9.8 Recommended Institutional Options and Legal Implications

In the light of the above analysis and the requirements of both the Government of Kenya and JICA, the registration of a trust corporation to take over the water supply service would be the best option. This option not only meets the requirements of the two parties but also presents fewer logistical and operational problems.

The legal requirement will be as follows:-

(a) Application for registration in the prescribed form accompanied by,

(b) A statement of the objects and constitution of the trust concerned, e.g. to take over and operate the Kabarnet water supply service, to enter into an agreement for the lease of any assets and equipment, to impose and charge tariffs for the supply of such services, to employ such personnel or such terms and conditions as may be deemed necessary, to formulate working arrangements for the effective and efficient operation of the water supply, to acquire and hold such property as may be necessary for the discharge of its functions, etc;

(c) A statement and short description of the property or interest therein which at the date of application is held or intended to be held by the trust;

(d) A statement as to whether the trust concerned is a society registered or exempt from registration, or is incorporated under the Companies Act;

(e) The names and addresses of the trustees;

(f) The proposed title of the corporate body, of which the words "trustees" and "registered" shall form part, e.g. THE REGISTERED TRUSTEES OF ------ (TOWN) WATER SUPPLY SERVICE;

(g) The proposed device of the common seal; and

(h) The regulations for the custody and use of the common seal.

Under the constitution in (b) above, provisions can be made for the number of trustees to be registered and how these may be appointed do as to be representative of all the stakeholders.

Organizationally, the Board of Trustees will have the overall management of the trust in order to ensure efficient delivery of services to the consumers. To this extent, it will be its responsibility to hire the management staff and such other personnel as may be required. To ensure transparency and accountability, the Board of Trustees will be expected to consult regularly with the major stakeholders on the progress achieved in implementing the mandate of the Trust. This consultative process will be provided in the trust instrument.

9.9 Institutional Framework for the Proposed Kabarnet Urban Water Supply Service.

In this section we develop the organisational structures and operating mechanism for the Trust Corporation, which is the recommended institutional and legal option for Kabarnet Urban Water Supply Service.

9.9.1 Organisational Structure

The proposed institutional framework comprises the following structures:

(a) The Board of Trustees (BOT)
(b) Management

The role of these structures is now defined.

9.9.2 Board of Trustees

The Board of Trustees will be the governing body of the Trust Corporation. It will acquire and manage assets on behalf of the stakeholders; and will be responsible for policy guidance and the strategic direction of the Trust Corporation. The Board of Trustees will be appointed from the current stakeholders of Kabarnet Urban Water Supply. Major stakeholders are:

(a) Kabarnet Municipal Council;

(b) District Water Officer (DWO);

(c) Major consumers, especially the co-operative societies , business enterprises and institutions (educational and health);

(d) Development partners;

(e) Religious organisations;

(f) Community water projects;

(g) District Social Development Officer (DSDO)

The initial appointment will be facilitated by the Inter-Ministrial Core Team. Thereafter, replacement within the Board of Trustees shall be effected by the Trustees themselves on the basis of agreed procedure. This renewal process will be detailed in the constitution of the Trust Corporation.

Other provisions enshrined in the constitution of the Trust are:

(i) That the number of trustees shall be between 5 - 7;

(ii) That Government representation shall be provided in BOT to safeguard public interest;

(iii) That BOT can co-opt, for particular purpose, an expert on issues of relevance to the Trust or beneficial to the advancement of the interests of the Trust;

(iv) That the Board of Trustees shall convene a stakeholders consultative forum every year to keep stakeholders closely informed of the progress in the affairs of the Trust Corporation.

The specific duties of the Board of Trustees are:

(a) To lease and / or acquire and own assets on behalf of the stakeholders;

(b) To appoint the General Manager and senior managers of the Trust Corporation and to fix their remuneration;

(c) To approve the organisational structure and the establishment level of the management and operational staff;

(d) To approve policy and strategy of the organisation;

(e) To approve the capital and operating budgets of the Trust Corporation;

(f) To monitor management performance in accordance with the agreed plans;

(g) To prepare and submit reports to the Stakeholder Council in the manner provided by law and the Trust Instrument.

9.9.3 Management

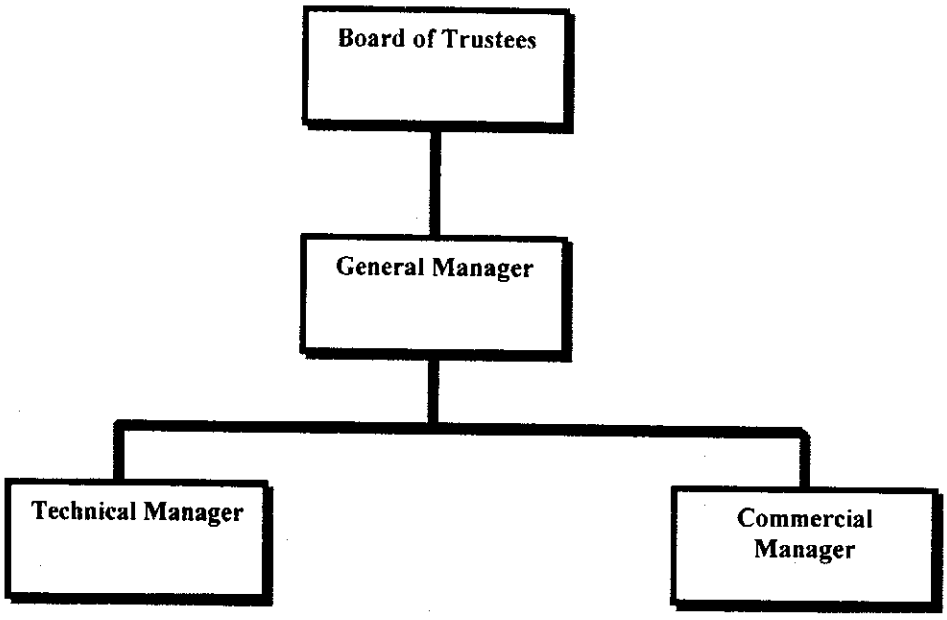
It should be noted that the Trust can operate the water supply and sewerage system in the Town. Alternatively, the Trust can contract out this function to a private operator. In the event the BOT decides to manage these services, it will appoint senior members of the Management Team.

These are:

(a) The General Manager
(b) The Technical Manager
(c) The Commercial Manager

Other positions will be approved by the BOT but will be recruited by the Management Team. The high level organisational structures of the Trust Corporation are illustrated in **Fig. 3.1.**

Fig. 3.1: High level organisational structures for Kabarnet Water Supply Service.



The General Manager: will be responsible for all aspects of the management and operations of the Trust Corporation. These include policy and strategy formulation for BOT approval and subsequent implementation after BOT approval.

The Technical Manager: will be responsible for operations and maintenance; and assets replacement for efficient supply of water and sanitation services.

The Commercial Manager: will be responsible for billing and revenue collection; accounting and financial management of the Trust Corporation. He / She will also approve water supply connections and oversee customer service standards.

9.9.4 Syndication of Water Supply and Sewerage Services Management

It is quite possible that some of the smaller towns could derive economies of scale from syndication of the water supply and sewerage services management. This essentially means forming a management company to manage the water and sewerage services in two or more local towns.

The proposal to form a trust corporation on a syndicated basis must be seen against the need to ensure that stakeholders in the "catchment area" of the local town have a common interest in water and sewerage issues that directly affect them. It is unlikely that stakeholders in different local towns could show a common interest that would sustain the formation of a Water and Sewerage Services Trust Corporation encompassing these different towns. In the event, therefore, where syndication could

be a feasible option in the management of the water and sewerage services, this should be confined to the operational management aspects. In effect, therefore, Water and Sewerage Trust Corporations in the concerned local towns could contract out the operations and management of the water supply and sewerage services to a professional private sector operator. This is a feasible option in areas where expertise in the management of these essential services is limited. It is also a more practical and simpler solution than the formation of a management company by the Trust Corporation in the local towns. The latter is likely to suffer from over-politicisation of the leadership and management role of such a company.

9.9.5 Operating Mechanisms

The operations of the Trust Corporation will be as follows:

(a) The initial appointment to the Board of Trustees will be facilitated by the Interministerial Core Team. Appointment will be from current stakeholders and will include Government representation. A woman representative should also be appointment. Subsequent appointments to fill vacancies in the BOT shall be provided in the constitution of the Trust. The relevant provision should allow BOT to renew itself by appointing replacements from specified stakeholders. To obtain ownership and support of stakeholders to the proposed Trust and the appointment thereof, a sensitization and consensus building workshop involving major stakeholders should be held before the Trust Corporation is registered.

(b) The Board of Trustees will "hire and fire" the Senior Managers of the Trust Corporation. The BOT can also contract out the management of the water supply and sanitation system to a private operator. BOT must, however, ensure that the services of the Trust Corporation are not harmed by such an arrangement and will ensure that safeguards are in place to provide services in a sustainable manner. The BOT will own or lease assets and properties on behalf of the Trust Corporation and will enter into contracts with third parties. The BOT will sue and be sued on behalf of the Trust Corporation.

(c) The management (and / or management agent) will manage the day to day operations of the Trust Corporation. Management will be accountable for their performance to the Board of Trustees through regular reports and meetings of the Board of Trustees.

10.0 FINANCIAL, ECONOMIC AND SOCIAL EVALUATION

10.1 INTRODUCTION

This section provides the financial, economic and social evaluation of Kabarnet Urban Water Supply. The financial viability analysis is only useful for indicative purposes only. It is contended that projects of this nature should rely more on economic and social viability. These two aspects are given more emphasis in the evaluation.

10.2 INSTITUTIONAL MANAGEMENT COSTS

To obtain the desired results from the rehabilitation of the Kabarnet water supply, there will be need for a new institutional arrangement. This will be need to be supported by a change in management style. This involves substantial investment, which is taken as part of the cost of the project. The financial costs of undertaking this exercise are summarized in Table 10.1.

Table 10.1: Kabarnet Institutional Development Costs

1	Hold consensus building workshop	(a) Travel refreshments and honorarium for 50 participants at Ksh. 5,000 /= per participant	250,000
		(b)Consultants facilitation costs and travel	700,000
		(c)Transport and related expenses for ministry staff	200,000
2	Develop and register the trust instrument	Legal and follow up effort	50,000
3	Management Contract	Appoint local expert to support the institutional rehabilitation process for the 3 year period	52,800,000
4	(a) Identify water supply and sewerage infrastructure and estimate cost	Standard infrastructural valuation procedures	5,000,000
	(b) Identify and value other assets.		
5	Develop staffing and financial plans for the new organization	25 working days at KSh. 40,000 per w/day	1,000,000
6	Develop operations manual	20 working days at KSh. 30,000 per day	600,000
7	Operational Support	Vehicles, motor cycles, computers and software, office equipment	
8	Provide initial working capital to the new organization	Average annual billings for the last 3 years	4,500,000
Sub - total			**65,100,000**
Contingency (10%)			**6,510,000**
Total			**71,610,000**

10.0 FINANCIAL, ECONOMIC AND SOCIAL EVALUATION

10.1 INTRODUCTION

This section provides the financial, economic and social evaluation of Kabarnet Urban Water Supply. The financial viability analysis is only useful for indicative purposes only. It is contended that projects of this nature should rely more on economic and social viability. These two aspects are given more emphasis in the evaluation.

10.2 INSTITUTIONAL MANAGEMENT COSTS

To obtain the desired results from the rehabilitation of the Kabarnet water supply, there will be need for a new institutional arrangement. This will be need to be supported by a change in management style. This involves substantial investment, which is taken as part of the cost of the project. The financial costs of undertaking this exercise are summarized in Table 10.1.

Table 10.1: Kabarnet Institutional Development Costs

No.	Activity	Bases of cost estimate	Estimated cost (Ksh.)
1	Hold consensus building workshop	(a) Travel refreshments and honorarium for 50 participants at Ksh. 5,000 /= per participant	250,000
		(b)Consultants facilitation costs and travel	700,000
		(c)Transport and related expenses for ministry staff	200,000
2	Develop and register the trust instrument	Legal and follow up effort	50,000
3	Management Contract	Appoint local expert to support the institutional rehabilitation process for the 3 year period	52,800,000
4	(a) Identify water supply and sewerage infrastructure and estimate cost	Standard infrastructural valuation procedures	5,000,000
	(b) Identify and value other assets.		
5	Develop staffing and financial plans for the new organization	25 working days at KSh. 40,000 per w/day	1,000,000
6	Develop operations manual	20 working days at KSh. 30,000 per day	600,000
7	Operational Support	Vehicles, motor cycles, computers and software, office equipment	
8	Provide initial working capital to the new organization	Average annual billings for the last 3 years	4,500,000
Sub - total			**65,100,000**
Contingency (10%)			**6,510,000**
Total			**71,610,000**

It is contended that the key problem in the town's water supply system is management weakness. Institutional support is recommended as the foundation for improving the nature and efficiency of management.

10.3 WATER TARIFFS

Kabarnet water supply scheme is subject to the tariff regime legally set by the Minister of Water. The legal tariffs are as indicated in the Table 10.2.

Table 10.2: Urban Water Tariffs

PART I - GENERAL	Charge (Kshs.)
(a) Where no meter is installed, a monthly charge of	200
(b) Where a meter installed, the charges will be as follows:	
(i) Where the amount of water sold through the meter in any one month does not exceed 10 cubic metres (minimum charge)	200
(ii) Where the amount of water sold through the meter in any one month is more than 10 cubic metres but does not exceed 20 cubic metres, the charge per cubic metre in excess of 10 cubic metres	25
(iii) Where the amount of water sold through the meter in any one month is more than 20 cubic metres but does not exceed 50 cubic metres, the charge per cubic metre in excess of 20 cubic metres	30
(iv) Where the amount of water sold through the meter in any one month is more than 50 cubic metres but does not exceed 100 cubic metres, the charge per cubic metre in excess of 50 cubic metres	45
(v) Where the amount of water sold through the meter in any one month is more than 100 cubic metres but does not exceed 300 cubic metres, the charge per cubic metre in excess of 100 cubic metres	75
(vi) Where the amount of water sold through the meter in any one month is more than 300 cubic metres the charge per cubic metre in excess of 300 cubic metres	100
c) Where water is sold through a meter at a kiosk, the charge per cubic metre	15
d) Where water is sold by retail at a kiosk per unit of 20 litres or part thereof, the charge per	2
e) For the bulk sales to an undertaker for resale, the charge per cubic metre	15
PART II - BOARDING SCHOOLS	**Charge**
1. A school with a permissible water demand not exceeding 600 cubic metres per month, the charge per cubic metre	20
2. A school with a permissible water demand not exceeding 1200 cubic metres per month, the charge per cubic metre	25
3. Any other learning institution with a permissible water demand of 1200 cubic metres per month, the charge per cubic metre	25
4. The charge per cubic metre of water consumed in excess of permissible water demand	45

Source: Kenya Subsidiary Legislation, 1999: Legal Notice No. 174

The tariffs apply only to those who have formal access to water. Those with no access to water and who acquire water from vendors pay about Ksh10.00 per 20 litres or Kshs 500 per m^3. This, for all practical purposes,

is a very high charge and has a dramatic effect on the household disposable income. A computation based on the water consumers' distribution and billing in Kabarnet gives an average billing rate of Kshs 33.25 per m^3.

10.4 FINANCIAL COSTS OF REHABILITATION

The financial costs for rehabilitation works for Kabarnet water supply amounts to Kshs.79,972,800. These are composed of the cost of rehabilitation water supply amounting to Kshs.8,362,800 (Table 4.4), and that of institutional reform amounting to Kshs.71,610,000 (Table 10.1).

10.5 ECONOMIC COSTS OF REHABILITATION

The economic costs for the rehabilitation of Kabarnet water supply have been taken to be the total financial costs plus the incremental costs of households to connect to the mains. An average of 2,100 additional households will be connected at the cost of Kshs.1,500 per household. The resulting additional costs will be Kshs.3,150,000 bringing total economic costs to Kshs.83.1 million.

10.6 FINANCIAL BENEFITS FROM REHABILITATION

The main benefit of the rehabilitation plan will be institutional strengthening of the town's water supply system. This will result in enhancement of management. The observable outcomes will be increased water supply, reduction of water losses and improvement in the revenue collection efficiency. The benefits will accrue under the following assumptions.

1. The management Consultant is in place at the beginning of Year 1 and involved for it period of 48 months.

2. The distribution network and metering would be rehabilitated/replaced during the first year of the management involvement.

3. Staff levels, remuneration and requirements are as proposed by the recommended Kabarnet organization chart.

4. The working capital to kick-start the process is available.

5. The appropriate infrastructure to support operations (transport, computers and software requirements and office space) is available.

The benefits will occur as summarized in the following paragraphs.

10.6.1 Revenue from Extra Water Sold

The scheme is designed to produce an average of 12,800 m^3 per day. It currently produces 1700 m^3 per day. Projected demand will reach 4,053 m^3 per day in 10 years. Increased management efficiency with rehabilitation will meet water demand from the third year of rehabilitation. This will improve water revenues by an average of Kshs.21 million per annum.

10.6.2 Reduction in Unaccounted for Water (UfW)

The average UfW has been determined to be 77.45%. Assuming that the management consultant has the piping system replaced/repaired and the billing under control within the first year, and this should result in UfW being reduced to 25% during year 1 and 2 and then sustained to not exceed 20% during years 3 – 7, then to 10% during years 8-10.

Reduction in UfW will result in revenue improvement averaging Kshs.11.9 million per annum using the current average tariff rate of Kshs.33.25 per m^3 for Kabarnet.

10.6.3 Improvement in Collection Efficiency

Collection efficiency has averaged 85.80%. No change is anticipated in the first year. Improved collection efficiency to 87% in year 2 is expected as a result of improved services. The efficiency will change to 95% as the billing system is enhanced through computerization from year 3 to 10.

Improved collection efficiency will improve cash flows by an average of Ksh.0.5 million per annum.

10.6.4 Improvement in Sewerage Coverage Revenue

No benefits are calculated from this source since Kabarnet does not have a municipal sewerage system.

10.7 ECONOMIC BENEFITS FROM REHABILITATION

In identifying the benefits, the way to be consistent and accurate is to look at all people conceivably affected by the program and ask how much better off they will be as a result of the expected water and sanitation rehabilitation exercise in the town. In order to give a precise estimation of the social benefits accruing to each individual category, a number of assumptions are made in each approach.

The major focus for this study is on three broad categories of social benefits that are assumed to accrue to the household within a situation of an improved water and sanitation system. These are:

- Social/economic benefits (hereby referred to as opportunity costs) of alternative uses of time previously used for fetching water by the household over along distance.
- Social benefits enjoyed by the household due to better health for water users and their families.
- Social benefits accruing from a reduction in health costs.

(1) Valuation of economic benefits of time saved

The methodology used in the calculation of these benefits is founded on a number of assumptions. These assumptions include:

i. The minimum amount of water required by each household to meet basic sanitary requirement is 100L per day. Therefore at the cost of Kshs 10 per a 20L-jerrican of raw water, they would have to spend an average of Kshs 50 per day on water.

ii. Assuming that the water source is one km away, it means that it would take on average a minimum of 30 minutes per trip to fetch a 20L-jerrican of water. Consequently, to get the minimum daily water requirement of 100L (i.e. 5x20L-jerricans) it would take 2.5 hours.

iii. Assuming that a household earns an average minimum daily wage rate of Kshs 150 for an eight-hour normal working day, it is then possible to calculate the opportunity cost of fetching water in terms of man-hours spent and converting this to money units. The loss is (2.5/8 x Kshs 150) = Ksh.47 per household per day. The annual total loss per household is Ksh.47x365 days = Ksh.17,155.

(2) Economic benefits of better health for users and their families.

In analyzing the benefits accrued to an individual, the study considered the opportunity cost of falling sick due to a water and sanitation related problem.

Given the health data on Kabarnet (the study, however, from the outset acknowledges lapses in data capture), on average, each household losses 30 productive days due to the debilitating effects water related ailments. Assuming a mean daily average wage rate of Kshs.150 per person per day, it then follows that the total loss per household will be Kshs.150*30 = Kshs.4,500 per annum. This is the benefit that would accrue to the users with improvement in water delivery.

(3) Economic benefits from reduction in Health costs.

According to the findings of the Welfare Monitoring Survey II of 1994, the budget share of household income spent on health care is 1.8%. Assuming that 60% of this income goes to sanitation related ailments, and given that the average mean monthly household income for Kabarnet is Kshs.4,861.78, it implies that each household spends Kshs.52.50 on this type of ailments per month. The total expenditure per household in the town is Kshs.52.50 x 12 = Kshs.630.00 per annum.

(4) Summary of Economic Benefits derived for Kabarnet Town

Nature Benefits	Derived Benefits in Kshs per Household per annum
Economic benefits of time saved from fetching water from source	17,155
Economic benefits of better health for users and their families	4,500
Economic benefits in reduced health cost	630
Total benefits per household per annum	**22,285**

10.8 ABILITY TO MEET O&M COSTS

The water supply will be able to raise enough incremental revenue to cover operating and maintenance costs. The net contribution margin is projected to average Kshs.20 million per annum.

10.9 FINANCIAL EVALUATION

Preliminary evaluation of the proposed water supply rehabilitation project should be undertaken in compliance with the financial and economic viability of the project. The overall results of the financial evaluation of Kabarnet Town Water Supply Scheme are summarized in **Table 10-3.** An average discount rate of about 4%, which reflects the current cost of soft loans to Kenya is used for the evaluation. The base evaluation is for a period of 10 years.

Table 10- 3 Financial Evaluation of Kabarnet Town Water Supply

Financial Evaluation					
FIRR		NPV		RER	
Rate	Viability	Kshs.	Viability		Viability
33%	FV	74,263,595	FV	1.479	FV

FV = Financially Viable
N/V = Not Viable

The results of the financial evaluation given in the Table 10.3 indicate that Kabarnet town water supply is financially viable, based on the current tariff and a 10-year project life. The NPV of Kshs. 74,263,595 shows that the rehabilitation of the water supply will be able to recover the initial cost of the Investment by year 10.

The financial internal rate of return (FIRR) of 33% is well above the hurdle rate of 4%. The revenue – expenditure ratio (RER) is 1.479 indicating the project is fully able to cover all its costs.

10.9.1 Financial Sensitivity Analysis

It is generally agreed that evaluation of a water utility over a ten-year period may be too ambitious. Most water utility investments are expected to indicate positive returns from 25 to 30 years after investment. In this case the project was financially evaluated using the following scenarios:

Case 1: The project is has a life of 15 years.

Case 2: The project is has a life of 15 years but costs (Investment + O&M) increase by 15%.

Case 3: The project is has a life of 15 years and is financed by Grant.

In carrying out the above analysis we assume that the cash flow at the end of year 10 is maintained in the additional periods.

The results of this analysis are presented in Table 10.4.

Table 10.4: Financial Sensitivity Analysis for Kabarnet Water Supply

	Base Case	Case1	Case2	Case3
	Project has a life of 10 years	**Project has a life of 15 years**	**Project has a life of 15 and Investment Cost and O&M increase by 15%**	**Case 1 but Project financed by Grant**
FIRR	33%	37%	25%	37%
NPV	74,263,595	144,809,835	108,654,587	223,439,888
RER	1.4790	1.7117	1.4884	1.7117
	FV	FV	FV	FV

N/V = Not Viable

FV = Financially Viable

The project still remains financially viable even with changes in the cost structure of 15%.

10.10 ECONOMIC EVALUATION

The results of the economic evaluations are summarized in Table 10.5, which shows that the rehabilitation costs for Kabarnet Town Water Supply are justifiable with a fair acceptable economic rate of return. An average

discount rate of about 4%, which reflects the current cost of soft loans to Kenya is used for the evaluation.

The project is evaluated using:

(a) a rate of EIRR (Economic Rate of Return)
(b) a value of NPV (Net Present Value)
(c) a ratio of CBR (Cost Benefit Ratio)

Table 10- 5 Economic Evaluation of Kabarnet Town Water Supply

Economic Evaluation					
EIRR		NPV		CBR	
Rate	Viability	Kshs.	Viability		Viability
145%	EV	177,719,045	EV	0.488	EV
EV = Economically Viable					

The project is economically viable with a high EIRR against the hurdle rate of 4%. The positive NPV value of Kshs.177,719,045 makes the project economically very attractive. The project is also able to cover its costs comfortably with a cost-benefit ratio (CBR) of 0.488.

10.10.1 Economic Sensitivity Analysis

An economic sensitivity analysis was performed to determine whether changed circumstances would affect the viability of the project. The following assumptions have been made for the sensitivity analysis.

Case 1: Investment costs increase by 15%
Case 2: O&M costs increase by 15%
Case 3: Both investment costs and O&M increase by 15%

The results of the sensitivity analysis are presented in Table 10.6.

Table 10.6: Economic Sensitivity Analysis for Kabarnet Water Supply

	Base Case	Case1	Case2	Case3
		Increase Investment Cost by 15%	Increase O&M by 15%	Increase both costs by 15%
EIRR	145%	86%	115%	73%
NPV	177,719,045	166,242,586	160,918,282	149,441,824
CBR	0.488	0.515	0.534	0.561
	EV	EV	EV	EV

EV = Economically Viable

The project is economically viable under all the given conditions. The project economically stands well against any changes in investment and operating costs and is viable under all circumstances.

10.11 SOCIAL EVALUATION

There is no doubt that society values water due to its effect on social welfare. In this study the two main issues considered were full time availability of clean water and the impact of water on public sanitation and health. Residents in the urban area were requested, through a rapid assessment survey, to specify the relative importance they attach to each of these two aspects.

In all the cases, full time availability of clean water was considered to be of very great importance, with a weighting of 92% by residents surveyed. The residents were willing to pay a higher tariff to have availability of water guaranteed. This means that it might be probable for tariff increases to be justified and hence enhance the financial viability of the project.

The residents were quite clear in their minds that clean water impacts positively on public sanitation and health. On health issues, the response indicated that 87% of disease incidences suffered at the local level should be eliminated by the supply of clean water. Again, residents were willing to pay a premium to mitigate against the health effects of non-availability of clean water.

11 IMPLEMENTATION PROGRAMME FOR PROPOSED PLANS PROGRAMME

11.1 WATER SUPPLY REHABILITATION

The implementation programme for rehabilitation works is given as Figure 11.1.

11.2 WASTEWATER AND SANITATION REHABILITATION

There is no waterborne sanitation system to rehabilitate.

11.3 UTILITY MANAGEMENT PLAN

The implementation programme for utility management is given in Figure 11.1.

11.4 LEGAL AND INSTITUTIONAL FRAMEWORK

The transitional arrangements from the current ownership and operation of the Urban Water Supply to the operations of the Trust Corporation will be structured as follows;

(a) Develop consensus among important stakeholders on the proposed approach to the operations of Kabarnet Urban Water Supply Service (the Trust Corporation). This is best achieved through a stakeholder workshop.

(b) Appoint members of the Trust from identified stakeholders

(c) Prepare the constituting instrument for Kabarnet Urban Water Supply Service. This can be done concurrently with activities (a) and (b) above. Registration, however, must await stakeholder consensus. On achievement of consensus on the proposed approach, present the Trust Instrument and registration forms to the Registrar of Trusts at AGs Chambers and ensure registration of the Trust Corporation.

(d) Concurrently with (a), (b) and (c) above, carry out an inventory of the water supply system infrastructure of Kabarnet Urban Water Supply System. Assign estimated value to these assets. Carry out a valuation of all other assets of Urban Water Supply including equipment, vehicles, furniture, fittings and loose assets.

(e) Develop organisational structures and staffing plans for the new organisation;

(f) Complete the financial plan for the new organisation;

(g) Agree on:

(i) Lease, transfer or sale of infrastructural assets and other assets by GOK and Kabarnet Municipal Council to the Trust Corporation;

(ii) Transfer or recruitment of the existing staff to the new organisation. Agree also on the retirement package or the transfer within the Ministry of staff not absorbed in the new organisation;

(iii) Arrange financial support to the new organisation.

(h) Develop the operations manual for Kabarnet Urban Water Supply Service;

(i) Ensure all the assets, staff and financial resources are in place in the new organisation (necessary transfers / acquisitions made)

These activities and time frames are illustrated in **Table 11.1**

Table 11.1: Kabarnet Water Supply Service – Transitional arrangements and time frame.

No.	Activity	Month	1	2	3	4	5	6	7	8	9	10	11	12
1.	Hold consensus building workshop		●	- - -	- - -	- - -	★							
2.	Appoint Board of Trustees		●	- - -	- - -	- - -	- - -	★						
3	Develop and present for registration the Trust Instrument		●	- - -	- - -	- - -	- - -	- - -	★					
4.	Identify and make an inventory of water and sanitation infrastructure assets and estimate their value. Identify and estimate the value of other assets.					●	- - -	- - -	- - -	★				
5.	Develop structures and staffing plans						●	- - -	- - -	★				
6.	Prepare financial plan for the Trust						●	- - -	- - -	★				
7.	Agree on: (i) Lease, transfer or sale of assets (ii) Transfer or recruitment of staff (iii) Financial support					●	- - -	- - -	- - -	- - -	★			
						●	- - -	- - -	- - -	- - -	★			
						●	- - -	- - -	- - -	- - -	★			
8.	1.1 Develop operations manuals							●	- - -	★				
9.	Assets, staff and financial resources in place										★			
10.	Kabarnet Water Supply Service operational											★		

Key:	1.2 Event ● - - - ▶	1.3 Event deadline ★

11.5 FINANCIAL PLAN

11.5.1 Business Plan

The summarized business plan for Kabarnet town is given in Table 11.2. The specific feature of interest is that the utility will be able to fully cover its operating and maintenance costs. The plan indicates also very health net cash flows from year to year. If these are reinvested into the system, then the residents of the town can be guaranteed a reliable water supply for many years to come. However, the achievements of the predictions indicated in this business plan are strictly contingent upon there being the appropriate institutional framework for the town. This will call for a change in management style and structures that will facilitate the delivery of the set intent.

11.5.2 Financing Plan

It is assumed that the rehabilitation costs will be composed of four components: Institutional Strengthening, Professional Input for works, Water Supply and Sanitation. These financial costs of the project are projected to be incurred as follows:

Table 11-4: Financing Plan - Kabarnet Town Water Supply

Year	1	2	3	4	Total
	Kshs	Kshs	Kshs	Kshs	Kshs
Institutional Development Costs	28,050,000	14,520,000	14,520,000	14,520,000	71,610,000
Consultancy Fees for Works (20% of works)	418,140	696,900	278,760	-	1,393,800
Water Supply Rehabilitation	2,090,700	3,484,500	1,393,800	-	6,969,000
Sanitation Rehabilitation	-	-	-	-	-
Total Overall Project Cost	30,558,840	18,701,400	16,192,560	14,520,000	79,972,800

The total cost of rehabilitation is Kshs.80 million approximately. These costs are spread over a four-year period.

The working capital and the institutional set-up costs must be availed at the beginning of the rehabilitation plan.

It should be noted that the financial evaluation has been based strictly on the cost of rehabilitation.

The total cost of rehabilitation is Kshs.80 million approximately. These costs are spread over a four-year period.

The working capital and the institutional set-up costs must be availed at the beginning of the rehabilitation plan.

It should be noted that the financial evaluation has been based strictly on the cost of rehabilitation.

Table 11.2: BUSINESS PLANS FOR Kabarnet TOWN WATER SUPPLY

CASH FLOWS

Year	1	2	3	4	5	6	7	8	9	10
REVENUE GENERATED										
Revenue from Extra Water Sold	9,111,654	11,461,960	17,746,232	19,118,235	20,502,374	22,070,377	23,638,381	25,206,384	26,786,524	28,550,528
Revenue from Unaccounted for Water	10,821,287	10,821,287	11,852,869	11,852,869	11,852,869	11,852,869	11,852,869	12,884,450	12,884,450	12,884,450
Savings from Collection Efficiency	-	64,184	492,078	492,078	492,078	492,078	492,078	492,078	492,078	492,078
Revenue from Sewerage Charges	-	-	-	-	-	-	-	-	-	-
Total	19,932,941	22,347,431	30,091,178	31,463,181	32,847,320	34,415,324	35,983,327	38,582,912	40,163,052	41,927,056
Expenditures (Kenya Shilling)										
Transport & Staff Related Expenses	3,587,929	4,022,538	5,416,412	5,663,373	5,912,518	6,194,758	6,476,999	6,944,924	7,229,349	7,546,870
O&M	3,986,588	4,469,486	6,018,236	6,292,636	6,569,464	6,883,065	7,196,665	7,716,582	8,032,610	8,385,411
Postage	75,745	84,920	114,346	119,560	124,820	130,778	136,737	146,615	152,620	159,323
Telephone	181,390	203,362	273,830	286,315	298,911	313,179	327,448	351,104	365,484	381,536
Purchase of meters	326,900	366,498	493,495	515,996	538,696	564,411	590,127	632,760	658,674	687,604
Stationery	217,269	243,587	327,994	342,949	358,036	375,127	392,218	420,554	437,777	457,005
Fuel & Gas	1,006,614	1,128,545	1,519,604	1,588,891	1,658,790	1,737,974	1,817,158	1,948,437	2,028,234	2,117,316
Current O&M Costs	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)	(1,264,846)
Incremental O&M Costs	**8,117,589**	**9,254,090**	**12,899,071**	**13,544,873**	**14,196,388**	**14,934,447**	**15,672,506**	**16,896,131**	**17,639,902**	**18,470,219**
Sulplus(Deficit)	**11,815,352**	**13,093,341**	**17,192,106**	**17,918,308**	**18,650,933**	**19,480,877**	**20,310,821**	**21,686,781**	**22,523,149**	**23,456,837**
Average Tariff (Kshs/m3)	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25
Investment Costs										
Net Cash Flow	**11,815,352**	**13,093,341**	**17,192,106**	**17,918,308**	**18,650,933**	**19,480,877**	**20,310,821**	**21,686,781**	**22,523,149**	**23,456,837**
Cumulative Cash Flow	**11,815,352**	**24,908,693**	**42,100,800**	**60,019,107**	**78,670,040**	**98,150,917**	**118,461,738**	**140,148,519**	**162,671,668**	**186,128,505**

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 WATER SUPPLY REHABILITATION

12.1.1 Existing water supply system

The National Water Conservation and Pipeline Corporation operate the Kabarnet water supply scheme. Supply is from three sources:

- Kirandich dam and water treatment plant, dam yield 12,800 m^3/d.
- Kapchemuswo dam and water treatment plant, installed plant capacity 720 m^3/d but the yield is unreliable.
- Four boreholes within the town.

The Kirandich works were commissioned in 1999. These comprise:

- A rockfill dam 55 m high.
- Treatment works and pumping plant at Kirandich dam.
- Rising main to Kabarnet.
- Storage in Kabarnet.

12.1.2 Shortcomings of existing system

- Kirandich dam and treatment works can more than meet projected demands.
- Kapchemuswo dam is reportedly an unreliable source – it is only used for a few hours per year to supply the agricultural show ground.
- Groundwater is aggressive.
- The boreholes at the Stadium and the Deaf Blind School pump undisinfected water into the distribution system.
- The borehole opposite the DWO is old – casing and plant nearing the end of their useful life.
- The distribution system is grossly undersized.
- There are 583 active connections, but only 206 working consumer meters.
- The new NWCPC offices have bare furnishings, but no office equipment.
- Only one motorcycle to administer the entire scheme.

12.1.3 El Niño Emergency Project

No works are being carried out on the Kabarnet water supply infrastructure.

12.1.4 Other works and projects

Phase II of the Italian-funded project will:

- Reinforce and extend the distribution system.
- Provide sewerage and wastewater treatment.

12.1.5 Rehabilitation requirements

The JICA ToR specify that rehabilitation comprises refurbishment of existing facilities to current production levels only. There will be no expansion works under the rehabilitation phase. The proposed rehabilitation measures are:

- Replace existing small bore distribution pipework.
- Construct two break pressure tanks.
- Install consumer meters at all connections.
- Decommission superfluous water sources.
- Provide appropriate office equipment and vehicles.

12.2 FUTURE EXPANSION OF WATER SUPPLIES

This is being addressed under Phase II of the Italian-funded project.

12.3 SEWERAGE SYSTEM REHABILITATION

12.3.1 Existing Sewerage Network And Sewage Treatment Plant

There is no sewerage system in Kabarnet.

12.3.2 Conditions And Performance Of The Existing System

Not applicable.

12.3.3 El Niño Emergency Project

None.

12.3.4 Other Works And Projects

Kabarnet Municipal Council commissioned a sewerage masterplan in 1986, but this was never implemented. The National Water Conservation and Pipeline Corporation has been requested to solicit funds and include the construction of a sewerage system under the Italian-funded Phase II project.

12.3.5 Rehabilitation measures

Not applicable.

12.4 FUTURE EXPANSION OF SANITATION FACILITIES

This will be addressed under the Italian-funded project.

12.5 LEGAL AND INSTITUTIONAL FRAMEWORK

12.5.1 Legal and institutional guidelines

Kabarnet water supply is operated and managed by the National Water and Pipeline Corporation.

In recommending a viable institutional and legal framework for Kabarnet Urban water Supply, the following guidelines were utilized: Government policy on the water sector Government policy on the restructuring and privatisation of public enterprises and the eligibility criteria for grant funding within the sector by Government of Japan. Other considerations include; sustainability of water supply and sanitation services; improved access to community, especially women; community participation and involvement; speed of incorporation in view of current strict deadlines and consistency with existing incorporation laws; - public orientation as opposed to private sector orientation.

The legal framework for water sector management in Kenya include: The Water Act, Cap. 372; The National Water Policy set out in Sessional Paper No. 1 of 1999; and the National Water Master Plan. The institutional framework for the water sector involves: the Ministry of Environment and Natural Resources; the National Water Conservation and Pipeline Corporation; the five River Basin Development Authorities; private sector operators and non governmental organisations;

12.5.2. Options for Kabarnet Urban Water Supply

Applying these guidelines, various institutional and legal options for Kabarnet Urban Water Supply were listed and expounded upon. They were:

(a) State corporation
(b) Limited liability company
(c) Co-operative society
(d) Trust corporation

After weighing the advantages and disadvantages of each option, and evaluating their conformance with Government of Kenya and JICA requirements, the

formation of a Trust Corporation for Kabarnet Urban Water Supply Service was proposed as the best option.

12.5.3 Legal requirements and Institutional framework for a Trust Corporation

The legal requirements for creating the proposed Trust Corporation for Kabarnet Urban Water Supply Service were outlined, together with an institutional framework. The following two structures were recommended:

(a) A Board of Trustees (BOT)

The Board of Trustees will be the governing body of the Trust Corporation. It will acquire and manage assets on behalf of the stakeholders; and will be responsible for policy guidance and the strategic direction of the Trust Corporation. The proposed Board of Trustees will be appointed from the current stakeholders of Kabarnet Urban Water Supply.

(b) Management structures

The Trust can operate the water supply and sewerage system in the Town or alternatively, the Trust can contract out this function to a private operator. In the event the BOT decides to manage these services, it can appoint senior members of the Management Team.

These are:

(a) The General Manager
(b) The Technical Manager
(c) The Commercial Manager

12.5.4 Implementation and recommended institutional form.

The transitional arrangements from the current ownership and operation of the Urban Water Supply to the operations of the proposed Trust Corporation were outlined. The arrangements were:

Developing consensus among important stakeholders on the proposed approach to the operations of Kabarnet Urban Water Supply Service (the Trust Corporation); appointing members of the Trust from identified stakeholders; Preparing the constituting instrument for Kabarnet Urban Water Supply Service; carrying out an inventory of the water supply system infrastructure of Kabarnet Urban Water Supply System and assigning values to these assets; developing organisational structures and staffing plans; completing the financial plan for the new organisation; agreeing on transfer modalities; developing an operations manual for Kabarnet Urban Water Supply Service; and ensuring all the assets, staff and financial resources are in place in the new organisation.

12.6 OVERALL FINANCIAL AND ECONOMIC EVALUATION

Table 12.1 Kabarnet - Overall Financial and Economic Evaluation (Without Sensitivity Analysis)

Financial Evaluation			Economic Evaluation			Social Concerns		Overall Evaluation
FIRR	NPV	RER	EIRR	NPV	CBR	Health needs	Water needs	
V	V	V	V	V	V	V	V	ESV

N/V = Not Viable
V = Viable
ESV = Socio-economically Investment Justifiable

Table 12.2 Kabarnet - Overall Financial and Economic Evaluation (With Sensitivity Analysis)

Financial Evaluation			Economic Evaluation			Social Concerns		Overall Evaluation
FIRR	NPV	RER	EIRR	NPV	CBR	Health needs	Water needs	
V	V	V	V	V	V	V	V	ESV

V = Viable
ESV = Socio-economically Investment Justifiable

12.6.1 Financial Evaluation

The project has been assessed to be financial viable under current tariff regime if a 10-year period is selected. The project also remains viable even with changes in the cost structure.

12.6.2 Economic Evaluation

The project is fully economically viable. From a public goods perspective, it makes good sense to invest in rehabilitating the water and sanitation services.

12.6.3 Social Evaluation

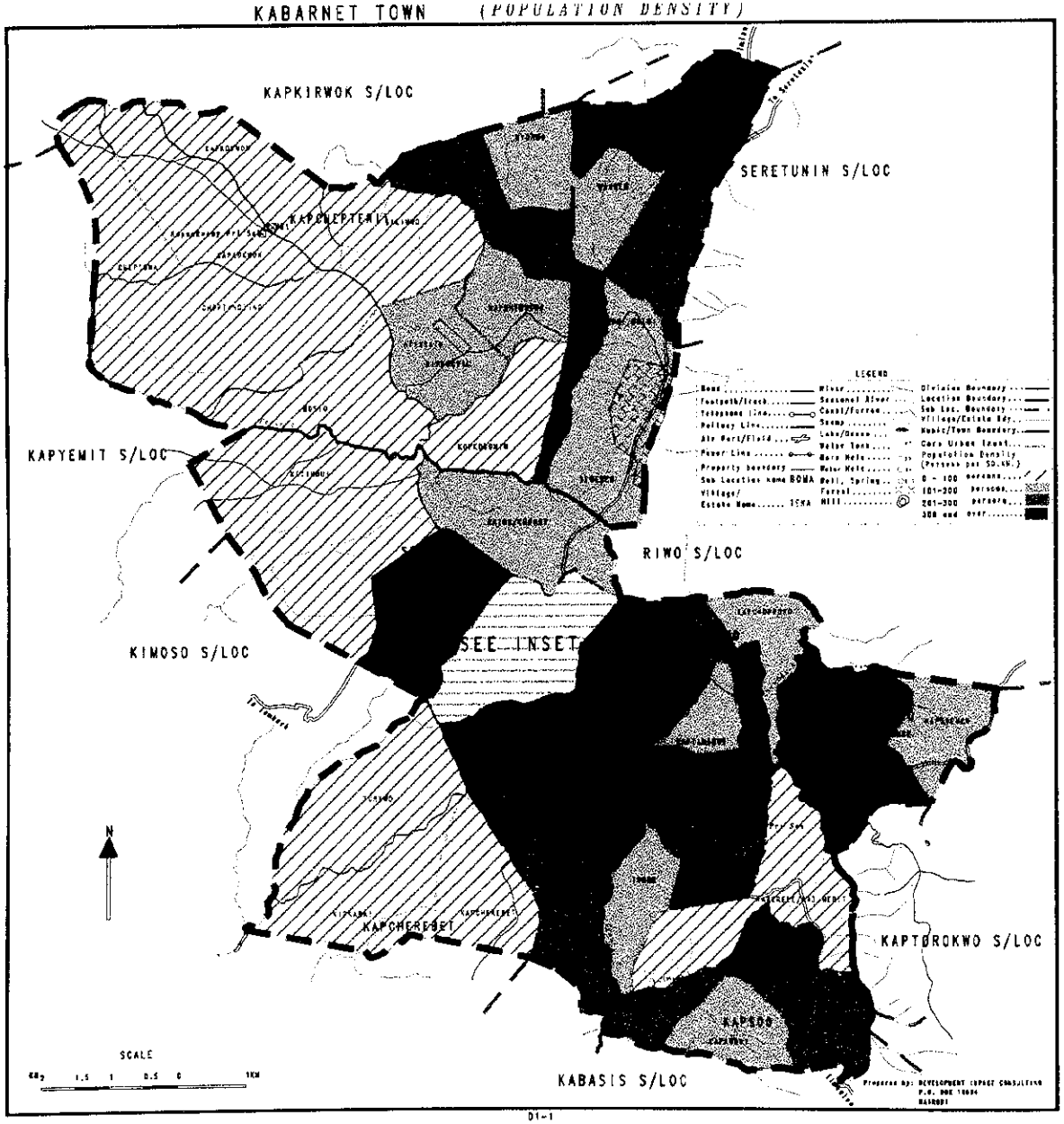
It was found that 99% on average of the residents consider supply of clean water a higher priority that other social infrastructure. They would also be willing to pay a higher tariff to obtain the social benefits arising from a clean and constant water supply system. The project is therefore socially justified

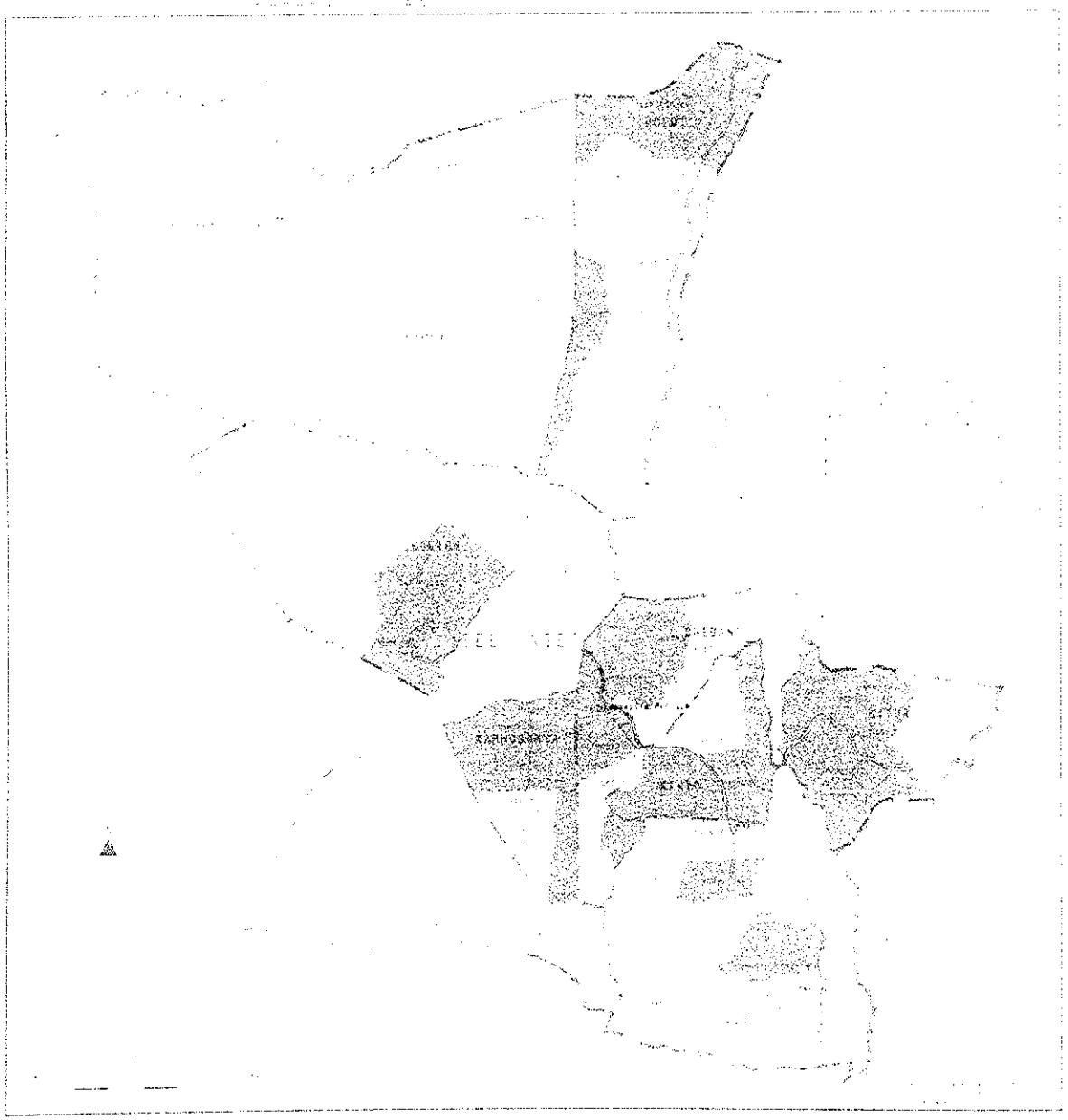
12.6.4 Overall Evaluation

The project, with due consideration is considered to be both financially and socio-economically justified as provided in Tables 12.1 and 12.2.

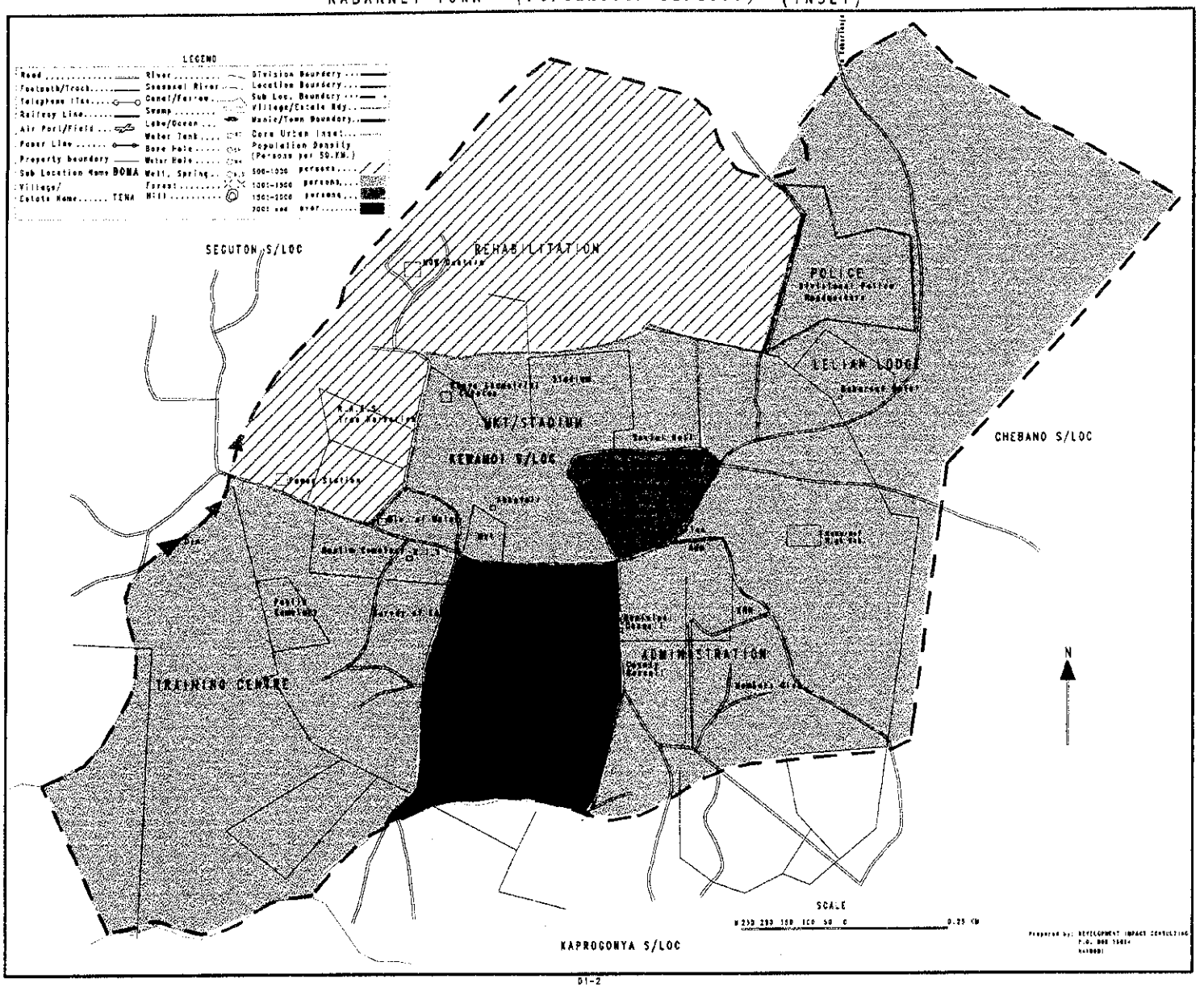
APPENDIX D1
KABARNET TOWN

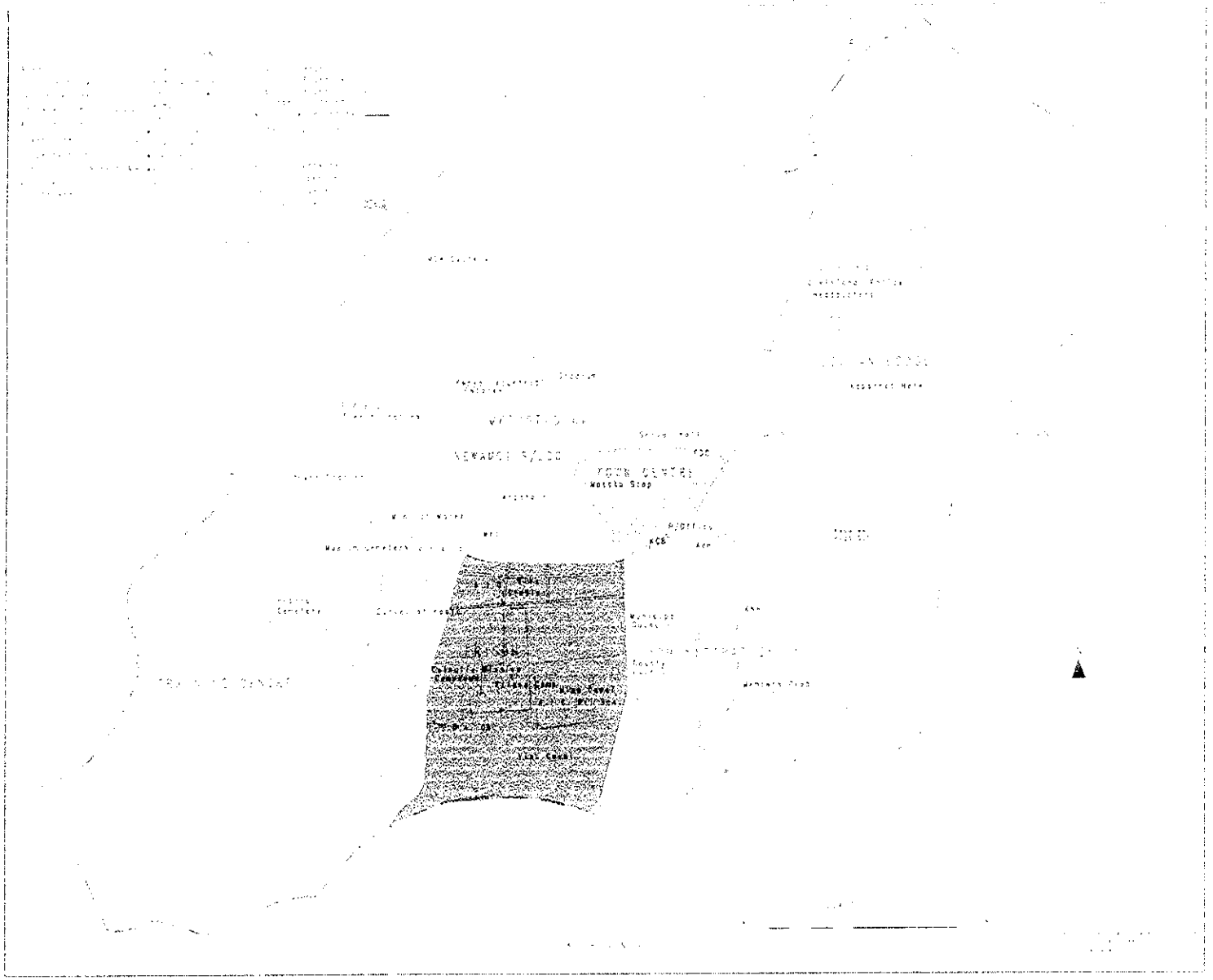
KABARNET TOWN *(POPULATION DENSITY)*





KABARNET TOWN *(POPULATION DENSITY)* (INSET)

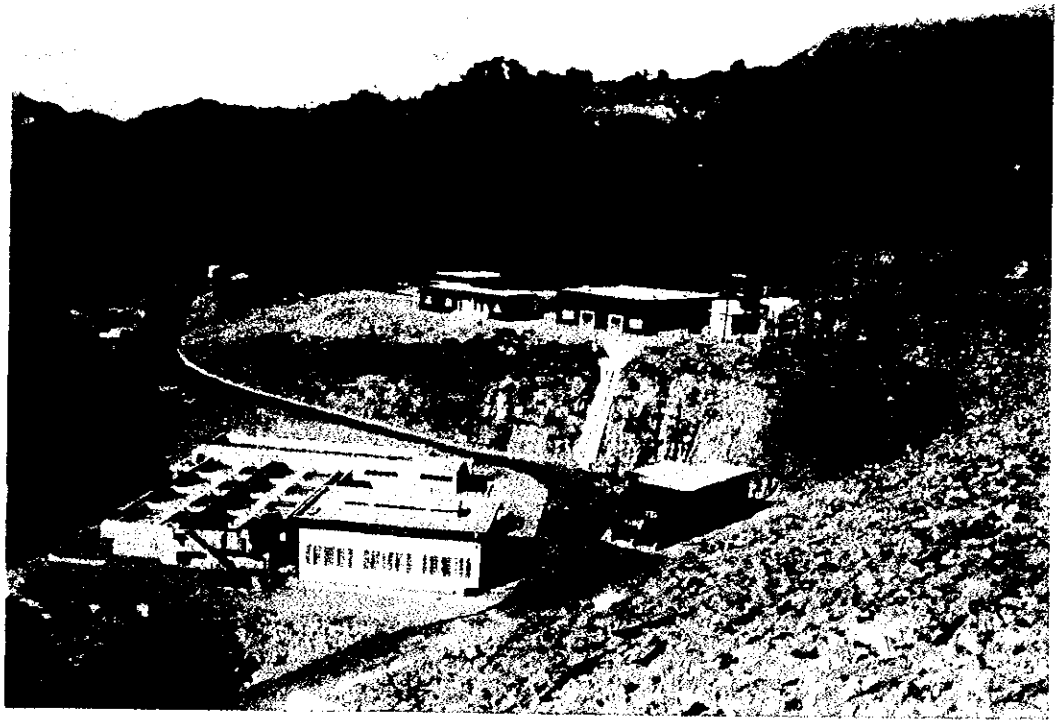




D1-3 1999 POPULATION DATA FOR KABARNET TOWN

LOCATION	SUB-LOCATION	AREA	NO. OF HOUSEHOLDS	MALE	FEMALE	TOTAL
KAPROPITA	KINYO	KABUSWA/KASOIYO	94	214	233	447
		KIBOI	63	149	164	313
		KAPROPITA	121	178	491	669
		KIPTARAKWO	49	127	131	258
		KINYO	33	99	99	198
		KAPSOO	54	154	168	322
		KIPNGEMUI	44	119	116	235
	KAPSOO/ BOROWONI	KAPTUI/KABASEN	80	213	187	400
		KAPKWONY/MONGO	59	133	159	292
		KABAREGE/TURUR	42	99	113	212
		KAPKORIOT	42	114	128	242
		KAMGOIN	52	136	131	267
		TATMERIT	30	92	82	174
		KAPSOGO	51	103	126	229
	CHEBANO	KAPCHOPKORO	44	134	134	268
		KIPTILIT	57	140	159	299
		LITEI	79	174	197	371
		KAREREM/TILELON	38	124	129	253
	KEWAMOI	WATER	79	115	76	191
		REHABILITATION	208	337	314	651
		KABARNET POLICE	72	120	83	203
		LELIAN LODGE	267	515	432	947
		KABARNET HOTEL	82	105	120	225
		MKT/STADIUM	163	234	154	388
		TOWN CENTRE	35	56	72	2160
		ADMINISTRATION	32	151	115	286
		PRISON/V. OSHWAL	225	325	278	603
		BARINGO T. CENTRE	278	520	567	1087
	SEGUTON	KETINDUI	123	254	262	516
		KATOR	123	252	279	531
		KAPTIMBOR	490	779	702	881
	KAPROGONYA	YEMO	53	112	99	211
		MUMOL	90	171	194	365
		KAPKUT	100	225	217	442
		KAPSISAT	64	149	160	309
		HOSPITAL	26	32	49	81
		KAPROGONYA	703	1054	1331	1485

APPENDIX D2
KABARNET
TOWN



KIRANDICH WATER TREATMENT WORKS (FROM DAM CREST)

HIGH LEVEL STORAGE SITE ON HILLTOP

APPENDIX A2 - ENGINEERING PRINCIPAL DESIGN CRITERIA

The following principal design criteria are used, with reference to the appropriate sections of the 1986 Design Manual prepared by the Ministry of Water.

(a) Water quality

(i) Bacteriological quality of water

No faecal coliforms (1986 Design Manual, section 5.2.2, subsection A.1). Following the 1994 WHO guidelines for drinking water quality, this can be achieved by disinfection:

- with a free chlorine residual of 0.5 mg/l (8.12.4 of the 1986 Manual gives 0.3 mg/l to 0.5 mg/l);
- at a pH less than 8, and
- a turbidity less than 1 NTU;
- for at least 30 minutes.

Section 138 of the draft Water Act states:

"All water undertakers must ensure that any water for human consumption shall be disinfected using approved disinfectants and the required residual levels maintained at the reservoirs, distribution lines and end points."

The word "any" means that all potable water must be disinfected, even groundwater. The word "residual" implies that the approved disinfectants will be limited to chlorine compounds or other halogens. It would not cover UV radiation, ozone, etc.

(ii) Chemical quality of water

- Fluoride to be less than 1.5 mg/l, or 3 mg/l in exceptional cases (1986 manual, section 5.3.1).
- Colour to be less than 15 TCU (5.3.2) or up to 50 TCU in exceptional cases (5.3.3).
- Turbidity to be less than 1 NTU for disinfection (1994 WHO guidelines).
- pH to be between 6.5 and 8.5 (5.3.2) or up to 9.2 in exceptional cases (5.3.3), but less than 8.0 during disinfection (1994 WHO guidelines).

- Iron to be less than 0.3 mg/l (5.3.2), or 1.0 mg/l in exceptional cases (5.3.3).
- Manganese to be less than 0.1 mg/l (5.3.2), or 0.5 mg/l in exceptional cases (5.3.3).
- Water should not attack concrete or ferrous products (5.3.4). This requirement imposes further limitations on pH.

(b) Treatment

(i) General

The works should be designed for continuous operation (8.1.4).

(ii) Pre-settlement

Section 8.4.1 of the 1986 Design Manual recommends pre-settlement ahead of slow sand filters when raw water turbidity is between 20 and 100 NTU. Pre-settlement tanks may also be used ahead of clarifiers when the turbidity exceeds 1,000 NTU.

(iii) Aeration

Not required for surface waters (Section 8.6.1). May be required for groundwater (8.6.2) to be followed by sedimentation or filtration when carried out to oxidise iron and manganese.

(iv) Treatment chemicals

Coagulant	:	aluminium sulphate (8.7.4)
pH correction	:	soda ash (8.7.4)
Disinfectant	:	tropical chloride of lime or calcium hypochlorite (8.12.2)

(v) Sedimentation

Section 8.9.3 of the 1986 Design manual requires horizontal flow tanks with a design surface loading of 1 m/hr.

Section 8.9.4 states that the operational requirements of vertical-flow, sludge blanket clarifiers are so strict that they should not be used except under very exceptional circumstances.

(vi) Rapid gravity filtration

The principal criteria for rapid gravity filters are:

- design surface loading to be 5 m/hr (8.10.1);

- filter bed thickness 0.7 m to 1.0 m (8.10.2);
- filter media to be quartz sand, 0.5 mm to 1.0 mm, with a uniformity coefficient less than 1.5 (8.10.2);
- backwash rate to be 50 m/hr minimum (8.10.4);
- air scour only in exceptional cases (8.10.4).

(vii) Chemical dosing for disinfection

The World Health Organisation recommends that water intended for potable use should be disinfected with 0.5 mg/l of free available chlorine for at least thirty minutes at a pH less than 8. This recognises that germicidal efficiency is dependent on both the free chlorine concentration and the time of contact.

To achieve a free chlorine residual, sufficient chlorine must be dosed to react with any dissolved ammonia, iron, manganese, etc. The required doses are:

- 7.6 g of chlorine to react with 1 g of ammonia;
- 0.54 g of chlorine to react with 1 g of ferrous iron, and
- 1.5 g of chlorine to react with 1 g of manganese.

(c) Transmission systems

Transmission systems should be designed for:

- twenty-four hour operation (implied in 12.7.1 for clear water pumps, explicit in 12.7.2 for raw water pumps and 12.7.3 for borehole pumps);
- one standby pump (12.8.1);
- diesel generators to provide 50% cover (12.8.2);
- a minimum head of 4 m in the transmission main (9.3.7).

(d) Storage

Section 11.3.1 of the 1986 Design Manual requires balancing storage to be fifty per cent of the daily demand. Section 11.3.2 requires the following emergency storage:

- 12 hours for gravity supply to storage;
- 18 hours for pumped supply;
- 8 hours for supplies from more than one independent system.

(e) Distribution

The principal criteria are as follows:

Minimum head at consumer connections to be 10 m;
Maximum head generally not greater than 60 m.

(f) Water demand in urban areas

People with individual connections	high class housing	250lcd
	medium	150
	low	75
People without connections	low	20

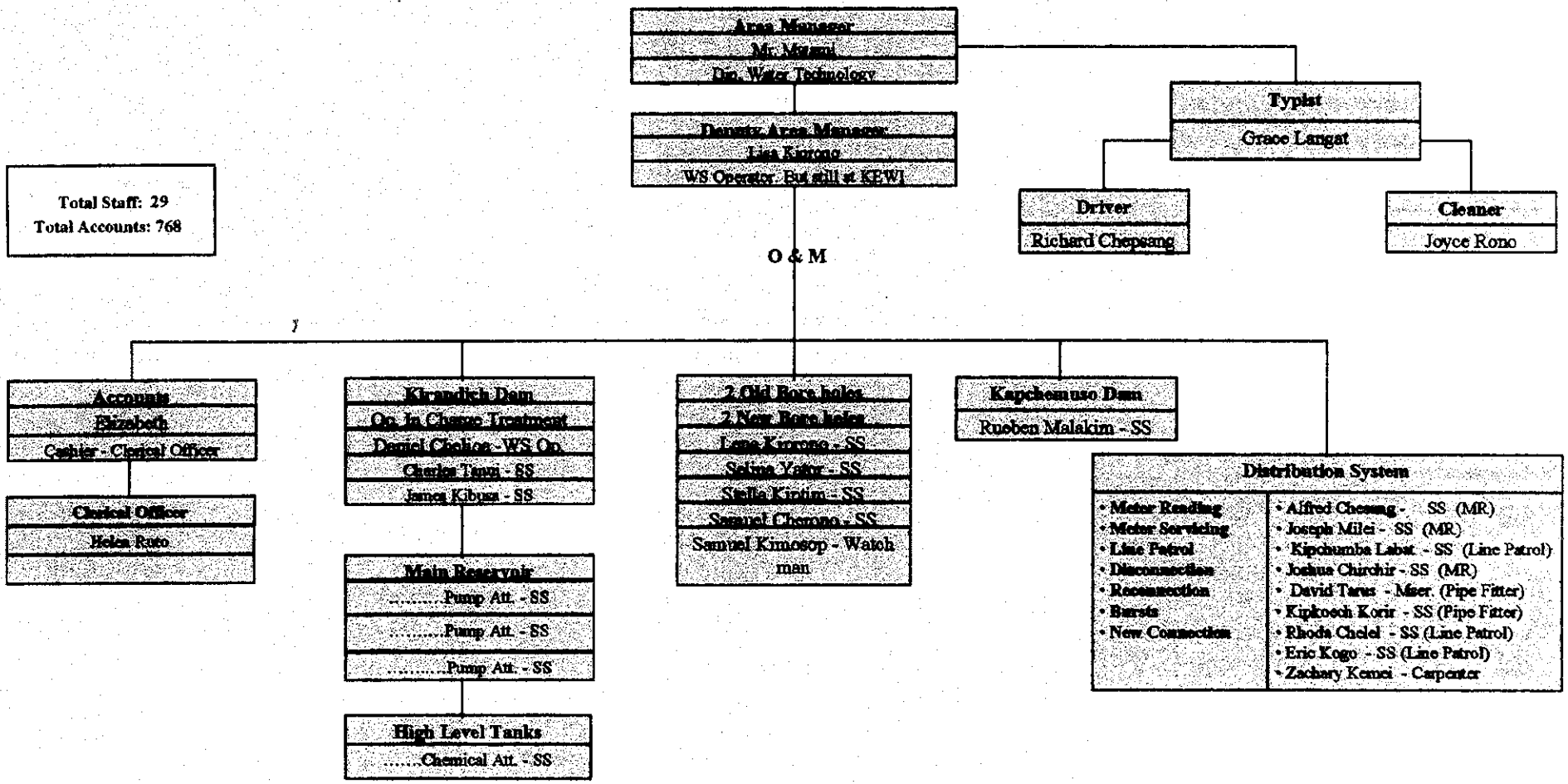
APPENDIX D3
KABARNET
TOWN

KABARNET

KABARNET WATER SCHEME ORGANISATION CHART

STUDY OF INSTITUTIONAL IMPROVEMENT ON REHABILITATION OF WATER SUPPLY SYSTEMS FOR TEN(10) LOCAL TOWNS IN KENYA

FIGURE: 8.1.4



Development Impact Consulting

Engineering and Utility Management Ltd.

GIBB Eastern Africa
LAWGIBB Group Member

Gibb Eastern Africa Ltd.

P. O. Box 16694, NAIROBI Tel: 713741, 712649 Fax: 712720 E-mail: dic@insightkenya.com

CONSORTIUM

Study of Institutional Improvement and Rehabilitation of Water Supply Systems for Local Towns in the Republic of Kenya

Location: Kabarnet WS&S System
Date: 11.-13.10.2000

Interviewer: LEK and CK

Area Manager: Mr. Patrick Mwami
Telephone: 0328/22093

Rift Valley Region: Regional Manager Nakuru visited on 16.10.00
Discussion with Regional Accountant: Mr. Koril
Head of Computer Dep.: M/s. Mercy
Deputy Regional Manager: Mr. Oluoch

Kabarnet WS area approx.: 20 sqkm

No.	Question:	*Answer:*
A.	Utility System	
1.	Office Set-up Office space? Office equipment? Tel.lines? Fax? E-mail? Reliable Power supply? Rationing? Other comments? Hardware, Software and skill: separate questionnaire !!	*New offices built with staff houses under the Kirandich Project: 2 offices* *Nil* *1, but only receiving, as cut off for N.P.* *No* *No* *No* *Rationed* *Done in Regional Office Nakuru*
2.	Staffing Set-up Total number of staff? Male/Femal ratio? Fluctuation? Due to? Average years within the system? Orga chart in place? Compare with enclosed chart Job description available? Level of skill? Overdue staff promotion? Training facilities offered? Used facilities? Technical Administration Management Qualification Station Manager Recruitment statistics Remuneration and benefits	 *See Chart* *Not known, as Area Manager since June* *?* *No* *No* *Annual Staff appraisal forms to RM, but nothing happens* *Not at the moment due to cash flow constraints* *N/A* *Diploma Water Technician, before as Soil Technician on Kirandich Dam* *HQ*
3.	Transport and Logistics Cars? Which? Number: Motorbike? Which? Number: Bicycle? Number:	 *NONE* *Yamaha 1990* *No*
4.	Institutional Frame NWCPC: Line of command	 *AM, RM, Chief O&M HO, MD*
B.	Utility Indices	
1.	Billing Consumption Actual vs Estimate Consumption Billed per month Consumption Billed last 3 years Billing Efficiency: Water billed/ Water supplied	 *Not clarified what is actual and estimated* *14.138cbm April, 12.335 cbm May, 14.099 cbm June & 11,305 July* *Not available* *Not calculated as production figure can only be estimated.*

	Billing Effectiveness: **How many out of 100 bills are wrong or returned for reason**	*Area Manager estimates 5 %, because he checks all the bills received from Nakuru, before he releases them*
2.	**Revenue & Collection** **Revenue Billed vs Revenue Collected per month** **For the last 3 years monthly and annual figures** **Collection efficiency: Total billed/ Total collected**	*Refer to Table 8.3.4.* *Not readily available* *Refer to Table 8.3.4. but no calculation as figures are not reliable.*
3.	**UfW** **1 - Recorded consumption/Production (supply efficiency) per month** **Or production vs billed consumption** **For the last 3 years, monthly and annually** **Value of UfW:** **loss x average tariff rate of system per month** **FY99/00:** **1998:**	*Total production partly verified = 51,000m^3* *Billed consumption = 11,500m^3* *Hence loss of 39,500m^3* *Not available* *39,500m3 * 33.25 = Kshs. 1,313,375.00* *Not available*
4.	**Tariff** **What is the average tariff rate per cbm?** **Total billed water/Total water supplied** **Tariff structure? Current** **Last 3 years:** **Additional charges?** **Additional sources of income?**	*June billing = Kshs. 382,430.00* *June billed consumption = 11,500m^3* *Average tariff = Kshs. 33.25 per m^3* *Gazetted* *Not available* *New connection, re-connection* *None*
5.	**Funding** **Required Funding per month?** **Salary** **Procurements** **Power** **Chemicals** **Others**	*Latest instruction: No more imprest from Nakuru, Station is to retain 50% of re-connection charge and new connection fee. But nobody reconnects and no new connection since May, therefore no money available* *Through HO* *Through Regional Office* *Through Regional Office* *Dto, but brought from Nairobi* *There is nothing*

6.	**Cost** **Total per month** **Salary** **Power** **O&M** **Administration** **Others**	*Refer to Table 8.5.4.*
7.	**Accounting** **Manual or computerised? If manual elaborate:** **Double Book keeping done** **Ledger cards**	*Computerised, but old system, could not trace expenditure prior to 12/00* *No* *No, no information kept at Kabarnet, not even meter reading books*
8.	**Debt Arrears** **Debt Arrears Situation in Kshs** **Increase per month** **Total FY 99/00** **98/99** **97/98** **Debtors Totals/Billed Revenue** **Debtors Totals/Collected Revenue**	*Refer to Table 8.3.4.* *No continuity*
C.	**Utility Procedures**	
1.	**Staff Recruitment**	*Request to be channelled through RM*
2.	**Defaulters Handling**	*Disconnection list from Nakuru* *He who is found re-connected, they remove pipe from the T* *No other action, because that requires the instruction of Nakuru*
3.	**Administration** **Are debtors maintained monthly?** **Is an aging analysis available?** **Debtors lists for different Consumer categories?**	*Yes, Nakuru and in monthly reports* *Report available in October was July* *No* *No*
4.	**Funding**	*All through HO, as all revenue banked and absorbed into regional account.* *No imprest at all on site, because he cannot make any money since the new instruction came out.* *Before they got 10,000.00 p.m. from Nakuru*
5.	**Installment Payment**	*Not decided in Kabarnet, approval would have to come through Nakuru*
6.	**Meter Reading**	*From the 16th of the month meters are read for approx. one week, sent to Nakuru by 23rd and received back before the end of the month.* *Bills are then distributed to the consumers for 1 week* *If disconnected, no bill from Nakuru*
7.	**Disconnection**	*Disconnection list received from Nakuru, then instruction effected in the field.*

8.	**Meter Servicing**	*Occasionally, when they are there and the problem can be solved*
9.	**HQ Reporting**	*Through Nakuru*
10.	**Procedure Manuals**	*Only logbook about pump hours run*
11.	**Financial Control**	*No reconciliation*
12.	**Cash/Cheque** **Un-accounted for cash advances?** **Consumer payments into consumer accounts?** **Cash/Bank book maintained and up to date?**	 *No* *Receipts issued to the consumer, money banked, cashier goes once a week to Nakuru* *No*
13.	**Reconciliation** **For Cash?** **For Bank?**	 *No* *No*
D.	**Discussions**	
1.	**Staff** **Awareness of operation and financing cost vs turnover?** **Job satisfaction and expectation?** **Existing constraints?** **Physical** **Financial** **Institutional** **Political** **Personnel** **Efforts made to overcome the constraints?** **Consumer relationship?** **Relationship with RM?** **Relationship with HO?**	 *No* *Job ok, but actually not able to do much because of constraints and sometimes lacking support from Nakuru: Consumer issues raised are forwarde to Nakuru,where diecision is made by committee, often ignoring what recommende from site* *No training* *Salary very low* *Decentralise for procurement* *Change staff composition, instead of many SS not necessary get staff with necessary skill* *Yes* *No transport, sometimes borrow from DWO or Kirandich project* *Currently Zero cash flow* *Decision making process too time consuming* *Yes, while Mayor complained during Moi Day Celebrations openly that they should pump continuously, he does not pay his bills, neither does the Council* *Lacking skill* *Mentioned to RM, nothing else can be done* *Ok* *Ok* *No relationship apart from personnell issues*

	Relationship with LA? **Planning Department?**	*None, only DDC*
	With other utility providers?	*No*
	External influence affecting the performance?	*Political, Councillors*
	Working environment?	*Ok*
	What is the opinion about PSP?	*If private sector appreciates effort and job satisfaction is there after having achieved s.th. at the end of the day, it is good* *Salary expectation: 200,000.00 Kshs (19 now)*
2.	**Consumers** **Comments on:** **Reliability** **Quality** **Billing** **Price** **Consumer requests on:** **Coverage** **Reaction Time** **Proposed changes** **Service rating** **Cost in relation to service provided?** **Tapped vs kiosk?** **View and understanding of PSP?** **What does the consumer expect?** **What does the consumer propose?** **What is his/her situation on rationing?**	*No time for consumers*
3.	**Stakeholders**	*No time to attend to*
E.	**Consumers**	
1.	**Consumer Portfolio** **Total number?** **Ratio Major/minor consumers?** **Consumer classification?** **Consumer categories?** **No. of new connect. Applied?** **No of new connect. Done?** **Percentage of suspected illegal**	 *768* *2 schools, GOK Bodies, Hospital, Police* *Other mainly domestic consumers* *N/A* *As gazetted* *No summary, cannot say like that* *None since April, but then we saw some, however they relate to the problem with the old A.M. acting. Problem pointed out to RM since 2/00. No instruction received. Problem was that connections were not official* *Action taken: transfer to Eldama Ravine in acting capacity* *Cannot say*

	connections? **Coverage water?** **How many Kiosks are in operation?** **Coverage Sanitation?**	 *50% of approx. 20 sqkm* *None* *Nil, only covered for Kirandich Phase II, Council had looked for planning, K.Ph.II would be implementation*
2.	**Consumer Indices**	
3.	**Consumer Procedures** **Open account?** **Close account?** **Get a credit into the next bill?** **Change address?** **Transfer account?**	*Consumer expresses the wish to have a connection,Area Manager fills form, survey is carried out and financial requirements communicated to the consumer i.e. amount payable and materials required. Nakuru R.M. has to approve the application and thereafter the pipe fitter does the connection upon the consumers payment and provision of required fittings. A.M. has to check that new connections are in the billing.* *No form, consumer just expresses the wish to close.Infor obtained from Nakuru about any outstanding payments, which has to be cleared. Deposit refund done through the Regional Office Nakuru.* *Yes, upon recommendation from the Area Manager to the Regional Manager. For obvious errors or omissions in the billing the in charge billing can handle. Delicate issues on adjustments are handled by a committee at Nakuru comprised of Deputy R.M., Regional Accountant, Internal Auditor + 2 O. & M. personnel. The committee makes recommendations to the R.M.* *Application form has to be filled again and forwarded to Nakuru* *Possible by first clearing old balance on the account, fill application form and pay Kshs.1,000.00 deposit and Kshs. 200.00 transfer fees*
F.	**Technical System**	
1.	**System Components?** **Is pumping necessary?**	*?* *Yes*
2.	**Zonal Meters** **How many are in the system?** **Are they controlling areas?** **Are they functioning?**	*?* *?* *?*
3.	**Network** **Transmission lines?** **Distribution lines?**	*?*

	Consumer lines? **Whole system coverage?** **Fully utilised?**	*?* *?*
4.	**Coverage**	*50%* *Phase II Kirandich*
G.	**Technical Indices**	
1.	**Production** **Capacity per day** **Actual per day** **Production Efficiency?**	*1400 m^3 + 400 m^3 +400 m^3 (reduce by 200m^3 as pump not working in one borehole)* *?*
2.	**Pumping Efficiency**	*?*
3.	**Supply Efficiency** **Recorded consumption/actual production.**	*?*
4.	**Service Efficiency** **How many days to attend to the problem?** **No. of total meters/number of operational meters?** **Total zonal meters/operational zonal meters?**	*Problem is only attended to as soon as they find money or Nakuru sends funds or necessary requirements to attend to the problem.* *Figures not provided* *Not available*
5.	**Sanitation** **Treatment Capacity** **Actual**	*N/A*
H.	**Technical Procedures**	
1.	**O&M**	*No defined O & M procedures found in place*
2.	**Rationing**	*Yes, because if they pump fully, power will be extremely high and not reflected in billed revenue bacause of unmetered + estimated meters i.e negative business*
3.	**Stock&Procurement** **Itemised stock list?** **Stock value** **Repair workshop** **Meter test bench** **Meter repairs/month/year**	*No there is no stock* *No, as no meters even to vandalise* *No* *?*

	Meter calibration **Meter test request by consumers?** **List of tools and repair equipment available?**	*No* *Not possible* *No*
4.	**Meter Test Procedures**	*No, no facilities*
5.	**Requisition Procedures**	***Requisition form filled, or call Nakuru if urgent, but since one month pump old borehole conductor burnt out and has been asking for an electrician, but no action so far, i.e. they wait*** ***For items worth Kshs. 1,500.00 a quotation will have to be raised*** ***Form S11 counter requisition and issue vouchers after received in the file*** ***Form S13 counter receipt voucher and signed by the one who receives it.***

STUDY OF INSTITUTIONAL IMPROVEMENT ON REHABILITATION OF WATER SUPPLY SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA

No. Of Connections	ARREARS (Kshs.)	JULY BILL (Kshs.)	METERED	FLAT RATE	WORKING	NON-WORKING	CUT OFF	ACTUAL CONSUMPTION M^3	AVERAGE CONSUMPTION M^3	LAST PAYMENT (Kshs.)
768	1,639,626.00	382,430.00	470	0	206	161	200	5,402	6,098	371,789.00

No. Of Actual Bills	206
No. Of Estimate Bills	363
In-Active	199
Total	768
Minimum Charge Bills	34.45%

Total Of Active & Inactive
768

Total m3 Billed
11,500

See Note	D
Adjuatment:	-1

199

NOTE:

a) All payments relate to the month of July 2000.
b) Flat rates were not indicated, even though they exist, but are assumed to be included in the estimate consumption.
c) One cut off record reflects as estimate consumption and at the same time a bill thus has been filtered out of the "cut off"
d) For 202 of the 363 estimated bills, no indication of either non-working of flate rate was made.

STUDY OF INSTITUTIONAL IMPROVEMENT ON REHABILITATION
OF WATER SUPPLY SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA

CONNECTION No.	ARREARS (Kshs.)	JULY BILL (Kshs.)	METERED	FLAT RATE	WORKING	NON-WORKING	CUT OFF	ACTUAL CONSUMPTION M^3	AVERAGE CONSUMPTION M^3	LAST PAYMENT (Kshs.)
0001	641.00						1			
0002	99,615.00	7,850.00	1		1			156		
0003	500.00	250.00	1			1			10	
0004	62,850.00	11,075.00	1		1			199		
0005	1,280.00	710.00	1		1			27		500.00
0006	600.00	300.00							14	
0007	2,107.00	560.00	1		1			22		
0008	1,070.00	770.00	1		1			29		1,070.00
0009	769.00	350.00							14	
0010	793.00						1			
0011	15,097.00	740.00	1		1			28		
0012	786.00						1			
0013	294.00	250.00							10	
0014	285.00	250.00	1		1			1		
0015	575.00	450.00	1		1			18		575.00
0016	750.00	250.00	1			1			10	
0017	4,800.00	1,850.00	1		1			60		
0018	494.00	500.00	1			1			20	500.00
0019	240.00	250.00	1		1			5		200.00
0020	2,127.00		1				1			
0021	912.00	425.00	1			1			17	
0022	350.00	350.00	1			1			14	
0023	342.00	350.00							14	350.00
0024	17,850.00	13,500.00	1		1			530		
0025	600.00	300.00							14	
0026	944.00		1				1			
0027	1,451.00		1				1			
0028	250.00	250.00	1		1			7		
0029	1,750.00	350.00	1			1			14	
0030	495.00	250.00	1		1			9		495.00
0031	3,327.00	250.00	1		1			8		2,000.00
0032	600.00	350.00	1			1			14	750.00
0033	1,156.00	350.00	1			1			14	1,256.00
0034	200,000.00	76,650.00	1		1			876		65,752.00
0035	3,170.00	350.00	1			1			14	
0036	679.00	325.00	1		1			13		500.00
0037	317.00	350.00	1			1			14	200.00
0038	250.00	250.00	1		1			10		250.00
0039	350.00	350.00	1			1			14	
0040	735.00	350.00	1			1			14	
0041	904.00	350.00							14	
Sub-Total	**432,105.00**	**122,105.00**	**32**	**0**	**17**	**12**	**6**	**1998**	**249**	**74,398.00**

CONSUMER ACCOUNT INFORMATION DATA

STUDY OF INSTITUTIONAL IMPROVEMENT ON REHABILITATION OF WATER SUPPLY SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA

CONNECTION No.	ARREARS (Kshs.)	JULY BILL (Kshs.)	METERED	FLAT RATE	WORKING	NON-WORKING	CUT OFF	ACTUAL CONSUMPTION M^3	AVERAGE CONSUMPTION M^3	LAST PAYMENT (Kshs.)
0739	1,242.00	300.00							14	950.00
0740	1,312.00						1			
0741	676.00	300.00							14	
0742	1,092.00	300.00							14	500.00
0743	242.00	300.00							14	
0744		300.00							14	
0745	2,394.00						1		14	
0746	292.00	300.00							14	
0747	600.00	300.00							14	
0748	900.00	300.00							14	
0749	548.00	300.00							14	300.00
0750	1,268.00	300.00							14	
0751	3,487.00						1			
0752	2,005.00		1				1			
0753	325.00	325.00							15	
0754	1,542.00	300.00							14	
0755	600.00	300.00							14	
0756	1,200.00						1			
0757	1,200.00						1			
0758	1,586.00	300.00							14	
0759	600.00	300.00							14	
0760	1,544.00	200.00							10	
0761	1,232.00						1			
0762							1			
0763							1			
0764	600.00	300.00							14	600.00
0765	1,552.00	300.00							14	800.00
0766	300.00	300.00							14	300.00
0767	300.00	300.00							14	
0768	975.00	325.00							15	
Sub-Total	**29,614.00**	**6,250.00**	**1**	**0**	**0**	**0**	**9**	**0**	**306**	**3,450.00**

KABARNET

BILLING AND REVENUE COLLECTION DATA

TABLE: 8.3.4

STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA

YEAR 2000

	JUNE	MAY	APRIL	MARCH	FEBRUARY	JANUARY
Accumulated Debt	1,539,959.00	2,496,524.00	2,263,849.00	2,145,096.00	2,104,689.00	2,019,584.00
Current month billed revenue	527,690.00	441,585.00	588,285.00	417,225.00	426,600.00	345,480.00
Total revenue collectable						
Adjustments	- 99,800.00	- 1,055,684.00	- 2,648.00	- 5,475.00	- 13,175.00	- 1,935.00
Total outstanding revenue	1,639,626.00	1,539,859.00	2,496,524.00	2,263,849.00	2,145,096.00	2,104,689.00

YEAR 1999

	DECEMBER	NOVEMBER	OCTOBER	SEPTEMBER	AUGUST	JULY
Accumulated Debt	1,884,371.00	1,857,049.00				
Current month billed revenue	390,005.00	245,880.00				
Total revenue collectable						
Adjustments	- 5,723.00	- 305.00				
Total outstanding revenue	2,019,584.00	1,884,371.00				

KABARNET

BILLING AND REVENUE COLLECTION DATA

TABLE: 8.3.4

STUDY OF INSTITUTION IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS
FOR TEN (10) LOCAL TOWNS IN KENYA

YEAR 2000

	JUNE	MAY	APRIL	MARCH	FEBRUARY	JANUARY
Accumulated Debt	1,539,959.00	2,496,524.00	2,263,849.00	2,145,096.00	2,104,689.00	2,019,584.00
Current month billed revenue	527,690.00	441,585.00	588,285.00	417,225.00	426,600.00	345,480.00
Total revenue collectable						
Actual collection	328,123.00	342,566.00	352,962.00	292,997.00	373,018.00	258,440.00
Adjustments	- 99,800.00	- 1,055,684.00	- 2,648.00	- 5,475.00	- 13,175.00	- 1,935.00
Total outstanding revenue	1,639,626.00	1,539,859.00	2,496,524.00	2,263,849.00	2,145,096.00	2,104,689.00

YEAR 1999

	DECEMBER	NOVEMBER	OCTOBER	SEPTEMBER	AUGUST	JULY
Accumulated Debt	1,884,371.00	1,857,049.00				
Current month billed revenue	390,005.00	245,880.00				
Total revenue collectable						
Actual collection	249,069.00	218,253.00				
Adjustments	- 5,723.00	- 305.00				
Total outstanding revenue	2,019,584.00	1,884,371.00				

MAJOR DEBTORS INFORMATION

STUDY OF INSTITUTIONAL IMPROVEMENT ON REHABILITATION OF WATER SUPPLY SYSTEMS FOR TEN (10) LOCAL TOWNS IN KENYA

1. OTHER (With consumption > 100m3 per month or arrears >Kshs.20,000.00)

CONSUMER NAME	ACCOUNT NUMBER	OUTSTANDING AS AT JUNE 2000
N/A	0002	99,615.00
N/A	0004	62,850.00
N/A	0024	17,850.00
N/A	0034	200,000.00
N/A	0057	44,448.00
N/A	0072	126,345.00
N/A	0077	5,920.00
N/A	0082	39,650.00
N/A	0178	22,150.00
N/A	0191	27,124.00
N/A	0193	69,965.00
N/A	0234	30,702.00
N/A	0284	2,725.00
N/A	0325	28,810.00
N/A	0415	10,300.00
N/A	0438	5,350.00
N/A	0501	4,780.00
N/A	0567	27,036.00
Sub - Total:		**825,620.00**

Total outstatnding minor consumers	814,006.00
Total outstatnding major consumers	825,620.00
total outstanding as at June 2000	1,639,626.00
Number of billable connections	768
Number of minor consumer connections	750
Number of major condsumer connections	18
Average outstanding / minor consumer	1,085.34
Average outstanding / major consumer	45,867.78

KABARNET

EXPENDITURE

TABLE: 8.5.4

STUDY OF INSTITUTIONAL IMPROVEMENT AND REHABILITATION OF WATER SUPPLY SYSTEMS
FOR TEN (10) LOCAL TOWNS IN KENYA

YEAR 2000

Item	Jan	Feb	March	April	May	June	July	
Transport + Operating	10,860.00	6,588.00	2,100.00	760.00	830.00	107,250.00	22,550.00	
Travelling + accomod.	15,150.00	9,250.00	6,550.00	11,150.00	9,250.00	20,740.00	2,000.00	
Fuels + Gas	20,000.00	55,032.00		62,000.00		20,000.00	20,000.00	
Publishing + printing	210.00	1,300.00		720.00	40.00			
Stationery	1,100.00	1,270.00		1,420.00	230.00			
Maint. Of W/S	16,530.00	52,070.00	6,380.00	47,120.00	3,900.00	13,300.00	3,480.00	
Elect. +water		1,500.00						
Misc.		1,260.00						
Passage + Leave			323.00	2,692.80	6,756.65	6,352.90		
Mainte. Buildings+ stations			24,346.00	840.00	18,164.00	2,000.00		
Postal + telegram				3,400.00		137.40		
Maint. Plant,equipment				2,720.00	6,500.00			
Minor alterations				6,600.00				
Telephone						235,643.25	5,376.00	→ Telephone not working at Kabarnet??
Drugs + Dressing							2,000.00	
Creditors prev. years							520,520.75	→ Distribution not available
Total	**63,850.00**	**128,270.00**	**39,699.00**	**139,422.80**	**45,670.65**	**405,423.55**	**575,926.75**	

An accounts package used to capture the cost of the Sub Area, but could not avail figures for July to December 1999.

MONTH	REVENUE COLLECTED 01-07/2000	COSTS
Jan.	258,440.00	63,850.00
Feb	373,018.00	128,270.00
March	292,997.00	39,699.00
April	352,962.00	139,422.80
May	342,566.00	45,670.65
June	328,123.00	405,423.55
July	371,789.20	575,926.75
Total	**2,319,895.20**	**1,398,262.75**

Payment for the above expenses is done from the Regional Office at Nakuru and no allocation is directly made to Kabarnet Sub-Area out of revenue collected.