19	Lunga	5	19.5.1	Lunga	1
113	CHUNGA	19	Lunga	5	19.5.2	Pesele	1
114	CHUNGA	19	Lunga	5	19.5.3	Luunge school	1
115	SINAMPANDE	21	Chisale	2	21.2.1	Zuunde	1
116	SINAMPANDE	21	Chisale	2	21.2.2	Mwata	1
117	SINAMPANDE	21	Chisale	2	21.2.3	Mundango	1
118	SINAMPANDE	21	Chisale	2	21.2.4	Nsabala 1	1
119	SINAMPANDE	21	Chisale	2	21.2.5	Nsabala 2	1
120	SINAMPANDE	21	Mpande	3	21.3.2	Sinampande sch.	1
121	SINAMPANDE	21	Chilamba	4	21.4.1	Chilamba	1
122	SINAMPANDE	21	Kaningo	5	21.5.1	Kaningo	1
123	SINAMPANDE	21	Kaningo	5	21.5.2	Siweio	1
124	SINAMPANDE	21	Nagangala	5	21.5.3	Ngangala sch.	1

6-2 RURAL WATER SUPPLY PROJECT IN BINGA DISTRICT

LOCATION MAP OF TARGET LOCALITIES



7. References

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JICA