No.

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR DEVELOPMENT OF GROUNDWATER
IN LILONGWE – DEDZA
IN
THE REPUBLIC OF MALAWI

OCTOBER 2001

JAPAN INTERNATIONAL COOPERATION AGENCY
JAPAN ENGINEERING CONSULTANTS CO., LTD.

PREFACE

In response to a request from the Government of the Republic of Malawi, the Government of Japan decided to conduct a basic design study on the Project for Development of Groundwater in Lilongwe-Dedza in the Republic of Malawi and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Malawi a study team from March 26 to May 22, 2001.

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

October, 2001

川上隆朗

President

Japan International Cooperation Agency

October 2001

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Development of Groundwater in Lilongwe-Dedza in the Republic of Malawi.

This study was conducted by Japan Engineering Consultants Co., Ltd., under a contract to JICA, during the period from March, 2001 to October, 2001. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Malawi 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,

山貝廣海

Hiromi Yamagai
Project Manager

Basic Design Study Team on the Project for
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ABBREVIATIONS

ADC	:	Area Development Committee
ADMARC	:	Agricultural Development and Marketing Corporation
AEC	:	Area Executive Committee
BH	:	Borehole
CBM	:	Community Based Management
CDA	:	Community Development Assistant
CIDA	:	Canadian International Development Agency
DAC	:	Development Assistance Committee
DC	:	District Commissioner
DDC	:	District Development Committee
DEC	:	District Executive Committee
DPD	:	Director of Planning and Development
HESP	:	Hygiene Education and Sanitation Programme
HSA	:	Health Surveillance Assistant
IMF	:	International Monetary Fund
KfW	:	Kreditanstalt fur Wiederaufbau
MASAF	:	Malawi Social Action Fund
MoGYCS	:	Ministry of Gender, Youth and Community Services
MoHP	:	Ministry of Health and Population
MWD	:	Ministry of Water Development
NDF	:	Nordic Development Fund
NGO	:	Non－Governmental Organization
OPC	:	Office of President and Cabinet
PC	:	Pump Caretaker
PRSP	:	Poverty Reduction Strategy Paper
TA	:	Traditional Authority
UNCDF	:	United Nations Capital Development Fund
VDC	:	Village Development Committee
VHWC	:	Village Health Water Committee
WDT	:	Water Department Tentative Standard
WMA	:	Water Monitoring Assistant
WPC	:	Water Point Committee

SUMMARY

The Government of Malawi set up the target of securing more than 74% of service ratio in supplying safe and stable water in the rural area, by the year 2010, in the "National Water Development Programme", a national plan in the Water Sector. The Ministry of Water Development (MWD) administers rural water supply undertakings, carrying forward construction of the borehole with a hand pump and gravity water supply systems utilising stream water, etc. Notwithstanding, according to 1998 Census, the service ratio of both boreholes and gravity water supply systems was 41.6%, far below the national target, in the rural area where 85.7% of the country population (8,474,000) reside. The Government states, in the "National Long-term Development Perspective for Malawi (Malawi Vision 2020)", made public in 1998, that the whole nation shall have an easy access to an appropriate water source, qualitatively as well as quantitatively; MWD has set down a provisional target of rural water supply service ratio 84% in the year 2004, and commenced, in 1998, new "3,000 Borehole Construction Programme" with the Government's own budget funds. Malawi is one of the poorest countries, with US$210 of GNP per capita. For the purpose of poverty alleviation, the Malawi Social Action Funds (MASAF) commenced the borehole construction, as well, financed by World Bank. Altogether, more than 5,000 boreholes, in total, have been constructed from 1998 onward. Nevertheless, even these boreholes added, it is currently estimated that the rural water supply service ratio remain not more than 56% (service population: 4,990,000) towards the whole rural population (8,900,000). For the fulfillment of the provisional target, more than 7,000 boreholes would have to be constructed during 2000 through 2004. MWD has a plan to construct 2,500 boreholes, in total, with the national budget funds, continually to the year 2004; however, due to financing difficulty, the target attainment solely in the national budget would be difficult. Though the activities of other implementing bodies such as MASAF and NGOs also being anticipated, the implementation of water supply programme (construction of 2,000 boreholes) requested to the international aid organisations, would be indispensable.

Against the background, the Government of Malawi has requested, in September 1999, a Japanese grant aid project for groundwater development in Lilongwe and Dedza Districts, Lilongwe River tributary basin and Linthipe River basin, considering the accomplishment that the previous 3 groundwater development projects under the Japanese grant aid scheme were successfully implemented.

Upon receiving the request, the Japan International Cooperation Agency (JICA) dispatched Basic Design Study Team, from March 26 to May 22, 2001. The Study Team held the discussion meetings with the officials concerned of the Malawi Government, and conducted the site survey; after returning to Japan, examined and analysed the survey results, and summed up into the Draft Final Report. For the explanation of the Draft Final Report, JICA dispatched again the Study Team, August 16 to 26, 2001.

The requested contents are: construction of 500 boreholes in 4 Traditional Authorities (TAs: administrative division corresponding to a district, with the Traditional Authority as a chief) in the south-east of Lilongwe District and 5 TAs in the west of Dedza District; and procurement of 2 drilling rigs and relevant equipment for borehole construction. The Study Team has, in consideration of the areal urgency of the requirements, determined the Study Area to be TA Chadza in Lilonge District, and TA Tambala, Sub-TA (STA) Chauma, TA Kachere, and STA Chilikumwendo in Dedza District, taking into account the fact that comparatively large-scale borehole construction and hygiene education are on-going under NGOs in the requested area, as well as that, in part of the area, boreholes were constructed in the previous groundwater development projects. The Study Team conducted the field investigation, required in the Basic Design, in 234 villages, requested for borehole construction by the Malawi side, located in the above TAs, as candidate villages.

In the Study Area, there are the existing 657 boreholes towards the estimated population of 317,900. (water supply service ratio: 52%). According to the field confirmation, almost 30% of the existing boreholes are not functioning, due to superannuation or trouble with the pump; it might be estimated, accordingly, that actual service ratio be around 40%. Most of the residents are forced to use manually-dug shallow-wells or surface water of swamps/marshes, rivers, streams, etc., being prone to be affected by water shortage in the dry season or by the outbreak of water-bone diseases. The groundwater development enabling to supply safe and stable water to the dispersed villages in a wide range, is an urgent matter.

From the hydrogeological/geographical conditions, the Study Area might be divided into 2: a flat plain in the south-west; and, the undulated hilly areas in the north-east (the slope of the Great Lift Valley). Ground surface in the plain is covered by the alluvium composed of viscid soils; many swamps/marshes called Dambo form branch-like drainage pattern in the upstream of rivers. Underground of the plateau, there are heavily-undulated fresh bed rocks with the much-varied thickness of the weathered zone, forming the aquifer; the aquifers are distributed, mostly, in a wide range; therefore, the favourable conditions are recognised to groundwater development. On the other hand, in the north-eastern hilly areas, the weathered zone is distributed relatively thin; non-weathered bed rocks are distributed shallow underground; the groundwater in the fissure of the fracture zone shall also be exploited; the disadvantageous characteristics are observed because of the limited distribution of groundwater. Groundwater is recharged by rainfall, approximately 900mm annually; however, almost 95% of annual rainfall is concentrated in the rainy season, from November to March, and, therefore, a heavy seasonal-fluctuation is observed in shallow aquifers; many are dried-up in the dry season. Water quality is mostly favourable, except for the shallow groundwater easily to be affected from the ground surface. Nevertheless, in the previous water quality test, occasionally a high fluoride concentration (beyond 3 mg/litre, the water quality standard in Malawi) was detected. The groundwater with high fluoride concentration is assumed to be influenced by the north-south quarts vein or pegmatite dyke penetrated into the bed rocks; the vein or dyke being small-scale and not appearing over the ground surface mostly, it is difficult to predict it.

A borehole construction plan has been formulated: 177 boreholes be constructed in total, in 154 villages (beneficiary population upon completion: approximately 50,400). It is based on the field survey results in 223 villages, out of the requested 234 villages, excluding the inaccessible 11 villages; after examining accessibility of drilling rigs, the existing borehole water supply facilities, minimum user population to secure maintenance expenses, and possibility of groundwater aquifer existence.

Necessity and quantity of drilling equipment to be procured, have been determined after examining institutional strength, expertise of technical skills, operation/maintenance capability, and others of the implementation body, considering the utilisation situation of the existing equipment procured in the previous grant aid projects as well as the requirements in MWD groundwater development programmes to come after implementing the requested Japanese assistance. The drilling rig shall be such a type that either the rotary drilling or the air-hammer drilling might be applied, in order to respond to much-varied layers from the viscid soils to hard rocks. Specifications of the rig have been set forth, based on the mobility and running stability in the mountainous areas in Malawi as in the Study Area, drilling diameter and drilling depth in the Project, and others.

After the borehole constructed, operation/maintenance of the facilities shall be done by the Village Health and Water Committee(VHWC) (in case more than one borehole constructed in a village, the Water Point Committee(WPC) of each borehole), instituted at the village level, supported by MWD personnel stationed at the District level. For this purpose, the Community Based Management(CBM) Programme, the enlightenment activities to the residents, has been undertaken, since 1994, as part of the rural water supply project. In 1999, prepared were Implementation Manual clearly instructing the District level administrative offices to take part in, and Trainer's Guide adopting the "participatory-type" method; and, the current CBM activities are following these guidelines. In the Japanese assistance, as the Soft Component, preparation of activities plan, consultation with District-level administrative offices, training to extension workers, approach to the residents, setting-up of VHWC/WPC, training to the residents in respect of operation/maintenance and hygienic conditions, and the monitoring, shall be conducted in extending the support, technically and financially; while the Malawi side shall bear a part of activity expenses such as the personnel emoluments. Also, the Japanese side shall procure the vehicles required in the enlightenment activities and in the monitoring. Besides, the resident training to be remaining at the time of construction completion, will have to be conducted in the Malawi side.

[Borehole Construction Work]

Item	Requested Contents National Target	Basic Plan	Rationale
Target Area of Assistance	Lilongwe District :4TAs Dedza District :5TAs	Lilongwe District :1TA Dedza District :4TAs	The area under NGOs' water supply/sanitation projects and the project areas of the previous large-scale groundwater development have been excluded.
Borehole Construction	500 boreholes	177 boreholes in 154 villages	Out of the requested 234 villages, in the assistance- target area as above-determined, the following have been excluded, according to field investigation (including the duplication between the items): - Not accessible, non-existent : 11 villages - Not accessible of the drilling rig : 5 villages - To be amply supplied water with the existing borehole, etc. : 48 villages - Small user population(less than 100) even inclusive of the surrounding residents : 3 villages - Almost no expectation of groundwater existence, according to electric prospecting, etc. : 17 villages In the villages with large population, so as to avoid the excessive use of the pump against the capacity, more than one borehole has been planned to construct (2 boreholes in 21 villages, 3 boreholes in one village), with the criteria of less than 500 of user population per borehole.
Water Supply Indicators: User population per borehole Per capita supply amount Distance of fetching water Standard yield	National Target 250/borehole 27 lpcd less than 500 m -	 100 to 500 /borehole 13.5 lpcd at the minimum Almost less than 500 m 0.2 liter/sec	The plan has been formulated, with a view to drawing the average value to the national target, for supplying safe water to as many residents as possible. The user population per borehole was set at 100 to 500, as against the current average of around 270. In case, with large user population, the yield being obtained almost at the minimum standard level, per capita supply amount shall be set at 13.5 lpcd, at the minimum, and water from the existing source be admitted only for non-drinking purposes. With 10 hours operation a day, 27 lpcd of water (national target) might be supplied to 250 users.
Drilling Depth	-	30 to 90 m (Average: 45 m)	Determined, according to the aquifer-bottom depth identified from the electric prospecting (1 point in each village). The drilling site shall be determined, with the consent of VHWC, after recommending the prospective site with deep-aquifer from the geophysical prospecting to be conducted at the candidate site selected by VHWC.
Borehole Success Rate	-	80%	Towards the planned number of boreholes, 23% of dry holes and 4% of unsuccessful boreholes with high concentration of fluoride, have been assumed. These are based on collation and examination between the aquifer identification from the electric prospecting results and the past accomplishment (areal dry hole appearance rate), and in consideration of the dotted existence of the groundwater with high-fluoride concentration.

[Equipment Procurement]

Name of Equipment	Specification / Contents	Quantity
Ⅰ. Borehole Drilling Equipment:		
Borehole Drilling Rig	Truck-mounted (4×4, GVM : not more than 16t) (Drilling capacity: 100 m to 150 m)	1 no.
High-pressure Air Compressor	Truck-mounted (4×4, GVM : not more than 16t) not less than 17.5kg/cm^2×20m^3/min	1 no.
Ⅱ. Testing Equipment:		
Geophysical Prospecting Equipment	Maximum prospecting depth: not less than 200 m, with software	1 no.
Equipment for Development	Truck: 4×4, GVM : 10t, loading capacity : 3t, with 3t-crane	1 no.
	Compressor : not less than 7kg/cm^2×3.5m^3/min	1 no.
	Generator: 17KVA (50Hz) / 20KVA (60Hz)	1 no.
	Air-lift Tools:	1 set
	Submersible pump, water gauge (100 m), pH meter, and electric conductivity meter (with thermometer)	1 no.each
Electric Logging Equipment	Auto-recording, with 100 m of code	1 no.
Ⅲ. Support Vehicle:		
Cargo Track	4×4, GVM : 13t, loading capacity : 5.5t, with 3t-crane	1 no.
Pick-up Truck	Single-cabin, 4×4, loading capacity : 1t	1 no.
Ⅳ. Mobile Workshop:		
Track for workshop	4×4, Crane (3t/2.7m or more), Aluminium-body	1 no.
Repairing equipment and tools	Generator, welding equipment, motor-compressor, grinder, drill, press, jib-crane, etc.	1 set
Ⅴ. Vehicles for CBM Activities:		
Pick-up Truck	Double-cabin, 4×4, loading capacity: 0.7t	1 no.
Motorcycle	For off-road use, displacement: 100 to 125cc	3 nos.

The Project shall be implemented, as a 2-phase undertaking under the Japanese grant aid scheme. In PhaseⅠ, equipment be procured, 36 boreholes constructed by utilising a local subcontractor, and the existing borehole drilling equipment repaired for the use in PhaseⅡ. In PhaseⅡ, 141 boreholes be constructed by utilising the equipment procured, the drilling equipment repaired, and the local subcontractor. The work periods required are: 9 months in the detailed design and tendering work; 9 months in the manufacturing, transportation, etc. of the equipment procured; 19.5 months in the construction of 177 boreholes and repairing of the existing drilling equipment (including the manufacturing, transportation of the repairing parts, etc.); and approximately 20 months for the Soft Component. Almost 25 months be required, as a whole.

The estimated current borehole water supply service ratio is approximately 40% in the target area towards the population of 317,900, which is lower than the national target as well as those in the other areas; most of the residents rely on unsanitary and unstable water sources. With the construction of 177 borehole water supply facilities (with a hand pump, apron, drainage channel, and washing place) in 154 villages, in the Project, almost 50,400 of service population would be increased, and the borehole water supply service ratio in the area uplifted to 55% in the year 2004. As indirect effects, it might be anticipated that the contraction percentage of water-born diseases be reduced in the area, derived from the facility sustenance and the enhanced hygienic consciousness, triggered by the augmented hygienic water supply facilities as well as by the enlightenment activities. Also, it might be anticipated that MWD groundwater development programme be efficiently undertaken, after the Project implementation, with the equipment procured in the Project. To the borehole water supply facilities, an operation/maintenance system with the residents as main constituents, would be established by promoting the enlightenment activities in the Project; supported by the District-level MWD personnel through the monitoring, etc. It might be judged that, to the procured equipment, the staff and funds required in operation/maintenance be secured according to the accomplishment, for the replacement of the superannuated equipment procured in the previous grant aid projects. From all the above, the Project might contribute to the national target attainment (74% of rural water supply service ratio, in 2010) and the target shown in Malawi Vision 2020 of securing easy access to appropriate water source, qualitatively as well as quantitatively. In the consequence, it might be judged that the Project implementation under the Japanese grant aid scheme be adequate. Moreover, provided that the matters below be improved and enhanced, the more smooth and effective implementation would be effected to the Project.

- A system shall be established in which MWD conduct monitoring and follow-up activities with the funds secured therefore, towards the boreholes constructed including the existing ones; the local administrative offices below the District-level cooperate in the Project implementation as well as the monitoring after the facilities constructed.
- Now is in the process of privatisation of pump spare-parts distribution. At the time of Project commencement, an appropriate price level and supply amount shall be secured; even afterwards, the same conditions shall continue.
- The collaboration shall be maintained with the hygienic improvement promoted by the Ministry of Health and Population as well as with the regional development promoted by the Ministry of Gender, Youth and Community Services.

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CHAPTER 1 BACKGROUND OF THE PROJECT

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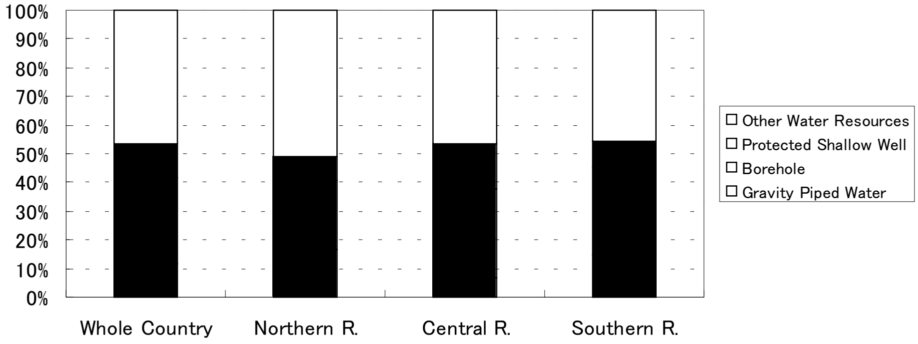
1-1 Present Situations and Difficulties in the Sector

1-1-1 Present Situations and Difficulties

The National Water Development Programme, 1994, is a national plan of the Water Sector in Malawi, indicating the attainment target up to the year 2010; water supply projects have been carried forward, either under the external assistance or in the national budget. Of these, the Ministry of Water Development (MWD) administers rural water supply projects, setting-up the provisional target, more than 74% of coverage of safe and stable water supply to be uplifted by the year 2010, through utilising the borehole with a hand pump as well as the gravity piped water supply system with stream water, etc.

Nevertheless, according to 1998 Census, the coverage of gravity piped water supply system and boreholes in the rural area, where 85.7% of the country population reside, was 41.6% towards 847,400 of rural population; far below the national target (refer to Table 1-1-1). After 1998, almost 5,000 boreholes were constructed in the rural water supply undertakings under MWD, etc., together with newly-added borehole construction programme of the Malawi Social Action Fund (MASAF) with the financing of World Bank. Provided that the served population per borehole be 250 (national target), the augmented boreholes might correspond to the 1,250,000 increase in the served population; however, the rural water supply service ratio still remains at 55.5% towards the estimated rural population of 8,990,000 in the year 2001, with the actual service population of 4,990,000 inclusive of that of the existing water supply facilities.

On the other hand, in the borehole construction projects after 1994, enlightenment activities have been rendered to the beneficiary residents to materialise operation and maintenance of the borehole by themselves. It is said that many previously-constructed boreholes are disused, with the pump broken, due to lack of operation and maintenance system by the residents themselves; which might be attributable, as one cause, to the lowered service ratio.



(Malawi Population and Housing Census, 1998)

Fig. 1-1-1 Rural Water Supply Service Ratio

Table 1-1-1 Population by Source of Drinking Water (Dry Season)

(1998 Malawi Population and Housing Census)

Item	Whole Country		Rural (85.7% of Population)			Urban (14.3% of Population)		
Population	9,883,222	%	8,474,166	%	%	1,409,056	%	%
Piped Inside DU	248,087	2.5	51,281	0.6		196,806	14	
Piped Outside DU	663,276	6.7	247,792	2.9	11.7	415,484	29.5	79.8
Communal Stand Pipe	1,202,662	12.2	690,478	8.1		512,184	36.3	
Borehole	2,651,429	26.8	2,531,684	29.9	29.9	119,745	8.5	8.5
Protected Well	1,074,798	10.9	1,002,070	11.8	11.8	72,728	5.2	5.2
Unprotected Well	2,495,711	25.3	2,429,196	28.7		66,515	4.7	
Spring	116,726	1.2	111,597	1.3	46.6	5,129	0.4	6.5
Stream/River	1,279,531	12.9	1,264,103	14.9		15,428	1.1	
Lake/Dam	151,002	1.5	145,965	1.7		5,037	0.4	

1-1-2 Development Plans

(1) Rural Water Supply Programmes in the Recent

Although the "National Long-term Development Perspective for Malawi" (Malawi Vision 2020), made public in 1998, does not indicate an attainment target in the Water Sector, the Government of Malawi set down, in connection with it, a provisional target, 84% of rural water supply service ratio, to be attained by the year 2004. The Government, for the promotion of the plan nationwide, commenced the "3,000 (Dispersed) Borehole Construction Programme" with its own budget funds, in FY 1998/99, and completed in FY 1999/2000, except for the partial pump installation.

MWD has considered that more than 7,000 borehole shall be further constructed for the fulfillment of the provisional target, and contemplated constructing 600 to 800 boreholes a year continuingly after 2001 (2,500 boreholes in total, by the year 2004). Although borehole construction by the other government organisations such as MASAF or NGOs, 2,500 to 3,000 boreholes, might be anticipated, the situation is indicating that the attainment of the provisional target would be difficult without the support of the international aid organisations; consequently, MWD has requested 2,000 boreholes construction to the international organisations.

The situations of rural water supply undertakings, succeeding to 1997, are as under.

- The borehole construction programme under MWD: though previously centred in the specific area for the external aid organisations; from FY1998/99 onward, the Dispersed Borehole Construction Programme, based on the requests from the electorate unit, has been implemented nationwide with the national budget funds; amount of the government own portion has been rapidly increased inside the MWD groundwater development funds, ranking with that of the external assistance in scale.
- MASAF has undertaken the borehole construction, as part of community-base development, since 1997, for the purpose of poverty alleviation, with the financing of World Bank. As of 2001, 2,731 boreholes were completed in total; the further 1,456 borehole construction is planned for FY2001/02. The construction plan envisages an apportionment of an equal number of boreholes to the District: the target village is determined through prioritisation of the requests from the communities. It might also be considered as "dispersed" water supply undertakings.
- The Office of the President and Cabinet (OPC) sporadically constructs boreholes as well, in political considerations; 100 to 200 boreholes a year in

the country.

- In line with the rapidly-increasing borehole construction, the private drillers have been increasing, and they are conducting most of the borehole construction work.
- The operation of gravity piped water supply system in the regional cities, previously undertaken by MWD, was transferred to 3 Regional Water Boards, incorporated as a public corporation.

As above-mentioned, the borehole construction has recently much progressed: more than 5,000 boreholes have been drilled since 1998, and it is said almost 15,000 boreholes are in operation, as of 2001.

(2) Poverty Alleviation Strategy

The Government of Malawi formulated, in October 1995, the “Policy Framework for Poverty Alleviation Programme”, and commenced substantially a poverty alleviation programme. The Government aims at, in the programme, relative to water supply, easy access of all the nationals to the sufficient quantity as well as safe quality of water for drinking, cooking and washing, as well as for securing a hygienic condition of the individuals, by the year 2005. The measures enumerated are:

1) Mobilisation of resources for expanding the coverage of water supply;
2) Participation of the private sector, NGOs, and others, in the water supply;
3) Continuous training to WPCs and to repairing team members;
4) Operation and maintenance improvement through training and holding adequate stock of spare-parts;
5) Mobilisation of local resources in operation and maintenance, including payment to volunteers looking after the water points;
6) Establishment of communal water points managed by the residents themselves; and,
7) Management of water resources.

Besides, in response to the World Bank and IMF strategies, the “Poverty Reduction Strategy Paper” (PRSP) was prepared; the “Interim Poverty Reduction and Growth Strategy Paper – A Road Map” was framed, as a provisional PRSP, in May 2000, and revised in August the same year. In the provisional PRSP, an appropriate and reliable access to clean water and favourable hygienic customs being placed as a key to improving the hygienic conditions, and to giving impetus to economic development; identified was a need of spreading a conscious strategy aimed at providing water to the poor as a basis for promoting other endeavors to uplift their living standards.

Nevertheless, afterwards, a comprehensive framework for the development and a system to secure cooperation with international organisations, have not been precisely indicated.

1-1-3 Socio-economic Trend

In 1998, Malawi had 9,934,000 of total population and US$ 210 of per capita GNP. More than 60% of the population had an annual income below US$ 40; majority belonged to the absolutely poor, far below the DAC poverty line of US$ 370. Agriculture sector constituted almost 87% of total employment, though the contribution to GDP being 37%. Most of farmers are the poor. Periodically occurring drought, from before the independence, has badly affected not only agricultural production but farmers' livelihood and the continuity of the village itself.

From the beginning of the 1980's, the Government of Malawi has complied with the structural adjustment policy of IMF and World Bank, and carried out the restraint of governmental expenditures, financial reform, privatisation, and others, for economic recovery. As a result, an average annual growth rate from 1989 to 1991, in real terms, reached 6%. Foreign exchange earnings, however, have reduced, caused by the drastically-reduced crops such as tobacco, tea and sugar-cane (agriculture produce occupying 90% amount of the whole Malawi exports) affected by droughts frequently-occurred in the first-half of the 1990's, coupled with the reduced assistance of the external donors arising from the human right issues in the politics.

1-2 Background of the Project

From the early years, the Government of Malawi has regarded the supplying hygienic and stable water in the rural village, as part of rural infrastructure provision to promote the stabilisation of and increase in the agriculture production, to be one of the major national policies. In 1987, formulated was the "Statement of Development Strategies, 1987-1996", targeting 74% of rural water supply service ratio to be uplifted by the year 1996. However, water supply facilities construction did not proceed much, due to financing difficulty. Consequently, in 1994, the "National Water Development Programme" was framed, reviewing the prior water policy to that time, and putting off the target year of attaining the service ratio 74% till 2010; assistance was eagerly asked to the international organisations as well as to the developed countries.

Japanese grant aid projects, for the water supply with groundwater, conducted from 1987 to 1999, were 3; 1 each in the Southern, Central and Northern Regions, which have been highly appraised by the Government of Malawi. Against the background, the Government made request of a grant aid, in 1999, for the Groundwater Development Project in Lilongwe and Dedza Districts (The Project) in the Linthipe River basin.

The requested target area occupies the south-eastern part of Lilongwe District and the western part of Dedza District, located to the south-east of the capital Lilongwe. The area is listed in, as one of, the most fertile land in the country, bearing an important role in the agriculture development in Malawi. Notwithstanding, majority of the total population 520,000 in the requested target area (in 1999), use, for securing water for the living, mostly marshy/swampy places named by Dambo, river surface water, or the manually-dug shallow wells. These water sources are, however, dried up in the dry season, forcing women or children to fetch water in the long distance as well as to seek for few alternative sources.

The following is a profile of the Project as requested by the Government of Malawi:

- Overall Goals:
  The living environment of the residents be improved, with an appropriate access to drinking water. Water supply facilities be maintained by the residents themselves, through understanding the relationship between the healthy/hygienic living customs and water-born diseases.
- Project Purpose:
  Safe and stable water points, within 500 m of accessible distance, be provided in the target village. Outbreak of water-born diseases, such as cholera, be prevented through improving the hygienic conditions.
- Requested Contents:
  [Facilities Construction]
  Borehole (with a hand pump) Water Supply Facility: 500
  (Ancillary structures: apron, drainage system, washing place, etc.)
  [Equipment Procurement]
  2 Truck-mounted Drilling Rigs, Support Vehicles, Relevant Equipment, etc.
- Objective Area:
  Lilongwe District: TA Mazengera, TA Chitekuwere, TA Kalumba, and TA Chadza.
  Dedza District: TA Tambala, STA Chauma, TA Kaphuka, TA Kachere, and STA Chilikumwendo.
- Project Implementation Body (Executing Agency):
  Dept. of Water Resources, MWD.
- Facilities Plan and Beneficiaries:
  With the 500 boreholes constructed, 125,000 of villagers would be benefited.

CHAPTER 2　CONTENTS OF THE PROJECT

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2-1 Basic Concept of the Project

2-1-1 Overall Goals and Project Purpose

According to 1998 Census, almost 3.52 million was the population served with gravity piped water supply systems and boreholes, in the rural area where 85% of the country population (approximately 8.47 million) reside. The service ratio accounts for some 41.5%. The Government of Malawi has laid down in the National Water Development Programme, 1994, a target in the rural area, the service ratio of 74% to be lifted up by the year 2010, through its own programmes together with by obtaining international assistance and NGOs' cooperation.

The National Long-term Development Perspective for Malawi (Malawi Vision 2020), made public in 1998, indicates that the whole nation have easy access to appropriate water source, quantitatively as well as qualitatively. The Ministry of Water Development (MWD) has set the provisional target, along it, 84% of rural water supply service ratio to be lifted-up by the year 2004, and commenced the implementation of the Dispersed Borehole Construction Programme (popularly-known as 3,000 Borehole Construction Programme) with the national budget funds, in 1998, and almost completed its implementation in 2000. Currently, the Ministry is planning to construct 2,500 boreholes in total, 600 to 800 boreholes annually, after FY2001/2002, with the fund allocated to the Ministry in the national budget, as a succeeding programme. This programme is also called the Dispersed Borehole Construction Programme, and included in the so-called 7,000 Borehole Construction Programme targeting the construction of more than 7,000 boreholes, jointly with water/hygiene projects of other internal/external organizations and NGOs, during 2000 through 2004.

The Government of Malawi has planned to draw the service ratio in the rural area with safe and stable drinking water to the national target, through newly constructing boreholes in the villages lacking water supply facilities, in the Lilongwe-Dedza Groundwater Development Project (The Project). The Project covers an area neighbouring the capital Lilongwe: TA Chadza, TA Mazengera, TA Kalumbu, and TA Chitekwere in Lilongwe District; and TA Tambala, STA Chauma, TA Kachere, STA Chilikumwendo, and TA Kaphuka in Dedza District (Central Dedza build-up area is excluded, due to waterworks facilities provided). The Project has also been placed as a portion of 7,000 Borehole Construction Programme.

In the Project, considering the activities of other donors in the above-enumerated areas, the Japanese assistance shall be extended to the target area covering TA Chadza, TA Tambala, STA Chauma, TA Kachere, and STA Chilikumwendo. In the target area, present population is approximately 317,900, and hitherto 657 boreholes have been constructed; however, an actual service ratio might be around 41%, equivalent to the national average, owing to almost 30% of defective boreholes among the existing ones. The Project envisages the enhancement of service ratio up to 55% substantially, through constructing boreholes in the villages deemed as appropriate, after examining the villages nominated by the Government of Malawi.

Besides, the National Water Development Programme, 1994, states that the borehole shall be maintained by the beneficiary residents themselves. In the groundwater development programmes, after 1994, undertaken has been the Community Based Management (CBM) Programme, the enlightenment activities aiming at setting-up an operation/maintenance system at the community level, concurrently with the water supply facilities construction. In the Project, envisaged is a sustainable use of the constructed boreholes, through extending the support to undertaking of the CBM Programme.

2-1-2 Project Outline

In the Project, for the attainment of water supply service ratio enhancement (from the current 41% to 55%), borehole water supply facilities be constructed in the village lacking the facilities, and CBM activities undertaken. From these, it might be anticipated that approximately 50,400 of residents have an easy access to safe water.

Japanese assistance consist in the procurement of a set of borehole drilling equipment (drilling rig and support vehicles, etc.) required in the borehole construction, and construction of 117 boreholes in 154 villages, including repairing the existing equipment, by utilising the procured equipment and equipment furnished by the Government of Malawi.

Besides, in Japanese assistance, towards the CBM Programme to be undertaken in the Malawi side, an expert be dispatched, as the Soft Component, for the technical and financial support in the planning, execution and evaluation of the activities through adopting the “participatory-type” method, and the vehicles for enlightenment activities procured as part of the support.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Requested Contents and the Responses

The request made by the Government of Malawi contains the construction of a total of 500 boreholes as well as the procurement of equipment and materials required in the following 9 Traditional Authorities (TAs) in Lilongwe and Dedza Districts:

Lilongwe District	:	Mazengera, Chitekuwere, Kalumbu and Chadza (added in 2001)
Dedza District	:	Tambala, Chauma, Kaphuka, Kachere and Chilikumwendo

However, except for TA Chadza, 3 out of 4 TAs in Lilongwe District have been removed from Study Area, since the relatively large-scale borehole construction is proceeding under the programme of a NGO (Inter Aide). Moreover, in Dedza District, TA Kaphuka along National Highway M1 has also been removed, due to a number of the existing boreholes in operation. Furthermore, another NGO (Concern Universal) is conducting the borehole construction in the southwestern part of Dedza District. It was concluded that TA Kachere and Sub-TA (STA) Chilikumwendo, outside of the NGO (Concern Universal) activity area in the south, and TA Tambala and STA Chauma in the north of Dedza District where the existing boreholes are less, shall be included in Study Area. Consequently, the finally agreed-upon Study Area (Project Area) includes 5 TAs: TA Chadza (Lilongwe District), and TA Tambala, STA Chauma, STA Chilikumwendo and TA Kachere (Dedza District).

Towards the agreed Study Area, the Malawi side has presented a list of 234 villages targeted anew in the borehole construction. In the Project, it was determined to select the villages suitable for Japanese assistance from the list, and to fix number of boreholes to be constructed, by examining (i) water quality, (ii) hydrogeological conditions revealed in geophysical prospecting, (iii) population, (iv) situations of the existing boreholes, (v) overwrapping with other aid projects, (vi) consent of residents in exerting the maintenance responsibility of the boreholes to be newly-constructed, and (vii) accessibility to the site.

As regards borehole construction equipment, procurement of 2 truck-mounted drilling rigs, relevant equipment and supporting vehicles and others were requested, in order to enhance capability of the Malawi side in the borehole construction work for rural water supply projects under MWD to come (including the Project). In consideration of the conditions of the borehole drilling equipment procured in the grant aid schemes in the past, in possession of MWD, the maintenance practices and the system in place, and number of boreholes to be constructed in the Project, it was determined that a new borehole drilling rig and a set of minimum range of equipment required in borehole construction for the use of new drilling rig be procured in the Project.

(2) Principles Regarding Natural Conditions

The geology of Study Area shows the bedrock formed by gneiss from the Precambrian to the early Palaeozoic Era and intrusive granite and gabbro protrudes, forming scattered hills. The relatively flat highland at the centre of southern part of Study Area, contains weathered overburden or alluvium at wetland, covering the bedrock. The northern part of Study Area is situated at the western slope of the Great Rift Valley. Fault fracture and tension crack zones are distributed, caused by tectonic movement, bringing about much undulating topography with well-developed valleys along such zones.

From hydrogeological viewpoints, aquifers in the north are controlled by the geological structure such as the fracture zone, while the thickness of the weathered zone constitutes a considerably varied aquifer in the south, resulting in much variation of aquifer distribution in narrow areas throughout the Study Area. Even though sufficient amount of groundwater for drinking purpose is mostly available in Study Area, an uneven existence of groundwater would mean, some villages, wholly or partially, hardly obtain the groundwater due to the location.

According to geological characteristics inferred from geophysical prospecting, geological maps, geological literatures, and from observation results of local topography and geology, the villages not likely to have a good aquifer even in a detailed survey were omitted from the scope of the Project. In the remaining target villages, the detailed geophysical prospecting shall be conducted, as part of the design and construction supervision, in order to improve success rate; actual borehole location shall be determined, considering an intention of the water supply community to be set-up under the CBM Programme. The design success rate shall be set, according to geophysical prospecting results in the Study as well as the accomplishment of the similar work in the past.

The drilling depth shall be deep enough so as to not only allow a screen to be placed up to the bottom of the aquifer but also ensure a constant supply of favourable-quality water in sufficient quantity, even during the dry season. In finalising the design drilling depth, a provisional drilling depth shall be set so as to add the length of casing required in the pump installation to the depth of the bottom of the aquifer at each electric prospecting site in the Study. As this provisional drilling depth is not necessarily the best depth in the target village, a site where a deeper and better aquifer is available shall be selected after the site survey. The mean design drilling depth shall, therefore, be set at slightly deeper than the mean value of the provisional depth.

As for quality of water supplied with rural water supply facilities from a borehole in Malawi, MWD Tentative Standard, taking note of actual situations and occurrence of health impediments in the country, referring to WHO Guidelines, shall be followed. During construction period in the Project, simplified on-site water quality tests shall be conducted to such items as set out in Tentative Standard. Specifically to fluoride, the existing test results frequently show that Tentative Standard value (= 3 mg/litre) is exceeded, while tests conducted in the Study have indicated none beyond it. Since WHO Guidelines set 1.5 mg/litre as a standard fluoride concentration, a detailed laboratory test shall be conducted, if the on-site test results exceed it. (In the Study, simplified on-site water quality tests to borehole groundwater revealed that 20% of samples tested have indicated concentration not less than 1.5 mg/litre). If detailed laboratory test results indicate the fluoride concentration exceeding Tentative Standard value (= 3 mg/litre), the borehole shall be placed as not successful. In this case, a pump shall not be installed at the borehole.

The water quality test in the existing boreholes revealed the presence of a group of coliform, indicating contamination from the ground surface. In the Project, the surroundings of the casing above the aquifer shall be surely filled-up with cement, while the borehole structure shall not have a screen of 10 m below or less from the ground surface, in the shallow aquifer (10 m below or less from the ground surface, though to be actually judged from the geological conditions) easily to be affected by the surface contamination. The drilling depth shall, therefore, be not less than 30 m, including the extra-drilling for confirmation of bottom of the aquifer.

Some 95% of annual rainfall is in the rainy season; i.e. from mid-November to March, and the accessibility to the sites would be extremely poor during this period. A construction plan is, therefore, required, with such work conditions in the rainy season taken into consideration.

(3) Principles Regarding Socio-economic Conditions

The target villages shall be selected, considering the population size and composition, existing water source, conditions of the existing water supply facilities, required amount of water in the livelihood, distance and time of water fetching, accessibility to water source, awareness of water supply problems among the residents, willingness of setting-up the Village Health and Water Committee (VHWC) and the Water Point Committee (WPC)*[1)], willingness to participate in borehole maintenance activities and others, in the Project Area.

The population in the villages vary, from tens to thousands. Villages of an extremely small population (less than 100) are apt to form a larger unit jointly. In case the borehole to be constructed in such villages, it shall be jointly used among the member villages. If the user population be extremely small, the water charge per household to be imposed by WPC, responsible for daily facility operation and maintenance after handing-over of the borehole to the local community, would be too high, causing difficulties in maintenance. Judged from the actual usage of the existing boreholes in the neighbouring areas, service population shall include population of nearby villages to be assumed also using the same borehole. Villages with less than 100 population shall be omitted from the scope of the Project, because of foreseeable difficulties in securing funds required in daily maintenance.

In contrast, too large user population would not only result in the prolonged waiting time of water drawing, reducing the convenience, but also cause the more rapid deterioration of pump and borehole due to excessive use frequency. In this case, more than one borehole shall be constructed in the villages, considering the limit of user population inferred from the time required in drawing water; as a rule, user population per borehole shall not be more than 500.

With a minimum and maximum user population of 100 and 500, respectively, the average population per borehole in the target villages would become approximately 285, drawing to the target of 250 per borehole in the National Water Development Programme.

＊[1)] : VHWC is an autonomous body, for conducting hygiene education and promotion of sanitary facilities, to be set-up in the respective villages. WPC is a committee, to be instituted under VHWC, in the case more than one borehole being constructed in one village, for operation/maintenance of the borehole.

The design borehole pumping rate shall be set at 0.2 litres/sec (12 litres/min), considering the capacity of an Afridev pump. The National Water Development Programme sets out a borehole access distance to be less than 500 m. Although it is judged that it might be achieved in view of the population density and number of user in the target villages inferred from the Census, there might be the cases in which the location of the planned borehole might not be at the centre of village due to hydrogeological conditions. In selecting an actual drilling site, the location convenient for the users shall be found in consultation with VHWC/WPC.

(4) Principles Regarding Local Construction Industry

1) Technical Level of Local Drillers and Their Utilisation

Only 2 to 3 private drillers were operating in the mid-1980's and mid-1990's. The number of drillers has, however, expanded to the tens due to rapidly increasing borehole drilling projects undertaken by the Government of Malawi. Specifically in 3,000 Borehole Construction Programme in 1998 and 1999 under MWD, 11 drillers constructed 87 to 887 boreholes, respectively. Out of the 2,880 actually drilled boreholes, 2,843 have passed the inspection. However, afterwards 295 boreholes became defective, such as in (i) intermittent water drawing availability, (ii) not possible of pumping-up water due to the lowered groundwater table, (iii) mixture of muddy water or turbid materials, and (iv) collapse of borehole walls.

Nevertheless, although the above-mentioned problems might be attributable to the poorly conducted siting, insufficient depth, insufficient cleaning and not good gravel packing, the existing private drillers have a valid borehole drilling experience as shown in Table 2-2-1, and basically as capable of satisfactorily conducting the drilling itself. It was, therefore, determined that these private drillers shall be used, as subcontractors, under the supervision of the Japanese contractor in the construction of some of the planned boreholes.

Table 2-2-1 Number of Boreholes Constructed by the Local Drillers and Problematic Boreholes (3,000 Borehole Construction Programme)

SL No.	Drillers	No. of BHs Claimed & Paid For	No. of BHs with Intermittent Supply	No. of BHs Dry with Pump	No. of BHs Collapsed	No. of BHs with Turbid/Muddy Water	No. of BHs with Bent Holes	No. of BHs Dry with No Pump & No Civil Works
1	Scandrill	248	33	0	0	0	0	0
2	National BH	326	24	11	4	14	0	11
3	BH Fund	155	14	1	0	0	0	0
4	Chitsime	887	38	3	2	7	0	1
5	Universal	145	11	2	0	0	0	14
6	Dell Tech	87	0	1	0	1	0	0
7	Central Africa	251	38	9	0	0	0	2
8	Contract Driller	127	2	2	0	2	0	0
9	Drill Tech	171	10	1	0	0	2	0
10	Select	260	7	2	0	0	3	2
11	Water Boring	186	12	0	5	2	0	2
Total		2,843	189	32	11	26	5	32

2) Technical Level of Local Civil Engineering Contractors and Their Utilisation

In the installation of pump head and an ancillary facility such as apron, a local method has been used in the previous Japanese grant aid schemes, 10 contractors having been operating with the expertise in the similar work in 3,000 Borehole Construction Programme (see Table 2-2-2). The use of local contractors in the pump head installation work and apron construction work being possible in view of the grade of these facilities, local civil engineering contractors shall be used, as subcontractors, in the Project.

Table 2-2-2 List of Local Civil Engineering Contractors

SL No.	Civil Engineering Contractors	No. of BHs Contracted
1	Gar Engineering Contractors	649
2	Boazi Khumbisa Engineering Contractors	384
3	Boazi Khumbisa Contractors	272
4	Sweetwater Contractors	218
5	Khaco Civil Engineering	220
6	Chitsime Civil Engineering	230
7	J & S Construction	286
8	Azele Civil Engineering Company	224
9	Mable Building Construction	258
10	Borehole Fund	188

3) Level and Volume of Labour Force and the Working Conditions

In Malawi, it is possible to recruit workers in different types of work as well as in different grades of work. Although there is, in principle, 5 working days in a week, it is not uncommon for site workers to work on weekends at a higher rate of payment. In the Project, Saturdays shall be for the working, for making the construction period less; 25 working days, in a month.

(5) Principles Regarding Local Equipment and Materials

The existing drilling equipment (one drilling rig, one compressor and one development unit) provided in a Japanese grant aid scheme in the past, in possession of MWD, shall be used in the Project, together with the equipment to be newly procured in the Project. The period, in which the drilling work be done using such equipment, coinciding with the work to be conducted by a subcontracted local drillers, there shall be 3 units simultaneously operating.

Locally available materials shall be used as much as possible. The materials to which no problem is being anticipated in respect of quantity, quality and delivery, include: cement, aggregates (gravel and sand), bricks, reinforcing bars, fuel (petrol and light oil), casings, screens and water pipes.

(6) Operation and Maintenance Capability of the Project Implementation Body

1) Project Implementation Body

In Malawi, the Water Resources Department, MWD, is responsible for the construction of rural water supply facilities, and the Water Supply and Sanitation Department, MWD, administers operation and maintenance of the facilities. The Water Resources Department be directly responsible for implementation of the Project. Figure 2-2-1 shows its organizational structure.

The Water Resources Department has an ample understanding of Japan's grant aid scheme, since its experience includes the implementation of the Groundwater Development Project in North Kawinga, 1987 to 1989, the Groundwater Development Project in Mchinji, 1991 to 1994, and the Groundwater Development Project in Mzimba West, 1997 to 1999. Its organizational structure as well as staff number are deemed sufficient for implementing the Project. As regards implementation funds, MWD has promised that the funds for CBM activities and for OJT in construction supervision (MK 5,818,000) be secured (refer to Appendix 4-Minute of Discussions); operation/maintenance expenses of the constructed facilities

(MK 806,000/year) might also be within the range of disbursement from the MWD recurrent budget (MK 79,000,000 to MK 117,000,000/year).

2) Operation and Maintenance of the Constructed Boreholes

In Malawi, in the rural water supply projects after 1994, the CBM Programme has been applied, by conducting education on the first-hand, daily maintenance of the facilities, with WPC set-up at the respective boreholes by the beneficiaries themselves. The CBM Programme has been undertaken nationwide, in the groundwater development projects implemented in Malawi, after 1994, including Mchinji and Mzimba West Groundwater Development Projects. Enlightenment activities undertaking have been accumulated, regarding the setting-up of the water supply community, education on operation/maintenance system and repairing method, hygiene education to the residents, fixing water charge by the residents, operation/maintenance of the facilities by the residents themselves, and others; accomplishments have been obtained almost as intended in most of the water supply communities the CBM Programme was undertaken.

Hitherto, WPC has been set-up under the guidance of the extension workers, being responsible, to the extent, for the periodical replacement of expendables. In January 1999, MWD altered the system to the intensified participation from planning phase to after completion and laid down the policy of setting up VHWC for taking the responsibility of operation/maintenance of water supply facilities per village. In this line, WPC came to be set-up in case more than one borehole in a village. VHWC/WPC shall be guided towards securing and managing funds required for the long-run maintenance including facility repairing.

In the executive side, the Area Executive Committee (AEC) composed of extension workers at the TA level (Assistants of MoHP, MoGYCS and MWD), District Executive Committee (DEC) at the District level, and the District Coordination Team (DCT) shall be instituted, and extend the support to operation/maintenance by the community, through monitoring water supply facilities and hygienic conditions.

The textbooks such as Trainers' Guide have been available in the new direction of the enlightenment activities and the monitoring, the financing of CBM activities relies on donors' funds as part of rural water supply/sanitation projects; furthermore, the extension workers, the locally-stationed personnel of MWD and the Ministries concerned, have not been experienced in the "participatory-type" method. Accordingly, in the Project, MWD shall bear the fund amount corresponding to that of the usual CBM activities, while the Japanese side shall extend support, technically and financially, to the entire enlightenment activities, such as a plan of activities adopting the "participatory-type" method, training to extension workers, and the proposals in monitoring and community training system.

Besides, motorcycles and a pick-up truck required in the enlightenment activities and in the monitoring shall be procured.

3) Equipment Operation and Maintenance

Borehole drilling equipment is administered by the Groundwater Development and Drilling Section of the Water Resources Department, MWD. Maintenance of equipment is conducted at the workshop disposed in 3 Regional MWDs (Muzuzu: Northern Region, Lilongwe: Central Region, and Blantyre: Southern Region), with 3 to 5 mechanics/electricians, respectively, belonging to the Equipment Units, Regional MWDs (total number: 11).

MWD has undertaken contract work of borehole construction and others, entrusted by other ministries and the private sector. Payments in the contract work are pooled in the treasury as funds for the different undertakings (excluding the personnel emolument, etc. disbursed from the ordinary account of the budget). The annual amount was MK 15 to 20 million in the last 3 years, partially earmarked for the equipment maintenance.

The drilling rigs have been used in the projects of international donors and 3,000 Borehole Programme with the national budget funds, for emergency measures at cholera outbreak sites, and others: approximately 50 boreholes are drilled per rig annually. All the 4 drilling rigs owned by MWD were provided in the past in the grant aid projects, having amply contributed to rural water supply projects. Nevertheless, 2 machines procured in FY 1989 have already been beyond the standard durable years, and a rig is suffering from marked decline of oil-pressure system performance. A truck this rig to be mounted on is superannuated markedly in engine and body, having been out of use since 1999, incapable of travelling at more than 60 km/hr on paved roads. Another truck is in operation; however, it often breaks down due to superannuation of oil-pressure system, engine and body. Not only the operation rate and operability are lowered but repairing cost becomes high.

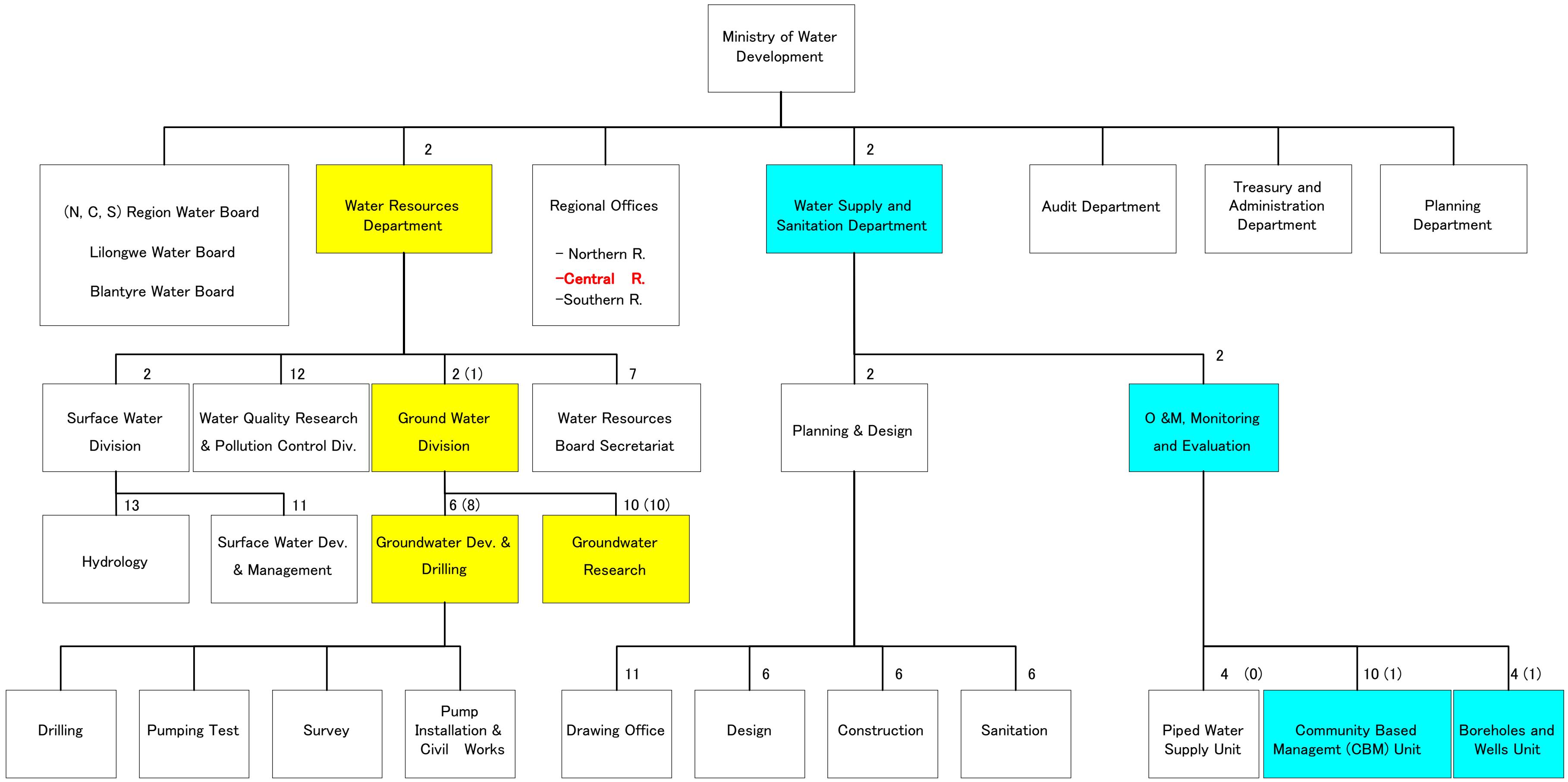
A drilling rig procured in FY 1992 is relatively well maintained; however, it is approaching to the end point of its standard durable years. Inevitably, the overall operability in drilling has lowered, and a considerable degree of repairing as well as adjustment is required in the major parts such as drill-head.

The latest drilling rig procured in FY 1997 has been maintained, and with favourable operational condition: replenishment of spare parts and expendables, to the extent of the routine maintenance, is only required.

Major equipment and tools for repairing are disposed in the Workshops, such as vehicle repair pit. In case technical expertise not meeting the requirements such as in repair of oil-pressure system, the repairing work is contracted out to the private repairer.

In consequence of the above, it is concluded that staff of the Equipment Unit, MWD, have a technical expertise enough for maintaining the drilling equipment including vehicles to the extent of daily use. It is also concluded, in the financial aspect, that operation/maintenance expenses be secured, since a part of treasury funds is earmarked for this purpose. Besides, it is considered that durable years of the equipment might be extended and maintenance costs in the repairing work reduced, provided that the technical level of the personnel as well as equipment and tools for repairing be further reinforced.

In the Project, it is scheduled that part of the existing equipment in the possession of MWD be furnished in the construction work. As preparatory work of the borehole drilling, spare parts for repairing and adjustment shall be replenished, the mechanics of the Contractor conduct the repairing and adjustment, and the Malawi side mechanics participate in repairing work as part of OJT for upgrading their skills. One cause of drilling equipment disability might be considered as the fact that the drilling work is continued without appropriate repairing, since it is mostly far from the workshop to drilling sites, couple with not good road conditions. So as to enhance maintenance capability as well as to maintain the drilling equipment in favourable working condition, a mobile workshop (vehicle) shall be added to the equipment procurement list in the Project.



: Charged with Borehole Construction

: Charged with Operation/Maintenance of Boreholes

Regional MWD, Central Region : Responsible for Target Area in the Project (Refer to Fig. 2-2-1 (2))

Remarks : Figures indicate the approved number of personnel.

( ) : number of personnel presently-manned.

Fig. 2-2-1 (1) Ministry of Water Development (MWD Headquarters)

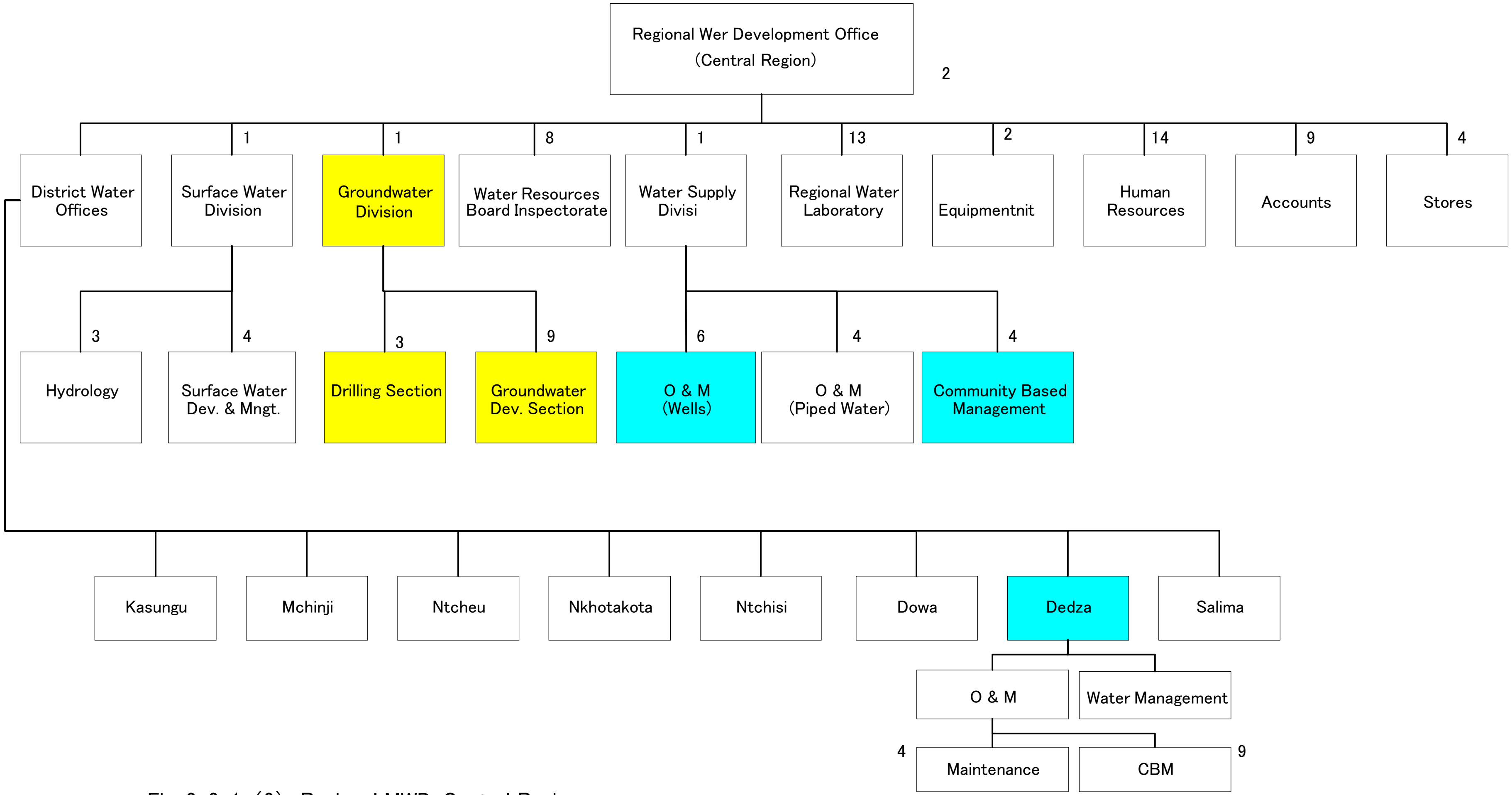


Fig. 2-2-1 (2) Regional MWD, Central Region

Remark : Figures indicate number of staff stationed.

2-2-2 Basic Plan (Construction Plan / Equipment Plan)

(1) Overall Plan

The Project envisages the construction of 177 borehole water supply facilities equipped with a hand pump in 154 rural villages in TA Chadza in Lilongwe District, and TA Tambala, STA Chauma, TA Kachere and STA Chilikumwendo in Dedza District where there is a shortage of safe and stable water supply facilities. These villages are located in the range of 10 to 80 km, the south and east of Lilongwe, the capital of Malawi. In addition to the borehole construction, the Project envisages the procurement of the equipment and materials required, as well as rendering assistance to the enlightenment activities in the water supply communities.

In the planning, the villages suitable for borehole construction have been selected, considering hydrogeological conditions, distribution of the existing boreholes, accessibility to the site, and others, by setting a user population of 100 to 500 per borehole from the socio-economic considerations, in order to draw the water supply situation in the Study Area to the national target in which service population ratio is set at 74% and user population 250 per borehole. The final drilling sites in the selected villages shall be determined from the results of detailed physical prospecting as well as in consultation with the residents at the construction supervision stage, in order to increase the success rate through finding a suitable aquifer as well as to reflect the opinions of the residents in the borehole siting.

The success rate of borehole drilling has been assumed to be 80% in the Project, after estimating 27% of unsuccessful borehole appearance (dry holes: 23% and boreholes with high fluoride concentration: 4%), in consideration of survey results, past performance of borehole drilling, and the existence of groundwater containing high fluoride concentration dotted in the Study Area.

Success rate = number of successful boreholes/(number of successful boreholes + number of dry holes and number of boreholes with high fluoride concentration)

= 1.0/(1.0 + 0.23 + 0.04)   0.8

The design drilling depth has been determined at 30 to 90 m, on an average 45 m, from the results of geophysical prospecting.

In the borehole construction work, a rig procured in the previous Japanese grant aid project as well as relevant equipment be furnished from the Malawi side. A rig shall be newly procured in the Project to be used also in construction work, with a view to effectively being utilised in borehole construction projects to come after the Project implementation, for the safe and stable water supply with the enhanced service ratio in Malawi. Furthermore, in the Project, local drillers with drilling capability increased in recent years shall be employed as subcontractors, mainly in the equipment procurement period, for making the construction period less.

As the Soft Component in the Project, the CBM Programme having been undertaken by the Government of Malawi since 1994 shall be improved and intensified, through extending support in the Japanese assistance, for the efficient undertaking of CBM activities adopting the “participatory-type” method, associated with the borehole construction work.

(2) Facilities Plan

1) Target Year

The Project aims at constructing, in an urgent manner, boreholes in the villages currently not provided with water supply facilities. The target year is set at 2004, the same as in 7,000 Borehole Construction Programme, the superior plan to the Project.

2) Basic Indicators of Water Supply

① Per Capita Water Supply Amount

The National Water Development Programme, 1994, sets forth the following target of water supply:

a) User population per borehole is not more than 250.

b) Per capita water supply amount is 27 lpcd (litres/capita/day).

c) Distance of fetching safe water is not more than 500 m.

From these figures, daily water supply amount per borehole would be 6,750 litres. Provided that daily operating hours of one borehole be 10, almost 34 buckets (20 litres/bucket) of water should be drawn an hour. The above target of user population would be adequate, if considering the time required in drawing water.

In the Project, as safe water shall be supplied to as many residents as possible, in determining borehole number to be constructed in target villages, user population of the individual boreholes not is being adhered to but user population in target village as a whole be drawn to the above target of 250 per borehole. In consequence, per capita water supply amount shall be set at 27 lpcd; then, the yield per borehole not less than 6,750 litre/day might be supplied to 250 users.

② User Population Per Borehole

[Maximum User Population]

According to socio-economic survey results, the current water consumption in Project Area is some 9 lpcd for drinking purpose and some 9 lpcd for miscellaneous use, totalling 18 lpcd.

Table 2-2-3 Consumption by Water Use Purpose in Project Area
(Findings in Socio-economic Survey)

TA (STA)	No. of Household Surveyed	Average Household Size	Average Water Consumption (litres)	Drinking Water (litres)	Water for Miscellaneous Use (litres)
Chadza	212	4.73	80	37	43
Tambala	149	4.19	78	37	41
Chauma	48	4.69	81	39	42
Kachere	132	5.30	97	52	45
Chilikumwendo	122	4.59	86	45	41
Total/Average	663	4.69	84.1	41.6	42.5
Per Capita			17.9	8.8	9.1

Although the fundamental is even the water for miscellaneous use to be taken from the safe water source, it is considered, in the Project, for the purpose of supplying water to as many residents as possible from the limited number of boreholes constructed, that the existing water source be inevitably utilised, only for miscellaneous use, when supply amount from the completed boreholes fall short in the villages with the larger user population. Towards the facilities with many users, concurrently served with water from the existing source, guided in the enlightenment activities in soft component of the Project would be, to use water only for washing, bathing and others. Moreover, in case the waiting time of water drawing foreseen to be excessively increasing, limitation of drawing amount as well as apportionment of drawing time shall be cautioned to be set-up autonomously after the deliberation inside the water supply community.

Taking into account the current water use situation of 9 lpcd for drinking and 9 lpcd for other purposes, towards the villages with over 250 populations, provided that maximum half (13.5 lpcd) of the national target of per capita supply amount (27 lpcd) be permitted to be taken from the existing source and not less than 13.5 lpcd of drinking water supplied, 500 users might be served with the standard daily yield per borehole of 6,750 lpcd.

After the examination of the above, the borehole number to be constructed in the Project has been determined, so as not to exceed the user population of 500 per borehole, based on the current population size clarified in the socio-economic survey, and, considering the population increase up to the time of the Project completion. 23 villages shown in Table 2-2-4 will have more than 500 of population, requiring more than one borehole. These villages shall be provided with 46 boreholes in the construction.

Generally apprehended is the inter-borehole influence, with the lowered groundwater table, in the proximity caused by water drawing in the closely-located boreholes. Almost 500 m to 1,300 m of intervals might, however, be secured between the neighbouring boreholes, according to the village area estimated from the population density in the surrounding areas (EA: statistical unit in the Census) including the requested villages, as well as from village population. Since the influential radius is to be 100 m to 300 m in case of such unconfined groundwater as in Project Area, it is considered that drilling sites might be selected so as not to cause the problem of groundwater table drawdown.

In determining actual drilling sites, the location shall be disposed for the purpose of securing more than 300 m of distance to the existing borehole as well as to the borehole to be newly constructed, after examining the results of detailed geophysical prospecting together with the intention of the water supply community.

[Minimum User Population]

If there are too few users of borehole, not only its efficiency would be reduced but daily maintenance expenses hardly be collected in such villages as with small cash income, in accordance with the CBM principle that the users shall bear borehole maintenance costs; thereby sustainable use of boreholes might be encumbered.

It is revealed in the socio-economic survey that annual average household income ranges from MK1,200 to MK1,500 in Project Area. It is generally held as affordability that the burden of water charge might be endured up to around 5% of annual amount of income. After the borehole completion, MK1,200 to MK1,500 is annually required in the maintenance, to be undertaken by the residents in accordance with the CBM Programme. In proportion, at least 100 users are required to a borehole. That is to say, as an average household size is 4.7 according to the socio-economic survey, MK1,277 of maintenance expenses might be collected from 100 users. (MK1,200 $\times$ 0.05 $\times$ 100/4.7 = MK1,277). In the water supply community, MK1,200 to MK5,000 has been collected annually, according to the interview survey conducted in the community with the existing borehole near Project Area. Thus, almost same or larger amount of maintenance cost has been actually collected so far, if compared to the above.

Besides, in the village having population of 100 or less, when the water supply community be formed inclusive of households of the neighbouring villages, the village population plus population of the neighbouring villages shall be regarded as the user population. In this respect, at the time of setting-up of VHWC/WPC, it is required to take note in forming the water supply community with user population enough for securing maintenance cost, inclusive of nearby villages, as the case may be.

In the Project, from the viewpoints of actual user population of the existing boreholes nearby as well as from the requirement of maintenance expenses collection, the case in which the user population is less than 100 to a borehole has been excluded from the construction plan.

③ Distance of Fetching Water

Taking the villages shown in Table 2-2-4 as an example, the population density ranges from 115 to 890 persons/km^2 in Project Area. Provided that user population to be 500 to a borehole at the maximum, it is considered that 500 m of distance of fetching water might be mostly secured, with the exceptional possibility of around 700 m in some villages.

Table 2-2-4 Villages Requiring More Than One Borehole and Inter-Borehole Distance

TA (STA)	No.	Village Name	Population	Number of Boreholes Required	Number of Existing Boreholes	Number of Planned Boreholes	*2) E/A No.	Population Density (persons/km^2)	Estimated Village Area (km^2)	Approx. Diameter of Village (km)	Estimated Inter-Borehole Distance (m)
Chadza	1	Kamchedzera	512	2	0	2	64/65	512	1.0	1.1	550
	2	Kaputuka	645	2	0	2	28	751	0.9	1.1	550
	3	Mlinga	839	2	0	2	27	628	1.3	1.3	650
	4	Mchizampheta	860	2	0	2	57	790	1.1	1.2	600
	5	Kadambe	628	2	0	2	19	680	0.9	1.1	550
	6	Mphete	976	2	0	2	7	398	2.5	1.8	900
	7	Marichi	529	2	0	2	68	362	1.5	1.4	700
Tambala	8	Mapemba	516	2	0	2	38	457	1.1	1.2	600
	9	Mfumbwa	1,066	3	0	2*1)	7	198	5.4	2.6	1,200
	10	Gwengwe Chilungusi	1,591	4	2	2	17	514	3.1	1.7	600
	11	Matipa (Mkundi)	1,290	3	2	1	7	319	4.0	2.2	1,000
Chauma	12	Chikumba	1,032	3	0	3	13	272	3.8	2.2	1,000
	13	Mthawanthu	516	2	0	2	12	442	1.2	1.2	600
Kachere	14	Kafere	1,200	3	1	2	5	173	6.9	2.7	1,250
	15	Chikalungeni	645	2	0	2	64	889	0.7	1.0	500
	16	Veru	658	2	0	2	57	352	1.9	1.5	750
	17	Yonani	645	2	0	2	28	144	4.5	2.4	1,200
	18	Gelemani	516	2	0	2	14	195	2.6	1.8	900
	19	Chapukata	538	2	0	2	54	256	2.1	1.9	950
	20	Mtende	559	2	0	2	49	296	1.9	1.6	800
	21	Mphasayaweni	516	2	0	2	42	257	2.0	1.6	800
Chilikumwendo	22	Chatondeza 1 and 2	507	2	0	2	27	338	1.5	1.4	700
	23	Chimanbamtengo	624	2	0	2	14	115	5.4	2.6	1,300
				52	5	46					

*1): At Mfumbwa, the construction of three boreholes was judged to be difficult, as electric prospecting results indicate that there exist partially an area any aquifer not likely to be found.

*2): Enumeration Area (an areal unit in Census).

3) Borehole Disposition Plan

After examining the requested villages on the basis of survey results, the target villages for Japanese cooperation have been selected. Excluded villages are such that:

- Favourable aquifer might not be found, due to hydrogeological conditions;
- Access of drilling rig would be difficult;
- Sufficient number of boreholes has already been provided to the village population; and,
- New borehole construction is scheduled in the other projects.

Besides, the borehole number to be constructed in the selected villages has been determined, in such a manner as the user population being 500 or less.

The target villages divided by TA, planned borehole number, and the planned location, are as shown in Table 2-2-5 and Figure 2-2-2. And, in Appendix 6 indicated are the name of villages to which the borehole construction has been planned.

Furthermore, the Project Area might, from topographical and hydrogeological conditions, be classified as; (1) flat land, in the south-west, and (2) hilly areas abundant in the undulation, in the north-east. In the former, the aquifer existence might generally be expected in the weathered zone of bedrocks, while that might be found only in the limited geological conditions such as in fractured zones of the latter in which fresh rocks come out in many cases from shallow underground. Table 2-2-5 indicates the planned borehole number with such the topographical and hydrogeological classification as well.

[Selection of Target Villages out of the Requested Villages]

(a) Target villages have been selected in the Project, based on overall evaluation of: (1) electric prospecting results, (2) existing boreholes and construction plan in the other projects, (3) socio-economic survey results, and (4) accessibility.

(b) Out of 234 requested villages, 223 villages have been examined for selecting target villages in the Project, after excluding 5 of not existing or duplicated villages and 6 with no viable accessibility. According to field investigation, the villages were graded into 3 in the items (1) to (4) above.

As a result of overall evaluation, it is concluded that 154 target villages in 5 TAs (Chadza, Tambala, Chauma, Kachere and Chilikumwendo) and a total of 177 boreholes construction be adequate in the Project, which is shown in Table 2-2-5.

(c) Population used in the socio-economic survey contains both the population given in the interview to village headmen and the estimation based on 1998 Census. Notwithstanding, the Census population is too much detailed. The livelihood sphere of the villagers not always coincide with the geographical boundary of the statistical unit in Census, as the settlements are often in a combination of different parts of neighbouring villages. The population furnished from the village headmen has been, in consequence, used in the Project, as the more realistic one.

Table 2-2-5 Target Village and Planned Borehole Number by TA

TA (STA)	Requested No. of Villages	No. of Villages Surveyed	No. of Target Villages	No. of Villages with 1 Borehole (population: 100 to 500)	No. of Villages with 2 Boreholes (population: 500 to 1,000)	No. of Villages with 3 Boreholes (Population: over 1,000)	No. of Planned Boreholes		
							①	②	Total
Chadza	71	71	58	51	7	0	47	18	65
Tambala	59	49	29	26	3	0		32	32
Chauma	16	16	7	5	1	1		10	10
Kachere	47	46	27	19	8	0	35		35
Chilikumwendo	41	41	33	31	2	0	35		35
Total No. of Villages	234	223	154	132	21	1			
Total No. of Boreholes				132	42	3			177

Note: ① Flat land in the south-west; ② Hilly areas in the north-east

4) Beneficiary Population

The current population of target villages is approximately 49,600. If deducting 1,400 of estimated users of the existing boreholes, beneficiary population is approximately 48,200. Provided with the average annual population increase rate of 1.5% (Dedza District, 1987 to 1998), beneficiary population in the target year would be 50,400.

Table 2-2-6 Selection Results of Target Villages in the Various Concerns

TA (STA)			Chadza	Tambala	Chauma	Kachere	Chilikumwendo	Total
Electric Prospecting Results	a	A well-developed favourable aquifer is expected.	24	15	4	22	21	86
	b	Further clarification of geological conditions through the detailed survey is required.	42	30	6	24	19	121
	c	It is difficult to obtain groundwater in the village and its environs.	5	4	6	0	1	16
Existing Boreholes	a	No borehole existing or the existing borehole(s) is beyond rehabilitation or construction of a new borehole(s) is required, because the user population exceeds 500.	60	37	13	25	30	165
	b	The existing shallow well (PSW) has a problem of (i) water quality, (ii) water volume and/or (iii) drying-up in the dry season.	3	0	0	2	4	9
	c	There is a broken down borehole either under rehabilitation or repairable by the WPC or there is a borehole under construction or planned to construct.	8	12	3	19	7	49
Socio-economic Survey Results	a	There is a consensus among villagers to the construction of a borehole and they are willing to pay O & M cost.	70	46	16	46	40	218
	b	There is a consensus among villagers to the construction of a borehole and they are willing to pay O & M cost. Although the village population is less than 100, it can exceed 100 if the population of a nearby village(s) is joined.	1	0	0	0	1	2
	c	There is no consensus among villagers to the construction of a borehole. Moreover, they are unwilling to pay O & M cost. The village population is less than 100 and will not exceed 100 even if the population of a nearby village(s) is joined.	0	3	0	0	0	3
Accessibility	a	There is no problem of access to the village.	68	25	5	46	39	183
	b	Road and bridge repair and improvement are required to secure access to the village. There is no access problem during the dry season.	3	22	11	0	2	38
	c	Vehicle (drilling rig) access to the village is extremely difficult.	0	2	0	0	0	2
Evaluation	○	All of the evaluation results for each factor are either a. or b. These villages are included in the scope of the Project.	58	29	7	27	33	154
	×	The evaluation results of each factor include at least one c. These villages are excluded from the scope of the Project.	13	20	9	19	8	69
Total			71	49	16	46	41	223

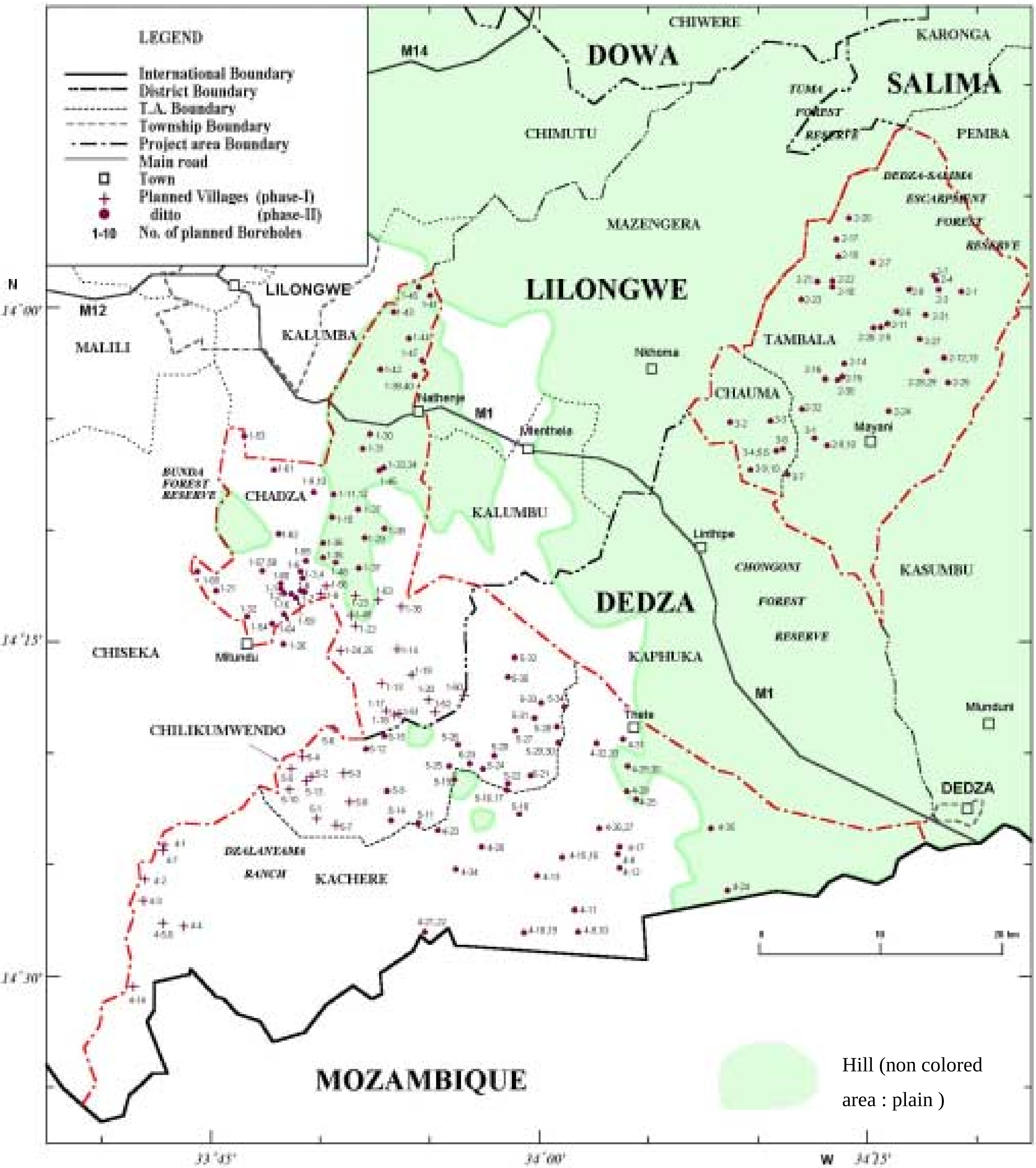


Fig. 2 –2 –2
Location Map of Planned Boreholes

5) Hydrogeological Conditions and the Success Rate in Drilling

[Dry Hole Rate]

In the Study, electric prospecting was conducted at 230 sites in the 226 villages accessible, and, as a result, the aquifer structure was classified into 4 types from the specific value of resistivity. Characteristics of each type and the possibility of dry hole appearance (including the case of borehole yield being less than the standard yield of 0.2 litres/sec) are as shown in Table 2-2-7.

Heavily-weathered and weathered bedrocks, forming aquifers, are distributed in much a diversified way in the area, even in a narrow range of one village. Even with favourable electric prospecting results, there is a possibility of dry hole appearance. For this reason, it is quite difficult to fix a dry hole rate directly to the classified aquifer type. Notwithstanding, the dry hole rate has been determined, hereunder, by referring to the accomplishment of 3,000 Borehole Construction Programme.

In TA Kachere and STA Chilikumwendo, with almost the same composition of Types A and B, the dry hole rate was around 15% in 3,000 Borehole Programme; 4 dry holes as against 29 successful boreholes. In the Study, assumed is an average dry hole rate of Types A and B corresponding to 15%, 10% of dry hole rate shall be set to Type A to which a favourable aquifer might be expected, and 20% to Type B having comparatively not a favourable condition.

In TA Tambala, composed of 1/3 of Type B and 2/3 of Type C, less aquifers to be expected to, 3,000 Borehole Programme has 28.6% of dry hole rate; 4 dry holes as against 14 successful boreholes. 20% of dry hole rate being fixed to Type B as above, 33% of dry hole rate shall be set to Type C, from the ratio of Types B and C composition.

Type D is characterised by a small resistivity value of bedrocks below the major aquifers and the dry hole rate might be inferred in the middle of Types A and B; therefore, 15% of dry hole rate shall be set to Type D.

As stated previously, Project Area might be divided into 2, according to hydrogeological conditions: (1) flat land occupying south-western part of Project Area, and (2) hilly areas occupying the north-eastern part. Number of planned boreholes by type of resistivity is summarised in Table 2-2-8. The estimated dry hole rate to the total number of planned boreholes is, according to the above dry hole rate by type, 23%.

[Standard Yield]

From the target of water supply (250 users/borehole, and per capita water supply amount: 27 lpcd), a standard daily yield of one borehole is 6,750 litres/day. It is a common practice that water drawing is done intermittently, spanning from dawn to sunset. Provided that the above daily yield be taken in 10 hours, on an average, 0.19 litres/sec of water would have to be drawn. In the Project, however, from the past performances in the existing boreholes, a standard yield shall be set at 0.2 litres/sec, and, in the continuous pumping test to be conducted after the borehole drilling, to be confirmed is that the water level be kept stable at the yield of 0.2 litres or more. Time of continuing the pumping test shall be 4 hours. If water level stability be not confirmed, the test shall be conducted either by extending the time up to 10 hours at the maximum or by reducing the pumping amount. Also, from the past performances in the existing boreholes, water level drawdown shall not be more than 30 m below the static water level. In this occasion, the dynamic water level shall not be more than 40 m below from the ground surface, in view of the head of the Afridev pump.

Table 2-2-7 Resistivity Type and Dry Hole Rate

Resistivity Type	Inferred Geological Formation	Aquifer Characteristics	Resistivity and Bottom Depth of Main Aquifer	Major Areas of Distribution	Estimated Dry Hole Rate (Dry Holes/ Planned Boreholes)
A	Alluvium	The lower part of thickly distributed alluvium forms partially an aquifer.	20 to 300Ω – m 35 to 55 m	Mainly in flat land (TA Kachere and STA Chilikumwendo, and part of TA Tambala)	10%
	Weathered Rock	The thickly distributed weathered rock forms a favourable aquifer, as its resistivity value is small.			
	Bedrock	If resistivity value is small, upper part of bedrock forms an aquifer.			
B	(Alluvium) Weathered Rock	The layer is thinner than in Type A, and the depth to bedrock forming an aquifer is slightly more shallow.	20 to 500Ω – m 30 to 45 m	Almost in entire Project Area	20%
	Bedrock	Although resistivity value is relatively big, groundwater might be expected partially in fractures and others.			
C	Weathered Rock	Resistivity value is slightly big, and few favourable aquifers might be expected with thin thickness.	20 to 700Ω – m 20 to 30 m	Almost in entire Project Area, but relatively a lot in TA Chadza, TA Tambala and STA Chauma	33%
	Bedrock	Resistivity value is generally big, not forming aquifers. However, groundwater might be expected in the fracture zone, as partially such layers as with small resistivity value is present inter-layers.			
D	(Alluvium) Weathered Rock	Aquifers might be expected in the outer layers, as in Types A and B.	25 to 400Ω – m 40 to 50 m	Though the cases being few, almost in entire Project Area, particularly in TA Chadza.	15%
	Bedrock	Indicated by small resistivity values, groundwater might be expected; however, special care is required in case of 10Ω – m or less, as possibly be estimated the water quality deterioration, existence of conductive quality of rocks such as clay, and others.			

Table 2-2-8 Hydrogeological Conditions and Dry Hole Rate in Project Area

Geographical Area	Topography and Geology	Aquifer Conditions	Resistivity Type According to Electric Prospecting and Borehole Number							
			Type	Planned Borehole Number by Resistivity Type *						Dry Hole Rate
				CDZ	TMB	CUM	KCR	CKM	Total	
① Flat Land: - Central to Western TA Kachere - Southern TA Chadza - Almost entire STA Chilikumwendo	[Topography] Plateau with flat peneplain characteristics, undulating gently, reaching the Mozambique border; dotted with monadnocks. [Geology] The outer layer near Dambo consists of alluvial silt and clay. Areas higher than Dambo mainly consist of weathered bedrocks. The bedrock mostly consists of gneiss.	Weathered bedrocks distributed deep below the alluvium gently spread over the undulating ground surface, lie in many places (Types A and B). The approximate aquifer depth is between 20 m and 80 m. The depth of bedrocks is more shallow (Type C) in the surroundings of the dotted monadnocks.	A	0	0	0	13	10	23	10%
			B	13	0	0	13	14	40	20%
			C	24	0	0	6	8	38	33%
			D	11	0	0	3	3	17	15%
			Total	48	0	0	35	35	118	21.5% (weighted average)
			Type	Planned Borehole Number by Resistivity Type *						Dry Hole Rate
				CDZ	TMB	CUM	KCR	CKM	Total	
② Hilly Areas: - Almost entire TA Tambala - Almost entire STA Chauma - Eastern TA Kachere - North-eastern TA Chadza	[Topography] Transitional fringe of plateau to lowland in the Rift Valley, with outcropping bedrocks caused by erosion, the dissection proceeding. [Geology] Heavily-weathered bedrocks lie near the outer layer. Bedrocks mostly composed of gneiss often outcrops, or being distributed at the shallow underground.	In addition to the well-developed weathered portion associated with fracture zone, etc. (Type B), bedrocks lie mostly shallow underground (Type C) in many sites. The approximate aquifer depth is between 15 m and 50 m, which is shallow more than ①.	A	0	1	0	0	0	1	10%
			B	8	10	8	0	0	26	20%
			C	8	19	2	0	0	29	33%
			D	1	2	0	0	0	3	15%
			Total	17	32	10	0	0	59	26.0% (weighted average)

* CDZ: TA Chadza; TMB: TA Tambala; CUM: STA Chauma; KCR: TA Kachere; CKM: STA Chilikumwendo

Total: 177 23%

[Unsuccessful Rate in View of Water Quality Standard]

In Project Area, it is apprehended that groundwater contains a high concentration of fluoride. In Malawi, Water Department Tentative (WDT) Standard has been set up to borehole water to be supplied without treatment, based on WHO water quality guidelines, and, in consideration of the natural and social conditions. As a health injury, it is said that mottled teeth might be appeared in drinking constantly water with fluoride concentration of more than 3 to 4 mg/litre in quantities. MWD has adopted 3 mg/litre of standard fluoride concentration, for not causing health injury, considering the distribution of fluoride-containing bedrocks in the country as well as the difficulty in difluoridating borehole water. In the Project, if the fluoride concentration be detected exceeding the standard of 3 mg/litre, any borehole shall be placed as "unsuccessful". In this occasion, the alternative sites shall be explored, as part of construction supervision, considering geological structure such as the direction of dyke or vein originating fluoride, and an alternative borehole, the 2nd one, shall be drilled in the same village; however, no more 3rd one shall be drilled.

The probability of water coming out with fluoride concentration more than the standard being related to geological characteristics, it is difficult to predict the existence of high-fluoride-concentration water in advance, since the estimated fluoride originating source, thin layers of quarts vein or pegmatite dyke, having intruded to the bedrocks at the final stage of their formation, are dotted in a large number not always being appeared at the ground surface.

Although none of 15 samples in the detailed water quality test in the Study has had fluoride concentration more than the standard (3 mg/litre), in the test conducted in the past, detected were fluoride concentration more than the standard, as many as 4 out of 6 samples. If the simple average between the past data and the detailed test results in the Study (total 21 samples) be taken, 24% (4 samples) exceed 3 mg/litre as against 17 samples below the standard. If judged from solely the test results in the Study, the probability of exceeding 3 mg/litre is less than 1/15 (approximately 6%). On the other hand, on-site simplified water quality test revealed that 10 (8.3%) out of 120 borehole water samples had fluoride concentration more than 3 mg/litre. Of these, 7 were taken in TA Chadza (26% of the 27 samples), and the remaining 3 samples in TA Tambala and STA Chauma (6% of the 50 samples). No sample showed high fluoride concentration in TA Kachere and STA Chilikumwendo. Although the simplified water quality test lacks the accurateness in the measurement, indicated is that groundwater with high fluoride concentration has an areally-biased distribution in Project Area.

Table 2-2-9 Variation of Fluoride Concentration in Water Quality Test

<table>
<tr><th colspan="2">Test/Study</th><th>No. of Samples</th><th>①
Below
3 mg/litre</th><th>②
3 mg/litre and over</th><th>②/①</th><th>Remarks</th></tr>
<tr><td colspan="2">Existing Data of MWD</td><td>6</td><td>2</td><td>4</td><td>2.0</td><td>Criteria of sampling, unknown.</td></tr>
<tr><td colspan="2">Detailed Test in the Study</td><td>15</td><td>15</td><td>0</td><td>0</td><td></td></tr>
<tr><td colspan="2">Simplified Test in the Study</td><td></td><td></td><td></td><td></td><td>Accurateness, low.</td></tr>
<tr><td rowspan="4">Area Division</td><td>Whole Area
(Total)</td><td>120</td><td>110</td><td>10</td><td>0.083</td><td>Biased, according to area and geology.</td></tr>
<tr><td>TA Chadza</td><td>27</td><td>20</td><td>7</td><td>0.26</td><td></td></tr>
<tr><td>TA Tambala
STA Chauma</td><td>50</td><td>47</td><td>3</td><td>0.06</td><td></td></tr>
<tr><td>TA Kachere
STA Chilikumwendo</td><td>43</td><td>43</td><td>0</td><td>0</td><td></td></tr>
</table>

The probability of fluoride concentration exceeding 3 mg/litre shall be set by TA, as in the following:

- The probability in entire Project Area be set at 3%, which is half of detailed test results (less than 6%).

- To reflect areally-biased distribution, the probability in the simplified test be multiplied with the ratio of the probability (36%) in the simplified test (8.3%) and with the probability in the detailed test (3%) in each TA.

In consequence, unsuccessful rate in view of fluoride concentration shall be set by TA, as in Table 2-2-10.

Table 2-2-10 Unsuccessful Rate in View of Fluoride Concentration

TA	Probability	No. of Planned Boreholes	No. of Unsuccessful Boreholes
TA Chadza	26.0% x 0.36 = 9.0%	65	6
TA Tambala and STA Chauma	6.0% x 0.36 = 2.0%	42	1
TA Kachere and STA Chilikumwendo	0%	70	0
Whole Area (Total)	7 boreholes (4%) out of the planned 177 boreholes: unsuccessful		

[Measures towards Unsuccessful Boreholes]

If an aquifer is not found in drilling up to the planned depth, the following measures shall be taken:

(a) After the comparison between electric prospecting results and drilling results, termination or further continuation of drilling shall be determined, in consultation with the consultant supervisor. Even shallow more than the planned depth, in case no aquifer judged to be found at the deeper place, the drilling shall be stopped after consultation.

(b) When the drilling in extension of the depth fail or the drilling is stopped after consultation as above, the borehole shall be placed as unsuccessful.

(c) Even if groundwater found, a borehole shall be placed as unsuccessful in case the yield being less than the standard 0.2 litres/sec. in the pumping test after casing inserted.

(d) If the results of on-site simplified tests exceed the relevant WDT Standard values, a laboratory test shall be conducted to such items. When the laboratory test results confirm the original value, the borehole shall be placed as unsuccessful. Specifically to fluoride, the laboratory test shall confirm that the fluoride concentration, detected in the simplified test, be not less than half of the Standard.

(e) When a drilled borehole be placed as unsuccessful, in the consequence of the above, the second borehole shall be drilled, with the approval of

VHWC/WPC, after selecting an alternative site in the same village or the same water supply community, through additional electric prospecting and others. At the alternative site, considering the geological structure, the drilling shall proceed to the right angle with, or perpendicular to, the direction of dyke or vein, the estimated fluoride originating source.

(f) If the second borehole also be placed as unsuccessful due to (b) through (d) above, no more drilling shall be done in the target village.

4) Average Drilling Depth of the Planned Boreholes

Shown in Appendix 6 are both the bottom depth of aquifers at electric prospecting sites in the target villages and the provisional drilling depth in the case the drilling to be done at such sites, having been determined from electric prospecting results in the Study. The provisional drilling depth is such that the screen installation depth might be up to the bottom of aquifers, and the length of casing required in installing a pump be added.

In the target villages, a drilling site with more than 20 m of aquifer depth shall be selected in order to secure the minimum drilling depth of 30 m, considering the contamination caused by infiltration of foul water. Moreover, in accordance with 85 m of maximum aquifer bottom depth revealed in electric prospecting, the provisional drilling depth shall be set at 90 m, in the Project, by adding a margin in the drilling.

As for the resistivity Type D mentioned previously, for the reason that it is apprehended there exist not-favourable-quality water in the deeper part below the aquifer bottom, the drilling depth shall be set around the bottom of aquifers, including the pump installation depth. The average provisional drilling depth by TA (STA) is as shown below.

TA (STA)	No. of Planned Boreholes	Provisional Drilling Depth (Average)
Chadza	65	44 m
Tambala	32	38 m
Chauma	10	38 m
Kachere	35	45 m
Chilikumwendo	35	46 m
Total	177	43 m

The bottom of aquifers composed of the weathered gneiss being much uneven, in order to exploit groundwater in a stable manner, the drilling site shall be selected where an aquifer is thick as well as deep, and the drilling work be continued until the bedrock formation might be confirmed in several metres. Electric prospecting was conducted, in principle, at one site in one target village (2 sites in large target villages) in the Study; therefore, the selected site not always has a favourable hydro-geographical condition. In a detailed survey to be conducted in the construction supervision, for securing the surer water source, through conducting electric prospecting and others at more than one location, a drilling site shall be selected where a deeper aquifer might be expected. In consequence, it is considered that the depth of aquifer bottom at the drilling site to be actually selected would be deeper than that confirmed in the Study, and the drilling depth to be determined from the detailed survey shall be deeper than the above provisional drilling depth set-up from the electric prospecting results in the Study.

The drilling depth to be determined after the detailed survey would be deeper than the provisional drilling depth; it shall be set at 45 m as against the above 43 m.

(3) Equipment Plan

1) Basic Principles in the Equipment Selection

The following are the principles adopted in selecting types and quantities of equipment to be procured, for the purpose of smoothly implementing groundwater development in the Project:

① The equipment to be procured shall be selected among those to be used in the borehole construction work in the Project, based on the necessity in MWD groundwater development projects to come as well as the appropriateness judged from the maintenance system, etc.

② Equipment shall be selected, by referring to MWD organizational structure, personnel, accomplishments, and equipment and materials possessed.

③ In the northern part of Project Area, movement is required in much undulating, hilly areas. The sites being mostly located 10 to 50 km away from the paved National Road, the equipment to be selected shall have an excellent mobility as well as running stability.

④ Geological features at the drilling sites are diverse, from loose soil and sand distributed in the surface layer in the plain to hard rocks having fracture zones. The equipment to be selected might cope with such diversified geological features.

⑤ In the equipment selection, to be examined are; (i) appropriateness in terms of work efficiency, construction period and economics, and others, and (ii) long-run appropriateness judged from the equipment utilisation plan, maintenance system and others, after the Project implementation.

⑥ In selecting equipment, to be considered are the operability, durability, prospects in the future, ease in procuring spare parts, ease of maintenance, accomplishments, price including costs of transportation and packing, after-sale service, and others.

⑦ The weight (GVM) of a vehicle, including drilling rig, to be procured shall not be more than 16 tons, considering the road conditions in the northern hilly areas (much undulating, narrow, unpaved roads, and the bearing capacity of bridges: 20 tons).

Based on the basic principles above as well as design principles, and, in consideration of borehole construction equipment owned by MWD, the equipment required in implementing the Project and the equipment to be newly procured in the Project might be listed as in Table 2-2-11.

Table 2-2-11 Equipment Plan

[Construction Equipment]

Item	Requested Quantity	Required Quantity	Existing Equipment to be Furnished	To be Brought-in	To be Newly Procured
1. Borehole Construction Equipment					
1.1 Truck-Mounted Drilling Rig 1)	2	2	1		1
1.2 Truck-Mounted High Presser Air Compressor 2)	2	2	1		1
1.3 Development / Pumping Test Equipment and a Truck (GVM 10 tons)	2	2	1		1
1.4 Water Tank (Portable; 4 m^3)	2	2	1	1	
1.5 Fuel Tank (Fixed 6 m^3: 1) (Portable 4 m^3: 1 to 2)	2	2	2		
1.6 Hand Pump (Afridev Type)	1 set	177	0	Incl. in direct construction cost	
1.7 Screen and Casing Pipe	1 set	1 set		Same as above	
2. Testing Equipment					
2.1 Electric Prospecting Instrument	2	2	0	1 to 2	1
2.2 Electric Logging Instrument	2	3	1	1	1
3. Support Vehicles					
3.1 Truck with Crane (5 tons)	2	0	0		
3.2 Truck with Crane (3 tons)	2	5	1	3	1
3.3 Pick-Up Truck (Double Cabin)	3	2	0	2	
3.4 Pick-Up Truck (Single Cabin)	3	3	0	2	1
3.5 Mobile Workshop (GVM 10 tons) Vehicles	1	1	0		1
3.6 Station Wagon		2		2	
4. Others					
4.1 GPS	10	3		3	
4.2 Radio Communication Equipment	1 set	1: Office 3: mobile		1: Office 3: mobile	
4.3 Repairing Equipment for Mobile Workshop	1 set	1 set			1 set
4.4 Spare Parts of Above	1 set	1 set		Incl. in direct construction cost	
4.5 Spare Parts for Repairing the Existing Equipment	1 set	1 set		Spare parts incl. in direct construction cost	

[Equipment for CBM Activity]

Item	Requested Quantity	Required Quantity	Existing Equipment to be Furnished	To be Brought-in	To be Newly Procured
1. Pick-Up Truck (Double Cabin)	1	1	0	0	1
2. Motorcycle	6	3	0	0	3

Notes

1) Specifications of equipment to be procured: drilling depth; 100 to 150 m, hole diameter; 171 to 270 mm, and truck; 4 x 4, GVM 16 tons
2) Specifications of equipment to be procured: discharge pressure; more than 17.5 kg/cm^2, discharge air volume; more than 20 m^3/min, and truck; 4 x 4, GVM 16 tons

The system of construction work is as outlined below; the more detailed description might be found in Section 2-2-4.

[Phase 1]

① 36 boreholes shall be drilled with drilling rigs and workers of local subcontractors. 2-machine system shall be applied, in consideration of work schedule.

② After the drilling completed, civil-engineering teams (almost 2 teams) shall construct ancillary structures, and install a hand pump.

③ The drilling rig and the relevant equipment to be furnished from the Malawi side for the use in Phase 2, shall be repaired and adjusted.

[Phase 2]

① 141 boreholes shall be drilled with a newly procured drilling rig, a furnished existing rig, and a rig owned by the local subcontractor. The work shall be done, respectively, by a drilling team and a pumping test team.

② After the drilling completed, the civil-engineering teams (almost 3 teams) shall construct ancillary structures, and install a hand pump.

2) Examination on Equipment to be Procured

It is expected that the drilling rig and the relevant equipment, as described hereunder, to be utilised in MWD rural water supply projects efficiently and continuously after the Project implementation, might contribute greatly to securing safe and stable drinking water, the basis of country's poverty alleviation programme, not only in the attainment of hitherto prolonged target of service ratio enhancement in the rural areas but in water supply facilities construction in an emergency to cope with cholera outbreak, flood hazards and others. Procurement of new equipment shall be considered to such an extent as appropriate towards MWD programmes to come.

[Accomplishment of the Existing Equipment and Current Situations]

The existing drilling rigs procured in 3 Japanese grant aid projects in the past (enough for 4 drilling teams) have been thoroughly utilised after the respective projects implemented, such as in rural water supply projects of other aid organizations, water supply in the camp of Mozambique refugees, and in 3,000 Borehole Construction Programme, 1998 to 2000, financed in the national budget, indicating the accomplishment of almost 50 boreholes annually constructed by one drilling rig, and contributing significantly to rural water supply undertakings in Malawi.

The recent situation of drilling rig use, after the Mzimba West Project, 1997 and 1998, is shown in Table 2-2-12. Construction accomplishment being almost 50 boreholes a year, it is considered that annual operating days might be more than the standard of 110 days. 2 rigs procured in the North Kawinga Project in 1998 have already been beyond the standard durable length of time (9.3 years), and one has been not operating since 1999 due to excessively large amount required in repairing. Another is still operating even after 12 years, owing to the overhaul conducted at the occasion of its use in the Mzimba West Project. Nevertheless, its faculty is declining, and it is anticipated that the repairing cost swell from this time on.

The drilling rig procured in 1992 would reach the end of its durable years when the Project implementation be commenced. Though superannuation being in progress, generally, it is currently in favourable operating conditions, together with the rig procured in 1997. It is much probable that a currently-operable North Kawinga rig be able to serve not for long, from now on, due to the declining faculty. For carrying out the borehole construction in the national programme, as delineated in the succeeding section, the drilling rigs owned by MWD should be supplemented.

Table 2-2-12 Utilisation Situation of the Drilling Rigs Provided in the Past

Vehicle No.	Project and Year of Procurement	Period of Use	Projects/Clients the Vehicle Being Used	Number of Boreholes
MG178L	North Kawinga (1989)	1989 to 1999	—	Not operating after 3,000 Borehole Construction Programme
MG177L	North Kawinga (1989)	1998 to 2000	- 3,000 Borehole Construction Programme - Ministry of Agriculture - Ministry of Health - Private enterprises, churches, etc.	Total: 76 boreholes/1.5 years
		2001	- Emergency 62 Borehole Project	Proceeding
MG930P	Mchinji (1992)	June 2000 to March 2001	- UNDP - Customs - 3,000 Borehole Construction Programme - Emergency 62 Borehole Project - Private enterprises	4 new boreholes 1 new borehole 8 new boreholes 20 new boreholes (proceeding) 2 new boreholes Total: 35 new boreholes
MG254U	Mzimba West (1997)	March 2000 to March 2001	- 3,000 Borehole Construction Programme - UNDP - Emergency 62 Borehole Project - Ministry of Finance - Private enterprises and churches	21 new boreholes 11 new boreholes and 25 rehabilitation 6 new boreholes (proceeding) 1 new borehole 3 new boreholes Total: 42 new boreholes and 25 rehabilitation

[Future Borehole Construction Programmes in Malawi]

MWD has a schedule of undertaking borehole construction programmes shown below, during and after the Project implementation. It is considered that a drilling rig and the relevant equipment to be procured in the Project might be sufficiently utilised in these programmes, contributing to securing safe and stable drinking water in Malawi.

① In 7,000 Borehole Construction Programme, MWD has a plan to construct 2,500 boreholes financed in the national budget: 600 in 2001/2002, 800 in 2002/2003, 800 in 2003/2004, and 300 in 2004/2005. Funds for 600 boreholes in the first year has already been secured. Planned is the maximum use of the drilling rigs possessed by the MWD.

② The Ministry of Agriculture and Irrigation is considering that only with the conventional non-irrigated farming, food supply amount might not meet the demand. It has requested MWD to cooperate in drilling boreholes in expectation of a large amount of yield.

③ MWD is currently formulating a borehole construction programme in disaster-prone areas such as flood hazards, the drilling rigs already in its possession being to be used. The most disaster-prone areas in the programme are:

a) Nsanje and Chikwawa in the downstream of Shire River

b) Karonga and Chitipa in the Northern Region

c) Rumphi and Nkhata in the Northern Region

④ As of March 2001, 3,507 out of the 18,795 completed boreholes are not operating in the country, and most of them are considered to need rehabilitation (redrilling). MWD has a plan to undertake redrilling with its possessed machines in all such the boreholes, after analysis of the current situation.

[Equipment Maintenance System]

The existing borehole drilling rigs and the relevant equipment are basically deployed to Central Region with 2 units procured in 1989, Northern Region with one unit procured in 1992, and to Southern Region with one unit procured in 1997, being maintained, together with the vehicles, at the workshop of the Regional MWD. Recently, the equipment under control of Regional MWD has been utilised with flexibility in the actual operation, because the boreholes are, in many cases, constructed intensively in a short duration, such as in emergency measures towards cholera outbreak and flood hazards.

At the workshop of Central Region, the responsible area of which includes Target Area, installed are a vehicle repair pit and a roofed maintenance area, being manned with 5 mechanics and 5 store personnel. Towards the troubles difficult to be handled in the regional workshop (repairing for oil-pressure system, engine, chassis, special electrical equipment, etc.), repairing work is contracted out to private repairer with ample equipment located in Lilongwe and Blantyre.

The fact that the equipment procured in 1997 has generally been well maintained and repaired and almost 50 boreholes have been drilled or rehabilitated annually, indicates a certain level of technical skills in maintenance being possessed by the personnel of the workshop.

MWD is currently in the process of reviewing its overall organisational structure, and it has a plan to place borehole construction personnel including mechanical and electrical engineers, in a government-affiliated independent corporation. After the reorganization, Regional MWD would have several supervising engineers as an equipment team, in order to administer the contracted repairing work of the private company including the corporation. As regards borehole construction work, the drilling rigs and the relevant equipment, continuously to be owned by the Government, would be leased to the corporation for the implementation of national projects. After the incorporating, income of contracted work, currently paid into treasury funds, would be counted in the corporation. Consequently, a clear demarcation of management responsibilities between the Government and the corporation would be required in the coming years, so that an efficient equipment maintenance system might be set-up.

3) Examination on Major Equipment

① Type of Drilling Rig and Relevant Equipment

In selecting the type of the drilling rig, items below shall be taken note of, provided that 110 boreholes be constructed by 2 drilling teams of a Japanese Contractor.

- Accomplishment records (drilling capacity, efficiency, etc.) of borehole construction equipment procured in Japan in the past
- Natural conditions, infrastructure, etc. in Target Area
- Requested contents towards drilling rigs from the Government of Malawi as well as the schedule of utilisation in the groundwater development programmes/projects to come

Various characteristics of the drilling rig, the major equipment to be procured in the Project, shall be pigeon-holed, and evaluation be made. In the evaluation, required are the following conditions being fulfilled:

a) The geology in Target Area is characterised by the distribution of relatively soft unconsolidated deposits and heavily-weathered rocks in the surface layer and hard rocks, principally Precambrian to early Paleozoic gneiss, in the lower layers. The existence of groundwater might be expected in the area extending from heavily-weathered rock zone to fissure zone in the upper part of hard rocks. Consequently, the type of drilling rigs shall be applicable to such a diversified geology.

b) The drilling rig shall be of a type with the same level of work efficiency as those currently possessed by MWD.

c) Mud-water normal circulation method might be employed with the drilling rig, which is capable of drilling in from collapsible soft formation to hard bedrocks with relatively a big drilling diameter.

d) An air hammer might be used with the drilling rig, which is capable of drilling in hard rocks with high efficiency.

e) The planned borehole construction sites are scattered over a wide area, and, specifically in the north, much undulating hilly areas would have to be passed through to the sites. In consequence, the drilling rig shall be of truck-mounted type with excellent mobility and driving stability, equipped with a slime pump, injection pump (for the use in foam drilling) and oil-pressured drilling derrick.

In view of the planned borehole diameter, drilling depth, geological conditions in the site, and work efficiency, the drilling rig type has been determined as under.

As a drilling method, mud-water normal circulation rotary method shall be adopted, which is very efficient in drilling boreholes of around 200 mm diameter and capable of conducting jointly the air drilling in hard rocks.

As a driving method of a rotary drill, top-drive type shall be adopted, which has a high drilling efficiency towards the medium drilling depth up to hundreds metres.

The planned drilling length being 30 to 90 m with a drilling diameter of 6-$^{3}/_{4}$", the drilling capacity is required up to 100 m. In case pulling up jammed rod required in the drilling, the pulling-up power stronger than the drilling capacity is required. Therefore, the nominal capacity shall be set, with a margin, towards the planned drilling depth. In the Project, a drilling capacity of 100 to 150 m with a drilling diameter of 6-$^{3}/_{4}$" shall be set to the truck-mounted drilling rig.

In the drilling work, the drilling rig shall be accompanied with standard accessories as well as the minimum number of tools required in the drilling work. The cost of drilling tools (bits) to be expended in the drilling work in the Project shall be counted in the direct construction cost.

A high-pressure compressor is required in air-hammer drilling, to be used in tandem with the truck-mounted drilling rig; the drilling rig selected in the Project shall also be accompanied with a truck-mounted high-pressure compressor. Capacity of the compressor shall be set, based on the planned borehole diameter (6-$^{3}/_{4}$" to 10$^{5}/_{8}$"), drilling depth (100 to 150 m), and capacity of the existing compressors, as follows:

Discharge pressure	:	Not less than 1.72 Mpa (17.5 kg/cm^2)
Discharge air volume	:	Not less than 20 m^3/min

② Examination on Other Equipment to be Introduced

(a) Development Equipment and Pumping Test Equipment

After a borehole drilled by the drilling team, washing of borehole, pumping test to determine the yield, and water quality test shall be conducted by the pumping test team. A series of work shall be done with the equipment for washing (development) as well as for pumping test, to be mounted on one vehicle. The equipment to be mounted are: compressor, generator, air lift tools, submersible pump, water level gauge, pH meter, electric conductivity meter, and simplified water quality test kit.

In total, 4 sets of truck-mounted development and pumping equipment were procured in the previous grant aid projects. 1 out of the 2 sets procured in 1989 has been disused, both compressor and generator, due to an accident. The remaining 3 sets are in operable conditions.

The washing of borehole and pumping test being to be conducted immediately after the drilling work, one drilling rig shall be accompanied with respective one set of development equipment and pumping test equipment. MWD would require 2 sets of development and pumping test equipment to 2 drilling rigs, and, therefore, the remaining 1 set might be used in the Project, together with 1 set to be newly procured. Notwithstanding, the set to be furnished from MWD not involving the water level gauge, pH meter, electric conductivity meter and simplified water quality test kit, such equipment and instruments shall be brought-in by the Contractor.

It is considered that the equipment and instruments might be transported to the drilling sites by a towing tractor, beside being mounted on a truck as in the case of the existing equipment. Nevertheless, a tractor being likely to easily topple over on hillside roads and on the roads crossing valleys, the truck-mounted transportation with superior driving stability would be more preferable.

(b) Testing Equipment

Of 4 existing electric prospecting instruments, 2 procured in 1988 have been disused due to beyond repairing. The remaining 2 have been used in Central Region and Southern Region, prospecting frequently as many as 150 to 200 points a year, and might not be available in the Project.

Since an electric prospecting instrument be required in conducting a supplementary survey when a dry hole appear, 1 shall be procured in the Project. While 2 instruments would be required in the detailed survey, 1 shall be brought-in by the Contractor to conduct electric prospecting.

Of 4 existing electric logging instruments, 2 procured in 1989 have been broken down and disused, according to the manufacturer's view of being beyond repairing. 1 procured in 1992 also broke down during the construction work in Mzimba West Project and being judged as beyond repairing by the manufacturer in Japan when brought back to Japan by the Contractor. It was subsequently disposed of, with the consent of the Malawi Government. The remaining 1 procured in 1997 having been in working condition and used in part of the borehole drilling undertaken by MWD.

The geo-electric borehole logger is required to determine the depth of screen installation, and a logger shall be provided to each drilling team.. Consequently, provided that an existing logger would be used, a logger shall be newly procured in the Project. These loggers do, however, require adequate maintenance in operation, and spare parts shall also be procured for the new logger, in view of the difficulty of replenishing the spare parts in Malawi. The local subcontractor not having a logger, an extra logger shall be brought-in in the first-half of the second year, in which three loggers would be required.

(c) Support Vehicles

As indicated in Construction Plan, support vehicles are required in the transportation of equipment and materials, relocation of workers and on-site repairing of equipment, to 2 drilling teams and to 2 development and pumping test teams.

In order to support the newly procured drilling rig, one truck with crane and one pick-up truck (single cabin) shall be procured in the Project.

Additionally, as described in the Section for the Soft Component, the vehicles as shown below would be required, in the undertakings of the CBM Programme by MWD relating to borehole water supply facilities to be constructed in the Project.

i) Pick-Up Truck (Double Cabin): 1

Purpose	:	Transport of Extension Workers (4) and transportation of equipment
Duration	:	Training to the residents – 5 days; 46 courses lasting almost 12.5 months

The pick-up truck for the CBM Programme above might also serve in the borehole construction projects (as part of the 7,000 Borehole Construction Programme) to be implemented in the future by MWD under the national budget. There being a big need in securing sure maintenance of water supply facilities, the pick-up truck shall be newly procured.

ii) Motorcycles

The site-visit using motorcycle is efficient in enlightenment activities such as VHWC/WPC setting-up and monitoring. So far, no motorcycle has been provided to Water Monitoring Assistants (WMAs) due to financial difficulty. Motorcycles would be essential in maintenance of water supply facilities after completion, and, accordingly, required number of motorcycles shall be newly procured.

Target Area being to be divided into 3 according to the District and TAs, as shown below, 3 motorcycles shall be newly procured, with one in each area division.

(1) Lilongwe District : TA Chadza (65 boreholes planned)
(2) Dedza District : TA Tambala and STA Chauma (42 boreholes planned)
(3) Dedza District : TA Kachere and STA Chilikumwendo (70 boreholes planned)

(d) GPS Units

GPS units are useful for identifying the planned borehole sites and actual drilling sites, and also effective, as supplementary, in selecting the alternative sites of dry holes. In total, 3 GPS units are required: 1 to each drilling team, and 1 in construction supervision. To be only required during the construction period, these shall be brought-in by the Contractor.

(e) Radio Communication Equipment

In Target Area, there are no fixed- or mobile-telephone facilities. It would, therefore, have to install radio communication equipment linking Lilongwe and support vehicles, as a regular and emergency communication system during the construction period, to make utilisation of the procured equipment and materials effective and construction work efficient.

MWD headquarters system with an antenna, mast and other accessories is currently installed in Lilongwe and Mzimba. Three pick-up trucks also have radio communication equipment. Those in Mzimba and on pick-up trucks is working while the one in Lilongwe has been out of order. The communication equipment required in the Project shall be brought-in by the Contractor.

(f) Mobile Workshop Vehicle with Repairing Equipment

[Necessity after the Project]

3 borehole drilling rigs currently in operation have been, in principle, disposed, one each, to 3 Regional MWD. In the recent accomplishment, however, 3 have been gathered and used in one area to construct many boreholes intensively in a short duration. In consequence, it is required either the movement to the nearest workshop or the private workshops or the transportation of mechanics and repairing equipment, to cope with the frequently taking-place on-site breakdown. On-site repairing work required are mostly to tyre punctures, oil or air leakage in the compressor, and others, not constituting the large-scale repairing work. Since the construction sites are mostly located in the remote areas, far from the cities with workshops/repairing factories (such as Lilongwe and Blantyre), the time and cost incurred from the repairing work would result in the delay of construction progress. Besides, shortage of vehicles at the respective workshops has also brought about an insufficient repairing efficiency.

Considering the current situations as above, and, in view of annually more than 100 boreholes to be constructed in the years to come, MWD has considered that the mobile workshop vehicle, capable of setting-up a repairing system in the remote area, might effectively be utilised in the future; especially in the intensive construction programme, such as in the countermeasures for disasters affection or cholera outbreak.

[Necessity in the Project]

Although Project Area is relatively near to the capital Lilongwe, it is required to move on unpaved roads in almost 20 km from the National Road, specifically in the northern part of Dedza District, the moving time being 2 to 3 hours in one direction due to much undulating, poor road conditions. An accident or breakdown in such areas would cause transportation difficulty of the broken-down machine as well as a fatal delay in the drilling work. The existing drilling rig to be furnished is already being used in more than 9 years, and considerably superannuated, requiring frequent repairing and mending. From these considerations, a system of on-site equipment repairing shall be set-up, and it is essential that a mobile workshop vehicle capable of conducting such repairing work be provided for the smooth and efficient progress in the borehole construction work in the Project. One mobile workshop shall be newly procured, for the reason of its usefulness not only in the Project but also in the future programme.

[Necessity of Equipment to be Equipped with in the Mobile Workshop]

From the predicted repairing work required during the construction period, the repairing equipment and tools as shown in Table 2-2-11 shall be equipped with in the mobile workshop.

Table 2-2-13 Equipment and Tools for Mobile Workshop Vehicle and the Necessity

Equipment/Tools	Necessity
Truck with 3 Ton Crane	As the access roads to the sites are in poor condition, a 4 x 4 truck is required. A 3 ton crane is also required to lift such heavy components as an engine for repairing purposes.
Welding Equipment with Diesel Engine Generator	Welding equipment is required in frequent damage of metal components. A generator is required to power a compressor, air grinder and bench drill.
Acetylene Gas Welder and Cutter	Acetylene gas welding is required in repairing thin metal components (the fuel tank and exhaust pipe of the truck are frequently damaged due to the poor road conditions). The metal cutting is often required in manufacturing emergency parts, etc.
Motor-compressor	A compressor is required to inflate tyres to be frequently damaged on poor-conditioned roads. Cleaning of engine and other precision components using compressed air is also required as the construction sites are full of minute dust.
Power Bench Grinder	This is required in finishing the welded metal components.
Power Bench Drill	This is frequently used to fit emergency parts.
Hydraulic Press	The chassis and body-related components are often deformed due to the damage caused by travelling on bad roads. This press is required for their repairing.
Battery Charger	The battery is quickly exhausted because of its use under unfavourable conditions (particularly the vehicle battery).
Portable Hydraulic Jack	This is required in lifting the vehicles for repair.
Jib-crane	Required for loading/unloading of the heavily-weighted goods to the body.
Fuel Drum Pump	This is used to replenish fuel and to drain out fuel at the time of repairing.
Oil Bucket Pump	For the replenishment of oil. Frequent oil changes are required.
Grease Gun	For the application of grease. Grease shall be frequently applied.
Volume Pump	For the replenishment of lubricating oil.
Nozzle Tester	This is required in the occasion of engine repair.
Tyre Repairing Tools	Tyre damage due to travelling on bad roads regularly occurs, necessitating these tools.
Circuit Tester	Damage by vibration due to travelling on bad roads frequently occurs to the electrical equipment used by the drilling rig and vehicles, loggers and radio communication equipment. A circuit tester and electrical tools are, therefore, essential for their repair.
Electrical Tools	
Engine Service Apparatus	Required in the engine adjustment of drilling equipment.
Mechanical Tools	Drivers, pliers and others are essential in basic repairing work.
Extension Cable Reel	This is required in using power air grinder or power bench drill directly at the part under repairing in large machinery/equipment. It is also required in using floodlights in the night work.
Floodlights	Urgent work shall sometimes be done at night, necessitating the use of floodlights. Even during the daytime, floodlights might be required in the work involving dark inner part of the equipment.
Work Bench	This is required in assembling of the repaired equipment and in manufacturing emergency parts.

(g) Water Tank

The tank (4 m^3) shall be used to transport the circulating water required in the borehole drilling work; to be of a type allowing transportation and loading/unloading by a truck with a 3 ton crane.

The existing water tanks having been used in accompany with the existing drilling rigs, one water tank shall be furnished from the Malawi side in the Project, in accompany with the drilling rig to be furnished, to be shared by the drilling teams.

(h) Fuel Tank

There is no petrol station in Target Area, and the nearest station is located at Dedza and Bunda crossroad on National Road M1. A large 6 m^3 fuel tank (for existing equipment) shall be installed at the Linthipe Camp located at the centre of Project Area, to secure the work efficiency, and a portable 4 m^3 fuel tank (for existing equipment) be mounted on a truck to deliver fuel. These 2 tanks shall be furnished from the Malawi side in the Project.

(i) Mud-water Agent and Foaming Agent

Mud-water agent and foaming agent used with circulating mud-water to protect the inner wall during drilling shall be in expendable work items, and their cost be included in the construction cost. The consumption amount shall be calculated on the basis of number of planned boreholes, considering the dry hole rate.

- A liquid chemical product with transportation cost less than bentonite shall be used as the mud-water agent.

- A foaming agent shall be used for facilitating the slime discharge. The use amount shall be determined, based on past records of the similar work in Malawi.

(j) Spare Parts of Equipment to be Newly Procured

The cost of spare parts required in the construction work shall be included in the direct construction cost.

(k) Repairing Parts of Drilling Rigs Etc.,Procured in the Previous Grant Aid Projects

Drilling equipment including one drilling rig shall be furnished from the Malawi side in the implementation of the Project, to be used after its repair. In this context, parts, equipment and tools for repairing the drilling equipment (drilling rig, compressor, development unit and truck) procured in Mchinji Project in 1992 are required in the Project, together with the spare parts required in the construction work.

The cost of parts required in the construction work shall be counted on the direct construction cost. The equipment to be furnished from the Malawi side in the Project having reached the end of its durable years after the use in 9 years, the major components (drilling unit, drill head and oil-pressure system, etc.) have been superannuated. The equipment need the overall replacement of the parts as well as an entire adjustment, in order to perform its faculty fully in the Project. For this reason, the cost of the necessary repairing parts shall be counted on the construction cost.

4) Equipment Plan

The equipment procurement plan is summarised in Table 2-2-14, based on the basic principles and the results of examination, by clarifying the type and quantity of the equipment required in the construction as well as the equipment to be furnished from the Malawi side.

Table 2-2-14 Specifications and Quantity of Equipment

Equipment and Its Specifications	Procurement Quantity
I. Equipment for Borehole Construction	
1. Drilling Rig and Tools	1 set
1.1 Drilling Rig	
- Top Drive Truck-Mounted: combination of mud-water rotary and air hammer methods	
- Truck: water-cooled diesel engine, right-hand drive, 4 x 4, GVM; not more than 16,000 kg, with PTO to drive the drilling rig (in case without PTO, deck-engine also applicable, engine output; more or less 215 PS)	
- Drilling Rig Capacity: final drilling diameter ; 6-$^{3}/_{4}$" (170 mm), drilling depth; 100 to 150 m (air hammer)	
- Rotary Head: maximum loading capacity; not less than 5,500 kg	
- Pull Down: hold-back capacity; not less than 5,500 kg, stroke; not less than 4.0 m	
- Draw Works: hoisting capacity; not less than 1,700 kg	
- Mud Pump Capacity: discharge volume; 600 litres/min, pressure; more or less 20 kg/cm^2	
1.2 Standard Accessories for the Above	1 set
1.3 Tools for the Above	1 set
a) Drilling Tools (mud-water drilling tools, down-the-hole hammer drilling tools, etc.)	
b) Casing Tools (surface casing, casing holder, pipe band, etc.)	
c) Fishing Tools (jack, inside-outside taps, etc.)	
d) General Drilling Tools (pipe wrench, super tong, sledge hammer, etc.)	
2. Truck-Mounted Air Compressor	1 set
- Capacity: not less than 17.5 kg/cm^2 x 20 m^3/min, with standard accessories	
- Truck Specifications: water-cooled diesel engine, right-hand drive, 4 x 4, GVM; not more than 16,000 kg, engine output; more or less 215 PS	
II. Testing Equipment	
1. Electric Prospecting Instrument: maximum prospecting depth; not less than 200 m, with software for 2-dimensional cross-section analysis	1 set
2. Development/Pumping Test Equipment	
2.1 Truck Specifications: 4 x 4, with 3 t-crane, GVM; more or less 10 t, loading capacity; not less than 3 t, engine output; 190 PS	1 no.
2.2 Compressor: not less than 7 kg/cm^2 x 3.5 m^3/min	1 no.
2.3 Generator:17 KVA (50Hz)/20 KVA(60Hz)	1 no.
2.4 Air Lift Tools	1 set
- Discharge Pipe: 2", enough for 100 m	
- Air Pipe: $^{3}/_{4}$", enough for 100 m	
2.5 Submersible Pump: head; 50 m, discharge volume; not less than 100 litres/min, pipe attached; 1-$^{1}/_{2}$"	1 no.
2.6 Water Level Gauge: 100 m	1 no.
2.7 pH Meter	1 no.
2.8 Electric Conductivity Meter (with thermometer)	1 no.

Equipment and Its Specifications	Procurement Quantity
3. Electric Logging Instrument - Type: automatic recording system, with 100 m of cord - Logging Items: natural potential, resistivity (normal and micro), radioactivity (natural gamma) - Accessories: battery, recording paper, etc.	1 set
III. Support Vehicles	
1. Cargo Truck with Crane - Truck Specifications: water-cooled diesel engine, right-hand drive, 4 x 4, GVM; 13,000 kg, engine output; 190 PS - Loading Capacity: not less than 5,500 kg - Crane Capacity: 3 tons	1 no.
2. Pick-Up Truck (Single Cabin) - Specifications: water-cooled diesel engine, right-hand drive, 4 x 4, GVM; more or less 2,650 kg, engine output; 77 PS - Loading Capacity: not less than 1,000 kg	1 no.
IV. Mobile Workshop Vehicle, Equipped with Repairing Equipment	
1. Truck for Mobile Workshop - Specifications: water-cooled diesel engine, right-hand drive, 4 x 4, engine output; 190 PS, GVM; approximately 10,000 kg - Crane Capacity: maximum hoisting capacity; not less than 3 t/2.7 m - Aluminium Body: LWH; not less than 4,200 x 2,300 x 2,000	1 no.
2. Repairing Equipment and Instruments	1 set
2.1 Diesel Engine Generator/Welder - Generator: voltage/capacity; 3 phases - 380 V/50 Hz, 10 KVA, voltage in single phase; 220 V/50 Hz, 3 kW - Welder: current range; 30 to 270A - Engine: equipped with an engine-cooling air-duct and exhaust-pipes to the outside	1 no.
2.2 Oxygen-Acetylene Gas Welder/Cutter - Oxygen Cylinder: $7m^3$ - Acetylene Cylinder: 7kg	1 no.
2.3 Power Motor-Compressor - Motor: 3 phases - 380 V/50 Hz, 1.5 kW - Compressor: maximum pressure; $7 kg/cm^2$, receiver; 83 I	1 no.
2.4 Power Bench Grinder (at the fixed work-table) - Grinding Wheel: 205 mm in diameter - Power Source: single phase - 220 V/50 Hz	1 no.
2.5 Power Bench Drill (also, at the fixed work-table) - Maximum Drilling Diameter: 13 mm - Power Source: single phase – 220 V/50 Hz - RPM: 500 to 3,000 rpm - Size of Table: 240 x 240 mm	1 no.

Equipment and Its Specifications	Procurement Quantity
2.6 Hydraulic Press (also, at the fixed work-table)	1 no.
- Press Capacity: 10 t	
- Cylinder Stroke: 240 mm	
- Space for Work: 417 mm in height, 450 mm in width	
2.7 Battery Charger	1 no.
- Power Source: single phase – 220 V/ 50 Hz	
- Charger Output: 12 V/ 70 A, 24 V/ 35 A	
2.8 Portable Hydraulic Jack	2 nos.
- Jack Capacity: 10 t	
- Maximum Height: 390 mm	
2.9 Jib Crane (Attached to the latter-part of the Van)	1 no.
- Crane Capacity: 250 kg	
- Length of Jib: 1,100 mm	
- Height of Jib: 1,880 mm	
2.10 Fuel Drum Pump	1 no.
- Pump Capacity: 30 I/min/1000 rpm, rotating-type	
2.11 Oil Bucket Pump	1 no.
- Lubricating Capacity: 40 cc/stroke, rotating-type	
2.12 Grease Gun	1 set
- Gun Capacity: 300 cc, manually-operating type	
2.13 Volume Pump	1 no.
- Lubricating Volume: 20 cc/stroke	
- Pump Capacity: 50 kg/cm^2, 15 I	
2.14 Nozzle Tester (at the fixed work-table)	1 set
- Pressure Gauge: 500 kg/ cm^2	
- Diameter: 100 mm	
2.15 Tyre Repairing Tools	1 set
2.16 Circuit Tester	1 no.
2.17 Engine Service Tools	1 set
2.18 Electrical Tools	1 set
2.19 Mechanical Tools	1 set
2.20 Cable Reel	1 set
2.21 Floodlights	1 no.
2.22 Work Table (with a cabinet and drawers)	1 no.
V. Support Vehicles for CBM Programme	
1. Pick-Up Truck (Double Cabin)	1 no.
- Specifications: water-cooled diesel engine, right-hand drive, 4 x 4, GVM; 2,650 kg approximately, engine output; not less than 77PS	
- Loading Capacity: not less than 700 kg	3 nos.
2. Motorcycles	
- For off-road use: displacement; 100 to 125 cc, engine output; more or less 12PS	

2-2-3 Basic Design Drawings

(1) Borehole Construction Procedures and Design of Ancillary Structures

The procedures of borehole construction work are summarised hereunder.

① The mouth diameter of the borehole is 10-$^{5}/_{8}$”, and, drilling with fresh water is made up to the depth of 6 m. A conductor pipe of 10” inner diameter is then inserted.

② Mud-water drilling with 8-$^{1}/_{2}$” diameter is conducted in the subsequent section of overburden or heavily-weathered rock (depth: 10 to 20 m); thereafter, a guide pipe of 7-$^{1}/_{2}$” inner diameter is inserted. Prior to inserting the guide pipe, electric logging is conducted for confirmation of existence of an aquifer as the case may be.

③ In the subsequent hard rock section, the drilling is made with air hammer method with 6-$^{3}/_{4}$” diameter.

④ After the prescribed drilling depth drilled, the aquifer is examined through electric logging; then, a screen and a casing of 4”-class 10 inner diameter are installed. The slit-depth of the screen shall be 0.8 mm, with more than 9% of open ratio.

⑤ Gravel of the prescribed diameter around the screen, and clay around the casing, are soundly filled, respectively.

⑥ The hole is cleansed with air lift device until water becomes clean.

⑦ Pumping test and water quality test are conducted to make sure water quantity as well as quality, to determine the borehole to be acceptable or not. Towards water quality, MWD tentative standards for rural water supply undertakings shall be applied. In the pumping test, the standard yield of 0.2 litre/sec to be exploitable in a stable manner, shall be confirmed.

⑧ Once the borehole is placed as “successful” from the test results in ⑦ above, a pump is installed, and ancillary structures such as apron for receiving water, washing area and drainage channel are constructed. Borehole construction work is then complete. The specifications of the pump shall be:

- Afridev-type
- Length of spout: 580 mm

- Pump rod: made of stainless-steel (AISI30A)
- Pump-stand: tripod type

Ancillary structures shall be designed, by applying the following principles:

- Facilities layout such as for footing, washing area and bucket stand shall be such that not only the surroundings of the borehole might be kept clean but for the convenience of users.

- The structure shall be durable.

- The apron shall have an area of almost 4 m^2 for not hindering water drawing; a bucket stand shall be installed for easy placing the bucket on drawers' head.

- The length of drainage channel shall be amply stretched, enough to prevent the muddification in the surroundings of the borehole mouth.

- 2 washing basins with a washboard shall be installed at washing area, to prevent the splashing of water in the washing by beating.

- For the purpose of using an Afridev pump, footing of the same structure as apron for receiving water, shall be installed at the backside of the pump.

Figures 2-2-2 and 2-2-3 indicate the structure of borehole, ancillary structures, and drainage ditches. ① through ⑤ above shall be undertaken the drilling team, and ⑥ and ⑦ by the pumping test team.

For the construction of 177 boreholes in 2 years by 2 teams above and the local subcontractor, it is imperative that the Malawi side shall, prior to the construction commencement, rehabilitate or construct access roads, in cooperation with the residents, so that road conditions might not hinder the vehicle passing.

The perimeter fence of the borehole water supply facilities as well as drainage ditches/soak pits shall be constructed by the residents themselves, at the Project site, by furnishing with the materials/labour work required.

The perimeter fence shall be made of wood, easily available around the site; for the purpose of preventing domestic animals from breaking into the area inside the borehole water supply facilities as well as of keeping the sanitary conditions around the facilities from excrements, etc.   Specimens of the perimeter fence are shown in Fig. 2-2-4 and 2-2-5.

To the drainage ditches, to be applied is an infiltration-method, so that unsanitary situations might not come out from withholding water at the ground surface, through letting the drainage from the ancillary structures flow into open-ditches installed radially. Since the surroundings of the ditches become a land suitable for crop-cultivation, these shall be utilised for growing cash-crops such as banana, helping fund-raising activities for the maintenance expenses.   A specimen of the drainage channel is shown in Fig. 2-2-4.

Besides, in the case the drainage ditches construction being difficult due to geological/geographical conditions, soak-ways shall be installed at the terminal of ancillary structures; Fig. 2-2-5 indicates a specimen.

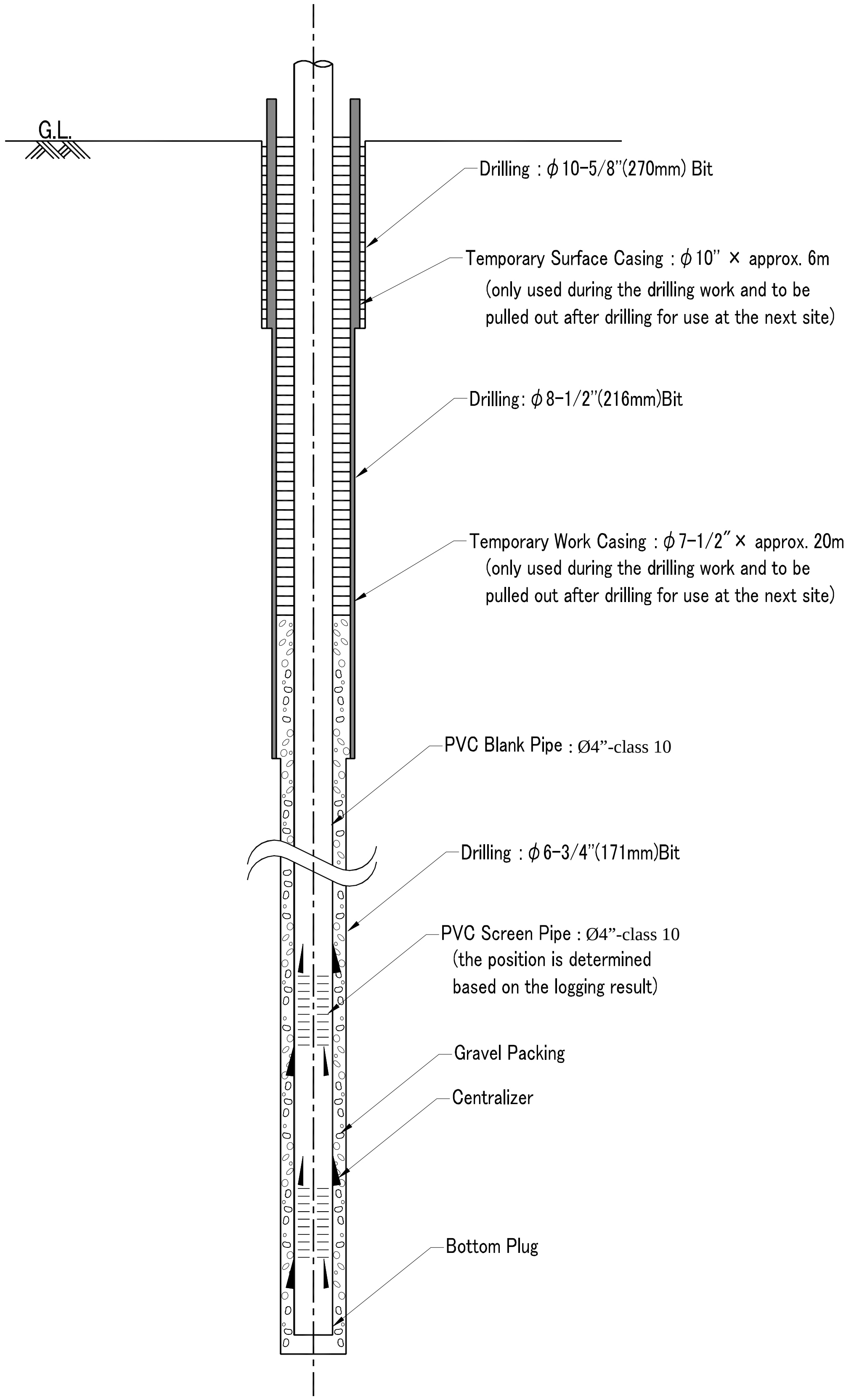


Fig. 2-2-3　Structure of Borehole

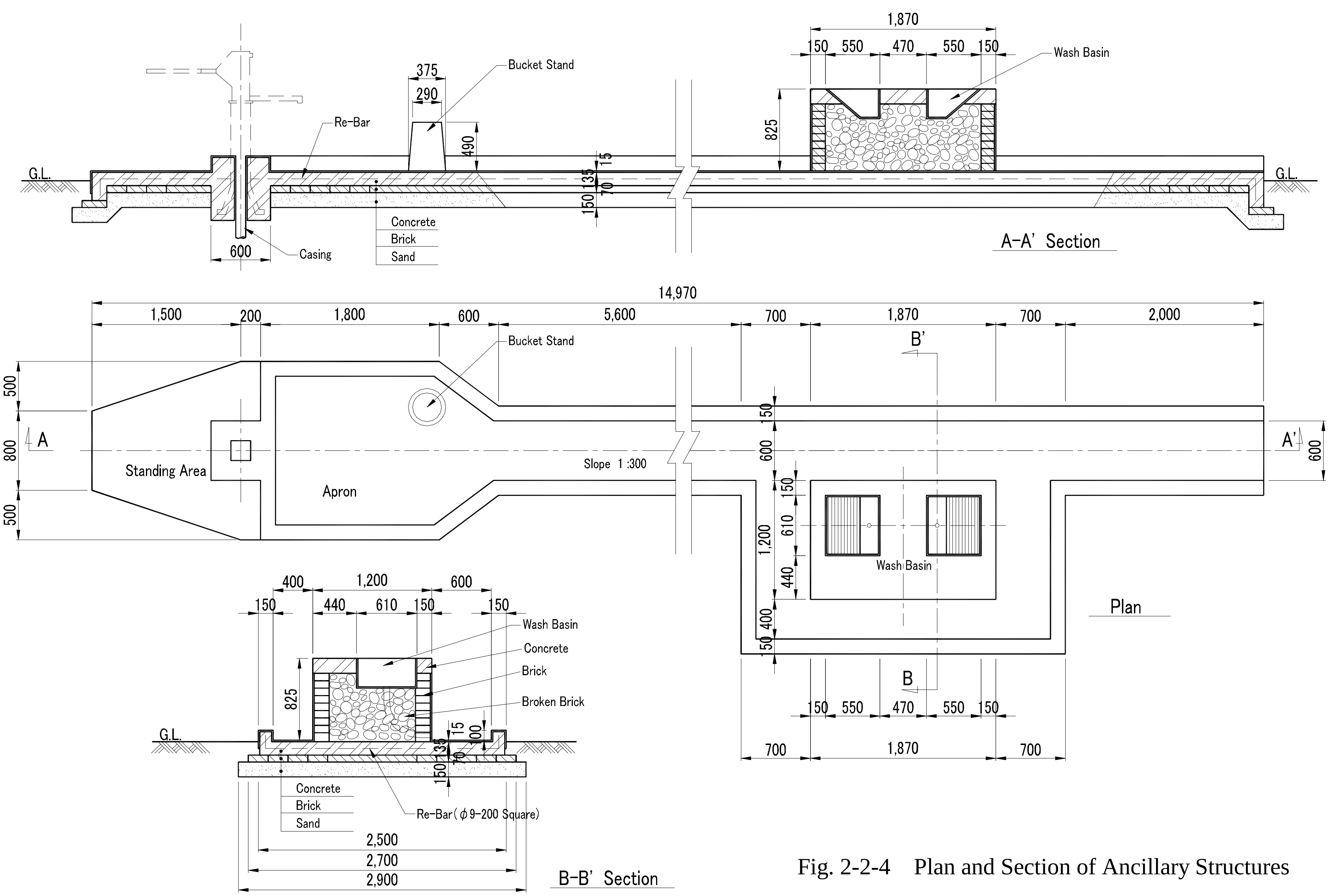


Fig. 2-2-4 Plan and Section of Ancillary Structures

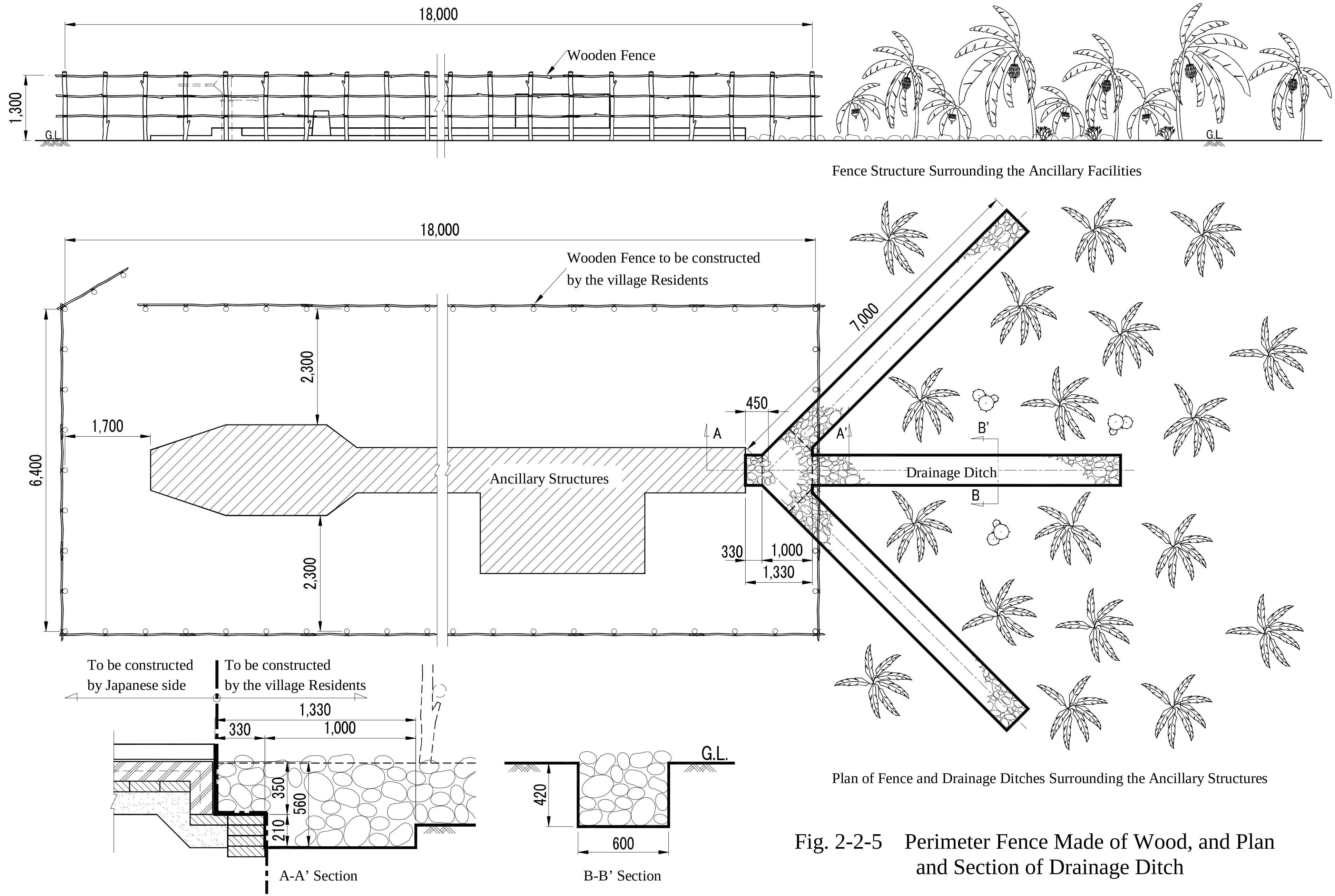
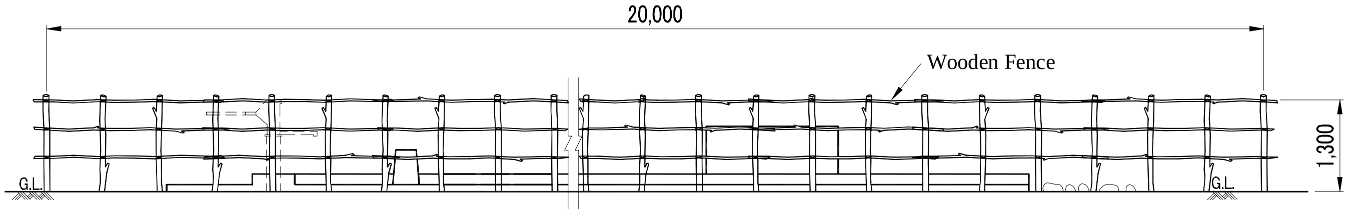
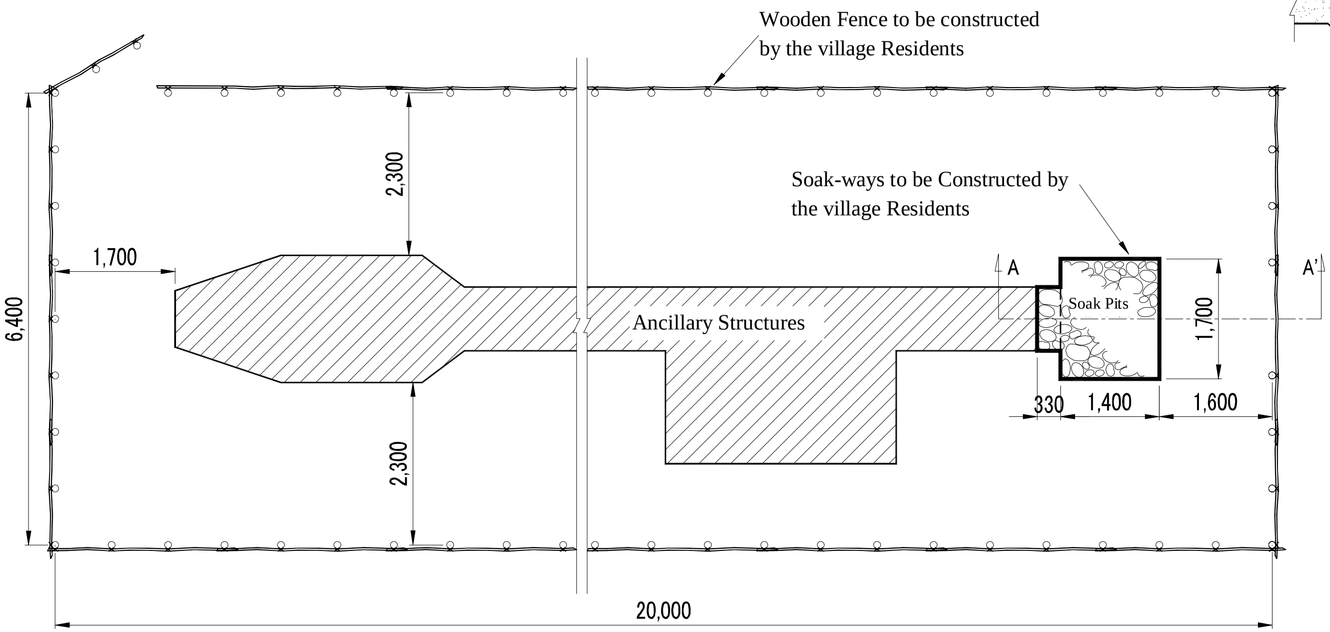


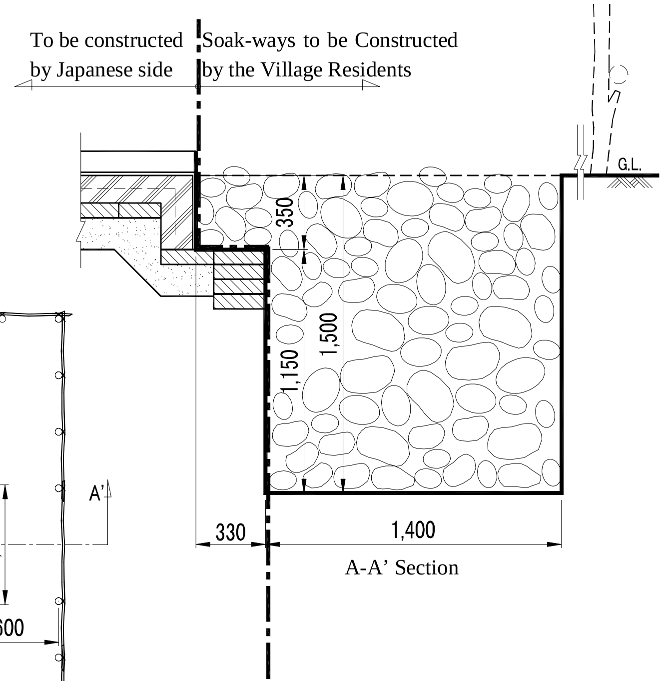
Fig. 2-2-5 Perimeter Fence Made of Wood, and Plan and Section of Drainage Ditch



Fence Structure Surrounding the Ancillary Facilities



Plan of Fence and Soak-ways Surrounding the Ancillary Structures



A-A' Section

Fig. 2-2-6 Perimeter Fence Made of Wood, and Plan and Section of Soak Pit

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Fundamental Matters

Fundamental matters in the construction and procurement in the Project are as under.

① The Project be implemented, in accordance with the system of grant aid scheme of the Government of Japan, by the Water Resources Department of MWD, Malawi, as a project implementation body.

② A Japanese consultant (the Consultant) conduct the detailed design, tendering work on behalf of the project implementation body, and supervision of the procurement of borehole construction equipment and materials, as well as the borehole construction work, in the Project, in accordance with the system of grant aid scheme of the Government of Japan.

③ A Japanese contractor (the Contractor) be responsible for the procurement and delivery of the borehole construction equipment and materials as well as the construction of boreholes (including OJT), in the Project.

④ MWD secure capable local staff for the participation in OJT to be conducted by the Contractor, prior to the construction commencement.

⑤ MWD secure the personnel for the Project implementation, throughout the construction period.

⑥ MWD make tax exemption arrangement, etc. towards the procured equipment to be imported, in cooperation with the Ministry of Finance, Malawi.

⑦ MWD make arrangement of the priority supply, in the procurement of equipment, according to construction schedule, in order to avoid any delay in construction work.

(2) Work Implementation System and Work Schedule

1) Work Schedule

It would take maximum 4 years with 1 drilling rig, 2 years with 2 drilling rigs, and 1 year with 3 drilling rigs, to construct the planned number of boreholes (177 boreholes in 154 villages) in the Project, according to accomplishment in the past (50 boreholes/year/rig). Provided that 1 drilling rig be furnished out of the existing rigs possessed by MWD to the Project, with some repairing, and considering that most of the time be taken in the procurement in the first year, 3 drilling rigs, 2 to be newly procured, would be required in 2 years of construction period including the procurement period. In case only one drilling rig being newly procured, 3 years of construction period would be required, with 2 drilling rigs in operation.

On the other hand, borehole construction by private drillers has become brisk almost after 1998 in Malawi, and about 10 drillers have been engaged in the borehole drilling for government organizations and NGOs. Notwithstanding, though the drilling skill itself being at a certain level, it is considered that their capability, without supervision, be insufficient in terms of hydrogeograhpical judgement to find sure aquifers, finishing work, and control of work schedule as required in the Japanese grant aid scheme, judged from the fact that many problems arose after the construction and in many cases failed were meeting the fixed schedule in the recent implementation of 3,000 Borehole Construction Programme.

In the Project, a direction shall be set in which the planned number of boreholes be completed in the 2 phases of one fiscal year, through utilising the local private driller as a subcontractor under supervision as well as with technical guidance, in order to shorten the construction period with efficient work; the drilling work entrusted to such private drillers being proceeded even in the equipment procurement period.

Since 110 boreholes are planned to be constructed with 2 drilling rigs by the Contractor in the second year, number of boreholes to be drilled by the subcontractor shall be the remaining 67. The drilling rig capacity shall set at around 40 boreholes annually, from the accomplishment of the second-hand Japanese drilling rigs in Mzimba West Project.

When considering the engagement of private drillers in Dispersed Borehole Construction Programme (600 to 800 boreholes/year) under MWD and Borehole Construction Programme (almost 1,500 boreholes/year) under the Malawi Social Action Fund (MASAF), both to be implemented in parallel with the Project, it is considered that many drilling rigs might not be secured concurrently from the private drillers. Consequently, the drilling target of the subcontractor in the first year shall be set at 36 in total, 18 boreholes each with 2 drilling rigs, due to a short work duration, and the remaining 31 boreholes shall be drilled in the second year, at the same time with the work to be conducted by the Contractor.

The borehole construction capacity of a drilling rig is reducing according to the years of usage, from the accomplishment records in Mzimba West Project, the Japanese grant aid project in the past. Number of boreholes to be drilled might be set as shown in Table 2-2-15, reflecting such a declining capacity in the usage.

Table 2-2-15 Efficiency of Drilling Rigs in Mzimba West Project

Project / Drilling Rig Provision	Mzimba West T-2 (1997)	Mzimba West T-3 (1998)	The Project	
			Phase 1 (Half Year)	Phase 2 (Full Year)
Newly Procured	68	66		65 (considering the topographical conditions)
Mchinji (1992)	65 (5 years in use)	54 (6 years in use)		45 (10 years in use)
North Kawinga (1988)	47 (9 years in use)			
Brought-In by Contractor	-			
Local Subcontractor	-		18 18	31
Total	180	120	36	141

* Accomplishment in Mzimba West is calculated by multiplying the planned number of boreholes with the ratio of drilled boreholes including dry holes.

The existing drilling rigs have suffered from functional reduction in terms of the drilling capacity and travelling performance such as the climbing ability, due to superannuation, being inferior in the performance to a new drilling rig, even after repairing and adjustment. In the Mzimba West Project (1997 to 1998), the drilling rig in 5-year use, originally procured in the Mchinji Project, and the drilling rig in 9-year use, originally procured in the North Kawinga Project, were used after the repairing together with a newly procured drilling rig. The operating rate of 9-year used rig was almost 2/3 of that of the new rig, under repairing after repairing. The 5-year used rig could not climb on many sloping roads, being often replaced by the new rig in the planned drilling sites. The more difficult road conditions being foreseen at the planned sites in the Project, especially in the northern hilly areas, than the Mzimba West Project, it is considered that the completion of construction work as in the schedule be difficult without procuring a new drilling rig in the Project.

2) Work Implementation System

① Work in the First Year

(a) Borehole Construction Work

As work in the first year, 36 boreholes and ancillary structures be constructed, with equipment and workers of a local subcontractor, under the supervision of the Contractor.

The borehole construction work be divided into drilling work and pumping test, both requiring 2 teams, respectively. In the respective work, technical control, schedule control, and logging in the drilled hole, to which Malawi side does not have a skill, shall be daily conducted. Also important on-site management work include the selection of alternative drilling sites from the hydrogeological judgement in the case a dry hole appear, and conducting the detailed test according to simplified water quality test results on-site. In consequence, 2 engineers shall be dispatched in this phase in the Project; a drilling engineer mainly in charge of drilling technique, and a hydrogeological engineer in charge of pumping test as well as judging water quality and geology.

After the borehole drilled, a team, different from the drilling team, shall construct ancillary structures such as apron, including installation of a hand pump. The work shall be the charge of a civil engineer of the Contractor.

(b) Repairing of the Existing Equipment

The existing drilling equipment to be used in the second year in the Project would have to be repaired. A mechanic of the Contractor shall be responsible for the work, including OJT to local mechanics at the Central Region MWD, so that the equipment might be get ready for operation in almost one month.

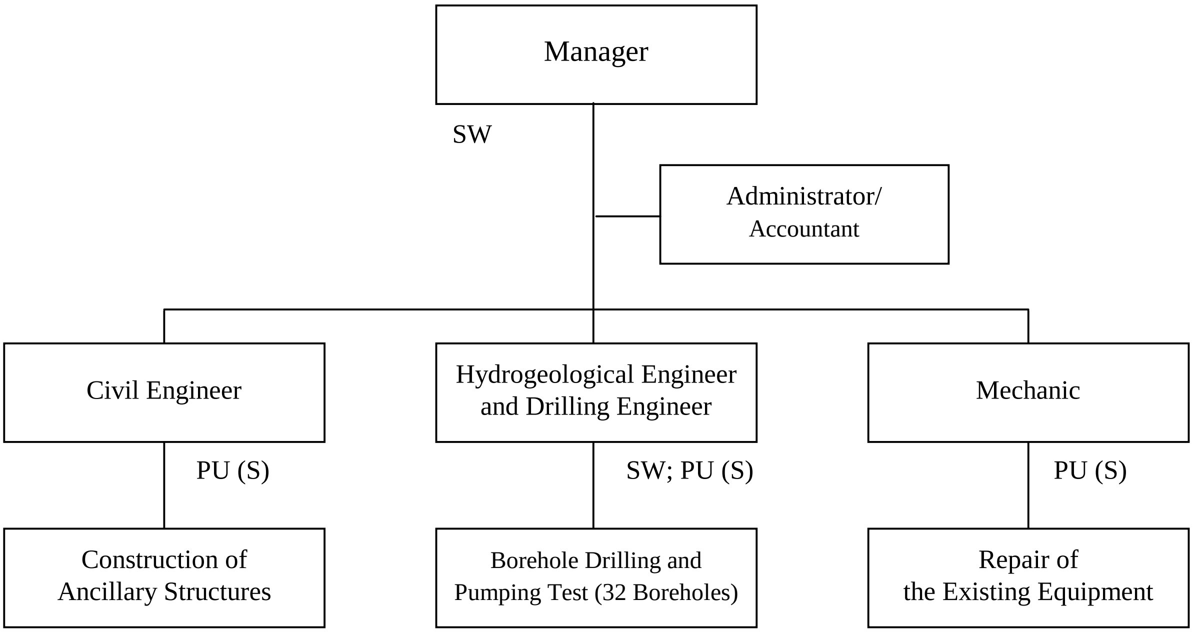
The equipment to be repaired has, after almost 10 years of usage, with constant travelling on poor-conditioned roads, been severely damaged and torn to such an extent that the ordinary routine adjustment might not cope with.

In the Project, equipment maintenance and repairing cost shall be included in the direct construction cost, which is equivalent to the cost of repairing/replacement parts as deemed required in the Study.

Of the equipment to be furnished with in the Project, the repairing would be required, as follows:

- Truck-mounted drilling rig : 1 no.
- Truck-mounted high-pressure compressor : 1 no.
- Development unit : 1 no.
- Generator (20 KVA) : 1 no.
- Truck with a 3-ton crane : 1 no.

Figure 2-2-6 and Table 2-2-16 depict the above-mentioned implementation system: borehole drilling, pumping test, construction of ancillary structures, and repairing work of the existing equipment.



Legend for Vehicles

SW : Station Wagon
PU (S) : Pick-Up Truck (Single Cabin)
(all to be brought-in)

Fig. 2-2-7 Work Implementation System (First Year)

Table 2-2-16 Major Equipment in Borehole Construction Work and Standard Composition of Vehicles (First Year)

Work Implementation System / Major Equipment and Vehicles	Drilling-related Team		Construction of Ancillary Structures (2 teams)	Coordination/ Negotiation/ Supervision	Total Number
	Drilling Team	Pumping Test Team			
Rotary Air Hammer Drilling Rig	(2)				0
Compressor	(2)				0
Pumping Test Machine		(2)			0
Truck with Crane (3 tons)	(2)				0
Station Wagon				2	2
Pick-Up Truck (S)	(1)		(2)	3	3
Pick-Up Truck (D)		(1)			0

* Figures in brackets indicate the number of equipment/vehicles used by the local subcontractor.

② Work in the Second Year

As work in the second year, 141 boreholes and ancillary structures be constructed by the Contractor using 2 drilling rigs; 1 existing and 1 newly procured, and 31 boreholes to be constructed by the local subcontractor. The work implementation system is as shown in Fig. 2-2-7.

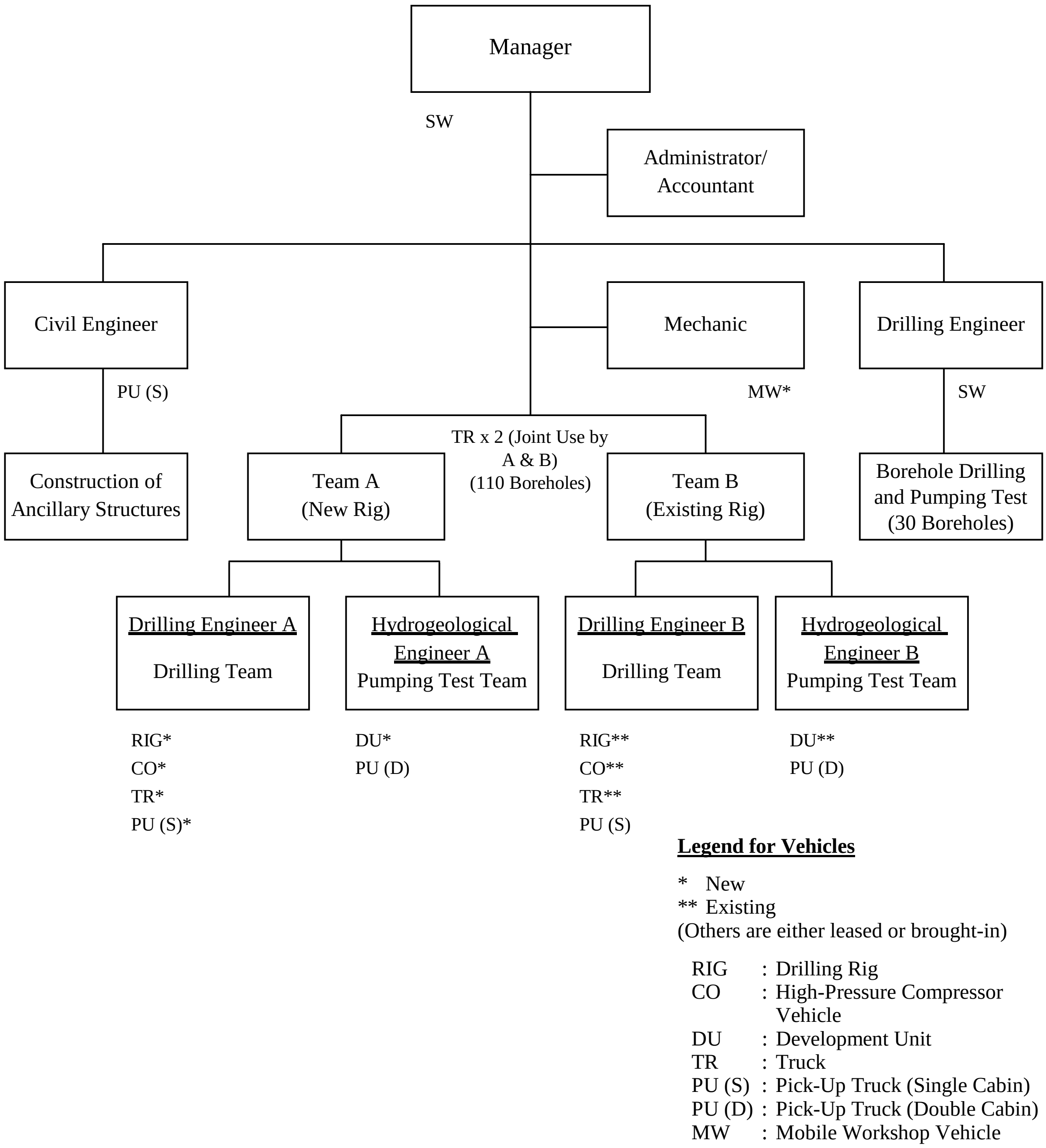


Fig. 2-2-8 Work Implementation System (Second Year)

Support vehicles be required for the smooth implementation of drilling work. Table 2-2-17 lists the major equipment, including support vehicles, in the borehole construction work, a standard fleet configuration indicated to the vehicles.

Table 2-2-17 Major Equipment in Borehole Construction Work and Standard Composition of Vehicles (Second Year)

Work Implementation System / Major Equipment and Vehicles	Standard Composition and Required Number of Vehicles								
	Borehole Drilling Team						D Ancillary Structures (3 teams)	Coordination/ Negotiation/ Supervision	Total No.
	A		B		C	Common			
	Drilling Team	Pumping Test Team	Drilling Team	Pumping Test Team	Drilling and Test				
Truck-Mounted Drilling Rig	1		1		(1)				2
Truck-Mounted High Pressure Compressor	1		1		(1)				2
Truck-Mounted Pumping Test Machine		1		1	(1)				2
Truck with Crane (3 tons)	1 [*1]		1 [*1]		(1)	3 [*2]			5
Station Wagon								2 [*3]	2
Pick-Up Truck (S)	1		1		(1)		(3)	1 [*4]	3
Pick-Up Truck (D)		1		1	(1)				2
Mobile Workshop						1			1

Notes

*1 As the drilling work and pumping test are simultaneously conducted, the trucks used by the drilling unit and for common purposes shall be temporarily used to transport equipment and materials to pumping test teams.

*2 Common use trucks consist of 2 for water and fuel supply and 1 for transportation of gravel from a distant borrow-pit(s).

*3 These shall be used for the purposes of coordination/negotiation/supervision of the Borehole Construction Team C.

*4 This shall be used for the supervision of the ancillary structures construction work (D).

( ) Figures in brackets indicate the number of equipment/vehicles to be used by the local subcontractor.

Operations requirements and the necessity of the respective support vehicles are as under.

(a) Trucks for Equipment and Materials Transportation

The truck operation plan for equipment and materials transportation is shown in Table 2-2-18. A total of 5 trucks are required in the transportation of equipment and materials; 2 to be assigned to Teams A and B, respectively, (both have a drilling team and a pumping test team), and 3 for common use. Holding a margin in the planned operating rate of each vehicle is required, considering the probable breakdowns and the overlapping of multiple work to a single truck, so that the vehicles might be flexibly used in the required work.

Table 2-2-18 Truck Operation Plan in Equipment and Materials Transportation
(Second Half of Dry Season in Second Year)

Truck	Required Time for One Drilling and Pumping Test Cycle (2 Boreholes in 4 Days)			Operating Rate
Truck A	- Transportation, installation and removal of equipment of drilling team - Transportation, installation and removal of equipment of pumping test team - Movement	8.0 hrs 8.0 hrs 0.3 hrs	Total: 16.3 hrs	0.44
Truck B	- Transportation, installation and removal of equipment of drilling team - Transportation, installation and removal of equipment of pumping test team - Movement	8.0 hrs 8.0 hrs 0.3 hrs	16.3 hrs	0.44
Truck C	- Refuelling one time/day (base-2 sites-base) (Drilling rig & Compressor Consumption: $0.73m^3$/day)	6.2 hrs	6.2 hrs x 3.74 = 23.19	0.62
Truck D (Common Use)	- 4 trips carrying a 4 m^3 water tank (travelling, water collection and water delivery) (transportation distance of more than 100 km in the second half of the dry season*)	7.4 hrs	7.4 hrs x 4 = 29.6	0.8
Truck E (Common Use)	- Return journey for transportation of gravel for 4 boreholes (pit to base: 250 km) - Transportation of gravel and PVC pipes (base to site: 40 km) - Transportation of cement for 6 boreholes (Lilongwe to base: 40 km)	15.6 hrs/2 6.8 hrs 6.0 h/3	16.6 hrs	0.44

* As Linthipe River, Dianphwe River and Nathenje River in the Project Area almost dry up towards the end of the dry season (October – November), it is assumed that water be collected outside the Project Area.

** The operating rate in the above Table is the time required in 1 cycle, divided by the actual working time of 3.74 hours (3.74 x 10 = 37.4).

A truck with a 5-ton crane has a long body (6 x 4) with GVM of over 20 tons; the driving in the much undulating hilly areas in Target Area seems to be difficult. Examination of feasibility, however, revealed that the trucks (4 x 4) with a 3-ton crane might be used with loading/unloading arrangements made towards the large commodities such as 4 m^3 water tank and fuel tank among the equipment to be transported.

From the examination results above, 5 trucks with a 3-ton crane would be necessary to transport the equipment and materials in the borehole construction work; 1 each to 2 drilling teams and 3 for common use. It is planned that 1 truck be furnished from the Malawi side jointly with 1 existing drilling rig, the remaining 3 shall be 1 to be newly procured and 3 to be brought-in by the Contractor.

(b) Pick-Up Trucks

2 pick-up trucks are required for the movement of workers, transportation of light equipment and materials and communication; 1 to the drilling team, and 1 to the pumping test team (for the transportation of the pump set used in the development, pumping test and construction of ancillary structures). A single cabin pick-up truck be suitable for the drilling team as it will mainly be used for the transportation of light equipment and materials. In contrast, a double cabin pick-up truck be suitable for the pumping test team as it will be used to transport 4 workers, equipment, and others. A total of 4 pick-up trucks are required to serve the 4 teams.

An additional pick-up truck be required in the supervision of construction sites of the ancillary structures (simultaneously to be constructed at 3 to 4 sites).

As part of the minimum fleet of support vehicles for the smooth operation of the newly procured drilling rig, 1 pick-up truck shall be newly procured. The remaining 4 pick-up trucks shall be brought-in by the Contractor.

(c) Station Wagons

2 station wagons shall be brought-in by the Contractor for coordination/negotiation/supervision of the drilling work and pumping test.

2-2-4-2 Implementation Conditions

It is indispensable, in the Project implementation, that the Malawi side complete the preparation as enumerated below, in cooperation with the Consultant, in view of the commencement of borehole construction work by the local subcontractor prior to borehole construction equipment and materials handed-over.

(1) Confirmation of setting-up of VHWC/WPC, before the geophysical prospecting for the siting commenced.

(2) Attendance in the electric prospecting to be conducted by the Consultant, in order to get hold of the residents' intentions towards the target drilling site as well as to make consultations with the Consultant. The borehole drilling site shall be determined by collating the electric prospecting results and the residents' intentions.

(3) Construction or rehabilitation of access roads, upon determination of the drilling site, with the residents' labour (land preparation at construction/rehabilitation sites, road work, etc.) as well as with locally-produced materials (sand, laterite, etc.).

(4) Layout determination of the drainage channel, by incorporating opinion of the residents, in such a way that farm land, for fund (maintenance expenses) raising, might be located to the direction of the channel terminal, for using the drainage as irrigation water.

(5) Securing the land for base camp (equipment and materials yard) planned at Linthipe before work commencement, land preparation with laterite, etc., and putting perimeter fence.

(6) Establishing the system of large-scale repairing work at MWD workshops in consideration of the probable case, even though problems in the construction period shall, in principle, be handled on-site, provided that the mechanical tools and spare parts required in the equipment maintenance and repairing be included in the planned procurement.

(7) Securing the capable local staff, for the participation in OJT.

(8) Getting approval, from the relevant Ministry or department, of using the prescribed frequency in radio communication equipment to be used in the Project.

2-2-4-3 Scope of Works

The scope of works between the Japanese side and the Malawi side is as shown in Table 2-2-19.

Table 2-2-19 Scope of Works

Work Item	Japanese Side	Malawi Side
Securing the land and land preparation at the base camp site and at the borehole construction sites		○
Construction/Rehabilitation of access roads (including bridge rehabilitation) at the borehole construction site [1)]		○
Procurement of equipment and materials required in the borehole construction work	○	○ [2)]
Borehole construction work	○ [4)]	○ [3)]
Undertaking the CMB Programme to enlighten/educate the residents (including hygiene education) regarding the need to maintain the boreholes by themselves	○	○

Notes
*1) Appendix 6 shows location and improvement method of the road requiring the improvement.
*2) Furnishing the equipment (one set) procured in the previous grant aid project, labour from the local community to meet part of labour requirement, and locally-produced materials
*3) Payment of cost of Malawi-side engineers participating in the OJT in borehole construction work
*4) Includes work to be conducted by the subcontractor.

2-2-4-4 Consultant Supervision

Following the conclusion of the consultancy agreement after signing the E/N, the Consultant shall conduct the detailed design, preparation of the tender documents, the tender on behalf of the project implementation body, and the supervision of procurement of borehole construction equipment and materials as well as the construction work, after the conclusion of the construction contract.

(1) Detailed Design Study

The Consultant shall conduct the detailed geophysical prospecting at the target villages selected in the Basic Design Study, for borehole construction work, and prepare the Detailed Design Study Report clearly indicating the location and drilling depth of the planned boreholes, for the approval in the Malawi side.

(2) Preparation of Tender Documents

Based on the results of (1) above, the Consultant shall prepare tender documents, together with the detailed design documents, for the approval in the Malawi side, through consultations.

(3) Agent for Tender

The Consultant shall advertise the tender, receive tender applications, distribute the tender documents, receive bids and analyse as well as evaluate the bids on behalf of the Malawi Government. The Consultant shall also assist the conclusion of the construction contract between the Government of Malawi and the successful bidder by providing advice, etc. in the contract negotiations between the two parties.

(4) Supervision of Equipment Procurement and Construction Work

The Consultant shall conduct the work below, relating to supervision of borehole construction work as well as procurement of equipment and materials, in the Project.

[Construction Supervision]

① Confirmation and approval of contents of work plans and other documents submitted by the Contractor.

② Implementation of the detailed geophysical prospecting to obtain basic data for the determination of drilling sites in the target villages, prior to the commencement of borehole construction work; assistance to MWD in finalising the drilling sites, through explanation of and discussions with VHWC/WPCs regarding the prospecting results, evaluation of the possibility of successful drilling; the planned drilling depth shall be conveyed to MWD staff in accompany with the physical prospecting team.

③ On-site confirmation of the finalised drilling sites, and indication of these sites to the Contractor in the meeting to be held before work commencement; provision of data on the design drilling depth based on the geophysical prospecting results, and the geophysical prospecting results used in the finalisation of drilling sites to the Contractor, at the same time.

④ Appropriate disposal of unsuccessful boreholes as well as the design change in the construction period.

⑤ Constantly getting hold of the work progress, in order to examine, discuss and instruct the measures required to the Contractor and others for the work completion within the scheduled work period.

⑥ Inspection and approval of quality control efforts of the Contractor in the construction period.

⑦ Conducting the interim and final inspections of the work.

[Procurement Supervision]

① Confirmation and approval of drawings and specifications of equipment to be procured submitted by the Contractor.

② Inspection at the manufacturing plant.

③ Inspection at the port of shipment.

④ Final inspection of the procured equipment in Malawi for the acceptance.

(5) Personnel Plan

The personnel required in the construction and procurement supervision to be conducted by the Consultant, with the respective work assignments, are as under.

- Overall Supervision (Spot Supervision)
  - Agent for the construction contract on behalf of the project implementation body, and assistance to it
  - Coordination of the final inspection of the equipment procurement and borehole construction work

- Hydrogeology I (Spot Supervision)
  - Determination of the drilling sites and drilling depth through the detailed survey, prior to work commencement in each phase (including explaining the results to the community), and re-determination of drilling site/depth after the appearance of dry holes, after the construction commencement

- Equipment Plan/Hydrogeology II (Spot Supervision)
  - Equipment plan in the Detailed Design Study
  - Determination of the drilling sites and drilling depth through the detailed survey, prior to work commencement in each phase (including explaining the results to the

community), and re-determination of drilling site/depth after the appearance of dry holes, after the construction commencement

- Equipment Procurement Plan and Supervision/Estimation (Spot Supervision)
  - Evaluation of bids, consultations with the Contractor in terms of the equipment procurement, and approval of shop drawings for the equipment
  - Procurement supervision (acceptance inspection of the equipment, and handing over)

- Construction Supervision (Resident Supervision)
  - Quick determination of the counter measures, in case an unsuccessful borehole appear or the design change required
  - Schedule control
  - Inspection and approval of quality control and materials control to be conducted by the Contractor
  - Coordination with the soft component of the Project, relating to the work schedule
  - Interim and final inspection of the borehole construction work

2-2-4-5 Quality Control Plan

(1) Borehole Drilling Work

The Consultant shall instruct the Contractor to conduct the analyses/tests listed in Table 2-2-20, in connection with the borehole drilling work, so that the results might be reflected in quality control.

Table 2-2-20 Analyses and Tests for Quality Control (Borehole Drilling)

Type of Work	Test Items	Test Frequency	Remarks
1. Drilling	- Continuous pumping test - Water quality test	- Once per borehole - For each borehole	A simplified test be conducted on 12 items (pH, electric conductivity, colon bacilli, common bacteria, ammonium, total hardness, nitrates, copper, total iron, sulphate, fluoride, magnesium, and cadmium), and a detailed test be conducted on such items as the simplified test results exceed the tentative water quality standard in Malawi. In the case of fluoride, the detailed test shall be conducted to the sample beyond the WHO guidelines value, 1.5mg/litre.
2. Gravel Packing	- Grain size analysis	- Once at each delivery	

The materials to be locally procured (PVC screens and casing pipes) shall be ordered in small quantities, to prevent their deterioration during on-site storage; their quality and shape (slit width, rate of aperture, etc.) shall be made sure at the time of delivery.

(2) Ancillary Structures Construction Work

The Consultant shall instruct the Contractor to conduct the analyses and tests listed in Table 2-2-21, in connection with the ancillary structures construction work, so that the results might be reflected in quality control.

Table 2-2-21 Analyses and Tests for Quality Control (Ancillary Structures)

Type of Work	Test Item	Test Frequency	Remarks
1. Concrete Work			
(1) Test Mixing	Fine aggregate size analysis	Once in each mixing	
	Rough aggregate size analysis	As above	
	Chloride ion concentration test	As above	With simplified method
	Compression strength test	As above	7-day & 28-day strength
(2) Casting On-Site	Slump test	Once to five water supply facilities	
	Chloride ion concentration test	As above	With simplified method
	Compression strength test	As above	7-day & 28-day strength
2. Reinforcing-Bar Work	—	At the time of each delivery	Based on the mill sheet

The Afridev pumps to be procured in India shall be inspected at the time of delivery, to confirm the quality and functioning, and others. The PVC rising pipes to be locally procured shall be ordered in small quantities to prevent deterioration during on-site storage, and, in the delivery, shall be confirmed the appropriateness of the quality. An inspection bar shall be used to check any bending at the joint socket section of the lifting pipes, in order to avoid the damage to the lifting pipes from the friction between the lifting pipe and pump rod at the time of actual use.

2-2-4-6 Procurement Plan

The survey on domestic markets in Malawi revealed that among the equipment and materials required in the borehole construction work, cement, gravels, sand, laterite, filtering materials (gravels), bricks, reinforcing bars, casings and screens (PVC pipes) might be procured in Malawi; the others would all have to be imported.

After examination of financial situations of the Government of Malawi, economics, quality, and others available in Malawi, it has been concluded:

(1) Materials to be Procured Locally

There is a domestic company producing cement. Gravels, sand and laterite can be procured in the Project Area. Filtering materials can be procured, in appropriate quantity as well as with appropriate quality, from a borrow-pit run by MWD at Mangochi on the shore of Lake Malawi. Bricks are readily available from many brick factories in operation. The imported reinforcing bars from South Africa are available in the market, and supply conditions are stable. Petrol and diesel oil are also imported from South Africa and the Middle East, and no shortage of supply is observed. PVC pipes shall be procured from a Malawi manufacturer in Lilongwe, in appropriate quantity as well as with appropriate quality; small quantity orders shall be made to ensure quick delivery as well as to avoid the deterioration during on-site storage.

(2) Equipment and Materials to be Imported

1) Mud-water Agent

Bentonite is commonly used as a mud-water agent. Not being produced domestically in Malawi, the importation is required. A chemical agent with less transportation cost of small weight shall be used, to be brought-in by the Contractor, as an expendable material required in the borehole drilling work.

2) Drilling Equipment

Towards the borehole drilling equipment, involving a number of different, mutually-related, kinds and types, to be examined are the functions, quality, future prospects, ease of obtaining spare-parts, etc., after-sale service, prices, and others. Specifically to the drilling rig, the major equipment, it is imperative that spare-parts, etc. be easily to be purchased, for the continual as well as effective utilisation after the Project implementation. To fulfil this condition, it shall be purchased from a manufacturer, either having an agent or the liaison office in Malawi, or capable of setting-up an agent or liaison office immediately after receiving the order.

3) Afridev Pumps

Afridev pumps have been manufactured neither in Japan nor in Malawi. The Indian products, with sufficient accomplishment both in quality and quantity, shall be adopted in the procurement.

4) Vehicles

Vehicles made in Japan shall be procured in Japan, except for those relating to drilling rigs.

2-2-4-7 Implementation Schedule

The Project might be divided into: Phase 1, involving procurement of equipment and materials, repairing the existing equipment, and borehole construction by the local subcontractor; and Phase 2, involving further borehole construction by the local subcontractor as well as borehole construction by the Contractor.

In Phase 1, MWD conclude a consultancy agreement for the detailed design in the Project with the Japanese Consultant, after signing the E/N. The Consultant conduct the field survey, prepare the tender documents in 2.5 months, and complete the tender to select suitable Japanese companies (equipment suppliers, and borehole construction contractor) in almost 4.5 months. The tender be conducted by MWD with the assistance of the Consultant. Following the determination of the successful bidder, a construction contract be concluded between the successful bidder and MWD through negotiations.

As for the manufacturing and procurement of equipment, almost 6.0 months is required in case of manufacturing of the major drilling equipment, 2.0 months in transportation and customs clearance, and 0.5 months in inspection and handing-over.

The manufacturing and procurement of repairing parts for the existing equipment will take 3.0 months, and the maritime transportation and customs clearance 2.0 months. In the consequence, repairing parts of the existing equipment would be delivered 5.0 months after the conclusion of the construction contract, followed by the preparation work of borehole drilling with almost 1.0 month (repairing and adjustment of the existing equipment); proceeding to the borehole construction work in Phase 2.

In Phase 1, 36 boreholes be constructed by a local subcontractor under the supervision of the Contractor. The borehole construction work with 2 rigs will take 5.6 months.

As regards the Soft Component, after concluding the Consultant Contract, technical assistance shall be rendered as: preparation of CBM activities improvement plan in cooperation with MWD, training to EWs to be undertaken by the Government, VHWC/WPC set-up, residents participation/attendance to the construction in the respective water supply communities, and

CBM training to the residents after construction completion (36 points). The whole period required would be almost 10.0 months.

In Phase 2, MWD conclude a consultancy agreement with the Japanese Consultant to conduct the detailed design for Project Phase 2 as in Phase 1. After the agreement conclusion, the Consultant conduct the field survey, prepare the tender documents in 2.5 months, and complete the tendering to select a Japanese borehole construction contractor (the Contractor) in 4.5 months. The tender be conducted by MWD with the assistance of the Consultant, and MWD conclude a construction contract with the successful bidder through negotiations.

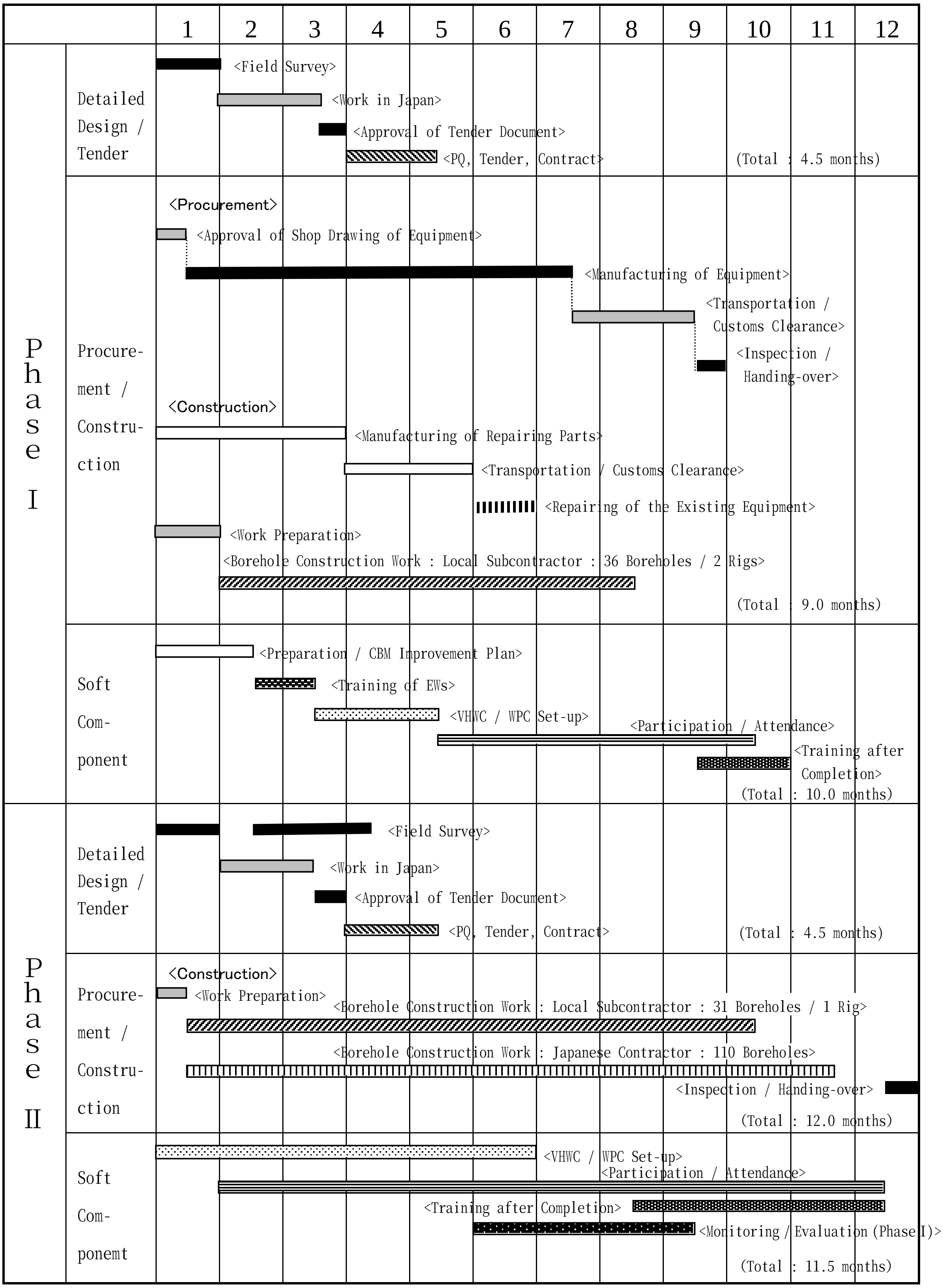
In the borehole construction work, 31 boreholes be constructed by the local subcontractor under the supervision of the Contractor, and 110 boreholes by the Contractor. The total construction period, including the borehole construction period of the local subcontractor (8.6 months) be one year.

As for the Soft Component, required would be: almost 6.0 months in VHWC/WPC (141 points), 10.5 months in the participation/attendance in construction work (141points), 4.0 months in the training after completion (125 points). In the meantime, the monitoring and evaluation would be conducted towards the undertakings in Phase I (36 points – 3.5 months). Training to the remaining 16 VHWC/WPC would have to be conducted by MWD, within 3 months after the Project completion.

The rainy season starts around the end of the construction period; though the work efficiency being reduced, it is considered that the work still be possible at such sites as near the main roads in the flat land.

Table 2-2-22 indicates the work implementation schedule as described above.

Table 2-2-22 Work Implementation Schedule



2 - 3 Obligations of Recipient Country

The Government of Malawi shall undertake the work described below in the Project. The project implementation body in Malawi having an adequate understanding of its obligations through implementing 3 groundwater development projects under the Japanese grant aid scheme in the past, no problem is anticipated in its undertakings.

1) Securing the land: The borehole construction sites shall be secured and provided by the Malawi side. The land tenure of the borehole construction sites belongs to the government, and the use rights are owned by the residents. The drilling sites being to be selected in consultation with the residents and according to geophysical prospecting, an officer responsible for water development shall attend at the time of determining the sites.

2) Clearing and preparing the site: Upon determination of the borehole sites, the sites shall be cleared and prepared by the residents under the supervision of VHWC/WPC. While the base camp site already being secured is generally flat, it still requires land preparation to withstand the weight of drilling rigs as well as trucks, the same type of preparation work as in Mchinji and Mzimba West Project.

3) Providing an access road and a warehouse site: In the base camp site, the land shall be provided, for a temporary warehouse to keep materials required in the construction work, temporary yard of cement, sand and gravel, fuel tank installation, and parking/storage of work vehicles. In addition, an access road to the base camp shall be provided.

4) Constructing/Rehabilitating the access roads before the construction work: Most of the access roads to the borehole construction sites might bear the weight of a drilling rig, though being unpaved. In the hilly areas in the north, however, the widening and levelling of the roads, and the mounting with rocks at the river crossing points are required. MWD has promised to make request to the office in charge at the District, the road rehabilitation being the undertakings of the District. Bridge intensification shall be done, also in the Malawi side.

   The items of 5) to 14) below have been undertaken, without hindrance, in the Malawi side in the previous grant aid projects. The similar undertaking shall also be made in the Project.

5) Furnishing with information and data required in the Project.

6) Bearing the commission in the services afforded by a Japanese bank, in accordance with the banking agreement.

7) Completing the procedures required in tax/duty exemption towards the equipment brought-in from Japan in the Project as well as the customs clearance.

8) Ensuring speedy unloading, customs clearance and inland transportation of the equipment procured in the Project.

9) Exempting import duty and internal taxes/levies of the equipment and materials brought-in by Japanese nationals and/or Japanese companies as well as of their services to be provided under the verified contracts.

10) Rendering conveniences of entry into Malawi and the stay therein of the Japanese nationals, under the verified contract.

11) Securing the staff and funds required in the operation and maintenance of the equipment procured in the grant aid scheme.

12) Ensuring appropriate as well as effective use of the equipment procured in the grant aid scheme.

13) Bearing all the expenses, other than those to be borne in the grant aid scheme, required in the Project implementation.

14) Maintaining the tools and spare parts procured under the grant aid scheme.

15) Furnishing with the existing equipment required in the planned borehole construction work in the Project: out of the equipment procured in the previous grant aid projects, one set of a drilling rig and the relevant equipment and one truck shall be provided throughout the construction period, in order to assist the drilling work.

16) Ensuring the participation of Malawi engineers in the borehole construction work (OJT).

17) Undertaking the CBM Programme to enlighten/educate the residents, in respect of autonomous operation/maintenance of borehole facilities by the community (including

hygiene education). The Japanese side extending support in undertaking the Programme, the Malawi side shall conduct training to the villagers, not yet completed at the time of Project completion, with its own budget funds.

[Costs to be Borne in the Malawi Side]

1)	Construction Cost of the Base Camp	:	MK 280,000
2)	Construction Supervision and OJT Cost	:	MK 1,938,000
3)	CBM Programme Cost	:	MK 3,600,000
	Total	:	MK 5,818,000

2 - 4 Project Operation Plan

The operation and maintenance plan in the Project might be divided into 2: the operation and maintenance plan of the boreholes, as the water supply facilities; and the maintenance plan of borehole construction equipment. The maintenance system shall be set-up upon completion of the Project, which is the key in the success of the Project. Since the borehole be used immediately after its completion, prior to the Project completion, due to urgency, the maintenance system of a borehole would have to be set-up, parallelly to the construction work.

(1) Maintenance System of Water Supply Facilities

MWD, in the framework of village-level operation and maintenance (VLOM) for the borehole water supply facilities, through adopting the Afridev pump to be easily maintained, has been promoting the CBM Programme, an education programme. MWD has an intention to apply the CBM Programme in the Project, as well (see Fig. 2-4-1).

Maintenance system might be divided into 2: (1) technical maintenance of the facilities, and (2) instituting the set-up for operation/maintenance of borehole water supply facilities, and tackling the social/economic/technical matters relating to operation/maintenance of boreholes. The details are as under.

1) Technical Maintenance of Water Supply Facilities

MWD has undertaken the CBM Programme, composed of setting-up VHWC/WPC, holding training courses in respect of maintenance skills and health/hygiene, and the monitoring, so as to promote autonomous operation/maintenance of water supply facilities, by handing-over the ownership of the borehole to users' autonomous operation/maintenance set-up, after the borehole constructed.

Daily maintenance of the borehole is carried out by 3 Pump Caretakers (PCs; more than 2 PCs to be women), who have taken training courses regarding pump maintenance and health/hygiene among the VHWC/WPC members (10 persons) set-up at the respective boreholes.

Training to VHWC/WPC members is conducted by the CBM Unit, MWD. Purchasing of pump spare-parts is done by VHWC/WPC, by collecting water charge from the users.

- PCs practice the daily check and repairing of the borehole, autonomously, according to the maintenance log (diary), being responsible for environmental/hygienic conditions around the borehole, such as cleaning the surrounding area.

- When the repairing of the borehole is deemed beyond the capability of PCs, the Water Monitoring Assistant (WMA), CBM Unit, Regional/District MWD extends the technical support.

Previously, the pump spare-parts were imported by the Government, and sold through Chipilu Store, a nation wide retail chain: however, now is in the transitional period to privatise importation as well as sales/distribution of them. Consequently, prior to the Project implementation the readiness of the system shall be confirmed in which the spare-parts required in the maintenance might be procured, without any hindrance, at the time of the Project completion. If not, MWD shall promote it.

2) System to Deal with Social/Economic/Technical Matters

VHWC/WPC is an institution, inclusive of the obligation of improving health/hygiene conditions related to water, to raise funds and purchase pump spare-parts, being responsible for operation/maintenance of borehole water supply facilities, with technical support of EWs belonging to the ministries shown in the followings. As a District institution, the District Executive Committee (DEC) has been set-up in the District, composed of the representatives of MWD, MoGYCS, MoHP, etc., conducting practical administrative matters on behalf of the District Development Committee (DDC) dealing with the development projects in the District as well as solving problems derived therefrom.

The success or failure of the CBM Programme is dependent upon the autonomous operation/maintenance by the residents with the self-devotion as well as spontaneous responsibility towards the borehole. For this, it is essential for the residents to foster a consciousness of “our own borehole, our own pump”, by participating in the determination of borehole location, and by conducting the pump maintenance, etc. spontaneously after the borehole completion.

[Cost Required for MWD in Water Supply Facilities Maintenance]

Total Annual Amount (annual) for 177 boreholes	:	MK 806,000
Personnel Cost (2 persons)	:	MK 96,000
Travelling Cost	:	MK 60,000
Vehicle Maintenance	:	MK 450,000
Pump Spare-parts	:	MK 200,000

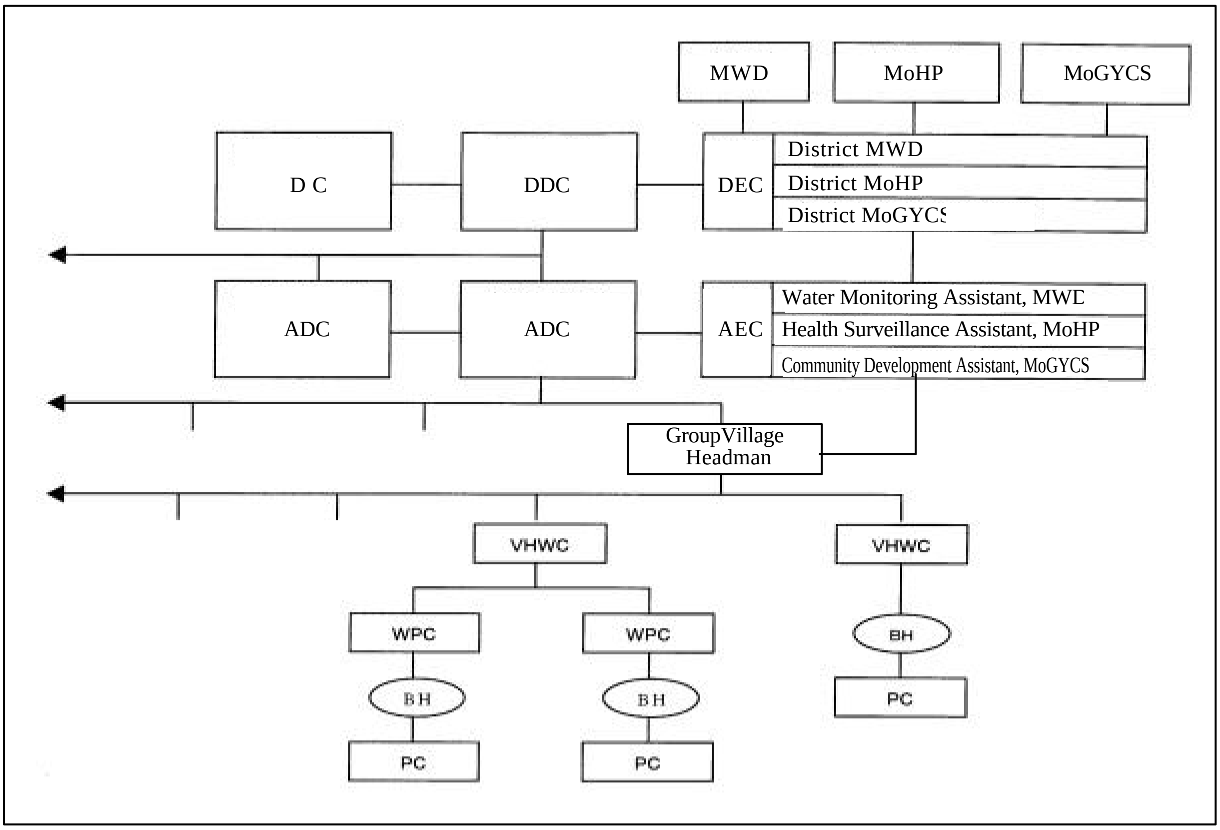


Fig. 2-4-1 Borehole Operation / Maintenance System at the Village Level

(2) Equipment Maintenance System

A sure budgeting measure would be required in maintenance funds allocation to the borehole drilling equipment, because a part of Development Budget and Treasury Fund (income from the contracted work) would be earmarked to the newly procured equipment, as in the previous cases. Additionally, for conducting periodical inspections and maintenance/repairing as planned, it is desirable to keep a portion of the contract work income as funds for maintenance/repairing. At present, under scrutiny is the budgeting of maintenance funds of vehicles for borehole maintenance other than Borehole Treasury Fund, now that the responsibility was transferred from Dept. of Water Resources to Dept. of Water Supply and Sanitation, a new set-up.

The existing drilling equipment is operated by the drillers in charge, with the responsibility of daily maintenance. Repairing and spare-parts management are performed by the Equipment Unit and Stores, Regional MWD. One of 4 drilling rigs procured in the previous grant aid projects, has been heavily-superannuated and disused; it is considered that the newly-procured equipment would possibly be operated and maintained in the present system, by applying the personnel of the above disused one.

In the Project, not only OJT shall be conducted to drillers, regarding operation and maintenance skills, in the drilling work, but Equipment Unit personnel shall participate in repairing the existing equipment in order to improve their repairing skills.

As regards augmentation of repairing equipment, a mobile workshop capable of handling frequently the required repairing on-site to the damages, without the equipment and vehicle movement, shall be procured in the Project; with this, enabled would be (1) maintaining conditions of the equipment and vehicles favourable prior to the large repairing work required, to prolong the life of usage, and (2) utilising drilling equipment efficiently.

Incorporating an independent corporation with drillers and mechanics and others, as constituents, is under consideration, at the moment. Notwithstanding, the following is proposed, in the Study, in order to maintain the appropriate maintenance system towards the equipment possessed by MWD:

[Management with Dispersed Responsibility]

The drilling rig and the relevant equipment to be newly procured in the Project, forming a drilling team, and the existing equipment shall be rearranged and deployed to the Regional MWDs, and maintained with the respective responsibilities. Also, towards the mobile workshop vehicle to be procured to strengthen the equipment maintenance system, a major responsible office shall be designated with the appointed mechanics, in order to make the management system reliable.

[Management with Centralised Operation]

The more intensive borehole drilling, by gathering the drilling equipment of the different Regional MWDs, being foreseen in the rural water supply projects scheduled after the Project implementation, operation of drilling equipment and mobile workshop shall be centralised. In addition, the Headquarters or the core Regional MWD, in the future project, shall regularly make sure the conditions of equipment as well as inventory of the spare parts with a view to appropriately replenishing repairing equipment and spare parts, etc. in the regional workshops.

The maintenance cost of the existing drilling equipment shall be met with the funds in each Project. Some ¥ 5 million (MK 3,165,000) of maintenance cost would be required in the newly procured equipment in the Project, according to standard annual operating days.

2-5 Other Relevant Issues

2-5-1 Soft Component Plan

(1) Necessity of the Soft Component and the Matters to be Settled

Necessity of Applying the Soft Component

The Government of Malawi has, since 1994, undertaken the Community Based Management(CBM) Programme, enlightenment and educational activities as part of groundwater development programme, aiming at autonomous operation and maintenance of boreholes by users themselves as well as hygiene education, by adopting the concept of "village level operation and maintenance" (VLOM), and by making WPC set-up at each borehole.

The CBM Programme; an application guidelines, guidance manuals, and Committee handbooks containing the syllabi for lectures, with local language versions, being prepared to; is undertaken in the procedures shown below.

1) District CBM Unit set-up
2) Training to Extension Workers (EWs; selected from MWD, MoHP, MoGYCS)(5days)
3) Community mobilisation and WPC set-up (1/2 day at each borehole)
4) Training to WPC members (5days)
5) Furnishing with repairing tools and maintenance-log notebook (upon completion)

Recently, a number of rural water supply/sanitation projects have been implemented by NGOs, international organisations, and the governmental organisations other than MWD. Faced with this, in January 1999, MWD prepared, in the National Water Development Project financed by World Bank, in consultation with the related organisations (4 Ministries, 5 NGOs, UNICEF and World Bank), the "Community Based Rural Water Supply, Sanitation and Hygiene Education: Implementation Manual", as guidelines of activities related to the rural water supply/sanitation. The following are the extensively-revised activities:

- In esteeming the traditional village system, the more spontaneous resident participation shall be promoted, in the course of planning, implementation, monitoring and appraisal of rural water supply/sanitation projects; the ownership and responsibility of water supply facilities shall be handed over to such community as VHWC/WPC to be set up at each borehole.
- The responsibilities shall be clearly demarcated among the community, the Government, NGOs, international aid organisations, and private enterprises;

anticipated is the cooperation among them.

- The District Development Committee (DDC) and the District Executive Committee (DEC), under it, shall give approval to, and make coordination in the plans and programmes of the different implementation bodies.

Besides, in line with the above Implementation Manual, a trainers' guide for both EW training and WPC training, was prepared, as part of the Rural Water Supply and Sanitation Programme (RWSSP) aiming at the "participatory-type" enlightenment activities. (December 1999).

The fundamental guidelines have been prepared, for the enlightenment activities towards the residents to be undertaken, associated with the borehole construction, as above-mentioned; however, Japanese support, both technical and financial, is required, in view of the matters enumerated below.

- There have been few accomplishments in the "participatory-type" enlightenment activities; an evaluation towards the method and activities is still floating. EWs have not been acquainted with the "participatory-type" method thoroughly.
- As regards funds for CBM activities, only confirmed in the Project is MWD bearing of the amount corresponding to that for the ordinary CBM activities; in view of the further manpower and materials input being anticipated in the adoption of the "participatory-type" method, the more funds would be required.

Matters to be Settled

1) Establishment of Ownership Consciousness and Autonomous Operation and Maintenance System

- For enabling the continuous water supply from the constructed borehole, the residents or users, shall understand the importance of safe water, and spontaneously conduct operation and maintenance of the borehole, as an owner; ownership consciousness shall, therefore, be fostered among them.
- Consciousness reform shall be promoted, so that the community might tackle the need of smoothly succeeding the funds, responsibilities and skills required in the sustainable operation and maintenance of the facilities, either in the case fund raising being difficult for maintenance expenses due to external constraints or in case VHWC/WPC members such as pump caretakers to be replaced.

- It is required to fill-up orientation and workshop to the village prior to the borehole construction, in order to foster the spontaneity and participatory consciousness among the residents.

2) Maintenance Funds

- So far, the responsibility of the residents cover only the replacement of the expendables such as sheel made of gum and the bearings. To be responsible for the maintenance, as an owner, repairing expenses such as replacement cost of the rod, to be easily damaged in the Afridev pump, and the rising pipe shall be borne by the residents, to be collected from them, and, to be managed by them. As for the required maintenance expenses, a clear standard shall be referred to the residents.

3) Task Execution System

- MoHP deploys, nationwide, a Health Surveillance Assistant (HSA) at several villages, and has undertaken the guidance on hygienic utilisation of water according to the source and sanitation facilities installation, under the Hygiene Education and Sanitation Programme (HESP). MoHP is now moving to switch-over to the "participatory-type" Participatory Hygiene and Sanitation Transformation (PHAST) Programme.

  In the Soft Component, it is required to promote the residents to tackle spontaneously the hygiene education as well as long-run operation and maintenance of the facilities, by extending the support to the enlightenment activities for securing the sustainability of borehole water supply facilities to be constructed in the groundwater development programme. Hygiene education and sanitation facilities are common between the CBM Programme of MWD and PHAST Programme of MoHP; both coincidently aim at improving hygienic conditions in the area. In this consequence, a tied-up system shall be set-up with MWD, MoHP, and MoGYCS, and, according to circumstances, the proposals shall be made so that the tackling with areal hygiene improvement, follow-up measures, and monitoring activities might be continuously conducted.

4) Price and Supply of Spare-parts

- As regards the parts made of gum and plastic, requiring the periodical replacement in the hand-pump maintenance, it is scheduled that private companies handle the importation and marketing from the year 2001. MWD shall, at the commencement of the CBM activities, confirm the distribution situation, and investigate the price, in view of the relationship with the fixing water charge to be collected from the residents for the borehole maintenance.

(2) Objectives of the Soft Component

Grounded on the above-mentioned background and the rationale of applying the Soft Component, Overall Goals of the Soft Component shall be: "autonomous operation/maintenance activities of the borehole water supply facilities be conducted and continued by the residents".

Project Purpose of the Soft Component to be undertaken is:

> "VHWC/WPC be set-up according to the residents' intentions, and the autonomous operation and maintenance system be established".

For the attainment of Project Purpose, pump spare-parts and expendables distribution shall be maintained at an appropriate price level.

(3) Output of the Soft Component

Output (Direct Effects)	CBM Activities
1. CBM activities be improved.	1-1 Consultation with DDC, relating to the execution. 1-2 Analyses of the previous problems and lessons. 1-3 Consultations for the CBM activities improvement. 1-4 Preparation of the guidelines for the improved CBM activities. 1-5 Monitoring of the CBM activities undertaken, evaluation, and proposals for CBM Programme improvement.
2. EWs acquire the intensified understanding and skills of "participtory -type" activities.	2-1 Preparation of training papers reflecting the above consultation results. 2-2 Training to EWs. 2-3 Drills in the responsible area of each EW (or in the surrounding villages).
3. Borehole ownership consciousness be fostered among the residents, and the spontaneous resident participation be promoted.	3-1 Explanation to community leaders of the facilities plan, coordination of the meetings, collection of information relative to the village. 3-2 Community mobilisation. 3-3 Explanation of the principle of the CBM activities, and selection of VHWC/WPC members on a democratic ba-

Output (Direct Effects)	CBM Activities
	sis. 3-4 Discussion on water charge collection system meeting the village situation. 3-5 Discussion on the importance of hygienic customs and hygiene education. 3-6 Agreement of the resident participation and cost bearing. (Agreement Document) 3-7 Selection of borehole drilling site. 3-8 Preparation of construction site and access roads, furnishing with local construction materials, contributing in the labour work.
4. Operation/Maintenance system of VHWC/WPC be established.	4-1 Training to VHWC/WPC members. 4-2 Attending in the construction, and confirmation of borehole structure. 4-3 Discussion on spontaneous participation of the residents and on the activities for consciousness enhancement. 4-4 Discussion on water charge collection, management and fund raising. 4-5 Discussion on hygiene education. 4-6 Discussion on succession method of borehole operation/ maintenance skills. 4-7 Improvement of operation/maintenance skills and provision of repairing tools. 4-8 Collection/management of water charge, and fund raising activities. (VHWC/WPC) 4-9 Operation and maintenance (routine inspection and parts replacement) (VHWC/WPC) 4-10 Monitoring (VHWC/WPC, EWs)

(4) CBM Activities in the Soft Component

[Task Execution System]

In the Soft Component, almost the same task execution system shall be taken, as in the existing CBM Programme: 24 EWs selected from 3 Ministries, under the guidance of supervisors, conduct the training, before and after the borehole construction, in the target village. In practice, 3 EWs form a team for conducting the mobilisation of the respective villages, Workshop 1 and Workshop 2. As supervisors, a Japanese consultant and 3 MWD officers superintend and command the execution.

[Contents of the CBM Activities]

"Participatory-type" CBM activities shall be undertaken, mostly in line with the WPC/VHWC Training Manual in RWSSP.

Prior to the Borehole Construction

1) Construction plan explanation to, and consultation with DDC, DEC and District Co-ordination Team (DCT); and asking their cooperation
2) Consultations relating to the CBM activities improvement
3) Training to EWs
   In 10 days, 6 Facilitators conduct lectures and drills to 24 EWs, for the purpose of intensifying the understanding and skills of "participatory-type" workshop method.
4) Initiation
   As an initiation, community mobilisation and Workshop 1 be conducted in the target village. A team of 3 EWs conduct the activities at the community facilities such as schools, by visiting 5 times in total.

- Explanation to community leaders of the water supply facilities plan, coordination of the meetings, and collection of information relative to the village
- Community mobilisation, and holding the meetings
- Selection of VHWC/WPC members, on a democratic basis
  Composition of VHWC/WPC: Chairman, Secretary, Accountant, and other 4 members. (More than half should be the female-members.)
- Training to VHWC/WPC members: "Workshop 1 "
  Subject matters: responsibilities, constitution, the meetings; facility maintenance; selection of the construction site; collection of maintenance expanses and the management; hygiene education, sanitation facilities, etc.
- Selection of the drilling site out of candidate sites recommended by VHWC/WPC (Geophysical prospecting shall be conducted by the Consultant).
- Coordination between the work schedule and the CBM activities

At the Stage of Borehole Construction:

- Participation of the residents in borehole construction work (keeping the favourable conditions of the construction site and the access roads, perimeter fencing, furnishing with materials, contribution in the labour work, etc.).
- Understanding and keeping record of the borehole structure(pump structure, borehole

depth, rising pipe number, rod number, etc.) through participating in pump installation work.

After the Borehole Constructed:

- Training to VHWC/WPC members: "Workshop 2"
  Workshop 2 shall be conducted, in 2 days, by gathering 3 to 5 VHWC/WPCs' members at one place. Discussion items are: method of problem solving, spontaneous participation of the residents and enhancement of their consciousness, collection of maintenance expenses and the management, meetings and keeping a record, fund raising for maintenance expenses, importance of hygiene education and sanitation facilities, succession method of borehole operation/maintenance skills, and others.
- Training on facilities repairing method and improving the maintenance skills: 3 VHWC/WPC members shall be nominated as "pump caretakers", who shall maintain water supply facilities in operational conditions. Succeeding to the Workshop 2, 4 VHWC/WPCs' pump caretakers gather at one place, for the 3-day intensive technical guidance. Afterwards, repairing tools shall be furnished with.
- Collection and management of water charge as well as fund raising method for other maintenance expenses shall be discussed and determined. (VHWC/WPC).
- Practicing the maintenance work, such as routine inspection and parts replacement. (VHWC/WPC).
- Holding the meetings inside the village and conducting the monitoring. (VHWC/WPC, EWs).
- Monitoring and follow-up activities by the officers in charge of the related Ministries. (HSA, MoHP; CDA, MoGYCS; WMA, MWD).
- Completion of securing distribution/supply channels of spare-parts, under the guidance of MWD.
- With a Japanese consultant as the central figure, the activities undertaken in Phase Ⅰ shall be monitored and evaluated; thereafter, proposed be an improvement plan of the CBM Programme, including the follow-up measures in the target area, and an improvement plan of the CBM activities to be undertaken in the other areas.

[Output by Phase]
The Project shall be implemented in 2 Phases: in Phase Ⅰ, 36 boreholes be constructed; and the remaining 141 boreholes, in Phase Ⅱ. By virtue of this work schedule, 36 WPCs shall be set-up in Phase Ⅰ; and 141 WPCs in Phase Ⅱ, in the target villages. The Soft Component Work shall be the enlightenment activities towards the autonomous operation/maintenance of the facilities as well as towards the hygienic utilisation of safe water, in the respective numbers of borehole water supply facilities in the Phase. Phase Ⅰ is the

initial stage of the Soft Component Plan: at the outset, the preparatory work shall be undertaken, such as; the existing CBM activities be improved; the Developed CBM(D-CBM) Activities Plan be prepared, adopting the "participatory-type" method by referring to RWSSP; a work sharing system be adjusted among the Ministries/offices. Thereafter, training to EWs shall be conducted; by EWs the CBM activities to be undertaken in the target village. With EWs as the central figures, 36 target places shall be visited to conduct the CBM activities prior to the borehole construction; such as: enlightenment towards the residents, discussion on the method of operation/maintenance, hygiene education, borehole site selection, selection of WPC members, Workshop to WPC members, and others. Succeedingly, technology-transfer during the construction period and the Workshop after the construction shall be rendered to WPC members. The WPC would be brought-up in the target villages; then the Phase Ⅰ CBM activities be complete.

The construction work of Phase Ⅱ is scheduled to start in April, end of the rainy season. The CBM activities shall, on the other hand, be commenced half-year prior to the construction commencement, because of a number of target villages, and continued to the end of the year of the construction work. With the EWs already trained in Phase Ⅰ as the central figures, 141 WPCs shall be set-up through undertaking the D-CBM activities, and the enlightenment towards the operation/maintenance of the facilities as well as the hygiene education to WPC members of the constructed borehole. Since the Phase Ⅱ construction work would not be completed before the start of rainy season, in some villages, the Workshop after the construction might not be conducted, within the Project implementation period. In such the villages (with 16 boreholes), the Malawi side shall conduct the Workshop after the borehole construction, to be continued, after the Project implementation, from April 2004, end of the rainy season, to June 2004, when the fiscal year finishes in Malawi. Furthermore, in Phase Ⅱ, the monitoring and evaluation shall be conducted towards 36 WPCs already brought-up in Phase Ⅰ; to be proposed are the follow-up measures in the target area, and an improvement plan of the CBM Programme to be undertaken in the other areas.

The materials coming out from the Soft Component by Phase are as under.

Phase Ⅰ:

- D-CBM Activities Plan (May 2002)
- Village Agreement (Copy): 36 WPCs
- Village Visit Report of EWs, Monthly Report Summary: 36 WPCs
- Village Minute of Discussions: 36 WPCs

Phase Ⅱ:

- Village Agreement (Copy): 141 WPCs
- Village Visit Report of EWs, Monthly Report Summary: 141 WPCs
- Village Minute of Discussions: 125 WPCs
- Training Conducting Plan, after the Project completion: 16 WPCs (to be conducted by the Malawi side, April to June 2004)
- Appraisal Report of CBM Activities(including the follow-up measures in the target villages, and improvement plan of the CBM Programme to be undertaken in the other areas)

From Village Agreement, it might be confirmed how the residents participated in the construction work as well as to what extent the operation/maintenance responsibilities being borne by them. Village Minute of Discussions summarises what finally was determined, and, by submitting it, indicated would be matters agreed upon inside the WPC. As indicating whether Workshops or the meetings were actually held or not, Reports of EWs and Monthly Reports shall be used for confirmation of the Soft Component activities conducted in actuality.

(5) Input in the Soft Component

1) Personnel

unit: man-month(MM)

Designation	Number	Phase Ⅰ	Phase Ⅱ	Total
[Consultant]				
Social Development Expert:	1 person	4.75	3.75	8.50
[Malawi Government]				
1. Consultations with the District				
CBM Coordinator:	2 persons	0.40		0.40
District Coordinator:	8 persons	0.80		0.80
DEC:	2×22persons	2.20		2.20
2. Orientation				
Administration:	12 persons	0.60		0.60
EW:	24 persons	1.20		1.20
Auxiliary:	4 persons	0.20		0.20
3. Training to EWs				
Facilitator: (MWD:2,MoHP:2,MoGYCS:2)	6 persons	3.00		3.00
EW: (MWD:8,MoHP:8,MoGYCS:8)	24 persons	12.00		12.00
Supervisor:	4 persons	2.00		2.00
Auxiliary:	5 persons	2.50		2.50
Accountant:	1 person	0.50		0.50
4. Pump Spare-parts Supply Confirmation/Promotion				
Supervisor:	2 persons	0.25		0.25
Auxiliary:	2 persons	0.25		0.25
5 WPC Mobilisation "Workshop 1"				
EW:	24 persons	14.40	60.00	74.40
Supervisor:	4 persons	3.20	14.00	17.20
Auxiliary/Accountant:		6.40	28.00	34.40
6. "Workshop 2" after Completion				
EW (MWD):	8 persons	3.00	10.80	13.80
EW (MoHP/MoGYCS):	16 persons	3.00	10.80	13.80
Supervisor:	4 persons	2.00	7.20	9.20
Driver/Accountant:	2 persons	6.00	21.60	27.60
7. Monitoring				
EW:	2 persons	–	0.90	0.90
Total		68.65	157.05	225.70

Work Schedule

1. Workshop 1:

Phase Ⅰ(2002-1):	Southern TA Chadza	:	18WPCs	:	3EWs×(1Team-2months,1Team-1month)
	Western TA Kachere				
	+Western STA Chilikumwendo	:	18WPCs	:	3EWs×(1Team-2months,1Team-1month)
	Sub-total	:	36WPCs	:	14.4MM
Phase Ⅱ(2002-2):	Western TA Chadza	:	15WPCs	:	3EWs×(1Team-2months,1Team-1month)
	Western TA Kachere				
	+Eastern STA Chilikumwendo	:	30WPCs	:	3EWs×(1Team-2months,1Team-3months)
	TA Tambala+ STA Chauma		42WPCs		3EWs×(1Team-4months,1Team-3months)
	Sub-total	:	87WPCs	:	36.0MM
Phase Ⅱ(2003-1):	Central TA Chadza	:	16WPCs	:	3EWs×(1Team-2months,1Team-1month)
	Eastern TA Kachere	:	22WPCs	:	3EWs×(1Team-2months,1Team-2months)
	Sub-total	:	38WPCs	:	16.8MM
Phase Ⅱ(2003-2):	Northern TA Chadza	:	16WPCs	:	3EWs×(1Team-2months,1Team-1month)
	Sub-total	:	16WPCs	:	7.2MM
	Total	:	177WPCs	:	74.4MM

2. Workshop 2:

Phase Ⅰ(2002-1):	Southern TA Chadza	:	18WPCs	:	1Team×5weeks(1.25months)
	Western TA Kachere				
	+Western STA Chilikumwendo	:	18WPCs	:	1Team×5weeks(1.25months)
	Sub-total	:	36WPCs	:	3.0MM each MWD,MoHP,MoGYCS
Phase Ⅱ(2003-1):	TA Chadza	:	31WPCs	:	1Team×8weeks(4.0months)
	TA Kachere+STA Chilikumwendo	:	52WPCs		1Team×13weeks(3.25months)
	TA Tambala+STA Chauma	:	42WPCs	:	1Team×11weeks(2.75months)
	Sub-total	:	125WPCs	:	MWD:9.6MM,MoHP/MoGYCS:9.6MM
Undertakings by the Malawi side:	TA Chadza	:	16WPCs	:	1Team×4weeks(1.0month)
	Sub-total	:	16WPCs	:	MWD:1.2MM,MoHP/MoGYCS:1.2MM
	Total	:	177WPCs	:	13.8MM

3. Monitoring :	Southern TA Chadza	:	18WPCs	:	9days
	Western TA Kachere				
	+Western STA Chilikumwendo	:	18WPCs	:	9days
	Total	:	36WPCs	:	0.9MM

2) Vehicles

The Water Supply and Sanitation Department, MWD, in charge of water supply facilities maintenance, does not possess any vehicle for VHWC/WPC training, and the existing motor-bikes, for the use in setting-up of VHWC/WPC and in the monitoring, are out of order, and disused. For this reason, pick-up trucks and motor-bikes shall be procured, with a view to facilitating the effective as well as efficient CBM activities, jointly with the construction work, and also in consideration of the intensified CBM activities to come in the Malawi side.

Now that the CBM activities shall be commenced with preparation before the borehole construction, in order to set-up VHWC/WPC at the time of geophysical prospecting for the selection of drilling sites, motor-bikes would have to be procured locally as earliest as possible after procurement contract conclusion, so that they might be get ready at the commencement of the borehole construction work in Phase Ⅰ.

・The Vehicle for Consultant Personnel Moving:

Station-wagon (4×4): 1no.(rental)×8.5months

・Vehicles for CBM activities:

	FY	Pick-up Truck (double cabin)(vehicle・month)				Motor-bike (vehicle・month)		
		Government -owned	Rental	To be Procured	Total	Rental	To be Procured	Total
Phase Ⅰ	2001/2002	2.0	—	—	2.0	2.0	6.0	8.0
	2002/2003	—	2.5	—	2.5	—	2.5	2.5
	Sub-total	2.0	2.5	—	4.5	2.0	8.5	10.5
Phase Ⅱ	2002/2003	—	4.0	—	4.0	8.0	10.0	18.0
	(02/03 Sub-total)	(2.0)	(6.5)	(—)	(8.5)	(8.0)	(18.5)	(20.5)
	2003/2004	—	4.25	4.75	9.0	—	9.0	9.0
	Sub-total	—	8.25	4.75	13.0	8.0	19.0	27.0
Total		2.0	10.75	4.75	17.5	10.0	27.5	37.5

3) Others

Expenses for meetings (hall-rental fee, etc), stationery, materials (documents) preparation, and others.

CHAPTER 3　PROJECT EVALUATION AND RECOMMENDATIONS

CHAPTER 3　PROJECT EVALUATION AND RECOMMENDATIONS

3-1　Project Effects

Table 3-1-1　Effects of Project Implementation and Improvement

Present Situations and Difficulties	Counterplan in the Project (Japanese Assistance)	Project Effects/Improvement
1.The water supply service ratio is estimated to be 41% in the target area, which is lower than the national target as well as those in the other areas. Majority of the residents rely on unsanitary and unstable water sources.	- 177 borehole water supply facilities to be constructed in 154 villages (with a hand pump, apron, drainage channel and washing place) - Procurement of 1 set of borehole drilling equipment and the relevant equipment (drilling rig, pumping-test equipment, support vehicles (truck, pick-up, workshops vehicle), equipment for geophysical prospecting: 1set each)	[Direct Effects] It is anticipated that almost 50,400 of the served population increase, to uplift the water supply service ratio in the target area to 55%, in 2004. [Indirect Effects] - With the augmented hygienic water supply facilities, the contraction percentage of water-born diseases would be reduced in the target area. - After implementing the Project, the rural water supply undertakings under MWD, such as the emergency measures towards the disaster-affected areas and the cholera-outbroken areas, might be efficiently carried out, by using the procured drilling equipment and others.
2.Intended have been sustainable operation and maintenance of the facilities and improvement of hygienic conditions, by adopting the method of "participatory -type" enlightenment activities aiming at an operation and maintenance system	- Technical as well as financial support in the planning and execution of enlightenment activities (training to 24 EWs, 177 VHWC /WPCs set-up, training to 161 WPCs after the borehole construction (the reminder shall be trained by	- 24 EWs get a thorough acquaintance with "participatory-type" activities, and their capability of conducting enlightenment activities be enhanced. - In VHWC/WPC set-up, maintenance expense collection be commenced.

with the residents as the main constituents. However, there are few accomplishments of "participatory-type" activities, and it is viewed financially that the implementation with the government's own budget funds would be difficult.	the government itself), and monitoring and evaluation at 36 places) - Procurement of vehicles, for the monitoring and for enlightenment activities (3 motor-bikes and a pick-up truck)	- Borehole water supply facilities be autonomously operated and maintained, by the residents spontaneously participated.

3-2 Recommendations

So as to make the Project effects appear and continue, as well as to draw the rural water supply undertakings to the national target, tackling the matters enumerated below would be indispensable.

(1) Collaboration among the organisations concerned in the monitoring

After the Japanese assistance provided, the monitoring of water supply facilities (including the existing ones) would be conducted by the different offices at the District level. In the case of the Project, in view of the enlightenment activities adopting the "participatory-type" method, the community shall participate in the monitoring, in relation to the operation/maintenance and the hygienic conditions. The EWs of MWD-CBM activities (Water Monitoring Assistants, MWD; Health Surveillance Assistants, MoHP; Community Development Assistants, MoGYCS) shall form a coordination sub-committee in each TA, and conduct the monitoring, under the guidance of the DCT, the superior body, and DEC, with the participation of the community involved in the TA. It is imperative to maintain the communication/coordination system between DDC (District Commissioner, Director of Planning and Development, etc.) administering development projects inside the District, and the 3 related-ministries district offices, in order to set-up an operation/maintenance system even of the existing borehole water supply facilities.

(2) Distribution and supply of pump spare-parts

For the continuous utilisation of water supply facilities, it is required to maintain a distribution system in which the users might easily obtain the required pump spare-parts. The Government of Malawi made a shift to permit private companies to handle from importation to marketing of the pump spare-parts from the year 2001, from the hitherto monopolistic importation by the Government, as a whole, and entrusting the distribution to a country-wide retailing chain. At the commencement of Project implementation, important is the establishment of a system in which spare-parts might be obtained at an appropriate price. The Government shall confirm distribution situations, and give guidance to the private companies, either in case not appropriate price being noticed or in the case distribution amount being insufficient.

(3) Groundwater development programme to come

Upon the Project completion, with 177 boreholes constructed, the rural water supply service ratio would be 55% in the target area. Even the simultaneously constructed MASAF boreholes (20 to 30 boreholes in FY 2001/2002, almost 2% service ratio uplifting) being added, around 220 boreholes would be in short, for the attainment of 74% of national target in the year 2010. From this time on, it is foreseen that new borehole drilling programmes come out such as the Dispersed Borehole Construction Programme, and those of MASAF and NGOs at the request of the communities. Consequently, the programmes of the different organisations shall be adjusted and coordinated, aiming at the appropriate rural water supply undertakings, without the mutual duplications and with the combination between new borehole drilling and rehabilitations after the inventory survey of the existing boreholes to be conducted by the District-level offices.

Furthermore, for the furtherance of the Project effects, the following are recommended:

(1) Coordination with PHAST:

The Environmental Health Section, MoHP, has planned to adopt a “participatory-type” method, Participatory Hygiene and Sanitation Transformation (PHAST), for conducting the hygienic improvement activities more efficiently. Though PHAST involves the similar contents, such as resident participation and hygiene education, to MWD-RWSSP, the personnel of MoHP stationed at the District level are far more than the number of MWD personnel stationed; the more elaborate undertakings might be conducted by them for hygienic improvement (including the existing water supply facilities). It is expected that VHWC to be set-up by village in the Project not only operate and maintain the borehole newly constructed but also become an autonomous body for hygienic improvement in the village, guided in a democratic selection of members as well as with knowledge of hygiene relating to water. In PHAST, the similar VHWC set-up is included at the initial stage of enlightenment activities, as well. In the consequence, VHWC to be set-up in the Project would also correspond to part of PHAST activities.

MWD and MoHP shall, in the respective CBM and PHAST Programmes, coordinate in the mutual relation and tie-up, either preceding, and, cooperate with each other, between the District-level personnel, in the undertakings.

(2) Integrated Regional Development:

Provision of safe and stable water source in the rural area, is the basis of hygienic improvement as well as economic development in the area. On the other hand, for the sustainability of water supply facilities, the community shall hold an appropriate perception towards the hygienic conditions, and secure the income level enough to bear the financial burden of the maintenance expenses. Like this, water, hygiene and the productivity are criss-crossed, forming a ground for the regional development. If the technical assistance to promote the "participatory-type" development at the village level, based on the VHWC set-up with the resident participation, be formulated, the larger effects might come out from the Project.

APPENDICES

APPENDIX 1. MEMBER LIST OF THE STUDY TEAM

1． MEMBER LIST OF THE STUDY TEAM

Basic Design Study

NAME	ASSIGNMENT	ORGANIZATION
Yuji MARUO	Team Leader	South Africa Office Japan International Cooperation Agency (JICA)
Hirotaka NAKAMURA	Coordinator	First Project Management Div Grant Aid Management Dept. Japan International Cooperation Agency (JICA)
Hiromi YAMAGAI	Project Manager/ Water Supply Facilities Planner	Japan Engineering Consultants Co., Ltd. (JEC)
Shuro MATSUHASHI	Hydrogeologist (I) /Drilling Planner	Japan Engineering Consultants Co., Ltd. (JEC)
Sakae NAKAMURA	Socio-Economic Surveyor /Operation and Maintenance Planner	Japan Engineering Consultants Co., Ltd. (JEC)
Kazuo HIRAYAMA	Hydrogeologist (II)	Japan Engineering Consultants Co., Ltd. (JEC)
Mitsuhiro HOSOOKA	Geophysical Electric Prospecting Surveyor (I)	Japan Engineering Consultants Co., Ltd. (JEC)
Shigetoshi SAITO	Geophysical Electric Prospecting Surveyor (II)	Japan Engineering Consultants Co., Ltd. (JEC)
Tetsuo TAKAMATSU	Cost Estimator /Construction Procurement Planner	Japan Engineering Consultants Co., Ltd. (JEC)

Final Report Explanation

NAME	ASSIGNMENT	ORGANIZATION
Yuji MARUO	Team Leader	South Africa Office Japan International Cooperation Agency (JICA)
Junko UNO	Coordinator	First Project Management Div Grant Aid Management Dept. Japan International Cooperation Agency (JICA)
Hiromi YAMAGAI	Project Manager/ Water Supply Facilities Planner	Japan Engineering Consultants Co., Ltd. (JEC)
Shuro MATSUHASHI	Hydrogeologist (I) /Drilling Planner	Japan Engineering Consultants Co., Ltd. (JEC)

APPENDIX 2. STUDY SCHEDULE

Basic Design Study Schedule

SL No.	2001 Day	Date	OFFICIAL	Project Manager /Water Facilities Planner	Hydrogeologist(I) /Drilling Planner	Dy. Project Manger /Socio-Economic Surveyor/O & M Planner	Cost Estimator /Construction ・Procurement Planner	Geophysical Prospecting Surveyor(I)	Geophysical Prospecting Surveyor(II)	Hydrogeologist (II)
			Yuji MARUO Hirotaka NAKAMURA	YAMAGAI, Hiromi	MATSUHASHI, Shuro	NAKAMURA, Sakae	TAKAMATSU, Tetsuo	HOSOOKA, Mitsuhiro	SAITOH, Shigetoshi	Hydrogeologist (II)
	24-Mar	S	*(Mr. Maruo has been in LLW for other project.)* TYO→SIN (SQ997							
1	25-Mar	S	SIN→JNB (SQ406 1:20→7:30)	TYO→BKK(TG641 11:00→15:30)						
2	26-Mar	M	JNB→LLW(SA170 10:20→12:40) Meeting with JICA Office	BKK→JNB(TG7051 00:50→06:40)JNB→LLW(SA170 10:20→12:40) Meeting with JICA Office						
3	27-Mar	T	Courtesy Call, Discussions with MWD, CRWB, MoFEP							
4	28-Mar	W	Site Survey (Lilongwe/ Dedza)							
5	29-Mar	T								
6	30-Mar	F	Discussions with MWD							
7	31-Mar	S	Site Survey (Lilongwe, Dedza							
8	1-Apr	S								
9	2-Apr	M	Discussions with I.O.(DFID, CIDA)		Site Survey (Lilogwe/Dedza)					
10	3-Apr	T	Discussions with MWD/I.O.(UNICEF)							
11	4-Apr	W	Discussions with MWD				TYO→HKG(JL739 18:55→22:25) HKG→JNB(SA287 23:50→			
12	5-Apr	T	Signing of Minutes with MWD & MoFEP, Discussions with World Bank				→06:40) JNB→LLW(SA170 10:20→12:40)			
13	6-Apr	F	LLW→JNB (SA171 13:35→16:05)	Internal Meeting, Preparation of Site Survey, Discussions with MWD						
14	7-Apr	S		Site Survey		・Selection of Local Consultant for Socio-economic Survey ・Discussions and Data Collection (MWD)	Site Survey	・Geo-physical Prospect-ing Survey ・Survey on Existing Wells ・Survey on Water Quality ・Electro-magnetic Survey (VLF) (Survey Area: TA Tambala, TA Chouma, TA Kachere West) ・Analyzing Survey Data	・Geo-physical Prospect-ing Survey ・Survey on Existing Wells ・Survey on Water Quality (Survey Area: TA Chadza,TA Kachere) ・Analyzing Survey Data	・Collection of hyro-geological & Meteoro-logical data ・Survey on Existing Wells and hydro-geology ・Survey on Water Quality ・Geo-physical Prospect-ing Survey (Survey Area: TA Chadza,TA Chiliku-mwendo) ・Analyzing Survey Data
15	8-Apr	S		・Discussions ・Explanations to Local Consultants for Socio-ecnomic Survey ・Survey on Existing	・Data Collection ・Hydro-geological Site Survey					
16	9-Apr	M					・Survey on Existing Rigs,etc. (Central Region)			
17	10-Apr	T								
18	11-Apr	W								
19	12-Apr	T								
20	13-Apr	F	<Easter Holiday>	Internal Meeting and Data Collection						
21	14-Apr	S								
22	15-Apr	S		・Discussions/ Data Collection (CRWB,MWD:Budget/ Past Projects)	・Survey on Water Quality ・Suvey on Existing Wells ・Hydro-geological Site Survey		・Survey on Existing Rigs, etc.(Balaka, Mzimba, Zomba)			
23	16-Apr	M	↑			・Negotiation/ ・Signing of Contract ・Socio-economic Survey				
24	17-Apr	T								
25	18-Apr	W								
26	19-Apr	T								
27	20-Apr	F								
28	21-Apr	S		Data Arrangement						
29	22-Apr	S	Temporary Holidays for Government Officers							
30	23-Apr	M		Report to JICA	・Sampling for Water Quality Test ・Survey on Existing Well	・Survey on Cost Estimate ・Survey on Equipment Procurement	・Survey on Cost Estimate (LLW:Local Drilling Firms,etc.			
31	24-Apr	T		Visit to Inter Aide Facilities						
32	25-Apr	W								
33	26-Apr	T		Equipment Survey (Drilling Firm)						
34	27-Apr	F								
35	28-Apr	S		Internal Meeting/Data Collection						
36	29-Apr	S		Arrangement for Collected Data	LLW→JNB(QM201 07:55→10:15)	Arrangement for Collected Data				
37	30-Apr	M	↓	Discussions & Data Collection (MWD, CRWB)	JNB→HKG (CX748 12:50→	LLW→JNB(SA171 13:35→16:05)				
38	1-May	T		Data Collection	→08:10) HKG→TYO(JL736 11:00→16:00)	Survey on Procurement of Equipment and Materials (JNB, Pretoria)	Survey on Procurement of Equipment and Materials			
39	2-May	W		Discussions			JNB→HKG(SA286 17:00→12:15) HKG→TYO(JL732 14:45→19:45)			
40	3-May	T		Visit to Inter Aide Facilites						
41	4-May	F		Discussions with MASAF, etc.		Engaged in other project from this				
42	5-May	S		DataArrangement						
43	6-May	S		Mangochi: KfW Site Zomba: Statisticql Off.					Arragement for Collected Data	
44	7-May	M								
45	8-May	T		・Discussions, Data Collection (Geological,Meteor-ological, Hydro-logical/ Cost Estimate/ Well)					LLW→JNB(QM201 10:05→12:25) JNB→HKG(CX1748/SA286 17:00→→12:15) HKG→TYO (JL732 14:45→19:45)	
46	9-May	W								
47	10-May	T								
48	11-May	F								
49	12-May	S								
50	13-May	S		Site : Mangochi						
51	14-May	M		・Discussions, Data Collection (MASAF/OPC/MoHP/Raod Dept./Electric Corporation)						
52	15-May	T								
53	16-May	W								
54	17-May	T								
55	18-May	F								
56	19-May	S		Data Arrangement Wrap-up Meeting Report to JICA				Arragement for Collected Data Explanation of Survey Results & Discussions Repert to JICA		
57	20-May	S								
58	21-May	M								
59	22-May	T		LLW→JNB(QM201 10:05→12:25) JNB→HKG(CX1748/ SA286 17:00→				LLW→JNB(QM201 10:05→12:25) JNB→HKG(CX1748/		
60	23-May	W		→12:15) HKG→TYO (JL732 14:45→19:45)				→12:15) HKG→TYO (JL732 14:45→19:45)		

BKK: Bangkok
HKG: Hong Kong
JNB: Johannesburg
LLW: Lilongwe
TYO: Tokyo
MWD: Ministry of Water Development
CIDA: Canadian Int. Development Agency
CRWB: Central Region Water Board
DFID: Department for Int. Development
MoGYCS: Ministry of Gender,Youth&Community Services
MoHP: Ministry of Heath&Population Services
MoFEP: Ministry of Finance&Economic Planning
MWD: Ministry of Water Development

Draft Final Report Explanation Schedule

SL No.	2001		OFFICIAL	Project Manager /Water Facilities Planner	Hydrogeologist(I) /Drilling Planner
SL No.	Day	Date	Yuji MARUO Junko UNO	YAMAGAI, Hiromi	MATSUHASHI, Shuro
1	15-Aug	W	TYO→HKG(JL735 17:25→20:55) HKG→ JNB(SA287 23:50→	TYO→HKG(JL735 17:25→20:55) HKG→JNB(SA287 23:50→	
2	16-Aug	T	(Dr. Maruo, who stations in SA, participated in JNB) →06:40) Internal Meeting JNB→LLW (SA170 10:20→12:40) Discussions with JICA Office		
3	17-Aug	F	Courtesy Call to MWD, MoFEP, Lilongwe & Dedza District Planning Officers		
4	18-Aug	S	Site Survey (Lilongwe District: Chadza, Dedza District: Kachere, Chilikumwendo		
5	19-Aug	S	Site Survey (Dedza District: Tambala、Chauma)		
6	20-Aug	M	Draft Final Report Explanation to Officails Concerned、Discussions with MWD		
7	21-Aug	T	Discussions with MWD		
			Preparation of Draft Minutes on Discussions	Discussions with MWD	
8	22-Aug	W	Discussions with MWD (Minutes on Discussions)		
			Finalizing of Minutes on Discussions	Meeting with MWD, NWDP Office	
9	23-Aug	T	Signing of Minutes on Discussions		
			Report to JICA Office	Meeting with MWD, MoHP, MoGYCS	
10	24-Aug	F	LLW→LUS(QM181 11:15→12:55) Report to Embassy of Japan in Zambia	Meeting with MWD (Access Roads, etc.) Site Survey	
11	25-Aug	S	LUS→JNB(SA065 14:05→16:10)	Meeting with MWD, Arrangement of Collected Data	
12	26-Aug	S	JNB→HKG(SA286 17:00→	LLW→JNB(QM201 07:55→10:15) JNB→HKG(SA286 17:00→	
13	27-Aug	M	→12:15) HKG→TYO(JL732 14:45→19:45)		

LLW: Lilongwe HKG: Hong Kong JNB: Johannesburg LUS: Lusaka TYO: Tokyo SA: South Africa, HKG: Hong Kong
MWD: Ministry of Water Development, DWR: Department of Water Resources, MoFEP: Ministry of Financial and Economic Planning
MoGYCS: Ministry of Gender, Youth, Community Services, NWDP: National Water Development Programme

APPENDIX 3. LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY

3． LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY

Ministry of Water Development (MWD)

Ms. H. Kawalewale	Principal Secretary
Mr. S. M. N. Mainala	Director of Water Resources
Mr. Owen M. Kankhulungo	Controller of Water Services
Ms. E. Chapeta	Deputy Secretary/Director for Administration and Financing
Mr. A. B. Chirwa	Deputy Director of Surface Water
Mr. B. M. C. Gondwe	Programme Leader (NWDP)
Mr. Yusuf Hassan	Financial Controller
Mr. P. Mwenesongole	Senior Assistant Accountant
Mr. Austin Ndovi	Accountant Borehole Fund
Ms. Penenbe	Office Superintendent

<Department of Water Resources (DWR)>

Ms. M. B. Kanjaye	Senior Hydrogeologist
Mr. P. Mleta	Hydrogeologist
Mr. K. Mponda	Hydrogeologist
Mr. H. Sanyila	Chief Driller
Mr. R. Chiwaula	Asst. Hydrogeologist
Mr. Msasata	Asst. Hydrogeologist

<Department of Water Supply and Sanitation>

Mr. H. K. M. Muhezua	Ag. CBM Manager
Mr. J. Phiri	Water Chemist, Laboratory

<Regional Office (C)>

Mr. J. T. Banda	Principal Water Officer, Senior Hydrogeologist
Mr. Mvando	Mechanical Supervisor
Mr. Hara	Mechanic
Mr. F. C. Misho	Water Monitoring Assistant (Lilongwe)
Mr. M. Mkandawere	Water Monitoring Assistant (Lilongwe)
Mr. E. Pangani	Water Monitoring Assistant (Lilongwe)
Mr. Kalonga	CBM Coordinator (Dedza)
Mr. Balakasi	Water Monitoring Assistant (Dedza)

<Regional Office (S)>

Mr. Gausi	Principal Water Officer (S), Senior Hydrogeologist

<Regional Office (N)>

Mr. P. P. Mkandawire	Principal Water Officer (N), Principal Hydrogeologist
Mr. Mlauji	Water Monitoring Assistant, (Mzimba)

Ministry of Finance and Economic Planning (MoFEP)

Mr. A. Mzoma	Assistant director (Asia and America)
Mr. Y. Kamphale	Principal Economist (Debt and Aid)
Mr. M. Taguchi	Aid and Project Management, MOF / JICA

Office of President and Cabinet (OPC)

Mr. Matope	Project Coordinator
Mr. Magombo	Project Officer

Ministry of Health and Population Services (MoHP)

Mr. B. Macumba	Ag. Chief Environment Health Officer
Mr. Zabula	Assistant HESP Coordinator
Mr. Makalani	Assistant Environmental Officer, Lilongwe District Office
Mr. Matteus J. Kalaya	District Health Inspector, Dedza District Office
Mr. Moyo	Clinical Officer, Dedza District Office

Ministry of Gender, Youth and Community Services (MoGYCS)

Mr. S. Matamura	Community Development Offier (Lilongwe)

National Statistical Office

Mr. Ndawala	Assistant Commissioner
Mr. Douglas Khumalo	Statistician

Lilongwe District Assembly

Mr. E. Msewa	Director of Planning & Development
Mr. J. Sibale	District Environmental Officer

Dedza District Assembly

Mr. B. Kaseka	District Commissioner
Mr. W. Chiputu	Director of Planning & Development

Central Region Water Board (CRWB)

Mr. G. Johnstone	Board Chairman
Mr. P. Chinkhuntha	Acting Financial Controller
Mr. M. Nyangwa	Projects Engineer

Mr. J. Chagunda	Planning Engineer
Mr. H. Fukiza	Engineering Manager
Mr. M. Nyang'wa	Project Engineer

MASAF (Malawi Social Action Fund)

Mr. Mandala	Director
Mr. Kennedy Lweya	Assistant Director of Community Fub Projects
Mr. Green Salima	Technical Service Officer
Mr. Mike Mwale	Procurement Manager
Ms. A. Mpheruka	Zone Manager, Lilongwe
Mr. Chiawati	Technical Supervisor, Lilongwe Zone
Mr. Kavalo	Zone Manager, Dedza & Ntcheu
Mr. Mlose	Technical Supervisor, Dedza & Ntcheu Zone

ESCOM

Mr. A. S. Kuntambila	Customer Service Engineer
Mr. L.B. Moyo	Senior Engineer (Construction)

International Aid Organizations in Malawi

Department for International Development (DFID)

Dr. H. Potter	First Secretary (Natural Resources Development)

Canadian International Development Agency (CIDA)

Ms. B. Gill	Sector Coordinator

UNICEF

Mr. Kabuka M. Banda	Head of Water and Environmental Sanitation

World Bank

Ms. C. E. Kimes	Senior Operation Officer, WB Malawi Office
Mr. Mbuka	Agriculture Specialist

Consultants

GITEC

Mr. Philip Hankin	
Mr. Winston Chilonsa	Site Inspector, Mangochi East Project

Willy & Partner Engineering

Mr. Mandowa	Director

NGOs

Promotion of Soil Conservation and Rural Production (PROSCARP)

Mr. Peter Phiri	Water Engineer
Mr. G. K. Gompho	Extension and Training Specialist

Inter Aide

Dr. Thierry Vincent	Country Coordinator
Mr. Benoit Michaux	Project Officer / Civil Engineer
Ms. Baudaux	

Concern Universal

Mr. Robert Kampala	Programme Manager, Water & Sanitation
Mr. Senard Mwala	Manager, Dedza Office

Water Aid

Mr. Steven Sugden	Country Representative

Africare-Malawi

Mr. Ernest Heyes	Country Representative
Mr. McDonald Kanjewe	Borehole Specialist
Ms. Margaret Khonje	Programme Manager

Local Contractor

National Borehole CO. LTD

Mr. J. Stambuli	Operation Director

Drilltech & Engineering Ltd.

Mr. Shabil Patel	Managing Director
Mr. Eddie Vanwyk	Drilling Manager

Embassy

Embassy of Japan in Zambia

Mr. Takashi Kimura	First Secretary (Economic Cooperation)

JICA

JICA Malawi Office

Mr. Hiroshi Kamimura	Resident Representative
Mr. Minoru Yoshimura	Deputy Resident Representative
Mr. Keiichi Okitsu	Assistant Resident Representative
Ms. Tomoko Harada	Project Formulation Advisor

APPENDIX 4. MINUTES ON DISCUSSIONS

4. MINUTES ON DISCUSSIONS

Basic Design Study

MINUTES OF DISCUSSIONS
ON BASIC DESIGN STUDY ON THE PROJECT
FOR DEVELOPMENT OF GROUNDWATER
IN LILONGWE – DEDZA
IN
THE REPUBLIC OF MALAWI

In response to a request from the Government of the Republic of Malawi (hereinafter referred to as "Malawi"), the Government of Japan decided to conduct a basic design study on the Project for Development of Groundwater in Lilongwe-Dedza in the Republic of Malawi (hereinafter referred to as "the Project") and entrusted the study to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Malawi a Basic Design Study Team(hereinafter referred to as "the Team"), headed by Dr. Yuji MARUO, Technical Advisor for the Implementation of Grant Aid Project, JICA, and scheduled to stay in Malawi from March 26 to May, 2001.

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

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

Lilongwe, 5th April, 2001

丸尾祐治

Dr. Yuji Maruo
Leader
Basic Design Study Team
Japan International Cooperation Agency
(JICA)

Ms Colleen Zamba
Principal Secretary
Debt and Aid Department
Ministry of Finance and Economic Planning

Mrs Hannah Gladys Kawalewale
Principal Secretary
Ministry of Water Development

ATTACHMENT

1. Objective

The objective of the Project is to improve the health and living standard of the people who live in Lilongwe and Dedza Districts by providing potable water through construction of water supply facilities.

2. Project Area

The Project Areas are located in the following five(5) Traditional Authorities(T.A.) in Lilongwe and Dedza Districts, i.e. Chadza (Lilongwe District), Kachere, Chilikumwendo, Tambala and Chauma (Dedza District).

3. Responsible and Implementing Agencies

(1) Responsible organization : Ministry of Water Development
(2) Implementing organization : Department of Water Resources

4. Items requested by the Malawian side

After a series of discussions with the Team, the Malawian side requested the following items. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

(1) Construction of boreholes with hand pumps
(2) Procurement of equipment(Annex-1)

5. Japan's Grant Aid System

(1) The Malawian side has understood Japan's Grant Aid system explained by the Team, as described in Annex-2.

(2) The Malawian side will take necessary measures, as described in Annex-3, for smooth implementation of the Project, on condition that the Japan's Grant Aid Assistance is extended to the Project.

6. Schedule of the Study

(1) The consultant of the Team will proceed to further studies in Malawi until May, 2001.

(2) Based on the Minutes of Discussions and technical examination of the study results, JICA will prepare a draft report in English and dispatch a mission to Malawi in order to explain its contents around August, 2001.

(3) In case that the contents of the draft report are accepted in principle by the Malawian side, JICA will complete the final report and send it to Malawi around October, 2001.

7. Other Relevant Issues

(1) Candidate Village

Altogether around 200 candidate villages will be selected in the Project Area as the target of present Basic Design Study.

The Malawian side will present the following data and information to the Team by the morning of 6th April:

1: The list of candidate village with population in the Project area
2: Maps which clearly show the demarcation between the area covered by Concern Universal project and the area proposed to Japan in Chilikumwendo and Kachere T.A.
3: Plan of operation of Concern Universal in Chilikumwendo and Kachere T.A.

(2) Site Selection

Actual implementation sites will be selected from the candidate villages applying various criteria mentioned below:

- Water quality
- Hydrogeological condition
- Demographical condition
- Existing water facility
- Duplication of other projects
- Communities' willingness to operate and maintain their facilities
- Accessibility and
- Others

(3) Community Based Management(CBM)

Both sides agreed that CBM Program should be implemented in the Project.

Detailed CBM Program which is based on the one developed by the Malawian side will be formulated during the Basic Design Study.

(4) Equipment

In principle, the existing equipment and vehicles which were procured under the previous Japan's Grant Aid projects will be fully utilized in the Project.

The necessity of the additional equipment and vehicles which will be procured under the Project is scrutinized applying various criteria mentioned below:

- Budgetary arrangement
- Personnel allocation
- Qualification and experience of personnel
- Previous record of operation
- Plan of operation in the near future
- Present condition of the equipment
- Possibilities of the alternative method
- Others

(5) On Going and Future Program of Boreholes Construction

After explaining approximate implementation schedule of the Project, the Team requested the Malawian side to deploy two existing drilling rigs to the Project.

The Malawian side explained to the Team that an Emergency Program was going on until June 2001, utilizing three existing drilling rigs out of four procured under the previous Japan's Grant Aid projects.

Those three drilling rigs would be continuously utilized for construction of a part of proposed 7,000 boreholes construction program which would continue until 2004.

Therefore only one drilling rig would be available for deployment to the Project

(6) Other Projects

The Japanese side requested the Malawian side to submit all documents about the projects which would be implemented by any other organization in the Project area.

Annex-1

Items Requested by the Malawian side

	Equipment	Quantity
1	Drilling Rig, Truck Mounted,4×4	2 Units
2	High Pressure Air Compressor,Truck Mounted,4×4	2 Units
3	Mobile Well Development Unit,4×4	2 Units
4	Pumping Test Equipment	1 Lot
5	Geo-Electric Prospecting Equipment	2 Units
6	Geo-Electric Borehole Logger	2 Units
7	Cargo Truck with 5-ton Crane,4×4	2 Units
8	Cargo Truck with 3-ton Crane,4×4	2 Units
9	Pick-up type Light Vehicles,Single Cab,4×4	3 Units
10	Pick-up type Light Vehicles,Double Cab,4×4	4 Units
11	Motorcycle	6 Units
12	Global Positioning System (GPS)	10 Units
13	Water Tank (for construction)	2 Units
14	Fuel Tank (for construction)	2 Units
15	Telecommunication Equipment	1 Lot
16	Mobile Workshop,4×4	1 Lot
17	Equipment and Tools for Workshop	1 Lot
18	Foaming Agent and Mud Material	1 Lot
19	Well Casing and Screen Pipe	1 Lot
20	Spare Parts for the above Equipment	1 Lot
21	Repair Parts and Tools for the existing Equipment supplied in the past Groundwater Development Projects under Japanese Grant Aid	1 Lot
	Facilities	
1	Construction of 500 boreholes with Afridev handpump, apron, drain and washing slab	

Annex-2

Japan's Grant Aid Scheme

1. Grant Aid Procedures

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

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

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

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

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

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

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

2. Basic Design Study

1) Contents of the Study

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

a) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for Project's implementation.

b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.

c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

d) Preparation of a basic design of the Project.

e) Estimation of costs of the Project.

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

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

2) Selection of Consultants

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

The consultant firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchanges of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) Grant Aid

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

2) Exchange of Notes (E/N)

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

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

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.
When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

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

5) Necessity of the "Verification"

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

6) Undertakings required of the Government of the Recipient Country

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

(1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.

(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 procurement in case the installation of the 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 this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(8) Re-export
The products purchased under the Grand Aid should not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

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

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

Necessary measures to be take by the Government of Malawi

1: To secure the sites for the Project

2: To clear, level and reclaim the sites prior to commencement of the Project

3 :To provide the land for access road, a temporary site office, warehouse and stockyard during implementation of the Project

4: To construct the access road to the site prior to commencement of the construction

5: To provide data and information for the Project

6: To bear commissions to a Bank of Japan for the banking services based upon the Banking Arrangement

7: To exempt taxes and levies and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation

8: To ensure prompt unloading and customs clearance at a port of disembarkation in Malawi and facilitate internal transportation therein of the products purchased under the Project

9: To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Malawi with respect to the supply of the products and services under the contracts verified by the Government of Japan

10: To accord Japanese nationals whose services may be required in connection with supply of the products and services under the contract verified by the Government of Japan, such facilities as may be necessary for their entry into Malawi and stay therein for the performance of their work

11 :To assign the necessary staff and secure the necessary budget for operation and maintenance of the equipment purchased under the Grant

12: To maintain and use properly and effectively the equipment procured under Grant Aid

13: To bear the expenses other than those to be borne by the Grant Aid necessary for construction of the facilities as well as for the transportation and installation of the equipment

14 :To maintain the control of tools and spare parts purchased under the Grant Aid

Final Report Explanation

MINUTES OF DISCUSSIONS ON THE BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF GROUNDWATER IN LILONGWE-DEDZA IN THE REPUBLIC OF MALAWI (EXPLANATION ON DRAFT FINAL REPORT)

From March to April 2001, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched Basic Design Study Team on THE PROJECT FOR DEVELOPMENT OF GROUNDWATER IN LILONGWE-DEDZA (hereinafter referred to as "the Project") to the Republic of Malawi (hereinafter referred to as "Malawi"), and through discussions, field surveys, and technical appraisal of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the components of the draft report, JICA sent to Malawi the Draft Final Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Dr. Yuji MARUO, Technical Advisor for the Implementation of Grant Aid Project, JICA, from 16 August to 26 August 2001.

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

Lilongwe, 23 August 2001

丸尾祐治

Dr. Yuji Maruo
Leader
Basic Design Study Team
Japan International Cooperation Agency
Japan

Mr. Ambrose Huxley Mzoma
Assistant Director
Debt and Aid Department
Ministry of Finance and Economic Planning
Malawi

Mr. S.M.N. Mainala
Director of Water Resources
Ministry of Water Development
Malawi

ATTACHMENT

1. Contents of the Draft Final Report

The Malawian side agreed to and accepted in principle the contents of the draft of final report as explained by the Team.

2. Japan's Grant Aid Scheme

The Malawian side understood the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Malawi as explained by the Team and described in Annex-2 and Annex-3 of the Minutes of Discussions which was signed by both parties on 5 April, 2001.

3. Schedule of the Study

JICA will complete the final report in accordance with the items confirmed in this Minutes of Discussions and send it to Malawi by October 2001.

4. Other Relevant Issues

(1) Components of the Project

Both sides agreed that the Project would be composed of the following components when the Japanese Government finally decides to implement the Project.

- Construction of maximum number of 177 boreholes in the 154 villages which are listed in ANNEX-1
- Procurement of equipment listed in ANNEX-2
- Assistance for implementation of CBM programme (Soft Component)

(2) Assistance for implementation of CBM programme (Soft Component)

The Malawian side requested the Japanese side to provide assistance in the implementation of CBM (Community Based Management) Programme for the communities in which water supply facilities would be constructed under the Project.

The Japanese side explained that the CBM activity would be based on the programme developed by Ministry of Water Development of Malawi, however actual programme of hygiene education and sustainable operation and maintenance of the facilities would be duly reinforced.

The Malawian side agreed to the explanation and promised to allocate necessary personnel who is listed in ANNEX-3 and to secure the required amount of budget which is indicated in ANNEX-4.

The Malawian side also confirmed to consider due amount of budget for the maintenance of the motorcycles which would be procured in the Project.

(3) Duplications of the target villages with other projects

During course of the study, the Team recognized that there were some duplications in the target villages with MASAF project which would be implemented in 01/02 MFY. The Malawian side explained after meeting with the MASAF director that although the MASAF project has been approved by the government and due amount of budget is to be allocated for the implementation, action plan of the project has not been finalized yet and there is a certain degree of flexibility in selecting the target villages.

Based on this aspect, the Malawian side strongly requested the Japanese side to include all the duplicated villages into the Project so that the MASAF would take alternative villages for their project. The Japanese side agreed to include those villages that were duplicated with MASAF project after MASAF had confirmed with the Japanese side to exclude them from their programme, which was clarified in the annexed letter (ANNEX-5). As a result, total number of the target villages and number of boreholes become 154 and 177 respectively.

The Malawian side confirmed that the Ministry of Water Development would make necessary arrangements for the district offices to coordinate with other possible projects in order to avoid any further duplication.

(4) Existing equipment to be deployed to the Project

The Malawian side confirmed to provide for the Project following existing equipment and vehicles that were procured under the previous Japan's Grant Aid projects.

- 1 Drilling Rig, Truck Mounted (procured in 1992)
- 1High Pressure Air Compressor, Truck Mounted (procured in 1992)
- 1 Mobile Well Development Unit (procured in 1992)
- 1 Water Tank
- 2 Fuel Tanks (procured in 1997)
- 1 Geo-Electric Borehole Logger (procured in 1992)
- 1 Cargo Truck with 3-ton Crane (procured in 1992)

Necessary parts for repair and repair works of the above mentioned equipment will be provided by the Japanese side prior to the commencement of the actual construction work.

(5) Improvement of access roads and bridges to the sites

The Team pointed out that there were some portions of the access roads and bridges to the target villages where proper improvement work must be carried out for the drilling machines to be easily passable.

The Malawian side confirmed to take all the necessary measures for the improvement works. In the meantime, exact locations, required design at respective location and dead line would be clarified in the final report.

Those target villages which are pointed out in the final report would be removed from the Project, if proper improvement work at particularly designated locations were not carried out.

Coordinating with respective district office, the Malawian side will make necessary arrangements to deploy motor grader preferentially to the major access roads of the Project right after the rainy season.

(6) Recruitment of necessary personnel for new equipment

The Malawian side confirmed to fully utilize the equipment in its forthcoming projects and to keep them properly maintained after the completion of the Project.

The Malawian side also confirmed to recruit, if necessary, due number of personnel shown in ANNEX-6 for newly acquired equipment which are to be provided by the Project.

(7) Budgetary arrangement of Malawian side

The Malawian side agreed to make necessary budgetary arrangement to cover required amount of cost shown in ANNEX-4.

MM

Target Villages and Number of Borehole

TA	Village	No.of BH
TA Chadza		
	Kalenjeka	1
	Kalumba	1
	Kamchedzera	2
	Mbimbi / Chimombo	1
	Jeremiya / Zikiyele	1
	Matambo / Misonjo	1
	Dzundi / Kulumbi	1
	Kapatuka	2
	Mlinga	2
	Nankwela	1
	Chinthu	1
	Mpokosa	1
	Dzoole / Mtoseni	1
	Kapazila	1
	Kaphamtengo	1
	Mkakwala	1
	Choma	1
	Mgawi	1
	Chapata	1
	Kumchenga	1
	Mchizampheta	2
	Chinthale	1
	Kumlaka	1
	Mpoto	1
	Chagulugulu	1
	Mingu	1
	Katsabola	1
	Samson	1
	Kadambe	2

TA	Village	No.of BH
TA Chadza		
	Mgola	1
	Mwadzungu	1
	Mzapule	1
	Mfuti	1
	Mphete	2
	Chisalipo	1
	Mcholoma	1
	Khonthi	1
	Chimwenje	1
	Mtepa	1
	Mbalame	1
	Chisindo	1
	Sukwa	1
	Kachono	1
	Khomani	1
	Phula	1
	Chinthankwa	1
	Bodzalibwera	1
	Chambadzana	1
	Chinungu	1
	Chonangulu	1
	Marichi	2
	Mkoche	1
	Manjondo	1
	Msampha II	1
	Kansinsi	1
	Dzamalala	1
	Kawande	1
	Chipoto	1
	58 Villages	65

TA	Village	No.of BH
TA Tambala		
	Mangamphasa	1
	Mbuziyadula	1
	Mphombe	1
	Kwilimbe	1
	Kalima	1
	Kamwana	1
	Mkwenembera	1
	Mgawi	1
	Mapemba	2
	Kaphale	1
	Mfumbwa	2
	Nganya	1
	Chingo	1
	Mbakama	1
	Kanyama / Mikuyu	1
	Chiboli	1
	Chigumula	1
	Kapanda	1
	Kapazila	1
	Mzikamanda	1
	Kudembe	1
	Mnenula	1
	Kaole	1
	Zande	1
	Kawire	1
	Gwengwe Chilungusi	2
	Shuga	1
	Mathikila	1
	Matipa (Mkundi)	1
	29 Villages	32

TA	Village	No.of BH
TA Chauma		
	Kachulu	1
	Kambuwe	1
	Linyama / Chatsika	1
	Chikumba	3
	Miyowe	1
	Kumlenga	1
	Mthawanthu	2

7 Villages 10

TA	Village	No.of BH
TA Chilikumwendo		
	Khondowa	1
	Thunduzi	1
	Lombwa	1
	Kachepa	1
	Jere	1
	Kukalambo	1
	Kanjinga I	1
	Chimombo	1
	Folomani	1
	Mmbeya	1
	Kang'ombe A & B	1
	Kamadzi	1
	Chisani	1
	Aliyelo	1
	M'gawi	1
	Chatondeza 1& 2	2
	Nyemba	1
	Phale	1
	Sankhani	1
	Lumwira/(Nyamasanka)	1
	Kaluzi	1
	Maguya / Kanundu	1
	Ngombeyagwada	1
	Katsalapoti	1
	Chatsika	1
	Msampha/Mbona	1
	Mtalimanja	1
	Chimambamtengo	2
	Mwanzimba	1
	Chimchere	1
	Kumbisa / (Kanyada)	1
	Chimtundudza	1
	Chipsye	1

33 Villages 35

TA	Village	No.of BH
TA Kachere		
	Mantega	1
	Dimoni	1
	Kude / Kanthongo	1
	Dickisoni	1
	Kafere	2
	Kumilambe	1
	Manase Chiundi / Kaunyolo	1
	Chikalungeni	2
	Gwaza	1
	Gaga	1
	Kasonda	1
	Majamanda	1
	Veru	2
	Chimombo (A)(B)	1
	Yonani	2
	Kafumbi	1
	Gelemani	2
	Msepe	1
	Betenego	1
	Chabuka / Chindamba	1
	Chapukuta	2
	Chitukula	1
	Mtende	2
	Chizuzu	1
	Mphasayaweni	2
	Chakuwala / Mwambila Mando	1
	Liyela	1

27 Villages 35

TOTAL 5 TAs

154 Villages 177

Specifications and Quantity of Equipment

Equipment and Its Specifications	Procurement Quantity
I. Equipment for Borehole Construction	
1. Drilling Rig and Tools	
1.1 Drilling Rig	One set
- Top Drive Truck-Mounted: combination of mud-water rotary and air hammer	
- Truck: water-cooled diesel engine; right-hand drive 4 x 4; GVM 16,000 kg; with PTO to drive the drilling rig	
- Drilling Rig Capacity: final drilling diameter of 6-$^3/_4$" (170 mm); depth of 100 – 150 m (air hammer)	
- Mud Pump Capacity: discharge volume of 600 litres/min; pressure of 20 kg/cm^2 or higher	
1.2 Standard Accessories for Above	
1.3 Tools for Above	One set
a) Drilling Tools (mud-water drilling tools and down the hole hammer drilling tools, etc.)	One set
b) Casing Tools (surface casing, casing holder and pipe vent, etc.)	
c) Fishing Tools (jack and inside-outside taps, etc.)	
d) General Drilling Tools (pipe wrench, super tons and sledge hammer, etc.)	
2. Truck-Mounted Air Compressor	
- Capacity: 17.5 kg/cm^2 x 20 m^3/min or higher with standard accessories	One set
- Truck Specifications: diesel engine; right-hand drive; 4 x 4; GVM 16,000 kg	
II. Test Equipment	
1. Electric Prospecting Instrument (prospecting depth: MAX 200 m or deeper)	One set
2. Pumping Test Equipment	
2.1 Development Equipment, Pumping Test Equipment (and truck)	One set
- Compressor: 7 kg/cm^2 x 3.5 m^3/min or higher	
- Generator: 50 Hz, 220 V, 20 KVA	
- Truck : 4 x 4 with 3t crane; GVM 10,000 kg	
2.2 Air Lift Tools	One set
- Discharge Pipe 2": 75 m	
- Air Pipe $^3/_4$": 75 m	
2.3 Submersible Pump: head of 50 m; discharge volume of 100 litres/min or higher; pumping pipe of 1-$^1/_2$"	One set
2.4 Water Level Meter: 100 m	One set
2.5 pH Meter	One set
2.6 Electric Conductivity Meter (with thermometer)	One set
3. Electric Logging Instrument	One set
- Type: automatic recording; 100 m cord	
- Logging Items: natural potential; specific resistance	
- Accessories: battery; recording paper; others	
III. Support Vehicles	
1. Cargo Truck with Crane	One

Equipment and Its Specifications	Procurement Quantity
- Truck Specifications: water-cooled diesel engine; right-hand drive; 4 x 4; GVM 13,000 kg - Loading Capacity: maximum of 5,500 kg - Crane Capacity: 3 tons 2. Pick-Up Truck (Single Cabin) - Specifications: water-cooled diesel engine; right-hand drive; 4 x 4; GVM 2,650 kg - Loading Capacity: maximum of 1,000 kg	 One
IV. Mobile Workshop Vehicle, Including Repair Equipment 1. Truck for Mobile Workshop - Specifications: water-cooled diesel engine; right-hand drive, 4 x 4 - Capacity: with 3 ton crane 2. Repair Equipment and Tools 2.1 Diesel Engine Generator/Welder 2.2 Oxygen-Acetylene Gas Welder/Cutter 2.3 Power Motor Compressor 2.4 Power Air Bench Grinder 2.5 Power Bench Drill 2.6 Hydraulic Press 2.7 Battery Charger 2.8 Portable Hydraulic Jack 2.9 Jib Crane 2.10 Fuel Drum Pump 2.11 Oil Bucket Pump 2.12 Grease Gun 2.13 Volume Pump 2.14 Nozzle Tester 2.15 Tyre Repair Tools 2.16 Circuit Tester 2.17 Engine Service Tools 2.18 Electric Tools 2.19 Mechanical Tools 2.20 Cable Reel 2.21 Floodlights 2.22 Work Table (with Cabinet)	 One One set
V. Support Vehicles for CBM Programme 1. Pick-Up Truck (Double Cabin) - Specifications: water-cooled diesel engine; right-hand drive; 4 x 4; GVM 2,650 kg - Loading Capacity: maximum of 700 kg 2. Motorcycles - Off-Road Motorcycles: 100 – 125 cc class	 One Three

MM

List of Personnel to be assigned to CBM Programme

Title	Name		Ministry
- Facilitator (Training to Trainers)	H. M. Muhezuwa		MoWD
	B. Makumba		MoHP
	S. Matamula		MoGYCS
- Supervisor (Committee Training)	J. F. Njewa		MoWD (LL)
	H.S. Muhuwa		MoWD(LL)
	L.D. Mwenelupembe		MoWD (DZ)
	(to be recruited by Dec. '01)		MoWD
- Extension Workers	C. C. Misho	(WMA)	MoWD (LL)
	M M. Mkawandawire	(WMA)	MoWD (LL)
	T.B. Jalufu	(WMA)	MoWD (LL)
	C.M. Mzumara	(WMA)	MoWD (LL)
	A. Kamwendo (Ms)	(CDA)	MoGYCS(LL)
	P. Kutengule (Ms)	(CDA)	MoGYCS(LL)
	Y. K. Phili	(CDA)	MoGYCS(LL)
	B. Chonga	(CDA)	MoGYCS(LL)
	E. Nkhana	(HSA)	MoHP (LL)
	Kabuwazi	(HSA)	MoHP (LL)
	Kanzimbi	(HSA)	MoHP (LL)
	Benala	(HSA)	MoHP (LL)
	D.N.Balasai	(WMA)	MoWD (DZ)
	F.W. Kalonga	(WMA)	MoWD (DZ)
	D.Mafendwe	(WMA)	MoWD (DZ)
	E. I. Kolowole	(WMA)	MoWD (DZ)
	O.B. Mwunthali	(CDA)	MoGYCS(DZ)
	Kataika	(CDA)	MoGYCS(DZ)
	J. Misanjo	(CDA)	MoGYCS(DZ)
	C. Kalonga	(CDA)	MoGYCS(DZ)
	Chisamba	(HSA)	MoHP (DZ)
	Kapopo	(HSA)	MoHP (DZ)
	Nkhosa	(HSA)	MoHP (DZ)
	Kulemeka Ms	(HSA)	MoHP (DZ)

MoWD: Ministry of Water Development, MoHP: Ministry of Health and Population
MoGYCS: Ministry of Gender, Youth and Community Services

Project Costs Born by Malawian Side

(Unit: 1,000MK)

Description	Amount
1. Leveling of Camp Site at Linthipe	280
2. Work Cost and Allowance of MWD Staff for Drilling Works	1,938
- FY2001/2002	0
OJT	0
Management	0
- FY2002/2003	584
OJT	173
Management	411
- FY2003/2004	1,354
OJT	576
Management	778
3. Cost for implementation of CBM	3,600
3.1 Training of Trainers and Mobilisation of Committee	600
- FY2001/2002	600
3.2 Training of WPC	3,000
- FY2002/2003	2,000
- FY2003/2004	1,000
4. Improvement of Access Road	N.A.
5. Construction of Fences and Drain Ditch	N.A.
TOTAL	5,818

Present value of Malawi Kwacha against US$ is 0.014.
No contingency is considered for these figures.

MALAWI SOCIAL ACTION FUND

Red Cross House,
Area 14,
Capital City,
LILONGWE 3,
MALAWI

Private Bag 352
Capital City
Lilongwe3
Tel.: 775 666
776 339
Fax: 775 949
E-mail: masaf@masaf.org

MI/ADMIN/

22nd August 2001

The Secretary for Water Development
Tikwere House
Private Bag 390
Lilongwe 3

Cc : Team Leader
Basic Design Study Team
Japan International Cooperation Agency

Dear Sir

EXCLUSION OF DUPLICATED SITES

With reference to our mutual discussions with Mr Mainala on the duplication of sites between MASAF Projects and Lilongwe-Dedza Groundwater Project under Japan Grant Aid Programme.

We are pleased to confirm that the following sites have been removed from our project and should be included in the Lilongwe-Dedza Groundwater Project.

Traditional Authority Chadza

1. Kamchedzera

Traditional Authority Tambala

1. Matsikila

Traditional Authority Chauma

1. Chikumba
2. Miyowe

"The People's Fund for Community Development"

Traditional Authority Kachere

1. Kasonda
2. Chapukuta

Traditional Authority Chilikumwendo

1. Kaluzi
2. Lumwira

Your usual cooperation is greatly appreciated.

Yours faithfully

C E Mandala
Director of Community Sub-Projects
For : Executive Director

Required Personnel and Designated Division for Newly Procured Equipment

Item	Responsible Division	Required Personnel	
		Designation	Number
Equipment for Borehole Construction ・ Drilling Rig ・ Air Compressor ・ 3 Trucks (the Truck with Rig, the Truck with Compressor, Cargo Truck with Crane) ・ Electric Logging Instrument	Borehole Treasury Fund under Water Resources Division	Chief Driller	1
		Senior Driller	1
		Drilling Headman	1
		Drilling Overseeres	7 (including 3 drivers)
Development Equipment, Pumping Test Equipment ・ Compressor ・ Generator ・ Submersible Pump ・ Water Level Meter ・ pH Meter ・ Electric Conductivity Meter ・ Truck	Borehole Treasury Fund under Water Resources Division	Hydrogeologist	1
		Technical Assistant	1
		Pumping Test Crew	4 (including 1 driver)
Mobile Workshop ・ Repair Equipment and Tools ・ Truck	Borehole Treasury Fund under Water Resources Division	Mechanical Super Visor / driver	1
		Welder	1
		Mechanic	1
		Electric Mechanic	1
Electric Prospecting Instrument	Borehole Treasury Fund under Water Resources Division	Hydrogeologist	1
		Technical Assistant	1
		Survey Crew	5 (including 1 driver)
Pick-Up Truck (Single Cabin)	Borehole Treasury Fund under Water Resources Division	Driver	1
Pick-Up Truck (Double Cabin)	Central Regional Office	Senior Community Water Supply Officer	1
		Driver	1
Motorcycles	Central Regional Office	Senior Community Water Supply Officer	1
		Water Monitoring Assistant	3

APPENDIX 5. COST ESTIMATION BORNE BY THE RECIPIENT COUNTRY

5．COST ESTIMATION BORNE BY THE RECIPIENT COUNTRY

Description	Amount (MK)
1. Leveling of Camp Site at Linthipe	280,000
2. Work Cost and Allowance of MWD Staff for Drilling Works	1,938,000
－FY2001/2002 0	0
OJT	0
Management	0
－FY2002/2003	584,000
OJT	173,000
Management	411,000
－FY2003/2004	1,354,000
OJT	576,000
Management	778,000
3. Cost for Implementation of CBM	3,600,000
3.1 Training of Trainers and Mobilization of Committee	600,000
－FY2001/2002	600,000
3.2 Training of WPC	3,000,000
－FY2002/2003	2,000,000
－FY2003/2004	1,000,000
4.Improvement of Access Road	N.A.
5.Construction of Fences and Drain Ditch	N.A.
TATOL	5,818,000

APPENDIX 6. OTHER RELEVANT DATA

6-1 Target Villages and Borehole Drilling Plan
6-2 Evaluation Results of Target Villages
6-3 Results of Socio-economic Survey for Target Villages
6-4 Results of Geophysical Prospecting Survey
6-5 Results of Water Quality Test
6-6 Roads Required Improvement and Target Villages
6-7 Location of Health Care Centre and Hospital
6-8 Existing Borehole List

6-1 Taget Villages and Borehole Drilling Plan

District	TA/STA	No.	Name of Village	BH No.	Provisional Drilling Depth(m)	Phase-wise	
						1	2
LILONGWE	CHADZA	1	Kalenjeka	LD 1- 1	30.00		○
	CHADZA	2	Kalumba	LD 1- 2	35.00		○
	CHADZA	3.1	Kamchedzera	LD 1- 3	30.00		○
		3.2		LD 1- 4	30.00		○
	CHADZA	4	Mbimbi / Chimombo	LD 1- 5	70.00		○
	CHADZA	5	Jeremiya / Zikiyele	LD 1- 6	50.00		○
	CHADZA	6	Matambo / Misonjo	LD 1- 7	60.00		○
	CHADZA	7	Dzundi / Kulumbi	LD 1- 8	70.00	○	
	CHADZA	8.1	Kapatuka	LD 1- 9	30.00		○
		8.2		LD 1- 10	30.00		○
	CHADZA	9.1	Mlinga	LD 1- 11	30.00		○
		9.2		LD 1- 12	30.00		○
	CHADZA	10	Nankwela	LD 1- 13	35.00	○	
	CHADZA	11	Chinthu	LD 1- 14	40.00	○	
	CHADZA	12	Mpokosa	LD 1- 15	90.00		○
	CHADZA	13	Dzoole / Mtoseni	LD 1- 16	65.00		○
	CHADZA	14	Kapazila	LD 1- 17	60.00	○	
	CHADZA	15	Kaphamtengo	LD 1- 18	35.00	○	
	CHADZA	17	Mkakwala	LD 1- 19	30.00	○	
	CHADZA	18	Choma	LD 1- 20	55.00	○	
	CHADZA	20	Mgawi	LD 1- 21	40.00		○
	CHADZA	22	Chapata	LD 1- 22	35.00	○	
	CHADZA	23	Kumchenga	LD 1- 23	30.00	○	
	CHADZA	24.1	Mchizampheta	LD 1- 24	40.00	○	
		24.2		LD 1- 25	40.00	○	
	CHADZA	25	Chinthale	LD 1- 26	65.00		○
	CHADZA	26	Kumlaka	LD 1- 27	65.00		○
	CHADZA	27	Mpoto	LD 1- 28	40.00		○
	CHADZA	28	Chagulugulu	LD 1- 29	55.00		○
	CHADZA	29	Mingu	LD 1- 30	40.00		○
	CHADZA	30	Katsabola	LD 1- 31	40.00		○
	CHADZA	31	Samson	LD 1- 32	30.00		○
	CHADZA	33.1	Kadambe	LD 1- 33	30.00		○
		33.2		LD 1- 34	30.00		○
	CHADZA	34	Mgola	LD 1- 35	30.00		○
	CHADZA	35	Mwadzungu	LD 1- 36	75.00		○
	CHADZA	36	Mzapule	LD 1- 37	30.00		○
	CHADZA	37	Mfuti	LD 1- 38	40.00	○	
	CHADZA	40.1	Mphete	LD 1- 39	65.00		○

6-1 Taget Villages and Borehole Drilling Plan

District	TA/STA	No.	Name of Village	BH No.	Provisional Drilling Depth(m)	Phase-wise	
						1	2
		40.2		LD 1- 40	65.00		○
	CHADZA	42	Chisalipo	LD 1- 41	35.00		○
	CHADZA	43	Mcholoma	LD 1- 42	30.00		○
	CHADZA	44	Khonthi	LD 1- 43	30.00		○
	CHADZA	45	Chimwenje	LD 1- 44	30.00		○
	CHADZA	46	Mtepa	LD 1- 45	30.00		○
	CHADZA	48	Mbalame	LD 1- 46	40.00		○
	CHADZA	56	Chisindo	LD 1- 47	30.00		○
	CHADZA	61	Sukwa	LD 1- 48	85.00		○
	CHADZA	63	Kachono	LD 1- 49	30.00	○	
	CHADZA	64	Khomani	LD 1- 50	50.00	○	
	CHADZA	66	Phula	LD 1- 51	30.00	○	
	CHADZA	65	Chintankwa	LD 1- 52	40.00	○	
	CHADZA	68	Bodzalibwera	LD 1- 53	55.00		○
	CHADZA	69	Chambadzana	LD 1- 54	50.00		○
	CHADZA	70	Chinungu	LD 1- 55	60.00		○
	CHADZA	71	Chonangulu	LD 1- 56	50.00	○	
	CHADZA	73.1	Marichi	LD 1- 57	40.00		○
		73.2		LD 1- 58	40.00		○
	CHADZA	74	Mkoche	LD 1- 59	40.00		○
	CHADZA	75	Manjondo	LD 1- 60	30.00		○
	CHADZA	76	Msampha II	LD 1- 61	30.00		○
	CHADZA	77	Kansinsi	LD 1- 62	35.00		○
	CHADZA	78	Dzamalala	LD 1- 63	60.00	○	
	CHADZA	79	Kawande	LD 1- 64	65.00		○
	CHADZA	80	Chipoto	LD 1- 65	30.00		○

Sub-total 65

6-1 Taget Villages and Borehole Drilling Plan

District	TA/STA	No.	Name of Village	BH No.	Provisional Drilling Depth(m)	Phase-wise	
						1	2
DEDZA	TAMBALA	2	Mangamphasa	LD 2- 1	35.00		○
	TAMBALA	3	Mbuziyadula	LD 2- 2	40.00		○
	TAMBALA	4	Mphombe	LD 2- 3	40.00		○
	TAMBALA	6	Kwilimbe	LD 2- 4	35.00		○
	TAMBALA	11	Kalima	LD 2- 5	55.00		○
	TAMBALA	12	Kamwana	LD 2- 6	45.00		○
	TAMBALA	13	Mkwenembera	LD 2- 7	35.00		○
	TAMBALA	14	Mgawi	LD 2- 8	30.00		○
	TAMBALA	16.1	Mapemba	LD 2- 9	30.00		○
		16.2		LD 2- 10	30.00		○
	TAMBALA	18	Kaphale	LD 2- 11	40.00		○
	TAMBALA	22.1	Mfumbwa	LD 2- 12	45.00		○
		22.2		LD 2- 13	45.00		○
	TAMBALA	28	Nganya	LD 2- 14	30.00		○
	TAMBALA	30	Chingo	LD 2- 15	30.00		○
	TAMBALA	31	Mbakama	LD 2- 16	30.00		○
	TAMBALA	33	Kanyama / Mikuyu	LD 2- 17	50.00		○
	TAMBALA	34	Chiboli	LD 2- 18	45.00		○
	TAMBALA	35	Chigumula	LD 2- 19	50.00		○
	TAMBALA	37	Kapanda	LD 2- 20	30.00		○
	TAMBALA	39	Kapazila	LD 2- 21	40.00		○
	TAMBALA	44	Mzikamanda	LD 2- 22	35.00		○
	TAMBALA	45	Kudembe	LD 2- 23	40.00		○
	TAMBALA	46	Mnenula	LD 2- 24	30.00		○
	TAMBALA	48	Kaole	LD 2- 25	30.00		○
	TAMBALA	53	Zande	LD 2- 26	40.00		○
	TAMBALA	57	Kawire	LD 2- 27	35.00		○
	TAMBALA	58.1	Gwengwe Chilungusi	LD 2- 28	30.00		○
		58.2		LD 2- 29	30.00		○
	TAMBALA	60	Shuga	LD 2- 30	55.00		○
	TAMBALA	62	Mathikila	LD 2- 31	45.00		○
	TAMBALA	63	Matipa (Mkundi)	LD 2- 32	40.00		○

Sub-total 32

6-1 Taget Villages and Borehole Drilling Plan

District	TA/STA	No.	Name of Village	BH No.	Provisional Drilling Depth(m)	Phase-wise	
						1	2
DEDZA	CHAUMA	1	Kachulu	LD 3- 1	40.00		○
	CHAUMA	6	Kambuwe	LD 3- 2	55.00		○
	CHAUMA	8	Linyama / Chatsika	LD 3- 3	30.00		○
	CHAUMA	9.1	Chikumba	LD 3- 4	30.00		○
		9.2		LD 3- 5	30.00		○
		9.3		LD 3- 6	30.00		○
	CHAUMA	12	Miyowe	LD 3- 7	30.00		○
	CHAUMA	16	Kumlenga	LD 3- 8	70.00		○
	CHAUMA	19.1	Mthawanthu	LD 3- 9	30.00		○
		19.2		LD 3- 10	30.00		○

Sub-total 10

6-1 Taget Villages and Borehole Drilling Plan

District	TA/STA	No.	Name of Village	BH No.	Provisional Drilling Depth(m)	Phase-wise 1	Phase-wise 2
DEDZA	KACHERE	8	Mantega	LD 4- 1	60.00	○	
	KACHERE	9	Dimoni	LD 4- 2	30.00	○	
	KACHERE	10	Kude / Kanthongo	LD 4- 3	35.00	○	
	KACHERE	11	Dickisoni	LD 4- 4	40.00	○	
	KACHERE	12.1	Kafere	LD 4- 5	30.00	○	
		12.2		LD 4- 6	30.00	○	
	KACHERE	14	Kumilambe	LD 4- 7	55.00	○	
	KACHERE	15	Manase Chiundi / Kaunyolo	LD 4- 8	60.00		○
	KACHERE	16.1	Chikalungeni	LD 4- 9	35.00		○
		16.2		LD 4- 10	35.00		○
	KACHERE	17	Gwaza	LD 4- 11	30.00		○
	KACHERE	18	Gaga	LD 4- 12	35.00		○
	KACHERE	19	Kasonda	LD 4- 13	50.00		○
	KACHERE	20	Majamanda	LD 4- 14	40.00	○	
	KACHERE	21.1	Veru	LD 4- 15	60.00		○
		21.2		LD 4- 16	60.00		○
	KACHERE	22	Chimombo (A)(B)	LD 4- 17	70.00		○
	KACHERE	23.1	Yonani	LD 4- 18	35.00		○
		23.2		LD 4- 19	35.00		○
	KACHERE	24	Kafumbi	LD 4- 20	50.00		○
	KACHERE	27.1	Gelemani	LD 4- 21	45.00		○
		27.2		LD 4- 22	45.00		○
	KACHERE	29	Msepe	LD 4- 23	35.00		○
	KACHERE	33	Betenego	LD 4- 24	30.00		○
	KACHERE	35	Chabuka / Chindamba	LD 4- 25	55.00		○
	KACHERE	36.1	Chapukuta	LD 4- 26	35.00		○
		36.2	Chapukuta	LD 4- 27	35.00		○
	KACHERE	37	Chitukula	LD 4- 28	70.00		○
	KACHERE	38.1	Mtende	LD 4- 29	30.00		○
		38.2	Mtende	LD 4- 30	30.00		○
	KACHERE	39	Chizuzu	LD 4- 31	60.00		○
	KACHERE	43.1	Mphasayaweni	LD 4- 32	90.00		○
		43.2	Mphasayaweni	LD 4- 33	90.00		○
	KACHERE	46	Chakuwala / Mwambila Mando	LD 4- 34	30.00		○
	KACHERE	47	Liyela	LD 4- 35	30.00		○

Sub-total 35

6-1 Taget Villages and Borehole Drilling Plan

District	TA/STA	No.	Name of Village	BH No.	Provisional Drilling Depth(m)	Phase-wise	
						1	2
DEDZA	CHILIKUMWENDO	1	Khondowa	LD 5- 1	40.00	○	
	CHILIKUMWENDO	2	Thunduzi	LD 5- 2	35.00	○	
	CHILIKUMWENDO	3	Lombwa	LD 5- 3	50.00	○	
	CHILIKUMWENDO	4	Kachepa	LD 5- 4	75.00	○	
	CHILIKUMWENDO	5	Jere	LD 5- 5	50.00	○	
	CHILIKUMWENDO	6	Kukalambo	LD 5- 6	50.00	○	
	CHILIKUMWENDO	7	Kanjinga I	LD 5- 7	45.00	○	
	CHILIKUMWENDO	8	Chimombo	LD 5- 8	85.00	○	
	CHILIKUMWENDO	10	Folomani	LD 5- 9	65.00		○
	CHILIKUMWENDO	11	Mmbeya	LD 5- 10	45.00	○	
	CHILIKUMWENDO	13	Kang'ombe A and B	LD 5- 11	50.00		○
	CHILIKUMWENDO	14	Kamadzi	LD 5- 12	75.00		○
	CHILIKUMWENDO	15	Chisani	LD 5- 13	45.00	○	
	CHILIKUMWENDO	16	Aliyelo	LD 5- 14	40.00		○
	CHILIKUMWENDO	17	M'gawi	LD 5- 15	45.00		○
	CHILIKUMWENDO	20.1	Chatondeza 1and 2	LD 5- 16	50.00		○
		20.2		LD 5- 17	50.00		○
	CHILIKUMWENDO	21	Nyemba	LD 5- 18	35.00		○
	CHILIKUMWENDO	22	Phale	LD 5- 19	45.00		○
	CHILIKUMWENDO	23	Sankhani	LD 5- 20	60.00		○
	CHILIKUMWENDO	24	Lumwira/Nyamasanka	LD 5- 21	30.00		○
	CHILIKUMWENDO	25	Kaluzi	LD 5- 22	30.00		○
	CHILIKUMWENDO	26	Maguya / Kanundu	LD 5- 23	45.00		○
	CHILIKUMWENDO	28	Ngombeyagwada	LD 5- 24	35.00		○
	CHILIKUMWENDO	29	Katsalapoti	LD 5- 25	35.00		○
	CHILIKUMWENDO	30	Chatsika	LD 5- 26	50.00		○
	CHILIKUMWENDO	31	Msampha	LD 5- 27	30.00		○
	CHILIKUMWENDO	32	Mtalimanja	LD 5- 28	35.00		○
	CHILIKUMWENDO	33.1	Chimambamtengo	LD 5- 29	30.00		○
		33.2		LD 5- 30	30.00		○
	CHILIKUMWENDO	34	Mwanzimba	LD 5- 31	35.00		○
	CHILIKUMWENDO	37	Chimchere	LD 5- 32	60.00		○
	CHILIKUMWENDO	39	Kumbisa / (Kanyada)	LD 5- 33	30.00		○
	CHILIKUMWENDO	40	Chimtundudza	LD 5- 34	30.00		○
	CHILIKUMWENDO	41	Chipsye	LD 5- 35	60.00		○

Sub-total 35

Total 177

6-2 Evaluation Results of Target Villages

	Candidate Site	EA No.	Village Headman	No. of Households	Household Population	1998 Census	Projected Population 2001	Geophysical and Hydrogeological Condition of Aquifer				Existing Borehole			Socio-economic Survey	Access Condition		Synthetic Evalu-ation	Remarks
								Evalu-ation	Specific Resistivity	Depth	Remarks	Evalu-ation	Borehole No.	Remarks	Evalu-ation	Evalu-ation	Remarks		
TRADITIONAL AUTHORITY CHADZA																			
1	Kalenjeka	065	Kalenjeka	100	430	283	299	b	155	12	Shallowly seated bedrock	a			a	a		a	
2	Kalumba	065	Kalumba	49	211	152	160	a	265	28		a	BH no name(B/D)	Abandoned	a	a		a	
3	Kamchedzera	064/ 065	Yotamu	119	512	125	132	b	30, 125	5.5,130	Weathered zone and/or of bedrock	a	MASAF 01/02		a	a		a	
4	Mbimbi/chimombo	064	Mbimbi	95	409	438	462	b	60, 150	12, 120	Weathered zone and/or of bedrock	a			a	a		a	
5	Jeremiya/Zikiyele	064	Jeremiya	44	189	30	32	a	45,165	20,50		a			a	a		a	
6	Matambo/Misonjo	064	Matambo	50	215	170	179	a	70 ,258	10,60		a			a	a		a	
7	Dzundi/Kulumbi	064	Dzundi	45	194	114	120	a	36 ,230	9,70		a			a	a		a	
8	Kapatuka	028	Kapatuka	150	645	252	266	b	90	10.5	Shallowly seated bedrock	a			a	a		a	
9	Mlinga	027	Mlinga	195	839	350	369	b	25 ,300	9,24		a			a	a		a	
10	Nankwela	055	Nankwela	61	262	71	75	a	35,65	12,36		a			a	a		a	
11	Chinthu	056	Chinthu	60	258	88	93	a	60, 360	11,32		a			a	a		a	
12	Mpokosa	042	Mpokosa	41	176	128	135	b	65, 600	13,44		a			a	a		a	
13	Dzoole/Mtoseni	065	Mtoseni	50	215	89	94	b	32, 750	16,60		a			a	a		a	
14	Kapazila	054	Kapazila	59	254	151	159	a	70	60		a			a	a		a	
15	Kaphamtengo	054	Kaphamtengo	49	211	134	141	a	65, 46	22,36		a			a	a		a	
17	Mkakwala	049	Mkakwala	59	254	74	78	b	52, 300	11,24		a			a	a		a	
18	Choma	052	Choma	53	228	275	290	a	37, 82	19,50		a			a	a		a	
19	Nakuyere	069	Nakuyere	117	503	369	389	a	24, 300	10,50		c	BH WDC62	Working	a	a		c	
20	Mgawi	069	Mgawi	165	710	96	101	a	120	32		a			a	a		a	
21	Mwenda/Guta	032	Mwenda/Guta	70	301	419	442	b	30 / 95, 240	6.5 / 8, 24	Shallowly seated bedrock	c	MASAF 01/02		a	a		c	MASAF drilling plan is confirmed at Draft Mission
22	Chapata	059	Chapata	50	215	189	199	b	100, 120	12,28		a			a	a		a	
23	Kumchenga	061	Kumchenga	36	155	53	56	b	480, 240	17,24		a			a	a		a	
24	Mchizampheta	057	Mchizampheta	200	860	214	226	a	65, 100	9.4, 32		a			a	a		a	
25	Chinthale		Chinthale	51	219	219	231	b	20, 50	3, 60	Weathered zone and/or of bedrock	a			a	a		a	
26	Kumlaka	024	Kumlaka	45	194	122	129	b	130	60	Weathered zone and/or of bedrock	a			a	a		a	
27	Mpoto	044	Mpoto	56	241	172	181	a	135,60	24,32		a			a	a		a	
28	Chagulugulu	027	Chagulugulu	70	301	164	173	a	360	50		a			a	a		a	
29	Mingu	017	Mingu	58	249	219	231	a	113	32		a			a	a		a	
30	Katsabola	018	Katsabola	27	116	53	56	a	385	32		a			a	a		a	
31	Samson	066	Samson	78	335	215	227	b	160	24		a		MASAF	a	a		a	*Kanjedza/Samisoni*
32	Mkuzi/Phatha	014	Mkuzi	48	206	224	236	c	140	9	Shallowly seated bedrock	b	PSW	Working (bad quality, poor volume, not dry up in dry season)	a	a		c	
33	Kadambe	019	Kadambe	146	628	165	174	b	210	22		a			a	a		a	
34	Mgola	042	Mgola	60	258	118	124	b	150, 550	6, 24		a			a	a		a	
35	Mwadzungu	041	Mwadzungu	50	215	93	98	b	240	70	Weathered zone and/or of bedrock	a			a	a		a	
36	Mzapule	062	Mzapule	45	194	132	139	b	400	22		a			a	a		a	
37	Mfuti	046	Mfuti	98	421	111	117	a	120	32		a			a	a		a	
39	Chingaele	004	Chingaele	50	215	125	132	b	90	55	Weathered zone and/or of bedrock	c		Drilling completed, auxiliary facility not completed (3,000 boreholes program?)	a	a		c	
40	Mphete	007	Mphete	227	976	411	434	b	180,90	60, 110	Weathered zone and/or of bedrock	a			a	a		a	
41	Ntcherelo	011	Ntcherelo	20	86	126	133	b	300, 400	60,80	Weathered zone and/or of bedrock	c	BH RSC2/125	Not working, Inter Aid plans to drill	b	a		c	
42	Chisalipo	001	Chisalipo	100	430	356	376	b	85, 120	12,28		a			a	a		a	
43	Mcholoma	006	Mcholoma	60	258	126	133	b	100	32		a			a	a		a	
44	Khonthi	003	Khonthi	74	318	985	1,039	b	55, 200	12, 120	Weathered zone and/or of bedrock	a			a	b	Bad access, repair required	a	
45	Chimwenje	002	Chimwenje	95	409	657	693	b	240	14	Shallowly seated bedrock	a			a	a		a	
46	Mtepa	001	Mtepa (Gumbi)	110	473	392	414	b	40	16	Shallowly seated bedrock	a			a	a		a	
48	Mbalame	019	Mbalame	52	224	125	132	a	360	36		b	PSW	Working (bad quality, poor volume, not dry up in dry season)	a	a		b	
52	Jonathani	001	Jonathani (Gumbi)	40	172	142	150	b	65, 650	6.5, 20		c	BH LFP 83	1 working, 1 drilling completed, auxiliary facility not completed (3,000 borehole program?)	a	a		c	
53	Kandunai	005	Kandunai	42	181	409	431	b	110,40	22,40		c	BH no name(3,000 project)	Drilling completed, auxiliary facility not completed (3,000 borehole program)	a	a		c	
55	Kazika	002	Kazika	32	138	166	175	c	70	8.6	Shallowly seated bedrock	a			a	b	Bad access, repair required	c	
56	Chisindo	005	Chisindo	36	155	52	55	a	52,13	28,90		a			a	b	Bad access, repair required	a	

[A B B B R.] a : Satisfactory, b : Passing, c : Failure

Evaluation of Candidate Villages for Lilongwe-Dedza Project (Chadza)

	Candidate Site	EA No.	Village Headman	No. of Households	Household Population	1998 Census	Projected Population 2001	Geophysical and Hydrogeological Condition of Aquifer				Existing Borehole			Socio-economic Survey	Access Condition		Synthetic Evalu-ation	Remarks
								Evalu-ation	Specific Resistivity	Depth	Remarks	Evalu-ation	Borehole No.	Remarks	Evalu-ation	Evalu-ation	Remarks		
57	Chipula	041	P.Chigodula	45	194	54	57	c	76	7.2	Shallowly seated bedrock	a			a	a		c	
58	*Kamundi*	013	Kadunai	70	301	225	237	b	55,20	30,55		c	2BH RS 442, no name(B/D)	1 working, 1 not working	a	a		c	
59	Chibudula	006	Chibudula	42	181	81	85	c	53	4.2	Shallowly seated bedrock	a			a	a		c	
60	Nyozwa	006	Nyozwa	30	129	50	53	c	180	3.5	Shallowly seated bedrock	a			a	a		c	
61	Sukwa	041	Sukwa	38	163	53	56	b	160, 320	12,80	Weathered zone and/or of bedrock	a			a	a		a	
63	Kachono	060	Kachono	70	301	216	228	b	230	24		a			a	a		a	
64	Khomani	051	Khomani	100	430	149	157	a	75, 200	45, 100		a			a	a		a	
65	Chinthankhwa	052	Chinthankhwa	43	185	281	296	b	60,75	16,40		a	BH PM 269	Not working (18 m deep) B/D	a	a		a	
66	Phula	054	Phula	220	946	491	518	b	85	28		a	BH PM 270	Working (details unknown)	a	a		a	**Population 946, one more new borehole required**
67	Kayabwa	033	Kayabwa	55	237	273	288	a	37, 240	20,35		c	no name	Working	a	a		c	
68	Bodzalibwera	033	Bodzalibwera	40	172	60	63	a	50, 200	20,50		a			a	a		a	
69	Chambadzana	066	Chambadzana	63	271	75	79	b	40, 300	7, 45～		a	PSW		a	a		a	
70	Chinungu	064	Chinungu	70	301	269	284	a	360,30	40,55		a			a	a		a	
71	Chonangulu	064	Chonangulu	47	202	224	236	b	48	50		a			a	a		a	
73	Marichi	068	Marichi	123	529	216	228	a	22,180	14,32		a			a	a		a	
74	Mkoche	064	Mkoche	48	206	160	169	b	45,10	35,65		a	2BH PM 255(B/D), no name(B/D)	2 existing boreholes (abandoned)	a	a		a	
75	Manjondo	065	Manjondo	104	447	232	245	b	60	12	Shallowly seated bedrock	a			a	a		a	
76	Msampha II	032	Msampha	40	172	299	315	b	55, 450	14,32		a			a	a		a	
77	*Kansinsi*	035	Kansinsi	40	172	86	91	b	160, 400	10,30		a			a	a		a	
78	Dzamalala / Sante	061	Dzamalala	29	125	98	103	b	400	55	Weathered zone and/or of bedrock	a			a	a		a	
79	Kawande	066	Kawande	37	159	59	62	b	300	60	Weathered zone and/or of bedrock	a			a	a		a	
80	Chipoto	069	Chipoto	110	473	294	310	b	35, 160	10,20		b	PSW	Working (usual quality, poor yield, not dry up in dry season)	a	a		b	
	Total 71 Villages			**74**	**316**	**204**	**215**												

[A B B B R.] a : Satisfactory, b : Passing, c : Failure

Evaluation of Candidate Villages for Lilongwe-Dedza Project (Tambala)

	Candidate Site	EA No.	Village Headman	No. of Households	Household Population	1998 Census	Projected Population 2001	Geophysical and Hydrogeological Condition of Aquifer				Existing Borehole			Socio-economic Survey	Access Condition		Synthetic Evalu-ation	Remarks
								Evalu-ation	Specific Resistivity	Depth	Remarks	Evalu-ation	Borehole No.	Remarks	Evalu-ation	Evalu-ation	Remarks		
TRADITIONAL AUTHORITY TAMBALA																			
1	Kaoche	004	Kaoche	42	181	206	215	Not carried out.			No accessible	a			a	c	–	c	Rig not accessible at present
2	Mangamphasa *1	004	Mangamphasa	47	202	164	171	b	430	27		a			a	b	Over the Chilungusi river/bridge need	a	Rig not accessible at present
3	Mbuziyadula	005	Mbuziyadula	70	301	364	381	a	230	36		a			a	b	Over the Chilungusi river	a	
4	Mphombe	006	Mphombe	47	202	264	276	a	130	34		a			a	b	Over the Chilungusi river	a	
5	*Kazembe*	005	Kazembe	82	353	303	317	c	30 / 25	4 / 3	Shallowly seated bedrock	a			–	c	Over the Chilungusi river/2 bridges need to be improved	c	Rig not accessible at present
6	Kwilimbe (Chembe)	004	Chemble	35	151	123	129	b	300	28		a			a	b	Over the Chilungusi river	a	
7	Chesa																		No village
8	Gwengwe	019	Gwengwe	120	516	415	434	b	450	30		c	2BH DZ 275, GT _59	2 working	a	a		c	
9	Chiyepa	014	Chiyepa	9	39	39	41	b	450	24	Weathered zone and/or of bedrock	a			c	a		c	
10	Ajibu	009	Ajibu	107	460	328	343	c	38	5	Shallowly seated bedrock	a			a	a		c	
11	Kalima	009	Kalima	32	138	89	93	a	300,240	20,50		a			a	a		a	
12	Kamwana	009	Kamwana	40	172	172	180	a	300,180	32,40		a			a	a		a	
13	Mkwenembera	003	Mkwenembera	93	400	80	84	a	150,90/ 115,300	22,30/ 10,100		a			a	a		a	
14	Mgawi	003/ 006	Mgawi	116	499	214	224	b	110	22		a			a	b	Over the Chilungusi river	a	
15	Mitawa	013	Mitawa	50	215	215	225	b	440	36		c	BH SB/07/284 at Mlozi sch.	Close to working borehole at school	a	a		c	MASAF 2001/2002
16	Mapemba	038	Mapemba	120	516	483	505	b	380	24		a	BH no name(B/D)	Not working (little water)	a	a		a	
17	Kaundikiza	020	Kaundikiza	37	159	70	73	c	100	4.5	Shallowly seated bedrock	a			a	b	Large steep slope	c	Access of rig difficult at present
18	Kaphale	009	Kaphale	47	202	103	108	a	210	35		a			a	b		a	
19	Kalimba	009	Kalimba	79	340	215	225	a	200,160	30,45		c	BH GT 260(B/D since '93)	Not working	a	a		c	Bad u-seal, little water
20	Mankhambaza																		No village
21	Kafwafwa	016	Kafwafwa	186	800	1,269	1,327	b	600	24		c	2BH DH 26(B/D), no name(B/D)	2 not working (1 of 2 with no pump)	a	a		c	No new borehole planned (population 800, 2 existing boreholes)
22	Mfumbwa	007	Mfumbwa	248	1,066	236	247	b	300/50	40 / 8	One of two indicates shallowly seated bedrock	a			a	a		a	2 new boreholes planned (population 1,066, no existing borehole)
23	Mzinga																		Rig not accessible
25	Napwanga	008	Napwanga	175	753	292	305	a	144	36		c	BH SB/07/361 (Mlenga Sch.)	Close to working borehole at school	a	c	Surrounded by deep valley	c	Rig not accessible at present
26	*Kumaunda(2)*	012	Kumaunda	37	159	107	112	b	72	10	Shallowly seated bedrock	c	BH no name at Kumaunda(1)	Working (hour-restricted use)	a	a		c	
27	Chipango	019	Chipango	45	194	112	117	c	95	7	Shallowly seated bedrock	a			a	b	Over the Lisisi stream, Ngombe river	c	Rig not accessible at present
28	Nganya	020	US.Mchepa	35	151	151	158	b	500	22		a			a	b	Over the Dowa river	a	
30	Chingo	021	Chingo	48	206	167	175	b	130	20		a			a	b		a	
31	Mbakama	021	Mbakama	40	172	106	111	b	180	16	Shallowly seated bedrock	a			a	b		a	
32	Matupa	022	Matupa	120	516	338	353	b	320	45	Weathered zone and/or of bedrock	c	BH	Working	a	b	Over the Ngombe river	c	
33	*Kanyama/Mikuyu*	001	Kanyama	80	344	238	249	b	60,80	20,50		a			a	b	Over the Ngombe river	a	
34	Chiboli	002	Chiboli	54	232	163	170	b	100,50,120	40,90,100		a			a	b	Over the Ngombe river	a	
35	Chigumula	001	Chigumula	39	168	92	96	b	550,400	16,80	Weathered zone and/or of bedrock	a			a	b	Over the Ngombe river	a	
36	Nyangu	001	Nyangu	50	215	269	281	b	40,80	40,50	Weathered zone and/or of bedrock	c	MASAF2000/01		a	b	Over the Ngombe river	c	MASAF drilling is planned.
37	Kapanda	001	Kapanda	93	400	283	296	b	140	24	Weathered zone and/or of bedrock	a			a	b	Over the Ngombe river	a	
38	Mafolera	001	Mafolera	15	65	61	64	b	160/130,240	32/45,70	Weathered zone and/or of bedrock	a			a	c	Over the Ngombe river/along steep and long road	c	Inaccessible for drilling
39	Kapazila	001	Kapazila	72	310	196	205	b	300	36	Weathered zone and/or of bedrock	a			a	b	Over the Ngombe river	a	
40	Chipokosa	001	Mafolera	10	43	35	37	b	20,32	32,50		a			–	c	Over the Ngombe river/along steep and long road	–	Rig not accessible
41	Chokoma	010	Chokoma	50	215	141	147	Not carried out.				c	BH DZ 49(B/D)	Not working (rod broken)	a	b	Dambo	–	Waiting fund for repair
42	Kanonyere*2																		Rig not accessible
43	Mzingo																		No village, Mdingo?
44	Mzikamanda(A)	001	Mzikamanda	42	181	41	43	b	75,20	28,70		a			a	b	Bad access, repair required	a	
45	Kudembe	002	Kudembe	80	344	506	529	b	420	32		a			a	b		a	
46	*Mnenula*	026	Munenula	35	151	158	165	b	265	24		a			a	a		a	
48	Kaole	015	Kaole	82	353	341	357	b	700	24		a	BH no name(B/D)	Not working (no water)	a	a		b	
49	Msanyama	014	Chilanga	59	254	189	198	a	140	32		c	BH GT 264(B/D since '94)	Not working (silted)	a	a		c	
50	Bowa	017	Bowa	47	202	192	201	a	225	40		c	BH DZ 24(B/D)	Not working	a	a		c	

[ABBR.] a : Satisfactory, b : Passing, C : Failure

Evaluation of Candidate Villages for Lilongwe-Dedza Project (Tambala)

	Candidate Site	EA No.	Village Headman	No. of Households	Household Population	1998 Census	Projected Population 2001	Geophysical and Hydrogeological Condition of Aquifer				Existing Borehole			Socio-economic Survey	Access Condition		Synthetic Evalu-ation	Remarks
								Evalu-ation	Specific Resistivity	Depth	Remarks	Evalu-ation	Borehole No.	Remarks	Evalu-ation	Evalu-ation	Remarks		
51	Chiumbe	003	Chiumbe	16	69	69	72	**b**	**100**	**24**		**a**			**c**	**a**	**Bad access, repair required**	**c**	
52	*Maganga 2*	003	Maganga	40	172	128	134	**b**	**180**	**24**		**c**	BH SB/07/281	Working	**a**	**a**	**Bad access, repair required**	**c**	
53	Zande	012	Zande	45	194	108	113	**a**	**360**	**32**		**a**			**a**	**b**	**Surrounded by dambo**	**a**	
54	Kunchinza	007	Kumchiza	39	168	194	203	**c**	**2000**	**8**	**Shallowly seated bedrock**	**a**			**a**	**a**		**c**	
56	Kazembe 2	008	Kazembe	17	73	75	78	**b**	**260**	**28**		**a**			**c**	**a**		**c**	
57	Kawire	008	Kawire	56	241	221	231	**a**	**80**	**30**		**a**			**a**	**a**		**a**	
58	*Gwengwe Chilungusi*	017	Gwengwe	370	1,591	889	930	**b**	**280**	**16**	**Shallowly seated bedrock**	**a**	2BH PI 418, no name(B/D)	1 working, 1 not working	**a**	**a**		**a**	**2 new boreholes planned (population 1,591, 2 existing boreholes)**
59	Mmong'ono																		**No village**
60	Shuga	021	Shuga	24	103	28	29	**b**	**400**	**50**	**Weathered zone and/or of bedrock**	**a**			**a**	**a**		**a**	
61	Likangala	034	Likangala	70	301	135	141	**a**	**320**	**30**		**c**	BH no name(B/D)	Not working	**a**	**a**		**c**	
62	Matsikila	006	Matsikila	70	301	207	216	**a**	**320**	**40**		**a**	MASAF 2001/2002	Desk App	**a**	**b**	**Over the Chilungusi river**	**a**	
63	*Matipa (Mkundi)*	007 (CHAUMA)	Mkundi	300	1,290	552	577	**a**	**84**	**36**		**a**	2BH RS 078, no name	2 working	**a**	**a**		**a**	**1 new borehole planned (population 1,290, 2 existing boreholes)**
	Total 59 Villages			**81**	**348**	**248**	**259**												

[ABBR.] a : Satisfactory, b : Passing, C : Failure

Evaluation of Candidate Villages for Lilongwe-Dedza Project (Chauma)

	Candidate Site	EA No.	Village Headman	No. of Households	Household Population	1998 Census	Projected Population 2001	Geophysical and Hydrogeological Condition of Aquifer				Existing Borehole			Socio-economic Survey	Access Condition		Synthetic Evalu-ation	Remarks
								Evalu-ation	Specific Resistivity	Depth	Remarks	Evalu-ation	Borehole No.	Remarks	Evalu-ation	Evalu-ation	Remarks		
TRADITIONAL AUTHORITY CHAUMA																			
1	Kachulu	039 (Tambala)	Kachulu	97	417	261	273	**a**	**95**	**30**		**a**			**a**	**b**	**Surrounded by dambo**	**a**	
2	Muonda	001	Muonda	39	168	118	123	**c**	**85**	**4.6**	**Shallowly seated bedrock**	**a**			**a**	**b**		**c**	Monda/MASF 2001/2002
3	Sapita	002	Sapita	100	430	362	379	**c**	**43**	**5.5**	**Shallowly seated bedrock**	**a**			**a**	**a**		**c**	
4	*Mkhumbwa*	001	Mkhumbwa	150	645	318	333	**c**	**380**	**15**	**Shallowly seated bedrock**	**a**			**a**	**a**		**c**	
5	*Chiwaza*	001	Chiwaza	43	185	250	261	**c**	**30**	**2.8**	**Shallowly seated bedrock**	**a**			**a**	**a**		**c**	
6	Kambuwe	010	Kambuwe	53	228	184	192	**a**	**210**	**46**		**a**			**a**	**b**		**a**	
7	Mnthambwe	012	Mnthambwe	80	344	309	323	**b**	**100**	**16**	**Shallowly seated bedrock**	**c**	BH EP 055、DH 7	Close to 2 working boreholes (1 at school, 1 in next village)	**a**	**b**		**c**	
8	*Linyama/Chatsika*	013	Linyama	100	430	254	266	**b**	**255**	**22**		**a**			**a**	**b**	**Between 2 narrow bridges, the bridge on upper stream should be improved**	**a**	
9	Chikumba	013	Chikumba	240	1,032	506	529	**b**	**154**	**18**		**a**			**a**	**b**	**Between 2 narrow bridges, the bridge on upper stream should be improved**	**a**	**Improvement of the road from Miyowe is necessary.**
10	Chisasa II	014	Chisasa	39	168	167	175	**b**	**90**	**16**	**Shallowly seated bedrock**	**c**	BH DZ 225(B/D)	Not working (rod stolen)	**a**	**b**		**c**	
12	Miyowe	015	Miyowe	80	344	161	168	**a**	**150**	**24**		**a**	MASAF 2001/2002	Desk App	**a**	**b**		**a**	
15	*Thunduzi*	010	Thunduzi	34	146	117	122	**c**	**65**	**8**	**Shallowly seated bedrock**	**a**			**a**	**b**		**c**	
16	Kumlenga	014	Kumlenga	39	168	210	220	**a**	**90**	**60**		**a**			**a**	**b**		**a**	
17	Gonkho	003	Gonkho	300	1,290	738	772	**c**	**240**	**35**	**Weathered zone and/or of bedrock**	**a**	DH 6	Not working (repairable)	**a**	**b**		**c**	No new borehole planned due to C electric prospecting evaluation in spite of population (1,290) and 1 existing borehole
18	Kudoko	007	Kudoko	40	172	108	113	**b**	**350**	**25**		**c**	BH RS 073	Working	**a**	**a**		**c**	
19	Mthawanthu	012	Mthawathu	120	516	316	330	**b**	**300**	**20**	**Shallowly seated bedrock**	**a**			**a**	**a**		**a**	
	Total 16 Villages			**97**	**418**	**274**	**286**												

[ABBR.] a : Satisfactory, b : Passing, c : Failure

	Candidate Site	EA No.	Village Headman	No. of Households	Household Population	1998 Census	Projected Population 2001	Geophysical and Hydrogeological Condition of Aquifer				Existing Borehole			Socio-economic Survey	Access Condition		Synthetic Evalu-ation	Remarks
								Evalu-ation	Specific Resistivity	Depth	Remarks	Evalu-ation	Borehole No.	Remarks	Evalu-ation	Evalu-ation	Remarks		
TRADITIONAL AUTHORITY KACHERE																			
1	Chingwalu	073	Chingwalu	67	288	243	254	a	130,80	45,70		c	Protected shallow well	CUEM194	a	a		c	MASAF Chimuwangalu Sch.
2	Sukasuka I	091	Sukasuka	210	903	348	364	a	300	36		c	2BH PI 423,no name	2 working	a	a		c	
3	Sukasuka II	093	E.Dangaya	210	903	698	730	b	400	28		c	BH	2 working, 1 not working	a	a		c	
4	Gunduze I	076	Gunduze I	186	800	913	955	b	600, 500	35,60	High Resistivity	c	BH EA 123(B/D)	Working	a	a		c	
5	Kamenya	077	Kamenya	84	361	468	489	b	850	24	High Resistivity	c	BH CU 95(for Sch.)	Close to working borehole at school	a	a		c	
6	Chumachisala	077/ 081	Chumachisala	58	249	233	244	b	650	32	High Resistivity	c	3BH CZ 01, PM 744, no name(B/D)	2 working, 1 not working	a	a		c	
7	Kachikoti	002	David.Biliati	71	305	209	219	b	65	24		c	BH PI 23	Not working (repairable)	a	a		c	
8	Mantega	001	Mantega	41	176	176	184	a	130, 300	20,55		a			a	a		a	
9	Dimoni	003	Dimoni (Kude)	50	215	180	188	b	320	20		a			a	a		a	
10	Kude / Kanthongo	005	Kude	26	112	54	56	a	360	30		a			a	a		a	
11	Dickisoni	004	Dickisoni	49	211	194	203	a	450	36		a			a	a		a	
12	Kafere	005	Kafere	279	1,200	921	963	b	200, 350	16,24		a	BH no name(B/D)	Not working	a	a		a	2 new borehole planned due to population (1,200) and 1 existing borehole
13	Kunjawa	007	Kunjawa	80	344	252	264	a	400	32		c	BH no name(B/D)	Not working	a	a	Pass on dambo	c	
14	Kumilambe	001	D.Jamester	65	280	280	293	a	90, 250	28,50		a			a	a	Pass on dambo	a	
15	Manase Chiundi/Kaunyolo	053	Manase Chiundi	46	198	103	108	b	360	55	Weathered zone and/or of bedrock	a			a	a		a	
16	Chikalungeni	064	Chikalungeni	150	645	400	418	b	80	28		a			a	a		a	
17	Gwaza	063	Gwaza	70	301	386	404	b	90,20	8,15	Shallowly seated bedrock	a			a	a		a	
18	Gaga	069	F.Mkwezalamba	39	168	126	132	b	360	28	Weathered zone and/or of bedrock	b	CUV 138(PSW)	Not working (usual quality, poor yield, not dry up in dry season)	a	a		b	
19	Kasonda	032	Kasonda	53	228	191	200	a	220	45		a			a	a		a	
20	Majamanda	007	Majamanda	78	335	106	111	a	480	32		b	CUV 127(PSW)		a	a	Pass on dambo	b	
21	*Veru*	057	Veru	153	658	420	439	a	380, 200	32,55		a			a	a		a	
22	Chimombo (A)(B)	054	Chimombo	65	280	298	312	b	650	65	Weathered zone and/or of bedrock	a			a	a		a	
23	Yonani	028	Yonani	150	645	179	187	a	120	28		a			a	a		a	
24	Kafumbi	021	Kafumbi	68	292	132	138	a	46, 150	22,50		a			a	a		a	
25	Masola	012	L.Tsela	320	1,376	534	558	a	320	28		c	CU/MASAF 2001/2002	CU conducted electric prospecting	a	a		c	No new borehole planned due to construction plan of CU
26	*Dolobeni /Chinkuita*	021	Dolobeni /Chinkuita	65	280	122	128	a	360, 240	45, 120		c	BH MM391	Working	a	a		c	
27	Gelemani	014	Gelemani	120	516	210	220	a	120	40		a			a	a		a	
28	Lodzanyama	010	Lodzanyama	96	413	215	225	a	240, 180	36, 60		c	BH FM173	Working (???)	a	a		c	
29	Msepe	010	Msepe	35	151	210	220	a	240	36		a			a	a		a	
30	Chipanga	050/	Chipanga	95	409	302	316	a	220	75		c	BH no name(Chipanga 1)	Close to working borehole at school	a	a		c	
31	Kaliyozi	079	Kaliyozi	40	172	268	280	b	200	16	Shallowly seated bedrock	c	BH RM 763(B/D)	Not working (broke down recently)	a	a		c	
32	Chakachadza	083/ 084	Chakachadza	400	1,720	2,597	2,716	b	450	24		c	6BH RS405(B/D), RK83(B/D), RS402(for School)(B/D), 3no name(B/D)	I working, 5 not working	a	a		c	No new borehole planned due to population (1,720) and 6 existing boreholes
33	Betenego	080	Betenego	57	245	158	165	b	75	20		a			a	a		a	
34	M'khomaanthu	072	M'khomaanthu	93	400	638	667	a	360	30		c	2BH SB/07/008,CU2(B/D)	1 working, 1 not working	a	a		c	
35	Chabuka/Chindamba	052	Chindamba	57	245	374	391	b	320	50	Weathered zone and/or of bedrock	a			a	a		a	
36	Chapukuta	054	Chapukuta	125	538	219	229	b	56	28		a	MASAF 2001/2002		a	a		a	Chapatuka
37	Chitukula	050	Chitukula	63	271	387	405	b	160	50		a			a	a		a	
38	Mtende	049	Mtende	130	559	246	257	b	140	100	Weathered zone and/or of bedrock	a			a	a		a	
39	Chizuzu	046	Chizuzu	65	280	238	249	b	120	55		a			a	a		a	
40	~~Tchetsa~~																		
41	Chimkhombe/Kaudzu	043/	Chimkhombe	70	301	275	288	b	180,550	16,55		c	BH no name(for Kaudzu Vill.)	Working borehole in next village	a	a		c	CU plans new borehole
42	Chonde	042	Chonde	128	550	154	161	a	240	45		c	BH		a	a	Bad access, repair required	c	CU plans new borehole
43	Mphasayaweni	042	Mphasayaweni	120	516	277	290	a	25,40	23,85		a			a	a		a	
44	*Kalamba / Domoya*	041	Kalambe	36	155	148	155	b	30	30		c	BH LP 051(for Kayama Sch.)	Working borehole at school	a	a		c	
45	*Mbuta*	055	Mbuta	58	249	230	241	a	360	32		c	BH 28(for Kampherembe Sch.)	Working borehole at school	a	a		c	
46	Chakuwala/Mwambila Mando	020	Chakuwala	67	288	491	513	b	120	24		a			a	a		a	
47	Liyela	077	Liyela	70	301	373	390	b	240	24		a			a	a		a	
	Total 47 Villages			**108**	**466**	**376**	**393**												

[ABBR.] a : Satisfactory, b : Passing, c : Failure

Evaluation of Candidate Villages for Lilongwe-Dedza Project (Chilikumwendo)

	Candidate Site	EA No.	Village Headman	No. of Households	Household Population	1998 Census	Projected Population 2001	Geophysical and Hydrogeological Condition of Aquifer				Existing Borehole			Socio-economic Survey	Access Condition		Synthetic Evalu-ation	Remarks
								Evalu-ation	Specific Resistivity	Depth	Remarks	Evalu-ation	Borehole No.	Remarks	Evalu-ation	Evalu-ation	Remarks		
TRADITIONAL AUTHORITY CHILIKUMWENDO																			
1	Khondowa	045	Khondowa	30	129	108	113	**a**	**45**	**32**		**b**	PSW	Not working (usual quality, poor yield, not dry up in dry season)	**a**	**a**		**b**	
2	Thunduzi	045	Thunduzi	40	172	106	111	**a**	**50**	**32**		**a**			**a**	**a**		**a**	
3	Lombwa	041	Lombwa	37	159	178	186	**b**	**40,100**	**24,45**		**a**			**a**	**a**		**a**	
4	Kachepa	046	Kachepa	30	129	115	120	**b**	**38, 260**	**13, 70**	**Weathered zone and/or of bedrock**	**a**			**a**	**a**		**a**	
5	Jere	046	Jere	30	129	101	106	**b**	**32,300**	**22,45**		**a**			**a**	**a**		**a**	
6	Kukalambo	040	Kukalambo	30	129	142	148	**b**	**450**	**45**		**a**			**a**	**a**		**a**	
7	Kanjinga I	044	Kanjinga	45	194	429	449	**a**	**48**	**38**		**a**			**a**	**b**	**Access road should be improved**	**a**	
8	Chimombo	042	Chimombo	45	194	153	160	**a**	**25,33**	**45,80**		**a**			**a**	**a**		**a**	
9	Kamtambo	036	Kamtambo	74	318	256	268	**c**	**50**	**7**	**Shallowly seated bedrock**	**a**			**a**	**a**		**c**	
10	Folomani	038	Folomani	70	301	441	461	**a**	**38**	**60**		**a**			**a**	**a**		**a**	
11	Mmbeya	046	Mmbeya	48	206	83	87	**a**	**250**	**40**		**a**			**a**	**a**		**a**	
13	Kang'ombe A and B	036	Kang'ombe	40	172	175	183	**a**	**40,60**	**20,45**		**a**			**a**	**a**		**a**	
14	Kamadzi	033	Kamadzi	29	125	124	130	**a**	**45, 240**	**22,70**		**a**			**a**	**a**		**a**	
15	Chisani	045	Chisani	40	172	84	88	**a**	**35,90**	**28,40**		**a**			**a**	**a**		**a**	
16	*Aliyelo*	043	Aliyelo	49	211	205	214	**a**	**50,70**	**24,36**		**a**			**a**	**a**		**a**	
17	M'gawi	033	M'gawi	26	112	121	127	**b**	**80**	**48**		**a**			**a**	**a**		**a**	
18	Chideza	040	Chideza	21	90	56	59	**a**	**220,80**	**60,110**		**c**	BH	2 working	**a**	**a**		**c**	
20	Chatondeza 1and 2	027	Chatondeza	118	507	338	353	**a**	**320**	**45**		**b**	PSW	Working (good quality, poor volume, not dry up in dry season)	**a**	**a**		**b**	
21	Nyemba	027	Nyemba	52	224	136	142	**b**	**120**	**28**		**a**			**a**	**a**		**a**	
22	Phale	028	Phale	46	198	360	376	**b**	**150,20**	**40,90**		**a**			**a**	**b**	**Access road should be improved**	**a**	
23	Sankhani	021/	Sankhani	40	172	128	134	**b**	**45,(540)**	**22,(55)**		**a**			**a**	**a**		**a**	
24	Lumwira/(Nyamasanka)	023	Lumwira	68	292	185	193	**b**	**30**	**16**	**Shallowly seated bedrock**	**a**			**a**	**a**		**a**	
25	Kaluzi	024	Kaluzi	30	129	72	75	**b**	**75**	**22**		**a**			**a**	**a**		**a**	
26	Maguya/Kanundu	026	Maguya	19	82	248	259	**a**	**120**	**40**		**a**			**b**	**a**		**b**	
27	Chidonthi	026	Chidonthi	35	151	81	85	**a**	**40, 360**	**22, 100**		**c**	BH 226、CU_	Working	**c**	**a**		**c**	
28	Ngombeyagwada	026	Ngombeyagwada	83	357	87	91	**a**	**200, 320**	**30,70**		**a**			**a**	**a**		**a**	
29	Katsalapoti	029	Katsalapoti	61	262	259	271	**b**	**25,60**	**22,36**		**a**			**a**	**a**		**a**	
30	Chatsika	030	Chatsika	56	241	161	168	**a**	**120, 360**	**24,45**		**a**			**a**	**a**		**a**	
31	Msampha	015	Msampha	47	202	286	299	**b**	**120**	**22**		**a**			**a**	**a**		**a**	
32	Mtalimanja	014	Mtalimanja	41	176	199	208	**a**	**78**	**28**		**a**			**a**	**a**		**a**	
33	Chimambamtengo	014	Chimambamteng	145	624	1,010	1,056	**b**	**130**	**22**		**a**			**a**	**a**		**a**	
34	Mwanzimba	015	Mwanzimba	68	292	286	299	**b**	**360**	**28**		**a**			**a**	**a**		**a**	
35	Willinda	003	Willinda	80	344	310	324	**b**	**160**	**28**		**c**	BH no name	Drilled by CU	**a**	**a**		**c**	
36	Malonikansepa/kansepa	009	Malonikansepa	110	473	383	400	**a**	**80,180,80**	**32,70,90**		**c**	BH LP 455	Working	**a**	**a**		**c**	
37	Chimchere	008	Chimchere	76	327	443	463	**a**	**180,55**	**32,55**		**b**	PSW	Not working (usual quality, poor yield, not dry up in dry season)	**a**	**a**		**b**	
38	Mphoozi	008	Mphoozi	52	224	246	257	**a**	**420, 280**	**32,70**		**c**	BH RK 69	Close to working borehole in next Kabwazi T.C.	**a**	**a**		**c**	
39	Kumbisa/(Kanyada)	012	Kumbisa	40	172	319	334	**b**	**280**	**24**		**a**			**a**	**a**		**a**	
40	Chimtundudza	013	Chimtundudza	28	120	110	115	**b**	**24**	**28**		**a**			**a**	**a**		**a**	
41	Chipsye	009/ 011	Chipsye	30	129	163	170	**b**	**140,25**	**55,100**		**b**	PSW	Not working (usual quality, poor yield, not dry up in dry season)	**a**	**a**		**b**	
42	Chiimutu Woyera	006	Chiimutu Woyera	50	215	288	301	**b**	**75,100**	**32,90**		**c**	EM 204 (Chimutu Waruda Vill.)	Close to working borehole in next village	**a**	**a**		**c**	
43	*Asafu*	037	Asafu	76	327	214	224	**a**	**300**	**45**		**c**	PC 50(B/D)	Not working (repairable)	**a**	**a**		**c**	
	Total 41 Villages			**52**	**224**	**224**	**234**												

[ABBR.] a : Satisfactory, b : Passing, c : Failure

Village Headman (CHADZA)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use: River/Dambo: Perennial Flow or Not	River/Dambo: Water Quality	Unprotected Shallow Well: No.	Unprotected Shallow Well: Water Quality	Unprotected Shallow Well: Dried-up or Not	Protected Shallow Well: No.	Protected Shallow Well: Water Quality	Protected Shallow Well: Dried-up or Not	Borehole: No.	Borehole: Water Quality	Borehole: Dried-up or Not	Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family (Buckets)	Average Volume of Water Usage per Family (liter)	Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates: South Latitude	Coordinates: East Longitude
TRADITIONAL AUTHORITY CHADZA																														
1	Kalenjeka	065	Kalenjeka	100	430	2,000	S.F.	None			2	Bad	Not							None	BOH	3	60	Not	Yes	Yes	Yes		14° 12' 30"	33° 48' 10"
2	Kalumba	065	Kalumba	49	211	1,500	S.F.	None			4	Bad	2-D.U. 2-Not							3 USWs(1990's)& 1 USW(2000)/Now in use ※※	BOH	4	80	Not	Yes	Yes	Yes	F=0.5(USW)	14° 12' 51"	33° 48' 22"
3	Kamchedzera	064/ 065	Yotamu	119	512	2,500	S.F.	None			6	Bad	Not							None	BOH	5	100	Not	Yes	Yes	Yes		14° 12' 13"	33° 49' 11"
4	Mbimbi/chimombo	064	Mbimbi	95	409	3,000	S.F.	None	Not	Bad	3	Bad	Not							None	BOH	5	100	Not	Yes	Yes	Yes		14° 11' 57"	33° 49' 14"
5	Jeremiya/Zikiyele	064	Jeremiya	44	189	2,000	S.F.	School			1	Bad	Not							USW in a Dambo(1944)/now in use/renovated every year	BOH	4	80	Not	Yes	Yes	Yes		14° 12' 46"	33° 49' 06"
6	Matambo/Misonjo	064	Matambo	50	215	3,000	S.F.	None			1	Bad	Not							USW reconstructed every year within the same Dambo	BOH	4	80	Not	Yes	Yes	Yes		14° 12' 46"	33° 49' 18"
7	Dzundi/Kulumbi	064	Dzundi	45	194	2,000	S.F.	None			1	Bad	Not							USW(1990's)/now the pump is removed but working as an USW.	BOH	4	80	Not	Yes	Yes	Yes	Population reduced due to death & job seeking in town between 1998-1999	14° 12' 54"	33° 50' 08"
8	Kapatuka	028	Kapatuka	150	645	2,000	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	3 USW (Drying up quickly)	14° 08' 21"	33° 49' 46"
9	Mlinga	027	Mlinga	195	839	13,000	S.F.	None			3	Bad	Not							USWs in Dambo(2000)/now in use	BOH	6	120	Not	Yes	Yes	Yes		14° 08' 24"	33° 50' 39"
10	Nankwela	055	Nankwela	61	262	500	S.F.	None	P.F.	Bad	1	Bad	Not							None	BOH	4	80	Not	Yes	Yes	Yes		14° 16' 49"	33° 52' 51"
11	Chinthu	056	Chinthu	60	258	700	S.F.	None	P.F.	Verry Bad										None	BOH	5	100	Not	Yes	Yes	Yes	F=0.5	14° 15' 20"	33° 53' 32"
12	Mpokosa	042	Mpokosa	41	176	1,000	S.F.	None	P.F.	Bad	1	Bad	Not							Dambo/Long ago>20 year in use USW-Just Dug/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=2(USW)	14° 09' 27"	33° 50' 35"
13	Dzoole/Mtoseni	065	Mtoseni	50	215	1,500	S.F.	None			1	Bad	Not							USW (1984)/now in use	BOH	3	60	Not	Yes	Yes	Yes		14° 12' 55"	33° 48' 42"
14	Kapazila	054	Kapazila	59	254	2,000	S.F.	None			2	Bad	Not							USWs/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 18' 06"	33° 53' 01"
15	Kaphamtengo	054	Kaphamtengo	49	211	1,000	S.F.	None			2	Bad	Not							USWs/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 18' 17"	33° 53' 24"
17	Mkakwala	049	Mkakwala	59	254	1,000	S.F.	None			4	Bad	Not							Very bad USW and now in use	BOH	3	60	Not	Yes	Yes	Yes		14° 16' 28"	33° 54' 13"
18	Choma	052	Choma	53	228	1,000	S.F.	None			8	Bad	Not							USWs/now in use	BOH	3	60	Not	Yes	Yes	Yes	One USW surrounded by 3 toilets within a 15m radius	14° 17' 38"	33° 54' 57"
19	Nakuyere	069	Nakuyere	117	503	3,000	S.F.	School			7	Bad	Not							USWs/now in use ※	BOH	10	150	Not	Yes	Yes	Yes	Primary School with Classes 1 to 6. -Learning under trees 1 to 5. -One block for STD 6	14° 11' 34"	33° 45' 22"
20	Mgawi	069	Mgawi	165	710	2,000	S.F.	None			3	Bad	Not							USWs/now in use	BOH			Not	Yes	Yes	Yes		14° 12' 44"	33° 45' 15"
21	Mwenda/Guta	032	Mwenda/Guta	70	301	3,000	S.F.	School			8	Poor, Salty	Not							USWs(1994)/now in use	BOH	5	100	Yes	Yes	Yes	Yes	Rain water utilized for 6 households only (with tinshed roofs) Non functioning BH for more than 15 years	14° 07' 24"	33° 47' 25"
22	Chapata	059	Chapata	50	215	2,000	S.F.	None			1	Bad	Not							USW/now in use	BOH	5	100	Not	Yes	Yes	Yes		14° 14' 18"	33° 51' 36"
23	Kumchenga	061	Kumchenga	36	155	1,000	S.F.	None			3	Bad	Not							1 USW-salty water, 2 USWs-bad/now in use	BOH	6	120	Not	Yes	Yes	Yes	F=1 36(Kumchenga)+11(Mteuje)=47 hauseholds	14° 12' 58"	33° 51' 48"
24	Mchizampheta	057	Mchizampheta	200	860	4,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	F=0.5(Dambo)	14° 15' 25"	33° 50' 54"
25	Chinthale	(CHISEKA)	Chinthale	51	219	1,000	S.F.	None	P.F.	Bad	1	Bad	Not							USW/now in use	BOH	3	60	Not	Yes	Yes	Yes		14° 15' 06"	33° 48' 20"
26	Kumlaka	024	Kumlaka	45	194	2,000	S.F.	None	Not	Bad										None	BOH	3	60	Not	Yes	Yes	Yes	River(Not)&Dambo	14° 09' 07"	33° 51' 38"
27	Mpoto	044	Mpoto	56	241	1,500	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 09' 52"	33° 52' 55"
28	Chagulugulu	027	Chagulugulu	70	301	1,000	S.F.	None	Not	Not Good										None	BOH	6	120	Not	Yes	Yes	Yes		14° 10' 20"	33° 52' 05"
29	Mingu	017	Mingu	58	249	1,500	S.F.	None	P.F.	Not Good	1	Not Good	Not							USW(1980's)/with a pump (NIPA) Now USW with pump removed and in use	BOH	4	80	Not	Yes	Yes	Yes	F=1(USW) The grid location is slightly out due to the resettlement of the headman (the house moved to another place) Transition trend reduced due to death.(2000-2001)	14° 05' 46"	33° 52' 15"
30	Katsabola	018	Katsabola	27	116	5,000	S.F.	None			1	Not Good	Not							USW(1980's)/with a pump Now collapsed, not in-use but constructed a new one-USW at a new place	BOH	5	100	Not	Yes	Yes	Yes		14° 06' 24"	33° 51' 57"
31	Samson	066	Samson	78	335	2,000	S.F.	None	Not	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		14° 13' 49"	33° 46' 35"
32	Mkuzi/Phatha	014	Mkuzi	48	206	5,000	S.F.	None						1	Bad	Not				PSW in dambo(1982)/now it is unprotected The pump broke down and removed in 1984	BOH	4	80	Not	Yes	Yes	Yes		14° 06' 36"	33° 54' 32"
33	Kadambe	019	Kadambe	146	628	3,000	S.F.	None	P.F.	Bad										None	BOH	3	60	Not	Yes	Yes	Yes	F=3 (USW in Dambo)	14° 07' 12"	33° 52' 55"
34	Mgola	042	Mgola	60	258	700	S.F.	None	Not	Very Bad										None	BOH	5	100	Not	Yes	Yes	Yes	F=1.5(USW in Dambo)	14° 11' 11"	33° 51' 29"
35	Mwadzungu	041	Mwadzungu	50	215	400	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 10' 38"	33° 50' 10"
36	Mzapule	062	Mzapule	45	194	1,500	S.F.	None			2	Bad	Not							USWs/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 11' 46"	33° 51' 45"
37	Mfuti	046	Mfuti	98	421	1,000	S.F.	None			1	Bad	Not							USW/now in use	BOH	3	60	Not	Yes	Yes	Yes		14° 13' 23"	33° 53' 39"
39	Chingaele	004	Chingaele	50	215	1,000	S.F.	None			2	Not Good	Not							USWs/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=3	14° 01' 41"	33° 52' 45"
40	Mphete	007	Mphete	227	976	3,000	S.F.	School			1	Bad	Not							USW/now in use	BOH	5	100	Not	Yes	Yes	Yes		14° 03' 03"	33° 54' 26"
41	Ntcherelo	011	Ntcherelo	20	86	2,000	S.F.	None			1	Bad	Not							USW in dambo/now in use ※※	BOH	5	100	Not	Yes	Yes	Yes	20(Ntchelelo)+19(nelghboring)=39 households	14° 04' 01"	33° 52' 06"
42	Chisalipo	001	Chisalipo (Gumbi)	100	430	1,000	G,S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		13° 59' 28"	33° 55' 07"

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
BOH=Bucket on Head P.F.=Perennial Flow D.U.=Dried Up C.U.=Concern Universal

Village Headman (CHADZA)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use: River/Dambo: Perennial Flow or Not	River/Dambo: Water Quality	Unprotected Shallow Well: No.	Unprotected Shallow Well: Water Quality	Unprotected Shallow Well: Dried-up or Not	Protected Shallow Well: No.	Protected Shallow Well: Water Quality	Protected Shallow Well: Dried-up or Not	Borehole: No.	Borehole: Water Quality	Borehole: Dried-up or Not	Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family (Buckets)	Average Volume of Water Usage per Family (liter)	Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates: South Latitude	Coordinates: East Longitude
43	Mcholoma	006	Mcholoma	60	258	2,500	S.F.	None			1	Bad	Not							USW constoructed a long time ago by villagers and still in use	BOH	5	100	Not	Yes	Yes	Yes		14° 02' 46"	33° 52' 54"
44	Khonthi	003	Khonthi	74	318	2,000	G,S.F.	School	Not	Not Good										None	BOH	4	80	Not	Yes	Yes	Yes		14° 00' 20"	33° 53' 31"
45	Chimwenje	002	Chimwenje	95	409	2,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 01' 24"	33° 54' 10"
46	Mtepa	001	Mtepa (Gumbi)	110	473	3,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		13° 59' 04"	33° 54' 33"
48	Mbalame	019	Mbalame	52	224	5,000	S.F.	None						1	Bad	Not				PSW in dambo constructed in the 80's and broken down and abandoned. USW in dambo without any brick lining.	BOH	4	80	Not	Yes	Yes	Yes		14° 07' 16"	33° 52' 44"
52	Jonathani	001	Jonathani (Gumbi)	40	172	2,000	S.F.	None	P.F.	Bad										None	BOH	3	60	Not	Yes	Yes	Yes	F=2	13° 59' 49"	33° 54' 38"
53	Kandunai	005	Kandunai	42	181	2,000	S.F.	School. Mobile clinic. Post office			2	Bad	Not							USW-1/now in use USW-2(2001)/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 02' 21"	33° 53' 09"
55	Kazika	002	Kazika	32	138	700	S.F.,G.	None	Not	Bad										None	BOH	5	100	Not	Yes	Yes	Yes	32(Kazika)+13(Mwininudzi)+5(tangueka)=50 households	14° 01' 43"	33° 54' 45"
56	Chisindo	005	Chisindo	36	155	1,000	S.F.	None	Not	Bad										None	BOH	5	100	Not	Yes	Yes	Yes	F=2 10 No. of families from sorrounding village expected to use the planned BH	14° 02' 24"	33° 54' 40"
57	Chipula	041	P.Chigodula	45	194	2,000	S.F.	None	P.F.	Bad										None	BOH	6	120	Not	Yes	Yes	Yes	F=1.5(River/Dambo)	14° 10' 58"	33° 50' 20"
58	*Kamundi*	013	Kadunai	70	301	1,500	S.F.	None	Not	Fair										1 USW(1992)& 2 USWs(1997)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=2.0(BH)	14° 04' 45"	33° 53' 40"
59	Chibudula	006	Chibudula	42	181	1,000	S.F.	None	P.F.	Bad										None	BOH	3	60	Not	Yes	Yes	Yes		14° 01' 49"	33° 52' 05"
60	Nyozwa	006	Nyozwa	30	129	2,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	30(Nyozwa)+14(Mapalala)=44 households	14° 01' 56"	33° 52' 00"
61	Sukwa	041	Sukwa	38	163	2,000	S.F.	School			2	Bad	Not							USWs/now in use	BOH	3	60	Not	Yes	Yes	Yes	38(Sukwa)+4(Mbangombe)=442 households	14° 11' 32"	33° 50' 42"
63	Kachono	060	Kachono	70	301	300	S.F., G.	School			3	Bad	Not							USWs/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=1(USW)	14° 13' 51"	33° 51' 24"
64	Khomani	051	Khomani	100	430	2,000	S.F., G.	None			4	Bad	Not							USWs/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=1(USW)	14° 17' 25"	33° 56' 35"
65	Chinthankhwa	052	Chinthankhwa	43	185	1,000	S.F.	None			5	Very Bad	Not				1	-	-	USWs/now in use ※※	BOH	4	80	Not	Yes	Yes	Yes		14° 18' 09"	33° 55' 14"
66	Phula	054	Phula	220	946	3,000	S.F.				4	Bad	Not							Broken BH since 1994 USWs/now in use	BOH	3	60	Not	Yes	Yes	Yes		14° 18' 20"	33° 53' 19"
67	Kayabwa	033	Kayabwa	55	237	2,000	S.F.	School			3	Bad	Not				1	Good	Not	3 USWs(1998)/now in use BH(2000)/now in use funded by UDF	BOH	1	60	Not	Yes	WMC has been organised	Yes	F=1(BH)	14° 05' 22"	33° 46' 31"
68	Bodzalibwera	033	Bodzalibwera	40	172	4,000	S.F.	None			1	＊	Not							＊Being treated with chemicals once every month by HAS USW(1994)/now in use with no cover	BOH	8		Not	Yes	Yes	Yes	F=0.5	14° 05' 46"	33° 46' 34"
69	Chambadzana	066	Chambadzana	63	271	500	S.F.	None			1	Bad	Not							USW/now in use ※※	BOH	4	80	Not	Yes	Yes	Yes	F=0.5(USW)	14° 14' 22"	33° 47' 45"
70	Chinungu	064	Chinungu	70	301	1,000	S.F.	School			6	Bad	D.U.							4 USWs(1990)/now in use 2 Dambos(1990)/now in use	BOH	5	100	Not	Yes	Yes	Yes		14° 11' 19"	33° 49' 24"
71	Chonangulu	064	Chonangulu	47	202	2,000	S.F.	None			1	Bad	Not							USW constructed every 2 years within the same dambo/now in use)	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(USW)	14° 12' 30"	33° 50' 16"
73	Marichi	068	Marichi	123	529	2,000	S.F.	None	P.F.	Bad										None	BOH	11	165	Not	Yes	Yes	Yes		14° 11' 51"	33° 47' 22"
74	Mkoche	064	Mkoche	48	206	2,000	S.F.	School			1	Bad	Not				1	Bad	Not	USW(1976)/now in use The BH produces muddy water.	BOH	4	80	Not	Yes	Yes	Yes	F=1.0(Barebole)	14° 13' 06"	33° 48' 54"
75	Manjondo	065	Manjondo	104	447	1,500	S.F.	None			3	Bad	Not							3 USWs/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 12' 27"	33° 48' 13"
76	Msampha II	032	Msampha	40	172	5,000	S.F.	None			2	Not Good	Not							2 USWs/now in use	BOH	4	100	Not	Yes	Yes	Yes	F=1.5 Population transition-decrease due to marriage	14° 07' 19"	33° 47' 55"
77	*Kansinsi*	035	Kansinsi	40	172	8,000	S.F.	None			4	Not Good	2 No.- D.U. 2 No.- not							3 USWs(1989)/now in use 1 USW(1999)/Now in use	BOH	5	100	Not	Yes	Yes	Yes	Population transition : Decrease due to: deaths, job seeking	14° 10' 10"	33° 48' 06"
78	Dzamalala	061	Dzamalala	29	125	1,500	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	29(Dzamalala)+27(Santhe)=56 households	14° 13' 06"	33° 52' 38"
79	Kawande	066	Kawande	37	159	600	S.F.	None			1	Very Bad	Not							USW/now in use	BOH	3	60	Not	Yes	Yes	Yes		14° 13' 42"	33° 48' 23"
80	Chipoto	069	Chipoto	110	473	2,000	S.F.	None	P.F.	Bad				1	Bad	Not				PSW(2000)/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=0.5	14° 11' 49"	33° 44' 26"
	Total 71 Villages			**74**	**316**	**2,206**																	**85**							

NOTES ： ※ ; Existing BH being in operation was confirmed by Electric Prospecting Survey Team.
※※ ; Existing BH being out of order was confirmed by Electric Prospecting Survey Team.

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
BOH=Bucket on Head P.F.=Perennial Flow D.U.=Dried Up C.U.=Concern Universal

CHADZA

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use		Volume of Water Usage		Q'ty and Q'nty of Potable Water		Fetching Water						Alternative Water Source		Time Needed for (hours/day)			Diseases Affecting the Family (for the past 1 year) (person)							Others
												Present Volume	Volume Expected	Potable Water	Water for Washing	Q'nty 1.Satisfied 2.Unsatisfied	Q'ty 1.Good 2.Fair 3.Not Good	1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40 Male	Fimale	Time Needed (hours)	Distance (km)	No. of Persons for Your Family (person)	Method of Carrying Water	Type of Water Source	Distance (km)	Water Fetching	Domestic Cares	Farming Practices	Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	
TRADITIONAL AUTHORITY CHADZA																																				
1	**Kalenjeka**	065	3				3.67		1,233			53	87	33	20					0:13	0.06	1.33				0:45	3:00	4:00	4.00	0.00	0.00	0.67	0.00	0.00	0.00	
				3	Mrs.Velina Daniel	23/04/01	4	H.W.	1,000	1	Yes	40	80	20	20	2	2	-	2,5	0:10	0.01	2	BOH	USW	0.2		5:00	4:00	6	-	-	-	-	-	-	Chemicals applied to well water
				3	Mrs.E.Arnold	23/04/01	4	H.W.	1,200	1	Yes	60	100	40	20	2	3	-	3	0:15	0.08	1	BOH	USW	0.1	0:45	2:00	3:00	2	-	-	2	-	-	-	
				3	Mr.L.Banda	23/04/01	3	S.F.	1,500	1	Yes	60	80	40	20	2	3	-	3	0:15	0.08	1	BOH	USW	0.1	0:45	2:00	5:00	4	-	-	-	-	-	-	
2	**Kalumba**	065	3				2.67		1,333			63	92	22	42					0:18	0.10	1.00				0:30	2:40	5:20	2	0	0	1	0	0	0	
				3	Mr.E.Kainja	23/04/01	2	S.F.	1,800	1	Yes	40	80	20	20	2	3	-	2	0:15	0.10	1	BOH	USW	0.2	0:30	2:00	5:00	4	-	-	2	-	-	-	
				3	Mrs.F.Nyengere	23/04/01	3	H.W.	1,000	1	Yes	100	120	20	80	2	3	-	3	0:25	0.10	1	BOH	BH	2		3:00	6:00	1	-	1	-	1	1	-	
				3	Mrs.L.Kadziko	23/04/01	3	H.W.	1,200	1	Yes	50	75	25	25	2	3	-	2	0:15	0.10	1	BOH	USW	0.2	0:30	3:00	5:00	1	-	-	-	-	-	-	
3	**Kamchedzera**	064/ 065	3				3.67		1,433			113	127	67	47					0:10	0.03	1.33				0:56	2:40	6:40	4	0	0	0	0	0	0	
				3	Mr.L.Chalera	23/04/01	5	S.F.	1,800	1	Yes	140	140	80	60	1	3	-	3	0:10	0.02	1	BOH	River	1.5	1:10	2:00	7:00	6	-	-	-				
				3	Mr.L.Mweziakarsala	23/04/01	3	S.F.	NA	1	Yes	140	140	100	40	1	3	-	2,4	0:10	0.05	2	BOH	River	1.5	1:10	2:00	7:00	4	1	-	-	-	-	-	
				3	Mrs.Nachiletso	23/04/01	3	H.W.	2,500	1	Yes	60	100	20	40	2	3	-	3	0:10	0.02	1	BOH	Dambo	0.15	0:30	4:00	6:00	2	-	-	1	-	-	-	
4	**Mbimbi/chimombo**	064	3				4.33		2,033			67	93	33	33					0:08	0.02	1.67				1:45	4:10	6:20	3	1	0	1	1	0	0	
				3	Mrs.L.Maloko	23/04/01	3	H.W.	1,600	1	Yes	60	80	40	20	2	3	-	3	0:10	0.01	1	BOH	USW	0.8	0:30	2:00	6:00	4	1	-	1	1	-	-	USW(next Vg.)
				3	Mrs.Mihunzi	23/04/01	5	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	1,4	0:05	0.015	2	BOH	Dambo	1	0:30	5:30	6:00	2	-	-	-	1	-	-	
				3	Mrs.R.Phiri	23/04/01	5	H.W.	2,500	1	Yes	60	100	20	40	2	3	-	1.4	0:10	0.035	2	BOH	Dambo	1	0:45	5:00	7:00	3	1	1	1	2	-	-	
5	**Jeremiya/Zikiyele**	064	3				3.67		1,567			67	113	27	40					0:45	0.43	1.33				2:30	2:00	6:00	6.33	0.00	1.00	0.00	2.33	0.00	0.00	
				3	Mr.Mphatso Iphani	23/04/01	4	S.F.	2,000	1	Yes	80	160	20	60	2	2	-	2	1:00	-	1	BOH	BH	3	4:00	2:00	7:00	8	-	1	-	4	-	High Blood Pressure 3	
				3	Mr.A.J.Mneta	23/04/01	2	Widower	1,200	1	Yes	40	60	20	20	2	3	2	-	0:45	0.30	1	BOH	BH	1	1:30	2:00	5:00	3	-	2	-	1	-	-	BH(next Vg.)
				3	Mr.P.Jailosi	23/04/01	5	S.F.	1,500	1	Yes	80	120	40	40	2	3	-	1,4	0:30	1.00	2	BOH	BH	2	2:00	2:00	6:00	8	-	-	-	2	-	-	BH(next Vg.)
6	**Matambo/Misonjo**	064	3				4.33		2,500			73	120	33	40					0:45	1.07	1.00				2:45	2:20	5:20	3.33	0.00	0.33	0.00	0.33	0.00	0.00	
				3	Mr.S.Basikolo	23/04/01	6	S.F.&Commercial	5,000	1	Yes	80	140	20	60	2	3	-	5	1:00	1.50	1	BOH	-	-	4:00	3:00	5:00	4	-	1	-	1	-	-	
				3	Mr.F.Lesitala	23/04/01	3	S.F.	1,200	1	Yes	80	120	40	40	2	3	-	3	0:30	1.00	1	BOH	BH	2	2:00	2:00	6:00	3	-	-	-	-	-	-	BH(next Vg.)
				3	Mrs.R.Lokiasi	23/04/01	4	H.W.	1,300	1	Yes	60	100	40	20	2	3	-	3	0:45	0.70	1	BOH	BH	1	2:15	2:00	5:00	3	-	-	-	-	-	-	BH(next Vg.)
7	**Dzundi/Kulumbi**	064	3				5.00		1,733			80	113	33	47					0:26	0.10	1.33				2:30	2:20	6:20	6.00	0.33	2.00	0.67	1.00	0.00	0.00	
				3	Mr.Z.Kumkamle	23/04/01	5	S.F.	1,700	1	Yes	80	100	40	40	2	3	-	3	0:15	0.10	1	BOH	None	-	1:00	2:00	7:00	4	-	3	1	1	-	-	
				3	Mr.K.Philimon	23/04/01	4	S.F.	1,500	1	Yes	80	100	40	40	2	3	-	3	0:30	0.10	1	BOH	None	-	2:00	2:00	6:00	6	-	1	1	1	-	-	
				3	Mrs.M.Jefesoni	23/04/01	6	H.W.	2,000	1	Yes	80	140	20	60	2	3	-	2,4	0:35	0.10	2	BOH	-	-	2:00	3:00	6:00	8	1	2	-	1	-	-	
8	**Kapatuka**	028	3				3.67		3,000			60	113	33	27					0:45	0.20	1.33				1:45	3:00	5:20	8.67	0.33	2.33	1.33	1.33	0.00	0.00	
				4	Mr.Harod Lenadi	21/04/01	4	S.F.	1,500	1	Yes	60	140	40	20	2	3	-	2	0:45	0.10	1	BOH	USW	1.5	2:15	2:00	7:00	8	-	3	2	1	-	Cholera Eye Infection	
				4	Mrs.Elina Kwichidala	21/04/01	4	D.W.	500	1	Yes	60	100	40	20	2	3	-	1,2	0:30	0.20	2	BOH	USW	1.5	1:.30	2:00	4:00	3	-	-	-	-	-	-	
				4	Mr.Wilson Kadzonewe	21/04/01	3	S.F.	7,000	1	Yes	60	100	20	40	2	3	-	3	1:00	0.30	1	BOH	River	4	3:00	5:00	5:00	15	1	4	2	3	-	-	
9	**Mlinga**	027	3				2.67		3,333			61	96	30	31					1:00	0.47	1.00				2:45	3:00	5:40	4.33	0.67	1.33	1.00	1.00	0.00	0.00	
				3	Mrs.Rebeca Zikili	21/04/01	2	H.W.	2,000	1	Yes	60	100	40	20	2	3	-	2	0:45	0.50	1	BOH	R/D & BH	R/D-0.5 BH-1.5	2:15	2:00	5:00	3	1	-	1	-	-	-	
				3	Mr.Mikauwa Chikeya	21/04/01	3	S.F.	2,000	1	Yes	60	100	40	20	2	3	-	5	0:45	0.50	1	BOH	BH	1.5	1:30	3:00	5:00	5	-	-	1	2	-	-	
				3	Mr.Jelous Chipingasa	21/04/01	3	S.F.&Commercial	6,000	1	Yes	63	88	10	53	2	3	-	3	1:30	0.40	1	BOH	None	-	4:30	4:00	7:00	5	1	4	1	1	-	-	
10	**Nankwela**	055	3				4.33		1,667			87	115	52	35					0:15	0.03	1.00				1:00	2:20	6:20	7.33	0.33	1.33	2.67	0.00	0.33	0.00	
				3	Mrs.G.Tobiasi	26/04/01	5	H.W.	1,600	1	Yes	100	125	75	25	2	3	-	3	0:15	0.01	1	BOH	River	0.4	1:00	2:00	7:00	6	-	-	-	-	-	-	
				3	Mrs.E..Tobiasi	26/04/01	5	H.W.	1,800	1	Yes	100	140	60	40	2	3	-	3	0:15	0.01	1	BOH	River	0.3	1:15	2:00	7:00	8	1	-	2	-	-	-	
				3	Mr.Chikayiko	26/04/01	3	S.F.	1,600	1	Yes	60	80	20	40	2	3	-	3	0:15	0.06	1	BOH	None	-	0:45	3:00	5:00	8	-	4	6	-	1	-	
11	**Chinthu**	056	3				5.67		2,067			80	113	40	40					0:16	0.09	1.33				1:05	2:00	6:20	6.67	1.67	1.33	1.33	0.33	0.33	0.00	
				3	Mr.D.Banda	26/04/01	7	S.F.	2,400	1	Yes	60	100	40	20	2	3	-	2,4	0:15	0.01	2	BOH	Dambo	0.6	0:45	2:00	7:00	8	-	-	-	1	-	-	
				3	Mr.M.Mkomba	26/04/01	6	S.F.	2,300	1	Yes	120	140	60	60	2	3	-	4	0:15	0.10	1	BOH	River	0.6	1:30	2:00	7:00	6	3	-	3	-	-	-	
				3	Mr.T.Majawa	26/04/01	4	S.F.	1,500	1	Yes	60	100	20	40	2	3	-	3	0:20	0.15	1	BOH	None	-	1:00	2:00	5:00	6	2	4	1	-	1	-	
12	**Mpokosa**	042	3				4.33		3,667			93	127	40	53					0:26	0.09	1.67				2:00	4:00	4:20	9.33	0.33	0.67	1.00	1.00	0.00	0.00	
				4	Mrs.Hale	21/04/01	4	H.W.	1,000	1	Yes	60	100	40	20	2	3	-	2,4	0:30	NA	2	BOH	USW	0.07	1:30	2:00	5:00	5	1	-	-	1	-	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty 1.Satisfied 2.Unsatisfied	Q'ty and Q'nty of Potable Water: Q'ty 1.Good 2.Fair 3.Not Good	Fetching Water (1.Under 10, 2.Under 20, 3.Under 30, 4.Under 40, 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				3	Mr.Chaima	21/04/01	6	S.F.	2,000	1	Yes	140	180	40	100	2	3	-	1,4	0:20	0.07	2	BOH	Dambo	1.5	2:30	5:00	5:00	7	-	1	2	2	-	-	
				3	Mr.Mkuzamanba	24/04/01	3	B.M.	8,000	1	Yes	80	100	40	40	2	3	-	3	0:30	0.20	1	BOH	-	-	2:00	5:00	3:00	16	-	1	1	-	-	-	
13	**Dzoole/Mtoseni**	065	3				5.33		1,533			100	133	47	53					0:16	0.25	2.00				1:25	2:40	5:40	6.00	0.33	0.00	0.00	0.00	0.00	0.00	
				3	Mr.M.Phiri	23/04/01	6	S.F.	1,800	1	Yes	120	140	80	40	2	3	-	1	0:15	0.01	3	BOH	BH	1	1:30	2:00	6:00	8	-	-	-	-	-	-	BH(next Vg.)
				3	Mrs.R.Likhobwe	23/04/01	5	H.W.	1,000	1	Yes	100	140	20	80	2	3	-	3	0:20	0.60	1	BOH	BH	3	1:45	4:00	6:00	3	1	-	-	-	-	-	BH(another neighbor Vg..)
				3	Mr.B.Jannary	23/04/01	5	S.F.	1,800	1	Yes	80	120	40	40	2	3	-	2,4	0:15	0.15	2	BOH	BH	1	1:00	2:00	5:00	7	-	-	-	-	-	-	BH(next Vg.)
14	**Kapazila**	054	3				3.00		3,000			67	100	33	33					0:16	0.04	1.00				0:56	3:00	6:20	4.00	0.33	2.00	0.67	0.33	0.33	0.00	
				3	Mrs.D.Mkivichi	26/04/01	3	H.W.	2,000	1	Yes	60	80	40	20	2	3	-	3	0:15	0.009	1	BOH	USW	0.01	0:45	2:00	7:00	4	-	-	-	-	-	-	
				3	Mr.S.Windi	26/04/01	3	S.F.	2,000	1	Yes	80	120	20	60	2	3	-	3	0:20	0.10	1	BOH	Dambo	2	1:20	4:00	6:00	4	1	2	-	-	1	-	F=0.5
				3	Mr.D.Sadiki	26/04/01	3	S.F.	5,000	1	Yes	60	100	40	20	2	3	-	3	0:15	0.02	1	BOH	None	-	0:45	3:00	6:00	4	-	4	2	1	-	-	
15	**Kaphamtengo**	054	3				6.00		2,100			73	93	33	40					0:13	0.09	2.67				0:48	2:20	6:20	5.67	0.00	2.67	1.00	0.67	1.33	0.00	
				3	Mrs.E.Msiye	26/04/01	4	H.W.	2,000	1	Yes	60	80	40	20	2	3	-	2,3	0:15	0.10	2	BOH	USW	0.8	0:45	2:00	7:00	6	-	2	-	1	-	-	USW(next Vg.)
				3	Mrs.Fuluzidala	26/04/01	7	H.W.	2,300	1	Yes	80	100	40	40	2	3	1	4	0:10	0.06	3	BOH	None	-	0:40	3:00	6:00	6	-	1	1	1	3	-	
				3	Mr.N.Nombi	26/04/01	7	S.F.	2,000	1	Yes	80	100	20	60	2	3	1	4	0:15	0.10	3	BOH	None	-	1:00	2:00	6:00	5	-	5	2	-	1	-	
17	**Mkakwala**	049	3				3.00		1,767			78	100	37	42					0:13	0.05	1.67				0:48	2:40	6:40	5.33	0.00	0.00	0.33	0.00	0.33	0.00	
				3	Mrs.E.Guwa	26/04/01	3	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	2,4	0:15	0.008	3	BOH	River	0.7	1:00	2:00	7:00	4	-	-	-	-	-	-	
				3	Mrs.M.Fred	26/04/01	4	H.W.	2,800	1	Yes	75	100	50	25	2	3	-	3	0:15	0.07	1	BOH	River	0.7	0:45	2:00	7:00	8	-	-	1	-	-	-	
				3	Mrs.Mdasekera	26/04/01	2	H.W.	500	1	Yes	80	100	20	60	2	3	-	5	0:10	0.06	1	BOH	BH	0.3	0:40	4:00	6:00	4	-	-	-	-	1	-	BH(next Vg.)
18	**Choma**	052	3				4.67		2,967			80	113	47	33					0:13	0.02	3.00				0:58	2:20	6:40	9.67	0.67	1.00	1.00	1.33	0.33	0.00	
				3	Mr.G.Chembale	26/04/01	5	S.F.	2,400	1	Yes	60	100	40	20	2	3	-	2,3	0:20	0.05	3	BOH	USW	0.1	1:00	2:00	7:00	10	2	3	1	1	-	-	
				3	Mrs.D.Choma	26/04/01	6	H.W.	5,000	1	Yes	100	140	60	40	2	3	-	2,4	0:15	0.005	5	BOH	USW	0.02	1:15	2:00	7:00	12	-	-	-	2	-	-	
				3	Mr.Jolomosi	26/04/01	3	S.F.	1,500	1	Yes	80	100	40	40	2	3	-	3	0:05	0.01	1	BOH	None	-	0:40	3:00	6:00	7	-	-	2	1	1	-	
19	**Nakuyere**	069	3				6.33		4,567			120	180	60	60					0:13	0.04	1.33				1:12	2:00	6:00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	
				3	Mrs.D.Joseph	23/04/01	4	H.W.	1,700	1	Yes	60	100	40	20	2	3	-	3	0:15	0.02	1	BOH	River	1.5	0:45	2:00	6:00	3	-	-	-	-	-	-	
				3	Mr.Chimoya	23/04/01	8	S.F.	10,000	1	Yes	200	300	80	120	2	3	-	3,5	0:05	0.01	2	BOH	River	-	-	2:00	7:00	7	-	-	-	-	-	-	
				3	Mr.M.Chikamga	23/04/01	7	H.W.	2,000	1	Yes	100	140	60	40	2	3	-	5	0:20	0.10	1	BOH	River	1.5	1:40	2:00	5:00	2	-	-	-	-	-	-	
20	**Mgawi**	069	3				9.67		4,800			153	247	73	80					0:21	0.30	4.67				3:20	2:40	5:20	16.67	0.33	0.33	0.33	0.00	0.00	0.00	
				3	Mrs.Flora	23/04/01	9	H.W.	2,000	1	Yes	200	400	60	140	2	3	-	2	0:30	0.50	4	BOH	-	-	5:00	2:00	4:00	7	-	1	-	-	-	Ulcers	
				3	Mrs.S.Zulu	23/04/01	9	H.W.	1,400	1	Yes	100	120	80	20	2	3	-	1,2,4	0:20	0.15	5	BOH	BH	1.2	1:40	2:00	6:00	10	1	-	1	-	-	-	BH(Maliseche Vg).
				3	Mr.Martin Chikaonda	23/04/01	11	Teacher	11,000	1	Yes	160	220	80	80	2	3	-	1,2,5	0:15	0.25	5	BOH	dambo	0.4	-	4:00	6:00	33	-	-	-	-	-	-	
21	**Mwenda/Guta**	032	3				3.00		633			60	73	20	53					0:43	0.43	1.33				2:10	3:20	4:00	6.67	0.00	0.33	0.33	0.00	0.00	0.00	
				3	Mrs.Juliana Riaphiri	20/04/01	4	H.W.	600	1	Yes	80	100	20	100	2	3	-	2,3	1:00	0.50	2	BOH	USW	1.5	4:00	2:00	2:00	3	-	-	1	-	-	-	
				3	Mrs.Frorida Nakwenda	20/04/01	3	Widow	300	1	Yes	40	60	20	20	2	3	-	5	1:00	0.75	1	BOH	USW	1.5	2:00	4:00	4:00	3	-	-	-	-	-	-	
				3	Mrs.Stella Sambani	20/04/01	2	H.W.	1,000	1	Yes	60	60	20	40	2	3	-	4	0:10	0.04	1	BOH	USW	0.1	0:30	4:00	6:00	14	-	1	-	-	-	-	
22	**Chapata**	059	3				4.33		1,500			80	102	43	37					0:13	0.06	1.00				0:48	2:20	5:40	6.33	0.00	3.00	0.33	0.33	0.67	0.00	
				3	Mrs.K.Eliya	25/04/01	4	H.W.	1,700	1	Yes	60	80	40	20	2	3	-	4	0:15	0.08	1	BOH	River	0.2	0:45	2:00	7:00	6	-	2	-	-	1	-	
				3	Mrs.L.Michael	25/04/01	6	H.W.	1,500	1	Yes	100	125	50	50	2	3	-	3	0:15	0.07	1	BOH	River	0.2	1:00	2:00	7:00	7	-	3	1	1	-	-	
				3	Mr.Damiano	25/04/01	3	S.F.	1,300	1	Yes	80	100	40	40	2	3	-	3	0:10	0.015	1	BOH	Dambo	0.2	0:40	3:00	3:00	6	-	4	-	-	1	-	
23	**Kumchenga**	061	3				4.67		1,800			77	120	48	28					0:13	0.05	1.67				0:45	3:00	5:40	6.33	0.00	1.00	0.00	0.33	0.67	0.00	
				3	Mrs.N.Milana	25/04/01	4	H.W.	1,600	1	Yes	50	100	25	25	2	3	-	3	0:20	0.06	1	BOH	USW	0.1	0:40	2:00	6:00	6	-	1	-	-	1	-	Headache
				3	Mrs.B.Mltuzi	25/04/01	5	H.W.	1,800	1	Yes	100	140	80	20	2	3	-	2,4	0:15	0.06	2	BOH	USW	0.1	1:15	2:00	7:00	7	-	2	-	1	1	-	
				3	Mrs.Kuchilumba	25/04/01	5	H.W.	2,000	1	Yes	80	120	40	40	2	3	-	2,5	0:05	0.03	2	BOH	BH	0.7	0:20	5:00	4:00	6	-	-	-	-	-	-	BH(Chipeni Village)
24	**Mchizampheta**	057	3				5.33		3,600			107	147	53	53					0:21	0.42	2.67				2:00	5:20	4:20	5.67	0.00	2.00	1.67	2.33	0.33	0.00	
				3	Mrs.N.William	26/04/01	7	H.W.	2,300	1	Yes	120	160	80	40	2	3	-	2,4	0:30	0.80	4	BOH	None	-	3:00	3:00	6:00	8	-	4	1	2	-	-	
				3	Mr.S.William	26/04/01	3	S.F.	5,500	1	Yes	80	100	40	40	2	3	-	2	0:15	0.25	1	BOH	None	-	1:00	6:00	4:00	1	-	1	-	-	-	-	
				3	Mrs.Motheranji	26/04/01	6	H.W.	3,000	1	Yes	120	180	40	80	2	3	-	1,2,3	0:20	0.20	3	BOH	None	-	2:00	7:00	3:00	8	-	1	4	5	1	-	
25	**Chinthale**	(CHISEKA)	3				4.00		1,767			67	93	33	33					0:13	0.05	1.00				0:43	3:00	5:20	3.67	0.67	2.33	0.67	0.00	0.33	0.00	
				3	Mrs.I.Chiwoko	26/04/01	4	H.W.	1,500	1	Yes	80	120	20	60	2	3	-	3	0:10	0.015	1	BOH	Dombo	0.4	0:40	5:00	4:00	3	1	3	-	-	1	-	
				3	Mrs.L.Lewis	26/04/01	5	H.W.	1,800	1	Yes	60	80	40	20	2	3	-	3	0:15	0.06	1	BOH	Dombo	0.3	0:45	2:00	7:00	3	1	2	2	-	-	-	Headache
				3	Mrs.E.Derick	26/04/01	3	H.W.	2,000	1	Yes	60	80	40	20	2	3	-	3	0:15	0.06	1	BOH	Dombo	0.3	0:45	2:00	5:00	5	-	2	-	-	-	-	
26	**Kumlaka**	024	3				4.00		2,000			73	89	30	43					0:33	0.27	1.33				1:46	2:40	6:40	9.00	2.00	4.33	0.67	0.33	0.00	0.00	
				4	Mrs.Amosi	21/04/01	5	H.W.	2,000	1	Yes	100	140	20	80	2	3	-	2,4	0:10	0.10	2	BOH	BH	3	0:50	3:00	9:00	15	4	9	-	-	-	-	
				4	Mrs.Eles Chipiriro	21/04/01	3	H.W.	1,000	1	Yes	40	8	30	10	2	3	-	3	0:45	0.35	1	BOH	Spring	1	1:30	3:00	6:00	6	1	3	2	1	-	-	Spring in the Mountain
				4	Mrs.Hnley Kachisa	21/04/01	4	H.W.	3,000	1	Yes	80	120	40	40	2	3	-	3	0:45	0.35	1	BOH	Spring	1	3:00	2:00	5:00	6	1	1	-	-	-	-	Spring in the Mountain
27	**Mpoto**	044	3				6.67		1,600			80	120	47	33					0:40	0.60	1.67				2:40	2:00	7:00	11.33	0.00	1.67	0.67	0.00	0.00	0.00	
				4	Mr.M.Keliyala	21/04/01	6	S.F.	2,000	1	Yes	80	120	40	40	2	3	-	1,4	1:00	0.50	2	BOH	USW	1	4:00	3:00	7:00	9	-	3	1	-	-	Eye Infection	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

CHADZA

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty 1.Satisfied 2.Unsatisfied	Q'ty and Q'nty of Potable Water: Q'ty 1.Good 2.Fair 3.Not Good	Fetching Water (1.Under 10, 2.Under 20, 3.Under 30, 4.Under 40, 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				4	Mrs.E.Julius	21/04/01	7	H.W.	1,500	1	Yes	80	120	60	20	2	3	-	4	0:45	1.00	1	BOH	None	-	3:00	2:00	6:00	10	-	-	-	-	-	Cholera	
				4	Mr.Fanuel	21/04/01	7	S.F.	1,300	1	Yes	80	120	40	40	2	3	-	1,4	0:15	0.30	2	BOH	R/D	0.2	1:00	1:00	8:00	15	-	2	1	-	-	-	
28	**Chagulugulu**	027	3				6.33		1,167			93	147	47	47					0:30	0.23	2.67				2:20	3:20	5:40	7.00	0.67	0.67	0.33	0.67	0.00	0.00	
				4	Mrs.Jane David	21/04/01	9	H.W.	2,000	1	Yes	120	180	40	80	2	3	-	2,5	0:30	0.50	2	BOH	R/D	0.3	3:00	4:00	5:00	6	-	2	-	1	-	-	
				4	Mrs.E.Chizimbe	21/04/01	3	H.W.	500	1	Yes	60	120	40	20	2	3	-	3	0:30	0.10	1	BOH	R/D	0.3	1:30	4:00	6:00	7	-	-	-	-	-	-	
				4	Mr.Alick Kamanya	21/04/01	7	S.F.	1,000	1	Yes	100	140	60	40	2	3	-	1,2,3	0:30	0.10	5	BOH	R/D	0.3	2:30	2:00	6:00	8	2	-	1	1	-	-	
29	**Mingu**	017	3				4.33		1,200			67	113	40	27					0:30	1.90	1.33				1:40	2:20	5:20	4.00	0.00	5.00	0.33	0.00	0.33	0.00	
				3	Mr.Namani Noiwo	22/04/01	4	S.F.	2,000	1	Yes	60	120	20	40	2	3	-	4	0:30	0.20	1	BOH	USW	0.6	1:30	3:00	4:00	5	-	15	-	-	1	-	Chemicals applied
				3	Mrs.Z.Chitsonga	22/04/01	6	H.W.	700	1	Yes	80	120	60	20	2	3	-	2,5	0:30	0.50	2	BOH	USW	1	2:00	2:00	6:00	1	-	-	1	-	-	-	
				3	Mr.R.Chakana	22/04/01	3	S.F.	900	1	Yes	60	100	40	20	2	3	-	3	0:30	5.00	1	BOH	USW	1	1:30	2:00	6:00	6	-	-	-	-	-	-	
30	**Katsabola**	018	3				4.33		2,333			67	100	37	30					2:00	0.75	1.67				6:40	2:40	6:00	6.00	0.33	0.00	0.33	0.00	0.00	0.00	
				2	Mr.E.Sakulani	22/04/01	3	S.F.	3,000	1	Yes	40	60	10	30	2	2	-	3	2:00	0.25	1	BOH	PSW	1	4:00	4:00	6:00	3	-	-	-	-	-	-	PSW(in another Vg.)
				2	Mrs.F.Feriasi	22/04/01	7	H.W.	2,500	1	Yes	100	140	60	40	2	3	-	2,4	2:00	1.00	3	BOH	PSW	1	10:00	2:00	6:00	6	1	-	1	-	-	-	PSW(next Vg.)
				2	Mrs.C.Yohane	22/04/01	3	H.W.	1,500	1	Yes	60	100	40	20	2	3	-	3	2:00	1.00	1	BOH	PSW	1	6:00	2:00	6:00	9	-	-	-	-	-	-	PSW(next Vg.)
31	**Samson**	066	3				3.67		750			80	120	33	40					0:50	0.73	1.67				3:00	3:00	5:20	6.33	1.67	2.00	1.00	0.00	0.00	0.00	
				4	Mr.Fashoni Noah	21/04/01	5	S.F.	1,000	1	Yes	100	120	40	40	2	3	-	1,2,5	0:45	0.50	3	BOH	BH	1	3:00	2:00	6:00	3	-	-	1	-	-	-	BH(Next Vg.)
				4	Mrs.Yona	21/04/01	3	Widow	750	1	Yes	80	140	40	40	2	3	-	5	0:45	0.50	1	BOH	BH	1	3:00	2:00	6:00	6	-	2	-	-	-	-	BH(Next Vg.)
				4	Mrs.Kataliya	21/04/01	3	H.W.	500	1	Yes	60	100	20	40	2	3	-	3	1:00	1.20	1	BOH	BH	0.6	3:00	5:00	4:00	10	5	4	2	-	-	Eye Infection	BH(Next Vg.)
32	**Mkuzi/Phatha**	014	3				3.33		1,333			47	87	33	13					1:00	1.10	1.33				2:20	2:40	5:00	6.00	0.33	0.67	0.67	1.33	0.00	0.00	
				3	Mr.Weluzani	22/04/01	2	S.F.	1,500	1	Yes	40	80	20	20	2	3	-	5	1:30	1.50	1	BOH	R/D	2	3:00	2:00	7:00	3	1	1	-	2	-	-	
				3	Mrs.L.Rodrick	22/04/01	5	H.W.	1,500	1	Yes	60	100	40	20	2	3	-	1.5	1:00	1.50	2	BOH	R/D	2	3:00	2:00	4:00	4	-	1	2	2	-	-	
				3	Mrs.Nkuzamanda	22/04/01	3	H.W.	1,000	1	Yes	40	80	40		2	3	-	2	0:30	0.30	1	BOH	None	-	1:00	4:00	4:00	11	-	-	-	-	-	-	
33	**Kadambe**	019	3				6.00		3,167			93	127	40	53					1:20	0.70	1.67				7:40	2:40	4:40	5.67	0.33	0.00	1.00	1.00	0.67	0.00	
				4	Mr.S.Kalemba	22/04/01	7	S.F.	5,000	1	Yes	100	140	20	80	2	3	-	2,5	1:00	0.70	2	BOH	PSW	3	5:00	4:00	6:00	2	-	-	1	-	-	-	PSW(another village)
				4	Mrs.M.Mqina	22/04/01	6	H.W.	2,000	1	Yes	100	102	60	40	2	3	-	3,5	2:00	0.70	2	BOH	USW	0.7	10:00	2:00	4:00	9	-	-	2	1	1	-	USW(same river)
				4	Mr.F.Chimalizeni	22/04/01	5	S.F.	2,500	1	Yes	80	140	40	40	2	3	-	4	1:00	0.70	1	BOH	USW	0.7	8:00	2:00	4:00	6	1	-	-	2	1	-	Temporary USW(in same river)
34	**Mgola**	042	3				2.33		600			47	67	20	27					0:11	0.10	1.00				0:35	3:00	5:40	2.00	0.67	0.00	0.67	0.67	1.00	0.00	
				4	Mrs.Satiodi	25/04/01	3	H.W.	1,000	1	Yes	60	80	20	40			-	2	0:15	0.20	1	BOH	None	-	0:45	4:00	4:00	2	1	-	-	1	1	-	
				4	Mr.Kagona	25/04/01	2	S.F. (Widower)	500	1	Yes	40	60	20	20	2	3	3	-	0:10	0.09	1	BOH	USW	0.4	0:30	2:00	6:00	1	1	-	1	1	1	-	
				4	Mr.E.Folomeni	25/04/01	2	S.F.	300	1	Yes	40	60	20	20	2	3	-	3	0:10	0.02	1	BOH	USW	0.4	0:30	3:00	7:00	3	-	-	1	-	1	-	
35	**Mwadzungu**	041	3				5.67		1,167			80	113	40	40					0:15	0.15	2.00				1:00	3:00	5:20	6.67	0.00	2.00	1.00	1.00	1.00	0.00	
				4	Mrs.M.Dausini	25/04/01	6	H.W.	1,300	1	Yes	80	120	40	40	2	3	-	2,4	0:20	0.20	2	BOH	USW	0.09	1:20	2:00	7:00	9	-	3	2	1	-	-	USW(Personal) Convulsions & unconsciousness
				4	Mr.Sido	25/04/01	6	S.F.	1,000	1	Yes	80	100	40	40	2	3	-	2,5	0:10	0.10	2	BOH	None	-	0:40	3:00	5:00	5	-	2	1	-	1	-	
				4	Mr.Yusufu	25/04/01	5	S.F.	1,200	1	Yes	80	120	40	40	2	3	-	2,4	0:15	0.15	2	BOH	None	-	1:00	4:00	4:00	6	-	1	-	2	2	-	
36	**Mzapule**	062	3				3.00		1,500			73	107	40	27					0:10	0.06	1.00				0:27	2:40	6:00	4.00	0.00	0.00	1.00	0.67	1.00	0.00	
				3	Mr.P.Seveni	25/04/01	4	S.F.	2,000	1	Yes	60	100	40	2	2	3	-	4	0:10	0.07	1	BOH	USW	0.1	0:30	3:00	7:00	6	-	-	2	2	1	-	Nyamakazi
				3	Mr.Chatewa	25/04/01	2	S.F.	1,000	1	Yes	60	120	20	40	2	3	4	-	0:10	0.10	1	BOH	BH	0.4	0:03	2:00	6:00	2	-	-	1	-	2	-	BH(Chidambaira Vg.)
				3	Mrs.L.Alani	25/04/01	3	H.W.	1,500	1	Yes	100	100	60	40	1	3	-	2	0:10	0.006	1	BOH	BH	0.8	0:50	3:00	5:00	4	-	-	-	-	-	-	BH(Next Vg.)
37	**Mfuti**	046	3				4.67		1,933			73	107	40	33					0:16	0.07	1.67				0:58	2:40	5:40	6.67	0.33	0.67	0.67	0.33	0.33	0.33	
				3	Mr.Y.Kanjere	25/04/01	4	S.F.	2,000	1	Yes	80	100	40	40	2	3	-	2,5	0:20	0.10	2	BOH	Dambo	7:12	1:10	4:00	3:00	7	-	2	2	-	1	-	
				3	Mrs.A.Kaguna	25/04/01	6	H.W.	2,000	1	Yes	80	120	40	40	2	3	-	3	0:15	0.05	1	BOH	USW	0.8	1:00	2:00	7:00	8	-	-	-	-	-	1	USW(in the Vg.)
				3	Mr.Kaonkanji	25/04/01	4	S.F.	1,800	1	Yes	60	100	40	20	2	3	-	1,4	0:15	0.07	2	BOH	USW	0.8	0:45	2:00	7:00	5	1	-	-	1	-	-	USW(in the next Vg.) Headache
39	**Chingaele**	004	3				5.67		2,300			73	101	40	33					0:23	0.33	1.67				1:30	2:20	5:20	5.00	0.67	0.67	0.00	0.67	0.33	0.00	
				3	Mrs.K.Bintoni	22/04/01	5	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	1,2,4	0:30	0.40	3	BOH	River	0.5	2:00	3:00	5:00	6	1	-	-	-	-	-	
				3	Mrs.I.Jonasi	22/04/01	4	H.W.	1,400	1	Yes	80	100	40	40	2	3	-	4	0:30	0.40	1	BOH	River	0.5	2:00	2:00	5:00	3	1	-	-	2	-	-	
				4	Mr.T.James	22/04/01	8	S.F.	4,000	1	Yes	60	102	40	20	2	3	-	5	0:10	0.20	1	BOH	-	-	0:30	2:00	6:00	6	-	2	-	-	1	-	
40	**Mphete**	007	3				4.67		2,667			53	87	20	33					0:28	0.28	1.00				1:38	4:00	5:40	8.67	0.00	2.33	0.33	0.00	0.67	0.00	
				3	Mrs.Filipino	24/04/01	4	H.W.	3,500	1	Yes	40	80	20	20	2	3	-	3	0:25	0.35	1	BOH	Dambo	0.4	1:40	7:00	5:00	6	-	1	-	-	1	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

CHADZA

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source (1.BH 2.PSW 3.USW 4.R/D)	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities (1.Necessary 2.Not Necessary)	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty (1.Satisfied 2.Unsatisfied)	Q'ty and Q'nty of Potable Water: Q'ty (1.Good 2.Fair 3.Not Good)	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				3	Lemekezani	24/04/01	4	S.F.	2,500	1	Yes	60	80	20	40	2	3	-	3	0:15	0.20	1	BOH	Dambo	0.2	0:45	2:00	6:00	4	-	1	1	-	1	-	
				3	L.Nkanasi	24/04/01	6	S.F.	2,000	1	Yes	60	100	20	40	2	3	-	4	0:45	0.30	1	BOH	None	-	2:30	3:00	6:00	16	-	5	-	-	-	-	
41	**Ntcherelo**	011	3				4.67		2,100			67	100	33	33					16:46	1.07	1.33				3:53	2:20	5:40	6.67	0.67	1	1.33	1.00	0.00	0.00	
				3	Mr.Kafandikhale	22/04/01	7	S.F.	3,000	1	Yes	100	120	40	60	2	3	-	4	0:20	0.20	1	BOH	BH	1.5	1:40	3:00	7:00	12	2	2	3	1	-	-	BH(next Vg.)
				2	Mrs.M.Kafandlkhale	22/04/01	5	H.W.	1,800	1	Yes	60	100	40	20	2	3	-	2	2:00	1.50	2	BOH	River	0.8	6:00	2:00	4:00	4	-	-	1	2	-	-	PSW(next Vg.)
				2	Mrs.M.Chitenje	22/04/01	2	H.W.	1,500	1	Yes	40	80	20	20	2	3	-	3	48:00	1.50	1	BOH	River	0.8	4:00	2:00	6:00	4	-	1	-	-	-	-	PSW(next Vg.)
42	**Chisalipo**	001	3				4.00		2,500			67	100	27	40					0:16	0.22	1.67				0:53	4:00	3:20	7.00	0.67	4.33	0.00	0.33	1.00	0.00	
				4	Mr.F.Chimpanga	24/04/01	4	S.F.	2,000	1	Yes	60	80	20	40	2	3	-	1,4	0:20	0.20	3	BOH	None	-	1:00	4:00	2:00	8	1	3	-	1	-	-	
				4	Mr.Faitani	24/04/01	4	S.F.	3,000	1	Yes	60	100	20	40	2	3	-	4	0:20	0.25	1	BOH	None	-	1:00	3:00	4:00	7	1	3	-	-	2	-	
				4	Mrs.Kumbukani	24/04/01	4	H.W.	2,500	1	Yes	80	120	40	40	2	3	-	3	0:10	0.20	1	BOH	None	-	0:40	5:00	4:00	6	-	7	-	-	1	-	
43	**Mcholoma**	006	3				4.33		2,100			73	100	40	33					0:51	0.90	1.67				3:40	2:00	6:00	6.67	0.33	1.67	0.33	0.67	0.00	0.00	
				4	Mr.Auki Samsoni	22/04/01	4	S.F.	3,000	1	Yes	80	100	40	40	2	3	-	1,3	1:30	0.70	2	BOH	-	-	6:00	2:00	8:00	6	1	2	1	-	-	-	
				4	Mrs.M.Zelina	22/04/01	3	D.W.	800	1	Yes	60	80	40	20	2	3	-	5	1:00	1.00	1	BOH	None	-	3:00	2:00	3:00	4	-	1	-	-	-	-	
				4	Mr.F.Sapezeka	22/04/01	6	S.F.	2,500	1	Yes	80	120	40	40	2	3	-	2,4	0:03	1.00	2	BOH	None	-	2:00	2:00	7:00	10	-	2	-	2	-	-	
44	**Khonthi**	003	3				4.33		1,500			50	78	22	28					0:20	0.75	1.33				0:46	2:20	5:40	5.67	0.67	1.33	1.00	1.33	1.00	0.00	
				4	Mrs.A.Okhoni	22/04/01	4	H.W.	1,500	1	Yes	50	75	25	25	2	3	-	2,4	0:20	0.15	2	BOH	River	1	0:40	2:00	5:00	6	1	-	-	3	1	-	
				4	Mr.Kawaleza	22/04/01	3	S.F.	2,000	1	Yes	40	80	20	20	2	3	-	4	0:20	2.00	1	BOH	River	1	0:40	3:00	5:00	4	-	2	-	-	-	-	
				4	Mrs.Kambona	22/04/01	6	H.W.	1,000	1	Yes	60	80	20	40	2	3	-	4	0:20	0.10	1	BOH	-	-	1:00	2:00	7:00	7	1	2	3	1	2	-	
45	**Chimwenje**	002	3				5.33		2,667			80	140	40	40					0:30	0.22	1.33				1:50	2:10	7:00	9.00	2.33	2.00	1.00	0.00	2.00	0.00	
				4	Mr.B.Pemba	24/04/01	5	S.F.	1,000	1	Yes	80	140	40	40	2	3	-	5	0:20	0.25	1	BOH	Dambo	2	1:30	3:00	7:00	14	2	4	-	-	1	2 Cholera	
				4	Mr.Sinkanawo	24/04/01	6	S.F.	2,000	1	Yes	120	200	60	60	2	3	-	1,4	0:25	0.15	2	BOH	None	-	2:30	1:00	8:00	7	-	2	-	-	2	-	
				4	Mr.F.Jeke	24/04/01	5	S.F.	5,000	1	Yes	40	80	20	20	2	3	-	3	0:45	0.25	1	BOH	None	-	1:30	2:30	6:00	6	5	-	3	-	3	-	
46	**Mtepa**	001	3				5.33		3,400			100	140	40	60					0:26	0.23	2.00				3:45	2:40	5:20	8.00	0.33	2.67	2.00	1.33	0.67	0.00	
				4	Mr.O.Jimu	24/04/01	7	S.F.	4,000	1	Yes	80	140	40	40	2	3	-	4	0:30	0.20	1	BOH	None	-	2:00	3:00	7:00	5	-	1	1	4	1	-	
				4	Mr.Kaundikiza	24/04/01	4	S.F.	3,000	1	Yes	100	140	40	60	2	3	-	2,3	0:30	0.20	2	BOH	None	-	2:30	3:00	3:00	14	-	1	4	-	-	Cholera	
				4	Mr.Makina	24/04/01	5	S.F.	3,200	1	Yes	120	140	40	80	2	3	-	1,2,4	0:20	0.30	3	BOH	None	-	3:00	2:00	6:00	5	1	6	1	-	1	-	
48	**Mbalame**	019	3				3.67		1,833			60	120	33	27					0:26	0.30	1.00				1:20	2:20	5:10	6.67	0.00	1.00	1.00	0.33	0.67	0.00	
				3	Mrs.M.Ototoni	22/04/01	4	H.W.	1,500	1	Yes	60	100	40	20	2	3	-	4	0:30	0.30	1	BOH	River	0.4	1:30	2:00	6:00	6	-	-	-	-	-	-	
				3	Mrs.S.Tsale	22/04/01	3	H.W.	1,000	1	Yes	60	100	40	20	2	3	-	3	0:30	0.30	1	BOH	USW	0.4	1:30	2:00	5:00	4	-	1	1	-	-	-	
				3	Mr.Kilito	22/04/01	4	S.F.	3,000	1	Yes	60	160	20	40	2	3	-	3	0:20	0.30	1	BOH	R/D	0.4	1:00	3:00	4:30	10	-	2	2	1	2	-	R/D(next Vg.)
52	**Jonathani**	001	3				6.00		1,833			87	133	33	40					0:41	0.47	1.67				2:50	3:40	6:40	13.33	1.00	10.33	1.33	1.67	2.33	0.00	
				4	Mr.Shawa Before	24/04/01	8	S.F.	1,500	1	Yes	80	140	40	0	2	3	-	4	1:00	0.30	1	BOH	River	12:00	4:00	3:00	8:00	27	2	30	4	4	2	-	
				4	Mrs.Macheke	24/04/01	5	H.W.	2,000	1	Yes	100	160	40	60	2	3	-	2,4	0:35	0.50	2	BOH	None	-	2:30	4:00	6:00	6	-	1	-	1	2	-	
				4	Mrs.Wilson	24/04/01	5	H.W.	2,000	1	Yes	80	100	20	60	2	3	-	1,4	0:30	0.60	2	BOH	None	-	2:00	4:00	6:00	7	1	-	-	-	3	-	
53	**Kandunai**	005	3				6.00		1,833			73	113	33	40					0:35	0.57	1.33				2:10	3:40	5:40	9.33	0.67	0.33	0.00	0.33	1.00	0.00	
				3	Mr.Kamkaka	22/04/01	7	S.F.	1,000	1	Yes	60	100	20	40	2	3	-	4	0:30	0.40	1	BOH	USW	0.4	1:30	3:00	7:00	8	1	-	-	-	1	-	No chemicals
				3	Mrs.Linesi	22/04/01	3	H.W.	3,000	1	Yes	80	120	40	40	2	3	-	1,3	0:30	0.30	2	BOH	-	-	2:00	5:00	4:00	8	-	-	-	-	1	-	
				3	Mrs.S.Kapalamla	22/04/01	8	H.W.	1,500	1	Yes	80	120	40	40	2	3	-	5	0:45	1.00	1	BOH	None	-	3:00	3:00	6:00	12	1	1	-	1	1	-	
55	**Kazika**	002	3				6.00		1,667			93	147	33	60					0:50	0.62	2.33				4:05	3:00	6:20	11.67	0.00	1.33	1.33	1.00	1.33	0.00	
				4	Mr.Chipompa	24/04/01	10	S.F.	1,000	1	Yes	140	220	40	100	1	3	-	2,5	1:00	1.00	4	BOH	None	-	7:00	4:00	6:00	24	-	2	2	3	1	4 Cholera	
				4	Mrs.Dzamalala	24/04/01	2	H.W.	1,000			40	80	20	20			-	5	0:45	0.45	1	BOH	None	-	1:30	3:00	7:00	4	-	1	1	-	1	-	
				4	Mr.G.Misili	24/04/01	6	S.F.	3,000	1	Yes	100	140	40	60	2	3	-	2	0:45	0.40	2	BOH	None	-	3:45	2:00	6:00	7	-	1	1	-	2	-	
56	**Chisindo**	005	3				5.67		1,433			80	107	27	53					0:31	0.45	2.67				1:15	4:00	5:20	6.67	0.00	2.33	1.67	0.67	2.00	0.00	
				4	Mrs.N.Chigwada	24/04/01	7	H.W.,G.	1,000	1	Yes	120	160	20	100	1	3	-	1,2,4	0:45	0.50	6	BOH	-	-		3:00	5:00	6	-	3	-	2	2	-	
				4	Mr.Zikutherani	24/04/01	5	S.F.	1,000	1	Yes	60	80	20	40	2	3	-	5	0:30	0.45	1	BOH	None	-	1:30	3:00	6:00	7	-	3	-	-	1	-	
				4	Mrs.Daniel	24/04/01	5	H.W.	2,300	1	Yes	60	80	40	20	2	3	-	4	0:20	0.40	1	BOH	None	-	1:00	6:00	5:00	7	-	1	5	-	3	-	
57	**Chipula**	041	2				3.50		1,750			80	110	40	40					0:37	0.35	1.00				2:45	6:30	5:30	8.50	0.00	0.50	0.50	1.00	0.50	0.00	
				4	Mrs.Phillimoni	16/05/01	4	H.W.	1,500	1	Yes	120	140	60	60	2	3	-	4	0:45	0.40	1	BOH	None	-	4:30	7:00	5:00	14	-	-	-	2	1	-	
				4	Mrs.Abele	16/05/01	3	H.W.	2,000	1	Yes	40	80	20	20	2	3	-	3	0:30	0.30	1	BOH	None	-	1:00	6:00	6:00	3	-	1	1	-	-	-	
58	**Kamundi**	013	3				5.00		1,400			100	133	60	40					1:22	0.12	1.33				1:15	6:00	6:00	8.00	0.00	2.00	0.00	2.00	1.33	0.00	
				1	Mrs.Lufina	17/05/01	7	H.W.	1,000	1	Yes	80	100	40	40	2	1	2	4	0:15	0.12	2	BOH	None	-	1:00	6:00	6:00	8	-	-	-	4	2	-	
				1	Mrs.Biati	17/05/01	4	H.W.	1,200	1	Yes	120	160	60	60	2	1	-	2	0:15	0.10	1	BOH	None	-	1:30	7:00	5:00	6	-	3	-	1	1	-	
				1	Mr.Lasifold	17/05/01	4	S.F.	2,000	1	Yes	100	140	80	20	2	1	-	3	3:36	0.15	1	BOH	None	-	1:15	5:00	7:00	10	-	3	-	1	1	-	
59	**Chibudula**	006	3				3.67		1,100			65	93	43	22					0:15	0.10	2.00				0:45	2:00	4:40	4.00	0.00	0.67	0.33	0.33	0.67	0.00	
				4	Maganga	22/04/01	2	S.F.	1,000	1	Yes	75	100	50	25	2	3	-	3	0:05	0.10	1	BOH	-	-	0:15	2:00	4:00	3	-	2	1	1	1	-	
				4	Mr.N.Kumpinnula	22/04/01	4	H.W.	1,100	1	Yes	60	80	40	20	2	3	-	1,3	0:20	0.10	2	BOH	None	-	1:00	2:00	5:00	6	-	-	-	-	1	-	
				4	Mrs.Ledeni	22/04/01	5	Widow	1,200	1	Yes	60	100	40	20	2	3	-	2,5	0:20	0.10	3	BOH	None	-	1:00	2:00	5:00	3	-	-	-	-	-	-	
60	**Nyozwa**	006	3				5.00		1,367			73	113	40	33					0:16	0.07	3.00				0:56	2:40	5:40	6.33	0.67	2.33	0.33	0.00	0.00	0.00	
				3	Mrs.M.Sandalamy	22/04/01	6	H.W.	1,600	1	Yes	80	120	40	40	2	3	-	1,2,4	0:20	0.10	4	BOH	River	0.15	1:20	3:00	6:00	8	-	3	1	-	-	-	
				4	Mr.F.Elifala	22/04/01	5	Bricklayer	1,000	1	Yes	100	140	60	40	2	3	4	5	0:10	0.10	2	BOH	-	-	0:50	3:00	6:00	6	1	4	-	-	-	-	
				3	Mrs.N.Lankson	22/04/01	4	H.W.	1,500	1	Yes	40	80	20	20	2	3	-	1,2,5	0:20	0.01	3	BOH	River	0.15	0:40	2:00	5:00	5	1	-	-	-	-	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty 1.Satisfied 2.Unsatisfied	Q'ty and Q'nty of Potable Water: Q'ty 1.Good 2.Fair 3.Not Good	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
61	**Sukwa**	041	3				4.33		1,500			87	120	47	28					0:18	0.09	2.33				1:20	2:40	6:40	6.00	1.00	0.33	1.00	1.00	0.33	0.00	
				3	Mrs.M.Kholidi	25/04/01	3	Widow	1,200	1	Yes	60	80	40	20	2	3	-	2,3	0:20	0.03	2	BOH	River	0.4	1:00	2:00	7:00	4	1	-	2	-	-	-	
				3	Mr.Kwanje	25/04/01	7	S.F.	1,300	1	Yes	120	180	80	4	2	3	-	2,4	0:20	0.03	3	BOH	River	0.4	2:00	2:00	7:00	9	-	1	-	2	-	-	
				3	Mrs.Namaganizo	25/04/01	3	H.W.	2,000	1	Yes	80	100	20	60	2	3	-	1,5	0:15	0.20	2	BOH	Dambo	0.4	1:00	4:00	6:00	5	2	-	1	1	1	-	Dambo(Najin river) Backache problem
63	**Kachono**	060	3				8.00		2,033			87	140	53	33					0:18	0.20	1.67				1:16	2:40	6:40	8.67	1.00	0.33	1.33	1.67	0.00	0.00	
				3	Mrs.Nkupatira	25/04/01	6	H.W.	2,000	1	Yes	120	200	60	60	2	3	-	2,5	0:15	0.20	2	BOH	Dambo	0.3	1:30	4:00	6:00	4	-	-	-	1	-	-	
				3	Mr.Galoni	25/04/01	10	S.F.	2,000	1	Yes	80	120	60	20	2	3	-	2,4	0:20	0.20	2	BOH	River	0.25	1:20	2:00	7:00	12	-	1	3	-	-	-	
				3	Mr.Tembwe	25/04/01	8	S.F.	2,100	1	Yes	60	100	40	20	2	3	-	3	0:20	0.20	1	BOH	River	0.25	1:00	2:00	7:00	10	3	-	1	4	-	-	
64	**Khomani**	051	3				4.00		1,933			120	153	60	60					0:13	0.01	1.67				1:21	3:00	5:40	6.67	0.67	1.00	0.33	0.67	0.33	0.00	
				3	Mr.Moses	26/04/01	4	S.F.	1,000	1	Yes	160	200	40	120	2	3	2	4	0:15	0.02	3	BOH	None	-	2:00	3:00	4:00	7	-	3	-	-	1	-	
				3	Mrs.C.Josamu	26/04/01	4	H.W.	3,000	1	Yes	100	120	80	20	2	3	-	3	0:15	0.015	1	BOH	River	0.8	1:15	3:00	7:00	7	-	-	-	1	-	-	
				3	Mrs.Z.Pasilani	26/04/01	4	H.W.	1,800	1	Yes	100	140	60	40	2	3	-	3	0:10	0.009	1	BOH	River	0.8	0:50	3:00	6:00	6	2	-	1	1	-	-	
65	**Chinthankhwa**	052	3				6.00		3,000			160	207	67	93					0:11	0.07	2.33				2:13	2:20	5:40	9.67	1.67	1.67	1.67	0.33	0.67	0.00	
				3	Malaya-athina	26/04/01	4	S.F.	3,000	1	Yes	80	100	40	40	2	3	-	3,4	0:05	0.004	2	BOH	Dambo	0.3	0:40	2:00	6:00	7	2	1	-	-	2	-	
				3	Mr.Kofi	26/04/01	9	Salesman	5,000			320	400	120	200	2		-	2,3	0:20	0.20	4	BOH	USW	0.8	5:20	3:00	5:00	15	3	4	5	1	-	-	
				3	Mrs.P.Alick	26/04/01	5	H.W.	1,000	1	Yes	80	120	40	40	2	3	-	3	0:10	0.02	1	BOH	USW	0.4	0:40	2:00	6:00	7	-	-	-	-	-	-	
66	**Phula**	054	3				3.67		1,867			68	100	38	30					0:11	0.03	1.67				0:35	2:00	6:40	4.67	0.00	0.67	0.33	1.00	0.00	0.00	
				3	Mr.J.Daniel	26/04/01	4	S.F.	1,800	1	Yes	45	75	25	20	2	3	-	2,3	0:15	0.04	2	BOH	USW	0.06	0:30	2:00	7:00	5	-	-	1	2	-	-	Headache
				3	Mr.M.Chimphonda	26/04/01	3	S.F.	1,800	1	Yes	100	125	50	50	2	3	-	3	0:15	0.02	1	BOH	USW	0.5	1:00	2:00	7:00	3	-	1	-	-	-	-	
				3	Mr.N.Leziamu	26/04/01	4	S.F.	2,000	1	Yes	60	100	40	20	2	3	-	1,3	0:05	0.015	2	BOH	Dambo	0.2	0:15	2:00	6:00	6	-	1	-	1	-	-	
67	**Kayabwa**	033	3				5.67		3,667			98	133	22	90					0:13	0.04	2.00				1:05	4:20	6:20	11.33	0.00	1.00	1.00	0.67	0.00	0.00	
				1	Mrs.Maxwel	20/04/01	6	H.W.	3,600	1	Yes	75	100	25	50	2	1	-	1,2	0:10	0.025	2	BOH	USW	0.15	0:30	6:00	7:00	13	-	-	-	-	-	-	
				1,3	Mr.Esaya Kayamba	20/04/01	6	S.F. & Commercial Farming	5,000	1	Yes	140	200	20 (BH)	120 (USW)	2	BH-1 USW (worms)-3	-	2,5	BH- 0:25 USW- 0:03	BH- 0.175 USW- 0.001	2	BOH	USW	0.001	0:45	3:00	7:00	9	-	-	-	-	-	-	One BH in Kayabwa vg., USW near the household without water treatment
				1	Mrs.Develia John	20/04/01	5	H.W.	2,400	1	Yes	80	100	20	100	2	1	-	2,5	0:30	0.10	2	BOH	SW	0.05	2:00	4:00	5:00	12	-	3	3	2	-	Eye Infection	
68	**Bodzalibwera**	033	3				3.00		5,000			70	100	17	52					0:16	0.21	1.00				1:33	4:00	6:30	9.67	0.00	0.00	3.33	0.00	0.00	0.00	
				3	Mrs.Alieti Nachulu	20/04/01	3	H.W.	1,000	1	Yes	90	120	22	67	2	1	-	3	0:20	0.60	1	BOH	USW	0.3	2:00	3:00	7:00	5	-	-	2	-	-	-	
				3	Mr.Dominic Bodzalibwe	20/04/01	3	B.M.	10,000	1	Yes	60	90	15	45	2	3	-	3	0:10	0.001	1	BOH	BH	1	1:20	3:00	9:00	14	-	-	8	-	-	-	Quality(smell, color)
				3	Mrs.Rozina Bensamin	21/04/01	3	H.W.	4,000	1	Yes	60	90	15	45	2	3	-	3	0:20	0.04	1	BOH	USW	0.4	1:20	6:00	3:30	10	-	-	-	-	-	-	
69	**Chambadzana**	066	3				4.67		1,400			93	107	40	53					0:23	0.01	1.33				0:36	2:20	6:40	6.67	0.67	1.00	0.00	0.00	1.00	0.00	
				3	Mrs.Dina	25/04/01	5	H.W.	1,200	1	Yes	120	160	40	80	2	3	-	3,4	0:50	0.025	2	BOH	BH	0.8	0:30	3:00	6:00	8	2	3	-	-	3	-	BH(Chizinga Vg.)
				3	Mrs.G.Kahano	25/04/01	5	Widow	1,400	1	Yes	80	80	40	40	1	3	-	4	0:10	0.007	1	BOH	USW	0.8	0:40	2:00	7:00	6	-	-	-	-	-	-	USW(Next Vg.)
				3	Mr.M.Larson	25/04/01	4	H.W.	1,600	1	Yes	80	80	40	40	1	3	-	3	0:10	0.006	1	BOH	USW	0.8	0:40	2:00	7:00	6	-	-	-	-	-	-	USW(Next Vg.)
70	**Chinungu**	064	3				5.33		7,467			83	123	23	60					4:21	0.20	2.00				2:33	2:20	0.28	6.00	0.67	6.00	1.67	2.67	0.00	0.00	
				3	Mr.Chapotela Mnyimbo	21/04/01	6	S.F.	1,400	1	Yes	90	150	30	60	2	3	-	1,2,4	0:45	0.30	3	BOH	Dambo	2	4:30	2:00	7:00	8	2	1	2	2	-	-	
				3	Ms.N.Nyimbo	21/04/01	4	H.W.	1,000	1	Yes	100	120	20	80	2	3	-	3.4	0:20	0.10	2	BOH	Dambo	1.5	1:40	4:00	7:00	4	-	2	1	4	-	-	Chemical Treatment no worms Cases of Cholera in the village in year 2000
				3	Chigoneka	21/04/01	6	S.F.	20,000	1	Yes	60	100	20	40	2	3	-	4	12:00	0.20	1	BOH	R/D	4.8	1:30	1:00	6:00	6	-	15	2	2	-	-	
71	**Chonangulu**	064	3				5.00		1,233			73	87	38	35					0:25	0.30	1.33				1:18	2:40	5:00	5.33	0.33	2.00	0.67	2.00	0.00	0.00	
				3	Mr.K.Bikuoni	23/04/01	5	S.F.	1,200	1	Yes	80	100	40	40	2	3	-	5	0:20	0.30	1	BOH	None	-	1:20	2:00	6:00	6	-	1	2	3	-	-	
				3	Mr.M.Matekela	23/04/01	6	S.F.	1,800	1	Yes	100	102	60	40	2	3	-	2,3	0:15	0.20	2	BOH	None	-	1:15	2:00	6:00	7	-	-	-	1	-	-	
				3	Mrs.M.Fositala	23/04/01	4	H.W.	700	1	Yes	40	60	15	25	2	3	-	3	0:40	0.40	1	BOH	None	-	1:20	4:00	3:00	3	1	5	-	2	-	-	
73	**Marichi**	068	3				6.00		4,000			90	153	42	48					0:30	0.60	2.00				2:20	2:20	5:00	6.00	0.67	1.67	0.67	0.67	0.00	0.00	
				4	Mrs.Bezita	23/04/01	8	H.W.	2,000	1	Yes	120	180	40	80	2	3	-	2	0:30	0.60	2	BOH	-	-	3:00	2:00	5:00	4	-	1	1	1	-	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source (1.BH 2.PSW 3.USW 4.R/D)	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities (1.Necessary 2.Not Necessary)	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty (1.Satisfied 2.Unsatisfied)	Q'ty and Q'nty of Potable Water: Q'ty (1.Good 2.Fair 3.Not Good)	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				4	Mr.A.Rodnd	23/04/01	3	Butcher	5,000	1	Yes	50	100	25	25	2	3	-	2	0:20	0.40	1	BOH	Personal USW	0.2	0:40	3:00	3:00	4	1	1	1	-	-	-	
				4	Mr.C.Mlenga	23/04/01	7	S.F.	5,000	1	Yes	100	180	60	40	2	3	-	1,2,4	0:40	0.80	3	BOH	Personal USW	0.2	3:20	2:00	7:00	10	1	3	-	1	-	-	
74	**Mkoche**	064	3				5.00		2,167			93	113	27	53					0:16	0.08	1.33				1:25	2:20	5:40	3.67	0.00	0.67	0.00	0.67	0.00	0.00	
				1	Mrs.M.Kaiimbe	23/04/01	3	H.W.	1,000	1	Yes	60	80	0	20	2	2	-	1,2	0:15	0.10	2	BOH	River	3	0:45	2:00	5:00	4	-	-	-	-	-	-	
				1	Mr.I.Phiri	23/04/01	5	S.F.	1,500	1	Yes	120	120	60	60	1	2	-	3	0:15	0.05	1	BOH	River	3	1:30	2:00	6:00	5	-	-	-	-	-	-	
				1	Mrs.Liness Wilesi	23/04/01	7	H.W.	4,000	1	Yes	100	140	20	80	2	2	-	3	0:20	0.10	1	BOH	USW	1	2:00	3:00	6:00	2	-	2	-	2	-	-	
75	**Manjondo**	065	3				3.67		1,967			67	113	20	20					0:21	0.20	1.33				0:50	3:00	4:20	3.33	0.00	3.33	0.00	0.00	0.00	0.00	
				3	Mrs.Elina Enlds	23/04/01	6	H.W.	4,000	1	Yes	100	160	20		2	3	2	4	0:25	0.30	2	BOH	BH	1		3:00	4:00	3	-	8	-	-	-	-	
				3	Mrs.E.Khutani	23/04/01	2	H.W.	900	1	Yes	40	60	20	20	2	3	-	4	0:20	0.10	1	BOH	BH	0.8	0:40	2:00	3:00	3	-	2	-	-	-	-	BH(next Vg.)
				3	Mrs.Matandika	23/04/01	3	H.W.	1,000	1	Yes	60	120	20	40			-	3	0:20	0.20	1	BOH	-	-	1:00	4:00	6:00	4	-	-	-	-	-	-	
76	**Msampha II**	032	3				5.00		5,500			77	115	18	87					0:35	0.30	2.67				3:15	3:20	5:00	10.33	1.00	5.67	0.00	0.00	0.67	0.00	
				3	Mr.H.Mzukwa	20/04/01	7	S.F.	6,000	1	Yes	100	160	20	120	2	3	2	2	0:45	0.30	3	BOH	None	-	3:45	3:00	6:00	20	2	15	-	-	-	-	
				3	Mr.M.Natani	20/04/01	5	B.M.	10,000	1	Yes	100	140	20	80	2	3	-	2	0:30	0.30	3	BOH	USW	0.3	5:00	5:00	2:00	7	1	1	-	-	1	-	No BH
				3	Mrs.S.Chigango	20/04/01	3	D.W.	500	1	Yes	30	45	15	60	2	3	-	3,4	0:30	0.30	2	BOH	None	-	1:00	2:00	7:00	4	-	1	-	-	1	-	
77	**Kansinsi**	035	3				5.67		2,833			80	127	38	55					0:31	0.67	1.67				2:06	2:40	5:01	6.67	0.33	1.33	0.67	0.33	0.00	0.00	
				3	Mr.L.Notisi	21/04/01	4	S.F.	4,000	1	Yes	60	120	50	50	2	3	-	3	0:45	1.00	1	BOH	USW	1.2	3:00	2:00	5:00	3	-	-	-	-	-	-	
				3	Mr.G.Ngomayacheza	21/04/01	9	S.F.	1,500	1	Yes	80	120	40	40	2	3	-	2,4	0:45	1.00	2	BOH	USW	1.2	3:00	2:00	5:03	12	-	-	-	-	-	-	
				3	Mrs.E.Mosi	21/04/01	4	H.W.	3,000	1	Yes	100	140	25	75	2	3	-	3,4	0:05	0.005	2	BOH	USW	1.5	0:20	4:00	5:00	5	1	4	2	1	-	-	No chamicals
78	**Dzamalala**	061	3				6.00		1,700			80	102	31	37					0:18	0.07	2.00				1:08	2:40	6:40	6.33	0.00	1.33	1.00	1.00	0.67	0.00	
				4	Mr.B.Usikesi	25/04/01	5	S.F.	1,800	1	Yes	60	80	4	20	2	3	-	2,3	0:15	0.01	3	BOH	USW	0.2	0:45	2:00	7:00	7	-	3	1	3	-	-	
				4	Mr.F.Kadzakumranja	25/04/01	6	H.W.	1,800	1	Yes	100	125	50	50	2	3	-	2,4	0:15	0.01	2	BOH	USW	0.2	1:00	2:00	7:00	7	-	-	1	-	-	-	
				4	Mrs.Zakaliya	25/04/01	7	H.W.	1,500	1	Yes	80	102	40	40	2	3	-	4	0:25	0.20	1	BOH	Dambo	0.4	1:40	4:00	6:00	5	-	1	1	-	2	-	Dambo (Santhe Vg.)
79	**Kawande**	066	3				6.00		2,433			127	180	43	50					0:09	0.07	1.67				1:45	2:20	4:20	9.00	0.00	0.33	1.33	0.33	0.00	0.00	
				3	Mrs.F.Mkalambe	25/04/01	9	H.W.	1,800	1	Yes	200	220	50	50	2	3	-	2,4	0:15	0.10	2	BOH	BH	0.8	2:30	3:00	6:00	10	-	-	1	-	-	-	Convulsions & unconsciousness
				3	Mrs.Samuel	25/04/01	5	H.W.	2,500	1	Yes	120	200	60	60	2	3	-	1,3	0:02	0.005	2	BOH	BH	0.4	0:30	3:00	3:00	6	-	1	3	1	-	Eye Infection	
				3	Mr.Kamwaza	25/04/01	4	S.F.	3,000			60	120	20	40	2	3	-	3	0:10	0.10	1	BOH	BH	0.8	0:30	1:00	4:00	11	-	-	-	-	-	-	BH(Next Vg.) Backache
80	**Chipoto**	069	3				4.67		1,700			70	105	35	35					0:18	0.20	1.67				1:01	3:00	5:00	5.33	0.33	2.67	0.33	0.33	0.00	0.00	
				2	Mrs.Dalesi	23/04/01	5	H.W.	2,400	1	Yes	60	120	20	40	2	2	-	2,4	0:15	0.10	2	BOH	R/D	0.2	0:45	5:00	5:00	5	1	4	1	1	-	-	
				2	Mrs.J.Chengera	23/04/01	3	H.W.	1,500	1	Yes	50	75	25	25	2	2	-	3	0:20	0.25	1	BOH	River	0.8	0:40	2:00	5:00	4	-	2	-	-	-	-	
				2	Mrs.N.Zendewa	23/04/01	6	D.W.	1,200	1	Yes	100	120	60	40	2	2	-	1,5	0:20	0.25	2	BOH	River	0.8	1:40	2:00	5:00	7	-	2	-	-	-	-	
	Total 71 Villages		**212**				**4.80**		**2,274**			**82**	**119**	**38**	**43**					**0:45**	**0.31**	**1.69**				**1:51**	**2:57**	**5:45**								

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

Village Headman (TAMBALA)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use: River/Dambo: Perennial Flow or Not	River/Dambo: Water Quality	Unprotected Shallow Well: No.	Unprotected Shallow Well: Water Quality	Unprotected Shallow Well: Dried-up or Not	Protected Shallow Well: No.	Protected Shallow Well: Water Quality	Protected Shallow Well: Dried-up or Not	Borehole: No.	Borehole: Water Quality	Borehole: Dried-up or Not	Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family (Buckets)	Average Volume of Water Usage per Family (liter)	Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates: South Latitude	Coordinates: East Longitude
TRADITIONAL AUTHORITY TAMBALA																														
1	Kaoche	004	Kaoche	42	181	1,500	S.F.	None	P.F.	Bad	1	Bad	D.U.							USW(1997)/dried up in 1998	BOH	4	80	Not	Yes	Yes	Yes	F=2.0(Kamwachale River)	13° 57' 59"	34° 19' 23"
2	Mangamphasa [*1]	004	Mangamphasa	47	202	1,500	S.F.	None			1	Bad	Not							USW(1997)/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=2(USW)	13° 58' 09"	34° 19' 08"
3	Mbuziyadula	005	Mbuziyadula	70	301	1,500	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	Chetsa River	13° 58' 33"	34° 18' 02"
4	Mphombe	006	Mphombe	47	202	1,500	S.F.	School	Not	Poor										River-2 Nos.	BOH	4	80	Not	Yes	Yes	Yes	F=2(River Nsauka)	13° 59' 10"	34° 18' 17"
5	*Kazembe*	005	Kazembe	82	353	1,000	S.F.	None			1	Bad	Not							USW(1994)/now in use	BOH	5	100	Not	Yes	Yes	Yes		13° 59' 37"	34° 19' 46"
6	Kwilimbe (Chembe)	004	Chemble	35	151	1,500	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		13° 58' 52"	34° 18' 10"
~~7~~	~~Chesa~~																											NO VILLAGE		
8	Gwengwe	019	Gwengwe	120	516	1,000	S.F.	None									1	Good	Not	BH(1988)/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=0.5	14° 02' 50"	34° 14' 59"
9	Chiyepa	014	Chiyepa	9	39	2,000	S.F.	None			1	Bad	Not							USW(1983)/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=1.0(USW) Surrounding villages are also candidate ones. There are Kunaunda, Kumlenga.	14° 01' 33"	34° 14' 50"
10	Ajibu	009	Ajibu	107	460	1,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 00' 57"	34° 14' 49"
11	Kalima	009	Kalima	32	138	2,000	S.F.	None			1	Poor	D.U.							USW(2000)/now in use	BOH	7	140	Not	Yes	Yes	Yes	10 more households can use the facility	14° 00' 54"	34° 15' 37"
12	Kamwana	009	Kamwana	40	172	1,500	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes	F=1(River)	14° 00' 16"	34° 16' 21"
13	Mkwenembera	003	Mkwenembera	93	400	1,500	S.F.	None	Not	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		13° 58' 16"	34° 15' 18"
14	Mgawi	003/ 006	Mgawi	116	499	1,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		13° 59' 01"	34° 16' 27"
15	Mitawa	013	Mitawa	50	215	1,500	S.F.	School									1	Good	Not	BH(1999)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=1.0(BH)	14° 02' 17"	34° 14' 27"
16	Mapemba	038	Mapemba	120	516	2,000	S.F.	None	P.F.	Bad										※※	BOH	6	120	Not	Yes	Yes	Yes	F=5(River) 15families	14° 06' 10"	34° 13' 04"
17	Kaundikiza	020	Kaundikiza	37	159	700	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	37(Kaundikiza)+4 (Mpungeni)=41 households	14° 02' 44"	34° 13' 23"
18	Kaphale	009	Kaphale	47	202	700	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 00' 45"	34° 15' 56"
19	Kalimba	009	Kalimba	79	340	700	S.F.	None	P.F.	Bad										BH(1980)/not working for 8 years ※※	BOH	-	120	Not	Yes	Yes	Yes		14° 00' 41"	34° 15' 08"
~~20~~	~~Mankhambaza~~																											NO VILLAGE		
21	Kafwafwa	016	Kafwafwa	186	800	1,500	S.F.	None			7	Bad	D.U.							USWs(1980) BH(1989)/not working BH(1982)/not working, no pump ※※	BOH	5	100	Not	Yes	Yes	Yes	F=1.0(USW)	14° 04' 05"	34° 17' 31"
22	Mfumbwa	007	Mfumbwa	248	1,066	1,500	C.	School	Not	Bad											BOH	5	100	Not	Yes	Yes	Yes		14° 02' 22"	34° 18' 32"
~~23~~	~~Mzinga~~																											NO ACCESS		
25	Napwanga	008	Napwanga	175	753	2,000	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	F=1(BH at Mlenga School)	14° 01' 24"	34° 17' 16"
26	*Kumaunda(2)*	012	Kumaunda	37	159	800	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		14° 00' 53"	34° 15' 04"
27	Chipango	019	Chipango	45	194	700	S.F.	None	Not	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		14° 02' 25"	34° 15' 21"
28	Nganya	020	US.Mchepa	35	151	1,300	S.F.	None			1	Bad	Not							USW(1970's)/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=1.0(USW) 53 households(BH at Msoka village)	14° 02' 26"	34° 13' 55"
30	Chingo	021	Chingo	48	206	800	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		14° 03' 08"	34° 13' 59"
31	Mbakama	021	Mbakama	40	172	1,000	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes	F=2.0(Dambo)	14° 03' 36"	34° 13' 01"
32	Matupa	022	Matupa	120	516	1,000	S.F.	Clinic	P.F.	Bad							1	Good	D.U. summer	BH(1988)/now in use The BH is located at the extreme end of the village, 0.30km from the headman's house	BOH	5	100	Not	Yes	Yes	Yes		14° 03' 46"	34° 12' 30"
33	*Kanyama/Mikuyu*	001	Kanyama	80	344	1,000	S.F., C.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		13° 57' 01"	34° 13' 36"
34	Chiboli	002	Chiboli	54	232	1,000	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes	F=2.0(River)	13° 59' 10"	34° 13' 18"
35	Chigumula	001	Chigumula	39	168	900	S.F., C.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	F=3.0(River)	13° 57' 47"	34° 13' 30"
36	Nyangu	001	Nyangu	50	215	1,500	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		13° 58' 30"	34° 12' 42"
37	Kapanda	001	Kapanda	93	400	1,500	S.F., C.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		13° 56' 02"	34° 14' 08"
~~38~~	~~Mafolera~~	001	Mafolera	15																								NO ACCESS		
39	Kapazila	001	Kapazila	72	310	1,000	S.F., B.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		13° 58' 51"	34° 12' 45"
~~40~~	~~Chipokosa~~	001	Mafolera	10																								NO ACCESS		
41	Chokoma	010	Chokoma	50	215	1,000	S.F., C.	None	P.F.	Bad										None ※※	BOH	4	80	Not	Yes	Yes	Yes		14° 00' 52"	34° 12' 27"
~~42~~	~~Kanonyere~~[*2]																											NO ACCESS		
~~43~~	~~Mzingo~~																											NO VILLAGE		
44	Mzikamanda(A)	001	Mzikamanda	42	181	1,000	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		13° 58' 43"	34° 13' 32"
45	Kudembe	002	Kudembe	80	344	900	S.F., C.	None	Not	Bad										None	BOH	3	60	Not	Yes	Yes	Yes	F=0.5(R/D)	14° 00' 11"	34° 12' 11"

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
BOH=Bucket on Head P.F.=Perennial Flow D.U.=Dried Up C.U.=Concern Universal

Village Headman (TAMBALA)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use: River/Dambo		Unprotected Shallow Well			Protected Shallow Well			Borehole			Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family		Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates	
									Perennial Flow or Not	Water Quality	No.	Water Quality	Dried-up or Not	No.	Water Quality	Dried-up or Not	No.	Water Quality	Dried-up or Not			(Buckets)	(liter)						South Latitude	East Longitude
46	*Mnenula*	026	Munenula	35	151	1,500	S.F.	School			2	Fair	1 no.-D.U. 1 no.-Not							None	BOH	5	100	Not	Yes	Yes	Yes	F=1.0(USW)	14° 04’ 39”	34° 16’ 03”
48	Kaole	015	Kaole	82	353	1,500	S.F.	None	Not	Bad										The Village had one BH which became dry in 1993 ※※	BOH	3	60	Not	Yes	Yes	Yes		14° 03’ 32”	34° 18’ 43”
49	Msanyama	014	Chilanga	59	254	1,100	S.F.	None	P.F.	Bad											BOH	3	60	Not	Yes	Yes	Yes	F=1.0(Dambo)	14° 01’ 25”	34° 16’ 26”
50	Bowa	017	Bowa	47	202	800	C.				1	Bad	Not							1 BH dug in 1996 and broken down in 1998 (major technical problem) ※※	BOH	3	60	Not	Yes	Yes	Yes	F=1(USW);Spring	14° 03’ 42”	34° 17’ 42”
51	Chiumbe	003	Chiumbe	16	69	1,500	S.F., B.	None	2 Not	Bad										No facility provided	BOH	6	120	Not	Yes	Yes	Yes	10 households expected to use the planned facility from the neighboring villages	13° 59’ 12”	34° 15’ 29”
52	*Maganga 2*	003	Maganga	40	172	3,000	S.F.	None	Not	Bad										None	BOH	3	60	Not	Yes	Yes	Yes		13° 59’ 10”	34° 15’ 19”
53	Zande	012	Zande	45	194	600	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	F=2.0(Dambo)	14° 00’ 52”	34° 15’ 18”
54	Kunchinza	007	Kumchiza	39	168	168	S.F.	None	Not	Bad										None	BOH	3	60	Not	Yes	Yes	Yes	F=1(R/D)	14° 01’ 58”	34° 18’ 29”
56	Kazembe 2	008	Kazembe	17	73	600	S.F.	None	Not	Bad										None	BOH	6	120	Not	Yes	Yes	Yes	F=1.0(River)	14° 01’ 31”	34° 17’ 34”
57	Kawire	008	Kawire	56	241	2,000	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 01’ 30”	34° 17’ 24”
58	*Gwengwe Chilungusi*	017	Gwengwe	370	1,591	500	S.F.	None	Not	Bad										BH not working for 5 years Technical problem with plunger ※	BOH	2	40	Not	Yes	Yes	Yes		14° 03’ 07”	34° 17’ 33”
~~59~~	~~Mmong'ono~~																											NO VILLAGE		
60	Shuga	021	Shuga	24	103	1,000	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		14° 03’ 16”	34° 13’ 39”
61	Likangala	034	Likangala	70	301	1,500	S.F.	None	P.F.	Bad										BH(1988)/now under breakdown	BOH	4	80	Not	Yes	Yes	Yes	F=2.0(River)	14° 03’ 16”	34° 13’ 39”
62	Matsikila	006	Matsikila	70	301	1,000	S.F.	None	P.F.	Bad										None	BOH	2	40	Not	Yes	Yes	Yes		14° 07’ 59”	34° 14’ 32”
63	*Matipa (Mkundi)*	007 (CHAUMA)	Mkundi	300	1,290	1,500	S.F.	None									2	Good	Not	BH-1(1999)& BH-2(1970's)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=2.0(BH)	14° 04’ 32”	34° 12’ 03”
	Total 59 Villages			**81**	**348**	**1,281**																	**91**							

NOTES : ※ ; Existing BH being in operation was confirmed by Electric Prospecting Survey Team.
※※ ; Existing BH being out of order was confirmed by Electric Prospecting Survey Team.

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
BOH=Bucket on Head P.F.=Perennial Flow D.U.=Dried Up C.U.=Concern Universal

TAMBALA

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source (1.BH 2.PSW 3.USW 4.R/D)	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities (1.Necessary 2.Not Necessary)	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty (1.Satisfied 2.Unsatisfied)	Q'ty and Q'nty of Potable Water: Q'ty (1.Good 2.Fair 3.Not Good)	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
TRADITIONAL AUTHORITY TAMBALA																																				
1	**Kaoche**	004	3				5.00		1,167			107	140	53	53					0:20	0.18	1.67				1:20	4:20	6:00	7.33	0.00	2.33	2.00	0.33	1.00	0.00	
				4	Mr.J.Lim	15/05/01	3	S.F.	1,000	1	Yes	80	100	40	40	2	3	-	2,4	0:15	0.20	2	BOH	None	-	1:00	2:00	6:00	6	-	2	3	1	-	-	-
				4	Mr.Thomas	15/05/01	4	S.F.	1,000	1	Yes	80	120	40	40	2	3	-	3	0:25	0.20	1	BOH	None	-	1:30	5:00	7:00	6	-	4	2	-	2	-	
				4	Mr.Mkango	15/05/01	8	S.F.	1,500	1	Yes	160	200	80	80	2	3	-	3,5	0:20	0.15	2	BOH	None	-	1:30	6:00	5:00	10	-	1	1	-	1	-	
2	**Mangamphasa**[*1]	004	3				6.00		1,167			133	163	67	67					0:31	0.40	2.00				2:10	4:20	5:20	10.00	0.33	0.67	0.33	0.33	0.00	0.00	
				3	Mr.Chabnna	15/05/01	7	S.F.	1,500	1	Yes	120	140	60	60	2	3	-	2,4	0:20	0.30	2	BOH	None	-	2:00	2:00	5:00	9	-	2	-	-	-	-	
				3	Mr.Wyson	15/05/01	8	S.F.	1,000	1	Yes	160	200	80	80	2	3	-	2,3	0:45	0.60	2	BOH	None	-	2:30	4:00	6:00	15	1	-	1	1	-	Back ache	
				3	Mrs.E.Kunangu	15/05/01	3	H.W.	1,000	1	Yes	120	150	60	60	2	3	-	2.5	0:30	0.30	2	BOH	None	-	2:00	7:00	5:00	6	-	-	-	-	-	Eye Infection	
3	**Mbuziyadula**	005	3				4.33		1,167			100	133	47	53					0:15	0.09	1.33				1:15	4:20	6:00	7.00	0.67	2.33	1.00	0.67	0.33	0.00	
				4	Mr.K.Azali	15/05/01	5	S.F.	1,500	1	Yes	80	100	40	40	2	3	-	2,3	0:15	0.10	2	BOH	None	-	1:00	2:00	5:00	6	-	2	3	1	-	-	
				4	Mrs.Chimtoto	15/05/01	5	H.W.	1,000	1	Yes	120	160	60	60	2	3	-	3	0:15	0.10	1	BOH	None	-	1:30	6:00	6:00	7	2	4	-	-	-	-	
				4	Mrs.Yohane	15/05/01	3	H.W.	1,000	1	Yes	100	140	40	60	2	3	-	3	0:15	0.07	1	BOH	None	-	1:15	5:00	7:00	8	-	1	-	1	1	-	
4	**Mphombe**	006	3				5.33		1,000			130	230	60	70					0:21	0.14	1.67				1:33	4:20	6:20	7.67	0.00	3.00	1.00	0.33	0.67	0.00	
				4	Mr.J.Lusi	15/05/01	4	S.F.	1,000	1	Yes	80	100	40	40	2	3	-	2,3	0:15	0.20	2	BOH	River	1	1:00	2:00	6:00	6	-	3	2	-	-	-	
				4	Mrs.Macheka	15/05/01	8	H.W.	1,000	1	Yes	160	320	80	80	2	3	-	2,4	0:30	0.15	2	BOH	None	-	2:00	7:00	5:00	11	-	6	1	1	1	-	
				4	Mrs.Kambuzi	15/05/01	4	H.W.	1,000	1	Yes	150	270	60	90	2	3	-	5	0:20	0.07	1	BOH	None	-	1:40	4:00	8:00	6	-	-	-	-	1	-	
5	**Kazembe**	005	3				4.33		1,667			100	133	47	53					0:25	0.18	1.33				3:50	6:00	4:40	8.67	1.00	2.00	0.33	0.33	1.33	0.00	
				3	Mrs.Malola	17/05/01	6	H.W.	1,000	1	Yes	140	200	60	80	2	3	-	2,4	0:30	0.20	2	BOH	None	-	3:30	6:00	5:00	11	1	4	-	-	1	-	
				3	Mrs.Mdoka	17/05/01	4	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	3	0:15	0.10	1	BOH	None	-	1:00	7:00	4:00	8	1	-	1	-	2	-	
				3	Mr.Bilaya	17/05/01	3	S.F.	2,000	1	Yes	80	100	40	40	2	3	-	3	0:30	0.25	1	BOH	None	-	7:00	5:00	5:00	7	1	2	-	1	1	-	
6	**Kwilimbe (Chembe)**	004	3				3.00		1,667			73	100	33	40					0:25	0.23	1.67				1:25	3:40	5:40	5.33	0.00	1.00	1.00	0.33	0.00	0.00	
				4	Mr.Zuivedi	15/05/01	4	S.F.	2,000	1	Yes	100	120	60	40	2	3	-	1,2,4	0:15	0.20	3	BOH	None	-	1:15	2:00	5:00	6	-	2	3	-	-	-	
				4	Mrs.Willlson	15/05/01	2	H.W.	1,000	1	Yes	60	80	20	40	2	3	-	3	0:30	0.25	1	BOH	None	-	1:30	4:00	7:00	4	-	-	-	-	-	-	
				4	Mrs.Langisha	15/05/01	3	H.W.	2,000	1	Yes	60	100	20	40	2	3	-	3	0:30	0.25	1	BOH	None	-	1:30	5:00	5:00	6	-	1	-	1	-	-	
~~7~~	~~**Chesa**~~																																			
8	**Gwengwe**	019	3				3.33		1,500			73	93	33	40					0:26	0.23	1.00				1:40	5:40	5:20	6.67	0.00	0.00	0.00	0.00	1.00	0.00	
				1	Mr.Samuel	17/05/01	4	S.F.	2,000	1	Yes	80	100	40	40	2	1	-	4	0:30	0.25	1	BOH	None	-	2:00	4:00	6:00	5	-	-	-	-	1	-	
				1	Mrs.Nchembere	17/05/01	2	H.W.	1,500	1	Yes	80	100	40	40	2	1	-	5	0:30	0.25	1	BOH	None	-	2:00	6:00	6:00	6	-	-	-	-	1	-	
				1	Mrs.James	17/05/01	4	H.W.	1,000	1	Yes	60	80	20	40	2	1	-	3	0:20	0.20	1	BOH	None	-	1:00	7:00	4:00	9	-	-	-	-	1	-	
9	**Chiyepa**	014	3				5.67		1,333			87	107	47	40					0:16	0.16	1.33				1:15	7:20	4:00	10.67	0.00	0.67	0.00	0.33	1.33	0.00	
				3	Mrs.Benard	17/05/01	7	H.W.	1,000	1	Yes	80	100	40	40	2	3	-	5	0:15	0.17	1	BOH	None	-	1:00	7:00	5:00	16	-	-	-	1	1	-	
				3	Mrs.Dziwenji	17/05/01	8	H.W.	2,000	1	Yes	120	140	60	60	2	3	-	2,5	0:20	0.20	2	BOH	None	-	2:00	7:00	4:00	11	-	-	-	-	3	-	
				3	Mrs.James	17/05/01	2	H.W.	1,000	1	Yes	60	80	40	20	2	3	-	2	0:15	0.10	1	BOH	None	-	0:45	8:00	3:00	5	-	2	-	-	-	-	
10	**Ajibu**	009	3				4.33		1,233			73	93	47	27					0:16	0.12	1.33				1:01	2:20	5:40	8.67	0.67	2.00	1.00	4.00	0.00	0.00	
				4	Mr.J.Sikalioti	12/05/01	6	S.F.	1,200	1	Yes	80	100	60	20	2	3	-	2,4	0:20	0.15	2	BOH	None	-	1:20	3:00	7:00	15	-	3	-	10	-	-	
				4	Mrs.L.Kmyenda	12/05/01	3	H.W.	1,000	1	Yes	60	80	40	20	2	3	-	3	0:15	0.10	1	BOH	River	1.5	0:45	2:00	5:00	5	2	1	-	1	-	-	
				4	Mrs.F.Abe	12/05/01	4	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	4	0:15	0.10	1	BOH	River	1.5	1:00	2:00	5:00	6	-	2	3	1	-	-	
11	**Kalima**	009	3				5.33		1,067			87	113	40	47					0:20	0.23	1.67				1:25	3:40	5:40	5.67	1.00	0.00	0.00	0.00	0.33	0.00	
				3	Mr.J.Morgan	14/05/01	6	S.F.	200	1	Yes	120	140	60	60	2	3	-	2,4	0:15	0.20	2	BOH	None	-	1:30	2:00	5:00	8	2	-	-	-	-	-	
				3	Mr.M.Kaliyala	14/05/01	4	S.F.	1,000	1	Yes	80	100	40	40	2	3	-	2,5	0:30	0.30	2	BOH	None	-	2:00	3:00	7:00	5	1	-	-	-	-	-	
				3	Mrs.Peter	14/05/01	6	H.W.	2,000	1	Yes	60	100	20	40	2	3	-	3	0:15	0.20	1	BOH	None	-	0:45	6:00	5:00	4	-	-	-	-	1	-	
12	**Kamwana**	009	3				4.67		833			77	107	37	40					0:15	0.17	1.33				0:55	3:40	5:40	6.33	0.00	0.67	0.67	0.00	0.33	0.00	
				4	Mrs.Doba	14/05/01	4	H.W.	1,000	1	Yes	80	100	40	40	2	3	-	5	0:15	0.30	1	BOH	None	-	1:00	2:00	5:00	6	-	2	2	-	-	-	
				4	Mrs.Adaliya	14/05/01	6	H.W.	500	1	Yes	80	100	40	40	2	3	-	2,5	0:15	0.12	2	BOH	None	-	1:00	5:00	6:00	8	-	-	-	-	1	-	
				4	Mrs.German	14/05/01	4	H.W.	1,000	1	Yes	70	120	30	40	2	3	-	3	0:15	0.10	1	BOH	None	-	0:45	4:00	6:00	5	-	-	-	-	-	-	
13	**Mkwenembera**	003	3				4.33		1,733			67	107	40	27					0:41	0.63	2.00				2:50	3:40	6:00	7.33	0.67	0.67	0.33	0.33	0.00	0.00	
				4	Mrs.Nkwapatira	14/05/01	7	H.W.	2,200	1	Yes	100	140	60	40	2	3	-	2	1:00	0.40	3	BOH	None	-	5:00	5:00	6:00	9	-	-	-	-	-	Back ache	
				4	Mrs.Solomon	14/05/01	3	H.W.	2,000	1	Yes	40	100	20	20	2	3	-	4	1:00	0.50	1	BOH	None	-	2:00	4:00	7:00	8	-	2	-	-	-	-	
				4	Mrs.Samson	14/05/01	3	Widow	1,000	1	Yes	60	80	40	20	2	3	-	2,5	0:03	1.00	2	BOH	None	-	1:30	2:00	5:00	5	2	-	1	1	-	-	
14	**Mgawi**	003/ 006	3				5.33		1,133			113	140	53	60					0:30	0.57	1.00				2:50	4:20	6:00	6.67	0.67	2.67	0.33	1.67	1.00	0.00	
				4	Mr.B.Lymoni	17/05/01	6	C.M.	1,500	1	Yes	120	140	60	60	2	3	-	4	0:30	0.50	1	BOH	None	-	3:00	5:00	6:00	8	1	1	-	1	1	-	
				4	Mr.J.Phinifolo	17/05/01	5	S.F.	900	1	Yes	120	160	60	60	2	3	-	3	0:30	0.60	1	BOH	None	-	3:00	5:00	6:00	5	1	3	-	3	1	-	
				4	Mr.T.Kadya Zogula	17/05/01	5	S.F.	1,000	1	Yes	100	120	40	60	2	3	-	4	0:30	0.60	1	BOH	None	-	2:30	3:00	6:00	7	-	4	1	1	1	-	
15	**Mitawa**	013	3				5.33		1,667			93	113	53	40					0:20	0.17	1.67				1:30	3:00	5:20	7.00	0.67	3.33	0.67	0.00	0.33	0.00	
				1	Mrs.Kuseni	12/05/01	4	H.W.	2,500	1	Yes	100	120	60	40	2	1	-	1,3	0:15	0.10	2	BOH	BH	1	1:15	2:00	5:00	6	-	4	1	-	-	-	BH(next vg.)
				1	Mrs.Alimu	12/05/01	7	H.W.	2,000	1	Yes	100	120	60	40	2	1	-	2	0:15	0.10	2	BOH	BH	1	1:15	2:00	5:00	9	1	2	1	-	-	-	BH(next vg.)

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

TAMBALA

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume Expected	Volume of Water Usage: Potable Water	Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty 1.Satisfied 2.Unsatisfied	Q'ty 1.Good 2.Fair 3.Not Good	Fetching Water (1.Under 10, 2.Under 20, 3.Under 30, 4.Under 40, 5.More than 40): Male	Fimale	Time Needed (hours)	Distance (km)	No. of Persons for Your Family (person)	Method of Carrying Water	Alternative Water Source: Type of Water Source	Distance (km)	Time Needed for (hours/day): Water Fetching	Domestic Cares	Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				1	Mrs.Che mbenusa	12/05/01	5	H.W.	500	1	Yes	80	100	40	40	2	1	-	5	0:30	0.30	1	BOH	None	-	2:00	5:00	6:00	6	1	4	-	-	1	-	
16	**Mapemba**	038	3				5.00		1,400			80	107	40	40					0:30	0.27	2.00				2:01	2:20	5:20	7.33	0.00	3.00	0.00	2.33	2.33	0.00	
				4	Mr.Amidu	14/05/01	4	S.F.	1,500	1	Yes	80	100	40	40	2	3	-	3	0:45	0.50	1	BOH	None	-	3:00	2:00	4:00	6	-	1	-	3	-	-	
				4	Mr.Y.White	14/05/01	8	S.F.	2,000	1	Yes	100	120	40	60	2	3	-	2,3,4	0:25	0.15	3	BOH	None	-	2:05	3:00	5:00	10	-	2	-	4	4	-	
				4	Mr.S.Mimu	14/05/01	3	S.F.	700	1	Yes	60	100	40	20	2	3	-	2,5	0:20	0.15	2	BOH	None	-	1:00	2:00	7:00	6	-	6	-	-	3	-	
17	**Kaundikiza**	020	3				2.00		1,000			53	73	33	20					0:21	0.18	1.00				1:00	2:20	5:40	3.67	0.33	1.00	0.67	1.00	0.00	0.00	
				4	Mr.Jeke	12/05/01	3	S.F.	500	1	Yes	80	100	60	20	1	3	-	5	0:25	0.15	1	BOH	None	-	1:40	3:00	7:00	4	-	1	-	3	-	-	
				4	Mrs.William	12/05/01	2	H.W.	1,000	1	Yes	40	60	20	20	2	3	-	2	0:20	0.20	1	BOH	None	-	0:40	2:00	5:00	4	1	-	2	-	-	-	
				4	Mrs.Philison	12/05/01	1	Widow	1,500	1	Yes	40	60	20	20	2	3	-	4	0:20	0.20	1	BOH	None	-	0:40	2:00	5:00	3	-	2	-	-	-	-	
18	**Kaphale**	009	3				3.00		933			87	113	60	27					0:26	0.17	1.00				2:45	4:00	5:20	6.00	0.67	0.67	0.00	1.00	0.33	0.00	
				4	Mrs.Jumg	16/05/01	3	H.W.	800	1	Yes	80	100	60	20	2	3	-	3	0:30	0.22	1	BOH	None	-	2:00	5:00	6:00	5	1	-	-	-	1	-	
				4	Mrs.Mwatha	16/05/01	2	H.W.	1,000	1	Yes	60	100	40	20	2	3	-	2	0:30	0.20	1	BOH	None	-	1:30	4:00	6:00	3	1	-	-	1	-	-	
				4	Mr.Nowa	16/05/01	4	C.M.	1,000	1	Yes	120	140	80	40	2	3	-	2	0:20	0.10	1	BOH	None	-	2:00	3:00	4:00	10	-	2	-	2	-	-	
19	**Kalimba**	009	3				4.67		1,833			87	113	47	40					0:18	0.13	1.33				1:20	2:00	6:20	7.00	0.67	1.00	1.33	1.00	0.33	0.00	
				4	Mr.G.Magwiya	12/05/01	4	S.F.	2,000	1	Yes	80	120	40	40	2	3			0:15	0.00	1	BOH	None	-	1:00	2:00	8:00	7	-	-	1	1	1	-	
				4	Mr.L.Kamtamda	12/05/01	4	S.F.	1,500	1	Yes	80	100	40	40	2	3	-	2,3	0:20	0.20	2	BOH	None	-	1:20	2:00	6:00	6	2	1	-	2	-	-	
				4	Mr.Billy	12/05/01	6	S.F.	2,000	1	Yes	100	120	60	40	2	3	-	3	0:20	0.20	1	BOH	None	-	1:40	2:00	5:00	8	-	2	3	-	-	-	
~~20~~	~~**Mankhambaza**~~																																			
21	**Kafwafwa**	016	3				3.67		2,167			73	93	40	33					0:23	0.23	1.33				1:26	3:20	5:20	6.33	0.33	2.67	0.33	0.00	0.00	0.00	
				3	Mrs.Chaduka	11/05/01	5	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	5	0:30	0.30	1	BOH	None	-	2:00	6:00	6:00	8	1	4	-	-	-	-	
				3	Mrs.Malewinya	11/05/01	4	H.W.	2,000	1	Yes	100	120	60	40	2	3	-	4	0:20	0.20	1	BOH	USW	1.5	1:40	2:00	5:00	6	-	2	-	-	-	-	USW(next vg.)
				3	Mrs.Musapi	11/05/01	2	H.W.	2,500	1	Yes	40	60	20	20	2	3	-	2,4	0:20	0.20	2	BOH	USW	1.5	0:40	2:00	5:00	5	-	2	1	-	-	-	USW(next vg.)
22	**Mfumbwa**	007	3				6.33		1,900			107	153	27	80					1:00	0.47	1.67				6:00	2:40	6:20	9.67	0.00	1.00	0.00	0.33	0.00	0.00	
				4	Mrs.B.Edimondi	15/04/01	8	H.W.	1,000	1	Yes	120	160	40	80	2	3	-	2	1:00	0.40	2	BOH	-	-	6:00	3:00	7:00	20	-	-	-	-	-	-	
				4	Mrs.Kumbayela	15/04/01	8	H.W.	800	1	Yes	100	140	20	80	2	3	-	4	1:00	0.50	1	BOH	-	-	7:00	2:00	8:00	3	-	-	-	-	-	-	
				4	O.M.Bwanali	15/04/01	3	Teacher	3,900	1	Yes	100	160	20	80	1	3	2	3	1:00	0.50	2	BOH	-	-	5:00	3:00	4:00	6	-	3	-	1	-	-	
~~23~~	~~**Mzinga**~~																																			
25	**Napwanga**	008	2				5.00		1,250			110	170	20	90					0:30	0.35	1.50				2:45	3:30	6:30	6.50	0.00	4.50	0.00	2.50	0.00	0.00	
				4	Annie Leueni	15/05/01	7	S.F.	1,500	1	Yes	120	180	20	100	2	3	-	4,5	0:30	0.40	2	BOH	BH	0.7	3:00	3:00	7:00	3	-	1	-	3	-	-	
				4	Mrs.Patuma Tenesi	15/05/01	3	H.W.	1,000	1	Yes	100	160	20	80	2	3	-	4	0:30	0.30	1	BOH	-	-	2:30	4:00	6:00	10	-	8	-	2	-	-	
26	**Kumaunda(2)**	012	3				4.33		1,667			93	122	57	37					0:35	0.47	2.00				2:40	3:40	5:20	6.33	0.00	1.33	0.67	0.67	0.33	0.00	
				4	Mrs.Abili Anusa	12/05/01	4	H.W.	500	1	Yes	120	160	80	40	2	3	-	5	0:45	0.40	2	BOH	None	-	4:30	7:00	6:00	8	-	-	-	-	1	-	
				4	Mrs.Lifa	12/05/01	7	H.W.	2,000	1	Yes	100	125	50	50	2	3	-	2,4	0:30	0.50	3	BOH	None	-	2:00	2:00	5:00	8	-	2	2	2	-	-	
				4	Mr.S.Saizi	12/05/01	2	S.F.	2,500	1	Yes	60	80	40	20	2	3	-	3	0:30	0.50	1	BOH	None	-	1:30	2:00	5:00	3	-	2	-	-	-	-	
27	**Chipango**	019	3				4.33		1,200			100	134	37	63					0:38	0.80	1.67				3:11	4:40	6:00	4.67	0.33	3.67	0.00	0.67	0.67	0.00	
				4	Mrs.Lyson	17/05/01	3	H.W.	600	1	Yes	100	160	30	70	2	3	-	2,4	0:45	0.25	2	BOH	None	-	3:45	6:00	6:00	5	-	2	-	-	1	-	
				4	Mr.Nyumba yafili	17/05/01	4	S.F.	1,500	1	Yes	100	102	40	60	2	3	-	2,4	0:25	2.00	2	BOH	None	-	2:05	5:00	5:00	4	-	3	-	2	1	-	
				4	Mr.William	17/05/01	6	S.F.	1,500	1	Yes	100	140	40	60	2	3	-	5	0:45	0.15	1	BOH	None	-	3:45	3:00	7:00	5	1	6	-	-	-	-	
28	**Nganya**	020	3				5.00		700			127	167	47	80					0:20	0.21	2.33				2:00	4:40	7:00	6.67	0.00	0.33	0.33	2.33	1.33	0.00	
				3	Mrs.Saidi	17/05/01	4	H.W.	700	1	Yes	100	120	40	60	2	3	-	2	0:30	0.25	2	BOH	None	-	2:30	6:00	6:00	8	-	-	1	1	1	-	
				3	Mrs.Dalawezo	17/05/01	7	H.W.	900	1	Yes	200	240	60	140	2	3	-	2,3,5	0:15	0.20	3	BOH	None	-	2:30	5:00	7:00	7	-	-	-	2	2	-	
				3	Mr.K.Mpombe	17/05/01	4	S.F.	500	1	Yes	80	140	40	40	2	3	-	2,5	0:15	0.18	2	BOH	None	-	1:00	3:00	8:00	5	-	1	-	4	1	-	
30	**Chingo**	021	3				5.00		1,400			73	107	40	33					0:15	0.17	1.67				0:55	2:40	5:20	6.00	1.00	1.33	2.00	1.00	0.00	0.00	
				4	Mrs.Pazanje	12/05/01	4	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	2,4	0:15	0.20	2	BOH	None	-	1:00	2:00	5:00	6	2	2	-	3	-	-	
				4	Mrs.Chirambo	12/05/01	8	H.W.	2,000	1	Yes	80	120	40	40	2	3	-	2,4	0:15	0.15	2	BOH	None	-	1:00	2:00	6:00	10	1	2	6	-	-	-	
				4	Mrs.Abilimasi	12/05/01	3	Widow	700	1	Yes	60	100	40	20	2	3	-	5	0:15	0.15	1	BOH	None	-	0:45	4:00	5:00	2	-	-	-	-	-	-	
31	**Mbakama**	021	3				4.00		2,500			90	113	43	35					0:13	0.22	1.00				0:55	2:40	5:20	6.00	0.00	1.33	1.67	0.00	0.00	0.00	
				4	E.Samali	12/05/01	5	Carpenter	3,000	1	Yes	90	120	30	60	2	3	-	4	0:10	0.10	1	BOH	None	-	0:30	4:00	5:00	5	-	1	1	-	-	-	
				4	Mr.Kalanga	12/05/01	5	S.F.	2,000	1	Yes	100	120	60	40	2	3	-	3	0:15	0.30	1	BOH	None	-	1:15	2:00	5:00	7	-	2	2	-	-	-	
				4	Mr.Kanduma	12/05/01	2	S.F.	2,500	1	Yes	80	100	40	4	2	3	-	2	0:15	0.25	1	BOH	None	-	1:00	2:00	6:00	6	-	1	2	-	-	-	
32	**Matupa**	022	3				5.67		1,633			100	73	53	47					0:12	0.07	2.00				0:56	2:00	6:00	12.00	1.00	1.00	0.67	1.33	0.33	0.00	
				1	Mr.Jasa	09/05/01	8	S.F.	900	1	Yes	120		60	60	2	1	-	2,4	0:07	0.012	3	BOH	R/D	0.02	0:35	2:00	8:00	24	2	3	-	2	1	-	
				4	Mrs.Chintila	09/05/01	4	H.W.	2,000	1	Yes	100	120	60	40	2	3	-	4	0:15	0.10	1	BOH	None	-	1:15	2:00	5:00	6	1	-	2	1	-	-	
				4	Mr.Atawa	09/05/01	5	S.F.	2,000	1	Yes	80	100	40	40	2	3	-	1,4	0:15	0.10	2	BOH	None	-	1:00	2:00	5:00	6	-	-	-	1	-	-	
33	**Kanyama/Mikuyu**	001	3				4.00		1,067			60	93	33	27					0:30	0.22	1.00				1:30	5:40	6:00	4.67	0.33	3.33	1.33	1.33	1.00	0.00	
				4	Mr.Khweko	18/05/01	3	C.M.	1,000	1	Yes	40	60	20	20	2	3	-	4	0:30	0.20	1	BOH	None	-	1:00	5:00	6:00	4	-	3	2	1	1	-	
				4	Mr.Panganani	18/05/01	5	C.M.	1,000	1	Yes	80	100	40	40	2	3	-	3	0:30	0.25	1	BOH	None	-	2:00	6:00	6:00	4	-	6	-	2	1	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

TAMBALA

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty 1.Satisfied 2.Unsatisfied	Q'ty and Q'nty of Potable Water: Q'ty 1.Good 2.Fair 3.Not Good	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				4	Mrs.Mzamba	18/05/01	4	H.W.	1,200	1	Yes	60	120	40	20	2	3	-	4	0:30	0.22	1	BOH	None	-	1:30	6:00	6:00	6	1	1	2	1	1	-	
34	**Chiboli**	002	3				3.67		1,333			100	127	47	53					0:25	0.17	1.00				2:01	5:40	6:00	9.67	0.33	2.00	0.67	0.00	1.67	0.00	
				4	Mrs.Patrick	18/05/01	3	H.W.	2,000	1	Yes	80	120	40	40	2	3	-	3	0:30	0.20	1	BOH	None	-	2:00	5:00	6:00	8	-	4	1	-	2	-	
				4	Mrs.Nambewe	18/05/01	3	H.W.	1,000	1	Yes	100	120	40	60	2	3	-	5	0:25	0.17	1	BOH	None	-	2:05	5:00	6:00	6	-	-	-	-	1	-	
				4	Mrs.Abiti Bonongwe	18/05/01	5	H.W.	1,000	1	Yes	120	140	60	60	2	3	-	5	0:20	0.15	1	BOH	None	-	2:00	7:00	6:00	15	1	2	1	-	2	-	
35	**Chigumula**	001	3				3.33		633			73	93	40	33					0:26	0.20	1.00				1:40	5:20	5:00	5.00	1.00	1.67	0.67	0.00	0.67	0.00	
				4	Mr.Zagwa	18/05/01	4	C.M.	800	1	Yes	60	80	20	40	2	3	-	3	0:20	0.20	1	BOH	None	-	1:00	5:00	5:00	5	1	3	-	-	-	-	
				4	Mr.Kalekeni	18/05/01	2	C.M.	700	1	Yes	80	100	40	40	2	3	-	2	0:15	0.15	1	BOH	None	-	1:00	6:00	4:00	3	-	2	1	-	1	-	
				4	Mrs.Kozowe	18/05/01	4	H.W.	400	1	Yes	80	100	60	20	2	3	-	3	0:45	0.25	1	BOH	None	-	3:00	5:00	6:00	7	2	-	1	-	1	-	
36	**Nyangu**	001	3				4.33		1,500			127	153	53	73					0:15	0.17	1.67				1:35	5:40	6:20	7.00	0.33	1.67	0.67	0.33	1.00	0.00	
				4	Mrs.George	18/05/01	3	H.W.	1,000	1	Yes	60	100	20	40	2	3	-	3	0:15	0.15	1	BOH	None	-	0:45	6:00	6:00	5	1	3	-	-	1	-	
				4	Mrs.Batuweli	18/05/01	8	H.W.	2,000	1	Yes	180	200	60	120	2	3	-	2,5	0:15	0.15	3	BOH	None	-	2:15	5:00	7:00	12	-	1	1	1	1	-	
				4	Mrs.Chisale	18/05/01	2	H.W.	1,500	1	Yes	140	160	80	60	2	3	-	3	0:15	0.20	1	BOH	None	-	1:45	6:00	6:00	4	-	1	1	-	1	-	
37	**Kapanda**	001	3				4.00		1,533			73	113	33	40					0:38	0.24	1.00				2:25	4:40	5:20	8.33	0.00	3.67	0.67	0.00	1.33	0.00	
				4	Mr.Jojeph	18/05/01	5	S.F.	2,000	1	Yes	80	120	40	40	2	3	-	3	0:45	0.25	1	BOH	None	-	3:00	3:00	5:00	15	-	3	-	-	1	-	
				4	Mrs.Kayitama	18/05/01	3	H.W.	600	1	Yes	60	80	20	40	2	3	-	4	0:25	0.20	1	BOH	None	-	1:15	7:00	5:00	4	-	3	-	-	1	-	
				4	Mr.Chokochani	18/05/01	4	S.F.	2,000	1	Yes	80	140	40	40	2	3	-	3	0:45	0.27	1	BOH	None	-	3:00	4:00	6:00	6	-	5	2	-	2	-	
38	**~~Mafolera~~**	001																																		
39	**Kapazila**	001	3				5.00		1,233			100	147	47	53					0:13	0.09	2.33				1:10	5:40	5:20	11.67	0.00	1.00	0.00	0.00	1.33	0.00	
				4	Mr.Nyadani	18/05/01	3	C.M.	1,500	1	Yes	60	80	40	20	2	3	-	3	0:10	0.05	1	BOH	None	-	0:30	6:00	4:00	7	-	-	-	-	1	-	
				4	Mrs.Dzimbin	18/05/01	6	H.W.	1,200	1	Yes	100	160	40	60	2	3	-	2,4	0:15	0.12	3	BOH	None	-	1:15	6:00	6:00	15	-	3	-	-	2	-	
				4	Mrs.Fositala	18/05/01	6	H.W.	1,000	1	Yes	140	200	60	80	2	3	-	2,5	0:15	0.10	3	BOH	None	-	1:45	5:00	6:00	13	-	-	-	-	1	-	
40	**~~Chipokosa~~**	001																																		
41	**Chokoma**	010	3				3.00		833			53	87	27	27					0:15	0.15	1.00				0:50	6:20	6:00	7.67	0.00	2.67	0.33	0.00	1.33	0.00	
				4	Mrs.Petro	18/05/01	4	H.W.	700	1	Yes	60	80	40	20	2	3	-	3	0:15	0.10	1	BOH	None	-	0:45	7:00	6:00	8	-	2	-	-	1	-	
				4	Mrs.Nayele	18/05/01	3	H.W.	800	1	Yes	60	100	20	40	2	3	-	4	0:15	0.20	1	BOH	None	-	0:45	5:00	6:00	13	-	4	1	-	2	-	
				4	Mrs.Jonifani	08/05/01	2	H.W.	1,000	1	Yes	40	80	20	20	2	3	-	5	0:15	0.15	1	BOH	None	-	1:00	7:00	6:00	2	-	2	-	-	1	-	
42	**~~Kanonyere~~**[*2]																																			
43	**~~Mzingo~~**																																			
44	**Mzikamanda(A)**	001	3				4.67		467			113	153	53	60					8:30	0.65	1.00				4:40	4:00	6:00	7.00	0.00	0.67	0.00	0.00	0.67	0.00	
				4	Mrs.Jailosi	18/05/01	6	H.W.	400	1	Yes	160	200	80	80	2	3	-	4	0:45	0.50	1	BOH	None	-	6:00	4:00	7:00	11	-	-	-	-	1	-	
				4	Mrs.Liyana	18/05/01	4	H.W.	500	1	Yes	80	120	40	40	2	3	-	3	0:45	0.55	1	BOH	None	-	3:00	4:00	5:00	6	-	2	-	-	1	-	
				4	Mr.Saidi Mlenga	18/05/01	4	C.M.	500	1	Yes	100	140	40	60	2	3	-	5	24:00	0.90	1	BOH	None	-	5:00	4:00	6:00	4	-	-	-	-	-	-	
45	**Kudembe**	002	3				4.00		967			90	113	48	42					0:23	0.26	1.00				1:16	6:40	5:40	5.67	0.00	1.00	0.33	0.00	0.33	0.00	
				4	Mrs.Fanuelo	18/05/01	3	H.W.	900	1	Yes	100	120	40	60	2	3	-	3	0:25	0.30	1	BOH	None	-	2:05	7:00	6:00	3	-	2	-	-	-	-	
				4	Mrs.Symoni	18/05/01	3	H.W.	800	1	Yes	80	100	60	20	2	3	-	4	0:15	0.20	1	BOH	None	-	1:00	7:00	5:00	4	-	1	-	-	1	-	
				4	Mrs.Patrick	18/05/01	6	H.W.	1,200	1	Yes	90	120	45	45	2	3	-	4	0:30	0.28	1	BOH	None	-	0:45	6:00	6:00	10	-	-	1	-	-	-	
46	**Mnenula**	026	3				3.67		1,167			80	107	47	33					0:20	0.50	1.33				1:20	2:00	5:20	6.33	2.00	2.33	1.33	1.33	0.00	0.00	
				3	Mrs.Mwasa	06/05/01	3	H.W.	1,000	1	Yes	60	80	40	20	2	3	-	4	0:20	0.50	1	BOH	USW	0.7	1:00	2:00	5:00	7	2	3	1	2	-	-	-
				3	Mrs.Alabi	06/05/01	2	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	4	0:20	0.50	1	BOH	USW	0.7	1:00	2:00	6:00	7	2	3	-	2	-	-	
				3	Mrs.Msitaba	06/05/01	6	H.W.	1,000	1	Yes	120	160	60	60	2	3	-	2,4	0:20	0.50	2	BOH	USW	0.7	2:00	2:00	5:00	5	2	1	3	-	-	-	
48	**Kaole**	015	3				3.67		1,067			67	120	20	47					1:30	0.60	1.00				4:40	3:40	5:00	7.33	0.00	3.67	0.33	0.33	0.00	0.00	
				4	Mr.A.Chakwana	14/05/01	3	B.M.	1,000	1	Yes	60	120	20	40	2	3	-	5	1:30	0.60	1	BOH	-	-	4:00	3:00	6:00	14	-	7	1	1	-	-	
				4	Mr.Kasikizi Falsoni	14/05/01	4	B.M.	1,500	1	Yes	80	140	20	60	2	3	-	4	1:35	0.70	1	BOH	-	-	6:00	4:00	5:00	5	-	3	-	-	-	-	
				4	Mr.Chikwanekwane	14/05/01	4	B.M.	700	1	Yes	60	100	20	40	2	3	-	3	1:25	0.50	1	BOH	-	-	4:00	4:00	4:00	3	-	1	-	-	-	Celebral malaria 3	
49	**Msanyama**		3				4.33		767			67	93	33	33					0:45	0.31	1.00				2:30	7:00	5:00	6.67	0.00	2.67	0.67	0.00	1.33	0.00	
				4	Mrs.Jasamu	17/05/01	4	H.W.	1,000	1	Yes	80	120	40	40	2	3	-	3	0:45	0.35	1	BOH	None	-	3:00	8:00	4:00	7	-	2	-	-	1	-	
				4	Mrs.Mkhalepo	17/05/01	3	H.W.	700	1	Yes	40	60	20	20	2	3	-	3	0:45	0.30	1	BOH	None	-	1:30	6:00	6:00	4	-	1	2	-	1	-	
				4	Mrs.Kaziputa	17/05/01	6	H.W.	600	1	Yes	80	100	40	40	2	3	-	5	0:45	0.29	1	BOH	None	-	3:00	7:00	5:00	9	-	5	-	-	2	-	
50	**Bowa**	017	3				7.67		700			58	115	22	37					0:35	0.43	2.00				1:30	3:40	7:00	6.00	0.67	5.00	0.67	1.00	0.67	0.00	
				3	Mrs.S.Lingisoni	14/05/01	8	H.W.	700	1	Yes	60	100	20	40	2	3	-	2,3	0:30	0.40	2	BOH	River	0.6	1:30	3:00	8:00	3	-	10	-	-	-	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty 1.Satisfied 2.Unsatisfied	Q'ty and Q'nty of Potable Water: Q'ty 1.Good 2.Fair 3.Not Good	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				3	Mrs.Chekani	14/05/01	7	H.W.	600	1	Yes	40	120	20	20	2	3	-	2,4	0:30	0.40	2	BOH	River	0.6	1:00	4:00	6:00	6	2	3	-	3	-	Celebral malaria 3	
				3	Mr.Kweni Chitaka	14/05/01	8	C.M.	800	1	Yes	75	125	25	50	2	3	-	2,4	0:45	0.50	2	BOH	-	-	2:00	4:00	7:00	9	-	2	2	-	2	-	
51	Chiumbe	003	3				3.67		1,333			100	140	60	40					0:33	0.60	1.67				2:53	2:40	5:20	4.33	0.33	0.67	1.00	0.33	0.67	0.00	
				4	Mr.C.William	14/05/01	6	S.F.	2,000	1	Yes	160	200	80	80	2	3	-	1,4	0:45	1.50	2	BOH	River	3	6:00	2:00	5:00	9	-	2	-	-	-	-	
				4	Mr.Mlozi Abuda	14/05/01	2	C.M.	1,000	1	Yes	60	120	40	20	2	3	-	4	0:45	0.25	1	BOH	None	-	2:00	2:00	5:00	2	1	-	-	-	1	-	
				4	Mrs.E.Makande	14/05/01	3	H.W.	1,000	1	Yes	80	100	60	20	2	3	-	3,4	0:10	0.05	2	BOH	None	-	0:40	4:00	6:00	2	-	-	3	1	1	-	
52	Maganga 2	003	3				5.67		4,667			100	160	33	67					0:31	0.33	1.67				2:40	3:40	6:00	5.00	0.00	1.00	0.00	0.00	0.00	0.00	
				4	Ms.Achiwa Akibu	15/05/01	8	S.F.	2,000	1	Yes	140	200	40	100	2	3	-	3,4	0:30	0.30	2	BOH	River	0.7	3:30	4:00	6:00	3	-	1	-	-	-	-	
				4	Ms.Chizimba Taka	15/05/01	5	H.W.	2,000	1	Yes	80	140	20	60	2	3	-	4	0:35	0.40	1	BOH	-	-	2:30	4:00	6:00	9	-	2	-	-	-	-	
				4	Mr.Sula Taxi	15/05/01	4	B.M.	10,000	1	Yes	80	140	40	40	2	3	-	2,3	0:30	0.30	2	BOH	River	0.6	2:00	3:00	6:00	3	-	-	-	-	-	-	
53	Zande	012	3				3.67		1,133			60	87	33	27					0:16	0.22	1.67				0:51	3:20	5:40	6.67	1.00	1.00	1.33	2.00	1.67	0.00	
				4	Mrs.Mafukeni	12/05/01	4	D.W.	1,000	1	Yes	60	80	40	20	2	3	-	2,4	0:15	0.25	2	BOH	None	-	0:45	2:00	6:00	7	1	2	3	2	1	-	
				4	Mrs.A.Blach	12/05/01	2	D.W.	1,500	1	Yes	40	60	20	20	2	3	-	5	0:15	0.25	1	BOH	None	-	0:30	2:00	5:00	3	2	1	1	4	2	-	
				4	Mrs.Meya	12/05/01	5	H.W.	900	1	Yes	80	120	40	40	2	3	-	2,4	0:20	0.15	2	BOH	None	-	1:20	6:00	6:00	10	-	-	-	-	2	-	
54	Kunchinza	007	3				6.67		667			93	160	27	67					0:40	0.37					3:10	3:20	6:20	18.00	0.00	12.33	0.00	0.33	1.00	0.00	
				4	Mrs.Zao Ajidu	15/05/01	5	S.F., H.W.	1,000	1	Yes	100	180	20	80	2	3	-	2,4	0:30	0.30	2	BOH	-	-	2:30	3:00	7:00	21	-	10	-	-	2	-	
				4	Mr.White John	15/05/01	9	F.	1,000	1	Yes	100	180	40	60	2	3	-	2,3,4	0:50	0.40	3	BOH	-	-	4:00	4:00	6:00	23	-	12	-	-	1	-	
				4	Mrs.Zione	15/05/01	6	H.W.		1	Yes	80	120	20	60	2	3	-	3	0:40	0.40	1	BOH	Down stream of a river	0.6	3:00	3:00	6:00	10	-	15	-	1	-	-	
56	Kazembe 2	008	3				4.33		767			120	147	53	67					0:15	0.12	2.33				1:30	7:00	5:00	9.67	0.33	0.00	0.00	2.33	1.33	0.00	
				4	Mrs.Annie	17/05/01	3	H.W.	1,000	1	Yes	120	140	60	60	2	3	-	2,4	0:15	0.15	2	BOH	None	-	1:30	8:00	4:00	9	1	-	-	1	1	-	
				4	Mrs.Nganizyo	17/05/01	7	H.W.	600	1	Yes	160	200	60	100	2	3	-	2,4	0:15	0.12	3	BOH	None	-	2:00	7:00	5:00	12	-	-	-	4	2	-	
				4	Mrs.Fbula	17/05/01	3	H.W.	700	1	Yes	80	100	40	40	2	3	-	2,4	0:15	0.10	2	BOH	None	-	1:00	6:00	6:00	8	-	-	-	2	1	-	
57	Kawire	008	3				5.00		2,267			80	127	20	60					0:41	0.43	1.33				3:00	3:40	6:20	6.33	0.33	3.00	0.00	0.67	0.00	0.00	
				4	Mrs.Amina Maligeni	15/05/01	7	H.W.	800	1	Yes	100	160	20	80	2	3	2,4	-	0:45	0.40	2	BOH	-	-	4:00	5:00	6:00	7	1	6	-	-	-	-	
				4	Mr.Molesi	15/05/01	5	B.M.	4,000	1	Yes	80	140	20	60	2	3	-	3	0:40	0.50	1	BOH	-	-	3:00	3:00	5:00	5	-	-	-	2	-	-	
				4	Mrs.Prima Chisande	15/05/01	3	H.W.	2,000	1	Yes	60	80	20	40	2	3	-	3	0:40	0.40	1	BOH	-	-	2:00	3:00	8:00	7	-	3	-	-	-	-	
58	Gwengwe Chilungusi	017	3				8.33		433			67	113	20	47					0:45	0.53	2.67				2:40	3:00	6:20	11.00	0.00	1.67	0.00	0.00	0.67	0.00	
				4	Mr.Yobe Mose	14/05/01	11	S.F.	500	1	Yes	60	160	20	40	2	3	-	1,2	0:35	0.50	3	BOH	-	-	2:00	3:00	7:00	20	-	5	-	-	2	-	
				4	Mrs.Nafukasi Wailesi	14/05/01	6	H.W.	400	1	Yes	80	100	20	60	2	3	-	1,3	0:40	0.50	2	BOH	-	-	3:00	3:00	6:00	10	-	-	-	-	-	-	
				4	Mrs.Florence Chelinje	14/05/01	8	H.W.	400	1	Yes	60	80	20	40	2	3	-	2,5	1:00	0.60	3	BOH	-	-	3:00	3:00	6:00	3	-	-	-	-	-	-	
59	~~Mmong'ono~~																																			
60	Shuga	021	3				6.67		1,333			113	153	60	53					0:20	0.50	1.67				1:53	2:00	5:00	6.00	2.00	2.67	1.00	0.33	0.00	0.00	
				4	Mrs.Yusufu	06/05/01	7	H.W.	1,500	1	Yes	120	160	60	60	2	3	-	1,4	0:20	0.50	2	BOH	None	-	2:00	2:00	5:00	5	2	3	-	-	-	-	
				4	Mrs.Siderecle	06/05/01	8	H.W.	1,000	1	Yes	140	200	80	60	2	3	-	1,3	0:20	0.50	2	BOH	None	-	2:20	2:00	5:00	7	2	5	-	-	-	-	
				4	Mrs.Saidi	06/05/01	5	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	4	0:20	0.50	1	BOH	None	-	1:20	2:00	5:00	6	2	-	3	1	-	-	
61	Likangala	034	3				5.33		1,333			73	100	40	33					0:15	0.32	1.33				0:55	2:00	5:20	8.00	1.33	6.00	1.67	3.33	0.00	0.00	
				4	Mr.Mdala	06/05/01	8	S.F.	1,500	1	Yes	100	140	60	40	2	3	-	3	0:15	0.20	1	BOH	None	-	1:15	2:00	5:00	9	3	5	-	5	-	-	
				4	Mrs.Kapepe	06/05/01	5	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	2,3	0:15	0.35	2	BOH	None	-	1:00	2:00	6:00	6	1	5	2	1	-	-	
				4	Mrs.Saidi	06/05/01	3	H.W.	1,000	1	Yes	40	60	20	20	2	3	-	2	0:15	0.40	1	BOH	None	-	0:30	2:00	5:00	9	-	8	3	4	-	-	
62	Matsikila	006	3				5.67		1,167			47	80	33	13					1:15	0.35	1.67				2:45	5:20	5:40	11.00	0.00	3.33	1.33	0.67	1.33	0.00	
				4	Mrs.May	17/05/01	5	Widow	1,000	1	Yes	60	100	40	20	2	3	-	2,4	0:45	0.25	2	BOH	None	-	2:15	6:00	6:00	11	-	3	1	-	2	-	
				4	Mr.S.Manyozo	17/05/01	3	S.F.	1,500	1	Yes	40	60	20	20	2	3	-	3	1:30	0.40	1	BOH	None	-	3:00	6:00	5:00	7	-	1	3	1	1	-	
				4	Mr.Kaburiri	17/05/01	9	S.F.	1,000	1	Yes	40	80	40	-	2	3	-	2,4	1:30	0.40	2	BOH	None	-	3:00	4:00	6:00	15	-	6	-	1	1	-	
63	Matipa (Mkundi)	007	3				4.33		1,333			93	113	53	40					0:15	0.17	1.33				1:13	2:00	5:00	5.33	2.00	0.00	2.67	0.00	0.00	0.00	
		(CHAUMA)		1	Mrs.Gumbe	06/05/01	4	H.W.	1,500	1	Yes	100	120	60	40	2	1	-	3	0:20	0.50	1	BOH	None	-	1:40	2:00	5:00	6	2	-	3	-	-	-	
				1	Mrs.Alima	06/05/01	5	H.W.	1,000	1	Yes	100	120	60	40	2	1	-	2,3	0:10	0.001	2	BOH	None	-	1:00	2:00	5:00	5	2	-	2	-	-	-	
				1	Mrs.Wiliam	06/05/01	4	H.W.	1,500	1	Yes	80	100	40	40	2	1	-	4	0:15	0.002	1	BOH	None	-	1:00	2:00	5:00	5	2	-	3	-	-	-	
	Total 59 Villages		**149**				**4.19**		**1,168**			**78**	**107**	**37**	**40**					**0:31**	**0.26**	**1.30**				**1:44**	**3:32**	**4:59**								

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

Village Headman (CHAUMA)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use: River/Dambo: Perennial Flow or Not	River/Dambo: Water Quality	Unprotected Shallow Well: No.	Unprotected Shallow Well: Water Quality	Unprotected Shallow Well: Dried-up or Not	Protected Shallow Well: No.	Protected Shallow Well: Water Quality	Protected Shallow Well: Dried-up or Not	Borehole: No.	Borehole: Water Quality	Borehole: Dried-up or Not	Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family (Buckets)	Average Volume of Water Usage per Family (liter)	Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates: South Latitude	Coordinates: East Longitude
TRADITIONAL AUTHORITY CHAUMA																														
1	Kachulu	039 (Tambala)	Kachulu	97	417	1,500	S.F.	None			1	Bad	Not							USW(very long time ago)/now in use	BOH	5	100	Not	Yes	Yes	Yes		14° 05' 51"	34° 12' 36"
2	Muonda	001	Muonda	39	168	1,000	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		14° 02' 30"	34° 08' 26"
3	Sapita	002	Sapita	100	430	1,000	S.F.	None			2	Bad	D.U.							USWs(1992)/now in use	BOH	5	100	Not	Yes	Yes	Yes		14° 03' 25"	34° 08' 25"
4	*Mkhumbwa*	001	Mkhumbwa	150	645	1,200	S.F.	School			1	Bad	Not							USW(1982)/now in use	BOH	7	140	Not	Yes	Yes	Yes	F=1.0(USW)	14° 03' 14"	34° 08' 16"
5	*Chiwaza*	001	Chiwaza	43	185	1,400	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		14° 02' 04"	34° 08' 47"
6	Kambuwe	010	Kambuwe	53	228	700	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 05' 17"	34° 07' 57"
7	Mnthambwe	012	Mnthambwe	80	344	800	S.F.	None			2	Bad	Not							USWs(1960's)/now in use	BOH	3	60	Not	Yes	Yes	Yes	F=0.5(USW)	14° 06' 52"	34° 09' 52"
8	*Linyama/Chatsika*	013	Linyama	100	430	1,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 06' 09"	34° 10' 45"
9	Chikumba	013	Chikumba	240	1,032	1,200	S.F.	None			3	Bad	Not							USWs(1990)/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 06' 25"	34° 10' 47"
10	Chisasa II	014	Chisasa	39	168	1,500	S.F.	None			1	Bad	D.U.				1	-	-	USW originally; PSW currently with pump removed and in use. BH (AFRIDEV 1994)/not working since last 2 years (Repairable) ※※	BOH	3	90	Not	Yes	Yes	Yes	F=2.0(USW)	14° 05' 50"	34° 11' 00"
12	Miyowe	015	Miyowe	80	344	1,400	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes	R/D F=1.0	14° 07' 29"	34° 11' 22"
15	*Thunduzi*	010	Thunduzi	34	146	1,500	S.F.	None			1	Bad	Not							USW(1982)/now in use	BOH	5	100	Not	Yes	Yes	Yes	34(Thunduzi)+14(Kayesera)+20(Mjolo)=68 households	14° 05' 38"	34° 08' 14"
16	Kumlenga	014	Kumlenga	39	168	900	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes		14° 06' 19"	34° 11' 04"
17	Gonkho	003	Gonkho	300	1,290	1,000	S.F.	None			4	Bad	Not				1	-	-	USWs(1960)/now in use BH(AFRIDEV 1992)/not working now, no pump head (Repairable) ※※	BOH	4	80	Not	Yes	Yes	Yes		14° 03' 56"	34° 08' 08"
18	Kudoko	007	Kudoko	40	172	1,000	S.F.	None									1	Good	Not	BH(1997)/now in use Water comes after long pumping ※	BOH	4	80	Not	Yes	Yes	Yes		14° 05' 13"	34° 11' 48"
19	Mthawanthu	012	Mthawathu	120	516	1,200	S.F.	None			2	Bad	D.U.							USWs(1980)/now in use	BOH	5	100	Not	Yes	Yes	Yes		14° 07' 23"	34° 09' 36"
	Total 16 Villages			**97**	**418**	**1,144**																	**93**							

NOTES：※ ; Existing BH being in operation was confirmed by Electric Prospecting Survey Team.
※※ ; Existing BH being out of order was confirmed by Electric Prospecting Survey Team.

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
BOH=Bucket on Head P.F.=Perennial Flow D.U.=Dried Up C.U.=Concern Universal

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use		Volume of Water Usage		Q'ty and Q'nty of Potable Water		Fetching Water						Alternative Water Source		Time Needed for (hours/day)			Diseases Affecting the Family (for the past 1 year) (person)							Others
				1.BH 2.PSW 3.USW 4.R/D						1.Necessary 2.Not Necessary		Present Volume	Volume Expected	Potable Water	Water for Washing	Q'nty 1.Satisfied 2.Unsatisfied	Q'ty 1.Good 2.Fair 3.Not Good	1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40 Male	Fimale	Time Needed (hours)	Distance (km)	No. of Persons for Your Family (person)	Method of Carrying Water	Type of Water Source	Distance (km)	Water Fetching	Domestic Cares	Farming Practices	Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	
TRADITIONAL AUTHORITY CHAUMA																																				
1	**Kachulu**	039	3				4.33		1,500			87	107	40	47					0:21	0.12	1.67				1:10	3:40	4:40	7.33	0.67	1.00	1.00	2.33	0.33	0.00	
		(Tambala)		3	Mrs.Yasini	09/05/01	3	H.W.	1,000	1	Yes	60	80	20	40	2	3	-	3	0:30	0.20	1	BOH	None	-	0:40	7:00	5:00	10	-	1	-	5	1	-	
				3	Mr.Wayson Sawanga	09/05/01	5	S.F.	2,000	1	Yes	80	100	40	40	2	3	-	3	0:20	0.05	1	BOH	None	-	1:20	2:00	5:00	6	1	1	2	1	-	-	-
				3	Mrs.Makandanje	09/05/01	5	H.W.	1,500	1	Yes	120	140	60	60	2	3	-	1,2,4	0:15	0.10	3	BOH	None	-	1:30	2:00	4:00	6	1	1	1	1	-	-	
2	**Muonda**	001	3				5.67		1,600			100	167	40	60					0:15	0.19	2.33				1:15	3:40	7:40	6.67	0.33	1.00	0.00	0.00	0.00	0.00	
				4	Mrs.Kuseli	10/05/01	6	H.W.	1,100	1	Yes	100	140	40	60	2	3	-	2,4	0:15	0.15	2	BOH	None	-	1:15	4:00	7:00	9	-	-	-	-	-	-	
				4	Mrs.Mtuusautsa	10/05/01	7	H.W.	1,200	1	Yes	100	160	40	60	2	3	-	2,3,5	0:15	0.22	3	BOH	None	-	1:15	4:00	8:00	5	1	-	-	-	-	-	
				4	Mr.H. Matima	10/05/01	4	S.F.	2,500	1	Yes	100	200	40	60	2	3	-	2,4	0:15	0.20	2	BOH	None	-	1:15	3:00	8:00	6	-	3	-	-	-	-	
3	**Sapita**	002	3				5.67		333			73	107	30	43					0:35	0.33	2.00				2:15	4:20	6:00	8.67	0.00	1.33	0.67	0.00	1.00	0.00	
				3	Mrs.Chilowa	10/05/01	4	H.W.	-	1	Yes	60	80	20	40	2	3	-	4	0:30	0.30	1	BOH	None	-	1:30	6:00	5:00	6	-	-	1	-	1	-	
				3	Mrs.Malizani	10/05/01	4	H.W.	-	1	Yes	60	80	20	40	2	3	-	3	0:30	0.30	1	BOH	None	-	1:30	4:00	7:00	9	-	-	-	-	1	-	
				3	Mr.Kampido	10/05/01	9	S.F.	1,000	1	Yes	100	160	50	50	2	3	-	1,5	0:45	0.40	4	BOH	None	-	3:45	3:00	6:00	11	-	4	1	-	1	-	
4	**Mkhumbwa**	001	3				4.67		1,183			113	160	53	60					1:05	0.68	1.67				6:15	4:40	6:40	6.00	0.33	0.67	0.33	1.00	1.33	0.00	
				3	Mrs.Maxwell	10/05/01	6	H.W.	750	1	Yes	140	160	60	80	2	3	-	2,4	1:15	0.85	3	BOH	None	-	8:45	5:00	6:00	5	-	-	1	1	2	-	
				3	Mr.R.Damisun	10/05/01	4	Bricklayer	2,000	1	Yes	120	200	60	60	2	3	-	3	1:00	0.70	1	BOH	None	-	6:00	5:00	6:00	6	1	2	-	2	-	-	
				3	Mrs.Bernard	10/05/01	4	H.W.	800	1	Yes	80	120	40	40	2	3	-	3	1:00	0.50	1	BOH	None	-	4:00	4:00	8:00	7	-	-	-	-	2	-	
5	**Chiwaza**	001	3				3.33		900			47	73	27	20					0:26	0.28	1.00				1:00	6:00	5:20	5.00	0.00	4.00	0.00	0.00	0.00	0.00	
				4	Mrs.Kabachoka	10/05/01	3	H.W.	1,000	1	Yes	40	60	20	20	2	3	-	3	0:30	0.30	1	BOH	None	-	1:00	7:00	4:00	4	-	1	-	-	-	-	
				4	Mrs.David	10/05/01	3	H.W.	800	1	Yes	60	80	40	20	2	3	-	3	0:20	0.25	1	BOH	None	-	1:00	5:00	6:00	5	-	7	-	-	-	-	
				4	Mrs.Michael	10/05/01	4	H.W.	900	1	Yes	40	80	20	20	2	3	-	3	0:30	0.30	1	BOH	None	-	1:00	6:00	6:00	6	-	4	-	-	-	-	
6	**Kambuwe**	010	3				3.00		1,767			67	87	33	33					0:14	0.48	1.00				1:06	2:40	6:00	5.00	0.33	1.00	0.00	1.00	0.00	0.00	
				4	Mrs.Zafeniya	11/05/01	3	H.W.	3,000	1	Yes	100	120	40	60	2	3	-	5	0:10	0.04	1	BOH	BH	0.2	0:50	4:00	8:00	6	1	1	-	1	-	-	BH (Next villege-
				4	Mrs.Goliati	11/05/01	1	Widow	800	1	Yes	40	60	20	20	2	3	-	4	0:30	0.70	1	BOH	None	-	1:00	2:00	5:00	3	-	1	-	-	-	-	Kayetjera)
				4	Mrs.Fusani	11/05/01	5	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	3	0:03	0.70	1	BOH	None	-	1:30	2:00	5:00	6	-	1	-	2	-	-	
7	**Mnthambwe**	012	3				4.67		1,333			78	113	43	35					0:31	0.73	1.33				1:56	2:20	6:00	8.67	0.00	0.00	0.33	0.00	0.00	0.00	
				3	Mr.Chakupuka	09/05/01	4	S.F.	2,000	1	Yes	80	120	40	40	2	3	-	4	0:45	0.20	1	BOH	None	-	3:00	3:00	8:00	14	-	-	-	-	-	-	
				4	Mrs.Wazili	09/05/01	4	H.W.	-	1	Yes	75	100	50	25	2	3	-	3	0:30	1.00	1	BOH	None	-	1:30	2:00	5:00	6	-	-	-	-	-	-	
				4	Mrs.C.Cholozani	09/05/01	6	H.W.	2,000	1	Yes	80	120	40	40	2	3	-	2,4	0:20	1.00	2	BOH	None	-	1:20	2:00	5:00	6	-	-	1	-	-	-	
8	**Linyama/Chatsika**	013	3				4.00		1,400			67	93	33	33					0:30	0.28	1.67				1:40	3:20	5:20	6.00	0.67	1.67	0.00	0.00	0.33	0.00	
				4	Mrs.Annie	09/05/01	5	H.W.	700	1	Yes	60	100	20	40	2	3	-	4,5	0:30	0.25	2	BOH	None	-	1:30	6:00	6:00	7	1	-	-	-	1	-	
				4	Mrs.J.Seliasi	09/05/01	4	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	3	0:30	0.30	1	BOH	None	-	2:00	2:00	5:00	6	-	2	-	-	-	-	
				4	Mrs.C.Susila	09/05/01	3	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	2,3	0:30	0.30	2	BOH	None	-	1:30	2:00	5:00	5	1	3	-	-	-	-	
9	**Chikumba**	013	3				4.33		1,000			60	93	30	30					0:16	0.10	1.00				0:46	3:40	4:40	6.00	1.67	1.33	1.33	0.33	0.00	0.00	
				4	Mrs.M.Kuthenje	09/05/01	1	Widow	800	1	Yes	20	40	10	10	2	3	-	5	0:20	0.10	1	BOH	None	-	0:20	2:00	3:00	2	2	1	1	-	-	-	
				4	Mrs.Kcosiya	09/05/01	6	H.W.	1,500	1	Yes	80	120	40	40	2	3	-	4	0:15	0.10	1	BOH	None	-	1:00	2:00	5:00	8	2	2	3	-	-	-	
				4	Mrs.Kachulu	09/05/01	6	H.W.	700	1	Yes	80	120	40	40	2	3	-	4	0:15	0.10	1	BOH	None	-	1:00	7:00	6:00	8	1	1	-	1	-	-	
10	**Chisasa II**	014	3				4.33		1,500			73	107	33	40					0:15	0.05	2.33				0:55	2:00	6:00	5.33	0.00	2.33	0.33	0.67	0.00	0.00	
				3	Mrs.A.Chingoma	09/05/01	3	H.W.	2,000	1	Yes	80	100	40	40	2	2	-	1,5	0:15	0.05	2	BOH	None	-	1:00	2:00	4:00	5	-	2	-	-	-	-	
				3	Mrs.L.Chongoleka	09/05/01	4	H.W.	1,500	1	Yes	80	100	40	40	2	2	-	2,4	0:15	0.05	2	BOH	None	-	1:00	2:00	6:00	5	-	2	1	-	-	-	
				3	Mr.N.William	09/05/01	6	S.F.	1,000	1	Yes	60	120	20	40	2	3	-	2,3,5	0:15	0.05	3	BOH	R/D	0.2	0:45	2:00	8:00	6	-	3	-	2	-	-	
12	**Miyowe**	015	3				5.67		967			100	120	47	53					0:35	0.32	1.33				2:55	6:20	5:40	8.33	0.00	1.33	0.33	0.00	0.00	0.33	
				4	Mrs.Zakaliya	10/05/01	7	H.W.	1,200	1	Yes	100	120	60	40	2	3	-	4	0:45	0.40	1	BOH	None	-	3:45	7:00	6:00	10	-	4	-	-	-	-	
				4	Mrs.Belila	10/05/01	3	H.W.	1,000	1	Yes	100	120	40	60	2	3	-	2,5	0:30	0.30	2	BOH	None	-	2:30	7:00	5:00	6	-	-	1	-	-	1	
				4	Mrs.Mustafa	10/05/01	7	H.W.	700	1	Yes	100	120	40	60	2	3	-	4	0:30	0.25	1	BOH	None	-	2:30	5:00	6:00	9	-	-	-	-	-	-	
15	**Thunduzi**	010	3				5.00		1,333			93	113	47	47					0:16	0.17	1.00				1:20	3:00	5:20	6.67	0.00	1.33	0.00	0.00	0.33	0.00	
				4	Mrs.Napuleya	11/05/01	6	Widow	1,000	1	Yes	80	100	40	40	2	3	-	5	0:15	0.12	1	BOH	None	-	1:00	5:00	6:00	8	-	1	-	-	1	-	
				4	Mr.H.Kachingwe	11/05/01	4	S.F	1,500	1	Yes	120	140	60	60	2	3	-	3	0:20	0.30	1	BOH	None	-	2:00	2:00	5:00	6	-	2	-	-	-	-	
				4	Mrs.Chapsla	11/05/01	5	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	4	0:15	0.10	1	BOH	BH	1	1:00	2:00	5:00	6	-	1	-	-	-	-	BH(Next Village)
16	**Kumlenga**	014	3				5.33		1,467			80	120	40	40					0:23	0.32	2.00				1:38	5:40	5:00	7.00	0.33	0.67	0.00	1.67	1.00	0.00	
				4	Mrs.Mathews	10/05/01	4	H.W.	800	1	Yes	60	100	40	20	2	3	-	3.5	0:15	0.25	2	BOH	None	-	0:45	6:00	5:00	6	-	-	-	1	-	-	
				4	Mrs.Chepita	10/05/01	6	H.W.	600	1	Yes	80	100	40	40	2	3	-	3	0:25	0.32	1	BOH	None	-	1:40	7:00	5:00	8	1	2	-	4	2	-	
				4	Mr.Pemba	10/05/01	6	S.F.	3,000	1	Yes	100	160	40	60	2	3	-	2,4	0:30	0.40	3	BOH	None	-	2:30	4:00	5:00	7	-	-	-	-	1	-	
17	**Gonkho**	003	3				5.67		800			87	113	33	53					0:25	0.22	1.67				1:55	4:20	7:00	9.33	0.67		0.67	0.67	1.33	0.00	
				3	Mrs.Jositua	10/05/01	4	Widow	600	1	Yes	60	100	20	40	2	3	-	2.5	0:15	0.15	2	BOH	None	-	0:45	3:00	8:00	7	1	-	1	1	1	-	
				3	Mrs.Molosi	10/05/01	5	H.W.	1,000	1	Yes	120	140	40	80	2	3	-	4	0:30	0.30	1	BOH	None	-	3:00	4:00	7:00	9	-	1	1	1	1	-	
				3	Mrs.Dede	10/05/01	8	H.W.	800	1	Yes	80	100	40	40	2	3	-	2	0:30	0.20	2	BOH	None	-	2:00	6:00	6:00	12	1	-	-	-	2	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

CHAUMA

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source (1.BH 2.PSW 3.USW 4.R/D)	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities (1.Necessary 2.Not Necessary)	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty (1.Satisfied 2.Unsatisfied)	Q'ty and Q'nty of Potable Water: Q'ty (1.Good 2.Fair 3.Not Good)	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
18	**Kudoko**	007	3				4.67		1,333			80	107	47	33					0:15	0.11	1.00				1:00	3:00	5:20	5.33	0.33	0.33	0.33	0.67	0.33	0.00	
				1	Mrs.Andison	09/05/01	5	H.W.	1,000	1	Yes	100	120	60	40	2	1	-	5	0:15	0.12	1	BOH	None	-	1:15	5:00	6:00	5	1	-	-	-	1	-	
				1	Mrs.Edson	09/05/01	3	H.W.	1,500	1	Yes	60	80	40	20	2	2	-	3	0:15	0.10	1	BOH	USW	0.3	0:45	2:00	5:00	6	-	1	-	1	-	-	
				1	Mrs.Lanjesi	09/05/01	6	H.W.	1,500	1	Yes	80	120	40	40	2	2	-	5	0:15	0.10	1	BOH	USW	0.3	1:00	2:00	5:00	5	-	-	1	1	-	-	
19	**Mthawanthu**	012	3				4.67		1,333			93	113	47	47					0:20	0.06	1.33				1:35	3:20	5:20	5.67	0.00	2.00	0.33	4.67	0.00	0.00	
				3	Mrs.Kosimaji	09/05/01	5	H.W.	1,000	1	Yes	100	120	40	60	2	3	-	2	0:30	0.10	2	BOH	None	-	2:30	5:00	6:00	5	-	4	-	-	-	-	
				3	Mrs.Kanyangali	09/05/01	4	Widow	1,500	1	Yes	80	100	40	40	2	3	-	5	0:15	0.03	1	BOH	None	-	1:00	3:00	5:00	6	-	-	-	12	-	-	
				3	Mrs.Benald	09/05/01	5	H.W.	1,500	1	Yes	100	120	60	40	2	3	-	4	0:15	0.04	1	BOH	None	-	1:15	2:00	5:00	6	-	2	1	2	-	-	
	Total 16 Villages		**48**				**4.69**		**1,234**			**81**	**112**	**39**	**42**					**0:25**	**0.28**	**1.52**				**1:47**	**3:52**	**5:45**								

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

Village Headman (KACHERE)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use: River/Dambo: Perennial Flow or Not	River/Dambo: Water Quality	Unprotected Shallow Well: No.	Unprotected Shallow Well: Water Quality	Unprotected Shallow Well: Dried-up or Not	Protected Shallow Well: No.	Protected Shallow Well: Water Quality	Protected Shallow Well: Dried-up or Not	Borehole: No.	Borehole: Water Quality	Borehole: Dried-up or Not	Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family (Buckets)	Average Volume of Water Usage per Family (liter)	Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates: South Latitude	Coordinates: East Longitude
TRADITIONAL AUTHORITY KACHERE																														
1	Chingwalu	073	Chingwalu	67	288	1,500	S.F.	None			3	Bad	Not							USWs/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 23' 11"	34° 16' 36"
2	Sukasuka I	091	Sukasuka	210	903	1,500	S.F.	School									5	Good	Not	BHs(1980's)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=1.0(BH)	14° 23' 46"	34° 17' 20"
3	Sukasuka II	093	E.Dangaya	210	903	1,500	S.F.	School									5	Good	Not	BHs(1980's)/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=1.0(BH)	14° 23' 25"	34° 17' 18"
4	Gunduze I	076	Gunduze I	186	800	1,500	S.F.	None	P.F.	Bad				1	Good	Not				PSW/now in use ※※	BOH	4	80	Not	Yes	Yes	Yes		14° 22' 07"	34° 07' 44"
5	Kamenya	077	Kamenya	84	361	1,200	S.F.	None			2	Bad	Not							USWs dug by communities/now in use/Dried up in dry season	BOH	5	100	Not	Yes	Yes	Yes		14° 22' 44"	34° 07' 58"
6	Chumachisala	077/ 081	Chumachisala	58	249	2,000	S.F.	None			3	Bad	Not							USWs/Constructed on self help basis ※	BOH	4	80	Not	Yes	Yes	Yes	F=1(USW)	14° 23' 18"	34° 08' 36"
7	Kachikoti	002	David.Biliati	71	305	1,500	S.F.	None			4	Bad	2 no.- D.U. 2 no.- Not							3 USWs(1998), 1 USW(1993)/ now in use	BOH	4	80	Not	Yes	Yes	Yes	F=0.5(USW)	14° 23' 34"	33° 44' 08"
8	Mantega	001	Mantega	41	176	1,500	S.F.	None	P.F.	Bad	3	Poor	D.U.							None	BOH	4	80	Not	Yes	Yes	Yes	F=1.0(USW)	14° 24' 19"	33° 42' 53"
9	Dimoni	003	Dimoni (Kude)	50	215	2,000	S.F.	None	P.F.	Bad	1	Poor	D.U.							USW(1994)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(USW)	14° 25' 50"	33° 42' 01"
10	Kude / Kanthongo	005	Kude	26	112	1,500	S.F.	None	Not	Bad	1	Bad	Not							None	BOH	4	80	Not	Yes	Yes	Yes		14° 26' 22"	33° 42' 00"
11	Dickisoni	004	Dickisoni (Kafere)	49	211	1,500	S.F.	None	Not	Bad	2	Bad	D.U.							2 USWs(1970's/1980's)/now under breakdown	BOH	5	100	Not	Yes	Yes	Yes	F=2.0(River)	14° 26' 36"	33° 43' 41"
12	Kafere	005	Kafere	279	1,200	1,500	S.F.	None			3	Poor	D.U.							BH(1980's)/now under breakdown	BOH	4	80	Not	Yes	Yes	Yes		14° 27' 31"	33° 43' 05"
13	Kunjawa	007	Kunjawa	80	344	1,500	S.F.	School	P.F.	Bad	4	Bad	D.U.							BH(1980's)/now under breakdown	BOH	4	80	Not	Yes	Yes	Yes		14° 28' 45"	33° 41' 37"
14	Kumilambe	001	D.Jamester (Mantega)	65	280	2,000	S.F.	None	P.F.	Bad	5	Poor	D.U.							None	BOH	4	80	Not	Yes	Yes	Yes		14° 24' 31"	33° 42' 52"
15	Manase Chiundi/Kaunyolo [*1]	053	Manase Chiundi	46	198	2,000	S.F.	None			6	Bad	Not							USWs/now in use with no cover	BOH	5	100	Not	Yes	Yes	Yes	F=1(USW)	14° 24' 33"	34° 03' 24"
16	Chikalungeni (Chikulungeni)	064	Chikalungeni	150	645	1,500	S.F.	None			2	Bad	Not							USWs/now in use	BOH	5	75	Not	Yes	Yes	Yes		14° 28' 00"	34° 01' 48"
17	Gwaza	063	Gwaza	70	301	1,000	S.F.	None			4	Bad	Not							USWs dug by community and in use for the past 10 years	BOH	5	100	Not	Yes	Yes	Yes		14° 27' 03"	34° 01' 39"
18	Gaga	069	F.Mkwezalamba	39	168	1,200	S.F.	None						1	Fair	Not				PSW(1999)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(PSW)	14° 25' 20"	34° 03' 27"
19	Kasonda	032	Kasonda	53	228	2,000	S.F.	None			2	Bad	Not							USWs(1992)/Unimproved source. Coverd with tree logs	BOH	4	80	Not	Yes	Yes	Yes	F=0.5(USW)	14° 25' 30"	33° 59' 55"
20	Majamanda	007	Majamanda (Kude)	78	335	1,500	S.F.	School	P.F.	Bad										BH(1992)/now under breakdown	BOH	4	80	Not	Yes	Yes	Yes	F=1.0	14° 30' 35"	33° 41' 28"
21	*Veru*	057	Veru	153	658	1,500	S.F.	None			1	Bad	Not							USW/now in use	BOH	6	90	Not	Yes	Yes	Yes		14° 24' 43"	34° 01' 03"
22	Chimombo (A)(B)	054	Chimombo	65	280	700	S.F.	None	P.F.	Bad	5	Bad	Not							USW/now in use	BOH	5	100	Not	Yes	Yes	Yes		14° 24' 11"	34° 03' 38"
23	Yonani	028	Yonani	150	645	1,000	S.F.	None	P.F.	Bad										None	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(Dambo)	14° 28' 04"	33° 59' 21"
24	Kafumbi	021	Kafumbi	68	292	800	S.F.	None			2	Bad	Not							USWs(1990's)/now in use	BOH	5	100	Not	Yes	Yes	Yes	Committee for BH already elected and are working for the BH	14° 24' 24"	33° 57' 01"
25	Masola	012	L.Tsela	320	1,376	1,000	S.F.	None			2	Bad	1 no.- D.U. 2 no.- Not							USW-1(1972), USW-1(1984)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(USW)	14° 26' 17"	33° 54' 07"
26	*Dolobeni /Chinkuita*	021	Dolobeni /Chinkuita	65	280	1,500	S.F.	Clinic School									1	good	Not	BH(1997)/by C.U.	BOH	5	100	Not	Yes	Yes	Yes	F=1(BH)	14° 24' 33"	33° 57' 09"
27	Gelemani	014	Gelemani	120	516	2,000	S.F.	None			2	Bad	Not							1 USW was constructer as PSW under refugee programmer/bad condition	BOH	5	100	Not	Yes	Yes	Yes		14° 28' 02"	33° 54' 48"
28	Lodzanyama	010	Lodzanyama	96	413	1,000	S.F.	None			1	Fair	Not				1	Good	Technical Problem	BH(1998)/Not working properly due to plunger problem. PSW/not working without pump handle.	BOH	4	80	Not	Yes	Yes	Yes		14° 24' 13"	33° 54' 30"
29	Msepe	010	Msepe	35	151	1,000	S.F.	School	Not	Bad	4	Bad	Not							USWs(1999)/No improvement	BOH	3	60	Not	Yes	Yes	Yes	F=0(USW) 35(Msepe)+5(Tundwi)=40 households	14° 23' 28"	33° 55' 21"
30	Chipanga	050/ 074	Chipanga	95	409	1,500	S.F.	None						1	Fair	Not				PSW in dambo(1997)/Good condition	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(PSW)	14° 21' 25"	34° 04' 31"
31	Kaliyozi	079	Kaliyozi	40	172	1,500	S.F.	None			3	Bad	D.U. from July							None ※※	BOH	4	80	Not	Yes	Yes	Yes		14° 25' 15"	34° 08' 06"
32	Chakachadza	083/ 084	Chakachadza	400	1,720	2,000	S.F.	School Hospital			7	Bad	Not							None ※※	BOH	5	100	Not	Yes	Yes	Yes		14° 23' 10"	34° 10' 46"
33	Betenego	080	Betenego	57	245	500	S.F.	None			1	Bad	D.U.							None	BOH	5	100	Not	Yes	Yes	Yes		14° 26' 10"	34° 08' 36"
34	M'khomaanthu	072	M'khomaanthu	93	400	1,500	S.F.	None									1	Good	Not	BH (1999)/Good condition/by C.U.	BOH	3	60	Not	Yes	Yes	Yes	F=0.5(BH)	14° 25' 27"	34° 06' 03"
35	Chabuka/Chindamba	052	Chindamba	57	245	1,500	S.F.	None			1	Poor	D.U.							USW(1980's)/constructed as PSW for refugees but now cover is removed	BOH	5	100	Not	Yes	Yes	Yes	F=1.0(USW)	14° 22' 08"	34° 22' 10"

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
BOH=Bucket on Head P.F.=Perennial Flow D.U.=Dried Up C.U.=Concern Universal

Village Headman (KACHERE)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use: River/Dambo		Unprotected Shallow Well			Protected Shallow Well			Borehole			Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family		Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates	
									Perennial Flow or Not	Water Quality	No.	Water Quality	Dried-up or Not	No.	Water Quality	Dried-up or Not	No.	Water Quality	Dried-up or Not			(Buckets)	(liter)						South Latitude	East Longitude
36	Chapukuta	054	Chapukuta	125	538	1,500	S.F.	None			1									USW(1980's)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=1.0(USW)	14° 23' 28"	34° 02' 42"
37	Chitukula	050	Chitukula	63	271	1,000	S.F.	None	P.F.	Bad	1	Poor	D.U.							USW(1999)/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 21' 36"	34° 04' 03"
38	Mtende	049	Mtende	130	559	1,500	S.F.	None	P.F.	Bad	1	Poor	Not							USW(1993)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=1.0(USW)	14° 20' 27"	34° 03' 53"
39	Chizuzu	046	Chizuzu	65	280	1,500	S.F.	None	P.F.	Bad	1	Poor	Not							USW(1980's)/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 19' 32"	34° 03' 52"
~~40~~	~~Tchetsa~~																											NO VILLAGE		
41	Chimkhombe/Kaudzu	043/ 044	Chimkhombe	70	301	1,500	S.F.	School	P.F.	Bad	3	Bad	Not							USW-1(1996), USW-2(1994)& USW-3(1997)/now in use	BOH	6	120	Not	Yes	Yes	Yes	F=0.5(USW)	14° 17' 46"	34° 02' 46"
42	Chonde	042	Chonde	128	550	1,500	S.F.	School	P.F.	Bad										BH(2001)/by C.U./yet to be commissioned	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(USW)	14° 19' 14"	34° 01' 58"
43	Mphasayaweni	042	Mphasayaweni	120	516	2,000	S.F.	None	P.F.	Bad	1	Poor	Not							USW(2000)/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=2.0(USW)	14° 19' 42"	34° 02' 45"
44	*Kalamba / Domoya *1*	041	Kalambe	36	155	1,500	S.F.	School	P.F.	Bad							1	Good	Not	BH for school(1980)/now in use	BOH	4	80	Not	Yes	Yes	Yes	F=1.0(BH)	14° 20' 06"	34° 03' 40"
45	*Mbuta*	055	Mbuta	58	249	1,500	S.F.	School	Not	Bad										BH for school(1980's)/now in use	BOH	4	80	Not	Yes	Yes	Yes		14° 23' 36"	34° 01' 13"
46	Chakuwala/Mwambila Mando	020	Chakuwala	67	288	1,500	S.F.	None	Not	Bad	3	Poor	D.U.							USW(1987)/constructed as PSW/now in use	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(USW)	14° 25' 15"	33° 56' 15"
47	Liyela	077	Liyela	70	301	1,500	S.F.	None	Not	Bad	4	Poor	D.U.							None	BOH	4	80	Not	Yes	Yes	Yes		14° 23' 26"	34° 07' 56"
	Total 47 Villages			**108**	**466**	**1,556**																	**96**							

NOTES : ※ ; Existing BH being in operation was confirmed by Electric Prospecting Survey Team.
※※ ; Existing BH being out of order was confirmed by Electric Prospecting Survey Team.

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
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KACHERE

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source (1.BH 2.PSW 3.USW 4.R/D)	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities (1.Necessary 2.Not Necessary)	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty (1.Satisfied 2.Unsatisfied)	Q'ty and Q'nty of Potable Water: Q'ty (1.Good 2.Fair 3.Not Good)	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person)	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
TRADITIONAL AUTHORITY KACHERE																																				
1	**Chingwalu**	073	3				3.33		2,700			67	107	40	27					0:16	0.12	1.67				0:56	3:20	5:00	4.67	0.33	2.33	1.00	0.67	0.33	0.00	
				3	Mr.E.Sailesi	02/05/01	3	S.F.	5,000	1	Yes	60	100	40	20	2	3	-	2,3	0:15	0.10	2	BOH	Dambo	0.2	0:45	2:00	5:00	4	-	2	1	-	-	-	
				3	Mr.Masapula	02/05/01	3	S.F.	2,000	1	Yes	60	100	40	20	2	3	-	2,5	0:15	0.10	2	BOH	Dambo	0.2	0:45	3:00	7:00	5	1	3	1	2	-	-	
				3	Mrs.Kaweche	02/05/01	4	H.W.	1,100	1	Yes	80	120	40	40	2	3	-	4	0:20	0.15	1	BOH	None	-	1:20	5:00	3:00	5	-	2	1	-	1	-	
2	**Sukasuka I**	091	3				5.00		1,500			113	140	60	53					0:15	0.23	2.00				1:25	2:00	5:00	7.00	0.67	2.67	0.33	2.33	0.00	0.00	
				1	Mrs.L.Phibmoni	05/05/01	5	H.W.	1,500	1	Yes	120	140	60	60	2	1	-	2,4	0:15	0.30	2	BOH	BH	0.8	1:30	2:00	5:00	7	-	3	-	2	-	-	
				1	Mrs.J.Lipeka	05/05/01	5	H.W.	1,500	1	Yes	120	160	60	60	2	1	-	2,3	0:15	0.20	2	BOH	BH	0.6	1:30	2:00	5:00	7	-	2	1	3	-	-	
				1	Mrs.F.Moses	05/05/01	5	H.W.	1,500	1	Yes	100	120	60	40	2	1	-	2,3	0:15	0.20	2	BOH	BH	0.6	1:15	2:00	5:00	7	2	3	-	2	-	-	
3	**Sukasuka II**	093	3				5.67		1,167			87	113	47	40					0:15	0.04	2.00				1:05	2:00	5:20	5.33	2.67	0.33	0.67	0.67	0.33	0.00	
				1	Mrs.Mula	05/05/01	6	H.W.	1,000	1	Yes	100	120	60	40	2	1	-	2,3	0:15	0.04	2	BOH	BH	0.7	1:15	2:00	6:00	8	2	1	-	1	-	-	
				1	Mrs.Rameck	05/05/01	4	H.W.	1,000	1	Yes	80	100	40	40	2	1	-	2,3	0:15	0.04	2	BOH	BH	0.7	1:00	2:00	5:00	2	5	-	-	-	-	-	
				1	Mr.Dangaya	05/05/01	7	S.F.	1,500	1	Yes	80	120	40	40	2	1	-	2,3	0:15	0.03	2	BOH	BH	0.5	1:00	2:00	5:00	6	1	-	2	1	1	-	
4	**Gunduze I**	076	3				3.67		1,367			77	110	33	43					0:41	0.25	1.00				2:20	5:00	4:20	4.67	0.00	1.00	1.33	1.33	0.67	0.00	
				3	Mrs.Nasankhani	04/05/01	4	Widow	600	1	Yes	90	150	60	30	2	3	-	4	1:00	0.30	1	BOH	None	-	3:00	7:00	4:00	6	-	2	1	4	2	-	
				4	Mr.Kazamila	04/05/01	3	S.F.	2,500	1	Yes	60	80	20	40	2	3	-	4	0:20	0.20	1	BOH	None	-	1:00	2:00	5:00	4	-	1	2	-	-	-	
				3	Mrs.Joseph	04/05/01	4	H.W.	1,000	1	Yes	80	100	20	60	2	3	-	3	0:45	0.25	1	BOH	None	-	3:00	6:00	4:00	4	-	-	1	-	-	-	
5	**Kamenya**	077	3				3.67		867			97	140	35	62					1:00	0.23	1.33				3:40	2:40	6:00	5.67	0.00	2.67	1.00	1.67	0.00	0.00	
				2	Mrs.E.Makwala	04/05/01	3	H.W.	600	1	Yes	120	160	40	80	2	1	-	2,4	1:00	0.15	2	BOH	Dambo	0.35	4:00	3:00	7:00	6	-	5	2	2	-	-	
				2	Mrs.M.Sikoti	04/05/01	4	H.W.	500	1	Yes	120	160	40	80	2	1	-	4	1:30	0.35	1	BOH	Dambo	0.1	6:00	3:00	6:00	5	-	2	1	2	-	-	
				2	Mrs.G.Maclean	04/05/01	4	H.W.	1,500	1	Yes	50	100	25	25	2	1	-	3	0:30	0.20	1	BOH	BH	0.3	1:00	2:00	5:00	6	-	1	-	1	-	-	BH(next Vg.)
6	**Chumachisala**	077/ 081	3				6.33		1,833			113	187	53	60					0:16	0.13	1.67				1:03	2:20	7:00	7.00	0.00	3.00	0.00	0.67	0.00	0.00	
				3	Mrs.Paul	04/05/01	6	H.W.	2,000	1	Yes	160	240	80	80	2	3	-	4	0:15	0.10	1	BOH	None	-	1:00	2:00	8:00	6	-	2	-	1	-	-	
				3	Mrs.Edson	04/05/01	4	H.W.	1,000	1	Yes	80	160	40	40	2	3	-	3	0:15	0.10	1	BOH	None	-	0:30	3:00	8:00	5	-	2	-	-	-	-	
				3	Mrs.V.Fredrick	04/05/01	9	H.W.	2,500	1	Yes	100	160	40	60	2	3	-	1,2,4	0:20	0.20	3	BOH	None	-	1:40	2:00	5:00	10	-	5	-	1	-	-	
7	**Kachikoti**	002	3				3.67		1,133			120	153	73	47					0:15	0.12	1.00				1:30	7:00	4:20	3.67	0.67	2.33	0.33	0.67	1.33	0.00	
				3	Mrs.Loya	17/05/01	6	H.W.	700	1	Yes	160	220	80	80	2	3	-	4	0:15	0.15	1	BOH	None	-	2:00	7:00	4:00	6	1	3	-	-	2	-	
				3	Mrs.Jefrey	17/05/01	2	H.W.	1,500	1	Yes	120	140	80	40	2	3	-	4	0:15	0.12	1	BOH	None	-	1:30	8:00	4:00	1	-	4	1	-	1	-	
				3	Mrs.Belifa	17/05/01	3	H.W.	1,200	1	Yes	80	100	60	20	2	3	-	5	0:15	0.10	1	BOH	None	-	1:00	6:00	5:00	4	1	-	-	2	1	-	
8	**Mantega**	001	3				4.00		1,333			67	100	40	27					0:15	0.20	2.00				0:50	2:20	5:20	6.67	0.33	3.33	0.33	1.67	0.00	0.00	
				3	Mr.Damalani	07/05/01	5	S.F.	1,500	1	Yes	80	120	40	40	2	3	-	2,3	0:15	0.20	2	BOH	USW	0.3	1:00	2:00	6:00	7	-	3	-	3	-	-	
				3	Mrs.Dicksoni	07/05/01	3	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	2,3	0:15	0.20	2	BOH	USW	0.4	0:45	3:00	5:00	6	1	3	-	2	-	-	
				3	Mrs.Kumsindzi	07/05/01	4	H.W.	1,000	1	Yes	60	100	40	20	2	3	-	2,4	0:15	0.20	2	BOH	USW	0.3	0:45	2:00	5:00	7	-	4	1	-	-	-	
9	**Dimoni**	003	3				4.00		1,167			60	87	33	27					0:15	0.01	1.67				0:45	2:00	5:00	6.67	1.33	2.33	0.00	0.67	0.00	0.00	
				3	Mrs.Kampala	07/05/01	3	H.W.	1,500	1	Yes	40	60	20	20	2	3	-	2,4	0:15	0.01	2	BOH	None	-	0:30	2:00	5:00	7	2	-	-	1	-	-	
				3	Mrs.Lazaba	07/05/01	3	H.W.	1,000	1	Yes	60	80	40	20	2	3	-	3	0:15	0.01	1	BOH	None	-	0:45	2:00	5:00	5	-	3	-	-	-	-	
				4	Mrs.Chisale	07/05/01	6	H.W.	1,000	1	Yes	80	120	40	40	2	3	-	2,4	0:15	0.01	2	BOH	None	-	1:00	2:00	5:00	8	2	4	-	1	-	-	
10	**Kude / Kanthongo**	005	3				5.33		1,667			80	107	47	33					0:15	0.01	1.67				1:00	2:00	6:40	8.00	0.67	2.67	0.67	0.33	0.00	0.00	
				4	Mr.S.Matias	07/05/01	6	S.F.	1,500	1	Yes	100	120	60	40	2	3	-	3	0:15	0.01	1	BOH	None	-	1:15	2:00	7:00	9	2	3	-	-	-	-	
				4	Mrs.Laison	07/05/01	4	H.W.	2,000	1	Yes	60	80	40	20	2	3	-	2,4	0:15	0.01	2	BOH	None	-	0:45	2:00	7:00	6	-	3	2	1	-	-	
				4	Mrs.Macfield	07/05/01	6	H.W.	1,500	1	Yes	80	120	40	40	2	3	-	2,4	0:15	0.01	2	BOH	None	-	1:00	2:00	6:00	9	-	2	-	-	-	-	
11	**Dickisoni**	004	1				16.00		4,000			200	360	120	80					1:00	2.10	5.00				3:20	6:00	15:00	24.00	5.00	6.00	3.00	3.00	0.00	0.00	
				4	Mr.Nution	07/05/01	4	S.F.	1,500	1	Yes	60	100	40	20	2	3	-	3	0:20	0.70	1	BOH	None	-	1:00	2:00	5:00	7	3	-	2	-	-	-	
				4	Mr.Thanzeni	07/05/01	4	S.F.	1,000	1	Yes	60	100	40	20	2	3	-	2,4	0:20	0.70	2	BOH	None	-	1:00	2:00	5:00	8	2	3	-	1	-	-	
				4	Mr.D.Beni	07/05/01	8	S.F.	1,500	1	Yes	80	160	40	40	2	3	-	2,3	0:20	0.70	2	BOH	None	-	1:20	2:00	5:00	9	-	3	1	2	-	-	
12	**Kafere**	005	3				6.00		1,667			113	153	60	53					0:13	0.15	2.00				1:18	2:20	6:00	9.67	1.33	4.00	0.00	2.00	0.00	0.00	
				3	Mr.G.Kanchisamba	07/05/01	9	S.F.	1,500	1	Yes	160	240	80	80	2	3	-	2,4	0:15	0.20	2	BOH	USW	0.4	2:00	2:00	6:00	12	2	4	-	2	-	-	
				3	Mr.B.Guly	07/05/01	5	S.F.	2,000	1	Yes	100	120	60	40	2	3	-	2,3	0:15	0.25	2	BOH	USW	0.4	1:15	3:00	6:00	8	2	4	-	1	-	-	
				3	Mrs.Zakaliya	07/05/01	4	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	1,3	0:10	0.01	2	BOH	USW	0.4	0:40	2:00	6:00	9	-	4	-	3	-	-	-
13	**Kunjawa**	007	3				4.00		1,333			60	80	33	27					0:15	0.40	1.00				0:45	2:00	5:20	6.67	2.00	1.67	0.00	1.67	0.00	0.00	
				3	Mrs.Daniel	07/05/01	4	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	3	0:15	0.40	1	BOH	USW	0.5	0:45	2:00	5:00	7	2	1	-	3	-	-	
				3	Mrs.Tiyika	07/05/01	3	H.W.	1,500	1	Yes	40	60	20	20	2	3	-	3	0:15	0.40	1	BOH	USW	0.5	0:30	2:00	5:00	7	2	3	-	1	-	-	
				3	Mr.J.J.Likanje	07/05/01	5	S.F.	1,000	1	Yes	80	100	40	40	1	3	-	3	0:15	0.40	1	BOH	USW	0.5	1:00	2:00	6:00	6	2	1	-	1	-	-	
14	**Kumilambe**	001	3				4.00		1,833			73	100	40	33					0:15	0.02	1.67				0:55	2:20	5:40	8.67	0.67	3.00	1.33	1.67	0.00	0.00	
				3	Mr.W.Ofela	07/05/01	5	S.F.	1,500	1	Yes	80	120	40	40	2	3	-	3	0:15	0.01	1	BOH	USW	0.02	1:00	2:00	6:00	8	-	2	2	1	-	-	
				3	Mr.A.Samson	07/05/01	4	S.F.	2,000	1	Yes	80	100	40	40	2	3	-	2,3	0:15	0.015	2	BOH	USW	0.02	1:00	3:00	5:00	9	2	3	-	3	-	-	
				3	Mr.D.C.Paul	07/05/01	3	S.F.	2,000	1	Yes	60	80	40	20	2	3	-	2,3	0:15	0.02	2	BOH	USW	0.3	0:45	2:00	6:00	9	-	4	2	1	-	-	-
15	**Manase Chiundi/Kaunyolo** [*1]	053	3				7.00		2,333			140	187	73	67					0:10	0.02	3.67				0:56	3:20	5:20	7.33	1.33	1.33	0.00	0.33	0.00	0.00	
				3	Mrs.Chiponda	03/05/01	9	H.W.	4,000	1	Yes	200	280	80	120	2	3	-	1,2,5	0:05	0.004	6	BOH	None	-	0:25	6:00	5:00	8	2	4	-	1	-	-	
				3	Mrs.D.Mwandiani	03/05/01	6	H.W.	1,000	1	Yes	100	120	60	40	2	3	-	1,4	0:15	0.05	2	BOH	None	-	1:15	2:00	5:00	6	-	-	-	-	-	-	
				3	Mrs.K.Chinkhanyanga	03/05/01	6	H.W.	2,000	1	Yes	120	160	80	40	2	3	-	2,4,5	0:10	0.01	3	BOH	None	-	1:10	2:00	6:00	8	2	-	-	-	-	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

KACHERE

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source (1.BH 2.PSW 3.USW 4.R/D)	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/year)	Needs for Hygienic Water Supply Facilities (1.Necessary 2.Not Necessary)	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty (1.Satisfied 2.Unsatisfied)	Q'ty and Q'nty of Potable Water: Q'ty (1.Good 2.Fair 3.Not Good)	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person)	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
16	**Chikalungeni (Chikulungeni)**	064	3				3.67		1,500			60	93	33	27					0:23	0.67	1.00				1:01	3:20	5:40	4.33	0.67	2.67	0.67	2.33	0.00	0.00	
				3	Mrs.F.Nchenga	03/05/01	2	Widow	2,000	1	Yes	60	80	40	20	2	3	-	4	0:30	1.00	1	BOH	None	-	1:30	2:00	6:00	4	2	2	1	1	-	-	
				3	Mrs.V.Ester	03/05/01	4	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	3	0:30	1.00	1	BOH	None	-	1:30	2:00	6:00	5	-	3	-	2	-	-	
				3	Mrs.Maliko	03/05/01	5	H.W.	1,000	1	Yes	60	120	20	40	2	3	-	3	0:10	0.02	1	BOH	BH	0.4	0:03	6:00	5:00	4	-	3	1	4	-	-	BH(next Vg.)
17	**Gwaza**	063	3				4.33		1,833			93	127	47	47					0:13	0.04	1.33				1:00	2:40	5:20	5.00	0.00	1.67	0.67	0.00	0.00	0.00	
				3	Mr.P.Patson	03/05/01	4	S.F.	3,000	1	Yes	80	120	40	40	2	3	-	3	0:15	0.05	1	BOH	USW	0.7	1:00	2:00	3:00	6	-	3	1	-	-	-	
				3	Mr.J.Samson	03/05/01	5	S.F.	1,500	1	Yes	80	100	40	40	2	3	-	1,3	0:15	0.05	2	BOH	Dambo	1	1:00	2:00	7:00	5	-	2	-	-	-	-	
				3	Mr.Kasamalani	03/05/01	4	S.F.	1,000	1	Yes	120	160	60	60	1	3	-	3	0:10	0.03	1	BOH	None	-	1:00	4:00	6:00	4	-	-	1	-	-	-	
18	**Gaga**	069	3				3.67		983			93	140	40	53					0:21	0.20	1.33				2:03	6:20	5:20	3.67	0.00	0.33	0.00	0.00	1.67	0.00	
				2	Mrs.Lemisoni	16/05/01	6	H.W.	850	1	Yes	80	120	40	40	2	2	-	3	0:15	0.20	1	BOH	None	-	1:00	8:00	4:00	4	-	-	-	-	2	-	
				2	Mrs.Onetsani	16/05/01	2	H.W.	1,100	1	Yes	60	100	20	40	2	2	-	3	0:10	0.15	2	BOH	None	-	0:30	6:00	5:00	2	-	-	-	-	1	-	
				2	Mrs.Gaga	16/05/01	3	H.W.	1,000	1	Yes	140	200	60	80	2	2	-	5	0:40	0.25	1	BOH	None	-	4:40	5:00	7:00	5	-	1	-	-	2	-	
19	**Kasonda**	032	3				4.33		2,333			80	113	47	33					0:23	0.12	1.67				1:36	2:20	5:00	4.67	0.00	1.00	0.00	0.00	0.00	0.00	
				3	Mrs.L.Sitivini	03/05/01	5	H.W.	1,500	1	Yes	100	140	60	40	2	3	-	3	0:30	0.15	1	BOH	None	-	2:30	3:00	6:00	4	-	3	-	-	-	-	
				3	Mr.E.Banda	03/05/01	4	S.F.	3,000	1	Yes	80	120	40	40	2	3	-	3	0:20	0.10	1	BOH	None	-	1:20	2:00	3:00	5	-	-	-	-	-	-	
				3	Mrs.V.Clupangula	03/05/01	4	H.W.	2,500	1	Yes	60	80	40	20	2	3	-	2,5	0:20	0.10	3	BOH	BH	1	1:00	2:00	6:00	5	-	-	-	-	-	-	BH(Next Vg.)
20	**Majamanda**	007	2				7.50		2,000			120	170	60	40					0:45	0.90	2.00				3:00	3:00	7:30	11.50	0.00	3.50	0.00	3.50	0.00	0.00	
				4	Mr.Danlani	07/05/01	7	S.F.	1,500	1	Yes	100	140	60	40	2	3	-	2,4	0:30	0.60	2	BOH	None	-	2:30	2:00	5:00	9	-	2	-	3	-	-	
				4	Mrs.Mzingeza	07/05/01	4	H.W.	1,500	1	Yes	60	100	40	20	2	3	-	3	0:30	0.60	1	BOH	None	-	1:30	2:00	5:00	7	-	3	-	1	-	-	
				4	Mrs.Luka	07/05/01	4	H.W.	1,000	1	Yes	80	100	20	20	2	3	-	3	0:30	0.60	1	BOH	None	-	2:00	2:00	5:00	7	-	2	-	3	-	-	
21	**Veru**	057	3				4.00		3,000			67	107	40	27					0:15	0.09	2.00				0:50	2:00	5:40	5.67	0.00	1.67	0.67	0.33	0.00	0.00	
				3	Mr.W.Mlewe	03/05/01	6	S.F.	2,000	1	Yes	60	120	40	20	2	3	-	2,4	0:15	0.08	3	BOH	None	-	0:45	1:30	6:00	8	-	3	-	-	-	-	
				3	Mr.W.Jackson	03/05/01	4	S.F.	2,000	1	Yes	80	120	40	40	2	3	-	1,3	0:15	0.08	2	BOH	None	-	1:00	1:30	7:00	4	-	2	-	-	-	-	
				3	Mr.A.Chikaonda	03/05/01	2	S.F.	5,000	1	Yes	60	80	40	20	2	3	-	2	0:15	0.11	1	BOH	None	-	0:45	3:00	4:00	5	-	-	2	1	-	-	
22	**Chimombo (A)(B)**	054	3				5.33		1,367			73	93	20	53					0:11	0.03	1.67				0:48	3:40	4:20	4.67	0.33	0.00	0.33	0.00	0.33	0.00	
				3	Mrs.Lenard	03/05/01	6	H.W.	600	1	Yes	80	100	20	60	2	3	-	2,4	0:15	0.05	2	BOH	USW	1	1:00	2:00	3:00	2	1	-	1	-	-	-	USW(next Vg.)
				3	Mrs.S.Amas	03/05/01	4	H.W.	1,500	1	Yes	60	80	20	40	2	3	-	3	0:15	0.03	1	BOH	USW	1	0:45	2:00	5:00	5	-	-	-	-	-	-	USW(next Vg.)
				3	Mrs.Jasi	03/05/01	6	H.W.	2,000	1	Yes	80	100	20	60	2	3	-	2,4	0:05	0.002	2	BOH	None	-	0:40	7:00	5:00	7	-	-	-	-	1	-	
23	**Yonani**	028	3				4.33		2,400			93	127	40	53					0:31	0.43	1.67				2:26	4:00	5:00	6.00	0.33	2.00	1.00	0.33	0.33	0.00	
				3	Mr.L.Kalizamimba	02/05/01	4	S.F.	1,500	1	Yes	80	100	40	40	2	3	-	4	0:20	0.40	1	BOH	USW	0.2	1:20	3:00	5:00	6	1	2	-	-	-	-	
				3	Mrs.Moyenda	02/05/01	5	H.W.	700	1	Yes	120	160	40	80	2	3	-	2,4	0:30	0.40	2	BOH	None	-	3:00	4:00	6:00	7	-	1	2	1	1	-	
				3	Mr.Chimpeni	02/05/01	4	S.F.	5,000	1	Yes	80	120	40	40	2	3	-	2,5	0:45	0.50	2	BOH	None	-	3:00	5:00	4:00	5	-	3	1	-	-		
24	**Kafumbi**	021	3				4.33		1,500			87	113	40	47					0:15	0.04	1.67				1:05	2:10	5:40	5.33	0.33	2.33	0.33	0.00	0.33	0.00	
				3	Mrs.Harrison	02/05/01	6	H.W.	1,000	1	Yes	100	140	40	60	2	3	-	2,4	0:15	0.05	3	BOH	None	-	1:15	3:00	6:00	7	1	2	1	-	1	-	
				3	Mrs.K.Roid	02/05/01	3	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	2	0:15	0.04	1	BOH	Dambo	0.3	1:00	1:30	5:00	4	-	3	-	-	-	-	
				3	Mr.V.Maliko	02/05/01	4	S.F.	2,000	1	Yes	80	100	40	40	2	3	-	3	0:15	0.04	1	BOH	Dambo	0.3	1:00	2:00	6:00	5	-	2	-	-	-	-	
25	**Masola**	012	3				7.00		1,133			120	147	53	67					0:35	0.34	1.00				3:25	6:20	5:20	10.33	0.00	3.33	2.67	1.00	2.67	0.00	
				3	Mrs.Felix	17/05/01	6	H.W.	900	1	Yes	120	140	40	80	2	3	-	3	0:30	0.30	1	BOH	None	-	3:00	7:00	5:00	6	-	-	-	1	3	-	
				3	Mrs.Betumeyo	17/05/01	7	H.W.	1,000	1	Yes	100	120	40	60	2	3	-	3	0:45	0.40	1	BOH	None	-	3:45	6:00	6:00	12	-	4	3	2	2	-	
				3	Mrs.Isaki	17/05/01	8	H.W.	1,500	1	Yes	140	180	80	60	2	3	-	5	0:30	0.32	1	BOH	None	-	3:30	6:00	5:00	13	-	6	5	-	3	-	
26	**Dolobeni /Chinkuita**	021	3				6.00		1,833			100	147	53	47					0:20	0.09	1.33				1:35	3:00	5:40	5.67	0.67	1.67	1.00	0.67	0.00	0.00	
				1	Mr.Atonyoni	02/05/01	5	S.F.	500	1	Yes	80	140	40	40	2	1	-	5	0:30	0.15	1	BOH	None	-	2:00	3:00	6:00	2	1	-	-	-	-	-	
				1	Mrs.Charles	02/05/01	5	H.W.	2,000	1	Yes	80	120	40	40	2	1	-	2,3	0:15	0.07	2	BOH	None	-	1:00	4:00	6:00	5	-	-	-	2	-	-	
				1	Mr.Njela	02/05/01	8	S.F.	3,000	1	Yes	140	180	80	60	2	1	-	4	0:15	0.05	1	BOH	None	-	1:45	2:00	5:00	10	1	5	3	-	-	-	
27	**Gelemani**	014	3				4.33		1,000			60	100	33	27					0:23	0.57	1.67				1:06	2:10	6:00	6.00	0.00	1.33	0.67	0.67	0.33	0.00	
				3	Mrs Idah Mmgiler	02/05/01	4	Widow	1,000	1	Yes	60	100	40	20	2	3	-	2,5	0:20	0.70	2	BOH	Dambo	0.4	1:00	2:00	7:00	6	-	-	2	-	-	-	
				3	Mrs.Namayabi	02/05/01	6	D.W.	1,500	1	Yes	80	120	40	40	2	3	-	2,4	0:20	0.70	2	BOH	Dambo	0.4	1:20	1:30	5:00	8	-	-	-	-	-	-	
				3	Mrs.Nalukani	02/05/01	3	H.W.	500	1	Yes	40	80	20	20	2	3	-	4	0:30	0.30	1	BOH	None	-	1:00	3:00	6:00	4	-	4	-	2	1	-	
28	**Lodzanyama**	010	3				7.33		1,833			98	157	53	42					0:20	0.10	2.00				1:45	2:10	6:00	9.33	0.67	0.67	0.33	0.00	0.00	0.00	
				1	Mrs.Robert	02/05/01	7	H.W.	2,000	1	Yes	140	200	80	60	2	1	-	2,5	0:30	0.10	3	BOH	None	-	3:30	3:00	6:00	8	-	2	-	-	-	-	
				1	Mrs.M.Butukusi	02/05/01	8	H.W.	1,500	1	Yes	80	120	40	40	2	1	-	1,4	0:15	0.10	2	BOH	BH	0.1	1:00	2:00	6:00	12	1	-	1	-	-	-	
				1	Mr.F.Bizwell	02/05/01	7	H.W.	2,000	1	Yes	75	150	40	25	2	1	-	4	0:15	0.10	1	BOH	BH	0.1	0:45	1:30	6:00	8	1	-	-	-	-	-	
29	**Msepe**	010	3				3.33		1,567			87	120	47	40					0:16	0.12	2.00				1:11	1:50	6:20	4.67	1.00	1.33	0.67	1.33	0.33	0.00	
				3	Mrs.M.Dziko	02/05/01	3	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	2,3	0:15	0.01	2	BOH	Dambo	0.3	1:00	1:30	6:00	5	-	-	-	-	-	-	
				3	Mr.K.Savlosi	02/05/01	4	S.F.	700	1	Yes	80	140	40	40	2	3	-	3,4	0:20	0.15	2	BOH	None	-	1:20	2:00	6:00	5	3	1	2	4	1	-	
				3	Mr.G.Vickson	02/05/01	3	S.F.	2,000	1	Yes	100	120	60	40	2	3	-	2,4	0:15	0.20	2	BOH	None	-	1:15	2:00	7:00	4	-	3	-	-	-	-	
30	**Chipanga**	050/ 074	3				4.00		1,317			100	150	50	50					0:13	0.07	1.33				0:48	4:20	5:00	4.33	0.00	1.67	0.33	1.33	0.00	0.00	
				2	Mrs.Teresa	03/05/01	4	H.W.	900	1	Yes	120	200	80	40	2	1	-	3	0:15	0.10	1	BOH	None	-	1:00	5:00	5:00	4	-	2	-	2	-	-	
				2	Mrs.Rebiam	03/05/01	3	H.W.	2,500	1	Yes	60	100	40	20	2	1	-	2,4	0:15	0.07	2	BOH	None	-	0:45	2:00	5:00	4	-	-	-	-	-	-	
				2	Mrs.Elisi	03/05/01	5	H.W.	550	1	Yes	120	150	30	90	2	1	-	3	0:10	0.05	1	BOH	None	-	0:40	6:00	5:00	5	-	3	1	2	-	-	
31	**Kaliyozi**	079	3				5.00		1,833			127	167	80	47					0:15	0.07	1.00				1:35	2:20	4:40	7.33	0.00	5.00	3.67	0.67	0.00	0.00	
				3	Mrs.Mary	03/05/01	3	H.W.	1,000	1	Yes	60	100	20	40	2	3	-	3	0:15	0.12	1	BOH	Spring	0.35	0:45	3:00	5:00	7	-	5	8	2	-	-	
				3	Mrs.E.Lemek	03/05/01	3	H.W.	2,000	1	Yes	80	120	40	40	2	3	-	3	0:15	0.04	1	BOH	USW	1	1:00	2:00	5:00	6	-	2	1	-	-	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty 1.Satisfied 2.Unsatisfied	Q'ty and Q'nty of Potable Water: Q'ty 1.Good 2.Fair 3.Not Good	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person)	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				3	Mrs.Kwada	03/05/01	9	H.W.	2,500	1	Yes	240	280	180	60	2	3	-	2,4	0:15	0.04	1	BOH	USW	1	3:00	2:00	4:00	9	-	8	2	-	-		
32	Chakachadza	083/ 084	3				3.00		2,000			73	93	40	33					0:23	0.20	1.00				1:06	3:20	5:20	4.00	0.00	0.67	0.00	0.00	0.33	0.00	
				3	Mrs.E.Kalenje	04/05/01	3	H.W.	2,500	1	Yes	80	100	40	40	2	3	-	4	0:20	0.20	1	BOH	BH	1	1:20	2:00	7:00	4	-	2	-	-	-	-	
				3	Mrs.V.Pemleka	04/05/01	3	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	5	0:20	0.20	1	BOH	None	-	1:20	2:00	5:00	5	-	-	-	-	-	-	
				3	Mrs.Tayimosi	04/05/01	3	H.W.	2,000	1	Yes	60	80	40	20	2	3	-	2	0:30	0.20	1	BOH	None	-	0:40	6:00	4:00	3	-	-	-	-	1	-	
33	Betenego	080	3				3.33		1,333			60	90	30	30					0:26	0.47	1.33				1:13	3:00	5:40	4.33	0.00	2.67	0.67	0.00	0.00	0.00	
				3	Mrs.T.Laniyele	03/05/01	4	H.W.	2,000	1	Yes	60	100	20	40	2	3	-	3	0:30	0.50	1	BOH	None	-	1:30	2:00	6:00	6	-	2	-	-	-	-	
				3	Mrs.J.Yohani	03/05/01	3	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	2	0:30	0.80	1	BOH	None	-	1:30	2:00	5:00	4	-	2	-	-	-	-	
				3	Mrs.Dinesi	03/05/01	3	H.W.	500	1	Yes	60	90	30	30	2	3	-	2,5	0:20	0.10	2	BOH	None	-	0:40	5:00	6:00	3	-	4	2	-	-	-	
34	M'khomaanthu	072	3				5.00		1,783			72	100	35	37					0:15	0.24	2.67				0:48	2:00	5:00	6.00	0.67	0.00	1.33	0.33	0.00	0.00	
				1	Mrs.Mackson	03/05/01	6	H.W.	2,000	1	Yes	60	100	40	20	2	1	-	2,4	0:15	0.10	3	BOH	USW	0.2	0:45	2:00	6:00	7	1	-	-	1	-	-	
				1	Mrs.Sannon	03/05/01	3	H.W.	1,350	1	Yes	80	100	40	40	2	1	-	1,2,4	0:10	0.015	3	BOH	USW	0.2	0:40	2:00	5:00	4	-	-	2	-	-	-	
				1	Mrs.Chokani	03/05/01	6	H.W.	2,000	1	Yes	75	100	25	50	2	1	-	1,3	0:20	0.60	2	BOH	USW	0.2	1:00	2:00	4:00	7	1	-	2	-	-	-	
35	Chabuka/Chindamba	052	3				5.00		1,167			93	120	53	40					0:20	0.50	2.00				1:33	2:00	5:20	6.67	0.67	1.33	0.00	0.33	0.00	0.00	
				3	Mrs.Chingayms	09/05/01	5	H.W.	1,500	1	Yes	100	120	60	40	2	3	-	2,3	0:20	0.50	2	BOH	PSW	0.7	1:40	2:00	4:00	6	2	1	-	-	-	-	
				3	Mrs.Litchewa	09/05/01	4	H.W.	1,000	1	Yes	80	100	40	40	2	3	-	2,4	0:20	0.50	2	BOH	PSW	0.7	1:20	2:00	6:00	6	-	1	-	-	-	-	
				3	Mrs.Tazem	09/05/01	6	H.W.	1,000	1	Yes	100	140	60	40	2	3	-	2,3	0:20	0.50	2	BOH	PSW	0.7	1:40	2:00	6:00	8	-	2	-	1	-	-	
36	Chapukuta	054	3				6.33		1,333			127	147	73	53					0:11	0.10	2.33				1:21	2:00	6:40	7.33	0.67	2.00	0.67	0.33	0.00	0.00	
				3	Mrs.Zande	09/05/01	7	H.W.	1,500	1	Yes	140	160	80	60	2	3	-	2,3	0:15	0.10	2	BOH	None	-	1:45	2:00	7:00	8	-	3	-	-	-	-	
				3	Mrs.Molesi	09/05/01	5	H.W.	1,000	1	Yes	100	120	60	40	2	3	-	2,3	0:10	0.10	2	BOH	None	-	1:00	2:00	7:00	7	2	-	-	1	-	-	
				3	Mrs.Kachibowa	09/05/01	7	H.W.	1,500	1	Yes	140	160	80	60	2	3	-	2,3	0:10	0.10	3	BOH	None	-	1:20	2:00	6:00	7	-	3	2	-	-	-	
37	Chitukula	050	3				4.67		1,167			93	127	53	53					0:20	0.50	1.67				1:26	2:00	5:00	6.67	0.33	2.67	0.67	1.67	0.00	0.00	
				4	Mrs.Khwanya	09/05/01	6	H.W.	1,000	1	Yes	120	160	60	60	2	3	-	2,3	0:20	0.50	2	BOH	USW	0.7	2:00	2:00	5:00	7	-	3	-	3	-	-	
				4	Mrs.Satikana	09/05/01	5	H.W.	1,500	1	Yes	80	120	60	60	2	3	-	4	0:20	0.50	1	BOH	USW	0.8	1:20	2:00	5:00	7	-	3	2	1	-	-	
				4	Mrs.James	09/05/01	3	H.W.	1,000	1	Yes	80	100	40	40	2	3	-	2,4	0:20	0.50	2	BOH	USW	0.7	1:00	2:00	5:00	6	1	2	-	1	-	-	
38	Mtende	049	3				4.67		1,333			93	120	53	40					0:15	0.15	2.00				1:10	2:00	5:40	8.33	0.33	3.00	0.67	1.33	0.00	0.00	
				3	Mrs.F.Kambila	09/05/01	3	Widow	1,000	1	Yes	60	80	40	20	1	3	-	2,3	0:15	0.10	2	BOH	None	-	0:45	2:00	6:00	7	1	3	1	2	-	-	
				4	Mr.L.Ben	09/05/01	5	S.F.	1,500	1	Yes	100	120	60	40	2	3	-	2,3	0:15	0.15	2	BOH	None	-	1:15	2:00	6:00	9	-	2	-	-	-	-	
				3	Mrs.G.Beya	09/05/01	6	H.W.	1,500	1	Yes	120	160	60	60	2	3	-	2,4	0:15	0.20	2	BOH	None	-	1:30	2:00	5:00	9	-	4	1	2	-	-	
39	Chizuzu	046	3				4.33		1,333			80	100	47	33					0:16	0.30	1.67				1:06	2:00	5:20	5.67	0.67	1.67	0.67	0.33	0.00	0.00	
				3	Mrs.Chimgula	09/05/01	4	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	2,3	0:20	0.40	2	BOH	None	-	1:20	2:00	5:00	7	2	2	-	1	-	-	
				3	Mrs.Zina	09/05/01	6	H.W.	1,000	1	Yes	100	120	60	40	2	3	-	2,4	0:15	0.30	2	BOH	None	-	1:15	2:00	5:00	7	-	3	2	-	-	-	
				3	Mrs.Martin	09/05/01	3	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	2	0:15	0.20	1	BOH	None	-	0:45	2:00	6:00	3	-	-	-	-	-	-	
40	~~Tchetsa~~																																			
41	Chimkhombe/Kaud zu	043/ 044	3				4.33		1,167			80	107	47	33					0:16	0.27	2.00				1:05	2:00	5:40	7.67	0.00	2.67	1.00	0.67	0.00	0.00	
				3	Mrs.Same	09/05/01	5	H.W.	1,000	1	Yes	80	120	40	40	2	3	-	2,3	0:15	0.30	2	BOH	USW	0.5	1:00	2:00	5:00	9	-	3	2	-	-	-	
				3	Mrs.Kili	09/05/01	3	H.W.	1,000	1	Yes	60	80	40	20	2	3	-	1,4	0:20	0.30	2	BOH	USW	0.45	1:00	2:00	6:00	7	-	2	-	-	-	-	
				3	Mrs.Girbert	09/05/01	5	H.W.	1,500	1	Yes	100	120	60	40	2	3	-	2,3	0:15	0.20	2	BOH	None	-	1:15	2:00	6:00	7	-	3	1	2	-	-	
42	Chonde	042	3				6.67		1,333			98	133	57	42					0:15	0.22	1.67				1:10	2:00	5:20	7.33	0.00	3.67	1.67	1.33	0.00	0.00	
				4	Mrs.Zimyongo	09/05/01	6	H.W.	1,500	1	Yes	80	120	40	40	2	3	-	2,3	0:15	0.20	2	BOH	None	-	1:00	2:00	6:00	6	-	3	2	1	-	-	
				4	Mr.Speki	09/05/01	9	S.F.	1,500	1	Yes	140	180	80	60	2	3	-	2,4	0:15	0.20	2	BOH	None	-	1:45	2:00	5:00	9	-	4	2	1	-	-	
				4	Mrs.Johanisi	09/05/01	5	H.W.	1,000	1	Yes	75	100	50	25	2	3	-	3	0:15	0.25	1	BOH	None	-	0:45	2:00	5:00	7	-	4	1	2	-	-	
43	Mphasayaweni	042	3				6.33		1,500			107	140	60	47					0:16	0.40	2.00				1:30	2:20	5:20	8.67	1.33	2.67	0.67	1.00	0.00	0.00	
				3	Mrs.M.David	09/05/01	8	H.W.	1,500	1	Yes	120	160	60	60	2	3	-	2,3	0:20	0.50	2	BOH	None	-	2:00	2:00	5:00	10	-	4	2	-	-	-	
				3	Mr.Ndojole	09/05/01	5	S.F.	1,500	1	Yes	100	120	60	40	2	3	-	2,3	0:15	0.40	2	BOH	None	-	1:15	3:00	5:00	8	2	1	-	2	-	-	
				3	Mrs.G.Menjaagwrani	09/05/01	6	H.W.	1,500	1	Yes	100	140	60	40	2	3	-	2,3	0:15	0.30	2	BOH	None	-	1:15	2:00	6:00	8	2	3	-	1	-	-	
44	Kalamba / Domoya [*1]	041	3				4.67		1,667			93	120	47	47					0:20	0.43	2.33				1:33	2:00	5:20	7.00	1.33	0.33	0.00	0.67	0.00	0.00	
				1	Mr.Chipangana	09/05/01	4	S.F.	2,000	1	Yes	80	100	40	40	2	1	-	2,4	0:20	0.40	2	BOH	USW	0.2	1:20	2:00	5:00	7	-	1	-	-	-	-	
				1	Mr.K.Phiri	09/05/01	4	S.F.	1,500	1	Yes	80	100	40	40	2	1	-	2,3	0:20	0.45	2	BOH	USW	0.3	1:20	2:00	6:00	5	2	-	-	1	-	-	
				1	Mr.Mizoiya	09/05/01	6	S.F.	1,500	1	Yes	120	160	60	60	2	1	-	2,3	0:20	0.45	3	BOH	USW	0.3	2:00	2:00	5:00	9	2	-	-	1	-	-	
45	Mbuta	055	3				4.67		1,333			73	103	37	37					0:15	0.20	1.67				0:50	2:20	5:40	7.67	0.67	2.33	1.67	1.00	0.00	0.00	
				4	Mrs.Njande	09/05/01	7	H.W.	1,000	1	Yes	100	150	50	50	2	3	-	2,3	0:15	0.20	2	BOH	BH	1	1:00	3:00	5:00	10	2	1	3	-	-	-	
				4	Mrs.Opheni	09/05/01	2	H.W.	1,500	1	Yes	40	60	20	20	2	3	-	2	0:15	0.20	1	BOH	BH	1	0:30	2:00	6:00	5	-	2	-	-	-	-	
				4	Ms.Chinyani	09/05/01	5	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	2,3	0:15	0.20	2	BOH	BH	0.9	1:00	2:00	6:00	8	-	4	2	3	-	-	
46	Chakuwala/Mwambil a Mando	020	3				4.67		1,333			87	120	47	40					0:15	0.10	2.00				1:05	2:00	5:20	8.33	0.33	3.00	1.00	2.00	1.33	0.00	
				3	Mrs.Dikapansi	09/05/01	4	H.W.	1,500	1	Yes	80	120	40	40	2	3	-	2,4	0:15	0.10	2	BOH	River	1	1:00	2:00	5:00	9	-	2	3	3	1	-	
				3	Mrs.George	09/05/01	7	H.W.	1,500	1	Yes	100	140	60	40	2	3	-	2,3	0:15	0.10	3	BOH	River	1.5	1:15	2:00	5:00	9	1	3	-	-	3	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

KACHERE

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use		Volume of Water Usage		Q'ty and Q'nty of Potable Water		Fetching Water						Alternative Water Source		Time Needed for (hours/day)			Diseases Affecting the Family (for the past 1 year) (person)							Others
				1.BH 2.PSW 3.USW 4.R/D						1.Necessary 2.Not Necessary		Present Volume	Volume Expected	Potable Water	Water for Washing	Q'nty 1.Satisfied 2.Unsatisfied	Q'ty 1.Good 2.Fair 3.Not Good	1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40 Male	Fimale	Time Needed (hours)	Distance (km)	No. of Persons for Your Family (person)	Method of Carrying Water	Type of Water Source	Distance (km)	Water Fetching	Domestic Cares	Farming Practices		Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	
				3	Mrs.Asiyakeni	09/05/01	3	H.W.	1,000	1	Yes	80	100	40	40	2	3	-	2	0:15	0.10	1	BOH	River	1	1:00	2:00	6:00	7	-	4	-	3	-	-	
47	**Liyela**	077	3				5.33		1,167			105	140	63	42					0:15	0.20	2.00				1:15	2:20	5:40	8.33	1.33	1.33	1.33	1.33	0.00	0.00	
				3	Mrs.Chaliwa	10/05/01	5	H.W.	1,500	1	Yes	75	100	50	25	2	3	-	3	0:15	0.20	1	BOH	USW	0.5	0:45	3:00	6:00	7	2	-	-	3	-	-	
				3	Mr.G.Kulemeka	10/05/01	9	S.F.	1,000	1	Yes	180	240	100	80	2	3	-	2,3	0:15	0.20	4	BOH	USW	0.6	2:15	2:00	5:00	13	2	1	3	-	-	-	
				3	Mr.Sitsani	10/05/01	2	S.F.	1,000	1	Yes	60	80	40	20	2	3	-	2	0:15	0.20	1	BOH	USW	0.6	0:45	2:00	6:00	5	-	3	1	1	-	-	
	Total 47 Villages		**132**				**5.30**		**1,688**			**97**	**135**	**52**	**45**					**0:21**	**0.28**	**1.87**				**1:29**	**2:59**	**5:57**								

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

Village Headman (CHILIKUMWENDO)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use: River/Dambo		Unprotected Shallow Well			Protected Shallow Well			Borehole			Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family		Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates	
									Perennial Flow or Not	Water Quality	No.	Water Quality	Dried-up or Not	No.	Water Quality	Dried-up or Not	No.	Water Quality	Dried-up or Not			(Buckets)	(liter)						South Latitude	East Longitude
TRADITIONAL AUTHORITY CHILIKUMWENDO																														
1	Khondowa	045	Khondowa	30	129	1,000	S.F.	None						1	Dirty	Not				Dirty Water (Mostly in October) Constructed under refuge program in 1990's In good condition with concrete apron)	BOH	4	80	Not	Yes	Yes	Yes	F=0.5(PSW) 30(Khondowa)+15(Ntala wantha)=45 households	14° 22' 55"	33° 49' 48"
2	Thunduzi	045	Thunduzi	40	172	500	S.F.	None	P.F.	Bad	2	Bad	Not							USWs(1983)/now in use, but water is very dirty	BOH	4	80	Not	Yes	Yes	Yes		14° 21' 05"	33° 49' 37"
3	Lombwa	041	Lombwa	37	159	500	S.F.	None			6	Bad	Not							DUG by the communities/now in use	BOH	4	80	Utilised	Yes	Yes	Yes	4 families catch rain water from their iron sheet covered house	14° 20' 59"	33° 51' 01"
4	Kachepa	046	Kachepa	30	129	500	S.F.,G.	None			2	Bad	Not							None	BOH	4	80	Not	Yes	Yes	Yes	30(Kachepa)+8(Chigobwa)=38 households	14° 20' 13"	33° 49' 07"
5	Jere	046	Jere	30	129	1,000	S.F.	None			1	Bad	Not							USW(1990)/now in use	BOH	3	60	Utilised	Yes	Yes	Yes	F=0.5(USW) 30(Jere)+15(Kalusa)=45 households	14° 20' 31"	33° 48' 47"
6	Kukalambo	040	Kukalambo	30	129	1,000	S.F.	None	P.F.	Bad										None	BOH	3	60	Not	Yes	Yes	Yes	30(Kukalambo)+20(Mbera)=50 households	14° 18' 53"	33° 50' 36"
7	Kanjinga I	044	Kanjinga	45	194	2,000	S.F.	None			5	Dirty	Not							Families dug themselves for home use, and other villagers are allowed to use/bad condition	BOH	5	100	Utilised	Yes	Yes	Yes	Only 9 families utilize rain water cought by iron sheeted houses	14° 23' 13"	33° 50' 53"
8	Chimombo	042	Chimombo	45	194	700	S.F.	None			2	Bad	Not							USWs(8 years ago)/no concrete protection	BOH	3	60	Utilised	Yes	Yes	Yes	7 families catch water from their iron sheeted houses	14° 22' 17"	33° 51' 16"
9	Kamtambo	036	Kamtambo	74	318	600	S.F.	None			6	Bad	Not							USWs(1997)/no chemicals	BOH	4	80	Not	Yes	Yes	Yes		14° 22' 57"	33° 53' 35"
10	Folomani	038	Folomani	70	301	1,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes	F=0.5	14° 21' 41"	33° 53' 03"
11	Mmbeya	046	Mmbeya	48	206	3,000	S.F.	None			2	Bad	Not							USWs(1984)/now in use/no brick lining/dries in Oct.	BOH	4	80	Not	Yes	Yes	Yes		14° 21' 38"	33° 48' 37"
13	Kang'ombe A and B	036	Kang'ombe	40	172	800	S.F.	None	P.F.	P.F.										-	BOH	3	60	Not	Yes	Yes	Yes		14° 23' 11"	33° 54' 29"
14	Kamadzi	033	Kamadzi	29	125	1,000	S.F.	None	P.F.	P.F.										None	BOH	5	100	Not	Yes	Yes	Yes	F=0.5	14° 19' 50"	33° 52' 02"
15	Chisani	045	Chisani	40	172	1,000	S.F.	None			1	Bad	Not							USW(1984)/now in use/no brick lining	BOH	4	80	Not	Yes	Yes	Yes		14° 21' 15"	33° 49' 24"
16	*Aliyelo*	043	Aliyelo	49		400	S.F.	None	P.F.	Bad	1	Bad	Not							USW(1995)/no improvement in construction	BOH	3	60	Not	Yes	Yes	Yes		14° 22' 59"	33° 53' 11"
17	M'gawi	033	M'gawi	26	112	2,000	S.F.	None			2	Dirty	Not							USWs(1992)/not protected, no headworks	BOH	4	80	Not	Yes	Yes	Yes	F=0.5	14° 19' 13"	33° 52' 57"
18	Chideza	040	Chideza	21	90	5,000	S.F.	School									2	Good	Not	BHs(2000)/now in use ※	BOH	4	80	Not	Yes	Yes	Yes	F=0.5(BH) Chideza vg. has 2 BHs working	14° 19' 33"	33° 49' 52"
20	Chatondeza 1and 2	027	Chatondeza	118	507	1,000	S.F.	None						1	Bad	Not				-	BOH	4	80	Not	Yes	Yes	Yes	F=0.5(Dambo)	14° 21' 42"	33° 58' 36"
21	Nyemba	027	Nyemba	52	224	1,000	S.F.	None			1	Bad	Not							USW(now in use) PSW('80's)/pump broken down and removed	BOH	3	60	Not	Yes	Yes	Yes		14° 22' 34"	33° 59' 02"
22	Phale	028	Phale	46	198	1,000	S.F.	None	Not	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 21' 13"	33° 56' 09"
23	Sankhani	021/ 026	Sankhani	40	172	1,000	S.F.	None			4	Bad	Not							USWs(1993's)/no protection	BOH	4	80	Not	Yes	Yes	Yes	F=1	14° 20' 10"	33° 57' 57"
24	Lumwira/(Nyamasanka)	023	Lumwira	68	292	1,000	S.F.	None			2	Bad	Not							-	BOH	4	80	Not	Yes	Yes	Yes		14° 21' 01"	33° 59' 38"
25	Kaluzi	024	Kaluzi	30	129	1,000	S.F.	None	P.F.	Bad										-	BOH	4	80	Not	Yes	Yes	Yes	30(Kaluzi)+14(Changunden de)=44 households	14° 21' 26"	33° 58' 38"
26	Maguya/Kanundu	026	Maguya	19	82	1,000	S.F.	None			1	Bad	Not							USW dug by the community	BOH	3	60	Not	Yes	Yes	Yes	19(Maguya)+10(Kanundu)+10(phase) =39 households	14° 20' 32"	33° 56' 48"
27	Chidonthi	026	Chidonthi	35	151	1,000	S.F.	None									1	Good	Not	BH(2000)/condition very good/implemented by C.U. ※	BOH	4	80	Not	Yes	Yes	Yes	F=0.5 35(Chidonthi)+ 5(Chimpikiso)+7(Sogawa)=47 households	14° 19' 47"	33° 57' 38"
28	Ngombeyagwada	026	Ngombeyagwa da	83	357	700	S.F.	None	P.F.	Bad	1	Bad	Not							USW/now in use	BOH	3	60	Not	Yes	Yes	Yes		14° 20' 42"	33° 57' 26"
29	Katsalapoti	029	Katsalapoti	61	262	1,000	S.F.	School	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 20' 40"	33° 55' 56"
30	Chatsika	030	Chatsika	56	241	500	S.F.	None			1	Dirty	Not							Dug(1986)/very bad water	BOH	4	80	Not	Yes	Yes	Yes		14° 19' 36"	33° 56' 24"
31	Msampha	015	Msampha	47	202	1,500	S.F.	None			2	Bad	Not							USWs(1990)/has concrete protection, lining/no pump	BOH	5	100	Not	Yes	Yes	Yes	F=0.5	14° 19' 06"	33° 58' 52"
32	Mtalimanja	014	Mtalimanja	41	176	800	S.F.	None			4	Bad	Not							-	BOH	5	100	Not	Yes	Yes	Yes		14° 18' 48"	34° 00' 51"
33	Chimambamtengo	014	Chimambamten go	145	624	800	S.F.	School	P.F.	Bad	2	Bad	Not							USW-1 with dirty water dug (1991)/now in use USW-2(80's)	BOH	5	100	Not	Yes	Yes	Yes		14° 19' 38"	34° 00' 51"
34	Mwanzimba	015	Mwanzimba	68	292	1,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 18' 26"	33° 59' 33"
35	Willinda	003	Willinda	80	344	800	S.F.	None			2	Bad	Not							USWs(1991)/no concrete protection/bad	BOH	6	120	Not	Yes	Yes	Yes	BH under construction by C.U.	14° 14' 09"	33° 57' 04"
36	Malonikansepa/kansepa	009	Malonikansepa	110	473	2,000	S.F.	None									1	Good	Not	BH(march, 2000/condition good/constructed by PROSCARP)	BOH	3	60	Not	Yes	Yes	Yes	F=0.5	14° 16' 16"	33° 57' 34"
37	Chimchere	008	Chimchere	76	327	1,000	S.F.	None	P.F.	Bad				1	Fair	Not				None	BOH	4	80	Not	Yes	Yes	Yes		14° 15' 44"	33° 58' 52"
38	Mphoozi	008	Mphoozi	52	224	1,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 16' 21"	33° 58' 54"
39	Kumbisa/(Kanyada)	012	Kumbisa	40	172	600	S.F.	None			2	Bad	Not							No protection	BOH	3	60	Not	Yes	Yes	Yes		14° 17' 40"	34° 00' 13"
40	Chimtundudza	013	Chimtundudza	28	120	1,000	S.F.	None			3	Bad	Not							USWs(3 years ago)	BOH	4	80	Not	Yes	Yes	Yes	F=0.5 28(Chimtundudza)+18 families(Chiwaza)=46 households	14° 17' 50"	34° 01' 12"
41	Chipsye	009/ 011	Chipsye	30	129	1,000	S.F.	None						1	Fair	Not				PSW(1998)/No concrete linings/no pump fitted	BOH	4	80	Not	Yes	Yes	Yes	F=0.5 30(Chipsye)+30(Mtoseni)=60 households	14° 16' 37"	33° 58' 34"

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
BOH=Bucket on Head P.F.=Perennial Flow D.U.=Dried Up C.U.=Concern Universal

Village Headman (CHILIKUMWENDO)

No.	CANDIDATES SITES	EA No.	Village Headman	No. of Households	Household Population	Average Income amond Villagers (MK/year)	Source of Income	Povision of Public Facilities	Water Souce of Present Use											Water Supply Facilities (past record of construction/ present condition)	Method of Carrying Water	Average Volume of Water Usage per Family		Rain Water Utilized or Not	Willingness to Accept the Facilities in a Consensus of the Village	Willingness to AcceptFormation of Water Management Committee	Willingness to the Contribution in Currency for Payment of O/M expenses	Others	Coordinates	
									River/Dambo		Unprotected Shallow Well			Protected Shallow Well			Borehole													
									Perennial Flow or Not	Water Quality	No.	Water Quality	Dried-up or Not	No.	Water Quality	Dried-up or Not	No.	Water Quality	Dried-up or Not			(Buckets)	(liter)						South Latitude	East Longitude
42	Chiimutu Woyera	006	Chiimutu Woyera	50	215	1,000	S.F.	None	P.F.	Bad										None	BOH	4	80	Not	Yes	Yes	Yes		14° 16' 10"	34° 01' 13"
43	*Asafu*	037	Asafu	76	327	1,500	S.F.	None			4	Poor	D.U.							BH(1980's)/now under breakdown	BOH	5	100	Not	Yes	Yes	Yes	F=0.5(USW)	14° 22' 10"	33° 52' 52"
	Total 41 Villages			**52**	**224**	**1,127**																	**79**							

NOTES：※ ; Existing BH being in operation was confirmed by Electric Prospecting Survey Team.
※※ ; Existing BH being out of order was confirmed by Electric Prospecting Survey Team.

ABBREV : S.F.=Subsistence Farming B.=Business C.=Crafts G.=Gardening
BOH=Bucket on Head P.F.=Perennial Flow D.U.=Dried Up C.U.=Concern Universal

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source 1.BH 2.PSW 3.USW 4.R/D	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities 1.Necessary 2.Not Necessary	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty 1.Satisfied 2.Unsatisfied	Q'ty and Q'nty of Potable Water: Q'ty 1.Good 2.Fair 3.Not Good	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
TRADITIONAL AUTHORITY CHILIKUMWENDO																																				
1	**Khondowa**	045	3				6.33		3,233			107	140	60	47					0:11	0.02	1.67				1:00	2:20	6:20	6.67	0.00	0.33	0.00	0.00	0.33	0.00	
				2	Mrs.George	28/04/01	5	H.W.	2,500	1	Yes	80	100	40	40	2	1	-	3	0:15	0.03	1	BOH	River	0.7	1:00	2:00	7:00	8	-	-	-	-	-	-	
				2	Mrs.Langwani	28/04/01	7	H.W.	2,200	1	Yes	120	120	80	40	1	1	-	2,4,5	0:15	0.03	2	BOH	River	0.7	1:30	2:00	6:00	8	-	-	-	-	-	-	
				2	Mrs.Chingalu	28/04/01	7	H.W.	5,000	1	Yes	120	200	60	60	2	3	-	2,4	0:05	0.01	2	BOH	None	-	0:30	3:00	6:00	4	-	1	-	-	1	-	
2	**Thunduzi**	045	2				4.00		1,150			90	110	40	50					0:15	0.09	1.50				1:07	3:00	6:00	5.00	0.00	0.00	1.00	0.00	0.50	0.00	
				3	Mrs.M.Yelemia	27/04/01	3	H.W.	1,800	1	Yes	60	80	40	20	2	3	-	2	0:15	0.10	1	BOH	Dambo	0.5	0:45	2:00	7:00	6	-	-	1	-	-	-	-
				3	Mr.Z.Jumbe	27/04/01	5	S.F.	500	1	Yes	120	140	40	80	2	3	-	2,4	0:15	0.08	2	BOH	None	-	1:30	4:00	5:00	4	-	-	1	-	1	-	
3	**Lombwa**	041	3				4.67		2,500			73	93	53	20					0:10	0.01	1.67				0:40	2:40	6:00	7.67	0.00	1.33	0.00	0.33	0.00	0.00	
				3	Mrs.Lunlemi	28/04/01	5	H.W.	2,000	1	Yes	80	100	60	20	2	3	-	2,3	0:15	0.006	2	BOH	USW	0.3	1:00	2:00	6:00	8	-	1	-	1	-	-	
				3	Mrs.Nelson	28/04/01	6	H.W.	2,500	1	Yes	100	120	80	20	2	3	-	2,4	0:10	0.005	2	BOH	USW	0.2	0:50	2:00	6:00	9	-	2	-	-	-	-	
				3	Mr.M.Sitolo	28/04/01	3	B.M.	3,000	1	Yes	40	60	20	20	2	3	-	2	0:05	0.015	1	BOH	None	-	0:10	4:00	6:00	6	-	1	-	-	-	-	
4	**Kachepa**	046	3				4.67		2,067			93	127	47	47					0:16	0.10	2.00				1:10	3:00	5:40	4.33	0.00	0.00	1.33	1.67	0.33	0.00	
				3	Mrs.Bitalosi	27/04/01	1	Widow	2,000			80	120	60	20			-	5	0:15	0.10	1	BOH	USW	0.06	1:00	3:00	6:00	-	-	-	-	-	-	-	
				3	Mrs.L.Brasho	27/04/01	6	H.W.	2,200	1	Yes	80	100	60	20	2	3	-	2,4	0:20	0.10	2	BOH	USW	0.025	1:00	2:00	6:00	8	-	-	-	5	-	-	
				3	Mr.T.Kaziputa	27/04/01	7	S.F.	2,000	1	Yes	120	160	20	100	2	3	-	2,5	0:15	0.10	3	BOH	None	-	1:30	4:00	5:00	5	-	-	4	-	1	-	
5	**Jere**	046	3				6.00		2,000			107	147	60	34					0:13	0.07	2.00				1:13	2:10	6:20	7.67	0.67	1.00	1.00	1.00	0.00	0.00	
				3	Mr.D.Besenti	27/04/01	7	S.F.	1,000	1	Yes	120	180	80	2	2	3	-	2,3	0:15	0.015	2	BOH	None	-	1:30	1:30	7:00	12	1	-	2	-	-	-	Shingles
				3	Mrs.Sinoya	27/04/01	7	H.W.	2,000	1	Yes	120	160	80	40	2	3	-	3	0:15	0.10	3	BOH	None	-	1:30	2:00	6:00	9	1	-	-	-	-	-	
				3	Mr.B.Tsamba	27/04/01	4	S.F.	3,000	1	Yes	80	100	20	60	2	3	-	3	0:10	0.10	1	BOH	None	-	0:40	3:00	6:00	2	-	3	1	3	-	-	
6	**Kukalambo**	040	3				3.00		1,533			100	127	47	53					0:26	0.18	1.00				2:10	2:10	4:40	4.67	0.33	0.00	0.33	0.67	0.00	0.00	
				4	Mr.Kumanda	26/04/01	4	S.F.	600	1	Yes	120	140	60	60	2	3	-	3	0:30	0.15	1	BOH	None	-	3:00	1:00	3:00	5	1	-	1	-	-	-	
				4	Mr.C.Yasini	27/04/01	3	S.F.	3,000	1	Yes	60	100	40	20	2	3	-	2	0:30	0.15	1	BOH	None	-	1:30	1:30	5:00	9	-	-	-	1	-	-	
				4	Mrs.Alidi	27/04/01	2	H.W.	1,000	1	Yes	120	140	40	80	2	3	-	5	0:20	0.25	1	BOH	None	-	2:00	4:00	6:00	-	-	-	-	1	-	-	
7	**Kanjinga I**	044	3				5.00		1,833			72	113	43	28					0:11	0.01	1.33				0:36	3:20	6:20	7.67	0.33	0.00	0.00	0.67	0.33	0.00	
				3	Mrs.O.Kumlebko	28/04/01	7	H.W.	2,500	1	Yes	75	100	50	25	2	3	-	2,3	0:15	0.015	2	BOH	Dambo	0.3	0:45	3:00	6:00	9	-	-	-	-	1	-	Heart attack
				3	Mrs.M.Maora	28/04/01	5	H.W.	1,000	1	Yes	60	120	40	20	2	3	-	5	0:15	0.02	1	BOH	Dambo	0.3	0:45	2:00	7:00	8	-	-	-	1	-	-	Heart attack
				3	Mrs.Richard	28/04/01	3	H.W.	2,000	1	Yes	80	120	40	40	2	3	-	3	0:05	0.005	1	BOH	None	-	0:20	5:00	6:00	6	1	-	-	1	-	-	
8	**Chimombo**	042	3				3.33		2,333			80	107	40	40					0:11	0.03	1.67				0:46	2:00	5:40	5.67	0.00	1.67	0.33	0.00	0.00	0.00	
				3	Mr.J.Banda	28/04/01	3	S.F.	3,000	1	Yes	80	100	40	40	2	3	-	2	0:10	0.005	2	BOH	USW	0.1	0:40	2:00	4:00	6	-	-	-	-	-	-	USW(next vg.)
				3	Mrs.Mkolongur	28/04/01	5	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	2,4	0:15	0.02	2	BOH	USW	0.1	1:00	2:00	7:00	7	-	3	-	-	-	-	
				3	Mrs.Januay	28/04/01	2	H.W.	2,000	1	Yes	80	120	40	40	1	2	-	3	0:10	0.05	1	BOH	None	-	0:40	2:00	6:00	4	-	2	1	-	-	-	
9	**Kamtambo**	036	3				3.00		1,233			53	73	33	20					0:15	0.04	1.00				0:41	2:20	5:20	5.00	0.33	0.00	0.67	0.00	0.00	0.00	
				3	Mrs.A.Kanthiti	28/04/01	4	H.W.	2,000	1	Yes	60	80	40	20	2	3	-	3	0:20	0.05	1	BOH	USW	0.08	1:00	2:00	6:00	6	-	-	-	-	-	-	
				3	Mrs.Nasikelo	28/04/01	2	D.W.	400	1	Yes	60	80	40	20	2	3	-	3	0:15	0.03	1	BOH	None	-	0:45	2:00	4:00	5	1	-	2	-	-	-	
				3	Mrs.Maliyera	28/04/01	3	H.W.	1,300	1	Yes	40	60	20	20	2	3	-	3	0:10	0.025	1	BOH	None	-	0:20	3:00	6:00	4	-	-	-	-	-	-	
10	**Folomani**	038	3				3.67		2,000			93	120	67	27					0:11	0.04	1.33				0:56	2:40	6:00	5.33	0.00	1.33	1.00	0.00	0.00	0.00	
				4	Mrs.Radiant	28/04/01	2	H.W.	2,000	1	Yes	80	120	40	40	2	3	-	3	0:05	0.01	1	BOH	None	-	0:20	4:00	5:00	4	-	-	1	-	-	-	
				4	Mrs.L.Jefrey	28/04/01	3	H.W.	2,000	1	Yes	100	120	80	20	2	3	-	3	0:15	0.06	1	BOH	None	-	1:15	2:00	7:00	5	-	2	1	-	-	-	
				4	Mrs.M.Tsamba	28/04/01	6	H.W.	2,000	1	Yes	100	120	80	20	2	3	-	2,5	0:15	0.05	2	BOH	None	-	1:15	2:00	6:00	7	-	2	1	-	-	-	
11	**Mmbeya**	046	3				4.33		2,167			77	117	37	40					0:15	0.02	1.00				1:05	3:00	6:40	6.67	0.67	0.67	1.00	1.00	0.00	0.00	
				3	Mrs.R.Ching'anga	27/04/01	5	H.W.	1,500	1	Yes	60	100	40	20	2	3	-	4	0:15	0.02	1	BOH	USW	0.03	0:45	2:00	7:00	8	-	-	2	-	-	-	
				3	Mrs.S.Tasiyano	27/04/01	4	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	3	0:15	0.01	1	BOH	USW	0.04	1:00	2:00	7:00	6	-	-	-	-	-	-	
				3	Mrs.Chinguwo	27/04/01	4	H.W.	3,000	1	Yes	90	150	30	60	2	3	-	3	0:15	0.03	1	BOH	None	-	1:30	5:00	6:00	6	2	2	1	3	-	-	
13	**Kang'ombe A and B**	036	3				5.00		1,433			100	133	40	60					0:20	0.11	2.00				1:35	4:20	6:00	6.67	0.00	1.00	0.33	0.67	0.33	0.00	
				4	Mrs.Natsutsani	02/05/01	5	H.W.	800	1	Yes	80	120	20	60	2	2	-	2,5	0:20	0.10	1	BOH	None	-	1:15	5:00	6:00	7	-	2	-	-	-	-	
				4	Mrs.Najedana	02/05/01	4	H.W.	1,000	1	Yes	120	160	40	80	2	3	-	1,2,5	0:25	0.14	3	BOH	None	-	2:15	6:00	5:00	5	-	1	1	2	1	-	
				4	Mrs.N.Levison	02/05/01	6	H.W.	2,500	1	Yes	100	120	60	40	2	3	-	2,4	0:15	0.10	2	BOH	None	-	1:15	2:00	7:00	8	-	-	-	-	-	-	
14	**Kamadzi**	033	3				4.00		1,000			53	87	33	20					0:20	0.27	1.00				0:45	2:40	6:20	6.67	0.33	2.67	1.33	0.00	0.00	0.00	
				4	Mrs.N.Felesoni	28/04/01	3	H.W.	1,000	1	Yes	40	60	20	20	2	3	-	2	0:15	0.30	1	BOH	None	-	0:30	3:00	6:00	4	-	-	-	-	-	-	
				4	Mrs.C.Gavmala	28/04/01	5	H.W.	1,000	1	Yes	60	120	40	20	2	3	-	5	0:15	0.30	1	BOH	None	-	0:45	3:00	6:00	6	1	-	-	-	-	-	
				4	Mr.Damalekani	28/04/01	4	S.F.	1,000	1	Yes	60	80	40	20	2	3	-	4	0:30	0.20	1	BOH	None	-	1:00	2:00	7:00	10	-	8	4	-	-	-	
15	**Chisani**	045	3				5.33		4,333			107	193	67	40					0:11	0.03	1.33				1:03	3:00	5:40	7.67	0.00	1.00	1.33	0.00	0.00	0.00	
				3	Mrs.H.Biziwelo	27/04/01	3	H.W.	4,000	1	Yes	100	160	60	40	2	3	-	3	0:10	0.015	1	BOH	None	-	0:50	4:00	6:00	4	-	2	2	-	-	-	
				3	Mrs.S.Chisami	27/04/01	8	H.W.	2,000	1	Yes	100	280	60	40	2	3	-	2,5	0:10	0.03	2	BOH	None	-	0:50	3:00	3:00	10	-	-	2	-	-	-	Shingles
				3	Mr.F.Chagani	27/04/01	5	S.F.	7,000	1	Yes	120	140	80	40	2	3	-	4	0:15	0.03	1	BOH	None	-	1:30	2:00	8:00	9	-	1	-	-	-	-	Tooth ache
16	**Aliyelo**	043	3				3.33		3,133			73	93	47	27					0:13	0.08	1.67				0:46	3:00	6:20	5.67	0.33	3.67	2.33	1.33	0.00	0.00	
				3	Mrs.M.Filiab	28/04/01	4	H.W.	2,400	1	Yes	60	80	40	20	2	3	-	3	0:15	0.10	1	BOH	USW	0.3	0:45	2:00	7:00	5	-	2	1	-	-	-	
				3	Mrs.Johana	28/04/01	3	D.W.	2,000	1	Yes	60	80	40	20	2	3	-	2,5	0:15	0.10	3	BOH	USW	0.3	0:45	2:00	6:00	5	-	-	1	-	-	-	
				3	M.Barifani	28/04/01	3	S.F.	5,000	1	Yes	100	120	60	40	2	3	-	5	0:10	0.05	1	BOH	None	-	0:50	5:00	6:00	7	1	9	5	4	-	-	
17	**M'gawi**	033	3				4.67		1,767			93	127	40	53					0:10	0.02	1.67				0:41	3:20	6:20	5.33	0.33	0.67	0.33	0.33	0.33	0.00	
				3	Mrs.F.Gideon	28/04/01	4	H.W.	2,000	1	Yes	120	160	40	80	2	3	-	5	0:15	0.025	1	BOH	None	-	0:45	3:00	6:00	4	-	2	-	-	1	-	
				3	Mrs.F.Gideon	28/04/01	4	H.W.	1,300	1	Yes	80	100	40	40	2	3	-	2,5	0:05	0.01	2	BOH	None	-	0:40	5:00	6:00	4	1	-	-	1	-	-	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

CHILIKUMWENDO

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source (1.BH 2.PSW 3.USW 4.R/D)	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities (1.Necessary 2.Not Necessary)	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty (1.Satisfied 2.Unsatisfied)	Q'ty and Q'nty of Potable Water: Q'ty (1.Good 2.Fair 3.Not Good)	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fetching Water: Fimale	Fetching Water: Time Needed (hours)	Fetching Water: Distance (km)	Fetching Water: No. of Persons for Your Family (person)	Fetching Water: Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Time Needed for (hours/day): Domestic Cares	Time Needed for (hours/day): Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				3	Mrs.Nafulan	28/04/01	6	H.W.	2,000	1	Yes	80	120	40	40	1	3	-	2,3	0:12	0.01	2	BOH	USW	0.2	0:40	2:00	7:00	8	-	-	1	-	-	-	
18	**Chideza**	040	3				5.00		2,233			90	118	48	42					0:18	0.12	1.00				1:05	3:00	6:20	6.00	1.00	0.67	1.00	0.33	0.00	0.00	
				3	Mrs.V.Mkandawire	26/04/01	7	H.W.	3,000	1		120	140	80	40	2	1	-	4	0:10	0.005	1	BOH	BH	0.1	1:00	3:00	7:00	9	1	-	-	-	-	-	Heart attack
				1	Mrs.S.Nelsoni	27/04/01	3	H.W.	2,500	1	Yes	50	75	25	25	2	1	-	3	0:30	0.10	1	BOH	USW	0.04	1:00	2:00	6:00	4	-	-	1	1	-	-	
				1	Mrs.Chalela	27/04/01	5	H.W.	1,200	1	Yes	100	140	40	60	2	1	-	5	0:15	0.25	1	BOH	None	-	1:15	4:00	6:00	5	2	2	2	-	-	-	
20	**Chatondeza 1and 2**	027	3				4.67		1,833			67	100	33	33					0:16	0.06	1.33				0:51	4:40	5:20	6.00	0.67	1.00	1.00	0.33	0.33	0.00	
				2	Mrs.Nasoza	29/04/01	4	H.W.	1,500	1	Yes	40	60	20	20	2	1	-	3	0:10	0.03	1	BOH	-	-	0:20	5:00	6:00	5	-	3	-	-	-	-	
				2	Mrs.Emile	29/04/01	4	H.W.	2,000	1	Yes	60	120	20	40	2	3	-	3	0:25	0.04	1	BOH	-	-	1:00	7:00	3:00	4	1	-	1	-	1	-	PSW(Personal)
				2	Mrs.Alson	29/04/01	6	H.W.	2,000	1	Yes	100	120	60	40	2	1	-	2,4	0:15	0.10	2	BOH	Dambo	0.4	1:15	2:00	7:00	9	1	-	2	1	-	-	
21	**Nyemba**	027	3				4.67		2,000			67	93	33	33					0:20	0.33	1.00				1:00	2:40	5:20	4.00	0.33	0.67	0.67	0.67	0.00	0.00	
				3	Mrs.Nadwasi	29/04/01	7	H.W.	500	1	Yes	40	80	20	20	2	3	-	5	0:30	0.20	1	BOH	None	-	1:00	4:00	6:00	2	-	-	-	2	-	-	
				3	Mrs.N.Beseni	29/04/01	4	H.W.	1,500	1	Yes	80	100	40	40	2	3	-	3	0:15	0.40	1	BOH	Dambo	0.5	1:00	2:00	6:00	6	1	1	1	-	-	-	
				3	Mr.F.Jackson	29/04/01	3	S.F.	4,000	1	Yes	80	100	40	40	2	3	-	3	0:15	0.40	1	BOH	Dambo	0.5	1:00	2:00	4:00	4	-	1	1	-	-	-	
22	**Phale**	028	3				3.00		1,667			53	73	33	20					0:15	0.08	1.00				0:40	2:20	6:00	4.67	0.33	1.33	0.33	1.00	0.00	0.00	
				4	Mr.F.Biginale	29/04/01	2	S.F.	3,000	1	Yes	60	80	40	20	2	3	-	3	0:15	0.10	1	BOH	None	-	0:45	2:00	7:00	2	-	1	-	-	-	-	
				4	Mrs.N.Saferama	29/04/01	4	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	3	0:15	0.10	1	BOH	None	-	0:45	2:00	5:00	6	-	2	1	2	-	-	
				4	Mrs.James	29/04/01	3	H.W.	500	1	Yes	40	60	20	20	2	3	-	3	0:15	0.05	1	BOH	None	-	0:30	3:00	6:00	6	1	1	-	1	-	-	
23	**Sankhani**	021/ 026	3				3.33		2,833			100	128	50	50					0:12	0.03	1.33				0:42	3:00	5:00	5.00	0.33	1.00	0.33	0.00	0.00	0.00	
				3	Mr.Aliki	29/04/01	3	S.F.	3,000	1	Yes	120	160	60	60	2	3	-	3	0:15	0.05	1	BOH	None	-	0:40	5:00	5:00	6	1	1	-	-	-	-	
				3	Mrs.F.Kamakhala	29/04/01	5	H.W.	3,000	1	Yes	100	125	50	50	2	3	-	2,3	0:12	0.02	2	BOH	USW	0.3	0:48	2:00	5:00	6	-	-	1	-	-	-	
				3	Mr.E.Yotam	29/04/01	2	S.F.	2,500	1	Yes	80	100	40	40	2	3	-	2	0:10	0.01	1	BOH	USW	0.1	0:40	2:00	5:00	3	-	2	-	-	-	-	
24	**Lumwira/(Nyamasank a)**	023	3				5.33		2,833			73	113	40	33					0:20	0.28	1.67				1:16	2:20	6:40	9.67	0.00	4.33	0.33	0.00	0.00	0.00	
				3	Mrs.G.Chmldeko	29/04/01	6	H.W.	1,500	1	Yes	80	120	40	40	2	4	-	3.4	0:20	0.20	2	BOH	Dambo	0.3	1:20	2:00	7:00	8	-	2	1	-	-	-	
				3	Mrs.I.Tenazio	29/04/01	5	H.W.	2,000	1	Yes	60	100	40	20	2	3	-	3	0:20	0.20	1	BOH	Dambo	0.3	1:00	2:00	7:00	6	-	1	-		-	-	Pancreas problem
				3		29/04/01	5	S.F.	5,000	1	Yes	80	120	40	40	2	3	-	1,4	0:20	0.45	2	BOH	Dambo	0.3	1:30	3:00	6:00	15	-	10	-	-	-	-	
25	**Kaluzi**	024	3				4.33		1,500			73	120	40	33					0:25	0.29	2.33				1:25	3:00	6:40	5.33	0.00	1.00	0.67	0.33	0.00	0.00	
				4	Mr.Kumwenda	29/04/01	7	S.F.	2,000	1	Yes	60	160	40	20	2	3	-	2,3	0:30	0.40	3	BOH	BH	0.5	1:30	2:00	7:00	8	-	1	1	-	-	-	BH(next vg.)
				4	Mr.Chakumba	29/04/01	3	S.F.	1,500	1	Yes	60	80	40	20	2	3	-	2,4	0:30	0.40	2	BOH	BH	0.5	1:30	2:00	7:00	4	-	2	1	1	-	-	BH(next vg.)
				4	Mrs.Banda	29/04/01	3	H.W.	1,000	1	Yes	100	120	40	60	2	3	-	4.5	0:15	0.06	2	BOH	BH	0.3	1:15	5:00	6:00	4	-	-	-	-	-	-	BH(next vg.)
26	**Maguya/Kanundu**	026	3				4.33		1,833			67	93	33	33					0:33	0.40	1.00				2:00	3:20	5:20	6.00	0.33	1.33	0.33	0.00	0.00	0.00	
				4	Mr.Wilson.G.	29/04/01	5	S.F.	1,500	1	Yes	80	100	40	40	2	3	-	3	0:20	0.30	1	BOH	None	-	1:20	2:00	6:00	6	-	2	1	-	-	-	
				3	Mrs.Limisoni	29/04/01	4	H.W.	2,000	1	Yes	80	100	40	40	2	3	-	3	1:00	0.60	1	BOH	None	-	4:00	6:00	3:00	6	-	1	-	-	-	-	
				4	Mr.Michael	29/04/01	4	S.F.	2,000	1	Yes	40	80	20	20	2	3	-	3	0:20	0.30	1	BOH	None	-	0:40	2:00	7:00	6	1	1	-	-	-	-	
27	**Chidonthi**	026	3				3.67		1,167			67	87	33	33					0:20	0.08	1.33				1:06	2:40	5:40	2.33	0.00	0.00	0.00	0.00	0.33	0.00	
				1	Mrs.B.Sipenala	29/04/01	5	H.W.	1,200	1	Yes	100	120	40	60	2	1	-	5	0:20	0.04	1	BOH	None	-	1:40	4:00	6:00	7	-	-	-	-	1	-	
				1	Mrs.Keflina	29/04/01	2	Widow	800	1	Yes	40	60	20	20	2	1	-	5	0:20	0.10	1	BOH	USW	0.5	0:40	2:00	5:00	-	-	-	-	-	-	-	
				1	Mrs.Sebina	29/04/01	4	D.W.	1,500	1	Yes	60	80	40	20	2	1	-	2,4	0:20	0.10	2	BOH	USW	0.5	1:00	2:00	6:00	-	-	-	-	-	-	-	
28	**Ngombeyagwada**	026	3				5.33		1,333			80	107	40	40					0:12	0.02	1.33				1:00	3:20	6:40	4.67	0.33	0.33	1.33	0.67	0.00	0.00	
				3	Mrs.Fani	29/04/01	6	H.W.	1,200	1	Yes	100	120	40	60	2	3	-	1,3	0:15	0.04	2	BOH	None	-	1:15	4:00	6:00	4	-	1	1	1	-	-	
				3	Mrs.Dikilemi	29/04/01	5	H.W.	1,800	1	Yes	80	100	40	40	2	3	-	3	0:12	0.01	1	BOH	Dambo	0.4	1:15	2:00	7:00	6	1	-	2	1	-	-	
				3	Mrs.Mtherapansi	29/04/01	5	H.W.	1,000	1	Yes	60	100	40	20	2	3	-	3	0:10	0.015	1	BOH	None	-	0:30	4:00	7:00	4	-	-	1	-	-	-	
29	**Katsalapoti**	029	3				4.67		1,167			67	100	33	33					0:23	0.20	1.00				1:11	3:20	5:00	5.33	0.00	0.33	0.67	0.33	0.00	0.00	
				4	Mrs.Sunge	28/04/01	4	H.W.	1,000	1	Yes	60	80	20	40	2	3	-	3	0:30	0.20	1	BOH	None	-	1:15	6:00	4:00	5	-	-	1	-	-	-	
				4	Mr.Lejala	28/04/01	3	S.F.	1,000	1	Yes	60	100	40	20	2	3	-	5	0:20	0.20	1	BOH	None	-	1:00	2:00	5:00	4	-	1	1	1	-	-	
				4	Mrs.E.Chonadr	28/04/01	7	H.W.	1,500	1	Yes	80	120	40	40	2	3	-	4	0:20	0.20	1	BOH	None	-	1:20	2:00	6:00	7	-	-	-	-	-	-	
30	**Chatsika**	030	3				3.67		1,333			67	93	33	27					0:11	0.04	1.33				0:28	2:40	6:20	4.33	0.67	0.33	0.33	0.33	0.00	0.00	
				3	Mrs.Namalandira	28/04/01	4	H.W.	1,500	1	Yes	60	80	40	20	2	3	-	2,5	0:15	0.07	2	BOH	None	-	0:45	2:00	7:00	5	1	1	1	1	-	-	Eye problem
				3	Mrs.Lutifa	28/04/01	2	Widow	500	1	Yes	40	60	20	20	2	3	-	5	0:10	0.025	1	BOH	None	-	0:20	3:00	6:00	4	1	-	-	-	-	Eye Infection	
				3	Mrs.Thanzeni	28/04/01	5	H.W.	2,000	1	Yes	100	140	40	40	2	3	-	3	0:10	0.03	1	BOH	None	-	0:20	3:00	6:00	4	-	-	-	-	-	-	
31	**Msampha**	015	3				4.33		2,000			80	133	40	40					0:10	0.02	1.67				0:36	2:40	6:00	4.33	0.00	1.33	1.00	0.33	0.00	0.00	
				3	Mr.B.Kapalikize	29/04/01	4	S.F.	3,000	1	Yes	100	160	60	40	2	3	2	5	0:05	0.01	2	BOH	None	-	0:25	3:00	5:00	3	-	2	-	-	-	-	
				3	Mr.J.Buleh	29/04/01	3	S.F.	1,500	1	Yes	80	120	20	60	2	3	-	3	0:10	0.035	1	BOH	None	-	0:40	3:00	6:00	3	-	-	2	1	-	-	
				3	Mrs.E.Lahson	29/04/01	6	H.W.	1,500	1	Yes	60	120	40	20	2	3	-	2,4	0:15	0.01	2	BOH	None	-	0:45	2:00	7:00	7	-	2	1	-	-	-	
32	**Mtalimanja**	014	3				4.00		3,500			120	153	47	73					0:16	0.06	2.00				1:26	2:40	6:00	5.00	0.33	3.67	0.00	0.33	0.00	0.00	
				3	Mr.Zakeyo	01/05/01	5	S.F.	5,000	1	Yes	200	240	40	160	2	3	-	1,3	0:10	0.035	2	BOH	None	-	1:40	4:00	5:00	7	1	5	-	1	-	-	
				3	Mrs.Mtengowagwa	01/05/01	5	H.W.	2,500	1	Yes	100	140	60	40	2	3	-	2,4	0:20	0.07	3	BOH	None	-	1:40	2:00	6:00	4	-	3	-	-	-	-	
				3	Mrs.Tamvekenji	01/05/01	2	H.W.	3,000	1	Yes	60	80	40	20	2	3	-	5	0:20	0.07	1	BOH	None	-	1:00	2:00	7:00	4	-	3	-	-	-	-	
33	**Chimambamtengo**	014	3				4.67		1,000			80	120	47	33					0:25	0.14	2.00				1:45	3:00	6:20	6.67	0.00	3.33	1.33	0.33	1.33	0.00	

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

CHILIKUMWENDO

No.	CANDIDATES SITES	EA No.	No. of interviewes	Type of Water Source (1.BH 2.PSW 3.USW 4.R/D)	Name of Person who Filled in	Date when Filled in	No.of Family Members	Occupation	Income (MK/ year)	Needs for Hygienic Water Supply Facilities (1.Necessary 2.Not Necessary)	Willingness to the Contribution in Currency for O/M of Water Supply Facilities	Volume of Water for Domestic Use: Present Volume	Volume of Water for Domestic Use: Volume Expected	Volume of Water Usage: Potable Water	Volume of Water Usage: Water for Washing	Q'ty and Q'nty of Potable Water: Q'nty (1.Satisfied 2.Unsatisfied)	Q'ty and Q'nty of Potable Water: Q'ty (1.Good 2.Fair 3.Not Good)	Fetching Water (1.Under 10, 2.Under 20 3.Under 30, 4.Under 40 5.More than 40): Male	Fimale	Time Needed (hours)	Distance (km)	No. of Persons for Your Family (person)	Method of Carrying Water	Alternative Water Source: Type of Water Source	Alternative Water Source: Distance (km)	Time Needed for (hours/day): Water Fetching	Domestic Cares	Farming Practices	Diseases Affecting the Family (for the past 1 year) (person): Malaria	Respiratory Diseases	Diarrhea	Parasites	Skin Deseases	Mottled Teeth	Ohters	Others
				4	Mr.F.Thukuta	01/05/01	5	S.F.	1,000	1	Yes	60	100	40	20	2	3	-	2,4	0:20	0.20	2	BOH	None	-	1:00	2:00	7:00	6	-	3	3	-	-	-	
				3	Mr.M.Mikieli	01/05/01	3	S.F.	1,000	1	Yes	60	100	20	40	2	3	-	3	0:25	0.12	1	BOH	None	-	1:15	3:00	6:00	8	-	5	-	1	1	-	
				3	Mrs.Pililami	01/05/01	6	H.W.	1,000	1	Yes	120	160	80	40	2	3	-	1,2,3	0:30	0.10	3	BOH	None	-	3:00	4:00	6:00	6	-	2	1	-	3	-	
34	**Mwanzimba**	015	3				4.67		1,500			87	120	33	53					0:25	0.15	1.67				1:55	4:40	5:40	4.33	0.33	1.00	0.00	0.00	0.00	0.00	
				4	Mrs.Funulo	29/04/01	4	H.W.	2,000	1	Yes	120	160	40	80	2	3	-	1,5	0:30	0.25	2	BOH	None	-	3:00	7:00	4:00	3	-	1	-	-	-	-	
				4	Mrs.Kasile	29/04/01	5	H.W.	500	1	Yes	80	100	20	60	2	3	-	5	0:30	0.20	1	BOH	None	-	2:00	5:00	6:00	4	1	2	-	-	-	-	
				4	Mrs.L.Njilayagoma	29/04/01	5	H.W.	2,000	1	Yes	60	100	40	20	2	3	-	2,4	0:15	0.01	2	BOH	None	-	0:45	2:00	7:00	6	-	-	-	-	-	-	
35	**Willinda**	003	3				3.33		1,300			73	107	47	27					0:20	0.10	1.33				1:15	2:00	6:00	3.33	0.33	1.67	0.67	0.33	0.33	0.00	
				3	Mr.G.Gwadani	01/05/01	3	S.F.	2,000	1	Yes	80	120	40	40	2	3	-	3	0:30	0.15	1	BOH	None	-	2:00	2:00	4:00	5	-	3	2	-	1	-	
				3	Mr.Weluzani	01/05/01	5	S.F.	900	1	Yes	80	120	60	20	2	3	-	1,3	0:15	0.05	2	BOH	USW	0.5	1:00	2:00	7:00	5	1	2	-	1	-	-	
				3	Mr.Nelo	01/05/01	2	S.F.	1,000	1	Yes	60	80	40	20	2	3	-	2	0:15	0.10	1	BOH	USW	0.5	0:45	2:00	7:00	-	-	-	-	-	-	-	
36	**Malonikansepa/kansepa**	009	3				5.33		1,900			120	160	53	67					0:16	0.11	1.67				1:38	4:00	6:00	6.00	0.00	2.33	0.33	0.67	0.33	0.00	
				1	Mr.Balaine	01/05/01	7	S.F.	2,000	1	Yes	100	140	60	40	2	1	4	2,4	0:15	0.07	3	BOH	Dambo	0.1	1:15	2:00	7:00	9	-	3	-	-	-	-	Dambo(PSW neer pump)
				1	Mrs.Balain	01/05/01	7	H.W.	700	1	Yes	80	100	40	40	2	1	-	4	0:25	0.20	1	BOH	None	-	1:40	6:00	5:00	5	-	3	-	-	1	-	
				1	Mrs.Mayinza	30/09/28	2	H.W.	3,000	1	Yes	180	240	60	120	2	1	-	5	0:10	0.05	1	BOH	None	-	2:00	4:00	6:00	4	-	1	1	2	-	-	
37	**Chimchere**	008	3				6.00		733			97	80	48	48					0:13	0.05	1.33				1:03	2:40	6:20	7.33	1.00	3.33	0.67	0.33	0.33	0.00	
		:		2	Mrs.E.Charles	01/05/01	4	H.W.	1,000	1	Yes	50	100	25	25	2	2	-	3	0:15	0.02	1	BOH	Dambo	0.8	0:30	2:00	7:00	6	-	2	-	-	-	-	
				2	Mrs.M.Chiankho	01/05/01	7	H.W.	700	1	Yes	160	20	80	80	2	2	-	4	0:15	0.02	1	BOH	Dambo	0.8	2:00	2:00	5:00	6	-	2	1	-	-	-	Eye problem
				2	Mrs.C.Tobiyasi	01/05/01	7	H.W.	500	1	Yes	80	120	40	40	2	2	-	2,4	0:10	0.10	2	BOH	Dambo	0.7	0:40	4:00	7:00	10	3	6	1	1	1	-	
38	**Mphoozi**	008	3				7.33		2,333			127	193	53	73					0:16	0.09	2.67				1:45	3:20	6:00	6.33	0.33	1.00	0.33	0.00	0.33	0.00	
				4	Mrs.Chmthu	01/05/01	7	H.W.	4,000	1	Yes	120	160	60	60	2	3	-	1,2,3	0:15	0.04	3	BOH	Dambo	0.6	1:30	2:00	7:00	8	-	2	-	-	-	-	
				4	Mr.Sipiliyoni	01/05/01	7	S.F.	2,000	1	Yes	140	240	60	80	2	3	-	2,4	0:20	0.15	2	BOH	None	-	2:15	4:00	5:00	7	-	1	1	-	1	-	
				4	Mrs.Chikandira	01/05/01	8	H.W.	1,000	1	Yes	120	180	40	80	2	3	-	2,5	0:15	0.07	3	BOH	None	-	1:30	4:00	6:00	4	1	-	-	-	-	-	
39	**Kumbisa/(Kanyada)**	012	3				4.33		2,400			80	133	47	40					0:23	0.09	1.33				1:33	3:00	5:20	8.00	0.00	1.33	0.33	0.33	0.00	0.00	
				3	Mr.Y.Balaki	29/04/01	6	S.F.	4,000	1	Yes	80	200	40	40	2	3	-	2,4	0:30	0.08	2	BOH	None	-	2:00	5:00	4:00	18	-	2	-	-	-	-	
				3	Mrs.E.Chunangam	29/04/01	3	H.W.	2,500	1	Yes	100	120	60	40	2	3	-	3	0:20	0.10	1	BOH	USW	0.5	1:40	2:00	7:00	4	-	1	-	-	-	-	
				3	Mrs.Nyachilan	29/04/01	4	D.W.	700	1	Yes	60	80	40	40	2	3	-	4	0:20	0.10	1	BOH	USW	0.15	1:00	2:00	5:00	2	-	1	1	1	-	-	
40	**Chimtundudza**	013	3				4.67		1,833			80	107	40	40					0:16	0.04	1.33				1:00	2:40	6:00	4.00	0.00	1.67	0.33	0.67	0.00	0.00	
				3	Mrs.K.Inodi	01/05/01	3	H.W.	2,500	1	Yes	60	80	40	20	2	3	-	3	0:20	0.04	1	BOH	Dambo	0.6	1:00	2:00	5:00	4	-	3	-	-	-	-	
				3	Mrs.A.Yohane	01/05/01	3	H.W.	2,000	1	Yes	60	80	40	20	2	3	-	3	0:20	0.04	1	BOH	Dambo	0.6	1:00	2:00	7:00	4	-	2	-	2	-	-	
				3	Mrs.Sineli	01/05/01	8	H.W.	1,000	1	Yes	120	160	40	80	2	3	-	2,5	0:10	0.025	2	BOH	Dambo	0.6	1:00	4:00	6:00	4	-	-	1	-	-	Back ache	
41	**Chipsye**	009/ 011	3				4.67		3,333			93	127	40	53					0:18	0.15	2.00				1:33	2:20	6:00	5.00	0.33	2.00	0.67	0.00	0.00	0.00	
				2	Mr.E.Jumbe	01/05/01	6	S.F.	8,000	1	Yes	120	160	40	80	2	2	-	2,4	0:30	0.20	3	BOH	None	-	3:00	3:00	6:00	3	1	2	1	-	-	-	
				2	Mrs.M.Levisoni	01/05/01	4	H.W.	1,000	1	Yes	80	120	40	40	2	2	-	3	0:15	0.10	1	BOH	USW	-	1:00	2:00	7:00	6	-	2	-	-	-	-	
				2	Mr.W.Kanthona	01/05/01	4	S.F.	1,000	1	Yes	80	100	40	40	2	2	-	2,5	0:10	0.15	2	BOH	None	-	0:40	2:00	5:00	6	-	2	1	-	-	-	
42	**Chiimutu Woyera**	006	3				6.00		1,500			107	140	53	41					0:20	0.25	2.00				1:46	2:40	5:00	5.67	0.67	0.67	0.67	0.00	0.33	0.00	
				4	Mrs.Geresomu	01/05/01	8	H.W.	500	1	Yes	120	160	40	80	2	3	-	2,5	0:20	0.15	2	BOH	None	-	2:00	4:00	5:00	5	1	2	2	-	1	-	
				4	Mrs.E.Chakamka	01/05/01	6	H.W.	2,500	1	Yes	120	160	80	40	2	3	-	2,4	0:20	0.30	2	BOH	BH	0.4	2:00	2:00	5:00	6	1	-	-	-	-	-	BH(next vg.)
				4	Mrs.C.Zuze	01/05/01	4	H.W.	1,500	1	Yes	80	100	40	4	2	3	-	1,3	0:20	0.30	2	BOH	BH		1:20	2:00	5:00	6	-	-	-	-	-	-	BH(next vg.)
43	**Asafu**	037	3				6.67		1,667			133	173	73	60					0:20	0.50	2.33				2:13	1:40	5:20	10.67	0.33	4.33	0.00	1.00	0.00	0.00	
				4	Mrs.Asilodi	09/05/01	4	H.W.	1,500	1	Yes	80	120	40	40	2	3	-	2,3	0:20	0.50	2	BOH	None	-	1:20	1:00	5:00	8	-	3	-	1	-	-	
				4	Mrs.Chitebwe	09/05/01	10	H.W.	2,000	1	Yes	200	240	120	80	2	3	-	3,4	0:20	0.50	2	BOH	None	-	3:20	2:00	5:00	15	1	7	-	-	-	-	
				4	Mrs.Daimoni	09/05/01	6	H.W.	1,500	1	Yes	120	160	60	60	2	3	-	2,3	0:20	0.50	3	BOH	None	-	2:00	2:00	6:00	9	-	3	-	2	-	-	
	Total 41 Villages		**122**				**4.59**		**1,962**			**86**	**119**	**45**	**41**					**0:17**	**0.12**	**1.53**				**1:11**	**2:53**	**5:54**								

A-6-42

ABBREV : S.F.=Subsistence Farmer B.M.=Businessman C.M.=Craftsman H.W.=House Wife D.W.=Divorced Wife G.=Gardener BOH=Bucket on Head

6-4 (1) Results of Electric Prospecting Survey

District	TA/STA	No.	Requested Villages	Distribution of Aquifer		Type of ρ−a Curve
				ρ (ohm-m)	depth(m)	
LILONGWE	CHADZA	1	Kalenjeka	155	12.00	C
	CHADZA	2	Kalumba	265.0	28.00	C
	CHADZA	3	Kamchedzera	30, 250	10.00	C
	CHADZA	4	Mbimbi / Chimombo	60, 150	65.00	B
	CHADZA	5	Jeremiya / Zikiyele	45, 165	50.00	D
	CHADZA	6	Matambo / Misonjo	70, 258	60.00	D
	CHADZA	7	Dzundi / Kulumbi	36, 230	70.00	B
	CHADZA	8	Kapatuka	90.0	10.50	C
	CHADZA	9	Mlinga	25, 300	24.00	C
	CHADZA	10	Nankwela	35, 65	36.00	D
	CHADZA	11	Chinthu	60, 360	32.00	B
	CHADZA	12	Mpokosa	65, (200)	90.00	D
	CHADZA	13	Dzoole / Mtoseni	32, (160)	60.00	B
	CHADZA	14	Kapazila	70.0	60.00	D
	CHADZA	15	Kaphamtengo	65, 46	36.00	D
	CHADZA	17	Mkakwala	52, 300	24.00	C
	CHADZA	18	Choma	37, 55	50.00	B
	CHADZA	19	Nakuyere	24, 300	50.00	C
	CHADZA	20	Mgawi	120.0	32.00	C
	CHADZA	21a	Mwenda / Guta	30	6.50	C
	CHADZA	21b	Mwenda / Guta	95, 240	24.00	C
	CHADZA	22	Chapata	100, 120	28.00	B
	CHADZA	23	Kumchenga	480, 240	24.00	C
	CHADZA	24	Mchizampheta	65, 100	32.00	B
	CHADZA	25	Chinthale	20, (50)	60.00	C
	CHADZA	26	Kumlaka	45, (130)	60.00	C
	CHADZA	27	Mpoto	135, 60	32.00	B
	CHADZA	28	Chagulugulu	360.0	50.00	B
	CHADZA	29	Mingu	113.0	32.00	B
	CHADZA	30	Katsabola	385.0	32.00	C
	CHADZA	31	Samson	160.0	24.00	B
	CHADZA	32	Mkuzi / Phatha	140.0	9.00	C
	CHADZA	33	Kadambe	210.0	22.00	C
	CHADZA	34	Mgola	150, 550	24.00	C
	CHADZA	35	Mwadzungu	450, (240)	70.00	B
	CHADZA	36	Mzapule	400.0	22.00	C
	CHADZA	37	Mfuti	120.0	32.00	B
	CHADZA	39	Chingaele	90.0	55.00	C
	CHADZA	40	Mphete	180	60.00	B
	CHADZA	41	Ntcherelo	300	60.00	B
	CHADZA	42	Chisalipo	85, 120	28.00	B
	CHADZA	43	Mcholoma	100.0	32.00	D
	CHADZA	44	Khonthi	55, (200)	12.00	C
	CHADZA	45	Chimwenje	240.0	14.00	C
	CHADZA	46	Mtepa	40.0	16.00	B
	CHADZA	48	Mbalame	360.0	36.00	C
	CHADZA	52	Jonathani	65, 650	20.00	C
	CHADZA	53	Kandunai	110, 40	40.00	D
	CHADZA	55	Kazika	70.0	8.60	D
	CHADZA	56	Chisindo	52, 13	28.00	D
	CHADZA	57	Chipula	76.0	7.20	C
	CHADZA	58	Kamundi	55, 20	55.00	D

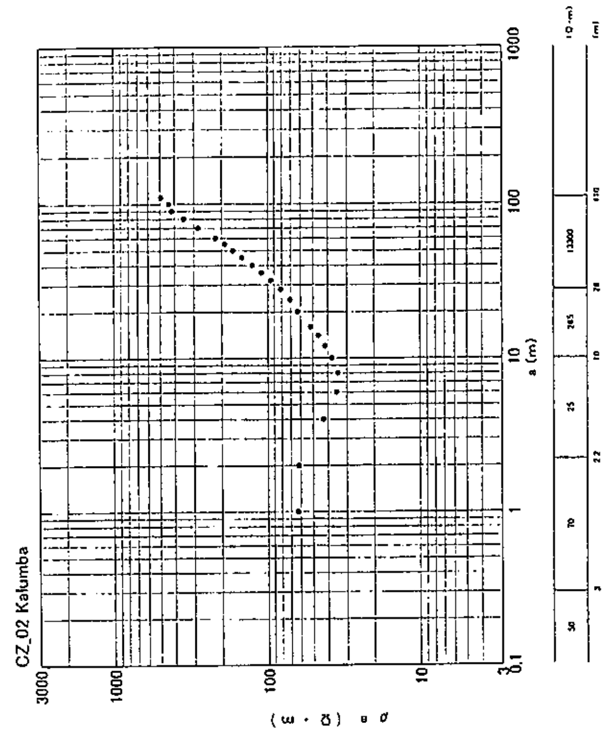
District	TA/STA	No.	Requested Villages	Distribution of Aquifer		Type of ρ -a Curve
				ρ (ohm-m)	depth(m)	
	CHADZA	59	Chibudula	53.0	4.20	C
	CHADZA	60	Nyozwa	180.0	3.50	C
	CHADZA	61	Sukwa	160, (320)	80.00	C
	CHADZA	63	Kachono	230.0	24.00	C
	CHADZA	64	Khomani	75, 200	45.00	B
	CHADZA	65	Chinthankhwa	60, 75	40.00	D
	CHADZA	66	Phula	85.0	28.00	D
	CHADZA	67	Kayabwa	37, 240	35.00	C
	CHADZA	68	Bodzalibwera	50, 200	50.00	B
	CHADZA	69	Chambadzana	40, (300)	7.00	C
	CHADZA	70	Chinungu	360, 30	55.00	C
	CHADZA	71	Chonangulu	48.0	50.00	D
	CHADZA	73	Marichi	22, 180	32.00	C
	CHADZA	74	Mkoche	45, 10	35.00	D
	CHADZA	75	Manjondo	60.0	12.00	C
	CHADZA	76	Msampha II	55, 450	32.00	D
	CHADZA	77	Kansinsi	160, 400	30.00	C
	CHADZA	78	Dzamalala	15, (400)	55.00	C
	CHADZA	79	Kawande	20, (300)	60.00	C
	CHADZA	80	Chipoto	35, 160	20.00	B
DEDZA	TAMBALA	1	Kaoche	-	-	-
	TAMBALA	2	Mangamphasa	430.0	27.00	C
	TAMBALA	3	Mbuziyadula	230.0	36.00	C
	TAMBALA	4	Mphombe	130.0	34.00	C
	TAMBALA	5a	Kazembe	30	4.00	C
	TAMBALA	5b	Kazembe	25	3.00	C
	TAMBALA	6	Kwilimbe	300.0	28.00	B
	TAMBALA	7	*Chesa*			
	TAMBALA	8	Gwengwe	450.0	30.00	C
	TAMBALA	9	Chiyepa	60, (450)	24.00	C
	TAMBALA	10	Ajibu	38.0	5.00	C
	TAMBALA	11	Kalima	300, 240	50.00	C
	TAMBALA	12	Kamwana	300, 180	40.00	B
	TAMBALA	13a	Mkwenembera	150, 90	30.00	B
	TAMBALA	13b	Mkwenembera	115, 420	22.00	B
	TAMBALA	14	Mgawi	110.0	24.00	B
	TAMBALA	15	Mitawa	440.0	36.00	C
	TAMBALA	16	Mapemba	380.0	24.00	B
	TAMBALA	17	Kaundikiza	100.0	4.50	C
	TAMBALA	18	Kaphale	210.0	35.00	B
	TAMBALA	19	Kalimba	200, 160	45.00	B
	TAMBALA	20	*Mankhambaza*			
	TAMBALA	21	Kafwafwa	600.0	24.00	C
	TAMBALA	22a	Mfumbwa	300	40.00	C
	TAMBALA	22b	Mfumbwa	50.0	8.00	C
	TAMBALA	23	*Mzinga*			
	TAMBALA	25	Napwanga	144.0	36.00	B
	TAMBALA	26	Kumaunda	72.0	10.00	C
	TAMBALA	27	Chipango	95.0	7.00	C
	TAMBALA	28	Nganya	500.0	22.00	C
	TAMBALA	30	Chingo	130.0	20.00	C
	TAMBALA	31	Mbakama	180.0	16.00	C
	TAMBALA	32	Matupa	320.0	45.00	C
	TAMBALA	33	Kanyama / Mikuyu	60, 80	50.00	D

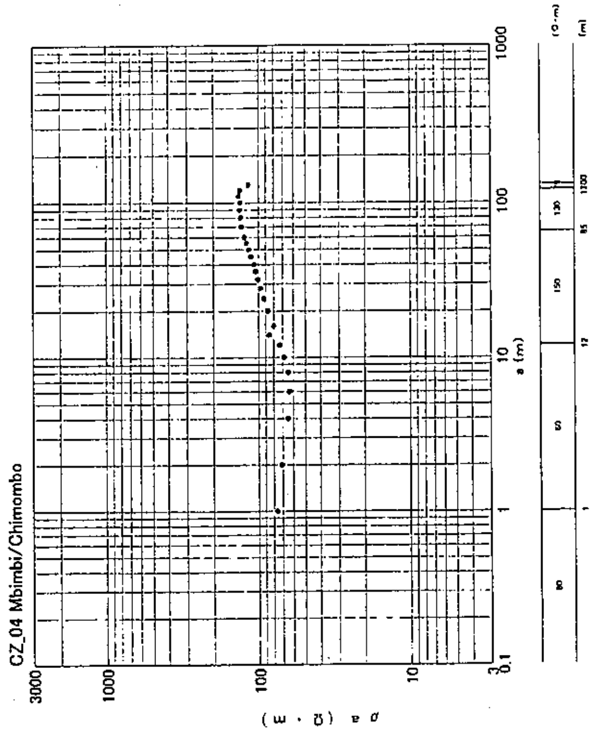
District	TA/STA	No.	Requested Villages	Distribution of Aquifer		Type of ρ−a Curve
				ρ (ohm-m)	depth(m)	
	TAMBALA	34	Chiboli	100	40.00	B
	TAMBALA	35	Chigumula	40, 80	50.00	D
	TAMBALA	36	Nyangu	500, (400)	80.00	B
	TAMBALA	37	Kapanda	140.0	24.00	C
	TAMBALA	38	Mafolera	160	32.00	D
	TAMBALA	39	Kapazila	300.0	36.00	B
	TAMBALA	40	Chipokosa	20, 32	50.00	A
	TAMBALA	41	Chokoma	-	-	-
	TAMBALA	42	*Kanonyere*			
	TAMBALA	43	*Mzingo*			
	TAMBALA	44	Mzikamanda	75, 20	28.00	B
	TAMBALA	45	Kudembe	160, (420)	32.00	C
	TAMBALA	46	Mnenula	265.0	24.00	C
	TAMBALA	48	Kaole	700.0	24.00	C
	TAMBALA	49	Msanyama	140.0	32.00	B
	TAMBALA	50	Bowa	225.0	40.00	B
	TAMBALA	51	Chiumbe	100.0	24.00	C
	TAMBALA	52	Maganga 2	180.0	24.00	B
	TAMBALA	53	Zande	360.0	32.00	C
	TAMBALA	54	Kunchinza	61	8.00	C
	TAMBALA	56	Kazembe 2	260.0	28.00	C
	TAMBALA	57	Kawire	80.0	30.00	A
	TAMBALA	58	Gwengwe Chilungusi	280.0	16.00	C
	TAMBALA	59	*Mmong'ono*			
	TAMBALA	60	Shuga	400.0	50.00	C
	TAMBALA	61	Likangala	320.0	30.00	C
	TAMBALA	62	Matsikila	320.0	40.00	C
	TAMBALA	63	Matipa (Mkundi)	84.0	36.00	C
DEDZA	CHAUMA	1	Kachulu	95.0	30.00	B
	CHAUMA	2	Muonda	85.0	4.60	C
	CHAUMA	3	Sapita	43.0	5.50	C
	CHAUMA	4	Mkhumbwa	380.0	15.00	C
	CHAUMA	5	Chiwaza	30.0	2.80	C
	CHAUMA	6	Kambuwe	210.0	46.00	B
	CHAUMA	7	Mnthambwe	100.0	16.00	C
	CHAUMA	8	Linyama / Chatsika	255.0	22.00	C
	CHAUMA	9	Chikumba	154.0	18.00	B
	CHAUMA	10	Chisasa II	90.0	16.00	C
	CHAUMA	12	Miyowe	165	13.00	C
	CHAUMA	15	Thunduzi	65.0	8.00	C
	CHAUMA	16	Kumlenga	90.0	60.00	B
	CHAUMA	17	Gonkho	20	7.00	C
	CHAUMA	18	Kudoko	350.0	25.00	C
	CHAUMA	19	Mthawanthu	300.0	20.00	B
DEDZA	KACHERE	1	Chingwalu	130, 80	70.00	A
	KACHERE	2	Sukasuka I	300.0	36.00	D
	KACHERE	3	Sukasuka II	400.0	28.00	C
	KACHERE	4	Gunduze I	600, 500	60.00	C
	KACHERE	5	Kamenya	850.0	24.00	C
	KACHERE	6	Chumachisala	650.0	32.00	C
	KACHERE	7	Kachikoti	65.0	24.00	A
	KACHERE	8	Mantega	130, 300	55.00	A
	KACHERE	9	Dimoni	320.0	20.00	B
	KACHERE	10	Kude / Kanthongo	360.0	30.00	B

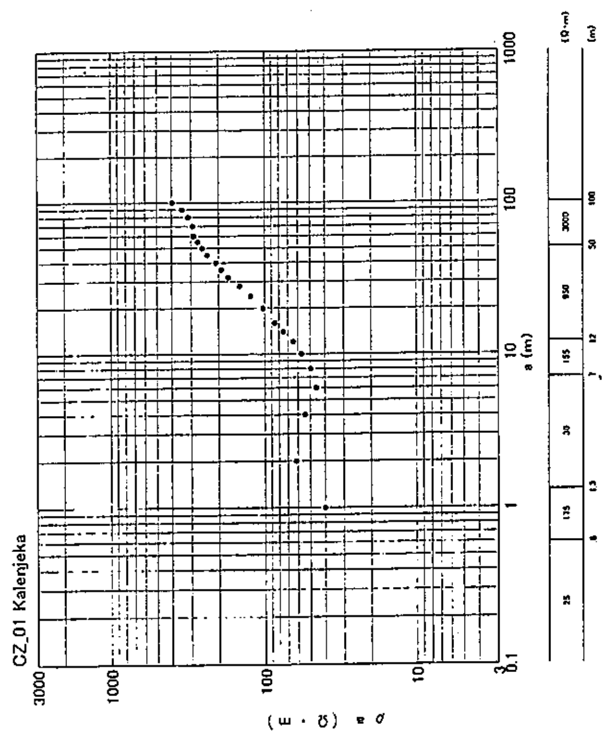
District	TA/STA	No.	Requested Villages	Distribution of Aquifer		Type of ρ−a Curve
				ρ(ohm-m)	depth(m)	
	KACHERE	11	Dickisoni	450.0	36.00	A
	KACHERE	12	Kafere	200, 350	24.00	A
	KACHERE	13	Kunjawa	400.0	32.00	A
	KACHERE	14	Kumilambe	90, 250	50.00	A
	KACHERE	15	Manase Chiundi / Kaunyolo	360.0	55.00	B
	KACHERE	16	Chikalungeni	80.0	28.00	A
	KACHERE	17	Gwaza	90, 20	15.00	B
	KACHERE	18	Gaga	360.0	28.00	B
	KACHERE	19	Kasonda	220.0	45.00	B
	KACHERE	20	Majamanda	480.0	32.00	A
	KACHERE	21	Veru	380, 200	55.00	B
	KACHERE	22	Chimombo (A)(B)	40, (650)	65.00	C
	KACHERE	23	Yonani	120.0	28.00	C
	KACHERE	24	Kafumbi	46, 150	50.00	D
	KACHERE	25	Masola	320.0	28.00	C
	KACHERE	26	Dolobeni / Chinkuita	360, 240	45.00	D
	KACHERE	27	Gelemani	120.0	40.00	B
	KACHERE	28	Lodzanyama	240, 180	60.00	B
	KACHERE	29	Msepe	240.0	36.00	D
	KACHERE	30	Chipanga	220.0	75.00	A
	KACHERE	31	Kaliyozi	200.0	16.00	C
	KACHERE	32	Chakachadza	450.0	24.00	C
	KACHERE	33	Betenego	75.0	20.00	A
	KACHERE	34	M'khomaanthu	360.0	30.00	B
	KACHERE	35	Chabuka / Chindamba	55, (320)	50.00	B
	KACHERE	36	Chapukuta	56.0	28.00	B
	KACHERE	37	Chitukula	160.0	50.00	A
	KACHERE	38	Mtende	32, 400	24.00	C
	KACHERE	39	Chizuzu	350, 120	55.00	A
	KACHERE	40	*Tchetsa*			
	KACHERE	41	Chimkhombe / Kaudzu	180, 500	55.00	B
	KACHERE	42	Chonde	240.0	45.00	B
	KACHERE	43	Mphasayaweni	25, 40	85.00	A
	KACHERE	44	Kalamba / Domoya	30.0	30.00	D
	KACHERE	45	Mbuta	360.0	32.00	B
	KACHERE	46	Chakuwala / Mwambila Mando	120.0	24.00	A
	KACHERE	47	Liyela	240.0	24.00	C
DEDZA	CHILIKUMWENDO	1	Khondowa	45.0	32.00	A
	CHILIKUMWENDO	2	Thunduzi	50.0	32.00	A
	CHILIKUMWENDO	3	Lombwa	40, 100	45.00	A
	CHILIKUMWENDO	4	Kachepa	38, (260)	70.00	C
	CHILIKUMWENDO	5	Jere	32, 300	45.00	A
	CHILIKUMWENDO	6	Kukalambo	450.0	45.00	B
	CHILIKUMWENDO	7	Kanjinga I	48.0	38.00	A
	CHILIKUMWENDO	8	Chimombo	25, 33	80.00	A
	CHILIKUMWENDO	9	Kamtambo	50.0	7.00	C
	CHILIKUMWENDO	10	Folomani	38.0	60.00	A
	CHILIKUMWENDO	11	Mmbeya	250.0	40.00	B
	CHILIKUMWENDO	13	Kang'ombe A and B	40, 60	45.00	A
	CHILIKUMWENDO	14	Kamadzi	45, 240	70.00	B
	CHILIKUMWENDO	15	Chisani	35, 90	40.00	A
	CHILIKUMWENDO	16	Aliyelo	50, 70	36.00	A
	CHILIKUMWENDO	17	M'gawi	80.0	48.00	D
	CHILIKUMWENDO	18	Chideza	220	60.00	A

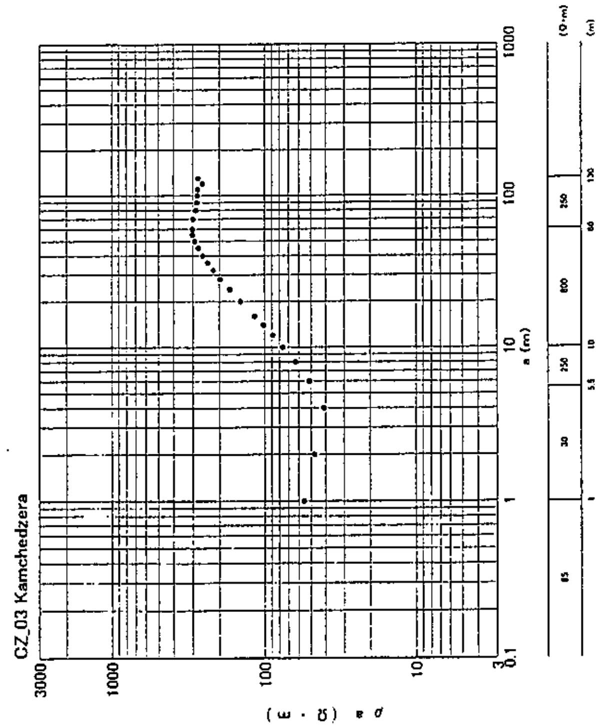
District	TA/STA	No.	Requested Villages	Distribution of Aquifer		Type of ρ−a Curve
				ρ (ohm-m)	depth(m)	
	CHILIKUMWENDO	20	Chatondeza 1and 2	320.0	45.00	B
	CHILIKUMWENDO	21	Nyemba	120.0	28.00	B
	CHILIKUMWENDO	22	Phale	150	40.00	B
	CHILIKUMWENDO	23	Sankhani	45, (540)	55.00	B
	CHILIKUMWENDO	24	Lumwira / (Nyamasanka)	30.0	16.00	C
	CHILIKUMWENDO	25	Kaluzi	75.0	22.00	B
	CHILIKUMWENDO	26	Maguya / Kanundu	120.0	40.00	B
	CHILIKUMWENDO	27	Chidonthi	40	22.00	B
	CHILIKUMWENDO	28	Ngombeyagwada	200, 320	30.00	B
	CHILIKUMWENDO	29	Katsalapoti	25, 60	36.00	D
	CHILIKUMWENDO	30	Chatsika	120, 360	45.00	D
	CHILIKUMWENDO	31	Msampha	120.0	22.00	C
	CHILIKUMWENDO	32	Mtalimanja	78.0	28.00	C
	CHILIKUMWENDO	33	Chimambamtengo	130.0	22.00	C
	CHILIKUMWENDO	34	Mwanzimba	360.0	28.00	C
	CHILIKUMWENDO	35	Willinda	160.0	28.00	C
	CHILIKUMWENDO	36	Maloni Kansepa / kansepa	80	32.00	B
	CHILIKUMWENDO	37	Chimchere	180, 55	55.00	B
	CHILIKUMWENDO	38	Mphoozi	420, 280	32.00	B
	CHILIKUMWENDO	39	Kumbisa / (Kanyada)	280.0	24.00	C
	CHILIKUMWENDO	40	Chimtundudza	24.0	28.00	B
	CHILIKUMWENDO	41	Chipsye	140	55.00	B
	CHILIKUMWENDO	42	Chiimutu Woyera	75, 100	32.00	B
	CHILIKUMWENDO	43	Asafu	300.0	45.00	A

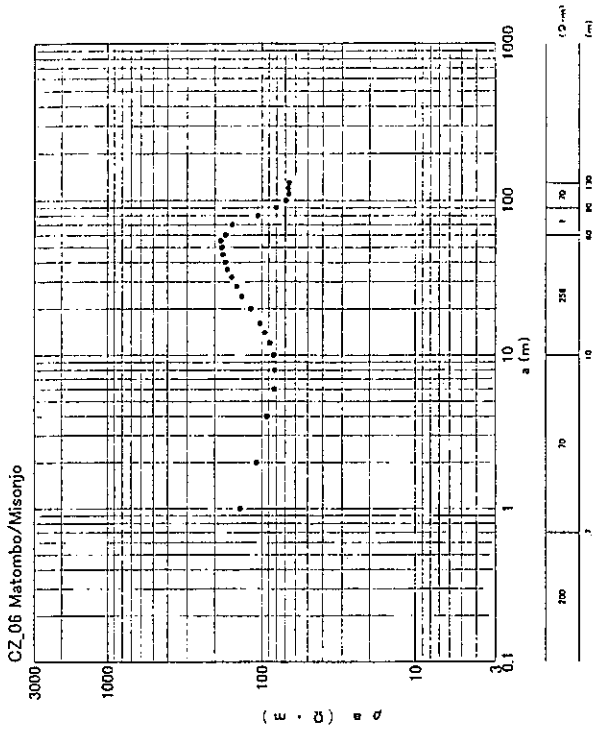
6-4 (2) ρ -a Curve

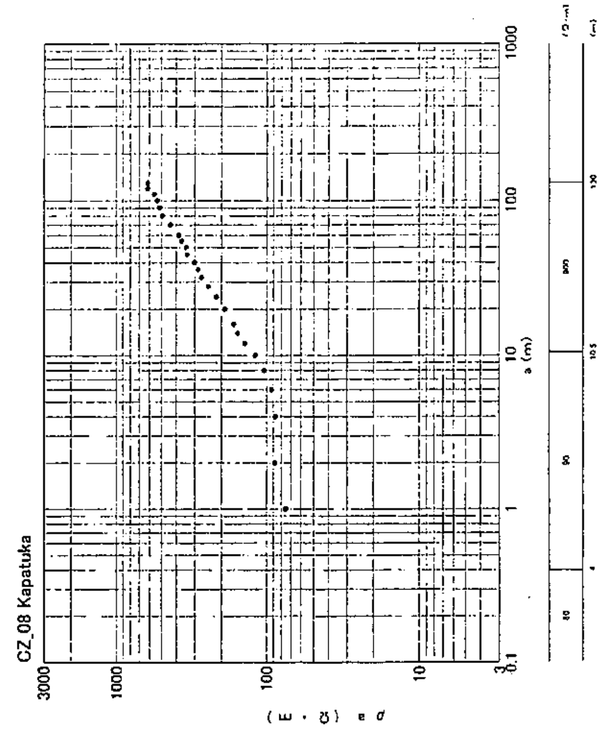

CZ_02 Kalumba

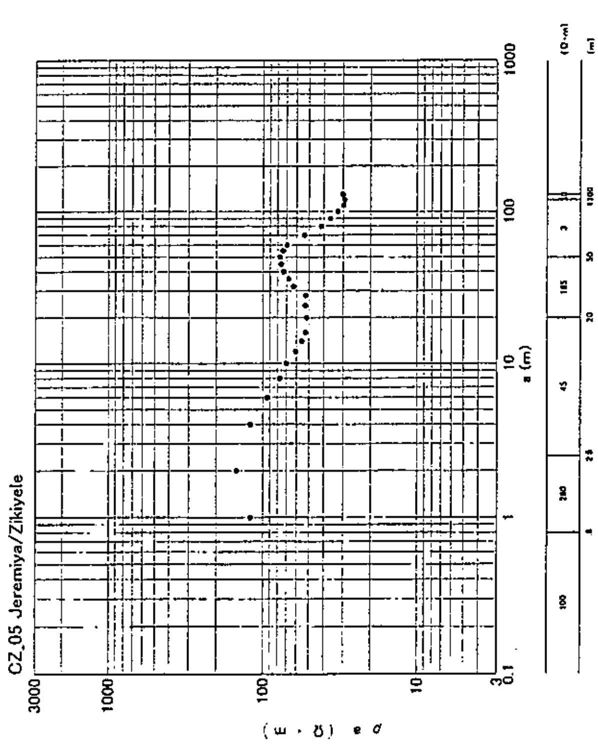

CZ_04 Mbimbi/Chimombo

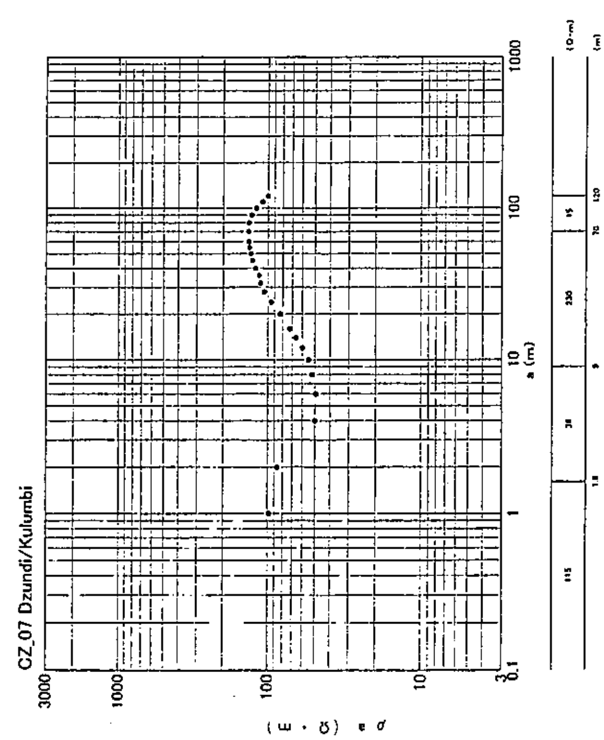

CZ_01 Kalerijeka

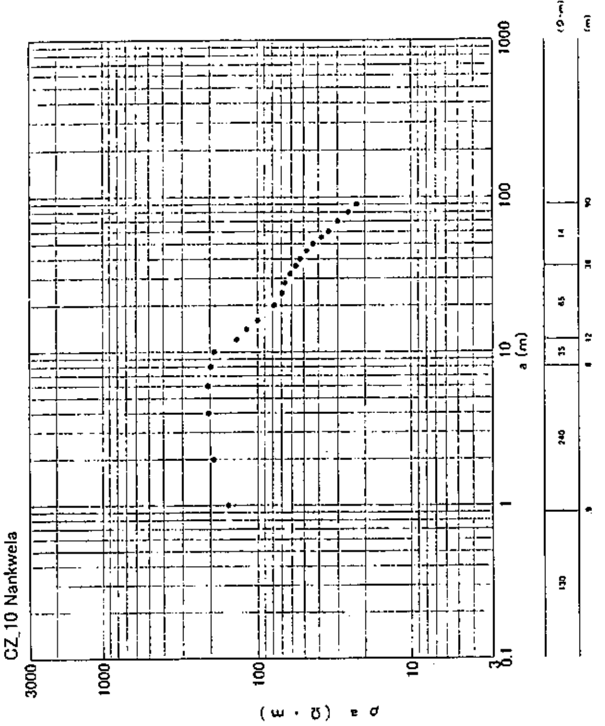

CZ_03 Kamchedzera

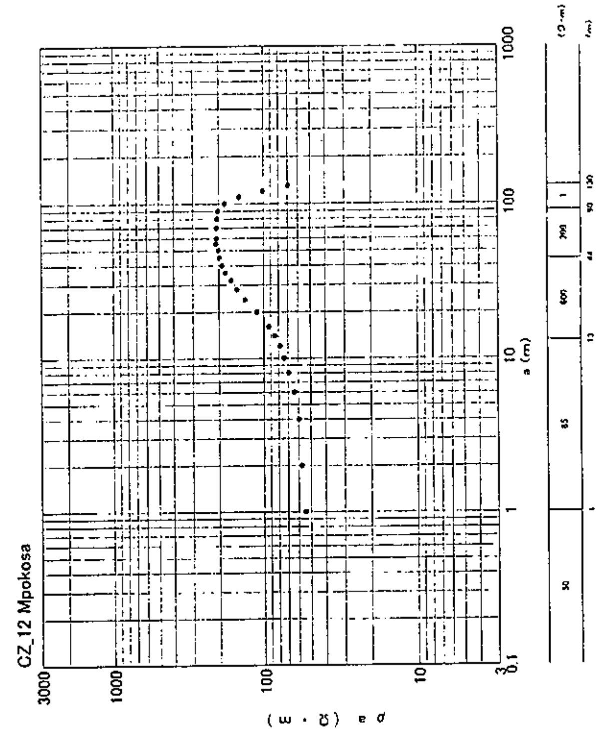

CZ_06 Matombo/Misonjo
a (m)

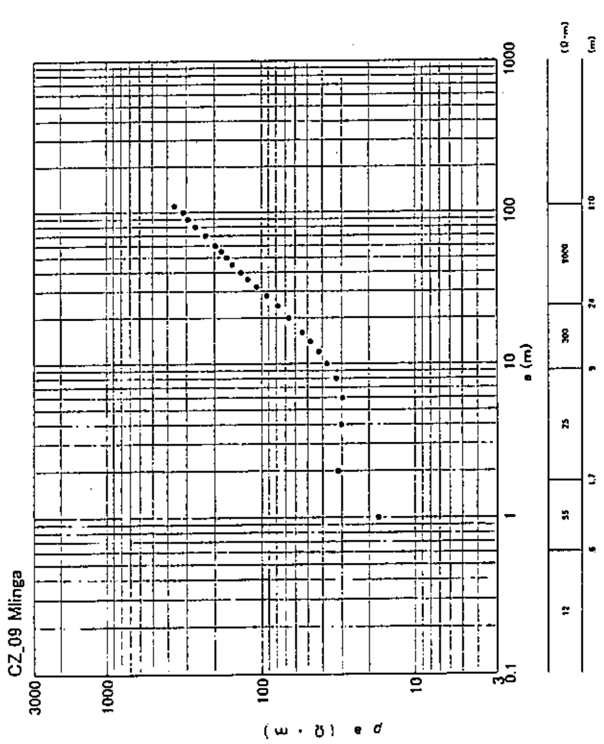

CZ_08 Kapatuka
a (m)

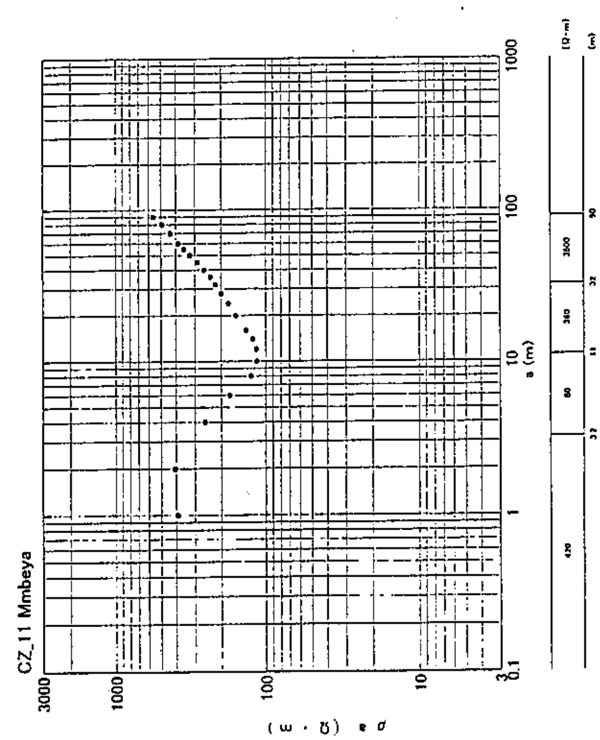

CZ_05 Jeremiya/Zikiyele
a (m)

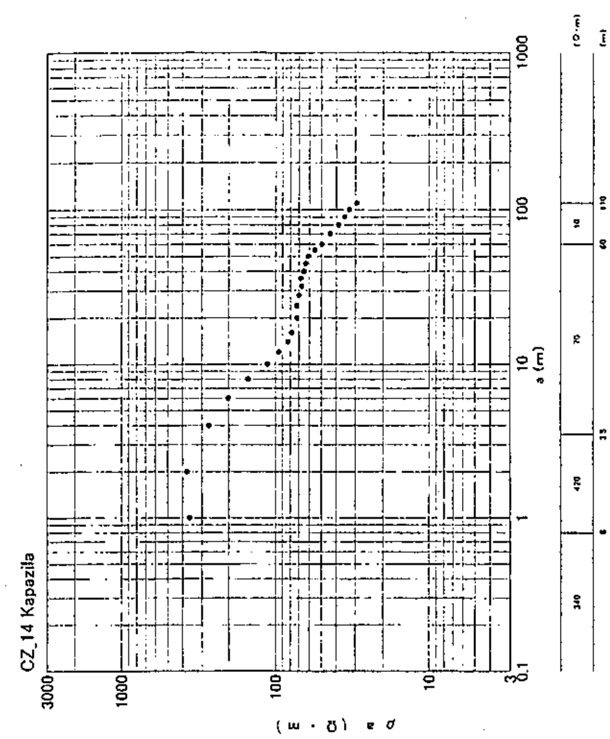

CZ_07 Dzundi/Kulumbi
a (m)

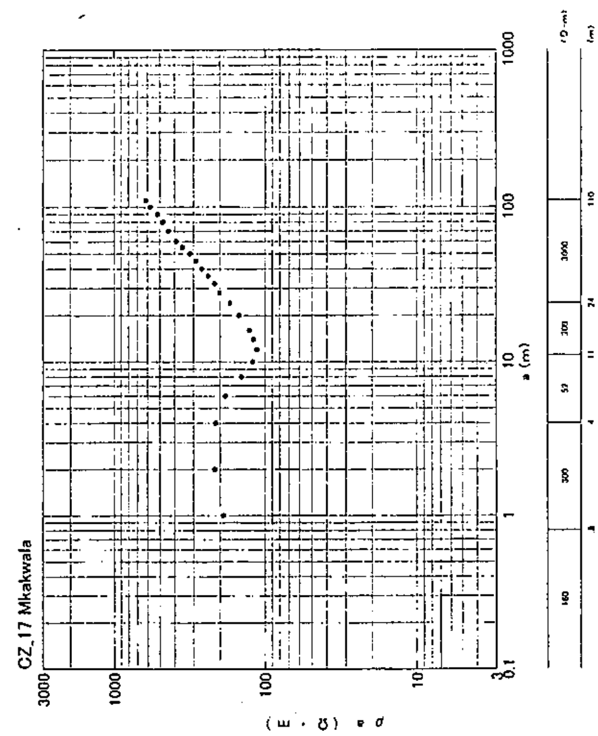

CZ_10 Nankwela
a (m)
ρa (Ω・m)

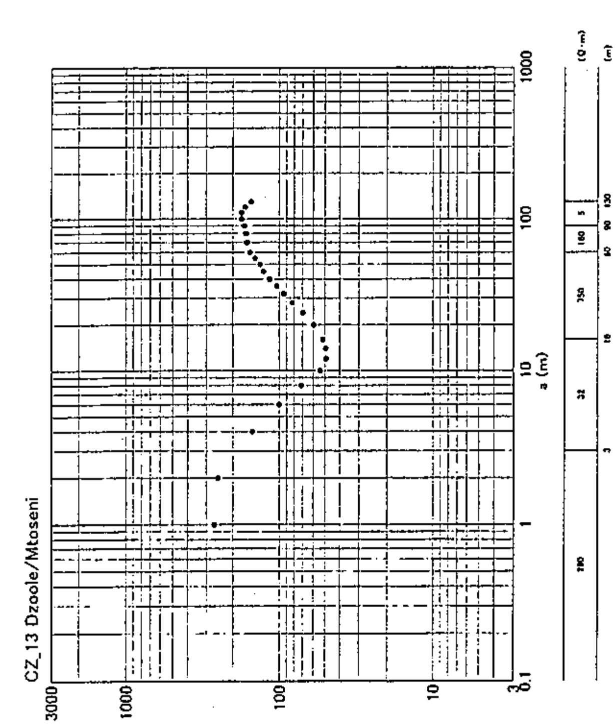

CZ_12 Mpokosa
a (m)
ρa (Ω・m)

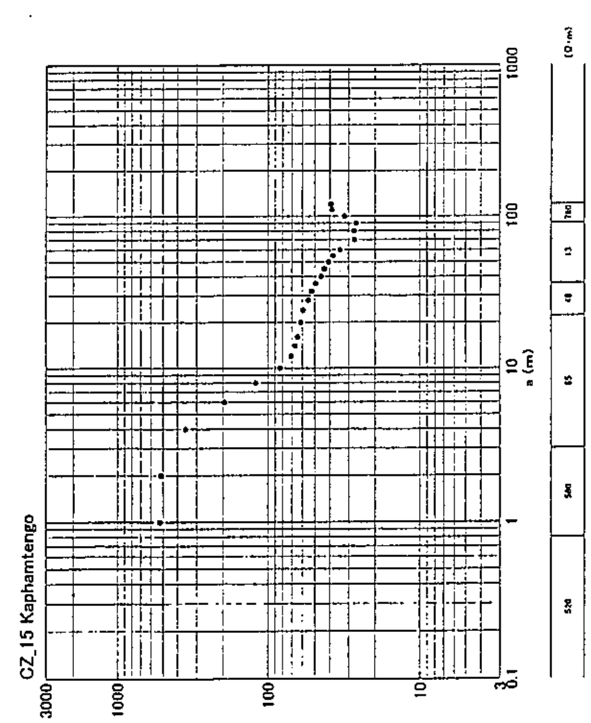

CZ_09 Mlinga
a (m)
ρa (Ω・m)

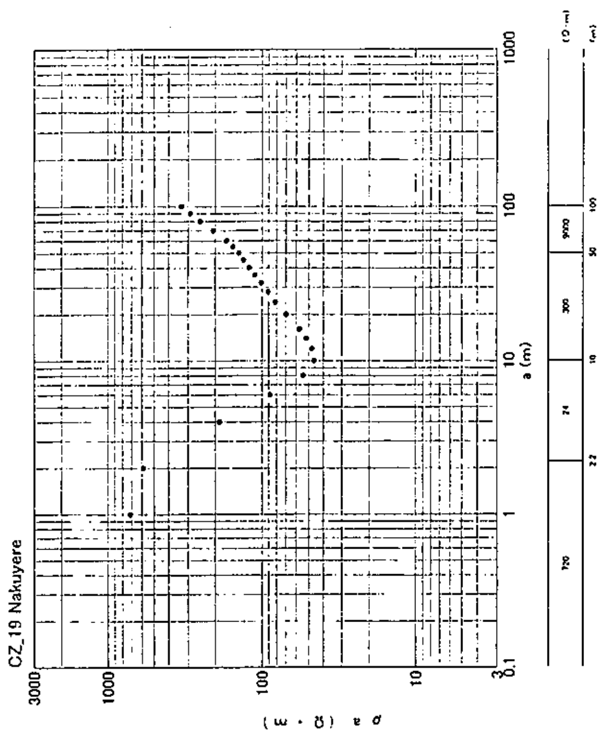

CZ_11 Mmbeya
a (m)
ρa (Ω・m)

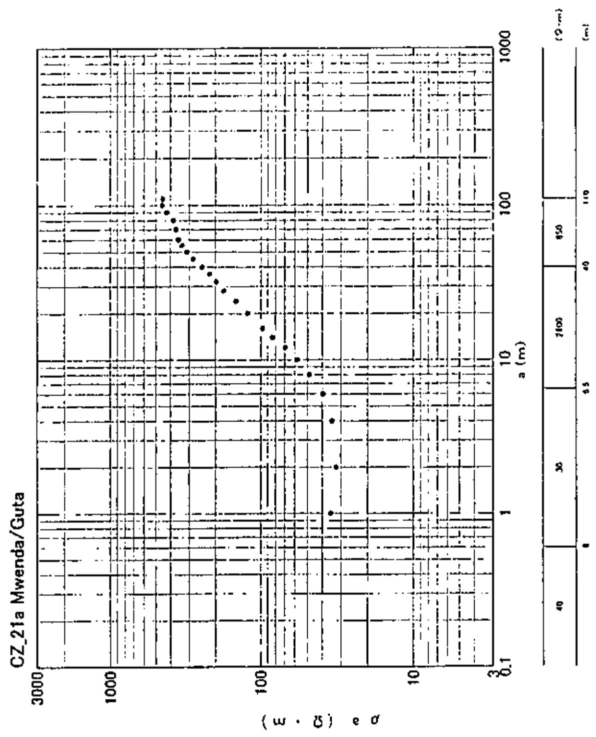

CZ_14 Kapazila

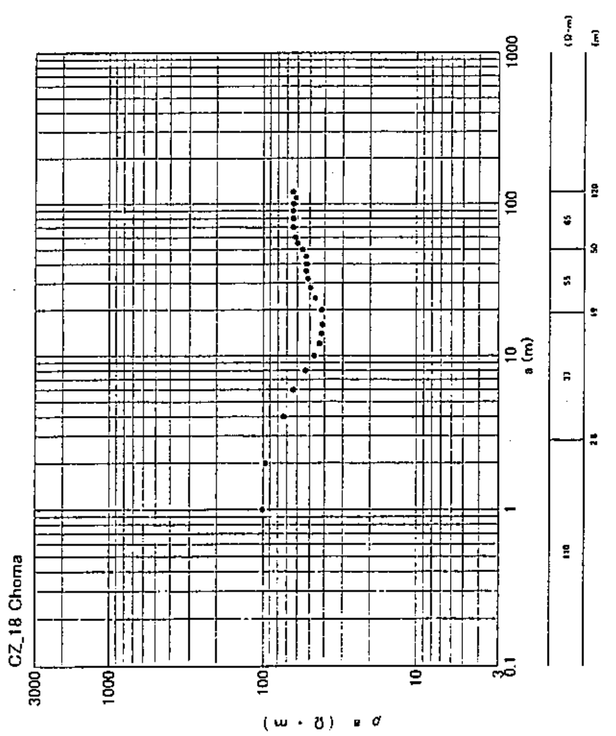

CZ_17 Mkakwala

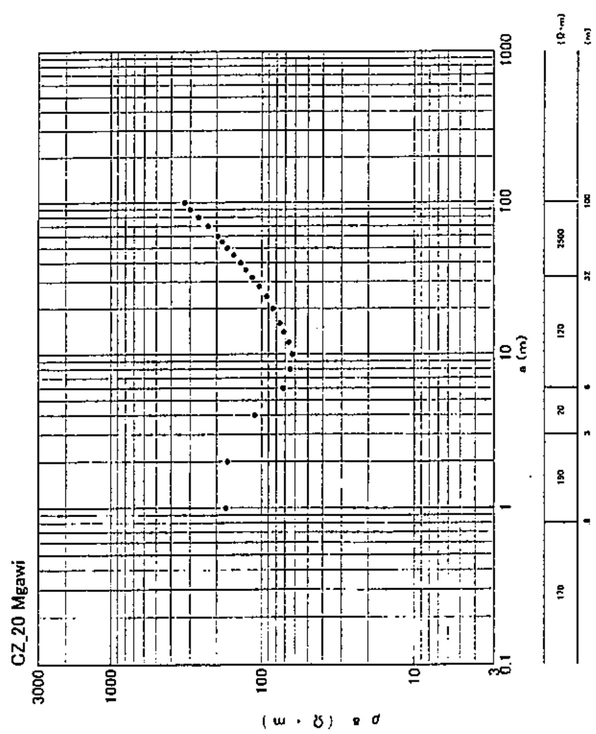

CZ_13 Dzoole/Mtoseni

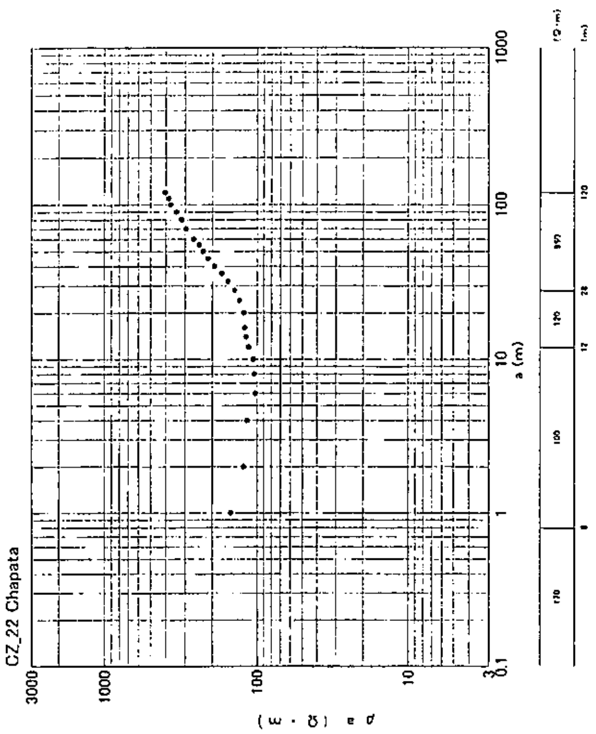

CZ_15 Kaphamtengo

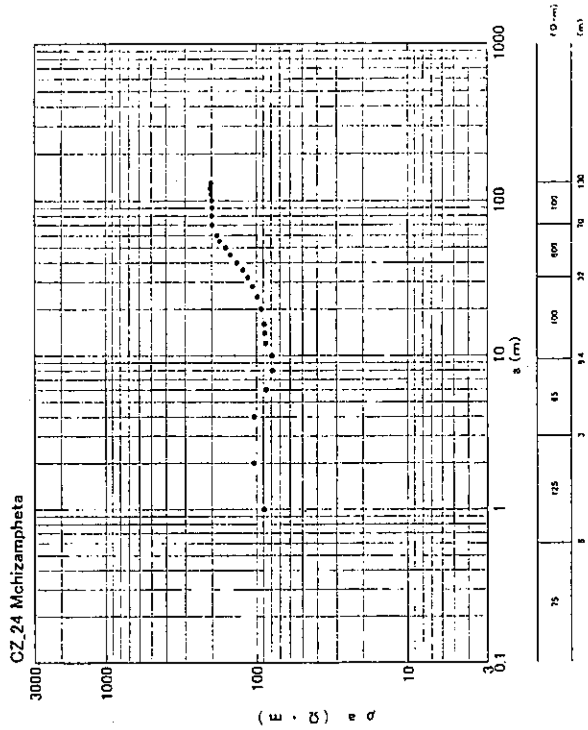

CZ_19 Nakuyere
ρa (Ω・m)
a (m)

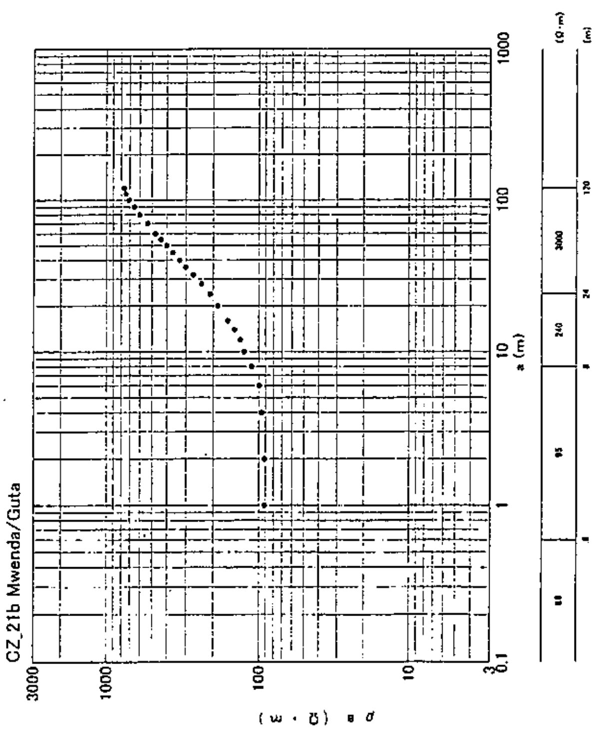

CZ_21a Mwenda/Guta
ρa (Ω・m)
a (m)

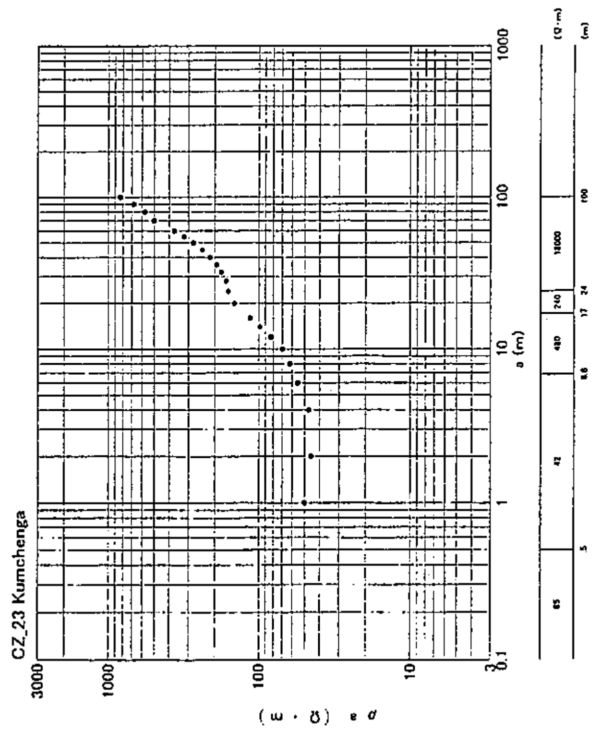

CZ_18 Choma
ρa (Ω・m)
a (m)

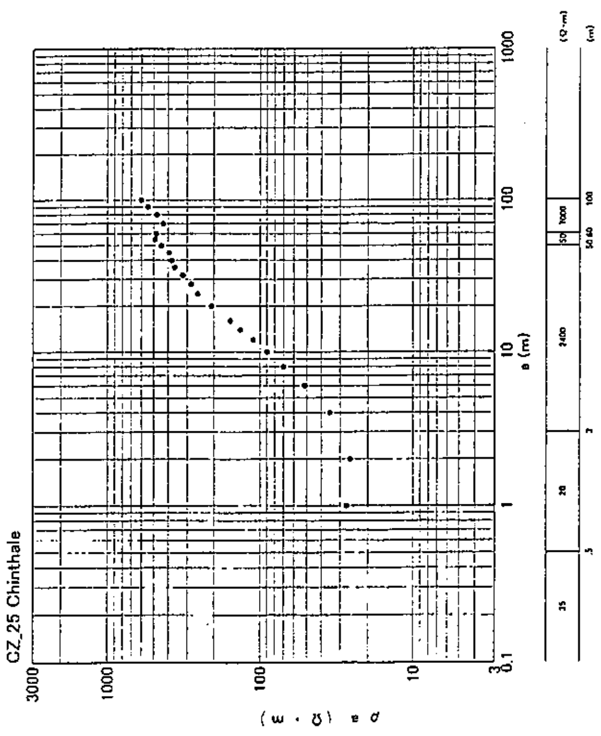

CZ_20 Mgawi
ρa (Ω・m)
a (m)

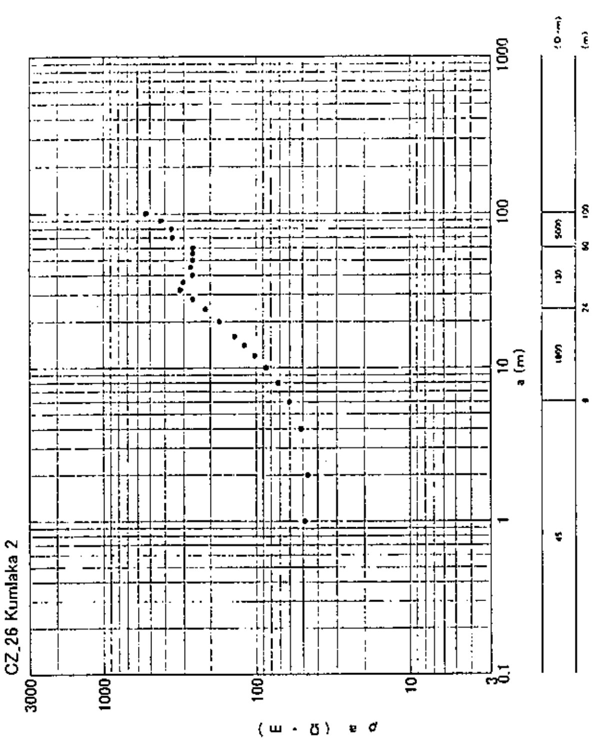

CZ_22 Chapata
ρa (Ω・m)
a (m)

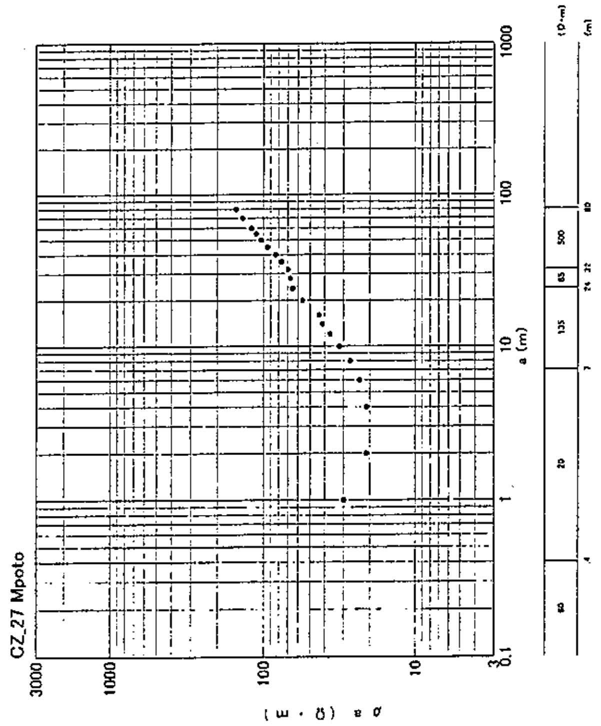

CZ_24 Mchizampheta
ρa (Ω・m)
a (m)

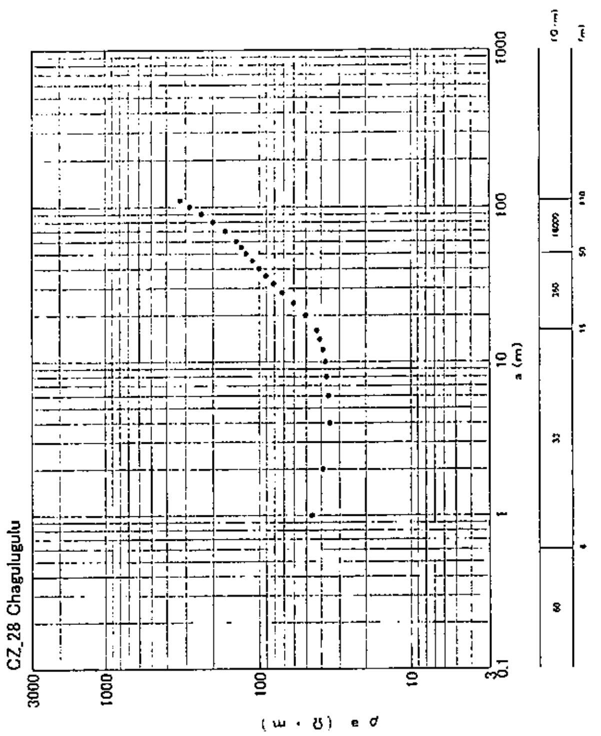

CZ_21b Mwenda/Guta
ρa (Ω・m)
a (m)

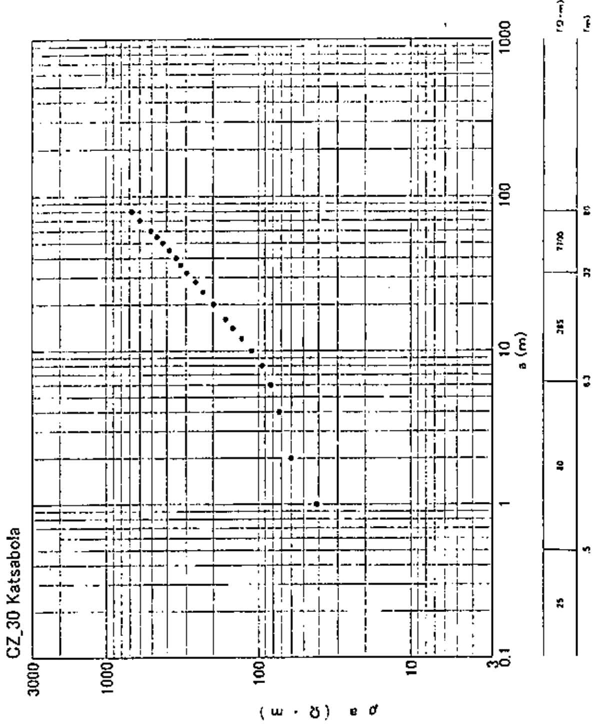

CZ_23 Kumchenga
ρa (Ω・m)
a (m)

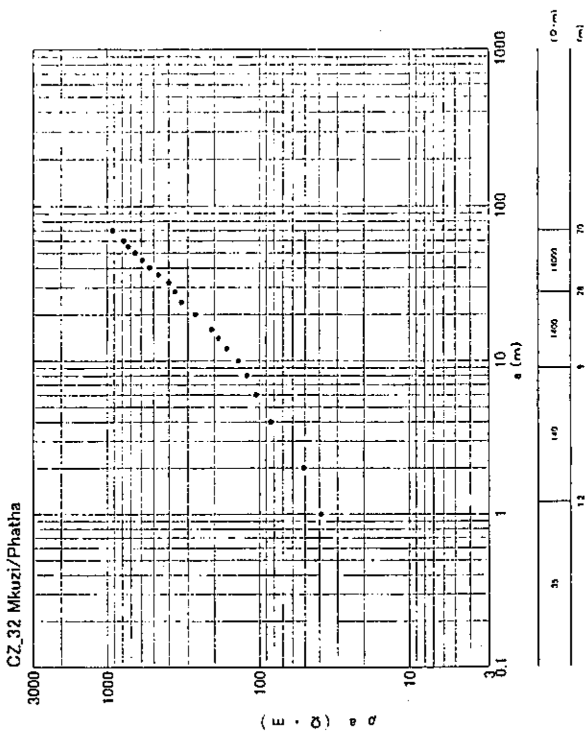

CZ_25 Chinthale
ρa (Ω・m)
a (m)

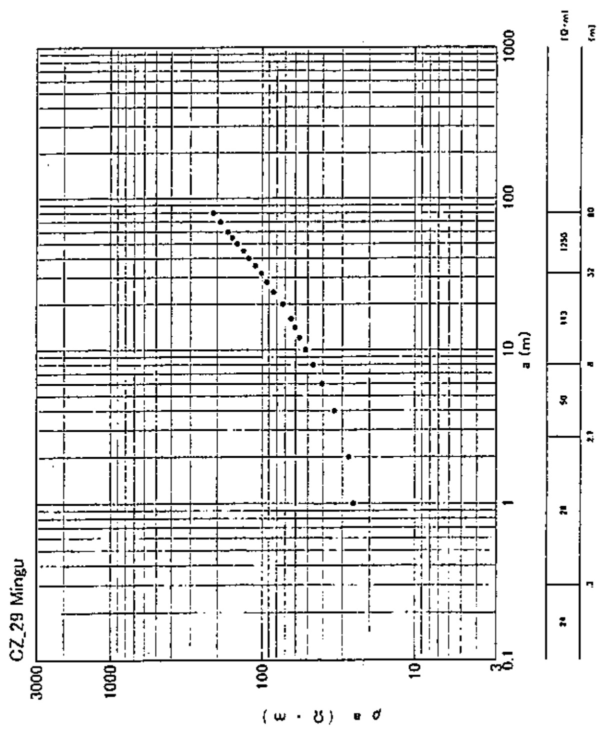

CZ_26 Kumlaka 2
ρa (Ω・m)
a (m)

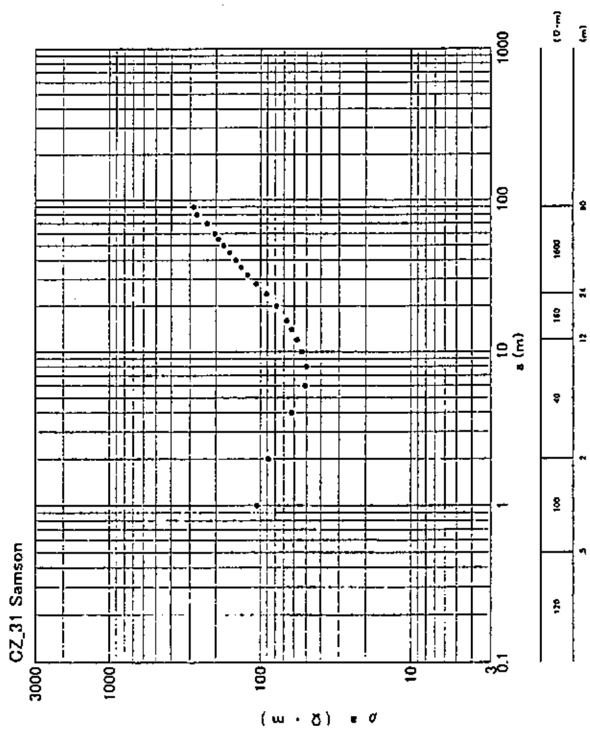

CZ_27 Mpoto
ρa (Ω・m)
a (m)

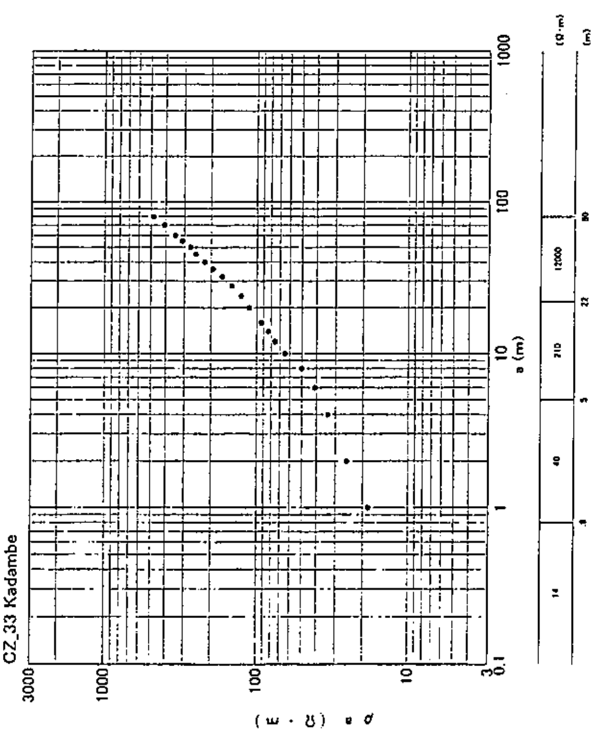

CZ_28 Chagulugulu
ρa (Ω・m)
a (m)

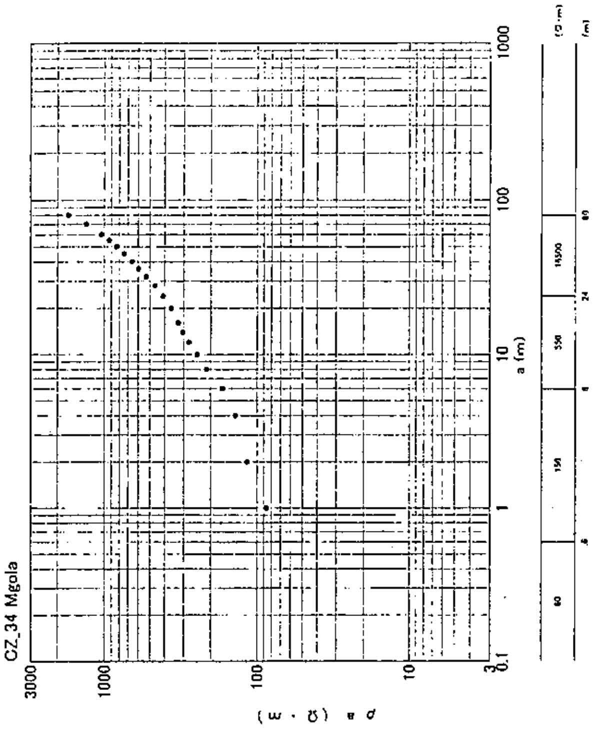

CZ_30 Katsabola

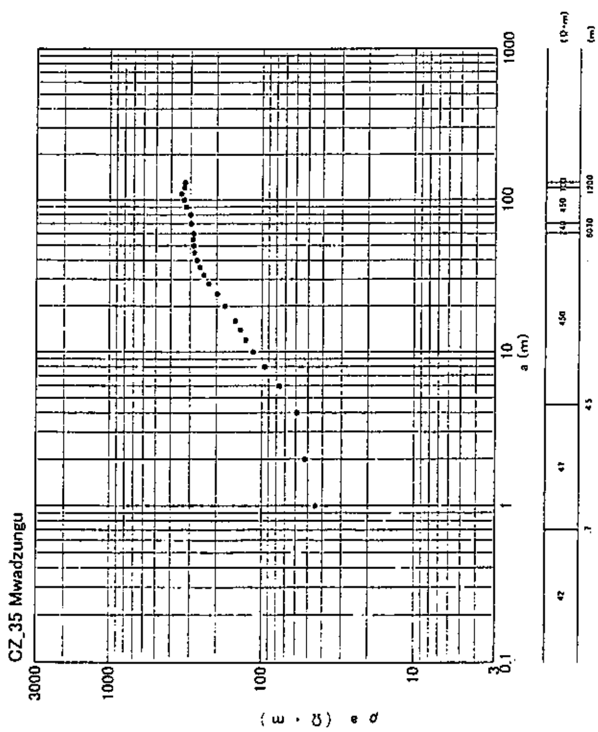

CZ_32 Mkuzi/Phatha

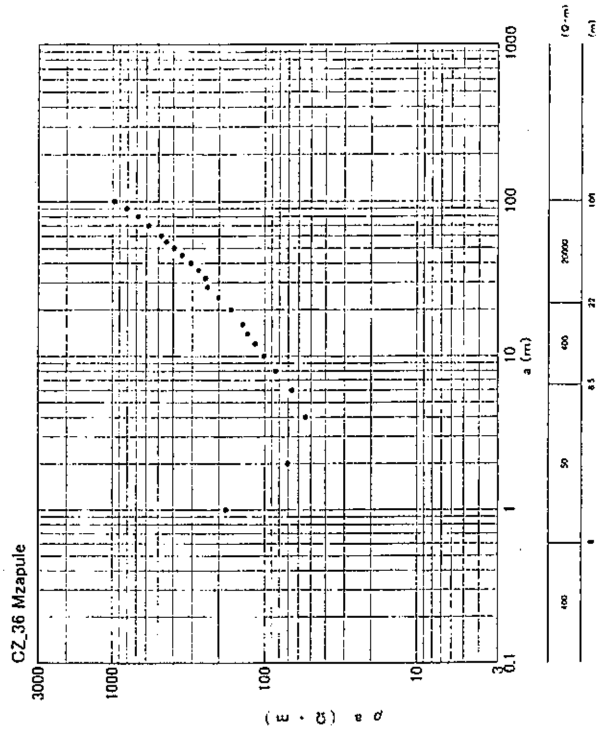

CZ_29 Mingu

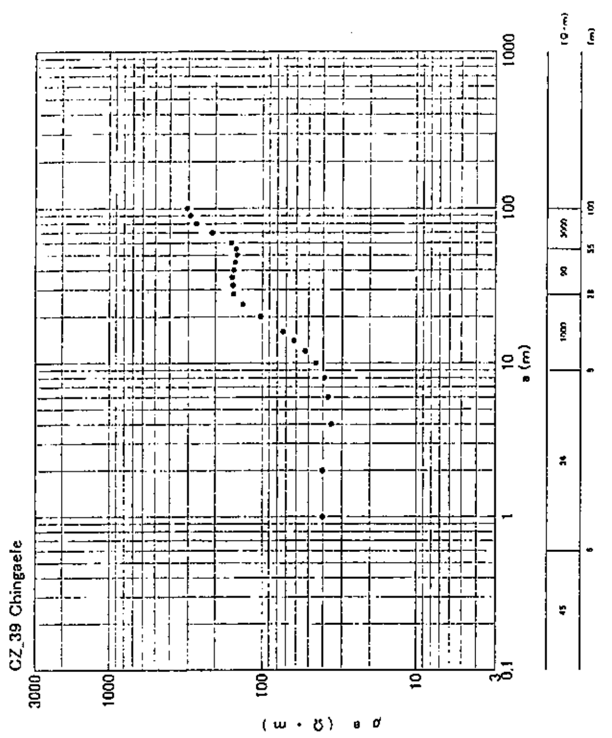

CZ_31 Samson

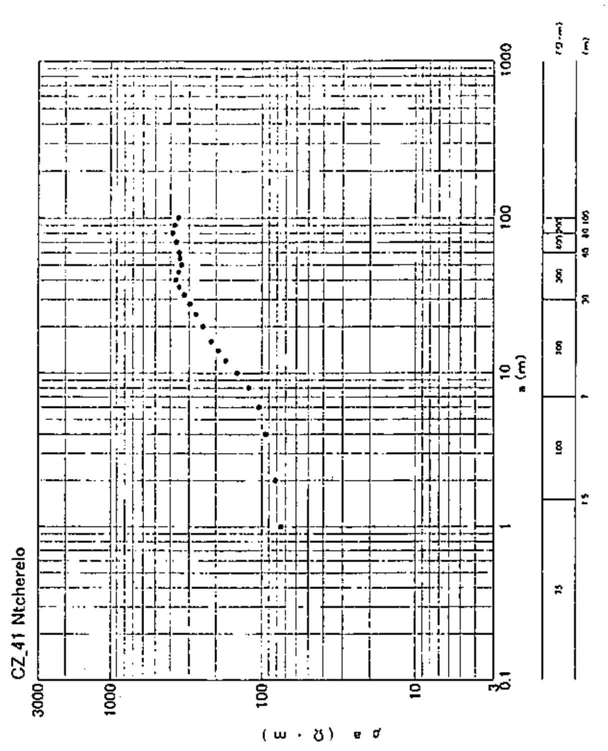

CZ_33 Kadambe


CZ_34 Mgola


CZ_35 Mwadzungu


CZ_36 Mzapule


CZ_39 Chingaele
ρa (Ω・m)
a (m)


CZ_41 Ntcherelo
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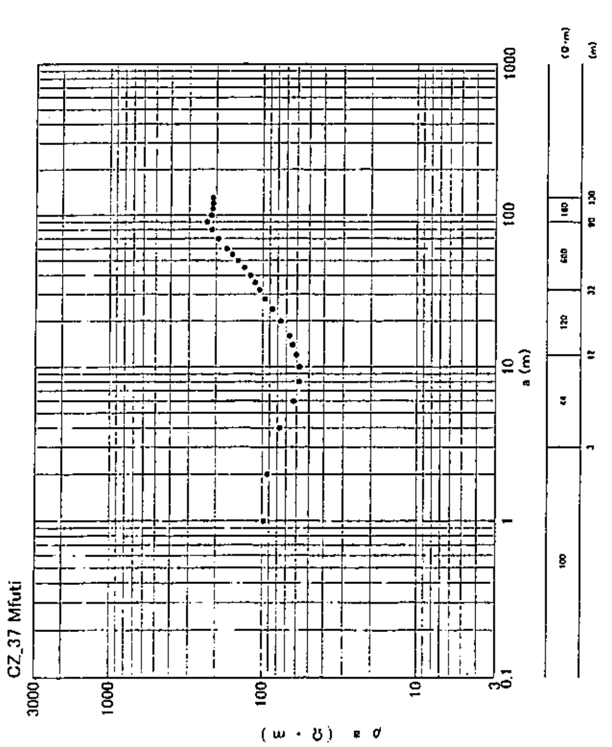
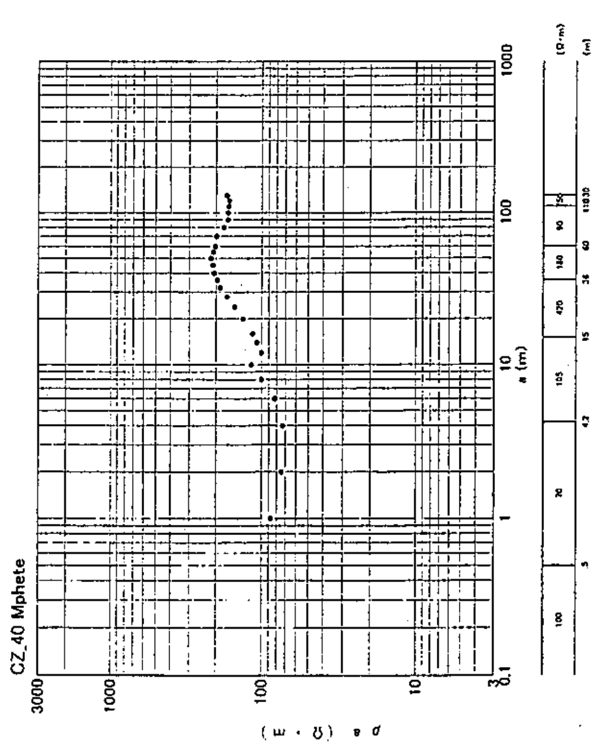
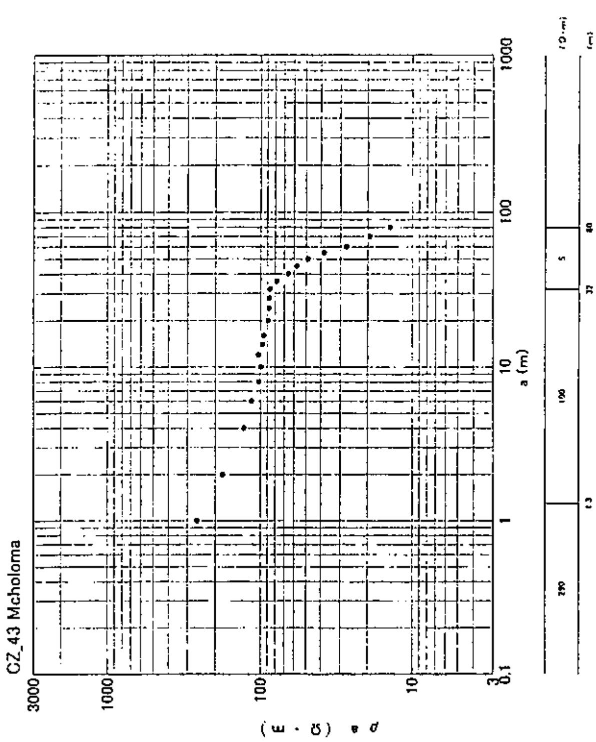
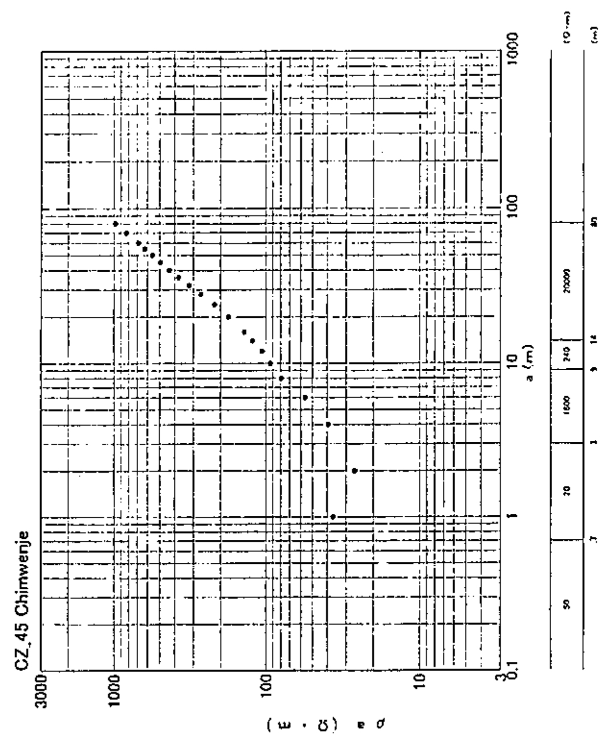
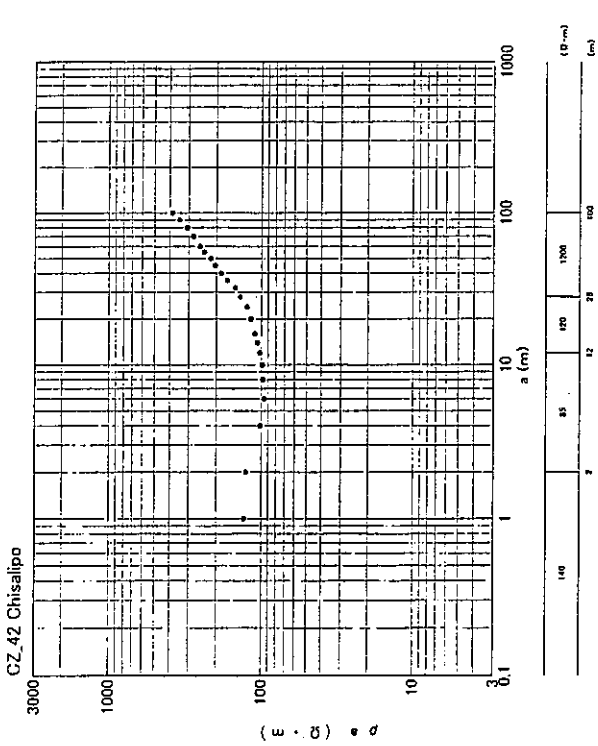
a (m)

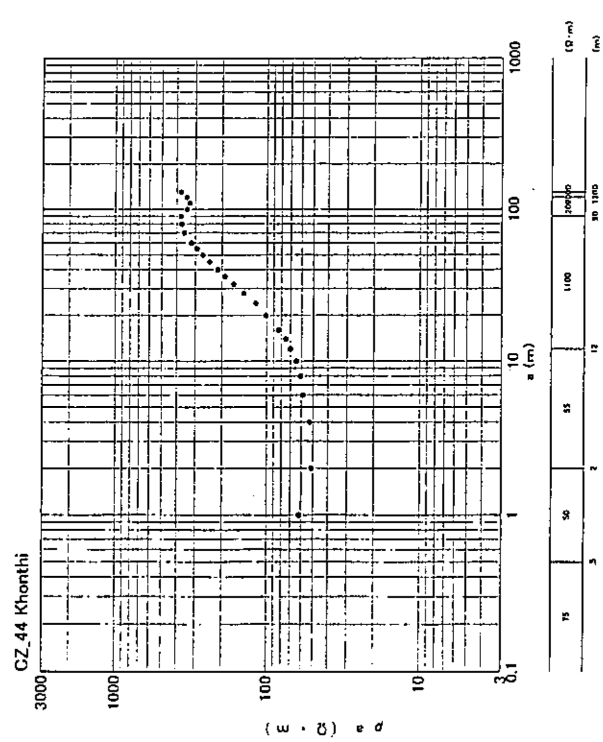

CZ_37 Mfuti
ρa (Ω・m)
a (m)

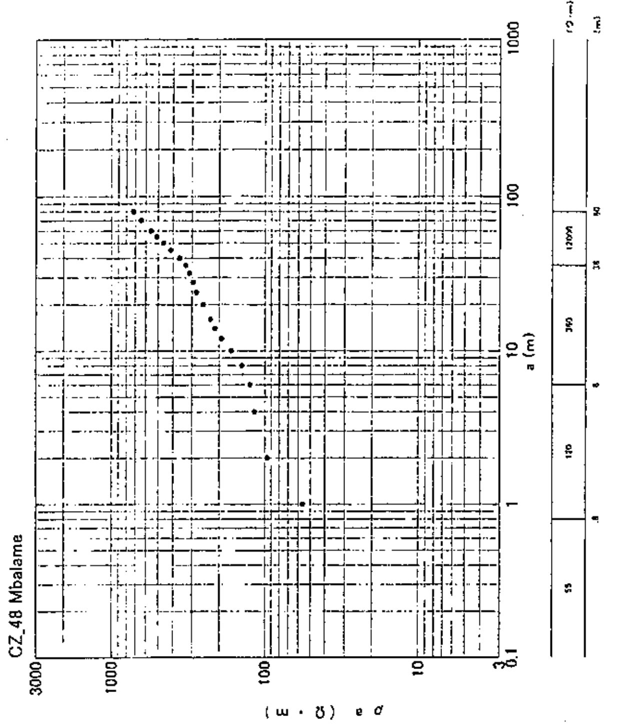

CZ_40 Mphete
ρa (Ω・m)
a (m)

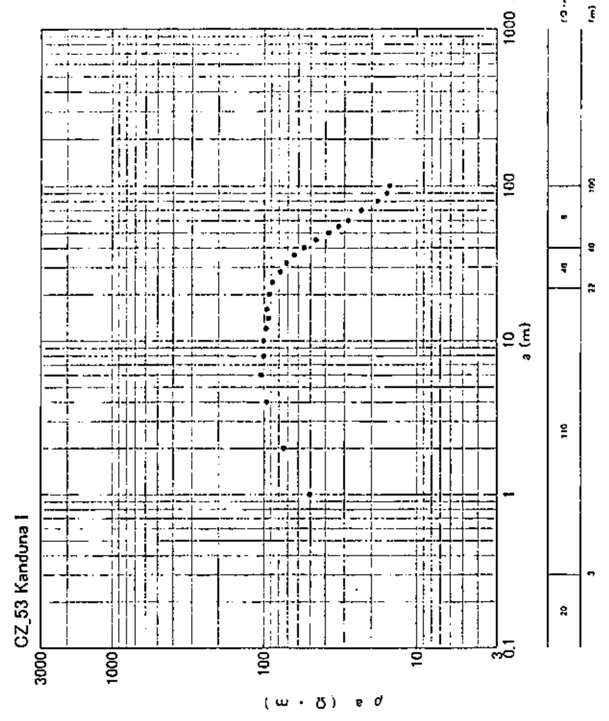

CZ_43 Mcholoma
a (m)
ρa (Ω・m)

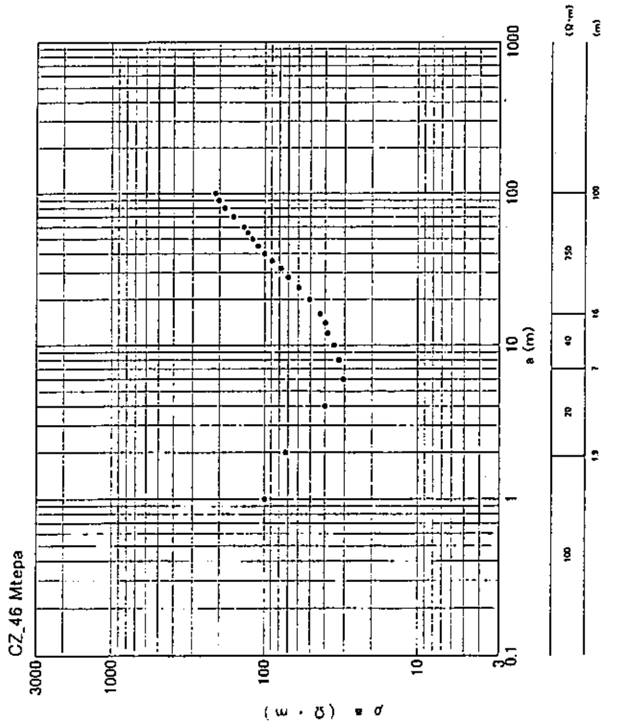

CZ_45 Chimwenje
a (m)
ρa (Ω・m)

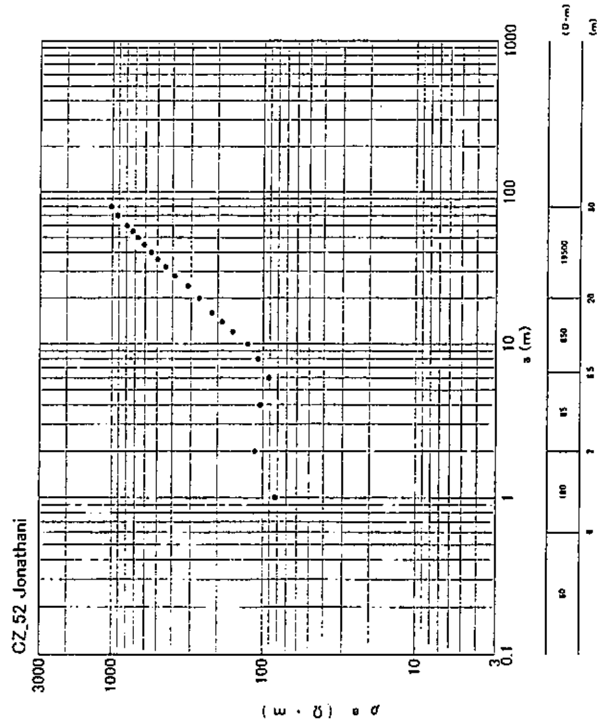

CZ_42 Chisalipo
a (m)
ρa (Ω・m)

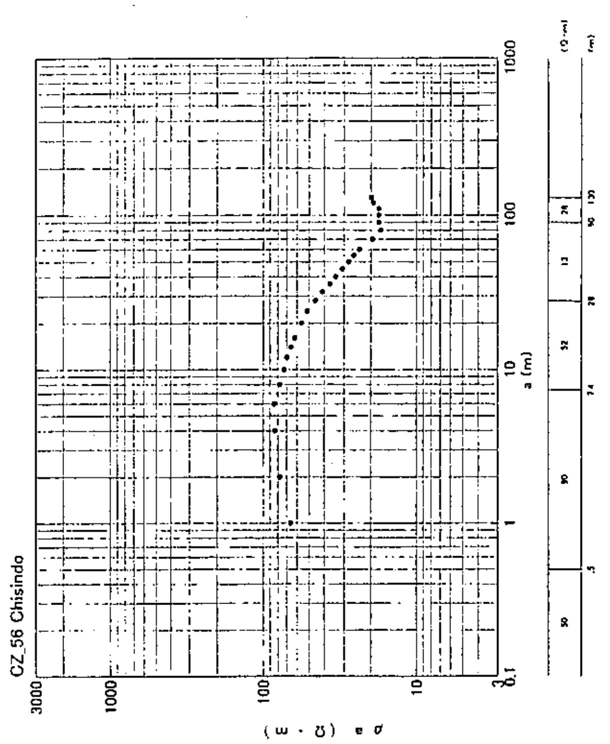

CZ_44 Khonthi
a (m)
ρa (Ω・m)

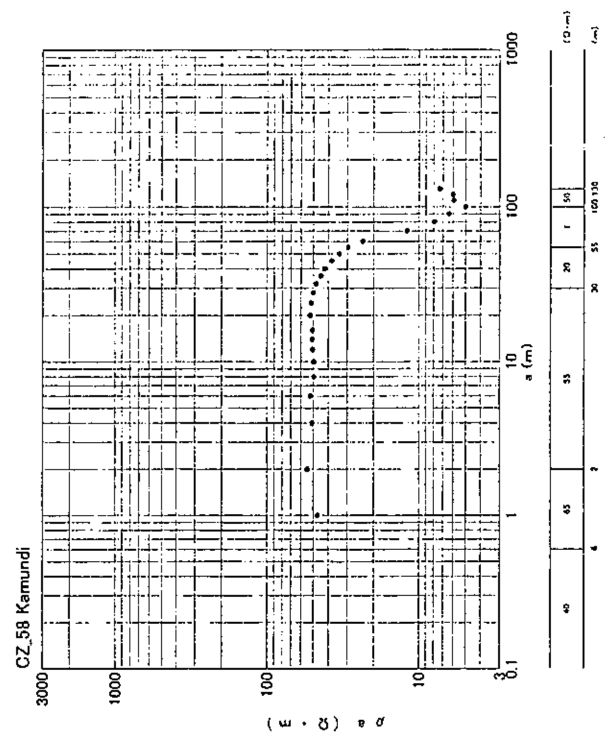

CZ_48 Mbalame
ρa (Ω・m)
a (m)

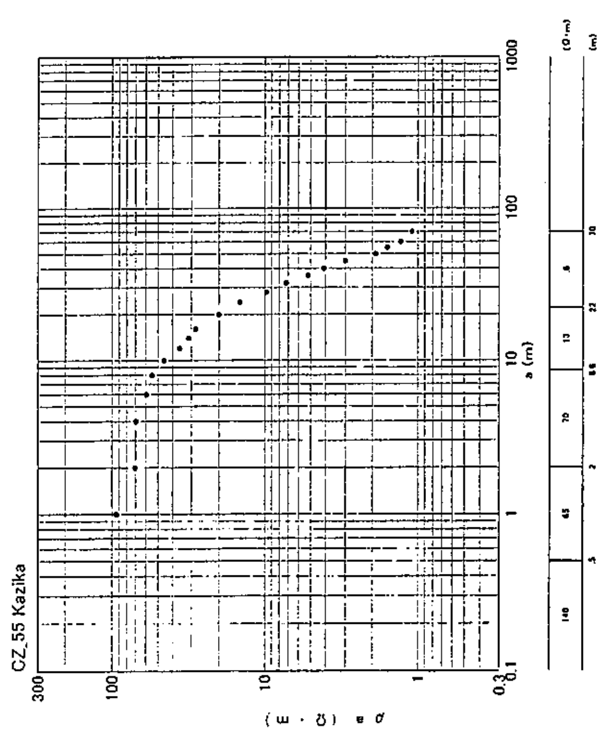

CZ_53 Kanduna I
ρa (Ω・m)
a (m)

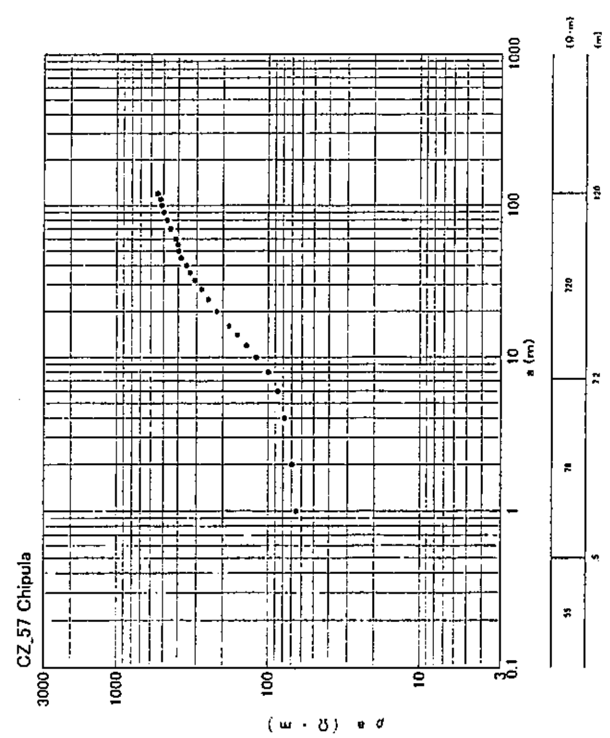

CZ_46 Mtepa
ρa (Ω・m)
a (m)

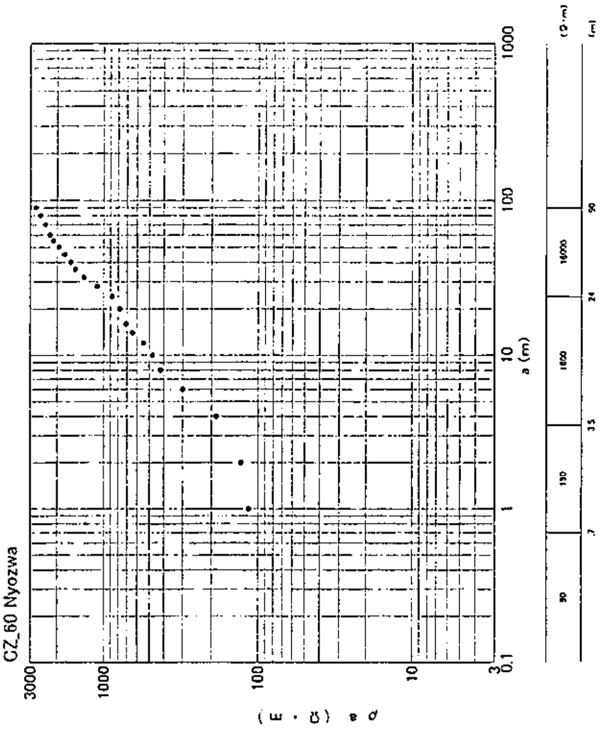

CZ_52 Jonathani
ρa (Ω・m)
a (m)

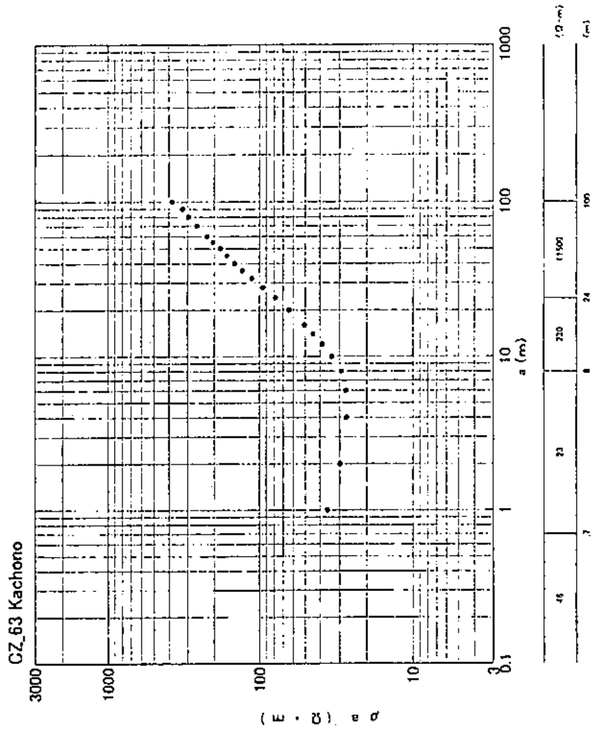

CZ_56 Chisindo
ρa (Ω・m)
a (m)

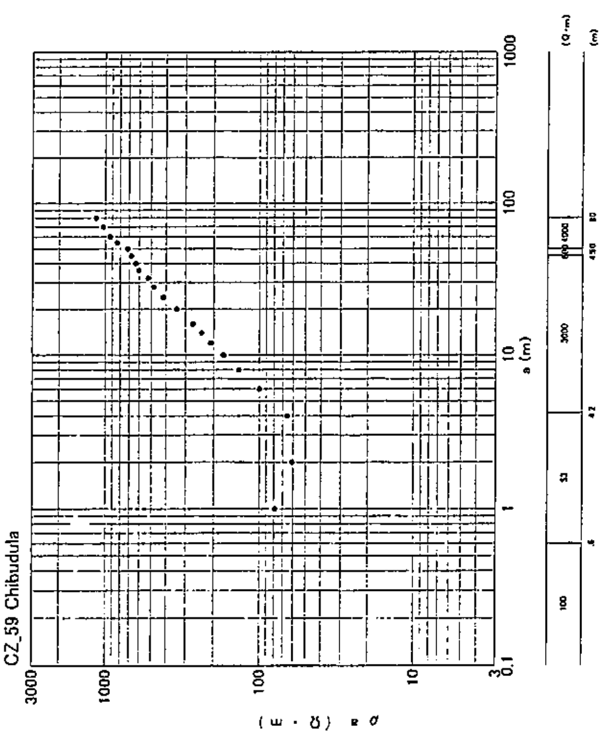

CZ_58 Kamundi
ρa (Ω・m)
a (m)

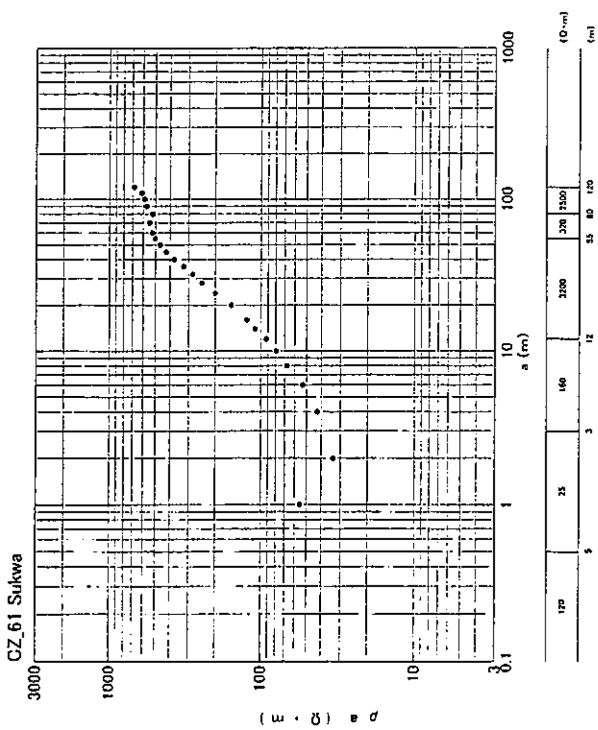

CZ_55 Kazika
ρa (Ω・m)
a (m)

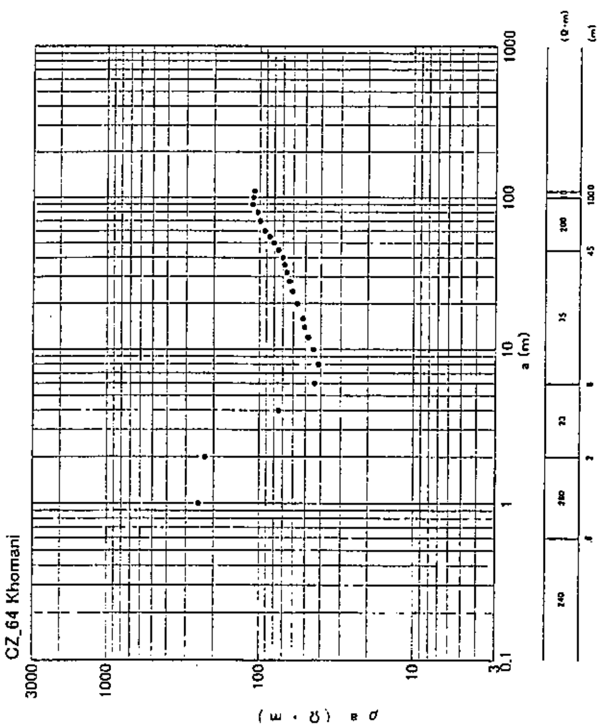

CZ_57 Chipula
ρa (Ω・m)
a (m)

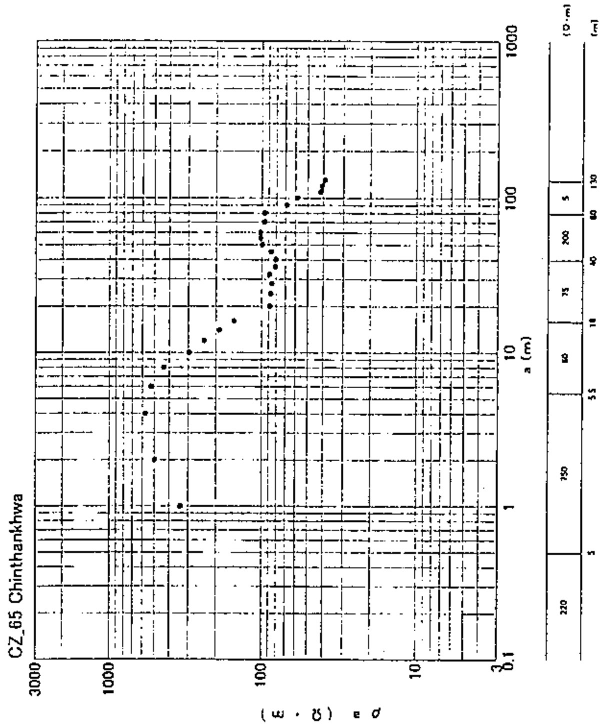

CZ_60 Nyozwa

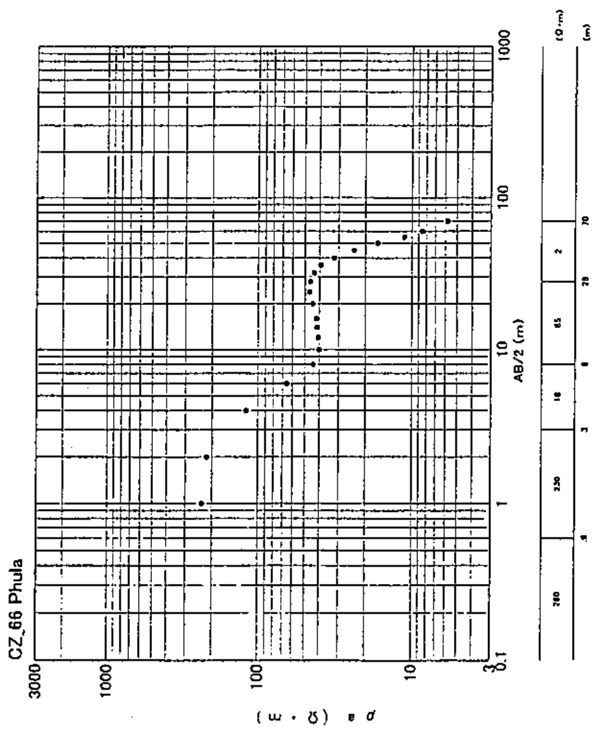

CZ_63 Kachono

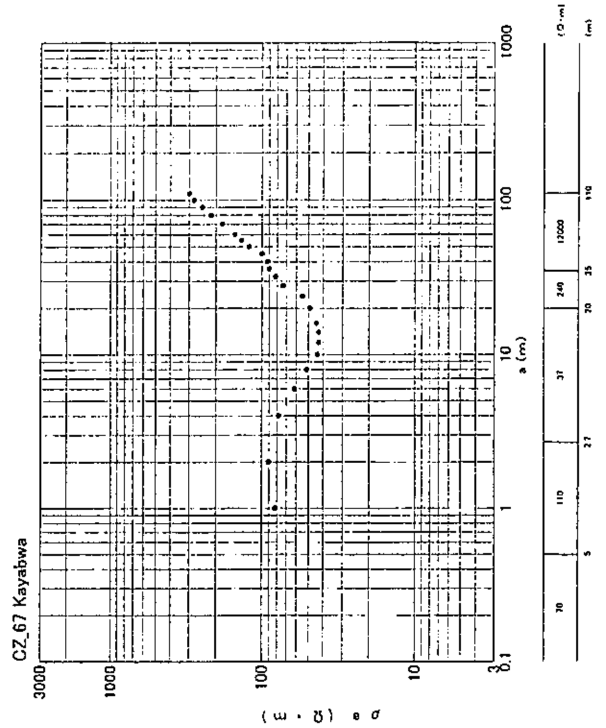

CZ_59 Chibudula

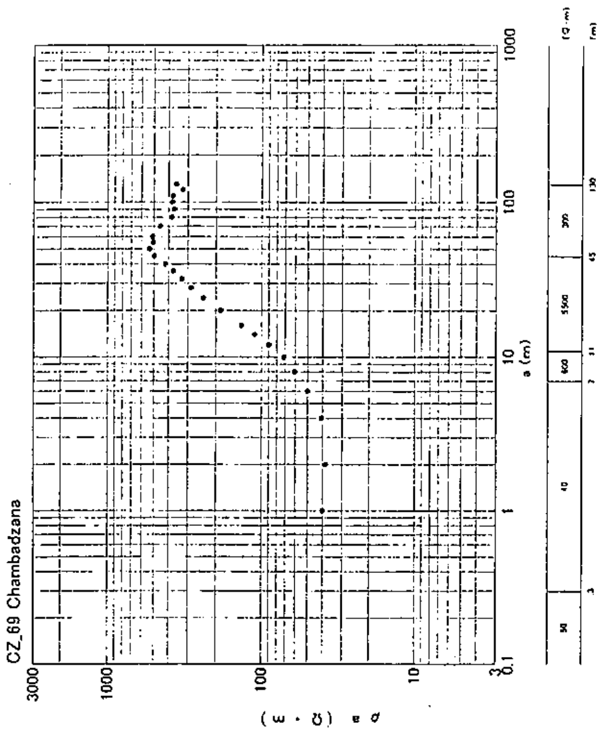

CZ_61 Sukwa

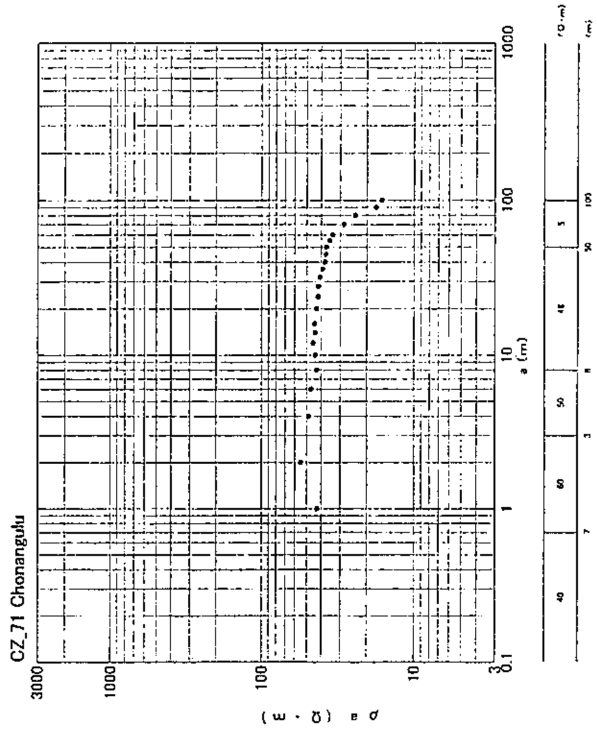

CZ_64 Khomani

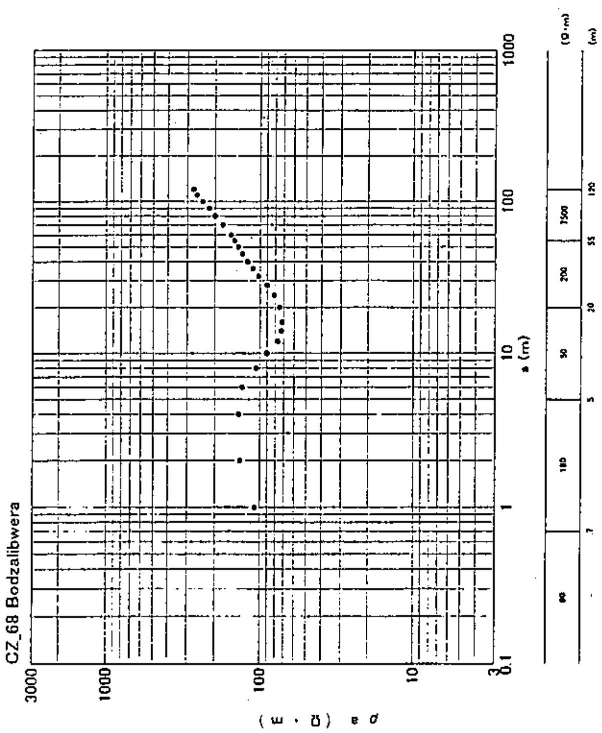

CZ_65 Chinthankhwa

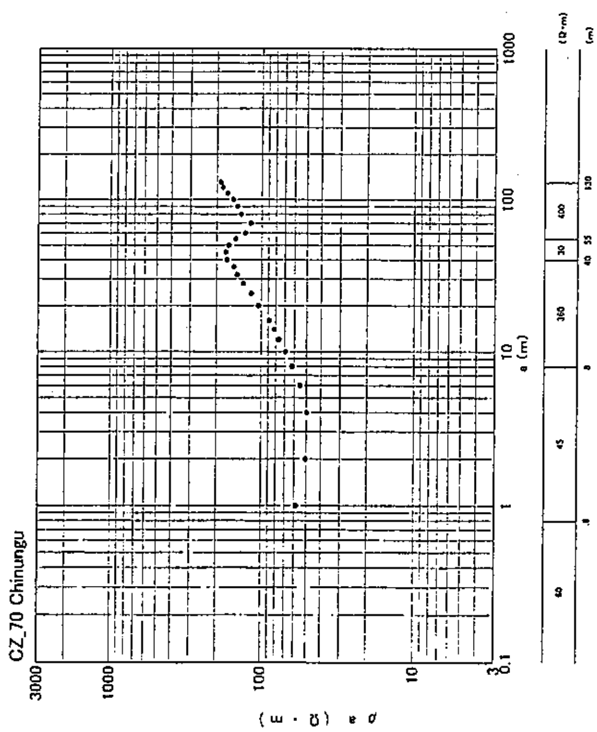

CZ_66 Phula

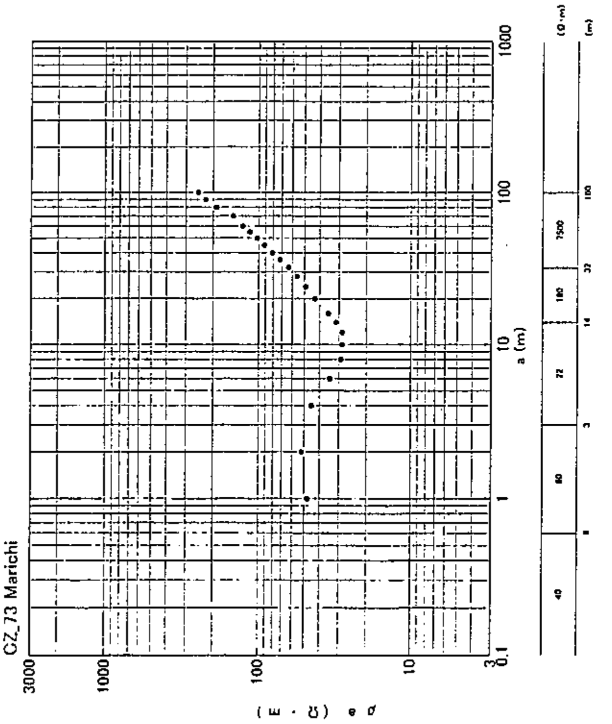

CZ_67 Kayabwa

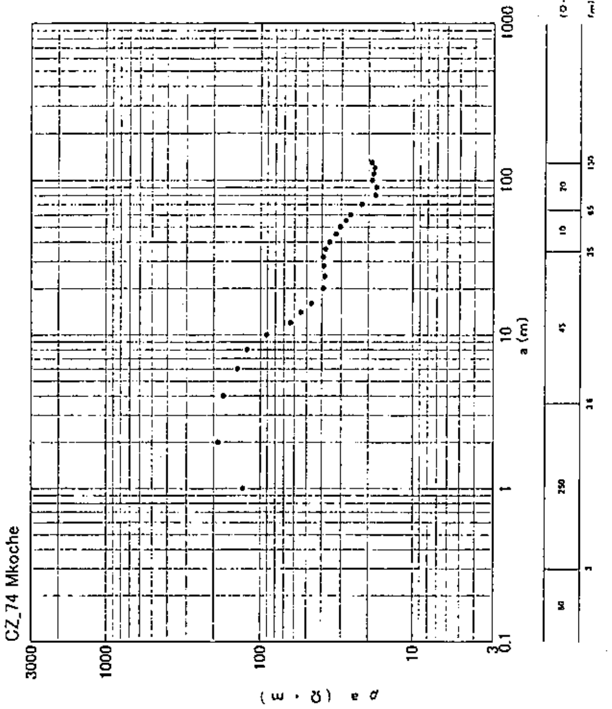

CZ_69 Chambadzana
ρ a (Ω・m)
a (m)

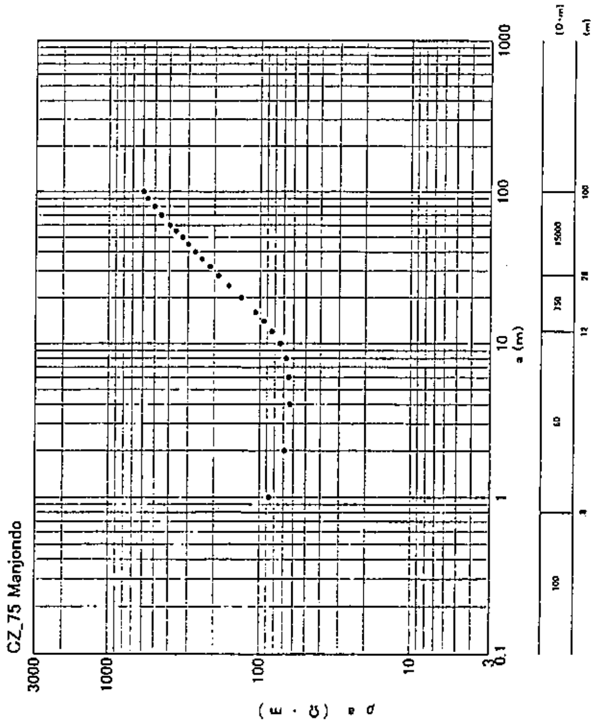

CZ_71 Chonangulu
ρ a (Ω・m)
a (m)

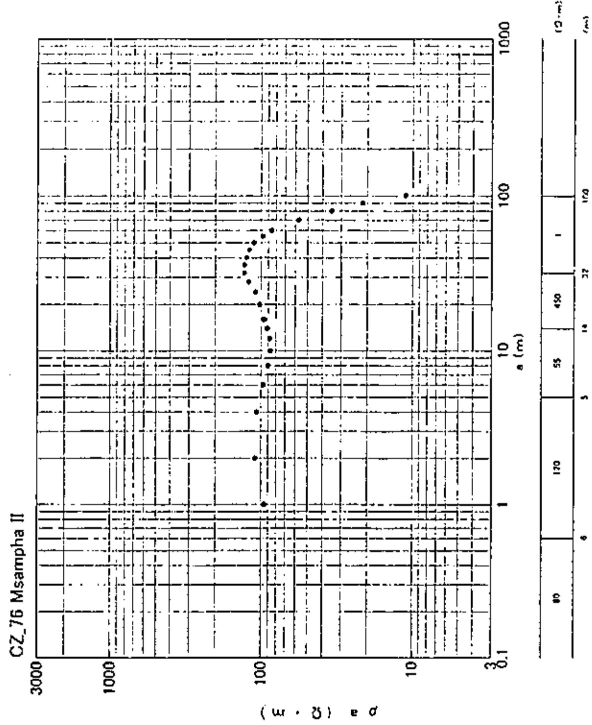

CZ_68 Bodzalibwera
ρ a (Ω・m)
a (m)

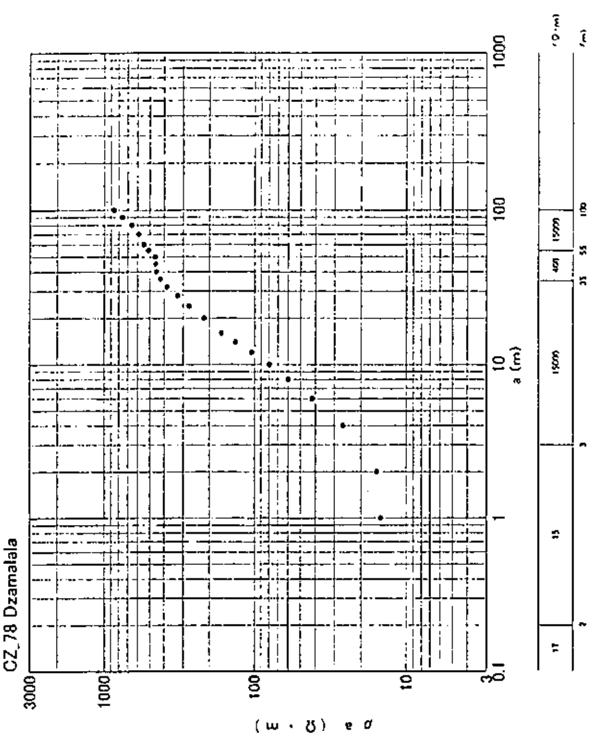

CZ_70 Chinungu
ρ a (Ω・m)
a (m)

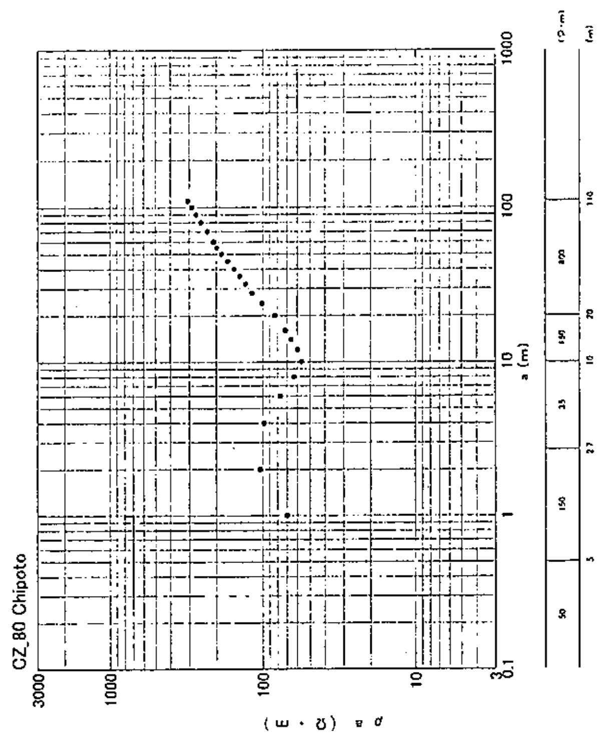

CZ_73 Marichi
ρ a (Ω・m)
a (m)

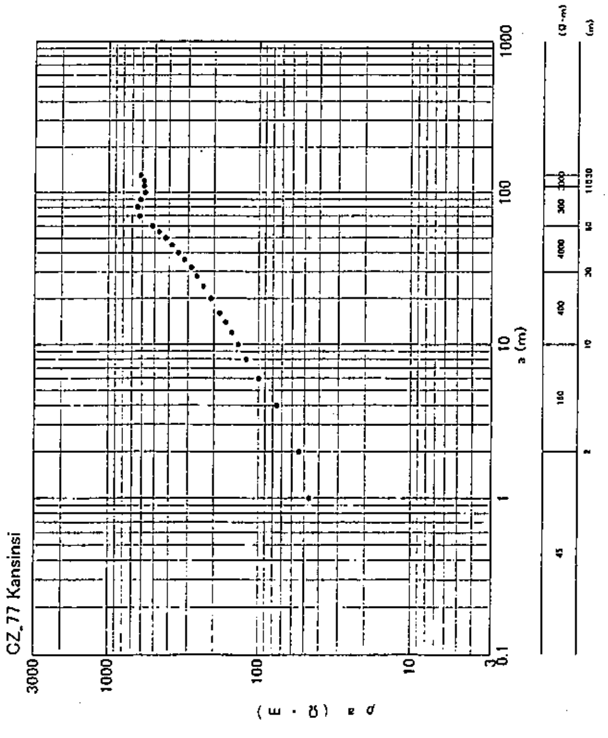

CZ_74 Mkoche
ρ a (Ω・m)
a (m)

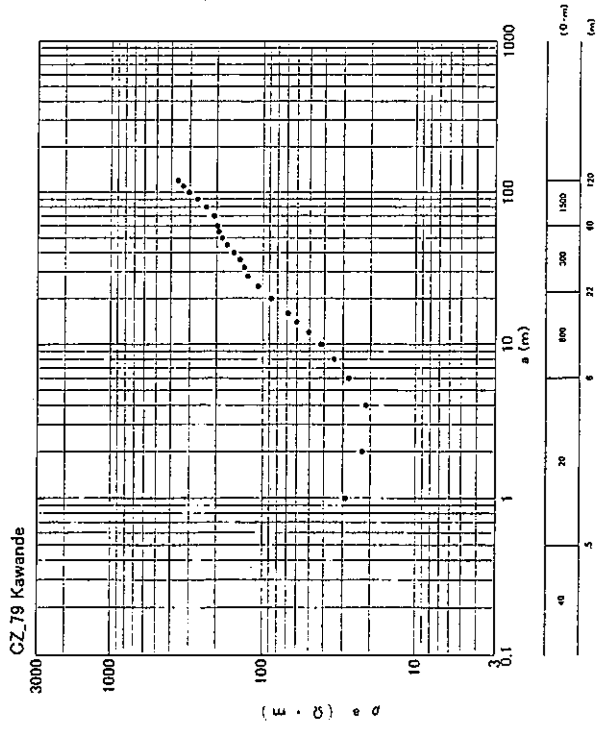

CZ_75 Manjondo
ρ a (Ω・m)
a (m)

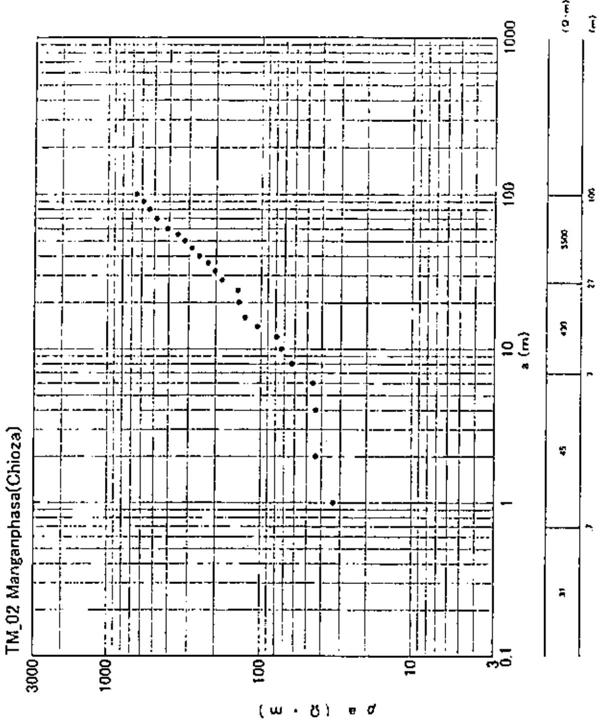

CZ_76 Msampha II
ρ a (Ω・m)
a (m)

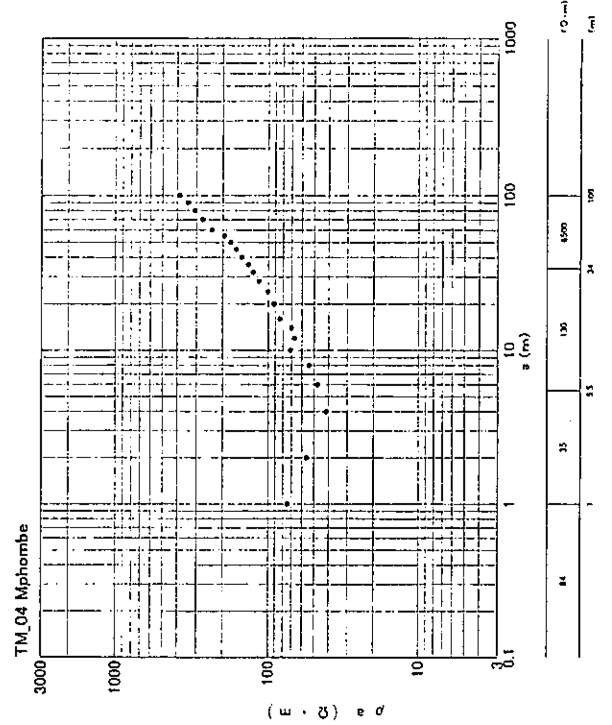

CZ_78 Dzamalala
a (m)
ρa (Ω・m)

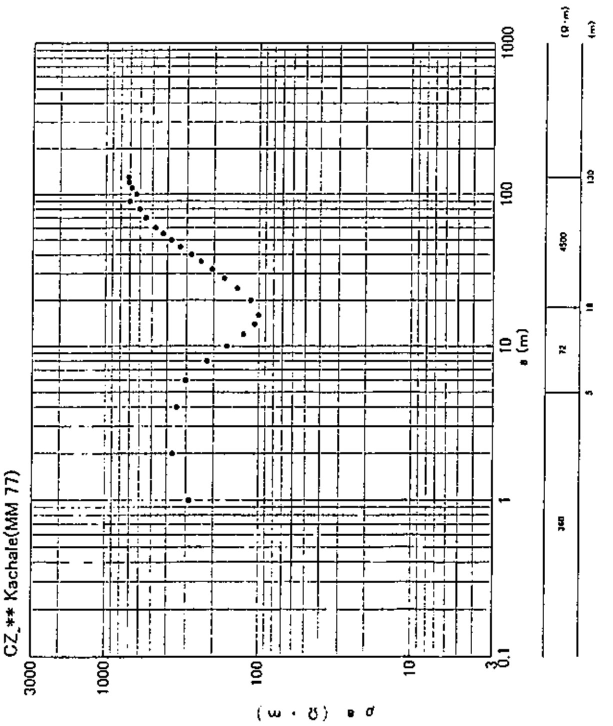

CZ_80 Chipoto
a (m)
ρa (Ω・m)

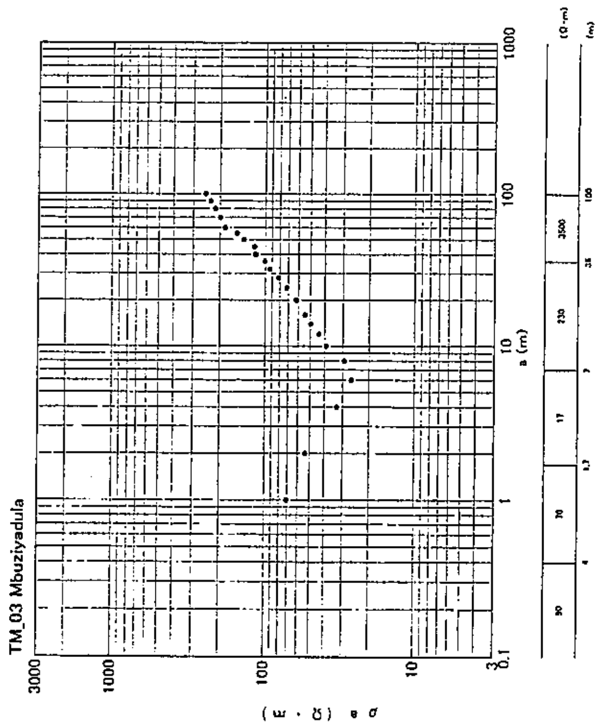

CZ_77 Kansinsi
a (m)
ρa (Ω・m)

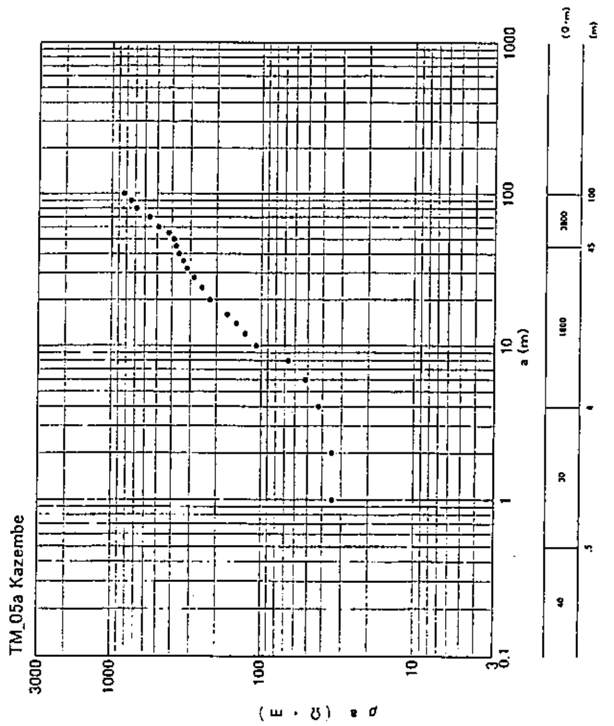

CZ_79 Kawande
a (m)
ρa (Ω・m)

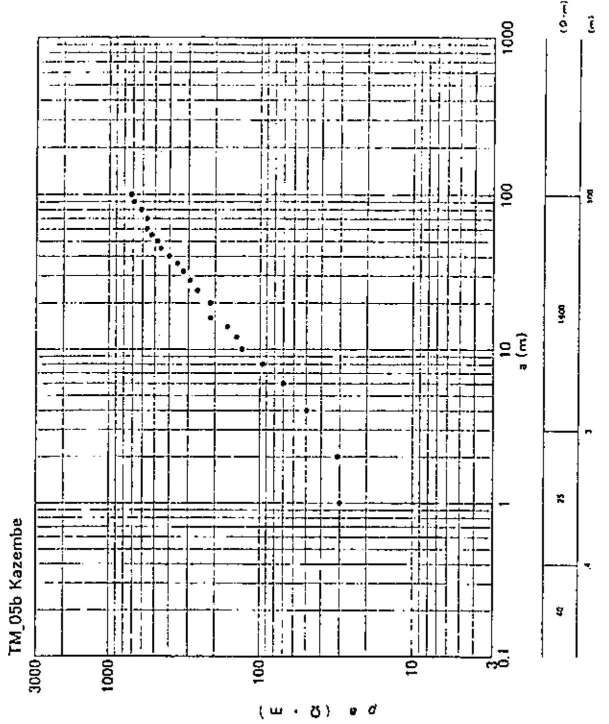

TM_02 Manganphasa(Chioza)
ρa (Ω・m)
a (m)

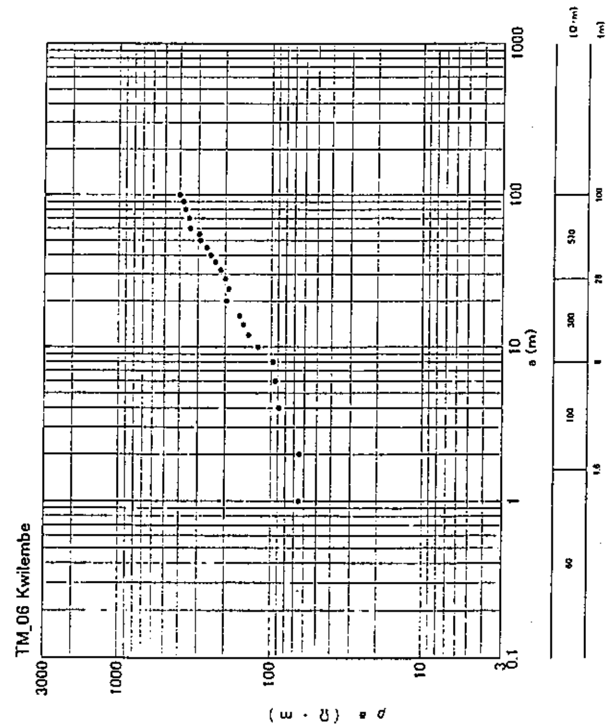

TM_04 Mphombe
ρa (Ω・m)
a (m)

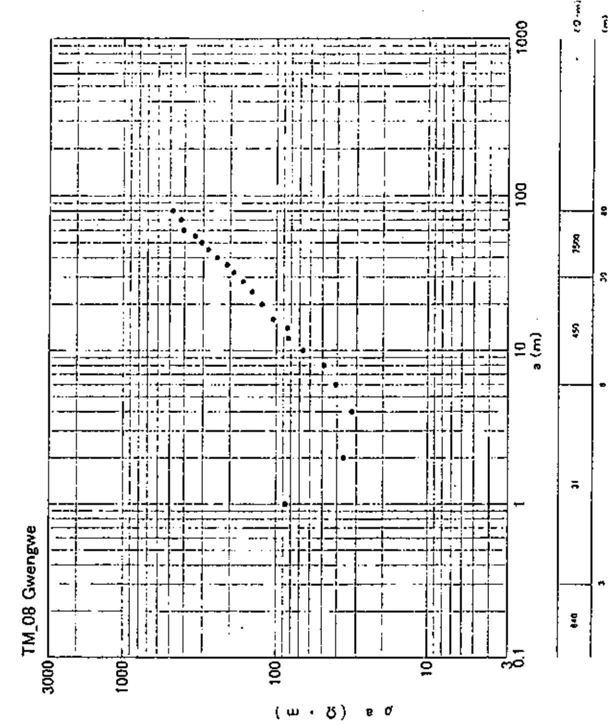

CZ_** Kachale(MM 77)
ρa (Ω・m)
a (m)

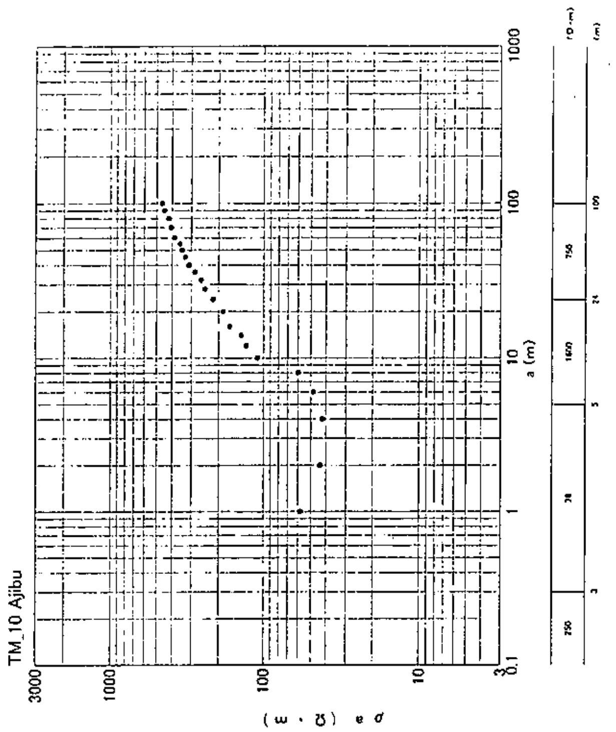

TM_03 Mbuziyadula
ρa (Ω・m)
a (m)

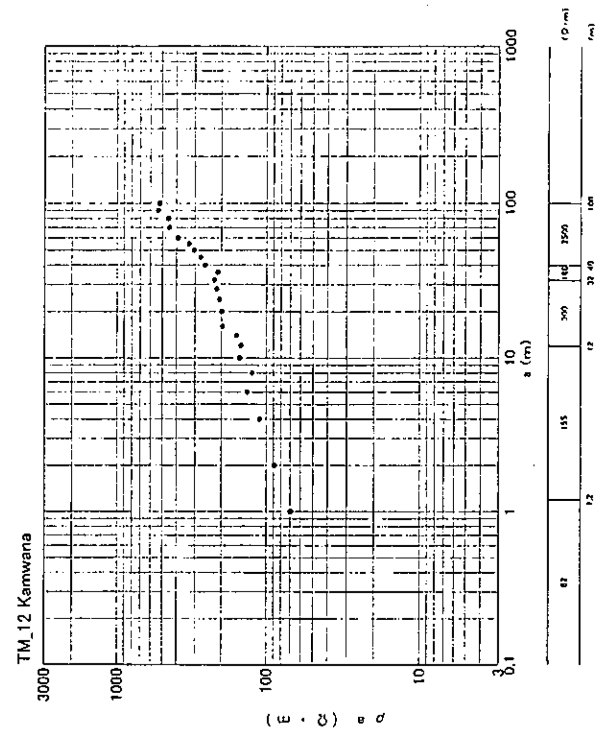

TM_05a Kazembe
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

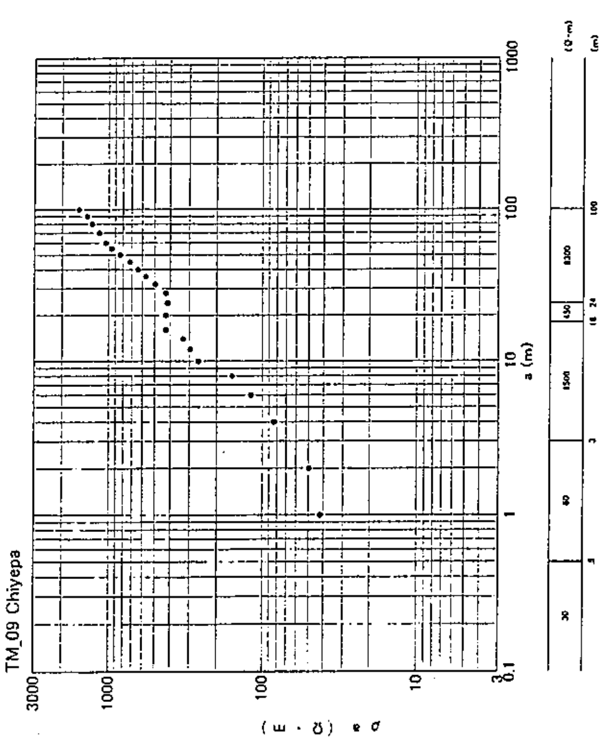

TM_05b Kazembe
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

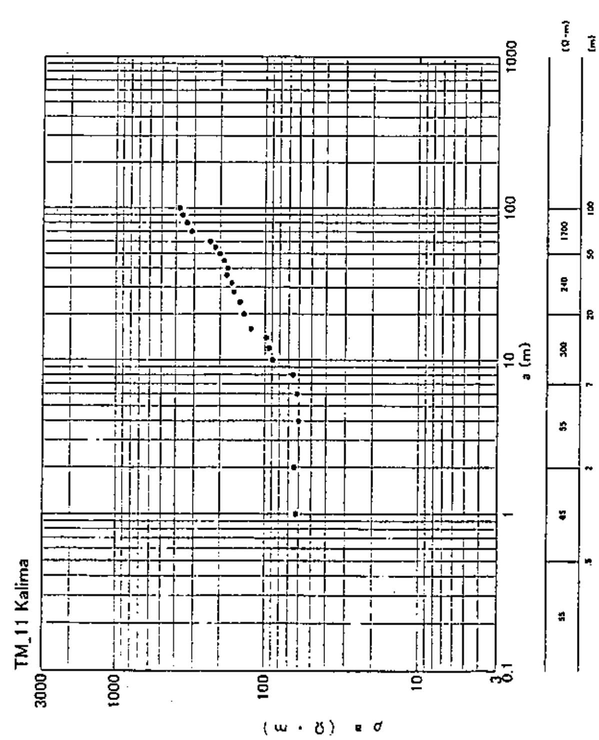

TM_06 Kwilembe
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

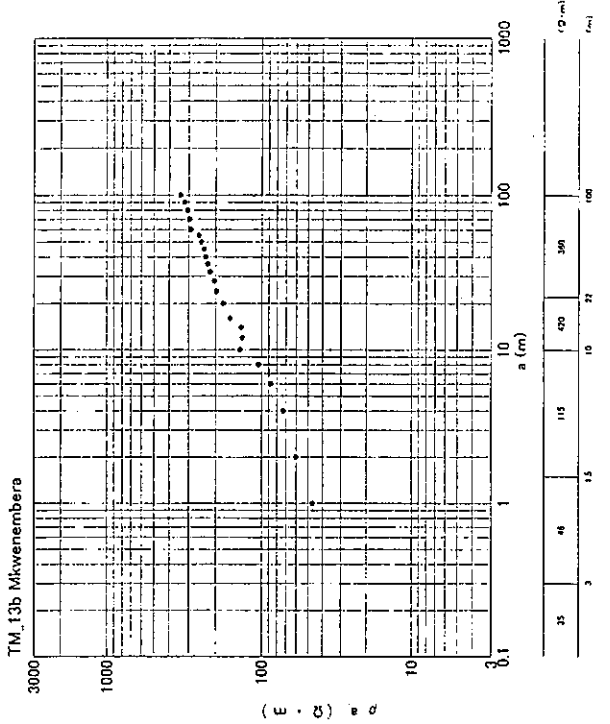

TM_08 Gwengwe
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

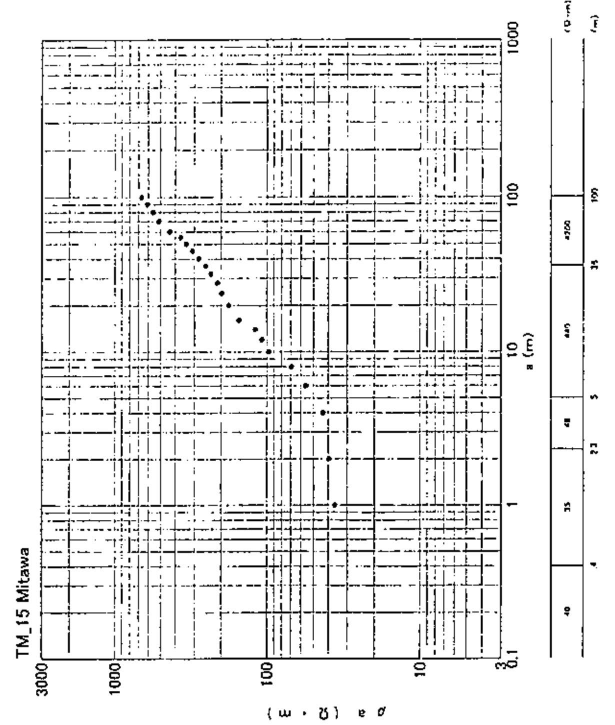

TM_10 Ajibu
ρa (Ω・m)
a (m)

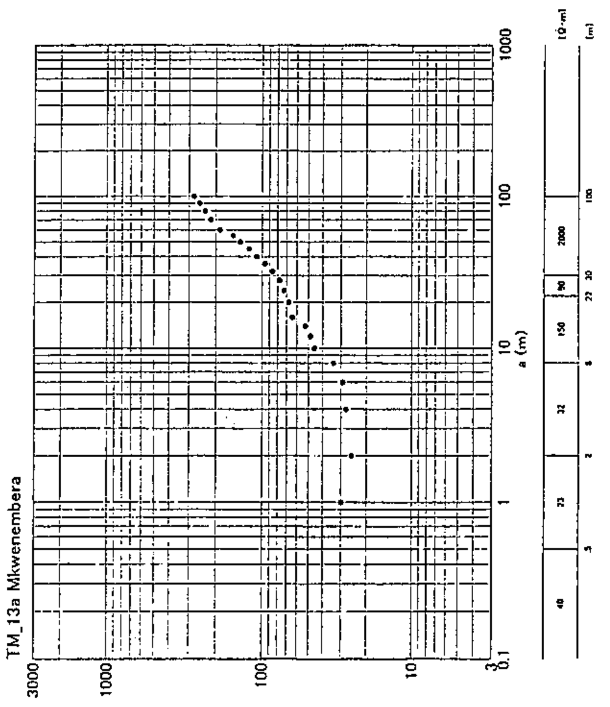

TM_12 Kamwana
ρa (Ω・m)
a (m)

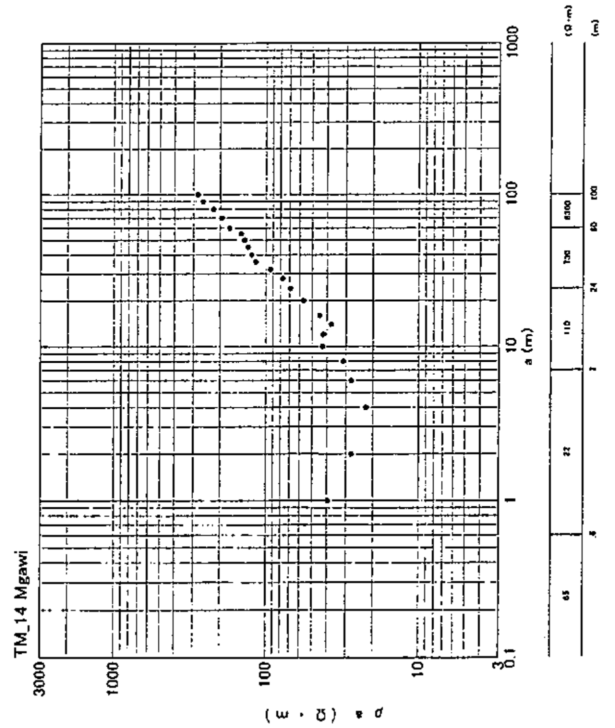

TM_09 Chiyepa
ρa (Ω・m)
a (m)

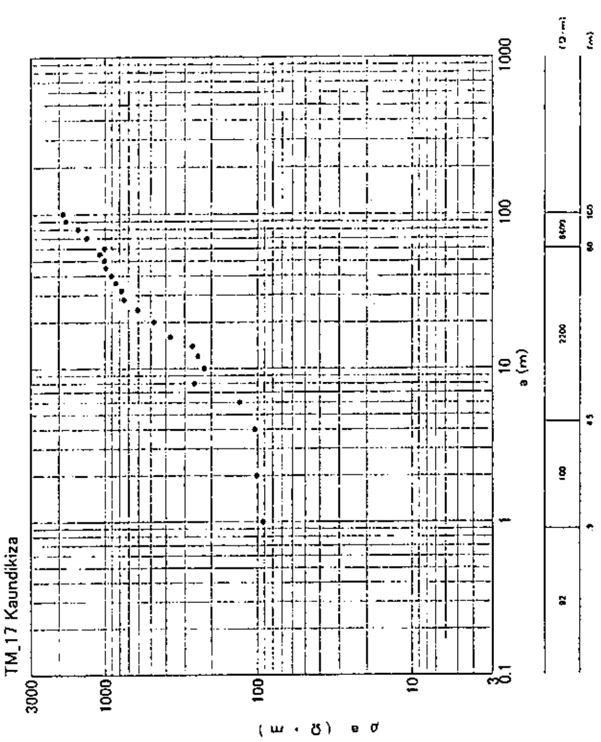

TM_11 Kalima
ρa (Ω・m)
a (m)

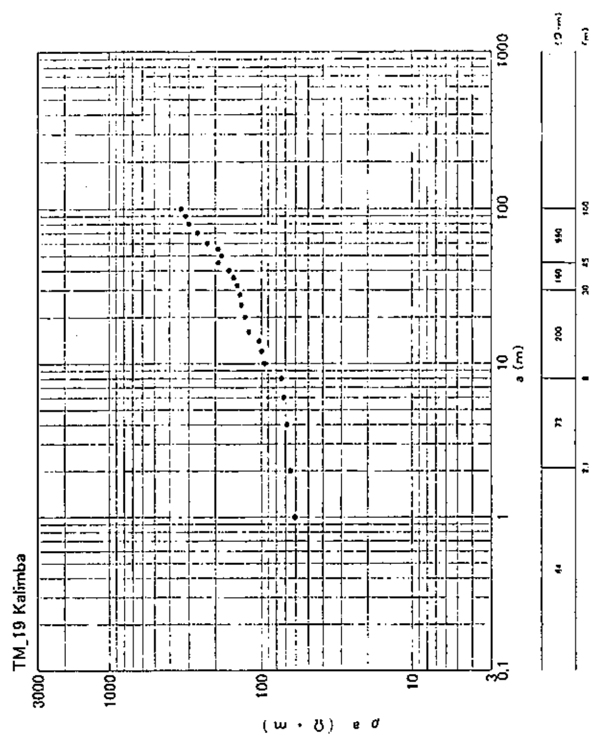

TM_13b Mkwenembera
ρa (Ω・m)
a (m)

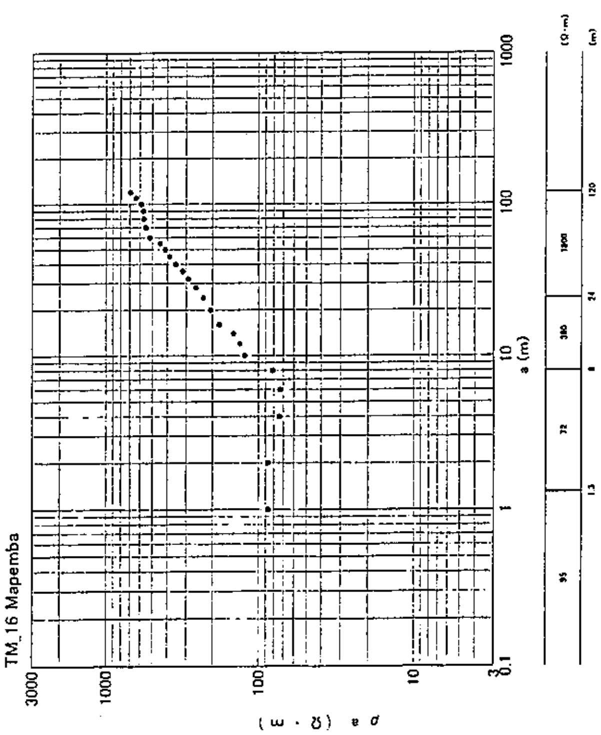

TM_15 Mitawa
ρa (Ω・m)
a (m)

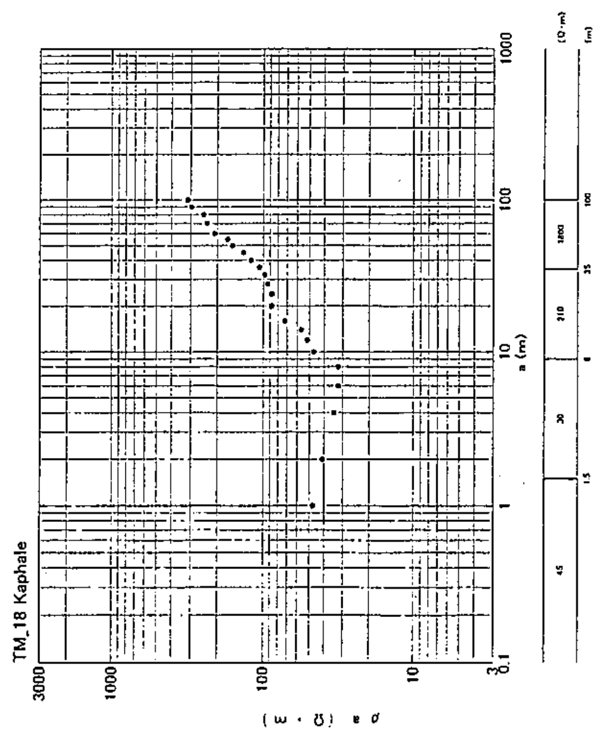

TM_13a Mkwenembera
ρa (Ω・m)
a (m)

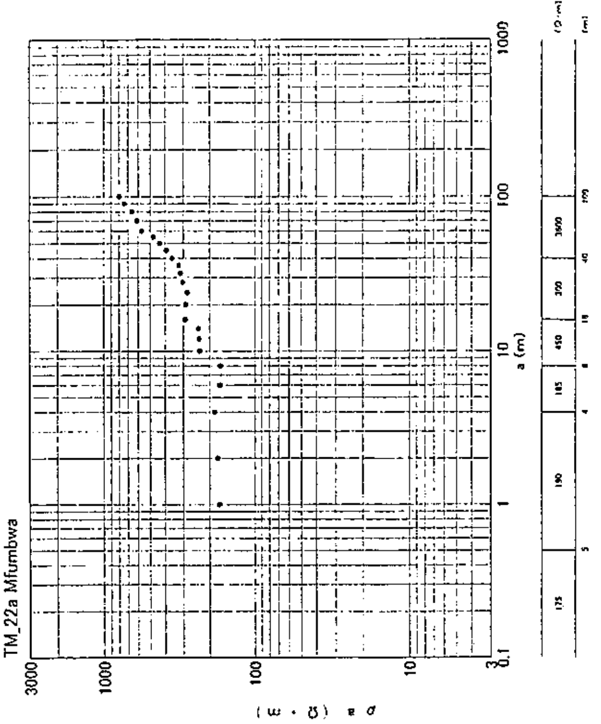

TM_14 Mgawi
ρa (Ω・m)
a (m)

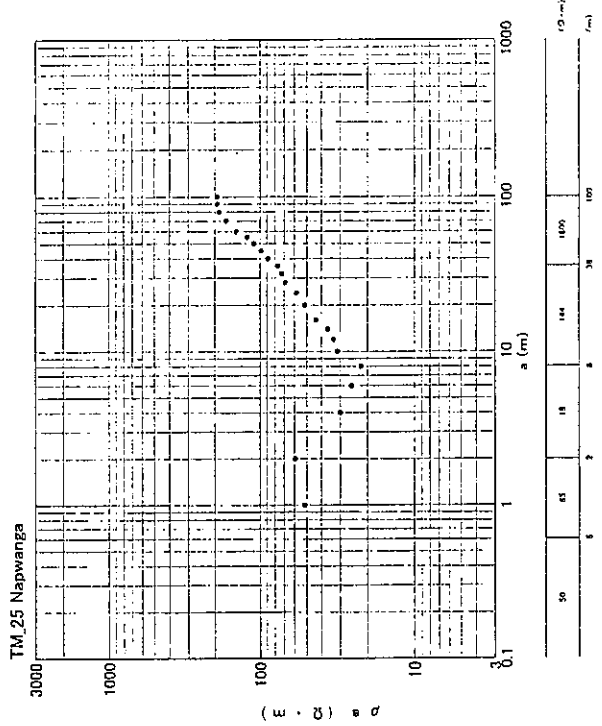

TM_17 Kaundikiza
a (m)
ρa (Ω・m)

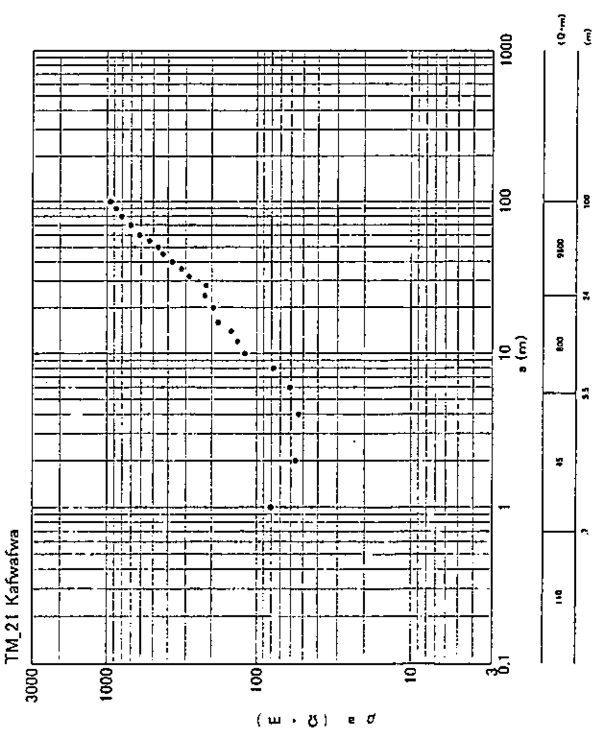

TM_19 Kalimba
a (m)
ρa (Ω・m)

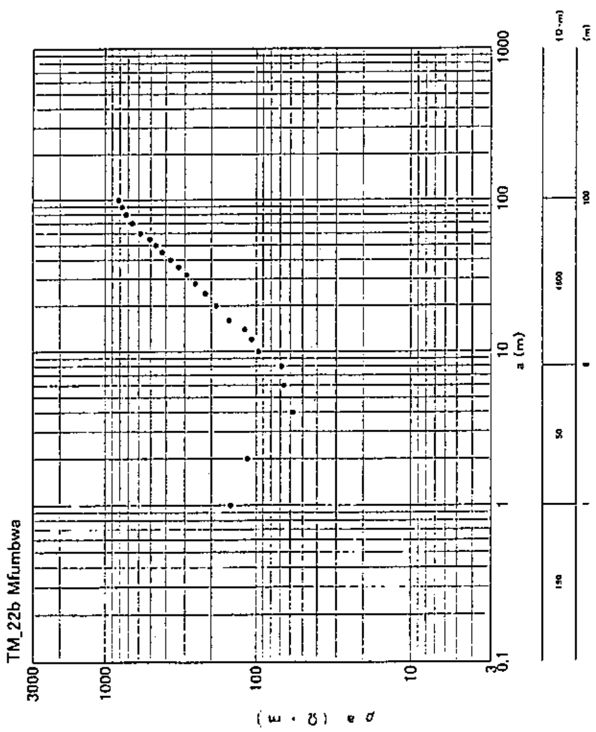

TM_16 Mapemba
a (m)
ρa (Ω・m)

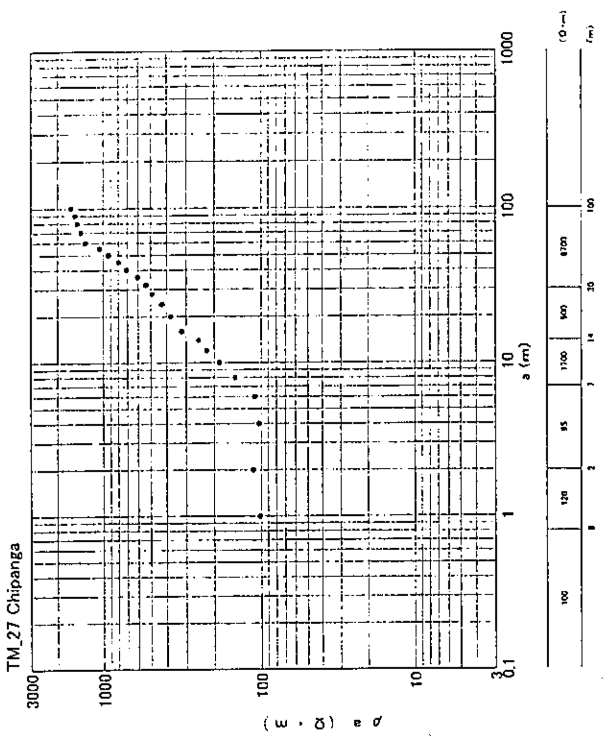

TM_18 Kaphale
a (m)
ρa (Ω・m)

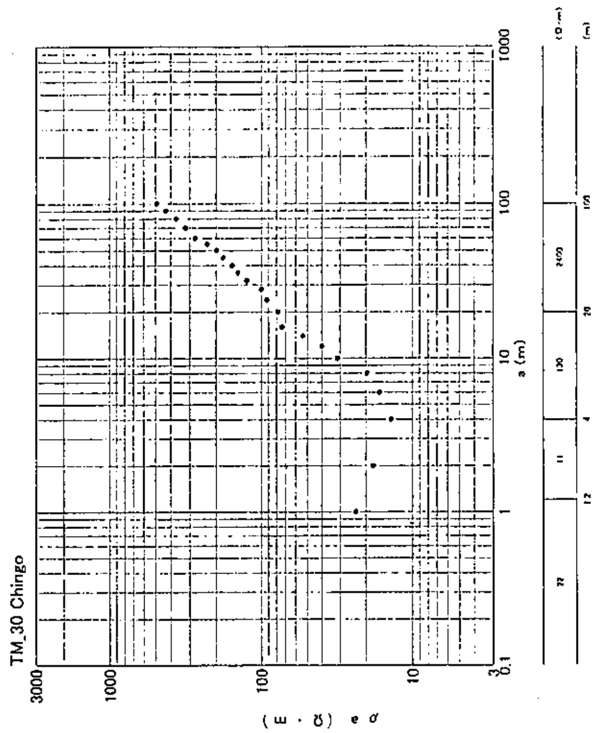

TM_22a Mfumbwa
ρa (Ω·m)
a (m)

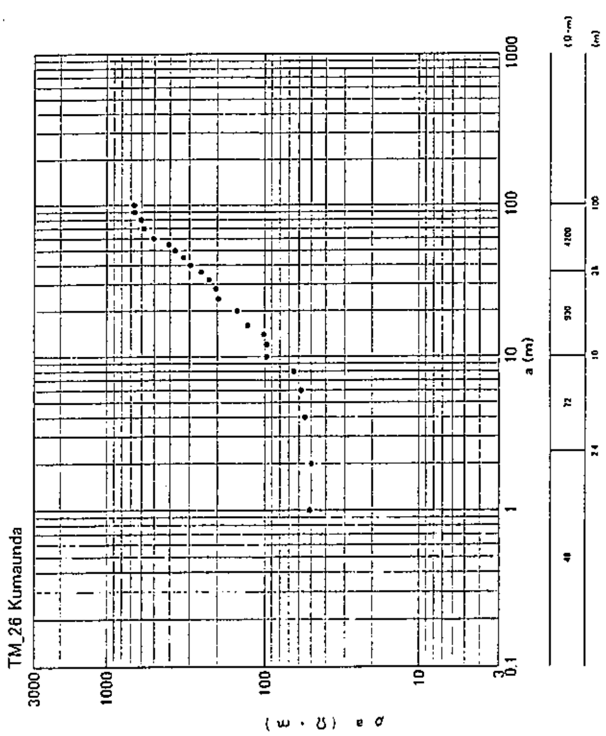

TM_25 Napwanga
ρa (Ω·m)
a (m)

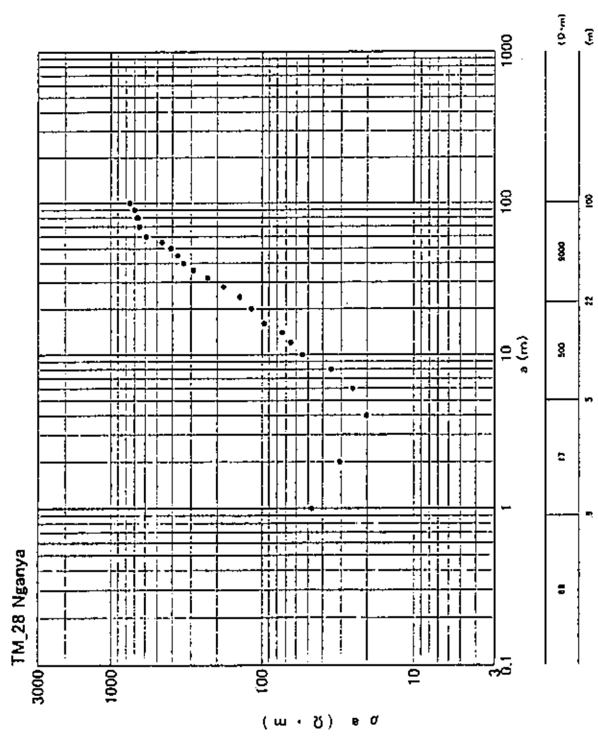

TM_21 Kafwafwa
ρa (Ω·m)
a (m)

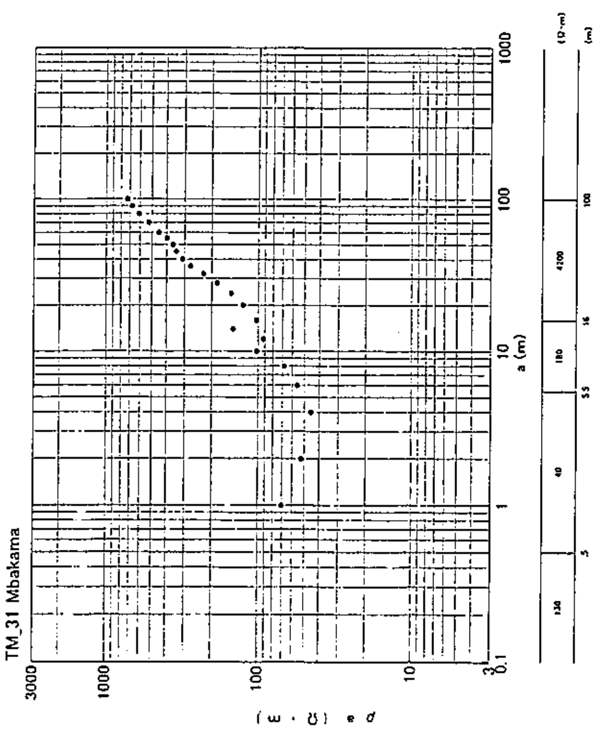

TM_22b Mfumbwa
ρa (Ω·m)
a (m)

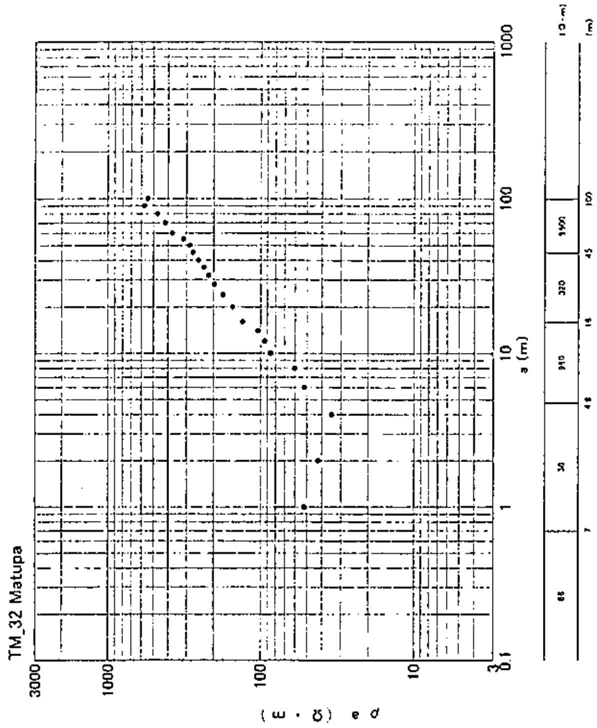

TM_27 Chipanga

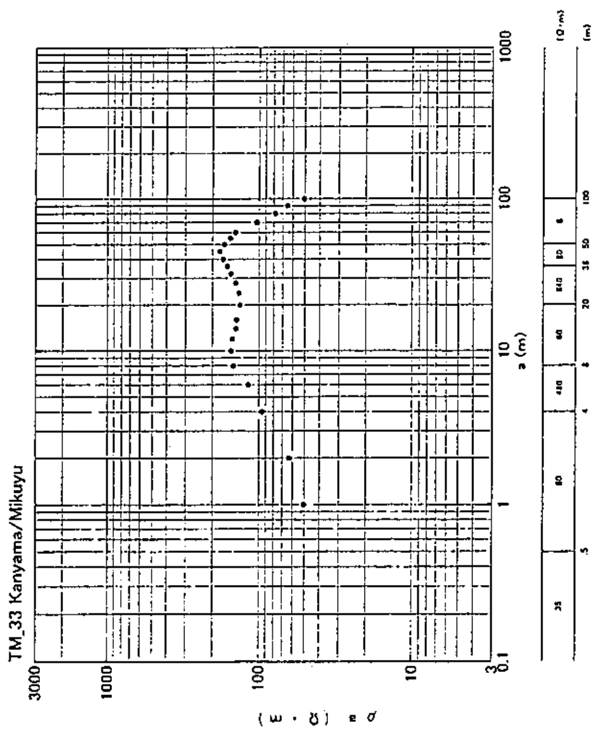

TM_30 Chingo

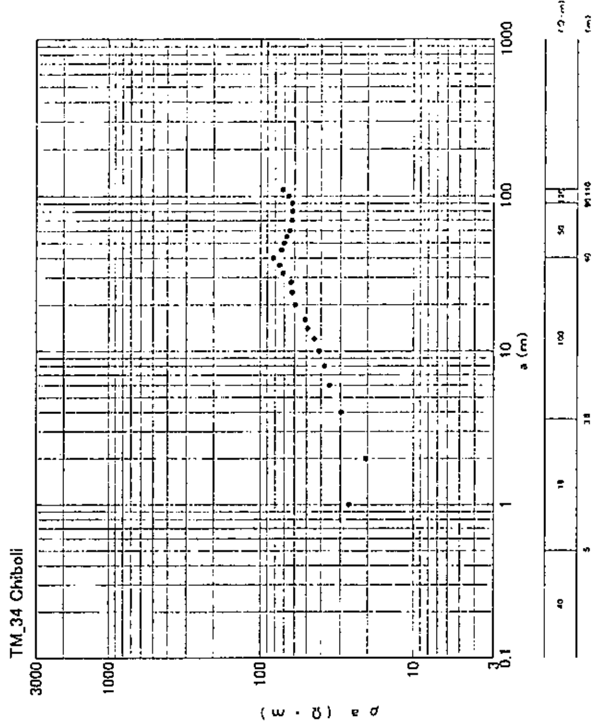

TM_26 Kumaunda

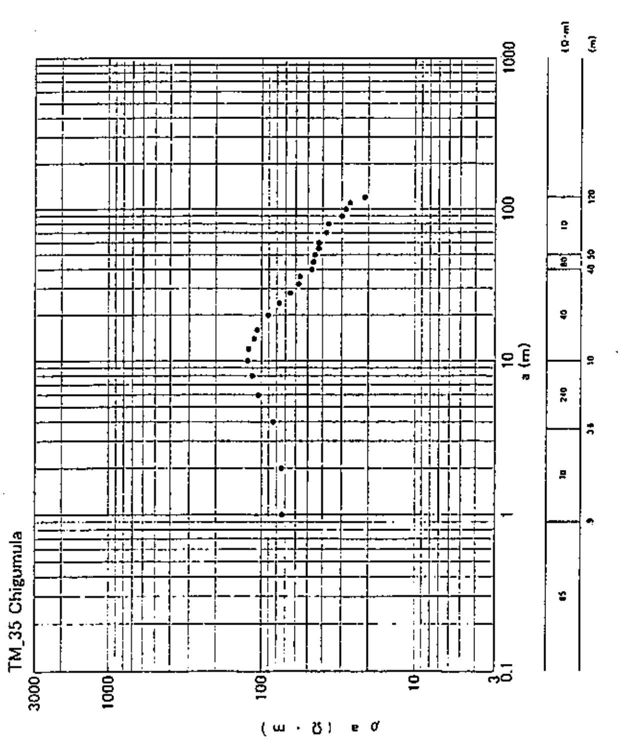

TM_28 Nganya


TM_31 Mbakama
a (m)
ρa (Ω・m)

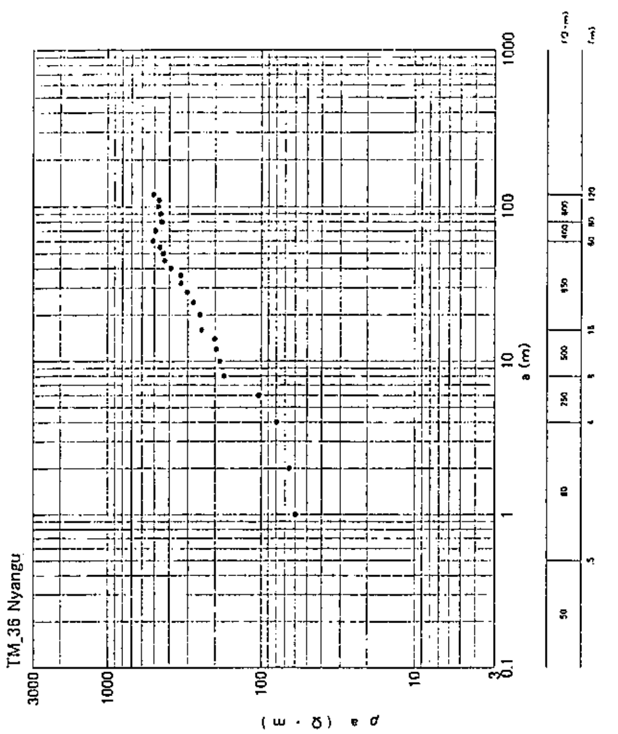

TM_32 Matupa
a (m)
ρa (Ω・m)


TM_33 Kanyama/Mikuyu
a (m)
ρa (Ω・m)

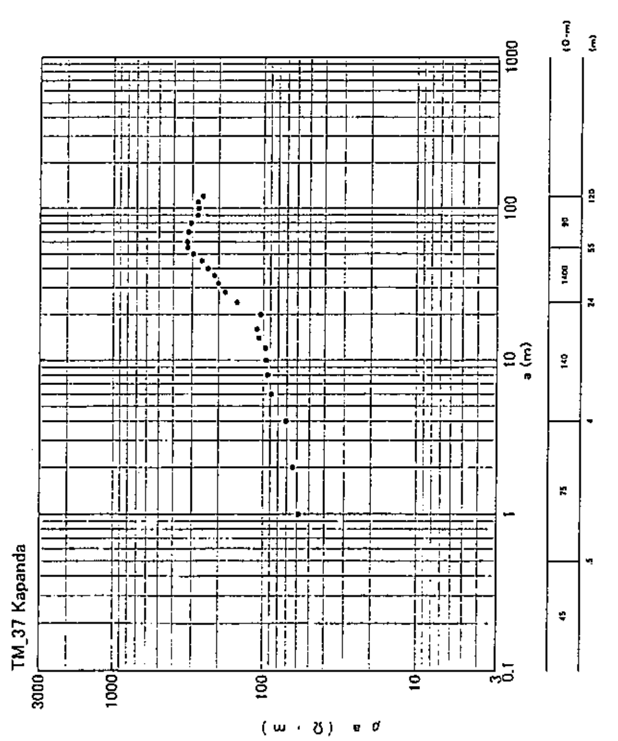

TM_34 Chiboli
a (m)
ρa (Ω・m)



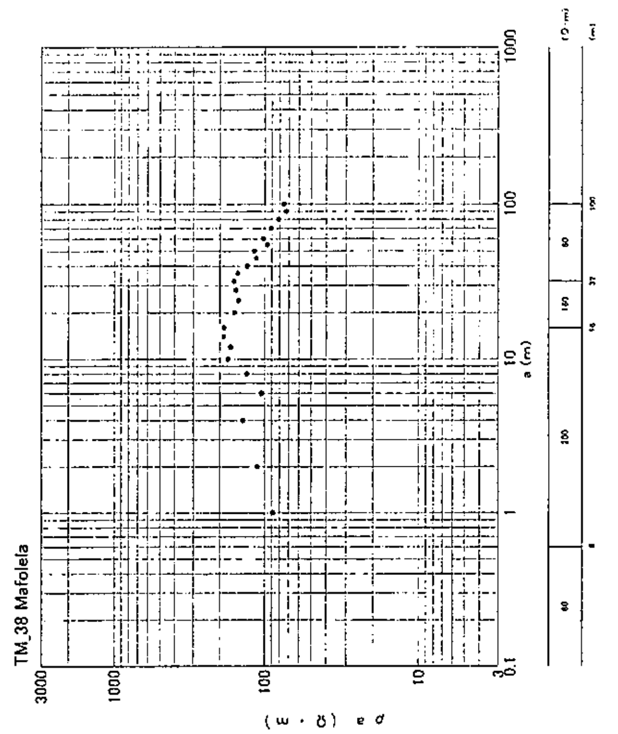
TM_35 Chigumula



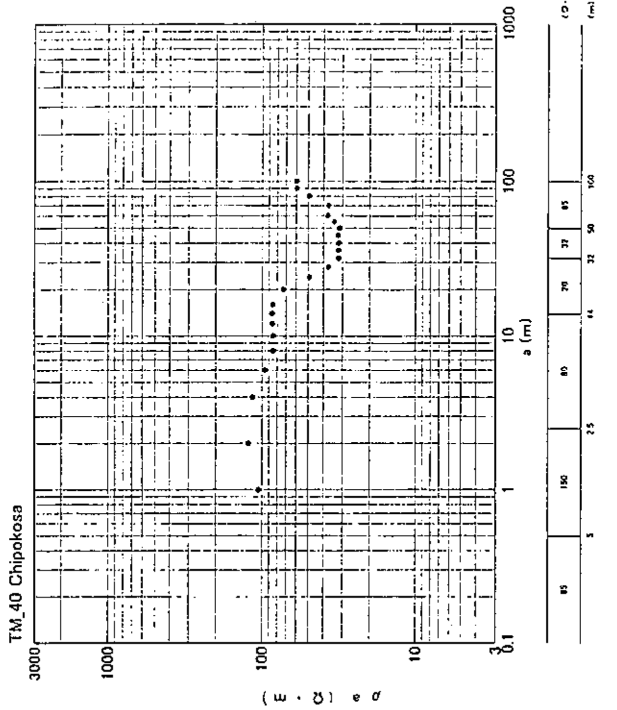
TM_36 Nyangu

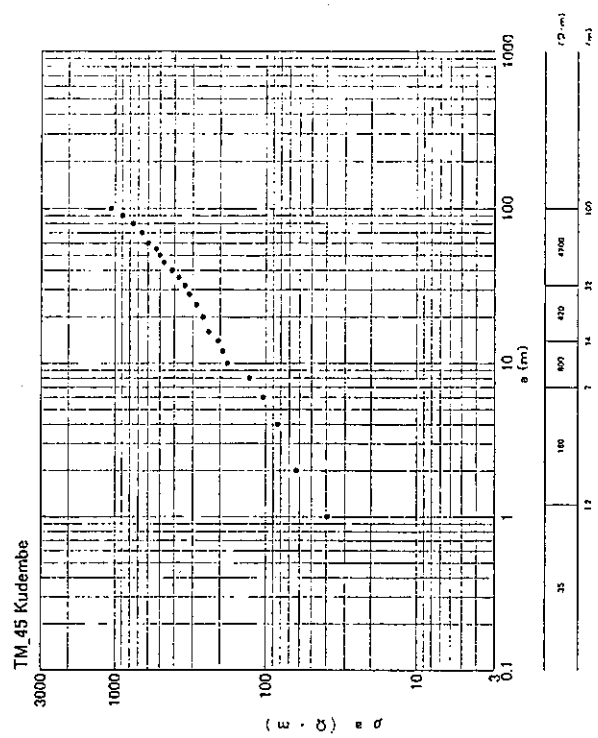


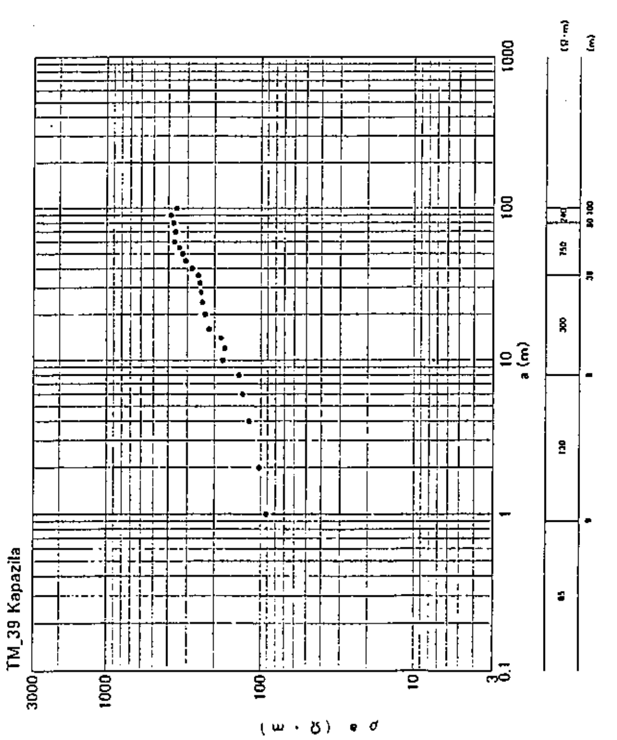
TM_37 Kapanda

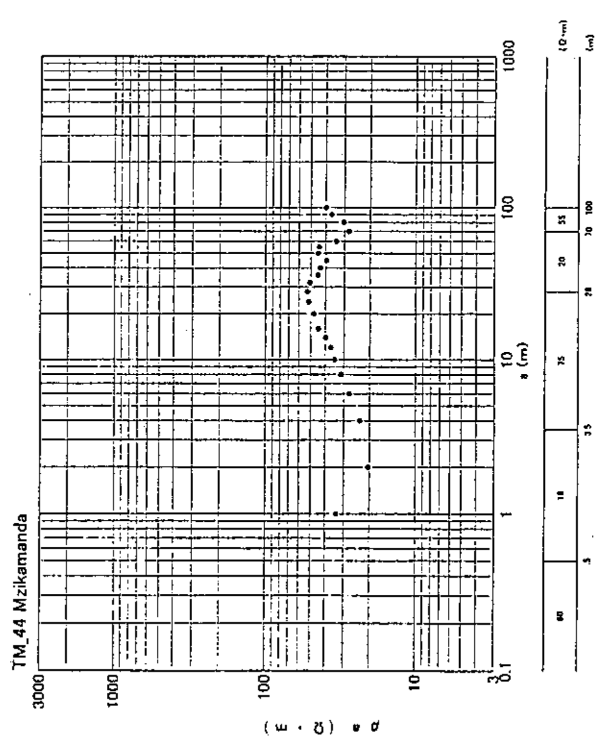


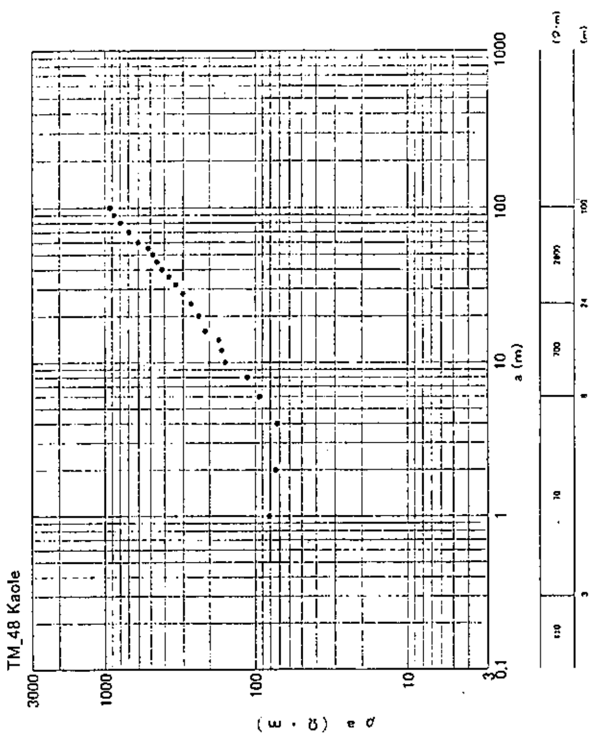
TM_38 Mafolela

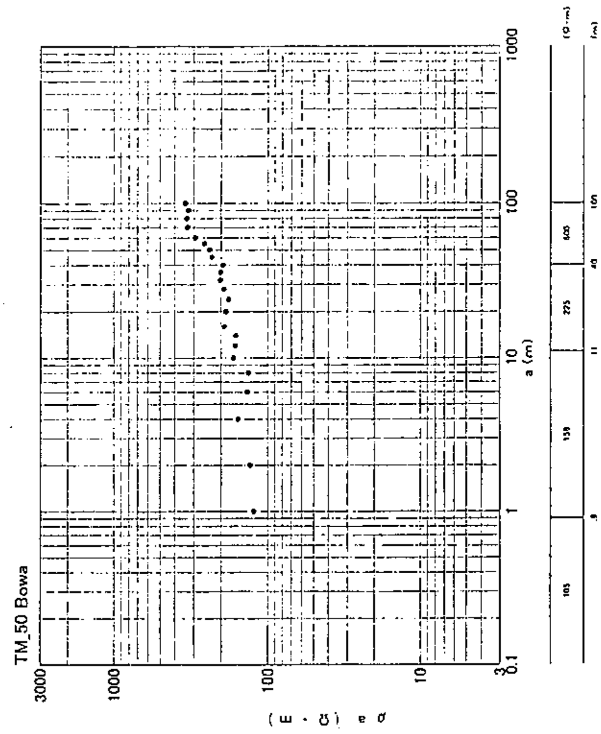

TM_40 Chipokosa
a (m)

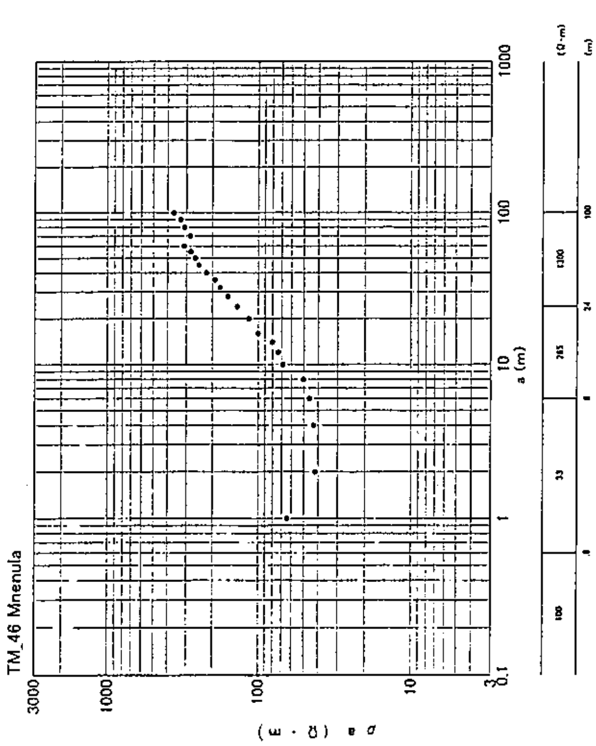

TM_45 Kudembe
a (m)

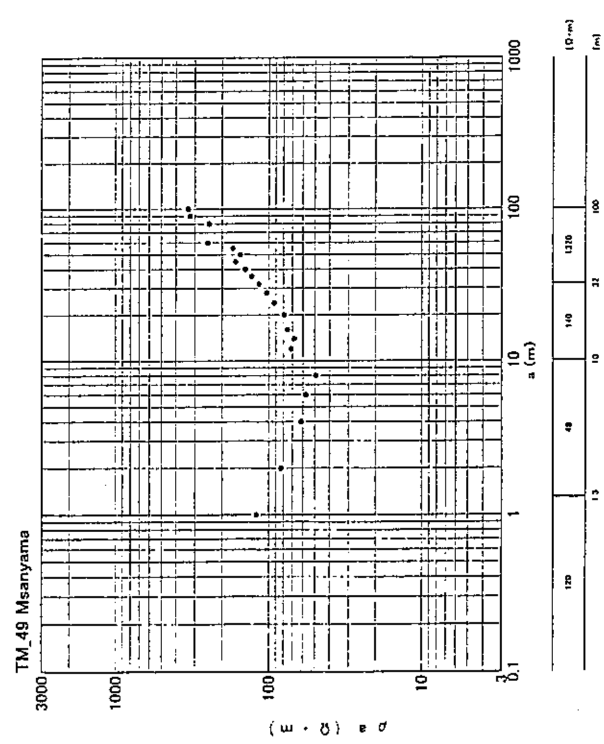

TM_39 Kapazila
a (m)

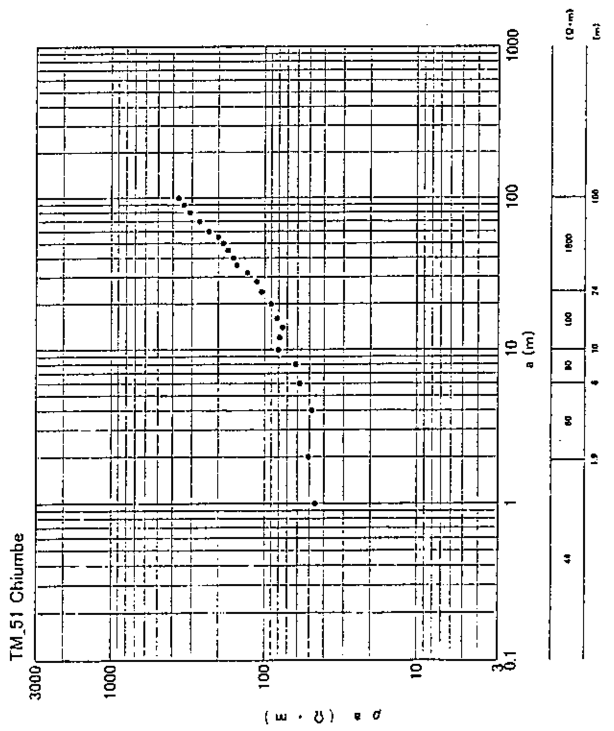

TM_44 Mzikamanda
a (m)

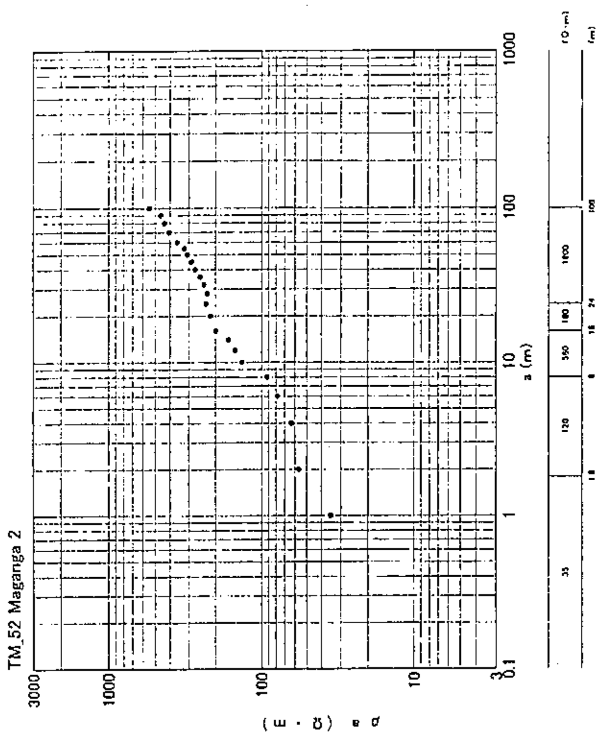

TM_48 Kaole
a (m)
ρa (Ω・m)

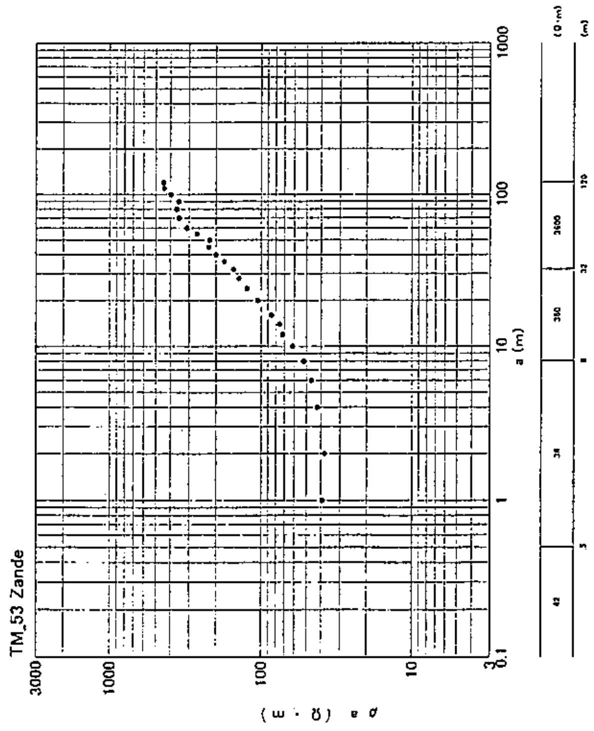

TM_50 Bowa
a (m)
ρa (Ω・m)

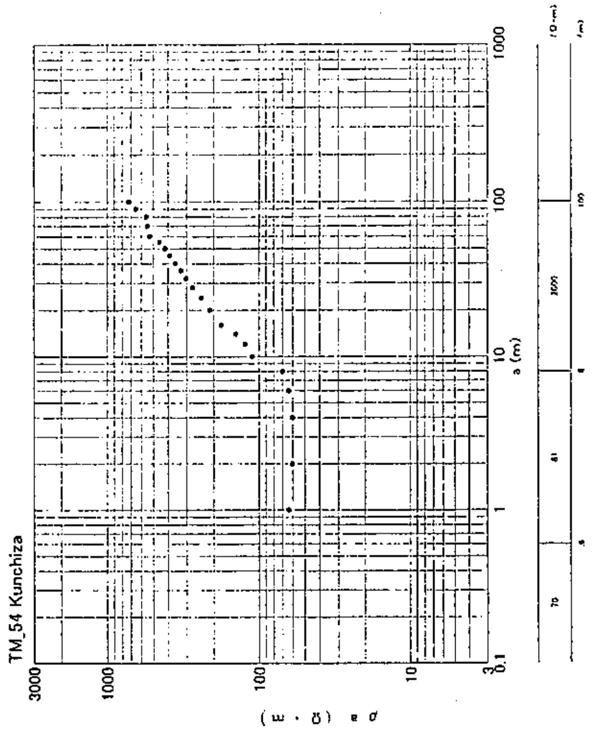

TM_46 Mnenula
a (m)
ρa (Ω・m)

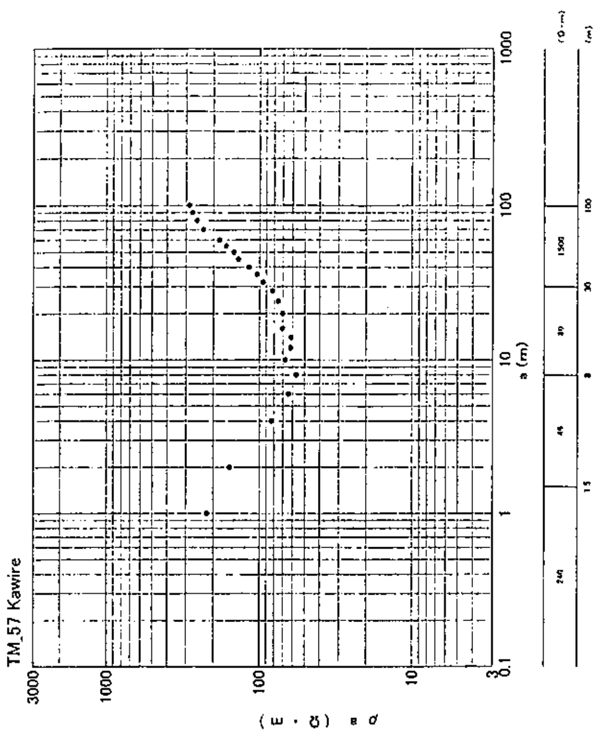

TM_49 Msanyama
a (m)
ρa (Ω・m)

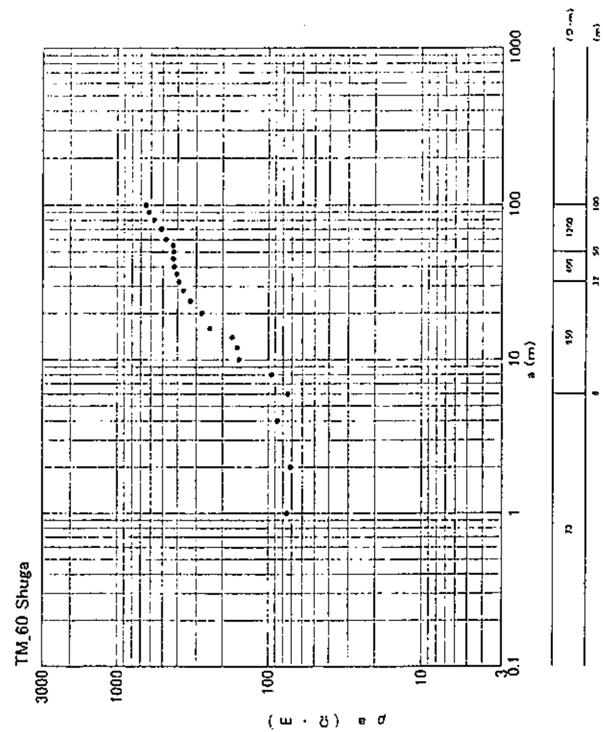

TM_51 Chiumbe
ρa (Ω・m)
a (m)

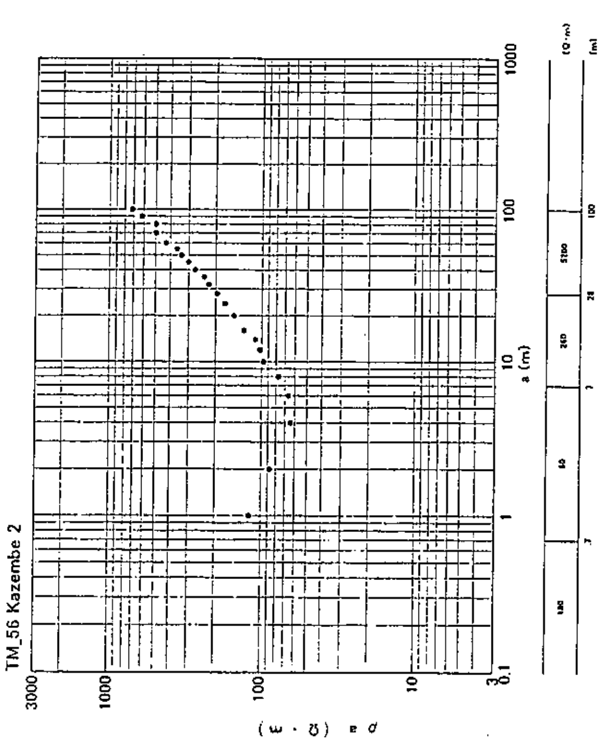

TM_52 Maganga 2
ρa (Ω・m)
a (m)

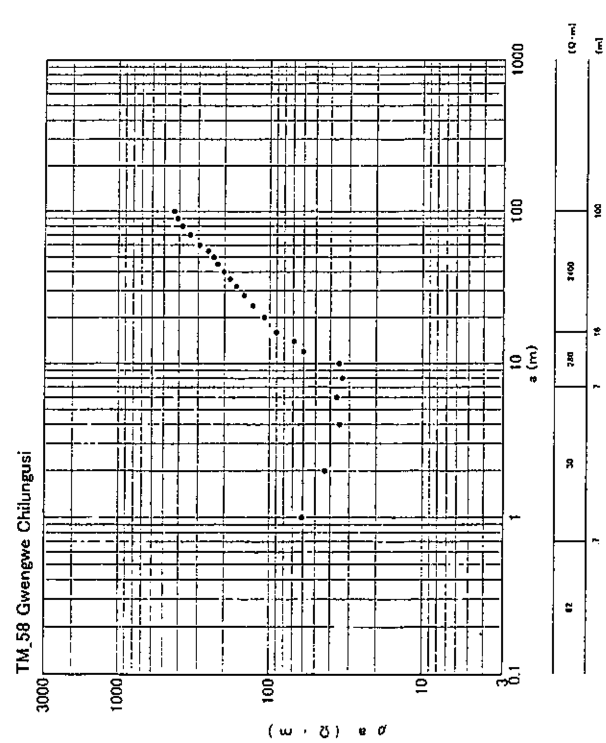

TM_53 Zande
ρa (Ω・m)
a (m)

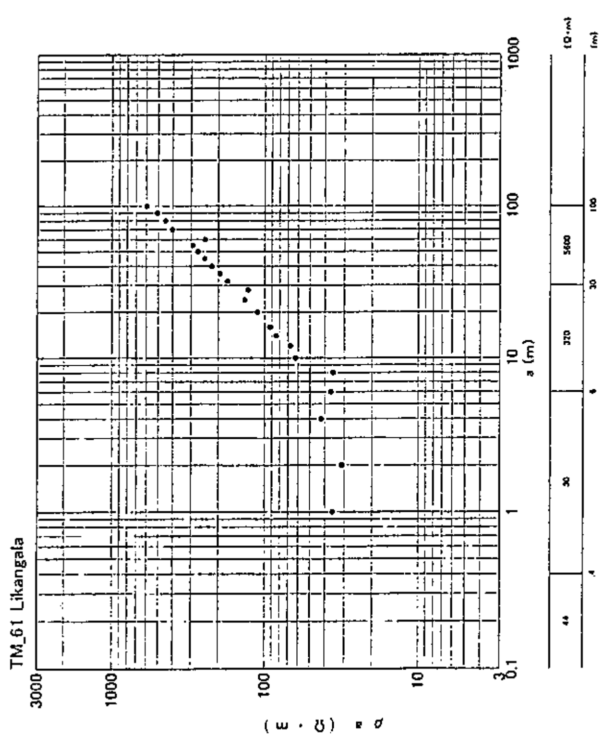

TM_54 Kunchiza
ρa (Ω・m)
a (m)

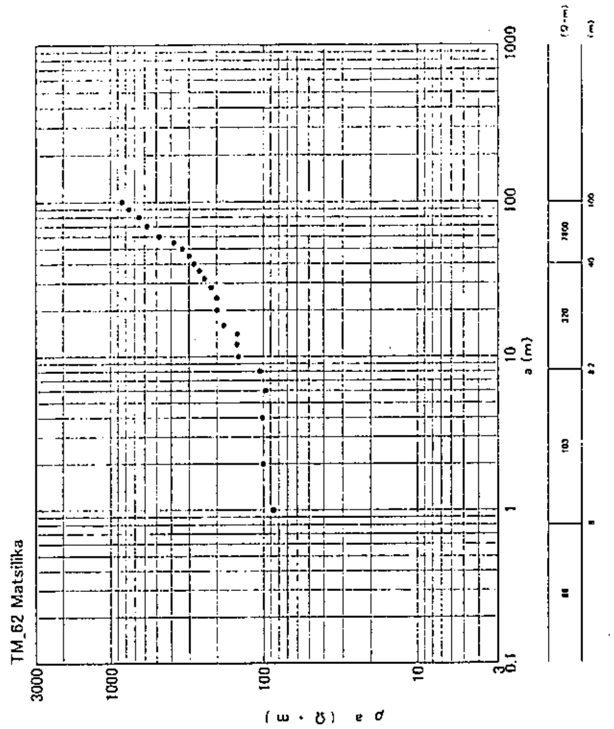

TM_57 Kawire
a (m)
ρa (Ω·m)
3000
1000
100
10
3
0.1
1
10
100
1000

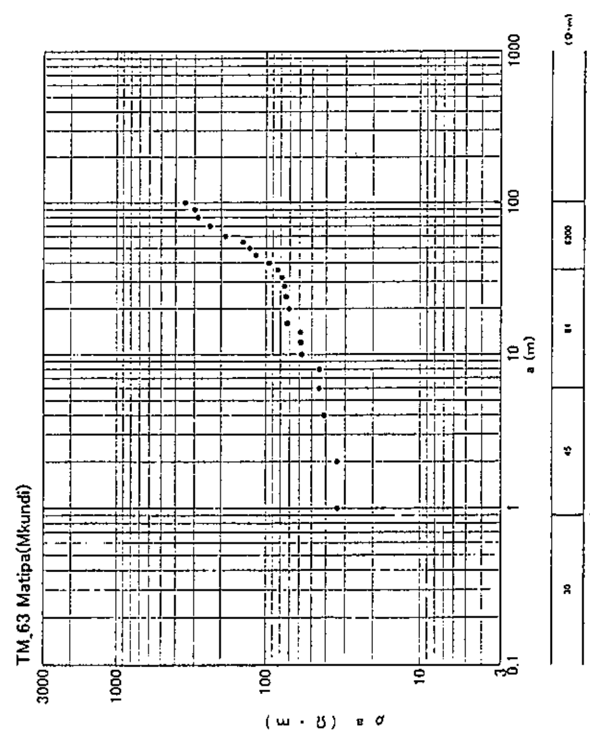

TM_60 Shuga
a (m)
ρa (Ω·m)
3000
1000
100
10
3
0.1
1
10
100
1000

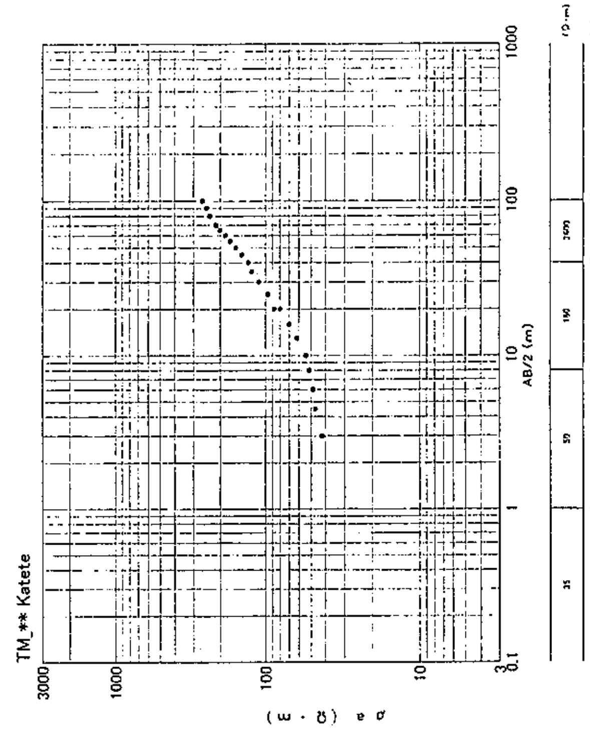

TM_56 Kazembe 2
a (m)
ρa (Ω·m)
3000
1000
100
10
3
0.1
1
10
100
1000

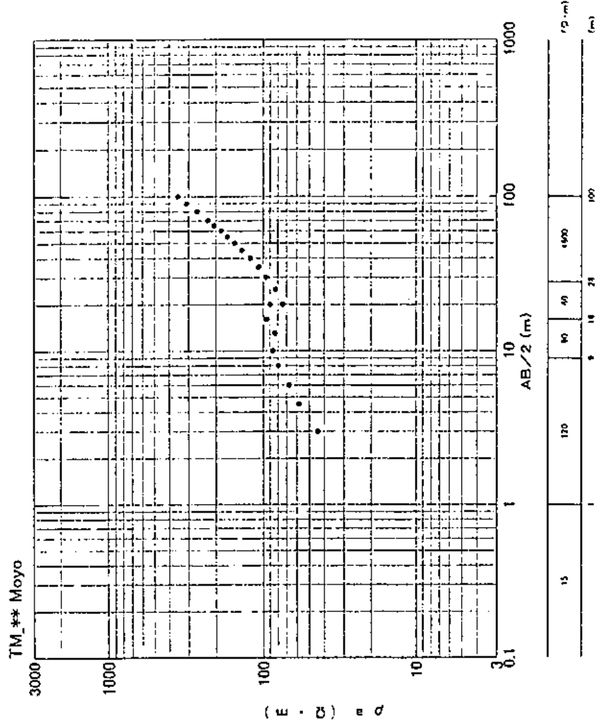

TM_58 Gwengwe Chilungusi
a (m)
ρa (Ω·m)
3000
1000
100
10
3
0.1
1
10
100
1000

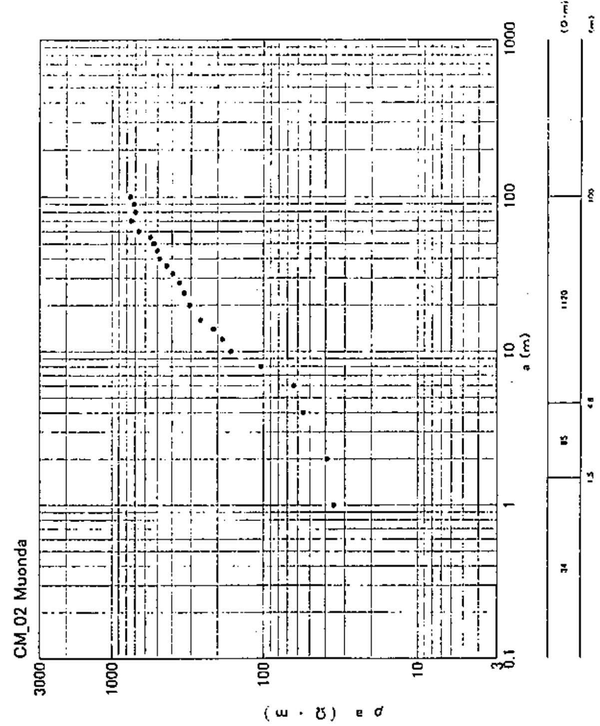

TM_61 Likangala
ρa (Ω·m)
a (m)

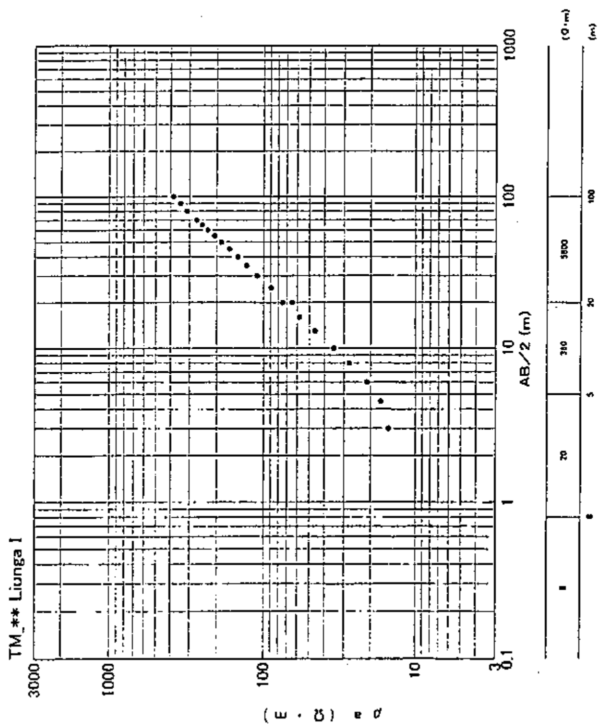

TM_62 Matsilika
ρa (Ω·m)
a (m)

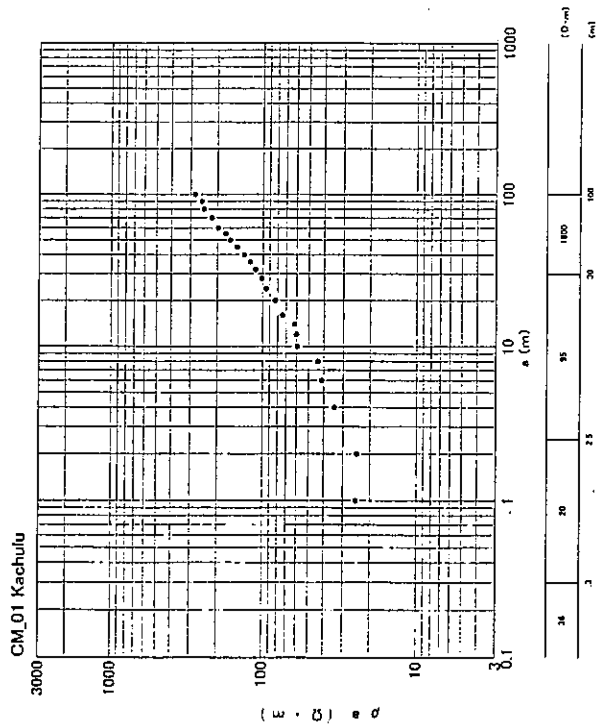

TM_63 Matipa(Mkundi)
ρa (Ω·m)
a (m)


TM_** Katete
ρa (Ω·m)
AB/2 (m)

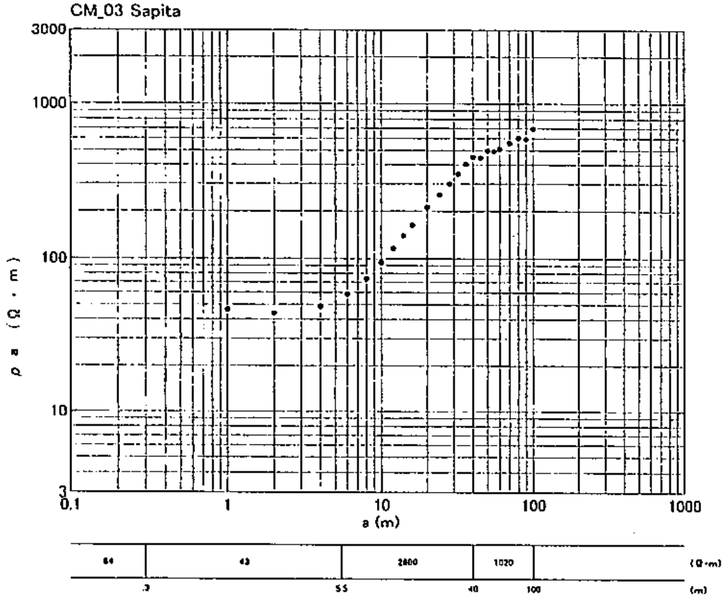

TM_** Moyo
AB/2 (m)
ρa (Ω·m)


CM_02 Muonda
a (m)
ρa (Ω·m)

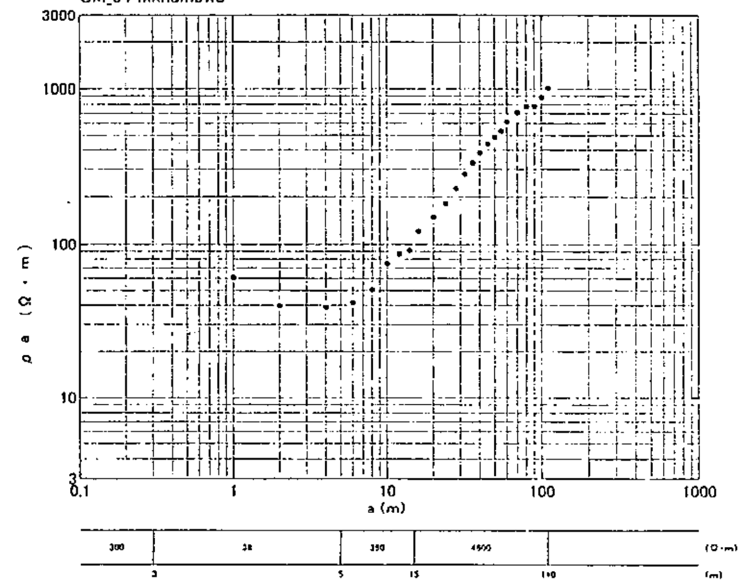

TM_** Liunga I
AB/2 (m)
ρa (Ω·m)


CM_01 Kachulu
a (m)
ρa (Ω·m)

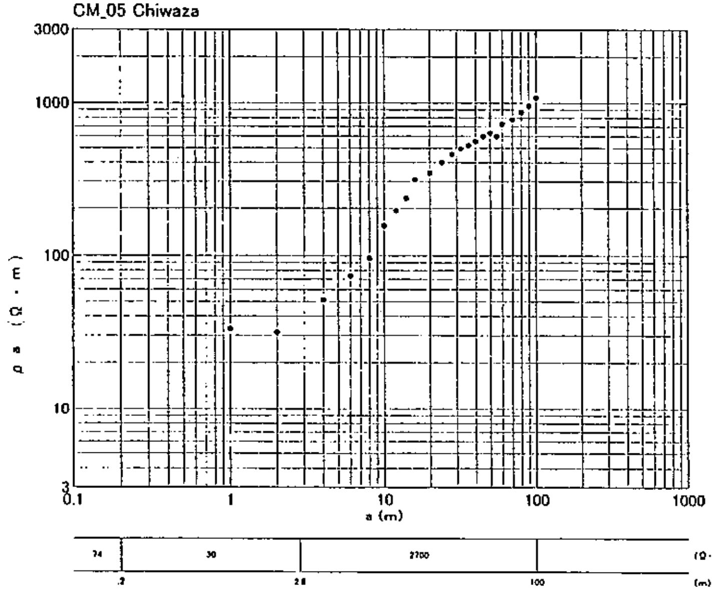
CM_03 Sapita



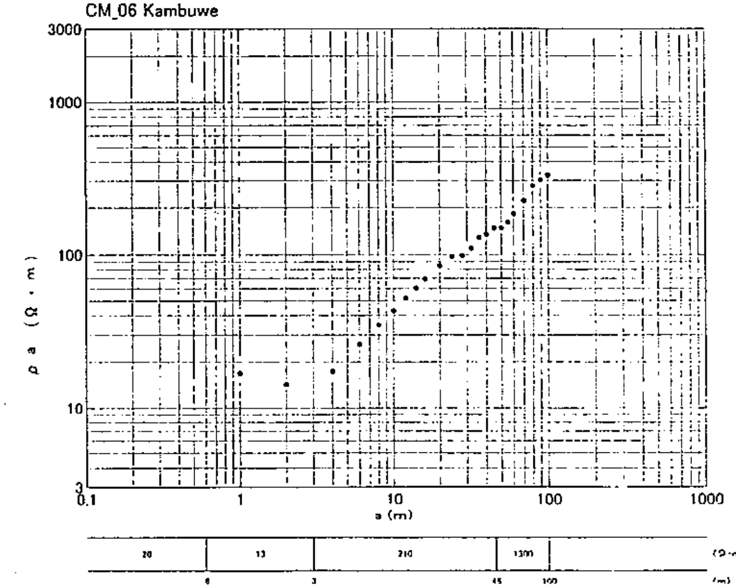
CM_04 Mkhumbwa

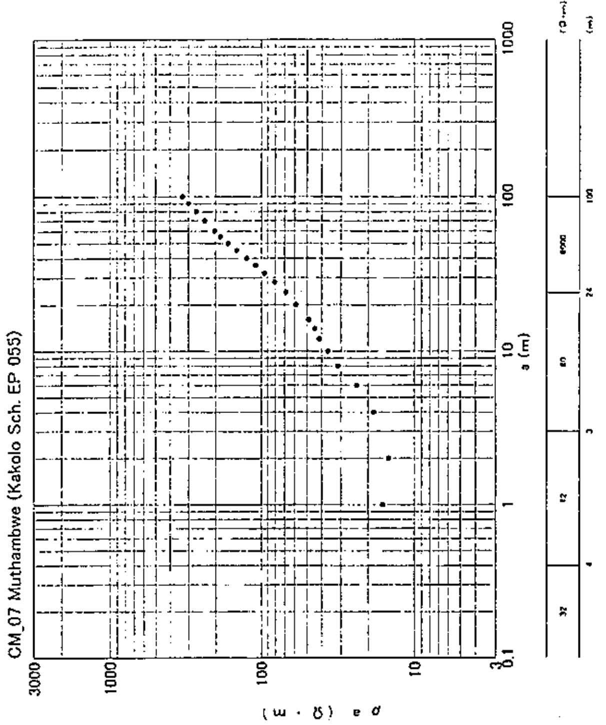


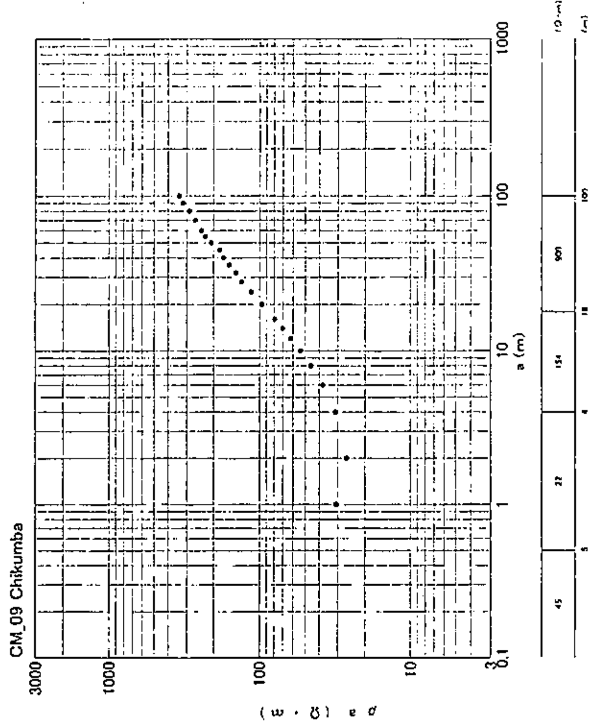
CM_05 Chiwaza

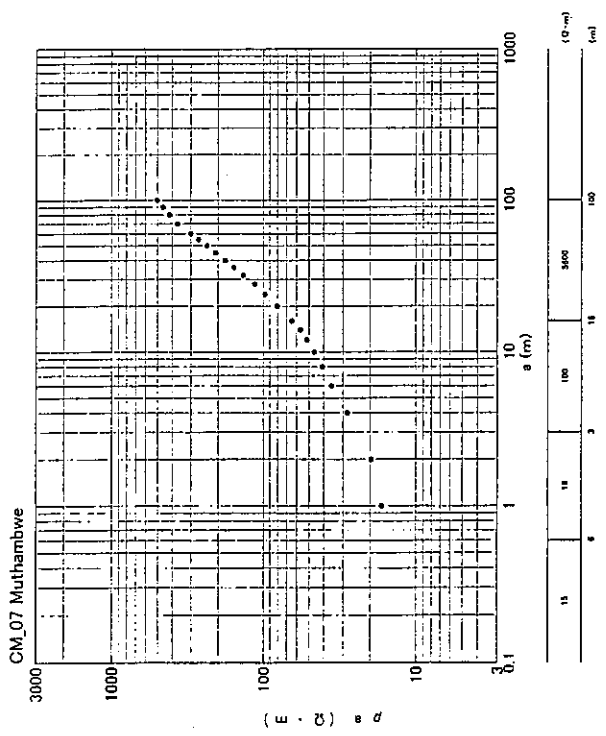


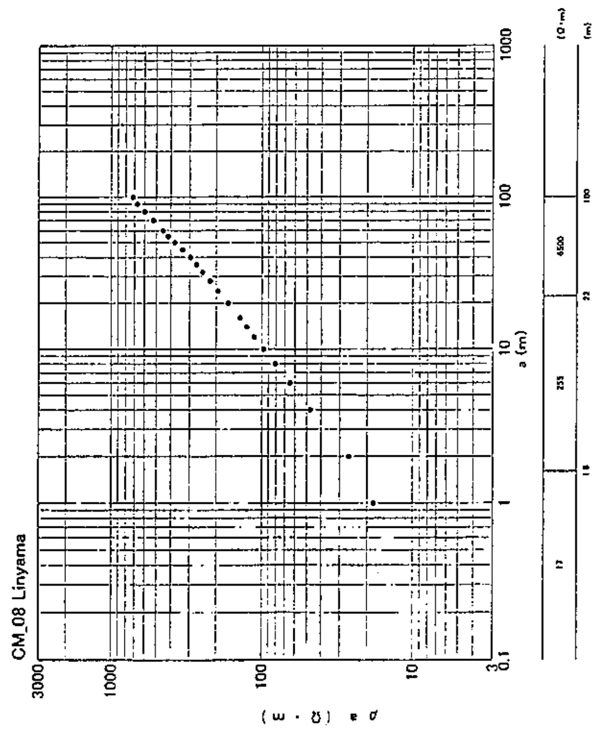
CM_06 Kambuwe

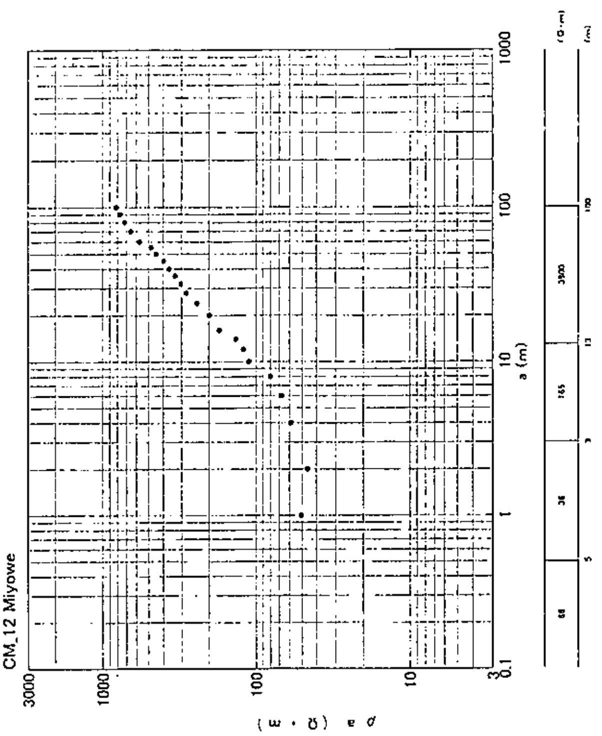


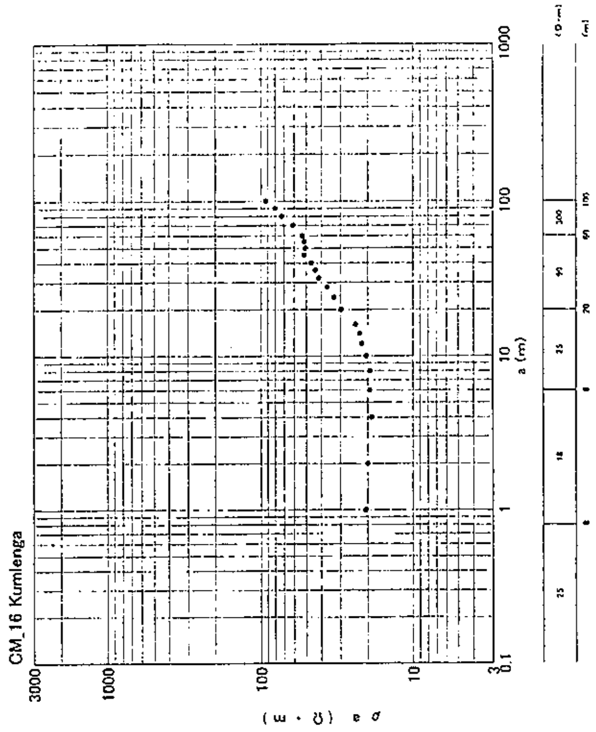

CM_07 Muthambwe (Kakolo Sch. EP 055)
a (m)
ρa (Ω・m)

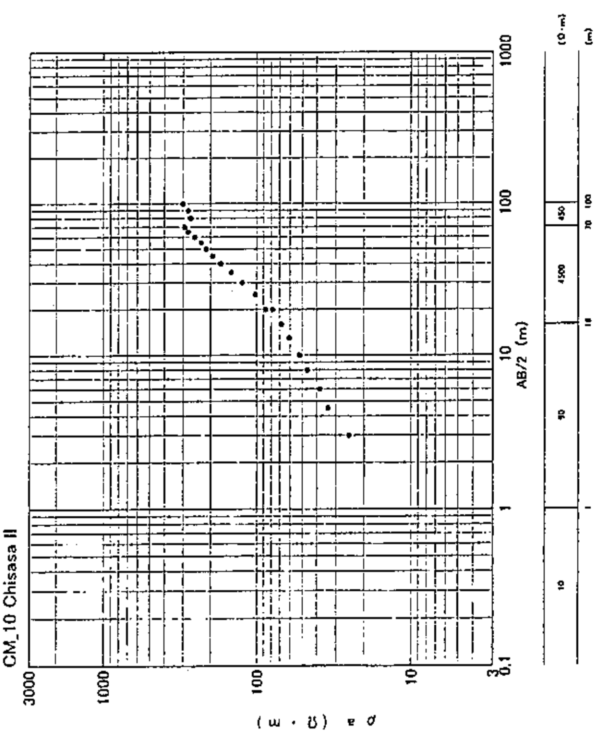

CM_09 Chikumba
a (m)
ρa (Ω・m)

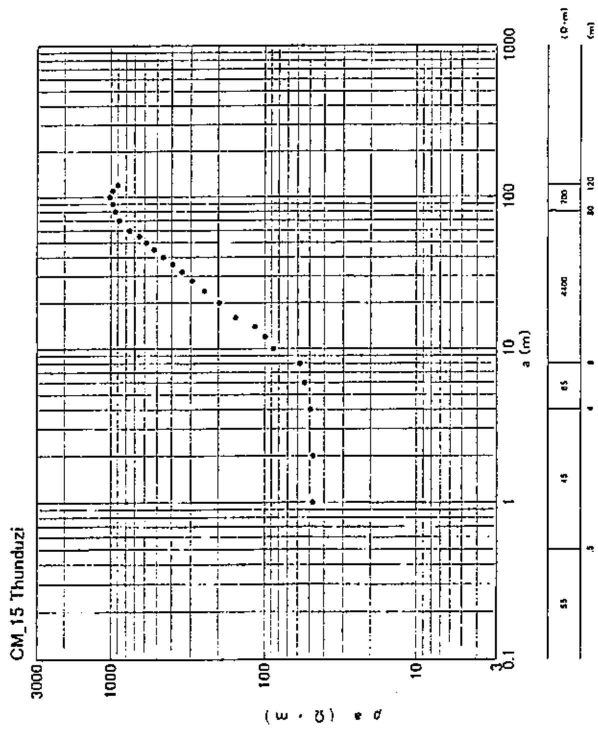

CM_07 Muthambwe
a (m)
ρa (Ω・m)

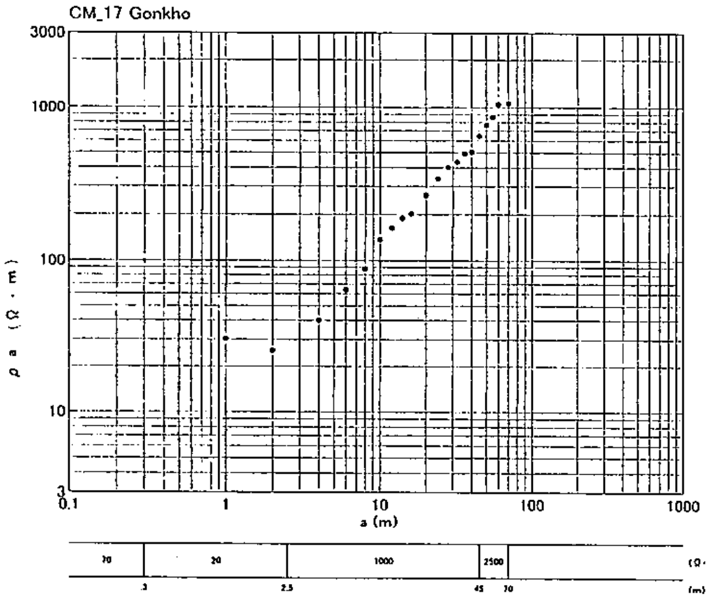

CM_08 Linyama
a (m)
ρa (Ω・m)

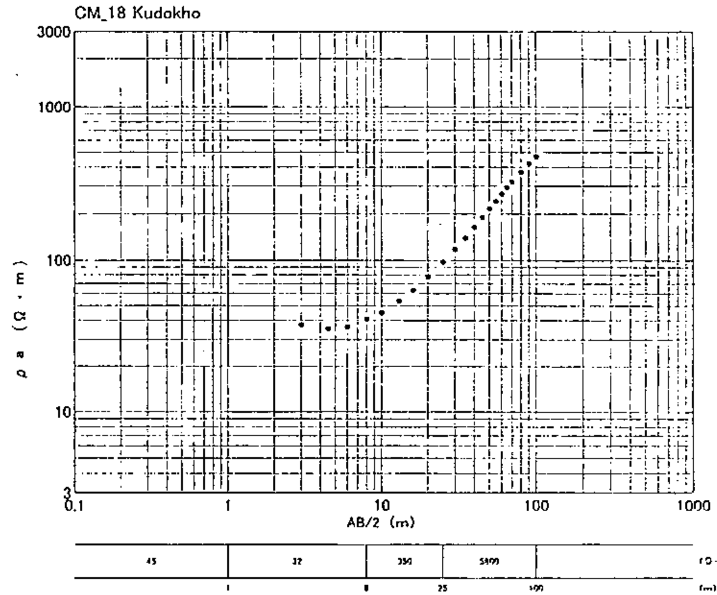

CM_12 Miyowe
a (m)
ρ a (Ω・m)

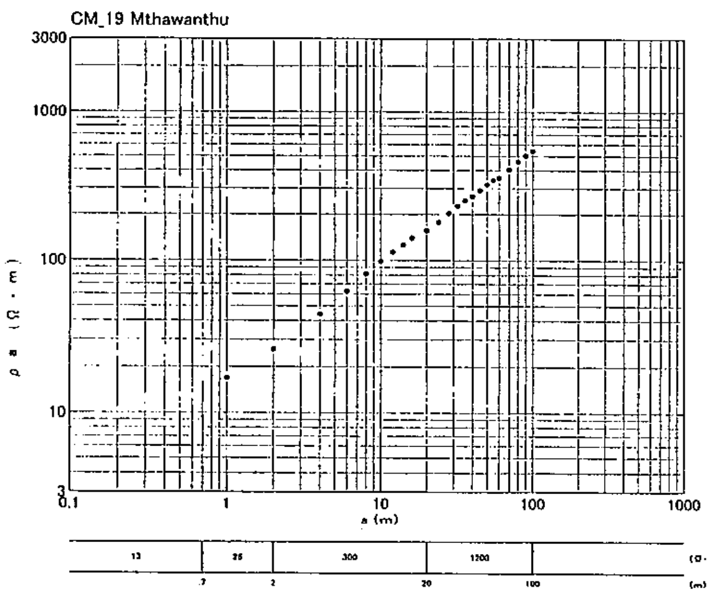

CM_16 Kumlenga
a (m)
ρ a (Ω・m)

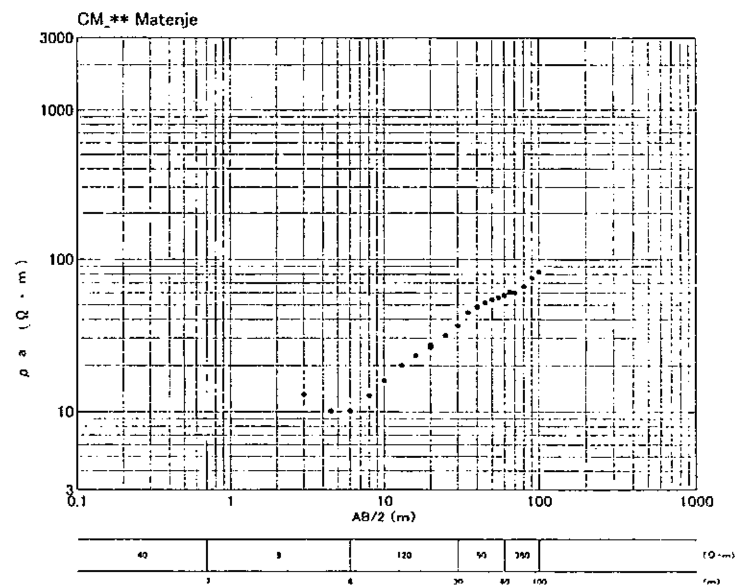

CM_10 Chisasa II
AB/2 (m)
ρ a (Ω・m)

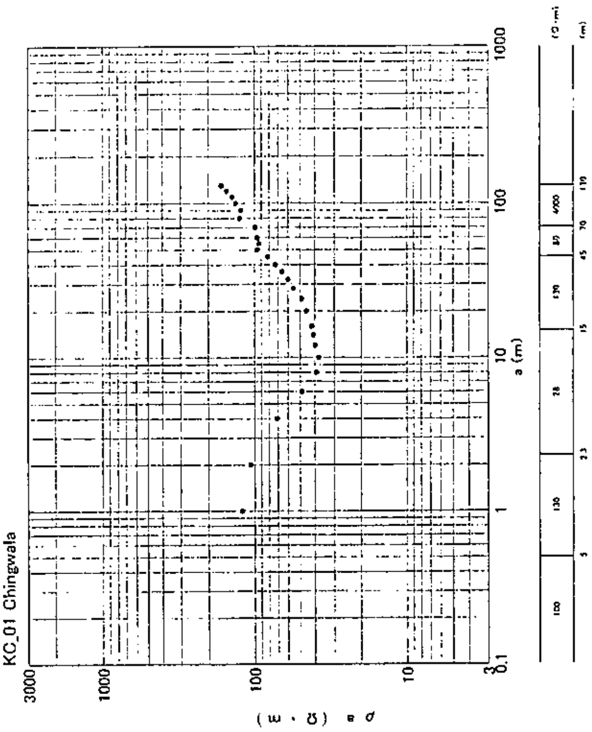

CM_15 Thunduzi
a (m)
ρ a (Ω・m)

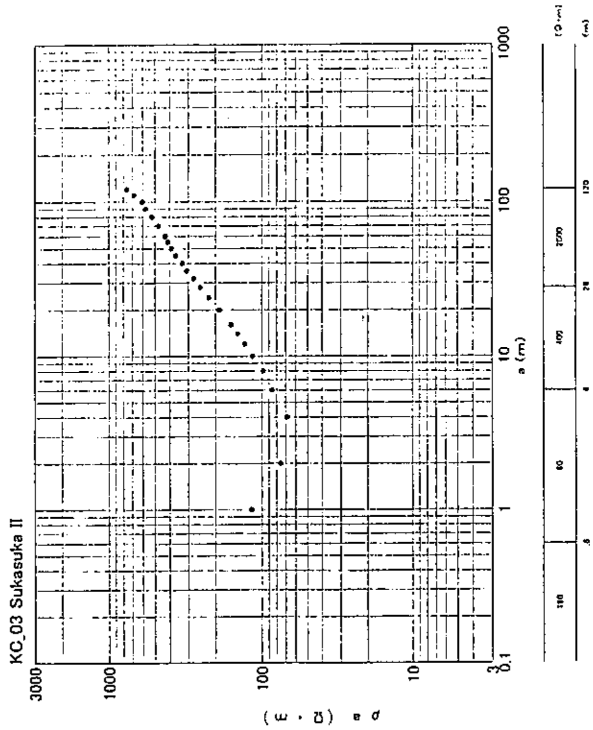

CM_17 Gonkho
ρa (Ω・m)
a (m)
(Ω・m)
(m)

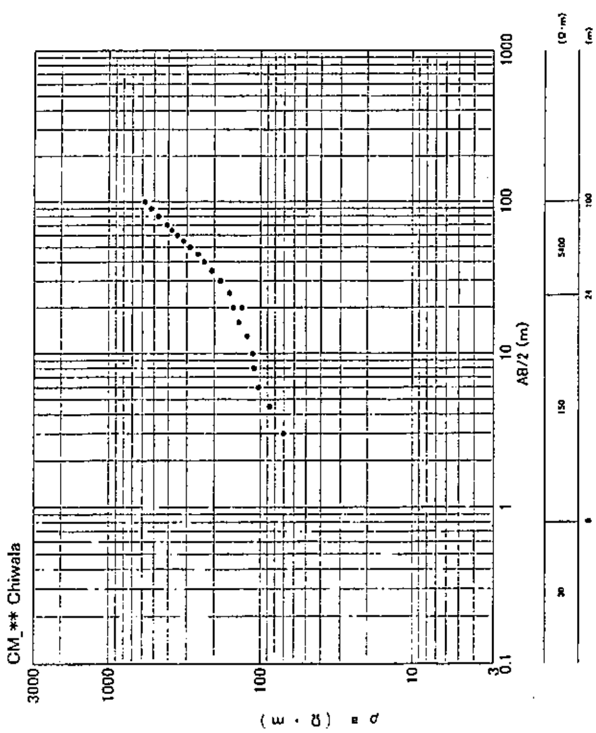

CM_18 Kudakho
ρa (Ω・m)
AB/2 (m)

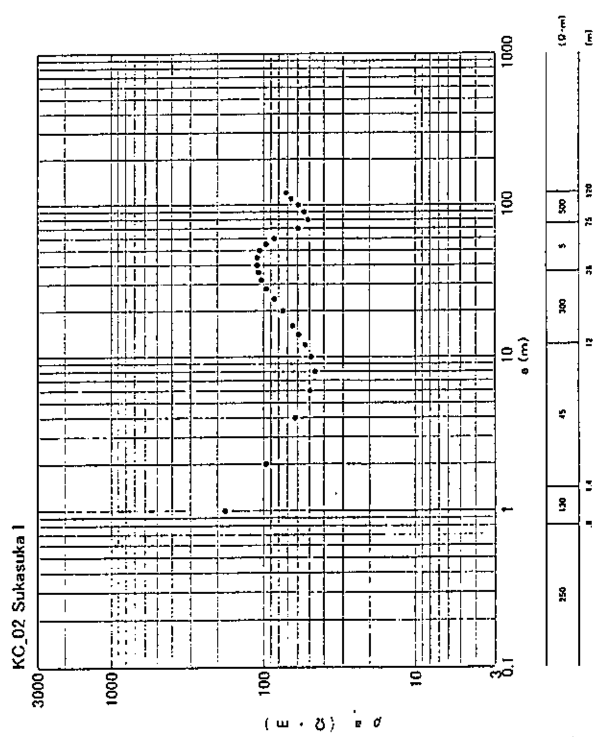

CM_19 Mthawanthu
ρa (Ω・m)
a (m)
(Ω・m)
(m)

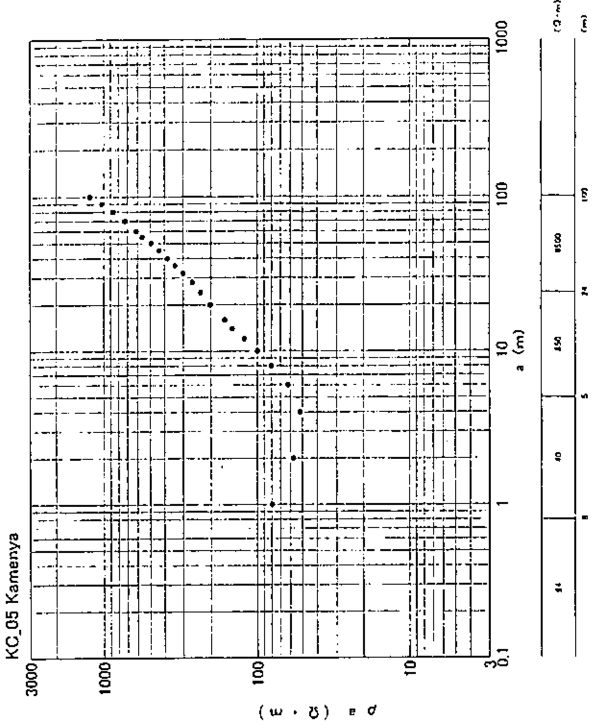

CM_** Matenje
ρa (Ω・m)
AB/2 (m)

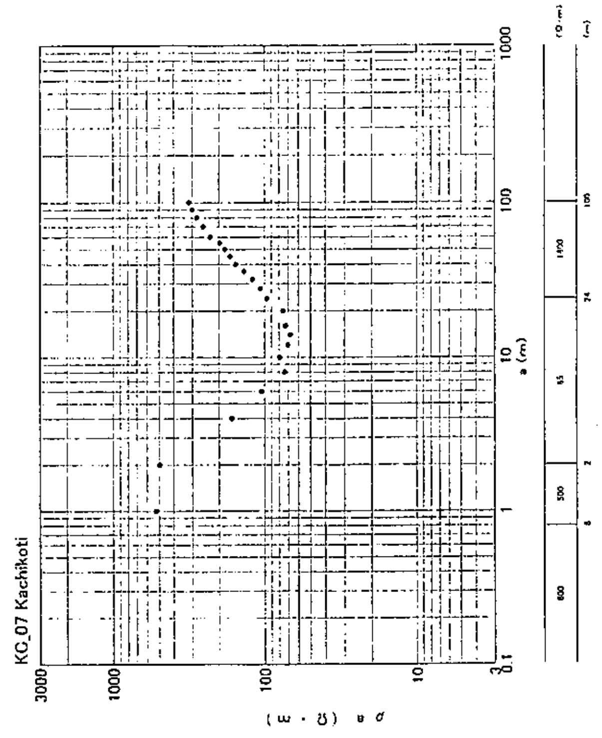

KC_01 Chingwala
ρa (Ω・m)
a (m)

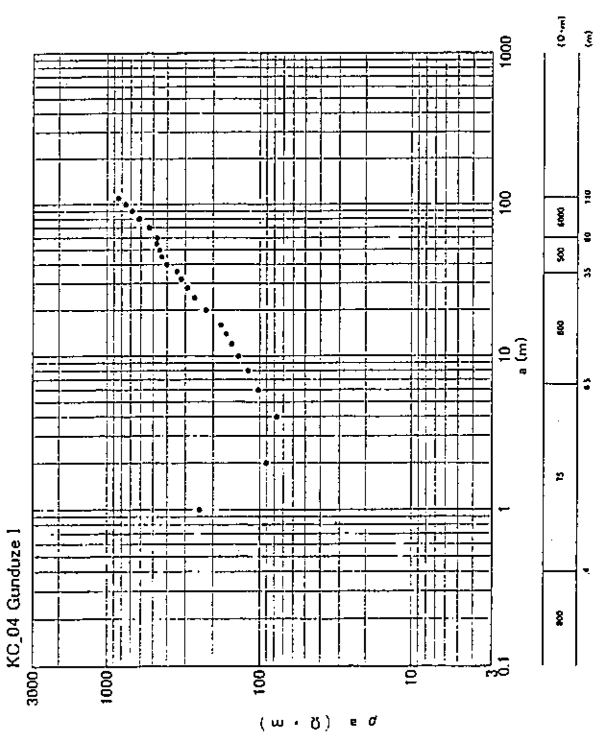

KC_03 Sukasuka II
ρa (Ω・m)
a (m)

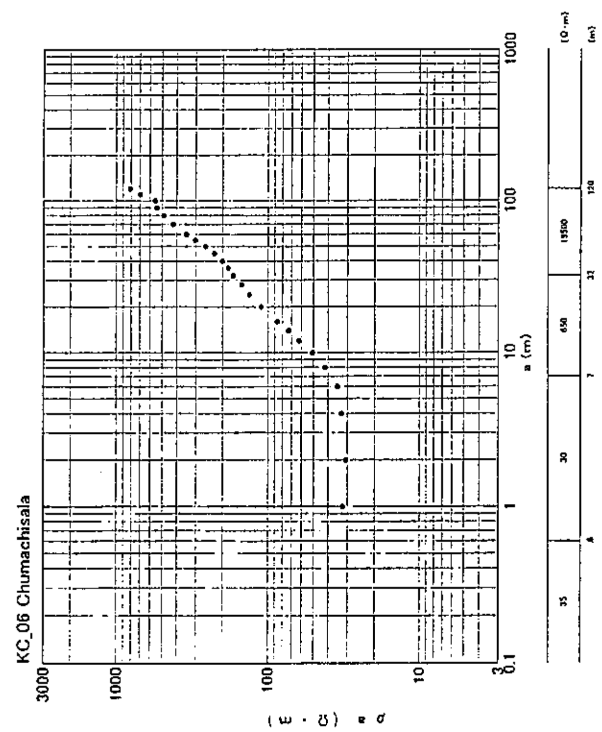

CM_** Chiwala
ρa (Ω・m)
AB/2 (m)

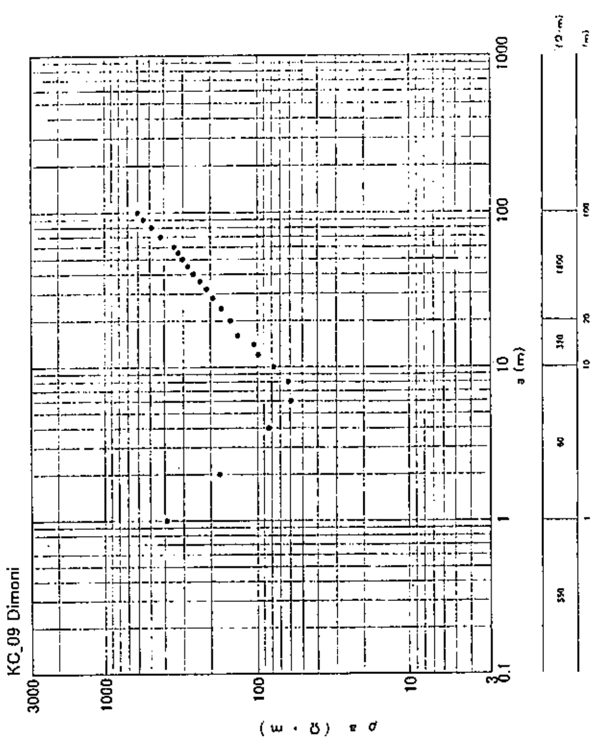

KC_02 Sukasuka I
ρa (Ω・m)
a (m)

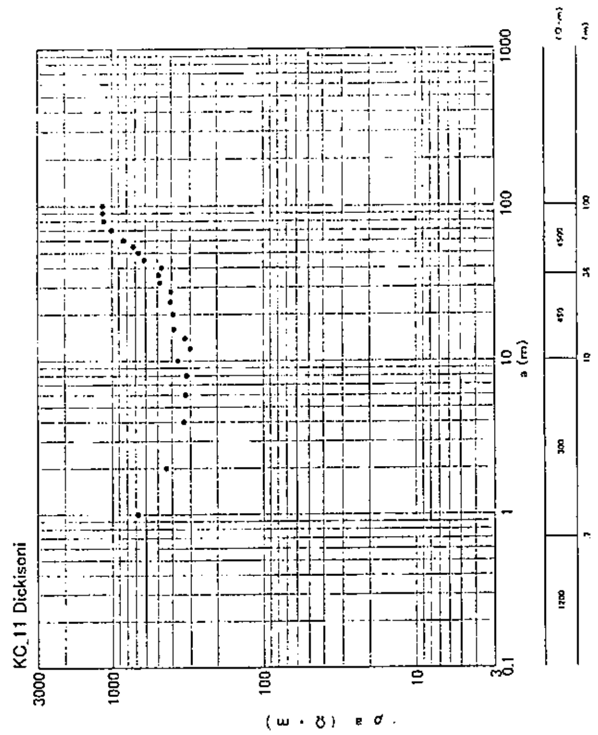

KC_05 Kamenya
a (m)
ρa (Ω・m)

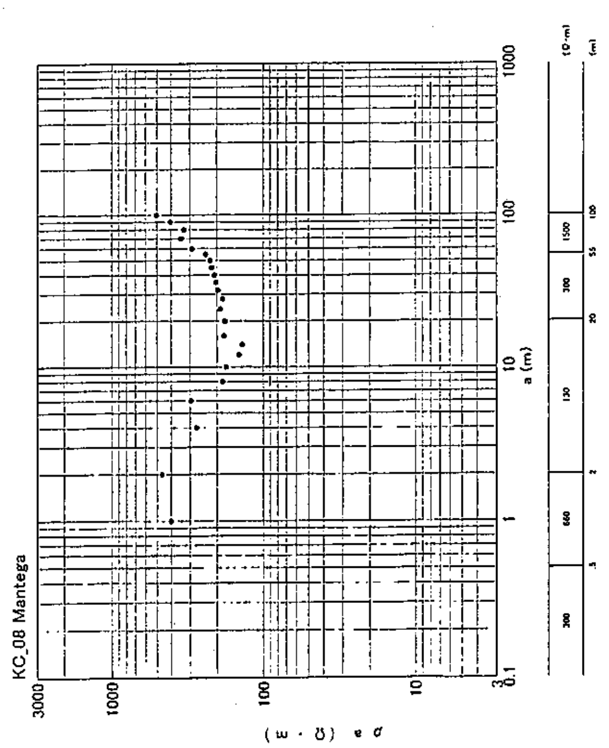

KC_07 Kachikoti
a (m)
ρa (Ω・m)

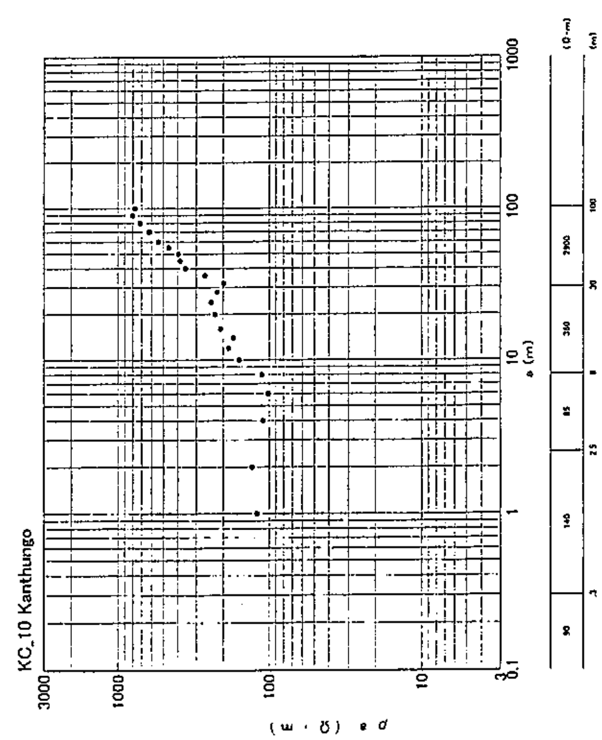

KC_04 Gunduze I
a (m)
ρa (Ω・m)

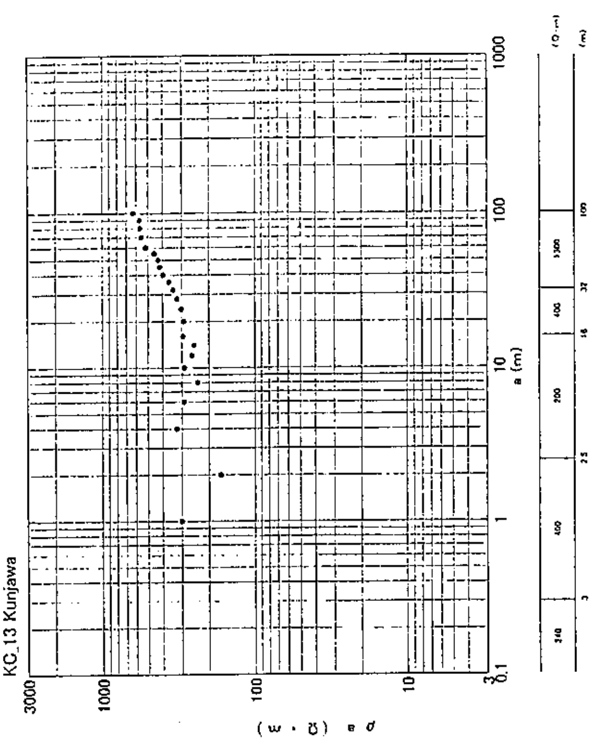

KC_06 Chumachisala
a (m)
ρa (Ω・m)

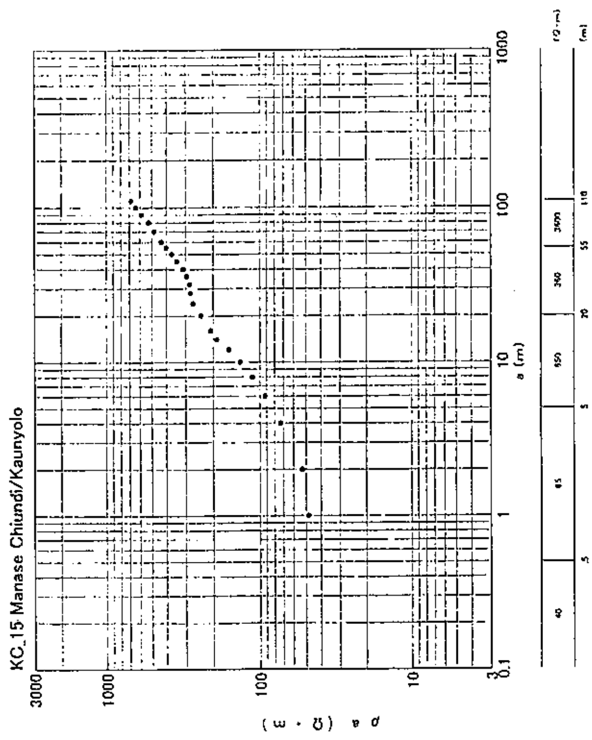

KC_09 Dimori
a (m)
ρa (Ω・m)

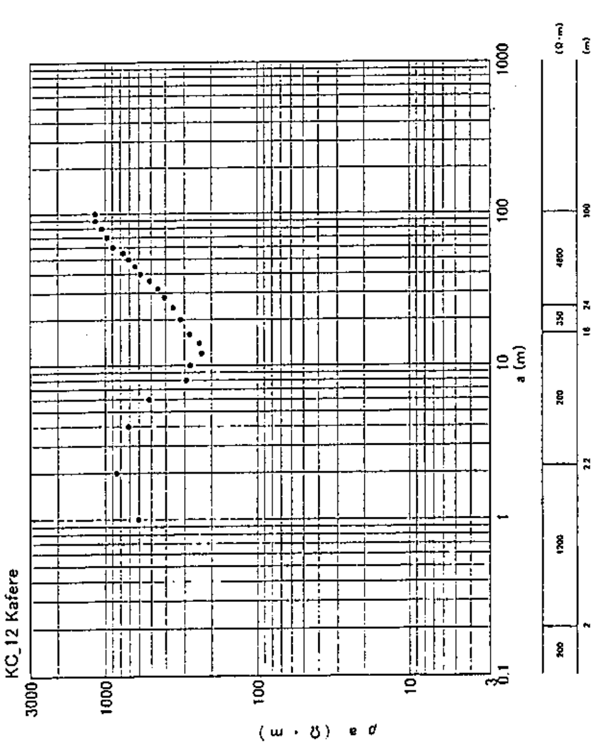

KC_11 Dickisoni
a (m)
ρa (Ω・m)

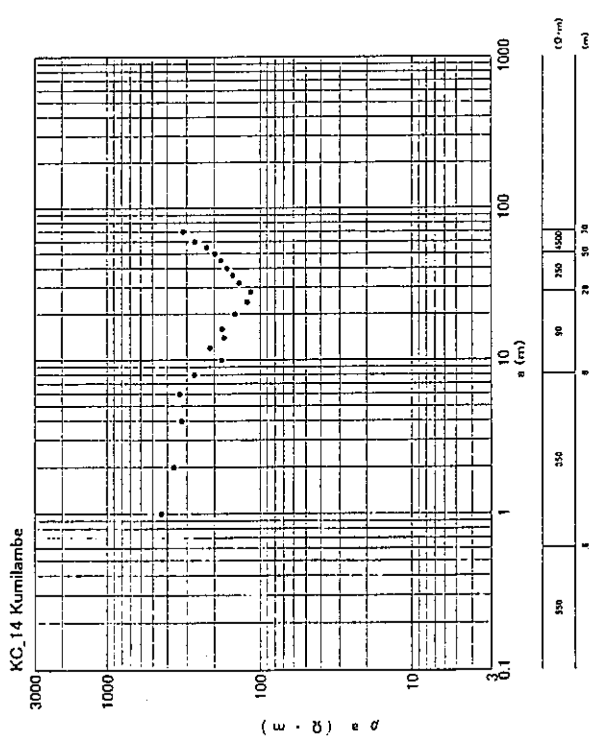

KC_08 Mantega
a (m)
ρa (Ω・m)

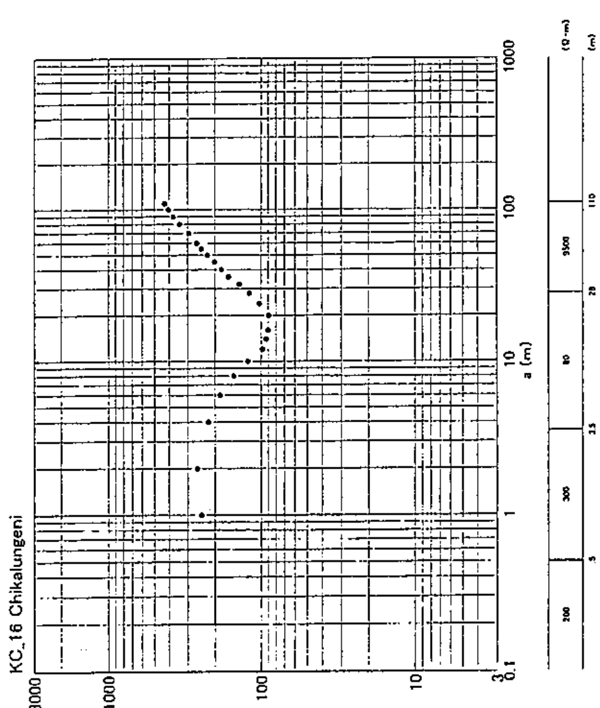

KC_10 Kanthungo
a (m)
ρa (Ω・m)

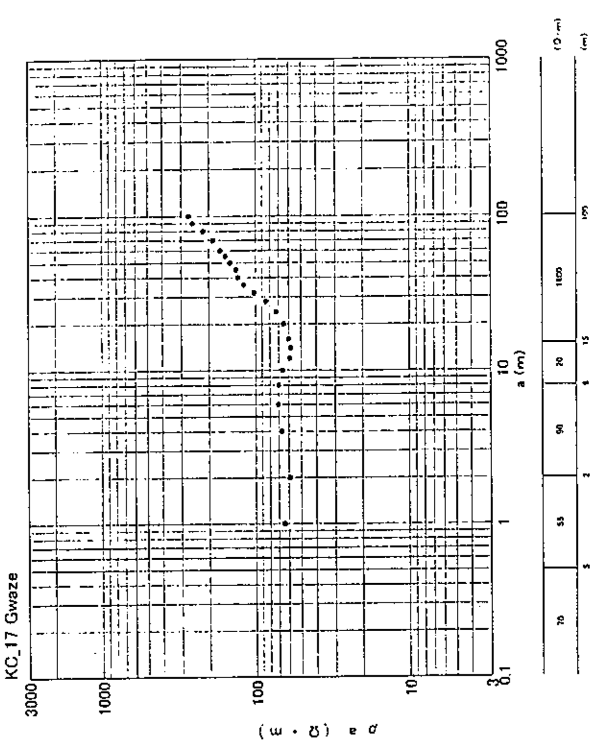

KC_13 Kunjawa
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

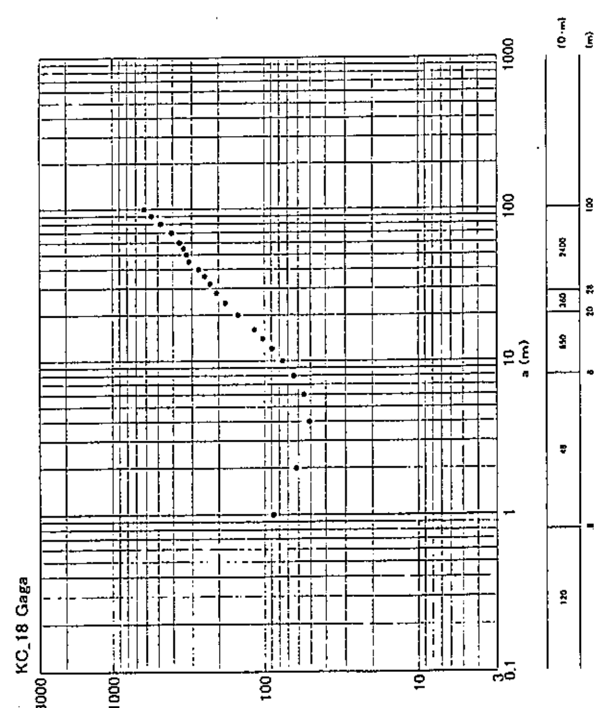

KC_15 Manase Chiundi/Kaunyolo
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

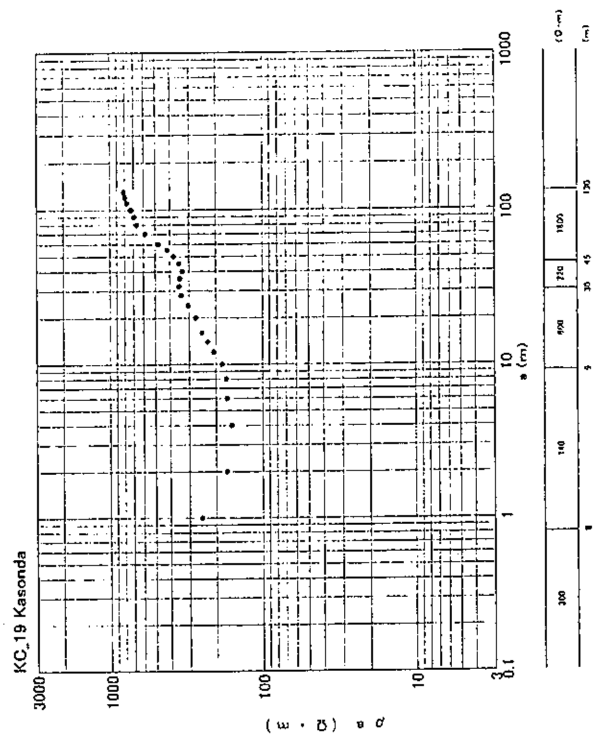

KC_12 Kafere
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

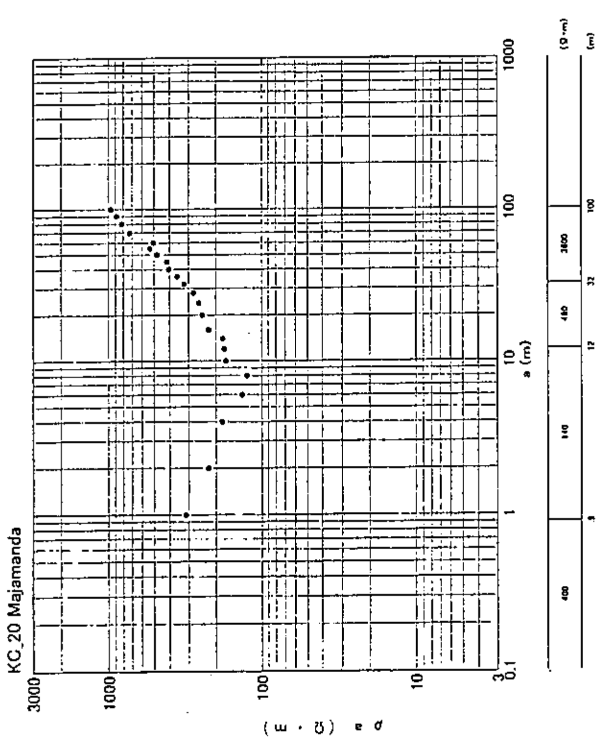

KC_14 Kumilambe
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

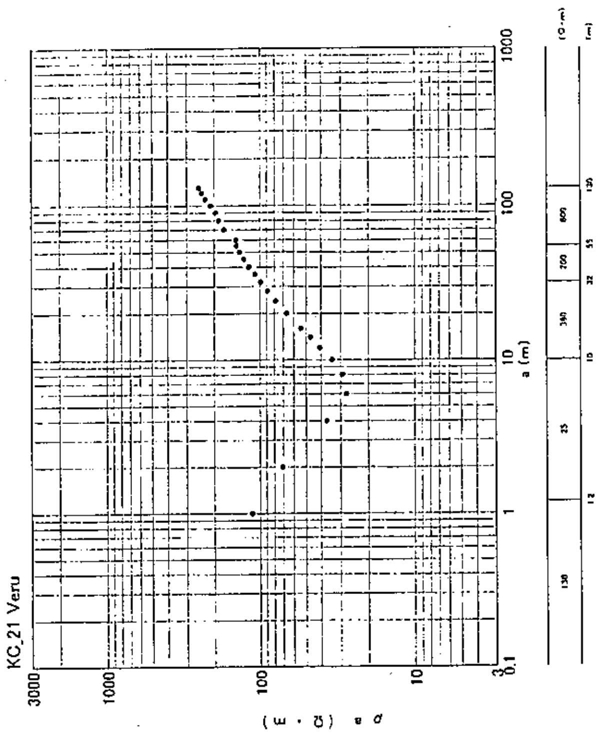

KC_16 Chikalungeni
a (m)
ρa (Ω・m)

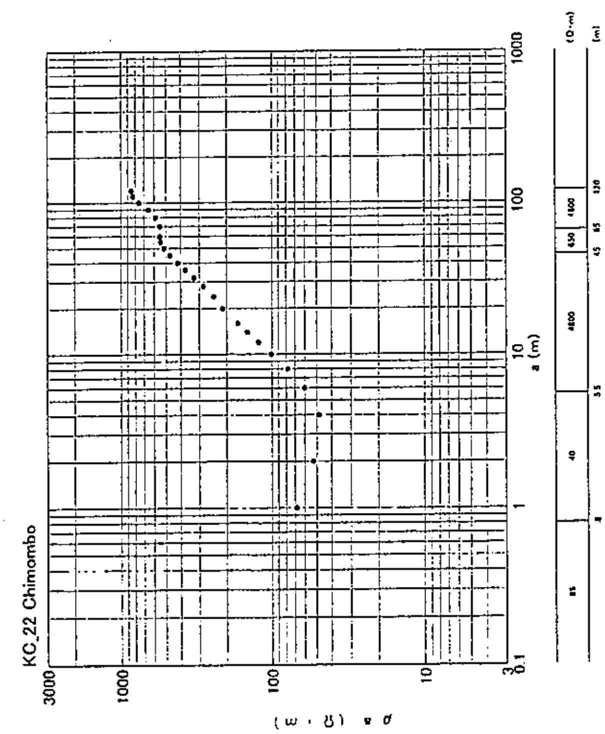

KC_17 Gwaze
a (m)
ρa (Ω・m)

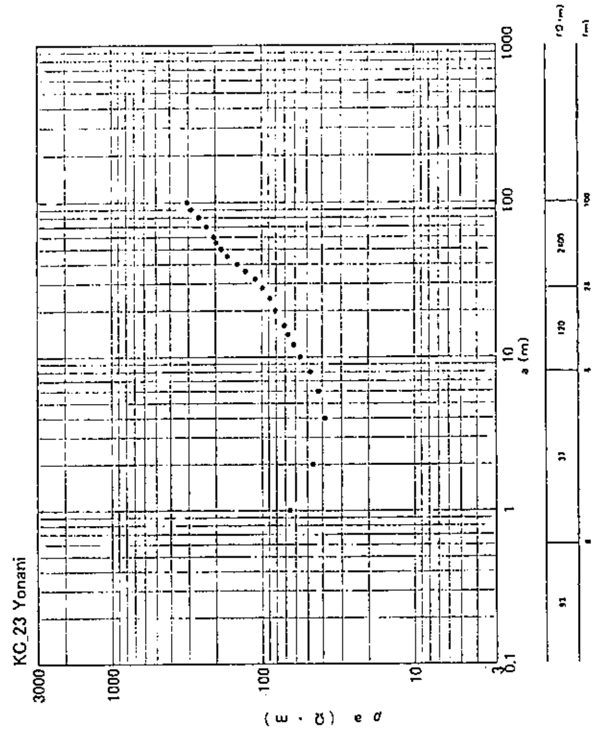

KC_18 Gaga
a (m)
ρa (Ω・m)

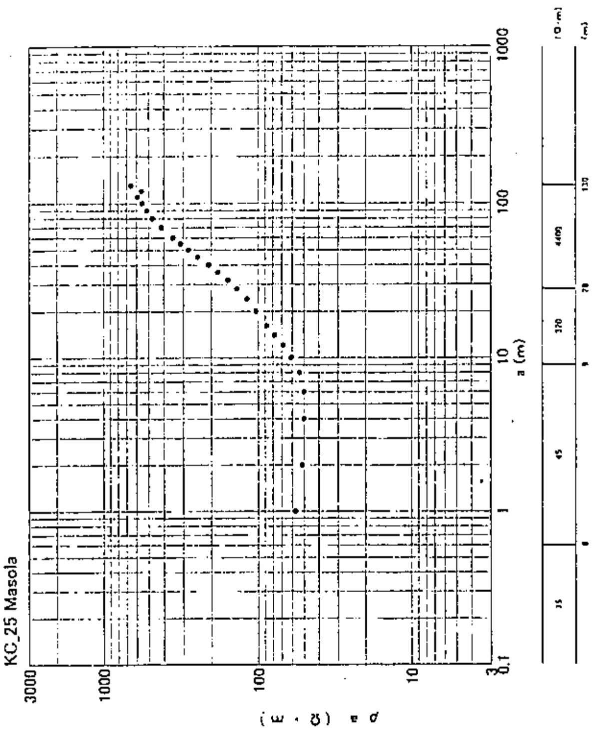

KC_19 Kasonda
a (m)
ρa (Ω・m)

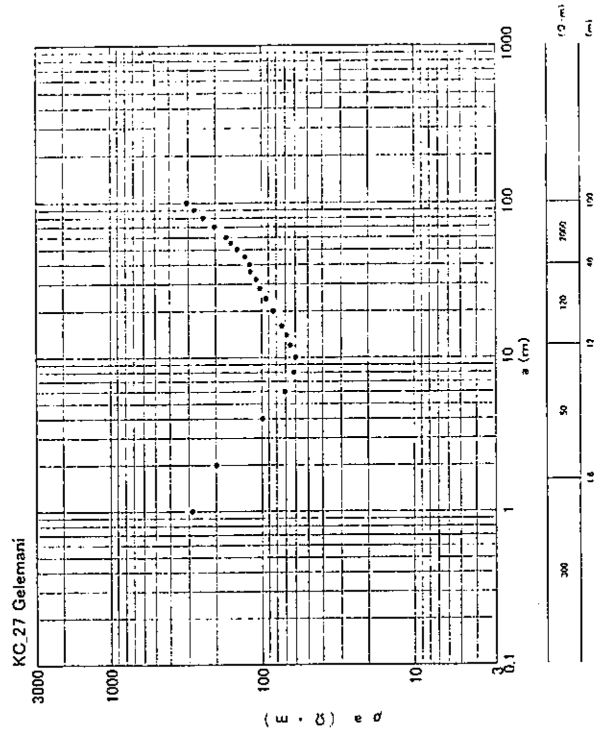

KC_20 Majamanda
ρa (Ω・m)
a (m)

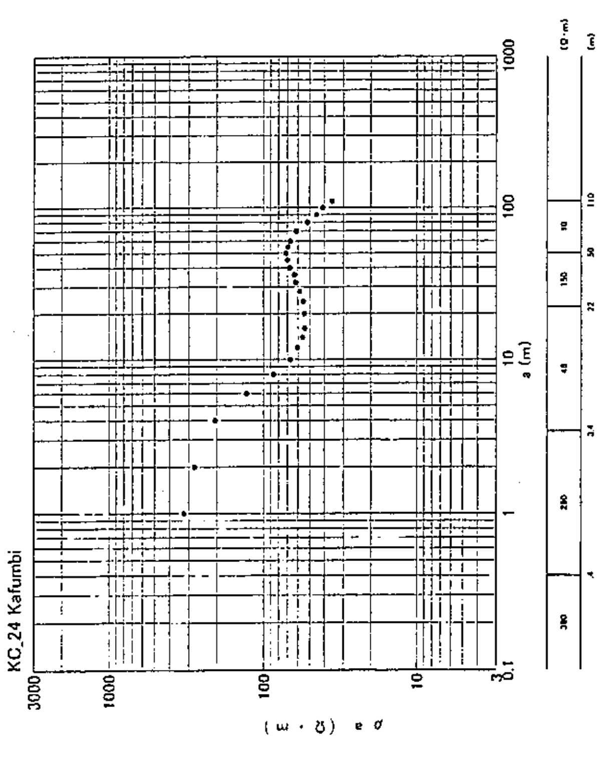

KC_21 Veru
ρa (Ω・m)
a (m)

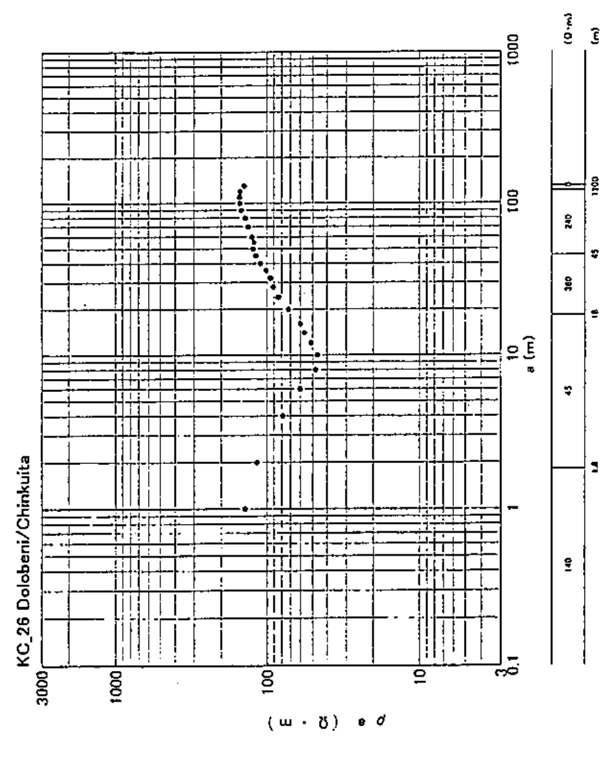

KC_22 Chimombo
ρa (Ω・m)
a (m)

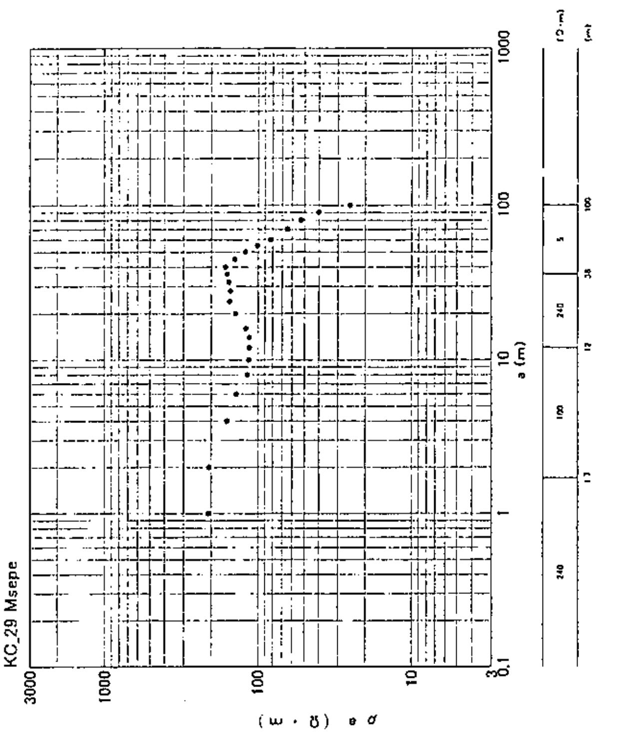

KC_23 Yonani
ρa (Ω・m)
a (m)

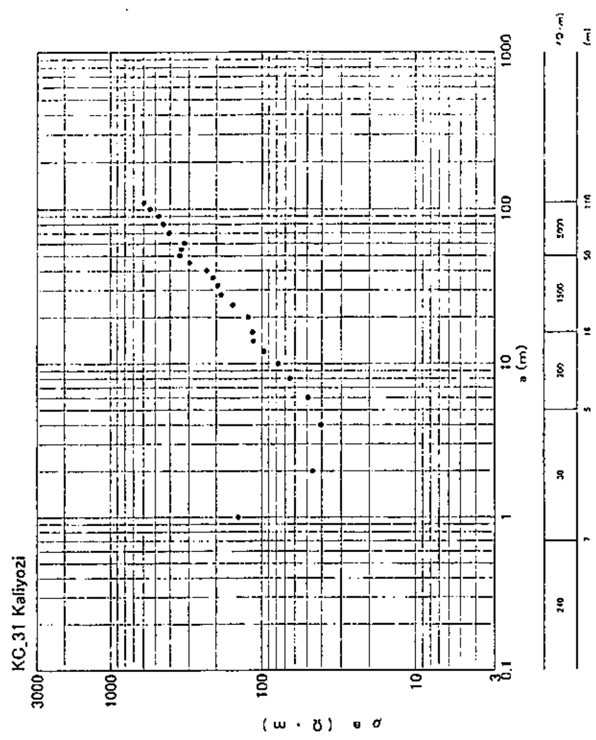

KC_25 Masola
a (m)
ρa (Ω·m)

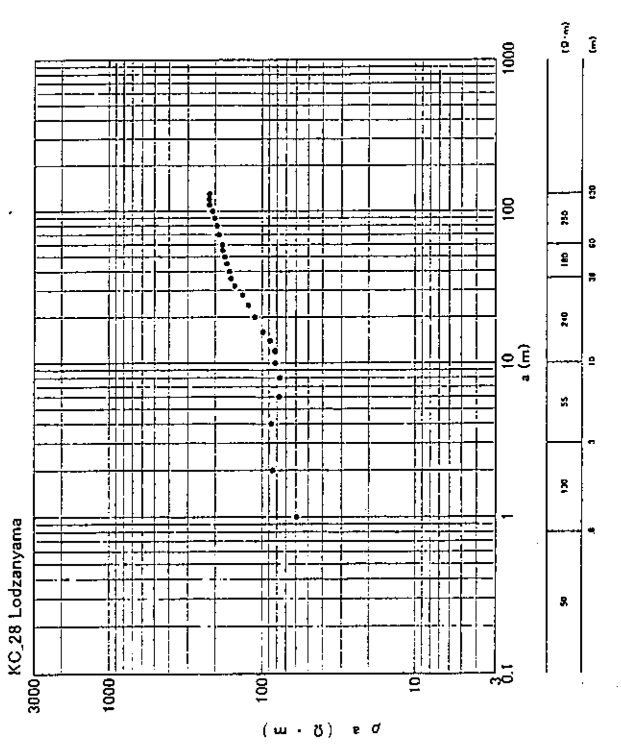

KC_27 Gelemani
a (m)
ρa (Ω·m)

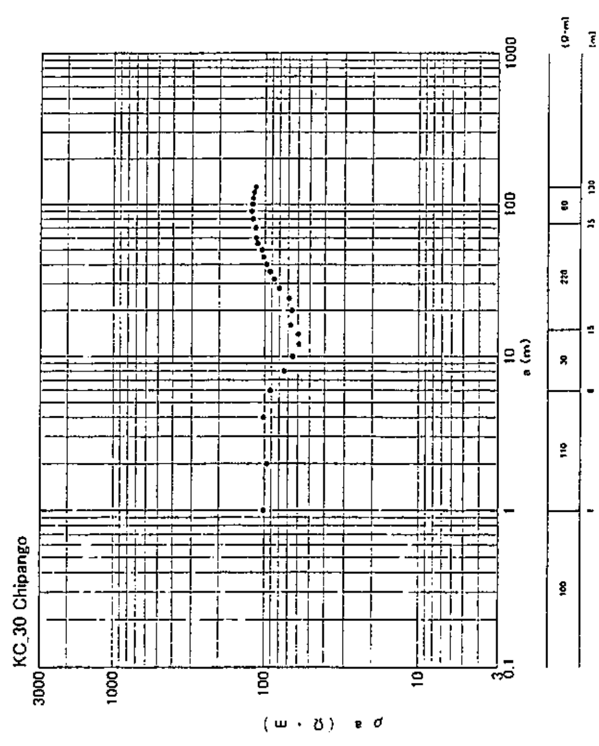

KC_24 Kafumbi
a (m)
ρa (Ω·m)

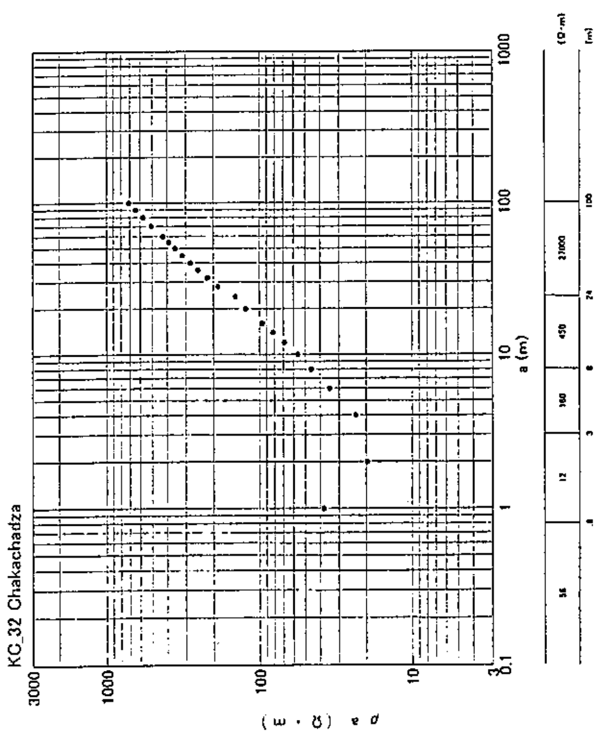

KC_26 Dolobeni/Chinkuita
a (m)
ρa (Ω·m)

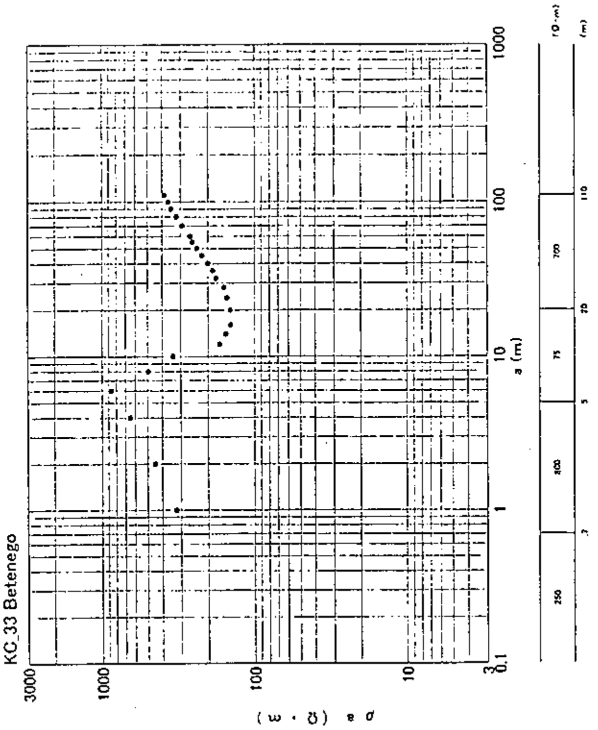

KC_29 Msepe
ρa (Ω・m)
a (m)

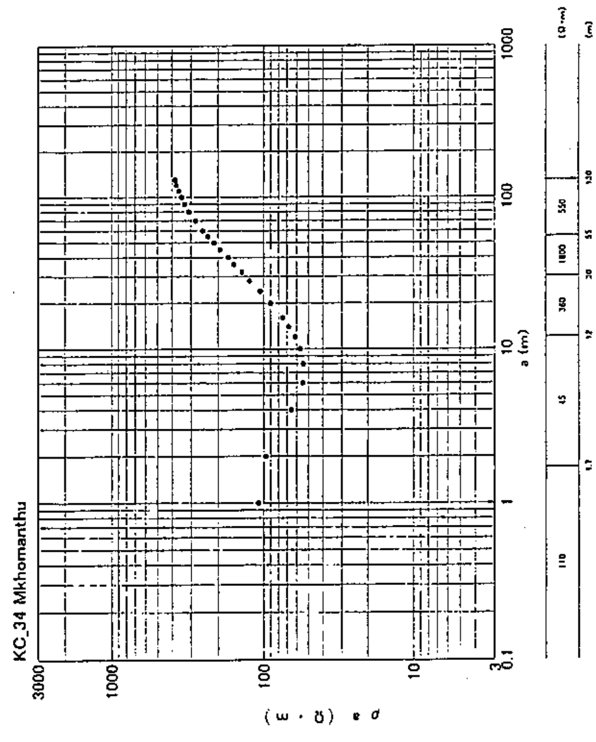

KC_31 Kaliyozi
ρa (Ω・m)
a (m)

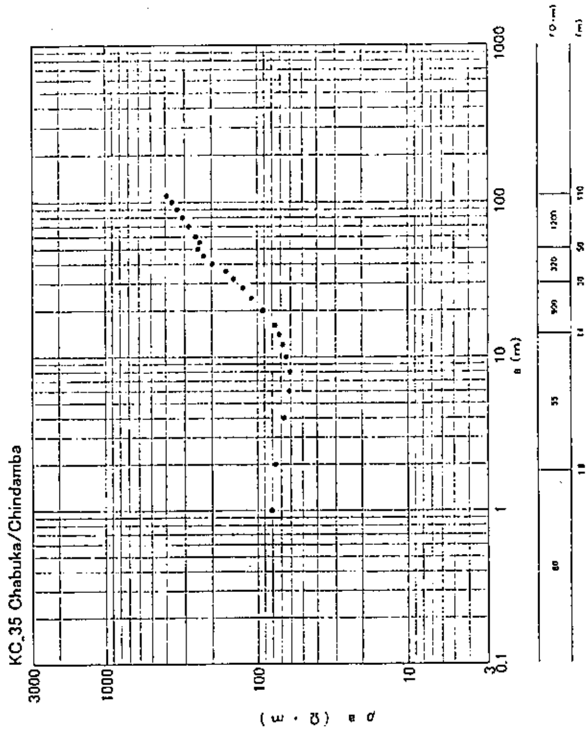

KC_28 Lodzanyama
ρa (Ω・m)
a (m)

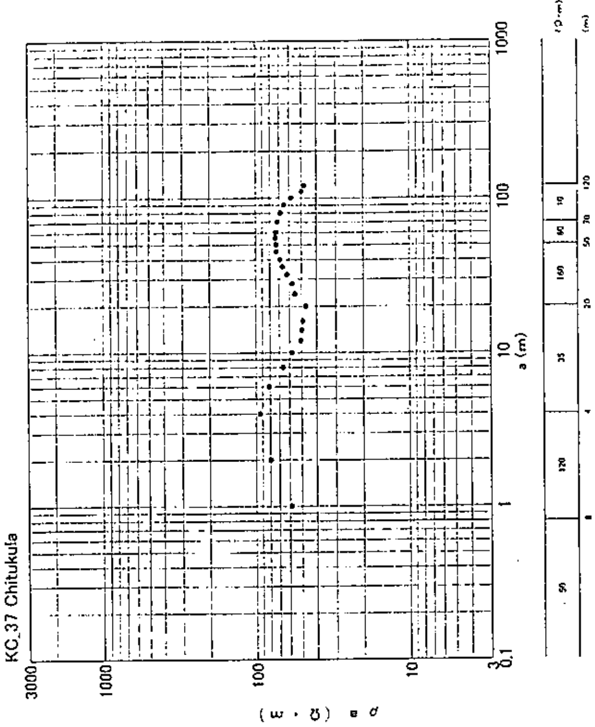

KC_30 Chipango
ρa (Ω・m)
a (m)

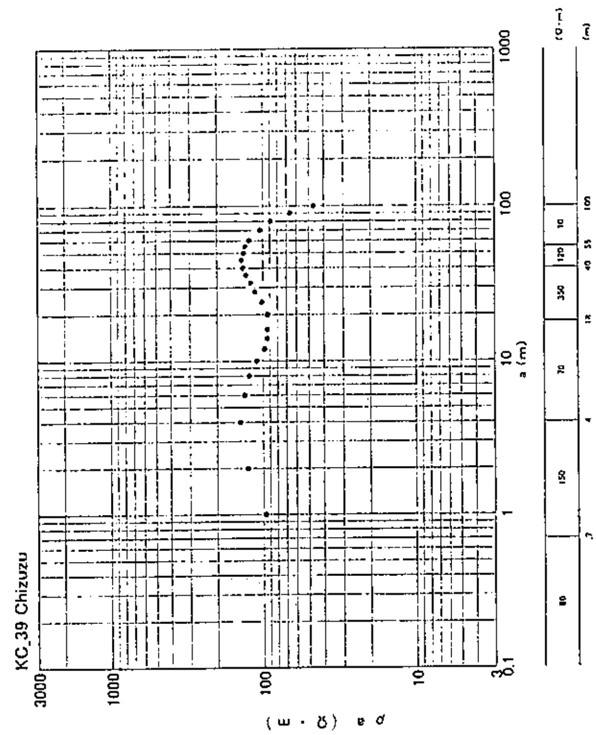

KC_32 Chakachadza
a (m)
ρa (Ω・m)

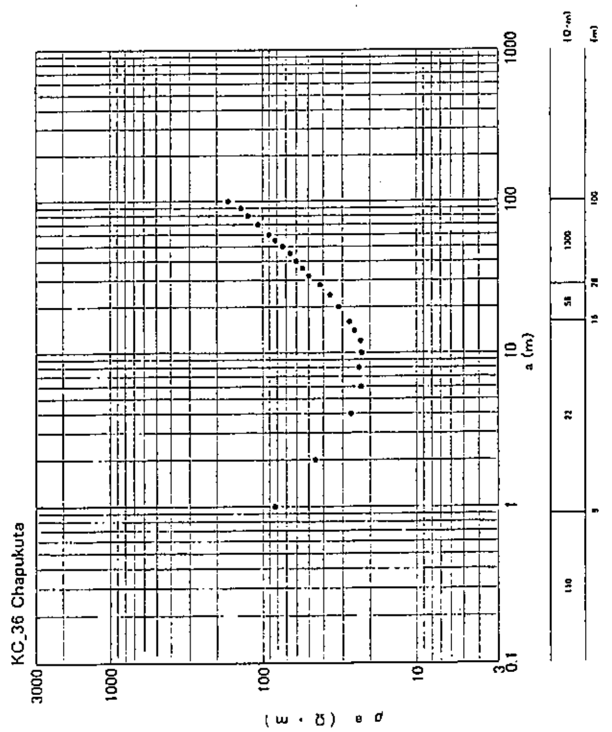

KC_33 Betenego
a (m)
ρa (Ω・m)

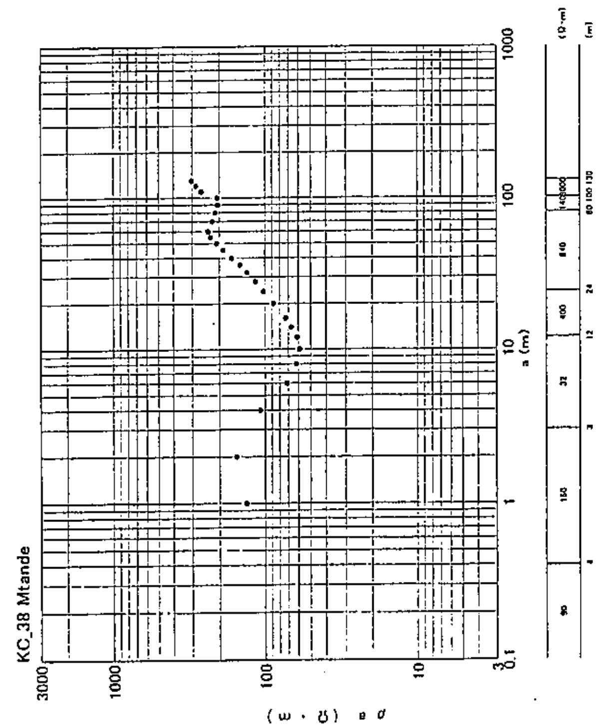

KC_34 Mkhomanthu
a (m)
ρa (Ω・m)

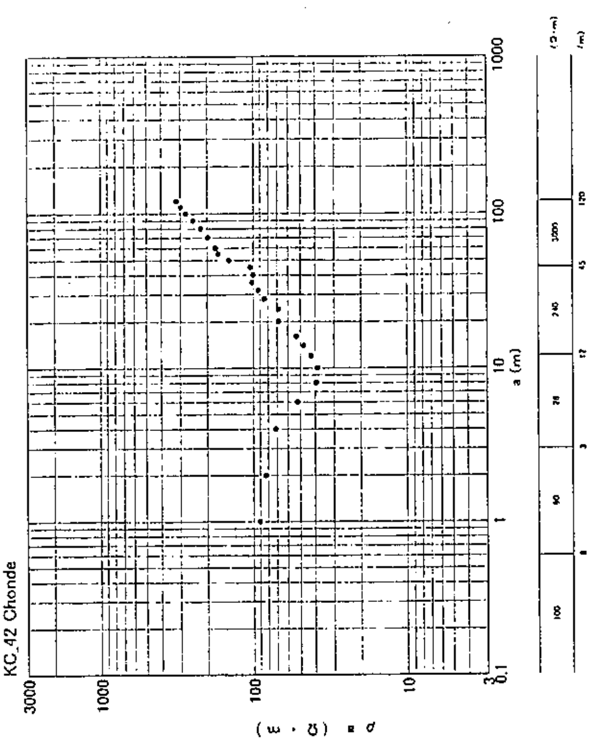

KC_35 Chabuka/Chindamba
a (m)
ρa (Ω・m)

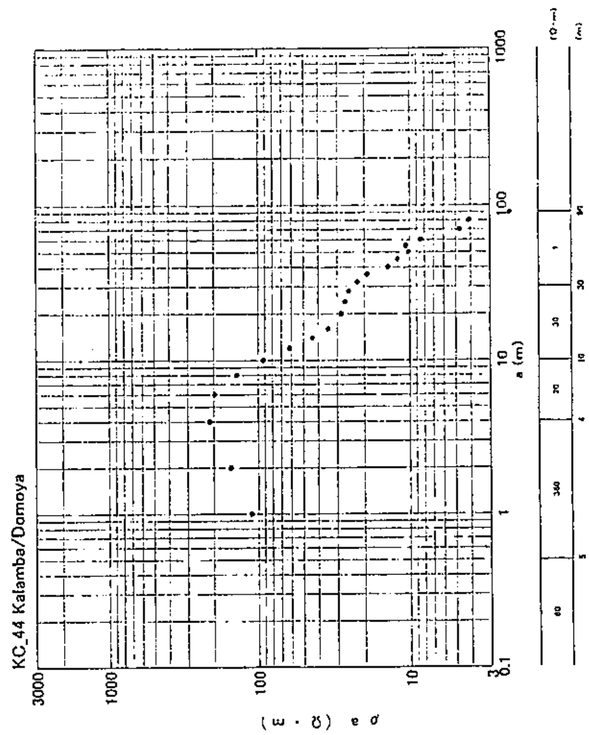

KC_37 Chitukula
a (m)
ρa (Ω・m)

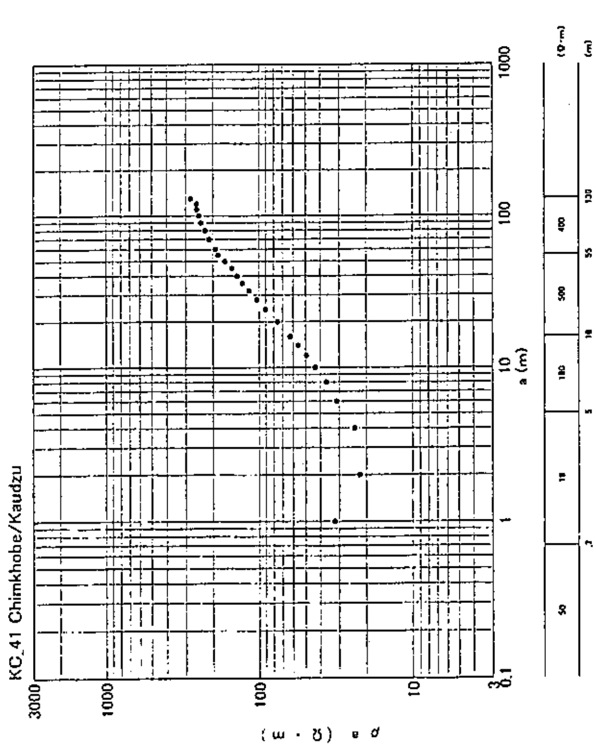

KC_39 Chizuzu
a (m)
ρa (Ω・m)

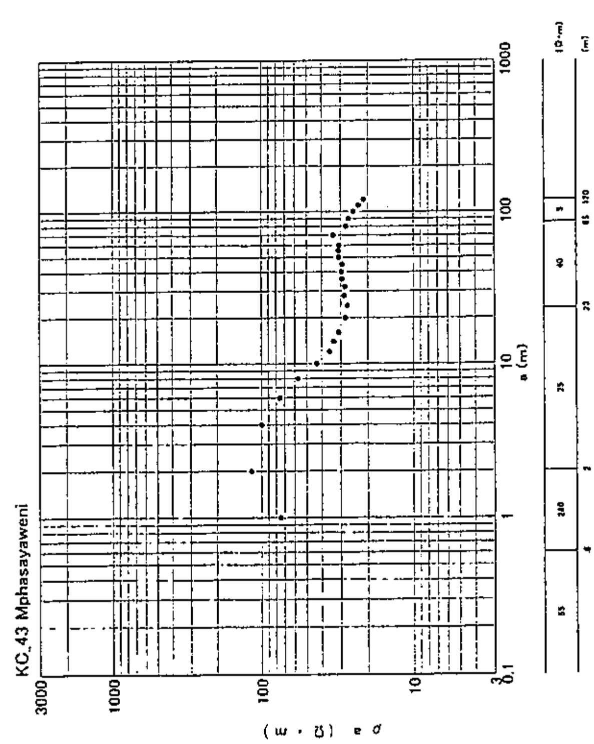

KC_36 Chapukuta
a (m)
ρa (Ω・m)

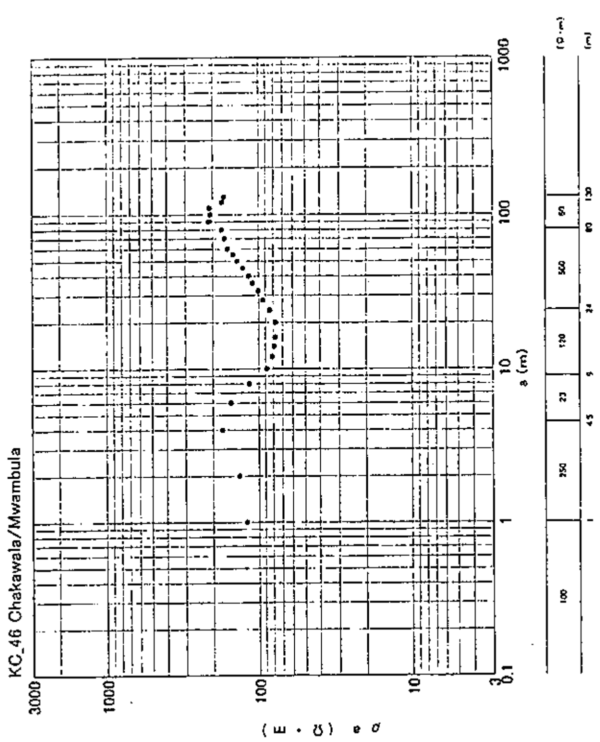

KC_38 Mtande
a (m)
ρa (Ω・m)

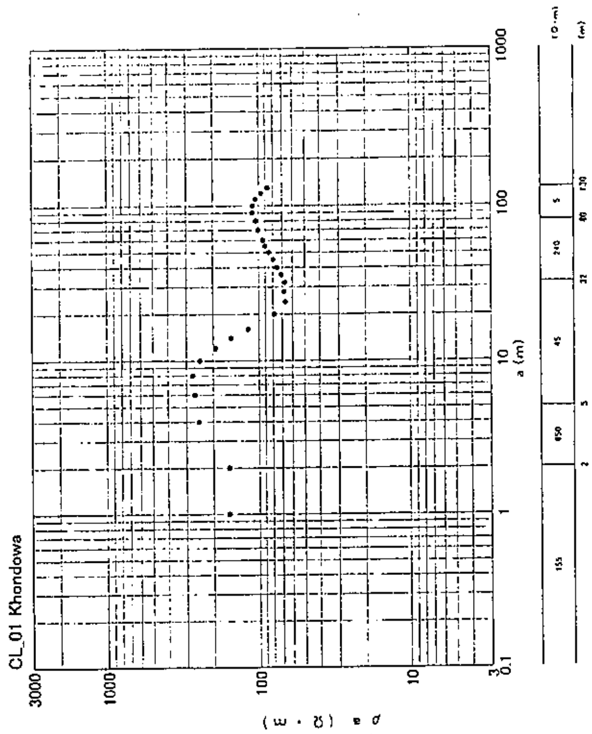

KC_42 Chonde
ρa (Ω・m)
a (m)

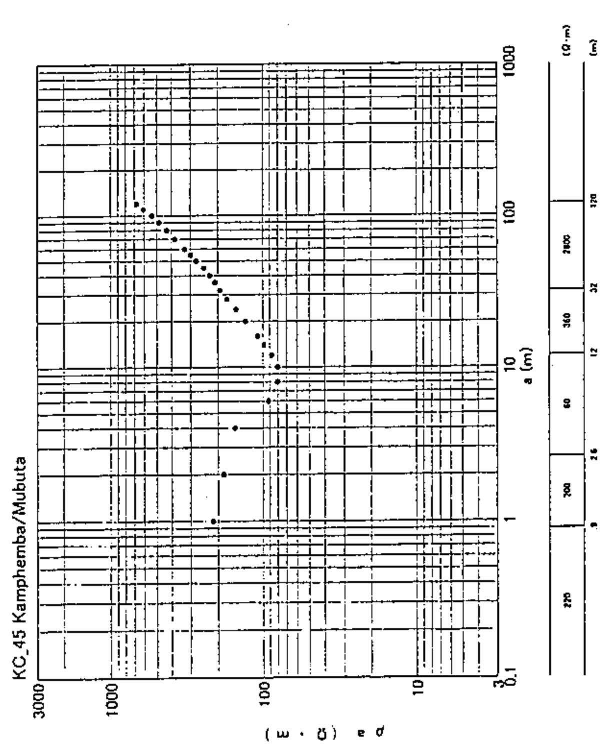

KC_44 Kalamba/Domoya
ρa (Ω・m)
a (m)

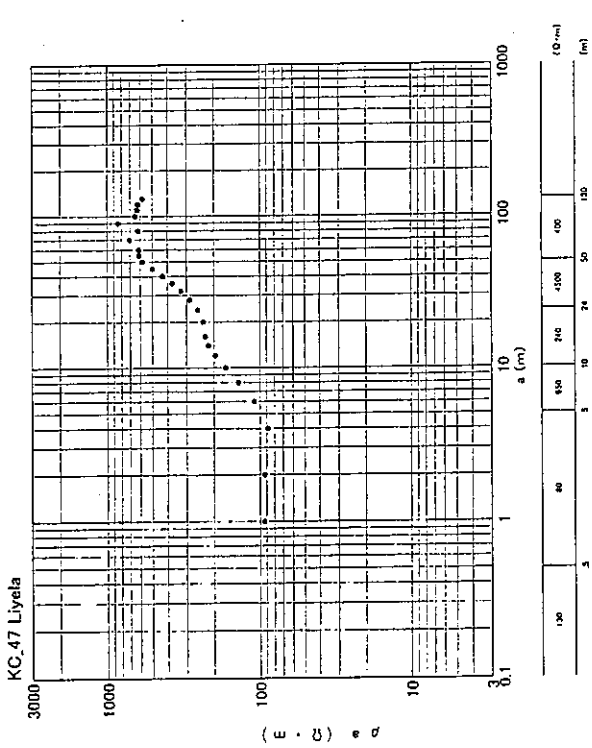

KC_41 Chimkhobe/Kaudzu
ρa (Ω・m)
a (m)

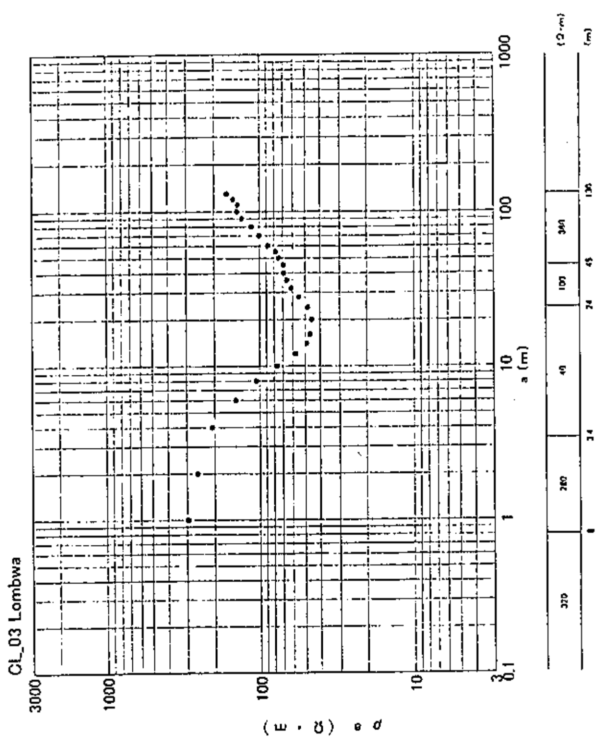

KC_43 Mphasayaweni
ρa (Ω・m)
a (m)

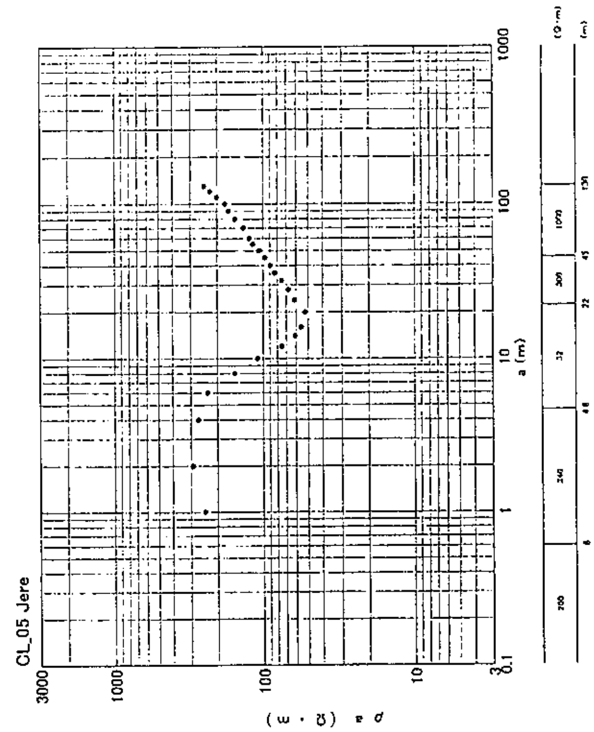

KC_46 Chakawala/Mwambula
a (m)
ρa (Ω・m)

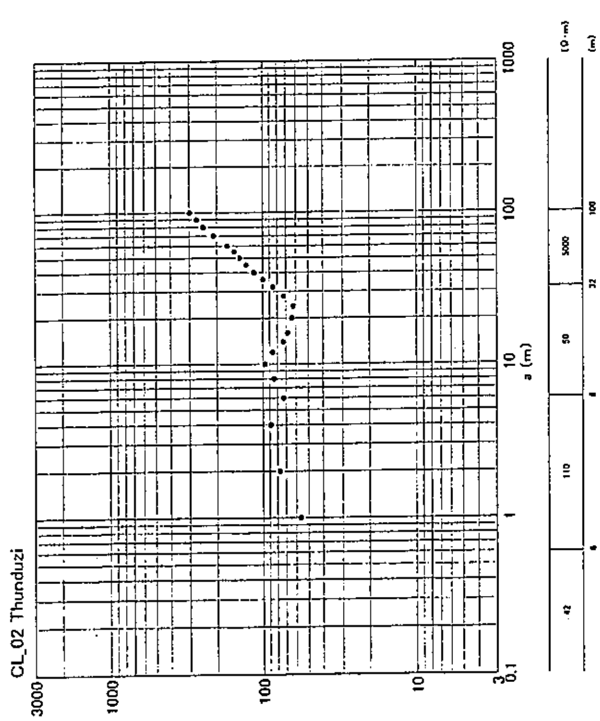

CL_01 Khondowa
a (m)
ρa (Ω・m)

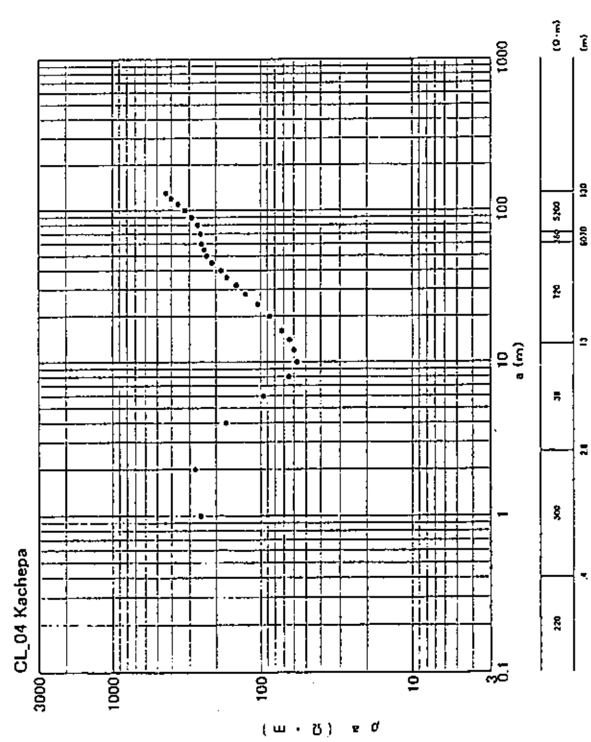

KC_45 Kamphemba/Mubuta
a (m)
ρa (Ω・m)

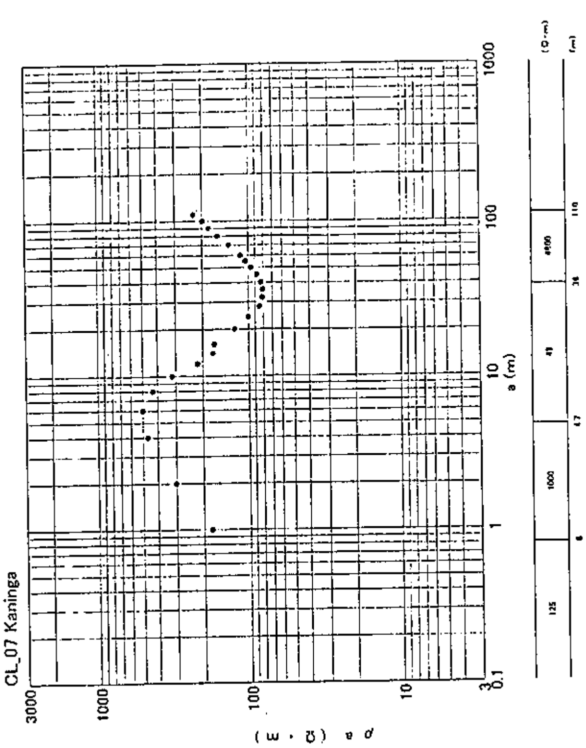

KC_47 Liyela
a (m)
ρa (Ω・m)

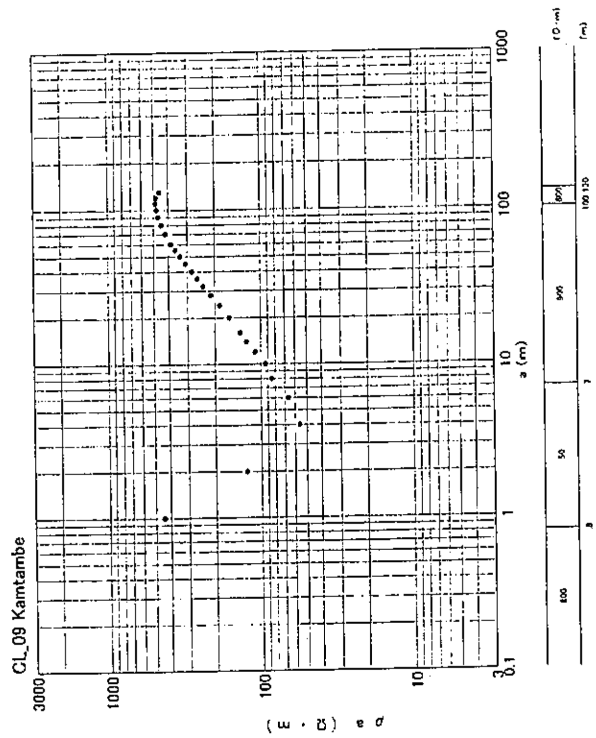

CL_03 Lombwa
a (m)
ρa (Ω・m)

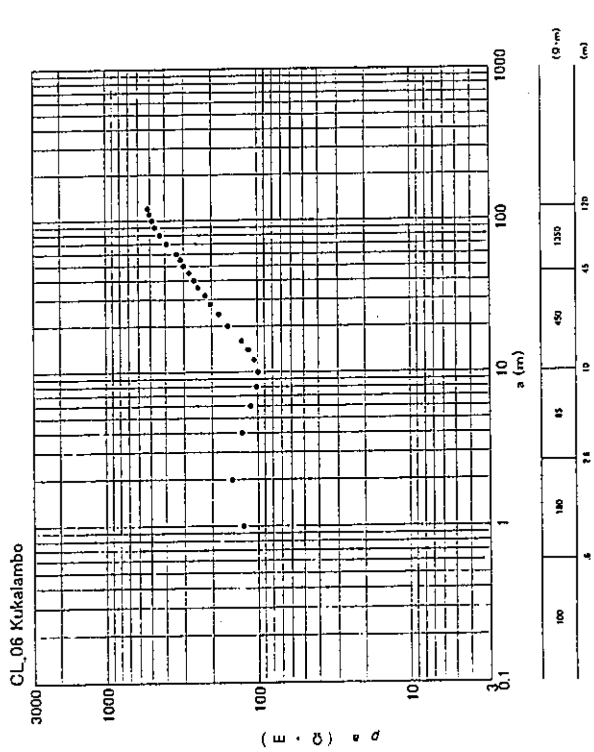

CL_05 Jere
a (m)
ρa (Ω・m)

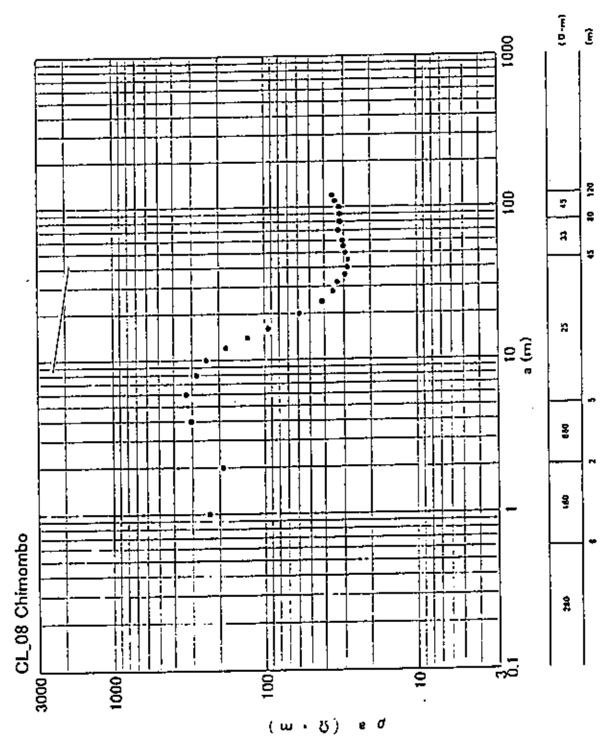

CL_02 Thunduzi
a (m)
ρa (Ω・m)

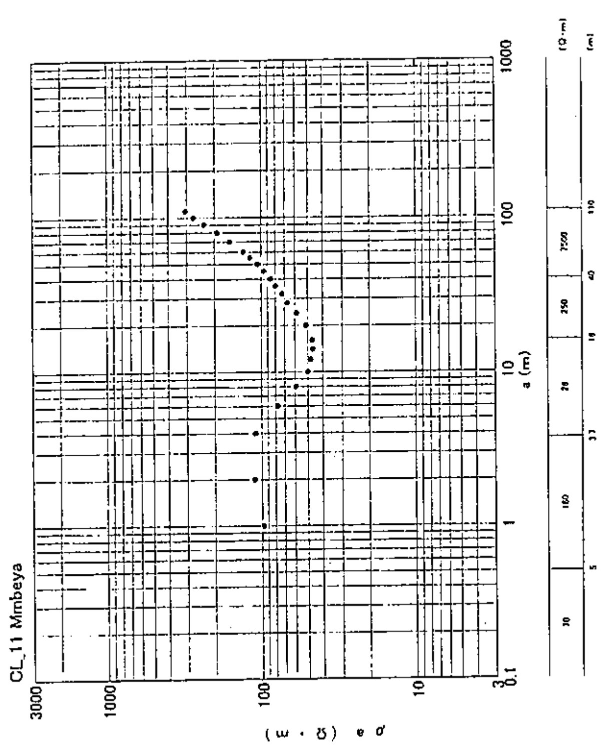

CL_04 Kachepa
a (m)
ρa (Ω・m)

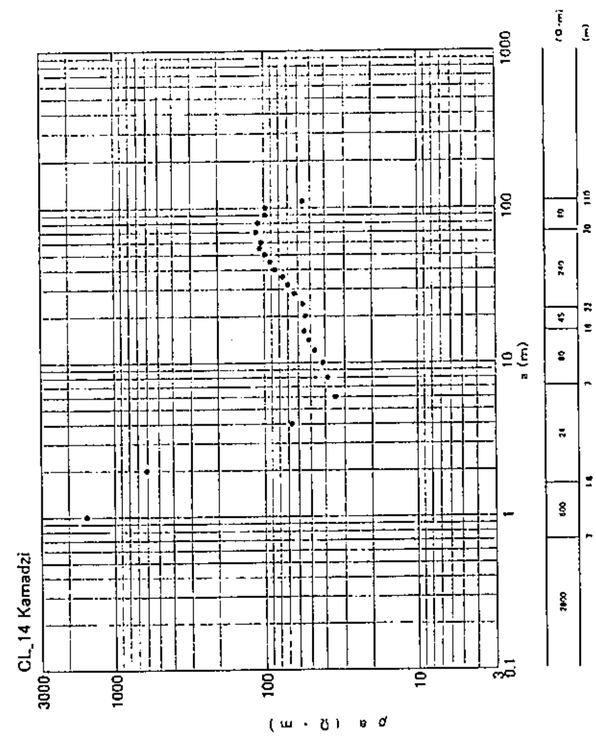

CL_07 Kaninga
a (m)
ρa (Ω・m)

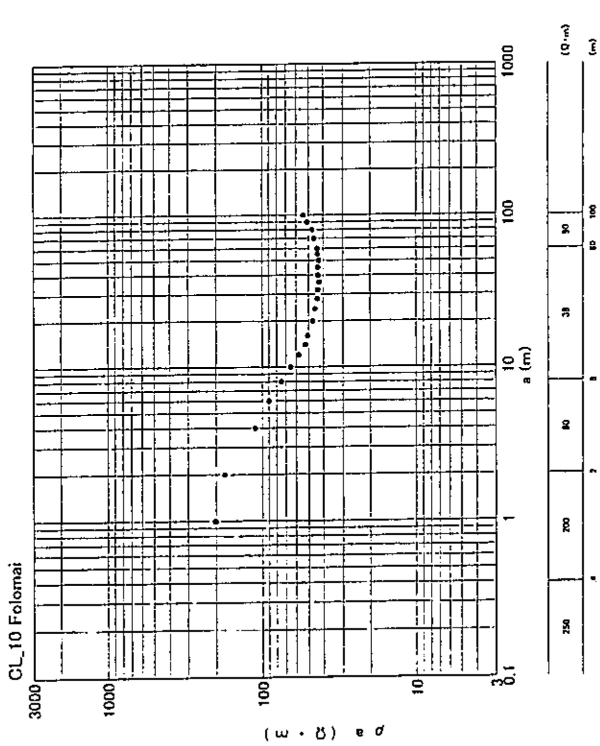

CL_09 Kamtambe
a (m)
ρa (Ω・m)

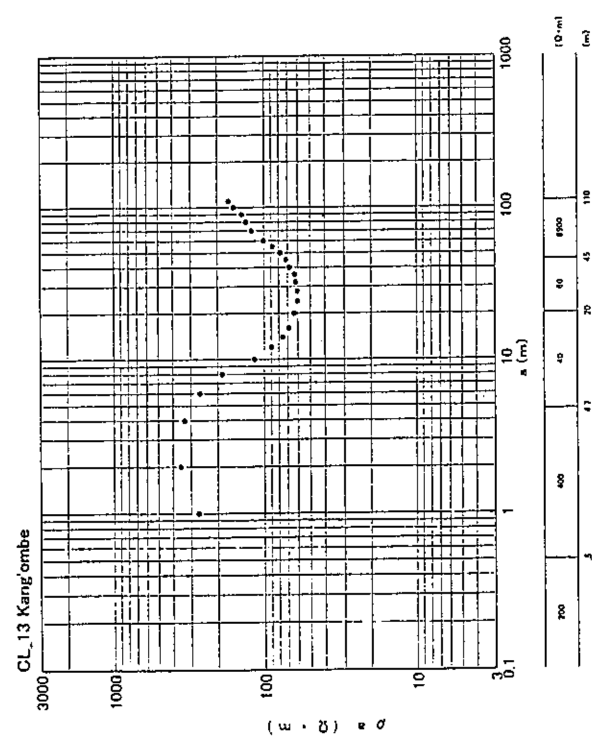

CL_06 Kukalambo
a (m)
ρa (Ω・m)

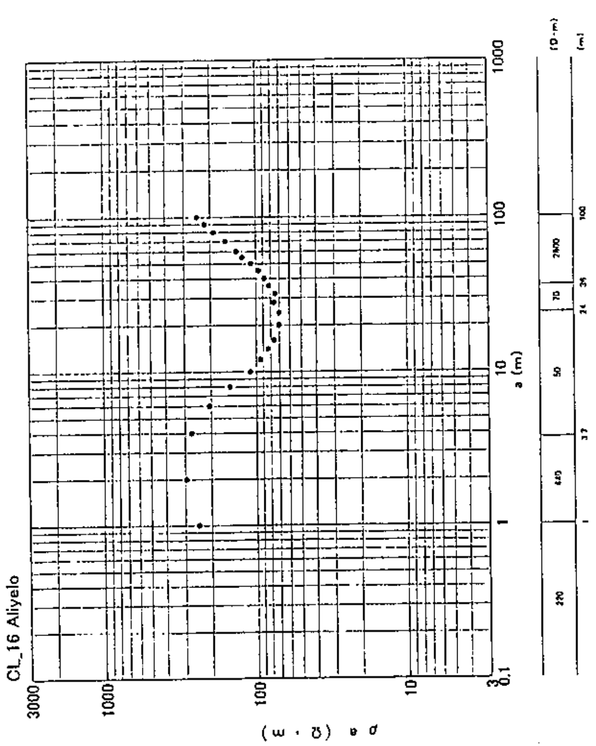

CL_08 Chimombo
a (m)
ρa (Ω・m)

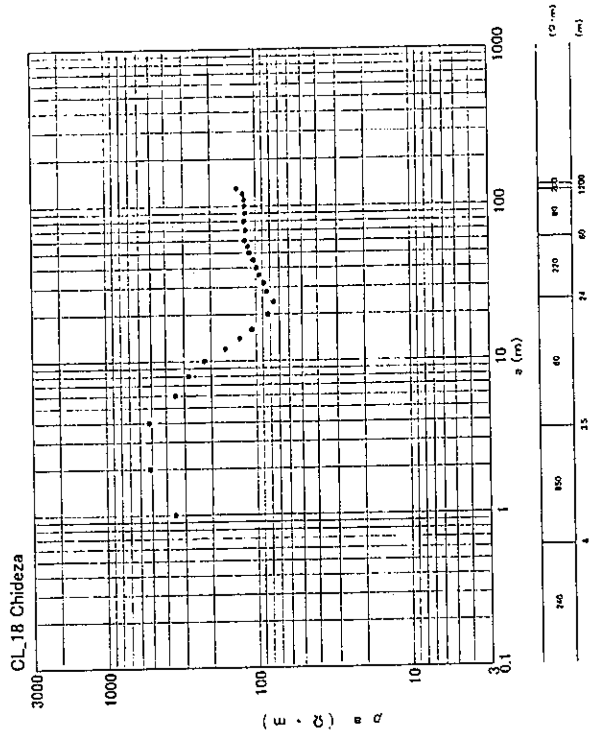

CL_11 Mmbeya
a (m)
ρa (Ω・m)

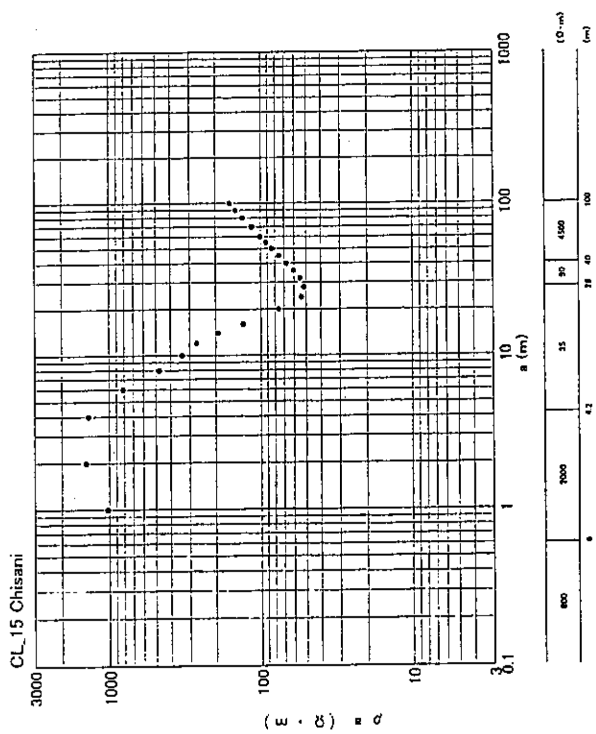

CL_14 Kamadzi
a (m)
ρa (Ω・m)

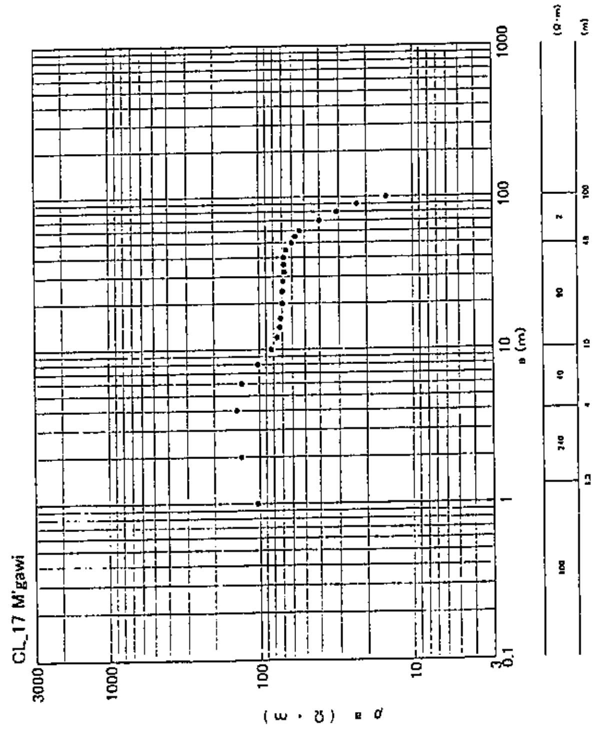

CL_10 Folomai
a (m)
ρa (Ω・m)

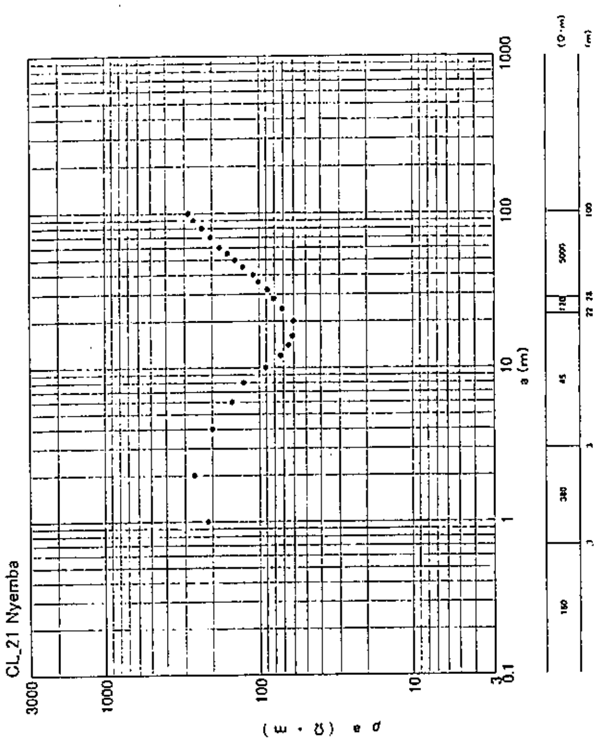

CL_13 Kang'ombe
a (m)
ρa (Ω・m)

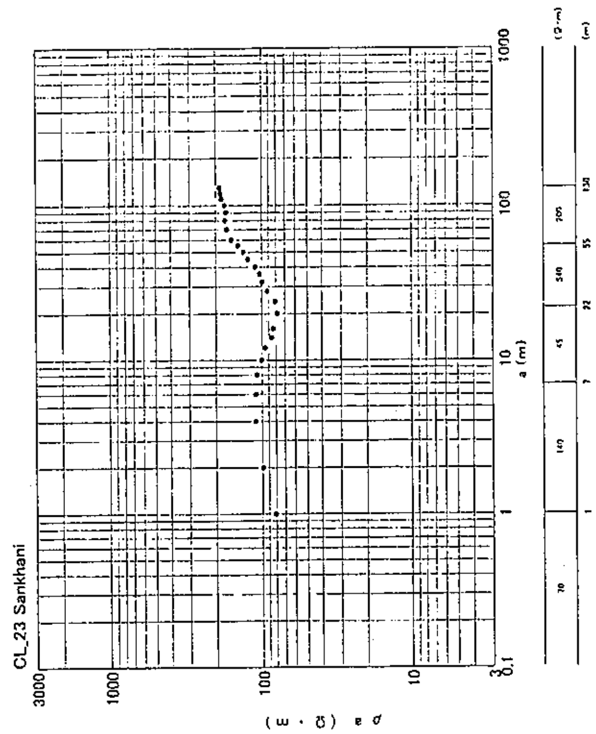

CL_16 Aliyelo
a (m)
ρa (Ω・m)

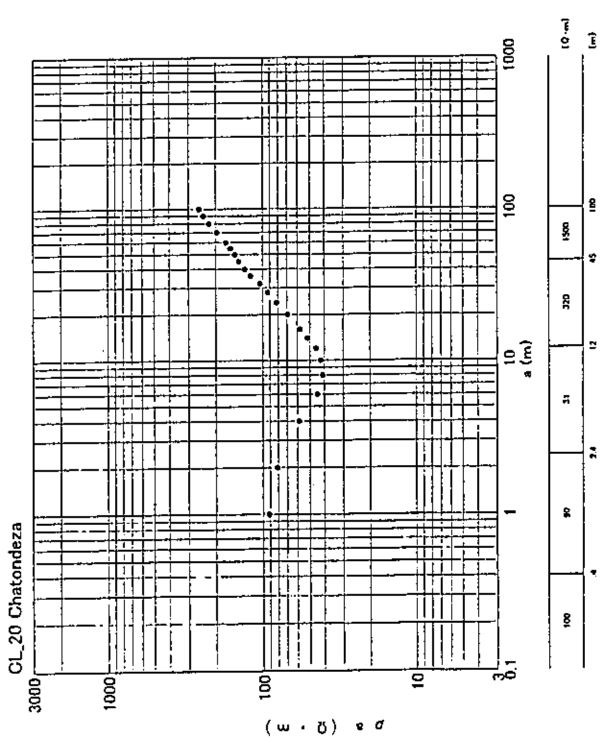

CL_18 Chideza
a (m)
ρa (Ω・m)

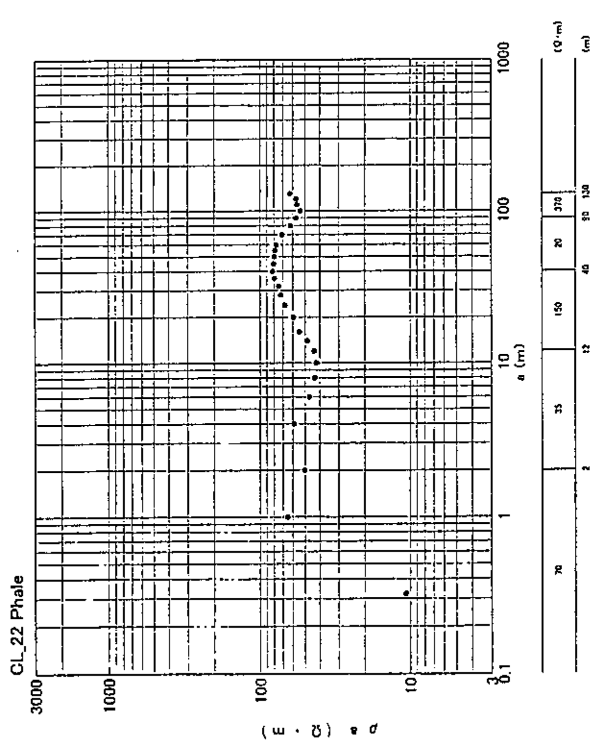

CL_15 Chisani
a (m)
ρa (Ω・m)

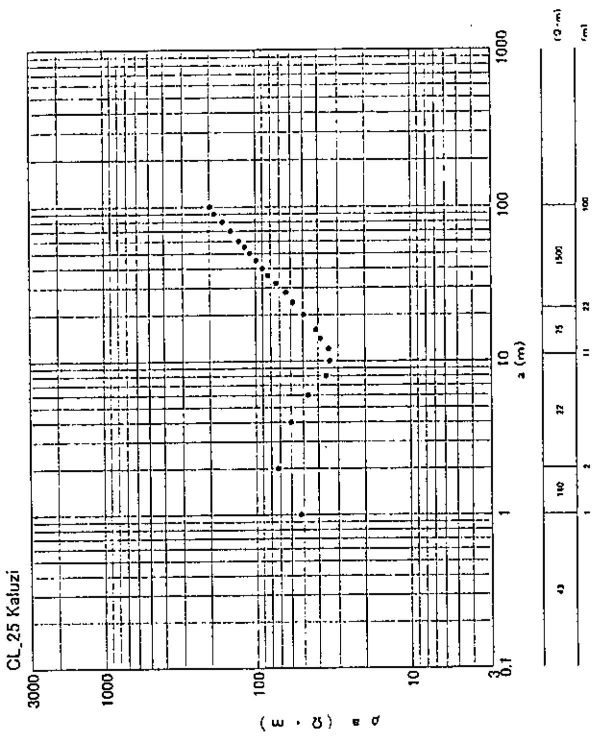

CL_17 M'gawi
a (m)
ρa (Ω・m)

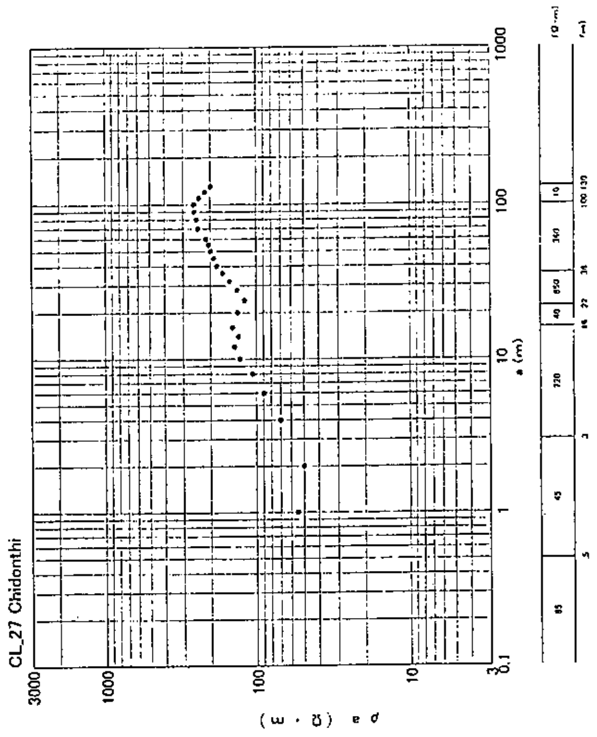

CL_21 Nyemba
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

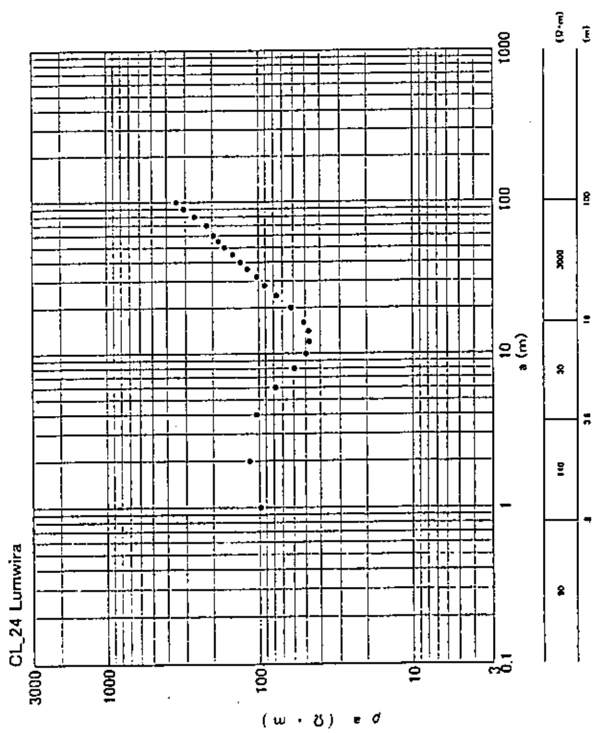

CL_23 Sankhani
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

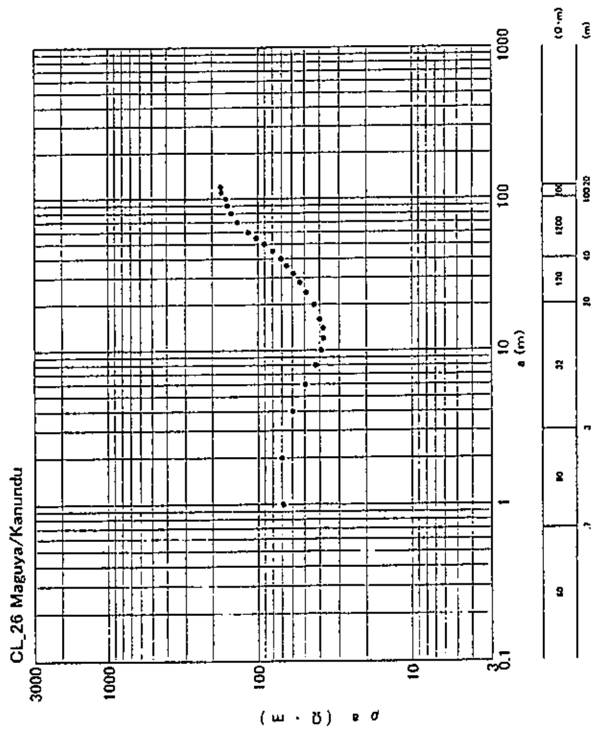

CL_20 Chatondeza
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

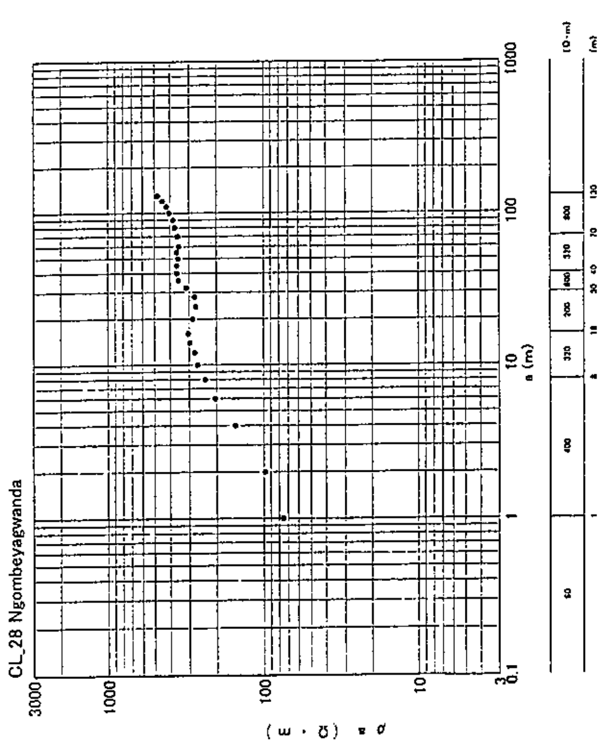

CL_22 Phale
ρa (Ω・m)
a (m)
3000
1000
100
10
3
0.1
1
10
100
1000

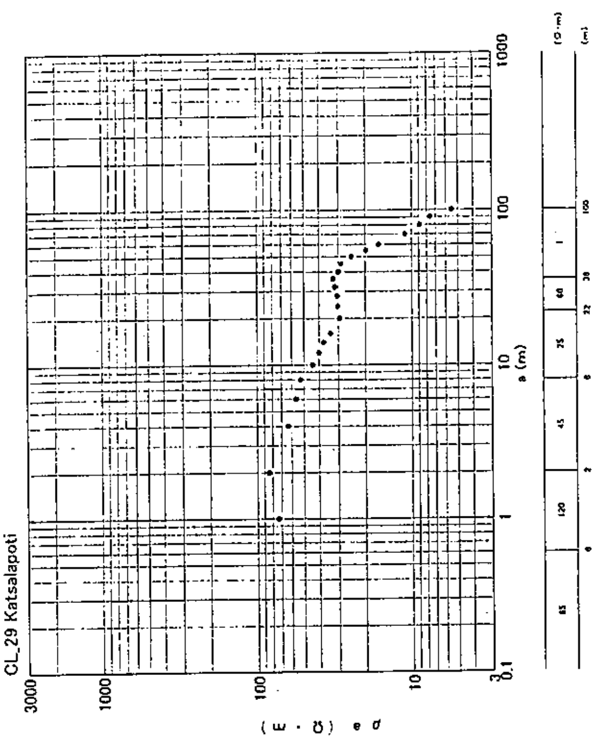

CL_25 Kaluzi

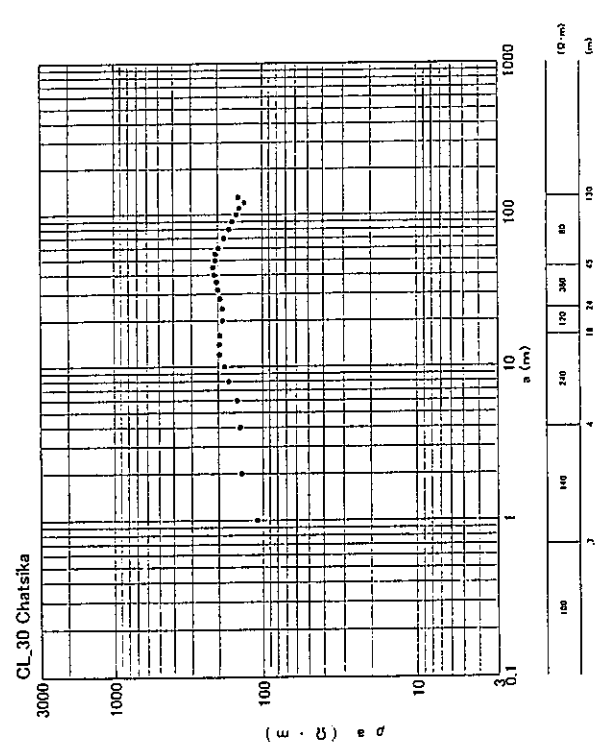

CL_27 Chidonthi

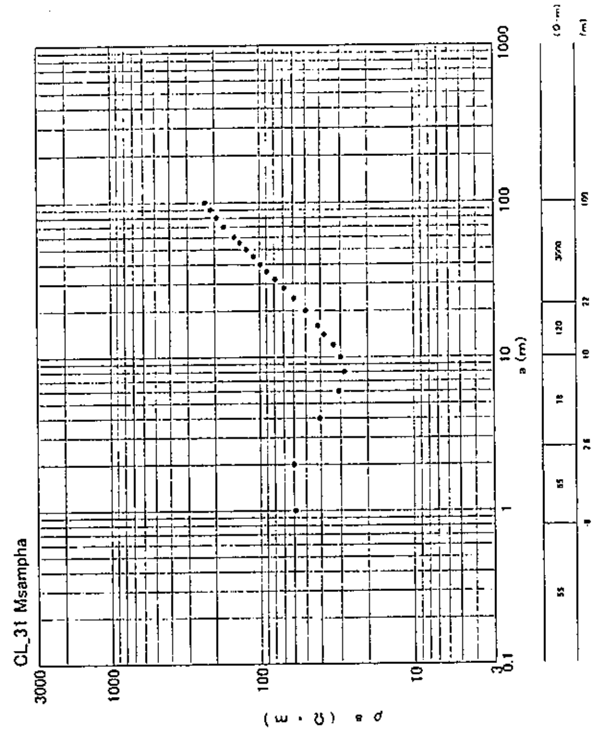

CL_24 Lumwira

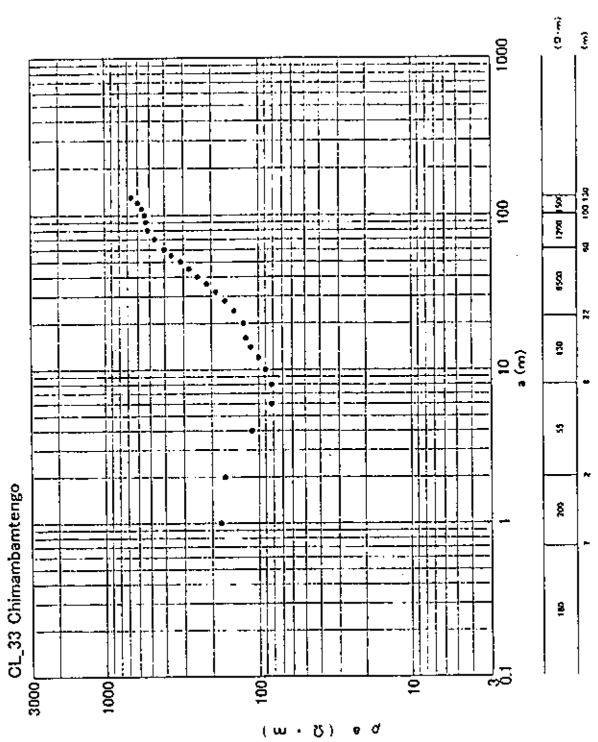

CL_26 Maguya/Kanundu

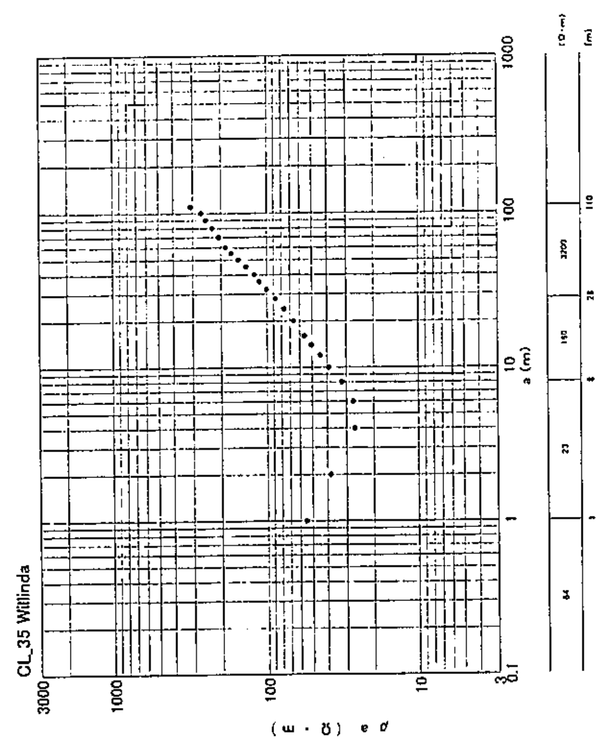

CL_28 Ngombeyagwanda
ρa (Ω・m)
a (m)

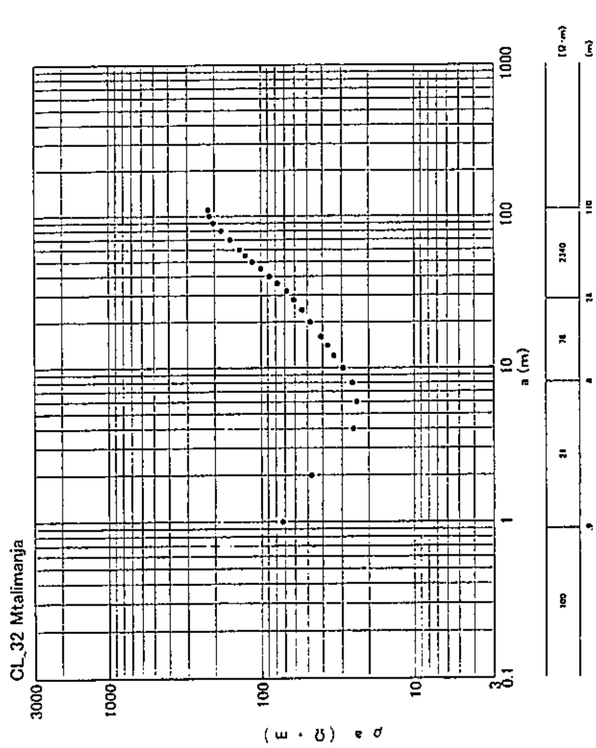

CL_29 Katsalapoti
ρa (Ω・m)
a (m)

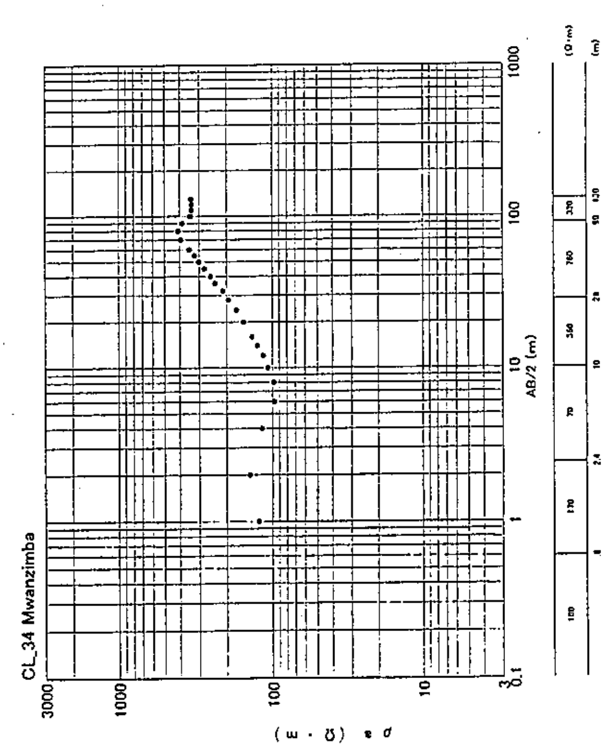

CL_30 Chatsika
ρa (Ω・m)
a (m)

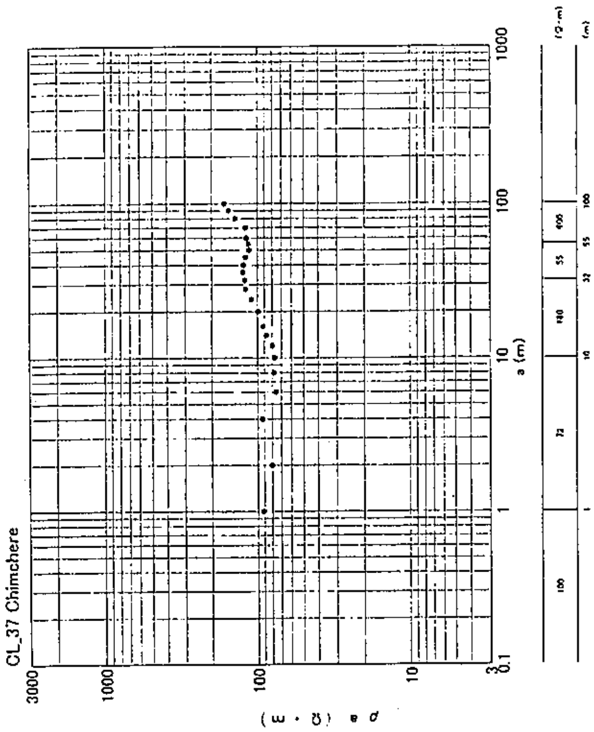

CL_31 Msampha
ρa (Ω・m)
a (m)

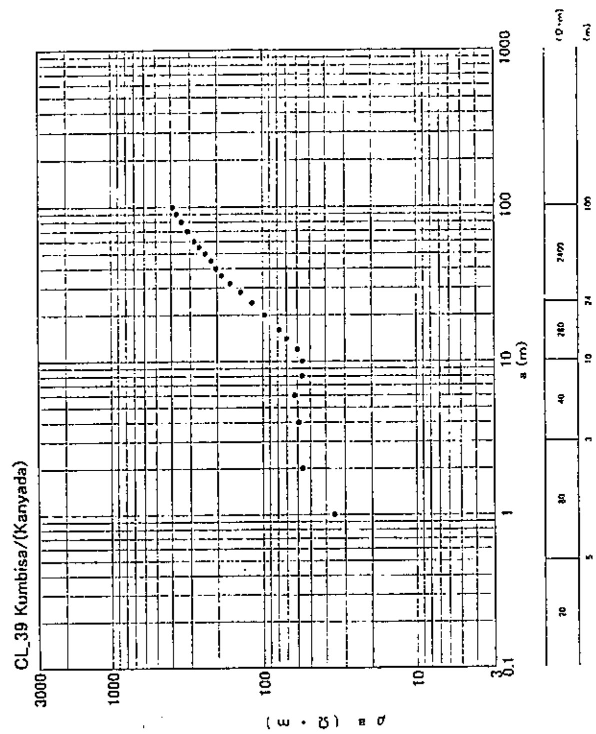

CL_33 Chimambamtengo

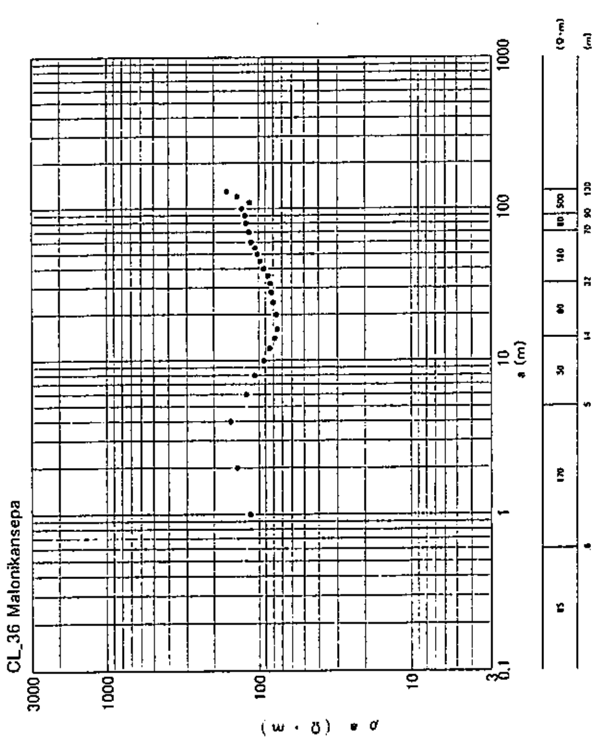

CL_35 Wilinda

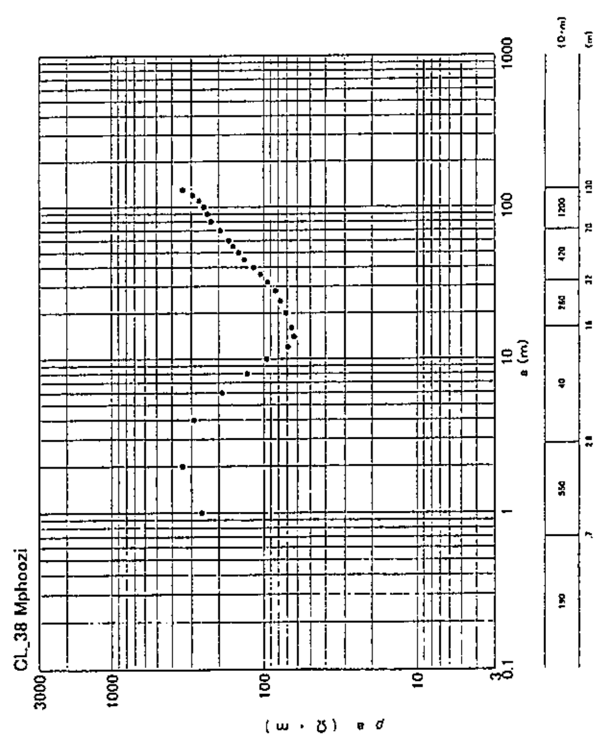

CL_32 Mtalimanja

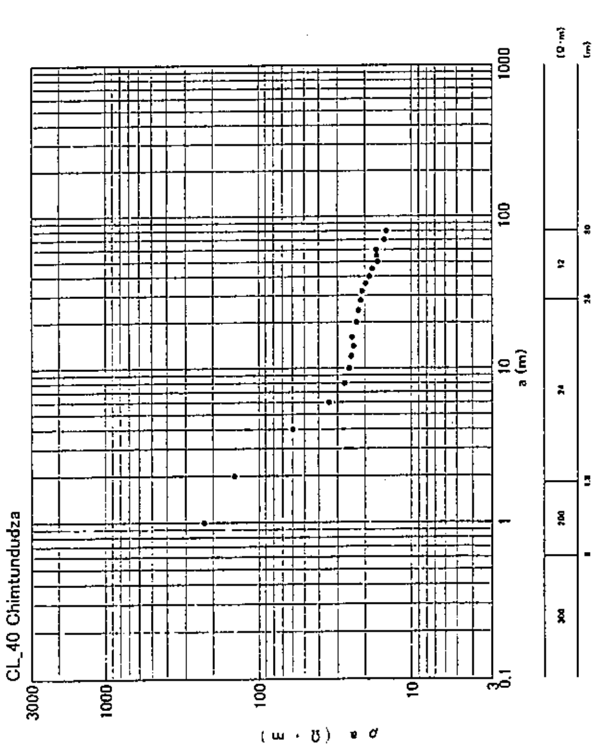

CL_34 Mwanzimba

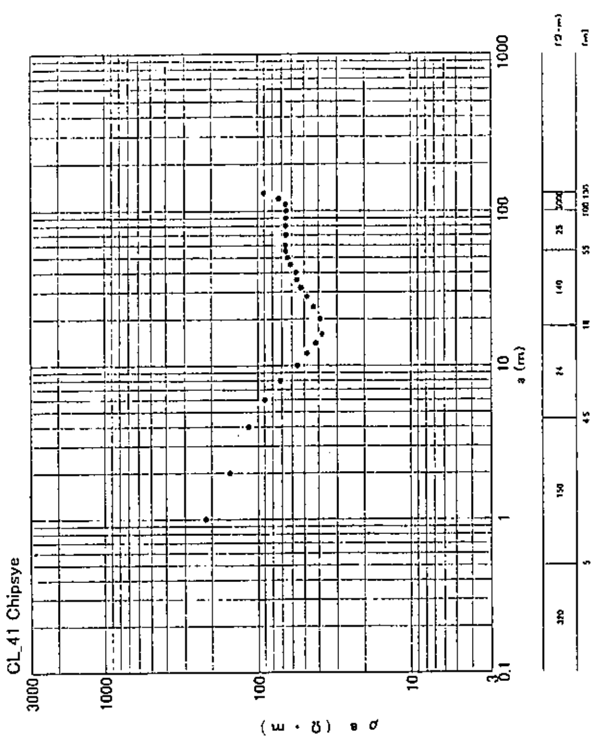

CL_37 Chimchere
a (m)
ρa (Ω·m)

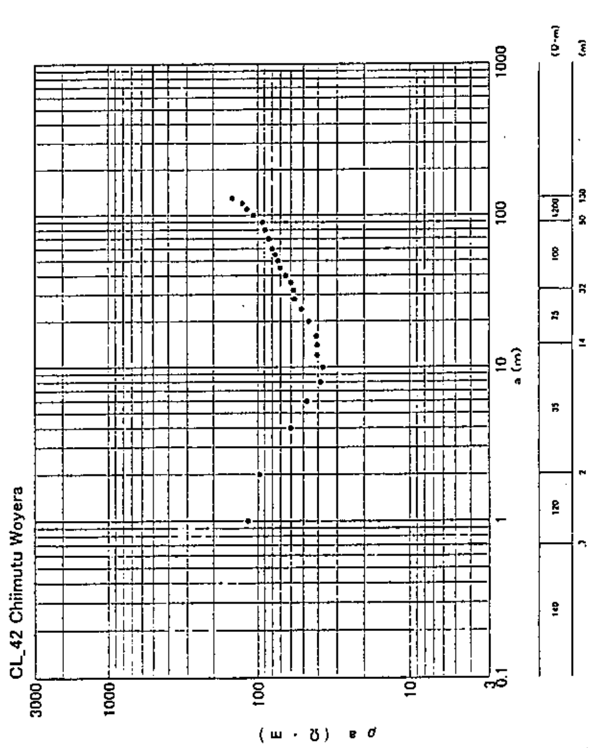

CL_39 Kumbisa/(Kanyada)
a (m)
ρa (Ω·m)

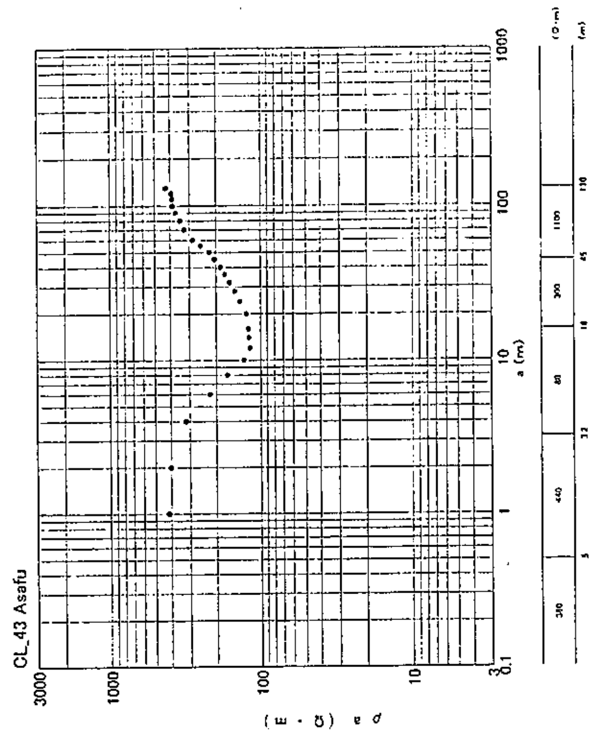

CL_36 Malonikansepa
a (m)
ρa (Ω·m)


CL_38 Mphoozi
a (m)
ρa (Ω·m)


CL_40 Chimtundudza
a (m)
ρa (Ω·m)

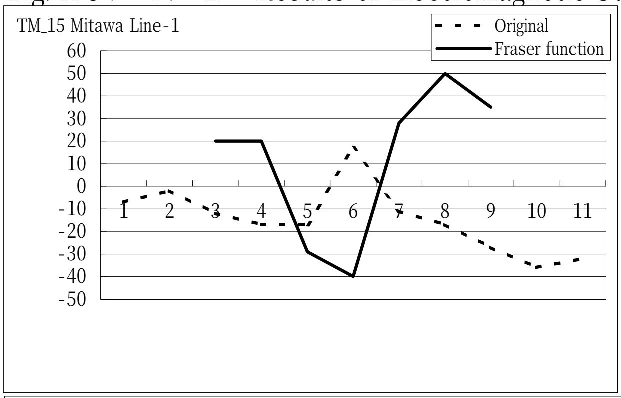

CL_41 Chipsye
a (m)
ρa (Ω·m)

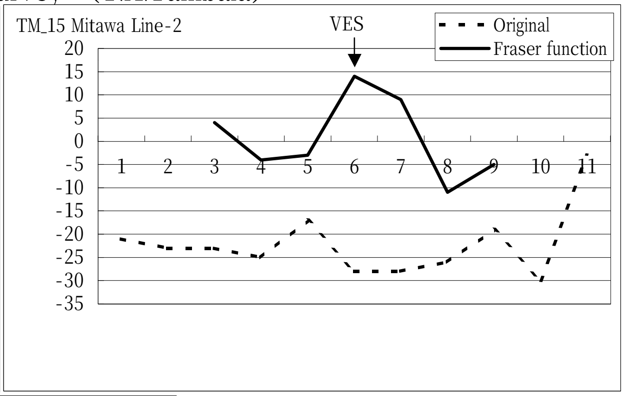

CL_42 Chiimutu Woyera
a (m)
ρa (Ω·m)


CL_43 Asafu
a (m)
ρa (Ω·m)

6-4(3) Results of Electromagnetic Survey

Fig. A6．４．１　Results of Electromagnetic Survey （T.A.Tambala）





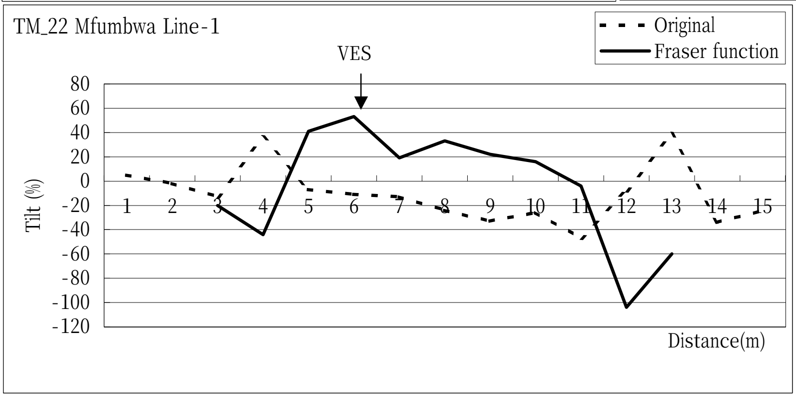
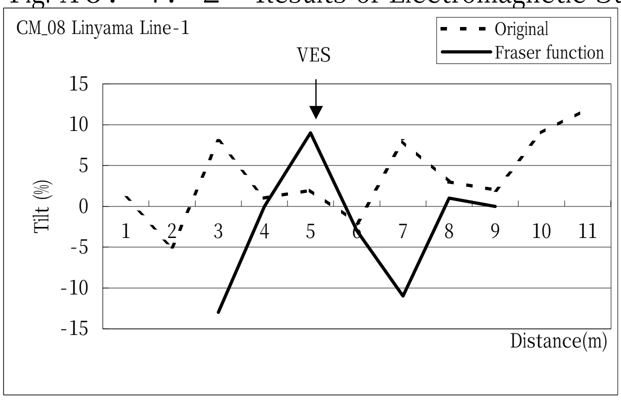
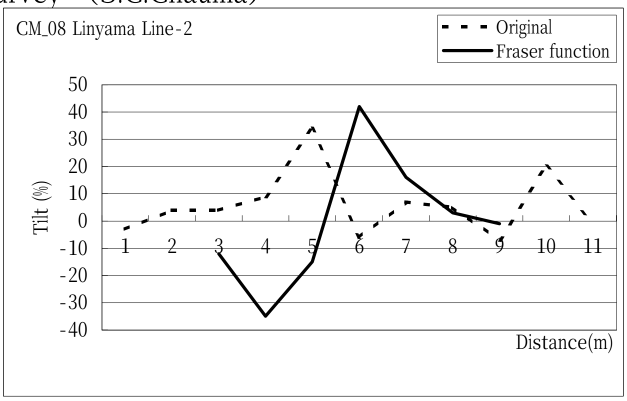


Fig. A6．４．２　Results of Electromagnetic Survey （S.C.Chauma）





6-5(1) Results of Water Quality Test (Chemical)

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Guide Lines	
Village Name	Chibubu Sch.	Mbweche	Kachale	Mchokwe	Milonde Sch.	Lodzanyama	Mtukula	Maganga II	Dawe	Chisasa II	Matundu	Katenje	Gabriel	Lufesi	Kalulu		
B/H No.	L 231	–	MM 77	L 07/225	L 07/99	GT 254	DP 158	SB/07/281	CL/501	DZ 225	NBC 2001	CUV	SB/07/194	NBC 2000	002RS	WHO (1996)	WDT*
District	Lilongwe	Lilongwe	Lilongwe	Lilongwe	Lilongwe	Dedza	Dedza	Dedza	Dedza	Dedza	Dedza	Dedza	Dedza	Dedza	Dedza		
T/A	Chadza	Chadza	Chadza	Chadza	Chadza	Tambala	Tambala	Tambala	Chauma	Chauma	Kachere	Kachere	Kachere	Chilikumwendo	Chilikumwendo		
E/A	020	005	049	066	069	016	013	003	003	013	003	052	020	042	016		
Geology**	Xs	Xs	Xk	Xs	Xs	Xs	Xk	Xk	Xk	Xba	Xa'	Xk	Xk	Xk or Xs	Xk		
Thermotolerant coliform/100 ml	0	0	100	2	800	190	36	120	2	0	40	6	10	240	132	0	50
Arsenic (mg/l)	0.003	<0.001	0.002	0.001	0.003	0.003	0.001	<0.001	<0.001	0.008	0.001	0.003	<0.001	<0.001	0.008	0.01	0.05
Boron (mg/l)	0.32	0.52	0.48	0.62	0.42	0.2	0.45	0.3	0.15	0.11	0.01	0.12	0.08	<0.10	0.35	0.5	–
Cadmium (mg/l)	0.008	0.001	0.01	0.005	0.01	0.01	0.005	0.002	<0.001	0.004	<0.001	0.015	0.001	0.002	0.006	0.003	0.01
Copper (mg/l)	0.061	0.023	0.01	0.01	<0.01	0.21	0.13	0.08	0.01	0.008	<0.01	0.06	0.03	0.21	0.12	1.0	2.00
Fluoride (mg/l)	0.48	1.6	0.18	1.2	1.3	0.5	0.47	0.83	0.93	0.76	1.3	0.97	0.67	1.08	1.03	1.5	3.0
Manganese (mg/l)	0.01	0.01	0.01	0.01	0.03	0.03	0.01	0.01	0.01	0.02	0.01	0.03	<0.01	<0.01	0.01	0.1	1.5
Nitrate (mg/l)	0.65	1.9	0.55	0.05	0.67	0.24	0.65	0.56	0.03	0.46	0.06	0.59	0.46	0.69	0.42	50	100
Nitrite (μg/l)	0.88	0.67	0.72	0.02	0.43	0.66	0.82	0.04	0.35	0.28	0.01	0.33	0.31	0.035	0.2		
Colour (TCU)	9	10	12	5	10	5	10	18	10	12	5	10	5	8	8	15	50
Turbidity (NTU)	6	0.9	0.9	1	0	2.6	3.8	11	0.2	3	1	0.3	0.3	8	2		
pH Value	7.3	7.5	7.4	7.5	7.2	7.4	7.5	7.4	7.3	6.8	6.9	7	7.1	6.4	6.9	6.5～8.5	6.0～9.5
Conductivity (μs/cm)	330	640	130	320	160	250	290	210	530	480	140	120	280	90	230		
Chloride (mg/l)	44	51	43	32	36	50	34	37	40	35	35	43	45	27	34	250	750
Total Hardness (mg/l)	122	270	44	130	100	96	148	92	290	228	64	40	136	102	94		
Iron (mg/l)	0.15	0.02	0.03	0.01	0.33	0.14	0.17	0.28	<0.01	0.22	0.02	0.03	<0.01	0.02	0.02	0.3	3.0
Sodium (mg/l)	6	22	12	10	12	11	8	11	10	17	3	9	5	17	10	200	500
Sulphate (mg/l)	5.2	7.5	4	5.8	4.5	4.3	7.1	7.1	8.8	24	5	5	5.5	4.7	11	250	800
Potassium (mg/l)	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.4	0.1	0.1	0.1	0.1		
Total Dissolved Solids (mg/l)	190	420	80	188	96	138	182	132	346	290	84	70	168	52	138	1,000	2,000
Bicarbonate (mg/l)	239	437	90	242	120	88	220	127	466	39	105	90	220	68	176		
Silica (mg/l)	50	43	42	47	38	43	34	34	48	28	40	20	56	56	50		
Suspended Solids (mg/l)	1	1	2	2	0	1	2	15	1	2	2	2	2	2	2		

* Water Development Tentative Standard ; ** Xs : Biotite-gneiss, Xk : Charnockitic-gneiss & Granulite, Xba : Anorthosite & Anorthositic gneiss, Xa' : Semi-pellitic schist

6-5(2) Results of Water Quality Test (Coliform)

BACTERIOLOGICAL TEST RESULTS OF WATER SAMPLES FROM SOME EXISTING BOREHOLES IN GROUNDWATER DEVELOPMENT PROJECT AREA – LILONGWE & DEDZA

DATE TESTED: 24-27/04/2001

No.	SAMPLE SOURCE & LOCATION	BACTERIA TYPE Thermotolerant (Faecal) coliform	REMARKS
1	Chibubu Sch. BH No. L231, Lilongwe District	0	• No appron • Clean surrounding
2	Mbweche Vge BH No. 18/9/91 T/A Chadza, Lilongwe District	0	• Clean surrounding
3	Kachale Sch. BH No. MM77, Lilongwe District	100	• Very dirty surrounding
4	Mchokwe Trading Centre BH No. L07/225, Lilongwe District	2	• Clean surrounding • Situated 7M away from nearest building
5	Milonde School BH No. DC 62, Lilongwe District	800	• Dirty surrounding • Situated below classroom /toilets
6	Lodzanyama Vge BH No. GT 254, Dedza District	190	• Appron with cracks • Nearest house about 20M away
7	Mtukula Vge BH No. DP 158, T/A Tambala, Dedza District	36	• Appron with cracks
8	Manganga II Vge BH No. SB/07/281, Dedza District	120	• Newly drilled BH • Situated downstream settlement (30M)
9	Dawe Vge BH No. CL/TITAN/01, Dedza District	2	• Clean surrounding
10	Chisasa II Vge BH No. DZ 225, T/A Tambala, Dedza District	0	• BH not in use
11	Matundu Trading Centre BH No. NBC2001, T/A Chilikumwendo, Dedza District	40	• Dirty surroundings
12	Katenje Vge BH No. CUU, Dedza District	6	• Dirty surrounding
13	Gabriel Vge BH No. SB/07/194, T/A Kachere, Dedza District	10	• Clean surrounding
14	Lufesi Vge BH No. NBC 2000, T/A Chikumwendo, Dedza District	240	• Newly drilled BH • Clean surrounding
15	Kalulu Vge BH No. RS 002, T/A Chilikumwendo, Dedza District	132	• Stagnant water around the BH

ANALYSIS CARRIED OUT BY CENTRAL WATER LABORATORY

6-5(3) Results of Water Quality Test(Past Data)

Results of Existing Water Quality Test

Items Tested in 1985		Malawi Water Quality Standard	Malawi Water Quality Standard				
			1	2	3	4	5
			MWACHILALA Shallow Well (LILONFWE)	LINTHIPE-Ⅱ River (DEDZA)	JONCHO Borehole (LILONGWE)	MSAUU Borehole (LILONGWE)	CHIYENDA Shallow Well (LILONGWE)
PH		6.0-9.5		7.6	7.4	7.6	
E.C.	(μS/cm)		885	135	536	1089	838
Cl	(mg/l)	750		2.5	2.8	5.0	
SO^4	(mg/l)	800		6.6	7.8	11.0	
NO^3	(mg/l)	100		0.20	3.70	1.40	
Fe^2	(mg/l)	3.0		0.21	0.62	0.37	
T.H.	(mg/l)	800					
Turbidity	(NTU)	25		8.0	2.4	1.9	
F	(mg/l)	3.0	2.1	0.17	4.4	4.6	1.2

Items Tested in 1985		Malawi Water Quality Standard	Malawi Water Quality Standard				
			6	7	8	9	10
			CHIPSYERA MAZENGERA Well with Hand-Pump	MWECHILOLO Well with Hand-Pump	NG'OMBEYA YERA Well with Hand-Pump	CHIMCHERE Borehole No.1,N 83	CHING'OMBE Borehole No.1,N 61
F	(mg/l)	3.0	3.3	2.5	4.8	0.15	2.0

Items Tested in 1999		Malawi Water Quality Standard	Malawi Water Quality Standard				
			11	2	12	13	14
			NATHENJE River (LILONGWE)	LINTHIPE-Ⅱ River (DEDZA)	MWATIBU Borehole J.G 159 (LILONGWE)	MTHALA Shallow Well	LOBI TRADING CENTRE Borehole.D76 (DEDZA)
PH		6.0-9.5	8.0	7.5	7.3	6.9	6.6
E.C	(μS/cm)		406	132	335	101	135
Cl	(mg/l)	750	20	30	18	18	23
SO^4	(mg/l)	800	27.0	7.8	12.0	15.0	4.2
NO^3	(mg/l)	100	0.06	0.07	0.90	0.11	0.11
Fe^2	(mg/l)	3.0	0.12	0.42	0.05	0.12	0.05
T.H.	(mg/l)	800	336	84	244	92	104
Turbidity	(NTU)	25	14	10	＜0.10	300	24
F	(mg/l)	3.0	7.8	3.0	4.6	3.5	3.1

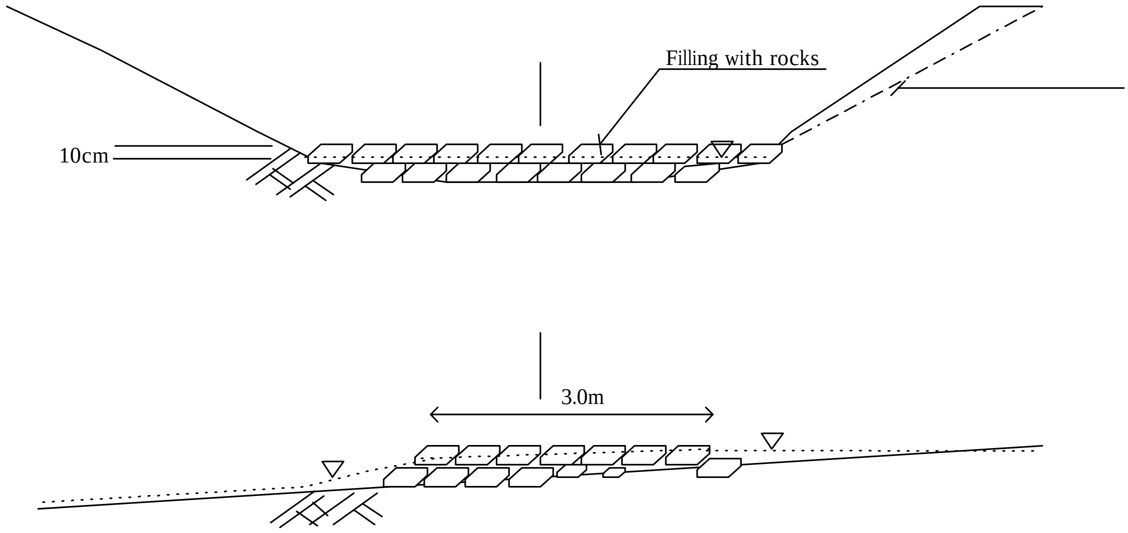
ABBR: E.C.; Electric Conductivity, T.H.; Total Hardness

6-6 Roads Required Improvement and Target Villages

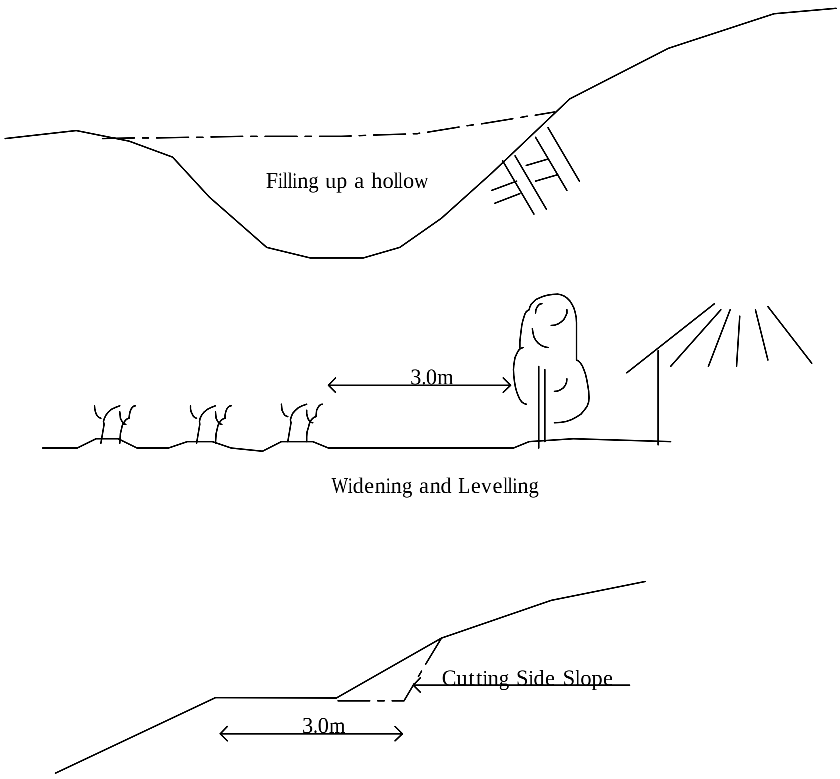
The Project for Development of Groundwater in Lilongwe-Dedza

LIST OF ROADS REQUIRED IMPROVEMENT

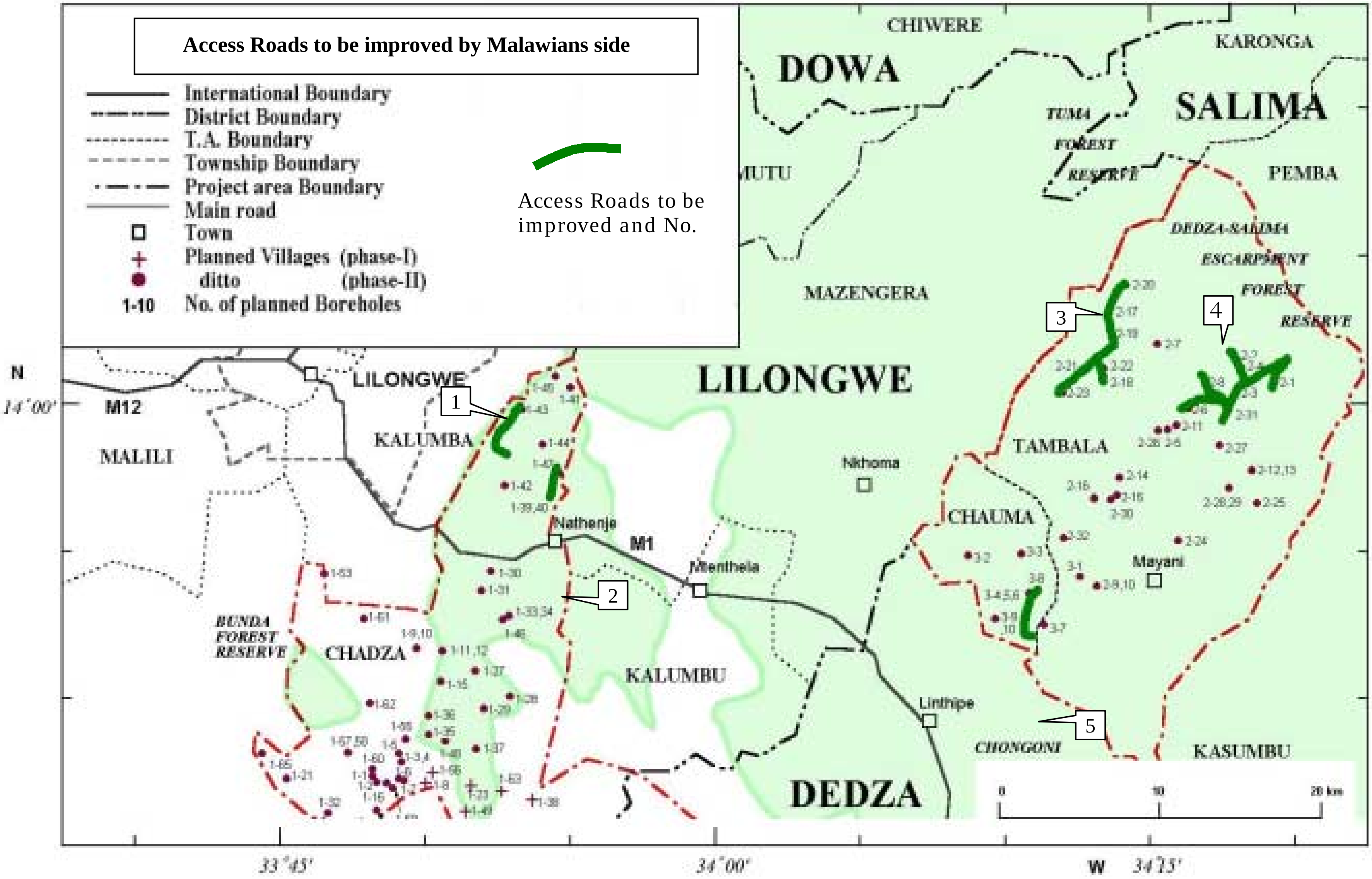
No. on Map	TA	Road and Crossing Riverbed need Improvement	Improvement Works	Targeted Village
1	Chadza	Riverbed of Mphete river	Paving on Riverbed with stones	Khonthi (1-43)
		Road between Sanjika Sch. and the site	Widening and leveling	
2	Chadza	Riverbed of Katope River	Paving on Riverbed with stones	Chisinda (1-47)
		Road between Mngomba village and Chisinda	Widening and leveling	
3	Tambala	Riverbed of Ngoma River	Paving on Riverbed with big stones	Kapanda(2-20), Kanyama(2-17), Chigumula(2-19, Mzikamanda(2-22), Kapazila(2-21), Chibori(2-18), Kudembe(2-23)
		Road between Kalulu village and the 7 sites Steep slope crossing valley (1.5km north-east from Kalulu village)	Widening and leveling Filling over valley with earth to make slope gentle and to widen road	
4	Tambala	Riverbed of Chilungusi River	Paving on Riverbed with big stones	Mangamphasa(2-1), Kwilemba(2-4), Mbuziyadula(2-2), Mpombe(2-3), Mgawi(2-8), Matsikila(2-31)
		Road between Chilungusi river and the 6 sites	Widening and leveling	
5	Chauma	Riverbed of Livuwadzi River	Paving on Riverbed with big stones	Linyama(3-8), Chikumba(3-4,5,6)
		Road between Biwi Chaunawa and the 4 sites	Widening and leveling	



Necessary Measure for Access Road at Crossing River



Improvement of Access Road for Drilling Rig (GVM 16t)



Access Roads to be improved by Malawians side
International Boundary
District Boundary
T.A. Boundary
Township Boundary
Project area Boundary
Main road
Town
Planned Villages (phase-I)
ditto (phase-II)
1-10 No. of planned Boreholes
Access Roads to be improved and No.
CHIWERE
KARONGA
DOWA
SALIMA
TUMA FOREST RESERVE
MUTU
PEMBA
DEDZA-SALIMA ESCARPMENT FOREST RESERVE
MAZENGERA
LILONGWE
LILONGWE
M12
14°00'
N
KALUMBA
MALILI
TAMBALA
Nkhoma
Nathenje
M1
Mlenthela
CHAUMA
Mayani
BUNDA FOREST RESERVE
CHADZA
KALUMBU
Linthipe
CHONGONI
KASUMBU
DEDZA
1
2
3
4
5
0
10
20 km
33°45'
34°00'
34°15'
W

6-7 LOCATION OF HEALTH CARE CENTRE AND HOSPITAL

Distribution of Health Care Centres and Hospital

Legends

International Boundary
District Boundary
T.A. Boundary
Project Area
City

■ Health Care Centre/Hospital (under MoHP or District)
◆ Location of Health Care Centre/Hospital (under Church)
Main Road (Paved)
Secondary Road (Paved)
Secondary Road (Unpaved)
Tertiary Road (Unpaved)
District Road (Unpaved)

EXISTING BOREHOLE LIST (TA. CHADZA)　　既存井戸資料（TA. Chadza）

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter(mm)	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)		(m)	Static	Dynamic	(lts/s)						
Akudowa		LM 418																			
Bunda College		FP 154								25.00	250					AFRIDEV		University	1975		
Bunda College		GK 139								25.00	300					CLIMAX		University	1974		
Bunda Forestry		HD 19								36.00	110					AFRIDEV		Govt.	1952		
Bwenba		PSC2/131								54.00			2.00	47.41	0.50						
Chadabwa Sch.		—														AFRIDEV		MASAF			
Chadza	049	LDF 62	14°08’58”	33°51’08”	3											AFRIDEV	W		1999		
Chadza	055	RC,NBC25	14°09’10”	33°51’04”	3												W				
Chadza Court	051	K 39	14°08’43”	33°50’30”	3					40.00	130					AFRIDEV	W	T.A.	1954		
Chadza MCDE		MM 101								42.00						CLIMAX			1994/5/5		
Chadza Sch.		SM 17								20.00	150					CLIMAX		LLDP	1976		
Chadza Sch.		W 121								20.00	100					BUSH		T.A.	1961		
Chakumodzi		PSC2/067								41.00			10.30	24.07							
Chamadenga Sch.		—														AFRIDEV		MASAF			
Chambadzana	066	—			0.5												W				
Chibubu P.S.	056	L 231			3											AFRIDEV					
Chibubu P.S.	046	RS 444	14°07’37”	33°53’23”	>5	23.5	0.412	24.3	7.14							AFRIDEV	W		13/3/1999		
Chibubu Sch.		SB/07/351								40.00			1.99			AFRIDEV		3K project	1999		
Chidambaila		LFP 64														AFRIDEV			1999		
Chikanga Sch.		—														AFRIDEV		MASAF			
Chikhumba	058	HD 205	14°14’17”	33°52’48”						12.00	112					AFRIDEV	W	T.A.	1956		
Chimbayo		A 25								20.00	106					AFRIDEV		T.A.	1961		
Chimutu	056	DM 25	14°16’16”	33°53’46”						35.00	150					BUSH	B/D	LLDP	1976		broken down since 2000
Chimwala		—														AFRIDEV		MASAF			
Ching'ombe Sch.		SM 206														AFRIDEV			1984		
Chinsapo III		D 17								26.00	90					CLIMAX		T.A.	1967		
Chinthwankwa	052	PM 269	14°17’53”	33°55’26”						18.00	150					AFRIDEV	B/D	LLDP	1976		
Chiozumba		DM 26														BUSH			1976		
Chipabwe		RM 40								9.00	150					BUSH		LLDP	1975		
Chipeni		—														AFRIDEV		MASAF			
Chipeni	043	PM 272	14°13’23”	33°51’28”	3					27.00	150					AFRIDEV	W		1976		
Chiphaka	037	X 39	14°10’53”	33°53’15”	0.7	24.0	0.391	25.6	7.38	46.00	120					AFRIDEV	W	T.A.	1970		
Chiphaka TC		—														AFRIDEV			1999		
Chipiri	027	SB/07/142	14°05’19”	33°46’29”	0.5											AFRIDEV	W	3K project			Chipiri J/P Sch.
Chisamba I		PM 256								20.00	150					AFRIDEV		LLDP	1976		
Chisamba II		PM 265								40.00	150					AFRIDEV		LLDP	1976		
Chisenga/Chizinga	027	H 151	14°13’51”	33°47’58”						12.00	150					AFRIDEV	B/D	T.A.	1966		
Chitekwele		RM 39								10.00	150					BUSH		LLDP	1975		
Chithamkanda		SM 191								30.00	150					AFRIDEV		LLDP	1977		
Chitikwere		—																			
Chiwala		Q 202								73.00	153					CLIMAX		LLDP	1968		
Chiwiri Sch.		PAMM 065														AFRIDEV		MASAF			
Chizinga	027	R 20																			
Cliwoko		SM 208														AFRIDEV			1977		
Diamphwe Clinic		FP 29								28.00	150					CLIMAX		DC	1973		
Dzama-Nathenje		LM 81														MALAWI P		I.D.A.	1986		
Dziwe		—														AFRIDEV			1995		
Gumbi Sch.	015	L.F.P.83	13°59’44”	33°54’38”												AFRIDEV	B/D				Jonathani Vill. , broken down since 10/2000

EXISTING BOREHOLE LIST (TA. CHADZA)　　既存井戸資料（TA. Chadza）

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter(mm)	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)		(m)	Static	Dynamic	(lts/s)						
Kachala I		D 64								18.00	116					Mono		LLDP	1968		
Kachala II		D 65								12.00	116					CLIMAX		LLDP	1968		
Kachale H.C.	066	MM 77	14°16’46”	33°54’31”	0.5	24.2	0.117	85.5	7.30							CLIMAX	W		3/12/1993		
Kacheta		—														AFRIDEV		MASAF			
Kachure		MM 291														AFRIDEV			1995		
Kafula		SB/07/243								36.00			4.68			AFRIDEV		3K project	1999		
Kakwela Sch.		SB/07/217								30.00			3.58			AFRIDEV		3K project	1999		
Kalima		JG 169														AFRIDEV			1995		
Kaliopa School		L 147								13.00	120					AFRIDEV		T.A.	1954		
Kalumba		—	14°12’49”	33°48’21”												AFRIDEV	B/D				
Kalumba/Mchenga		E 283								33.00	103					AFRIDEV		T.A.	1959		
Kalumbi		HD 204								25.00	115					AFRIDEV		T.A.	1956		
Kamchedzera		—																			
Kamtigidi		SB/07/240								30.00			2.83					3K project	1999		
Kamundi	013	—	14°04’57”	33°53’38”																	
Kamundi	013	RS 442	14°04’54”	33°53’31”	>5	25.2	0.843	11.9	7.59								W		11/3/99		
Kankhulungo		SB/07/238								31.00		24.00	5.53			AFRIDEV		3K project	1999		
Kapazanje		RM 38								3.00	150					MONO		LLDP	1975		
Kape	007	A8A_	14°03’33”	33°54’06”	>5	23.7	0.527	19.0	7.32								W		31/8/91		
Katsuwatsuwata	069	E 294	14°15’56”	33°52’18”	0.3												W				
Katsuwatsuwata		L 294								10.00	110					AFRIDEV		T.A.	1955		
Katunga	020	E 193	14°11’46”	33°53’50”	1	24.0	0.67	14.9	7.25	34.00	137					BUSH	W	T.A.	1958		
Khombe Sch.	020	LM 68	14°09’37”	33°48’36”	4											MALAWI P	W		1984		
Kudowa		LN 418								16.87		13.00	2.80		1.00						
Kumitondo		SB/07/***														AFRIDEV			1999		
Kumzinda		SM 200								31.00	150					AFRIDEV		LLDP	1977		
Kunzama		GM 115A								33.00	34					90			1986		
Kunzama		GM 115B								42.00	43					105			1986		
Liwiro		PM 262								21.00	150					AFRIDEV		LLDP	1976		
Lunguzi		—														AFRIDEV		MASAF			
Majetanji		SM 194								18.00	150					AFRIDEV		LLDP	1977		
Malimbwe		PM 257								15.00	150					IRQIGA		LLDP	1976		
Malimbwe II		SM 204														AFRIDEV			1977		
Maluwa clinic		PM 207								20.00	150					AFRIDEV		DC	1975		
Maluwa T.C.	066	PM 20	14°15’38”	33°52’25”		24.0	0.343	29.2	7.25								W				
Mang'ombe		PM 254								18.00	171					AFRIDEV		LLDP	1976		
Matumbo	007	—	14°03’19”	33°54’17”																	
Mbalame Sch.		—														AFRIDEV		MASAF			
Mbalamo		DM 27								5.00	175					IRQIGA		LLDP	1976		
M'bang'ombe		SM 199								10.00	150					AFRIDEV		LLDP	1977		
Mbatat		—																			
Mbewa	059	SM 195	14°06’25”	33°52’00”	2	23.1	0.63	15.9	7.02	20.00	150					AFRIDEV	W	LLDP	1977		
Mbewa II		SM 205								10.00	150					AFRIDEV		LLDP	1977		
Mbwache	064	—	14°01’42”	33°53’32”	1	25.6	0.641	15.6	7.79							AFRIDEV	W		18/9/1991		
Mchonkhwe	064	L07/225			0.5											AFRIDEV	W		7/11/1999		
Mchuchu																					
Milonde P.S.	060	L07/99 (WDC 52)	14°12’27”	33°45’02”	0.5											AFRIDEV	W				
Mitundu (Unit24)		PM 56								10.00	167/10					CLIMAX		LLDP	1975		

EXISTING BOREHOLE LIST (TA. CHADZA)　　既存井戸資料（TA. Chadza）

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter(mm)	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)		(m)	Static	Dynamic	(lts/s)						
Mitundu DEC		—	14°14’25”	33°46’54”	0.2											AFRIDEV	W				
Mkhomera		SM 189								30.00	150/30					AFRIDEV		LLDP	1977		
Mkhomo		PM 30								44.00						AFRIDEV			1999		
Mkhomo Sch.		—														AFRIDEV		MASAF			
Mkoche	027	—	14°13’03”	33°48’55”																	
Mkoche	028	PM 255	14°13’02”	33°48’55”													B/D				
Mkwinda		PM 57								10.00	175					CLIMAX		LLDP	1975		
Mlare Mission		R 23								30.00	150					POWER		Mission	1969		
Mnodzedzi		SM 7								32.00	105					CLIMAX		LLDP	1976		
Mongo	033	SB/07/215	14°05’37”	33°54’09”	2					30.00		24.00	5.91			AFRIDEV	W	3K project	1999		
Moyo / Mwatibu		JG 159														AFRIDEV			1995		
Mpemba Town Prop		SM 8														AFRIDEV			1976		
Mphatha / Phunde		SM 187								45.75	150	45.00	4.90		22.80			LLDP	1977		
Mphepo		SM 188														AFRIDEV			1977		
Mphonde		SB/07/249								36.00		27.00	4.66					3K project	1999		
Msampha I		E 195								19.00	100					BUSH		T.A.	1958		
Msampha I		PSC2/069								30.00			5.20	13.71	0.40						
Msendere		PM 42								40.00	210					CLIMAX		LLDP	1975		
Mtika/Mlinga		Q 118								45.00	91					CLIMAX		T.A.	1957		
Mwadzungu I		SM 190								30.00	150					AFRIDEV		LLDP	1977		
Mwalaulomwe T.C.	011	SB/07/342														AFRIDEV		3K project	1999		
Mwase VH		LFP 65														AFRIDEV			1999		
Mwatibu	018	LDF 63/LFP 63	14°08’43”	33°49’36”	5											AFRIDEV	W		1999		
Mwenda		E 192								19.00						BUSH		T.A.	1958		
Mwenda Sch.		—														CLIMAX					
Nakuyele		WDC 62	14°12’27”	33°45’02”	0.5											AFRIDEV	W	EU			Milonde J/P Sch.
Namankho		LM 65														MALAWI P			1984		
Namankho	011	RS 440	14°04’21”	33°51’39”	>5	24.8	0.947	10.6	7.28							AFRIDEV	W				
Nathenje		X 150								37.21	122	36.60	7.01		68.40	POWER		F.C.T	1971		
Nathenje Clinic		SM 155								16.00	175					POWER		LLDP	1977		
Nathenje T.C.		K 37								36.60	120	33.50	10.00		57.00	AFRIDEV		T.A.	1954		
Ncherero		PSC2/125								52.00			12.05	34.31	0.25						
Ndabwi		DM 29								25.00	155					AFRIDEV		LLDP	1976		
Njela		D 55								20.00	175					POWER		T.A.	1967		
Njwala		SB/07/241								36.00			7.99			AFRIDEV		3K project	1999		
Nkhosa	011	E 284	14°15’01”	33°52’10”						20.00	160					AFRIDEV	W	T.A.	1958		
Nsabwe		H 150								35.00	160					AFRIDEV		T.A.	1966		
Nsabwemanyazi		PM 258								18.00	150								1977		
Nsanjika Sch.		—														AFRIDEV			1995		
Ntcherela	011	RSC2/125	14°04’06”	33°52’01”													W		5/2001		no pump installation
Nthanga		SB/07/216								36.00			6.13			AFRIDEV		3K project	1999		
Nyamazani	051	PM 268	14°16’58”	33°56’37”	1	23.8	0.282	35.5	6.65	23.00	150					AFRIDEV	W	LLDP	1976		
Nyemba		SM 207														AFRIDEV			1977		
Nyondo		—														AFRIDEV		MASAF			
Phatha / Thunde		SM 187								30.00	150					AFRIDEV		LLDP	1977		
Phula		PM 270								10.00	130					AFRIDEV		LLDP	1976		
Sokomela		—																			
Tengwe		—														AFRIDEV		MASAF			

EXISTING BOREHOLE LIST (TA. CHADZA)　　既存井戸資料（TA. Chadza)

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diamet	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)	er(mm)	(m)	Static	Dynamic	(lts/s)						
Thunga		PI 352								54.00		26.00						American Embassy	1993		
Tsoka		SB/07/214								30.00		24.00	8.36			AFRIDEV		3K project	1999		
Unali		LN 379								9.00		6.00	5.00								
Zipendo		—																			

EXISTING BOREHOLE LIST (TA. Tambala) 既存井戸資料 （TA. Tambala）

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter(mm)	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)		(m)	Static	Dynamic	(lts/s)						
Alifi Malinda		DZ 231														AFRIDEV		DZ Hills	1993		
Biwi Chaundua		DZ 108A														AFRIDEV					
Bowa	015	DZ 24	14°03’38”	34°17’33”												AQUADEV	B/D				
Bwanamli		–														AFRIDEV					
Chabinda		DZ 272														AFRIDEV					
Chalendewa		DZ 44														AFRIDEV					
Chamba		DZ 232A														AFRIDEV		DZ Hills			
Chamba	018	DZ 41	14°03’16”	34°15’44”	0.5	24.1	0.202	49.5	6.18							AFRIDEV	W	DZ Hills			
Chambala		GT 413										41.30	10.00			AFRIDEV		DZ Hills	1994		
Chanba II	003	–	14°00’22”	34°15’33”	0	25.0	0.277	36.1	6.30							AFRIDEV	W				
Chawala		GT 239																			
Chief Tambala		SB/07/283								35.00			1.80			AFRIDEV		3K project			
Chikandwe		DZ 230														AFRIDEV		DZ Hills	1993		
Chikandwe	012	DZ 238	14°01’28”	34°13’55”	1	24.2	0.319	31.3	6.34							AFRIDEV	W	DZ Hills			scan2141
Chilakalaka		GT 248																			
Chilimata		DZ 106																DZ Hills	1994		
Chilungu	017	–	14°03’57”	34°17’56”													B/D				
Chimseu		GT 250														AFRIDEV		DZ Hills	1993		
Chimthalla		DZ 34										18.40	2.90			AFRIDEV		DZ Hills	1993		
Chimwere		DH 22								31.00		28.00									
Chimwere		GT 261A										31.50	7.60					DZ Hills	1994		
Chinkhola		DZ 233										26.50	9.20			AFRIDEV		DZ Hills			
Chiphalla		DZ 180										11.00	9.00			AFRIDEV		DZ Hills			
Chiphuwanya		DZ 31										31.20	3.50			AFRIDEV		DZ Hills	1993		
Chiphuwanya		GT 412														BUSH		DZ Hills	1993		
Chiphuwanya		PM 200														AFRIDEV		CSC	1975		
Chisangwi		SB/07/254																3K project			
Chitundu Sch.	801	DZ 16	14°06’04”	34°15’45”	0.5	23.8	0.1371	72.9	5.92							AQUADEV	W				Kajenda vill.
Chitundu Sch.	801	PM 199														AFRIDEV		CSC	1975		
Chiuye		DZ 3														AFRIDEV		DZ Hills	1993		
Chizwa		MM 157										29.00	7.50			AFRIDEV					
Chochoma		DZ 250A										17.00	11.00			AFRIDEV					
Chokoma	010	DZ 49	14°00’43”	34°12’26”												AFRIDEV	B/D				
Chombe		DZ 223														AFRIDEV		DZ Hills	1993		
Chombe		GT 238																			
Chonde		GT **																			
Dule	027	DH 18	14°05’55”	34°17’01”												AQUADEV	B/D	DZ Hills	1993		handle stolen
Gwengwe	019	DH 13										38.00	11.00			AFRIDEV		DZ Hills	1993		
Gwengwe	019	DZ 276	14°03’10”	34°15’04”	0.5	24.7	0.1883	53.1	6.33							AFRIDEV	W				
Gwengwe	019	GT *59	14°03’09”	34°14’56”	1	23.1	0.1376	72.7	6.07							AFRIDEV	W				
Gwengwe Chialilla		GT 58														AFRIDEV		DZ Hills			
Gwengwe Mpolo		DZ 276														AFRIDEV		DZ Hills			
Gwengwe Chilungusi	017	–	14°03’05”	34°17’33”												AQUADEV	B/D				
Gwengwe Chilungusi	017	PI 418	14°02’52”	34°17’45”	0.5	25.0	0.326	30.7	6.27							AQUADEV	W				
Kachala Dip Tank	046	GT 237	14°10’35”	34°13’15”	0.5～1	22.7	0.418	23.9	6.46							AQUADEV	W				
Kachunda		DZ 63																			
Kadyenda		DH 17														AFRIDEV		DZ Hills	1993		
Kadzikwe		GT 256														AFRIDEV		DZ Hills	1993		

EXISTING BOREHOLE LIST (TA. Tambala)　　既存井戸資料 （TA. Tambala）

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter(mm)	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)		(m)	Static	Dynamic	(lts/s)						
Kafwafwa	016	DH 26	14°04’17”	34°17’25”								47.00	9.00			AQUADEV	B/D				
Kafwafwa	016	DZ 25	14°04’27”	34°17’19”								16.00	6.20			AQUADEV	B/D	DZ Hills	1993		no pump
Kainja		DZ 176B														AFRIDEV		DZ Hills	1994		
Kalimba	009	GT 260	14°00’33”	34°15’09”	1.5	25.4	0.423	23.6	7.07			34.00	13.00			AQUADEV	W	DZ Hills	1993		
Kalinde		DH 19								41.00		39.00	5.00			AFRIDEV		DZ Hills	1993		
Kaliwande		DZ 814A														AFRIDEV		DZ Hills	1994		
Kalulu T.G.(Kudembe)	002	PM 109	13°59’47”	34°11’50”	0.5	24.0	0.611	16.4	6.83							CLIMAX	W	DDC			muddy water
Kalulu T.G.(Kudembe)	002	SB/07/364	13°59’47”	34°11’51”						48.00						AFRIDEV	B/D	3K project	24/4/2001		matcho b co.
Kamelo		GT 263														AFRIDEV		DZ Hills	1993		
Kamero	035	GT 26	14°06’18”	34°14’41”	0	24.0	0.202	49.5	6.29							AFRIDEV	W				
Kamgunda	036	D 15	14°04’50”	34°14’36”						24.00			8.00			AFRIDEV	B/D	T.A.	1967		scan2173
Kamgunda	036	DZ 23														AFRIDEV		DZ Hills	1993		
Kamgunda	036	DZ 277	14°05’01”	34°14’30”	0	21.6	0.1914	52.2	6.89							AFRIDEV	W				
Kamgunda	036	GT 277B														AFRIDEV		DZ Hills	1994		
Kamphinda		GT 249																DZ Hills	1993		
Kamtande	035	SB/07/276	14°08’04”	34°13’59”	0.5	24.2	0.213	46.9	6.23	45.00			6.05			AFRIDEV	W	3K project			
Kamtedza		PM 198														AFRIDEV		DDC	1973		
Kamtedza Sch.		DZ 73														AFRIDEV		DZ Hills	1993		
Kamtenga Sch.		－														AFRIDEV		MASAF		1999	
Kandoole		GT 234																			
Kantande	035	－	14°08’03”	34°13’56”												AFRIDEV	B/D				
Kanyungu Dip Tank		GT 409																			
Kaole	015	DH 26A	14°03’23”	34°18’42”								50.50	16.80			AQUADEV	B/D	DZ Hills			
Kapeleke		DZ 35										13.40	9.30			AFRIDEV		DZ Hills	1993		
Kaphudza		DZ 50A										23.00	16.00			AFRIDEV		DZ Hills			
Kaphuka Sch.		DZ 274																			
Kasinja		DZ 186														AFRIDEV		DZ Hills	1994		
Kasonda		DH 29																			
Kasonda		GT 235										50.00	2.50					DZ Hills	1994		
Kasonda		Y 170																			
Kasulo		DZ 108										19.00	15.00			AFRIDEV					
Katete	009	GT 258	14°00’50”	34°16’10”						43.00			28.00			AQUADEV	B/D	DZ Hills			poor supply
Kathumba		LP 480								39.00		33.00	4.80			AFRIDEV		DZ Hills			
Knmwembe		DZ 279														AFRIDEV					
Kulongwe		GT 255														AFRIDEV		DZ Hills			
Kumaloya		DZ 16														AFRIDEV		DZ Hills			
Kumatipa		FC 193														AFRIDEV		DDC	1972		
Kumaunda	013	DH 4	14°01’50”	34°14’41”								27.70	7.70			AFRIDEV					PROSCARP
Kumtawanga		GT 242										47.50	15.50			AFRIDEV		DZ Hills	1993		
Kumulembe		DZ 196														AFRIDEV		DDC	1993		
Kunkhongo		DZ 128A										26.50	6.30			AFRIDEV		DZ Hills	1994		
Kunyunguli		GT 253										25.00	2.90			AFRIDEV		DZ Hills	1993		
Kwanya	014	DZ 451	14°01’33”	34°15’23”	1	23.9	0.288	34.7	6.39	30.00			6.21			AFRIDEV	W	DZ Hills		rehabilitated	scan1011
Kwanya	014	LP 482																PROSCARP			
Likangala	034	DZ 82	14°07’53”	34°14’28”												AQUADEV	B/D	DZ Hills	1993		
Lipululu		GT 261B																DZ Hills	1994		
Liunga I	022	DZ 175	14°03’10”	34°11’33”	0	24.2	0.682	14.7	6.65							AFRIDEV	W	DZ Hills	1993		
Liunga I	022	DZ 176A														AFRIDEV		DZ Hills			

EXISTING BOREHOLE LIST (TA. Tambala)　　既存井戸資料（TA. Tambala）

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diamet	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)	er(mm)	(m)	Static	Dynamic	(lts/s)						
Liunga I	022	DZ 36	14°03'15"	34°11'32"												AFRIDEV	B/D	DZ Hills			
Lodzanyama		—														AFRIDEV		MASAF		1999	
Lodzanyama		DZ 207														AFRIDEV		DZ Hills	1993		Dry
Lodzanyama	029	GT 254	14°05'51"	34°17'37"	0.5	22.7	0.233	42.9	6.22	28.50			5.60			AFRIDEV	W	DZ Hills	1993		
Maganga		DZ 278														AFRIDEV					
Maganga II	003	SB/07/281	13°59'12"	34°15'16"	2	24.5	0.228	43.9	6.32	40.00			15.23			AFRIDEV	W	3K project	11/4/2001		
Malenya		DZ 2														AFRIDEV		DZ Hills	1993		
Mangila	021	—	14°02'30"	34°14'19"	0.5	23.8	0.217	46.1	6.82							AFRIDEV	W				u-seal
Mangila		DZ 277A														AFRIDEV		DZ Hills	1993		
Mangira		GT 251																DZ Hills	1994		
Mangwiza		DZ 50										23.00	17.00			AFRIDEV		DZ Hills	1993		
Manjira	021	GT 251	14°03'17"	34°14'09"												AQUADEV	B/D				broken down since 1997
Mapemba	039	DH 21	14°06'12"	34°13'10"												AFRIDEV	B/D				small yield
Matapwe		DZ 194														AFRIDEV		DZ Hills			
Matapwe		LP 481								54.00		45.00	6.00			AFRIDEV		PROSCARP			
Matawanya		DH 16								47.00											
Matipa	007	—	14°04'33"	34°12'02"	1	23.8	0.399	25.1	6.66							AFRIDEV	W				
Matipa	007	RS 078	14°04'25"	34°12'04"	1	24.7	0.548	18.2	6.41	40.00		33.00	5.00	30.00	0.44	AFRIDEV	W				
Maundu		DZ 75														AFRIDEV		DZ Hills	1993		
Mayani ADMARC		SM 58								45.25			15.24		6.70	AFRIDEV		ADMARC	1977		
Mayani Agri. Sta.		GT 243								42.00		38.65	11.25					DZ Hills	1993		
Mayani Disp.		E 17														AFRIDEV		Govt.	1959		silted
Mayani H.C.		ER 16														CLIMAX		DDC	1977		
Mayani P.O.	802	SB/07/278	14°05'58"	34°14'58"	0	23.5	0.1306	76.6	5.89	45.00			7.85			AFRIDEV	W	3K project			
Mayani T.C.	801	DZ 29										18.90	14.20					DZ Hills	1993		Dry
Mayani T.C.	801	MM 396	14°05'49"	34°15'04"	0.5	23.3	0.1801	55.5	5.80							AFRIDEV	W	DDC	1996		
Mikochi		DZ 227										28.50	5.80			AFRIDEV		DZ Hills	1994		
Misuthu		D 15A										38.50	3.60			BUSH		DZ Hills	1993		
Mitenje	010	DH 15	14°01'19"	34°11'20"												AFRIDEV	B/D				
Mjini		DZ 275														AFRIDEV		DZ Hills	1993		
Mjini H.C.		—														CLIMAX		MASAF		1999	
Mkhonde	008	DH 27	14°03'23"	34°17'04"								32.40	24.00			AQUADEV	B/D	DZ Hills			
Mkokoko	017	DH 12	14°03'57"	34°16'18"								37.70	3.40			AFRIDEV	B/D	DZ Hills			broken down since 1995
Mkokoko	017	DZ 254														AFRIDEV					
Mkomba		DZ 192														AFRIDEV		DZ Hills	1993		
Mkongo	021	—	14°03'17"	34°13'55"												AFRIDEV	B/D				scan2140
Mkulisa		GT 265										24.00	6.90			AFRIDEV		DZ Hills	1993		
Mlembe		DZ 250														AFRIDEV					
Mlenga	012	DZ 232	14°01'19"	34°14'57"	1	24.0	0.231	43.3	6.06							AFRIDEV	W	DZ Hills	1993		
Mlenga Sch	008	SB/07/361	14°01'14"	34°17'12"	1	24.0	0.342	29.2	6.42	41.00			4.28			AFRIDEV	W	3K project			Mkhonde vill.
Mlolo		DZ 234																			
Mlolo		DZ 40																			
Mlozi Sch.	013	SB/07/284	14°02'25"	34°14'34"	1～2	25.1	0.267	37.5	6.16	45.00						AFRIDEV	W	3K project			Mitawa vill.
Mndende		GT 267																			
Mndendere		DZ 206														AFRIDEV					
Mnewo		DZ 22										10.50	3.00			AFRIDEV		DZ Hills	1994		
Moyo	002	—	14°00'05"	34°11'40"	0	24.8	0.724	13.8	6.72							CLIMAX	W				for Kalulu Health Center
Mphalabungu		DZ 53										20.50	7.00			AFRIDEV		DZ Hills	1993		

EXISTING BOREHOLE LIST (TA. Tambala)　　既存井戸資料 （TA. Tambala）

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)	er(mm)	(m)	Static	Dynamic	(lts/s)						
Mphasa Estate		CC 32																	1980		
Mphenji		DZ 814B										30.00	3.00			AFRIDEV		DZ Hills	1994		
Mphenzi		DZ 1														AFRIDEV		DZ Hills	1994		
Mpilima		DH 8										35.00	4.00			AFRIDEV					
Mpima		DZ 48														AFRIDEV					
Msalanyama	014	GT 264	14°01'38"	34°16'26"								32.20	23.50			AFRIDEV	B/D	DZ Hills			silted
Mtabwe	037	－	14°05'27"	34°13'22"	1	23.1	0.268	37.3	6.26							AFRIDEV	W				
Mtambo		DZ 18														AFRIDEV		DZ Hills			
Mtawanga		GT 242								47.00		44.00									
Mtayang'oma		SB/07/365								45.00			8.33			AFRIDEV		3K project			
Mtemwende		DZ 221														AFRIDEV		DZ Hills			
Mtemwende		DZ 221A														AFRIDEV		DZ Hills			
Mtemwende		GT 252										29.30	3.30			AFRIDEV		DZ Hills			
Mtemwende		MM 268														AFRIDEV		World Vision			
Mtemwende II		SB/07/280								40.00						AFRIDEV		3K project			
Mtenje		DH 14										31.00	4.00			AFRIDEV		DZ Hills	1993		
Mtenje		DH 15														AFRIDEV		DZ Hills			
Mtitimila		DZ 189														AFRIDEV		DZ Hills			Dry
Mtonya		GT 236										41.70	7.50			AFRIDEV		DZ Hills	1994		
Mulanda Sch.		JG 28														AFRIDEV		DZ Hills	1993		
Muyowe		DZ 27														AFRIDEV		DZ Hills	1993		
Mwabua		DH 11										29.20	7.40			AFRIDEV		DZ Hills			
Mwadzama		DZ 223A														AFRIDEV		DZ Hills	1993		
Mwala	012	SB/07/285	14°01'37"	34°14'03"	0.5～1	23.0	0.1955	51.2	6.30	40.00			3.52			AFRIDEV	W	3K project	4/2001		
Mwanyimbo		DZ 79										30.00	5.20			AFRIDEV		DZ Hills			
Natawanga		SB/07/279								45.00			4.41			AFRIDEV		3K project			low yield
Njirayasowa		DZ 30														AFRIDEV		DZ Hills			
Sabwandira		DZ 6														AFRIDEV		DZ Hills	1994		
Sandalamu		LP 483								54.00		40.00	37.75			AFRIDEV		PROSCARP			
Sato		GT 266										20.00	3.00								
Tambala	013	DP 158	14°02'17"	34°14'21"	1	23.2	0.281	35.6	6.60							AFRIDEV	W	DDC	1972		
Tambala	019	DZ 275	14°02'31"	34°14'19"	4～5	23.5	0.263	38.0	6.36							AFRIDEV	W				scan2172
Tambala	013	SB/07/277	14°02'16"	34°14'11"	1	23.5	0.715	14.0	6.64	45.00			4.33			AFRIDEV	W	3K project			Mkomba Vill.
Thesi		DZ 225A														AFRIDEV					
Thombozi Sch.	036	SB/07/282	14°04'42"	34°14'29"						45.00		30.00	6.96			AFRIDEV	B/D	3K project			handle stolen
Tikuili		DZ 28														AFRIDEV		DZ Hills	1993		

EXISTING BOREHOLE LIST (STA. Chauma)　　　　既存井戸資料(STA. Chauma)

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)	er(mm)	(m)	Static	Dynamic	(lts/s)						
Biwi James	015	—																MASAF		1999	
Biwi James	015	—																MASAF		1999	
Biwi James	015	DZ 107	14°06'49"	34°11'52"	1.5	24.2	0.745	13.4	6.25			31.50	7.90			AFRIDEV	W	DZ Hills			
Chauma	014	GT 244	14°05'33"	34°12'09"	1～2	23.2	0.276	36.2	6.39							AFRIDEV	W	DZ Hills			
Chauma	014	RS 072	14°05'44"	34°12'05"	0.5	23.3	0.563	17.8	6.96	40.00		34.00	5.00	32.00	0.20	AFRIDEV	W				
Chauma	014	SM 289	14°05'39"	34°12'04"												AFRIDEV	B/D	DDC	1977		broken down since 1998
Chilanga Sch.	014	DZ 47	14°05'36"	34°11'36"	0.5	23.5	0.308	32.5	6.57							AFRIDEV	W	DZ Hills	1993		Chauma Vill.
Chilongosa		RS 027								40.00		33.00	5.00	27.00	0.72	AFRIDEV					NBC
Chipwika	014	RS 074	14°05'35"	34°11'55"	1	23.5	0.365	27.4	6.29	40.00		30.00	10.00	30.00	0.42	AFRIDEV	W				NBC
Chisasa II	014	DZ 225B	14°05'36"	34°10'57"	>5	25.8	0.461	21.7	6.63							AFRIDEV	W				
Chiwala	005	GT 239	14°03'47"	34°10'19"												AQUADEV	B/D				
Chonde		CL/501B																OPC	29/4/1998		
Danda		RS 077								40.00		27.00	3.00	25.00	1.00	AFRIDEV					
Dawe	003	CL/401	14°04'33"	34°08'17"	1.5	24.3	0.544	18.4	7.10							AFRIDEV	W	OPC			TITAN
Gonkho	003	DH 6	14°04'11"	34°08'13"						41.00		39.00				AFRIDEV	B/D				
Kakolo Sch.	012	EP 055	14°06'52"	34°09'34"	1	22.7	0.502	19.9	7.10							AFRIDEV	W	UNICEF	22/1/1998		Mnthambwe Vill.
Kalambo		SB/07/400								45.00			4.19			AFRIDEV		3K project			
Kangulu		CL/402																OPC			
Kaninde	009	DZ 250	14°03'54"	34°11'08"	0.5	23.2	0.496	20.2	6.74							AFRIDEV	W				scan 2149
Kapindiza	010	Y 174	14°04'47"	34°07'58"	1.5	23.4	0.387	25.8	7.45							AFRIDEV	W	DDC	1971		
Kaweche		GT 233								50.00		47.00									
Kayesela	010	DZ 274										22.00	15.00			AFRIDEV		DZ Hills	1993		
Kayesela	010	LC 501	14°05'26"	34°07'56"	0	23.1	0.333	30.0	6.55							AFRIDEV	W				
Kudoko	007	RS 073	14°05'09"	34°11'49"	1	25.0	0.219	45.7	6.24	40.00		30.00	2.00	27.00	1.00	AFRIDEV	W				
Kumitawa	012	DH 7	14°06'33"	34°09'47"	0	23.3	0.289	34.6	6.41							AQUADEV	W		27/4/1989		
Linga Sch.	005	GT 238	14°04'20"	34°10'15"	0.5～1	23.4	0.607	16.5	7.07	36.00		33.00				AFRIDEV	W				Kuchombe Vill.
Masinja		RS 079								40.00		33.00	3.00	30.00	0.65	AFRIDEV					
Matenje	014	GT 247	14°05'59"	34°11'57"								35.40	2.00			AQUADEV	B/D	DZ Hills	1993		
Mcheba	008	DH 5			0.6					36.00		33.00	4.10		1.50	AFRIDEV					
Mduluza		RS 080								40.00		30.00	7.00	27.00	0.97	AFRIDEV					
Mikundi Sch.	010	E 349	14°04'44"	34°08'31"	2	23.3	0.362	27.6	6.80	33.00			14.00			AFRIDEV	W		1964		Dawe Vill.
Mkanda		RS 076								40.00		30.00	10.00	30.00	0.69	AFRIDEV					
Mwase		DH 1								41.00		38.00									
Nkhola	010	—	14°04'38"	34°07'02"	2～5	22.2	0.691	14.5	7.19							AFRIDEV	W				
Sapita	001	DZ 43														AFRIDEV					
Thesi	004	RS 075	14°04'55"	34°10'21"	0	23.3	0.349	28.7	6.61	40.00		31.00	8.00	29.00	0.50	AFRIDEV	W				
Tsoyo	004	—														AFRIDEV		MASAF		1999	
Tsoyo	004	CL/502	14°04'43"	34°09'39"	0.5	23.3	0.419	23.9	6.63							AFRIDEV	W	OPC	5/1998		TARAZAN
Tsoyo	004	DZ/MSF/14/99	14°05'00"	34°09'44"	0.5	23.4	0.566	17.7	6.92							AFRIDEV	W	MASAF?	8/6/1999		MOZAGUA
Tsoyo Clinic	004	SM 290	14°04'46"	34°09'41"	0.7	23.6	0.606	16.5	6.70	46.00			7.00			CLIMAX	W	DDC	15/12/1977		
Tsoyo Dip Tank	004	GT 240								36.00		33.00	4.10		1.50						

Table - EXISTING BOREHOLE LIST (TA.KACHERE) 既存井戸資料 （TA. Kachere）

Village	E.A.	BH No.	Coordinates Lat.(S)	Long.(E)	F (ppm)	Temp .(℃)	EC (mS/cm)	RS (ohm-m)	pH	Depth (m)	Diameter(mm)	Pump (m)	Water Level (m) Static	Dynamic	MaxYld (lts/s)	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
Angonia		PI 433														AFRIDEV			6/1993		
Asafu		PC 54														AQUADEV		UN			
Assemblies God		DC 125														Private		ASS	1981		
Bema		MB 35								22.30			2.50			AFRIDEV		DC	1994		
Bembe		PM 775														AQUADEV		UN			
Betenego		PC 7														AQUADEV		UN			
Betenego		PM 766														AQUADEV		UN			
Bisimen		CU 1														AFRIDEV		CU	8/1995		
Bizi		PC 52														AQUADEV		UN			
Biziweui		CU 01								13.20						AFRIDEV		CU			
Boa		PM 949														AQUADEV		UN			
Bomba		SB/07/001								47.00					0.33	AFRIDEV		3K project	1/2000		NBC
Chafumbwa		RK 72									150		20.00			AFRIDEV		LLDP	1979		
Chakachadza	083	—	14°22'36"	34°10'30"												AFRIDEV	B/D		17/9/1993		IRC MOBILE TEAM
Chakachadza	083	—	14°22'38"	34°11'10"	0.3											AFRIDEV	W			31/12/1998	NBC
Chakachadza	084	—	14°22'59"	34°11'13"												AFRIDEV	B/D		31/12/1998		pump stolen at 2/1/99, NBC
Chakachadza	085	PP 297														AFRIDEV			11/1993		
Chakachadza	084	RK 83	14°22'55"	34°11'34"												AFRIDEV	B/D	CU/LLDP	1980	26/6/1993	
Chakachadza	083	RS 402	14°22'42"	34°10'54"												AFRIDEV	B/D		31/12/1998		NBC
Chakachadza	084	RS 405	14°22'57"	34°11'38"												AFRIDEV	B/D		1/1/1999		NBC
Chakachadza	083	SB/07/335								46.00								3K project			Ex. PP 297(?)
Chambiya T.C.		FM 102																		8/1994	
Chambwe	8 or 0	CUEM 190								13.00			2.72		0.29	AFRIDEV		CU	6/1999		Eureka D
Chambwe		PC 13														AQUADEV		UN			
Chambwe		PM 948														AQUADEV		UN			
Changadeya		PM 787														AQUADEV		UN			
Changadeyo(A)	030	—	14°27'23"	34°00'54"												AFRIDEV	B/D		1989(?)		
Chapatali		CZ 6														NIRA		RedCross			
Chewadi		PM 748														AQUADEV		UN			
Chibwezo	025	SB/07/197								45.00			3.45					3K project			
Chidwere		HD 54									80		11.00			AFRIDEV		T.A.	1952		
Chika		GK 111									150					AFRIDEV		DC	1974		
Chikho		PM 765														AQUADEV		UN			
Chikufikani		PC 14														AQUADEV		UN			
Chikufikani		PM 745														AQUADEV		UN			
Chikwati		CU 06								9.20						AFRIDEV		CU			
Chilikumwendo		MM 390								21.00			5.00			AFRIDEV		DDC			
Chimalira	030	CU 70	14°27'36"	34°00'53"						18.00			7.00			AFRIDEV		CU	2/1996		
Chimalira	029	FC 190								150.00						AFRIDEV		DC	1972	6/1994, 9/1997	
Chimalira Mkt.	029	FC 191								45.75			12.20		9.15						
Chimoto	032	F 15	14°26'27"	34°00'34"												CLIMAX			26/1/1994		
Chimoto 4C		PM 885														CLIMAX		UN			
Chimoto H.C.		FD 403														AQUADEV		UN			
Chimoto HC		PD 400														CLIMAX			6/1993		
Chimpando/Chikuzi		SB/07/271								46.00			2.78					3K project			
Chimphalika	032	SB/07/267								45.00			5.38					3K project			
Chimphalika Sch		MM 90								32.30			3.70			AFRIDEV		EDUC	1994		
Chimphe																AFRIDEV		CU			

Table - EXISTING BOREHOLE LIST (TA.KACHERE) 既存井戸資料 （TA. Kachere)

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter(mm)	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)		(m)	Static	Dynamic	(lts/s)						
Chimwakhuku		L 77																		8/1994	
Chimwangalu F.P. Sch.	031	CDC/01/132	14°26’44”	34°00’29”	0.1	23.9	0.55	18.2	7.53	46.00						AFRIDEV	W				
Chimwankhuku F.P. Sch.	049	KB 218	14°20’53”	34°04’26”												AFRIDEV		CU	10/1/1995		
Chingalu	8 or 0	CUEM 194								13.00			3.00		0.29	AFRIDEV	W	CU	7/1999		Eureka D
Chingwala	078	—	14°23’24”	34°06’32”						12.20			4.50			AFRIDEV			10/6/1999		
Chinhthankhwa		CUEA 124								26.00			3.80		0.20	AFRIDEV		CU	6/1997		Eureka H
Chinkhowbe Sch		MM 262								24.00			2.00			AFRIDEV		WB			
Chinkhu		PM 854														AQUADEV		UN			
Chinkhunda	055	CUEM 192								20.50			4.48		0.33	AFRIDEV		CU	7/1999		Eureka D
Chinkuite	021	MM 391	14°24’40”	33°57’12”						22.00			0.00			AFRIDEV		DDC			
Chipanga	074	—	14°21’13”	34°04’53”	0.7					11.00			3.40			NIRA	W	CU	20/10/97		
Chipanga	050	CUV 121														MALDA		CU	9/1997		
Chipeni		HA 16														AFRIDEV		GV			
Chiphalika		FC 191									150					AFRIDEV		DC	1972		
Chiphalika Sch		PM 841														AFRIDEV		UN			
Chiphe	053	CUEA 117								23.00			1.30		0.20	AFRIDEV		CU	5/1997		Eureka H
Chiphe	053	RK 68								150.00						AFRIDEV		LLDP	1979	8/1994	
Chiphe	053	SB/07/260																3K project			
Chisewe		MM 392								19.00			1.00			AFRIDEV		DDC			
Chithasa	064	PC 11														AFRIDEV		UN		11/1993	
Chithasa		PM 884														AQUADEV		UN			
Chiugauje		BJ 27														AQUADEV		UN			
Chiwala		MM 264								32.00			6.00			AFRIDEV		WB			
Chizu		PM 757														AQUADEV		UN			
Chopenga	038	CUEM 193								10.00			1.93		0.36	AFRIDEV		CU	7/1999		Eureka D
Chumachisala	077	CUEA 121								29.00			4.50		0.40	AFRIDEV		CU	26/6/1997		Eureka H
Chumachitsala																AFRIDEV		CU			
Clia Chimtengo																AFRIDEV		CU			
Dambo		CUEA 120								27.00			1.70		0.50	AFRIDEV		CU	5/1997		Eureka H
Dambo																AFRIDEV		CU			
Daniele		PM 792														AQUADEV		UN			
Dete		MM 239								40.00			9.00			AFRIDEV		W.Vission			
Domoya		PM 769														CLOSED		UN			
Dsuwbi		DM 19									150		25.00			AFRIDEV		LLDP	1976		
DZ MYP	012	R 217								33.55					3.05					8/1994	
DZ MYP		RK 217														AFRIDEV		MYP	1970		
Dzalauyama		DM 18														AFRIDEV		VET			
Dzasnouga		PM 764														AQUADEV		UN			
Dzinyemba		LM 125														AQUADEV		UN		8/1997	
Elia Chimtengo		CUEA 119								27.00			1.70		0.50	AFRIDEV		CU	5/1997		Eureka H
Fala		CZ 5														NIRA		RedCross			
Foboseni Ndatopa		PI 30														AQUADEV		UN			
Fosa	075	SB/07/345								46.00								3K project			
Fosa A	078	SB/07/235	14°23’17”	34°06’46”						45.00			5.87			AFRIDEV		3K project	14/6/1999		
Fosa I(A)	078	CM 3	14°23’30”	34°06’48”	0.2											AFRIDEV	W			8/1995	
Fossa	078	CM 38																		8/1994	
Gabriel	020	SB/07/194								41.00			6.38			AFRIDEV		3K project			
Gaga	069	CUV 138	14°25’23”	34°03’20”						8.00			1.50			NIRA		CU	31/9/99		

Table - EXISTING BOREHOLE LIST (TA.KACHERE) 既存井戸資料 （TA. Kachere)

Village	E.A.	BH No.	Coordinates Lat.(S)	Long.(E)	F (ppm)	Temp .(℃)	EC (mS/cm)	RS (ohm-m)	pH	Depth (m)	Diameter(mm)	Pump (m)	Water Level (m) Static	Dynamic	MaxYld (lts/s)	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
George Maliza		PM 887														AQUADEV		UN			
Geremani		PC 19														AQUADEV		UN			
Geza		LM 123														AQUADEV		UN			
Geza		LM 124														AQUADEV		UN			
Gilbert		CU 91	14°22’52”	33°59’32”	0.5	24.7	0.244	41.0	7.49	7.20						AFRIDEV	W	CU			
Gowampingo																AFRIDEV		CU			
Gunduze	076	CUEA 123	14°21’42”	34°07’38”						30.00			2.50		0.20	AFRIDEV	B/D	CU	8/7/1997		Eureka H
Gwede		PC 18														AQUADEV		UN			
Gwede		PM 940														AQUADEV		UN			
Hahals		PM 203									150					AFRIDEV		DDC	1975		
Hezekiya	071	FC 192																		8/1995, 9/1997	
Hezekiya		LM 122														AQUADEV		UN			
Jeremia	030	PM 788														AQUADEV		UN		1/1994	
Jeremiya		PM 853														AQUADEV		UN			
Jolamu		CU 05								12.70						AFRIDEV		CU			
Jonasi	2 or 0	CUEM 189								12.00			4.96		0.36	AFRIDEV		CU	1/1999		Eureka D
Jonasi		PM 779														AQUADEV		UN			
Jumbe		PI 424														AFRIDEV			6/1993		
Jumbe Domoya		PI 424														AQUADEV		UN			
Kababu		PM 780														AQUADEV		UN			
Kabanga	026	MM 225																		9/1997	
Kabanga		PC 17														AQUADEV		UN			
Kabanga	026	PC 26																		1/1994	
Kabanga	026	PI 432														AQUADEV		UN		9/1997	
Kabanga	026	PI 452														AFRIDEV			7/1993		
Kabinda	067	PM 781																		7/1995	
Kabwazi		RK 69									150					AFRIDEV		LLDP	1980		
Kabwazi EP4										12.00			3.00			AFRIDEV		CU			
Kacheta		CUV 118														AFRIDEV		CU	6/1997		
Kachibuti		PC 23														AQUADEV		UN			
Kachikuti	002	PI 23	14°23’38”	34°44’08”												AFRIDEV	B/D		16/9/88		silting
Kachiramadzi		MM 203														AFRIDEV			2/1996		
Kachule	801	CU_	14°18’42”	34°04’33”												AFRIDEV	B/D	CU	2/8/1993		
Kadule		CUEM 187								12.00			2.00			AFRIDEV		CU		6/1999	Eureka D
Kadzombe	3 or 0	CUEM 191								18.50			5.20		0.40	AFRIDEV		CU		6/1999	Eureka D
Kafere		BJ 25														DRY		UN			
Kafere	005	PM 345								48.80			3.60			AFRIDEV	B/D		23/9/1994		
Kafere		PM 345									84					AFRIDEV		LLDP	1976		
Kafotokodza	024	L 78																		9/1994	
Kafotokoza		HD 78									100		4.00			AFRIDEV		T.A.	1952		
Kafumbi																AFRIDEV		UN			
Kaimvi Sch	023	MM 263	14°22’55”	33°57’35”	0.5	24.1	0.257	38.9	7.95				11.00			AFRIDEV	W	WB			
Kajadiya		008/RS								39.00					0.42	AFRIDEV					NBC
Kalembere		CUEM 217								20.50			2.60			AFRIDEV		CU	5/2000		Eureka D
Kalikuti		CUEM 198								20.50			2.58		0.33	AFRIDEV		CU	9/1999		Eureka D
Kaliyazi	079	PM 763	14°25’24”	34°08’06”						32.55			5.25			AFRIDEV	B/D	CU			
Kaliyozi		PM 762														AQUADEV		UN			
Kamala	053	CU 93	14°23’54”	34°04’04”						7.70						AFRIDEV		CU			

Table - EXISTING BOREHOLE LIST (TA.KACHERE) 既存井戸資料 （TA. Kachere）

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter(mm)	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)		(m)	Static	Dynamic	(lts/s)						
Kamangire	020	SB/07/195								45.00			3.45			AFRIDEV		3K project	5/5/1999		
Kamenya Sch.	077	CU 95	14°22'50"	34°08'06"						12.30						AFRIDEV		CU	15/1/1996		
Kamphinda		MB 34								21.70			5.00			AFRIDEV		DC	1994		
Kamwendo	027	CUEA 128								21.00			3.50		0.30	AFRIDEV		CU	6/1997		Eureka H
Kamwendo										21.00			3.50			AFRIDEV		CU			
Kanamwali Kwawo		CU 87								9.50						AFRIDEV		CU			
Kanawe		A 297									84		22.00			AFRIDEV		T.A.	1963		
Kanjedza		M 66																		9/1994	
Kanjeza Sch		LM 66														AFRIDEV		DC			
Kanjule S.Tambe		PM 202									150					GODWIN		VET	1975		
Kanolo	043	SB/07/196	14°18'31"	34°01'40"	0.2					45.00			8.14			AFRIDEV	W	3K project	1/5/199		
Kantama		CUEM 196								18.70			4.60		0.36	AFRIDEV		CU	7/1999		Eureka D
Kanyama		E 18								27.45			8.85		6.10						
Kanyanda	002	PM 347	14°25'11"	34°43'23"	0.5	24.0	0.217	46.1	6.79		150					AFRIDEV	W	LLDP	1976	9/1994	rehabilitated by CU
Kanyenda	002	RK 118								45.75			3.05		1.22						
Kanyezi 4･C		MM 399								24.00			19.00			CLIMAX					
Kanyimbi	073	SB/07/228								45.00			6.44					3K project			
Kapalamula		PC 12														AQUADEV		UN			
Kapalamula		PI 420														AQUADEV		UN			
Kapesi		PM 975														AQUADEV		UN			
Kapesi	076	SB/07/273								46.00			4.26					3K project			
Kaphala		SB/07/268																3K project			
Kaphsya		PM 20									150					AFRIDEV		DDC	1975		
Kapiruts		Y 181									130					AFRIDEV		DDC	1971		
Kapiswi/Kupeta		CU 90								12.00						AFRIDEV		CU			
Kapitapita	079	H 43	14°26'04"	34°07'25"												AFRIDEV					
Kapitapita	079	K 40																		8/1994	
Kapitapita 1	079	HD 43								18.30	60		11.00			AFRIDEV		T.A.	1952	7/1995	
Kapitapita 2	079	PM 775	14°26'04"	34°07'25"												AFRIDEV				13/8/1993, 7/1995	
Kapsha Sch.	041	LP 051	14°20'03"	34°02'26"													B/D	UNICEF	17/01/1998		Dalikeni /Kalambe Vill.
Kapsya	041	RM 20																		6/1994	
Kapsya Sch.	041	RM 2	14°20'02"	34°02'31"												AFRIDEV		CU		12/7/93, 9/1997	Wiliam Vill.
Kapuzang'ona	048	CUV 119	14°19'43"	34°04'33"						9.60			3.40			MALDA		CU	8/1997		
Kapuzang'ona	048	CUV 126	14°19'27"	34°04'41"	0.4					12.60			1.24			NIRA	W	CU	12/1997		
Kasese		PI 362														AFRIDEV		UN			
Kasiya I (maphanje)	046	CUV 124														AFRIDEV		CU	11/1997		
Kasiya II (maphanje)	046	CUV 125														AFRIDEV		CU	12/1997		
Kasiya/Mphonje I	046	CUV _	14°18'54"	34°03'18"												NIRA		CU	2/6/1998		
Kasiya/Mphonje II	046	—	14°18'28"	34°02'57"						8.00			1.50			NIRA			8/9/1998		
Katenje	052	CUEM 225								17.00								CU			
Katenje	052	CUV			0					18.00						AFRIDEV	W	CU	12/2/2000		
Katewe		W 12									106		40.00			AFRIDEV		T.A.	1959		
Kaunda	069	CUEA 136								12.00			3.70		0.40	AFRIDEV		CU	5/1997		Eureka H
Kaunde	069	SB/07/229								26.00			3.12					3K project			
Kaundu		CZ 8														NIRA		RedCross			
Kaundu																AFRIDEV		CU			
Kaundzu	043	—	14°48'08"	34°01'25"	0.1	24.1	0.306	32.7	7.47	10.30			8.50			AFRIDEV	W	CU	13/12/00		
Kauyambitira		CU 89								11.00						AFRIDEV		CU			

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Village	E.A.	BH No.	Coordinates Lat.(S)	Coordinates Long.(E)	F (ppm)	Temp .(℃)	EC (mS/cm)	RS (ohm-m)	pH	Depth (m)	Diameter(mm)	Pump (m)	Water Level (m) Static	Water Level (m) Dynamic	MaxYld (lts/s)	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
Kauye																AFRIDEV		Ag Hills			
Kauyezi		HD 83									85		11.00			AFRIDEV		T.A.	1952		
Kawelama	044	CDC/01/13 4	14°17'29"	34°02'32"	0.5	24.5	0.188	53.2	7.60	41.00						AFRIDEV	W	MASAF			
Kayinga		CU 92								10.20						AFRIDEV		CU			
Kemesi		CZ 14														NIRA		RedCross			
Khulungira	081	CUEA 133								14.00			3.00		0.30	AFRIDEV		CU	7/1997		Eureka H
Khulungira										18.00			2.00			AFRIDEV		CU			
Khuyimbi		CU 96								7.00						AFRIDEV		CU			
Khyalawagombe		FC 192														AFRIDEV		T.A.			
Kotala		CL 147														AQUADEV		UN			
Kumitango	081	CUEA 132								19.00			4.00		0.20	AFRIDEV		CU	7/1997		Eureka H
Kumitengo										19.00			3.00			AFRIDEV		CU			
Kunjawa	007	PM 805	14°28'42"	34°41'43"												AQUADEV	B/D	UN			scan 2124
Langisoni		CUEM 222								13.00			4.32			MALDA		CU	10/1999		Eureka R
Lasani		CU 94								7.40						AFRIDEV		CU			
Lasani I	061	—																		9/1997	
Lasani II	061	CUV 122														MALDA		CU	9/1997		
Lasdui										30.00			2.00			AFRIDEV		DC			
Lembani		PC 19														AQUADEV		UN			
Lemesi		PM 749														AQUADEV		UN			
Levi		PC 06														AQUADEV		UN			
Levi		PM 950														CLOSED		UN			
Liabunya		PM 789														AQUADEV		UN			
Liabunya		PM 790														AQUADEV		UN			
Lifidgi		Y 178									150					Private		DDM	1971		
Lifidzi	022	—																		9/1997	
Lifidzi	022	CUEA 130			0					12.00			5.90			AFRIDEV	W	CU	28/7/1997		
Lifidzi F.P. Sch.	010	—	14°23'38"	33°55'09"	0.2					35.00						AFRIDEV	W			21/11/97	change to AFIDEV
Lifidzi Sch										33.00						SILTED		W Vision	1987		
Lingaka	089	CUEM 215								15.50			1.42		0.25	AFRIDEV		CU	4/2000		Eureka D
Livinza		HD 26								13.72			8.54		8.54						
Lobi Agriculture	805	CU 71														AFRIDEV		CU	2/1996		
Lobi Clinic	805	—	14°23'19"	34°04'19"	0.5											CLIMAX	W				
Lobi DEC	805	LCB 1																		7/1995	
Lobi EPA	805	HD 76	14°23'31"	34°04'24"							100		8.00			AFRIDEV		T.A.	1952	7/1995	
Lobi F.P.	805	LM 3	14°23'18"	34°04'18"												AFRIDEV	B/D	CU		5/8/1993, 8/1994	
Lobi H.Center																CLIMAX		MOH			
Lobi M.C.D.E.		MM 94								42.50			7.50			CLIMAX		EDUC	1994		
Lobi MCDE	805	LM 4								51.00			7.00			AFRIDEV		R.GROWTH	1983	6/1994	
Lobi P.Sch.		LM 3														AFRIDEV		R.GROWTH	1983		
Lobi Secondary Sch.	805	—	14°23'05"	34°04'17"												CLIMAX					
Lobi T.C.	805	L 76																	6/1994		
Lodzanyama		FM 173														AQUADEV		UN			
Lombwa		CU 04								8.00						AFRIDEV		CU			
Mabeka		PM 837														AQUADEV		UN			
Mac Donald	052	CUEM 221								21.00			3.40		0.48	AFRIDEV		CU	9/1999		Eureka R
Macombo	046	—	14°18'48"	34°04'08"												AFRIDEV					
Mafalanga	048	CUEM 229	14°20'13"	34°04'28"						24.00			2.50		0.43	AFRIDEV		CU	13/6/2000		Eureka R

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Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	(°C)	(mS/cm)	(ohm-m)		(m)	(mm)	(m)	Static	Dynamic	(lts/s)						
Magaba		PM 781														AQUADEV		UN			
Magomero		SM 116								150.00						AFRIDEV		DDC	1977	8/1994	
Magswero		LM 75								30.00			12.00			CLIMAX		VET	1985		
Maguza		HD 77									84		4.00			AFRIDEV		T.A.	1952		
Majamanda	007	CUV 127														MALDA		CU	6/1998		PSW
Makuluni	032	SB/07/199								39.00			12.00					3K project			
Malimba		CM 37									150					BUSH		DDC	1975		
Maluku	37	CUEM 195								20.50			8.20		0.31	AFRIDEV		CU	7/1999		Eureka D
Mandebri		BJ 24														DRY		UN			
Maonde		PM 768														AQUADEV		UN			
Maonde H.C		A 133								46.50			4.50			CLIMAX		GOV			
Maonde Hospital	078	—	14°24’14”	34°06’59”												CLIMAX					
Maonde Matope	802	SB/07/338	14°24’17”	34°06’30”						45.00			4.66			AFRIDEV		3K project			NBC
Maonde Nkosini		SB/07/007	14°24’17”	34°06’20”						38.00					0.33	AFRIDEV		3K project	1/2000		NBC
Maonde P.S.	078	—	14°24’20”	34°07’09”												AFRIDEV	B/D				since 2001
Maonde Sch	805	—																		11/1995	
Maonde Sch		HD 31									84		8.00			AFRIDEV		T.A.	1952		
Maonde T/C	805	Y 180								150.00						AFRIDEV		DC	1971	6/1994	
Masalo	2 or 0	CUEM 216								16.00			2.50		0.33	AFRIDEV		CU		5/2000	Eureka D
Masamba		CZ 2														NIRA		RedCross			
Masamba		PM 850														AQUADEV		UN			
Matundu Sch.	003	NBC 2001	14°25’54”	34°43’07”	0.8	23.9	0.125	80.0	5.86							AFRIDEV	W				Namakasu T.C.
Matuwba		X 49											20.00			CLIMAX		D.C	1970		
Mawala		IR 103								24.00			5.00			DRY AFRIDEV		L&C			
Mbadzi		FM 172														AQUADEV		UN			
Mbaji Sch		RK 71									150		26.00			AFRIDEV		LLDP	1979		
Mbalame ya Nyengo	801	SB/07/207	14°18’18”	34°04’54”												AFRIDEV		3K project	29/4/1999		
Mchemela		CZ 7														NIRA		RedCross			
Mchemera		Lm 128														AQUADEV		UN			
Mcheneka Sch.		SB/07/005								45.00					0.26	AFRIDEV		3K project	1/2000		NBC
Mchenga	062	CUV 128														MALDA		CU	5/1998		
Mchenga		PM 970														AQUADEV		UN			
Mebiuji S. Tamb		RK 73									150					AFRIDEV		LLDP	1970		
Meheuga	034	X 48									110		20.00		6.10	AFRIDEV		D.C	1970		
Mfutso		BJ 28														AQUADEV		UN			
Mfutso		PM 761														AQUADEV		UN			
Mfutso		PM 953														AQUADEV		UN			
Mfutso A	5 or 0	CUEM 214								21.00			0.50			AFRIDEV		CU	2/2000		Eureka D
Mfutso B	5 or 0	CUEM 213								24.00						AFRIDEV		CU	1/2000		Eureka D
Mgundadzuwa		CUEA 126								30.00			3.30		0.30	AFRIDEV		CU	6/1997		Eureka H
Mikondo	019	A 298									120		21.66		12.81	AFRIDEV		T.A.	1963	6/1994	Static Water :42.0m
Mikondo		FM 174														AQUADEV		UN			
Mikondo H.C		PM 843														CLIMAX		CATHOLIE			
M'khomawanthu	079	CU 2	14°25’32”	34°06’07”												AFRIDEV	B/D	CU	9/1995		
M'khomawanthu	079	SB/07/008	14°25’32”	34°06’11”	0.4					35.00						AFRIDEV	W	3K project	1/2000		NBC
Mkhuta	035	CUEA 129								12.00			0.60		1.00	AFRIDEV		CU	7/1997		Eureka H
Mkokamasa		CUEA 122								30.00			6.50		0.50	AFRIDEV		CU	7/1997		Eureka H
Mkokamasa																AFRIDEV		CU			

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Village	E.A.	BH No.	Coordinates Lat.(S)	Coordinates Long.(E)	F (ppm)	Temp .(℃)	EC (mS/cm)	RS (ohm-m)	pH	Depth (m)	Diameter(mm)	Pump (m)	Water Level (m) Static	Water Level (m) Dynamic	MaxYld (lts/s)	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
Mkomankhani		007/RS								39.00					0.36	AFRIDEV					NBC
Mkomatulo	2 or 0	Y 179								39.65	130		9.15		7.62	AFRIDEV		DDC	1971	6/1994	
Mkomawanthu		CU 02								10.50						AFRIDEV		CU			
Mkute I										12.00			2.00			AFRIDEV		CU			
Mlangali		CZ 3														NIRA		RedCross			
Mlangali	091	PCD 14	14°24'45"	34°16'30"													B/D				pump stolen
Mlangali	091	PM 745	14°24'30"	34°16'27"													B/D				pump stolen, scan
Mlangali	091	SB/07/004	14°24'14"	34°16'26"	1.5	23.2	0.537	18.6	7.91	41.00					0.28	AFRIDEV	W	3K project	1/3/2001		NELSON
Mlangeli H.C		PI 448														CLIMAX		UN			
Mlombwa (Ch)		CUEA 131								20.00			5.00			AFRIDEV		CU			
Mmangire		CU 98								13.40			3.80			AFRIDEV		CU			
Mofait		PC 51														AQUADEV		UN			
Mombula	021	—	14°23'54"	33°56'16"												AFRIDEV					
Moses		DM 115								7.70			1.70			AFRIDEV		T.A.			
Moses		HD 16									120		12.00			AFRIDEV		T.A.	1967		
Moses		PC 21														AQUADEV		UN			
Mosiuja		RK 77														AFRIDEV		DDC	1981		
Mphathi H.C		PC 9														CLIMAX		UN			
Mphathi H.C.	028	PC 9A																		11/1993	
Mphathi T.C		E 19									110		35.00			SILTED		T.A.	1957		
Mphathi T.C.	028	E 19								33.55			13.73		10.68						
Mpherembe Sch.	055	BH 28	14°23'26"	34°01'27"												AFRIDEV	B/D				Mbuta Vill.
Mphonde	035	CUEM 197								18.50			7.71		0.33	AFRIDEV		CU	8/1999		Eureka D
Mphunzi		—																		8/1994	
Mphunzi DEC		SB/07/002								45.00					0.33	AFRIDEV		3K project	1/2000		NBC
Mphunzi HC																AFRIDEV		Mission	1966		
Mphunzi Sch		MM 91								30.50			2.20			SILTED		EDUC	1994		
Mtelela		CZ 4														NIRA		RedCross			
Mtendere CTC	074	FP 98								40.97			12.20		3.66					8/1994	
Mtendere FR.		RK 178									200					Private		CATH	1980		
Mtendere Sch.	074	FP 97								40.87			7.62		4.27						
Mtendere Sch.	074	Q 293								37.20			18.30		2.14						
Mtendeu Sister		DM 431								31.00						Private		CATH	1983		
Mtengowagwa	018	CUEA 118								15.00			2.50		0.50	AFRIDEV		CU	5/1997		
Mtengowagwa	018	PI 431														AFRIDEV		UN	7/1993	9/1997	
Mtengowagwa	018	Y 181								39.65			9.15		8.54					12/1993, 11/1995	
Mtengowagwa																AFRIDEV		CU			
Mtonga	058	RK 73	14°24'28"	34°01'21"	0.1											AFRIDEV	W			6/1994, 9/1995	
Mtonga	057	SB/07/337								45.00			8.00					3K project			
Mtutuma		CU 97								8.00						AFRIDEV		CU			
Mtutuma	052	CUV 97	14°22'42"	34°04'26"	0.3					8.00			2.50			AFRIDEV	W	CU			
Mulangali	0 or 0	PI 446														CLIMAX			6/1993		
Mulima	089	CUEM 218								19.00			3.00		0.31	AFRIDEV		CU	5/1000		Eureka D
Mulima	089	SB/07/234																3K project			
Mwandouka	014	PC 20														AQUADEV		UN		9/1997	
Mzori	009	SB/07/192								45.00			4.10					3K project			
Namakasu T.C.	003	SM 19	14°25'48"	34°43'01"												CLIMAX	B/D				
Nambilikira		CUV 117														AFRIDEV		CU	6/1997		

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Village	E.A.	BH No.	Coordinates Lat.(S)	Coordinates Long.(E)	F (ppm)	Temp .(℃)	EC (mS/cm)	RS (ohm-m)	pH	Depth (m)	Diameter(mm)	Pump (m)	Water Level (m) Static	Water Level (m) Dynamic	MaxYld (lts/s)	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
Namikango Sch																AFRIDEV		CATH	1992		
Nandaya		CU 88								13.50						AFRIDEV		CU			
Nandaya		PM 778														AQUADEV		UN			
Ndamera		PI 28														AQUADEV		UN			
Ndebvu	013	W 46			0.2					26.23	86				4.58	AFRIDEV	W	T.A.	1959	6/1994, 9/1997	
Ndevu		PC 49														AQUADEV		UN			
Ndinde		PM 836														AQUADEV		UN			
Ngoloola	803	SB/07/006								39.00						AFRIDEV		3K project			
Ngulube		PM 856														AQUADEV		UN			
Njati	065	HD 52																		11/1993	
Njati		HD 53									84		25.00			AFRIDEV		T.A.	1952		
Njati		PM 938														AQUADEV		UN			
Njonja	031	HD 30								66.00			7.00			AFRIDEV		T.A.	1952	6/1994	
Njonja T.C.	031	H 30	14°26’29”	34°00’29”	0											AFRIDEV	W			15/7/93, 9/1997	rehabilitated by CU (1997)
Nkhapila		RK 119								45.75			9.15		4.27						
Nkhumba		CUEM 188								14.50			1.00			AFRIDEV		CU	6/1999		Eureka D
Nkutu		CUEM 219								15.00			0.80		0.25	AFRIDEV		CU	5/2000		Eureka D
Nthauthila		PM 845														AQUADEV		UN			
Nyemba		CUV 123														MALDA		CU	9/1997		
Pemba	802	005/RS								39.00					0.42	AFRIDEV					NBC
Pemba	802	PM 768	14°24’24”	34°06’52”	0.3											AFRIDEV	W				
Pemba		PM 842														AQUADEV		UN			
Pemba Gumbo		BJ 26														AQUADEV		UN			
Petrosi (Lwiza)		HD 26								45.00			17.00			AFRIDEV		T.A.	1952		
Petulosi	055	HD 26	14°23’36”	34°01’51”	0.4					13.55			7.50			AFRIDEV	W			7/11/1997	rehabilitated by CU
Phale		CUEM 200								14.50			1.60		0.50	AFRIDEV		CU	9/1999		Eureka D
Sadaliki	080	SB/07/336	14°26’19”	34°08’24”						45.00			7.67			AFRIDEV	B/D	3K project	1999		
Saeluzika	090	PI 426														AFRIDEV		UN	6/1993		
Saisoni		LM 126														AQUADEV		UN			
Salimoni	031	PI 430	14°26’57”	34°00’42”						45.00			7.67			AFRIDEV	B/D	UN	6/1993		
Sangweni		PC 50														AQUADEV		UN			
Sangweni		PI 29														AQUADEV		UN			
Saweluzika		PM 751														AQUADEV		UN			
Sefasi	061	SB/07/231								45.00			6.44					3K project			
Sichole		PI 31														AQUADEV		UN			
Simoni	012	CUEM 220								20.00			3.80		0.42	AFRIDEV		CU	5/2000		Eureka D
Sitenala		DM 390									150					AFRIDEV		DDC	1979		
Sitenala	4 or 0	CUV 120														MALDA		CU	11/1997		
Sitenala Village	4 or 0	SM 390								45.75			6.10		3.05						
Siyasiya		A 125								27.00			2.90		0.30	AFRIDEV		CU	6/1997		Eureka H
Stefano	034	CU 3								15.00						AFRIDEV		CU	10/1995		
Sukasuka		CZ 1														NIRA		RedCross			
Sukasuka		PM 750														AQUADEV		UN			
Sukasuka		PM 944														AQUADEV		UN			
Sukasuka		Y 183									150					AQUADEV		DDC	1971		
Sukasuka I	093	—	14°23’46”	34°17’26”												AQUADEV					
Sukasuka I	093	PI 423	14°23’50”	34°17’00”	0.7	22.2	0.1799	55.6	8.07							AFRIDEV	W		29/6/1993		
Sukasuka II	093	—	14°24’30”	34°17’13”													B/D				pump stolen

Table - EXISTING BOREHOLE LIST (TA.KACHERE) 既存井戸資料 (TA. Kachere)

Village	E.A.	BH No.	Coordinates Lat.(S)	Long.(E)	F (ppm)	Temp .(℃)	EC (mS/cm)	RS (ohm-m)	pH	Depth (m)	Diameter(mm)	Pump (m)	Water Level (m) Static	Dynamic	MaxYld (lts/s)	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
Sukasuka II	093	CZ 01	14°23'55"	34°17'12"	0.2	21.4	0.1313	76.2	8.15							NIRA	W		10/1995		
Sukasuka II	093	PM 744	14°24'20"	34°17'12"	0.5	22.0	0.203	49.3	8.19							AFRIDEV	W	UN			Sukasuka Makheui
Tampangani		MM 81								30.50			3.90			AFRIDEV		Ag Lifidzs	1994		
Tampangani	802	SB/07/007	14°24'17"	34°06'20"												AFRIDEV		3K project			NBC
Tapangani	802	SB/07/339								45.00			3.04					3K project			
Tete Market		HD 75									94		5.00			AFRIDEV		T.A.	1952		
Thambolagwa	086	MM 64														AFRIDEV		UN	11/1993	7/1995	
Thambolagwa		PM 952														AQUADEV		UN			
Themuka		CUEM 201								23.50						AFRIDEV		CU	8/1999		
Themuka		W 47								25.92			6.71							8/1994	
Thete Estate		GM 135								43.00			2.00			Private		Mr.MZE	1986		
Thete Primary Sch		MM 80								24.80			7.00			AFRIDEV		Ag Lifidzs	1994		
Thete T.C.	801	—	14°18'29"	34°04'41"												CLIMAX	B/D	CU	20/7/93		
Thete T.C.	801	L 75																		8/1994	
Thete T.C.	801	Y 184									150					CLIMAX		DDC	1971	6/1994	
Timuka		W 47									85		22.00			AFRIDEV		T.A.	1959		
Tseka	066	PC 10														AQUADEV		UN		11/1993	
Tseka	066	PM 848																		11/1993	
Tseka	066	PM 883														AQUADEV		UN		11/1993	
Tsumbi (Msumbi)	004	PC 22	14°27'22"	34°43'46"												AFRIDEV	B/D	UN	7/9/88		for refugees from Mocambiqu
Tsumbi (Msumbi)	004	PM 346	14°27'11"	34°43'42"							150					AFRIDEV	B/D	LLDP	1976	23/9/1994	rehabilitated by CU
William		PC 53														AQUADEV		UN			
Zande		PM 882														AQUADEV		UN			
Zebedayo		PM 785														AQUADEV		UN			
Zebedayo		PM 786														AQUADEV		UN			
Zebedayo		PM 849														AQUADEV		UN			
Zipusa	021	MM 156	14°23'41"	33°56'09"	0.1					19.20			3.00			AFRIDEV	W	CU		9/1997	
Zipusa		MM 238								33.00			6.00			AFRIDEV		W.Vision			
			: Duplication of No.																		

EXISTING BOREHOLE LIST (STA. CHILIKUMWENDO) 既存井戸資料 (STA. Chilikumwendo)

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diameter(mm)	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)		(m)	Static	Dynamic	(lts/s)						
Asafu	037	PC 50	14°22'06"	33°52'51"													B/D				broken down since 12/2000
Boozda		SB/07/407								46.00			5.06					3K project			
Chafumbwa	036	RK 72								45.75			6.71							8/1994	
Chafumbwa T.C.	035	RK 12	14°22'37"	33°55'09"	0～0.5	24.5	0.291	34.4	7.61							AFRIDEV	W				
Chamwankhaka		SB/07/404								46.00			2.68					3K project			
Chidewere	021	HD 54	14°20'31"	33°58'45"						24.40			4.88				B/D				
Chidewere Sch.	021	NBC	14°24'28"	33°59'11"	0.5	24.1	0.235	42.6	7.57							AFRIDEV	W	Govt.	17/12/2000		Mzumazi Vill.
Chidonthi	026	BH 226	14°19'50"	33°57'39"	0	23.6	0.122	82.0	7.60								W				
Chikuse	045	SM 114														AFRIDEV			21/7/93		
Chimutu/Wakuda	006	CUEM 204	14°16'17"	34°01'19"	0.5	24.2	0.29	34.5	7.53	16.00		13.00	4.64		0.36	AFRIDEV	W	CU	11/12/1999		
Chingondo		CDC/D4																	3/1/99		
Chklothi		CUEM 226								15.00		13.00	1.20			AFRIDEV		CU	2/1/2000		
Dulampingo	004	CUEM 212								15.30		11.00	2.50		0.47	AFRIDEV		CU	16/12/1999		
Falikire		W 49								30.50			7.32								
Gome		W 11								33.55			3.66								
Kabwazi EPA	008	CUEA 130								12.00		11.00	5.70		0.30			CU			
Kabwazi T.C.	008	K 69			0.5											AFRIDEV	W	Govt.	1979		
Kakhosi		CUEM 210								23.00		17.00	0.65		0.50	AFRIDEV		CU	2/12/1999		
Kalikuti	028	SM 198	14°21'53"	33°57'49"	0.5	23.8	0.24	41.7	7.43	20.50						AFRIDEV	W	CU	7/10/1999		
Kalulu	016	001 RS	14°18'33"	33°58'58"	0.5	24.1	0.197	50.8	7.55							AFRIDEV	W		10/2/2000		
Kalulu	016	002 RS	14°18'51"	33°59'00"	0.7											AFRIDEV	W	CU	27/5/2000		
Kamangazula	012	V 101	14°17'39"	33°59'44"	0	24.0	0.089	112.4	7.65	13.60							W	CU	30/7/1996		
Kamkodola	027	CUEM 199								19.50		16.00	4.38		0.27			CU			
Kamkuzi		CUEM 203								14.00		11.00	3.85		0.43			CU			
Kangulu		W 50								42.70			12.20								
Kanjerwa		SB/07/193								45.00			2.72					3K project			
Kanjule Dip Tank		PM 202								33.56			4.58								
Kanlinya		CUEM 260								21.00		18.00	1.46		0.48	AFRIDEV		CU	14/2/2001		
Kansepa	009	LP 455			0.7												W				
Kanuerwa		SB/07/103								45.00		27.00	2.72			AFRIDEV		3K project			NBC
Kaphesi	040	PM 975																	12/11/1991		
Katewe Court		W 12								32.33			12.20								
Kumichembo	025	CUEM 206								21.00		14.00	5.60		0.50			CU			
Lufesi	042	NBC 2000	14°22'20"	33°52'20"	0.5	24.4	0.091	109.9	7.65							AFRIDEV	W				
Lumwira		RK 76								45.75			7.62								
Magomelo		SM 116								45.75			3.05							8/1994	
Magomelo Sch.	042	JR 44	14°22'38"	33°52'17"												AFRIDEV			10/1/1999		
Malimba		CM 37								45.75			1.22								
Maoza	r 011(	CUEM 208								12.00		9.00	1.66		0.36	AFRIDEV		CU	26/11/99		
Matumba H.C.	036	X 49														AFRIDEV				2/9/1994	
Mbiidzi		E 303								39.65			24.40								
Milinga	007	CUEM 205	14°16'08"	34°00'06"						19.00		14.00	3.66		0.50	AFRIDEV		CU	6/12/1999		
Mkoka	010	CUEM 209								15.00		11.00	0.75		0.50	AFRIDEV		CU	3/12/1999		
Mkutamo		CUEM 202								16.50		14.00	4.50		0.27	AFRIDEV		CU	29/9/1999		
Mlombwa	015	CUEA 131								20.00		18.00	5.50		0.40	AFRIDEV		CU	7/7/1997		
Mnjerema	009	CUEM 211								18.40		14.00	5.75		0.44	AFRIDEV		CU	15/12/1999		
Moses	042	D 16																	13/10/1994		
Mphande		SB/07/410								46.00			2.08					3K project			

EXISTING BOREHOLE LIST (STA. CHILIKUMWENDO) 既存井戸資料 (STA. Chilikumwendo)

Village	E.A.	BH No.	Coordinates		F	Temp	EC	RS	pH	Depth	Diamet	Pump	Water Level (m)		MaxYld	Pump Type	Status	Client	Drilling	Rehabilitation	Remarks
			Lat.(S)	Long.(E)	(ppm)	.(℃)	(mS/cm)	(ohm-m)		(m)	er(mm)	(m)	Static	Dynamic	(lts/s)						
Mphanyama		—														AFRIDEV		MASAF			
Mphunzi	041	RK 83														AFRIDEV			10/7/1993		
Mzazi L.E.A.	041	RK 71	14°21'36"	33°50'21"	1	23.9	0.223	44.8	7.65	45.75			7.63			AFRIDEV	W		13/10/1994		Mpheza Vill.
Mzumunzi		SB/07/403								46.00			5.26					3K project			
Ngombe		W 10								30.50			3.05								
Nguluwe	042	PM 848A																	18/6/1991		
Njati Camp	3 or 0	PM 938																	22/11/1991		
Njoka Yakusi		SB/07/405								46.00			3.12					3K project			
San Maganga		KK 243								39.65			6.10								
Sumbe		PM 19								45.75			7.62								
Willinda	003	—	14°14'13"	33°57'03"														CU			
Zamadenga	020	CUEM 223	14°19'11"	33°57'26"	0.5	24.5	0.31	32.3	7.48	13.40			4.60		0.50	AFRIDEV	W	CU	5/11/1999		Eureka R

APPENDIX 7.   REFERENCES

7. REFERENCES

№	Name of Data	Type	Colleted Data	Data Prepared by Specialist	Data prepared by JICA	Publishing Organization	Remarks
1	1998 MALAWI POPULATION AND HOUSING CENSUS REPOT OF FINAL CENSUS RESULTS DECEMBER, 2000	Book	○			NATIONAL STATISTICAL OFFICE	
2	INTEGRATED HOUSEHOLD SURVEY 1997-98 June 2000	Book	○			NATIONAL STATISTICAL OFFICE	
3	MONTHLY STATISTICAL BULLETIN DECEMBER 2000	Book	○			National Statistical Office	
4	WATER AND SANITATION SECTOR PROGRAMME UPTO THE YEAR 2020 Community Water Sanitation and Health (Comwash) Project Identification Workshop May 1998	Book	○			GOVERNMENT OF MALAWI Ministry of Water Development	
5	GEOPHYSICAL REPORT Detailed Design for New Urban and Rural Gravity Fed Water Supply Schemes December 1998	Book	○			GOVERNMENT OF MALAWI Ministry of Water Development	
6	16 NEW WATER SUPPLY SCHEMES FEASIBILITY STUDY REPORT VOLUME III, PART6 MITUNDU WATER SUPPLY SCHEME JULY, 1998	Copied	○			REPUBLIC OF MALAWI MINISTRY OF WATER DEVELOPMENT	
7	PROJECT PROPOSALS FOR CENTRAL REGION WATER BOARD SEPTEMBER, 1999	Copied	○			CENTRAL REGION WATER BOARD	
8	3.0 PACKAGE I PEHABILITATION AND EXPANSION OF EXISTING WATER SUPPLY SCHEMES	Copied	○			CENTRAL REGION WATER BOARD	
9	KALEMBO GROUNDWATER PROJECT & RURAL WATER SUPPLY MANGOCHI DISTRICT 20/02/2001	Copied	○			GOVERNMENT OF MALAWI MINISTRY OF WATER DEVELOPMENT	
10	KELEMBO & GROUNDWATER PROJECT RURAL WATER SUPPLY MANGOCHI DISTRICT TA Katuli and TA Mbwana Nyambi Study Update March 2001	Copied	○			GITEC Consult	

№	Name of Data	Type	Colleted Data	Data Prepared by Specialist	Data prepared by JICA	Publishing Organization	Remarks
11	Kalembo Groundwater Project Evaluation of the project on long term health improvement March 2001	Copied	○			REPUBLIC OF MALAWI	
12	Water and Environmental Sanitation Programme Expanded Support to Community Based Management of Rural Water Supply, Hygiene Education and Sanitation July 2000	Copied	○			GOVERNMENT OF MALAWI (MINISTRY OF WATER DEVELOPMENT)/ UNICEF MALAWI	
13	Draft Information Memorandum	Copied	○			THE NATIONAL WATERS SUPPLY (MALAWI) LIMITED	
14	Fact File Malawi Social Action Fund November, 2000	Copied	○			Malawi Social Action Fund	
15	CONCERN UNIVERSAL WATER AND ENVIRONMENTAL SANITATION PROGRAMME MALAWI, EXTERNAL EVALUATION 4-14 October 1999	Copied	○			Cranfield UNIVERSITY Silsoe	
16	COMMUNITY BASED RURAL WATER SUPPLY, SANITATION AND HYDIENE EDUCATION IMPLEMENTATION MANUAL January, 1999	Book	○			GOVERNMENT OF MALAWI MINISTRY OF WATER DEVELOPMENT	
17	Trainer's Guide for Extension Worker Training Rural Water Supply and Sanitation Programme December, 1999	Book	○			GOVERNMENT OF MALAWI MINISTRY OF WATER DEVELOPMENT	
18	Trainer's Guide for WPC/VHWC Training Rural Water Supply and Sanitation Programme December, 1999	Book	○			GOVERNMENT OF MALAWI MINISTRY OF WATER DEVELOPMENT	