WATER RESEARCH COMMISSION

Guidelines for the Implementation

of Benchmarking Practices

in the

Provision of Water Services

in South Africa

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FOREWORD

Now that South Africa is fully integrated into the world economy, it faces challenges in the water and sanitation sector from the effects of globalisation.

Local Government, in particular, is under enormous pressure as the water services authority to ensure acceptable levels of water services to all residents and businesses in South Africa. The acceptability of these services will be determined by the extent to which they meet customers' needs. Customers' expectations will naturally be based on information gathered from their environment, including international publications and the Internet. This means that the levels and quality of service that the sector provides in South Africa will become increasingly aligned with international norms.

Water services providers from South Africa face increased pressure from large international service providers who see the South African market as an ideal opportunity for new business. In order to remain competitive, the industry will have to meet international standards of service provision in terms of quality, quantity and cost.

As a tool, benchmarking will, in my view, prove to be the cornerstone of our endeavours to develop a viable water services industry in South Africa that is internationally competitive. This publication will add significantly to an improvement in the understanding and usage of benchmarking in South Africa.

Neil Macleod

Executive Director,
Metro Water and Wastes,
City of Durban

Executive Summary

The Guidelines are intended to encourage the local authorities to benchmark their activities with their peers with a view to delivering water and sanitation services in a more effective and efficient manner.

Benchmarking has two components. The first is that of measuring performance against indicators that are precisely defined so that they may be compared with others. This is known as metric benchmarking. A value that is reasonably achievable is known as the benchmark for that activity. The next phase, which is performance benchmarking, is to identify other organisations that carry out the same activity in a better manner. They can then compare their results and ways that they took to achieve them so that the best methods can be identified. The remaining step is to incorporate the new ideas into the organisation and to re-measure the performance and mark the improvement.

There are a number of success stories from commercial and public enterprises resulting from benchmarking, which is essentially borrowing good ideas from other organisations.

Performance indicators are proposed covering all aspects of the local authority involvement in water supply and sanitation. These cover not only the technical aspects, but also the financial, human relations and, most importantly, customer expectations. They have been based mainly upon those adopted by the South African Associaiton of Water Utilities which, in turn, have much in common with the indicators for water supply developed by the task group of the International Water Association. The indicators for sanitation owe a measure to the benchmarking activities of the Six Cities of Scandinavia.

Performance benchmarking follows a distinct cycle of determining what to benchmark, then identifying the benchmark partners, selecting the people from the organisation to carry out the exercise, planning what to ask and discuss with the benchmark partners, contacting and interviewing them. Finally, the information that has been obtained must be analysed and the conclusions drawn up for further action. The most important stage is to incorporate the new ideas and methods of working into the organisation and measuring the improvement. There are areas in the operation that must be watched in order to be more certain of success.

South African legislation has created a climate that encourages benchmarking. Performance in the delivery of water and sanitation services must be reported to the Department of Water Affairs and Forestry in terms of the Water Services Act, Act No. 108 of 1997. The Municipal Systems Bill requires all local authorities to measure performance in terms of standard indicators.

A centralised database will be needed which can be accessed by all who wish to identify potential benchmark partners and to assess whether they are performing in an acceptable manner and reaching or exceeding the benchmark for any particular activity. The host for the database has yet to be determined, as well as the nature of the database. The guidelines make proposals in this regard.

Reference is made in the Guidelines to overseas literature and the successes that have been made in the aero industry, the manufacture of cartridges and in the creation of the first motor assembly line.

There is intense interest in benchmarking in the water sector overseas and initiatives by the World Bank and the African Utilities Partnership are mentioned. Work is being carried out in the USA, the United Kingdom, Australia, Scandinavia, and internationally generally by the International Water Association.

Benchmarking offers a route to more effective and efficient service delivery.

GUIDELINES FOR THE IMPLEMENTATION OF BENCHMARKING PRACTICES IN THE PROVISION OF WATER SERVICES IN SOUTH AFRICA

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CHAPTER 1
INTRODUCTION TO BENCHMARKING

1.1 INTRODUCTION

The biggest room in the world is the room for improvement.

Anon

The provision of water and sanitation services is vital in the life of any community of whatever size. In an increasing competitive age, in which the resources of finance and manpower need to be used with care and efficiency, it is thus important to measure and improve performance in all aspects of the service provision. Water and sanitation services are usually the responsibility of Water Services Authorities represented by the local authorities. Water services providers render the actual services. By their nature they are monopolistic and not subject to the market forces of competition. It is therefore important that there is a mechanism for measuring performance of both the public and the private sector water service providers to ensure effective and efficient delivery of service.

Benchmarking provides a tool for measuring performance and through this find the way to improve performance. It is not a competition to score the best on the performance tables.

From earliest times organisations sought better ways of doing things by visiting others performing the same tasks and seeing how the others did it. Such visits were often international in nature and brought benefits to the visitors. This form of benchmarking was informal and unstructured. Modern benchmarking is formal and structured with prior measurement, search for the best practitioners and then comparison of methods and the incorporation of the lessons into the practice.

Benchmarking is one of the more common buzzwords in management circles. It unfortunately has different meanings to different people. The original understanding of the word, a benchmark was a fixed reference point used by land surveyors from which measurements of height could be made. In the managerial context of the word it became a reference standard against which others could be measured. In the 1970s the concept of the benchmark changed beyond this use. It came to cover the measurement process as well, as just the reference standard, in order to conduct comparisons between different organisations. Early in the 1980s the noun became verbalised and the meaning was taken to be the continuing process of measuring products, services, and practised against competitors or those companies recognised as industry leaders.

From there the meaning was extended to mean the search for industrial best practices that lead to superior performance. The search is carried out amongst the leaders in the field with whom methods of achieving the superior performance can be discussed and refined by both or a number of parties. This aspect of **benchmarking** is referred to as **process benchmarking.** Process benchmarking is the ongoing search for best practices that produce superior performance when adapted and implemented in one's organisation.

The term **benchmark** will be used in this book to define a level, or reference standard of performance, which represent an achievable high standard of practice. It is a measurement of performance that all organisations should strive to meet. This leads now to the term **performance indicator**. This is a precisely defined measure of performance in any particular aspect of an operation. In this regard it is better to use commonly accepted definitions, which will enable you to compare your measurement of performance with others. It is not necessary to say that you are avoiding comparing apples with pears. It is necessary to compare only specific types of apples with one another. Too often much time and money is wasted when two organisations compare their performance and realise that they are not measuring the same things in the same way.

Metric benchmarking is the measurement of performance in any particular aspect of an organisation's business. It is the measurement of performance in numerical terms in order to make comparisons with earlier determinations or with those made by other organisations. Without such measurement, it would not be possible to see whether the organisation is improving or going backwards.

The provision of water and sanitation services is vital in the life of any community of whatever size. In an increasing competitive age, in which the resources of finance and manpower need to used with care and efficiency, it is important to measure and improve performance in all aspects of the service provision. Water and sanitation services are usually the responsibility of a statutory body, whether at central, regional or local level. By their nature they are monopolistic and not subject to the market forces of competition. It is therefore important that there is a mechanism for measuring performance of the both the public and the private sector water service providers to ensure effective and efficient delivery of service.

It should also be noted that the benchmarking process does not only involve comparisons with other local authorities but from any other organisation performing similar functions. Its history is a system of purposefully borrowing of ideas.

Emphasis will be placed in this book on the improvement in performance through the concept of benchmarking. There are currently some 284 local authorities in the country, most of which are understaffed and under-performing. A great deal of dissatisfaction has arisen amongst the customers at the standard of service being offered as well as the level of service. This in turn has led to a lack of credibility of the local authorities and to the culture of non-payment. It is totally unreasonable to expect any individual to pay for a service for which he as a consumer, is not billed correctly, or the service fails for several hours each day, or for various other deficiencies. The aim therefore is to improve the performance of the local authorities in the provision of water services.

Benchmarking should not be regarded as a chore and a burden. It should be seen as a voyage of exploration, in which the performance of one local authority can be compared with that of three or four others having similar problems and of which at least two are able to show good or better performance. New methods of working and organising that have been learnt through the process benchmarking process can then be applied with a growing sense of power and accomplishment as improvement in performance is measured, noted and the morale of the whole organisation is lifted.

The objective of achieving meaningful improvements in water and wastewater service delivery and water-use efficiency pre-supposes knowledge such as how water is presently used, conditions of supply, etc. Through the use of goal-setting performance indicators it is possible for local authorities to measure their current performance levels in water and wastewater service delivery relative to the performance of other local authorities providing similar delivery services. Performance indicators enable local authorities to set challenging, yet feasible targets, which help them to be more competitive. Local authorities will benefit most from knowing how well they perform in regard to several core indicators, how these ratios are changing over time, and how they compare with their peer local authorities.

1.1.1 The Target of this Document and the Uses of Benchmarking.

The guidelines are targeted at all the sectors of the local authority. The Municipal Councillors need to be conversant with the activities and procedures that are undertaken in the provision of water and sanitation services. They need information and an understanding on how effective and efficient is the service that they, as the responsible body, render to their constituencies. The Guidelines are intended to inspire them to initiate benchmarking activities in their own local authority and create the environment for the development of a culture of learning.

Where the private sector or other water service provider has entered into a long-term contract with the local authority, it will enable the councillors and officials to measure and compare the performance of the private sector service provider with that of the other local authorities. This will show the benefits, or otherwise, of engaging the private sector.

It is intended for the senior officials, who should seek to inspire all members of the staff to embark on their own individual voyages, to meet with their counterparts from other local authorities, to compare methods and from these identify and adopt what are deemed to be the best practices. In this regard it should be noted that benchmarking is an ongoing process to be used by all the disciplines and levels of the municipality.

Finally it is intended to encourage everyone working within the local authorities to measure their own performance and where needed to enhance it through the use of performance indicators and to benchmark with others for their own benefit and that of the organisation.

1.1.2 Development of the Benchmarking Process

Benchmarking has its origins in history when missions visited foreign countries on study tours to learn from others how they could do things better. This is the essence of benchmarking. It does not only involve organisations from the same industry, but rather organisations carrying out the same activities. The following examples will illustrate this.

An older example is that in the 1800s British textile mills were the best in the world. American mills in contrast were still in their infancy and a certain Francis Lovell from New England set out to change this by upgrading his business technology. He travelled to England where he studied the manufacturing techniques and industrial design of the best British mill factory. He saw the British plants had much more sophisticated equipment but their layouts did not utilise the labour effectively. In short there was room for improvement. In 1850 he built a factory that employed much of the technology of the British plants but that was designed to be much less labour intensive.

In 25 years he had established the town Lourel in Massachusetts as the second largest city in America and the largest manufacturing complex in the country. This dynamic growth was largely fuelled by one man's vision and his ability to adapt practices observed in the world's best mills creatively.(1)

More recently in 1912, a curious Henry Ford watched men cut meat during a tour of the Chicago slaughterhouse. The carcasses were hanging on hooks mounted on a monorail. After each man performed his job, he would push the carcass to the next station. When the tour was over, the tour guide said, "Well Sir, what do you think?" Mr Ford turned to the man and said, "Thanks son, I think you may have given me a real good idea". Less than six months later, the world's first assembly line started producing magnetos in the Ford Highland Park Plant (2).

A further dramatic illustration of what benchmarking is and what it can achieve is given by the following extract.

Dallas based Southwest Airlines used to have a problem. Most of its aircraft were on the ground between flights of an average of 40 expensive minutes. Although it had benchmarked its refuelling processes against other airlines, it found it was already one of the leaders. Some sort of quantum leap for improvement was needed, so it looked outside the airline industry for the most efficient refuellers in the world, Formula One racing. Adopting the turnaround processes used during pit stops, Southwest Airlines can now refuel an aeroplane in 12 minutes! (3)

The Remington Rifle Company was made aware that the customers wanted shinier rifle shells for their guns. Plant managers did not regard this as very important and although they tried to do so were unable to overcome it. Fortunately a short distance away was a cosmetics plant that produced shiny lipstick cartridges that were similar in size and shape to

the rifle shells. A site visit to the cosmetics plant paid off and the Remington team solved the production difficulties of producing shiny rifle shells.[4]

1.2 UNDERSTANDING BENCHMARKING

Benchmarking is a process for continuous improvement and involves the measurement of performance against particular criteria related to an activity. This aspect is known as metric benchmarking. The performance indicators should be in common use with other organisations carrying out the same activities.

The other component of benchmarking or the improvement of performance is through exchange of information and generating creative ideas, known as process benchmarking. There are several important concepts to understand about it.

- Firstly, it is continuous and ongoing. Very little will be gained by an organisation embarking on the benchmarking process for the first time if it is the only time. Each and every organisation will be on a learning curve and improving their own benchmarking practices. The process is cyclic.
- The process is one of improvement. Unless actual performance is measured after each round it will be impossible to know if there has been an improvement or not. The measurement of performance must be carried out in a consistent manner at each iteration of the process so that the comparisons will be valid.
- In order to improve one must change and in order to change one must learn new ways of doing things. In order to ensure that the operation will be successful a culture of learning is a pre-requisite before embarking on a process of benchmarking.
- A culture of learning can only permeate from the top down. Top management cannot decree such a culture, other than by example. It requires an encouraging atmosphere from managers and junior managers to all levels of staff and must be endued with the spirit of learning and improving.
- It follows that benchmarking must be supported at all levels of the organisation and all levels should be able to participate in the process in some way or the other. It is possible that certain sectors of an organisation may see this as a process of getting more work from fewer people and hence a threat to job security. This attitude must be countered possibly with greater rewards for greater productivity.

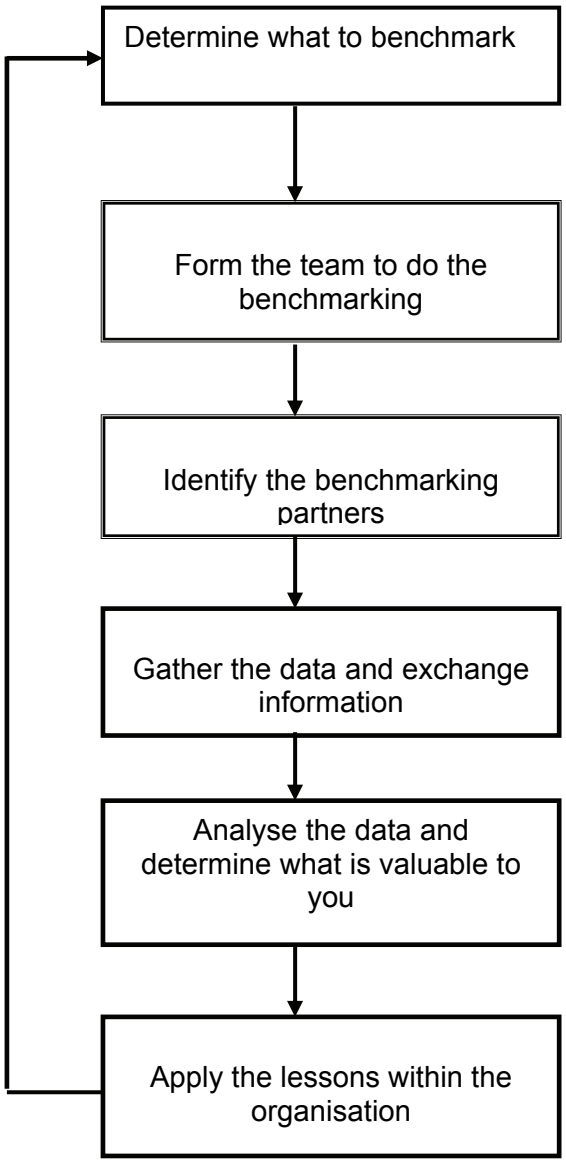
Therefore benchmarking is a concept and procedure that should involve the entire organisation and requires a special culture within the organisation that is performance-oriented. Without this there can be no measurement or awareness of improvement.

There are three possible ways of changing the organisation. The first, is the "*do it yourself approach"*. It is the most expensive. It is time consuming and does not ensure that the end result is at a comparable and competitive standard. The second is to *engage a consultant* to provide the link with current practice elsewhere. It is a satisfactory method, but is external and imposed and does not necessarily hold the hearts and minds of the participants.

The third is to engage in *process benchmarking* where the ideas of the more or most successful are borrowed and applied internally, preferably by those who will benefit most from those ideas. This is the least expensive way of improving the organisation and the one that offers the greatest chance of success.

1.3 THE BENCHMARKING CYCLE

There are six steps in the benchmarking cycle as shown below.



a) Determine what to benchmark. This is not so simple as it may seem. A great deal of effort and energy can be wasted if insufficient attention is paid at this step. It should be tackled in a systematic manner. The type of question that should be answered follows these lines:

- What is the most critical factor in the organisation's success?
- What factors are causing the most trouble?
- What factors account for customer satisfaction?
- What specific operational problems appear to the organisation?
- What are the major cost drivers in the organisation?
- What functions represent the highest percentage of cost?
- Which functions have the greatest room for improvement?

b) Form the benchmarking team. The teams to carry out the benchmarking can be formed from intact working groups, cross-functional and inter-organisational teams or ad hoc teams, which are formed for a specific activity. Each team should have a project manager, an internal or external benchmarking specialist and a group to collect and analyse the data. The roles and responsibilities of every member of the team must be defined in terms of what they must do. The need for training in the tasks identified should be considered and provision made to fulfil the training requirements, even at the expense of adding another team member to do the training.

c) Identify the benchmarking partners. These must be acknowledged leaders in what they do. They are not so easy to identify as may first appear. To what standards do they work? Is what they are measuring comparable to the key performance indicators of the organisation starting the benchmarking process?

d) They may be found through a variety of routes, from identifying award-winning organisations, through mailing other similar organisations, from independent reports and even word of mouth. In recent times benchmarking networks have arisen.

e) Collect the benchmark information. The data can be collected through a variety of media. These may range from telephone interviews, personal meetings, and surveys, through published information and from research into the archives. Each has advantages and disadvantages over the others and the method to be used should take these into account in accordance with the resources available. The information that is required should be carefully thought out and proper questionnaires prepared. These should be tested internally to ensure that the right information is being requested. The interviews should not be hurried and the data needs to be carefully recorded. The data should be analysed for consistency and accuracy. It must be thoughtfully used to enable valid conclusions and strategies to be drawn up.

f) Analyse the data. This first action in analysing the data is to carry out a reality check to ensure that the information is consistent, reasonable and plausible. Experience is perhaps the greatest asset in this assessment. If irregularities are found in the information, then the source of the facts should again be asked to verify their sources. The information that has been gathered should then be examined to determine those factors that can assist in the improvement of the way that you do things.

g) Take action with all the players and apply the lessons learnt. The final phase of the first round of benchmarking is to apply the lessons learnt into practice. This needs the full co-operation of the staff members who will be affected by the changes that are to be introduced. If they are hostile in any way the changes will not be effective. They should be brought into the process as soon as it is possible in order to minimize the effects of any de-motivating factors. The effect of the changes must be measured to provide stimulus to further improvement and also to evaluate the benefits of the benchmarking process. If necessary, the process may have to be modified so that the next round will be more effective.

1.4 THE NEED FOR BENCHMARKING GUIDELINES IN THE SOUTH AFRICAN WATER SECTOR

The Water Services Act (Act 108 of 1997) inter alia provides for the right of access for all to basic water supply and sanitation, the setting of national standards and norms in respect of water services and the preparation and adoption of water services development plans by the water service authorities. It follows that the effective and efficient delivery of water and sanitation services is a matter of concern to the water service authorities of South Africa. One of the means of improving performance is through benchmarking.

The Water Research Commission initiated studies in 1998 to determine the extent to which benchmarking was already taking place in the local authorities, which are the designated water service authorities.

The investigation concentrated on the comparative performance-benchmarking aspects, rather than on the measurement of key performance indicators in the delivery of water services. Of the eleven local authorities and one regional bulk supplier that were interviewed not one the Town Engineers was really familiar with the concept of benchmarking.

They had not really analysed their activities to determine which of these were critical to the success or otherwise of the water services delivery. After explanations of the purpose of benchmarking, all saw the need for more information and for guidelines on how to conduct the operation. The degree of enthusiasm differed as not all saw their way to being able to use such guidelines effectively. The reasons for this varied. One referred to the difficulties of persuading the Council to spend the time and the effort to start the process. Another reason, coming from the smaller authorities was that they were so short-staffed that there would not be the capacity to do anything about it.

As a result of these findings the Water Research Commission initiated a second project to prepare the Guidelines and establish performance indicators and benchmarks in the provision of water services that would have general acceptance.

The Institution of Municipal Engineers in South Africa has formed a task team to investigate how to initiate and complete the benchmarking operation. These guidelines are being prepared in conjunction with this task team.

In addition, the South African Associaiton of Water Utilities has also formed a task team to provide performance indicators relevant to the supply of bulk water and then to provide a service on information to initiate benchmarking. It will establish a database into which the performance of each water board will be fed on a regular and routine basis. In this way each board will be able to monitor its performance relative to the other water boards of similar size and customer base.

The Department of Provincial and Local Government has introduced the Municipal Services Act, which calls for the establishment of performance indicators across the whole municipal spectrum of activities.

The relationship of the different tiers of management in the water cycle is shown on the Table overleaf. All those involved can benefit from setting performance indicators and benchmarking with others.

	Water resource Development	Bulk Water Treatment and Delivery	Distribution	Wastewater collection and treatment
Department of Water Affairs and Forestry	The responsibility of the Department of Water Affairs and Forestry	Still responsible for schemes from homeland governments	Still responsible for schemes from homeland governments	Still responsible for schemes from homeland governments
Water Boards	Subject to permit from the Department of Water Affairs and Forestry.	Responsible for Regional Supplies	Where appointed as a water services provider	Responsible for wastewater treatment in a few instances
Water Service Authorities	Subject to permit from the Department of Water Affairs and Forestry.	Responsible for local bulk water schemes	Responsible for all delivery of a water supply service	Responsible for the delivery of all sanitation services
Water Service Provider		May be Responsible for Regional Supplies	Water services providers may be appointed	Water services providers may be appointed

The Table sets out the responsibilities defined in legislation.

1.4.1 The Purpose of the Guidelines

These benchmarking guidelines have been prepared to provide a uniform basis for interpreting and reporting operating and financial performance amongst the water service providers of South Africa. The guidelines are intended to provide a framework to encourage the local authorities to embark on a process of improvement to the water and sanitation services that they offer to their customers, leading to improved delivery, more efficient services and a greater focus on the best practices in the management of the use of water.

To this end, the guidelines provide an array of performance indicators that local authorities can use. Not all the indicators that have been defined will be needed and according to the size, customer profile and level of maturity of the local authority, so the applicable performance indicators should be selected and used. It is important to recognise those indicators that are key to the operation and those that contribute to the efficiency and effectiveness of the organisation.

The indicators are shown in Annex A and for the rural situation, where special conditions apply, a separate set is shown in Annex B. The indicators cover the important financial aspects as well as managerial issues, human resources and features of equity in employment and commerce. This is apart from the technical activities that are the core of water services provision. Every department of the local authority therefore should use this book and cooperate in the improvement of the joint performance. This is the route to sustainable and affordable services.

References:

(1) "The Wealth and Poverty of Nations" XYZ
(2) Brogan C.E. and English M.J. "Benchmarking for Best Practices. Winning Through Innovative Adaption" McGraw Hill Inc. 1994 Page 2
(3) Management Today. Nov. 1997 Published by the Institute of Management, United Kingdom
(4) Brogan C.E. and English M.J. Ibid. 1994 Page 3

CHAPTER 2
PERFORMANCE INDICATORS

"There are no winners or losers in benchmarking comparisons".

2.1 INTRODUCTION

The measurement of performance is the first step towards purposeful improvement. Just as the stopwatch is critical for the measurement of the performance of an athlete, so the use of performance indicators is imperative in the measurement of the performance of organisations. They are in common use in the business sector where they are regarded as an indispensable tool to effective management.

The measurement of performance by itself does not tell whether the performance is good or bad. There must be comparisons with other measurements, either at an earlier time or with other organisations carrying out the same operation. However, if the method of measurement differs in any way, a false comparison will be obtained. This is particularly true of financial indicators that may or not include specific costs or expenditures in the definition of the indicator. There must therefore be a clear definition of the indicator and the terms that are used to calculate the value of the indicator.

As set out in the introduction, there will be a value of the indicator that will represent a good target for organisations of the same class or stature to aspire to. This value is defined as the benchmark value.

Finally, it is not necessary for every organisation to attempt to calculate and monitor every performance indicator that is defined in the list in these guidelines or any other reference list. The organisation should select those that are most meaningful to its operations and success. This does not mean that only the key indicators should be monitored. The outcome of these will depend on the performance being achieved in other activities that all go to make up an overall satisfactory performance.

The balanced scorecard is the structure for translating the vision, mission strategies and environment of legislation and other external impacts of an organisation into a system of operation that will chart its progress for top management by measuring the advancement of performance in respect of the goals of the organisation.

The Balanced Scorecard management process incorporates financial, operational and social concerns and is based on the continuous measurement of performance in order to determine trends, which are the best and worst practices and where are the areas for improvement. The balance is provided between the short (2 Years) and long term goals (5 years), financial and other measures, lagging and leading indicators and perspectives of performance, both internally and externally.

The reason for doing this is to gain perspective on the strategic business objectives of the organisation and to discuss and communicate these objectives between the different business units. Resources can then be aligned to the strategic planning. The system provides the feed back on the progress with the strategic plans. The system becomes more transparent with accountability and open budgeting. All this adds up to improved productivity and effectiveness with prioritised business initiatives. It also enables the performance to be compared with outside organisations.

2.2 THE NATURE OF PERFORMANCE INDICATORS

There are certain factors to be taken into account in the selection and definition of the performance indicators. The use to which the indicators will be put determines some of the characteristics that are required. Certain of them will be used internally only in order to compare the performance in any particular activity over time. The Department of Water Affairs and Forestry will, for example, use indicators for comparisons with other water boards. The water boards will use them to exchange information in order to establish benchmark values against which to measure their performance.

The following are the criteria to be considered in determining the performance indicator:

- The set of indicators should cover the full range of activities of the water institutions.
- Be capable of representing the true situation without bias.
- Be clearly defined with a unique interpretation.
- Should not overlap.
- Be readily calculated from available data, or if not available, readily obtainable.
- Capable of being audited.
- Be easy to understand, by specialists as well as lay people. and
- Refer to a defined time period, usually one year.

If the indicators are to be used for external comparisons, they should in addition:

- Be referenced to a defined geographical area.
- Be applicable to the full range of water institutions with different characteristics and stages of development and.
- Be limited in number.

2.3 SELECTION OF INDICATORS

A number of organisations have been preparing lists of ‘standard performance indicators’ related to the water services industry. It is unfortunate that the definitions used for these do not all agree with one another. It is also unfortunate that sanitation and wastewater disposal is neglected. Only two organisations appear to have addressed this issue and a third one is just starting to do so. Another neglected area is in the field of project implementation at both the macro scale as well as in the implementation of small rural schemes.

The following is a selection of the lists available:

a) Water Supply and Distribution
   - International Water Association Task Team on Performance Indicators
   - The South African Association of Water Utilities
   - The Top Sixteen prepared by Rand Water
   - American Water Works Association
   - The World Bank Benchmarking Starter Kit and
   - Performance Benchmarking Among Six Cities in Scandinavia

b) Sanitation and Wastewater
   - Water Environment Federation (USA)
   - Performance Benchmarking Among Six Cities in Scandinavia

It should be noted that many of the financial and customer focused performance indicators for Sanitation and Wastewater are the same or similar to those provided for the Water Supply and Distribution. They are therefore not repeated again in these guidelines.

For purposes of standardisation the list adopted by the South African Associaiton of Water Utilities is being used for the water supply section. Additional indicators have been added from the International Water Association Task Team Report for the distribution aspects.

A sub-committee of the South African Associaiton of Water Utilities working over the April May period of 2000 drew up this list of indicators. An analysis was made of the international documents to establish the set of indicators and the categories within which they fell. The following categories were considered:

- Service Delivery
- Financial Credibility
- Technical Effectiveness
- Plant Capacity and Utilisation
- Human Resources
- Background Information

The frequency with which they should be reported has been marked. Many of the indicators can also be calculated from the information that should be part of the normal operations of the local authority and should not place any additional burden on them in collecting the data for calculation.

2.4 RELEVANCE TO LOCAL AUTHORITIES

Not all the local authorities are at the same stage of development. The larger and more mature have developed considerable capacity and managerial skills supported by long periods of experience working in their own areas. The newer local authorities may in many cases lack the skills and experience. They will also have a different set of priorities and areas of focus. Therefore not all the performance indicators that are shown will be relevant or and in some instances the basic raw data may not be readily available. Each local authority should therefore select the indicators that best reflect its business focus.

Not all the performance indicators have the universal applicability that will enable a comparison of the relative performance of each water board to be made. Those that do will be marked in the final version of this document. The remainder will be used to measure the water board's internal progress. The performance achieved should be reported annually and the progress, or lack of it, noted and any necessary corrective action should be pointed out during the appraisal process.

2.5 HUMAN RESOURCES, ENVIRONMENTAL AND AFFIRMATIVE PROCUREMENT

A number of Human Resources indicators are included in the revised list. These cover the rate of staff turnover, absenteeism, industrial stoppages, training and skills development as well as health and safety.

Legislation requires that an equity plan be drawn up for each organisation and therefore it is assumed that each local authority will have such a plan. The percentage compliance with the plan should be reported as an indicator. It should be noted that the Business Plans are required to give details of the proportions at each level that are to come from each of the

Designated Groups for each of the ensuing five years. Overall percentage compliance is the only single indicator that is possible.

It is interesting that none of the international authorities that have been consulted have drawn up any specific performance indicator for the environment. The International Water Association calls for reports on the climate and raw water quality only but nothing that indicates the capability of the water service provider to protect or control aspects of the environment. This document provides the same indicators as the water boards, particularly with respect to the management of the quality of the wastewater discharges.

The monitoring of stormwater quality is an aspect with which the local authorities should concern themselves, although not of universal concern at the present. Nevertheless, indicators which distinguish between industrial and residential areas, are included to determine the extent to which the local authority monitors the situation.

Affirmative procurement is dealt with under the financial indicators as being the percentage of the value of the orders that are placed each year with previously disadvantaged companies of the total value of orders that are placed by the water board. The indicator shows the intention of the water board in this regard but not necessarily the conclusion. The reason for this is that a number of such contracts fail due to causes that are beyond the control of the water board and therefore do not truly reflect the performance of the water board.

2.6 SANITATION AND WASTEWATER

The sanitation and wastewater aspects have attracted far less interest than that of water supply. The book that has been prepared for the Water Environment Federation uses regression analyses from a large number of respondents to derive a formula for comparing works of different sizes and methods of treatment. This is not realistic as there are too many factors that affect the comparisons to make them meaningful.

There are various difficulties concerning the collection of data applicable to the wastewater industry. These include: the difficulties in obtaining comparable financial data; the unreliability of reported operational data; wide differences particularly in regard to wastewater treatment; methods and processes and the lack of consensus regarding best practices. With regard to data, it is important that any data collected and used should have an accuracy statement attached to it, i.e. the limits within which the data can be regarded as reliable. Difficulties with regard to performance data relate primarily to the variability of wastewater strengths. This varies from works to works and at a single works, from hour to hour and day by day. The quality of the final effluent is a significant factor in regard to costs. It may be relatively simple to reduce the Chemical Oxygen Demand of raw sewage of say 500 mg/ℓ down to 50 mg/ℓ, i.e. a difference of 450 mg/ℓ. However the processes and costs to reduce that residual of 50 mg/ℓ of Chemical Oxygen Demand by a further 20 mg/ℓ become very significant. It is then not possible to compare such a process with a treatment works treating only domestic sewage and consistently producing an effluent with a Chemical Oxygen Demand of 30 mg/ℓ.

The performance of a sewage collection system relates to its ability to handle the flows without causing nuisance in the streets and sidewalks where it is laid. Should a blockage occur or overflow due to overload occur, local authorities are very much dependent on the ability of the population residing there to report such occurrences. The performance of the local authority in clearing the blockages can be measured by three time-related events. The first is the time taken from when the overflow first became apparent until the person who takes it on himself to report the incident, reaches the appropriate department and effective action is taken. The second is the time from when the call is logged to when the repair crew

arrives at the scene of the overflow. The third, which may not be a measured performance due to the different possible causes for the blockage, is the time taken to clear the blockage. This is very much a function of the cause and nature of the blockage. It is however very important that if nuisance is to be minimised, there is a simple call-up system, widely publicised, to alert the local authority of the problem.

Blockages are very much a function of the quality, material and age sewers. Older socket spigot vitreous clay sewers with cement caulked joints are going to be more prone to blockages due to the ingress of root systems than the more modern pipe systems in use.

The locality of the sewerage system may also affect the number of blockages due to abuse of this system by the local householders. It is therefore necessary when preparing the background data to enter the total length of sewer of different materials, if necessary isolate areas where blockages are above the average, as well as to record the costs of repairing all the blockages under the different sub-categories. Collection of data from multiple local authorities on these aspects will give indications of which systems yield the least maintenance costs.

Any performance indicators for wastewater treatment should compare works of similar size and process. The following size ranges are suggested:

- up to 1 Mℓ/day (this is the limiting size used by the International Water Association to define small wastewater treatment works),
- from 1 Mℓ to 50/Mℓ as a medium-sized unit and
- greater than 50 Mℓ/day.

As far as process comparisons are concerned it is necessary to make simplifications and the following categories are proposed:

- Fixed film systems including works utilising rotating biological filters as well as rotating biological contactors.
- Works utilising the activated sludge principles for treatment which are designed for nutrient removal, whether biologically or with the addition of chemicals, and
- Works utilising the activated sludge principles for treatment for which biological nutrient removal is not required.

In each of the previous categories is the provision of anaerobic digestion for the sludge handling facilities or not.

- The final sub-category would be simple pond systems.

This may not be the simplest system, nor may it have included all the possible categories and sub-divisions. It does however reduce the possibilities of selecting of benchmarks and benchmarking partners for works that are not comparable.

The table that follows sets out the Top Thirty Performance Indicators that were selected by members of the different local authorities as being what they regarded as the most critical in their operations. The selection panel included town engineers and town treasurers. It is interesting that customer service received the most attention ahead of the technical. Also the Human Resources indicators received attention out of the wide selection that was available.

A fuller selection is shown in Annex A. For the sake of consistency within the country, this list has been drawn up on the basis of the Performance Indicators selected by the South African Association of Water Utilities as being most applicable to their business. Indicators have been added for wastewater and sanitation issues.

It should be noted that this set does not conform to other so called “standard” sets of indicators e.g. International Water Association for water supply, the Water Environment Federation for American wastewater practice, the set produced by the World Bank etc. Therefore the set shown here may not be suitable for international comparisons but it will be suitable for South African benchmarking initiatives.

Certain of the indicators are site specific and should not be used for comparing performance with other authorities.

CHAPTER 3

GUIDES TO SUCCESSFUL PROCESS BENCHMARKING

3.1 INTRODUCTION

Benchmarking is successful in organisations that have a culture that encourages learning. These learning organisations encourage prudent risk-taking, encourage holistic thinking, expect curiosity and creativity, encourage networking and teamwork and reward meaningful difference. There is a focus on transformational progress into mere development change. There are six golden rules that encourage these cultures of learning.

1. Liberate employee potential rather than control it.

   The learning organisations turn away from top-down rule by a select few through hierarchies that build rigid controls into the organisational structure. These structures do not support change, experimentation or progress to the degree that they are required for survival.

2. Holistic systematic thinking and learning should be encouraged rather than applied to narrow problem solving. The traditional approach has been inwardly focused with employees analysing the problems and then brainstorming their own solution to these problems. This process does not build on the proven ideas of other organisations that have already addressed similar situations. The standard problem-solving techniques tend to target narrowly defined operating difficulties. Just as most core work processes flow across multiple functions and departments, process solutions usually require a wide-angle perspective of the full performance system.

3. Expect creativity, innovation and continuous learning rather than conformity from managers and employees. In the public sector where pay-for-knowledge systems are unacceptable, job rotations, ongoing training and career pathing together with innovation awards that are outside the normal salary structure can give the required encouragement. Future promotion should be based on knowledge by the individual, which must be regarded as a valuable asset. Employees should be encouraged to learn, innovate and improve at all stages. It must be emphasised however that these improvements and innovations must all be directed towards the effectiveness and efficiency of the water services provision rather than innovations that benefit the individual.

4. Networking and the sharing of information must become part of the corporate culture. Traditionally bureaucracies encouraged isolationism. This is best accomplished within a flat organisation rather than in a steep pyramid-shaped hierarchy. The networking across bureaucratic lines discourages duplications and wastes of effort. In turn however, it also encourages sharing, co-operative learning, team focus and creativity. These are the elements that support the evolution of flatter and faster reacting organisational structures.

5. The culture should nurture integrated cross-functional teamwork. In the traditional local authority concept of different departments being responsible for their own functions without integrating these with the functions of other departments, will discourage and preclude any successful benchmarking. It is necessary therefore to minimise the bureaucratic tendencies within the overall legislative framework governing the operation of local authorities.

6. Corporate culture should reward meaningful improvements from the status quo. In that continuous improvement is the basis of best practice.

3.2 THE SIX BENCHMARKING STEPS

The introductory chapter gave an outline of the six benchmarking steps. The first of these is to select what to benchmark. Other organisations and authorities recommend greater numbers of steps, but these tend to be subdivisions of the six steps that are proposed here.

A benchmarking exercise may prove to be expensive if carried out formally and correctly with best in class organisations but should not prove costly if carried out correctly and the desired improvements achieved. It is important to select only those operations and activities that contribute most to the success of the organisation. It is vital to define what constitutes success. The following practical outcomes of the delivery of water and services are seen to be the principal success criteria.

- Delivery of adequate quantities of satisfactory quality water to each customer at the agreed level of service.
- Payment by each customer for the full amount due and within the time stipulated.

This represents in its simplest form the required outcomes from the water supply side. On

the sanitation side the following are seen to be the simple criteria of success:

- That every customer is provided with a service, whether for on site systems which necessitate the removal of excreta or sludge, or through a connection for the successful disposal of the human excreta and grey water emanating from the normal household activities.
- The successful treatment of the wastewater from both industry and domestic areas to meet water quality criteria set by the Department of Water Affairs and Forestry.

It is up to each local authority however to identify within its own organisation which of the many activities contributing to these success factors require improvement. This can best be done by a comparison of the various performance indicators data and selecting those in which the greatest improvement can be made or by comparing with other local authorities.

In selecting these finer topics to be benchmarked the following should be kept in mind:

- The topic should not be too broad.
- The project needs to be focused and not clouded by side issues.
- It's necessary that the 'best-in-class' institutions should be chosen on the basis of correct operation rather than perceived success.

There are other critical success factors for the benchmarking operation. The triple A concept of adopt, adapt, and advance should be borne in mind continuously. There are other factors over which the organisation has good control and these are:

- Senior management support.
- Training in benchmarking practices for the project team.
- Useful information technology systems.
- A culture of learning within the organisation.
- Adequate resources in the form of staff time, funding and equipment.

3.3 TRAINING IN BENCHMARKING

It appears very simple to be able to call upon the great organisations and examining and adapting and adopting their practices. Benchmarking is not a difficult concept but requires detailed examination. The people to be involved in the actual benchmarking should be trained on how to conduct the benchmarking operation.

It is firstly necessary to ensure that there is a standard benchmarking process that is used throughout the organisation. Employees should be familiarised with this as it facilitates the training of other benchmarking teams, communication between the teams, departments, the functional and the business units. Consistency in this is vital within the organisation.

The training itself should familiarise the employees with the basic tools with which to analyse, understand and improve their work processes. This requires illustration showing the relationship and the sequence of events in the work process. They are required to define the relationships between the units and to describe the inputs and outputs of the system. Flow charts of activities show the precise sequence of work, information, and material flows from department to department in sub-processes. These detailed diagrams will help the teams to identify improvement opportunities.

The benchmark training should prepare the team in performance measurement. A flow chart represents a composite performance system and the performance measurement indicates how successful that system is operating. To this end various performance indicators have been prepared and are presented elsewhere.

It may also be necessary once the process map has been established in any local authority that the performance indicators, which are presented in general form, should be reviewed and only those that are pertinent used. If necessary, where there are critical bottlenecks, new performance indicators should be established.

The training should provide the team with the requisite technical skills, techniques and tools to implement the benchmarking process. These skills may include basic research techniques, development of surveys, how to conduct telephone interviews and site visits, as well as team interviews, Gap analysis and development of performance charts, action plans, management reports and implementation plans. The training should prepare the team members to execute these techniques successfully or advise them on where they can seek help.

Training should prepare the team members to be effective problem-solvers and creators of solutions. The team shall have to exercise analytic problem-solving skills and synthetic solution creation skills. They should be prepared to be comfortable in both roles. Exposure to lateral thinking techniques will assist in the creation of effective solutions.

The benchmark training should present the benchmarking process in the context of existing quality improvement initiatives. It enables the solution of the problems and hence continuous improvement. It is a means to an end and not the end itself.

Benchmark training should convey the philosophy of best practices as the catalyst for performance improvement. The training should communicate the purpose, power and benefits of the best practices as an improvement strategy that complements traditional improvement approaches.

3.4 RESOURCES

Adequate resources must be devoted to the benchmarking process to enable it to succeed.

The team members must be allowed time for training, research and meetings. It is very important that the team members corroborate and collaborate with one another through the medium of meetings. It will not be possible for team members to carry out the benchmarking if they are already trying to continue with their regular jobs. Special time must be allocated.

Funds must be provided for the research, site visits, data acquisition, production of reports and holding interviews. Specific budgets for which the benchmarking team is responsible must be allocated.

Equipment, mainly in the form of technology support, is critical to the benchmarking teams' success. It must be possible to access databases from which they can gather, store and retrieve, as well as share best practice information. It may be useful to provide a common database for all the members of a benchmarking partnership.

3.5 DESIGN OF THE BENCHMARKING PROCESS

It should be noted that benchmarking itself is subject to a learning curve. Time must be devoted to the following:

Benchmarking Step	**Approximate Time Allocations**
Determine what to benchmark	Ongoing
Form the Benchmarking Team and Train. Plan the Process	10% to 25%
Identify the Benchmarking Partners	< 5%
Data Gathering and Exchange Information	35% to 50%
Analyse the Data and Determine what is of value	20% to 40%
Apply the lessons within the organisation	10% to 20%
Determine what to benchmark next	Ongoing

If it is accepted that benchmarking is a technique for improving performance, any or most or actions that result in improved performance can be deemed to be within the definition of benchmarking. The degree of formality varies from the simplest and lowest levels working within a small group to looking outside the organisation and ultimately comparing and benchmarking at the 'world class'. These various levels are shown in the following table.

	NOVICE	INTERMEDIATE	MASTER
World class leadership			√
Best in country leadership			√
Industry leadership		√	√
Industry standard	√	√	√
Best in company	√	√	√
Borrowing good ideas	√	√	√
Learn from past successes	√	√	√

	SMALL	MEDIUM	LARGE
World Class Leadership			√
Best in Country Leadership		√	√
Industry Leadership	√	√	√
Industry Standard	√	√	√
Best in Company	√	√	√
Borrowed Good Ideas	√	√	√
Learned from Past Successes	√	√	√

3.6 LEARNING FROM PAST SUCCESSES

In order to gain benefits from past successes in any process it is necessary to distil the critical factors that enable it to be a success. The technique is to determine what were the factors that enabled the success to be achieved. It will be noted that in doing so, the employees concerned, will have their morale raised by the investigation and will in all probability continue to seek ways of improving upon those success factors.

It may be that the factors were originally discovered by luck or serendipity but it is important that they be identified so that the same conditions can be recreated.

It also necessary when seeking these successful factors to note any inhibiting factors including organisational procedures that stultify initiative and prevent lateral thinking and action taking. This does not imply that procedures which ensure proper accountability can be flouted and broken.

3.7 BORROWING GOOD IDEAS

The example of Henry Ford noting the production line techniques in an abattoir and adapting these to the automotive industry has been noted. The man who invented the Velcro fastener noted how common burrs with sticky hooked spines clung to the material of clothing. The idea was developed ultimately to create the all-purpose fabric fastener that is well-known today.

Smaller organisations are better suited to use this technique of borrowing or stealing good ideas from other similar organisations or organisations carrying out similar functions. It should be noted that this borrowing has to be carried out in a spirit of co-operation and the organisations visited should be invited to a return visit in order to assist them if possible.

The ideas and concepts that are borrowed do not have to be major alterations to existing systems but may represent slightly improved ways of handling similar problems. They all contribute to improved performance at the end of the day.

In order to encourage staff members who are not necessarily in the senior grade to start borrowing ideas it will be necessary to start them by brainstorming good ideas over a number of five to 10 minute sessions. All the ideas should be noted and those that are clearly of little value should then be eliminated. Then ask the staff members where did the idea come from and in most cases it will be found that the idea came from another organisation. In this way staff will realise that they can easily adapt or modify ideas from others and thereafter should be alerted to look for them when they visit any other organisation. It should be noted that whoever adapts the good ideas successfully should be rewarded.

Another important feature for staff members to appreciate is that in borrowing a good idea they are using a concept that has already been shown to work. When an idea is built up from scratch, it has no history of success.

3.8 DEVELOPING INTERNAL BEST PRACTICES

In order for this concept to be successful it must be practised between different groups carrying out the same tasks and operations within the same organisation. However they must also look at the concept of working for one organisation and assisting one another, rather than competing and holding their ideas close to their chests in order to gain some advantage or better scorecard over the remaining groups. The various groups should therefore be rewarded, not for their performance, but for the improvement in the performance of the other groups as a result of borrowing the top group's ideas and practices. This may not be possible within very small organisations and the smallest local authorities. In this case individuals may replace the groups.

It will also be necessary to break down the concept that each group believes itself to be the best in the organisation. This can be done very simply by measuring performance through the indicators, which are to be used by the groups and/or the individuals.

Groups must therefore be encouraged to avoid an inward approach to their work with a view that any outside influences are no good. They must be encouraged to realise that the contrary is probably a lot more accurate and nearer the truth.

Encouraging groups to engage in study of best internal practices is likely to prove fruitful for a number of reasons:

- The staff members share the same culture and speak the same operations language making comparisons faster.

- The participants share the same measurement system making the comparisons meaningful.
- They use similar technology processes and systems. Therefore small differences in practice could result in significantly improved performance.
- There should be no competition between groups as they share a common reward system.
- It is easier to recognise with whom they should benchmark within the organisation rather than looking at external organisations.
- It can continue easily down the line of responsibility and command.

It should be noted that the internal benchmarking system follows the same steps as outlined for the overall external benchmarking operation.

3.9 EXTERNAL BEST PRACTICES

Despite improvements in operational performance it may be necessary to look outside the organisation in a formal structured manner to identify improved methods of performing the same tasks. This is now entering the level of process benchmarking. It requires the formal identification of performance indicators for the required activity and ensures that these are measured in a consistent and accurate method with the other local authorities with whom the benchmarking exercise is to be undertaken. These performance indicators should be taken from the standard list which forms part of these guidelines. It should be noted however that due to the complexity, the time, and the resources required that only a few carefully selected indicators should be selected for benchmarking.

3.10 BEST IN CLASS BENCHMARKING

This is near the summit of benchmarking endeavour. There must be a strong need and real benefits to be gained to benchmark at this level. The need to become best in class should be examined as a concept very carefully. Firstly there are relatively few other local authorities with whom you can benchmark. The search may also have to be extended outside the country which raises tremendous problems particularly with financial and cost indicators which are bedevilled by currency fluctuations. Answers need to be obtained to the following questions:

- Are your operations sufficiently mature to emulate a world-class performer?
- Do you compete internationally or globally?
- Are you willing to devote adequate time, resources and capital to undertake ‘best in class’ search.
- Is your product area strategically important enough to warrant a ‘best in class’ search?

An answer of no to any of these questions should lead you to reconsider the decision to indulge in ‘best in class’ benchmarking. There are probably fewer than ten organisations in South Africa that are capable of being compared with the best in the world. These organisations should also determine whether this will result in an improved performance for their customers before entering into the field of international benchmarking.

3.11 IDENTIFYING BENCHMARK PARTNERS

There many local authorities in South Africa of differing size, capacity and requirements. There are the mega cities of Cape Town, Johannesburg, Durban and Port Elizabeth, the smaller towns and cities, may have a well-established infrastructure together with a core of capable professionals. At the other end of the scale is the smaller rural local authority, having little or no infrastructure and no professional officers who have the training, experience and capability to carry out their duties.

As a result of poor revenue collection the credit rating of many of these does not enable them to borrow funds for new infrastructure at acceptable interest rates. Therefore in order to benchmark satisfactorily, like should seek like.

In this regard the National Information System, which will be a database managed by the Department of Water Affairs and Forestry, will contain information supplied by all the local authorities in the country. This database will provide information on various performance indicators by which the local authorities are measuring their own performance relative to other local authorities of similar size, organisational capacity and perhaps even financial stability. It is therefore vital that the information is submitted timeously to the national information system concerning the parameters by which performance is being measured. It should be noted that these parameters will differ again from local authority to local authority. However what is important is that each performance indicator is measured honestly and objectively within specified limits of accuracy to standard methods of calculation defined herein.

It should also be noted that the performance indicators in any specific activity do not represent a huge table or competition between the local authorities. It is there solely, to identify those areas where the most improvement can be gained and from whom the best information is probably available.

It is not absolutely necessary to confine benchmarking activities to local authorities or even water boards. As an example, where the delivery of accounts to the customers is carried out late without full coverage of all the meters, it will be advisable to discuss billing and accounting procedures with one of the larger chain stores. The problem may be that of workflow.

Good information on the control of debtors' days can also be gained from the retail commercial sector.

3.12 COLLECTING AND ANALYSING BENCHMARKING INFORMATION

Having selected four or five benchmark partners it becomes necessary to determine what information your organisation will seek from them. This requires fundamental review and analysis by the benchmarking team of the processes involved with the activity that is to be benchmarked. This will follow from the earlier review that was undertaken in order to determine what to benchmark. The review of the processes should preferably be a team exercise during which it is probable that a number of good new ideas will come to light.

The review will involve documenting and analysing your own organisational performance. This should in fact be undertaken before advising your benchmarking partners of what you propose to investigate and what information you would like to have available to you. It must be emphasised that this review of the internal processes is one of the key success activities of the benchmarking process. It is absolutely vital to have a thorough understanding of what you are trying to do and how you are doing it.

Data Collection Methods

Method	Advantages	Disadvantages
Telephone interviews	• Easy to plan and conduct • Enables contact with a large number of resources • Can be conducted at almost any time • Relatively inexpensive	• Cold calling can be time-consuming • Difficult to get return calls • May be interruptions • People are less likely to spend a lot of time on the telephone
Personal meetings/ site visit	• Establishes personal and professional relationship • Provides more quality time • Likely to produce a good deal of information	• Expensive (travel costs) • Time-consuming • There can be scheduling difficulties
Surveys	• Ability to collect information from a large population • Easy to construct • Relatively inexpensive • Easy transfer of information for analysis	• Low return rate • Impersonal • No possibility to ask follow-up questions • Questionable validity of some information • Must be relatively brief • Little possibility for detailed response
Publications/ media	• Ease of collection/ access • Variety of resources • Assistance available from data sources • Inexpensive to collect • Public access to information • Large quantities of information produced for many types of industries	• Over-abundance of information in some industries • Need to validate sources / statistics • Many obscure references • May be time consuming • Need to translate foreign material
Archival	• Ease of collection (internal) • Inexpensive to collect	• Missing data • Poorly organised data • May be time-consuming • Often limited to internal analysis

Whatever method of gathering the data is used, it is essential to record the information on prepared sheets setting out the questions as well as the name of the interviewer, the name of the person being interviewed, the organisation that is being interviewed, together with its address and the name of contact person, together with the title *and time and date of interview*. The topic of the interview should be stated on the forms and whether the interview was completed or not. There are certain matters to be attended to when conducting telephone interviews:

- The interview should be prepared ahead of time with questions arranged in a logical sequence. If the information will take some searching it would be as well to advise the interviewee well in advance of the nature of the questions to be asked.
- There should be a limited number of contacts in each organisation that you call.

- The telephone calls should be co-ordinated with other team members to ensure that there is no duplication of effort.
- All the names and titles of the people in your benchmarking partners whom you wish to telephone should be listed.
- Explain the purpose of the call and identify yourself and your position clearly.
- Mention why you are calling that specific organisation and the background reasons therefore.
- Benchmarking is a process involving the exchange of information. This is a two-way traffic and you should be willing to offer any helpful ideas to your interviewee.
- At the outset of the call give a realistic estimate of how long you will involve your interviewee and if it is inconvenient to them call back at a more suitable time.
- Send a follow-up note of thanks to your interviewee.

3.13 PERSONAL MEETINGS

Personal interviews are undoubtedly the more fruitful method of gaining information. If the visit is to a site more information will be gained visually than rather a large number of drawings and explanations at some remote point. Such site visits should of course be reciprocated to the other party. Personal interviews can also be conducted at a relatively informal level at conferences, conventions and other meetings.

The major drawbacks of the personal interviews are cost and time constraints. If travel is involved this can escalate the costs disproportionately and it is preferable to arrange for the benchmarking partners to be geographically close. Some basic points to consider when planning these personal interviews are:

- Confirm all appointments in writing.
- It is preferable to travel in pairs. This allows one to focus individually on the interview whilst the other records the information. It also serves, in the discussion afterwards, to pick up any small points that the scribe may have omitted.
- There must be a structured outline to the interview with properly prepared forms and questions. It will save a lot of time if a copy of the questionnaire is forwarded to the interviewee beforehand.
- There should be a follow-up either by telephone call or fax or other means of confirming the visit? This follow-up call will ensure that if there is additional information you can get it easily.
- Finally send a thank-you note to acknowledge the meeting.

3.14 SURVEYS

It may be found necessary to survey a large number of organisations with simple questionnaires. When planning the use of these surveys:

- Keep it short.
- Call before you send it.

- Avoid lengthy response requirements and use questionnaires that require simple, short answers only.
- Provide a self-addressed stamped return envelope. This is basic.
- Identify yourself and how you can be reached through all means of communication.
- Design your survey for easy data transfer and electronic analysis.
- Acknowledge receipt of the response.

3.15 BENCHMARKING PROTOCOL

A certain protocol has been developed amongst benchmarking partners. This refers to the professional etiquette or to some prescribed means of behaviour. The main purpose of this is to ensure that before seeking information and exhausting the time of others that there is fundamental knowledge and purpose in the mission. Your purpose and programme must be well defined and should be available to your benchmarking partners. The following points need to be borne in mind:

- The project should be planned and scheduled realistically.
- It should be noted that in general most organisations under-estimate the time required to gather data. The simple rule is to estimate how long you will take to gather information from external partners and then double it. You are going to have to conform with their timetables as well as your own. Your priorities are not their priorities. It will almost certainly be necessary to return to your benchmarking partner to clarify or gather additional information.

Prepare an outline of your benchmarking project for your partners. This should include *inter alia*

- Statement of purpose.
- Personal introduction explaining your role.
- General description of the benchmarking project including the expected results, project times and resource requirement.
- A list of the other benchmark partners that you are involving in the project.
- A specific description of the exact information that you need.
- An indication of the follow-up that they should expect or that you expect of them.
- Any statements regarding confidentiality, anonymity or legal insurances regarding your and their participation in the project.
- Contact names, telephone and fax numbers and email where relevant.

This should occupy approximately two pages and no longer.

- It will be necessary to approach your benchmarking partners carefully and tactfully. It is best to do this initially over the telephone to explain what your needs are. This call should be followed immediately with a faxed copy of the outline of the project in order to ensure immediate attention and interest. Follow this up with another telephone call to make sure the recipient has understood the project and amplify any points that may be necessary.
- It is best to initiate your investigations at as high a level of seniority as possible. This gains the attention of your benchmarking partners at the right level although the actual interviews may be conducted later at the functional level. This ensures that proper agreement is reached on the release of sensitive or confidential information. By

contacting the senior person first those to whom he refers you will be more attentive than if they had been approached directly. Finally it gives you a better opportunity to establish a long-term partnership throughout the organisation and establishes a foundation for constructive long-term relationships.

- Stick to your outline and do not deviate if at all possible. You should not attempt to introduce new topics or ask for new information that has not been mentioned previously.
- Keep your site visit teams to two people only. A large group is unnecessary for an effective site visit. It also avoids your benchmarking partner having to find a conference room or similar facility.
- Statistical information should be available to be entered onto prepared forms and tables.

3.16 INFORMATION ANALYSIS

There are various steps in the analysis of the data that has been gained. Where this is statistical it should be reviewed for anomalies and discontinuities that may be apparent in the figures submitted by any one organisation. The reason for this is a possible lack of definition of what is included in the statistic. This definition should be given prior to the interview with the questionnaire. If the interviewee prepares the statistics in accordance with its own practices, which differ from yours, the reasons for the omissions and additions should be established during the course of the interview. A further indicator of poor information is when the same data has been collected from different sources by different members of the team and is found to be in conflict. Either or both sets of data may be incorrect. The reasons should be investigated and issues clarified. It may be necessary to go back to the source of the data to try and clarify the reasons therefore. Finally, if the data cannot be reconciled or it would be too costly to do so, abandon the data and ignore it. In analysing process information care must be taken to define exactly what processes are involved for each of the activities that are being considered. Fair descriptions must be obtained from the interviews so that the lessons and changes can be thought out and applied.

Another cause for confusion is that the persons interviewed may not have understood the questions and reasons for them. It is best to be very clear what the questions mean and the type of answer expected so that this can be explained during the course of the interviews. Ultimately the purpose of the benchmarking exercise is to understand the activities and processes of the other benchmarking partners. It is very difficult to make logical comparisons from sometimes seemingly contradictory or confusing information.

It is important to remember that, particularly when dealing with out-of-industry benchmarking partners, their business and managerial practices are based on their own history and experience. These may differ substantially from that of a local authority. It is however most important to be concerned about the reasons for the process decisions but rather to understand how that process works. This may need to be translated into the local authorities own history, experience, assumptions and perceptions.

It is also necessary to warn against expressing personal opinion or critique the actions of others during the benchmarking process.

The documented processes of the benchmark partners must be compared with the local authorities own documented internal processes. Carrying out this documentation enables you to step back from the day-to-day operations and focus solely on the intricacies of the processes. It will also assist you to develop internal benchmarking contacts and form internal networks. This will thereby spread the benefits from the benchmarking exercise further through the organisations.

- It is essential to know your own strengths and weaknesses. This information may come internally or from your benchmark partners in the exchange of information. This feedback may open quarters for concern or satisfaction but there must be an open exchange of information carried out between open minds.
- It must be necessary to determine the performance gap between yours and that of other organisations. The gap may be positive or negative but in either case lessons may be learnt from the benchmarking operation.

3.17 TAKING ACTION

Inevitably a project of this nature requires a report at its conclusion. The report may have a number of individual purposes

- It should be delivered to the group or sub-organisation dealing with the activity that has been benchmarked.
- It must represent a summary of the data that were collected and analysed.
- It should record the organisations that were benchmarked and detail the people who were contacted together with their details for future contact.
- For the use of other internal employees who may benefit from the conclusions.

The following is an outline of the contents of such a report:

- A statement of need or purpose of the benchmarking exercise.
- The project customers within the organisation who will benefit from the benchmarking project.
- The requirement of that customer group covering the scope, benchmarking subjects and the requirements for information both in respect to quantity, quality, delivery date and other formal requirements
- Mention the names of all members of the project team including their addresses within the organisation. It may prove useful to explain why they were selected for the project team.
- The description of the training process for the team.
- Project calendar or bar chart recording the time and sequence of events in the project.
- Provide an outline of the categories of information and the specific measures used to gather information.
- Set out names of the individuals who were contacted, their organisation and job titles.
- Describe how the data was collected, the surveys and interviews conducted, etc. Copies of the questionnaires can be included as an appendix to the report.
- Set out the results either in a simple, summarised narrative form or by means of tables.
- Provide any additional narrative that may be required to describe additional data gathered in the process, difficulties encountered in the process or other outstanding events.
- Analyse of the data including graphs and charts to illustrate the results. Present the results in summary fashion together with any recommendation concerning follow-up activities in order to use the information beneficially within the organisation.

Possible results from the benchmarking process may be in the form of direct process improvements. It may be difficult to implement these improvements as personnel may see their jobs and livelihood endangered as a result of improved efficiency. It is imperative to

allay such fears at the outset by encouraging a learning culture within the local authority. The improved processes should be seen as improving the customer service and explaining what can be done to assist those receiving the services who may have been unwilling in the past to pay for them as a result of poor delivery.

It may also be necessary to bring out the changes in a progressive, measured fashion. The important aspect is to measure and record what improvements are being made and publish these regularly for the information of the staff members concerned. It is also important that everyone should realise that reward is to be based not on improvement of performance but how the performance of the whole organisation can be improved. Those contributing to this improvement by assisting others and gaining improvement in them should be rewarded.

In the learning organisation benchmarking provides the opportunity to learn something new. By sharing the benchmarking experience with all members of the organisation different and new horizons will be opened up to the individuals, which could make considerable improvements in efficiency and effectiveness of their own activities. They may also identify activities that they would like to see benchmarked in order to improve their own performance. Benchmarking is an ongoing concept.

One of the final results is the formation of functional benchmarking. The numbers of contacts of the individuals involved in the benchmarking team can increase enormously and from these professional contacts many useful hints and tips can be gained.

A great deal of informal and beneficial benchmarking can be conducted as a result of forming these networks.

The final stage in the benchmarking operation is to determine what to benchmark again, bearing in mind that only key and critical success factors should be benchmarked. It is not a simple and cheap exercise.

3.18 PITFALLS

Embarking on a process of benchmarking does not guarantee success. There are a number of pitfalls, which need to be watched.

The process must be driven by the results that are achieved. It is essential, in order to retain the commitment of the people concerned, that they see improvements. If there is no improvement immediately, it is important to take action and analyse what has gone wrong and then revise the approach to ensure that there is a measured improvement in performance. No sportsman would continue on a rigorous training programme if there was no discernable improvement in performance. The same applies to employees. They must be able to see the improvement resulting from the efforts of benchmarking and applying the lessons learnt.

Another problem area is having the concept that the organisation must benchmark something and then not being clear on what the objectives are. It is important to have an unambiguous objective with well-defined outcomes in order to succeed. If the objectives are fuzzy, a fuzzy process will result and no worthwhile improvement will be achieved.

Leadership in the benchmarking process is most important. The team leaders must be committed to the process and be driven from within to succeed in what they are attempting. They should lead from the front and enthuse the stakeholders who will ultimately be responsible for effecting the changes and achieving the improvements. The attitudes of these people will determine whether the proposed changes will work or not. They should therefore be part of the process from the outset and accept the leadership.

Proper Prior Planning Prevents Poor Performance. It is imperative to plan the benchmarking process carefully, allowing sufficient time to complete the requirements of the tasks that are to be undertaken. The collection of data and information frequently takes the most time. Telephone calls to arrange interviews are difficult to control if the person being called has to spend much time in meetings. Planning these calls can save a lot of time. Planning the meetings of the benchmarking team will also enable you to focus on the critical issues of the exercise.

The benchmarking team should be proud of what they are doing and should not become defensive. The members of the team should not be seen as super spies trying to show up their colleagues who are part of the process, but not of the team. If properly executed and the desired results obtained, the benchmarking process is one in which all should be pleased.

The measurement of performance should not be seen as career threatening. It should be the performance of the group or team that is measured and not the individual. It should rather be seen as a career enhancing process and management must make this very clear to the staff members who are affected by the operation.

It is possible for the study to become a delaying mechanism with people reluctant to move forward and try new ideas. It is not necessary to wait for the outcome of any study to implement new procedures in order make sure that whatever is done is the product of a committee and for which no one will take responsibility. If there is a good idea, try it out and if it does not work, try another one. Do not get bogged down in analysis paralysis.

In the discussions with other organisations a mass of data will be assembled. It is very easy to misinterpret this by viewing it out of context, weighting it in favour of some theory of one of the benchmarking team or ignoring significant items of information.

Benchmarking requires the commitment of resources for success. These resources come in the form of people and money. If these resources are not made available by management then the process cannot proceed. Resourcefulness and inventiveness are other qualities needed for success. The justification for the funding comes from the improvements made in the operations and the financial savings that accrue.

Finally benchmarking should not be seen as the solution. It is a starting point for the onward development of the organisation.

CHAPTER 4

OPPORTUNITIES OFFERED BY LEGISLATION

4.1 INTRODUCTION

Over the past five years, a number of Acts have been placed on the statutes of South Africa creating the environment for regulation as well as requiring the performance of local authorities to be analysed against a prepared set of performance indicators provided on a public database.

In addition to the Constitution, which assigns responsibility for the delivery of community water supply to the third tier of government (i.e. local authorities), several other Acts affect the delivery of water and wastewater services to communities. Municipalities/local authorities are autonomous legal institutions, but Provincial governments may intervene in cases where local authorities are unable to fulfil their legal obligations.

4.2 WATER SERVICES ACT (Act 108, 1997)

The Water Services Act (Act 108 of 1997) provides for:

- the right of access to basic water supply and sanitation services;
- the setting of national standards and norms including the setting of tariffs,
- the preparation and adoption of water development plans by water services authorities;
- the provision of a framework for the regulation of water services institutions and water services intermediaries;
- the establishment and dis-establishment of water boards;
- the monitoring of water services;
- the provision of financial assistance to water services institutions;
- the gathering of information on a national scale and the publishing of that information; and
- the promotion of effective water resource management and conservation.

The Act sets out the conditions for the provision of water services including the need to comply with local by laws, technical conditions, determination and structure of the tariffs, and conditions of payment. In this regard there must be reasonable notice of intention to discontinue supply in the event of non-payment. Access to water services, including for industrial purposes, must be through designated water services providers.

The sections underlined above are of particular importance and relevance to the encouragement of benchmarking in its widest sense.

In terms of the Water Services Act, the water services of local authorities are to be ring-fenced and operated as a single business entity. The activities that can be benchmarked therefore cover the full range of water services provision in managerial functions, financial and accounting functions as well as the engineering. It is therefore possible to view the whole process of selling water services and collecting the revenues from the standpoint of a

single organisation. In the past there has been a tendency for the town treasurer and the town engineer to work in separate departments without fully cooperating with the activities and needs of the other. In the ring-fenced organisation both are part of the same team, with hopefully the same overall objective, which is to provide the best possible service at the best price to the customers, who are ratepayers of the town.

Within this form of service provision there are a great many activities that could be benchmarked or improved. It is vital to focus areas that are critical to the survival and effective operation of the organisation rather than to spread forces over a large area. This requires a critical review of activities and how they impact on the success of the organisation. It is as well at this stage to apply the 80:20 rule: that is to focus on the 20% of activities that will give 80% of the potential benefits.

Another aspect in selecting which activities to benchmark is to choose the ones that will have the most impact on the success of the organisation in the pursuit of its objectives and not the ones that are not well done or the best done. Unimportant activities, which do not impact on the success of the organisation, should not be benchmarked however badly they may be performed.

Under the Act, the Minister may prescribe mandatory national standards for the standard of the services; the quality of water taken from or discharged into any water services or water resource; the nature, operation, sustainability, operational efficiency and economic viability of water services; requirements for persons who install and operate water service works; and the construction and functioning of water service works and consumer installations. Every water services authority has a duty to all consumers or potential consumers in its area of jurisdiction to ensure the progressive efficient, affordable, economic and sustainable access to water services. The conditions, under which these services are to be rendered, including the preparation of a water services plan, are laid out in the Act.

Water development plans must cover the following: the physical attributes of the area; the demographic distribution of the population; a 5-year implementation plan for water services including industrial demands and disposal of industrial effluent; the numbers and location of people within the area who do not receive water services. The plan must identify the water service providers and the contracts or proposed contracts with those water service providers together with the technical aspects of the water services provision; the number and location of those people who will not receive water services within the next five years together with the reasons; and existing and proposed water conservation, recycling and environmental protection measures.

The water services authority must report on the implementation of the plan during each financial year. The report must be delivered to the Minister of Water Affairs and Forestry as well as the Minister for Provincial Affairs and Local Government. A water services authority may perform the functions of a water services provider or enter into a contract with a water services provider. It may only enter into a contract with a private sector WSP after it has considered all known public sector water services providers, which are willing and able to perform such function. All such approaches to enter into a contract with a water services provider must be publicised in advance.

The Minister of Water Affairs and Forestry may prescribe matters which must be regulated in terms of such a contract, mandatory conditions that must be included in such a contract, and the requirements for a joint venture contract. This is to ensure that water services are provided on an efficient, equitable, cost effective and sustainable basis and that the terms of the contract are equitable to the water services authority, the water services provider and consumers.

If the water services authority acts as the water services provider then the operation must be conducted independently from the other business of the local authority. Every water

services authority must prepare by-laws. The Department of Water Affairs and Forestry is preparing model by-laws, but they have not been finalised. To operate in the area, a water services provider must obtain approval from the water services authority.

The water services authority must monitor the performance of the water services provider to ensure that the standards and norms are being maintained and the terms of the contract are being adhered to.

4.3 MUNICIPAL STRUCTURES ACT (Act 117, 1998)

The Municipal Structures Act (Act 117 of 1998) provides for:

- Establishment of municipalities in accordance with the requirements relating to categories and types of municipality.
- Establishment of criteria for determining the category of municipality to be established in an area.
- Definition of the types of municipality that may be established within each category.
- Appropriate division of functions and powers between categories of municipality.
- Regulation of the internal systems, structures and office-bearers of municipalities.
- Appropriate electoral systems.
- Provision for matters in connection therewith.

4.4 MUNICIPAL SYSTEMS ACT (Act 32 of 2000)

The Municipal Systems Act (Act 32 of 2000) gives effect to the country's vision of a developmental local government as envisaged in the Local Government White Paper. The Act extends the definition of municipalities to include residents and communities within the municipal area, working in partnership with the municipality's political and administrative structures. This relationship is fundamental to creating sound and effective government and ensuring the long-term sustainability of local government. It establishes an enabling framework for the core processes of planning, performance management, resource mobilisation and organisational change, which underpin the notion of developmental local government. The Act undoes complex, fragmented, top-down, over-regulated approaches of the past. The Act empowers municipalities to use a wide variety of mechanisms to restructure and deliver services. It affirms the crucial role that local government plays in the overall reconstruction and development of South Africa while at the same time making sure that the municipalities get the basics right by focusing on the performance of priority services. It establishes a framework for support, monitoring and intervention by other spheres of government in order to build local government into an efficient frontline developmental agency.

Of particular importance is Chapter 6 of the Act, which refers to performance management.

It calls for the establishment of a performance management system in line with its resources and circumstances and in compliance with the requirements of the Act. A secondary

function is to promote a culture of performance management amongst its members, committees and functionaries and in its administration. It makes the management of the performance management system the responsibility of the executive of the municipality. It may assign responsibilities to the municipal manager. The municipal council must approve the system. The municipality must establish mechanisms to monitor and review its performance management system.

Section 41 of the Act prescribes the following actions.

- Set appropriate key performance indicators, including outcomes and impact with regard to the municipality's development priorities
- Set measurable performance targets with regard to these development priorities.
- Monitor the performance against each of the performance indicators and measure and review the performance at least once a year.
- Take steps to improve performance where the performance targets were not met and
- Establish a process of regular reporting the municipal council, the public and appropriate organs of state.
- The systems should be able to provide early warnings where it appears probable that the required performance level will not be reached.

The municipality must involve the community through appropriate mechanisms, in the development, implementation and review of the municipalities performance management system. The community must be involved in the setting of performance indicators and performance targets for the municipality. The performance indicators should be made public as well as the achievements against them.

The results of the performance are subject to audit, both by the internal auditor and also by the Auditor General.

Each year the municipality must report on the performance of itself and any other service providers that it may employ against the performance targets that it had set as well as a comparison with the figures for the previous year.

The Minister may make regulations covering a vast number of facets of the performance management system. Such regulations must take into account the capacity of the municipalities to comply with these matters and differentiate between different kinds of municipality according to their capacities.

4.5 DRAFT POLICY DOCUMENT (Department of Provincial and Local Government)

The Department of Provincial and Local Government has developed a Draft Policy Document, which is still subject to review and alteration.

The document analyses the current situation including the legislation and makes policy proposals to facilitate the creation of Municipal Services Partnerships.

It will be necessary to monitor any contracts resulting from this policy in terms of prescribed performance indicators. Such contracts will enlarge the scope of the available benchmarking partners operating in the field of water services provision.

The existence of this policy means that the public sector water services providers will have to improve on their efficiency or they will become take over targets by the private sector.

4.6 NATIONAL WATER ACT (Act 136, 1998)

In terms of this Act, the use of all water is subject to the granting of a licence. The exceptions to the licence are for reasonable use of the water for domestic purposes; aquatic sport and that the wastewater may be discharged into a conduit belonging to an authority that will treat the wastewater.

Existing rights to use the water are not subject to the granting of a licence. Responsible authorities may dispense with the application for a licence if the use contemplated is in accordance with the purposes of the Act. The use of wastewater for various purposes is subject to the regulation and control of the Minister.

The methods of pricing the charges that are to be made are laid down in the Act. The prices may vary geographically, between different categories of water users or individual users. The achievement of social equity is one of the considerations in setting the differentiated charges. The charges may also be used to ensure compliance with prescribed standards and water management practices according to the user pays and the polluter pays principle. The charges will also be used to discourage waste, and provision is made for incentives for effective and efficient water use.

A major advance is the provision for establishing catchment management agencies in order to delegate water resource management to the regional or catchment level and to involve the communities. Until now, no catchment management agencies have been established and the Minister is empowered to fulfil these functions in the interim. Public consultation will be an essential part of the establishment of the catchment management agencies. In terms of the Act, groups of people and organisations may form Water User Associations with the approval of the Minister. Water User Associations operate at a local level and have powers delegated to them by the Minister. The functions that Water User Associations will perform will be determined by local conditions and needs.

4.7 REGULATION

The Minister for Water Affairs and Forestry has caused draft regulations concerning the regulation of water services providers to be published. The following roles and responsibilities have been set out in the regulations.

There are various key issues which are addressed in the regulations.

Under the heading of Efficient And Financially Sustainable Services there is the statement that, “A benchmarking system will be introduced to allow comparisons of performance by Water Service Institutions enabled through the development of a consistent comparative performance information system.”

Under the key issue of treating public and private providers in a similar manner it states that,

“The benchmarking system will apply to all Water Services Providers, and will capture the performance of the Water Services Authorities, irrespective of the structure of the Water Services Providers they contract with.”

It is therefore the policy of the Department of Water Affairs and Forestry to look for benchmarking practices from the local authorities in order to improve their service delivery and hence their sustainability.

Roles and Responsibilities in Regard to Regulations

Role	Who	Responsibilities
Central Government as provided for by the Constitution of South Africa	Ministers of Water Affairs and Forestry, and Provincial and Local Government	• To set national norms and standards • To fill the role of Water Service Authority if service at local level fails • To provide support to local government in relation to water services • To legislate with regard to municipal functions (including minimum procurement rules) • To monitor performance
	Municipal government (local sphere)	• To be responsible for the provision of basic level of service to all South Africans
Regulator	Ministers of Water Affairs and Forestry and Provincial and Local Government	• To set minimum levels of service • To set minimum reporting requirements • To set tariff policy • To monitor performance • To encourage regionalisation to achieve economies of scale
Water Services Authority (WSA)	Municipal government	• To achieve requirements set by regulators • To balance the needs of stakeholders • To enter into contracts with WSP(s) best able to achieve these requirements • To monitor performance of the WSP in terms of the contract with the WSA • To report to regulators
Water Services Provider (WSP)	Public, private or mixed entities, or municipal government itself	• To provide the services and perform the duties as required in the contract, the WSA and the Constitution

The Provinces do not play a direct role in the monitoring of performance, other than to receive the annual reports of the municipalities in which the performance achieved will be set out.

Local Authorities By-Laws can be used to set certain standards of performance, which must be observed. However these will represent a minimum acceptable standard and do not represent benchmark values.

CHAPTER 5
INTERNATIONAL INITIATIVES

There have been a number of initiatives in definition of performance indicators and in benchmarking practices in various countries around the world.

5.1 INTERNATIONAL WATER ASSOCIATION

A task team was established in 1997 under the auspices of the International Water Supply Association with the objective of preparing a robust and well-devised system of performance indicators, which would be able to attract water undertakings to use it as a routine management tool. The system was required to cover the basic needs of different types of users and the indicators should be applicable to undertakings with different levels of development, different climatic, demographic and culture characteristics. Great emphasis was placed by the task team on creating universally accepted definitions. A standard performance indicator language was derived covering syntax i.e. the structure of the indicators, morphology or semantics i.e. vocabulary and definitions and finally the etymology or how to assess the indicators from the basic data. The system was divided into different categories of indicators shown in Table 5.1 below. The information however had to be taken in context of each undertaking, the system in which it operated and the regional profile. The indicators proposed by the task group are arranged into three levels covering general overview of efficiency and effectiveness of the water undertaking. The second level provided a better insight into those indicators marked as level one whilst at level three there were specific indicators, which were relevant to top management. The number and classification of these is shown in Table 5.1 below.

Table 5.1 Number of performance indicators proposed

Group of indicators	Level 1 L1	Level 2 L2	Level 3 L3	Total
Water resources indicators	1	1	0	2
Personnel indicators	1	4	17	22
Physical indicators	1	4	7	12
Operational indicators	8	17	11	36
Quality of service indicators	7	17	1	25
Financial indicators	8	13	15	36
Total number of indicators	26	56	51	133

The set of indicators as published are accompanied by software prepared by Institutier Technologico del Agua (ITA, Spain). The Sigma Light disk is available free of charge through the Internet and can be downloaded at the website

http://www.gmf.upv.es/soft/sigma.

The software can be used as a stand-alone PI evaluation system independent of external database. A complete set of performance indicators in accordance with the IWA proposal is contained in the information of the package.

The task group is currently conducting field-testing for the use of the performance indicators.

The International Water Association has now started preparing a set of performance indicators related to wastewater collection and treatment as well as sanitation generally. The Task Force working on this expects to complete its work at the end of 2002.

5.2 WORLD BANK

The World Bank has prepared a start up kit for improving performance through benchmarking. The kit includes an explanation of how to use it, a schedule of the countries of the world, a spreadsheet on which the data concerning the utility can be entered and the means to calculate the performance indicators. The latter are also defined in the kit and cover both the water and sanitation aspects. The purpose of the start up kit is to facilitate this for utilities that have not been exposed to metric benchmarking concepts.

The data pertaining to the different countries contains the following tables:

- GDP per Capita, 1994 – 1997
- Exchange Rates, 1994 – 1998
- Average Annual Inflation, 1994 – 1997

The purpose of these is to enable any country to convert the costs that are calculated into dollars for purposes of comparison.

The indicators that are proposed are divided into groups.

1. **Coverage**. The unit is a percentage of the total number of population having minimum standards of service compared to the total. The indicators are for water supply and sanitation.
2. **Water consumption and Production**. Here the unit may be either in terms of population, connection or household. The Starter kit acknowledges that this may mean that inter utility and inter country comparisons may be difficult. Differentiation is made of metered and unmetered consumption.
3. **Unaccounted for Water**. This is defined as the difference between water supplied and water sold with the units of expression as either a percentage, or m^3 / km/d or m^3/ connection/ day.
4. **Metering practices** being defined as the percentage of connections that are metered and the percentage of the former that is sold.
5. **Pipe network performance**. The indicators are for the number of pipe breaks or sewer blockages per year, expressed in terms of either kilometres of pipe or per connection.
6. **Cost and staffing**. The unit operational cost is expressed in US$/ m^3 sold and is defined as the operational expenses/total annual volume sold (which excludes depreciation, interest and debt service). Staffing is expressed as the number of staff per either water connection, water and sewerage connection or per thousand of population served. The final indicators selected compare the total labour costs with the total operational costs as well as the contracted out service.
7. **Quality of service**. This is expressed as continuity of service in average hours per day of service for water and by the number of complaints, divided by the number of connections. For wastewater treatment the level of service is defined as the percentage of the sewerage that is collected that receives at least primary treatment.
8. **Billings and collection**. The indicators include the average tariff, expressed as US$/ m^3 or per connection of household and is the total annual operating revenue divided by

the appropriate unit. A further ratio is that of the annual operating revenue divided by the per capita GDP and expressed as a percentage. Further cost comparisons are included in the list.

9. **Financial performance**. Straightforward indicators of the working ratio and the debt service ratio have been selected.
10. **Capital investment**. The indicators chosen by the World Bank are the value of the investments as a percentage of the operating revenues and the valuation of the fixed assets per capita.

A spreadsheet is provided which enables an authority to complete the data and have a complete set of the indicators calculated for it. These can then be transmitted to the World Bank in Washington to be entered into its data bank there and be available for access by other potential benchmarking partners.

5.3 AFRICA

Water Utilities Partnership

The Water Utility Partnership for Capacity Building in Africa was formed in 1996 to assist in the organisation of management assistance to African water utilities, principally by using the services of qualified African utilities. The Water Utility Partnership has already embarked on 6 projects, one of which concerns the Performance Indicators of Water Supply and Sanitation Utilities Project. This project has focused on the definition and use of performance indicators. The main objective of the Performance Indicators Project was to develop tools for the appraisal of performance to be used by African water and sanitation utilities managers to evaluate their performance levels and take, as early as possible, any necessary corrective measures to avoid failure in achieving their targets. The project had three specific objectives, which were:

- To develop practical methodologies for the elaboration of performance indicators to be used by all the utilities and/or sanitation organisations in Africa.
- To promote the use of the proposed system as a management tool to improve operational efficiency of African water utilities and/or sanitation organisations and to encourage them to carry out regular performance evaluation of their operations.
- To compile and update a performance database on African water and/or sanitation utilities and make the information available in the form of a “digest”.

The project had made the following progress:

- 107 utilities from 23 countries in Africa participated in the project, thus indicating a strong core of support across the continent.
- The project was actively promoted through a number of workshops, and involved representatives from International Water Association, World Health Organisation, consultants and utilities from all regions of Africa. This broadened the constituency beyond the Union of African Water Suppliers. It has been supported financially through the Department for International Development, of the United Kingdom.

- The project demonstrated a bottom-up approach with the utilities participating in the whole process of project planning and implementation. The questionnaire used to collect data was prepared in consultation with the participants.

- The project methodology involved the use of local consultants selected on a regional basis to work with the utilities in their regions in the preparation and quality assurance of the data. These consultants were either staff of the utilities or individuals who had recently worked in senior positions in a utility.

5.4 SCANDINAVIA

It should be noted that relatively little has been done worldwide in the wastewater field. An exception to this is the Six Cities initiative in Scandinavia. The planning departments in the water and wastewater utilities of a group of six cities, Copenhagen, Oslo, Helsinki, Stockholm, Gothenburg and Malmoe have collaborated since the late seventies. This co-operation initially concerned the question of whether to extend a combined sewer system or replace it with a dual system. From co-operation and by exchanging experience, effective master plans were devolved. This was followed on by discussions at management level at annual two-day meetings with well-prepared agenda's. However once the question of privatisation arose it was realised that there were very few hard facts to support the discussions. It was necessary to show the politicians that the utilities were being operated effectively and efficiently. In 1995 therefore the Six Cities group decided to start a joint co-operation project to develop performance indicators which would facilitate comparisons between the cities and give a better base for discussion concerning privatisation.

The Six Cities developed performance indicators under the following headings:

- Customer satisfaction – to reflect customers' expectations and their appraisal of the water services.

- Quality to complement the economical and customer satisfaction performance indicators.

- Availability describing the reliability of the operations of the entire system.

- Environment performance indicators to illustrate the utility's environmental achievements.

- Organisation/personnel performance indicators to describe the efficiency and relationship between in-house work and external services.

- Economy to compare block costs on the overall level.

As a result of the inter city benchmarking the following experience has been documented:

- The definition of the data and performance indicators is most important.

- The reporting of the performance should include a description of the trend during a 5 to 10-year period.

- Local conditions and accounting principles have a great value on the performance indicator values.

- During the test period the previously assumed performance indicators were approved and new ones developed.
- Interest increased within the utilities for working with performance indices.
- The performance indices can be used as a supplement to the annual accounts.

It is noteworthy that in the six cities' benchmarking initiatives in Scandinavia emphasis is placed on gathering basic data concerning the numbers served together with the volumes of water and wastewater throughout the year. A separate section is devoted to energy consumption and production at own plants both in water supply and in wastewater treatment.

The World Bank funded another benchmarking initiative in Five Baltic Countries. This was stimulated by a sanitation project. However since the project finished there was little incentive to continue and the countries stopped supplying the data. This appears due to cessation of funding on completion of the concerns over the issue of public disclosure of data. The original data is available on the World Bank Website.

5.5 AUSTRALIA

The Water Services Association of Australia is the principle body of the Australian urban water industry. Its members provide water and wastewater services to approximately 12½ million Australians and many of Australia's largest industrial and commercial enterprises.

Its vision is to promote and facilitate the creation of an environment that allows its members to:

- Enhance business performance in providing service to customers, safeguard public health.
- Protect the environment.

The principle cost drivers in the Australian urban water business are:

1. Customer service standards:
    - customer volume requirements and tight security of water supply systems
    - the requirement to expect water on demand to irrigate their gardens (in Perth 38% of the water is assumed to go onto gardens)
    - customer requirements for continuity of water and wastewater services
    - customer requirements for minimum pressures, and
    - fire suppression requirements.
2. Urban planning:
    - The transport networks for water and wastewater are the major investment component of the urban water businesses. Low densities in Australia have led to high costs of transport infrastructure.
3. Health standards:
    - Increasingly stringent standards for drinking water quality are increasing costs.
4. Environmental standards:
    - The discharge of effluent to either inland streams or coastal water

- Environmental standards defining the frequency of wastewater overflows
- Requirements for environmental flows to keep river systems healthy.

5. Variability of wastewater flows:
   - High wet weather peaks resulting from illegal storm water inflows or infiltration of groundwater.
6. Asset lifecycles:
   - Comparing water businesses at different stages in the asset lifecycle is fraught with difficulty. Recently constructed distribution systems have much lower requirements for extended expenditure on asset maintenance and replacement compared to older systems.
7. Design and construction standards:
   - There is a trade-off between the cost and expected service life of infrastructure assets.
8. Cost of capital:
   - Urban water industry is highly capital-intensive and is therefore sensitive to the cost of capital.
9. Government policies:
   - These can significantly increase or decrease industry costs for example policies such a competition policy can help drive costs down by introducing greater competition.
10. Regulatory practices
    - Changing regulatory standards have significant potential to increase costs. I

      In addition to providing information related to the operation of water and wastewater facilities, comparison is made against a large variety of indicators of the performance of its different members.

5.6 ITALY

The Benchmarking club of Italian water services was formed in 1998. The Federation was to:

- Set up a general comparison framework concerning operating aspects, organisational models and economic results.
- Determine and measure both with regard to the performances and to the economic results of the major activities of the water utility.
- Analyse the operating processes of these activities in order to allocate costs properly and to correlate them with the resulting outputs in volumes taking into account operating methodology and available supports.
- Work out the efficiencies and performance indicators in order to compare the activities among the companies, identify reference standards and possibly define best practices.

All the available water companies were invited to join the Benchmarking Club and 14 accepted the proposal. A firm of consulting engineers was engaged to lead the benchmarking study, conduct a preliminary survey with the selected companies in order to design a reference prototype of a typical water utility. Eighteen processes were identified as being fundamental to the services and were grouped into value chains. Data collection

followed relative to the selected processes with the help of specifically designed software. The data sets are carefully checked and validated before being processed. The end product is a set of tables and graphics comparing the performances of the companies, describing processes and practises and focusing on success factors.

The main results of the first stage have shown:

- Areas of good performance within each company and those with potential for improvement.
- Indicators on priority investments and more in general on resources. Allocation was found often as a result of a systematic analysis of interaction between inter-related activities.
- Analysis of segmentation of processes also provided significant indications and suggestions as to the organisational structures and related control systems more apt to overcome performance limitations.
- the project proved its validity as a stimulus within the utilities for reconsidering and rediscussing roles, functions, procedures, both for the organisation and the individuals, thus contributing to the advance of managerial skills at all levels. This activity is being taken further.

5.7 HOLLAND

The Dutch WML company, which supplies water in the Dutch province of Limburg has set up its own system of measuring and controlling its performance and efficiency through performance indicators and benchmarks. The system comprises two parts:

- the internal part which evaluates the performance of individual processes and activities and the individual parts of the organisation on the basis of performance indicators.
- an external part which evaluates the water company's overall performance by means of national benchmarking.

The strategy was initiated at top management level and on the basis of the results of a SWOT analysis, The long-term strategy was devised and explained to middle management in order to secure its commitment.

After this initial phase an attempt was made to implement the plans both short-term (one year) and medium term (five years) in a manner that would achieve quick, visible results. The purpose of this was to convince the employees that the company was on the right track. Performance indicators were formulated and used with targets created for progress. The new indicators and targets were intended to measure and control the individual processes and were related predominantly to efficiency and costs. The operation involved the entire firm and resulted in a system in which individual employees, or groups of employees, reported to middle management which in turn summarised the results and reported to top management. All the results were expressed in terms of the indicators.

The WML also joined in a national benchmarking operation. The objectives of this study were to:

- Give all internal and external parties insight into the performance of the water companies.
- Explain differences between individual water companies.
- Show how the best in class in each process achieves its high results.

- Identify strengths and weaknesses.

The study focuses on finance and efficiency of service and quality of the product.

Tables have been published covering the various aspects including numbers of connections, length of mains, density of the systems. In addition the costs related to production, distribution, sales, general overheads, and operating costs are compared. The final operating result in terms of Nederlandse Guilders per cubic metre sold are given in terms of profit and loss. The same costs are also reported per connection.

Costs of distribution covering depreciation, interest, personnel, services by other departments, services by third parties, material costs, energy, laboratory, losses from hydrants, capitalised expenditure and other sources of income and costs were processed to give a total transportation cost for the distribution system. Indices of costs per kilometre and per connection are quoted.

Standard financial ratios for each water company are set out together with the tariffs on a sliding scale according to consumption per month are provided. The operational efficiency of the various water companies is served.

5.8 UNITED KINGDOM AND AMERICA

Reports from the United Kingdom and America, both state that the water utilities are being challenged as never before to provide improved services. The pressure comes from a number of sources:

- The customers who want improvements to service within broadly stable prices.
- Shareholders of the water companies in the United Kingdom who want higher returns generated by superior performance.
- Competition for large industrial customers.
- Regulators who set price limits on the assumption of efficient operation.

This last refers to OFWAT the English regulating body. In America, developments have been slow but are rapidly gaining in pace. An important item of research is being conducted by the American Waterworks Association's research foundation in completing and pilot testing a customer survey instrument which would track customer service and satisfaction data over time.

The American Waterworks Association has developed a self-evaluation and peer review programme, which offers utilities the opportunity for third-party experts to assist in evaluating all aspects of an operation and provide a written evaluation. An increasing number of US utilities are participating. This is referred to as the AWWA QUALSERVE programme.

Metric benchmarking is being used to determine whether self-improvement or outsourcing should be followed. The process looks to models and practices applied successfully elsewhere in order to assess their own organisational capabilities and determine which functions or services they should consider outsourcing. Seattle, in engaging a successful public-private partnership for the design, construction and long-term operation of a new waterworks facility, is an example.

Utility benchmarking was relatively slow to develop in the United States but there have been a number of initiatives in this regard:

- The American Waterworks Association has prepared a manual on benchmarking

- The Water Environment Federation has prepared a benchmarking wastewater operations handbook
- The American Waterworks Association research foundation is evaluating various strategies
- The Water Environment Research Foundation is also sponsoring a benchmarking effort.

As a result of all this, consideration is being given to an industry-wide clearinghouse for the data. Data are covering the following:

- Cost measures
- Quality measures
- Quantity measures being the level of service or units produced.
- Resource utilisation measures such as labour or equipment utilisation per unit of output or energy use per unit of output.
- Customer satisfaction reflected in customer surveys or numbers of complaints received.
- Service or timeous measures such as backlog or cycle time indicators.
- Employee quality measures often reflected in safety, absenteeism, training or attitude measures.

In the United Kingdom it is seen as relatively straightforward to collect data for one's own organisation, but there appears to be reluctance for the water companies to publicise information that could be commercially valuable to their competitors. This stems from the commercial nature of the water companies in England and Wales. However much of the information is put into the public domain through the OFWAT agency. This is the water industry regulator for England and Wales. This has created a model considering each of the cost drivers and the effect on the price of the water. The various cost-drivers proposed include:

- Distribution input
- Leakage
- Average pumping head
- Number of connections
- Number of billing contacts
- Number of measured customers
- Length of network
- Quantities of water delivered.

Least square regression analyses were conducted within these to create a general model with a number of the candidate variables.

The general model was then modified for each specific case and in order to eliminate in a stepwise process the least significant variables until finally a simple general model resulted. This model was then used to calculate the theoretical costs for each of the major water companies and water utilities. The difference between the actual and theoretical was taken to be the measure of efficiency or inefficiency. However there are various problems with

this. The statistical properties of the models are somewhat erratic. To show that the simple relationships explain only part of the variation in the operating expenditures, they do not take account of local operating environments of the companies. Nevertheless they have provided a starting point on which efficiency assessments can be made. This is a good example of a metric benchmarking exercise.

5.8.1 Water Research Centre Consulting (UK)

WRc Consulting (WRcC) undertakes benchmarking studies on behalf of its clients that range from 6-month 'Full Delivery' exercises where a WRcC team works alongside the client's team to smaller desk-based studies of a few months or 'Bespoke Workshops' of a few days. These services cover three areas.

1. Metric Benchmarking

In many cases water companies have experience of metric exercises conducted by their own regulators. In these cases existing metrics can be utilised or additional metric benchmarking undertaken, for the following purposes:

- Calculation of key performance indicators.
- Measurement of inter-divisional or other internal comparative performance.
- Relative performance measurement of company against external comparators.

In general they recommend that metric benchmarking should be limited to that essential for:

- Identification of key areas of opportunity within the company.
- Identification of best practice performers as comparators.
- Quantification of benefits and costs of recommended operational improvements.
- Measurement and monitoring of benefits and costs of change implementation.

2. Process Benchmarking

The work undertaken to progress process benchmarking encompasses the identification of key processes in terms of importance to stakeholders, financial impact and ability to change.

This involves:

- Customer and other stakeholder analysis.
- Activity based costing.
- Du Pont analysis.
- Cash flow impact analysis.

This exercise leads on to:

- The prioritised selection of processes for comparison.
- Detailed process mapping of the selected processes.
- Definition of key performance indicators and drivers of performance.

Suitable ‘best practice’ partners are identified and visits are undertaken, leading to the identification of appropriate best practice.

Project outcome is usually an agreed schedule of recommendations for performance improvement, together with cost benefit analyses and a timetable for implementation.

Implementation is clearly critical to the success of any benchmarking exercise and WRc works with company management to ensure efficient and effective implementation

3. Intelligence Dissemination

As worldwide interest in benchmarking expands, the water and wastewater industries are continually developing strategies to deliver real improvements in performance. These systems for performance indicators and process benchmarking are being created at the global, regional, national and company level. They offer anyone developing their own system an excellent opportunity to benefit from the experience of others. The organisations involved include:

- Water Industry Research Organisations
- International Funding Agencies
- Water Regulators
- Water Utilities

WRcC maintains an extensive network of contacts through its free-subscription, bi-monthly benchmarking magazine *Watermarque* and its associated *Performance Benchmarking Network Website.*

The Performance Benchmarking Network is a service designed by WRc to facilitate the dissemination of information on benchmarking and best practice among water and wastewater executives and managers around the world.

Through its free subscription, bi-monthly electronic magazine Watermarque, the Network provides subscribers with strategic insight on how to increase their organization's efficiency, performance, and competitiveness. Their goal is to be a catalyst for beneficial change in the global water and wastewater industry.

Subscription is open to executives and managers of both publicly and privately operated water and wastewater organizations. The main features of the service are the bi-monthly newsletters, links to other relevant websites and benchmarking book reviews (via Amazon).

The address is: www.pbngroup.com.

CHAPTER 6

CREATING A SOUTH AFRICAN BENCHMARKING SYSTEM

6.1 INTRODUCTION

In essence benchmarking involves measurement of performance, comparison of measurements with peer organisations prior to engaging in the process-benchmarking phase with the other benchmarking partners of equal or superior performance. Identification of the appropriate benchmarking partners, however, may not be so simple as it first appears. There are 284 local authorities in South Africa. These vary from the large metropolitan municipalities to the smallest rural local authority operating under the management of a district council. Clearly what is a key issue for the largest will not be the same for the smallest. Many key issues will be the same, but will the smaller be able to match the performance of the largest or visa versa, because there are advantages that accrue to the small organisations. Where and in what groupings should the benchmarking partners be found?

In many of the benchmarking exercises reported in the literature, the organisations conducted extensive surveys to find benchmarking partners whom they considered could offer comparable performance in the activities that they wished to benchmark. Such surveys were costly to conduct and often failed to yield successful results because the calculation of the indicators was not based on the same assumptions and the same methods of calculation were not used. Where this was done internationally, problems arose as changes in the exchange rates created further difficulties in comparing the information.

In the South African context all the local authorities will be required to participate in some form of benchmarking of water and sanitation services in order to build up understanding of the important drivers in the delivery. There should therefore be a mechanism whereby information on performance can be exchanged simply and without undue expenditure. This indicates the need to establish a central repository for the information. Questions surrounding this central clearinghouse of information concern the ownership, the sources of funding and the management thereof.

One of the features of successful process benchmarking is that it is entered into voluntarily. There should be a willingness to improve, to measure, to compare and then to take action to remedy any deficiency that may be exposed. Many organisations may feel that they do not stand comparison with the best in the land and therefore do no wish to expose this perceived weakness. It is such cases that probably have the most need to benchmark and to try and improve. They should appreciate that half of all organisations fall below the median. While the median value may not be the benchmark value for any particular indicator it is probably the first step in establishing what is a reasonable value for it.

The other inhibiting factor is the syndrome that there is no difference between second place and last. Benchmarking is not a competitive activity. It is a process of improvement. Even the first placed organisation can and should improve. There is no reason why all the local authorities should not contribute willingly to a benchmarking exercise and submit voluntarily the comparative data on the selected performance indicators.

There are of course two approaches to the submission of data concerning performance. These are summarised as the “whip and the carrot”. The former may well engender feelings of reluctance and will not create a willing benchmark partner. The Municipal Systems Bill 1999 requires each local authority to establish key performance indicators to measure their performance in relation to their development objectives. They must report their achievements against these indicators to the Provincial and Central Government bodies at

the end of each financial year. No provision is made within the Bill for a collaborative central database where the information can be stored, managed and be made available on a comparative basis and in an easily understood format. While the measure is aimed at improving performance it does not introduce compulsory benchmarking. It is on the whip end of the scale.

The benefits that will accrue from this approach will be minimal. The alternative is the carrot whereby the local authorities submit the data freely and willingly. The first benefit is to be seen to be one of the leaders. This privilege is restricted to the few and is not likely to win a majority of supporters. Restricting the number of organisations that can be accessed from the database by any one organisation to those of a similar size or class may encourage support of the system. In this way comparisons will be made between peers and not between the smallest and the largest. The key issues will be similar to those of the same class. The disadvantage of this is that it restricts the potential benchmark partners and the ability to move out of that class to find superior performance.

However it is imperative to establish a central clearinghouse for the information concerning the results that are obtained by measurement against the standard performance indicators. There are certain essential features of such a database that should be kept in mind.

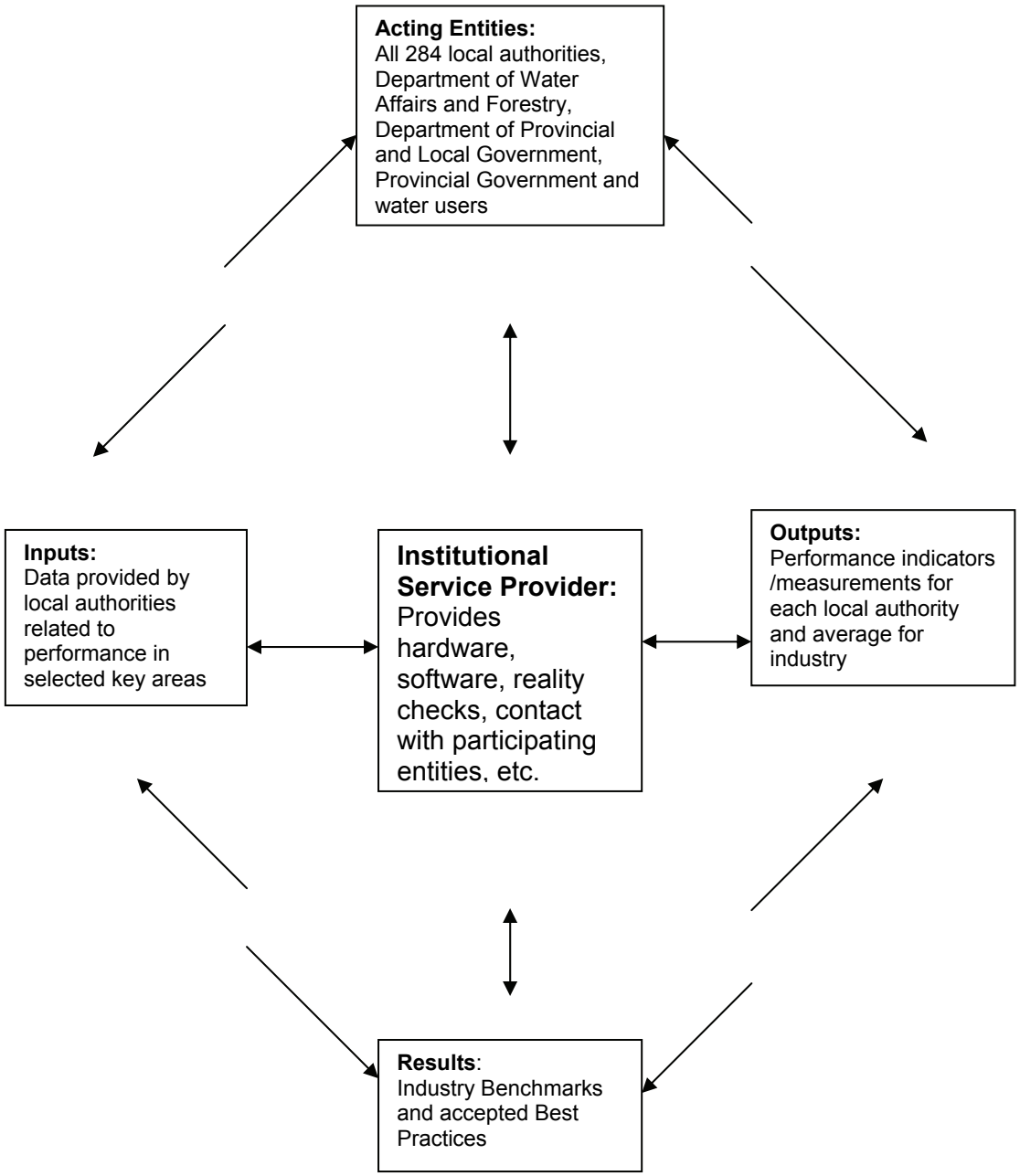
Firstly there must be a service provider to manage the system and be able to disseminate the data to the participants of the benchmarking scheme and to carry out the vital analysis on it.

The service provider should:

- Provide the necessary hardware and software
- Be able to provide reality checks on the data submitted and exclude any unexplained deviations
- Calculate the value of each of the performance indicators for each local authority
- Maintain contact with all the local authority clients and ensure the regular and timeous submission of the performance data
- Be accessible 24 hours per day
- Limit access to only approved bodies and persons.
- Provide different ways of comparing the data from selected local authorities

The data to be transmitted should in the first instance be limited to the more essential indicators, but without limiting the free choice of the local authorities as to what their own key indicators are. Furthermore, in order to be sure that the indicators are calculated in exactly the same way, the institutional service provider should receive basic data and calculate the indicators from these data after conducting whatever checks that are possible to verify the integrity of the data. These may involve comparisons with previous submissions, relative checks and checks that assess the bounds of possibility.

The diagram overleaf indicates the framework for considering the institutional aspects and provides a strong rationale for introducing benchmarks in the water sector.



The Palmer Development Group has undertaken research on “Information Management For The Water Services Sector With Specific Reference To The Regulatory System” on behalf of the Water Research Commission. The research, which is directed at national level strategies, suggests a number of possible service providers for the central repository or database.

The Group notes that the Department of Water Affairs and Forestry, the Department of Provincial and Local Government and the Department of Finance are the three national Departments with regulatory functions. They all react with the Water Service Authorities, the first directly and the latter two through the Local Authorities. The Water Service Authorities interact in turn with the Water Service Providers with whom the Department of Water Affairs

and Forestry also has a direct link. It is the Water Service Providers that have the most to gain from benchmarking.

The Palmer Development Group suggests that in addition to the above, the following organisations may be in a position to host the database that would be used to store the information for regulation.

- South African Local Government Association, which is a statutory body representing the interests of local government.
- South African Association of Water Utilities. See below.
- Water Research Commission. See below.
- The Water Institute of Southern Africa, which has a database that is concerned more with the functions of the Institute rather than to water services providers.

The South African Association of Water Utilities is creating a centralised database to which they will report their performance against the indicators that they have selected. The data will be presented in such a manner that for each indicator the performance of each water board can be compared, either in tabular or graphical format. It will be possible for each and every water board to access the information and see how it compares with its peers. Due to the disparate sizes of the boards and the economic circumstances of each, comparisons across the spread of water boards may not be relevant and boards of similar size will have to compare their performances. However, when it comes to the performance benchmarking, then they will have to look to the leaders and compare methods of operation with them.

6.2 SCENARIOS FOR POTENTIAL SERVICE PROVIDERS

The selection of the service provider is an important step to take. It depends on the source of finance to pay for the service, the cost of the service, the willingness of participants to contribute to these costs and the ability of the host to mount the very large database that will be required. The following, which are also suggested by the Palmer Development Group, are potential service providers

- The Department of Water Affairs and Forestry. The Department is through the Water Services Act, Act No. 108 of 1997, responsible for receiving the Water Development Plans of the Water Authorities, i.e. the local authorities. It is concerned with the efficiency of the service provision and would form a logical IT service provider. It is in addition creating a National Information System in terms of the same Act. In the event of formal regulation for water services providers, the data that could be used by the regulator would in many instances overlap with that useful for benchmarking purposes. Synergy could result from this, especially in the light of the Draft Regulations Concerning the Regulation of Water Services Providers.

  Checks will be needed to assess its capacity to handle the data. Separate provision would be required in the budget to mount and support the system or else external support would be needed.

- The Department of Provincial and Local Government. This Department is in terms of the Constitution responsible for the local authorities, their efficiency and viability. In terms of the Municipal Systems Bill, it requires the local authorities to implement performance management systems. In addition it will set up a monitoring and evaluation system, based on performance indicators.

  It is therefore in a position where it would need to receive and interrogate the data in order to assess which local authorities are in need of technical or other assistance through the performance indicators. It could also ensure that the local authorities supported the programme to benchmark their activities with the proper submission of

the data. The capacity of this department to handle the project is unknown as well as its technical capacity in IT. Separate provision would be required in the budget.

- Water Research Commission. The Commission has an extensive IT system, which would have to be assessed in terms of the requirements for the hosting of the data from the local authorities. It has the capability but the capacity would have to be assessed. Funding could be provided through the Commission.
- Development Bank of Southern Africa. The DBSA could possibly host the programme but its capacity and willingness is not known.
- Through the agency of the South African Association of Water Utilities and the service provider that it has engaged for its own purposes. The willingness of the South African Association of Water Utilities to do this is unknown as well as the capacity of the service provider that it has engaged for this purpose. The Water Research Commission assisted the Association to establish its system.
- Private Service Provider. There are a number of private companies that could provide the necessary service but funding would then have to be sought from either the local authorities or the State.
- South African Local Government Association. The members of this body would have an interest in the data but it is not known whether it would have the facilities to manage it on the scale that will be required.
- The Water Institute of Southern Africa. This is a private organisation that would have to enlarge its facilities to enable it to provide the required service.

It must be emphasised that none of the above organisations have been approached in this connection.

The question of funding the institutional service provider needs to be addressed. If either of the Department of Water Affairs and Forestry or the Department of Provincial and Local Government takes responsibility for the provision of the database then the general *fiscus* would prove to the logical source of the funds. This would at the same time enable them to carry out any regulatory functions using the same database.

The other alternative would require contributions from the individual local authorities according to their size and water consumption.

6.3 PROPOSAL

All of the above organisations need to be approached to establish their capacity and willingness to offer the required service. In view of the obligations of the local authorities to report performance to both the Department of Water Affairs and Forestry and the Department of Provincial and Local Government they may appear to be authoritarian rather than the adventure needed for successful benchmarking.

ANNEX A

Water Research Commission

Benchmarking for Local Authorities In the Provision of Water Services

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Key Performance Indicators by Category

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
	Service Delivery						
1.	Water Supply: House connection	Percentage of total houses and businesses served with potable water	No. of houses and businesses served / total number of houses and businesses x 100	%	Annual	Water	Houses and businesses to include individual flats as well as commercial and industrial premises. Use properties in preference to population counts, unless a specific head count has been undertaken. If the population figure is derived from sampling houses and extrapolating, use the house count.
2.	Water Supply: Yard or communal tap	Percentage of total houses and businesses served with potable water	No. of houses and businesses served / total number of houses and businesses x 100	%	Annual	Water	
3.	Customer Coverage: Waterborne sewerage connections	Percentage of total houses and businesses served with waterborne sewerage connections	No. of houses and businesses served with waterborne sewerage connections / total number of houses and businesses x 100	%	Annual	Waste-Water	
4.	Customer Coverage: On site sanitation	Percentage of total houses and businesses served with On site sanitation	No. of houses and businesses served with waterborne sewerage connections / total number of houses and businesses x 100	%	Annual	Waste-water	Note that this may be further sub-divided as between dry and wet systems
5.	Customer Response	Average time of responses to queries and complaints	Average time of responses / total number of calls	Mins.	Quarter	Water and waste-water	Call includes telephone, fax, email or postal correspondence and covers account queries as well as technical matters.

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
	Service Delivery						
6.	Customer Response : General	Percentage of unsatisfied complaints or queries	No. of repeat calls where the customer has not received satisfaction / total number of calls x 100	%	Quarter	Water and waste-water	
7.	Customer Response: General	Efficiency of notification of service disruption	No. of notifications / no. of customers affected x 100	%	Quarter	Water and waste-water	
8.	Customer Response: Sanitation	Time to respond to request to empty septic tank, conservancy tank or pit latrine	Average time from receipt of request to the actual emptying of the tank	Hour	Annual	Waste-Water	The unit should preferably be in hours. Backlogs may make days a more convenient unit. Reporting could be more frequent
9.	Service Reliability	Supply infrastructure failures	Total number of supply infrastructure failures	No.	Month	Water	Supply infrastructure failure covers all plant, works and pipelines. The failure need not e Necessarily lead to a disruption of service.

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
10.	Service Reliability	Supply infrastructure failure leading to disruption of service	Total period in hours during the reporting period for which service was disrupted as a result of a supply infrastructure failure / total number of hours in period x 100	%	Month	Water	Disruption of service should be regarded as any period greater than for one minute to any customer.
11.	Service Reliability: Wastewater	Blockages leading to overflow of sewage into areas accessible to public due to all causes	Total number of spills / 100 km of sewer per year	No.	Annual	Waste-Water	Note: From Indicator No. a secondary indicator can be derived, i.e. the number of blockages per Rand of preventive maintenance
12.	Service Reliability: Wastewater	Blockages leading to overflow of sewage into areas accessible to public due to ingress of roots	Total number of spills / 100 km of sewer per year	No.	Annual	Waste-Water	
	Financial Credibility						
13.	Water Tariff : Bulk Water	The average tariff paid for the entire system	Total amount paid for potable water for the year / the total volume put into service in mega litres	R/Mℓ	Annual		The amount paid includes the purchase price of the water, all statutory levies, full treatment costs, maintenance, including interest and redemption as well as the administrative costs.
14.	Water Tariff : Retail Water	The average tariff charged for the entire system	Total amount charged for potable water for the year / the total volume charged for in megalitres	R/Mℓ	Annual		
15.	Sewer Tariff	The average tariff charged for the entire system with water borne sanitation	Total amount charged for water borne wastewater services of for the year / the total no. of sewer connections	R/ Connection	Annual		

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
16.	Sanitation Charges	The average tariff charged for the entire system using on site sanitation	Total amount charged for on-site sanitation services/total number of properties with on-site sanitation	R/ Property	Annual		This may be sub-divided as between the costs of emptying conservancy tanks, septic tanks and pit latrines
	Financial Credibility						
17.	Financial Efficiency	Working percentage – net operating margin	Operating cost excluding depreciation and interest paid / operating revenue x 100	%	Year-to-Date		Operating revenue is the total revenue accrued from sale of water services excluding non-operating income, interest received and sundry income.
18.	Financial Efficiency	Controllable working ratio	Operating cost, excluding raw water, depreciation & interest /operating income (revenue)	#	Year-to-Date		Operating cost is the total expenditure incurred during the generation of operating revenue including production, marketing, distribution, depreciation and raw water costs interest paid.
19.	Financial Efficiency	Operating ratio	Operating cost, including depreciation & interest/ operating revenue	#	Year-to-Date		
20.	Financial Efficiency	Collections efficiency – amount	Total amount received / total amount billed in accounting period x 100	%	Twelve Month Moving Average		Ratio of total amount received to accounts receivable; both include VAT.
21.	Financial Efficiency	Collections efficiency – number	No. of accounts fully paid / no. of accounts sent out in accounting period x 100	%	Year-to-Date		No. of accounts sent out are the number of accounts billed.
22.	Credit Efficiency	Cash flow to capital expenditure ratio	Cash flow from operations / expenditures for plant and equipment	#	Year-to-Date		Indicates the ability to maintain plant and equipment from cash provided by operations rather than borrowing

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
23.	Profitability Performance	Rate of return on assets	Net income excluding interest received / average net book value of assets x 100	%	Year-to-Date		Net income excluding interest is operating revenue less cost of raw water. Average net book value equals opening value plus closing value divided by 2.
24.	Profitability Performance	Operating surplus	Net income / operating revenue x 100	%	Year-to-Date		
25.	Profitability Performance	Gross margin (GM) ratio	Gross income (profit) / net revenues x 100	%	Year-to-date		Gross margin represents the difference between net revenues and the cost of water sold.
26.	Profitability Performance	Assets turnover ratio	Total sales (revenue) / average net book value of total assets	#	Year-to-Date		Asset turnover reveals the efficiency of assets in generating revenue. A high ratio is desired.
	Financial Credibility						
27.	Liquidity Analysis	Current ratio	Current assets / current liabilities	#	Year-to-Date		Current assets are net accounts receivable including provision for bad debts. Liquid assets are positive cash resources and net accounts receivable. Total debt serviced includes long term borrowings, short term borrowings, accounts payable and bank overdraft. Long term debt is debt repayable after 12 months. Total amount owed consists of trading debt only.
28.	Liquidity Analysis	Quick ratio	Liquid assets / current liabilities	#	Year-to-Date		
29.	Liquidity Analysis	Debt service ratio	Net income excluding interest paid and depreciation / total debt service	#	Annual		
30.	Liquidity Analysis	Long term debt ratio	Long term liabilities / total liabilities	#	Annual		
31.	Liquidity Analysis	Debt ratio	Total debt / total assets	#	Annual		
32.	Liquidity Analysis	Interest cover ratio	Net income before interest received / total interest paid	#	Annual		
33.	Liquidity Analysis	Debtors days – debtors collection period	Trade debtors / credit sales x days in accounting period	Days	Year-to-Date		

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
34.	Liquidity Analysis	Creditor days – creditors settlement period	Trade creditors / cost of purchases x days in accounting period	Days	Year-to-Date		Total amount of short-term credit consists of trading credit only.
35.	Overall Inventory	Inventory valuation	Value of overall inventory / operating revenue x 100	%	Month		Determination of the cost assigned to raw materials inventory, work-in-process, and finished goods. Various inventory methods include LIFO, FIFO, and WEIGHTED AVERAGE. Strategic inventory is the inventory, which is critical to the ongoing operations of the water board & includes both materials and maintenance items.
36.	Strategic Inventory	Strategic inventory valuation	Value of strategic inventory / total value of inventory x 100	%	Month		
37.	Commercial Equity	Percentage of orders placed with previously disadvantaged companies (PDC)	Value of orders placed with PDC's / total value of orders placed x 100	%	Year-to-Date		The value of orders placed excludes VAT.
38.	Financial Control	Percentage of operational expenditure to operational revenue	Operational expenditure / operational revenue x 100	%	Month		Operational expenditure includes total cost of raw water and depreciation.
	Technical Effectiveness						
39.	Energy Efficiency	Pumping efficiency of water supply	Total energy consumption for pumping in kWh / megalitres pumped times the static head	kWh/ Mℓ	Month	Water	In the case of multiple pumping schemes use the weighted average pumping head.
40.	Energy Efficiency	Energy cost for water supply	Total electricity costs for water supply / mega litre of water put into supply	R/Mℓ	Month	Water	Energy cost is the total amount of electricity cost incurred by the water board.

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
41.	Energy Efficiency	Energy cost for the treatment of wastewater	Total electricity costs for the treatment of wastewater / megalitre of wastewater treated			Waste-Water	Total energy costs of treatment but excluding any external pumping costs.
42.	Energy Efficiency	Pumping efficiency for wastewater pumping	Total energy consumption for pumping wastewater in kWh / megalitre pumped times the static head pumped.			Waste-Water	Excludes any energy for pumping in the treatment processes. In the case of multiple pumping schemes use the weighted average pumping head.
43.	Meter Monitoring	Meter calibration	Total number of meters calibrated during the year / total number of meters installed x 100	%	Annual	Water	Meters include any class or type of meter irrespective of whether a flow meter or pressure meter.
44.	Equipment Maintenance	Planned maintenance	Actual expenditure on planned maintenance / operating cost x 100	%	Quarter	Water and waste-water	Planned maintenance includes all replacement and refurbishment costs or for which budget provisions have been made. Unplanned maintenance covers all repairs and maintenance minus planned maintenance. Note that the indicators are to apply to the sanitation system *mutatis mutandis*.
45.	Equipment Maintenance	Unplanned maintenance	Actual expenditure on unplanned maintenance / operating cost x 100	%	Quarter	Water and waste-water	
46.	Equipment Maintenance	Unplanned to planned maintenance	Actual expenditure on unplanned maintenance / actual expenditure on planned maintenance x 100	%	Quarter	Water and waste-water	
47.	Equipment Maintenance	Unplanned to total maintenance cost	Unplanned maintenance cost / total maintenance cost x 100	%	Quarter	Water and waste-water	
	Technical Effectiveness						

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
48.	Unaccounted for Water	Volumetric financial loss	Total value of water that has been billed / total value of water put into networks.	%	Annual	Water	The values are to be calculated at the average tariff derived above and based on the measured volumes
49.	Unaccounted for Water	Specific loss rate	The loss rate in kilolitres per hour divided by the total length of piping.	kℓ/h per km	Month	Water	The total length of piping includes service connections, reservoir and pumpstation manifolding. See SABS 0306:1999 for detailed definition of unaccounted for water
50.	Production Costs	Cost of water production per megalitre	Total operating cost / volume of water treated in megalitres	R/Mℓ	Quarter	Water	This is applicable only to local authorities that treat their own water supplies
51.	Equipment Availability	Assurance of supply – water treatment	Average available water treatment capacity / required water treatment capacity	No.	Annual	Water	Do.
52.	Equipment Availability	Assurance of supply – water treatment	Average available of water treatment capacity / peak (seven day maximum) demand	No.	Annual	Water	Do.
53.	Equipment Availability	Assurance of supply – delivery capacity	Average available delivery capacity / required delivery capacity	#	Annual	Water	
54.	Equipment Availability	Assurance of supply – delivery capacity	Average available delivery capacity / peak (seven day maximum) demand	#	Annual	Water	
55.	Equipment Availability	Assurance of supply – water storage	Average available water storage capacity / required water storage capacity	#	Annual	Water	
56.	Equipment Availability	Assurance of supply – water storage	Average available water storage capacity / peak (seven day maximum) demand	#	Annual	Water	

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
	Technical Effectiveness						
57.	Equipment Availability	Trunk Sewer Utilisation	Peak days flow in previous year / absolute hydraulic capacityx100	%	Annual	Waste-water	Same units of flow to be used
58.	Equipment Availability	Wastewater treatment	Previous years average annual flow / design capacity of wastewater treatment works	%	Annual	Waste-water	
59.	Water and Effluent Quality	Percentage of samples failing to meet given standards	Total no of samples failing to meet specified criteria / total no. of samples x 100	%	Month	Water and Waste-water	Criteria may be any set of criteria appropriate to the class of water being sampled and duly published in advance.
60.	Environmental Management	Frequency of pollution sampling	Number of days samples were taken / 365 days x 100	%	Annual		
61.	Capital Projects Management	Time	Total number of capital projects completed in a year within specified time / the total number of capital projects completed in that year x 100	%	Annual	Water and Waste-water	Only projects that are completed within the calendar year of reporting to be considered. Ignore ongoing projects.
62.	Capital Projects Management	Quality	Total number of capital projects completed in a year in proper compliance with the specifications / the total number of capital projects completed in that year x 100	%	Annual	Water and Waste-water	

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
63.	Capital Projects Management	Cost	Total number of capital projects completed in a year within specified cost / the total number of capital projects completed in that year x 100	%	Annual	Water and Waste-water	
64.	Raw Water Abstraction: Installed	Percentage of utilised capacity to installed capacity	Utilised in Mℓ/d / installed Mℓ/d x 100	%	Annual	Water	Installed capacity is the total infrastructure in place. Utilised capacity is the actual water supplied. Available capacity is the installed capacity less the infrastructure not in commission.
65.	Raw Water Abstraction: Available	Percentage of utilised capacity to available capacity	Utilised in Mℓ/d / available Mℓ/d x 100	%	Annual	Water	
66.	Raw Water Abstraction: Infrastructure	Ratio of capital expenditure to water sold	Total capital expenditure on average raw water abstraction capacity / annual volume of water sold in megalitres	Rand/ Mℓ	Annual	Water	
67.	Treatment Systems: Installed	Percentage of utilised capacity to installed capacity	Utilised in mℓ/d / installed mℓ/d x 100	%	Annual	Water	
68.	Treatment Systems: Available	Percentage of utilised capacity to available capacity	Utilised in Mℓ/d / available Mℓ/d x 100	%	Annual	Water	
69.	Treatment Systems: Infrastructure	Ratio of capital expenditure to water sold	Total capital expenditure on average treatment systems capacity / annual volume of water sold in megalitres	Rand/ Mℓ	Annual	Water	The nominal capacity divided by the design peak factor is the average capacity. Utilised capacity is the actual water supplied. Available capacity is the installed capacity less the infrastructure not in commission. Peak factor should be based on seven-day maximum demand.
70.	Pumping Systems: Installed	Percentage of utilised capacity to installed capacity	Utilised in Mℓ/d / installed Mℓ/d x 100	%	Annual	Water	

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
71.	Pumping Systems: Available	Percentage of utilised capacity to available capacity	Utilised in Mℓ/d / available Mℓ/d x 100	%	Annual	Water	
72.	Pumping Systems: Infrastructure	Ratio of capital expenditure to water sold	Total capital expenditure on average pumping systems capacity / annual volume of water sold in megalitres	Rand/ Mℓ	Annual	Water	
73.	Storage Capacity: Installed	Percentage of utilised capacity to installed capacity	Utilised in Mℓ/d / installed Mℓ/d x 100	%	Annual	Water	
74.	Storage Capacity: Available	Percentage of utilised capacity to available capacity	Utilised in Mℓ/d / available Mℓ/d x 100	%	Annual	Water	
75.	Storage Capacity: Infrastructure	Ratio of capital expenditure to water sold	Total capital expenditure on average storage capacity / annual volume of water sold in megalitres	Rand/ Mℓ	Annual	Water	
76.	Distribution Capacity: Installed	Percentage of utilised capacity to installed capacity	Utilised in Mℓ/d / installed Mℓ/d x 100	%	Annual	Water	
77.	Distribution Capacity: Available	Percentage of utilised capacity to available capacity	Utilised in Mℓ/d / available Mℓ/d x 100	%	Annual	Water	
78.	Distribution Capacity: Infrastructure	Ratio of capital expenditure to water sold	Total capital expenditure on average distribution capacity / annual volume of water sold in megalitres	Rand/ Mℓ	Annual	Water	

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
79.	Distribution Capacity: Peak Factor	Percentage of peak distribution capacity to available capacity	Peak distribution capacity in Mℓ per day / available capacity in Mℓ per day x 100	%	Annual	Water	
	Human Resources						
80.	Staffing Issues	Staff turnover percentage	Total number of exits / total number employed x 100	%	Month	Water and waste-water	Payroll cost is the total cost of salaries, wages and staff benefits incurred by the water board. Exits consist of resignations, dismissals, retirements and deaths. Absenteeism includes approved absence, sick leave, AWOL and labour related unrest whether approved or not, but excludes annual leave. Total number employed includes all permanent staff but excludes students, contractors, part-time workers and vacancies.
81.	Staffing Issues	Staff absenteeism percentage	Total number of days absent / total available days x 100	%	Month	Water and waste-water	
82.	Industrial Relations	Stoppages due to industrial action	Hours lost due to stoppages / total work hours x 100	%	Quarter	Water and waste-water	
83.	Training	Cost of training including skills development	Total training cost / total payroll cost x 100	%	Annual	Water and waste-water	Training cost includes courses, materials, transport and accommodation but excludes salary cost while attending courses.
84.	Skills Development	Cost of skills development training	Total skills development cost / total payroll cost x 100	%	Annual	Water and waste-water	Skills development cost consists of the cost of development and education including staff bursaries but excludes salary cost while acquiring skills.

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
85.	Skills Development	Percentage of skills development cost spent on previously disadvantaged persons	Skills development cost spent on previously disadvantaged persons / total skills development cost x 100	%	Annual	Water and waste-water	
86.	Skills Development	Percentage of mandays spent on skills development	No. of days spent on skills development / available mandays x 100	%	Annual	Water and waste-water	
87.	Skills Development	Percentage of days spent on skills development on previously disadvantaged persons	No. of days spent on skills development on previously disadvantaged persons / no. of days spent on skills development	%	Annual	Water and waste-water	
88.	Health and Safety	Disabling accidents	No. of disabling accidents per million work hours	No.	Annual	Water and waste-water	Disabling accidents as defined in the legislation
89.	Health and Safety	Mandays lost percentage	Total mandays lost / Total available mandays x 100	%	Annual	Water and waste-water	Available mandays refers to total working days in a year.
90.	Local Authority Water Services Statistics	Employee complement	Average number of employees on a monthly basis	No.	Annual	Water and waste-water	Number of employees includes temporary workers and contract labour.
91.	Local Authority Water Services Statistics	Water sold	Average number of megalitres sold on a monthly basis	Mℓ	Annual	Water and waste-water	
92.	Local Authority Water Services Statistics	Area of supply	Total number of square kilometres of distribution area	km^2	Annual	Water and waste-water	

Performance Benchmark Indicators							
No.	**Category**	**Concept**	**Computation**	**Unit**	**Timing**	**Sector**	**Definitions**
93.	Contractual Agreements	Percentage of clients with service agreements	Number of clients with service agreements / total number of clients x 100	%	Annual	Water and waste-water	Client is defined as a bulk consumer e.g. local authority, mine, etc.
94.	Employment Equity Planning	Equity planning	Is there an employment equity plan in place?	Yes or No	Annual	Water and waste-water	There needs to be a clearly defined employment plan.
95.	Social Responsibility	The extent to which disadvantaged communities are being assisted by government	The number of disadvantaged communities being assisted / the total number of communities x 100	%	Annual	Water and waste-water	Disadvantaged communities refers to areas which were previously occupied by previously disadvantaged persons and received no water services .
96.	Meter Coverage	Percentage of system covered by meters	No. of metered connections / total number of connections x 100	%	Annual	Water	
97.	Rural Networks	Percentage of total sales from rural reticulation schemes	Rural reticulation sales / total sales x 100	%	Annual	Water	Rural refers to areas which have no sewerage system and no proper water supply services.
98.	Environmental Management	Pollution Control	Are policies in place to monitor pollution?	Yes or No	Annual		
99.	Environmental Management	Raw water quality	Are policies in place to monitor raw water quality?	Yes or No	Annual	Water	
100.	Environmental Management	Return flow control	Are policies in place to monitor return flow?	Yes or No	Annual	Water	
101.	Water Quality	Number of samples taken	Average number of samples taken on a monthly basis	No.	Annual	Water	

ANNEX B

Water Research Commission

Benchmarking for Local Authorities In the Provision of Water Services

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Activities for the Provision of Water Services

Global management tasks	Central administration	▪ Strategic policies ▪ External relationship ▪ New businesses ▪ General secretariat ▪ Marketing
	Strategic planning	▪ Objectives definition ▪ Organisation ▪ Information systems planning ▪ Performance assessment
	Public relations	▪ Press service and releases ▪ Communication and image ▪ Customer surveys ▪ Company reports
	Legal affairs	▪ Legal contracts ▪ Legal protection and insurance ▪ Land administration
	Internal audits	▪ Check of financial procedures ▪ Check of administration procedures ▪ Check of technical procedures ▪ Quality management and audit
	Environmental management	▪ Environmental policies ▪ Environmental management and audits ▪ Control of waste management
Administrative management	General secretary	▪ Document registration ▪ Internal administrative circuits registration ▪ Word processing and copying services
Personnel tasks	Personnel administration	▪ Personnel management ▪ Job evaluation ▪ Payroll accounting and payment
	Education and training	▪ Training planning ▪ Training implementation and control
	Occupational safety and medicine services	▪ Working safety policies, implementation and control
	Social activities	▪ Social assistance ▪ Socio-cultural activities

Financial and commercial tasks	Economic and financial planning Economic administration	▪ Investment planning and controlling ▪ Cost planning and controlling ▪ Revenue and cost recover planning ▪ Financial planning and policies ▪ Bookkeeping ▪ Tangible assets assessment ▪ Annual accounts reporting
	Economic controlling	▪ Planning control ▪ Accounting control ▪ Economic performance assessment
	Purchasing and material management	▪ Suppliers information management ▪ Advertisement ▪ Commissioning ▪ Warehouse management
Customer service	Meter reading, accounting and control	▪ Meter reading ▪ Collection control ▪ Consumption control
	Customer relations and management	▪ Complaint management ▪ Marketing
Technical tasks for water: ▪ Resources ▪ Catchment ▪ Treatment ▪ Pumping, lifting ▪ Transmission ▪ Storage ▪ Distribution ▪ Metering ▪ Fire-fighting assets ▪ Laboratory ▪ Information systems	Planning	▪ Resource management and water protection ▪ Water supply master plan with medium and long term demand and supply, technical, personnel and economic objectives ▪ Planning, design and calculation of plants and equipment ▪ Specification of plants, constructions and material selection ▪ Planning and design of technologies, e.g. information of technologies ▪ Planning of operations, maintenance and rehabilitation of activities ▪ Statistics
	Construction	▪ Internal construction of plants ▪ Supervision and tests of internal and external construction sites ▪ Take-in operation of plants and equipment ▪ Rehabilitation

Technical tasks for water: ▪ Resources ▪ Catchment ▪ Treatment ▪ Pumping, lifting ▪ Transmission	Operations	▪ Supervision of water protection areas ▪ Standby duties and risk management ▪ Documentation, data collection, record-keeping and data processing ▪ Water quality monitoring, sampling and analysing ▪ Leakage management

	Maintenance	▪ System inspection ▪ Regular maintenance checks or service activities ▪ Regular meter replacement and maintenance ▪ Repair measures of failures ▪ Cleaning

	Rehabilitation	▪ Rehabilitation (all methods for improving the performance of existing plants, networks, etc.) ▪ Relining of pipes

ANNEX C

Water Research Commission

Benchmarking for Local Authorities In the Provision of Water Services

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Review of American Practice

REVIEW OF AMERICAN PRACTICE

More and more is being written on the subject of benchmarking. A literature review therefore could be extremely lengthy, but adding little to the sum of knowledge on the topic of benchmarking. There are certain classics that should be mentioned. The first is a World Bank technical paper No 334 entitled "Performance Monitoring Indicators Handbook." The handbook is general and covers many aspects for which performance indicators and benchmarking are applicable. It was published as a technical paper to communicate the results of the work to the development community with minimum delay the typescript has not been prepared in accordance with the procedures appropriate to formal text. The World Bank therefore does not accept responsibility for any errors within the handbook.

The World Bank management made efforts to foster the use of performance indicators in order to ensure proper feedback on the success or otherwise of World Bank projects. The World Bank management recognised that they needed to develop sector-specific indicators to help borrowers and bank staff to define the project objectives more narrowly and to derive logical measures of outcomes and impact in order to measure the achievement of the project objectives.

The following uses of the performance indicators were seen:

- Strategic planning. Performance indicators were used to help clarify the objectives and logic of the programme
- Performance accounting. The indicators helped inform resource allocation decisions if they are used to direct resources to the most successful activities and thereby promote the most efficient use of the financial resources.
- Forecasting and early warnings during programme implementation. The purpose was to measure progress against the indicators for pointers towards future performance and providing feedback to be used for planning, identifying areas that need improvement and perhaps suggesting what could be done.
- Measuring programme results. Good performance indicators measure what a programme has achieved relative to its objectives
- Programme marketing and public relations. Performance indicators can be used to demonstrate programme results to satisfy an external audience.
- Benchmarking. Performance indicators can generate data against which to measure other projects or programmes that provide a way to improve programmes by learning from success, identifying good performers and learning from their experience with whom to improve the performance of others.
- Quality management. The indicators can be used to measure customer satisfaction and thereby assess whether and how the programme is improving their lives.

The methodology is based on a logical framework, which defines the objectives and the indicators of success for these objectives. It does however set out that there are advantages to this approach as well as limitations. The advantages ensure that the fundamental questions were asked, that systematic guides and logical analysis of the projects were undertaken and that planning was improved by highlighting the linkages and the technology together with the effects on the environment. Limitations arise due to rigidity in approach and the fact that it was only one of several tools that could be used.

The type of performance indicators is analysed in the handbook. Firstly there are those that measure results relative to the project objectives. Then there are the input indicators that measure the quantity and sometimes the quality of resources provided for project activities. These can include:

- Funding
- Guarantees
- Human resources
- Training
- Equipment, materials and supplies or recurrent costs for these items.

The output indicators measure the quantity and sometimes the quality of the goods and services created or provided through the use of the inputs. These are measured quantitatively in terms of project objectives.

The outcome and income impact measure indicators measure the quantity and quality of the results achieved through the provision of the project goods and services. These could for example include benefits of receiving from water from the supply or the benefits of combined water supply and sanitation project. The relevance indicators measure the success or otherwise of the project based on the relevance of the project in terms of national or regional policies and objectives. These could for example include improved economic growth and enhanced consumer wellbeing through *inter alia* pollution controls and other new technology.

Efficiency indicators represent the ratio of inputs needed per unit of output produced. These can include accountability indicators, which in turn are a subset of efficiency indicators. Effectiveness indicators represent a ratio of outputs of the resources used to produce the outputs per unit of project outcome.

There are sustainability indicators, which represent the legacy of project benefits over time. These can be both direct measures, indirect measures or intermittent or leading or pointer indicators.

Although the relationships here are aimed primarily for project work and measurement by the World Bank of the effectiveness of its loans there is much in the handbook that is relevant to the assessment and creation of appropriate performance indicators. The handbook sets out an excellent methodology for approaching this problem. Local authorities when embarking on any specific project or infrastructure expansion could do well to follow the methodology outlined.

American Water Works Association

The American Water Works Association has commissioned a book on “Performance Benchmarking for Water Utilities.” The book was prepared on their behalf by the Water Research Centre of the United Kingdom.

Recognising that professionals in the water industry should seek ways to improve their performance whether by lowering costs, enhancing revenue collection, increasing the level of service the American Water Works Association commissioned the book with the purpose of assisting in this process. It recognised that two objectives had to be met in order to

improve performance. Firstly, that the areas of good performance and those with room for improvement should be identified by the compilation of accurate information on current performance levels. This required identifying levels of customer satisfaction, the service outcomes, in addition to using the traditional measures of cost, production, volume, staffing levels, etc. The other precondition was that tools should be developed to facilitate the changes in the work practice to improve the performance.

Benchmarking covers both these objectives. The book was intended to demonstrate how to apply benchmarking in practice within the water industry. It recognises that long lists of performance benchmark ratios when used to assess the performance of a utility have strict limitations and such benchmarks were rarely of value because of the need to account for the range of factors that impact those ratios but which are outside the control of management.

The research set out to facilitate the use of process benchmarking within the water industry by meeting the following objectives"

- To identify those water utility activities suitable for benchmarking
- To illustrate the use of metric benchmarks by quantifying a limited number of possible benchmark measures
- To investigate the availability of key data for metric benchmarking
- To identify shortfalls in the data
- To prepare a programme for the collection of additional data
- To investigate the extent of and challenges to benchmarking in the water industry, and
- To illustrate process benchmarking by preparing a case study.

The benchmark case study was performed with the active participation of the Philadelphia Water Department in conjunction with the American Waterworks Association research foundation sponsored project. The approach was to draw on the extensive water industry databases from more than 1000 utilities. Of these 20 actively supported the project with staff, time and resources and contributed a wealth of practical knowledge and experience to the project. Brainstorming meetings were held to identify those processes that were suitable for benchmarking. Other sessions were held to prepare lists of measures that might help practitioners assess performance and identify those factors which impact performance that are not within the control of the managers. Such factors include geography, topography, scale of operations, etc.

A small number of benchmarks for target levels of performance were prepared using existing industry databases. These measures included standards for operating costs and staffing levels. A range of analytical techniques was used from simple performance ratios to more complex multivariate regression models. The approach therefore was to complement basic information about performance benchmarking procedures with practical guidance and worked examples from the water industry. The conclusions reached from this study were that benchmarking consisted of two distinct and separate procedures referred to as metric benchmarking and process benchmarking. The authors defined metric benchmarking as a quantitative, comparative assessment that enabled utilities to track internal performance over time and to compare this performance against that of similar utilities. They saw process benchmarking as identifying specific work procedures to be improved through a step-by-step process mapping and then locating external examples of excellence in this process elements for standard setting and possible emulation.

In measuring performance this way it is important to note that there are many factors that influence the performance indicators. The authors of this American Water Works Association report developed a series of economic econometric models using uni-variate and multi-variate regression analyses in order to account for these explanatory factors. They state that given clear, large representative data sets multi-variate regression analysis can produce econometric measures which overcome the problem of comparing utilities with different operating environments. The authors also found that very simple ratio analysis was regularly undertaken in the water industry but the collection and reporting of outcome

measures was less extensive. These outcome measures concern the interfaces with its stakeholders and customers i.e. quality of service, or the award to its equity holders. It emphasises the importance of these outcome measures as a critical component of performance measurement in service oriented industries. It was noted that this was not accepted or uniformly collected or reported in the United States and compared this unfavourably with United Kingdom practices.

The authors emphasise the importance of sound, consistent and up to date data for any benchmarking activity. In addition when making external comparisons definitions of the ratios must be identical. Existing databases within the United States, which were maintained by the American Waterworks Associations and the National Association of Water Companies were extensive but did not cover what was needed fully.

The report ends by pointing out that process benchmarking provided a tool by which utilities can change the way they work through introducing improvements in efficiency and service. They emphasise that the methodology had to be properly applied and supported throughout an organisation in order to provide a full understanding for management of the current work processes and its strengths and weaknesses. It points out that this process benchmarking should follow the well-documented steps of identifying what to benchmark, measuring and assessing performance therein, forming the teams and identifying partnership arrangements and negotiating these. It emphasises that visits to a partner outside one's own utility, especially outside the water industry are an essential part of process benchmarking since these experiences generate new perspectives towards best practices and facilitate the development of innovative solutions to process problems.

In conclusion it recommends and points out that metric benchmarking can help water utilities track their own performance over time and to compare it with other utilities. Process benchmarking is the route to improved performance. It also points out that process benchmarking and total quality management cannot co-exist.

Water Environment Federation

The Water Environment Federation of America also commissioned the Water Research Centre to produce a book on "Benchmarking Wastewater Operations – Collection, Treatment And Biosolids Management."

The Water Environment Federation saw benchmarking as a route to improved performance in order to meet the challenges of reduced financial support, increased water quality regulations, higher customer expectations and a need to make their operations more efficient, competitive and customer-responsive. Water Environment Research Foundation therefore sponsored the study. The objectives of the study were:

- To develop and define a series of performance measures that capture the quantitative performance of wastewater utilities both nationally and regionally
- To develop a series of independent variables termed "explanatory factors"
- To develop measures that capture wastewater utility operational procedures and practices
- To define and collect data so that performance benchmarks allow meaningful comparisons to be made by the utility
- To compile case studies detailing the steps that utilities have taken to make their operations more efficient and cost-effective and
- To develop a benchmarking protocol that can be used by utilities to improve operations and reduce costs.

It defines benchmarking as "a systematic process of searching for best practices, innovative ideas and highly-effective operating procedures that lead to superior performance and then

adapting these practices, ideas and procedures to improve the performance of one's own utility. Benchmarking is seen as a continuous process of striving for and surpassing some previously determined standard."

As in the American Waterworks Association book, it separates metric benchmarking from process benchmarking "performance benchmarking" to cover the two combined. It points out the necessity of having management commitment with good organisational communication to allow employee participation thus paving the way to superior performance. The research involved obtaining information initially from 31 utilities and subsequently from 105 utilities in response to a questionnaire. The survey covered the following areas:

- Detailed operating, maintenance and administrative costs
- Asset values
- Contracts
- Physical characteristics and process data
- Laboratories and pre-treatment
- Customer service and revenue collection
- Automation
- Human resources practices, and
- Finance and planning.

Multi-variate analyses were done to create econometric models for collection systems and the wastewater and biosolids cost model. In the former the following aspects were taken into account in the equation:

The model took the following form:

$$\text{Operating Cost} = e^{0.898} . L^{0.539} . \{Insp/100+1\}^{-0.084} . \{P=1\}^{0.285} . W^{0.897} . \{100.kWh\}^{0.15}$$

Where

Operating Cost	=	Total cost of collection operations excluding depreciation ($ US)
L	=	Length of sewers. (Miles)
Insp	=	Percentage of sewers inspected each year (%)
P	=	Number of pumping stations (#)
W	=	Average annual wage of a collection worker ($ US/year)
kWh	=	Cost of electrical power per kilowatt-hour. (US Cents/kWh)

In accordance with this model the uncontrollable factors that determine the costs were the length of sewer pipes and prevailing wage rates.

The following factors were considered for the wastewater and biosolids cost model:

- Total cost to wastewater and biosolids depreciation
- Average daily flow expressed in million gallons per day
- Average daily flow per plant both wastewater and biosolids operated in million gallons per day
- Percentage of influent treated by the activated sludge process using pure oxygen
- Percentage of influent treated by the activated sludge process using mechanical aeration

- Quantity of biosolids produced per unit of influent (dry tons per million gallons daily)
- Average annual wage of worker in wastewater and biosolids operation, and
- Cost per kilowatt hour of electrical power.

The model takes the following form.

$$\text{Total Cost}=e^{6.43}.Q^{1.354}.Qs^{-0.493}.\{0p/100+1\}^{0.442}.\{Om/100+1\}.Sl^{0.404}.W^{0.499}.kWh^{0.342}$$

Where

Q	=	Average daily flow (Mgd US)
Qs	=	Average daily flow (Mgd US), including the biosolids
Op	=	Percentage of plant operated on pure oxygen
Om	=	Percentage of plant operated with mechanical aeration
Sl	=	Biosolids per unit of influent (dry t/mgd US)
W	=	Average annual wage of worker ($ US)
Kwh	=	Cost per kWh of power (US cents/kWh)

The calculated values were then compared with actual values from a number of utilities. As far as collection systems were concerned though utilities having lower costs than calculated from the econometric model had the following characteristics:

- Fewer staff per mile of sewer
- Less generous fringe benefits
- Fewer workers per supervisor
- Less elaborate planning systems
- Fewer government entities served
- More automated processes
- More rehabilitation of sewers
- Higher training budget
- Smaller crew for sewer operations
- More of the day's work orders completed today
- More reliance on civil service measures for compensation
- Fewer performance improvement processes, and
- Fewer incentive practices.

As far as the wastewater treatment and biosolids management was concerned the low cost utilities had the following characteristics:

- Fewer employees per million gallons per day processed
- Fewer workers per first-line supervisors
- Lower rate of worker turnover
- Marginally greater beneficial use of biosolids, and
- Simpler systems and management processes.

In all these handbooks are mainly directed to water and wastewater practice in the United States of America and do not have the same relevance for the South African situation. They were however produced prior to this project being started and may have been able to replace the present book.

ANNEX D

WATER RESEARCH COMMISSION

COMPARISON OF TOP THIRTY PERFORMANCE INDICATORS

DEFINITION OF INDICATORS

No.	Category	Concept	Water Research Commission	South African Association of Water Utilities	International Water Association
	Service Delivery				
1.	Water Supply: House connection	Percentage of total houses and businesses served with potable water	No. of houses and businesses served / total number of houses and businesses x 100	Number of people served / total number of people	Number of households and businesses connected to the public network / total number of households and business x 100
2.	Water Supply: Yard or communal tap	Percentage of total houses and businesses served with potable water	No. of houses and businesses served / total number of houses and businesses x 100	Not specified but included in an overall indicator.	Resident population served by the water undertaking through public tap or standpipes / total resident population
3.	Customer Coverage: Waterborne sewerage connections	Percentage of total houses and businesses served with waterborne sewerage connections	No. of houses and businesses served with waterborne sewerage connections / total number of houses and businesses x 100	Not applicable	Resident population served by sewerage systems / total resident population x 100
4.	Customer Coverage: On site sanitation	Percentage of total houses and businesses served with On site sanitation	No. of houses and businesses served with waterborne sewerage connections / total number of houses and businesses x 100	Not applicable	Not covered
5.	Service Reliability	Supply infrastructure failures	Total number of supply infrastructure failures	Total number of supply infrastructure failures	

No.	Category	Concept	Water Research Commission	South African Association of Water Utilities	International Water Association
6.	Service Reliability: Wastewater	Blockages leading to overflow of sewage into areas accessible to public due to all causes	Total number of spills / 100 km of sewer per year	Not applicable	Number of sewer blockages during the year / total sewer mains length *NB. This does not imply overflow.*
7.	Liquidity Analysis	Debt service ratio	Net income excluding interest paid and depreciation / total debt service	Net income excluding interest paid and depreciation / total debt service	Cash Flow / annual financial debt service x 100.
8.	Financial Efficiency	Collections efficiency – amount	Total amount received / total amount billed in accounting period x 100	Total amount received / total amount billed in accounting period x 100	Not applicable
9.	Profitability Performance	Operating surplus	Net income / operating revenue x 100	Net income / operating revenue x 100	No comparable indicator
10.	Unaccounted for Water	Volumetric financial loss	Total value of water that has been billed / total value of water that has been put into the networks x 100	Quantity of water abstracted form the primary source less water lost in treatment less the water sold / actual water production at treatment works x 100	Non-revenue water / system input volume x 100
11.	Equipment Availability	Assurance of supply – delivery capacity	Average available delivery capacity / required delivery capacity	Available delivery capacity per day / annual average daily demand x peak factor	No comparable indicator
12.	Customer Response	Average time of responses to queries and complaints	Average time of responses / total number of calls	No comparable indicator	*Response to written complaints.* Number of written responses within the target time / number of written complaints during the year x 100.
13.	Customer Response: Sanitation	Time to respond to request to empty septic tank, conservancy tank or pit latrine	Average time from receipt of request to the actual emptying of the tank	Not applicable	Not considered

No.	Category	Concept	Water Research Commission	South African Association of Water Utilities	International Water Association
14.	Water Tariff: Bulk Water	The average tariff paid for the entire system	Total amount paid for potable water for the year / the total volume put into service in mega litres	Total amount charged for potable water for the year / the total volume put into service in mega litres	Annual water sales revenue from residential, commercial, industrial, public, institutional and other customers (exported water excluded; public water taxes excluded) / (total annual authorised – exported water)

No.	Category	Concept	Water Research Commission	South African Association of Water Utilities	International Water Association
15.	Service Reliability	Supply infrastructure failure leading to disruption of service	Total period in hours during the reporting period for which service was disrupted as a result of a supply infrastructure failure / total number of hours in period x 100	Total period in hours during the reporting period for which service was disrupted as a result of a supply infrastructure failure / total number of hours in period x 100	*Defined as water interruptions.* Σ (Population subject to a water interruption x duration of interruption in hours) / (population served x 24 x 365) x 100
16.	Service Reliability: Wastewater	Blockages leading to overflow of sewage into areas accessible to public due to ingress of roots	Total number of spills / 100 km of sewer per year	Not applicable	Number of overflow discharges occurred during the year / number of overflow devices
17.	Commercial Equity	Percentage of orders placed with previously disadvantaged companies (PDC)	Value of orders placed with PDC's / total value of orders placed x 100	Value of orders placed with PDC's / total value of orders placed x 100	Not covered
18.	Equipment Availability	Assurance of supply – delivery capacity	Average available delivery capacity / required delivery capacity	Available capacity per day / annual average demand x peak factor.	Not covered
19.	Storage Capacity: Available	Percentage of utilised capacity to available capacity	Utilised in Mℓ/d / available Mℓ/d x 100	Available water storage capacity per day / annual average demand x peak factor	Total capacity of transmission and distribution storage tanks (private storage tanks excluded) / [authorised consumption (including exported water) + water losses] x 365
20.	Staffing Issues	Staff turnover percentage	Total number of exits / total number employed x 100	Total number of exits / total number employed x 100	Not covered
21.	Staffing Issues	Staff absenteeism percentage	Total number of days absent / total available days x 100	Total number of days absent / total available days x 100	Total number of days of absenteeism occurring during the year / total number of full time equivalent employees.

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22.	Local Authority Water Services Statistics	Employee complement	Average number of employees on a monthly basis	Not covered	Number of full time employees of the water undertaking / number of service connections.
23.	Local Authority Water Services Statistics	Water sold	Average number of megalitres sold on a monthly basis	Not covered	Annual input of the transmission system / 365
24.	Customer Response: General	Percentage of unsatisfied complaints or queries	No. of repeat calls where the customer has not received satisfaction / total number of calls x 100	No. of repeat calls where the customer has not received satisfaction / total number of calls x 100	*Defined as 'continuity complaints'.* Number of continuity complaints during the year / number of service complaints during the year x 100
25.	Sewer Tariff	The average tariff charged for the entire system with water borne sanitation	Total amount charged for water borne wastewater services of for the year / the total no. of sewer connections	Not applicable	*Note: treatment and collection treated separately. Also sub-divided into capital and running costs.* (WWT annual running costs + WWT annual capital costs) / treated wastewater in WWTP.
26.	Sanitation Charges	The average tariff charged for the entire system using on site sanitation	Total amount charged for on-site sanitation services/total number of properties with on-site sanitation	Not applicable	Not covered
27.	Energy Efficiency	Energy cost for the treatment of wastewater	Total electricity costs for the treatment of wastewater / megalitre of wastewater treated	Not applicable	Energy consumption at WWTP / treated wastewater in WWTP x100
28.	Equipment Maintenance	Unplanned to total maintenance cost	Unplanned maintenance cost / total maintenance cost x 100	Unplanned maintenance cost / total maintenance cost x 100	*Not specifically covered. The maintenance costs for different components of the schemes are called for in relation to the number: capacity etc.*

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29.	Liquidity Analysis	Debtors days – debtors collection period	Trade debtors / credit sales x days in accounting period	Trade debtors / credit sales x days in accounting period	*Defined as late payments ratio.* [1-(annual debt from customers / annual amount billed during the year) x 100
30.	Health and Safety	Man days lost percentage	Total man days lost / Total available man days x 100	Total hours lost / total available hours x 100	*Note: Time lost due to working accidents and to absenteeism dealt with separately.* Number of working accidents requiring medical care during the year / total number of full time equivalent employees.