REPORT TO THE WATER RESEARCH COMMISSION

WATER AND SANITATION IN URBAN AREAS:

FINANCIAL AND INSTITUTIONAL REVIEW

OCTOBER 1993

REPORT 1

OVERVIEW OF INSTITUTIONAL AND FINANCIAL

ARRANGEMENTS IN WATER SUPPLY AND SANITATION

WITH A FOCUS ON THE URBAN AREAS OF SOUTH AFRICA

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PREFACE

BACKGROUND

The Water Research Commission (WRC) appointed Palmer Development Group to undertake an institutional and financial review of water supply and sanitation services in the urban areas of South Africa. The project is a progression of earlier socio-technical evaluations of the urban water and sanitation sectors carried out for the WRC. These projects originated out of the Water and Sanitation 2000 initiative which addressed the need for unified and concerted action in the water and sanitation sector to meet the large and increasing need for adequate services in both urban and rural areas.

OBJECTIVE

The overall objective of this project is:

> *To present information and analysis that can help relevant community leaders and decision-makers:*
>
> - *to guide and promote the extension of services and the reshaping of organisations such as can enable all people living in the (urban) areas of South Africa to have adequate and appropriate water supply and sanitation, and*
>
> - *to facilitate the related processes of financial, institutional, (legislative) and other changes that the adoption and implementation of the above objective will require.*

The specific objectives of the project and working assumptions have been set out in the **Project Inception Document**, accepted by the Project Steering Committee in March 1993.

This report is in fulfilment of **Specific Objective Number 1**, namely:

> *Provide an overview of existing financial and institutional arrangements and relationships in South Africa for the provision of water supply and sanitation services including how existing services are being operated and new services arranged and funded.*

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INTRODUCTION

1. The study context

This report has been written at a time of political transition and consequent social, economic and institutional uncertainty. New constitutional arrangements are being negotiated which will have a profound impact on the way society is ordered. Many questions remain unresolved and there is hence uncertainty relating to the form that a "new" South Africa will take. Will South Africa have a federal constitution? Will regions have their own tax basis? How will national funds be distributed amongst the regions? Will there be a national housing programme with a capital subsidy component? How will local government be structured? These, and numerous other questions, profoundly impact on water and sanitation institutions, financing and policy.

Uncertainty at the national level also gives rise to local uncertainties. Institutions' roles and functions are changing and evolving in response to their expectations of change. Agencies involved in the supply and delivery of water and sanitation services are no exception to this, and many of these agencies are in the process of change.

To undertake an institutional and financial study of the water and sanitation sectors at this time is therefore fraught with difficulties. However, changing circumstances and transition also create new opportunities. Decisions that are made now, during the process of transition, may determine, to a large extent, the effectiveness of the sector in the longer term. Hence it is important that this dynamic of change is understood, and that the issues arising from this change are clarified. This will enable institutions and policy makers to be guided during the transition process, keeping the long term goals in mind, and ensuring that the attainment of these goals in realised as effectively and efficiently as possible.

2. Objective

The purpose of this report is to provide an overview of existing institutional and financial arrangements in the sector, and the current dynamic of change. The report is descriptive in nature, rather than evaluative (a later step in the project) and has, as its principle aim, the clarification of issues pertinent to the rapid delivery of services to the unserved and the sustainability, effectiveness and efficiency of managing these service on an ongoing basis.

ACKNOWLEDGEMENTS

The researchers would like to thank the many people who willingly made time available for interviews, assisted with the provision of documents and other information, and who shared insights and wisdom gained from their experience in the sector. Without their cooperation and assistance this project would not be possible. The number of people that were of assistance is too numerous for all people to be mentioned by name. However, a list of those with whom interviews were conducted is provided in Appendix 3 and we thank these people particularly. Although much of the source material used as the basis for this document was derived directly from the people interviewed, together with other primary documents, the synthesis, analysis and interpretation of the data presented in the report remains the responsibility of the researchers.

We would also like to acknowledge the assistance of the project steering commitee members:

Mr DS van der Merwe, Water Research Commission (Chairman)
Mr N Alli, Nimham Shand Incorporated
Mr A Borraine, PLANACT
Mr HC Chapman, Water Research Commission
Mr A Conley, Department of Water Affairs and Forestry
Mr TG Fowler, University of the Witwatersrand
Mr B Jackson, Development Bank of Southern Africa
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Mr H Maaren, Water Research Commission
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Mr M Muller, Development Bank of South Africa
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Mr JLJ van der Westhuizen, Department of Water Affairs and Forestry
Mr P van Ryneveld, University of the Western Cape
Mr B Walford, Umgeni Water
Mr D Huyser, Water Research Commission (Committee Secretary)

This report was written by Ian Palmer and Rolfe Eberhard.

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3. Methodology

The methodology and working assumptions of the project are clearly set out in the Project Inception Document and are not repeated here. However, one further assumption has been implicitly made during the first phase of the project and deserves mention here. The assessment of current institutional practises has focused, to a large extent, on existing white local authorities. The rationale for this is based on the assumption that the existing white local authority institutions will form the core of any 'new' service agencies that are evolved, both in the metropolitan areas and the classic apartheid towns. Thus the existing management styles and practices in these agencies will have an impact on how these institutions evolve, and will determine how effective the 'new' service agencies will be to a significant extent.

4. Data sources

All of the information collated during the course of the investigation and the preparation of this overview was obtained through:

- Structured interviews with key people in the water and sanitation industry.
- Interviews, telephonic interaction and correspondence with a large number of people involved in the day to day management of water and sanitation agencies through out South Africa.
- Collation of relevant literature, annual reports and financial statements.

The list of people interviewed is given in Appendix 3. A full list of literature consulted is provided in the references and bibliography.

It is difficult to adequately convey the results of such an extensive enquiry. To overcome this limitation, a set of rough working papers has been prepared from the interviews conducted as well as from other secondary sources. The list of papers is set out in Appendix 4 and is available on request.

5. Data limitations

In a situation of rapid change it is possible that, even within a few weeks of this report having been written, some of the facts quoted will be outdated. This is not necessarily a limitation, as every attempt has been made to draw qualitative conclusions which are likely to remain true irrespective of the specific details. The facts are quoted to support these conclusions and should not be viewed as having import or significance in their own right.

6. Review of international literature

During the course of the investigation, international literature pertaining to institutional and financial aspects of water and sanitation services, was collected and reviewed. This material, referenced in the bibliography, will provide points of departure for the analysis to be conducted in the second phase of this investigation (in accordance with specific objective number 4).

7. Report structure

The document comprises three parts:

Part A: Overview of current institutional arrangements (with a focus on operating and maintenance aspects).

Part B: Current financial arrangements with respect to the operation and maintenance of services.

Part C: Overview of the capital funding of water and sanitation services.

In Part A the distribution of existing levels of service in the context of current institutional arrangements in South Africa (including the homelands) is presented, showing the broad relationships between service levels and institutional forms and boundaries. In the light of this, the effect of institutional and boundary demarcation on service delivery is discussed.

The following sections illustrate the linkage between water and sanitation in various agencies and across agencies, review organisation structures in terms of managerial accountability, and discuss institutional performance and customer interface.

The major topics discussed in Part B of the report are:

- An overall assessment of the financial status of the water and sanitation sector.
- Illustrative financial arrangements in some selected institutions.
- A review of water and wastewater pricing theory.
- Overviews of water and sanitation pricing in South Africa.
- Illustrative tariffs and typical household bills in a number of agencies across South Africa.

In Part C, the major organisations involved in the funding of water and sanitation infrastructure investment are reviewed, with particular reference to policy, procedures for allocating funds, and the spacial distribution of existing funding. The relationship between bulk and internal services is also discussed.

PART A

CURRENT INSTITUTIONAL ARRANGEMENTS

(Operating and Maintenance)

1. OVERVIEW

1.1 Inadequate provision of services - the distribution

The distribution of South Africa's population in 1990 was approximately as follows:

Table 1: Population distribution by settlement type (millions)

	Urban				Rural
	Metro	Town	Dense Settlement	Total Urban	
South Africa excluding homelands	13.0	3.8	0	16.8	4.3
Independent homelands	1.8	0.44	0.93	3.17	4.2
"Self-governing" homelands	2.6	0.64	1.3	4.54	4.5
TOTAL	17.4	4.9	2.2	24.5	13.0

Source: Urban Foundation (1991)

About 65% of South Africa's population lives in urban areas, according to the Urban Foundation's Demographic Model data (Urban Foundation, 1991). Almost 71% of South Africa's urban population lives in or on the periphery of the metropolitan areas and 20% of the urban population lives in towns. The remaining 9% live in so-called dense settlements, that is, "closer" settlements in the independent and self-governing homeland states where people are reliant on the urban economy through commuting on a daily or weekly basis.

Population growth figures indicate that the metropolitan areas will experience the highest rates of growth. For example, the Urban Foundation (1991) predicted an average growth rate of 3.3% per annum in the metropolitan areas in the period 1990 to 2000 compared to 2.5% for the whole of the South African population. However, these figures are possibly misleading, because the poorer section of the population is growing at a much higher average growth rate. As an illustration, the Urban Foundation (ibid) estimated that the black metropolitan population would grow at 4.3% per annum over the same period, this comprising both natural population growth and in-migration. Analysis of the recent 1991 Census data suggests, however, that these growth figures may be overstated (see for example Todes and Smit, 1993).

The distribution of people without adequate water supplies is summarised below:

Table 2: Distribution of population without adequate water

	Population million	Population without adequate water	% Distribution of urban population without adequate water
Metropolitan areas	17.4	3.1	66%
Towns	4.9	0.27	6%
Dense settlements	2.2	1.3	28%
TOTAL URBAN	**24.5**	**4.7**	**100%**
Rural	13.0	6.1	
TOTAL	37.5	10.8	

Sources: Palmer Development Group / UCT (1993a), Pearson (1991).

The distribution of people without adequate sanitation is summarised below:

Table 3: Distribution of population without adequate sanitation

	Population million	Population without adequate sanitation	% Distribution of urban population without adequate sanitation
Metropolitan areas	17.4	3.8	51%
Towns	4.9	1.6	22%
Dense settlements	2.2	2.0	27%
TOTAL URBAN	**24.5**	**7.4**	100%
Rural	13.0	11.2	
TOTAL	37.5	18.6	

Sources: Palmer Development Group / UCT (1993b), Pearson (1991).

The distribution of people without adequate water supplies in metropolitan areas is summarised below:

Table 4: Metropolitan Population without adequate water supply

Metropolitan Area	Total Metropolitan Population	Population without adequate water supply	Percentage
Cape Town	2 556 000	300 000	12%
Port Elizabeth	984 000	200 000	20%
Durban / Pietermaritzburg	3 577 000	811 000	23%
Bloemfontein	602 000	280 000	47%
OFS-Goldfields	468 000	77 000	16%
PWV	8 744 000	1 366 000	16%
East London	451 000	40 000	9%
TOTAL	**17 382 000**	**3 074 000**	**18%**

Source: Palmer Development Group / UCT (1993a).

The distribution of people without adequate sanitation in metropolitan areas is summarised below:

Table 5: Metropolitan Population without adequate sanitation.

Metropolitan Area	Total Metropolitan Population	Population without adequate sanitation	Percentage
Cape Town	2 556 000	310 000	12%
Port Elizabeth	984 000	200 000	20%
Durban / Pietermaritzburg	3 577 000	1 172 000	33%
Bloemfontein	602 000	230 000	38%
OFS-Goldfields	468 000	77 000	16%
PWV	8 744 000	2 043 000	23%
East London	451 000	50 000	11%
TOTAL	**17 382 000**	**3 773 000**	**22%**

Source: Palmer Development Group / UCT (1993b).

a) Discussion

Definitions

The information presented in the above tables is derived from national surveys of water and sanitation coverage in urban areas (Palmer Development Group, 1993a and 1993b) and, in the case of rural areas, estimates done for the Water and Sanitation 2000 Workshop (Pearson, 1991). For the urban areas, an adequate water supply was defined as at least one water point per 25 households, or within 50 meters of each household, with provision for at least 30 litres of water per capita per day. In rural areas, "adequate" water supply has been taken as access to an "improved" water supply. The definition of adequate sanitation in urban areas was defined as full waterborne systems, septic tanks and Ventilated Improved Pit Latrines (VIPs). Bucket systems were not regarded as adequate. In the rural areas, the same definition is applicable.

Metropolitan areas

The data shows that about 50% and 66% of the urban population without adequate water and sanitation services respectively reside in the metropolitan areas. This situation is largely related to the housing crisis in these areas, where infrastructure development has not kept pace with the increase in the number of households seeking shelter and services.

The Pretoria-Witwatersrand-Vereeniging and Durban metropolitan areas have the largest numbers of people without adequate services. However, all of the metropolitan areas are experiencing rapid growth in their low-income populations and have significant numbers of people without adequate services.

Important anomalies exist in the distribution of services within metropolitan areas as a result of past apartheid policies and artificial homeland boundaries. For example, Mdantsane (25 km from East London) is situated in the Ciskei and was developed with a high level of infrastructure and services as a "growth point". However, few employment opportunities exist close to Mdantsane and the sustainability and affordability of the services provided is questionable. Atlantis (45 km from Cape Town), a "coloured" de-concentration point, and Botshabelo (55 km from Bloemfontein) are two further examples.

Towns

The situation with respect to water supply in the towns in South Africa is relatively good (compared to other areas), with only about 6% of the population without adequate water supplies. However, sanitation services in these towns generally lag behind, and about 30% of the population living in towns does not have adequate services.

Some important features as a result of apartheid policies and homeland boundaries are again of note. In the Northern Transvaal, most "white" towns in the RSA have "neighbouring" black areas which are situated in a homeland, sometimes a fair distance away. Policy, administration, financial flows etc. are therefore entirely separate, yet the twin towns function as single economic units. An example of this is Pietersburg, whose "black twin town" Sheshego is situated about 12 to 15 km away in Lebowa. This situation is also prevalent in Natal.

In some cases, those living in proclaimed towns in the homeland areas have benefitted from this arrangement in terms of services provision. These towns have been provided with high levels of service which are almost completely subsidised by the homeland government. Examples of these are KwaZulu proclaimed towns, where in many cases full waterborne sanitation and house connections are provided, and residents are only expected to pay a nominal charge (of the order of R 2 to R 5 per month), way below the actual cost of the service provision.

Dense settlements

About 28% of the urban population without adequate water and sanitation services reside in dense settlements. In the case of water supplies, about 60% to 70% of dense settlement residents do not have adequate supplies; and in the case of sanitation, up to 90% do not have adequate sanitation.

The dense settlements exist exclusively within the homelands. Service provision in these areas is largely dependent on the respective homeland policies and the budgets allocated to implement the policies. They have not received the same level of subsidy as smaller proclaimed towns in homeland areas.

Each independent homeland and self-governing state has developed its own policy with respect to water supply. For example, Bophuthatswana's Department of Water Affairs has the goal of supplying all of its resident's with reasonable access to safe water by the year 2000, where reasonable is defined as access to safe water within 500 meters of each household, and has developed a Water Plan by which this may be achieved. The Transkei government set itself the objective that eventually the whole population should have access to a safe and adequate water supply for household use and commissioned a water supply prioritization study recognising that the goal would only be able to be met in the long term. The Ciskei developed a National Water Plan in 1991, which focuses primarily on bulk water supply. No policy had been formulated by Venda at the time and it would appear that little is being done in terms of a coordinated effort to improve domestic water supply in the region. The QwaQwa government developed a four phase plan with the ultimate aim of providing safe water within 250 meters of every household in all of the villages in the region.

Phases 1 to 3 (bulk supply, storage and basic reticulation) have been completed and the final phase is commencing this year. Lebowa have a water plan with the aim of supplying water to within 500 meters of every household as does KaNgwane, but with the distance set at 200 m. In Gazankulu there is at present no specific plan for the upgrading of water supply to unproclaimed towns.

Policy with respect to sanitation provision is generally much less developed.

In practice, the policy goals in these regions are constrained by financial affordability which is the result of inadequate funding from public sources as well as the low levels of affordability of communities. Other major constraints are the institutional framework within which policy must be carried out, and the severe lack of capacity at the local level which diminishes the prospects of sustainability.

1.2 Typical institutional arrangements

a) Introduction and definitions

In dealing with institutional arrangements, urban settlements are separated into the following:

- Metropolitan areas within the RSA
- Metropolitan areas within homelands
- Towns within the RSA
- Towns within the homelands

The classification of settlements into the above groups follows that put forward by the Urban Foundation. It should be noted that this is not a statutory classification and neither does it necessarily represent an optimum classification from the point of view of the provision of services.

A brief description of the metropolitan boundaries, and their relevance, is given in Box 1.

In describing institutional arrangements the classification of the different parts of water and wastewater systems also need to be considered. The approach used here is defined in Box 2. This classification is important from the point of view of financing, as often internal services are funded as part of the housing package, a once-off capital investment, while bulk and connector services are funded through rates and tariffs.

Box 1: Definition of metropolitan boundaries

- **PWV:** The PWV is taken to be the whole of Region H and all the settlements in the region are considered as metropolitan. This includes some of the remoter areas of KwaNdebele and Bophuthatswana where people are living in villages. While it could be argued that the densely settled areas of the Winterveld in Bophuthatswana should be linked to the Pretoria metropolitan area, the arguments are not as easy to support in the case of the remoter villages.
- **Durban:** The edge of the Durban metropolitan area is not clearly defined. However, for the purposes of this report this can be taken as the Durban Functional Region (DFR) boundaries. Thus areas administered by Kwazulu are included.
- **Cape Town:** The boundaries of the Western Cape RSC are assumed.
- **Port Elizabeth:** Includes Uitenhage and all the black local authority areas.
- **Bloemfontein:** The metropolitan area includes Botshabelo and the whole of the ThabaNchu district of Bophuthatswana.
- **East London:** Includes greater East London and Mdantsane in the Ciskei.
- **Pietermaritzburg:** Includes Edendale and Vulindlela. In the case of Vulindlela, a similar situation exists to that described above for KwaNdebele. This is an area to the west of Pietermaritzburg which is classified by the Urban Foundation as metropolitan but which has rural characteristics.

b) Metropolitan areas - RSA

Bulk water supply

In the Witwatersrand, Pretoria, Durban, Bloemfontein and Orange Free State Goldfields metropolitan areas, bulk water is supplied by water boards. The water boards' powers are governed by the Water Act, with the exception of the Rand Water Board which has its own act (Rand Water Board Statutes [Private] Act). The water boards sell water to local authorities, and may also reticulate to individual consumers outside of local authority areas, or inside local authority boundaries with their consent. Comment on the role, functioning and control of the water boards is presented in the Working Paper 1.

In Cape Town, Port Elizabeth and East London, bulk water supply is managed by the respective municipalities. These municipalities retail bulk purified water to other local authorities within their areas of supply with the conditions of supply and tariffs set out in agreements between the supply and receiving authority. The supplying local authority should supply bulk treated water to the receiving local authority at cost.

Regional Services Councils (RSCs) may assume the regional water supply / distribution function. In theory this means that they could have the total responsibility for supplying and distributing treated water to local authorities within their area. In the Transvaal some of the councils have assumed the regional function (for example Central Witwatersrand

Box 2: Definitions of bulk and internal services

- **Bulk water supply service:** The primary resource (dam or wellfield), raw water conveyance and treatment and treated water conveyance to the point where it enters the local service reservoir.
- **Bulk wastewater service - wastewater conveyance and treatment:** Outfall sewers possibly including pump stations and rising mains, treatment works and treated effluent pipeline. In the case of on-site sanitation, the emptying of septic tanks and pit latrines is considered a bulk service.
- **Connector services - water:** Service reservoirs and conveyance from the reservoirs to the reticulation system within a township.
- **Connector services - wastewater:** Local connector sewers taking wastewater from local area reticulation to outfall sewer. Local pump stations and rising mains are included.
- **Internal services:** reticulation internal to the township. The on-site components of on-site sanitation are considered as internal services.

RSC and East Rand RSC), but in practise the Rand Water Board retains responsibility for supplying bulk treated water to the area of RSC jurisdiction and the RSC is responsible for the distribution of water within the area.

The Department of Water Affairs and Forestry (DWAF) is involved in the development of large water schemes for both urban and agricultural uses. The DWAF sells raw water to water boards or municipalities so as to recover the costs of each scheme. In some cases they are responsible for conveyance and treatment as well.

Wastewater conveyance and treatment

Water boards are able, in terms of the legislation, to own and operate wastewater treatment works. However, only Umgeni Water has become involved in this function to any extent.

Regional services councils may assume the regional function of wastewater conveyance and treatment. In the Witwatersrand area, the East, West and Central Witwatersrand RSCs have taken over this function. In the case of the Central Witwatersrand RSC, the actual management and operation of the wastewater conveyance and treatment is done by the Johannesburg City Council (JCC) (by far the largest share) and the Roodepoort Council (RCC) on an agency basis for the RSC. That is, all income is paid to the RSC who reimburse JCC and RCC according to an agreed annual budget for functions performed. In the East Rand, the RSC and local authorities have jointly formed a not-for profit company called East Rand Water Care Company (Erwat), controlled by a board elected by the membership comprising the 22 local authorities and the RSC, to manage and operate wastewater treatment within the RSC area. Even though the West, Central

and East Rand RSCs have the regional function for wastewater conveyance and treatment, their respective boundaries do not coincide with the wastewater catchment boundaries and it is necessary for the RSCs to enter into agreements with each other concerning the treatment of some of each other's wastewater. Joint planning for the whole of the Witwatersrand area has not, to date, been undertaken.

In Durban, Cape Town, Port Elizabeth and Bloemfontein (amongst other centres), the respective RSCs have not taken over the regional function. However, in Cape Town, the Western Cape RSC does own and operate some wastewater works of a regional nature and the province has commissioned a report to investigate the rationalisation of wastewater conveyance and treatment, with the view to the Western Cape RSC taking over the function.

Municipalities in metropolitan areas play an important role in wastewater conveyance and treatment. In most cases, the large "metropolitan" local authorities (for example, Cape Town, Durban, Port Elizabeth, Bloemfontein, Johannesburg) play a dominant role, conveying and treating wastewater from their own area, as well as receiving and treating wastewater from neighbouring authorities. It is rare that local authority boundaries coincide with wastewater catchment boundaries, and hence it is common for local authorities to enter into agreements with each other for the treatment of wastewater. The nature of these agreements differ, but the basic principle on which they are usually founded is that one local authority will undertake to treat wastewater from another local authority at an agreed rate which is estimated to be as close to cost as possible. The extent to which there is an intermediary to resolve disputes and to ensure fairness in the terms of agreement, is not clear. There would, however, appear to be cases where such agreements have resulted in one local authority / agency being disadvantaged over the other, either through the actual terms of the agreement, or as a result of failure to make or implement the agreements timeously (cf Mortimer, 1993, Volume 2, p9, p13).

The Department of Water Affairs and Forestry (DWAF) exercises regulatory control over wastewater discharges, as well as certain regulatory control functions pertaining to the operation of wastewater treatment works.

Internal services: water and sanitation

Local authorities are each responsible for water and sewer reticulation (or other sanitation services) within their own boundaries. However, existing local authority boundaries are still defined in terms of apartheid legislation, with the consequent widely divergent capacity within local authorities to carry out this function. Most white local authorities have sufficient resources and capacity to exercise this function adequately (within their own areas), although some of the smaller white local authorities within the metropolitan

areas are not able to raise the resources necessary to replace and upgrade ageing systems. For example, Westville is investigating the possibility of Durban Corporation assuming responsibility for their water and sanitation networks for this reason. Black local authorities, on the other hand, are almost universally weak and do not have the financial and personnel resources to adequately exercise this function. Technical (and financial) backup to these local authorities is provided by the provinces but their resources are spread thinly and the backup is consequently inadequate. The provinces also act as the local authority in areas where no local authority has been established, or where such authorities are dysfunctional, for whatever reason.

Inter-agency agreements may be entered into whereby an agency (local authority, regional services council, water board, private firm) may operate the water and/or wastewater reticulation under contract. The nature of these contracts vary. Some trends in, and instances of, inter-agency agreements are given below for illustrative purposes:

- There is, generally, a great reluctance on the part of white local authorities to become involved in the management of services in black areas (at least in the short term) in the metropolitan areas. The basic reason for this is the financial risk involved. The rate of payment for services in metropolitan black local authority areas is almost universally low, and there is little likelihood of this changing without legitimate institutional restructuring.

- Durban Corporation and, to a lesser extent, Port Elizabeth and Bloemfontein appear to be the few exceptions to this. Durban is involved in extensive negotiations for the taking over of water supply and sanitation services in black local authority, Natal Provincial Administration (NPA) and KwaZulu administered areas. However, even in these cases, Durban (quite understandably) is seeking to minimize its financial risk through, for example, entering into contracts with the KwaZulu government[1] whereby KwaZulu undertakes to make up certain shortfalls in revenue (the difference between the tariff levied and the cost of provision of the service) during a 5 year period during which the current uneconomic tariffs are adjusted to economic levels. In the NPA areas, Durban has stated that it is only willing to render services to these areas if there is an explicit commitment to payment by consumers and that services will operate on a "no payment - no service rendered" basis.

[1] Inter-agency agreements across homeland borders are affected to a great extent by national political considerations, complicating the issues involved. For example, KwaZulu has recently broken off negotiations with Durban Corporation.

- The situation in some of the homeland administered metropolitan areas is different. Here there has been a tendency to involve private companies in management and operation contracts. Until now these have been short term (2 to 3 year) contracts with local firms. Initially, most of these concerned the management and/or operation of discreet units, for example wastewater treatment works. However, more recently, township management contracts comprising either the town engineers function, or sometimes the whole township administrative function, have become more frequent. An example of a contract for managing the town engineers role in a township is Umlazi. More detailed discussion of this arrangement is presented in Working Paper 3, but essentially the private company is paid a fixed fee for the management of the engineering function. Although the "imported" expertise and the 'management by objectives' approach has yielded significant improvements in the overall management of especially the water and wastewater functions, the private company entering into the contract has not been exposed to any significant financial risk, as the township revenue function is totally divorced from the town engineering function. Such a contract is possible because payment to the private company is guaranteed by the KwaZulu government (subject to specified technical performance but) independently of overall economic performance of the township and revenue received. An additional point of note is that these contracts have not been entered into on an open tender basis.

c) Metropolitan areas - within homelands

A number of areas form a functional part of the major South African metropolitan areas but are situated in the independent and self-governing homelands. Settlements that fall into this category are listed in Table 6. Some points of note regarding services provision in these areas are highlighted below:

- The area known as the Winterveld in Odi 1 (about 45 km north west of Pretoria) has a population of about 250 000, of which about two thirds are living in the densely settled south east portion. The area is, to all intents and purposes, urban, with a housing density of about 25 units per hectare and a significant portion of its residents commuting to Pretoria and other urban centres on a daily or weekly basis. However, the settlement is in Bophuthatswana (even though the Bophuthatswana government was against its incorporation at the time of its "independence" in 1977) and is administered from Mmabatho, over 300 km distant. Although bulk water has been provided and underground reticulation installed, only about 7% of those to whom the water is available have connected to the supply. The reasons for this are complex, but essentially reduce

to the inappropriate institutional framework within which the Winterveld is administered. (For more detailed discussion of the Winterveld, see Working Paper 2).

- Umlazi is a fully urban area, situated about 10 to 15 km south of Durban City centre, which was initially developed in the early 1960s and administered by Durban municipality, but was taken over by the KwaZulu government at the time of its establishment. Although Umlazi has a local town council, much of the policy and decision making power rests with the KwaZulu government, seated in Ulundi. Bulk water is supplied from Umgeni Water, through the Durban reticulation network, then along an Umgeni owned pipeline and finally to Umlazi. Umlazi (KwaZulu Government) pays about 20c/kl more for its bulk water supply than does Durban Corporation. Wastewater flows to wastewater treatment works owned by KwaZulu (but operated on a contract basis by Umgeni Water) as well as into the major sewer outfall and treatment works managed by Durban. Because of the lack of personnel capacity within KwaZulu, the management of the engineering functions in Umlazi, including the operation and maintenance of the water and sewer reticulation networks, has been contracted out. Aspects of this contract arrangement have already been commented on in Section 1.2.b) "Internal Services: water and sanitation".

- On the other hand, the situation in Umbumbulu, 20-30 km to the south-west of Durban, is quite different because this area has not been proclaimed as an urban area, and hence it is does not have the same access to resources from the KwaZulu government that Umlazi does. The level of services in this area are therefore minimal, and the area is largely dependent on money from the Port-Natal Ebhodwe Regional Services Council.

- Mdantsane was specifically developed as a de-concentration industrial growth point, and is situated within the Ciskei border about 25 km from East London. Money was made available from the South African government through the Ciskei government for the development of Mdantsane. A high level of infrastructure was provided, but, sufficient resources for the adequate maintenance of the services have not been available leading to a deterioration in the state of the infrastructure. Because of high rates of unemployment and the distance to places of economic opportunity, residents cannot afford to pay the full costs of the service provided. An effective local authority does not exist and the area is, to a large extent, administered from Bisho (about 40 km away) outside King William's Town.

Table 6: Metropolitan settlements within homeland areas

Metropole	Settlements	Homeland	Population and comment
PWV	Odi I - Morotele I	Bophuthatswana	±900 000 people; ± 45 km north west of Pretoria, high density settlement in Winterveld, and proclaimed urban areas of Mabopane and Ga-Rankuwa
	Odi II - Bafokeng		±210 000 people; ± 60 km west of Pretoria, rural in character
	Morotele II		85 000 people; ± 60 km north east of Pretoria, rural in character
	KwaNdebele	KwaNdebele	±500 000 people; ± 40 km east of Pretoria
Durban	Umlazi, KwaMashu Umbumbulu, Ndwedwe, Ntuzuma, Empumulanga ...	KwaZulu	±1 900 000 people; Ranging from fully urban (Umlazi) to rural (Umbumbulu) in character
Pietermaritzburg	Vulindlela		± 250 000 people;
East London	Mdantsane	Ciskei	± 220 000 people; ± 25 km west of East London, fully urban
Bloemfontein	ThabaNchu	Bophuthatswana	± 85 000 people, ± 60 km from Bloemfontein
TOTAL			± 4 150 000 (24% of total urban population)

d) Towns within the RSA

Bulk water supply

Bulk water supplies in small towns within the RSA borders are generally managed by the white local authorities themselves. They may own their own dams, or extract groundwater in the vicinity of the town. In some cases, they purchase raw water from the Department of Water Affair's agricultural (or combined agricultural / urban) schemes. In almost all cases, black local authorities purchase water from neighbouring white local authorities. This water should be supplied at cost, but it is not clear whether this is always observed. Technical backup to towns may be provided by the provinces or the Department of Water Affairs.

Bulk wastewater

Most white local authorities own and operate their own wastewater treatment works. In very small towns and holiday resorts, no reticulated system may exist, in which case septic tanks or conservancy tanks are usually used with the municipality operating a desludging and tank emptying service to residents (at cost). Wastewater from black local authority areas is mostly treated by the white local authority at cost. Treatment works are usually designed for low maintenance costs and requirements (for example oxidation ponds or bio-filtration units). However more sophisticated nutrient removal activated sludge works are constructed in sensitive river catchments in order to comply with the Department of Water Affairs Special Standards. In many areas, waterborne systems do not exist or only serve a portion of the population. Several of the small towns operate bucket collection systems, and in a few cases pit latrines are used. Bucket collection services are mostly operated by the black local authorities and the nightsoil is emptied into the head of the treatment works (if it exists), composted with municipal refuse or buried. The Department of Water Affairs provides a subsidy to smaller local authorities to help them to build wastewater conveyance and treatment works[2]. This subsidy is, however, under review, following recommendations made by the De Loor Commission (1992).

Internal services: water and sanitation

Responsibility for the operation of the water and sewer reticulation networks is the same as for metropolitan areas. The imbalance in respective capacities between white and black local authorities to adequately operate and maintain the networks is again apparent. However, it would appear that, in general, more progress has been made towards the joint management of services in towns than has been the case to date in metropolitan areas. Most of these joint administration agreements have been made in terms of the Interim Measures Act (No. 128 of 1991). As at December 1992, 14 local authorities (out of 96 black local authorities) in the Cape Province, and 11 local authorities in Natal had amalgamated in terms of the Interim Measures Act. In the Orange Free State, by the same date, 47 local government negotiating forums had been established in terms of the Act and a further 9 outside of the Act. And in the Transvaal, by February 1993, 90 negotiating forums had been constituted (SAIRR, 1993, p8f).

The government's target date for the amalgamation of local authorities was 1 January 1993, and this date was subsequently changed to 1 July 1993. The then minister of Local Government and National Housing, Mr Leon Wessels, said that where the amalgamation did not occur voluntarily, certain fiscal measures would be used to encourage it (ibid, p7).

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2 The department can also subsidise bulk water supplies to small towns.

SANCO and the ANC have serious problems with the provisions of the Interim Measures Act. Discussions at the Local Government Negotiating Forum (as at July 1993) seemed to indicate that agreements reached in terms of this Act would be made null and void and that Interim Joint Councils would be appointed for all local authorities on 1 October 1993, these councils being appointed on a 50-50 basis by the "Statutory" (government: central, regional and local) and "non-statutory" (SANCO, ANC ...) sides of the negotiating table.

For most towns in South Africa, the issues are relatively uncomplicated: the previously separate "twin" white and black local authority areas will be amalgamated, a single Council will be appointed (and later elected), a single tax base will be formed, services will be rationally administered as a whole, and uniform financial and economic policy will apply to the whole town. There is, however, strong resistance to this by conservative white councils, particularly in the Transvaal, and the manner in which the sharp conflict in approach will be resolved is still unclear.

The economic impacts of the amalgamation will be different for each town, and this, together with the extent of government grants that will be made available to towns, will determine the level of services that is sustainable in a particular town.

The issues are slightly more complex in towns which are wholly or partly in the homelands, especially those towns which are divided between the RSA and an independent homeland (for example, Zwelitsha in the Ciskei but adjacent to King William's Town). The resolution of services (and other local government issues) will, in these cases, depend largely on the results of constitutional negotiations at the national level.

e) Towns in homeland areas

The bulk and internal services arrangements in these towns are usually different to those in the towns in the RSA in that these services are usually provided and administered directly by the homeland government (although this is not always the case; for example, Butterworth in the Transkei administers its own bulk and internal services). Local institutional capacity is usually too weak to properly administer these systems. A common consequence of this arrangement is that the supply of these services is totally divorced from the administration of the revenue (as these are usually done by separate government departments with poor cross linkages).

2. THE EFFECT OF DEMARCATION ON SERVICE DELIVERY

2.1 Introduction

The overview set out in the previous section has presented, in broad outline, the effect that homeland and local authority boundaries have on service provision. In this section, the effect of specific institutional boundaries on service delivery / management is outlined.

2.2 Water boards

The established water boards play a major role in providing bulk treated water to existing urban communities. Those water boards which have significant urban populations within their area of supply of are listed below:

	Supply area population	
Rand Water Board (RWB)	± 7 - 8 000 000	
Umgeni Water	± 4 500 000	
Magalies Water	± 1 300 000	(76% of water ex-RWB)
Bloemarea Water	±1 000 000	
Goldfields Water	500 000	
Total population	± 14 800 000	
% of total metropolitan population	± 85%	
% of total urban population	± 60%	

The boundaries of these water boards profoundly affect the access that urban communities have to bulk water supplies. These boundaries are set by the Minister of Water Affairs in terms of the Water Act (Act No. 54 of 1956). The discretion that the Minister has in this respect is wide: "*whenever the Minister deems it expedient or desirable that a combined scheme be established for supplying water for urban* [and other] *proposes within any area to local authorities, ..., or other persons, he may ... establish for the area in question which shall be defined in the notice* [in the Government Gazette] *a water board ... and may in like manner at any time alter the boundaries of such an area.*" (Section 108(2) of Act No. 54 of 1956). The Minister has similar powers with respect to the Rand Water Board which is governed by its own statutes (Rand Water Board Statutes (Private) Act No. 17 of 1950).

No clarification of the criteria for determining the areas of supply are given, and in certain instances it would appear that economic and efficiency grounds are not necessarily used as the basis for the decision. For example, the rationale for the creation of a separate Magalies Water to serve the Pretoria area would appear to have been made for the reasons of wishing to limit the size of the Rand Water Board, rather than optimising economies of scale and rationalising water distribution in the PWV area.

In practice, it appears that the Minister, in most instances, accedes to requests by the Water Boards themselves for extensions to their supply areas. The motivations for water boards to extend their areas of supply are various, but there are also reasons why they would not wish to expand as, in general, supply at the margin is more expensive than the average cost of supply. Hence it may be expected that the water boards (whose membership is dominated by the larger existing consumers) may resist expanding their areas of supply. In the case of the Rand Water Board, in terms of their statutes, new consumers in an expanded supply area are expected to pay the marginal capital costs of the new supply, or at least a significant portion of such costs. This may be either in an upfront capital payment, or through a levy on the tariff for a fixed period. The effect of this arrangement is that poorer communities, who may not be able to afford this premium, and/or whose consumption may be too low to make it worthwhile for the water board are disadvantaged by this arrangement. The Rand Water Board is of the opinion that the Act is reasonable in this, because it protects existing consumers. However, the negative consequences of this in terms of equity are also recognised and the board is presently investigating this with the view to proposing changes to the statutes (Bath, pers comm., 1993).

Umgeni Water have adopted an expansive approach, and have gone out of their way to expand there area of supply to incorporate poor communities and to endeavour to supply these communities with water, either through direct piped water supplies, or through development / improvement of local water sources. The impact of these marginal costs on average costs are estimated by Umgeni Water to be 2% of total costs, that is, about 1.5 c/kl (Walford, pers comm., 1993). However, an examination of projected capital expenditure shows that expenditure on the Rural Areas Water Supply and Sanitation Programme is expected to account for 16% of total capital expenditure, on average, over the next 5 years. Current interest and capital redemption charges account for about 50% of total costs. If it is assumed that this ratio will remain relatively constant, then it can be estimated that the future impact of Umgeni's rural water and sanitation schemes will be of the order of 8% of total future costs if all capital expenditure on rural schemes is provided by Umgeni Water. Umgeni Water is confident that based on experience to date, much of the capital expenditure required will be provided from other sources, for example, Joint Services Board, Trusts,

etc., and hence the impact on future costs may be significantly less than 8% (Walford, pers. comm., 1993). See Working Paper 3 for further discussion.

In terms of wastewater treatment, Umgeni is the only water board playing a significant role. Their primary interest in being involved in this is the environmental protection of the river catchments (cf. the agency agreement between Umgeni and KwaZulu for the operation of the KwaMashu wastewater treatment works, reported on in Working Paper 1), and they support the view that catchment based authorities should be established which have dual responsibility for water supply and wastewater treatment.

2.3 Regional Services Council Boundaries

In terms of the actual management of services, these boundaries only have an impact where regional councils have assumed the regional water and / or wastewater functions. In most instances the boundaries of councils in the metropolitan areas span a wide enough area for the adequate rationalisation of services. For example, the councils in Cape Town, Durban, Port Elizabeth, Bloemfontein, OFS Goldfields, and East London areas would all, theoretically, be able to carry out rational planning and management of both regional water and wastewater services within their areas of jurisdiction. This assumes that the councils remain, or are replaced by metropolitan based authorities. The one exception to this is the Witwatersrand area where three councils (East, Central and West Rand) divide what is essentially a contiguous area, and where, at least in the case of wastewater, it would make sense to plan this function for the whole area, as significant rationalisation could well be achieved through joint planning of macro wastewater treatment works. At present, the individual Witwatersrand councils each have the regional function for bulk wastewater within their areas, and all are planning these functions in comparative isolation from each other (Korf, pers comm., 1993; see also for example, Mortimer, 1993).

In situations outside the metropolitan areas the RSC boundaries define another potential arrangement for managing water and sanitation services. These areas may include a dominant town or a number of small to medium sized towns. In either case there is potential for sharing technical and management expertise between the towns. This arrangement could obviously be applied without the existence of statutory boundaries, on the basis of *ad hoc* agreements.

2.4 Local authorities - metropolitan areas

The current effect of local authority demarcations on service delivery in the metropolitan areas are well known and documented (see for example Bleibaum, 1992), and it is therefore not necessary to repeat these here. For illustrative purposes only, the local authority and wastewater catchment boundaries in Cape Town and Durban are shown in Maps 1 to 4.

It is common cause that the boundaries may change significantly in the near future (see for example SAIRR, 1993). The nature of these changes will have a profound influence on service delivery, and some brief comments on these impacts, are given here, from an institutional perspective (see Part B for further financial analysis).

a) Two-tier metropolitan structure

The prevalent trend in negotiations to date would seem to strongly favour the establishment of a two tier metropolitan structure with a metropolitan council operating at the metropolitan level, responsible for (at least) regional services, and lower tier councils functioning at the local level. The dominant thinking also appears to favour these being multi-functional councils, that is, operating and managing the trading services (especially electricity and water) which are important local authority revenue earners (see Part B). However, the distribution of service functions between the tiers of government is still far from clear. Marsden (1993), for example, proposes the following service matrix as being the most suitable:

Metropolitan level

- entire water function (source to tap)
- entire electricity function
- regional roads
- regional stormwater
- regional wastewater (bulk conveyance and treatment)
- regional solid waste (disposal sites)

Local level

- local roads
- local stormwater system
- local sewer reticulation and sanitation services
- local refuse collection

At the metropolitan level, the issues pertaining to the defining of the outer boundaries are similar to those raised for water boards in section 2.2 above. In particular, this will be the case if metropolitan wide uniform tariffs are adopted. The various options in this regard need to be subject to careful economic and financial analysis. Recent work carried out by the World Bank (World Bank, 1993) in Port Elizabeth, Cape Town, Durban and the Witwatersrand marks a start in this respect. It is clear from their work that services considerations should be an important input into this boundary demarcation process (see also, for example, Marsden et al, 1993).

The defining of internal local council boundaries is also a complex task, depending on a large number of both related and unrelated factors. Marsden (ibid) notes that historical, social, political and financial factors are likely to play a more important role in determining these boundaries than technical service delivery considerations. In the light of this it is possible that sub-optimal arrangements, from an economic efficiency point of view, will result. The rationalisation of service delivery at the metropolitan level with one institution assuming the full responsibility for certain functions may enable services to be delivered in a more cost effective and efficient way.

b) Service utilities

De Loitte Touche have recently (October 1993) completed an institution study for the provision of water and sanitation in the Central Witwatersrand Metropolitan Area (De Loitte Touche, 1993). Five institutional options were proposed, diagrammatically represented in Appendix 2, Figure 28. These were ranked, taking into account the following criteria: legitimacy, customer satisfaction, capacity/effectiveness, efficiency ("businesslike") and holistic management of water cycle. The two options most favoured by the project steering committee are briefly described here:

Option 1: A third tier Water and Sanitation utility which carries out the same responsibilities as the current Central Witwatersrand RSC and the various local authorities. The Rand Water Board would continue to operate according to its current brief.

Option 2: A single function sanitation utility at the second tier responsible for the bulk conveyance and treatment of waste water. The Rand Water Board would continue to operate according to its current brief.

A third tier Water and Sanitation utility which carries out the same responsibilities as the current Central Witwatersrand RSC and the various local authorities with the exception of bulk treatment.

Both of these options thus involve extracting water and sanitation functions from local and metropolitan government.

2.5 Local authorities - other areas

As noted before, boundary issues are much simpler in smaller towns which traditionally have one white local authority and one black local authority. The resolution in these cases is to draw one boundary around both and administer and manage as one unified town. The urban / rural boundary in these towns is usually fairly clear. However a number of caveats exist:

- "Twin towns" which straddle homeland boundaries, particularly in the case of the independent homelands which are stalling reincorporation (for example King William's Town / Zwelitsha (in the Ciskei)), present particular challenges.

- Towns such as Umtata do not necessarily have defined edges, and the task of drawing a line inside which "urban policies" have effect, and outside which "rural policies" are applied, is difficult. Dewar (1991), in a study titled 'Policy and planning approaches regarding the interface between rural and urban areas: The case of the Transkei', argues that it is necessary to create a peri-urban system in which the 'urban' areas are far more urban than they are at present, and in which rural functions are intensified in rural areas. He looks at how this can be achieved and suggests that investment policy plays a key part in determining this process.

2.6 Areas without local authorities

Presently there are areas inside the metropolitan areas which do not have their own local authorities (eg. Orange Farm). However, this situation is unlikely to persist much longer, and hence is not discussed here. The related problem of the urban periphery, that is those

areas on the edge of the metropolitan boundaries, which will be defined in the future, is a separate issue and is discussed in Section 2.7 below.

It is, however, likely that some essentially urban areas outside of the metropolitan areas are likely to continue to exist without functional local authorities. This is particularly likely in the case of the so-called dense settlements. Services provision to these settlements has been affected by the way they are classified and this may continue into the future. Many may remain classified as rural, in which case services provision will need to be effected by regional bodies of some kind. The dual role played by the Bophuthatswana Department of Water Affairs and the Water Supply Authority in extending water supplies in the rural areas and dense settlements in Bophuthatswana appears to suggest that scope may exist for sector specific water agencies to fulfil a portion of this function, in collaboration with other development agencies and non government organisations (NGOs) (See Working Paper 8 for further discussion).

2.7 The metropolitan fringe

Once the new metropolitan boundaries are defined, it is likely that peri-urban settlements will still exist on the fringes of the defined metropolitan area. This will mean that these settlements will not have a direct link into the metropolitan institutions. One possible approach to provide services to these communities has been proposed by the Valley Trust (an NGO), and in the context of collaboration between Umgeni Water, the Valley Trust and local Development and Water Committees, appears to hold much promise. The model is diagrammatically presented in Figure 3 of Appendix 2. (More detailed discussion of the option is provided in the Working Paper 3).

3. WATER SUPPLY AND SANITATION LINKAGES

3.1 Introduction

This section highlights the various relationships that exist between the water supply and wastewater functions in the urban areas of South Africa.

3.2 Bloemfontein - integrated service delivery

Bloemfontein is used as an example of a local authority which deals with all services in an integrated way. The Bloemfontein City Engineer's department structure is depicted in Figure 7 of Appendix 2.

The structure differs from that of many other larger local authorities in that all civil services (roads, stormwater, water and wastewater) are combined, and the functions split as follows:

design and planning
operation and maintenance
construction

The major advantage of this arrangement is in the planning and construction of new developments. Developers (either private or the municipality itself) only have to deal with one group of people and all the services are considered in a holistic way.

Revenue functions are retained by the City Treasurer and the only real direct linkage between this and the "supply side" structure shown above is through the annual budget.

This integrated services arrangement is possible in local authorities which are not too large (Bloemfontein City Council serves about 140 000, excluding Mangaung) and is fairly common in smaller local authorities.

3.3 Durban - "autonomous agencies"

Durban Corporation have gone the opposite route and separated service delivery to a large extent. Relevant parts of Durban Corporation's organisational structure are shown in Figures 4-6 of Appendix 2.

The Water Directorate and Wastewater Directorates are managed largely as autonomous "business" units. Each of these units is highly goal directed, and close linkages are maintained between revenue (included as a function within each directorate) and expenditure, with extensive use of the "cost centre" management and accounting approach. While this structure has advantages in terms of developing an organisation culture and increasing efficiency, there are also draw backs. For example, it is not in the interests of Durban Water for sewage billing to be tied in to water metering, because this causes added difficulties for Durban Water without any direct benefit to themselves. However, if a more holistic perspective is adopted, there may be overall advantages if wastewater management is more closely tied to water supply management. Another draw back may be that optimising the design and installation of new services may be more difficult with a high degree of autonomy of different departments. Here a greater degree of cooperation is needed if optimal planning is to be achieved.

3.4 Cape Town - traditional town engineer structure

Cape Town City Council represents the "middle of the road" case typical of many medium sized to large local authorities. The structure is depicted in Figure 9 of Appendix 2.

The organisational culture is very much that of the 'old style public service'. The water and sanitation functions are assigned to designated assistant city engineers, with the assistant city engineers reporting to deputy city engineers who in turn report to the city engineer. The functions (at least the management, administration and design components) of both the water and wastewater functions reside in the same building and cooperation between the branches within the City Engineers Department is likely to be fair to good, depending on inter-departmental politics and rivalry. However, these functions operate very much within the tradition of an engineering or "supply mode" approach, and there is little linkage between revenue and expenditure except through the annual budget cycle.

Appendix 2 contains organisational structure diagrams for a number of organisations. The wide range in types of structure and the interface between structures is well illustrated by these figures.

4. ACCOUNTABILITY

4.1 Political accountability

Political accountability is defined as accountability to elected officials for the purposes of this discussion.

a) Water boards

The management boards of water boards are directly appointed by the Minister of Water Affairs, and are thus accountable to him. In a narrow sense, the boards may thus be said to be politically accountable if the government is democratic and representative of the people. However, the accountability of the boards to locally elected officials is more tenuous.

In the case of the Rand Water Board, the management board initially comprised of representatives of all local authorities to whom the board supplied water. As the number of local authorities grew in number, and the task of the board became more complex, technical and specialised, the running of the board became unwieldy. The statutes were therefore amended in 1986 to make provision for the minister to appoint a maximum of 12 members to the management board, comprising people with the necessary expertise. Thus at the moment, the board does not have any direct political accountability to locally elected officials.

In the case of Umgeni Water, the appointment of the management board is made as follows: the Minister of Water Affairs requests nominations from each of the major water consumers - Durban Corporation, Pietermaritzburg Municipality, Industry, Joint Services Board and other local authorities. The Minister makes the appointments on the basis of this list. The board is thus politically accountable to the larger water consumers (large municipalities, industry), but the failing of this situation is that the smaller local authorities and areas without local authorities are unrepresented on the board.

The management board appointment procedure for the other water boards is the same as for Umgeni, and is done in terms of the Water Act.

In the cases where major metropolitan local authorities act as the regional bulk water supplier, direct political accountability for the functions exercised rests with the "metropolitan council". Other local authorities have no direct say in the management of the regional water supply, but they may have indirect influence through negotiations in terms of the inter-local authority agreements governing the provision of services by one local authority to another.

b) Regional Services Councils (and Joint Services Boards)

The political accountability of these councils has been criticised from their inception. Representation on the councils is weighted according to the value of services purchased, and thus wealthy areas, particularly the white local authorities with incorporated industrial and major commercial areas, are disproportionately represented.

c) Local authorities: metropolitan areas

Political accountability under the present situation is highly problematic. The criticisms of the present local political structures are well known and documented and are not repeated here.

However, it is worthwhile, to outline how political accountability with regard to water and sanitation provision might look under different possible metropolitan structures and service arrangements. Only the cases of a single tier and two-tier metropolitan structure and an autonomous service agency are examined here.

Single tier multi-functional metropolitan authority
The metropolitan council is directly elected by the resident population and manages all of the functions within the metropolitan area.

Two tier multi-functional metropolitan authority
The metropolitan authority may either be directly elected, partially directly elected (remainder comprising representation from second tier), or indirectly elected (only through representation from second tier). Water and wastewater functions could also be managed either solely by the metropolitan tier, or in combination with the local tier. The nature of accountability of services provision will be dependent on the choices made between these different options, but in all cases, political accountability to elected representatives will be fairly direct.

Autonomous service agencies
Autonomously managed sector agencies need not necessarily be independent of political accountability. This accountability could operate at a number of levels. These agencies could be accountable to an elected minister at the national or regional level, and be bound to carry out policy and comply with directives emanating from this level, for example, a policy of extending services to all within their area of supply. These agencies could also be

made politically accountable at the local level through structured (legislated) inter-action between the metropolitan council and the agency's management board.

d) Local authorities - other areas

In these areas, political accountability is simpler. Unified councils will be directly elected by residents, and it is likely that these councils will retain overall responsibility for services delivery. In cases where service delivery is contracted out, overall responsibility will still rest with the local authority.

e) Areas without local authorities

Political accountability in these areas is necessarily problematic. The model put forward by the Valley Trust for a peri-urban area on the fringe of Durban, diagrammatically represented in Figure 3 of Appendix 2, and discussed in the Working Paper 3, goes some way to providing a framework within which service delivery in these areas could take place, at the same time as building local institutional capacity. Little evidence was found of similar initiatives in other areas.

It is notable that in many of these areas there are tribal authorities who have administered them historically. The extent to which these tribal structures are effective is variable and the extent of accountability depends largely on the character of the headman, who may apply more or less democratic procedure. However, it is possible for the tribal arrangements to be adapted to achieve satisfactory service delivery. An example of this is at Qadi to the north of Durban where a services project has been implemented with greater success than many within defined urban areas.

4.2 Consumer accountability and customer / community interface

a) Definitions

The term consumer accountability is misleading in a context where a significant proportion of urban residents are excluded from services and hence are not consumers of services in the traditional sense of the term. The ensuing discussion therefore uses the following terms and definitions to distinguish between the two levels of accountability:

- "Consumer accountability": Accountability and responsiveness of service agencies to those it supplies with services (narrow definition).

- "Community accountability": Accountability and responsiveness of service agencies to all those in its supply area, both the served and unserved, but with a particular sensitivity to the needs and preferences of the unserved.

b) Water boards

The existing water boards have little direct accountability to consumers and the community within their areas of supply.

Bath (pers. comm., 1993) believes that there are two possible approaches to responding to the valid criticism of lack of accountability to the consumer:

- An electoral college could be formed. Local authorities could elect representatives to this college. This college would then appoint and oversee the management board comprised of people with knowledge and expertise in the necessary fields.

- The utility could also be made directly accountable to the consumer (British model). The regulator specifies the requirements which the utility must meet and consumer watchdog bodies ensure direct accountability.

Umgeni Water are attempting to achieve greater consumer accountability, particularly in the rural areas in which consumers are served directly, by establishing a "supra water committee" with representatives from each of the rural water committees, a representative of which will sit on the governing board.

Umgeni Water is also endeavouring to improve its direct consumer / public interface through developing media, holding public meetings and other related activities. The Rand Water Board is also actively involved in promoting its public image, as can be noted by the media it publishes and disseminates.

c) Local authorities: metropolitan areas

It would be fair to say, as a general rule, that existing local authorities in metropolitan areas, under present arrangements, are primarily concerned with consumer accountability in its narrow definition and that the unserved are largely voiceless.

It is nevertheless insightful to examine the nature of consumer accountability in various organisations, as these practices are likely to form the basis of any future evolution in institutional practice.

Cape Town City Council: The "traditional" local authority

Direct consumer accountability and the consumer interface is fairly under-developed in water and sewerage service delivery. The means of communication between the council and consumers is primarily through the monthly rates bill (wastewater) and quarterly water bill, and even this information is limited. For example, consumers do not know how much the wastewater service costs as there is no separate item on the rates bill. Information of public interest, usually relating to large water schemes, environmental concerns or major problem areas, is occasionally released to the press. The image of a pro-active agency taking care of current and future water supplies, treating wastewater and caring for the environment is not promoted. The water and wastewater departments also do not have a recognisable "public face" (for example, a "consumer desk"). Account payments queries are handled by the City Treasury department, water leak reporting by the Water Branch and sewer blockages by the Wastewater branch.

It is important to note that these criticisms are not directed at the quality of the services rendered. Water and sanitation services within the municipal area are well managed, and there is, in general, little cause for consumer complaint. There is also a (valid) argument that the establishment of such a public profile, customer interface and consumer responsiveness carries a premium in overhead costs which the (elected) council has viewed as being superfluous.

The customer accountability and interface outlined above is typical of (probably) the majority of "white" local authorities in South Africa.

Although, as already noted, this structure is quite workable in the current context, future demands that are likely to be placed on these institutions will make it imperative for this function to be adapted. The rapid delivery of new services, constrained resources and increased community (consumer) voice will result in the development of stresses and strains on management and operational aspects of services delivery. In this context, the role of customer accountability and interface will become increasingly vital.

It is, however, encouraging to note that some local authorities are becoming aware of this and taking pro-active measures to meet this challenge.

Durban Corporation: a pro-active customer interface

The City Council of Durban has realised that it will play a leading role in services delivery in the Durban Functional Region in the future and is preparing itself for this role at present. As part of this, the autonomous water and wastewater functions are increasing their public profile, improving their public image and developing more appropriate customer interfaces. Examples of this are outlined below:

- A dedicated "help desk", with one telephone number for all customer queries, has been established.
- The customer interface is multi-lingual (English, Afrikaans and Zulu).
- Market research is being conducted to improve the customer service.
- Customer follow-up after remedial action to a complaint is being initiated.
- Community liaison officers are being appointed to specifically liaise with communities (both served and unserved) in low-income and informal areas.
- Extensive media is being prepared and disseminated (including videos, pamphlets, talks etc).

Johannesburg City Council: A step in the right direction

The Johannesburg Water and Gas Department have as their mission the provision of a continuous supply of water of specified quality to meet the needs of the community (within their area of supply) on a cost effective basis. In line with this, the department determined to find out the needs and perceptions of the community that they served and to improve the service provided in response to these. They decided to do this on a trial basis through the establishment of 6 discussion groups each involving 10 people. The groups were geographically distributed to represent a cross-section of consumers within the supply area.

A major outcome of the once-off exercise was the need for the council to provide a better customer interface. Items that are being addressed in this respect are:

- Better communication of service disruptions.
- Training of personnel interfacing with customers in public relations skills.

- Communication on matters of general and specific interest relating to water supply and use through the billing system.

- Performance incentives for staff.

- Simplification of accounts.

- Provision of additional account payment points.

It may be noted, however, that the council has not, as yet, taken any concrete steps to prepare itself for providing adequate services and an appropriate customer interface to a very different customer profile which is likely to happen when the council assumes responsibility for services in Soweto.

4.3 Managerial autonomy

a) Introduction

Effective management requires a certain degree of autonomy from political and other interferences within a well defined external political and policy framework, as well as clearly demarcated responsibility and good lines of accountability within organisations.

Managerial responsibility and accountability (with respect to the management of water and sanitation services) within various organisations are outlined here.

b) Traditional local authority structure

The organisational structures for Cape Town and Bloemfontein, shown in Figures 7 and 9, are typical for large and medium to small size local authorities respectively. In the larger municipalities, it is common for there to be many levels of responsibility, with consequent long accountability chains. Each level is constrained by the level immediately above, and it is typical that much of the decision making power rests at the level of the City Engineer, or even higher, at the level of Town Clerk, Corporate Management Committee (Heads of Departments), Executive Committee, or other Council standing committees. This often results in long turn-around times in decision making as a result of inadequate delegation of decision making power. It is also typical in this structure for each head of department to

have of the order of two "deputies", and in turn for each of these to have two "assistants". The result of this is a many layered organisational structure.

Such structures are more functional in smaller local authorities where each person is able to assume more responsibilities as a result of reduced work loads, thus limiting the number of organisational layers required.

c) Less hierarchical management structure

The trend in commercial organisations is to move towards flatter organisational structures, with greater delegation of decision making powers within clearly defined policy and external frameworks. Durban Corporation has recently been restructured along these lines, after an independent evaluation by a specialist management consulting company. The basic principles of the new structure are that each manager has as close to six people reporting to him/her as possible, and that the maximum number of levels (from top to very bottom) is six. Each manager has clearly defined delegated tasks and decision making at the top levels of the structure are restricted, as far as is possible, to strategic aspects and policy making. The structure in Durban's Water Directorate, shown in Figure 6 of Appendix 2, illustrates the application of these principles in practice.

d) Contract management: short term

In order to overcome a shortage in management skills, KwaZulu government contracted out the management tasks of the town engineering function of Umlazi to a private consulting firm. Personnel from the consulting firm fill the management positions in the Town Engineer's Department, comprising the Town Engineer, two additional engineers and a technician. Clerical and other support staff employed by KwaZulu have been retained and work for the consultants, but their conditions of employment are set, and salaries paid, by the KwaZulu government. Further sub-consultants have, in turn, been appointed to manage aspects of the Engineering Department's functions, namely: water reticulation, sewer reticulation, roads and stormwater. These consultants also make use of existing staff employed by KwaZulu. These are once off appointments for a two year period for a fixed amount (that is a pure management contract on a fixed fee basis). The contracts were not awarded through an open tendering system. The brief (in broad terms) given to these consultants was:

- To produce a status quo report on the current assets and state of infrastructure.

- To draw up a management plan for the operation and maintenance of the infrastructure, including budget planning and identified needs for major capital works, performance objectives and criteria for measurement.

- To begin to implement the management plan.

In future, it is intended that the management of the various aspects of the infrastructure would be awarded on a 'limited period open tender' basis to private consultants. Whilst the management of services in Umlazi has undoubtedly improved as a result of this arrangement, it is possible that a premium for this benefit has been paid.

e) Management by objectives

Clearly defined, practically measurable and achievable objectives are helpful in enabling organisation performance to be monitored and management effectiveness to be increased. Little evidence of this practice was found during the course of investigations for this overview. It could be the case that management by objects is indeed practised, but was not thought worthy of mention during the interviews and discussion of internal performance monitoring. However, this may indicate that the practice is not being given due prominence.

Management by objectives is implicit in Durban's new management style. Interestingly, the only other instance worth mentioning, is the management contract in Umlazi, which has resulted in very clearly defined management objectives being defined by the consultants and clear monitoring and reporting procedures set in place. For further discussion of this, see the Working Papers 3.

Management by objectives is closely related to internal performance monitoring which is discussed in the following section.

f) Management contracts: long term

Long term management contracts between local authorities and private companies appear to be gaining currency in many parts of the world, in different cultural and legal frameworks. Cities as diverse as Sydney and Buenos Aires have recently embarked on contract ventures of this nature. Proponents of management contracts assert that it is a proven and successful approach to providing better and cheaper services to the concerned communities. There are other voices, however, which contend the opposite.

Long term management contracts are a new development in South Africa. The first such contract (between Queenstown Municipality and a specialist water care company) has recently been signed. Some key aspects of this contract, which follows the French local authority - contractor management model, are highlighted here. The reasons put forward in support of this type of contract as well as concerns voiced by critics of such schemes are outlined.

The nature of the Queenstown contract

The period of the contract is 25 years. The contract includes the management of raw water supply, water treatment, water distribution reticulation, wastewater reticulation and wastewater treatment. The scope of operation (at present) excludes the black town council area of Mlungisi. Meter reading remains the responsibility of Queenstown. Potable water and final effluent quality are the responsibility of the contracting company but final accountability in terms of the Act remains with the municipality. The contract allows for the replacement and development of capital assets, the costs of which are built into the contract. All assets remain in the ownership of Queenstown Municipality.

The contracting company is paid a fixed sum plus a rate per kl of water consumed, that is, total volume of water read by the water meters. Water losses in the system are therefore to the contracting company's account. The per kl tariff is based on fixed and variable costs. These costs are indexed to inflation and linked to factors such as the proposed capital programme etc.

Characteristics of a long term management and operation contract

There are two characteristic elements of these contracts:

- The contract is long term, cannot foresee all eventualities and must therefore be flexible.

- It is important that a relationship of trust is built-up between the client and the agency.

Efficiency gains claimed by the advocates of private management contracts

Advocates claim that this kind of contracting arrangement will result in better services at a reduced costs for the following reasons:

- Better management.

- Better technology.
- Better training of personnel.
- Planned maintenance rather than reactive maintenance.
- Delegation of authority within the private company leading to improved accountability and performance of personnel.
- Extensive technical and management backup available.

Possible reasons for pursuing this option

In addition to the potential efficiency gains stated above, other reasons exist for possibly pursuing this option:

- The municipality does not have the management and technical skills necessary to efficiently manage the system.
- The municipality does not have the ability to raise the financial resources required to upgrade and maintain the system to a satisfactory standard.
- In the cases of very small municipalities, the agency can provide economies of scale by providing management and technical backup to a number of small municipalities in a region, whereas a small municipality may not have the resources to afford the skilled management and personnel requirements on its own.

Some potential problems with long term agency agreements

Critics of private management contracts commonly voice the following concerns:

- The agency would usually be a private organisation operating with a profit motive. In theory, public agencies should be able to operate as efficiently as private agencies and hence it is possible that the private agency could cost more in the long run. (Private agencies will not enter into contracts unless they have something to gain, that is, profit). The counter arguments are that (specifically in this area of activity) profit has to be guided by social affordability, and that the client has the possibility of renegotiating or cancelling the contract.

- The agency usually has considerable managerial, technical and financial resources behind it. It could be argued that the relationship between the two parties is unequal and that there is therefore a possibility of the negotiations favouring the agency at the expense of the owner in a way that may not be obvious to the owner.

- The long term nature of the contract exacerbates this imbalance in strength because the contract must be flexible. It may be argued that once the agency has a "foot in the door", through providing favourable conditions at the beginning of the contract, it is in a stronger position to alter the conditions of the contract (because of its inherent flexibility) to its own benefit a few years into the contract. One counter-argument is that the flexibility is in place only to adjust the strong principles of the contract to local conditions, and not to modify these principles.

- The imbalance in power is all the more important in a non-competitive tendering environment.

- There is inherent suspicion amongst many people of the privatisation of traditionally public functions, such as the provision of water and sanitation, and there is therefore likely to be strong opposition to this kind of arrangement.

- 'Cherry picking' by private agencies needs to be guarded against. It is in the interests of private companies to take over or manage enterprises that are potentially profitable, disregarding areas where there is a need for investment, but from which recovery of the capital costs of the investment will be difficult, for example, investment in basic services to low-income people. In Queenstown, for example, the contract does not (at present) include the provision of services to the black areas Mlungisi, and thus this management arrangement will have little, if any, benefit to the people most in need of better provided and managed services. [The agency's response to this is that the current institutional environment hinders their involvement in Mlungisi, and that the agency is, in fact, negotiating for the inclusion of Mlungisi.]

- There is in South Africa, at present, an absence of a coherent policy and regulatory framework. In this context, the potential for 'cherry picking' and the development of unequal contracts is greater than in a more stable policy environment.

5. INTERNAL PERFORMANCE MONITORING

5.1 Introduction

This section provides an indication of the extent to which agencies involved in managing water and sanitation monitor their own performance. It should again be noted that the discussion does not aim to be representative, but rather illustrative in nature.

5.2 Water boards

The management of water boards, at least the major ones, is of a high professional standard. Performance monitoring occurs in numerous ways, a few of which are outlined below for the Rand Water Board for illustrative purposes:

Financial:	Financial control over budgets, expenditure, income, management of assets, investments and liabilities are obviously of vital importance to the efficient functioning of the organisation and excellent controls in this regard are exercised.
Technical:	Technical performance is measured in a wide variety of ways. Unaccounted-for water is monitored on a daily basis, meters are regular cross-checked and calibrated, water balance models are used (for example, around pump stations) etc. Continuity of supply is another key performance measure, as are other aspects such as water quality control and pumping efficiencies.
Capital projects:	Close control over capital projects is exercised through the monitoring of actual versus planned work, actual expenditure versus planned expenditure and a running check on estimated final cost.
Staff productivity:	No staff performance measures or incentives have been implemented as yet.

5.3 Local authorities - metropolitan areas

a) "White" local authorities

Overview

The form of performance monitoring undertaken by "white" local authorities would, at most, appear to only include the following two components:

- control over budgeted expenditure
- measurement of unaccounted-for water

Controls exercised over budgeted expenditure is usually good, but the extent to which unaccounted-for water is regularly monitored and the results acted upon, is highly variable. Pro-active programmes for the reduction of unaccounted-for water are a recent and still rare phenomena. This is partly the result of the low cost of water in many areas in South Africa.

A survey recent survey of white local authorities in metropolitan areas (Palmer Development Group, 1993a) yielded the following results:

Table 7: Unaccounted for water in white local authorities - metro areas

Unaccounted-for water	Percentage of local authorities
< 5%	10%
5 - 10%	40%
10 - 15%	40%
15 - 20 %	8%
> 20%	2%
TOTAL	100%

Sample: 54 white local authorities in metropolitan areas.
Source: Palmer Development Group / UCT (1993a).

Experienced professionals are of the opinion that these figures are optimistic (members of project steering committee, pers. comm., September 1993)

Johannesburg City Council

The Water and Gas Department has an active Unaccounted-for Water (UAW) reduction programme, a major component of which is leak detection. Estimated UAW in 1987/88 was about 30 Ml (26% of purchases), representing a value of R 20 million (Fox et al, circa 1989). Leakage is estimated to account for 65% of unaccounted for water (Coetzee et al, 1993). More recent estimates of the value of unaccounted-for in the Council area give a figure of R 30 million per annum, based on 18.5% unaccounted-for water and the value of water purchases in 1992 (De Loitte Touche, 1993).

The major components of the leakage control programme are:

- District metering
- Night-flow monitoring
- Sounding, step testing, correlators, radar, IR thermography
- Pressure control - reduce maximum system pressure from 10 bar to 6 bar and maintain pressures in the region of 4 to 6 bar
- Improved control of reservoirs
- Planned maintenance system (rather than reactive)

The Department also strives to improve efficiency through the following measures:

- Optimising water sales and reducing unmetered water:

  - Checking and improving accuracy of meters. Use of magnetic flow meters where cost effective.
  - Minimise incorrect meter reading - pilot implementation of hand held data loggers.
  - Active monitoring of water theft, especially from unmetered fire-hydrants.
  - Reducing unmetered water use of municipal departments and requiring returns recording unmetered water usage where metering impractical.

- Reducing expenditure (other than UAW control):

  - Optimising the replacement of meters
  - Optimising the replacement of mains

- Optimisation of network through computer aided network analysis, hence reducing future capital development requirements
- Improved risk management techniques

- Improved management through the development of an integrated management information system.

Cape Town City Council

Unaccounted-for water is about 10% of total water consumption in the Cape Town City Council area, with an approximate value of R 14.9 million per annum at R 1.30 per kl. The Waterworks Branch is beginning to put more emphasis on leak detection and optimum replacement of fittings, meters and pipes. Up until recently, the council did not have a systematic leak detection programme, but only responded to complaints or visual signs of leaks. An unaccounted-for water and leak detection programme was started towards the end of 1992, comprising:

- monitoring of bulk supply meters for under-reading
- zone metering
- monitoring of minimum night flows
- systematic relaying of old mains
- optimum replacement of fittings, meters, pipes

The scale of the programme is small, with a budget of only about R 130 000 (1992/93) and employing 4 to 5 people. It is intended that the programme will be stepped up gradually.

Performance of staff and costs of jobs are also monitored to improve efficiency and reduce costs.

Durban Corporation

Unaccounted for water is about 15% across the total distribution network managed by Durban Water, calculated on the basis of total water bought and metered water distributed. The value of this water is about R 24 million per annum at R 1.30 per kl.

Water losses are monitored through:

- Bulk and zone metering.

- Minimum night flow monitoring.
- Zone meter versus total individual meter readings over a fixed (30 day) period for coarse identification of problem areas.

The following are some of the other performance measures / incentives Durban Water uses:

- Rate of water price increases.
- Financial performance of 'utility'.
- Budget control through the cost centre principle.
- Development of a corporate / business culture within the organisation.
- Subjective staff evaluations.
- Bonus incentives for artisans and "gangers".
- Good auditing procedures, even for small jobs.

b) Black local authorities

Overview

In "black" local authorities, performance controls are generally much poorer than in white local authorities. Few internal monitoring procedures are instituted, even for the measurement and control of unaccounted-for water. Many "black" authorities could not respond to a survey question requesting information on unaccounted-for water (Palmer Development Group / UCT, 1993a). A summary of the information returned is presented in Table 8. This data should also be reviewed with caution as it is probably optimistic.

Soweto

Estimated average water losses in the Greater Soweto are between 30% and 50% of purchased water (Davis, pers comm., 1993), with a value of R 20 million to R 34 million, based on annual purchase cost of R 68 million (Johannesburg Metropolitan Chamber, 1993). No water loss accounting is possible as water meters have not been read for about four years (Soweto Town Council, pers comm., 1993).

Table 8: Unaccounted for water in black local authorities - metro areas

Unaccounted-for water	Percentage of local authorities
< 10%	28%
10 - 20%	29%
20 - 30%	14%
30 - 40%	18%
40 - 50%	7%
> 50%	4%
TOTAL	100%

Sample: 28 black local authorities in metropolitan areas.
Source: Palmer Development Group / UCT (1993a).

The reasons for the high estimated water losses are:

- Extensive corrosion of steel pipes - inadequate cathodic protection provided.

- Insufficient isolation valves were installed during the construction of the original system. In addition to this, existing isolation valves have not been maintained. Areas can, therefore, often not be isolated during repairs resulting in significant wastage of water.

Because of these factors, a decision was made in 1987 to replace the whole water reticulation system in Soweto, and this is presently under way. Further conditions exist which exacerbate water wastage in Soweto:

- Fittings within houses have not been maintained and numerous of these leak on a continuous basis.

  An attempt is being made to address this by installing district meters and monitoring minimum night flows in these areas. Areas with high night flows are tackled first. The Council is able to replace fittings in Council owned houses, but has no automatic right of access to privately owned houses.

- Consumers can afford to use water liberally because the monthly service fee is not directly dependant on the amount on water consumed and, at present (June 1993), most residents are not paying the service fees.

Lingelethu West Town Council (Khayelitsha)

Insufficient meters exist in order to do any water loss accounting in Khayelitsha. The only meters that exist are the Cape Town City Council's bulk meters and individual meters in the formal and core housing areas as well as the upgraded portion of Site C.

World Bank data (1993) for Khayelitsha indicates that: (per annum figures)

Volume metered water supplied:	720 Ml	10%
Volume unmetered water supplied:	6 480 Ml	90%

(The date for which these figures are applicable is not certain, but is probably 1991/92)

Data from the Cape Town City Council (Palmer Development Group / UCT, 1993a) indicates that:

Total supplied by Cape Town:	10 600 Ml	(1991/92 data)

The value of unmetered water supplied in Khayelitsha is approximately R 8.4 million per annum, if valued at R1.30 per kl.

The lack of ability to carry out any meaningful water loss accounting has been recognised as an important problem, especially in the light of the large monthly water budget and low level of cost recovery. The following plans exist:

- Purchase and install bulk supply meters to enable cross checking of Cape Town City Council bulk meters at point of purchase.

- Monitor minimum night flows from bulk meters to get an indication of the extent of system losses.

- Purchase and install district meters to monitor minimum night flows in districts and correlate district meters with sum of individual meters where these are installed.

- Install meters on all individual connections

Umlazi, Durban

The upgrading and rehabilitation of Umlazi's water supply system to Umlazi's 30 000 consumers at a cost of R 36 million, in conjunction with improved loss management procedures, has realised estimated savings in water losses in the region of R 5 million a year" (Engineering News, 4 June 1993). The reticulation system was in poor condition resulting in water losses, disruption of water supplies to consumers and maintenance problems.

6. EXTERNAL PERFORMANCE MONITORING

6.1 Introduction

Water supply and wastewater management services are natural monopolies. External control over the performance of the agencies providing these services is thus vital to ensure efficient operation and guard against monopoly pricing practices.

In this section existing controls over local authorities and the water boards are discussed. The newly implemented Reporting by Public Entities Act is reviewed and the need for the development of specific performance criteria is highlighted.

6.2 Local authorities

Where local authorities are responsible for water and sanitation services delivery, a number of external controls exist, consisting of various pieces of legislation (both national and provincial) pertaining mostly to financial, procedural and technical aspects of services delivery, and instituted to protect the consumer. These aspects of control are well documented and it is beyond the scope of this project to comment on these here.

One of the most important means of control of local authorities is, of course, by means of elected representatives whose task is to oversee the running of the council. The question of accountability of these councils has already been discussed in Section 4 and is therefore not repeated.

The point of interest, here, is the future possibility of removing service delivery from multi-functional metropolitan and local authorities to autonomous service agencies, and the effect this would have on external controls. Before discussing this issue it is instructive to look at the existing external controls exercised over the water boards and newly implemented legislation governing public enterprises.

6.3 Water boards

a) The Water Act (Act No. 54 of 1956)

Water boards operate essentially as efficient commercial operations. In the water environment this is best accomplished through maximising the sale of water and cost recovery on sales (thus maximising revenues) and maintaining a strict control on expenditure.

This mechanism is likely to be effective in terms of controlling expenditure according to the approved budget.

However, water boards are public entities and external control is therefore essential, primarily to ensure that:

- The water supplied is not more expensive than it should be.
- Public moneys are not misused or used inefficiently.
- Legal requirements with respect to water quality etc. are adhered to.
- Water resources are utilized efficiently and with due care for the environment.
- Water is returned to the river system satisfactorily (where wastewater is a function).

The existing external controls are summarised below. (A summary of the Water Act (Act No. 54 of 1956) as applicable to water boards is given in the Working Paper 1).

- The Minister:
  - Appoints members to the water board.
  - Determines the remuneration of board members.
  - Approves tariff schedules.
  - Approves loan amounts and loan institutions.
- The Act:
  - States that 'it is a general principle of a water board that its schemes shall, as far a practicable, be carried neither at a profit nor at a loss, and the charges for water supplied by such board and any rates assessed by it shall be adjusted accordingly from time to time' (Act 54 of 1956, Section 117 (4)).
  - Requires the books of the water board to be kept in an orderly manner and audited annually.
  - Requires water boards to publish an annual report (promoting public accountability).

Comments on external control

Apart from the normal standard financial and 'procedural' controls, the key control exercised by the Minister of Water Affairs is the approval of the tariff schedules. If this control is exercised with care, then it may be said that reasonable external control over the activities of the water board exists.

However, there are a number of shortcomings in the external controls stipulated in the Water Act:

- No emphasis is placed (in the Act) on demand management. It could be argued that the present arrangements, in fact, encourage water boards to sell as much water as they can in order to maximise revenues. This situation is not necessarily optimum, especially in the South African context of scarce water resources.

- Considerable latitude is given to the water board to generate surpluses for accumulation in reserve funds. This, in itself, is not a bad thing. However, in the absence of a clear (national/regional) policy on water tariff structures, this places considerable economic power within the hands of the water board, which may be of concern in the context of monopoly control (see below).

- There is no monitoring of performance and efficiency, other than through the water tariff schedule. Water supply is a natural monopoly (the Act in fact firmly entrenches this monopoly), and in the absence of competition, it is possible for a water board to abuse this position for its own gain.

- There is little direct accountability between the water board and its consumers (as previously discussed). This exacerbates the above situation.

b) Rand Water Board Statutes (Private) Act No. 17 of 1950

The Rand Water Board is governed by its own set of statutes (Rand Water Board Statutes (Private) Act No. 17 of 1950). The reasons for this are historical, however, there would seem to be a valid argument for rationalising the legislation so that one act applies to all of the water boards.

Key aspects of the Rand Water Board Statutes are summarised in the Working Paper 1. The external controls governing the Rand Water Board are essentially the same as those for the other water boards with the following exceptions:

- The board is constituted in a different manner, comprising a maximum of 12 people with the necessary skills, experience and expertise, appointed by the Minister (of Water Affairs).

- The maximum amounts that may be appropriated to reserve funds are explicitly stated (whereas the Water Act is vague in this respect).

The criticism levelled at the Water Act in terms of its provision for external controls is therefore also applicable to the Rand Water Board Statutes.

6.4 Reporting by Public Entities Act (Act No. 93 of 1992)

Some of the shortcomings in the Water Act and Rand Water Statutes (Private) Act have been overcome through the recent promulgation (August 1993) of the "Reporting by Public Entities Act".

The primary aim of this Act is to ensure that public entities (placed on a list kept by the Minister of State Expenditure) keep accounting and related records necessary to fairly represent the state affairs of the business of that entity and to explain its transactions and financial position. Some pertinent points are summarised below.

Reporting to Parliament

- Every listed public entity shall report on its activities and financial affairs to Parliament.

- Every listed entity shall, together with its set of financial statements, submit a report by its board of directors with respect to the state of affairs, the business and the financial position of the entity and the degree to which its objectives have been attained.

- The director's report shall also:

  - Set out the functions and objectives of the entity as determined by law or otherwise.

  - Contain relevant performance information regarding the economic, efficient and effective application of resources.

- Indicate the amount of money received from the State and any other commitment furnished by the state.

Internal audits

- Promote safeguarding and control of the assets of the entity.

- Promote compliance with this Act and any other relevant Acts of parliament.

- Promote the economical and efficient management of resources of the entity and the effective performance of the functions of the entity.

External audits

- Apart from the normal functions of external auditors, they are also given the right to investigate whether there are procedures for the proper application of sound economic, efficient and effective management.

- The external auditor shall also draw attention to any matters, falling in the scope of the auditors examination which, in his opinion, should, in the public interest, be brought to the notice of Parliament.

Regulations

- The Minister may make regulations in regard to any matter which he considers it necessary to prescribe in order to give effect to the objects of this Act.

Comments on the Act

The "Reporting by Public Entities Act" marks an important improvement in the scope of external control over water boards in that it is possible for the efficiency and effectiveness of these agencies to be monitored in terms of the Act and any anomalies in this brought to public attention. Nevertheless the Act does have some shortcomings:

- The Minister of State Expenditure does not have any sanction to act should it be brought to his attention that a particular entity is performing unnecessarily inefficiently, for example.

- The Act is vague in terms of defining effectiveness and efficiency. It is recognised that this is necessary in that the Act applies to a wide range of different public entities, and it is possible for the Minister to make regulations pertaining to particular entities. However, no such particular regulations have been promulgated, and it is not clear whether or not there is any intention to do this. It would be possible, for example, to develop specific measures whereby the efficiency of water boards could be monitored.

6.5 Autonomous sector agencies

The extraction of services from multi-function metropolitan or local authorities is usually argued on the grounds of efficiency and efficacy. For these efficiency and effectiveness gains to be realised and safeguarded, in the absence of direct (local) political accountability and control, it is necessary for these agencies to be subjected to clearly defined, rigorous, transparent and easily implementable policy and managerial controls.

The present controls exercised in terms of the Water Act and Reporting by Public Utilities Act, despite their present limitations, give an indication of how external controls could be applied to autonomous service agencies were these to be formed in metropolitan areas for example.

6.6 Development of specific performance criteria

Israel (1992), in his book "Institutional Development: Incentives to Performance" argues that competition and the extent to which an agency's tasks can be specified are key determinants of the effectiveness and efficiency of that agency. Water supply and sanitation are natural monopolies, and hence external control is essential to ensure effective and efficient organisations. While control over pricing is one means of achieving this (and is fairly well developed in South Africa), little attention has been given to the development of specific performance criteria. This would appear to be an area worthy of further investigation.

PART B

CURRENT FINANCIAL ARRANGEMENTS

(Operating and Maintenance)

1. OVERVIEW

1.1 Introduction

This section outlines the order of magnitude of financial flows in the water and sanitation sector. The data is presented for the purposes of attempting to gauge the overall surpluses/deficits generated in the sector. It should be noted that a comprehensive set of recent financial data for the sector is not available, nevertheless it is possible to develop an overall picture on the basis of the piecemeal information that is available.

The information is presented as follows:

- general government expenditure
- White local authorities
- Black local authorities
- Provincial administrations
- Regional Services Councils
- Water boards
- Department of Water Affairs

1.2 General government expenditure on water and sanitation

A summary of general government expenditure for 1990/91 is presented in Table 1, Appendix 1. This data essentially reflects expenditure derived from general tax revenue at the national level and general (property) tax revenue at the local level. Thus expenditure by local authorities on water, as reflected in their trading accounts, is excluded, as is all water board expenditure, except where there are transfers from central government or the rates and general services account of local authorities to these accounts. The water trading account of the Department of Water Affairs is also excluded.

The data, collated by the Central Statistical Service (P9141, 1993), is a summary of details of expenditure of the State Revenue Account; the revenue accounts of the House of Assembly, House of Representatives and House of Delegates; the extra-budgetary accounts and funds of central and provincial governments; the provincial revenue accounts of the four provinces; the TBVC states; the self-governing territories and the different types of local authorities. The internal transfers between the different levels of government are eliminated in the data. Data for the self-governing territories are obtained from the Department of Regional and Land Affairs. No processed statistics were available on the TBVC states and

the required statistics were reclassified from their different published estimates. In the case of local authorities, where final information was not available, it was estimated. The transactions of the National Housing Fund and the housing divisions of local authorities are included in the data. The data excludes government enterprises (local authority trading accounts, Department of Water Affairs trading account and water boards). General government expenditure from, for example, the general rates and services account, to a trading account, is reflected as a transfer. The data was published in January 1993 and is the latest available processed data.

The following points are of note:

Sanitation

- General government expenditure on "sewerage" and sanitation amounted to approximately R 1.4 billion (both current and capital expenditure), accounting for 3.5% of "Social security and welfare expenditure (R 40 billion), and 1.5% of total general government expenditure (R 98 billion). The social security and welfare category is broken into the following categories: Housing, sewerage and sanitation, community development, recreation, culture and other. The "other" category recorded an expenditure of R 435 million.

- Of the R 1.4 billion, 75% (R 1.1 billion) was current expenditure, broken down into R 950 million for goods and services and R 130 million on interest.

- Capital expenditure by general government on sewerage and sanitation, recorded by these statistics, amounted to R 362 million.

- The major share (95%) of general government expenditure on sewerage and sanitation, was accounted for by local authorities, with the remaining 5% split between the TBVC states (R 32 million) and the self-governing territories (R 35 million).

Water

- State water schemes and other water schemes are classified under economic services.

- Expenditure on state water schemes and other water services amounted to R 0.7 billion in 1990/91, that is, roughly half of that spent on sewerage and sanitation. This is somewhat surprising at first glance, however, it should be borne in mind that water

supplied to urban areas is essentially self-financing, and thus the general government expenditure reflected here does not represent the total amount invested in water schemes and services in this period.

- Capital expenditure accounted for 53% (R 385 million) and current expenditure 47% (R 340 million).

- The breakdown of the expenditure between the different levels of government for water is summarised below:

	R million	
Central government:	300	41%
TBVC states:	210	29%
Self-governing states:	140	19%
Local authorities:	50	7%
Other (extra budget):	25	3%
TOTAL	725	100%

It is probable that a major portion of the central government expenditure went towards agricultural schemes. Of note is the large proportion made available to the homelands (48% in all).

Housing

For the sake of context, and because housing expenditure includes expenditure on internal water and sanitation services, these figures were included in Table 1 in Appendix 1 and some pertinent points are noted here.

- Total recorded general government expenditure for housing amounted to R 1.2 billion , of which R 725 million (61%) was current expenditure, R 340 million (29%) capital expenditure and R 125 million (11%) capital transfers..

- 67% of housing expenditure (R 800 million) was recorded as being by the local authorities, and only 3% (R 35 million) by the homelands.

1.3 White local authorities

a) Overview, based on 1988/89 data

The latest comprehensive data set available for white local authority finances is for the 1988/89 financial year. Although the absolute numbers are out of date, it is unlikely that the overall picture would have changed significantly in the interim, and it is therefore worthwhile to highlight key points from this data set. The relevant data is summarised in Table 2, Appendix 1 (CSS, 91-14-01, 1991).

Rates and General Services

- An aggregate "surplus" of 16% of local authority income in the rates and general services account was realised by white local authorities in 1988/89. This "surplus" is calculated prior to appropriation to redemption of loans and reserve funds. In 1988/89 this "surplus" amounted to R 870 million on an income of R 5.5 billion.

- The item "sewerage" is included in the rates and general services account. Expenditure on this item accounted for 16% (R 730 million) of total expenditure (R 4.6 billion) in this account, whereas income reported for the item in the revenue portion of the account amounted to R 628 million, indicating a "deficit" of R 100 million. It should be noted, however, that not all income attributable to "sewerage" may have been included in this item as many local authorities do not bill "sewerage" as a unique or separate item.

- Income from rates only accounted for 30% of the total income recorded in the rates and general services account (R 1.6 billion out of R 5.5 billion).

Water

- The aggregate income on the water trading account amounted to about R 1.1 billion (1988/89), thus representing approximately 20% of the income obtained in the (separate) rates and general services account.

- An aggregate "surplus" of 17% was obtained in this account, amounting to R 184 million, compared to total expenditure of about R 900 million. The qualification of the term "surplus" noted above is also applicable here.

Appropriation of surplus

- About 37% (R 67 million) of the water trading account surplus of R 183 million was appropriated to the rates and general services fund. However, there was also a reverse transfer from general government to the water trading account of R 22 million, and hence the net amount appropriated was R 45 million, or 25% of the surplus, and 4% of the total income in the water trading account.

- About 63% (± R 580 million) of the electricity trading account surplus of R 925 million was appropriated to the rates and general services fund.

- The contribution of the water surplus towards "rates alleviation" is thus small in comparison to electricity.

- About 37% (R 67 million) of the initial water "surplus" was appropriated to capital reserves, with the remaining R 62 million being used to redeem loans and contribute to capital outlay.

b) Trends based on more recent sample financial data (1990 to 1992)

More recent quarterly and yearly statistical information on white local authorities, based on a sample survey, is available. The data from the sample survey is raised by a factor based on the full survey in 1988/89 and hence represents all local authorities. Up to the second quarter of 1992, this was based on a survey of 40 large local authorities. After that, the survey included 20 smaller local authorities. The data has been kept comparable by raising the earlier data on the basis of the complete 1988/89 survey. A summary of the latest available information from the surveys (up to December 1992) is provided in Table 3, Appendix 1 (CSS, P9144, 1993). Pertinent points are highlighted here.

The next full survey is planned for the 1993/94 financial year.

Rates and general services

- Rates accounted for about 50% of the rates and general services revenue in the years 1990/91 and 1991/92. This is significantly different to the figure reported for 1988/89, noted earlier.

- Income from "sewerage and solid waste" amounted to of the order of R 1 billion, and represented about 17% to 20% of rates and services income.

- Wages accounted for 44% of gross local authority expenditure recorded in the rates and general services account.

- Transfers from central government, regional services councils (RSCs) and other local government to the rates and general services account amounted to of the order of R 400 million in 1992, 6% of income.

Water

- Total income in the water trading account amounted to about R 2.2 billion in 1992. The surplus generated (prior to appropriation to reserves) was R 440 million (21%).

- The gross income in water trading accounts for about 20% of income from the total of all trading accounts (electricity being the main contributor).

- The water surplus of R 440 million accounts for 23% of the total surplus (prior to appropriation to reserves) generated by white local authorities in all of their trading accounts.

- Total trading account income was roughly double the aggregate rates and general services account income.

c) Local authorities as trading entities

The extent to which local authorities are trading entities is often not appreciated. Data presented in Table 9 (Simpkins, 1991), clearly demonstrates this.

Although the information provided in the table is dated, the dominant characteristics shown are unlikely to have changed much in the interim. In fact, given the inelasticity of municipal

rates (cf Cape Town City Council, 1993, p37 for example), it is likely that the proportion of income derived from water and electricity is likely to have increased.

Table 9: Composition local authority income, 1988/89

	Percentage of income	
	Grades 11 - 15	Grades 7 - 10
Electricity	52	56
Water	10	12
Sewerage and refuse	8	9
Other trading	2	
Sub-total: Trading	**78**	**77**
Rates	20	16
Other	2	2
Sub-total: Basic income	**22**	**18**
Housing	4	4
TOTAL	**100**	**100**

Notes: 1. Data rounded to nearest percentage
2. Source data does not add up correctly to 100%

Source: Municipal Employer's Organisation, Municipal Statistics, 1988-89 in Simpkins (1991)

Electricity accounts for the largest share of trading revenue by far, of the order of 50% to 60%. Water and sewerage trading services account for about 15% to 20% of trading revenue.

Obviously, the major share of this income is allocated directly to the purchase/provision of bulk services and expenditure related to the distribution and management of these services. Nevertheless, local authorities are allowed (in law) to generate a maximum surplus of 10% on their trading accounts which may be used for other purposes such as the alleviation of rates. However, it would appear that in practice, much larger surpluses have been generated. For example, an examination of Cape Town's financial data for 1991/92 showed a trading surplus of 20% (after appropriation to the bulk water reserve fund). It is not clear how wide spread this practise is, but it is clear that this statutory limitation on local authorities is not strictly enforced.

Other caveats also exist in the application of this piece of legislation. For example, if through transferring expenditure from other accounts into the trading account, local authorities can artificially increase the expenditure recorded in the trading account, then the

amount of surplus that can 'legitimately' be generated will increase. Only careful external auditing would be able to detect this practise if it is skilfully done.

1.4 Black local authorities

a) Overview - 1988/89 data

The Auditor-General, when he presented his report to Parliament in February 1991, noted that only five out of 259 black local authorities had presented audited accounts for the 1989/90 financial year (Simpkins, 1991, p2). The situation has not improved since then, hence reliable comprehensive statistics on black local authorities are not available. Nevertheless it is instructive to overview the data that is available, as it is possible to determine the overall trends and orders of magnitude of finances in these local authorities.

The most comprehensive and latest available data is by the Central Statistics Services for 1988/89. The data is based on returns from 190 out of the then 267 local authorities. Relevant information from this is summarised in Table 4, in Appendix 1. Pertinent points are noted below:

- The water trading accounts realised an aggregate deficit of R 34 million, which was 34% of the total expenditure in the water trading account of R 104 million. The total expenditure, although not representing the total for all black local authorities, is only about 10% of the expenditure by white local authorities. [These figures are only quoted to give an idea of the order of magnitude difference. The proportions of populations living in the white and black local authority areas in South Africa is approximately 50% : 50% (based on Urban Foundation Demographic model, 1991)].

- Similarly, total expenditure in the rates and general services account amounted to about R 520 million, again about 10% of that for white local authorities, .

b) The extent of debt in black local authorities

The total amount of debt owed by Black Local Authorities in 1986, at the time that the provinces took over administration of these areas from the development boards was R 789 million. In the years 1986 to 1991 the provinces made bridging loans to the value of R 2 253 million to the black local authorities. Some of the provinces treated these loans as grants from the outset, whilst others kept them as loans (Business Day, 14 June 1993.)

In June 1993, legislation was tabled in Parliament proposing to write off both of these debt amounts.

As from 1991, grants from the provinces to local authorities are specifically appropriated as inter-government aid.

The distribution of outstanding rent and service charges as reported in Parliament (Hansard, 24 February 1993, p205-206), as at 31 December 1992, is summarised in Table 10.

Table 10: Outstanding rent and service charges, 31 December 1992

	Total Arrears	Proportion
Cape Province	167	9%
Natal	11	<1%
Orange Free State	129	7%
Transvaal	1 607	84%
TOTAL	1 913	100%

Source: Hansard, 24 February 1993, column 205-206.

1.5 Provincial Administrations

a) Administration of local authorities

The provinces have the following administrative responsibilities with respect to local authorities:

- Involved in the establishment of new local authorities.
- Control the creation of new posts within the local authorities.
- Approve of staff appointments at Head of Department level and above.
- Attend to various other personnel matters not delegated to local authorities.
- Promulgate bye-laws pertaining to local authorities.

- Approve of tariffs submitted by local authorities.

  (Tariff decisions are made in consultation with the Administration and the Member of the Executive Council (MEC). In the case of black local authorities, the general policy is that the tariffs should be affordable and should not be higher than neighbouring white local authorities.)

b) Financial control

The provincial authorities also exercise financial control over local authorities in the following ways:

- Approve local authority operating budgets.

- Monitor financial performance of local authorities.

- allocate inter-governmental grants to local authorities.

c) Inter-governmental grants

As noted in the above section, the provincial administrations, since assuming responsibility for black local authorities in 1986, have channelled central government money to black local authorities to make up short falls in current expenditure. Up to 1991, money was supposed to be made available on the form of bridging finance, that is, on a loan basis. No strict upper limit on the amounts lent as bridging finance was enforced. The annual amount made available as bridging finance peaked in 1991, and was in the region of R 600 million. However, it became apparent that this situation was unsustainable and the system was changed. From 1991, inter-government grants were made available to assist local authorities. The grants are calculated on a formulae basis, based on a number of factors such as population and household income. Factors relating to budgeted deficit, history of payment for services and existing service levels are also taken into account in the allocation procedure. The inter-governmental grants are given on a block basis and not designated for specific services.

Table 11 shows inter-governmental grants in the Cape Town area, illustrating their importance in keeping existing black local authorities running.

Table 11: Some inter-government grants in Cape Town area.

Local Authority	Grant (1992/3) R million	Budgeted Expenditure (1992/93) R million	Percentage %
Lingelethu West	19.8	45.3[a]	40%
Mbekweni	1.5	4.8	31%
Khayamandi	1.2	3.2	31%

[a] Based on 1991/92 expenditure escalated by 10%.

d) Provinces as local authority

The provinces act as the local authority in cases where:

- No council has been established yet.
- The council has been disbanded (for whatever reason).
- The council is not capable of discharging its functions.
- Ex-South African Development Trust areas previously administered by the ex-Department of Development Aid.

The Administrator may use make use of a number of Acts by which he can control areas / communities and act as the local authority:

Act 102 of 1982: Black Local Authorities Act (Section 2.11)

The Administrator can assume the responsibility for the area where no local council has been established, or where it has been dissolved, and fulfil the functions of a local authority. The Administrator may appoint an agent to operate certain services in the area on an agency basis. The RSC is not obliged to render these services if requested by the CPA. Example of such a settlement is the Noordhoek informal settlement (Cape Town).

Act 113 of 1991: "*Less Formal Township Establishment Act*"

This gives the Administrator the power to lower service standards. Independent local authorities can also apply this Act as part of their zoning schemes, thereby creating areas within the local authority area which are "less formal". That is, the Act can be used in parallel with Act 102 of 1982.

The aim of the Act is to provide shortened procedures for the designation, provision and development of land, and the establishment of townships, for less formal forms of residential development.

"*The Administrator shall ensure that ... the planning and development takes place in such a manner as will make the subsequent upgrading thereon possible.*"

Act 52 of 1951 "*Prevention of Illegal Squatting Act*"

This Act provides the Administrator with powers similar to Act 113 with respect to controlling and administering areas.

e) Maintenance requirements

The CPA recently carried out an assessment of upgrading and annual maintenance requirements in all of the 92 black local authorities in the Cape Province. The information is necessarily very approximate, nevertheless indicates the order of magnitude of upgrading and annual maintenance requirements. These are summarised in Table 12.

1.6 Regional Services Councils

The regional services councils, whose primary role is in the funding of capital infrastructure, is discussed in more detail in Part C of this report. However, more recently, these councils have become involved in funding current expenditure and it is thus useful to provide a brief overview of their finances here. Table 5, in Appendix 1 (CSS, P9144, 1993) summarises the most recently available comprehensive financial information for the regional services councils. Some comments of these figures and other pertinent points are made below.

- Total levy income of the councils amounted to R 1.1 billion in 1991/92.

- Some of the councils were still coming into full operation during this period (for example, the joint services boards were established during 1991, and hence it is likely

Table 12 Maintenance requirements in black local authorities

	Annual Maintenance Total R m	Annual Maintenance per site Rands
Water	10	38
Sewerage	11	41
Stormwater + roads	21	80
Refuse removal	7	26
Electricity	11	42
Buildings	18	68
Other	10	38
TOTAL	87	330
Upgrading	Upgrading R m	Upgrading per site Rands
UPGRADING	711	2 700

Note: Total population in BLAs estimated to be 2.35 million people.

Upgrading = amount required to bring services of existing sites up to a standard (conventional) level of service.

that the total value of levy income has increased in real terms subsequent to the figures being published.

- Total council income amounted to R 1.7 billion in 1991/92, of which about R 200 million was derived from agency fees and about R 160 million from interest.

- The Minister of Local Government and Housing has recently (May 1993) stipulated that the councils set aside 10% of their levy income to assist black local authorities with current expenditure. Based on 1991/92 data, this would mean a transfer of about R 110 million per annum.

- The extent to which the councils are involved in trading is small, with the exception of the Cape councils, especially the Western Cape RSC, which took over the functions of the divisional councils (only in existence in this province).

- Total expenditure on trading services amounted to R 150 million in 1991/92 for all of the councils, generating a surplus of about R 20 million (13%). Total expenditure on water trading was R 47 million, with a surplus of R 2 million, for the same year (1991/92).

1.7 Water boards

The water boards' primary source of income is the sale of bulk treated water. Summary financial information for the larger water boards is presented in Table 13.

Table 13: Major Water Boards - Summary information (1992/93)

	Total volume water sold million m^3/annum	Income from sale of water R million	Total income R million	Total current expenditure R million	Surplus prior to appropriation to reserves R million
Rand Water Board	997	740	740	645	95
Umgeni Water	261	243	243	231	12
Goldfields	77.2	74	75	75	1.0
Bloemarea	38.7	24.5	25.5	23.9	1.5
Magalies	25.2	25.5	25.9	23.7	2.2
TOTAL	1 399	1 107	1 109	999	110

For comparative purposes, information for the large metropolitan municipalities that have responsibility for regional water supply is summarised in Table 14.

1.8 Department of Water Affairs

Financial data for the Department of Water Affairs is summarised in Appendix 1, Tables 6,7 and 8.

Table 14: Large municipalities with regional water supply functions (1992/93)

	Total volume water supplied million m^3/annum	Total income from sale of water R million	Total expenditure R million	Amount appropriated to reserves R million
Cape Town	262a	129[a]	127[b]	26[c]
Port Elizabeth[b]	44[d]	41[e]	41[f]	-[g]
East London	30	26.5[h]	21.6[i]	0.25[j]

Notes:
a. Total supplied times the bulk tariff (49 c/kl)
b. Surplus of R 2.4 million to be returned to municipalities.
c. Amount appropriated to Bulk Water Reserve Fund from bulk water levy of 10 c/kl. This amount is included in total expenditure.
d. Unusually low due to drought conditions. Estimated supply was 60 million m^3 for 1992/93.
e. Assumed equal to the amount expended on bulk supply, that is, bulk water supplied at cost.
f. Expenditure by Port Elizabeth in its role as bulk supplier only.
g. Only a small amount was appropriated to the tariff stabilisation fund (included as an expenditure item). No funds appropriated to capital development funds.
h. Income from the sale of all (bulk and internal) water by East London municipality.
i. Expenditure of both bulk and internal water services.
j. Only R0.25 million appropriated to capital reserves. It is not clear how the R5 million was allocated.

Total expenditure from the State Revenue Account was R386 million in 1991/92.

Total income from the Government Water Schemes Trading Account was R375 million, compared to an expenditure of R183 million. The expenditure, however, excludes the interest and capital redemption component.

The breakdown of income and expenditure between agricultural and industrial and domestic schemes is given in Table 8 in Appendix 1. The high degree of sudsidisation of agricultural schemes is evident from these figures, with revenue accounting for only 16% of the cost of the schemes.

2. ILLUSTRATIVE FINANCIAL ARRANGEMENTS

2.1 Introduction

The overview presented in the previous section showed the orders of magnitude of financial flows in the water and sanitation sector, indicating the extent of overall surpluses generated, that (especially white) local authorities can largely be characterised as trading enterprises, and the parlous state of financial arrangements in black local authorities. In this section, the financial state of the water and sanitation sector in a few metropolitan and small towns will be reviewed. The objective of presenting this data is to begin to get an initial indication (in order of magnitude terms) of the degree to which these sectors (from a financial point of view) could absorb rapid increases in the number of people served. The information is preliminary and is only presented for illustrative purposes. The financial implications of services delivery will be examined more systematically in fulfilment of Objective 4 of this project (see Palmer Development Group, 1993, Project Inception Document).

The areas that will be examined are:

- Witwatersrand, Johannesburg and Soweto
- Durban Functional Region

It was also the intention to illustrate the financial arrangements in Bloemfontein - Mangaung and Warmbaths - Belabela (Northern Transvaal), however financial information from these areas was not received in time for inclusion in this report.

Data for the Witwatersrand and the Durban Functional Region was primarily obtained from the recent World Bank Urban Reconnaissance Mission (World Bank, 1993). Additional financial data was directly sourced from financial statements, reports and interviews with relevant officials.

2.2 Witwatersrand, Johannesburg and Soweto

a) Central Witwatersrand Regional Services Council

This council has the largest budget of all the regional services councils in the country. The annual levy income for 1993/94 is estimated to be R 341 million. Total expenditure will be more than double this (R 733 million), because levy income is geared up through loans for

capital infrastructure development. The Regional Services Council will make R 144 million (42% of levy income) available to assist black local authorities with current expenditure deficits. The chairman, in his budget speech, expressed concern over this, noting that this practice may result in diminishing amounts of money being made available to fund capital infrastructure, the main purpose of the establishment of the regional services councils.

b) Combined white local authority accounts

Financial data for all of the white local authorities in the Witwatersrand (East, West and Central Rand RSC areas) is presented in Table 15.

Table 15: Summary financial data for white local authorities in the Witwatersrand

Witwatersrand white local authorities - (R million per annum - nominal)					
	88/89	89/90	90/91	91/92	92/93
Water					
Income	253	347	423	488	525
Expenditure	253	315	390	469	479
Surplus	-0.9	31.9	32.5	18.8	46.1
Sewerage - trading account					
Income	26.4	48.6	56.9	59.8	65.2
Expenditure	45.8	70.1	85.6	101.4	114.5
Surplus	-19.4	-21.5	-28.8	-41.6	-49.3
Sewerage - rates account					
Income	129	172	212	250	288

Note: 1992/93 figures are estimates.
Expenditure includes repayment of loans, but not appropriation to reserves.
Source: World Bank Financial data (World Bank, 1993)

Whilst a surplus of R 19 million (4% of income) was generated in the water trading accounts of these local authorities in 1991/92, the sewerage trading accounts showed a deficit of R 42 million (41% of expenditure). It should however be noted that not all local authorities in the area treat sewerage as a trading service. A separate row in the table shows income for sewerage itemised in the rates and general services account. This amounted to R 250 million in 1991/92, thus the combined income for sewerage was R 310 million, compared to the combined water income of R 488 million.

The water surplus amounted to about R 60 per household per annum within the white local authority areas in 1990/91, assuming reported local authority population figures and an average household size of 4.5.

c) Johannesburg City Council Data

The degree to which the finances of Johannesburg City Council dominate the above reported figures is illustrated by the following:

- Total income in water trading account was R 240 million in 1991/92, that is, 49% of total income for white local authorities in the Witwatersrand.

- Johannesburg's surplus in their water trading account of R 24 million in 1991/92 accounted for 74% of the total surplus for the white local authorities in the Witwatersrand.

- The water surplus, reduced to a per household basis (assuming a population of 950 000 people and average household size of 4.5) amounted to about R 115 per household per annum, for those living in the Johannesburg City Council area.

d) Greater Soweto

Financial information for Greater Soweto (Soweto, Dobsonville and Diepmeadow Town Councils) is summarised in Table 16.

The quality of the data leaves much to be desired, nevertheless it is possible to make some important remarks:

- Income from payment for services is highly unreliable, being strongly dependent on political considerations. The consequence of this is that people have become accustomed to not paying for services, making resumption of reliable payments at any significant level highly unlikely in the short term. The difficulties that the Johannesburg Metropolitan Chamber have experienced in reaching agreement on suitable tariffs is testimony to this. These negotiations have been going on for a number of years now (Milne, pers. comm., 1993).

- Per household expenditure on bulk water purchases is inordinately high. This is due to a number of factors, the most important of which are: significant leakage in network due

Table 16: Greater Soweto - summary financial data (1991/92)

	Soweto	Dobsonville	Diepmeadow	Total
Population estimate[a]	± 890 000	± 120 000	± 190 000	± 1 200 000
No. of formal houses[a]	± 85 700	± 26 500	± 32 000	± 144 200
No. of freestanding shacks[a]	± 9 000	± 16 000	± 5 000	± 30 000
Water - total (R million)				
Income (sales)	7 - 34[c]	na[e]	10[h]	
Expenditure (purchase only)	36[d]	na	17[h]	
Deficit	2 - 29	na	7[h]	
Water - per household[b] (Rands per formal house per month)				
Income (sales)	7 - 33	na	26	
Expenditure (purchase only)	35	na	44	
Deficit	2 - 28	na	18	
Sewerage				
Income - total (R million)	4 - 8[c]	na	[i]	
Income - per household pm	4 - 8	na	[i]	
Total trading account (R million)				
Income	90 - 180[c]	6[f]		
Expenditure	270[d]	16[f]		
Deficit		10[f]		
Trading account - per household (Rands per formal house per month)				
Income	88 - 175	19[g]		
Expenditure	263	50[g]		
Deficit	88 - 175	31[g]		

Notes:
a. Palmer Development Group, 1993a (Composite source: local authorities, studies, Urban Foundation, 1991, Johannesburg Metropolitan Chamber).
b. Based on number of formal houses. Assume freestanding shacks have minimal services and that both residents of freestanding shack and backyard shack dwellers do not pay service charges. These figures may therefore be overstated.
c. Income is highly dependent on state of rent and services boycott. Range given is the minimum and maximum income in the period 1988/89 to 1990/91. Note, no income for the period 1991/92 was reported.
d. Expenditure reflects only the bulk purchase of water, that is, no maintenance costs included.
e. na = not available.
f. Sewerage and other trading services. Exactly what these figures include is not clear.
g. This data not indicative. See note f.
h. This is for both water and sewerage (no separate figures kept).
i. Included in water data. See note h.

to corrosion of pipes (the whole network is being replaced as a result of this), inadequate resources available for maintenance of system, and lack of incentive on the part of residents to use water sensibly as residents are not paying service charges.

- The total trading account expenditure for Soweto Town Council of R 263 per formal residential site per month is inordinately high. An alternative estimate of this expenditure is set out and discussed below.

The Johannesburg Metropolitan Chamber's technical committee recently estimated the costs of providing services to Greater Soweto (excluding Dobsonville), which is summarised in Table 17.

Table 17: Greater Soweto - costs of services (excluding Dobsonville)

	Total Cost R million per annum 1993/94	Cost per residential site Rands per household per month[a] 1993/4	Percentage %
Water			
Bulk services	69	49	16%
Operating	10	7	2%
Sub-total	79	56	18%
Sewerage			
Bulk services	30	21	7%
Operation	7	5	2%
Sub-total	37	26	9%
Other trading services[b]	118	84	27%
Community services and administration	197	140	46%
TOTAL	431	306	100%

Note: a. Based on 117 400 residential sites.
b. Other trading services includes refuse removal and electricity for public use (street lighting), but excludes private consumption of electricity.

Source: Johannesburg Metropolitan Chamber, Technical sub-committee, February 1993.

These comprehensive costs are of the same order of magnitude as the figures previously presented. The following points are of note:

- The high water cost of R 56 per household per month. At a cost of R 1.50 per kl, this represents an average water consumption of 37 kl/month, or 1 250 litres per day per residential site. It is doubtful that this amount of water is being consumed on average, supporting the points previously made regarding the state and management of the water network.

- The cost of sewerage services would appear to be fair, if an adequate level of service was being provided as these costs are roughly equivalent to those being paid by Johannesburg residents for a fully functional and well maintained system. The general state of the sewer network is fair but it has been under-maintained due to lack of resources.

- It is difficult to compare the costs of the full package of services to Johannesburg, because a large share of rates and services income is derived from commerce and industry in Johannesburg, whereas this is minimal of Soweto. It is, however, possible to determine, in a very preliminary way, the impact on service costs in Johannesburg of combining the water and sanitation services of the "two cities". This is done in the following section, but first some comments on existing subsidies are made.

Current operating subsidies

Current operating subsidies to Greater Soweto (excluding Dobsonville) are summarised in Table 18. Based on these subsidies, the per household service costs required are calculated in Table 19. The current subsidies therefore account for 70% of the full costs of services provision in Greater Soweto (excluding Dobsonville). The required service charges are therefore reduced from R 306 to R 91 per household per month assuming 100% payment. This figure increases to R 114 and R 152 assuming payment levels of 80% and 60% respectively.

Impact on Johannesburg current service costs

The impact on current service costs in Johannesburg for water and sewerage services as a result in incorporating Greater Soweto (excluding Dobsonville) may be calculated in a preliminary way based on the data already presented and assuming:

- 1992/93 estimates are escalated by 10%.

Table 18: Greater Soweto - current subsidies (excluding Dobsonville)

	Total Cost R million per annum 1993/94	Subsidy R million per annum 1993/4	Percentage %
Regional Service Council Subsidy			
Water	79	50	63%
Sewerage	37	32	86%
Other trading services[a]	118	30	30%
Community services and administration	197	5	3%
TPA intergovernmental grant			
All services (block grant)		173	
State Health		12	
TOTAL	431	302	70%

Note: a. Other trading services includes refuse removal and electricity for public use (street lighting), but excludes private consumption of electricity.

Source: Johannesburg Metropolitan Chamber, Technical sub-committee, February 1993.

- Total service provision costs are absorbed by the white local authority water and sewerage trading services.

- RSC levies are not made available for current operating expenditure.

- Inter-government grants are only made available for non-trading services.

This data is presented for illustrative purposes only.

Table 19: Greater Soweto - service costs: with and without current subsidies (excluding Dobsonville)

	Full service cost R per site per month[a] 1993/94	Subsidised service cost R per site per month[a] 1993/4
Water	56	21
Sewerage	26	3
Other trading services[b]	84	62
Community services and administration	140	5
TOTAL	306	91
Total service payment assuming 80% payment		114
Total service payment assuming 60% payment		152

Notes: a. Based on 117 400 residential sites.
b. Other trading services includes refuse removal and electricity for public use (street lighting), but excludes private consumption of electricity.

Source: Johannesburg Metropolitan Chamber, Technical sub-committee, February 1993.

Scenario 1:

- The existing payment paradigm persists, that is, effective zero payment for services.
- Increase in expenditure on services:

Water:	R 216 m + R 79 m =	36%
Sewerage:	R 115[3] m + R 37 m =	32%

Scenario 2:

- Residents pay a flat rate service charge of R 15 per month for water and R 15 for sewerage. [The likely interim tariff agreement in Soweto for all services is R 45 per month for all services, thus a contribution of R 30 of this towards water and

3 No sewerage expenditure available. Used income figure based on the assumption that Johannesburg runs its sewerage service at cost.

sanitation services is probably optimistic. The scenario also assumes 100% payment rates.]

- Increase in expenditure on services:

Water:	R 216 m + R 79 m - R 21 m =	27%
Sewerage:	R 115 m + R 37 m - R 21 m =	14%

Scenario 3:

- Residents pay a flat rate service charge of R 25 per month for water and R 25 for sewerage. [Note that these services make up approximately 50% of service costs (excluding electricity) and thus households in this scenario will be required to pay about R 100 per month in total for all services, excluding electricity.].

- Increase in expenditure on services:

Water:	R 216 m + R 79 m - R 35 m =	20%
Sewerage:	R 115 m + R 37 m - R 35 m =	2%

2.3 Durban Functional Region

a) Joint Services Board

The Joint Services Board plays a relatively important role in the operation and maintenance of water systems in the region, but a minor role in the operation of wastewater services. The board manages the three previously autonomous water companies, North Coast Water, Pinetown Water and Amanzimtoti Water (south coast), which have a combined budget of R 78 million per annum (1993/94) and which, combined, operate at cost (budgeted surplus R 100 000 for 1993/94), however, Amanzimtoti has accumulated a significant deficit which will take some years to repay.

The board has not made an explicit budget available for assistance to black local authorities for operation and maintenance expenditure, unlike, the Central Witwatersrand RSC for instance.

The board's income from levies for 1993/94 is expected to total R 150 million, and the amount spent on capital projects is budgeted at R 115 million.

b) Aggregated white local authority financial data

Financial data for water services, aggregated for all of the white local authorities in the Durban area is presented in Table 20. Comprehensive data for wastewater services was not available. The list of local authorities included in this data was not explicit stated, however, it is likely that the local authorities served by North Coast and Amanzimtoti Water Companies are excluded, with Pinetown being included.

The data for the water services shows that the "surplus" (before appropriation to capital reserves or the rates accounts) generated by the white local authorities is, on average, about 6% of income (for the period 1988/89 to 1991/92), varying between 5% and 9%.

Table 20: Water services - white local authorities in DFR (R million)

	88/89	89/90	90/91	91/92	92/93
Income	119	139	155	171	190
Expenditure	112	127	148	160	191
Surplus	7.1	12.2	7.2	10.8	-0.5

Note: 1992/93 figures are estimates.
Expenditure includes repayment of loans but not appropriation to reserves.
Source: World Bank (1993).

Durban Corporation dominates the financial flows in both the water and sanitation sectors in the region.

c) Durban Corporation

Summary financial information for Durban Corporation Water and Waste Departments for 1991/92 is summarised in Table 21.

The data shows that Durban Corporation achieved a water trading surplus of R 17 million (12%), before appropriation to reserves, and contributed R 9.5 million of this to the rates and general services account. Total expenditure on wastewater amounted to R 57 million, however, it was not clear whether income raised through the separately itemised rates account exceeded the income necessary to balance expenditure after the deduction of direct

Table 21: Summary financial data for Durban Corporation

Durban Corporation Water and Waste - (R million per annum)	
	91/92
Water	
Income	156
Expenditure	139
Surplus[a]	17
Wastewater	
Income[b]	57
Expenditure[c]	57

Notes: a. Surplus prior to appropriation to reserves and rates and general services account. Of the R 17.1 million, R 9.5 million was transferred to the rates and general services account and R 7.7 million to the "appropriation account"

b. R 15 million from direct charges (acceptance of sewage from other areas, trade effluent fees etc.). The rest of the income comes from the rates account. Actual income attributable to wastewater on this account was not available, and it has been assumed here that income raised is only sufficient to cover expenditure. The actual income is therefore probably somewhat higher than this.

c. Expenditure includes capital charges, but excludes appropriation to capital reserves.

Source: Durban Corporation financial statements

charges (R 15 million).

d) Umgeni Water

Umgeni Water's income and expenditure for 1992/93 was as follows:

Income:	R 243	million	
Expenditure:	R 231	million	(prior to appropriation to reserves)
Surplus:	R 12	million	

e) Impact of services rationalisation in Durban Functional Region

The impact of rationalising water and sanitation services in the Durban Function Region may be illustrated in a similar manner to that done for the Witwatersrand. Again, only the impact on current operating and maintenance costs is considered.

- Assumptions:

  - Low-income population = 2.3 million (World Bank, 1993)
  - Number of low-income households in DFR = 380 000 (Household size = 6)

  Metered yard tap, full waterborne sanitation:

  - Operation and maintenance costs of metered yard tap (including water consumption) with average consumption of 100 l/cap/day (600 l/site/day) and water tariff, which includes the cost of maintenance, of R 1.50 per kl = R 27 per month.

  - Operation and maintenance cost of sewered connection, assuming wastewater flow of 300 l/site/day and wastewater tariff of R 1.00 per kl = R 9 per month.

  Communal standpipe, VIP latrines:

  - Water costs: R 15 per month per household (55 l/cap/day; 330 l/site/day)
  - VIP maintenance costs: R 5 per month per household (Palmer Development Group, 1993b)

- Scenario 1:

  - Full level of service provision across board.
  - Average payment for water and sewerage services: R 20 per month per household. (Note that in many areas, existing tariffs for yard tap and waterborne sanitation is in the region of R 5 to R 10 per month and, even in these areas, payment for services is low.)

  Impact on operating and maintenance costs:

  Shortfall in operation and maintenance costs: R 16 per household per month
  Total shortfall in recurrent costs: R 73 million.
  Total existing recurrent expenditure: R 196 million (Durban only).
  Percentage increase in expenditure: 37%.

- Scenario 2:

  - 50% : 50% mix of full and basic level of services.
  - Those with full level of service pay R 30 per month.
  - Those with basic level of service pay R 10 per month.

  Impact on operating and maintenance costs:

  Shortfall in operation and maintenance costs: R 5 per household pm (full)
  Shortfall in operation and maintenance costs: R 10 per household pm (basic)
  Total shortfall in recurrent costs: R 34 million.
  Total existing recurrent expenditure: R 196 million (Durban only).
  Percentage increase in expenditure: 17%.

Discussion

The numbers can, of course, be juggled at will. However, the above two scenarios serve to illustrate the following important points:

- Most low income residents have become accustomed to paying nominal amounts for services, or nothing at all. Although the grounds for this can be argued on the basis of illegitimate institutions, poor quality of services, etc., it is wishful thinking that once legitimate institutions are in place and service delivery has been normalised, that high levels of payment for service at rates close to the actual cost of delivery will be achieved, especially in the short term.

- Although it is true that spreading the burden of cross-subsidisation over a wider base will result in a reduced general burden, the above figures indicate that the provision of levels of service that are not affordable could result in a significant ongoing burden on recurrent expenditure.

- It is possible that the scenarios presented are under-stated. One argument supporting this contention is that where services are not paid for (or are significantly subsidised), consumption may be considerably higher than estimated in the above scenarios, resulting in greater operating costs and deficits. A second argument is that service delivery in low income settlements may be more expensive than comparable levels of service in high income settlements as a result of higher maintenance requirements, difficulties of access etc. The cost figures may therefore be understated.

3. TARIFFS

3.1 Introduction

This section discusses the pricing of water and sanitation services under the following headings:

- Water pricing theory
- Bulk water pricing in South Africa
- Domestic water pricing in South Africa
- Sanitation pricing theory
- Sanitation pricing in South Africa
- Illustrative water and sanitation tariffs

The focus of the section is on domestic tariffs. It is recognised that commercial and industrial pricing policies have an important influence on domestic tariffs, but a discussion of these policies is beyond the scope of this investigation. The major point of note in this regard is that industrial and commercial enterprises have, in general, subsidised residents in white local authority areas through differential tariff structures. In the future, this cross-subsidy, if maintained, will have to be spread over a much broader consumer base, and hence the significance of the subsidisation is likely to be substantially lowered.

3.2 Water pricing theory

(The following section outlines the basic economic and related principles upon which water pricing policy should be based. The discussion is included here because there appears to be little familiarity amongst water professionals (at least in public institutions) with the economic principles of water pricing. The discussion is taken from Palmer Development Group (1993a) which, in turn is borrowed from Bahl (1992)).

In general, pricing policy should be designed to meet the following goals:

- economic efficiency
- financial viability
- equity

The relative weight of these goals will be determined by the particular circumstances with regard to the existing extent of coverage, wealth distribution, consumption patterns etc. Allowance should also be made for institutional arrangements which may influence the feasibility of pursuing these goals.

Water charges can be grouped into five categories:

• lump-sum development charge	usually once off and included in cost of the property and independent of whether or not connected
• lump-sum connection charge	
• periodic maintenance fee	usually monthly or quarterly, to pay for the fixed costs of maintaining and administering the reticulation
• periodic consumption charge	usually monthly or quarterly, to pay for (metered) water consumed
• periodic development charge	occasional, to cover the cost of replacement / upgrading of reticulation network

The pricing of water will be discussed from each of the following perspectives in turn: efficiency, financial viability and equity. Further considerations are discussed thereafter.

Efficiency

It is usual to design a pricing policy on the basis of efficiency and then to adjust this as necessary taking into consideration the other policy goals. The effectiveness of using price as a tool in efficiently allocating resources is dependent on the price elasticity of demand, that is, the relative responsiveness of demand to changes in price. It should be noted that there are three dimensions of water supply services to which prices are applicable, namely access, connection and consumption. In general, the demand for water consumption is moderately price elastic (that is, there will be a moderate change in consumption with a change in price). However, there is a view that consumption is less price elastic for low income consumers as they are likely to consume water out of necessity and will have to pay

whatever the price (obviously within bounds). On the other hand, the demand for water connections are likely to be more price elastic for low-income households and show little price elasticity for high income households. These general remarks are, however, highly conjectural and should be tested during the development and implementation of a pricing policy.

The basic rule of efficient public service pricing is to set price equal to marginal cost.

The following should be taken into account when assessing and interpreting this statement:

- Note that the departure point of the above statement is **efficiency**. As already stated, it is a good principle to start with a tariff design that is based on efficiency, and then to make adjustments to this tariff taking into account other considerations, particularly equity and financial viability.

- The **marginal cost** is the cost incurred in supplying an additional amount of resource over and above that which is already being consumed.

- Pricing theory asserts that resources are most efficiently allocated when **price is set equal to marginal cost.** This principle is widely accepted and implemented in the world of commerce and industry, but is equally applicable to natural resource economics and is gaining currency and being implemented in relation to the realisation of the scarcity of respective natural resources, clean water being an example.

  The basis of this principle is as follows: When the price equals the marginal cost, then the marginal or opportunity cost of the resource is just equal to the marginal value of the good to society, reflected in the price that people are willing to pay to that amount of additional output. If the price of resource is higher than the marginal cost, then too little of the resource will be made available, and if the price is lower than the marginal cost then too much of the resource will be made available. Where price equals marginal cost, the allocation of resources is thus at an optimum.

  It should be noted that there are important qualifications to this principle, for example, that of externalities (discussed below) and of "public goods" (in the economic sense of the word).

An example of the application of marginal costs to water supply is given below:

> In the case of the Witwatersrand, the cost of supplying the next "batch" of water (over and above that currently available)[4] is about 5 times the current average price of water. Economic theory argues that to allocate water efficiently in this instance, the price of water in the PWV region should be set equal to this marginal cost. That is, people's decisions on how much water they should consume should be based on the full cost of supplying an additional amount of water to the region.

Ideally, a five-part **water tariff** is most likely to accurately reflect the economic principles of efficiency in the pricing of water.

- **A consumption charge.**

  The amount paid should be proportional to the amount of water consumed. That is, the price should be set as a unit consumption charge (cents per kilolitre [c/kl] consumed, for example).

  The unit consumption charge should be set equal to the marginal cost of the bulk water supplied to the area / region and delivered to the consumer. (This should be the starting point for the **efficient** pricing of water.)

  In the case of water supply, the long-run marginal cost should be used. This is also called the average incremental cost (AIC).

  The long run marginal cost (AIC) is used because investments in increasing bulk water supply system capacity are usually lumpy, spanning many years, and therefore marginal costs calculated over a shorter time span would vary widely, giving rise to price instability.

  The AIC is calculated by discounting the incremental costs which will be incurred in the future to provide the estimated additional amounts of water which will be demanded over a specific period, and dividing that by the discounted volume of incremental output over that period.

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[4] That is, the water that is to come from the Lesotho Highlands Water Project.

A consumption charge requires metering. However, metering incurs costs and a cost-benefit analysis should be carried out to ensure that the benefits of metering outweigh the costs. Where consumption is low, or metering costs unusually high, it is possible that the costs of metering may outweigh the benefits.

The consumption charge should also incorporate the operating and maintenance costs of bulk and connector services of the bulk water supply to the area / region.

- **A maintenance fee**

A periodic (usually monthly or quarterly) fee to cover the actual recurrent fixed costs of maintaining the reticulation system in that area / region. (Note that the maintenance cost of the bulk water supply is included in the consumption charge. This is because the overall operation and maintenance costs of the bulk supply system is related to overall consumption demand in the system, whereas, the maintain of the local reticulation system, once built, is largely independent of the individual amounts consumed by households.)

This charge is often not levied, institutions preferring to incorporate this into the consumption charge. From the perspective of efficient economic pricing, this is not desirable.

- **A connection fee**

A once-off payment at the time of connection.

From the perspective of efficient economic pricing, this should be set to equal the actual cost of making each connection.

- **A development charge.**

A once-off fee to cover the marginal capital cost of the development of the local reticulation system and the cost of connection into the existing bulk network. (The cost of development of the bulk supply is included in the consumption charge.)

This cost of the local reticulation is usually incorporated into the price of the serviced land or house. The cost of the connector to the bulk supply network is either included in the development cost or incorporated into the tariff. From the perspective

of efficient economic pricing, the latter practice is not desirable, especially if a uniform consumption tariff is used over the whole urban area.

- **An upgrading / replacement charge.**

  Periodic payment of a fee to cover the cost of major upgrading or replacement of the local reticulation network and connection to the bulk supply network. (The cost of upgrading the bulk supply network is included in the consumption charge.)

  This charge is, however, seldom levied separately, usually being incorporated into the consumption charge. Again, from an efficient economic pricing perspective, this is not desirable.

Financial viability

Self-financing urban water supply systems are attractive for a number of reasons:

- fairness: people pay for what they get
- reduced risk of distortions which may arise when raising revenues from other sources
- promotes local autonomy and accountability
- encourages appropriate standards in service provision
- associated with efficient management of public utilities

In principle no conflict arises between the objectives of efficiency and financial self-sufficiency if

- the development charges are set equal to actual development costs
- the connection fees are set equal to actual connection costs
- the periodic upgrading / replacement fee is set equal to actual costs
- the maintenance fee is set equal to actual maintenance costs
- the long run marginal costs of water supply are higher than the average historic costs.

Equity

Equity considerations are frequently embodied in water tariff structures in developing countries. Various methods may be used to build redistributive effects into pricing schemes, amongst which are:

- rising block and life-line[5] tariffs
- user fees linked to the value of the connected property
- financing through a general property tax
- making charges a function of wealth of neighbourhood
- higher charges for industrial and commercial consumers
- cross-subsidies with other urban services
- inter-regional or urban-rural cross-subsidies
- transfers between national and local general fund accounts
- making charges a function of connection pipe diameter or number of taps
- subsidising consumption from public taps

The point of reference should remain efficiency, which consists of marginal cost prices for the consumption, connection and access dimensions of the service. The redistributive affect should have to do only with the excess relative to the marginal cost price. The above redistributive mechanism should be evaluated in terms of the tax burden placed on the wealthy, the extent of subsidies created for the poor, the effect of the redistributive pricing on efficiency and the difficulty of implementation.

If the long run marginal costs of water supply are higher than the average historic costs, then a surplus will be generated which may be used selectively to subsidise selected classes of consumers provided the subsidies are efficient and equitable. For example, life-line consumption tariffs for small, poor consumers, subsidised connections in poor neighbourhoods, and subsidised provision of water from public taps are likely to be efficient (and socially equitable) uses of surplus funds. Additional surpluses generated may be transferred to other urban services (for example sanitation) or water systems in other regions of the country where self-sufficiency cannot be achieved. Of course, a suitable portion of the surplus should be retained in a capital development fund, to be used in the future for the construction of additional water supply schemes.

Other factors to be considered in the pricing of water

Externalities: Water supplies may be justified on the basis of health benefits brought to the community through the reduced incidence of water-borne disease. Between 20 and 40 l/capita/day of readily available water (together with adequate sanitation and sound hygienic practice) are sufficient to attain the main health benefits of water use. This benefit may be

[5] Life-line tariffs consist of a heavily subsidised low tariff for an initial consumption block of say 20 to 40 l/cap/day. Consumption above this amount is charged at the full marginal cost.

considered an externality, possibly to be paid for in part by a broader community-grouping, even though the specific community may be unwilling or unable to pay the marginal cost price. This is a rationale for the introduction of a life-line tariff (previously described).

Shadow pricing: Distortions in market prices (of input costs to water supply schemes - eg the cost of capital, skilled and unskilled labour, electricity etc) should be accounted for by using shadow pricing techniques. Unfortunately, the sensitivity of water charges to shadow prices has not been widely explored.

Administrative considerations: Efficient water tariff structures can only achieve their purpose if they can be administered effectively. For example, it may be costly or simply not feasible to meter all water supplies in an informal low-income area. Similarly, the inability to effectively collect charges renders tariff policies worthless.

Institutional considerations In principle, water pricing systems can be designed to provide services that are efficient, financially viable and equitable no matter what the institutional context. In practice, however, the institutional framework cannot be so easily disregarded. Systematic relations exist between the institutional setting and pricing structures, and it may be expected that pricing policies will be structured in such a way as to reflect the institution's goals. For example, a single purpose water utility is likely to have a different approach to water pricing than a multi-purpose local authority. Institutional autonomy will usually result in pricing practices which give rise to financial autonomy. However, this does not mean that autonomous institutions necessarily apply sound financial management and efficient pricing principles. Also, having autonomous institutions does not rule out inter-agency transfers. For example, it is possible to legislate or have a formal arrangement for a proportion of a surplus generated in a water utility to be transferred to a local authority.

3.3 Pricing of bulk water in South Africa

a) Department of Water Affairs (raw water)

Bulk raw water tariffs in South Africa are almost universally based on average historical costs (so called because the tariff is based largely on the repayment of capital borrowed in the past). The bulk treated water tariff is set equal to the average historical cost which is made up as follows:

- Current operating and maintenance costs.
- Interest charges on borrowed capital.
- Repayment (by instalment) of borrowed capital (capital redemption component)

The current Department of Water Affairs policy for the pricing of water to urban areas is as follows:

- Full cost recovery is practised.
- There is no prior payment for water schemes (the Lesotho Highlands Water Project is an exception to this - parliamentary approval was required).
- The unit cost of water equals the present volume of water sales divided by the sum of the present value of the capital and running costs at the base year.
- Repayment is calculated over 45 years.
- The interest rate is set by the State Treasury Department (currently 17% (nominal), compared to the current rate of inflation of 10%).

The disadvantages of the present method are:

- It does not take into account future projects.
- It allows for no prior payment for water schemes.
- The interest rates used are not considered appropriate.
- Demand management or demand constraint is not implicit in the pricing methodology.

In the light of this, the Department of Water Affairs has recently proposed that the method be altered as follows:

- Use real interest rates (currently about 3%).
- Let tariffs rise with inflation (that is, cater for a constant real tariff over time).
- Take future schemes into account and allow for 'pre-payment' of future schemes.
- Calculate Net Present Value (NPV) of capital expenditure over 20 years.
- Calculate NPV of future water sales over the next 45 years.
- Calculate NPV of operating costs over next 45 years.
- Recalculate tariffs each year with updated information and the new 20 and 45 year 'windows'.

This new method marks a step towards marginal pricing principals, but is still not based on marginal costs (long term average incremental costs). The reason for this is that the costs

are still calculated on the basis of the total water sales in the area of supply to which the tariff applies and not only to the water sales for the new sources of supply.

Demand management is not addressed in the proposed new tariff structure. With certain exceptions, raw water purchased by the regional supply authorities from the DWA is taken under a reservoir allocation agreement (with receiving regional supply authorities meeting capital and operating costs in full) rather than under a volumetric tariff. There is no incentive to conserve water under such agreements (Thompson, 1992).

b) Marginal versus average raw water costs

As part of this investigation, an attempt was made to obtain information on the marginal costs (long term average incremental costs) of major new water schemes in the major urban centres in South Africa. However, only information for the Witwatersrand area was available, and is quoted below. It is important for this kind of information to become available to policy makers in South Africa, as, even if actual water tariffs are not based on marginal costing principals, the marginal costs of water are still important to inform economic and urban development policy. For example, if the future cost of water to the PWV is going to be many times higher than the current costs, the present essentially, distorted price signals (from an economic point of view) may result in a situation in which water intensive industry is located in areas in which their long term future may be jeopardised.

Data made available for the Lesotho Highlands Water Project (LHWP), which is to begin supplying water to the PWV metropolitan area in 1997, suggests that the marginal cost of this (raw) water, at today's prices, will be R 1.50 per kl. However, the average cost (and tariff) of the raw water supplied to the PWV in 1997 will be 30 c/kl (today's prices), which is calculated by spreading the total cost of the scheme over the total sales of water (from all sources) from the Vaal River system. Thus the average long run marginal cost of water is some five times higher than the average historical cost for the PWV metropolitan area. If future raw water schemes are taken into account beyond the first phase of the LHWP, then this difference is even higher.

Intuitively, it is likely that the marginal costs of water in other major urban areas are likely to be less than that for the PWV, but still substantial. Preliminary data for Cape Town suggests that the marginal costs could be in the region of three times the current average costs.

c) Water boards

The Water Act (and the Rand Water Board Statutes) sets out broad parameters for the setting of tariffs by water boards (for example, by limiting the amount of surplus that may be accumulated to reserves), and the Minister of Water Affairs retains overall control over the tariffs charged by the water boards. However, within these constraints, the water boards still appear to have some leeway in the pricing of bulk treated water. For example, Umgeni Water write off capital expenditure over 20 years (as apposed to the current practice of the Department of Water Affairs of 45 years)[6].

The universal practice of the water boards is to base their tariffs on average historical costs, with the difference that a surplus is built into the tariff to allow for the accumulation of capital reserves which may be used for future capital expenditure.

It would appear that the large municipalities who act as regional water suppliers (for example, Cape Town and Port Elizabeth City Councils) follow similar policies, although it was not clear which legislation governed this practise.

d) Bulk treated water costs / tariffs in the metropolitan areas

A large proportion of the total urban water demand in South Africa is consumed in the major metropolitan areas, which in turn "house" 64% of South Africa's total urban population.

The average costs of bulk treated water in some of the major metropolitan areas are summarised in Table 22.

The following points with regard to the average costs may be made:

- Bulk water in Cape Town is the least expensive of all of the major metropolitan areas by a significant margin.

- It is surprising that the cost of / charge for water in the water scarce PWV area is lower than for the Durban / Pietermaritzburg area (a water rich region) (Briscoe, 1991).

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[6] This is the primary motivation for Umgeni wishing to purchase major raw water reservoirs from the Department of Water Affairs. Umgeni estimates that it could save about R 2 billion over the next 20 years because of the more advantageous financing package that Umgeni could assemble.

Table 22: Average Water Costs - Metropolitan Areas

Metropolitan Area	Bulk Water Supply Authority	Cost of Bulk Treated Water (c/kl)	
		(91/92 actual)	(92/93 actual)
Cape Town	Cape Town Municipality	39	48
Bloemfontein	Bloemarea Water Board	54	63
Port Elizabeth	Port Elizabeth Municipality	61	92[1]
PWV	Rand water Board	66	74
Durban	Umgeni Water Board	67	93

Notes: The above are average costs of water as supplied by the regional water authority based on actual 1991/92 and 1992/93 total expenditure (including contributions to capital reserves) and total water sales.

1. This cost higher than normal because of drought conditions.

- The relative costs of water in the PWV and Durban regions will, however, change in the future as the result of the introduction of the Lesotho Highlands Water Project in 1997.

- Raw water currently makes up about 22% of the total cost of water to the end user in the PWV area. As more expensive sources of water are developed the raw water cost, and hence the percentage of the end user price, will increase progressively. "*The days of relatively cheap water in the Vaal River supply area are over and consumers will have to prepare themselves for higher costs*" (Krige, 1992).

- Bulk water tariffs are based on average historical rather than marginal costs.

e) The economic value of water

To date, relatively little work has been done in South Africa on determining the economic value of water, although the theory and principles of economic pricing are beginning to gain currency (cf Hollingworth, 1992, Jackson, 1991, Forster and Mirrilees, 1993). A preliminary study to determine the economic value of water for the Vaal River System area was undertaken for the Department of Water Affairs in 1991 (Urban-Econ, 1991). The study concluded that the "value of water was substantially higher than the present cost of water" (ibid, p29). This, together with the discussion on marginal costing, supports the contention that water is under-priced in South Africa at present.

3.4 Pricing of domestic water in South Africa

a) White local authorities

Water tariffs is these areas are almost universally based on metered consumption. The four variations of this form of tariff found are:

Consumption charge
A straight consumption tariff is the most common tariff structure used by white local authorities.

Service charge plus consumption charge
The service charge covers fixed costs related to the management and maintenance of the water reticulation system, and the consumption charge is related to the variable costs. The service charge is usually a small amount, of the order of R 5 per month or less (for example, Cape Town City Council charges R 5 per quarter). This tariff structure is also fairly commonly used by white local authorities.

Rising block rate consumption charge
The unit cost of water increases as consumption increases. This tariff structure should encourage water conservation if demand is relatively price elastic. This tariff structure is relatively uncommon.

Service charge plus rising block rate
Variation of last two tariff structures. Not in common use.

Almost all white local authorities set water tariffs so as to cover operating costs, contribute to capital reserves and/or a tariff stabilisation fund, and contribute (usually about 10% of income) to the rates and general services account.

In most white local authorities, the condition of the water reticulation network is sound, and there are relatively small demands for expansion. Under these circumstances, the above tariff policies have enabled annual water tariff increases to be kept below the rate of inflation, at the same time as maintaining financially sound trading services.

However, exceptions to this general picture do occur, and it is further likely that it will not be possible to restrict tariff increases to below that of inflation in the future, in most instances. Some of the more important reasons for likely significant real increases in water tariffs in the future are:

Increasing cost of raw water supply

- All local authorities whose source of supply is the Vaal River System (Rand Water Board supply area, OFS Goldfields and a number of other smaller urban centres) will face significant real increases in water tariffs in future as a result of the high marginal costs of water supply (cf the costs of the Lesotho Highlands Water Project).

- It would be true to say that all major urban areas will experience real increases in water tariffs as a result of expanded demand and marginal costs which exceed historical average costs. The extent of the real increases will depend on specific circumstances. Consumers in the Port Elizabeth face a high marginal cost of supply, Cape Town's marginal costs are likely to be slightly less than for Port Elizabeth and Durban should have relatively low marginal costs compared to the other urban centres.

Ageing reticulation networks

- In some local authorities, especially smaller towns and some smaller white local authorities in metropolitan areas, water networks are aging and in need of significant upgrading or replacement. Adequate provision, in the form of capital reserves, has not always been made and consumers may face steep increases in tariffs in the future. An additional problem is that the smaller local authorities may experience difficulties in borrowing the required amounts of capital.

One city - one tax base

- The imminent unification of white and black local authorities in cities and towns, and the pooling of the tax base, will have important implications for water tariffs.

  - Most black local authority water trading accounts are operating at a deficit. At least a portion of this deficit will have to be borne by water users in the current white local authority areas, at least in the short term, but also quite likely in the medium and longer term.

- Residents in white local authority areas have enjoyed privileged access to cross-subsidies from the industrial and commercial sectors. "Surplus" income from these sources will, in the future, have to be spread over a significantly wider consumer base.

New infrastructure demands

- Much of the new demand for water infrastructure will arise from the low-income household sector. Even if much of the internal reticulation for water services to these areas is provided through grant finance from other sources, the water sector will still be required to invest in significant infrastructure development (through borrowing) with consequent real increases in water tariffs.

b) Black local authority areas

The most common tariff structure in use in the black local authority areas is the flat rate service charge. Other tariff structures, as outlined for white local authority areas, are also used, but these are the exception rather than the rule.

Flat rate service charge

This tariff structure is attractive (from the local authority point of view) because it is relatively easy and inexpensive to administer. In many instances the tariff was implemented in response to difficulties being experience with meter-reading, the high cost of administering a meter reading and accounting system, restricted access into the local authority areas as a result of violence, antagonism towards the meter readers, rent and service boycotts etc.

In theory, it is possible for local authorities to achieve adequate cost recovery through setting the service charge in relation to overall water usage and fixed operation, maintenance and administration costs. However, it appears to be common practice for the service charges to be set well below the rate required for cost recovery.

It would be fair to say a flat rate service charge is favoured by most civic associations in black local authority areas. The main reasons for this are:

- The fee is easily understood.

- The fee is seen by the civic associations as being equitable, that is, everybody pays the same amount, and it is therefore easier for them to "sell" this tariff structure to their constituencies.

However, there are also problems related to this tariff structure:

- The tariff is not equitable because those who use less water pay the same amount.
- The tariff does not encourage the conservation of water, because, from the individual household's perspective, payment is not related to water consumption.
- Increases in flat rate service fees are difficult to sell politically.

Water vending/kiosks

In addition to the tariff structures mentioned above, water vending (especially kiosk) arrangements are in existence in a number of informal settlements. Typically, a kiosk "owner" would buy water from a metered connection from the supply authority and resell the water to customers at a fixed rate per volume purchased. These tariffs vary, but typically range between 5 c and 8 c per 25 litres (R 2.00 to R 3.20 per kl) in Natal (Inanda area outside Durban). However, these costs can be much higher, for example, in the Winterveld (outside Pretoria) average water costs are 25 c per 25 litres (R 10.00 per kl). Therefore, the price of water in these informal settlements can be many times more expensive than in other areas where a much higher level of service is provided.

c) Tariff structures used in South Africa

The distribution of the various types of water tariff structures in use in South Africa, based on a sample of survey of about 270 local authorities (both black and white) , are shown in Figure 1. It should be noted that this data is not weighted by population nor is it necessarily representative; black local authorities in particular are under-represented. Hence the flat rate service charge which is applied by many black local authorities is under-represented. Nevertheless, the data does give an indication of the kinds of tariff structures in use.

d) Average tariffs in South Africa

The range of average domestic tariffs charged in South Africa (both black and white local authorities) is illustrated in Figure 2 and Figure 3. Note that the data is not weighted by population but rather gives an indication of the range of tariffs by local authority.

17.4 million people live in the metropolitan areas in South Africa (71% of total urban population). Typical average selling prices of water in these regions are illustrated in Table 23.

Table 23 Water prices in metropolitan areas (1992/93)

	Bulk [1] (c/kl)	Retail [2] (c/kl)
Witwatersrand	74	166
Durban	93	150
Cape Town	48	130
Port Elizabeth	92	128/190[3]
Bloemfontein	63	141
East London	na	111

Notes:
1. Data from Table 22
2. Based on core white local authority, consumption of 30 kl/month, current tariffs as at July 1993.
3. Normal / water shortage

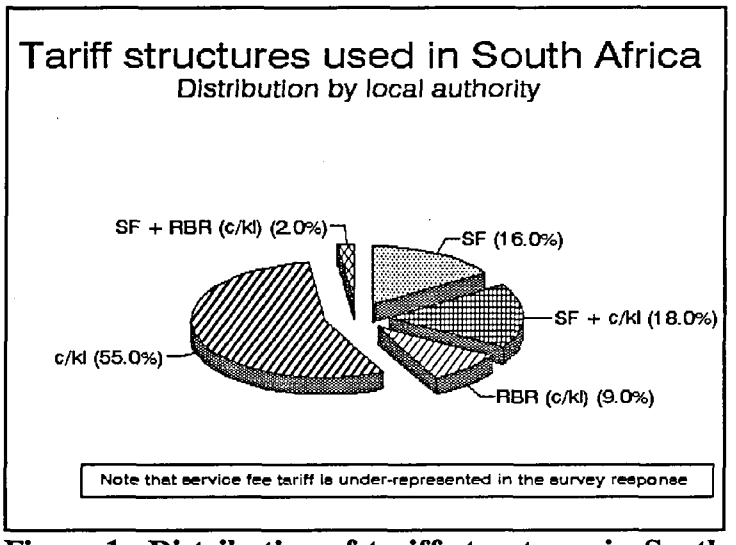

Figure 1: Distribution of tariff structures in South African Local Authorities

SF = flat rate service charge; **c/kl** = consumption charge; **RBR** = rising block rate consumption charge

Source: Palmer Development Group (1993a)

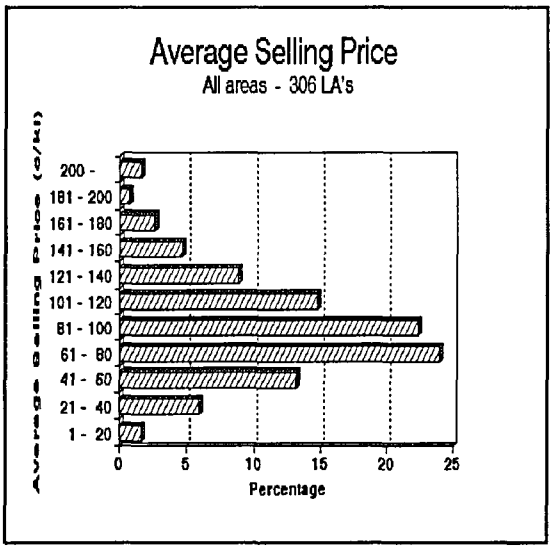

Figure 2: Average selling price - all urban areas

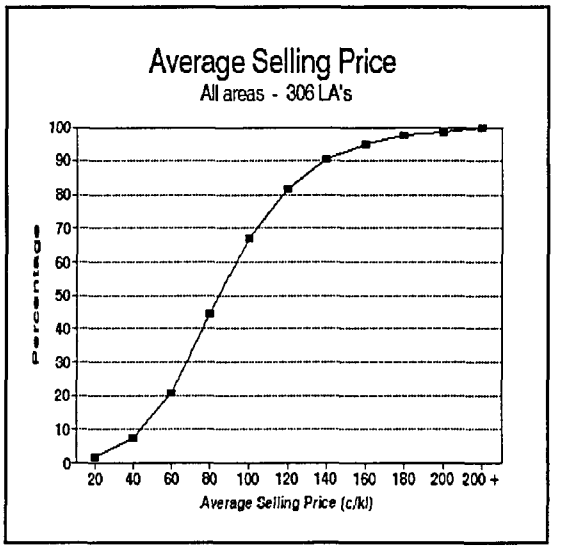

Figure 3: Average selling price - all urban areas

3.5 Sanitation pricing theory

(The following section provides a brief overview of an approach to the pricing of wastewater services. The discussion, which is borrowed from Bahl (1992) is not intended to propose the only or correct method of pricing sewerage, but is included for the purposes of highlighting an approach which is seldom applied in South Africa, but which is possibly worthy of consideration.)

Three types of sanitation services may be usefully distinguished for the purposes of pricing policy:

- Residential users connected to a conventional piped sewer system.
- Households with on-site sanitation systems.
- Industrial users.

The system of charging industrial users in accordance with actual effluent flows and strengths is well developed in South Africa and therefore the theory related to this is not discussed here.

a) An approach to sanitation pricing (after Bahl, 1992)

For residential users of piped systems who have water meters, a feasible tariff structure should parallel that for water (see Section 3.2) and should have the following elements:

- a consumption charge: A water-use related charge equal to the average incremental cost (AIC) (that is, long run marginal cost) of sewage transmission and treatment, and of any downstream costs imposed on other individuals.

- A maintenance fee: To be paid periodically (usually monthly) to cover fixed maintenance and administrative costs. This would be unrelated to water use. It could be adjusted according to income distribution (equity) and financial considerations much as water fees would be.

- A connection fee: The should reflect marginal connection costs, but may be adjusted for equity considerations much as water connection fees would be.

- A development charge: In high income areas, a development charge could be related to plot frontage, plot size or property value to recover the costs of the collection network.

  In low-income areas, a local property tax or general tax could be used to finance the system. These taxes could be adjusted taking into account equity considerations and externalities.

Unmetered residential users would be charged a periodic fee (perhaps linked to property value) in place of the water-use related charge for metered consumers.

Residential users of low-cost (on-site) systems could be charged a development cost related to the actual cost of new development or upgrading. This cost could be subsidised. Bahl recommends that this only occur at the local level, and only if local fiscal capacity permits. However, this cost could also form part of a national end-user capital subsidy scheme (see Part C).

Bahl suggests that there should be a hierarchy of subsidisation, in which subsidisation of piped sewer systems does not occur until all households not connected to piped systems are at least served with safe low-cost on-site systems (ibid, p345).

He further suggests that given the close linkage between the two services, it is most appropriate to combine the provision and pricing of water and sanitation in one agency. He suggests that provision and pricing by separate agencies seriously complicates the development and maintenance of efficient and equitable pricing policies.

b) Externalities, efficiency, equity and cross-subsidisation

Piped systems

In setting efficient sanitation tariffs, an important consideration is the benefits both to the household connecting and using the sewer system and to the community as a whole.

Although connection to a piped system is not a necessary or sufficient condition for improving community health conditions, the introduction of such a system is usually justified on this basis. External benefits that are realised, are likely to be concentrated in the immediate neighbourhood, but may also affect a much larger area. Therefore, in terms of financing, subsidising wastewater collection systems and connections may be efficient, at least for low-income households who would choose not to connect at the marginal cost price. Because the externalities usually apply only to the specific urban area, these subsidies are more appropriately financed from cross-subsidisation within a city, rather than from national or regional tax sources.

Equity considerations may influence tariff structures. There are likely to be cross-subsidies from wealthy to poor households through a progressive structuring of the connection and development charges and through the application of a life-line tariff in the water-use related sanitation charge. On the grounds of efficiency alone, charges for wastewater services in high income areas should be higher than those for low-income areas because of the lower density of development and externalities. Linking connection and development costs to property value rather than plot size would serve to accentuate the differences in costs.

Obviously, cross-subsidisation practices must be considered in the light of sustainability, otherwise the end objective will be defeated.

On-site sanitation

On-site systems can provide, at a lower cost, acceptable and safe means of wastewater disposal, except for high density inner-city development (cf Palmer Development Group, 1993b and Kalbermatten, Julius and Gunnerson, 1982).

If on-site sanitation services are subsidised from tax-revenues, a trade-off will have to be made between financial viability and replicability on the one hand and efficiency and equity on the other. For efficiency, there would probably need to be some subsidy on the grounds of external health benefits if poor households are not willing or able to pay the full costs. Equity would also favour a subsidy because the benefits of such a subsidy (directed at low-cost sanitation) would only reach low-income households.

Property tax financing may be an appropriate intermediate route (between full subsidisation and full cost recovery) if newly serviced sites are revalued to reflect the increase in value resulting from the improvement. In this case, the direct beneficiaries will bear some of the cost of the project through higher property tax payments, whereas the remainder of the

financing will be drawn from the other urban residents roughly in proportion to their incomes.

If full cost recovery is chosen as an option, then, as a minimum, all those with piped systems should also bear the full costs of their systems.

3.6 Sanitation pricing in South Africa

a) Industrial wastewater

As already noted, industrial wastewater pricing, based on direct measurement of effluent flows and strength, is generally well developed in South Africa, particularly in the metropolitan areas, and is therefore not discussed here. The following discussion is thus restricted to domestic sanitation pricing.

b) White local authorities

(Prior to the recent establishment of interim, or pre-interim, joint local administrations through negotiations, it was almost universally the case that white local authorities only administered piped wastewater systems, and thus pricing policies are well developed only in respect of these systems. The discussion in this section is therefore restricted to piped systems.)

The methods by which white local authorities price their wastewater systems may be generically categorised as follows:

- trading service

  (Autonomous income, expenditure and accounting practices.)

  The treatment of wastewater as a "true" autonomous trading service with separate accounting is relatively uncommon in South Africa, although a number of local authorities appear to be moving in that direction. Durban Corporation has begun using this arrangement and their tariff system is discussed in more detail below.

- semi-autonomous service

  (Billed separately on rates accounts, but part of rates and general services account.)

  This practise would appear to be fairly common in the larger metropolitan areas and marks a transition between the general services approach (see below) and trading services approach. Johannesburg City Council bill wastewater as a separate item on the rates account, but as far as could be ascertained, the accounting is still combined with the rates and general services account. Most of the local authorities in the Witwatersrand area follow similar practises to that of Johannesburg. A recent survey done by Cape Town City Council also showed that a majority of white local authorities treated sewerage as a "trading service" in this broader sense. This practice would, however, appear to be uncommon in smaller towns.

- general service

  (Income from general property rates; expenditure usually, but not necessarily, itemised separately in general rates and services expenditure statement.)

  This practice is widespread, particularly in smaller urban areas.

In the case of the first two approaches, local authorities generally endeavour to match income to expenditure, making an allowance for contributions to a capital reserve fund. Where wastewater is treated as a general service, budgeted expenditure on wastewater is combined with other expenditure, and rates are raised to meet total expenditure, again with an allowance for contributions to a general capital reserve fund. In the latter case, there is no direct connection between income and expenditure.

c) Black local authorities

The most common approach in these areas is to treat wastewater as a general service. In most instances, the service charges raised do not meet budgeted expenditure and the local authorities are heavily reliant on inter-government grants, and more recently in some areas, assistance from regional services councils. These block grants are not allocated to specific services.

Where Ventilated Improved Pit (VIP) latrines are installed, it would appear to be the emergent policy that households are required to bear the full cost of operation and

maintenance of these. The major expenditure in this regard is pit emptying, which typically costs R 100 per pit emptied and should be required every 5 to 7 years (that is, R 14 to R 20 per annum). However, in most cases, these latrines have not been installed for a long enough period to require emptying, hence actual practice in this respect is not yet known.

The point regarding a 'hierarchy of subsidisation' made by Bahl is worthy of mention here. It is not uncommon in South Africa that those with a lower level of service are required to pay more than those with a higher level of service. This is in direct contradiction to this principle and will cause obstacles to the implementation of rationalised tariff policies.

3.7 Illustrative domestic water and wastewater tariffs

a) Durban Corporation - water-use related wastewater tariffs

Durban's wastewater billing was based on property evaluation, with typical monthly bills having the following orders of magnitude:

high income:	over R 30 per month
middle income:	R 12 to R 30 per month
low income:	less than R 12 per month

Bye-laws for the Durban municipal area have recently (early 1993) been promulgated which allow for the billing of wastewater on the basis of direct water consumption. For residential properties, the wastewater tariff will be based on 60% of the monthly water consumption, at a rate of about 80 c/kl for wastewater treatment and a water tariff of R 1.50 c/kl (1993/94, VAT inclusive).

Typical monthly water and waste water bills under the new system, are illustrated in Table 24.

Under the old system, a household living in Chatsworth, for example, might only have paid R 2 per month for wastewater services. If this household uses 20 kl of water per month, then the new wastewater bill would be about R 10 per month.

The water tariff in Durban is a straight consumption tariff at R 1.50 per kl (1993/94, VAT inclusive).

Table 24: Direct wastewater tariffs in Durban, 1993 (Vat inclusive)

Water consumption kl/month	Water bill R / month	Wastewater bill R / month
5	R 7.50	R 2.40
10	R 15	R 4.80
20	R 30	R 9.60
30	R 45	R 14.40
40	R 60	R 19.20
50	R 75	R 24.00
60	R 90	R 28.80

b) Johannesburg - property related wastewater tariff

Payment for wastewater services by residents in the Johannesburg City Council area is based on property size. A typical middle income resident pays of the order of R 20 to R 40 per month.

The tariff structure used for water is a straight consumption tariff (the same as for Durban) at 166 c/kl (domestic tariff, VAT inclusive). During the drought restrictions, a stepped tariff was introduced, but the tariff reverted to normal once the drought had broken. The Water Department has recommended the implementation of a stepped rising block rate tariff, but the Councillors have declined to implement it, being worried about their constituencies' response. However, feedback from consumer discussion groups was that they would prefer stepped tariffs to water restrictions.

c) Cape Town - block rising rate water tariff

All consumers in the Cape Town City Council area pay a water tariff which increases with water consumption. The current domestic tariff structure (implemented in July 1993) is shown in Table 25.

No separate wastewater tariff is levied in Cape Town. Income for wastewater comes out of the general rates and services account.

Table 25: Water tariffs in Cape Town (July 1993)

Tariff structure:		
Fixed quarterly charge	R 5	
Consumption tariff:	Tariff (c/kl)	
0 - 30 kl/quarter	96	
30 - 100 kl/quarter	147	
> 100 kl/quarter	185	
Typical monthly accounts:		
Consumption (kl/month):	Account (R / month)	Average tariff (c/kl)
5	6.70	134
10	11.50	115
20	26.20	131
30	40.90	136
60	91.30	152

Note: figures inclusive of VAT.

d) East London - wastewater costs higher than water costs

In contrast to Durban, where water tariffs are higher than wastewater tariffs, East London has the following typical water and wastewater tariffs (middle-income areas):

Water tariff (1993/94):	1.11 c/kl (incl VAT)
Typical middle income consumption:	20 kl/month
Typical monthly water bill:	R 22 per month
Typical monthly wastewater bill:	R 30 per month

The reasons for this are that bulk treated water costs are relatively low as there has been very little capital development for a number of years; on the other hand, there has been recent significant capital investment in wastewater conveyance and treatment infrastructure. Durban, for example, are able to discharge a significant portion of their effluent out to sea with minimal pre-treatment.

e) Port Elizabeth - tariffs used to penalise consumption

Port Elizabeth has experienced a number of severe droughts in the recent past. During these periods it was necessary to enforce strict water restrictions. This was accomplished through implementation of very steep block rising tariffs.

The Port Elizabeth Municipality has three tariff schedules:

A Normal
B Water shortage, but not emergency
C Emergency

The tariffs (inclusive of VAT) for these schedules are summarised below: (1992/93)

A: Normal	c/kl
Domestic	127.6
Commerce	127.6
Industry	127.6
B: Water shortage	
Commerce	182.6
Industry	166.1
Domestic	
First 0.4 kl/day	127.6
Next 0.6 kl/day	232.1
Next 1.0 kl/day	287.1
Additional	363.0
C: Emergency	
Commerce	182.6
Industry	166.1
Domestic	
First 0.5 kl/day	159.5
Additional	**3630.0**

The emergency tariff was applied during the period 10 February 1992 to 5 August 1992 because of the drought.

f) Bloemfontein - Mangaung

Typical wastewater treatment costs for middle income residents in Bloemfontein is around R 40 per month. A straight consumption tariff is paid for water of 141 c/kl (1993, VAT inclusive).

In Mangaung, the neighbouring black local authority area, the following tariffs were promulgated for 1991/92:

Water:

Fixed maintenance fee:	R 5 per month

Water consumption:

Standpipes:	R 6.55 per month
Unmetered on-site:	R12.05 per month
Metered:	120 c/kl

Sewerage:

Flat charge:	R 6.60 per month

All services:

Communal water:	R 50 per month
Unmetered water:	R 56 per month
Metered water:	R 37 per month (excludes water consumption)

An interim arrangement has been agreed upon whereby R 15 per month for all services (including water consumed) is levied (and hopefully paid) until an 'affordable tariff' has been negotiated. This interim arrangement was negotiated between the Town Council and the civics in April 1993.

The actual payment of service charges was estimated to be about 20% of service charges levied prior to the interim agreement.

g) Warmbaths / Belabela

Warmbaths / Belabela in the Northern Transvaal was established at an underground warm spring and has a population of about 4 500 in the white local authority area and 25 000 in the black local authority area. Typical water consumptions and monthly water and wastewater bills in the respective areas are shown in Table 26.

Table 26: Warmbaths / Belabela - water and wastewater tariffs (1992/93)

	Warmbaths	Belabela
Population	4 500	25 000
Water consumption	70 kl / month	12 - 15 kl / month
Water tariff	97 c/kl	100 c/kl
Monthly water bill	R 68 per month	R 12 to R 15 per month
Wastewater bill	R 22 per month	
General services		R 38 per month

Note: figures inclusive of VAT.

h) KwaZulu - uneconomic tariffs

Residents in KwaZulu administered areas pay the following tariffs for services:

Full services[7]: R 25 per month (all services)
Basic services[8]: R 12 per month (all services)

In Umlazi (15 km south of Durban City centre), the cost of bulk treated water purchased from Umgeni by KwaZulu for supply to the township was R 1.24 per kl (incl VAT) in March 1993. This cost excludes administration costs (eg meter reading) and reticulation maintenance costs.

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7 Full services = full waterborne sanitation, house connection, tarred roads, refuse collection.

8 Basic services = on-site sanitation, communal standpipes, refuse collection by skip.

i) Inanda - ramifications of widely varying tariffs

Inanda, a densely settled area on Durban's northern urban fringe, about 24 km from the city centre, is a complex mixture of formal township, informal and squatter settlements. The area is governed by two governments (South Africa and KwaZulu) and different departments within these governments. The result is that the level of service provided and the rate of payment for these services is highly variable over short distances. For example, a household could pay anything between 35 c and 280 c per kl (assuming monthly consumption of 3.2 kl per month per household), depending on which area it lives in and which government agency provides the service. Serious anomalies arise from this, for example:

- Many people in Inanda are required to pay more (per kl) for their water than communities elsewhere in Durban with much better levels of service.

- Within Inanda, communities with lower levels of service have to pay more for their water that neighbouring communities with much higher levels of service.

- Communities in the RSA portion of Inanda are required to pay more for their water than communities with the same level of service in neighbouring KwaZulu areas.

In general, the level of payment for services in these areas is very low, which is understandable in the light of the above facts.

j) Bester's camp upgrade - reluctance by communities to assume responsibility for payment

The Urban Foundation (a housing and development NGO) is in the process of project managing the upgrading of the squatter settlements of Bester's Camp, Ihlungwane, Ezimangweni and Mzomusha in the south-eastern corner of Inanda. There are an estimated 8 000 households living in this area.

A negotiated agreement was reached, between the communities and the project managers, to install water kiosks and public standpipes in the area.

Both kiosks and standpipes were to be controlled by the Water Committee, an elected body which would be responsible for collecting monthly levies from standpipe users and run the kiosks. According to the initial agreement with the Committee, the Urban Foundation would meter every standpipe and kiosk on a monthly basis and submit an account to the water

committee. The committee would pay the account from levies charged to specific standpipe users and from the 7 c per 25 l for which water is sold from the kiosks. The Urban Foundation would then pay the provincial authority which supplies the bulk water.

This system was seen as an improvement to the uncontrolled standpipe system in neighbouring Inanda Newtown, which the provincial authority refused to have duplicated despite it being the community's initial preference. It was hoped that with the water committee acting as water bailiffs, and through more localised metering, payment for water would improve.

However, when the system began to operate, the Water Committee disappeared, as did the co-ordinating Development Committee which was negotiating with the upgrading planners. Communication between the community and project management subsequently broke down completely as internal conflicts in the community caused unstable leadership.

In recent negotiations aimed at breaking the deadlock in the upgrading process, low tariffs in KwaZulu were given as the main reason for resistance to paying the much higher levies and kiosk fees. The decision by the provincial authority not to cut off water supply to the area despite community non-payment of accounts was seen as proof by the community that water need not be paid for.

k) The Winterveld - complex tenure arrangements penalising the poor

The Winterveld, situated about 45 km north west of Pretoria, is a densely settled area in Bophuthatswana comprising about 250 000 people, two-thirds of which could be classified as functionally urban, with the breadwinners of the households commuting on a daily or weekly basis to Pretoria and vicinity. The Winterveld is unique in that plot owners have held free-hold title over the land throughout the apartheid era. Average plot sizes in the more densely settled south eastern portion are 4.2 ha and an average of about 40 families live on each plot, renting the land from the plot owners. Although piped water has been supplied to the area, only a very small percentage of plot owners have connected for various reasons, amongst which are the high connection fee, cost of reticulating inside the plot, difficultly in controlling distribution of water to tenants and cost recovery, and limitation on amount of water able to be supplied per connection.

In the absence of piped water connections, water is obtained from ground water sources controlled by the land owners and residents pay between 15 c and 30 c per 20 litres (R 7.50

to R 15 per kl). This is the most expensive charge found during the course of this study. Water is available from the already installed underground pipe system at the following tariffs:

- Consumption up to 20 kl/month = 54 c/kl
- Consumption over 20 kl/month = 92 c/kl

Due to their inability to connect directly to this water source at present, tenants are paying a high price for their powerlessness. It should be noted that a tariff that recovers actual supply costs would probably be in excess of R1.50 per kl, which is still much lower than that paid by most resident for the existing inadequate supplies.

l) Khayelitsha - a mixture of service levels and tariffs

Khayelitsha, one of the major black local authority areas in Cape Town has a mixture of service levels and tariffs:

Water:

Communal standpipe:	R 3 per month
Unmetered yard tap:	R 16 per month
Metered connection:	96 c/kl up to 30 kl/quarter
	114 c/kl above 30 kl/month

Sewerage:

There is no separate sewerage tariff, instead, a general service fee of R 36 for all services (excluding water) is levied. Where wastewater services have been formally provided, this has been full waterborne sanitation. Some areas are serviced with bucket collections systems in the interim, prior to services installation.

m) Soweto

The tariffs policies applied in Soweto during the transitional phase are likely to have an important impact on tariff policies nation wide. Negotiations over an acceptable tariff have been in progress for over two years. It seems likely that a flat rate service tariff of about R 45 per month for all services will be agreed upon for implementation in the transitional phase. The current total costs of services provision is estimated to be about R 300 per formal residential site per month and thus significant cross-subsidisation will be necessary,

at least in the short and probably medium term. More detail on service costs and tariffs has already been provided in Section 2.2.c).

PART C

CAPITAL INVESTMENT IN WATER SUPPLY AND SANITATION

1. INTRODUCTION

1.1 Aims

The aims of this part of the report are:

- To provide an overview of the organisations involved in the capital funding of new water supply and sanitation services.
- To show how investment decisions are made in terms of deciding priorities, amounts and geographic location.
- To review policy with respect to the capital funding and physical implementation of new water and sanitation services.
- To illustrate typical funding arrangements and depict the spacial distribution of funding.

1.2 Section outline

These topics will be discussed under the following headings:

- Context and definitions: The relationship between services and housing.
- Global estimates on present levels of capital funding.
- The role of the provincial authorities.
- Other major national funding. (IDT, Development Bank of Southern Africa).
- New housing initiatives
- The funding of bulk infrastructure

1.3 Context and definitions

a) Relationship between water and sanitation services and "housing"

It is useful, when dealing with the capital funding of services, to distinguish between the two components of water and sanitation services, namely bulk and connector services, and internal services, as these may be funded in very different ways. The definitions for these have already been given in Part A, Section 1.2 (a).

The internal service components of water and waste services are intimately related with "housing".

In the case of economic housing provision, that is where the household pays the full cost of the housing package, the normal funding arrangements are:

- Development cost: The household purchases a house / piece of serviced land. Included in the purchase price is the unit cost of the development of internal services (local roads, stormwater, water, sewer and electricity reticulation). The purchase price sometimes includes some contribution towards connector infrastructure costs. The extent of this contribution depends on local institutional arrangements.

- Connection cost: The household pays a connection fee to connect to the wastewater, water and other services. These costs are also usually included in the purchase price.

- Consumption[9] cost: The household pays a tariff for the consumption (use) of water. The costs of bulk water infrastructure development is incorporated into the water tariff. The extent to which connector infrastructure costs (eg local service reservoirs) are also recovered through the tariff is dependent on local policies.

- The payment for wastewater services are usually made in one of the following ways:

  - A general property tax, where the tax is related to property value. (In this case the cost of the wastewater service is not known to the resident, as it is treated as a general service).

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[9] Consumption here refers to total water usage rather than consumptive usage. Water resource professionals distinguish between consumptive and non-consumptive use, where the latter refers to water which is made available again to the water cycle as return flow (usually through the sewerage system).

- A separately itemised rates bill, where the cost of the wastewater service is usually related to either property value or property size / frontage.
- A trading service charge dependent on the amount of the service consumed (usually related to water consumption).

Whichever payment system is used for wastewater services, the local authority or agency managing the service usually aims to recover the cost of maintenance and operation as well as the cost of bulk and connector infrastructure development through the recurrent income raised in this manner.

It should be noted that, in most instances of 'economic' housing development , households have seldom had to pay the full costs, especially of the bulk infrastructure services. This is because the burden has been shared by commerce and industry who have significantly cross-subsidised (wealthy) households in white local authorities (see Thompson, 1992)[10]. In the future, with the unification of the cities, this cross-subsidisation will be shared over a much broader base encompassing low-income households.

In the case of sub-economic housing, that is, where the household cannot afford to pay the full cost of the housing package, the funding arrangements are more complicated. Grant and concessionary loans are made available through a number of different channels, each applying its own policy. The way in which bulk infrastructure is developed for these areas and costs recovered also differs widely. These arrangements are discussed in more detail in the following sections. However, global estimates of current capital funding in the housing and water and sanitation sectors are first provided as a context for this discussion.

[10] It is a fact that all households in white local authority areas are wealthy in comparison to their black local authority counterparts. Because of the structure of the apartheid city, rates from industrial and commercial property and surplus income (i.e. income over and above actual cost of provision of services) from electricity and water consumption have almost exclusively benefitted households living in white local authority areas through reducing their rates burden.

2. GLOBAL ESTIMATES OF CAPITAL FUNDING

2.1 Introduction

Reliable and comprehensive recent global estimates of expenditure on housing in general, and water and sanitation services in particular, are not readily available. Various estimates do exist, and are summarised here. The intention is to place an order of magnitude on current capital expenditure levels, to show the major channels through which the funding takes place and to illustrate the close relationship between housing and water and sanitation services expenditure.

2.2 Expenditure on housing and related services

The most recent comprehensive attempt to quantify expenditure of housing and related services was done by the De Loor Commission in 1992. A summary of their analysis is presented in the data sheet overleaf and Table 27. Without an extensive and detailed study, it is not possible to estimate how much of this money was spent on water and sanitation services, however the figures give a clear indication of the order of magnitude spent and the institutions involved in housing expenditure.

The figures presented in the data sheet include loan finance and expenditure that may occur over more than one financial year.

In Table 27 the expenditure is consolidated (avoiding double counting and only taking into account expenditure in the financial year 1990/91) to reflect two aggregates: firstly, the annual capital appropriation from the central fiscus for housing and, secondly, housing expenditure of a capital nature by public sector institutions (including housing subsidies).

Appropriations by the central fiscus for housing amounted to R 1.6 billion in 1990/91, which accounts for approximately 2.1% of the state budget. The total expenditure on housing was, however, somewhat higher than this when the utilisation of other financial sources are taken into account, and amounted to R 2.9 billion in 1990/91.

DATA SHEET: EXPENDITURE ON HOUSING AND RELATED SERVICES (90/91)

CENTRAL GOVERNMENT

Department of Housing and Local Government (1990/91)	
Acquisition of land for internal services:	R 1m
First-time home buyers subsidy scheme:	R 39m
Loan redemption (National Housing Commission)	R200m
Interest on loans	R135m
Administration (housing related)	R 8m
The department received an ad hoc allocation of R342m from the sale of strategic oil reserves from the 91/92 financial year which was to have been utilised for the upliftment of disadvantaged communities by providing serviced sites.	
Own Affairs Administrations	
Housing finance and administrative support	R 22m
First-time home buyers scheme contribution	R 89m
Slums clearance	R 3.4m
Loan repayments	R 9m
Farm labourers housing subsidies	R 10m
Department of Development Aid (now abolished)	
Contribution to housing in old Trust areas	R 5.6m
Department of Foreign Affairs	
Budgetary allocation normally not project linked, however, expenditure on housing estimated as:	R247m
Department of Water Affairs	
Subsidies for bulk water and bulk water-borne sanitation services:	R 25m
Department of Finance	
Redemption and interest on various housing loans	R 64m
Department of Manpower	
Training subsidies to building contractors	R 38m

CENTRAL GOVERNMENT DEVELOPMENT FUNDS

Housing Development Funds	
Allocation from parliamentary appropriations via respective government departments:	R510m
South African Development Trust Fund	R277m
Local Authorities loans fund	
New loans	R103m
Grants	R 4.6m

CENTRAL GOVERNMENT CORPORATE INSTITUTIONS

South African Housing Trust	
Interest free loans from central government to trust	R445m
Development Bank of Southern Africa	
Loans for urban development	R258m
The Independent Development Trust	
One off allocation from Central Government	
Housing Capital Subsidy Scheme	R750m
Housing loan finance	R120m

REGIONAL AND LOCAL INSTITUTIONS

Provincial Administrations	
Four provinces capital expenditure	R 18.9
Housing administration costs	R 4.3m
Transvaal direct expenditure	R 11m
(Bridging finance to BLAs)	(R650m)
Self-governing territories	
Land, internal services, superstructures	R 82m
Bulk infrastructure and community facilities	R 83m
Housing administration costs	R 9m
Local Authorities	
Major portion of finance provided by respective Housing development funds already itemised. They also obtain funds from regional services councils/joint services boards, the Development Bank of South Africa, the Local Authorities loan fund and the private capital market. The last is not significant. All the other funds have already been counted.	
Regional Services Councils	
Direct provision of internal services	R416m
Bulk services	R 84m

Source: de Loor Commission

Table 27: Aggregate capital expenditure on housing, 1990/91

Institution	Appropriations by the Central Fiscus	Expenditure by the public sector
	R m	R m
Central Government Departments	224	224
Housing Funds	510	887
Local Authorities Loans Fund	-	103
South African Development Trust Fund	175	175
Provincial Administrations	30	30
Self-governing territories	145	145
TBVC states	247	247
South African Housing Trust	-	195
Development Bank of Southern Africa	258	258
Regional services councils (and JSBs)	-	590
TOTAL	1 589	2 854

Notes: 1. Local Authorities are included under other institutions.
2. The fiscal impact of IDT housing expenditure and the Strategic Oil Fund ad hoc allocation are not included as their impact will only be reflected in 1992 and 1993.
3. The DBSA amount excludes loans already included under other institutions.

Source: De Loor Commission Report, p174.

2.3 Expenditure on water and sanitation

Information prepared by the Central Statistics Service for 1990/91, gives the breakdown of general government capital expenditure between housing, water services and "sewerage and sanitation". This data is shown in Table 28. Further information is presented in Appendix 1, Table 1.

This data excludes all expenditure reflected in local authority trading accounts and is therefore not comparable to the De Loor Commission data. The data does, however, show the total capital contribution to housing and water and sanitation derived from general national and local tax revenue.

Table 28: General government expenditure on housing, water and sanitation

	Housing	Water	Sewerage and sanitation
	R million	R million	R million
Capital expenditure	341	385	363
Capital transfers	125	0	0
Loans and advances	1	0	0
TOTAL	467	385	365

2.4 The relationship between bulk and internal services costs

An indication of the relationship between bulk infrastructure and internal services costs is provided here to show that both of these costs are significant and are roughly equal in proportion to each other. Thus any discussion of capital investment in the water and sanitation sector must also concern itself with investment in the "housing" (internal services) sector.

van Ryneveld (1991) calculated the following capital cost breakdown between bulk and internal components of services: (full level of service assumed)

Table 29: Bulk - internal services cost breakdown (van Ryneveld, 1991)

1991 Rands	Bulk	Internal
Water	R 2 400	R 500 - R 1 500
Sanitation	R 2 000	R 1 500 - R 3 000

The costs are current replacement costs. They are also "at capacity" costs, that is, no allowance is made for under-utilisation. The capital costs of bulk infrastructure costs are normally included as part of the running costs for provision, that is, capital redemption is included in the tariff. Expressed as a one-off cost, the cost appears higher than if expressed as an ongoing consumption related cost.

3. THE ROLE OF THE PROVINCES

3.1 Introduction

This section outlines the role of the National Housing Commission and the four Provincial Administrations in funding water and sanitation services. The Commission and the provinces play a major role in the funding of both bulk infrastructure and internal services in black local authority areas. Their role is thus discussed separately here.

The National Housing Commission was set up to administer the National Housing Fund, a primary conduit of government funding of housing and related infrastructure services. The policy of the National Housing Commission (NHC) is set out in the Housing Code. Key points of this policy are summarised here. Thereafter, the general role of the provinces in administering the implementation of NHC funded projects is reviewed. Regional differences are pointed out where appropriate.

Although the practices as set out in the Code are likely to change in the near future as a result of current negotiations at the National Housing Forum, the Code still determines current practice by the four Provincial Administrations. Also, the Provinces are likely to form the core bureaucracy of any future regional housing administration (in what ever form it takes), and hence it is useful to gain an insight into previous practices, as these will undoubtedly influence future roles.

3.2 National Housing Commission Policy

a) Introduction

This section highlights some pertinent points of the National Housing Code, the policy document of the National Housing Commission (NHC) which governs the financing of housing and infrastructure projects financed from the National Housing Fund, the main conduit for state funding of housing and related infrastructure. These highlights are taken primarily from a precis of the Housing Code prepared in draft form by Van Niekerk Klein and Edwards for the Independent Development Trust (IDT).

b) Constitution of the NHC

The members of the NHC are appointed by the Minister of Local Government and National Housing. The budget of the NHC is decided by inter-departmental committees comprising the Department of Local Government and Finance, State Expenditure and Finance. There are seven regional commissions, namely, one for each province and one for each "Own Affairs" administration. These are also appointed by the Minister.

c) Functions of the NHC

In terms of the Housing Act (Act 4 of 1966), the NHC may:

- Execute housing projects directly, or through black local authorities (BLAs).

- Grant loans to individuals.
- Subsidise individuals bonds at building societies / banks
- Grant loans to local authorities for land purchases, installation of internal services and construction of housing
- Advance funds to local authorities to enable them to grant loans to housing utility companies.
- Grant loans to housing utility companies.
- Grant loans for the provision of bulk/external services

d) Allocation of responsibilities

The Director General of Local Government and Housing and the provincial administrations are responsible for:

- The administration of the National Housing Fund (NHF).
- Technical and professional advice to local authorities.
- Evaluation of loan applications.
- Provision of standard plans and specifications.
- Drafting of amended legislation setting out government policy on housing.

The National Housing Commission:

- Formulates policy with respect to loans.
- Considers all applications for funds.

Regional committees of the NHC:

- Approve loans.
- Determine rental amounts or selling prices.
- Approve tenders.
- Approve expenditure on community facilities.

e) Typical loan conditions

"Economic" 11.25% interest (Nov 1992), 30 years repayment
"Welfare" 1% interest, payment over 40 years

f) Strategy regarding services / housing

The NHC generally provides money for internal and external services and community facilities. Housing structures are regarded as the responsibility of the individual.

g) Service standards

The NHC specifies detailed standards of the levels of service to be developed for each loan application. The general policy is as follows:

Table 30: Temporary sites - level of service policy

Temporary sites:	
Size:	63 to 77 m²
Water	From a water cart or, if more economical, borehole and hand pump or standpipe (within 150 m radius)
Sanitation	1 pit latrine or 1 bucket per site
Stormwater	Partly lined open drains

Table 31: Formal development - level of service policy

Formal development in BLA areas (minimum service levels)	
Size	250 - 360 m²
Water	Standpipes or kiosks (within 150m), 15 l/minute maximum, but developed for final system of 5 l/minute/site with metered connection.
Sanitation	1 VIP pit latrine per site (if soil suitable). Domestic wastewater in French drain on site. (Owner must install pit latrine under supervision of local authority
Stormwater	Partly lined open drainage

Although on-site sanitation is recommended by the National Housing Commission in the case of temporary sites, and is stated as a minimum for formal development, in practise they regard waterborne sanitation as the only acceptable permanent sanitation solution.

Loans

Concessionary loans are usually granted to families where the breadwinner earns less that R1 000 per month. Monthly instalments are calculated as a percentage of the borrowers monthly income and are subsidised by the NHC. The higher the monthly income and the higher the loan amount, the higher the percentage repayment. For example, a breadwinner earning R 500 per month will be required to pay 4.5% of his income on a R5 000 loan, and 15% of his income on a R20 000 loan. A person earning only R 100 per month would be required to pay 1% of his income on a R1 000 loan.

3.3 Provincial administrations

a) Introduction

The provincial administrations are involved in administering the National Housing Fund and projects funded by this fund. In addition, the provinces also have budgets for capital expenditure in the ex-South African Development Trust Areas, previously administered by the now defunct Department of Development Aid.

b) Funding available to the Provincial Administrations

The major share of funding available to the Provincial Administrations for the development of infrastructure is from the National Housing Fund (NHF). This fund receives most of its money from a direct allocation from the national budget each year. In recent years, in view of the housing and services crises, and because of socio-political imperatives, this amount has been supplemented by moneys from the Privatisation Fund and the Sale of Strategic Oil Reserves Fund.

Actual amounts allocated to the NHF are summarised in Table 32.

Table 32: Allocations to National Housing Fund (R million)

NHF Fund source	90/91	91/92	92/93	93/94
National budget	231	267	359	302
Privatisation Fund	103	119	-	-
Sale of Strategic Oil Reserves Fund		103	347	
TOTAL	334	489	706	302

Note: All figures in nominal Rands (million).

In addition to these capital funds, a revolving fund also exists, which received allocations in the order of R 15 million to R 20 million per annum in the years 1991/92 to 1992/93. However, this fund is being phased out.

It should also be noted that these allocations do not match actual expenditure as difficulties have been experience by the Provinces in spending the full amounts allocated each year, and there has thus been a carry forward of unspent funds from previous years. As an illustration, budgeted and actual expenditure for 1992/93 by the Transvaal Provincial Administration is given in Table 33, which shows that the TPA could only spend about 50% of the budgeted amount for 1992/93.

Table 33: Budgeted and actual expenditure, Transvaal Provincial Administration

Source of TPA Funds	Budget (92/93)	Expenditure (92/93)	%
	R million	R million	
National Housing Commission	216	131	61
Sale of Strategic Oil Fund	152	71	47
Privatisation Fund	28	3.6	13
Consolidation Fund	36.7	2.7	7
Squatter Fund	0.8	0.3	41
Land Acquisition Fund	35.6	17.8	50
TOTAL	469	226	48

3.4 Determination of priorities

a) National level

The National Housing Commission has seven sub-commissions, one for each province and one for each of the "Own Affairs" Administrations in the Tri-cameral Houses of Parliament. These sub-commissions each submit a budget of requirements for their area. Allocation between the sub-commissions is decided by the National Commission, based on these submissions, historical allocations of the budget, and other factors, such as political considerations. No rational criteria for allocation of funds between provinces and "Own Affairs" administrations exist.

b) Provincial level

The allocation of funds is decided by each sub-commission, housed in the respective provincial administrations. The way this allocation is done differs by province. The Cape Provincial Administration (CPA) have developed a "mathematical" method for deciding project priorities. This method is also being followed by Natal Provincial Administration (NPA). The Transvaal Provincial Administration (TPA) priorities appear to be decided more subjectively, with political considerations playing a more important part than for the other provinces. The TPA method is prioritisation is roughly as follows: (see Appendix 2, Figure 25 for diagrammatic representation)

- Project requests are made by black local authorities to the regional TPA office.
- Technical people at the regional office also prepare project proposals for TPA directly administered areas.

- Initial prioritisation of projects is done by the regional office and the prioritised list is submitted to head office (Physical Development Directorate).

- Prioritised lists from the regional offices (4 regions) are consolidated and reviewed by head office (Chief Directorate of Physical Planning).

- Final allocations are made by the NHC (Transvaal sub-commission) housed in the Urbanisation Directorate at TPA head office.

In practice, actual project funding at the end of the financial year is often quite different from that originally planned. This is largely the result of political considerations impinging on the way in which the money is spent. For example, Sevenfontein (an informal settlement near Johannesburg) might not have received an allocation of money, but because of its high political and public profile, money would have been diverted from other projects to address this problem. The CPA has attempted to make the allocation process more objective by introducing a mathematically based weighting system described in the Working Paper 4, "Cape Town metropolitan area".

c) Allocation of funds by project type

Data for all of the provincial administrations on the allocation of funds was not readily obtainable. Information supplied by the CPA and TPA are therefore supplied for illustrative purposes. The information is based on budgeted expenditure.

Table 34: Capital Development Programme - Cape Provincial Administration

Category	93/94	94/95	95/96	96/97	97/98
(to nearest R million)					
Land	12	24	23	16	6
Town planning	9	5	7	3	1
Survey	5	7	11	7	4
Bulk services	41	71	84	106	80
Internal services	254	230	135	188	144
Housing	19	119	174	173	194
Community facilities	1	0	59	83	112
Upgrading	17	3	66	22	25
Sports facilities	0	4	33	22	46
Electricity	5	19	47	24	13
TOTAL	363	484	639	645	627

Table 34 presents a "wish list" of the capital expenditure requirements based on identified and projected capital development needs for the Cape Province. It is likely that allocations are likely to be less than this and that hard decisions about which projects to give priority to will have to be made.

The above development programme reveals that expenditure on internal services development is the major priority, accounting for between 21% and 70% of proposed expenditure over the next five years, but that current funding levels of about R 250 million will drop to around the R 150 million mark. Bulk services expenditure is also significant, at present around R 40 million, and it is proposed that this be increased to between R 80 million and R 100 million per year. The relatively small amounts allocated to upgrading (with the exception of 1995/96) would appear to be a matter of concern.

Data for the Transvaal Provincial Administration for 1992/93 is shown in Table 35. A similar pattern is evident with about 35% to 40% being spent on internal services. Expenditure on bulk services was about 15% of total expenditure.

Table 35: Capital Development Allocations - Transvaal Provincial Administration

Category	Budget	%	Expended	%
(to nearest R million)				
Land	83	18	52	23
Town planning and survey	18	4	11	5
Bulk services	48	10	34	15
Internal services	174	37	90	40
Housing	4	1	3	1
Community facilities	.5		.2	
Upgrading	11	2	2	1
Electricity	5	1	2	1
Rudimentary services	30	6	14	7
Other	94	20	19	8
TOTAL	469	100	227	100

3.5 Variations in policies on level of service by province

a) Cape Province

The CPA appear to follow the NHC guidelines closely, except that they have an additional level of service for informal towns in planned areas. The level of service policy with respect to these areas is summarised below. It is not clear whether this is official NHC policy or not.

Table 36: Informal towns - level of service policy

Informal towns in designated areas:	
Size	220 m^2 (minimum = 170 m^2)
Water	Sale of water from points within easy walking distance
Sanitation	1 VIP pit latrine per site (if soil suitable). Occupant must provide super-structure. Domestic wastewater in French drain on site.
Stormwater	Partly lined open drainage

Transvaal Province

The TPA endeavours to install the full range of services at a minimum level to suit the affordability level of a specific community. In geologically stable areas they will generally install pit latrines or aqua-privies.

The TPA normally undertakes sample surveys of the population to determine affordability levels. Households with an income of more than R 1 000 per month do not qualify for TPA sites.

Average costs of serviced sites are in the region of R 5 000 each.

3.6 Financial arrangements for NHC serviced sites

It is NHC policy to sell the stand and transfer ownership to the occupant. The selling price is calculated as the sum of the cost of internal services and the raw land cost divided by the number of stands. The intention is for the individual to take up a "loan" with the local authority for the purchase of his stand. Payment for the purchased stand should theoretically cover the capital loan from the NHF (11% nominal interest over 30 years) together with the rates for services rendered or used. The payments are, however, determined by a sliding scale according to household income and because of the generally low affordability levels, both the interest and a large proportion of the capital are in fact subsidised by the NHC.

In spite of low monthly repayments (of the order of R 20 to R 30 per month) the recovery rates are very low. The rate of payments in the Transvaal area in "less formal" townships is close to zero. Rates of payment in other areas varies, but are generally not good. The CPA reported that the rates of payment in the Cape Province varied between 3% and 95%.

The poor payment record can attributed to:

- Occupants are apparently confused as to whether they are "renting" or "buying" their stands.
- The payment of a single amount including charges for services implies that consumer boycotts of service charges also stops the repayment of the capital contribution towards the stand.
- Poor administration of accounts.
- Low affordability levels.
- Perceived sub-standard services.
- The individual cannot see any benefit in making regular payments ("non-payers" get exactly the same services as "payers" and are not evicted).

4. OTHER MAJOR NATIONAL FUNDING

4.1 The Development Bank of Southern Africa

The Development Bank of Southern Africa (DBSA) was established by the South African Government in 1983 and became fully functional in 1985. Although it was set up with the possibility of becoming a truly Southern African development bank, its early role was primarily to fund projects in the homelands, whose governments were participating shareholders.

Towards the end of the 1980s, the DBSA re-orientated itself to function in non-homeland South Africa, particularly serving Black Local Authorities. Initially loans made by the Bank to these authorities were guaranteed by the South African government but this guarantee arrangement was withdrawn and the Bank was then exposed to substantial risk due to the poor financial position of most of these authorities.

In the early 1990s the DBSA had difficulties in making loans and disbursements and commitments declined, as indicated in the table below.

Table 37: Development Bank of Southern Africa: Funding commitments

	Disbursements R million	Commitments R million
1989	500	1 150
1990	750	1 215
1991	980	450
1992	763	300
1993	449	1 754

This situation of declining loans, has been related to the deterioration in the ability of both homeland governments and Black Local Authorities to act as responsible borrowers.

In 1993 the situation changed substantially with a dramatic increase in loan commitments. This relates to new borrower arrangements, particularly in the urban and urban infrastructure sectors where Regional Services Councils and "white" local authorities - financially stronger borrowers - have been taking out loans, often for projects in Black Local Authority areas.

The majority of the funding disbursed by the Bank is in the form of loans. For example, in 1993, disbursements were made up as follows:

Loans	R446 m
Grants	R3 m

However, although the grant funding portion is small it has a significant impact on the way the viability of projects is assessed and on the way planning of projects is carried out: much of the grant funding in urban areas is for technical assistance and for urban development plans.

As legitimate and viable urban authorities become established, the DBSA will have an increasing role to play in making loan capital available for urban projects, including the provision of water and sanitation services.

a) Role in water and sanitation funding

Water and sanitation services funding in urban areas takes place under the Bank's urban and infrastructure divisions. Their share of lending in the Banks 1992 and 1993 financial years is as follows:

		1992	**1993**
Infrastructure:			
	(total):	37%	49%
	(rural):	27%	
	(urban):	10%	
Urban:		21%	18%
Urban total:		**31%**	

In the case of the infrastructure division, of the R114 million loans approved in 1992, 51% was for water projects and none were approved for sanitation projects. A loan of R40 million for the Lesotho Highlands Water Project represented 35% of the total approved.

Under the urban division, R64 million was approved in 1992, with an estimated 34% of this for water and sanitation components of urban projects.

Therefore, of the R300 million committed by DBSA overall in 1992, an estimated R80 million (27%) was for the provision of water and sanitation services.

b) Raising capital

The DBSA has raised capital through the four sources given below, together with the 1992 capital value:

- Share capital from the members governments of the Bank (R200 million).
- "Development funds": transfers made from time to time by the South African government from its annual budget. (R2 903 million).
- Borrowings on the South African capital market (R702 million).
- Borrowings on the international capital markets (Only one issue to date of German DM200 million in the form of 1992/1998 bearer bonds).

The Bank issues various bonds on the local market which are taken up primarily by insurance companies, pension and provident funds.

4.2 Independent Development Trust

The Independent Development Trust (IDT) was established in 1991 with a grant of R2 billion from the South African government. It was set up by Jan Steyn with an independent board of trustees, and has acted as a development financing institution in the fields of housing, education, health, rural development and job creation.

Under the housing portfolio, the IDT launched a major initiative in 1992 to provide capital subsidies to the poorest people in South Africa's urban areas (homelands included). A total of 100 000 subsidies of R7 500 each were allocated to 104 projects throughout the country in mid-1992. This has since been increased to 112 700 subsidies with a total value of R845 million.

On each of the 104 projects, developers and community based organisations interact to implement projects, with local authorities also being key parties to negotiations relating to

project conditions. In most cases the subsidy has been sufficient to cover the cost of a serviced site only.

This scheme has affected the way services, including water and sanitation, are delivered in South Africa, with new approaches introduced, including:

- A demand-driven orientation: decisions are taken at the local level with the community directly involved in decision-making.

- Private and NGO sector involvement: developers have been private companies, public and parastatal bodies and community-based trusts.

- Equity: the same amount is made available to all beneficiaries.

- Financial discipline: the amount is fixed and is only paid out once the services are complete and transfer of ownership has been made to the beneficiary by the developer.

The contribution of the scheme to financing water and sanitation services can be assessed based on a typical breakdown of costs for a serviced site, as follows:

Land, township registration and tenure delivery:	R1 000
Water supply reticulation:	R1 220
Sanitation, including toilet structure:	R3 130
Roads, stormwater and public lighting:	R2 150
TOTAL:	R7 500

The above figures include allowances for design, developer overheads, finance charges and VAT.

Based on these figures, expenditure on water and sanitation is 58% of the total subsidy amount. This is only used for internal services; a requirement of the IDT was that the subsidy was a housing subsidy and could not be used for bulk and connector services.

The rate of disbursement, and the proportion estimated to be for water and sanitation is given in the table on the following page:

Table 38: Independent Development Trust - Capital funding of urban services

	Investment by Developers R million	Disbursement by IDT R million	Water and Sanitation disbursement R million
1992	340	220	128
1993	340	250	145
1994	165	250	145
1995		125	72
TOTAL	845	845	490

A variety of service levels have been used on capital subsidy scheme projects, depending on local conditions and preferences. These can be divided into two major groups as follows:

- Water supply to yard taps and waterborne sanitation including toilet privy. (About 75% of sites).

- Standpipe water supply and on-site sanitation, typically ventilated improved pit latrines. (About 25% of sites).

5. NEW HOUSING INITIATIVES

5.1 Introduction

Much criticism has been levelled at both the National Housing Commission and Independent Development Trust programmes of capital investment in housing and services infrastructure reviewed in the previous sections. Some of these are highlighted below:

a) National Housing Commission and related conventional state funding for housing

- The funding is designated exclusively for areas within the Republic's boundaries, that is, it excludes the TBVC states.

- The funding mechanism was conceived within an apartheid framework, and the allocation of funds between "own affairs" administrations (whites, coloured and asian) and "general affairs" (for expenditure in black local authority areas via the provinces) was governed by vested interests. The result was that the own affairs administrations received a disproportionate share of housing funds at the expense of 'black' areas.

- The funding treated self-governing and South African Development Trust areas separately, with different policies governing these areas.

- In the case of the self-governing territories, housing was the responsibility of the homeland government. Numerous cases of poor administrative and financial control procedures have recently been highlighted by the Auditor-General and various investigative commissions. Funding arrangements with respect to housing and services have generally been inadequate in these areas.

- The South African Development Trust areas were, until recently, administered by the Department of Development Aid. This department had a particularly poor record with respect to proper administrative and financial controls, and has subsequently been disbanded. The department's functions have been transferred to the provinces, but these areas are still administered in terms of separate budgets and the original administrative proclamations governing these areas.

- The National Housing Commission funding approach is largely supply driven. The standards are fairly rigorously applied and communities have little leeway to taylor a services package to their own needs and preferences.

- There is opposition at the community level to some National Housing Commission funded schemes. This has often resulted in long delays in project implementation.

- The provinces have experienced difficulty in actually spending the funds allocated, partly as a result of the above mentioned point, but largely as the result of delays in land identification and township registration.

- The funding is orientated towards site and service schemes predominantly situated on the outskirts of cities away from employment opportunities. It is argued that this low-density development on the periphery (within the old apartheid land-use framework) will exacerbate the marginalisation of the poor, and place large on-going financial burdens on cities as the result of the need for subsidised transport services.

b) Independent Development Trust

- Despite the IDT's commitment towards seeking good site location, the extensive development of low-density serviced-sites, largely on the periphery, has given rise to similar criticisms to those levelled at the Housing Commission funded schemes.

- The exclusive funding of internal services has been criticised by agencies supplying bulk services who have had to bear increased financial burdens as a result.

- The amount of the capital subsidy has been criticised from two perspectives. Some believe the amount to be too small and does not allow for the building of the house itself, while others assert that it is too large to be economically sustainable.

- A major criticism of the scheme is that it was a once-off allocation of funds which was not linked to an ongoing programme. The two main consequences of this were the raised expectations from potential beneficiaries which were not met, and the lack of continuity in the construction and building sectors.

Because of these and other broader ranging political and institutional criticisms, new initiatives for a national housing programme have been launched.

5.2 National Housing Forum

a) Introduction

Matters pertaining to the formation and activities of the National Housing Forum are raised here because the effect of housing policy on water and sanitation services is significant. It was note earlier that approximately 50% of investments in water and sanitation services are directly related to housing.

The National Housing Forum (NHF) was established in the latter half of 1992. One of the major thrusts of the forum was to work towards creating a single housing policy and single housing structure in South Africa, through which all future funds could be channelled. To this end the forum negotiated with the government to jointly administer, at least a portion of the funds budgeted for housing in the 1993/94 budget year. An amount of R 500 million, with the possibility of further funding during the financial year was allocated by the government to this joint funding process. A housing accord between the government and the forum setting out a policy and implementation framework was developed in the first half of 1993. However, agreement on this accord was not reached. The major reason for this, it would appear, is that the 'non-statutory' parties in the forum were reluctant to enter into a formal agreement with the government on a housing policy, which might, because of its pragmatism in the light of budget and other constraints, be criticised by other parties for political gain prior to the proposed national elections. At present, negotiations are taking place concerning the administration of the R 500 million, and additional funds, through a restructured National Housing Commission.

Although the outcome of these negotiations regarding national housing policy are still far from clear, it is nevertheless useful to outline some of the principles that have been considered by the forum and which may form part of future policy.

b) Basic principles of a new approach

The principles of a new housing policy are likely to include:

- providing for security of tenure
- maximising individuals' freedom of choice
- maximising socio-economic benefits to the local community
- making a significant impact on the backlog in services in the short term

- ensuring sustainability of approaches in the medium and longer term
- effective state intervention and maximising sustained involvement from other non-state sectors
- active local community participation, skills transfer and empowerment
- equity, transparency and accountability in the administration of housing
- contribution by individuals to their housing needs according to affordability
- provision of a state subsidy to ensure a guaranteed minimum standard of housing

c) Minimum standards

The choice of the minimum guaranteed standard of housing has crucial implications for sustainability. No agreements on this have been reached. Various proposals have been put forward, for example:

- a R 7 500 capital subsidy for households or breadwinners earning below a set income (R 1000 per month?) which could guarantee a package of services and may, depending of costs of land and services, provide for a small amount to building materials.

- a R 10 000 to R 12 000 capital subsidy which would be able to make a more substantial contribution towards building materials.

- a guarantee of a core unit comprising at least one habitable room with potable water supply, water-borne sanitation and electricity. This would entail a guaranteed subsidy at the low end of the affordability spectrum of about R 18 000 per household, or perhaps more.

At the time of the break in negotiations relating to the housing accord, it appeared that the last option was the most seriously considered, but, no agreement on this was reached.

d) Capital subsidy approach

Based on the current stage of negotiations at the NHF, it seems probable that housing will be funded using an end-user capital subsidy. From the point of view of housing finance, this has the advantages of promoting a demand-driven approach, allowing for the involvement of the private sector, being simple to administer and being equitable.

The amount of the capital subsidy is still being debated but it will probably be sufficient to at least cover the cost of a serviced site with a fairly good level of service. If the subsidy is sufficient to also allow for building of a house, or part of one, it will be important that the proportion of the subsidy used for the serviced site be constrained as otherwise the level of service may be driven upwards unnecessarily.

The arrangement may well be that the subsidy will decrease with an increase in the income of the household, or with an increase in the price of the housing unit. Therefore people who are less poor, and who can afford a more expensive unit will get a smaller subsidy.

In order to maximise the advantages of the demand-driven approach, it will be necessary to ensure that the individuals for whom the subsidy is meant, have a primary say in what is done with the subsidy. Normally they would express their wishes through a community structure. A method proposed by the NHF for doing this is to require that compacts are established at local level as groupings between community, business and local authority interests. These compacts would identify and structure projects.

It has also been proposed that the projects would be carried out by "development entities" which would include community representation.

This approach has important implications for the water and sanitation sector as decisions relating to service levels will be taken "at the bottom", obviously subject to acceptance by the local authorities who will become responsible for managing the services in the long term.

As has been noted under the discussion on IDT's capital subsidy scheme, the capital subsidy approach does have drawbacks from the finance point of view. Notably it does not provide for the funding of bulk and connector services and social infrastructure. These have to be funded through separate channels if services are to be operational and areas being developed are to have the social facilities necessary to create viable urban areas.

6. FUNDING OF BULK INFRASTRUCTURE

6.1 Introduction

The previous sections have dealt predominantly with the "housing" component of capital investment in water and sanitation services. This section provides an outline of the various ways in which capital investment in bulk infrastructure is funded.

6.2 Water boards

The two larger water boards, the Rand Water Board and Umgeni Water, need to raise substantial amounts of capital annually for asset replacement and augmentation. They raise this capital through issuing fixed interest stock on the Johannesburg Stock Exchange, much in the same way that Eskom raises capital funds through its Eskom Stock. The water boards' stock is named Rand Water Board Stock and Umgeni Water Stock respectively, and currently trades at slightly above and below the Eskom stock rate respectively.

Umgeni's capital expenditure plan for the next five years (from 1993/4 onwards) totals R 1 350 million (R 270 million per annum). This figure includes the purchase of the raw water reservoirs, from the Department of Water Affairs for R 443 million which is expected to take place in the 1993/94 financial year (Umgeni Water, Annual Report, 1992/93). It is anticipated that all of this capital will be raised on the domestic capital market.

Over the next seven years (up to the year 2000), the Rand Water Board will require R 3.3 billion (R 470 million per annum) for its 1992 Scheme (R 1.7 billion) and the augmentation and replacement of existing capital assets (R 1.6 billion). Some of the capital will be raised on external capital markets.

The manner in which the other water boards raise capital finance was not investigated. Their capital requirement will, however, probably be significantly less than those quoted above for the Rand Water Board and Umgeni Water.

6.3 Regional Services Councils

Regional services councils have become important funders of bulk infrastructure services. Income for capital expenditure is raised through levies on local commerce and industry. The amount available for capital investment may be geared through using levy income to

repay capital loans raised (for example from the Development Bank of Southern Africa). However, most councils have been reluctant to gear their income, as this entails long term commitments to loan repayments. Only the Witwatersrand Regional Services Council, of those councils for which information was obtained, has used this mechanism to any extent, but, even in this case, the extent of gearing has been kept low.

An overview of regional services council finances is given in Appendix 1, Table 5 and is discussed in Part B of the report.

The investment programmes of a few of the larger regional services councils are outlined below for illustrative purposes.

a) Central Witwatersrand

The council's income from levies is estimated to be R 340 million in 1993/94. Total budgeted expenditure is R 733 million, with R 377 million of this comprising loans to be used for capital development.

Budgeted expenditure on projects of a regional nature is summarised below:

Urbanisation:	28	(areas outside local authority areas)
Sewerage:	201	
Water:	21.5	
Other:	28	
TOTAL	259	(35% of total expenditure)

Budgeted capital expenditure for <u>total</u> projects and services for 1993/94 (that is, assistance to local authorities for capital development and operation and maintenance, <u>and</u> projects of a regional nature) is:

Water:	94	
Sewerage:	207	
Roads and stormwater:	74	
Operation and maintenance:	51	
Other	84	
TOTAL	510	(70% of total)

In addition to the above amounts, an additional R 144 million (20% of total expenditure, and 42% of levy income) is budgeted to be made available to assist with operation and maintenance expenditure in black local authority areas. The ongoing practice of using levy income for operation and maintenance assistance will have an important affect on the amount of funds available for capital investment in infrastructure.

b) Port Natal - Ebhodwe Joint Services Board (Durban)

The total levy income for 1993/94 is estimated to be R 153 million, less than half that of the Central Wits Regional Services Council. Total budgeted expenditure for the same year is R 171 million, the difference being accounted for by other sundry income. The board has not employed any gearing in an attempt to increase the amount of money available for capital investment in infrastructure. This seems to be typical practice amongst most regional services councils and joint services boards.

Total expenditure on projects (capital investment) is budgeted to be R 115 million in 1993/94. This may be compared to Durban Corporation's "Durban Functional Region Development Account" to which Durban has pledged to make available R 100 million per annum. This money represents about half of Durban City's annual income from investments.

Expenditure on capital infrastructure over the period 1991/2 to 1993/4 was distributed as follows: (Total project expenditure = R 315 million over this period)

Roads:	31%
Water:	25%
Sanitation:	25%
Electricity:	3%
Solid waste:	2%
Other:	13%
TOTAL:	100%

A distinction between bulk and internal infrastructure and between urban and rural areas is not made in the budget speeches and annual financial statements.

c) Western Cape Regional Services Council

Income from levies amounted to R 168 million in 1991/92, and thus the council's income base is slightly larger than that of the Port Natal - Ebhodwe Joint Services Board in Durban.

In addition to this, the council also derives a substantial income from agency fees and support services provided (R 218 million and R 174 million respectively). However, this latter income relates to recurrent expenditure for the management, operation and maintenance of services in areas previously administered by the divisional councils. This income is not available for capital development of regional bulk infrastructure or internal infrastructure in black local authority areas.

It is not clear from the annual report how much was expended on capital development projects. The financial statements report a R 123 million contribution to a capital development fund, and it is therefore likely that this was the maximum amount made available for capital infrastructure development. No gearing of the levy income was applied to increase this amount, as far as could be ascertained from the financial statements.

6.4 'Core' metropolitan local authorities

The 'core' metropolitan local authorities have traditionally played an important role in funding and developing bulk infrastructure of a regional nature. Johannesburg City Council's involvement in regional wastewater treatment is a prime example of this. However, from a funding point of view the burden of this function has in many cases recently shifted to the regional services councils, with their establishment and assumption of regional responsibilities. For example, the Witwatersrand RSC has assumed the regional function for wastewater treatment and is thus responsible for raising capital for the development and upgrading of major wastewater treatment works and sewer outfalls. Previously, this capital was raised by Johannesburg City Council through its Consolidated Capital Development and Loans Fund. In the case of Johannesburg, although the financial responsibility has shifted, it still is largely responsible for the management and operation of the system, including planning and design. It does this on an agency basis for the Witwatersrand RSC.

Some metropolitan local authorities still retain responsibility for bulk infrastructure funding. For example, Cape Town Municipality manage and run major regional wastewater treatment works and also have responsibility for regional bulk water treatment and supply. Capital for the expansion of this infrastructure is raised by the City Council, primarily through its Consolidated Capital Development and Loans Fund (CCDLF). In the case of bulk water supply, a levy of 10 c/kl (1992/93) is raised on all water sold which is placed in a bulk water reserve fund. This fund is administered as part of the CCDLF by the council.

The 'core' metropolitan authorities as well as other larger white local authorities have not, in the past, experienced difficulties in raising the required amounts. The one potential problem has been the restriction placed by the Department of State Expenditure on the rate of increase in capital spending from year to year. This is, at present, limited to 10%, for reasons of inflation control. However, the Department of State Expenditure has granted exemptions from this limit in cases where the capital expenditure to be spent by a local authority is of a regional nature. For example, the proposed expansion of Cape Town's bulk water infrastructure in the near future.

The unification of metropolitan areas and the pooling of the tax base will have profound impacts on existing arrangements for raising capital. The significance and ramifications of this for the different cities in South Africa are only beginning to be explored. Existing trading surpluses, an important foundation on which the borrowing of moneys by local authorities is based, may be significantly reduced or negated. The ability to raise capital will depend on the financial health of the city, which in turn will depend to a large extent on the services policies adopted and whether or not these are economically sustainable. In this respect, the ongoing operation and maintenance costs are an important component of any investment programme.

6.5 Other "white" local authorities

The situation with respect to the funding of bulk infrastructure in other 'white' local authorities varies depending on local circumstances. Local authorities with a strong economic base are usually fairly autonomous in raising their own finance for bulk infrastructure expansion, making use of consolidated capital development funds and commercial loans. However, many experience difficulty financing major upgrades or expansions. The lumpy nature of investment in water and sanitation bulk infrastructure exacerbates these difficulties. Smaller local authorities are able to make use of a subsidy from the Department of Water Affairs for water supply schemes and wastewater treatment works. However, the total amount paid out by the Department of Water Affairs on these subsidies in 1990/921 was R 25 million, and this source of funds is therefore not significant. This subsidy policy was criticized by the De Loor Commission report titled "Housing in South Africa" (De Loor, 1992) on the grounds of equity and efficiency and is consequently under review. Local authorities may apply to the regional services council in their area for loans. The condition of the loan usually depends on the economic situation of the applying local authority, with those in a weak financial position often granted concessionary loans. The provinces may also assist in the funding of bulk infrastructure, making use of National

Housing Commission funds. However, they are only likely to do this where the bulk infrastructure is needed to provide services to the neighbouring black local authority areas.

Some local authorities have resorted to privatisation as a means of overcoming their difficulties in raising finance for major investment programmes. The management contract recently concluded by Queenstown, discussed in Part A of this report, is an example of this.

6.6 Black local authorities

Black local authorities are universally in a weak financial position and are unable to raise finance of their own accord. They are thus totally reliant on the provinces, regional services councils, neighbouring white local authorities or other funding sources for assistance with bulk infrastructure investment. In the late 1980s the Development Bank began making loans to black local authorities for infrastructure development, on condition they undertook institutional reforms which often meant strengthening the financial and administrative links between white and black local authorities. Initially these loans were guaranteed by the RSA government but when this stopped the DBSA was increasingly exposed to risk and reduced lending to black local authorities. At present there is an increasing trend of lending to RSCs and white local authorities for projects in black local authority areas.

6.7 Division of responsibility between developer and local authority

(Source: Bleibaum, 1992)

a) White local authorities (Provincial Ordinance)

The provincial ordinances set out responsibilities with respect to provision of services. In this aspect, there is very little difference between the four provincial ordinances. The township developer is responsible for the provision of all internal services and the local authority is responsible for the provision of all bulk and connector services. However, the ordinances recognise that some internal services are trading services where the tariff structure may recover a portion of the capital cost. Therefore, in some cases local authorities have to make a contribution to the township developer for the cost of the provision of internal infrastructure for trading services.

The payment of this contribution is normally linked to the level of development in the new township. The amount of the contribution is subject to negotiation between the township

developer and the local authority but generally represents the full capital cost for such trading services. For example, in the case of East London Municipality, the first half of the capital cost of trading services is repaid to the township developer once one third of the houses in the residential development are connected to the internal services and are occupied. The second half is paid once two thirds of the houses are connected and occupied.

On the other hand, some local authorities also require a contribution from the developer to the local authority towards the cost of external services. The extent of this is subject to negotiation between the local authority and the developer. The general principle is that the local authority wishes to recover from the township developer a contribution so that the balance of costs for new bulk services is equivalent to existing outstanding loan amounts of all external services. This is based on the argument that new property owners should accept the same loan burden as existing residents. In practice, capital contributions vary significantly between different local authorities depending whether or not they encourage new development. Some examples of bulk sewerage treatment contributions for four cities in the PWV area (September 1986) are:

Pretoria:	R 278	per stand
Johannesburg:	R 451	
Germiston:	R 2 900	
Verwoerdberg:		no capital contribution

It should be noted that developers will add this contribution onto the selling prices of the housing unit and hence the individual purchasing the unit has to raise the capital. In the case of poorer households it is arguable that this places an unnecessary burden on them to finance the capital requirements for bulk infrastructure.

b) Black local authorities

The township establishment procedures under the Black Local Authority Act (Act No. 102 of 1983) have been superseded by the Less Formal Township Establishment Act (Act No. 113 of 1991). In terms of Act 102, the developer was responsible for all internal services and the local authority for all external services. The act did not envisage any contributions to be paid by either party. However, in practice, most black local authorities were unable to provide bulk services to new developments as they were unable to raise the necessary funding for construction. Many of the residential developments in the black urban areas were therefore undertaken on the basis of a payment towards construction of bulk services of between R 250 and R 1 500 per stand. These costs were recovered by the developer in

the selling price of the stand. The net effect of this was that these stands tended to be more expensive to purchase compared to similar development in white local authority areas (ibid, p52).

Act 113 allows much more flexibility with respect to who pays for what services. The act only stipulates that the township establishment application must be supported by a report which has to indicate whether the services will be provided by the applicant or by any other agency.

Most of the IDT funded site and service projects have been undertaken in terms of this act with the general trend that the township applicant was responsible to pay for the provision of all internal services and the local authority responsible for all external services. This arrangement complies with the IDT stipulation that no portion of the R 7 500 capital subsidy may be used to contribute to the cost of bulk services.

c) Recommendations of the De Loor Commissions

Bleibaum (1992, p57) notes that the De Loor Commission makes recommendations that revenue earning services in new residential areas be financed by the supply authority and therefore costs of water reticulation (assuming it is metered and paid for) will have no fiscal impact on the provision of serviced land. The effect of this approach will be to increase the costs of water to enable the reticulation network to be extended. Bleibaum (ibid) notes that existing consumers may resist new development in this case.

AFTERWORD

This report has provided an overview of the status quo and existing dynamic of change with repect to the institutional and financial arrangements in the provision of water and sanitation services in the urban areas of South Africa. The report fulfills objective 1 set out in the Project Inception Document.

The overall demand for, and costs of, water and sanitation services to low-income urban communities are set out in a separate report in fulfillment of objectives 2 and 3 of the project.

These reports form the basis for the assessment of the existing arrangements in the light of future demands for new services, carried out in terms of objective 4 of the project.

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APPENDIX 1

OVERVIEW FINANCIAL DATA

Contents:

All data from Central Statistical Services and latest available. Direct references are provided in tables.

This data is discussed in Part B: Section 1 of the main report.

Appendix 1, Table 1: Summary of General Government Expenditure: from water and sanitation perspective, 1990/91

	Social Security and Welfare			Economic services		TOTAL
	Housing	Sewerage Sanitation	TOTAL WELFARE	State water schemes Other Water Services	TOTAL ECONOMIC	ALL EXPENDITURE
(All figures in R Millions)						
CURRENT EXPENDITURE						
Goods and services	516	948	28 757	292	4 118	58 961
Interest	77	132	475		294	13 345
Current transfers	132	2	7 924	48	5 135	13 334
Sub-total	725	1 082	37 156	340	9 547	85 640
CAPITAL EXPENDITURE	340	362	3 097	385	3 053	8 227
CAPITAL TRANSFERS	125	0	207		656	3 863
SHARES, LOANS AND ADVA	1	0	11		276	365
TOTAL	1 191	1 444	40 471	725	13 532	98 095
Central Government	186		14 937	302	5 951	48 782
Provincial administrations	4		7 018		1 546	9 386
Extra-budget accounts	163	6	1 997	27	1 545	9 825
Universities			3 708			3 708
TBVC states	31	32	4 119	209	1 989	8 624
Self-governing territories	4	35	5 014	139	970	7 191
Local authorities	803	1 371	3 677	48	1 532	10 578
TOTAL	1 191	1 444	40 470	725	13 533	98 094

Source: CSS: Statistical News Release P9141, Expenditure of the general government, 1990/91, January 1993
File: fin-gov1.wq1

Note: This data excludes expenditure of government enterprises (eg local authority trading accounts) and bodies such as the Water Boards.

Appendix 1, Table 2: Summarised financial data for all white local authorities, 1988/89

RATES AND GENERAL SERVICES		WATER		SEWERAGE Extracted from rates and general account		APPROPRIATION OF SURPLUS	GENERAL GOVERNMENT	WATER	ELECTRICITY	TOTAL LA ACCOUNT
INCOME	1988/89									
(All figures in R Millions)										
Sale of services		Sale of services				Surplus	867	183	923	1 967
Sewerage	628	Water	889			Transfers from general government to enterp	(140)	22	1	0
Other	1426	Other	137			Transfers from enterprises to general govern	659	(67)	(577)	0
Interest	1014	Interest	51			TOTAL	1 386	138	347	1 967
Transfers - private sector		Transfers - private sector	1							
Rates	1633					Appropriation of surplus				
Other	274									
Transfers - government		Transfers - government	2			Redemption of loans	425	58	125	657
Rates	155					Contribitions to capital outlay	207	14	30	260
Metropolitan Transport	276					Net additions to reserve and other funds	754	67	192	1 050
Other	49					TOTAL	1 386	139	347	1 967
TOTAL	5455	TOTAL	1080							
EXPENDITURE	1988/89	EXPENDITURE	1988/89	EXPENDITURE	1988/89					
Purchase of services	2437	Purchase of water	464.0	Purchase of services	571					
Wages	1011	Wages	123.0							
Other	1040	Other purchases	159.0							
Interest	0	Interest	141.0	Interest	151					
Transfers	28	Transfers		Transfers	5					
General government	71	rates	2.4	Rates	5					
		water research levy	6.7							
		bad debts	0.3							
TOTAL	4587	TOTAL	896.4		732					
SURPLUS	868	SURPLUS	183.6							

Source: CSS: Financial statistics of local governments, 1988/89. Report 91-14-01 (1991)
File: fin-all.wq1

Appendix 1, Table 3: Summary of white local government finances

RATES AND GENERAL SERVICES				TRADING SERVICES	TOTAL			WATER			(Water/Trading)
	1990/91	1991/92	1992		1990/91	1991/92	1992	1990/91	1991/92	1992	(note 7)
(All figures in R Millions)											
REVENUE				INCOME							
Rates	2 350	2 900	3 373	Operating and other	9 180	9 970	10 831	1 636	1 883	2 073	19%
Sewage and solid waste	956	1 062	1 114								
Transfers - central	349	330	316	Goverment transfers	87	73	75	1	4	3	3%
Transfers - RSC + local	53	58	83								
Interest	244	200	219	Interest	104	101	109	46	44	44	43%
Other	1 187	1 299	1 397								
TOTAL	5 140	5 850	6 500	TOTAL	9 371	10 144	11 015	1 683	1 931	2 120	19%
EXPENDITURE				EXPENDITURE							
Wages	3 330	3 900	4 164	Wages	987	1 154	1 240	172	202	223	18%
Interest	749	944	1 009	Interest	677	794	845	203	224	243	29%
Other	3 602	3 716	4 256	Other	6 715	7 639	8 055	1 069	1 275	1 438	17%
less income from debits	2 541	2 710	2 929	less income from debits	694	812	997	103	131	221	18%
TOTAL	5 140	5 850	6 500	TOTAL	7 685	8 775	9 143	1 341	1 570	1 682	18%
SURPLUS	0	0	0	SURPLUS	1 686	1 369	1 872	342	361	438	23%

Source: CSS: Statistical Release P9144, Financial Statistics of local authorities, RSC and JSBs
File: finance.wq1

Notes:

1. Information relates only to white local authorities
2. Sewerage is included in rates and general services account data
3. Up to June 1992, sample survey consisted of 40 large white local authorities. This data was audjsuted by a factor based on 1988/89 complete survey so as to represent totals for all white local authorities.
4. From September 1992, 20 smaller white local authorities included to make sample survey more representative
5. Data for 1992 has been made comparable, by raising 1st two quaters data on basis on 1988/89 complete survey
6. Data for 1992 comprises total of the 4 quarterly data supplied in survey
7. Sum of water (90-92) / sum of trading (90 - 92)

Appendix 1, Table 4: Summary of black local authority financial data, 1988/89

RATES AND GENERAL SERVICES	1988/89	WATER	1988/89
(All figures in R Million)			
REVENUE		REVENUE	
Sale of services	182	Sale of water	63
Sewerage and sanitation	28	Other	6
Interest	51	Interest	0
Transfers	126	Transfers	1
TOTAL	387	TOTAL	70
EXPENDITURE			
Purchase of services	277	Purchase of water	85
Wages	213	Wages	14
Interest	31	Interest	5
Other	2	Other	0
TOTAL	523	TOTAL	104
SURPLUS	(136)	SURPLUS	(34)

Source: CSS: Financial Statistics of black local authorities - 1988/89. Statistical News Release P9107.1. May 1992

Note: Unraised financial information from 190 black local authorities out of 267.

Appendix 1, Table 5: Summary of regional services council finances

RATES AND GENERAL SERVICES	1990/91	1991/92	TRADING SERVICES	TOTAL 1990/91	TOTAL 1991/92	WATER 1990/91	WATER 1991/92	Percentage (Water/Trading) (note 7)
(All figures in R Millions)								
REVENUE			INCOME					
Levies	927	1 121	Operating and other	125	154	39	49	32%
Sewage and solid waste	12	11						
Transfers - central	188	178	Goverment transfers	13	12	0	0	0%
Transfers - RSC + local	7	5						
Interest	112	158	Interest	0	4	0	0	0%
Sale of services	217	201						
Other	74	90						
TOTAL	1 537	1 764	TOTAL	138	170	39	49	29%
EXPENDITURE			EXPENDITURE					
Wages	310	367	Wages	17	22	7	9	41%
Interest	24	25	Interest	17	17	3	3	18%
Contributions to local authorities	884	712	Other	93	110	34	35	34%
Other (mostly expenditure on services)	372	358						
less income from debits	171	146	less income from debits	0	0	0	0	
TOTAL	1 419	1 316	TOTAL	127	149	44	47	33%
SURPLUS	118	448	SURPLUS	11	21	-5	2	-9%

Source: CSS: Statistical Release P9144, Financial Statistics of local authorities, RSC and JSBs (fin-rsc.wq1)

Notes:
1. Information collected from all RSCs and JSBs
2. First RSCs operational in 1987 (July)
3. RSCs in Cape took over the functions of the divisional councils
4. Joint Services Boards come into operation from July 1991
5. Number of councils in 1990/91 = 29 to 37
6. Number of councils in 1991/92 data = 37 to 41
7. Levy income during first months of RSC or JSB establishment much lower than normal amounts expected once established
8. Agency services are included
9. RSC/JSB levies amounted to R275 million for 4th Quarter 1991 and R368 million for 4th quarter 1992.

Appendix 1, Table 6: Expenditure from the State Revenue Account

1991/92	R million
Administration	34.6
Planning and Design	43.5
Construction of government water schemes	138.4
Construction of state-aided water schemes	56.8
Control over public water	22.3
Auxiliary services	46.5
Other	43.9
TOTAL	386.0

Appendix 1, Table 7: Government Water Schemes trading account

1991/92	R million
Expenditure	
Management	33.0
Maintenance and operation	120.4
Betterment	24.7
Disaster repair work	3.6
Other	1.1
TOTAL	182.8
Income	375.0
Surplus	192.2
Overall expenditure on Government water schemes	3736.0

Appendix 1, Table 8: Summary of Revenue and Expenditure: Water Schemes

Figures for 1991/92	Dept Agri	Government water schemes		
	(Note 1)	Agric.	Ind+Dom	TOTAL
	R million	R million	R million	R million
CAPITAL EXPENDITURE				
Balance at start of year	38.8			3275
Expenditure for current year	0.7			109
Volume supplied (million m3 / annum)	293.2	4456	2241	6696
OPERATING EXPENDITURE	5.97	55.9	75.7	131.6
INTEREST ON CAPITAL BALANCE	4.07	188.7	245.3	434
REVENUE	1.75	38.4	328.1	366.5
SURPLUS / DEFICIT				
Surplus applied for capital redemption				
for year		0.075	84.2	84.2
to date	0.016	1.8	174.1	175.9
Deficit regarded as irrecoverable				
for year	8.29	206.3	30.7	237
to date	82.6	1920	493	2413
Deficit carried forward			46.4	46.4
CAPITAL BALANCE AT YEAR END	39.5			3346

Notes: 1) Schemes transferred to the Department of Agricultural Development but operated by DWA on agency basis

APPENDIX 2

ILLUSTRATIVE ORGANISATIONAL STRUCTURES

Figure 1: Umgeni Organisational Structure

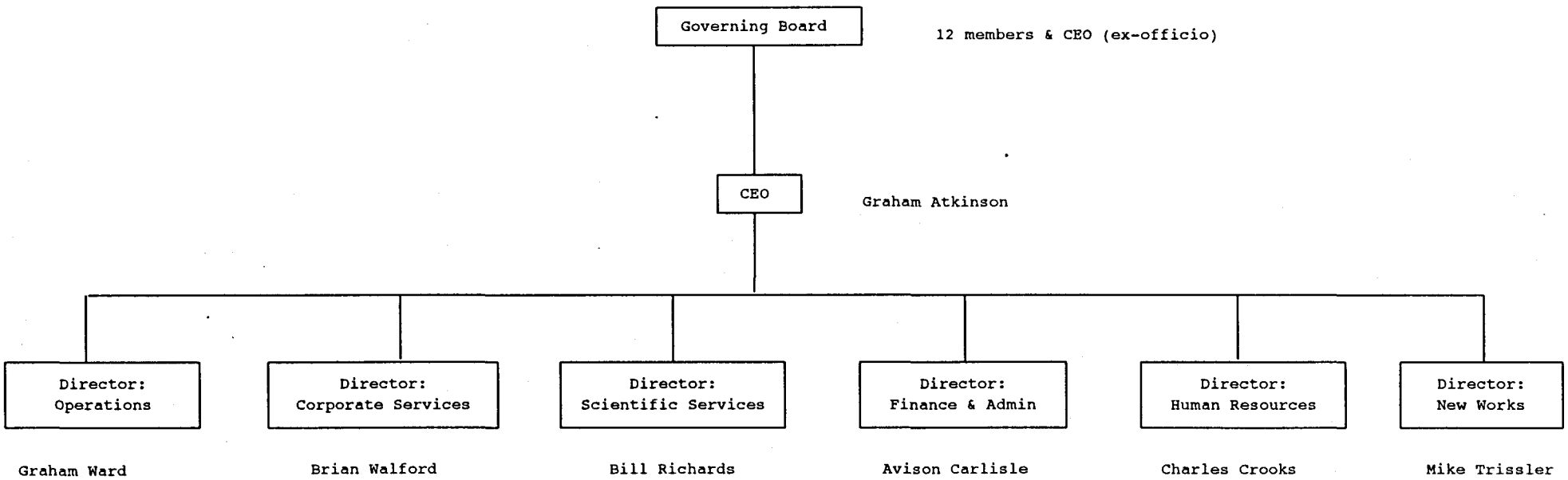


Figure 2: Umgeni's Rural Interface

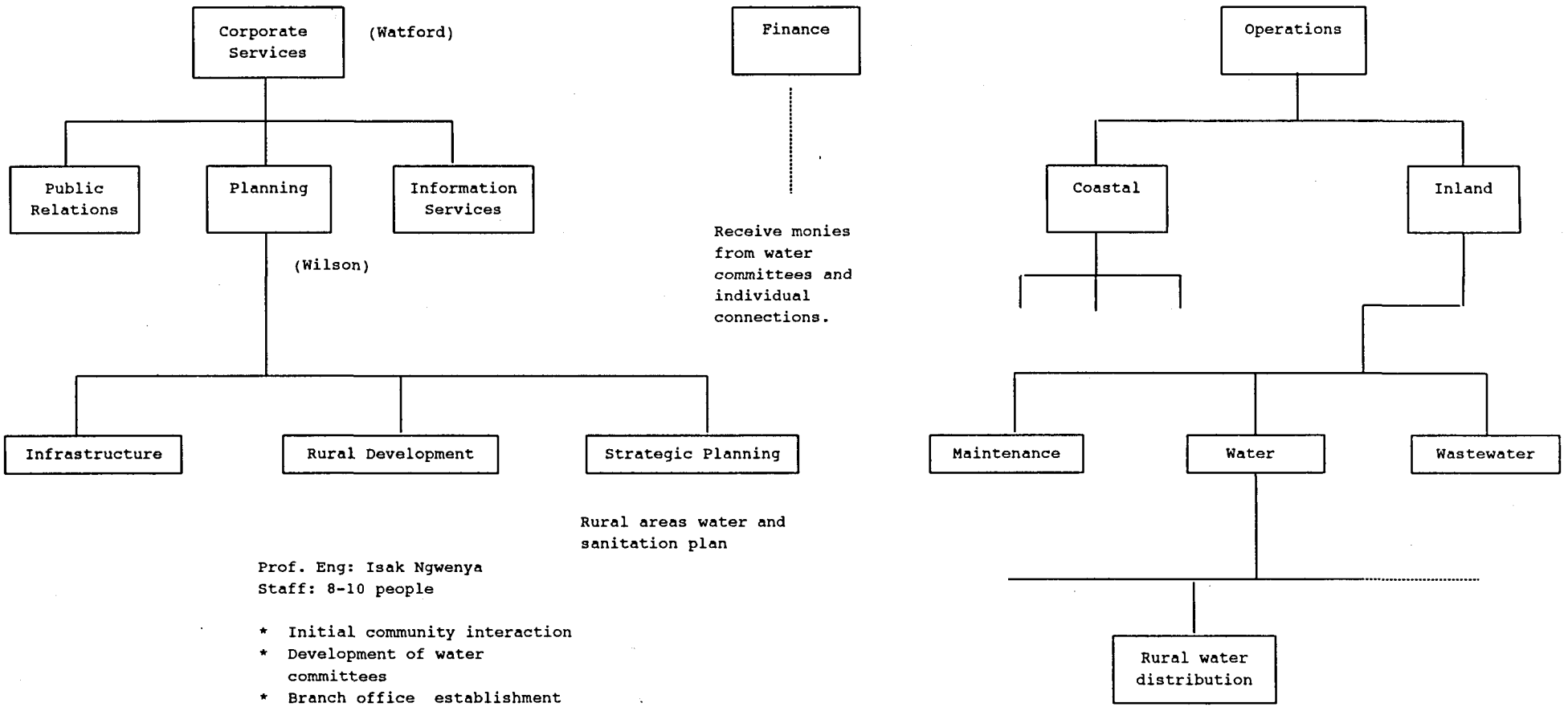


Figure 4: Durban Corporation

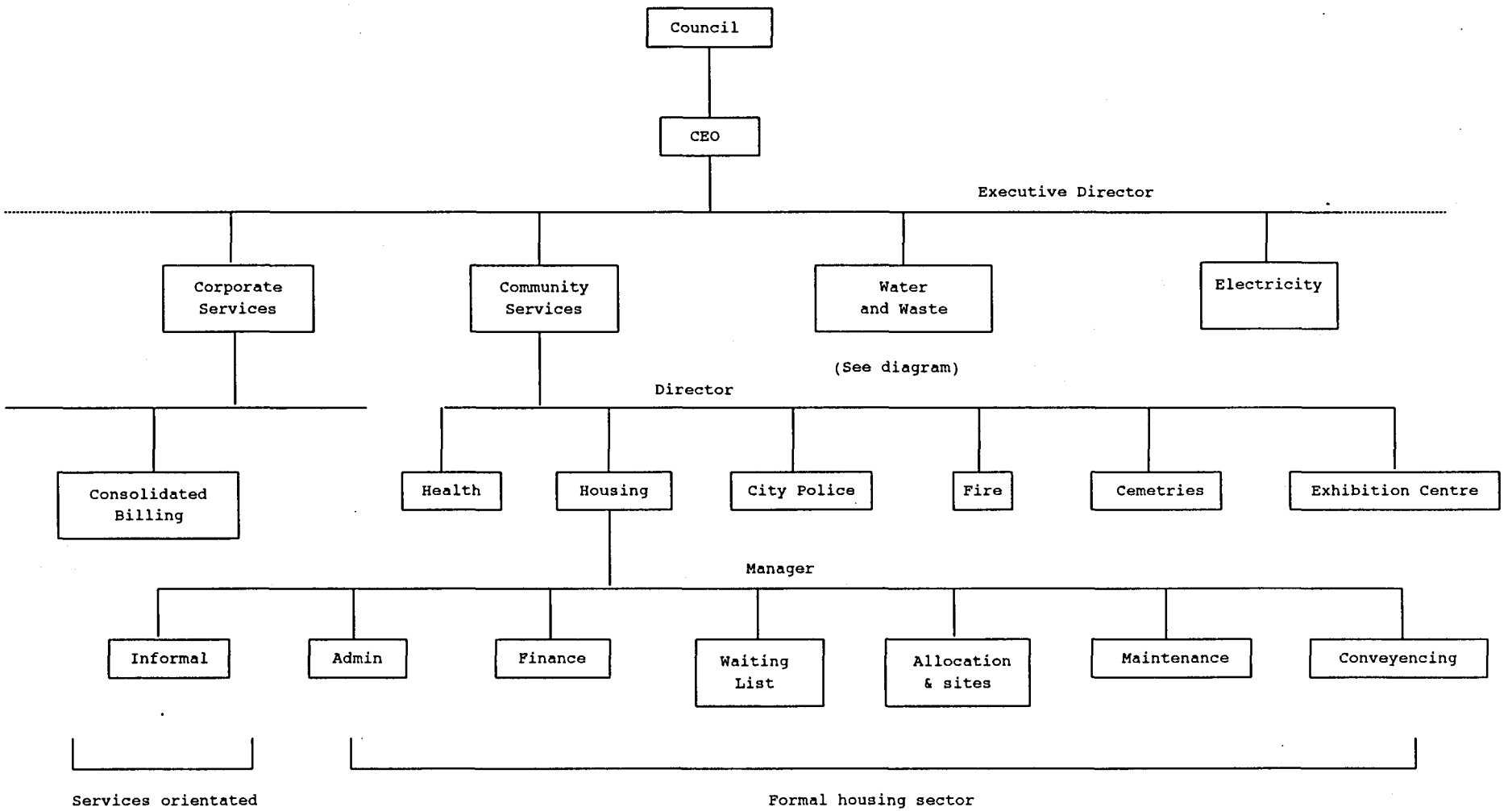


Figure 5: Durban: Wastewater

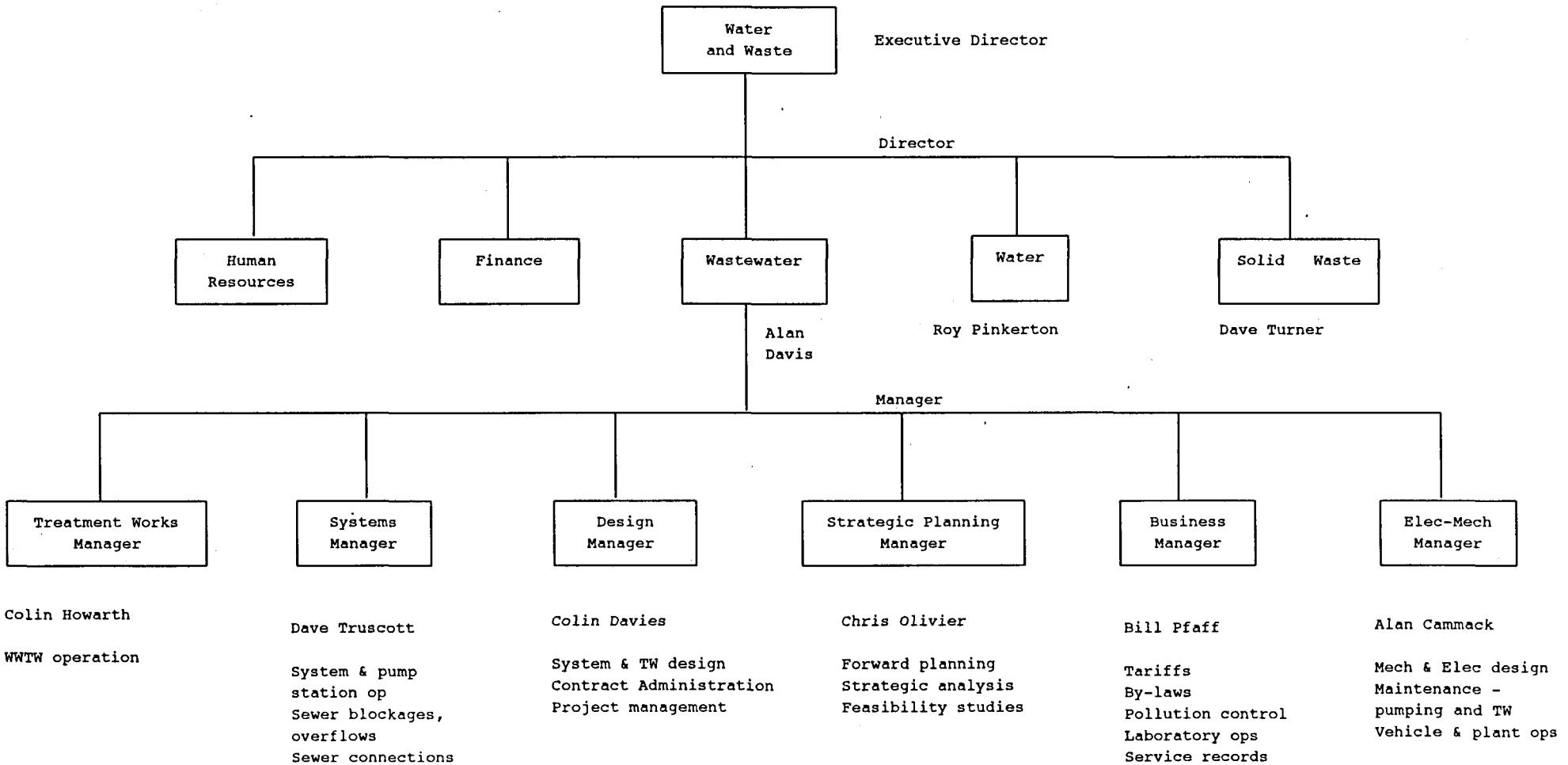


Figure 6: Durban: Water

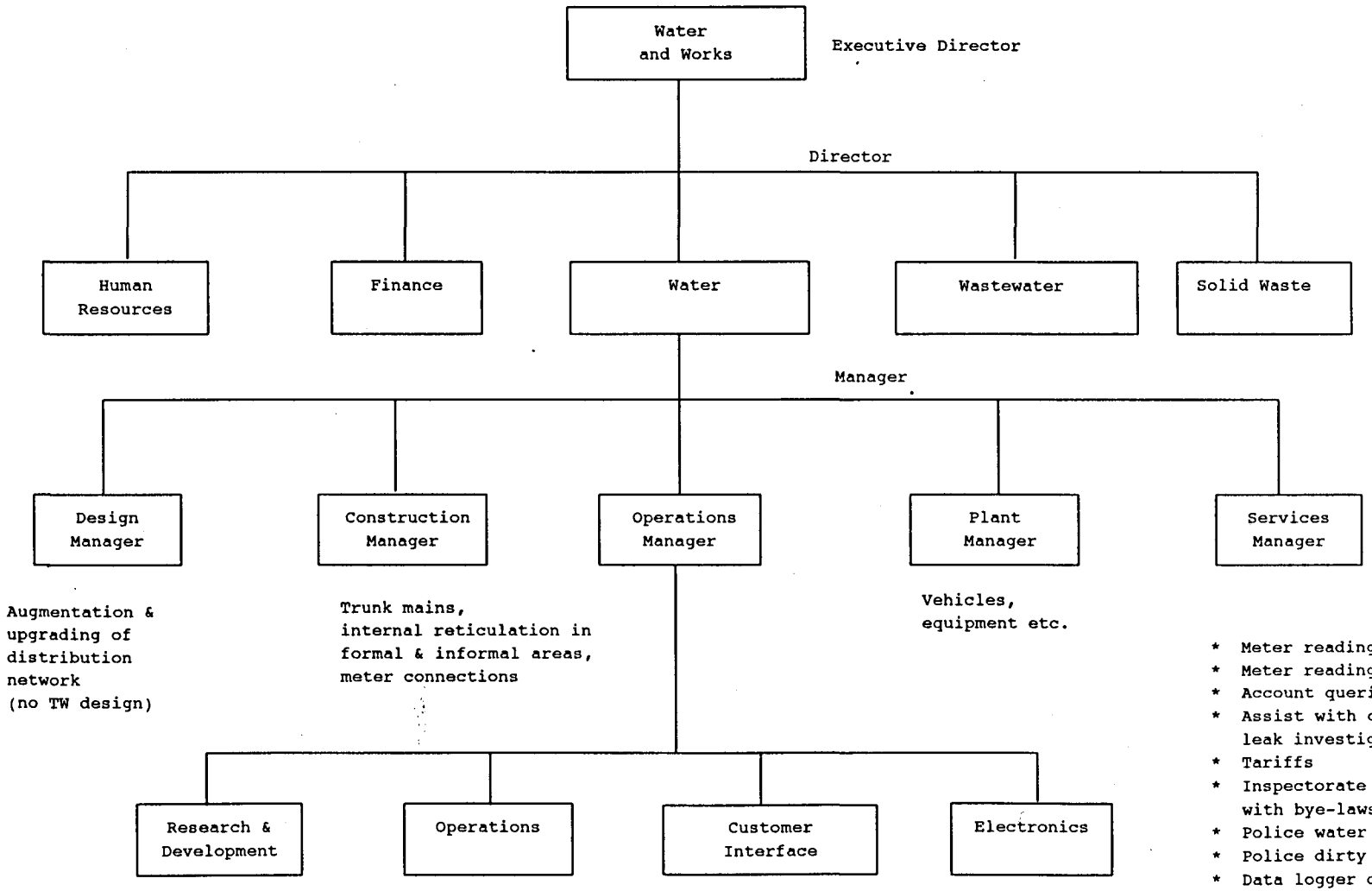


Figure 7: Bloemfontein City Engineer's Department

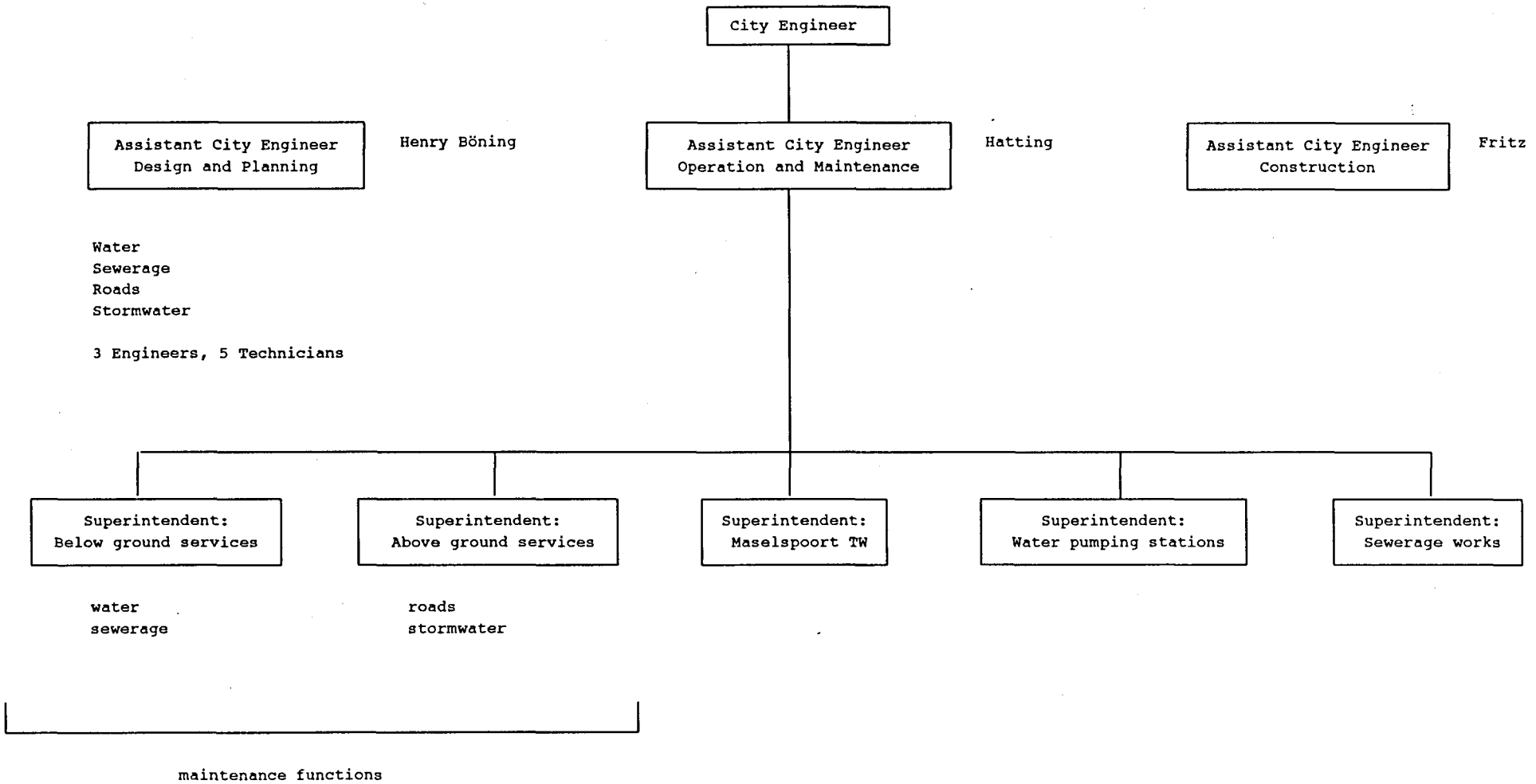


Figure 9: Cape Town

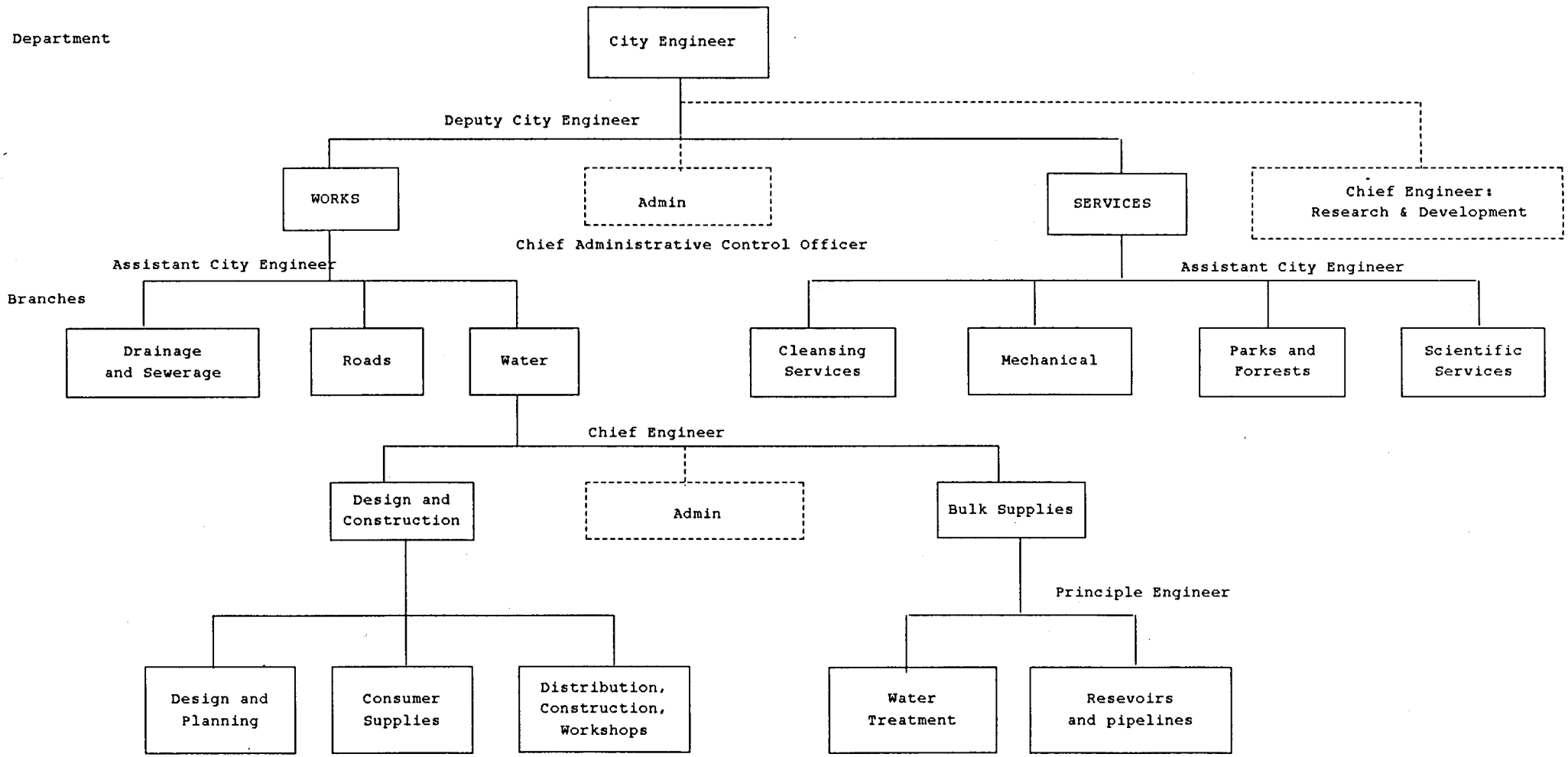
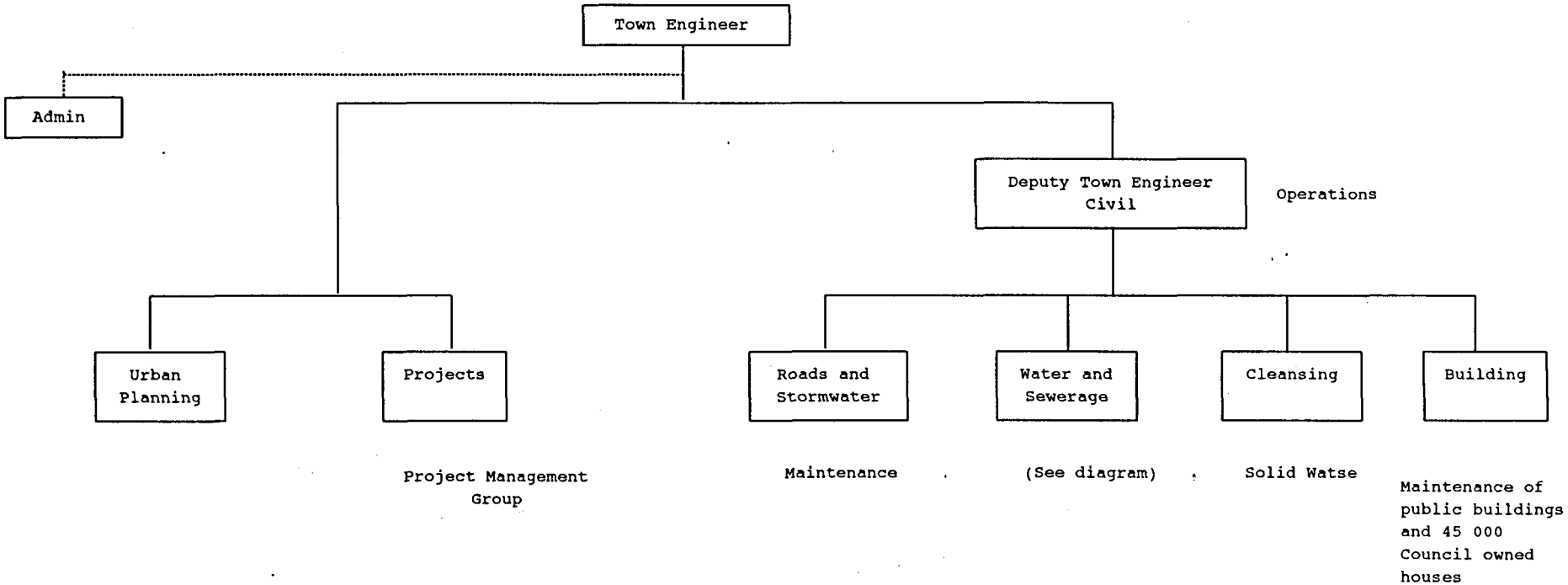


Figure 10: Soweto



Notes: One person performs posts of Town Engineer, Deputy Town Engineer and Projects engineer. (Town Engineer and Deputy TE recently left and no staff replacement possible due to shortage of funds.)

Figure 11: Soweto (Water and Wastewater)

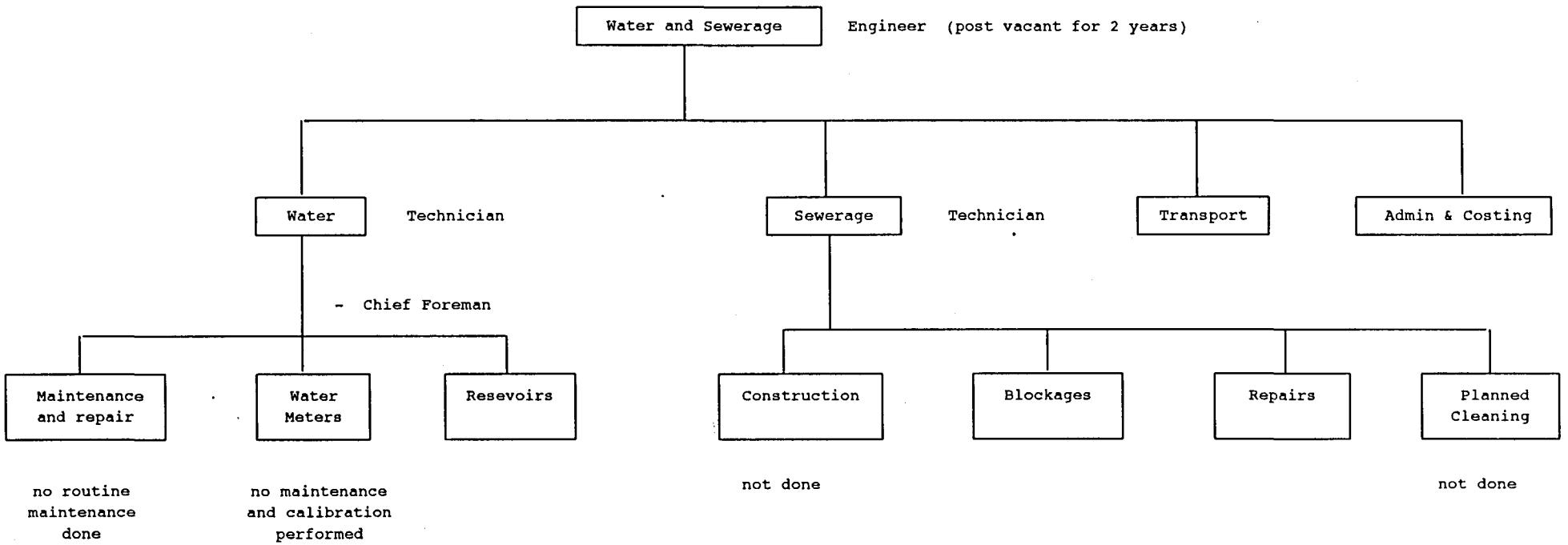


Figure 12: Khayelitsha (Cape Town) [Lingelethu West Town Council]

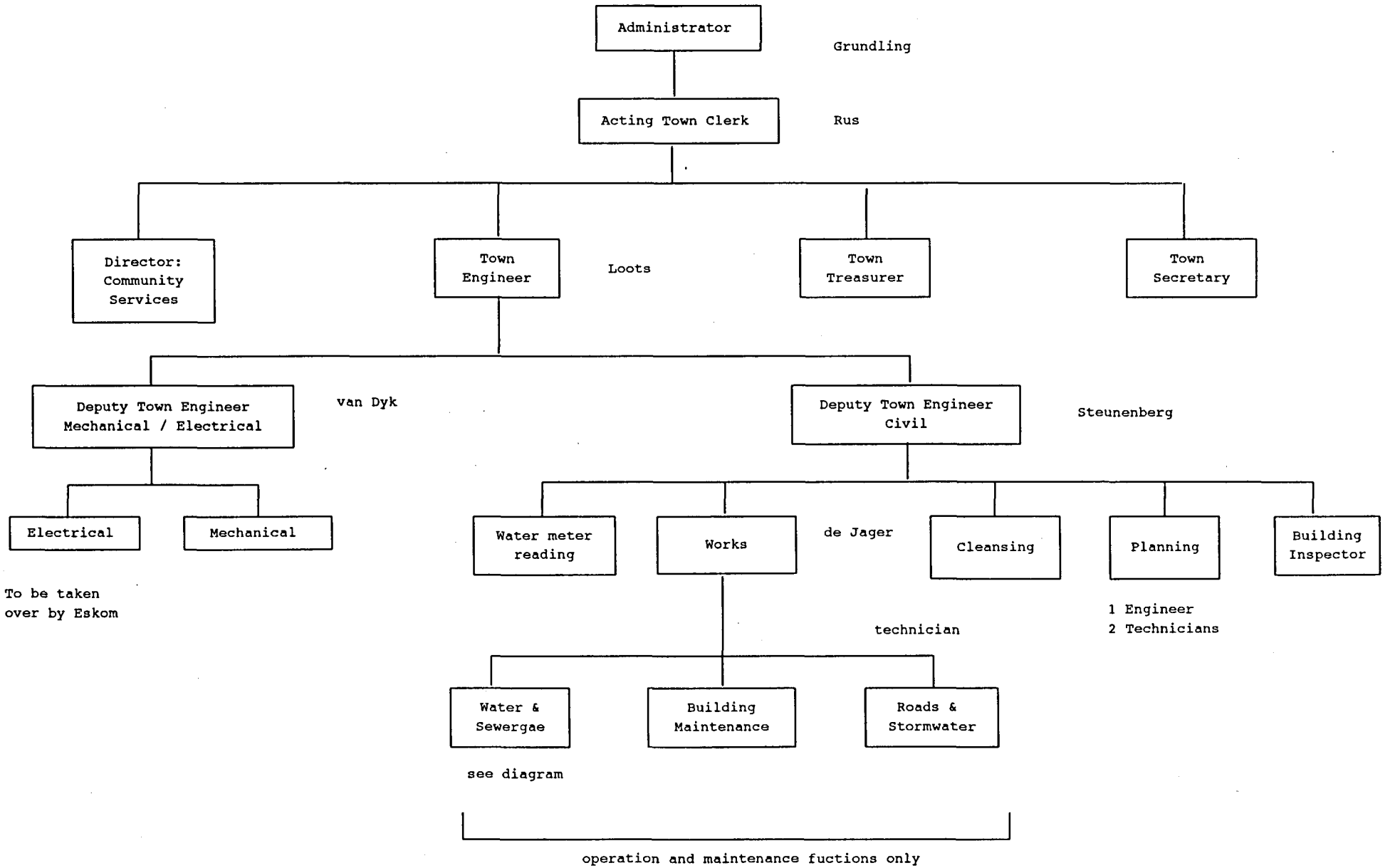


Figure 13: Khayelitsha (Water and Sewerage)

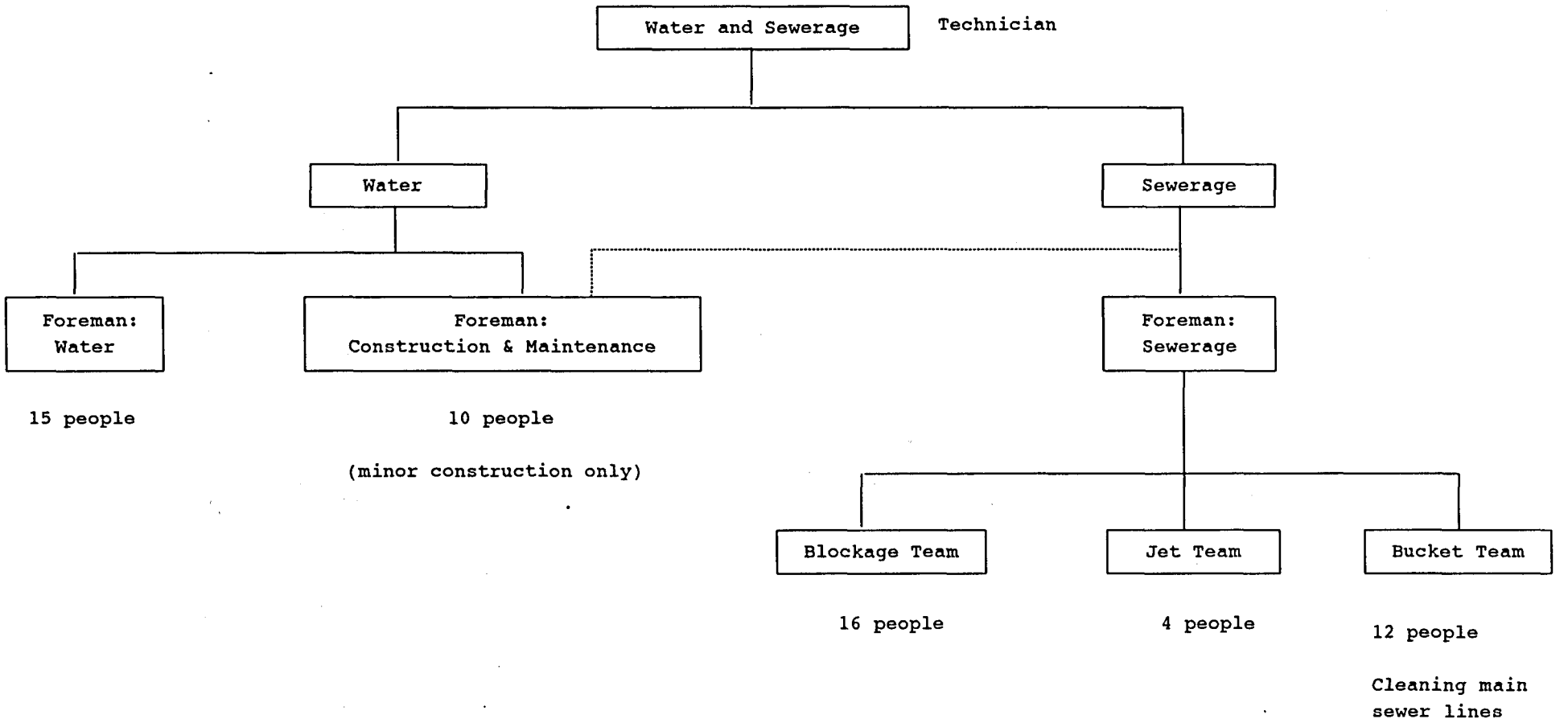


Figure 14: KwaZulu - Umlazi interface (Durban)

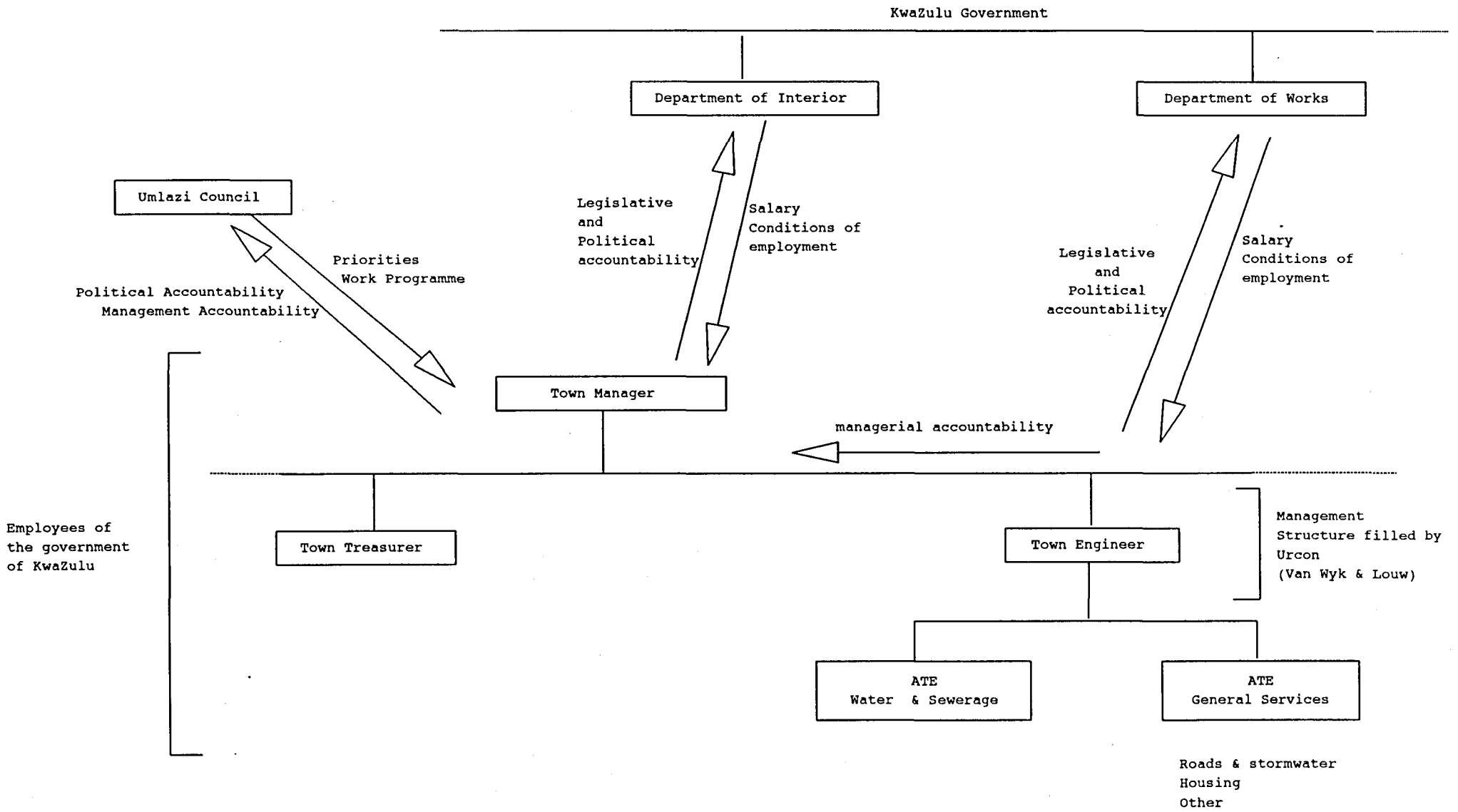


Figure 15: Umlazi - Proposed Operation and Maintenance Structure

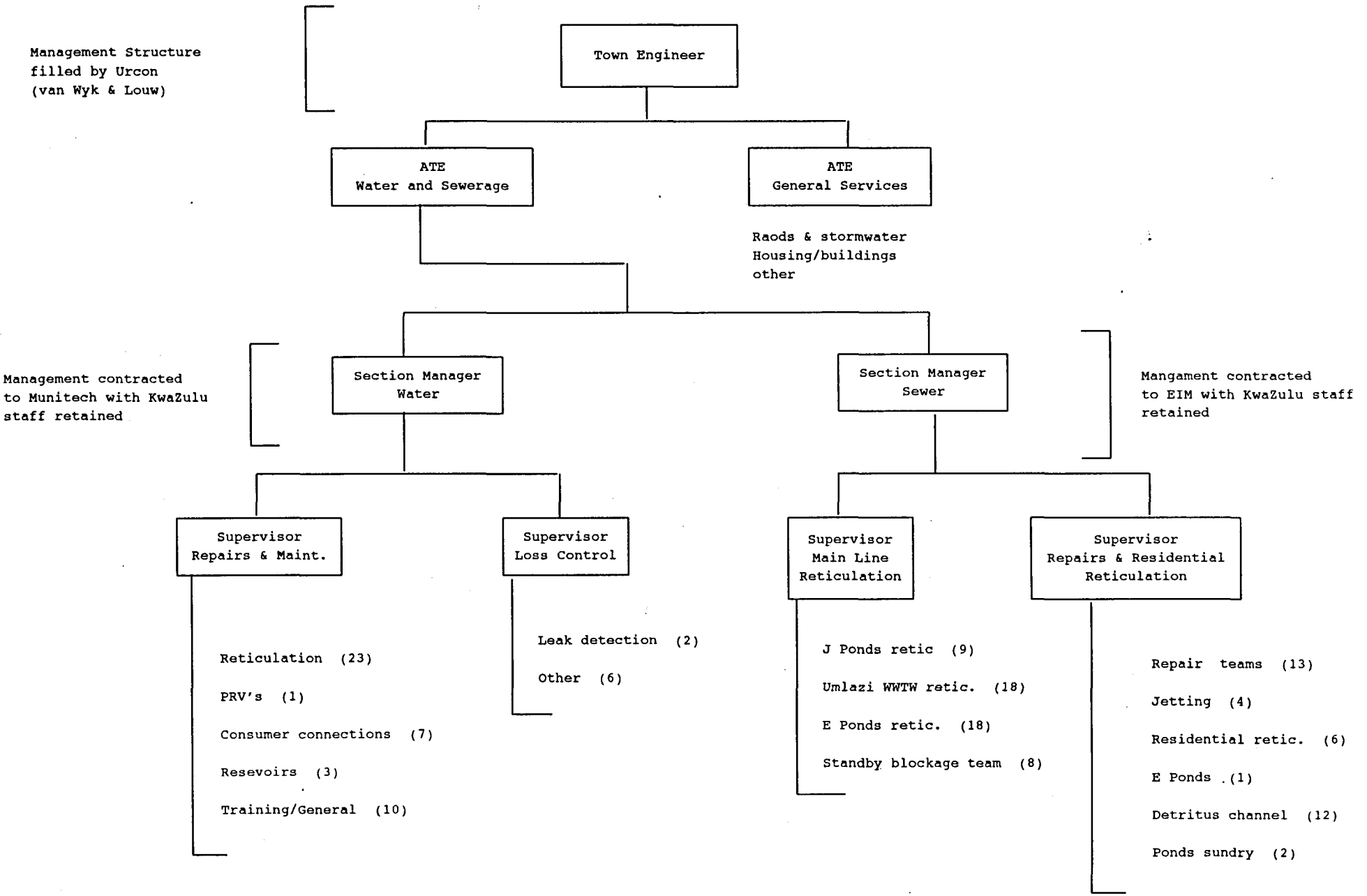


Figure 16: Warmbaths Municipality

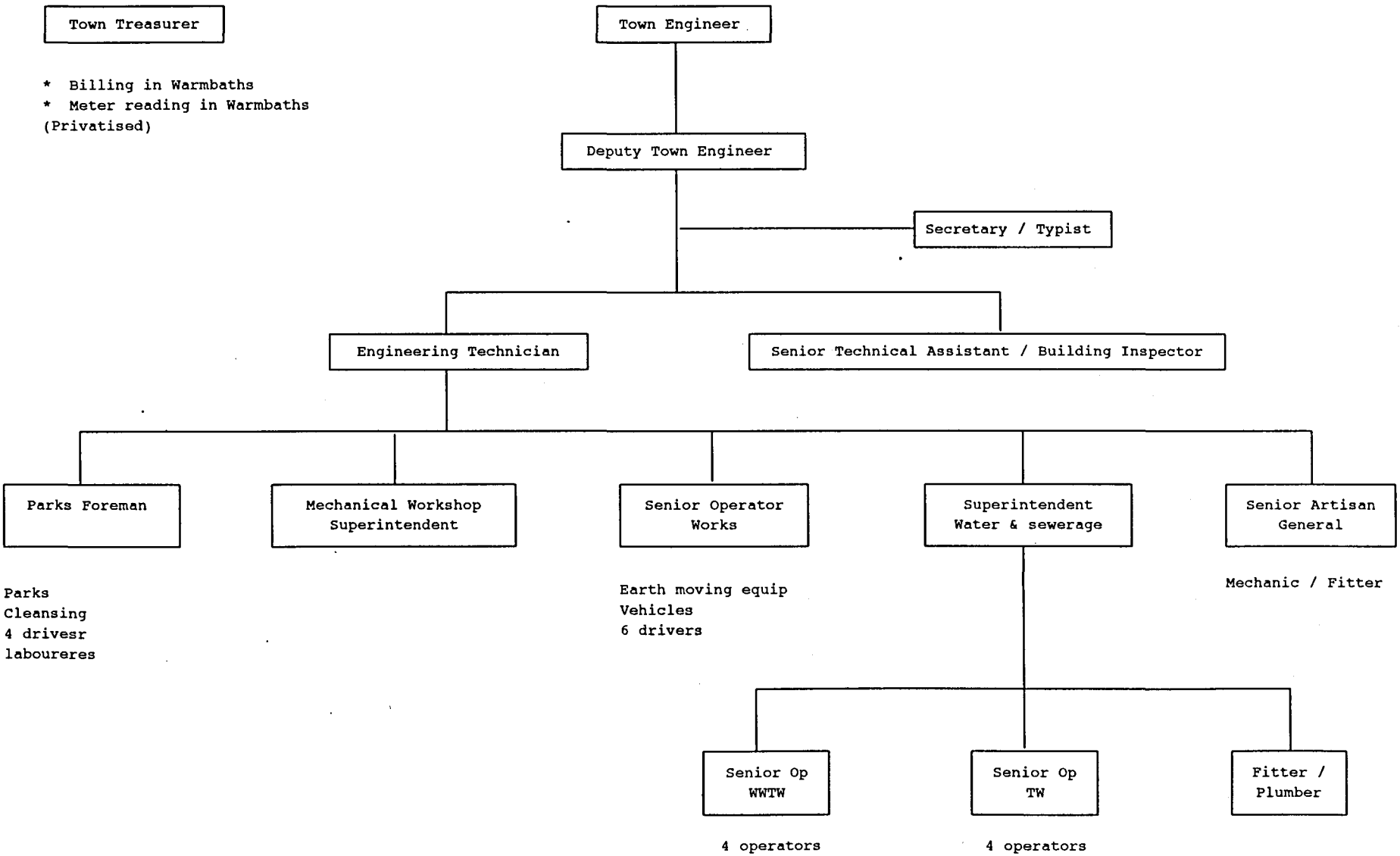
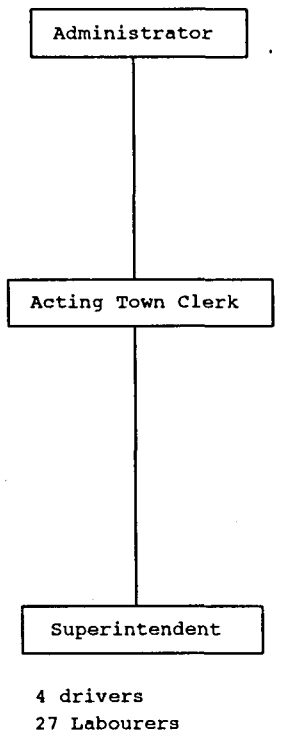


Figure 17: Belabela (Warmbaths)



TPA appointed Town Clerk of Warmbaths to be the administrator of Belabela. Belabela have no operating council.

Town Clerk is paid out of the Belabela budget.

Engineering advice is provided as a service by a local consulting engineering firm involved in capital development projects in Belabela.

Figure 18: NPA Structure

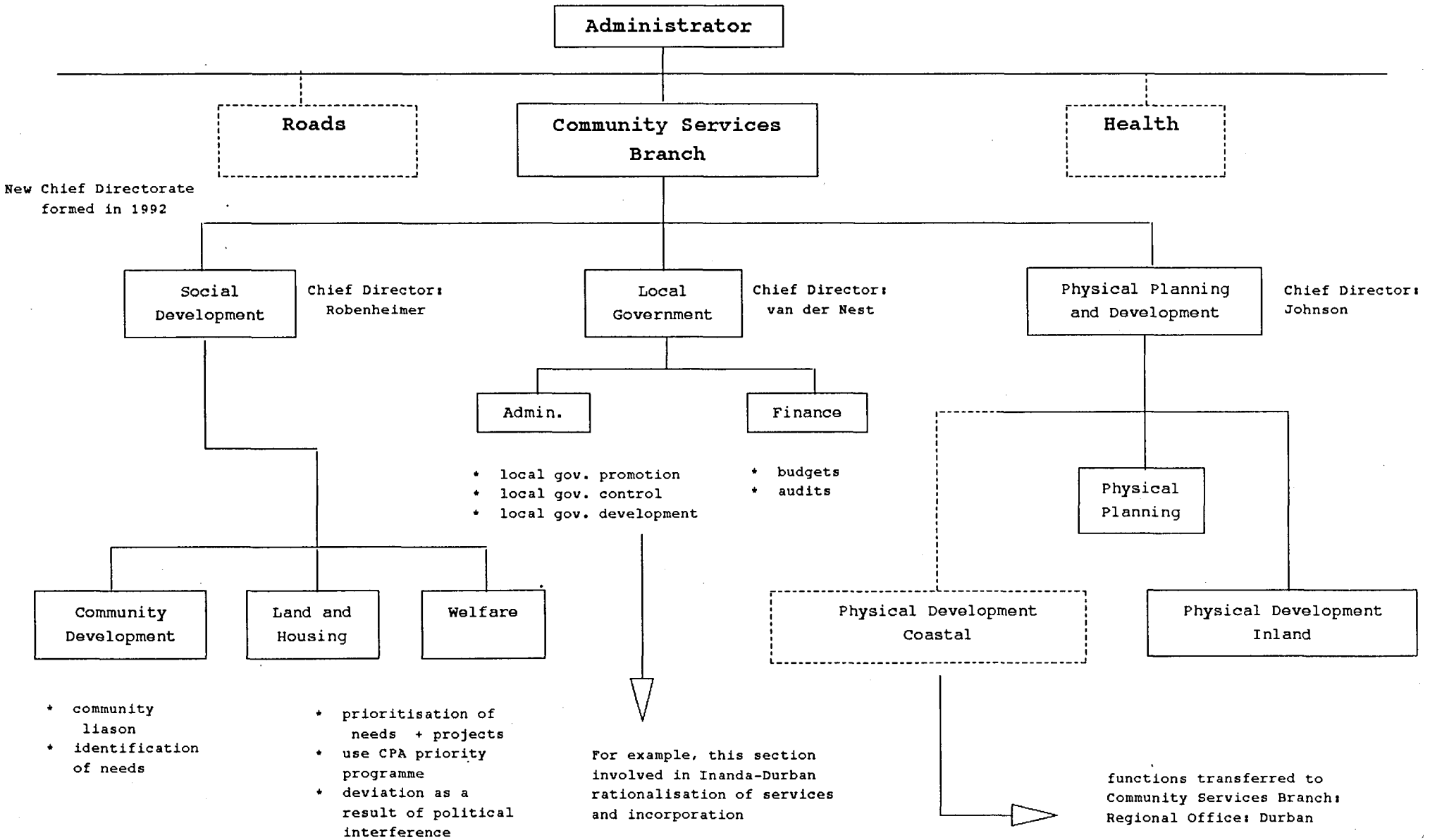


Figure 19: NPA administration of Inanda Complex (Durban)

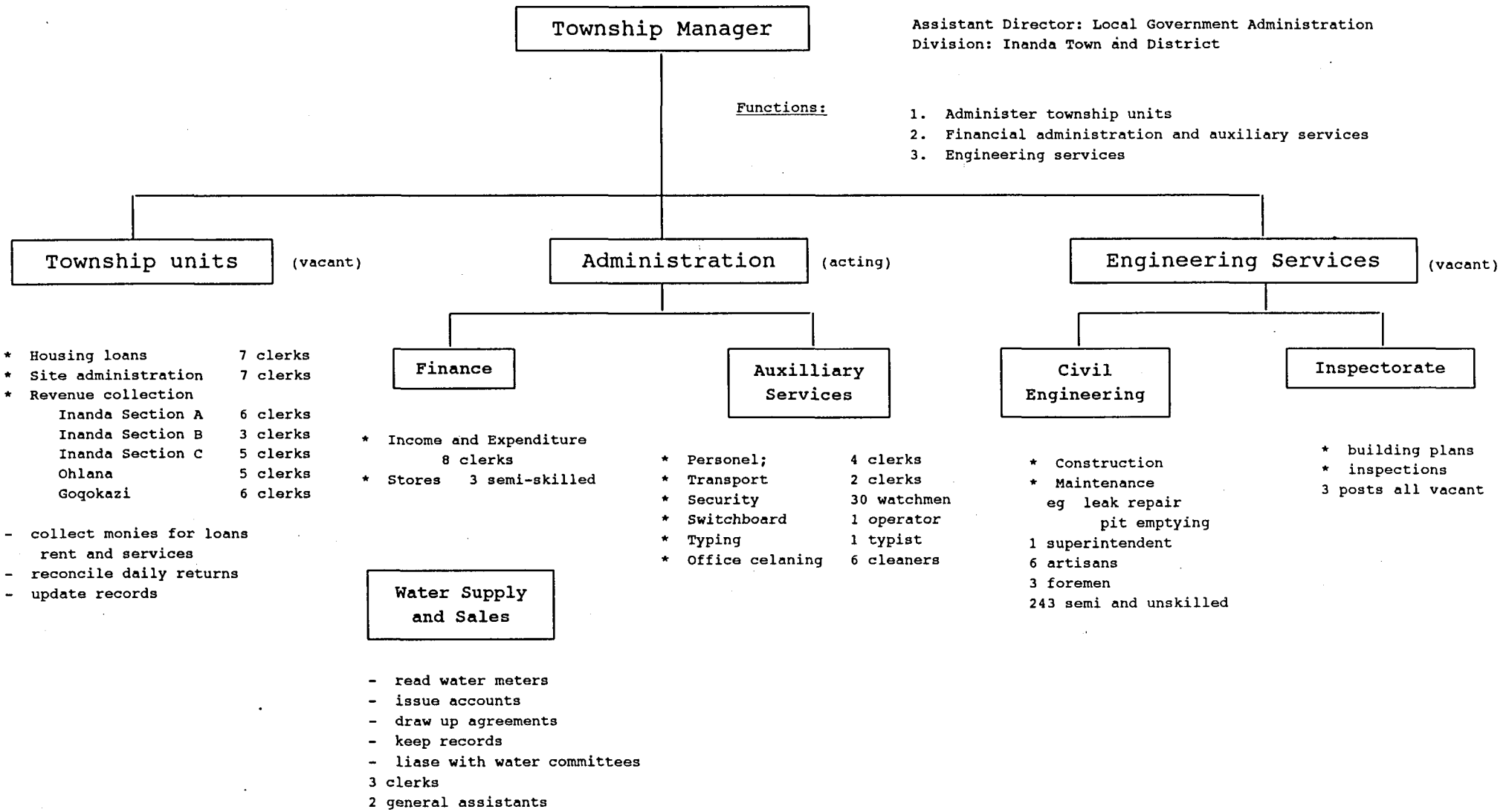


Figure 20: NPA - Inanda interface

NPA Head Office

Decide policy on:
- planning
- development
- standards
- finance
- cost recording
- prioritisation
- administrative procedures
- response to squatting

etc

Exercise control over:
- administration procedures
- budgets
- expenditure
- implementation of legislation

Decide on:
- allocation of funds
- priority of needs

Other Durban Sub-directorates provide support to Inanda in the following ways:
- major project implementation
- capital development projects
- maintenance support
- technical support
- administrative support
- training
- budgeting
- expenditure control
- audits

etc

NPA Durban Regional Office

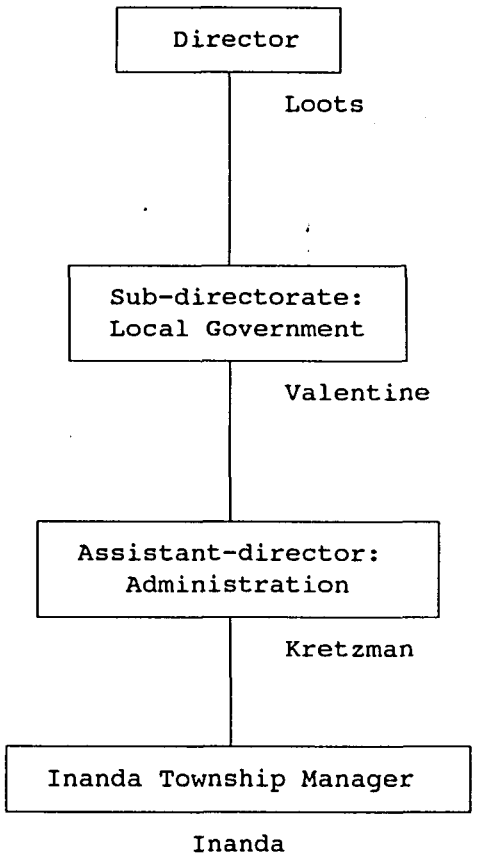


Figure 21: NPA Regional Office

Note : New structure under trial run as from January 1993

Director	K Loots
Sub Directorates	
Management Support Services	• personnel and financial services • auxiliary services (typing, registry, administrative support)
Engineering Services	• manage infrastructure in townships • technical support to black local authorities • budget control • co-ordinate programs • establishment: 2 engineers, 2 technicians, 4 admin 58 artisans, 327 semi- and un-skilled
Project Development	• guide consultants in NPA policy for development standards • render technical advice on maintenance and development of services • co-ordinate programs • budget control • establishment: 2 engineers, 4 technicians, 3 admin 30 artisans, 134 semi- and un-skilled
Major Projects	• administer major urban development projects • guide project managers in NPA policy • allocate funding • co-ordinate programmes • establishment: 2 engineers, 1 administrative clerk
Physical Planning	• prepare town and sub-regional plans • provide planning advice to NPA and local authorities • promote town and regional planning • exercise planning control • establishment: 12 planners, 7 technicians

Local Government

- ensure orderly local government administration

Financial Control:

- provide financial information
- exercise financial control
- render procurement service

Financial Services:

- render financial service to local authorities
- control income and expenditure
- compile estimates and final accounts

Administration:

- provide administrative functions to local authorities
- administer legislation in respect of local authorities
- promote effective local government training
- ensure institutional development of local government

The responsible "Town Mangager" for Inanda is the assistant director: local government administration.
See organo-diagram for Inanda.

Social Development

- promote social development

Land and housing:

- effect township development
- procure land
- attend to land related matters

Urbanisation support:

- promote orderly urbanisation
- prevent illegal squatting (Act 52 of 1951)
- monitor urbanisation
- resettlement of informal communities

Settlement:

- ensure effective and efficient community development
- facillitate community development plans
- provide socio-economic data
- implement upliftment projects

Social services:

- render social welfare services
- deal with social pensions

Figure 22: CPA Structure

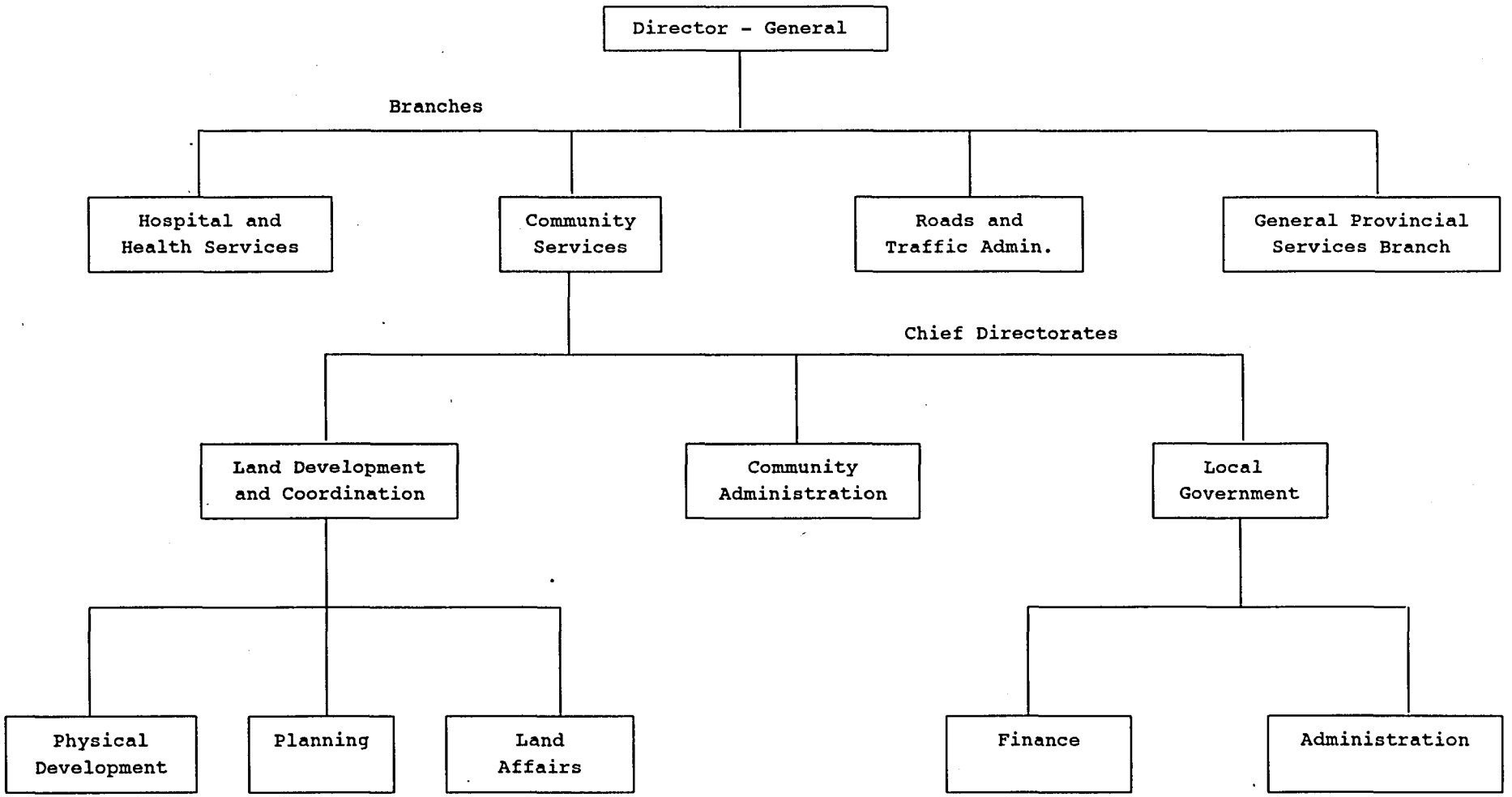


Figure 23: CPA Structure with respect to Black Local Authorities

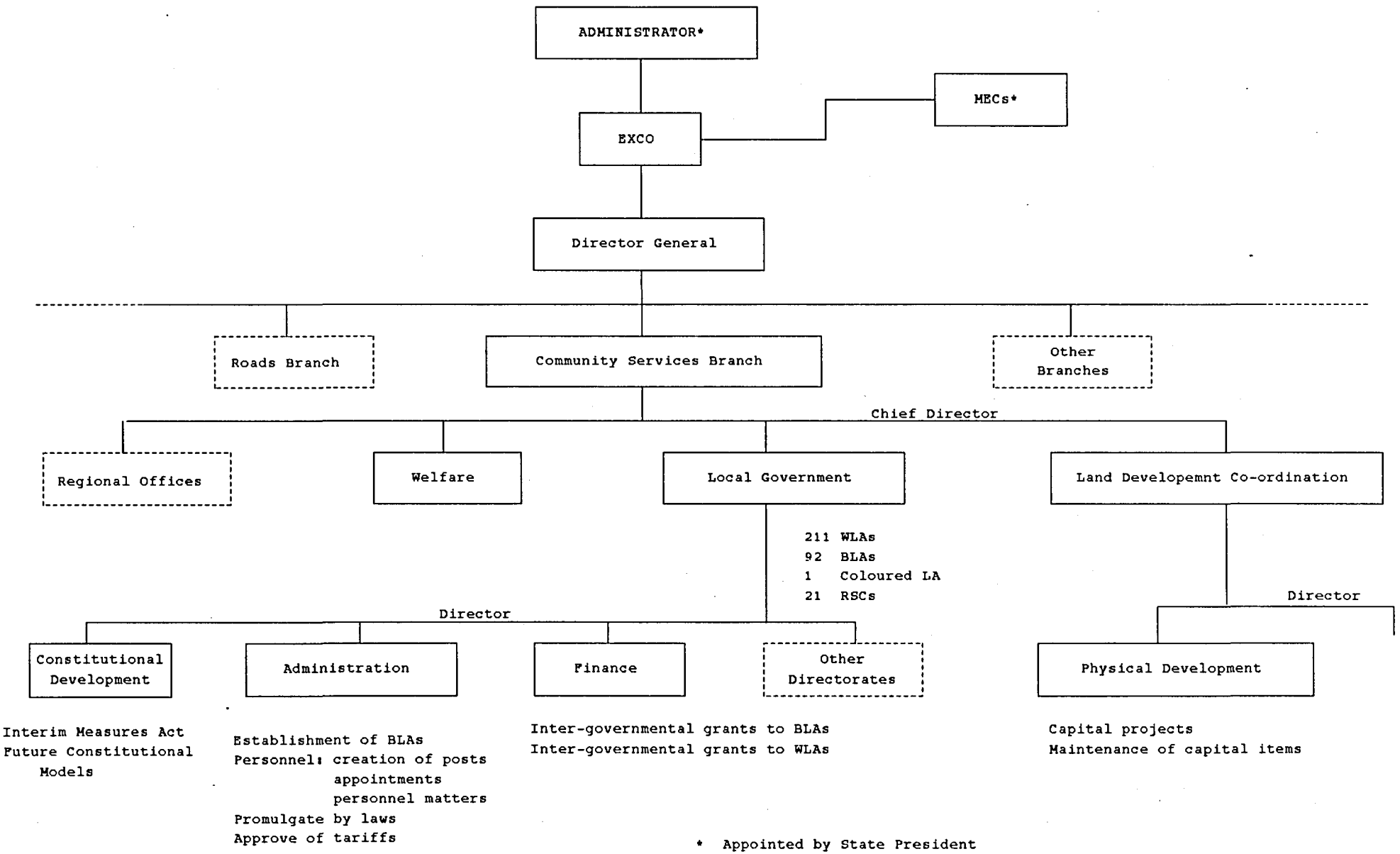


Figure 24: TPA Organisational Structure

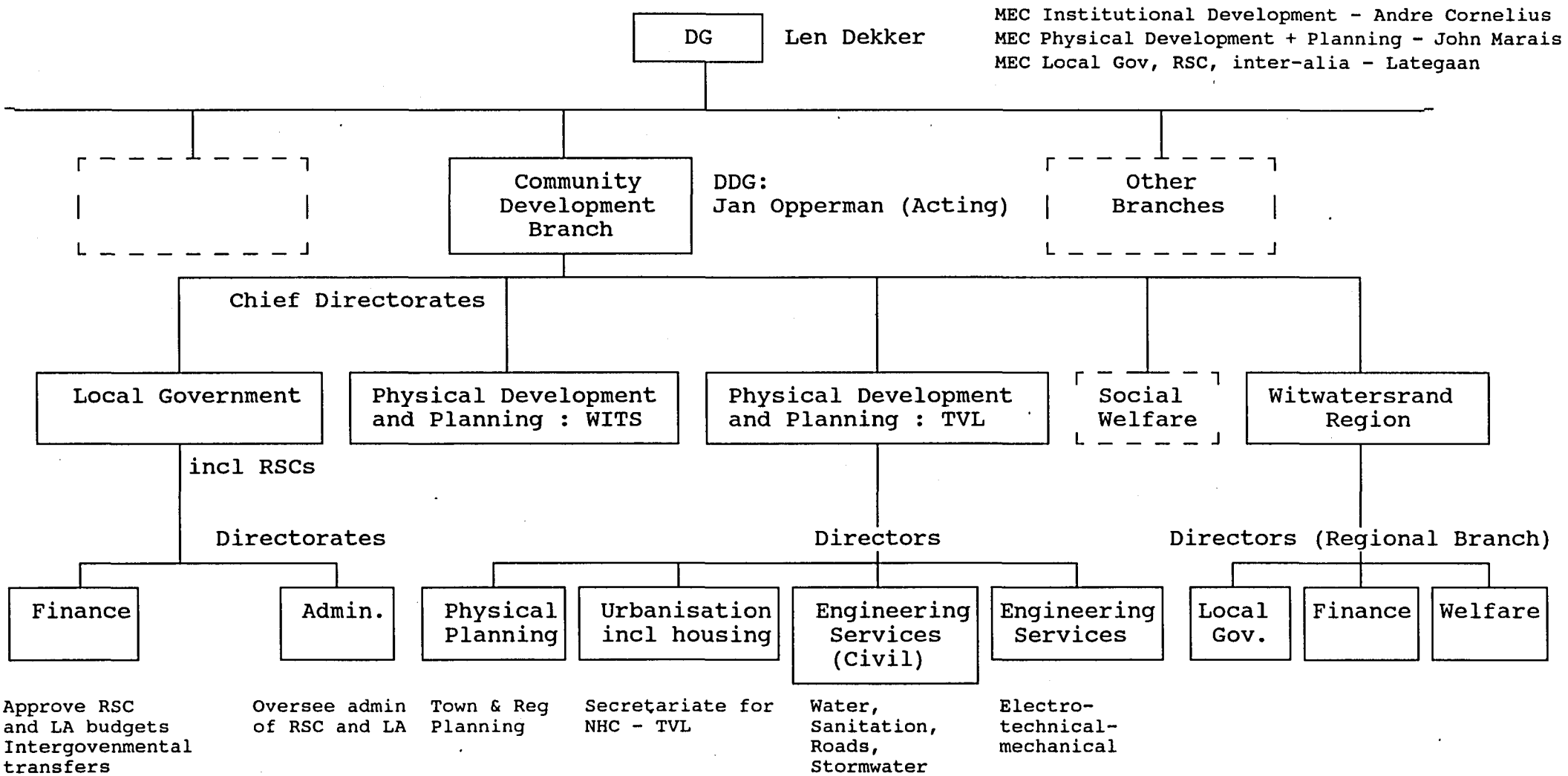


Figure 25: TPA: Regional Structures

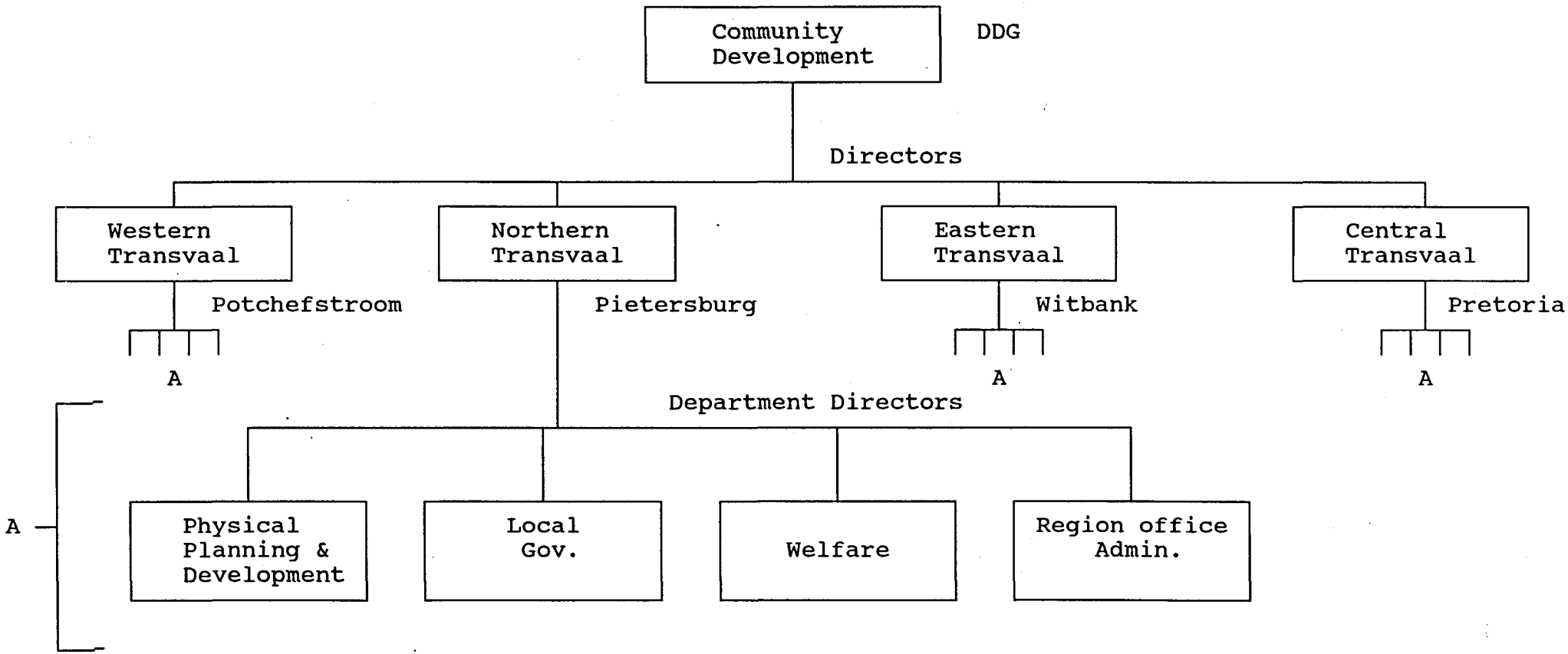


Figure 26: TPA Funding of Physical Development (schematic diagram)

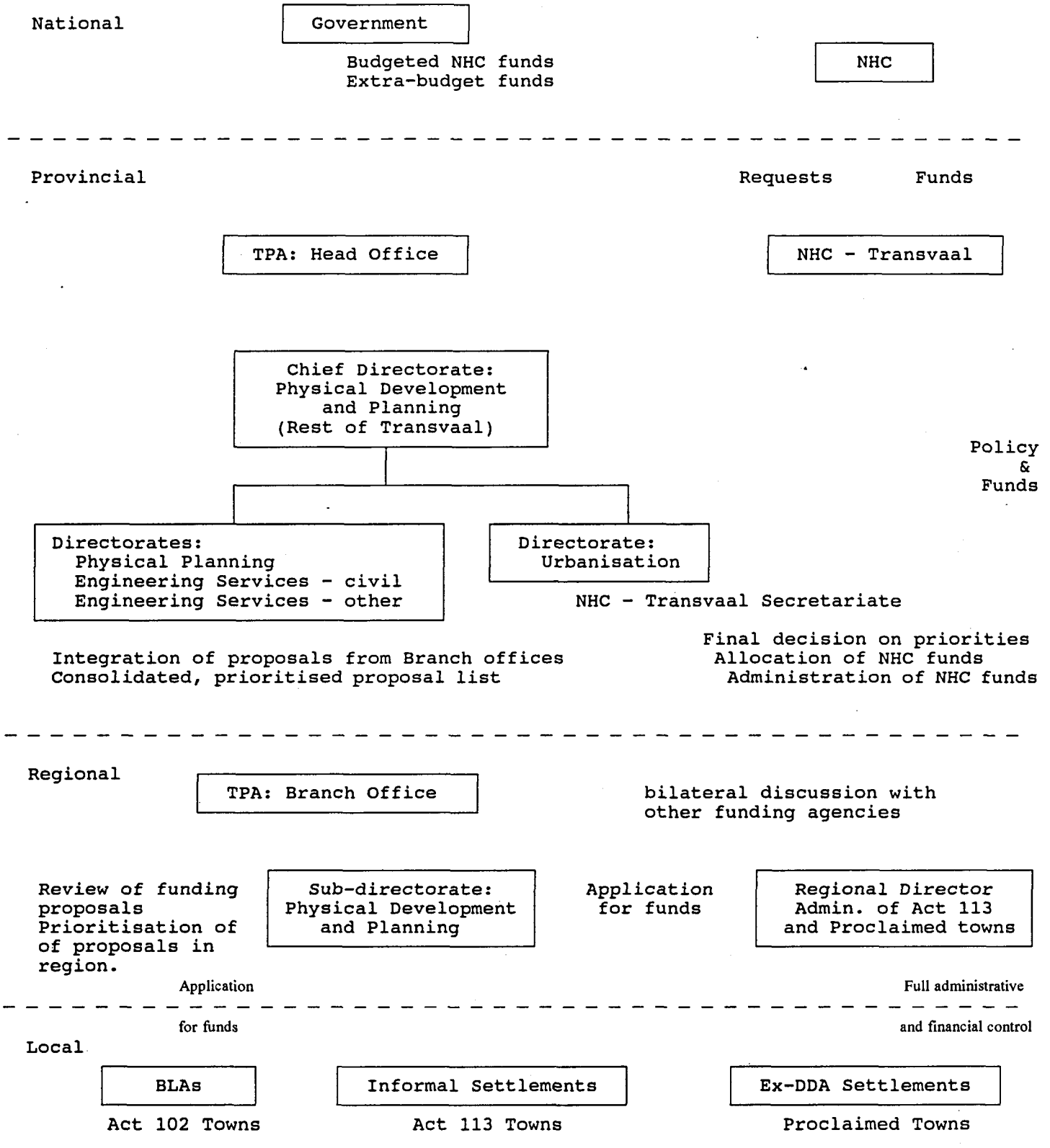
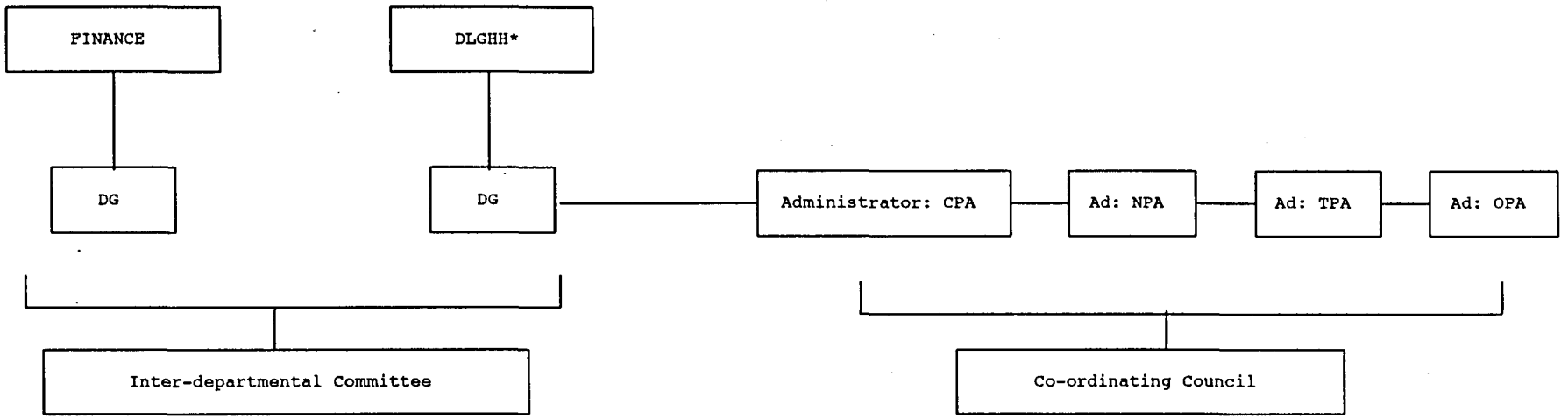
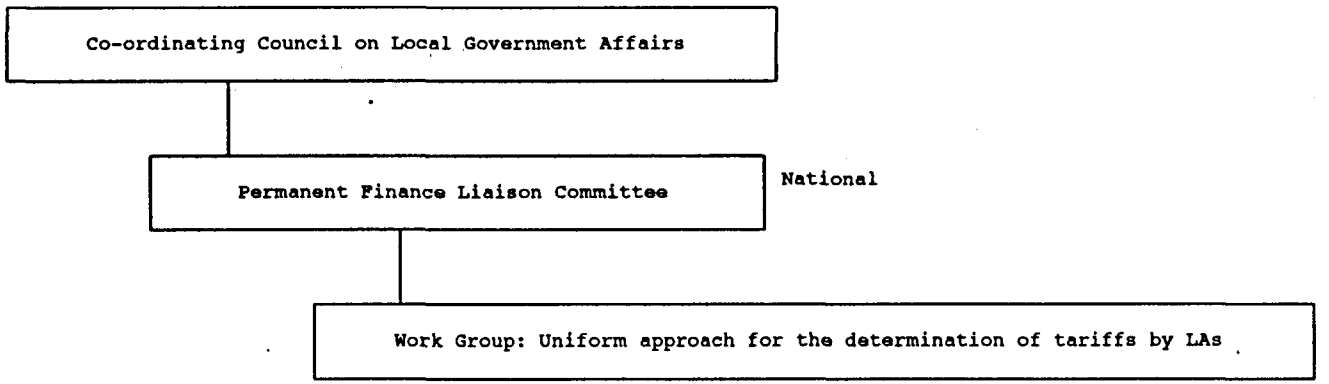


Figure 27: Inter-provincial co-ordination



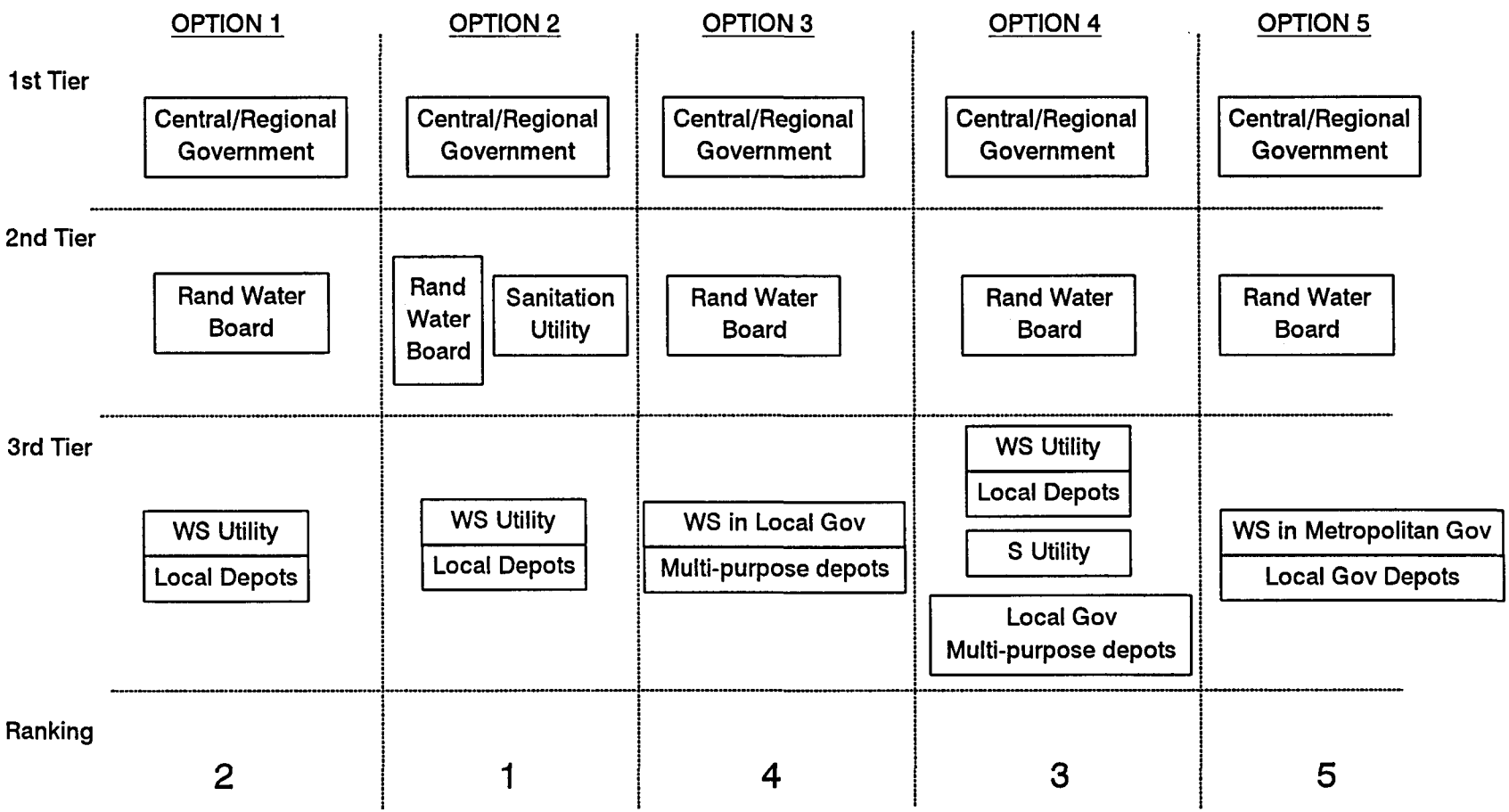
- Allocation of finance to Provinces
- Determination of formulae governing inter-governmental grants



chaired by OC Du Toit (CPA). In investigative stage.

* Department of Local Government and National Housing

Figure 28: Institutional options proposed for Central Wits Metropolitan Area



KEY: W = Water S = Sanitation

Source: De Loitte Touche (1993)

APPENDIX 3

LIST OF PERSONS INTERVIEWED

Mr Ardendorf, Chief Engineer: Design and Construction, Cape Town City Council. 7 May 1993.

Mr Bath, V., Chief Executive: Rand Water Board. 14 May 1993.

Mr Berger, H., Social Services, Nylstroom, Transvaal Provincial Administration 22 June 1993.

Mr Böning, H., Assistant City Engineer: Design and Planning, Bloemfontein City Council. 13 May 1993.

Mr Coetzee, M., Assistant City Treasurer: Mangaung, Bloemfontein City Council. 13 May 1993.

Mr Davis, A. Director: Durban Wastewater, Durban Corporation. 24 May 1993.

Mr Davis, A., then Deputy Town Engineer: Soweto Town Council. 25 June 1993.

Mr de Jager, Town Engineers Department: Lingelethu West Town Council. 7 July 1993.

Mr du Toit, O. C., Director: Local Government Finances, Cape Provincial Administration. 5 May 1993.

Mr Eksteen, Engineer: Urcon (van Wyk and Louw). Umlazi. 27 May 1993.

Mr Fernandez, P. Department of Water Affairs. Bophuthatswana. 27 May 1993.

Mr Fourie, J., Town Clerk: Belabela. 22 June 1993.

Mr Geerdts, C., Engineer: The Valley Trust. Botha's Hill. Durban. 28 May 1993.

Mr Hall, C., Chief Engineer: Development, Rand Water Board. 14 May 1993.

Mr Haygarth, G., Chairman: Joint Services Board. 25 May 1993.

Mr Hallet, R., designate Town Engineer: Soweto Town Council. 25 June 1993.

Mr Korf, Chief Executive: East Rand Water Care Company (Erwat). 24 June 1993.

Mr Laubscher, S., ex-Deputy Town Engineer: Milnerton and Aquagold Services (Pty) Ltd. 28 July 1993.

Mr Le Roux, Director: Local Government Administration, Cape Provincial Administration. 5 May 1993.

Mr Lomnitz, N., Deputy City Treasurer: Cape Town City Council. 5 May 1993.

Dr Lotter, L., Wastewater Department: Johannesburg City Council. 13 May 1993.

Mr Macleod, N., Director: Durban Water and Waste. 26 May 1993.

Mr Marsden, M., Chief Planning Engineer: Cape Town City Council. 5 May 1993.

Mr Milne, V., Chief Executive: Central Witwatersrand Metropolitan Chamber. 25 June 1993.

Mr Murray, T., Deputy Chief Engineer: Western Cape Regional Services Council. 4 May 1993.

Mr Pienaar, M., Chief Engineer: Physical Development, Transvaal Provincial Administration. 13 May 1993.

Mr Rodrigues, P. Manager: Operations, Durban Water Directorate, Durban Corporation. 27 May 1993.

Mr Singel, A., Chief Engineer: Bulk Supplies, Cape Town City Council. 7 May 1993.

Mr Steenkamp, H., Physical Planning Directorate: Cape Provincial Administration. 5 May 1993.

Mr Steunenberg, Deputy Town Engineer: Lingelethu West Town Council. 7 July 1993

Mr Swart, Chief Executive: East Rand Regional Services Council. 17 June 1993.

Mr van Rooyen, J., Deputy Chief Engineer: Project Planning, Central Region, Department of Water Affairs. 14 May 1993.

Mr van der Westhuizen, S. Consulting Engineer, Warmbaths. 22 June 1993.

Mr Walford, B. Director: Corporate Services, Umgeni Water. 25 May 1993.

APPENDIX 4

LIST OF WORKING PAPERS

Working paper Number and Title:

1. **Water boards**
2 **Witwatersrand Metropolitan Area**
3. **Durban Functional Region**
4. **Cape Town metropolitan area**
5. **Bloemfontein - Mangaung - Botshabelo**
6. **Warmbaths - Belabela**
7. **Queenstown**
8. **Bophuthatswana**

Outline of Working Papers:

1. Water boards

Rand Water Board: Overview of the board's current operations, legal constraints and vision of the future. Based on interviews with the Chief Executive and the Chief Engineer: Planning.

Umgeni Water: Overview of Umgeni's style of operation, with a focus on its role in directly supplying water to rural communities and its involvement in wastewater treatment through agency agreements. A summary of the provision of the Water Act as pertaining to Water Boards is also given here.

2. Witwatersrand Metropolitan Area

East Rand Water Care Company (Erwat): Description of the establishment and functions of the not-for profit section 21 company for wastewater treatment and conveyance in the East Rand Regional services Council area, and comments on the various contractual relationships that arise from this institutional setting.

Central Wits Regional Services Council: Remarks on its support for the Johannesburg Metropolitan Chamber, its role in the planning and rationalisation of bulk wastewater treatment (outcomes of Mortimer investigation) and summary of its financial affairs.

Johannesburg City Council: Focus on performance standards and customer interface of the Water Branch.

Greater Soweto: Review of negotiations in the metropolitan chamber pertaining to tariffs, services provision (management) and institutional issues in Greater Soweto. Comments on poor state of water infrastructure and weak institutional capacity.

Winterveld: A description of a community on the metropolitan fringe denied access to basic services as a result political fiat. Questions relating to the drawing of metropolitan boundaries and practice of uniform service and tariff policies within metropolitan areas are raised.

3. Durban Functional Region

Durban: Water and Waste: Overview of Durban Corporation's proactive involvement in services provision in areas outside of the council area, the move towards autonomous management and commercially based organisational structures and emerging policy regarding menus of standards and cost recovery.

Port Natal - Ebhodwe Joint Service Board: Remarks on the rationalisation of services in the Durban Functional Region, the JSB's existing funding and management roles, and comments on the likely demise of RSCs and JSBs. The JSB's role in rural areas outside of the Durban Functional Region (DFR) is also discussed.

The Valley Trust: NGO involvement in peri-urban water and sanitation - a possible model for replication.

Inanda (NPA / KwaZulu): A description of services provision on the periphery of Durban in the context of administrative complexity, and weak local institutional and financial capacity.

Umlazi (KwaZulu): A description of and commentary on the management contract arrangement for the town engineering function. The positive results of a management by objectives approach is also highlighted.

4. Cape Town metropolitan area

An brief overview of bulk service arrangements is provided. The respective roles and approaches of the Cape Town City Council and the Western Cape Regional Services Council are reviewed. Issues pertaining to the restructuring of services in the metropolitan area are raised and the comparative absence of activity aimed at preparing for this is noted. Service conditions in Khayelitsha it also briefly commented on.

5. Bloemfontein - Mangaung - Botshabelo

The management of services in a smaller metropolitan authority is reviewed. The fairly unique interaction between Mangaung and Bloemfontein City council is commented on and difficulties inherent in managing the artificially cerated Botshabelo (55 km from Bloemfontein) are noted.

6. Warmbaths - Belabela

The management arrangements in this "twin" apartheid town in the Northern Transvaal are reviewed. The town has a number of characteristics - a small economic base, a black population five times the size of the white population, a conservative white population and a fairly militant element within the black population - which make an investigation into the institutional and financial aspects of services rationalisation illuminating.

7. Queenstown

A long term contract with a 49% French owned water care company for the management of the complete water supply and wastewater networks in Queenstown has recently been concluded. This agreement is reviewed and potential problems that may arise from such agreements are highlighted.

8. Bophuthatswana

The institutional and financial arrangements for water supply and sanitation in Bophuthatswana are reviewed. Of note is their rural water supply plan and the categorisation of areas into economic (urban), sub-economic (urban) and rural, by which different financial and service delivery policies are applied.

MAPS

MAP 1: CAPE TOWN - Local Authority Boundaries

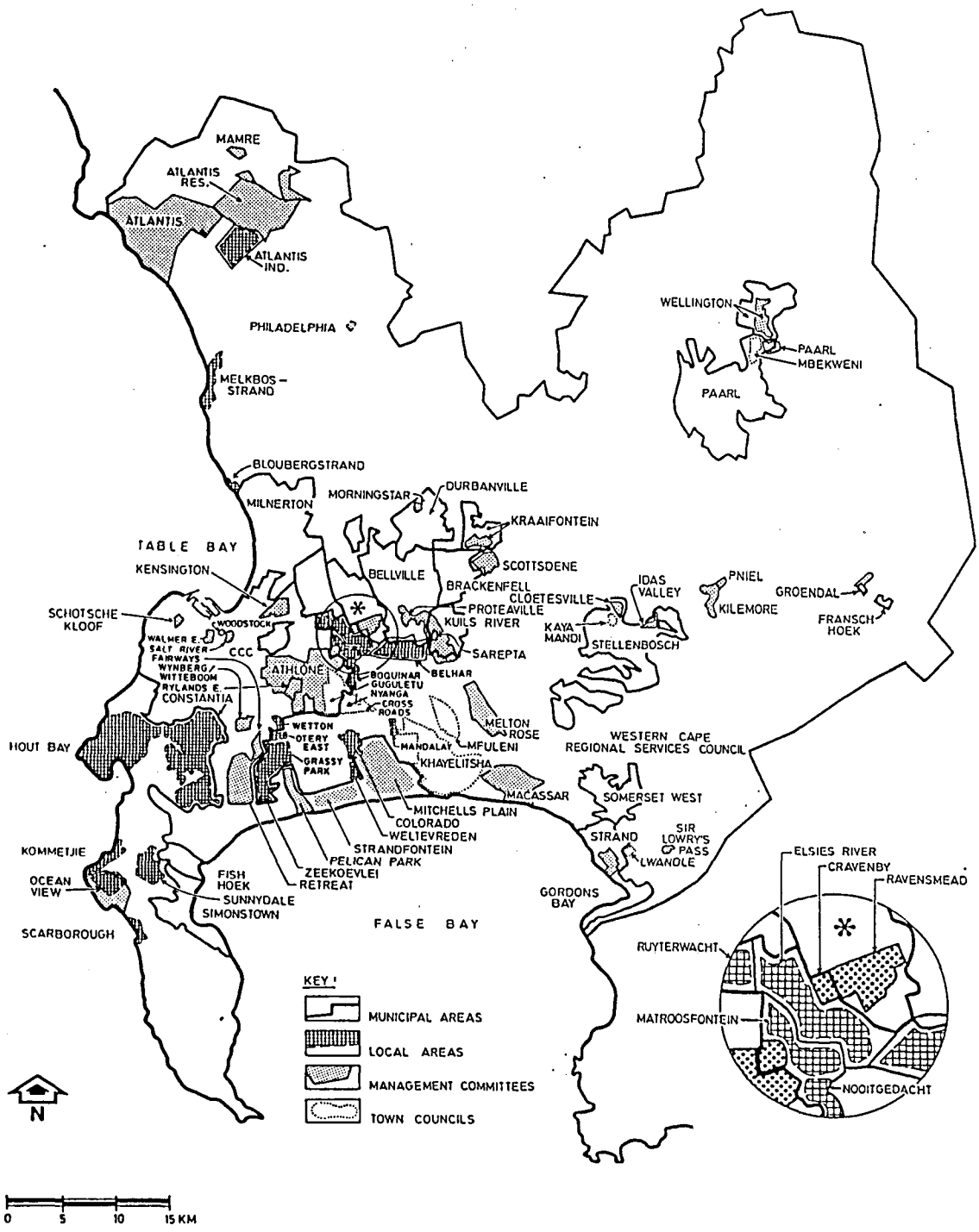
MAP 2: CAPE TOWN - Wastewater Catchment Areas

MAP 3: DURBAN - Local Authority Boundaries

MAP 4: DURBAN - Wastewater Catchment Areas

MAP 1

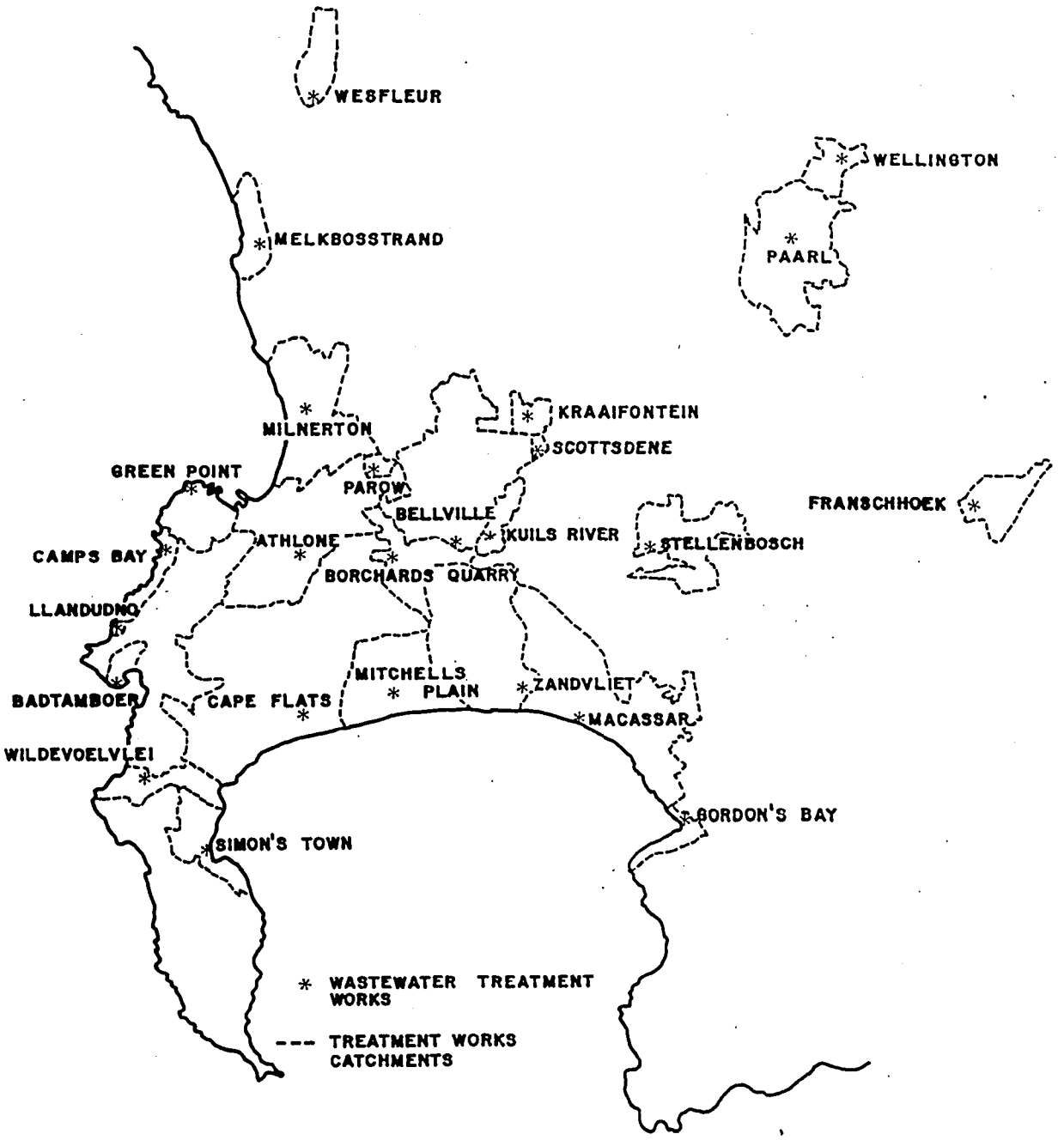
CAPE TOWN - Local Authority Boundaries



Source: Cape Town City Council

MAP 2

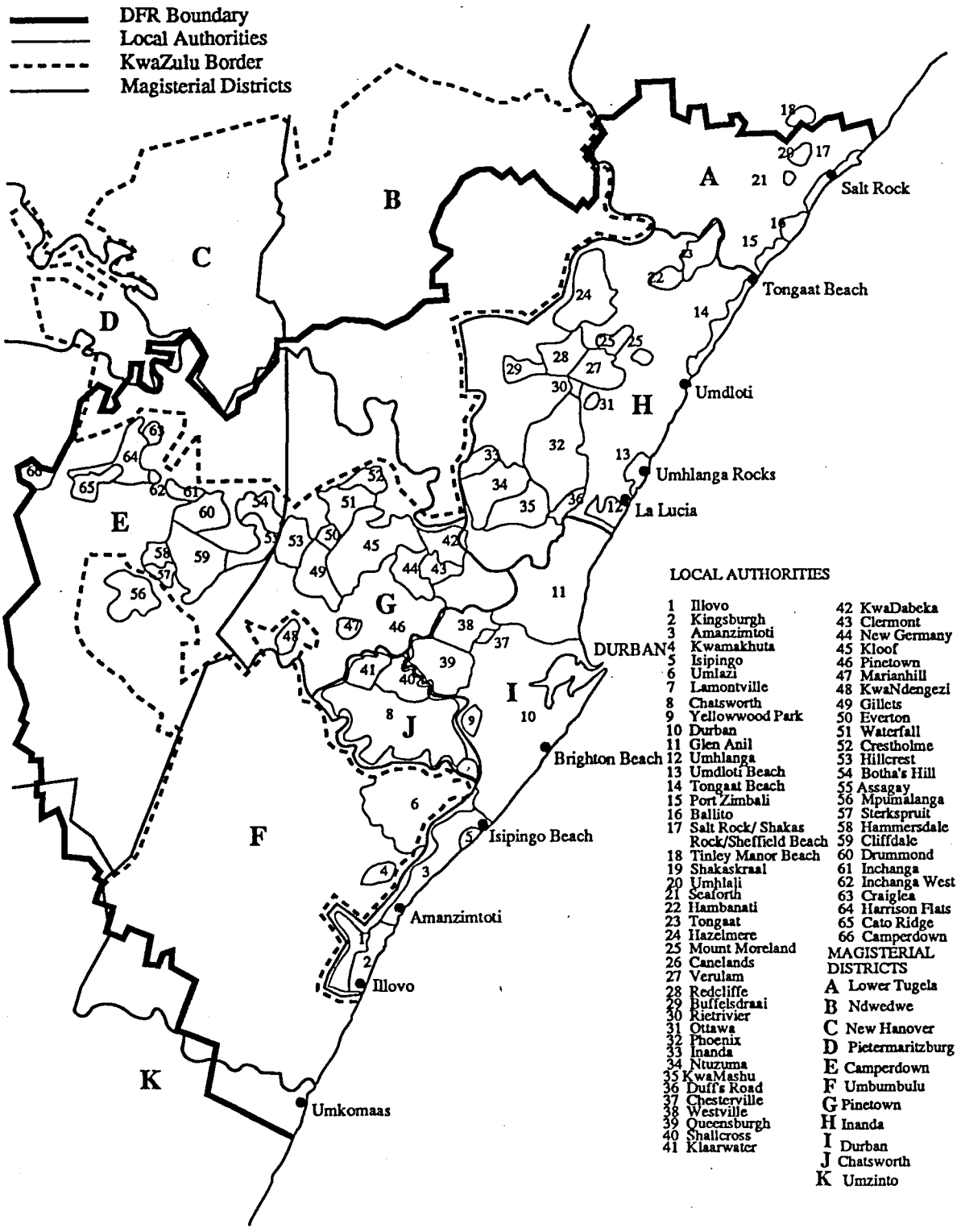
CAPE TOWN - Wastewater Catchment Areas



Source: Cape Town City Council

MAP 3

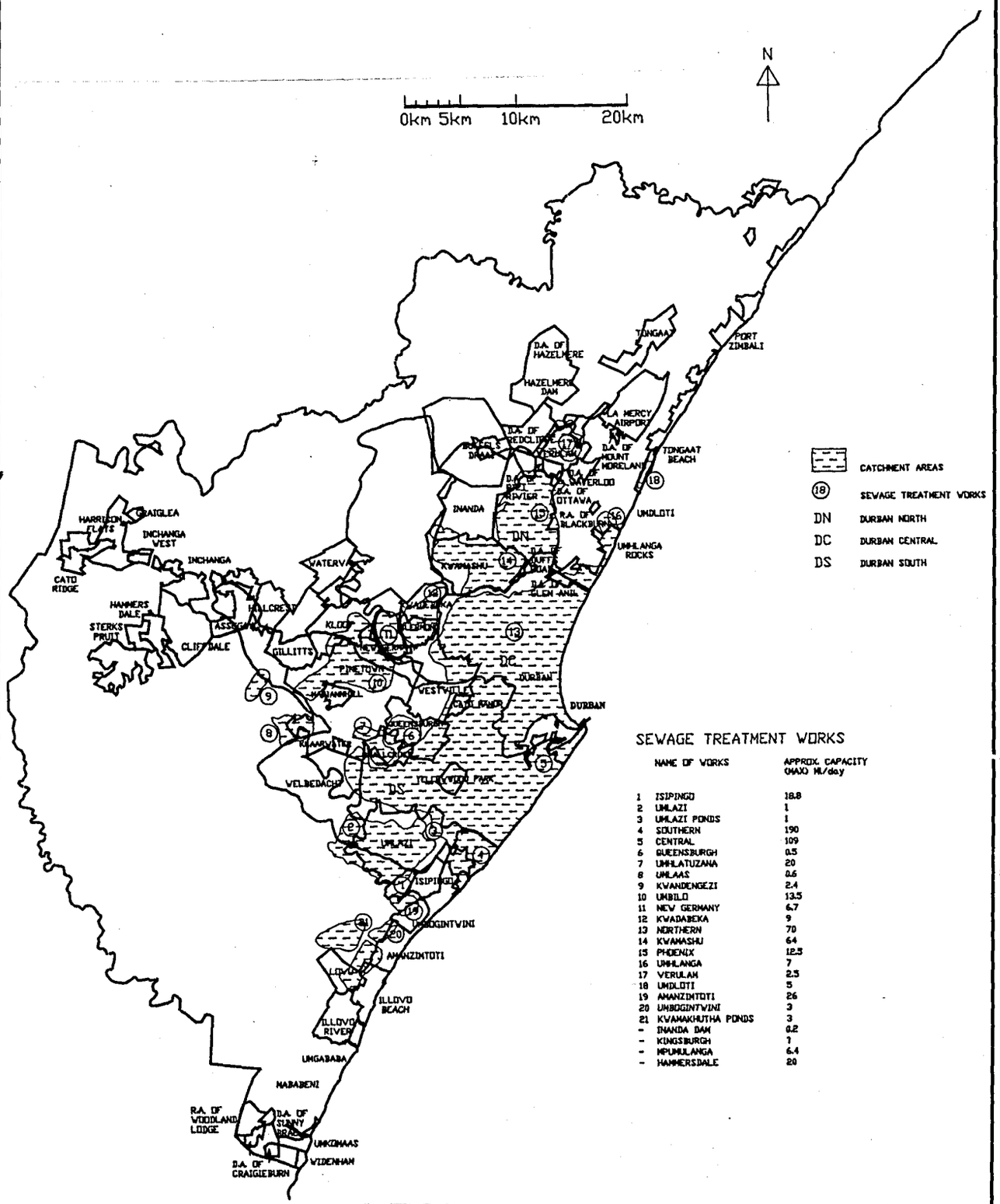
DURBAN - Local Authority Boundaries



Source: Development Bank of Southern Africa

MAP 4

DURBAN - Wastewater Catchment Areas



SEWAGE TREATMENT WORKS

	NAME OF WORKS	APPROX. CAPACITY (MAX) Ml/day
1	ISIPINGO	18.8
2	UMLAZI	1
3	UMLAZI PONDS	1
4	SOUTHERN	190
5	CENTRAL	109
6	QUEENSBURGH	0.5
7	UMHLATUZANA	20
8	UMLAAS	0.6
9	KWANDENGEZI	2.4
10	UMBILO	13.5
11	NEW GERMANY	6.7
12	KWADABEKA	9
13	NORTHERN	70
14	KWAMASHU	64
15	PHOENIX	12.3
16	UMHLANGA	7
17	VERULAM	2.5
18	UMDLOTI	5
19	AMANZIMTOTI	26
20	UMBOGINTWINI	3
21	KWAMAKHUTHA PONDS	3
-	INANDA DAM	0.2
-	KINGSBURGH	1
-	NPUMULANGA	6.4
-	HAMMERSDALE	20

Source: World Bank