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MINISTRY OF AGRICULTURE, WATER AND RURAL DEVELOPMENT

DEPARTMENT OF WATER AFFAIRS

REPUBLIC OF NAMIBIA

OPERATIONS AND MAINTENANCE MANAGEMENT SYSTEM FOR ONAANDA AND OKAHAO SOUTH WATER SCHEMES

THE PERMANENT SECRETARY
DEPARTMENT OF WATER AFFAIRS
PRIVATE BAG 13193
WINDHOEK

Report by:

PLANNING
DIVISION

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1. INTRODUCTION

The construction of the Onaanda and Okahao South Water Supply Project is nearing completion and will be ready for handover to the two Local Water Committees by the end of December 1992.

Since its inception, the project has been community-based involving the recipient communities in all stages of the project. It was intended right from the start that the communities, through their respective Local Water Committees, would also be responsible for the operation and maintenance of the two schemes once construction was complete.

Clearly, the Local Water Committees will require considerable guidance and training from the Department on how to manage the operation and maintenance of the two schemes. It is therefore important that an Operations and Maintenance Management System be put into place which will assure the long-term sustainability of the two schemes.

The aim of this report is to propose an Operations and Maintenance Management System which may be suitable for implementation by the water committees. In the report the parties concerned with operation and maintenance are identified and their responsibilities are spelled out. No details regarding specific operations or maintenance tasks appear in this report, since it is not the intention to deal with the question on how to carry out the tasks. These topics will be covered in more detail in the *Operations and Maintenance Manual* and the *Management Manual* which must still be compiled once this management structure has been developed and approved. The management structure proposed identifies the relationships and the links between the various parties concerned both on the community as well as the government side. It should be clear that this document will also serve as a basis for discussions with the Local Water Committees. Since this system will have to be adopted by the Local Water Committees, the proposed system can only be finalized once discussions have been held with these committees and once they have agreed on the system.

The proposals made in this report should be seen to pertain only to the Onaanda and Okahao South pipeline schemes which will act as pilot areas to gain more experience with community participation and community management in the rural water supply sector. The experiences gained in these pilot areas can then be used to develop a country-wide policy and approach for community-based water supply projects at a later stage.

2. BACKGROUND

With the International Decade for Water Supply and Sanitation having drawn to a close, it was found that despite the high capital inflows into the water and sanitation sector during the 1980s, the percentage of the populations in developing countries with access to safe drinking water and adequate sanitation facilities in the rural areas has in many cases decreased rather than increased.

One reason quoted for this disappointing result is the high population growth rate which is being experienced in developing countries and which resulted in the percentage of the population having access to safe drinking water to decrease despite an increase in the number of people being served. Another reason was the poor state of existing water supply and sanitation facilities in most developing countries. It was found that the rural areas are particularly affected and the WHO has estimated that over 50 % of existing water supply schemes in rural areas of developing countries are not reliable, not sustainable, or inefficient as a result of poor operation and maintenance of the schemes. It was furthermore found that the governments of many developing countries often lack the resources, both human and financial, to ensure the long term sustainability of such water schemes once the donors or external support agencies have withdrawn after the construction phase of the projects.

To remedy this situation a new approach to rural water supply projects has been advocated, developed and tested in developing countries by various donors, external support agencies and national governments. This new approach calls for active participation of the beneficiary communities in all stages of the water supply project. This community-based approach aims to create a sense of ownership of the scheme in the communities and to make the beneficiaries responsible for the operation and maintenance of their own schemes. Moreover, in order to ensure sustainability of the installations, considerable emphasis is laid on the aspect of recovery of operation and maintenance costs.

This approach thus differs considerably from the one where the government is seen as being solely responsible for the operation and maintenance of the water schemes. One advantage is that the users of the scheme have far more control over the quality and reliability of the service than would be the case if the scheme was entirely run and maintained by a government authority. Furthermore, taking on the responsibility for the scheme after construction allows the communities to control their own destinies rather than having to rely on government agencies all the time. The community-based approach thus contributes significantly to the self-reliance of rural communities.

It is apparent from the above that community participation in rural water schemes requires specific structures to be instituted within the communities and the national water agency particularly for operation and maintenance of the scheme which is ongoing and has to be sustainable for many years. It must also be clear from the outset that the communities must be prepared and trained in order to be able to carry out their new responsibilities confidently and successfully. Early experience with community-based projects has shown that a considerable amount of training must be given to those members of the communities who will be operating and maintaining the scheme.

Over the past few years, water supply projects based on the above principles of community participation and cost recovery have been applied in many developing countries worldwide and initial results, despite setbacks, have proved to be promising.

It should be mentioned at this point that a policy document for the Water and Sanitation Sectors in Namibia (WASP) has been compiled over the past year. The document also stresses the importance of community involvement, particularly for the rural areas. The recommendations made in the WASP document were taken into consideration in compiling this report. The WASP document is currently awaiting approval from Cabinet.

In the light of the above, the Department of Water Affairs has been encouraged by His Excellency the President, Dr Sam Nujoma, to apply the community-based approach to water supply projects in the communal areas of Namibia. As a result, the Onaanda and Okahao South Water Supply Project in Owambo was initiated in July 1991. It is the first project attempted by this Department which follows the community-based approach.

When this project was initiated, a meeting was held between the Department of Water Affairs, the engineering consultant and those communities who would eventually benefit from the project. During the meeting it was explained to the communities that the project could only go ahead if they were willing to help the government during all phases of the project, including the operation and maintenance of the scheme once construction has been completed. The communities indicated their willingness to assist. To ease communication between the consultant, Water Affairs and the communities, two Local Water Committees (LWCs) were established, one for the Onaanda Component and one for the Okahao South Component. The documented purpose and responsibilities of the Local Water Committees at that time were discussed with the two committees and were accepted by them (see **Appendix A**).

During the planning and design phases, the communities then assisted in determining the number of people living in the area, determining pipeline routes and deciding on the number, location and design of water points along the routes. During construction, the communities provided free labour for the digging of trenches, the laying of pipes and the

backfilling of the trenches. While construction was in progress, volunteers from the communities were already trained by the Construction Division to lay and repair uPVC pipes. It is envisaged that once construction is complete, the two schemes will be officially handed over to the communities and the responsibility for the operation and maintenance of the two piped water schemes will lie with the two Local Water Committees.

The project will upon completion supply drinking water for both human and stock consumption from the recently completed Ogongo-Okahao pipeline to the rural communities living in the vicinity of Onaanda and Okahao. The construction phase of the project commenced in October 1991 and sections of the pipelines are presently already transporting water. Construction is currently nearing its end and it is expected that the communities will take over the operation and maintenance of the two schemes by December 1992 under guidance from the Department of Water Affairs.

3. DESCRIPTION OF PROJECT

The Onaanda and Okahao South Water Supply Project consists of two independent components, the Onaanda Component and the Okahao South Component. Both are piped water supply schemes with two pipelines branching-off south from the recently completed Ogongo-Okahao main pipeline (refer to **Figures 1 and 2 in Appendix B** for the routes of the pipelines). Along the routes of the pipelines water points, consisting of storage tanks, drinking fountains, washing basins and cattle troughs, are being built for human and animal use. Elevated water tanks with capacities varying between 10 m^3 and 30 m^3 are also constructed in places where a clinic or school is supplied in order to provide some storage capacity and pressure for possible limited reticulation networks. The two pipeline systems are constructed with uPVC pipes and have lengths of 29,7 km and 46,9 km for the Onaanda and Okahao South Components respectively. Eight water points and 5 towers are being erected along the Onaanda pipeline network while 23 water points and 11 towers are being built along the Okahao pipeline system.

Both schemes receive water under pressure from the Ogongo-Okahao main pipeline and hence no pumps are required.

4. PROPOSED OPERATIONS AND MAINTENANCE MANAGEMENT SYSTEM

What follows below are proposals and suggestions for an Operations and Maintenance Management System to be implemented for the Onaanda and Okahao South Water Supply Project. Clearly the proposals are open to discussion within the Department and with the Central and Local Water Committees who will have to adopt and apply the system. The proposed system should thus be for implementation at these pilot areas and must be seen as a departing point for further discussions and refinement.

4.1 Management System

In order to operate and maintain the two pipeline schemes effectively, it is proposed that a Water Agent be put in charge of each of the two schemes respectively. These two Water Agents will be appointed and supervised by the two Local Water Committees and should initially receive a monthly allowance from the Department of Water Affairs for their work. Over the longer term it is envisaged that this allowance will be paid from revenue collected by the Local Water Committees and not the government. The functions and responsibilities of the Water Agents include the operation and maintenance of the schemes, revenue collection and bookkeeping, storekeeping and inventory control, training of Water Point Committees and the recording of watermeter readings.

Furthermore, apart from the Water Agents, it is suggested that at each water point a Water Point Committee (WPC) be established by the local users of the point whose responsibility it will be to take care of the water point. These Water Point Committees are to be established using the guidelines as spelt out in the *Handbook for Water Point Committee*[1] which is currently being developed and tested by the Directorate of Rural Development. The Water Point Caretakers who are appointed and supervised by the Water Point Committees are to be responsible for ensuring the cleanliness of the water point, promoting the judicious use of water as well as the collection of water tariffs.

Overall, the two Local Water Committees will be responsible for the entire water scheme and must ensure that the Water Point Committees, the Water Agents and the Caretakers carry out their jobs. A schematic layout of the areas of responsibility is shown in **Figure 3** below.

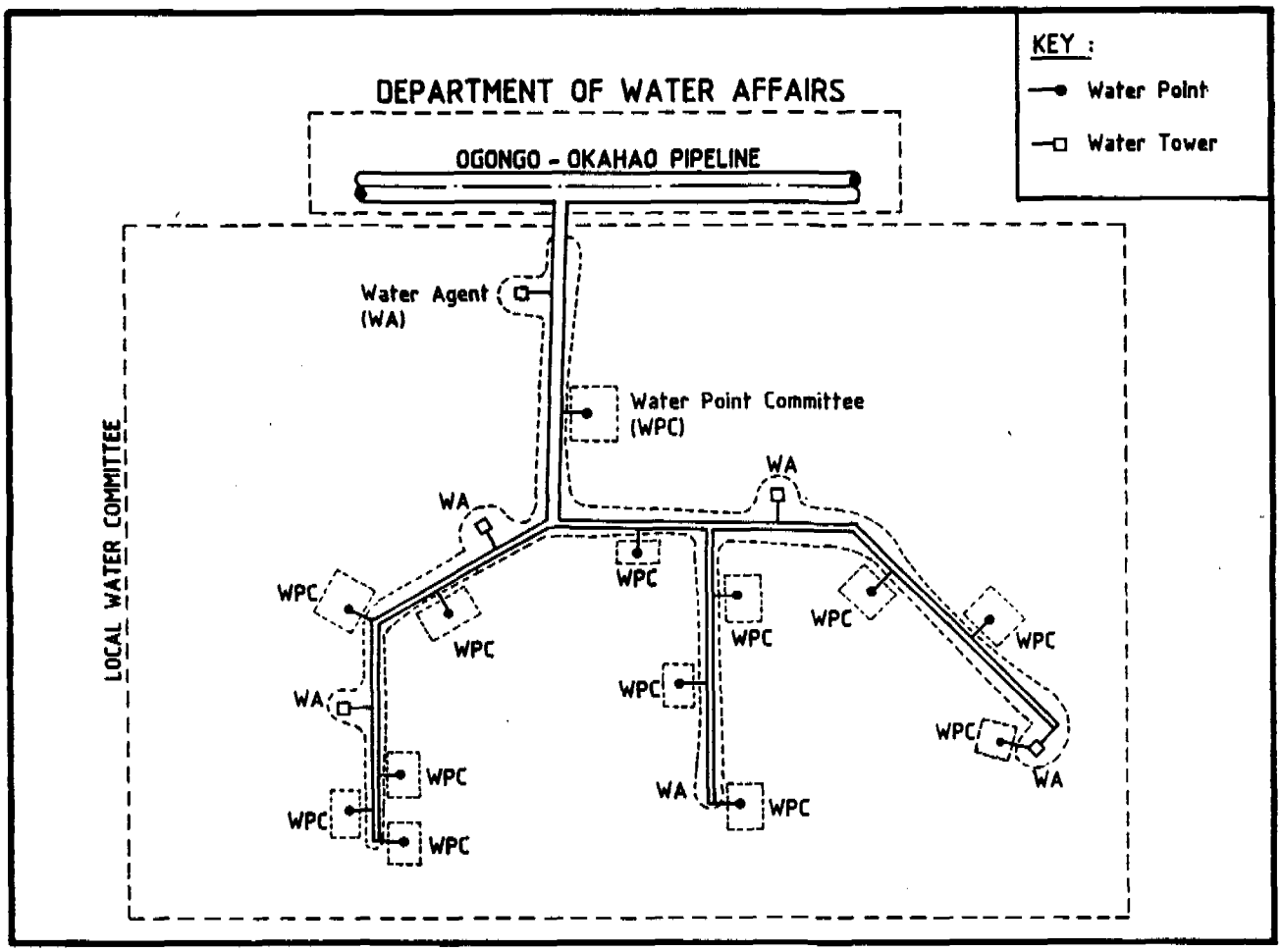

Figure 3: Schematic Layout of Pipeline System Indicating Areas of Responsibility

It should be evident that initially a lot of guidance and backing by government will have to be given to the Local Water Committees, the Water Agents, the Water Point Committees and the Caretakers. Case studies on community-based water supply projects in other developing countries have clearly shown the importance of support of the water committees and regular follow-up visits to maintain interest in the project and ensure sustainability. Community projects that have failed usually did so because the communities were left to their own after the construction phase was completed. This support should include training of the committees, technical assistance in cases of major breaks, help with financial and administrative problems and ideally also be combined with health education for the communities.

It must be kept in mind that only through receiving the necessary guidance and support will the Local Water Committees and the Water Point Committees be able to operate and maintain the water schemes effectively. It will therefore be in the Department's best interest to assist both the Local Water Committees as well as the Water Point Committees as much as possible, particularly in the beginning.

A schematic drawing of the proposed structure involving both the community and the government is given in **Figure 4** on the next page.

In order to ensure long-term sustainability of the water scheme and to enforce the judicious use of water, it has also already been mentioned that the recovery of operations and maintenance costs from the consumers forms an important element of the community-based approach. It is thus clear that tariffs will have to be introduced and consumers will be required to pay for the water used. The introduction of water tariffs into the region is expected to be problematic at best since people are not accustomed to pay for water in rural areas. A strong resistance to such tariffs can thus be expected initially, particularly if there are other communities in the region who do not have to pay for water and who even have private (and often unauthorized) connections to their homes. A cabinet decision on a water tariff policy for the rural areas is presently outstanding, but it is accepted for the purpose of this discussion that water tariffs in rural areas will be implemented in the near future.

A more detailed look at the technical, financial, administrative and training aspects of operation and maintenance of the two pipeline schemes is taken below.

4.1.1 Operation of Schemes

Actual operation of the two schemes is relatively simple since most of the tasks normally associated with operation, such as pumping and treating the water, occur up-stream of the two water schemes and will be undertaken by the Department of Water Affairs. Limited additional inputs by the Local Water Committees and Water Point Committees will therefore be necessary during the normal operation of the schemes. One operational task which does however have to be carried out by the water committees is that of monitoring the water usage; i.e. taking monthly water meter readings and preparing monthly summaries of the water usage for the different water points and branch lines.

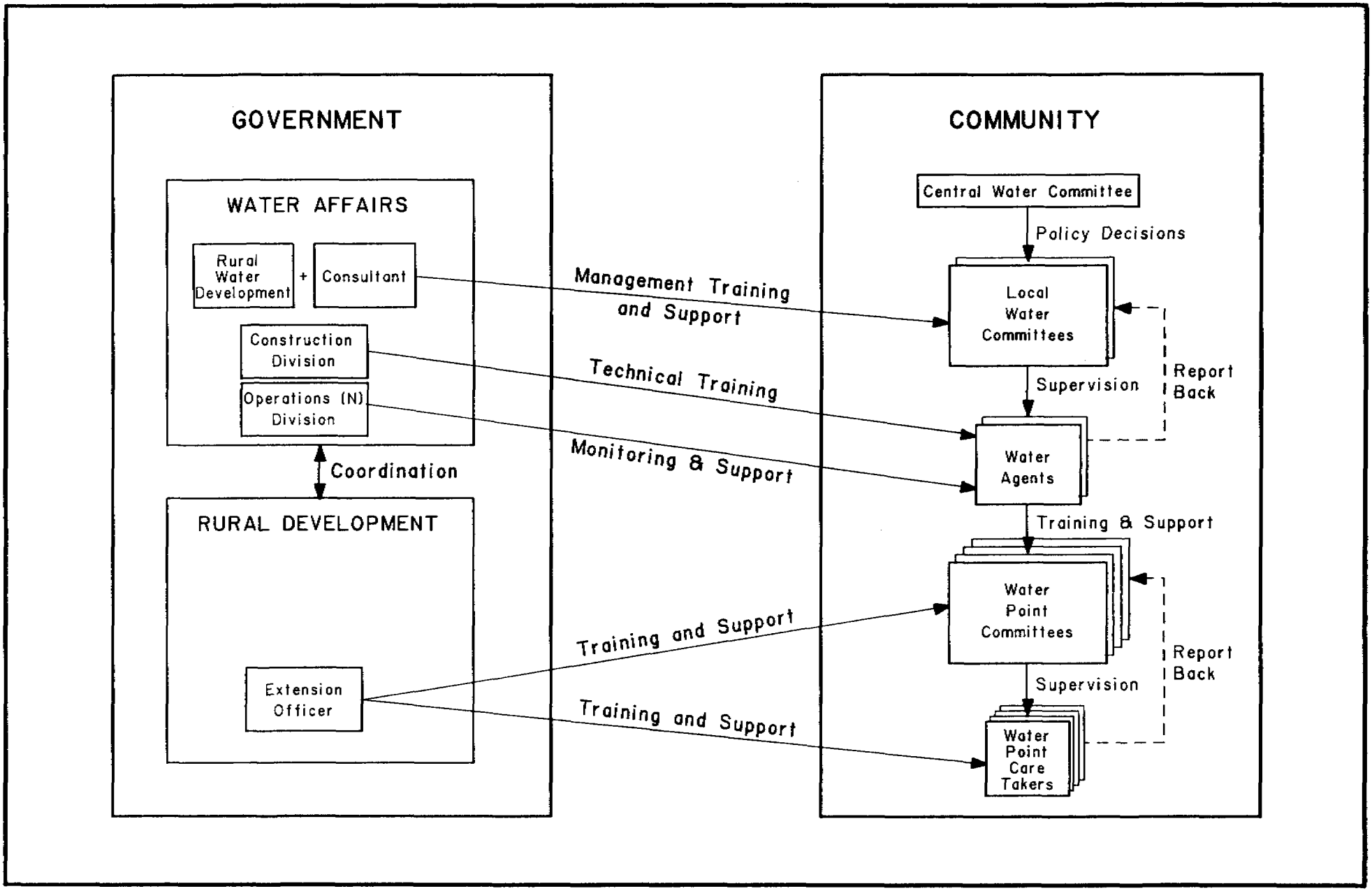

Figure 4 : Schematic Drawing of Proposed Management Structure for Operation and Maintenance

4.1.2 Maintenance of Schemes

The maintenance of the two water schemes will be the responsibility of the Local Water Committees and Water Point Committees. It is envisaged that the Water Point Committees through the Water Point Caretaker will be responsible for the up-keep of the water points. The Local Water Committees will be responsible for maintaining the pipelines and water towers. The actual maintenance will be carried out by the Water Agents for the Local Water Committees. Should any maintenance task prove to be too difficult to be tackled by the Caretakers or the Water Agents on their own, the Department of Water Affairs or a local contractor can be called in for assistance. It is envisaged that such assistance will be necessary especially in the first year until such time that the Caretakers and Water Agents have gained sufficient experience and confidence to tackle the task on their own. It is suggested that the Operations North Division be responsible for lending this support once the schemes have been handed over to the Local Water Committees.

It is also important, that as part of the maintenance responsibilities, the Water Agents should also keep records of the maintenance carried out on the schemes.

4.1.3 Revenue Collection and Cost Recovery

This task forms the most important element to ensure the long-term sustainability of the water scheme and needs to receive sufficient attention. It is envisaged that the users will have to pay for their water in direct relation to the amount of water consumed by each user rather than a flat rate which is independent of the amount of water used. It is hoped that a proportional tariff will result in a considerable reduction of water wastage and promote water saving.

Each user will have to pay for his water when it is fetched from the water point. When animals come to drink, payment will also have to be made for each animal. Alternatively, the caretaker of the water point can keep book on the amount of water received by each consumer and charge the users on a weekly or monthly basis. A system of pay-first water-later can also be considered where consumers should have a credit balance before they may receive water. A coupon system can also be investigated to avoid handling of cash. The money will be collected by the Water Point Caretakers of each water point and checked against water meter readings before being paid over to the Water Agents of the Local Water Committee. The Local Water Committee will again be charged for the water by the Department of Water Affairs according to the main watermeters at the branch-offs from the Ogongo-Okahao main pipeline.

From the revenue collected, the Water Point Committees as well as the Local Water Committees will retain a certain amount in order to pay the Caretakers, the Water Agents, the Department of Water Affairs for water and repairs, buy spares and tools and possibly build-up a fund for later capital expansion of the scheme. The water tariffs to be paid by the consumers must therefore be calculated carefully in order to ensure that sufficient revenue is collected to cover all expenses.

In order to keep track of all revenue and expenses, a simple book-keeping system will have to be introduced both for the Water Point Committees as well as the Local Water Committees.

4.1.4 Store Keeping and Inventory Control

Stores for tools and spares will have to be set up in the two areas served by the water schemes in order to allow for speedy repair of breaks in the pipelines. It is intended that a small stock of spares will be provided by the Department from the left-overs of the construction phase, however, tools for repair work will have to be acquired by the Local Water Committees on their own. Again proper records need to be kept and proper inventory control carried out. It is envisaged that the Water Agents will also be responsible for store keeping and inventory control.

4.1.5 Training

The importance of training the Local Water Committees, the Water Agents, the Water Point Committees, the Water Point Caretakers and the Extension Officers has already been highlighted. Until such time as a rural water supply training unit is established within either the Directorate of Rural Development or the Department of Water Affairs, the **technical** training required by the Water Agents and the Caretakers to operate and maintain the schemes is to be given by the Construction Division of the Department of Water Affairs. The Construction Division has already been involved with the training of Water Agents during the construction phase of the project. The technical part of the training has to be rounded off before the schemes can be handed over to Local Water Committees.

Apart from technical training, the financial and administrative aspects also need to receive urgent attention. Since the Department lacks sufficiently qualified personnel to provide training on these aspects, consultants have already been approached with the request for developing training material and eventually also carrying out the required non-technical training for the Local Water Committees. The training of Water Point Committees as well as Extension Officers is currently the duty of the Directorate of Rural Development and should remain with the

Directorate except if the rural water supply function is transferred to Water Affairs. Over the longer term, proper technical training by the Von Bach Training Centre is also planned.

4.1.6 Policy Decisions

Part of the management of the water supply schemes involves decision making regarding tariff policy, bulk water supply policy, policy for private off-takes and the formulation of rules around water points. Clearly, such decisions are made on different levels and hence involve different institutions. It is envisaged that a tariff policy be formulated by Water Affairs with assistance and advice from the Central Water Committee.

The development of a policy for private off-takes from the distribution network is seen to be the responsibility of the Local Water Committee while rules and regulations around water points should be drawn up by the Water Point Committees.

Another important issue which needs to be addressed is that of the legal status of the Local Water Committees. Provision must be made for the appointment of these committees and strict principles must be established to regulate the activities of the committees.

4.1.7 Monitoring and Evaluation

Since the Onaanda and Okahao South water schemes are the first schemes in the country which are to be managed by the respective local communities, it is therefore very important that the Department gain as much experience as possible from these two pilot projects in order to adjust and improve if necessary the proposed management system. Close monitoring and evaluation of the ability and success of the Local Water Committees to carry out the operation and maintenance of the pipe networks should therefore be undertaken by the Department on a regular basis. Alternatively, a consultant or external support agency could take on this responsibility.

Monitoring, however, also includes record keeping of water demand of the entire scheme, pipeline branches, and individual water points. This information will be of value if extensions to the schemes are considered at a later stage. Apart from the main watermeters at the beginning of the pipe networks, all other meters should be read and recorded by Local Water Committees and the Water Point Committees.

4.2 Summary of Responsibilities for Water Schemes

It is thus clear that a number of parties have various responsibilities contributing to the operation, maintenance and management of the two water schemes. These are the Department of Water Affairs, the Consultants, the Directorate of Rural Development, the Central Water Committee, the two Local Water Committees, the Water Agents, the numerous Water Point Committees and their Caretakers.

The responsibilities of the different parties regarding the various aspects of the operation and maintenance of the water schemes are spelt out in **Table 1** on the following page:

5. RECOMMENDATIONS

Regarding the community-based Operations and Maintenance Management System proposed for the Onaanda and Okahao South Water Supply Project, it is recommended that:

5.1 The proposed Management System be approved in principle.

5.2 Discussions be held with the Central Water Committee and the two Local Water Committees to finalize the Management System.

Planning/Rural Water Development

5.3 The system be implemented at both Onaanda and Okahao South for a testing period of one year during which it should be closely monitored.

Planning/Rural Water Development

Compiled by:

6. REFERENCE

6.1 *Handbook for Water Point Committee*, Directorate of Rural Development, Ministry of Agriculture, Water and Rural Development, Windhoek, Namibia, 1992.

7. APPROVAL

11.1 This report is approved for submission to the Director: Investigations and Research.

Chief: Planning

Date : 05/10/1992

11.2 The recommendations in this report are supported and the report is submitted to the Permanent Secretary for Water Affairs for approval.

Director: Investigations and Research

Date: 6/10/92

11.3 The recommendations in this report have been decided on as follows:

Approved

To be reconsidered once the reorganisation of the staff establishment investigation by the PMO has been concluded and approved by Cabinet

Permanent Secretary for Water Affairs

Date: 1.12.92

8. APPENDIX A - PURPOSE AND RESPONSIBILITIES OF WATER COMMITTEE

THE WATER COMMITTEE

1. Purpose and Responsibilities

The Water Committee will be a representative body elected by the community of a particular area with the aim to:

(i) identify the water needs of the people and stock of such an area and to determine the priority of supply to the respective settlements, schools etc..

(ii) assist the responsible Government institution with the planning of a water supply scheme which normally comprises of a bulk water supply scheme and a distribution system with a local water reticulation network which may be developed in phases as funds can be raised and will become available to execute the plans,

(iii) do the necessary negotiations to obtain all rights of way and plots needed for the water scheme at no cost to the Government and to see to it that these rights will be respected,

(iv) assist by organising the necessary labour requirements where necessary to construct the water distribution system at no cost to the Government,

(v) organise and manage the eventual operation and daily maintenance of the water distribution system,

(vi) promote the judicious utilization of water by the various consumers and to guard against any wastage of water,

(vii) to make recommendations on a water tariff structure to be levied to compensate or partially compensate the water supply authority for the operational cost of the bulk supply of water, and

(viii) if so agreed, the Water Committee will also become responsible for the collection of monies due for the supply of water in order to pay the monthly water account to the water supply authority.

The specific duties of the Water Committee for the water distribution system will be as described in paragraphs 2 to 4.

2. Duties During the Planning and Design Stages of the Project:

(i) The Water Committee determines the water needs and priorities of pipeline extensions and water supply points.

(ii) decides, in collaboration with the water supply authority, on pipeline routes,

(iii) informs and mobilizes the community to participate actively in the water project, and

(iv) forms labour brigades to execute the work for the community's own benefit

3. Duties during the Construction Stage:

(i) The Water Committee supervises and controls the participation of labour brigades in trench digging, pipe laying and backfilling,

(ii) provides safe storage facilities for and guards over materials and tools,

(iii) organizes, in collaboration with the water supply authority, the training of the labour force,

(iv) organizes construction teams for erecting water storage facilities at settlements, and

(v) initiates the construction of local reticulation networks.

4. Duties after Completion of the Project:

(i) The Water Committee takes full responsibility for day to day operation and maintenance of the distribution scheme and local reticulation networks,

(ii) sees to it that water is used with care and that it is not wasted,

(iii) collects and pays to the water supply authority monies due for water supplied, and

(iv) liaises with the water supply authority on all matters of mutual interest.

9. APPENDIX B - LAY-OUT OF ONAANDA AND OKAHAO SOUTH WATER SCHEMES

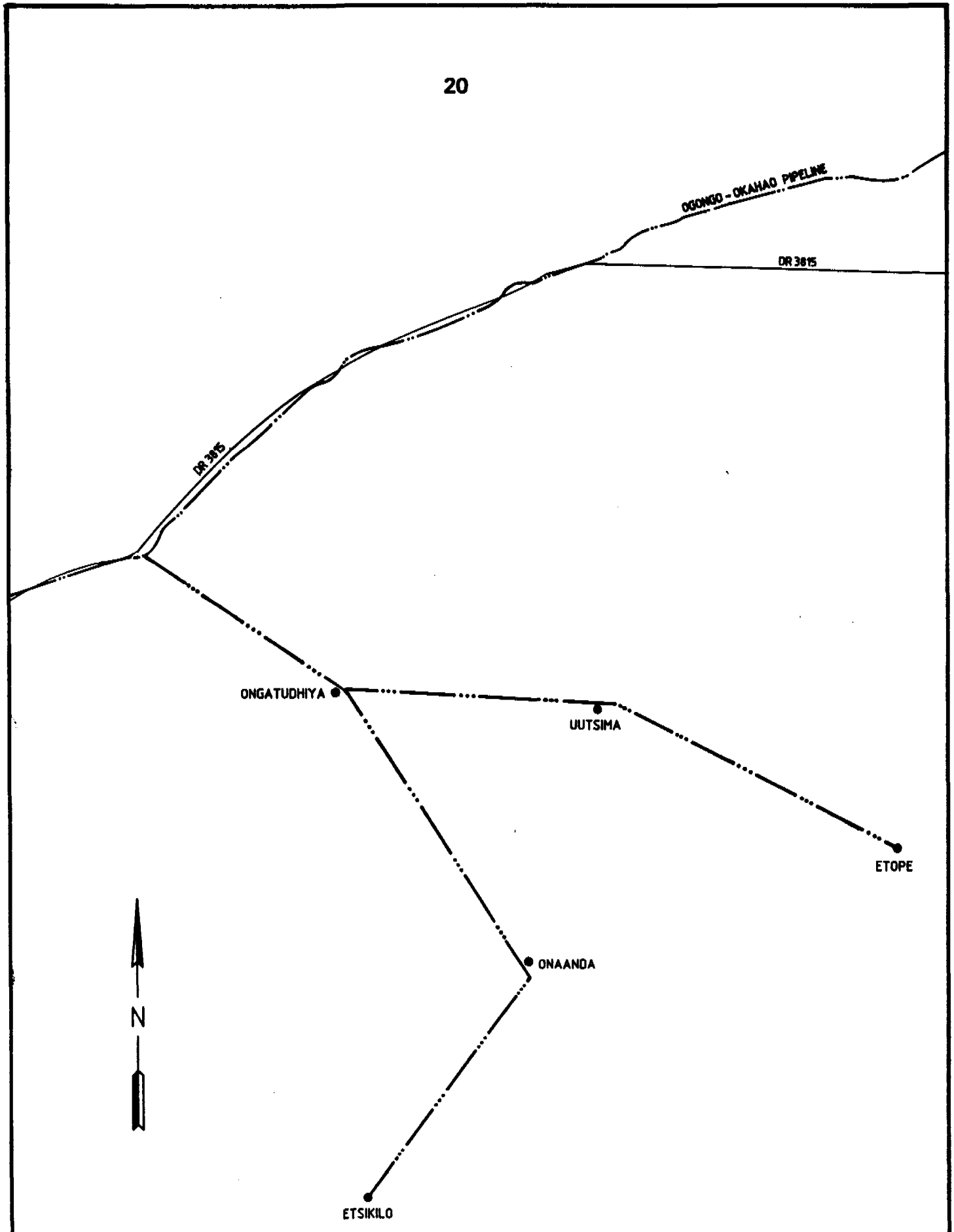

Figure 1: Lay-out of Onaanda Piped Water Scheme

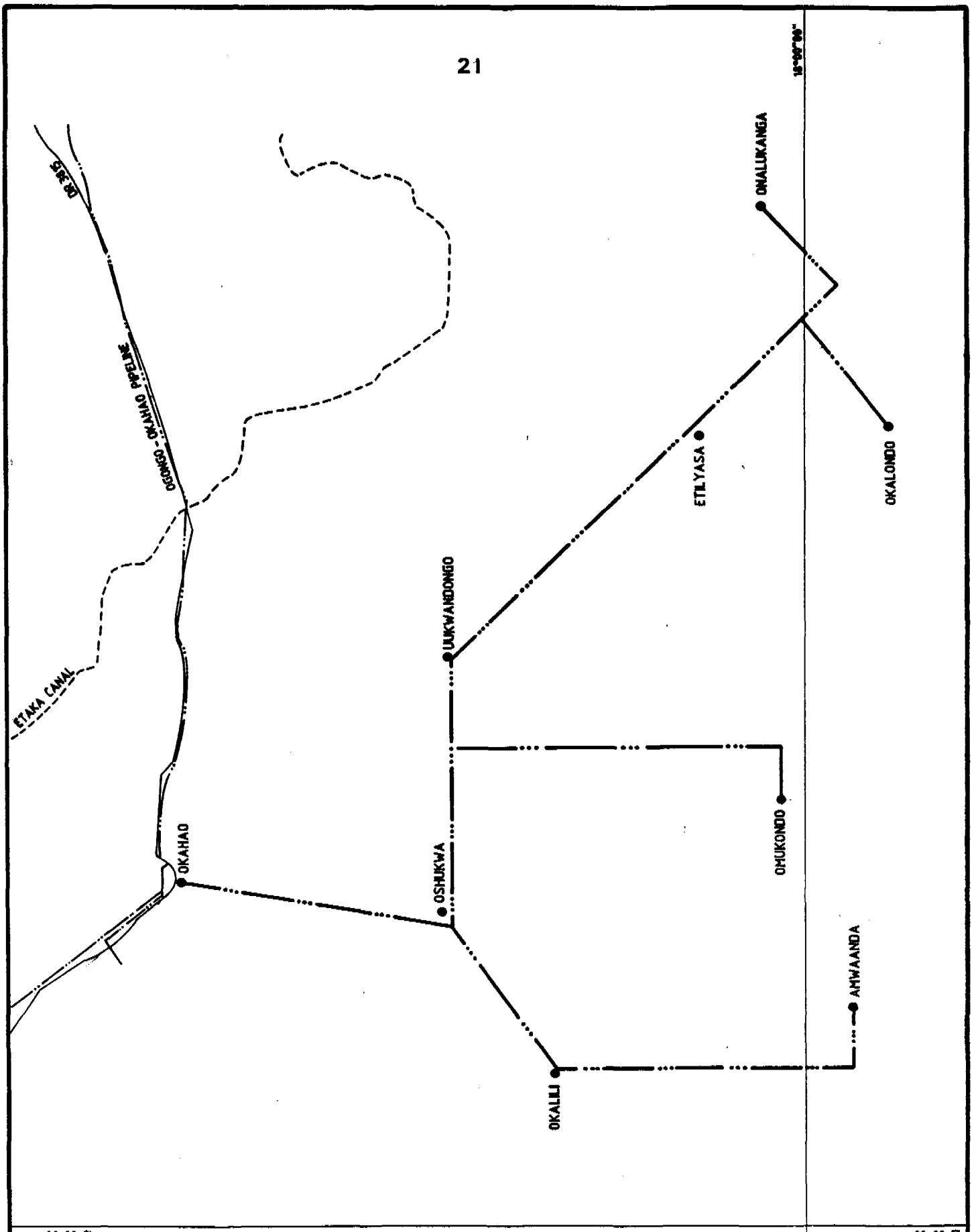

Figure 2: Lay-out of Okahao South Piped Water Scheme