



DEPARTMENT OF WATER AFFAIRS AND FORESTRY
Directorate: National Water Resource Planning

WESTERN CAPE WATER SUPPLY SYSTEM: RECONCILIATION STRATEGY STUDY



Overview of Water Conservation and Demand Management in the City of Cape Town

FINAL



CITY OF CAPE TOWN | ISIXEKO SASEKAPA | STAD KAAPSTAD

June 2007



Submitted by:
Ninham Shand (Pty) Ltd in Association with
UWP Consulting (Pty) Ltd





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Report No. 4 of 7

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SUBMITTED BY

Ninham Shand (Pty) Ltd
P O Box 1347
Cape Town
8000

Tel : 021 - 481 2400
Fax : 021 - 424 5588
e-mail : hydro@shands.co.za

UWP Consulting (Pty) Ltd
P O Box 9311
Centurion
0046

Tel : 012 - 664 9230
Fax : 012 - 664 7870

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AUTHOR : W Ketteringham (UWP)

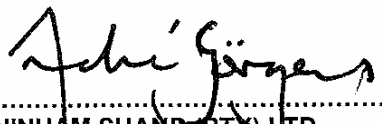
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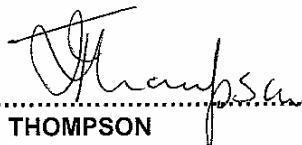
DATE : June 2007


Approved for the Study Team :


.....
NINHAM SHAND (PTY) LTD



.....
UWP CONSULTING (PTY) LTD

Approved for the Department of Water Affairs and Forestry :


.....
I THOMPSON
Study Manager


.....
J A VAN ROOYEN
Director : NWRP

WESTERN CAPE RECONCILIATION STRATEGY STUDY

VOLUME NUMBER	REPORT TITLE	
1	Reconciliation Strategy	
2	Determination of Future Water Requirements	
3	Scenario Planning for Reconciliation of Water Supply and Requirement	
4	Overview of Water Conservation and Demand Management in the City of Cape Town	
5	Treatment of Effluent to Potable Standards for Supply from the Faure Water Treatment Plant	
6	Overview of Water Re-use potential from Wastewater Treatment Plants	
7	Summary Report	

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- Mr M. Killick ex-City of Cape Town

THE WESTERN CAPE WATER SUPPLY SYSTEM RECONCILIATION STRATEGY

EXECUTIVE SUMMARY

Background

The Department of Water Affairs and Forestry (DWA) commissioned the Western Cape Reconciliation Strategy Study to facilitate the reconciliation of predicted future water requirement scenarios with supply from the Western Cape Water Supply System (WCWSS) over a 25 year planning horizon. The Study seeks to provide a decision support framework to facilitate timeous decision making of appropriate water resource interventions necessary to ensure that future water demands can be met on a sustainable basis.

It is anticipated that Water Conservation and Water Demand Management (WC/WDM) is likely to form part of any future suite of reconciliation interventions for the WCWSS. This report therefore investigates the extent to which Water Services Authorities (WSAs) in the study area are currently undertaking investigations and/or are implementing WC/WDM interventions, in order to assess the potential impact WC/WDM may have on the future water requirements in the study area. Where the WSAs have implemented WC/WDM interventions, the cost, benefits and challenges of implementing these interventions are assessed. Furthermore, this report assesses the effectiveness of the drought mitigation measures imposed to reduce demands during the recent droughts and the ability of the WSAs to reduce demand during future droughts, given the experiences of the droughts and in light of anticipated enhanced water use efficiency in the future.

Previous Studies

The main study undertaken to date on WC/WDM in the Western Cape is the Integrated Water Resources Planning Study (IWRP Study) completed in 2001 by the City of Cape Town (CCT). This study, initiated to investigate possible interventions to avoid having to impose water restrictions of ever-increasing severity in the short to medium-term and to ensure a sustainable supply of water into the future, concluded following extensive public participation and evaluation of options processes, that:

- Two packages of WC/WDM options be implemented, one of which is to be implemented directly by the CCT and the other to be promoted by the CCT via public awareness programmes;
- All ongoing WC/WDM initiatives should be supported and advanced; and
- The WC/WDM options should be implemented as soon as possible.

The packages put forward include the following:

Package 1 – City to Implement

- Pressure management
- User education
- Elimination of automatic flushing urinals
- Leakage repair, and
- Tariffs, metering and credit control

Package 2 – City to Promote

- Use of water-efficient fittings
- Use of private boreholes; and
- Grey water use

Both the CCT and the Drakenstein District Municipality (DDM) have developed a WC/WDM policy, strategies and implementation plans and have established WC/WDM units to conduct studies and implement projects/interventions. The extent to which the West Coast District Municipality and the

Stellenbosch Municipality (now Cape Winelands District Municipality (CWDM)) have progressed in this regard is unknown. However, it can be noted that the CWDM has recently appointed a service provider to assist in the development of a WC/WDM policy and strategy for its region.

Based on the findings of the CCT WC/WDM Strategy, it is estimated that some 445 MI/day (162.4 Mm³/a) could be saved through WC/WDM in the CCT alone, although the CCT's strategy is currently only targeting a saving of some 258 MI/day (94.2 Mm³/a). The DDM appears not to have determined any specific demand reduction targets as yet.

No other significant WC/WDM studies appear to have been undertaken by any of the WSAs in the study area.

Previous and Current Projects

Most of the WC/WDM projects/interventions undertaken by the CCT were started during or shortly after the completion of the IWRP Study in 2000 and were focused on the areas newly incorporated into the CCT, following the local government elections of 2000. These projects were largely aimed at improving service delivery to these areas which historically had not been well managed and maintained. Some of these projects such as the iKapa Leaks Project (saved 1.8% of CCT's total demand) and the Khayelitsha Pressure Management Project (saved between 2% and 3% of CCT's total demand) proved to be very successful.

Since the completion of the IWRP Study and apart from implementing WC/WDM projects, the CCT has had to impose restrictions and implement other demand reduction initiatives (i.e. increased tariffs and more intense public awareness campaigns) to mitigate the impacts of the droughts of 2000/01 and 2004/05. Although drought mitigation interventions (demand reduction focus) are similar in certain respects to WC/WDM interventions (demand optimisation focus) and would probably form part of any long-term WC/WDM strategy, there are fundamental differences between them. Drought mitigation, which is usually punitive in nature, focuses on demand reduction in the short-term, invariably with negative impacts on the quality of life of the consumer and potentially with reduced revenue streams for the municipality. WC/WDM on the other hand focuses on the sustained minimisation/elimination of wastage and the optimal use of water over the medium to long-term, with nominal impact on the quality of life of the consumer and invariably with financial benefits accruing to the municipality concerned.

In conjunction with the drought mitigation measures and WC/WDM projects implemented, the CCT has initiated comprehensive community awareness and education campaigns aimed at promoting water use efficiency. These collective initiatives have resulted in a significant increase in public awareness concerning the scarcity of water in the area and the need to use it more efficiently. This is confirmed through preliminary investigations, which indicate that winter demands have remained almost constant since 2000, whilst the summer demands indicate a decline.

Consumer surveys conducted to date indicate that some 57% of residential consumers have changed their water use behaviour, the primary reasons being:

- Price (41%)
- Restrictions (32%); and
- Awareness campaigns (20%)

The CCT has implemented the following WC/WDM projects to date:

Package 1 Options

Pressure management projects

- Khayelitsha:- annual savings of 9.0 Mm³/a Unit Reference Value (URV) = -3.4
- Mfuleni:- annual savings of 0.43 Mm³/a URV = -5.3
- Gugulethu:- annual savings of 0.58 Mm³/a URV = -5.4

User education

- Implemented as part of specific projects or drought mitigation interventions. The demand savings attributed directly to user education can therefore not readily be determined. However, the media campaign linked to the restriction won the Green Trust Award in 2000; and
- Programmes/initiatives to enhance in-house awareness.

Elimination of automatic flush urinals

- Undertaken as part of specific projects and drought mitigation interventions on municipal property and through the promulgation of by-laws for private property – savings and effectiveness can not readily be determined.

Leakage repair projects

- iKapa:- annual savings of 5.5 Mm³/a; URV = -2.21
- Khayelitsha:- benefits unknown
- Mfuleni:- annual savings of 0.7 Mm³/a
- Masiphumelele:- 58% reduction in zone water demand
- Leak free project:- focus on indigent households; ongoing; and
- Integrated leak repair project:- focus on low-income households; ongoing.

Tariffs, metering and credit control

- Rising block tariffs – price elasticity not determined
- Volumetric based sanitation tariffs – impact not determined
- Adopted policy of universal metering
- Meter audits of high demand consumers
- Programme to replace all “gallon” meters
- Programme to establish zones and install zone meters
- Instituted systems to facilitate the management of meters and the collection, assimilation and analysis of consumption data; and
- Actively pursued credit control.

Package 2 Options*Water-efficient fittings*

- Installed water-efficient fittings in council buildings
- By-laws and engagement with certain standard authorities to promote the use of water-efficient fittings in private properties.

Boreholes and wellpoints

- Promoted and regulated their installation and use, following the dramatic increase in demand for these during the recent drought
- Did not impose water restrictions on groundwater use during the drought, subject to certain conditions; and
- Initiated a study to assess the current extent of groundwater use and the impact of the collective use of all borehole and wellpoints on the aquifers in the area.

Grey water use and rain water tanks

- Unknown

The DDM has focused on pressure management and user education to date.

Institutional Implications

Despite good initial progress in the CCT, subsequent institutional changes, the competition for resources and the focus on drought mitigation measures resulted in fewer resources being committed to WC/WDM

initiatives between 2003 and 2004. As a result and with the assistance of DWAF, CCT reviewed its WC/WDM strategies in order to facilitate the establishment of an environment within the CCT conducive to the implementation of WC/WDM interventions on a sustained basis. The sustainability of the revised draft WC/WDM strategy can however not be confirmed at this stage as it is reported that CCT's revised Strategy (final draft form as at January 2006) is only scheduled for presentation to Council in the first quarter of 2007.

The DDM achieved good initial success in reducing demands in Paarl, but the sustainability of their strategy and the extent to which WC/WDM interventions have been extended to other towns is unknown.

Impact of WC/WDM on the ability to restrict demand during drought

Although inadequate information is currently available to confirm these findings, it does appear from CCT's experiences between the 2000/01 drought (10% curtailment measures imposed; 15% demand reduction achieved) and the 2004/05 drought (20% curtailment measures initially imposed; 20% demand reduction achieved only after more stringent restriction measures were imposed), that WC/WDM may have the effect of reducing a WSA's ability to reduce/restrict demands in times of drought.

A clear understanding of consumer demands and demand patterns is however currently not available and therefore it may only be necessary to restructure the curtailment measures in order to achieve pre-defined demand reduction targets. Nonetheless, it is not financially or environmentally viable to aggressively pursue demand reduction through WC/WDM, just to maintain the ability to impose restrictions in times of drought. The possible reduction in the ability to restrict demands in times of drought therefore needs to be considered in all future water resource planning.

Conclusions

The following main conclusions can be drawn from these investigations:

- If supported by all role-players in the water sector in the region and at all levels within the respective role-player institutions, WC/WDM can play a significant role in reconciling future water requirements with supply in the Western Cape;
- The extent to which WC/WDM will assist in this regard is however largely dependent on institutional constraints e.g. the capacity of the respective institutions involved and the extent to which WC/WDM is supported/endorsed by these institutions;
- It is estimated that some 445 Ml/day (162.4 Mm³/a) could be saved through WC/WDM in the CCT alone;
- Not only does WC/WDM assist in reconciling water supply and requirement through the minimization of wastage and water use efficiency, its implementation also results in significant socio-economic and environmental benefits;
- Secondary benefits such as reduced energy consumption can also be anticipated as a result of water use efficiency;
- Based on the WC/WDM projects implemented to date, the URVs of these projects are generally lower than those determined during the IWRP Study;
- The impact of savings due to reduced bulk water purchases and/or wastewater treatment and the impact of delayed implementation of capital works infrastructure (water and wastewater), have invariably not been taken into consideration when evaluating the cost-benefits of WC/WDM projects;
- The level of WC/WDM reporting by all the WSAs in the study area in general appears to be limited and in particular the WSDPs reviewed as part of these investigations were noticeably lacking in WC/WDM content;
- Some WSAs do report on WC/WDM interventions in more generic terms, but often key indicators such as unaccounted-for water (UAWs) and (minimum night flow) MNFs are absent, especially at a zone level; and

- Insufficient information is in certain instances being collected by WSAs to accurately assess the cost benefits of the WC/WDM projects/interventions implemented.

Recommendations

The following key recommendations are made to enhance the profile and effectiveness of WC/WDM to assist in reconciling supply and requirement in the Western Cape:

- All WSAs must develop and then periodically review their WC/WDM strategy;
- Commitment to and endorsement of WC/WDM by all role-players in the water sector must be obtained and/or enhanced to ensure an environment conducive to the implementation of WC/WDM measures on a sustainable basis;
- Water use efficiency must become central to all WSAs' planning and WSPs' operations;
- The capacity of the respective institutions needs to be enhanced and where required, support provided, to ensure their ability to effectively implement WC/WDM measures on a sustained basis;
- WSAs should ensure universal metering, the establishment and metering of supply zones and establish systems to effectively collect, assimilate and analyse water demands and demand patterns (globally and on a zone by zone basis);
- WSAs need to continuously review tariffs (pricing of water services) to ensure that they are appropriate and indicative of the scarcity of the commodity;
- An understanding of price elasticity in the area needs to be ascertained;
- WSAs must on a continuous basis maintain high profile community information and education campaigns promoting water use efficiency;
- WSAs need to undertake studies to ensure that an adequate number of viable WC/WDM projects can be implemented at short notice if required;
- WSAs need to more aggressively implement measures to ensure appropriate water-efficiency measures/devices are implemented/installed from the outset for all new consumers;
- WSAs must be encouraged and assisted where required, to ensure appropriate monitoring/tracking of all aspects (e.g. inclusive of the financial aspects) of WC/WDM projects/interventions to enable the effectiveness and cost-benefits of the projects to be accurately evaluated; and
- Reporting formats and procedures at project and WSA level need to be determined and as far as is practically possible, be standardised to ensure comprehensive and uniform reporting. In particular key indicators need to be defined and reported on at a predetermined interval.

DEPARTMENT OF WATER AFFAIRS AND FORESTRY
Directorate National Water Resource Planning
WESTERN CAPE WATER SUPPLY SYSTEM RECONCILIATION STRATEGY
Overview of Water Conservation and Demand Management in the City of Cape Town
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ABBREVIATIONS AND ACRONYMS

AFU	Automatic Flushing Urinal
BWP	Berg Water Project
CBD	Central business district
CBO	Community Based Organisation
CCT	City of Cape Town
CMA	Cape Metropolitan Area
CMC	Cape Metropolitan Council
DDM	Drakenstein District Municipality
DWAF	Department of Water Affairs and Forestry
EPWP	Expanded Public Works Programme
GIS	Geographic Information Systems
HR	Human Resources
IRP	Integrated Resource Planning
IWRP	Integrated Water Resources Planning Study
JASWIC	Joint Acceptance Scheme for Water Installation Components
KPI	Key Performance Indicators
KPMP	Khayelitsha Pressure Management Project
MLC	Metropolitan Local Council
MNF	Minimum Night Flow
NGO	Non-governmental organisation
O&M	Operation and Maintenance
PRP	Plumbing Repair Projects
PRV	Pressure Reducing Valve
SANS	South African National Standards
SM	Stellenbosch Municipality
UAW	Unaccounted-for Water
URV	Unit Reference Value
WADMAP	Water Demand Management Assistance Programme
WC	Water Conservation
WCWSS	Western Cape Water Supply System
WCDM	West Coast District Municipality
WDM	Water Demand Management
WRU	Water Re-use
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider

1. INTRODUCTION

The Department of Water Affairs and Forestry (DWAf) commissioned the Western Cape Reconciliation Strategy Study to facilitate the reconciliation of predicted future water requirements with supply from the Western Cape Water Supply System (WCWSS) for a 25 year planning horizon. The WCWSS serves the City of Cape Town (CCT), other urban users and irrigators and consists of infrastructure components owned and operated by both CCT and DWAf. The Study seeks to provide a decision support framework to facilitate timeous decision making of appropriate water resource interventions to ensure that the anticipated future water requirements can be met on a sustainable basis.

Previous studies undertaken to investigate augmentation options to reconcile future demand and supplies of the Western Cape are; the Western Cape System Analysis initiated by DWAf in 1989, the Integrated Water Resources Planning Study (IWRP Study) initiated by the then Cape Metropolitan Council (CMC) in October 1999 and the Cape Metropolitan Area Bulk Water Supply Study of 2002.

Apart from investigating three conventional supply augmentation options, the IWRP Study investigated eight Water Conservation and Water Demand Management (WC/WDM) options and three Water Re-Use (WRU) options. The IWRP Study, which included extensive public participation and evaluation of options processes, concluded that:

- Two packages of WC/WDM options be implemented, one of which was to be implemented directly by the CCT and the other to be promoted by the CCT via public awareness programmes;
- All ongoing WC/WDM initiatives should be supported and advanced; and
- The WC/WDM options should be implemented as soon as possible.

The packages put forward include the following:

Package 1 – City to Implement

- Pressure management
- User education
- Elimination of automatic flushing urinals
- Leakage repair, and
- Tariffs, metering and credit control.

Package 2 – City to Promote

- Use of water efficient fittings
- Use of private boreholes; and
- Grey water use.

Following the initial screening of options workshop held during August 2005 as part of this Study, at which support for all the WC/WDM options was re-confirmed, it was decided that additional WC/WDM and WRU investigations be undertaken prior to the completion of the Strategy, as WC/WDM and WRU would form part of any future reconciliation strategy interventions for the Western Cape.

This particular report, which forms part of a series of reports on Future Water Requirements, WC/WDM and WRU supporting the Reconciliation Study, provides an indication of the extent to which the Water Services Authorities (WSAs) in the Western Cape have implemented the recommendations of the IWRP Study in terms of the WC/WDM, and where they have, the costs, benefits and challenges encountered in implementing these recommendations. The report also assesses the impact of and responses to the recent drought in the study area, as well as the ability of the WSAs to reduce demands during periods of droughts, particularly where WC/WDM has been extensively implemented.

2. OBJECTIVE OF THE INVESTIGATIONS

The objectives of these investigations are to assess the following:

- The extent to which WSAs in the study area have initiated studies for or have implemented WC/WDM interventions;
- Where WSAs have implemented WC/WDM interventions, the costs, benefits and challenges of these interventions;
- The impact of the recent drought and the associated restrictions imposed on water use in the area; and
- The impact of WC/WDM on the ability of WSAs to apply water restrictions in the future, given the experiences of the recent drought.

3. INVESTIGATIONS

The following were undertaken as part of these investigations

- Interviews with Mr J Frame, Mr J Daniels and Mr M Killick of the City of Cape Town;
- Review of the Water Services Development Plans (WSDP) prepared by the various WSAs in the study area;
- Review of CCT's Draft Water Conservation and Water Demand Management Strategy Document; and
- Review of reports on recent WC/WDM projects and studies undertaken by the various WSAs.

4. CITY OF CAPE TOWN

4.1 Introduction

Since the completion of the IWRP Study in 2001, the City of Cape Town (CCT) has developed and fine tuned a comprehensive WC/WDM Strategy, has implemented a number of WC/WDM projects/interventions and has had to mitigate the impact of two droughts.

Most of the WC/WDM interventions were undertaken or started shortly after the completion of the IWRP Study in 2001, some of which proved to be very successful. However, due to WC/WDM having to compete for resources within the CCT, the impetus for a sustained WC/WDM drive was lost. Focus on WC/WDM in general and water demand reduction in particular was however re-initiated in 2004, in response to a severe drought, resulting in the development of the CCT's 10-Point Water Conservation Plan.

Although drought mitigation interventions (demand-reduction focus) are similar in certain respects to WC/WDM interventions (demand-optimisation focus) and would probably form part of any WC/WDM strategy, there are fundamental differences between them. Drought mitigation is usually punitive by nature and focuses on demand reduction in the short-term, often with significant impacts on the consumer and potentially with reduced revenue streams for the municipality (if the situation is not well managed). WC/WDM on the other hand focuses on the sustained minimisation/elimination of wastage and the optimal use of water over the medium to long-term, with nominal impact on the consumer and invariably with financial benefits to the municipality concerned. The recent droughts, together with the mitigation measures implemented, have resulted in a significant increase in public awareness regarding the scarcity of water in the area and the need to use it more efficiently.

A brief summary of the WC/WDM initiatives undertaken by the CCT or its predecessors to date, are as follows:

- 1997 The Cape Metropolitan Council (CMC) undertook to develop and manage a sustainable water demand management strategy to reduce projected water demands in the Greater Cape Town area by 10% or more (based on the historical growth rate of 4% pa) by the year 2010;
- 1998 The CMC established a Water Demand Management section to introduce initiatives to reduce the demand for water in the Cape Metropolitan Area. Metropolitan Local Councils (MLCs) initiated projects such as the iKapa Leakage Repair Project and the Khayelitsha Pressure Management Project. CMC adopted a WDM Strategy and Implementation Plan;
- 1999 Initiated the IWRP Study. MLCs introduced a 5-step tariff structure;
- 2000 Drought: restrictions imposed to achieve a 10% reduction in demand. Implemented a public awareness campaign;
- 2001 Completed the IWRP Study. CCT adopted a WDM Policy and Strategy based on the findings of the IWRP Study and introduced a new 5-step tariff structured to provide assistance to the poor and to promote wise water-use/conservation;
- 2002 Approval for the Berg Water Project (BWP) following the completion of the CCT's WSDP and acceptance of the CCT's Water Demand Management Strategy and programme. These were based on an undertaking that demand would not exceed 372 Mm³/a by 2010 (as reflected by the CCT's low water demand curve);
- 2004 Concern with regard to sustained commitment to WC/WDM. Service provider appointed by DWAF to assist CCT with a review of its WDM Strategy of 2001;
- 2004/2005 Drought: restrictions imposed from 1 October 2004 to achieve a 20% reduction in demand. CCT developed and started to implement a 10-Point Water Conservation Plan; and

- 2006 CCT completed the review of the WDM Strategy of 2001 and compiled a new WC/WDM Strategy, which is aligned with an enhancement of the 10-Point Water Conservation Plan.

The current organogram of CCT's Water Services Branch, indicating where WDM is positioned within the Branch, is contained in **Appendix A** of this report.

4.2 Recent Studies

4.2.1 Introduction

The CMC established a WDM Unit and adopted a WC/WDM strategy and policy in 1998. Following financial assistance from the CMC to the Metropolitan Local Councils (MLCs) via the Water Demand Management Assistance Programme (WADMAP), a number of projects such as the iKapa Leak Projects and the Khayelitsha Pressure Management Project (KPMP) were implemented.

The subsequent IWRP Study of 2001, initiated to investigate possible interventions to avoid having to impose water restrictions of ever-increasing severity in the short to medium term and to ensure a sustainable supply of water into the future, identified three packages of interventions. Two of the three packages were suites of WC/WDM interventions, one of which was to be implemented by the CCT and the other to be promoted by the CCT. Support and commitment to the findings of the IWRP Study was then confirmed by the adoption of the WC/WDM Policy and Strategy in 2001.

However, subsequent institutional changes and competing priorities for limited funds made it difficult to implement WC/WDM, although a study to extend pressure management into other areas was undertaken following the completion of the KPMP.

In order to assist the CCT with WC/WDM, DWAF made a service provider available to assist the CCT with the enhancement of its WC/WDM Strategy of 2001. This was undertaken as part of a joint agreement to intensify commitment to WC/WDM in general and to reach the 20% demand reduction target by 2010, in particular. However, due to funding and institutional constraints, the development of the strategy was suspended for some time before CCT re-initiated its continuance in 2005.

During the drought of 2004/5 and separate to the abovementioned review of the WC/WDM strategy, CCT launched a 10-Point Water Conservation Plan, aimed at achieving certain water demand reduction targets. Due to the severity of the drought, the CCT was required to focus more on the drought mitigation interventions than on the review of the strategy. This resulted in the final draft of the updated WC/WDM Strategy and Implementation Plan only being completed early in 2006. It is understood that the updated strategy and associated implementation plan has not been adopted by the CCT Council as yet, but is being used as a basis for the planning and implementation of all current and future WC/WDM interventions.

4.2.2 WC/WDM Strategy of 2001

A Water Demand Strategy and Implementation Plan were adopted by CCT in 2001, following the completion of the IWRP Study. The Strategy was developed by first defining guiding principles, which informed the formulation of policy and policy objectives, from which the Strategy was then developed.

The following principles informed the development of the policy:

- Water is a strategic, precious and scarce resource;
- The wastage of water can not be tolerated; and
- All consumptive water use must be measured and accounted for.

The Strategy was then developed based on the following objectives;

- *Equity*: Universal access to quality water supplies with a guaranteed minimum level of service through a metered connection;
- *Sustainability*: An acceptable level of assured water supply for future generations;
- *Affordability*: Ensure that water services remain affordable;
- *Demand Reduction*: Reduce the projected demand for water by 20% (or more) by the year 2010;
- Encourage, educate, promote and where appropriate, legislate the optimal use of water;
- Maximise the use of alternative sources such as wastewater effluent and boreholes; and
- Minimise the loss of water.

The Strategy developed from the above entailed an intense programme of intervention for three years, followed by a programme of ongoing maintenance and public education. Bi-annual reporting to the Portfolio Committee on progress was a significant component of the Strategy. A summary of the strategy is contained in Table 4.1.

Table 4.1 CCT's Water Demand Management Implementation Strategy of 2001

Strategy Item	Responsible	Total Budget IWRP Study	Capital Budget 2001/2002	Operating Budget 2001/2002
1. Identify high profile "Champions"	MWS	-		
2 Raising the profile of WDM * Assign specific responsibilities within Water Services * Policy and Strategy formulation and monitoring * WDM requirements in Water By-law * Mobilise donor funding	WDM			
3 Business plans for each water division	All			
4 Bulk Meter Management for Accuracy * Set up testing and replacement programme	BW	R600 000	R900 000	
5 Municipal policy on Wise Water Use * Ensure that all AFUs are removed * Ensure wise water use in Parks	WDM		R400 000	
6 Water Services By-law * WDM input into by-law	Retic (Plan) WDM			
Package One Initiatives:				
7 Leakage and Wastage minimization * Set up water auditing, data management and reports * Planning district metering and pressure management * Prioritise and install district meters * Set up leakage detection projects and programmes * Installation of PRVs and controllers * Monitor/analyse results	Retic (Plan) Retic (Ops)	R55 000 000	R4 000 000	
8 User Education in Water Conservation * Publicity research, planning and execution * Partnerships with schools, libraries, PAWC, etc. * Ongoing promotion of Water wise gardening * Formalise 'exhibition' collection * Establish an advisory 'Help Unit' * National Water Week	WDM and CARM	R5 000 000	R1 900 000	R2 250 000
9 Prohibit and remove Automatic Flushing Urinals * Prohibit through by-law	WDM	R1 000 000	R750 000	

Strategy Item	Responsible	Total Budget IWRP Study	Capital Budget 2001/2002	Operating Budget 2001/2002
* Remove all Automatic Flushing Urinals (AFUs)				
10 Plumbing (leakage) repair projects (PRP) * Plan and prioritise areas and budget funding * Fast track existing and new PRPs * Strategy to limit degeneration through education, etc.	Retic (Plan) Retic (Ops) and CARM	R45 000 000	R2 000 000	
11 Tariffs, metering and credit control * Universal metering and billing * Revisit commercial/industrial tariff structure * Set target consumptions city-wide * Meter testing and replacement programme	CARM Retic (Plan) Retic (Ops)	Ongoing	R2 000 000	
Package Two Initiatives:				
12 Alternative sources of water * Mapping and assessment of all large irrigation and industrial needs on GIS * Matching needs with effluent availability a) Municipal control * Maximise wastewater re-use * Maximise use of local springs * Install parks boreholes b) Consumer control * Promotion of alternative sources with guidelines * Identify/map areas for wellpoints * Assist schools, parks and sports clubs * Grey Water SABS guidelines in preparation	WDM (CARM)	Ongoing	R600 000	
13 Water Efficient Fittings * Raise awareness of water saving devices * Setting standards (SABS) and training plumbers * Legislate efficient fittings in water by-law * Mobilise state and provincial departments to retrofit * Create programmes and incentives to retrofit	WDM	Ongoing	R450 000	
Budget Totals:		R106 600 000	R13 000 000	R5 750 000

Note: The budget figures are guidelines at this stage until the respective business plans are finalised.

Abbreviations: Manager Water Services (MWS), Bulk Water (BW), Water Demand Management (WDM), Reticulation - Water and Sewers – Operations (Retic (Ops)), Reticulation - Water & Sewers – Planning (Retic (Plan)), Customer and Revenue Management (CARM).

4.2.3 CCT's 10-Point Water Conservation Plan

The 10-Point Water Conservation Plan adopted by Council in 2005 is summarised in **Table 4.2**.

Table 4.2 CCT's 10-Point Water Conservation Plan

	Goal	Objective	Programmes	Projects
1	Reduce Council demand Non revenue	Reduce network losses	<ul style="list-style-type: none"> • Pressure management and reduction • Network leak detection and repair • Rehabilitate the network 	<ul style="list-style-type: none"> • iKapa Pressure Management • Khayelitsha Pressure Reduction ongoing • Mfuleni Pressure Management • Lwandle Pressure Management • Delft Pressure Management • Identify other pressure management projects • Set up leak detection team • TOC – improve response time to complaints
2		Reduce Council consumption	<ul style="list-style-type: none"> • Open spaces • Sportsfields • Buildings 	<ul style="list-style-type: none"> • Water Audits • Extend use of treated effluent • Extend use of boreholes • Plant water-wise plants • Zero water options where appropriate • Retrofit Council buildings • Remove all AFUs
3	Consumers must not waste water and should endeavour to use water wisely	Reduce household leaks/wastage/inefficient use	<ul style="list-style-type: none"> • Leak Repair Projects in poor communities • High Consumption Reports and follow-ups 	<ul style="list-style-type: none"> • iKapa Leaks Repair – monitor • Khayelitsha Leaks Repair • Mfuleni Leaks Repair • Continue Nomzamo Leaks Repair • Identify further leaks Repair Project • High domestic water users • Ongoing follow up on high consumption • Enforce restrictions
4		Ensure equitable tariffs	<ul style="list-style-type: none"> • Revise tariffs 	<ul style="list-style-type: none"> • Model tariffs including restriction tariffs • Ongoing analysis of the effectiveness of tariff structure • Compare tariff proposal with other cities
5		Control water use in <u>new developments</u> through by-laws	<ul style="list-style-type: none"> • Existing Developments • New Developments • Innovations 	<ul style="list-style-type: none"> • Expedite new by-laws • Investigate feasibility of certain proposals in by-laws • Legislate against AFUs
6		Promote retrofitting and capacity building programmes	<ul style="list-style-type: none"> • Retrofitting • Water User Capacity building 	<ul style="list-style-type: none"> • Investigate subsidy/incentive schemes • Promote retrofitting of water-efficient fittings • Promote removal of all AFUs • Swimming pool management – reduce evaporation, other sources • Assist consumers in implementing water saving measures • Assist consumers with water audits • Water saving pamphlets

Table 4.2 CCT's 10-Point Water Conservation Plan (cont.)

	Goal	Objective	Programmes	Projects
7		Communication, education, partnerships and informative billing	<ul style="list-style-type: none"> Media Campaigns Educational Programmes Partnerships and Forums Informative Billing 	<ul style="list-style-type: none"> Restrictions Media Campaign Partnership with the media Water Week Internal Information Flow with regard to restrictions Industry and other forums Notices to consumers Informative material/pamphlets Effective response times to queries and assist with advice LT Media Campaign Engage NGOs, CBOs, neighbourhood watches Involvement of Ward Councillors and Committees Public participation to ensure buy-in to WC/WDM Strategy Partnership with other spheres of government Partnership with large consumers Schools Education – water audits Schools Education – WC/WDM as part of the curriculum Proposal for informative Billing through SAP
8	Reduce water demand from CCT's potable supply system	Promote alternative water sources	<ul style="list-style-type: none"> Extend treated effluent system Promote grey water re-use Promote private boreholes Promote water-wise gardening Investigate rainwater tanks By-laws 	<ul style="list-style-type: none"> Treated Effluent System Projects Media campaign for alternative water sources
9		Conserve CCTs water supply	<ul style="list-style-type: none"> Working for water programmes Control of invasive alien plant Groundwater management Control pollution of water 	
10	Adopt WC/WDM as a key service delivery strategy	Adopt WC/WDM as a key service delivery strategy Measurable Timebound		<ul style="list-style-type: none"> EPWP to support leaks repair projects, water audits etc. Sufficient funds and HR to be allocated to WC/WDM Consumption tracking / reporting Improve understanding consumer behaviour

4.2.4 WC/WDM Strategy of 2006

Background

As the WC/WDM Strategy adopted by CCT in 2001 was found not to be sustainable due to various institutional challenges and competing priorities for limited resources, the funding for WC/WDM was significantly reduced between 2003 and 2004.

As a result of the above, DWAF made a service provider available to CCT in 2004 as part of a joint agreement to enhance WC/WDM initiatives to review the existing WC/WDM Strategy in light of the

challenges being experienced and anticipated future requirements. However, due to funding constraints, the review was not completed until such time as CCT could fund the review. Subsequent changes in management and the impact of the drought further delayed the completion of the review, with the final draft strategy only being submitted to CCT for consideration early in 2006. It is understood that the Strategy has not been adopted by CCT's council as yet, but is being used as the basis for all current and future WC/WDM initiatives.

Although the water resource situation in the Western Cape was the main motivation for initiating the strategy review, financial efficiency, equitable access to water services, environmental sustainability and the development of a culture of water use efficiency are significant thrusts of the enhanced Strategy. The purpose of the Strategy is therefore to:

- Assist in reconciling supply and requirement over the long-term by minimizing wastage and promoting water use efficiency ;
- Water resource and environmental protection;
- Enhance the financial viability of the water services by reducing operating costs, improving revenue streams (the annual cost of the distribution losses and the loss of income were estimated to be in the order of R220 million, as at 2005) and postponing the need for expensive capital works projects (water and wastewater); and
- Assist in reducing hydraulic loading on wastewater infrastructure.

Savings

The Strategy states that the “anticipated” savings for the various WC/WDM options, determined from the IWRP Study and subsequent stakeholder workshops, are highly conservative and identifies the savings possible in CCT via WC/WDM interventions in **Table 4.3**.

Table 4.3 Demand Savings Possible through WC/WDM (from existing demands)

Source	From	To	Saving
Reduction in water wastage	148 MI/day	111 MI/day	37 MI/day
Reduction in inefficient usage	210 MI/day	147 MI/day	63 MI/day

WC/WDM therefore has the potential to reduce the existing demands from 797 MI/day to 697 MI/day, which represents a total savings of 100 MI/day (or 36.5 Mm³/a).

Apart from the savings possible on the existing demands, the potential to reduce the growth rate in water demand by 25% pa (from 2.7% pa to 2.0% pa) for new consumers was also identified.

The Strategy further identifies a reduction potential of 65 MI/day (23.7 Mm³/a) via the use of alternative sources. This is mainly via the use of boreholes and wellpoints, rainwater harvesting and grey water use (*not the re-use of domestic effluent at scale*).

The source and extent of the potential savings identified as part of the strategy is contained in **Table 4.4**.

Table 4.4 Potential and Opportunities for Demand Reduction through WC/WDM

Domestic (household)				Domestic (outside use)			
Efficient Usage	Inefficient Usage	Leaks	Total	Efficient Usage	Inefficient Usage	Leaks	Total
55%	38%	7%	100%	73%	20%	7%	100%
189,7	132,4	24,2	346,3	84,3	23,1	8,1	115,4
Industrial				Commercial/business			
Efficient Usage	Inefficient Usage	Leaks	Total (Mℓ/day)	Efficient Usage	Inefficient Usage	Leaks	Total
85%	10%	5%	100%	65%	25%	10%	100%
32,3	3,8	1,9	38,0	62,7	24,1	9,6	96,4
Municipal				Other consumers			
Efficient Usage	Inefficient Usage	Leaks	Total (Mℓ/day)	Efficient Usage	Inefficient Usage	Plumbing Leaks	Total (Mℓ/day)
65%	25%	10%	100%	65%	25%	10%	100%
22,4	8,6	3,4	34,5	47,3	18,2	7,3	72,8
UAW + bulk losses				Summary - Total			
Leak bursts	Backgr. Leaks	Commercial	Total	Efficient Usage	Inefficient Usage	Leaks	Total
30,00%	20%	50,00%	100%	55,08%	24,60%	18,53%	100%
55,8	37,2	93,0	185,9	438,7	210,2	148	796,7

Interventions to achieve the savings:

Unlike the IWRP Study, which evaluated the potential savings achievable via specific individual WC/WDM interventions, the Strategy first quantified the total savings potential by considering/evaluating certain indicators and by comparing actual demands against accepted efficient water use benchmarks. Once the source and extent of the savings possible were identified, appropriate types of WC/WDM interventions were recommended (i.e. the Strategy does not identify specific projects nor does it identify specific spatial areas for WC/WDM interventions and therefore further studies in this regard are still required).

The potential for reduction by eliminating wastage exists as the Minimum Night Flow (MNF) in CCT is estimated to be between 20% and 35% of the total average demand (inadequate district meters currently prevent the figure from being accurately determined).

The potential for reduction through efficient water use exists as it is estimated that up to 38.2% of existing household demand can be reduced by various WC/WDM measures, with the biggest savings achievable being through retrofitting toilets. Furthermore, inefficient use in the garden is estimate to be as high as 40%. Potential savings due to inefficient use by the commercial, industrial and municipal sectors were also quantified.

The WC/WDM activities and targeted savings identified as part of the Strategy are illustrated in **Table 4.5**.

Table 4.5 WC/WDM Activities and Targeted Savings

	Inefficiency component	Max Saving (MI/day)	% savings target	Target Savings (MI/day)	Activity to achieve saving	Primary necessity
1	Reduction of UAW (leaks only)	93.0	60%	55.8	· Comprehensive reticulation management programme	• Financial sustainability of Council
2	Inefficient water consumption in poor areas	39.2	75%	29.4	· Comprehensive management programme in poor communities	• Financial sustainability of Council • Affordability for consumer
3	Inefficient water consumption of business / industry	77.0	80%	61.6	· Behaviour change · Retrofitting · Leak repair	• Water resource consideration
4	Inefficient water consumption of domestic	148.7	75%	111.5	· Behaviour change · Retrofitting · Leak repair · Effective tariff	• Water resource considerations
5	Recycling and alternative water resources	87.0	75%	65.3	· Effluent recycling plants · Well and boreholes · rain harvesting · Unconventional resources	• Water resource considerations
	Total	444.8		323.5		

Framework

The Strategy, which is based on previous strategies and can therefore be seen as an enhancement of previous work, is based on five goals as detailed below. The main enhancement on the previous work is in the area of creating an environment within the CCT conducive to the implementation of WC/WDM interventions (i.e. to heighten the level of commitment to and resources for WC/WDM).

Goals A, B and E relate to the *implementation objectives* that will result in the direct reduction of water demand. Thirteen implementation objectives have been developed under these goals and are presented in **Table 4.6**.

- Goal A: CCT must by 2010, reduce and maintain the non-revenue demand of water to below 20% of the total average demand.
- Goal B: Water wastage by consumers should be reduced and maintained to below 2% of the total demand by 2010 and most consumers should achieve acceptable water efficiency benchmarks by 2015.
- Goal E: Reduce the projected potable water demand by 20% by the year 2010 and conserve Cape Town's water supply.

Table 4.6 Implementation Plan - Water Demand Reduction Objectives

Policy	Objective number	Description
Goal A	A1	Reduce and maintain low levels of water losses through the reticulation system
	A2	Reduce and maintain low levels of non-revenue demand by consumers
	A3	Adopt and implement proactive O & M measures
	A4	Reduce and maintain low levels of billing and metering losses
Goal B	B1	Promote the efficient use of water to consumers and customers
	B2	Regulate and enforce the prevention of wastage of water
	B3	Ensure the efficient use of water in new connections and developments
	B4	Introduce more equitable tariffs and informative billing
	B5	Assist and capacitate consumers to be water-efficient, including the introduction of leak repair and retrofitting projects
	B6	Reduce and maintain low levels of inefficient water use by Council (internal money)
Goal E	E1	Promote alternative water resources and technologies
	E2	Conservation of existing water resources
	E3	Ensure the quality of treated effluent is of suitable standards

The *enabling action plan* consists of two goals as detailed below and seven objectives as presented in **Table 4.7**. Goal C relates mainly to ensuring adequate information whilst Goal D relates mainly to ensuring adequate resources and capacity to implement WC/WDM.

- Goal C: CCT must by 2007, ensure and maintain ongoing effective management systems and implement Integrated Water Resource Planning in all decisions regarding water resources augmentation, bulk infrastructure development and water efficiency projects.
- Goal D: CCT must adopt WC/WDM as one of its key water service delivery strategies, must give priority to its implementation and must ensure an ongoing adequate enabling environment.

Table 4.7 Enabling Plan Objectives

Policy	Objective number	Description
Goal C	C1	Establish appropriate district management areas and monitor the unaccounted-for water
	C2	Ensure adequate information and policies to support decision-making
	C3	Ensure all decisions are supported in terms of Integrated Resource Planning (IRP).
	C4	Monitor the impact of WC/WDM measures and KPI
Goal D	D1	Ensure adequate financial resources
	D2	Ensure adequate human resources and processes
	D3	Ensure adequate transparency, stakeholder buy in and commitment

Budgets and Implementation Plan

Although not as yet approved by Council, the budgetary requirements for WC/WDM over the next eight years, starting from the 2005/06 financial year, are as given in **Table 4.8**:

Table 4.8 Budget Requirements to Implement the WC/WDM Strategy

Year	Amount R x 1000
Year 1	R 47 685
Year 2	R 90 177
Year 3	R 55 740
Year 4	R 51 245
Year 5	R 48 190
Year 6	R 39 960
Year 7	R 35 030
Year 8	R 35 080
Total	R403 107

A more detailed breakdown of the budgets and implementation plan is contained in **Appendix B** of this report.

Conclusions

The Strategy concludes that the effectiveness of WC/WDM in achieving its objectives will depend on the following:

- The savings that can actually be achieved
- The rate of implementation of WC/WDM interventions, which are entirely dependent on the capacity and resources of the municipality
- Reducing the water demand of new consumers.

4.3 Recent and Current Interventions

4.3.1 Introduction

As stated previously, two packages of options were recommended for implementation following the findings of the IWRP Study. They are:

Package 1 – CCT to Implement

- Pressure management
- User education
- Elimination of automatic flushing urinals
- Leakage repair; and
- Tariffs, metering and credit control

Package 2 – CCT to Promote

- Use of water efficient fittings
- Use of private boreholes; and
- Grey water use

The potential savings, costs and unit reference values (URVs) of the respective options investigated as part of the IWRP Study and subsequent stakeholder workshops are presented in **Table 4.9**.

Table 4.9 Potential Savings, Costs and URVs of the WC/WDM Options Investigated as part of the IWRP Study Subsequent Stakeholder Workshops

Intervention	IWRP Study			Subsequent Workshops		
	Savings (Mm ³ /a)	Cost (R million)	URV R/m ³	Savings ⁴ (Mm ³ /a)	Cost ² (R/million)	URV ³ (R/m ³)
Pressure Management	27.8	79.1	0.26	16.7	79.1	0.40
User Education	20.0	7.0 ¹	0.35	10	7.0 ¹	0.70
Elimination of Automatic Flushing Urinals	4.2	14.2	0.26	4.2	14.2	0.26
Leakage Repair	15.6	63.1	0.31	15.6	63.1	0.31
Tariff, Metering and Credit Control	20.0	N/A	N/A	10	N/A	N/A
Introduction of Water Efficient Fittings	26.3	62.0	0.18	7.9	62.0	0.60
Promotion of Private Boreholes	9.0	R3156 /household	-0.65	0.45 ⁵ -1.63 ⁶	R3156/household	0.46 ⁷ -1.63 ⁷
Promotion of Grey Water Use	3.3	R5600 /household	1.05	1.0	R5600/household	1.05
Rainwater Tanks	15m ³ /a hh	R7013 /household	35.39	15m ³ /a hh	R7013/household	35.39

Notes:

1. Operating budget not capital budget.
2. Costs escalated at 7% pa to 2005.
3. URV based on discount rates of 8%.
4. A workshop was held with a group of sector specialists in March 2003, following which "the most probable savings" for the respective options were determined.
5. Low usage (lower income) areas.
6. High usage (higher income) areas.
7. URVs do not change as they are determined at household level (i.e. total yield dependent on take-up).

The CCT has either implemented or promoted each of the abovementioned WC/WDM options, with the exception of promoting the use of rain water tanks, although the extent to which the respective options have been pursued has differed. Some of the options were implemented through specifically focused WC/WDM interventions, whilst others were implemented as part of drought mitigation interventions. Many of the initial projects were focused at the "poorer areas" of the CCT, aimed at improving service delivery to these areas which had been subject to neglect as a result of historical inequalities.

Package 1 - Options**4.3.2 Pressure Management****Khayelitsha Pressure Management Project***Introduction*

The most significant pressure management project undertaken by the CCT to date is the Khayelitsha Pressure Management Project (KPMP), which was initiated in 2001 and commissioned in February 2002. The project first started as a pilot project, but following favourable initial findings, was extended to be a more comprehensive project.

Khayelitsha, one of the largest townships in South Africa, is located on the Cape Flats some 20 km from Cape Town's central business district (CBD), accommodates some 500 000 people and is supplied with potable water from the Blackheath Reservoir. The make-up of the area at the time the project was initiated is as follows:

- 43 000 serviced sites with both internal water supply and water borne wastewater; and
- 27 000 squatter shacks supplied by communal standpipes.

Problem statement

The water distribution infrastructure in the area was in general considered to be in good condition. However during 2000, the volume of water supplied to the area was measured at around 2 500 m³/hr (21.9 Mm³/a) with the Minimum Night Flow (MNF), an indication of the levels of leakage and/or wastage, being in excess of 1 600 m³/hr (\pm 65% of the total flow to the area).

Following investigations, it was established that most of the water supplied to the area was being returned to the sewer system through household leakage, a result of high pressures (\pm 80 m) and pressure fluctuations over a sustained period having caused damage to the internal plumbing fittings.

Solution

The solution proposed for the area was to reduce the high water pressures and pressure fluctuations in the reticulation system, particularly during low demand periods. Undertaking the repair of internal plumbing was deemed not to be sustainable in the long-term, due to the high residual pressures in the area.

Scope of Work

Pressure reducing valves, complete with electronic controllers to improve the efficiency of the valves (regulate downstream pressure during off-peak periods), were installed on the two bulk water mains supplying the area.

Results

Accurate auditing of the results was an integral part of the project, with the leakage levels as at April 2000 when the project was first initiated, being the baseline from which the savings were calculated.

At the outset, the average daily flow into the area was around 2 500 m³/hr with a MNF of 1 600 m³/hr. The flow was first reduced to 1 800 m³/hour with a MNF of 1 200 m³/hr using fixed set PRVs, resulting in a saving of 6 Mm³/a. The flow was then reduced further to 1 500 m³/hour with a MNF of 750 m³/hr using time modulated PRVs (varying downstream pressure reduction over time), resulting in a savings of 9 Mm³/a.

Project costs benefits

The cost benefits are as summarised below:

- Annual savings = 9.0 Mm³/a (between 2% to 3% of total CCT demand);
- Cost savings on bulk water purchases = R27 million/a;
- Project cost = R4.5 million; and
- A URV of -3.40 compared with the 0.4 determined as part of the IWRP Study (which did not consider the cost impact of the savings)

General

The project has subsequently been extended to include Khayelitsha Site C, the details of which are unknown.

Mfuleni Pressure Management Project

Introduction

- Target area comprises some 9 000 dwelling units
- Design and installation undertaken in-house
- Project initiated during 2004/5 financial year and completed during December 2005

- The project is only the first phase of a much larger project planned for the area; and
- No reports on initial inflows and MNFs

Scope of work

- Installation of 2 No. PRVs (200mm and 300mm); and
- Installation of loggers and sewer measuring devices

Results

- Pressure reduced on average from 7 bar to 4 bar;
- Savings of 0,43 Mm³/a (R200 880/month); and
- MNF reduced by more than 50%

Project cost benefits

The cost benefits are as summarised below:

- Annual savings = 0.43 Mm³/a
- Cost savings on bulk water purchases = R2.41 million/a
- Project cost = R300 000
- Payback period = ± 2 months; and
- URV = -5.27

General:

Investigations are ongoing to use time-modulated PRVs in this area.

Gugulethu Pressure Management Project

Introduction

- Target area comprises some 8 000 dwelling units
- Design and installation undertaken in-house; and
- No reports on initial inflows and MNFs

Scope of work:

- Installation of 2 No. PRVs (100 mm and 300 mm); and
- Installation of loggers

Results

- Savings of 48 180 kl/month (R268 844/month); and
- MNF reduced by more than 50%

Project cost benefits

The cost benefits are as summarised below:

- Annual savings = 0.58 Mm³/a
- Cost savings on bulk water purchases = R3.2 million/a
- Project cost = R268 900
- Pay back period = 1 month; and
- URV= -5.37

Other Pressure Management Projects

The following areas have been identified for the implementation of pressure management projects:

- Lwandle;
- Delft; and
- Mitchells Plain (planned to start after June 2006).

4.3.3 User Education/Awareness Campaigns

Introduction

The user education and community awareness campaigns undertaken by CCT, were primarily undertaken as part of drought mitigation interventions or as part of specific projects, although some of the campaigns formed part of larger national drives to promote water awareness e.g. Water Week. CCT has also undertaken significant in-house campaigns/initiatives to enhance the profile and understanding of WC/WDM within the organisation.

Scope of Work

The following externally focused campaigns have been initiated by the CCT since the completion of the IWRP Study:

- Drought mitigation
 - Air and print media campaigns to make consumers aware of the droughts, the restriction measures imposed and success in achieving demand reduction targets
 - Engagement with "large consumers" and targets groups, e.g. schools to facilitate demand reduction and efficient use of water
 - Establishment of forums to collectively promote water-efficiency e.g. "greening/ gardening"; and
 - Informative billing and water-saving tips.
- Water Awareness Programmes (booklets)
- Partnership with the Department of Education and DWAF
- Schools awareness campaigns and water audits
- Joint Education drives (Two Oceans Aquarium/Ratanga Junction)
- Local awareness campaigns linked to specific projects and target areas (e.g. informal settlements)
- Participation in Water Week
- Participation at gala events, e.g. world summit and local conventions; and
- Shopping mall displays.

The following internally focused campaigns have been initiated by CCT:

- Identified a political WDM champion
- Made WDM a criteria for evaluating the performance of managers and division (each of the water divisions are required to prepare business plans for WDM initiatives)
- Established structures to facilitate the flow of information throughout the municipality
- Drafted policy for the irrigation of public open space
- Continuous enhancing of master plans
- Enhanced the training centre to train internal staff and external project plumbers; and
- Enhanced the customer care call centre

Results/project cost benefits

As these campaigns are generally undertaken as part of larger interventions or projects, their effectiveness (savings directly due to the campaigns) is difficult to measure. However, it is widely acknowledged that the effectiveness of the larger interventions or projects would be compromised should it be undertaken without also initiating community participation and/or awareness/education campaigns.

The results of various surveys undertaken indicate the following:

- Print media and particularly the daily press and informative bills are effective vehicles to relay the message
- Focused campaigns with campaign slogans e.g. "Water is precious – Big Tap" and "Save water – Save the Cape" have a significant impact
- 57% of residential consumers have changed their water use behaviour, the primary reasons being price (41%); restrictions (32%) and awareness campaigns (20%)

4.3.4 Elimination of Automatic Flush Urinals

It is necessary to distinguish between AFUs on municipal property and AFUs on private property, as those on municipal property need to be eliminated by the municipality itself, whilst those on private property need to be addressed by the landowner, enforced through by-laws. Furthermore, the elimination of AFUs normally forms part of larger retrofitting initiatives, therefore making it difficult to quantify the costs and savings directly related to this intervention.

An initiative to eliminate AFUs on municipal property was undertaken by CCT as part of its 10-Point Water Conservation Plan and is discussed in more detail in **Section 4.3.8**.

Prior to the amalgamation of the former administrations into the CCT, only the Cape Town Administration had instituted by-laws enforcing the retrofitting of AFUs. The CCT has recently promulgated new by-laws for its entire area of jurisdiction (1 September 2006 – See **Appendix D** of this report for a copy of the by-laws). These by-laws require the retrofitting of all AFUs with demand-type systems within two years. The use of AFUs was also prohibited through a Provincial Gazette in 1996.

It must be noted that the ability of the municipality to enforce/police these by-laws, has a significant impact on the effectiveness of this specific intervention.

4.3.5 Leakage Repair

iKapa Leaks Project

Introduction

Langa, Guguletu, Nyanga, Crossroads and Philippi are located on the Cape Flats, some 20 to 30 km from Cape Town's CBD. Following the demarcation process, which culminated in local government elections in 1995, these areas were incorporated into the new City of Cape Town, having emerged from an era of neglect and dysfunctional administrations, services and infrastructure.

Problem Statement

The water reticulation and domestic plumbing systems in these areas were found to be in very poor condition, with high leakage rates and unacceptable levels of customer neglect.

Solution

A community-based Water Leaks Repair Project was conceived in 1998 to :

- Restore the domestic plumbing and water reticulation infrastructure
- Achieve equity in service delivery, administration, metering and billing; and

- Empower and transfer skills to the community.

A reduction in water pressure to effect water-savings was not considered appropriate due to the already low water pressures in the area (3-7 kPa).

Scope of Work

The scope of the project included the following:

- An awareness campaign around this particular project and water conservation in general
- Repair of domestic water leaks to all Council and former Council housing-stock (approximately 23 000 housing units and 8 000 hostel households)
- Relocation of existing mid-block water mains to within the road reserves in certain areas
- Replacement of defective water meters and the installation of new domestic water meters where there were none
- Installation of bulk water meters
- Conversion of billing from a flat rate tariff to a volumetric based tariffs; and
- A community empowerment and skills transfer programme whereby 55 local and 13 CCT employees were trained to undertake plumbing repairs.

Results

The bulk water supplied to the project area is measured at six district meters. In addition, the area was divided into 10 zones and isolated by the installation of bulk water meters and loggers, to separately monitor the water consumption of each zone.

The project led to an average demand reduction of 5,5 Mm³/a. Furthermore, the project resulted in a $\pm 43\%$ reduction in sewer flows to the wastewater treatment works serving the area.

Further benefits of the project included:

- Annual savings of around R10 million as a result of a reduced water demand and sewer inflows
- An improvement in the billing database and the establishment of the foundation for an increased revenue base
- Simplified maintenance operations with the elimination of mid-block water mains; and
- Employment opportunities for approximately 270 local people.

Project cost benefits

The projects cost benefits are as summarised below:

- Annual savings = 5.5 Mm³/a ($\pm 1.8\%$ of CCT's total demand)
- Savings on bulk water purchases and wastewater treatment = R10 million/a
- Project cost = R32 million
- Payback period = ± 3 years; and
- URV of 0.71 excluding the impact of the savings and -2.21 including the impact of the savings, compared with the 0.31 determined as part of the IWRP Study (which did not factor in the cost benefits of the savings).

Assuming that interventions, costing the same as the initial capital outlay of the project, are required every 10 years to maintain the savings, the URV reduces to -1.57 and -0.61 if they are required every 5 years (i.e. still cost-effective to undertake repeated interventions – which may improve further if the impact of improved revenue streams and delayed water and sewer capital works is considered).

General

The following initiatives were identified as possible extensions to this project:

- Debt management and WDM programme = R2 million
- Meter installations (10 000 units) = R7 million
- Retrofit programme (11 000 units) = R5,5 million
- Awareness campaign = R1 million; and
- Establishment of small businesses = R1 million

It is unknown whether these initiatives were ever undertaken.

Khayelitsha Leaks Project

Introduction

This project, which included a significant communication and education campaign, formed part of a larger WDM strategy for Khayelitsha in that it was a follow-up project to the KPMP, which did not intervene beyond the domestic meter.

Problem Statement

The annual water loss in Khayelitsha after the KPMP as at 2002 was around 12.8 Mm³/a, with a large percentage of this volume being as a result of numerous small leaks on private properties.

Solution

A communication, education, training and domestic leakage repair intervention targeting those who use or influence the use of water (e.g. large consumers, schools, women groups and taxi associations) was undertaken.

Scope of Work

The intervention included the following:

- Working in conjunction with community leadership structures
- Mass education and awareness campaigns through the media (e.g. details of free basic water and the need to save water)
- Workshops with specific target groups (e.g. schools; women groups; churches)
- Door-to-door engagement of the top consumers by specifically trained community liaison officers to educate the consumers and identify leaks; and
- Repair of plumbing (cisterns, toilets and taps) using local plumbers (ward-based "community plumbers")

Results/Project cost benefits

The project entailed extensive community participation and resulted in the creation of employment opportunities for local residents. However, no specific costs and benefits have been made available for this project.

Other Leakage Repair Projects

Leakage repair in low income areas, areas which generally tended to have high levels of unaccounted for water, formed a significant component of the initial WC/WDM drive of the CCT. The following leakage repair initiatives are currently being undertaken by the CCT:

- *Leak Free Project:* Entails the once-off repair of leaks on private properties of "indigent homeowners" by trained local plumbers. Basic awareness/education for the homeowner on water

usage by community liaison officers also forms part of this project. This project follows a Council resolution to permit expenditure on private indigent homes.

High consumptions are identified from CCT billing databases (SAPS). Some 12 000 "indigent homes" using more than 30 kl per month have been identified, resulting in a total usage of around 17.5 Ml/day (cost ± R2 million/month).

Leaks were repaired in approximately 1 200 households as at June 2006, at an average cost of R80 per household (materials only), with a resultant drop in consumption in the order of 30% to 50% per household.

- *"Integrated leak repair project"*: The project, which also focuses on low-income communities, was recently initiated in conjunction with DWAF as a pilot project and aims to ensure that water is saved on a sustainable basis and that households only consume what they need and can afford. The project entails the following:
 - setting up project management structures with community participation
 - identifying and training community liaison officers to engage and educate residents and to identify leaks
 - identifying and training local plumbers to undertake once-off leak repairs
 - facilitating the establishment of sustainable local plumbing businesses
 - rewarding participating residents - "responsible water users" who maintain consumptions below 6 kl/household/month for six months, by writing off arrears; and
 - various media and community engagement campaigns.
- Masiphumelele – 58% of zone's water demand saved
- Mfuleni – reduced household demand from 18.5 kl/month to 11.4 kl/month. This equates to a saving of 0.68 Mm³/a and resulted in a five month payback period.

4.3.6 Tariffs, Metering and Credit Control

Tariffs

A three-step rising block tariff was introduced by the Cape Town City Council in 1973 and was extended to all the MLCs when a five-step rising block-rate tariff was introduced for the greater Cape Town area in June 1999. A converged five-step tariff, which made provision for a free basic supply, subsidization of the poor and high tariffs for large consumption to promote water-wise use (WDM initiative – marginal cost of water), was introduced for the entire region on 1 July 2001. Tariffs linked to water restrictions will be addressed later in this report.

The direct impact of these tariffs (i.e. price elasticity) appears not to have been determined, although consumer surveys have indicated price as being one of the main reasons for changing consumer demand patterns.

Water restrictions complete with tariff increases, aimed at achieving a 10% reduction in water demand were implemented on 1 November 2000. A R5.5 million awareness campaign was implemented in conjunction with the restrictions to promote the restrictions and keep the public informed of demand-reduction progress and dam levels. A 15.5% demand reduction was achieved, reflecting the success of the restrictions and awareness campaigns, for which CCT won the "Green Trust" award in 2000.

Water restrictions complete with tariff increases and public awareness campaigns, aimed at achieving a 20% reduction in water demand were again implemented in October 2004 for the 2004/05 hydrological year. It was initially thought that a demand reduction of only 15% was achieved, however, following a review of meter reading accuracies, it was concluded that the demand reduction targets were in fact met.

Monitoring and Information Management

CCT have undertaken several initiatives to improve the collection, assimilation and analysis of information in order to obtain an accurate understanding of demands and demand patterns and to facilitate appropriate decision taking. Some of the IT systems and packages implemented are detailed as follows :

- Automating data capture (telemetry)
- OSRAMI (IT database to monitor the demands of all schools, sportsfields and public open space)
- Municipal Buildings Database; to monitor demands and demand patterns
- SWIFT (sewer water interface with treasury)/IMQS : Reports/Graphs of Land Use/Consumption by Suburb/Zone; and
- EDAMS (network analysis linked to financial database)

Metering

Ensuring that all points of supply are metered and that water use and demand patterns can be accurately determined/monitored. This has formed a significant thrust of the work undertaken by CCT to date. The scope of work undertaken to date includes:

- Installation of domestic meters (objective to have all connections metered)
- Meter audits (specifically of the high industrial and commercial demand consumers and selected high domestic demand consumers)
- Replacement of all 'gallon' meters
- Zone metering and installation of telemetry and data acquisition software
- Master planning and the establishment of zones
- Installation of software to assist in establishing universal metering and improved monitoring of bulk meters.

The effect of metering (either directly or indirectly) has been as follows:

- Unaccounted for water reduced from 22% to around 19%
- Water Bad Debts <=8%
- Non-revenue Water <=25%
- Payment ratios improved from 72% to 83%, attributed in part to comprehensive billing, improved databases, new service connections, volumetric sanitation tariffs and the inclusion of previously unmetered consumers; and
- Establishment of systems to facilitate monthly audits.

Credit Control

Together with focusing on universal metering, improved consumer databases and information management systems, credit control has been actively pursued through the Debt Reduction Committee.

The effectiveness in the above measures and the combined impact they have had in reducing water demand is unknown. However, as pricing is reported to have had the largest impact on changing consumer behaviour and as revenue streams appear to have increased, the above measure must have contributed significantly in this regard.

Package 2 - Options

4.3.7 Water-efficient Fittings

Introduction

Again one needs to distinguish between municipal property and private property. The municipality can intervene directly on their property, whereas the municipality is required to implement by-laws and

undertake public awareness campaigns to facilitate the use of water-efficient fittings. One also needs to distinguish between retrofitting older properties (public awareness) and ensuring that appropriate fittings are used from the outset on all new properties (by-laws).

The CCT undertook as part of its 10-Point Water Conservation Plan, an initiative to install water-efficient fittings and to replace AFUs in all municipal buildings, the results of which are detailed below.

Council Buildings

Wale Street

Scope of Work

- Installed a data logger on the meter
- Carried out an initial water audit and prepared an action plan
- Replaced storage tank inlet valves
- Adjusted all flush valves
- Replaced all old flush valves
- Serviced all cisterns
- Eliminated automatic flushing cisterns
- Fitted spray-type flow controllers to taps; and
- Fitted washer-type restrictors to some "old" taps.

Results/Findings

- The connection in Wale Street was found to be supplying additional buildings
- Reduced minimum night flow from 1,91 m³/h to 0,00 m³/h
- Reduced maximum flow from 5.09 m³/h to 3.32 m³/h; and
- Reduced mean daily demand from 2.73 m³/h to 0.94 m³/h

Project cost benefits

The cost benefits are as summarised below:

- Annual demand reduction = 15 640 m³
- Approximate annual savings = R52 059
- Cost of project = R78 000
- Payback period = 1.5 years
- URV (assuming the fittings need to be replaced every 15 years) = -2.23

Other Council Buildings:

Introduction

The following other Council buildings were targeted as part of this initiative:

- Municipal Offices, Strand
- Municipal Library, Strand
- Municipal Library, Somerset West
- Slaney Centre, Tygerberg.

Scope of Work:

The following was undertaken at all of the above sites:

- Eliminated automatic flushing urinals
- Converted WC cisterns to user-controlled flushing volume
- Fitted flow controllers to basin taps; and
- Eliminated leaks and carried out general maintenance.

Results

The results of the work undertaken at the Slaney Centre in Tygerberg are as follows:

- Original consumption = 4.26 m³/day
- Final consumption = 1.16 m³/day
- Average daily saving = 3.1 m³/day

Project Cost Benefits

- Annual demand reduction = 1 131.87 m³
- Approximate annual savings = R4 788
- Payback period = 1 year 10 months
- URV= -3.3 (assumes fittings to be replaced every five years).

Private Property

It is understood that by-laws, which will enforce the retrofitting of AFUs and the use of water efficient fittings in new properties are currently being drafted. Furthermore, CCT is engaging with the Joint Acceptance Scheme for Water Installation Components (JASWIC) to provide input with regard to fittings approval and standards for water-saving devices. Progress in this regard is however reported to be slow.

4.3.8 Promote use of Private Boreholes

The use of private boreholes was initially not actively pursued by the CCT. The CCT did however investigate the use of boreholes for irrigating public open spaces and have developed a system to assist in managing the irrigation of these areas.

As a result of the restrictions imposed in response to the recent drought, the demand for private boreholes and wellpoints rose dramatically. This process was however managed and regulated by CCT by:

- Mapping existing boreholes for display on CCT's web site
- Mapping of groundwater resources in CCT; and
- Not restricting the use of alternate water supplies during the restrictions, subject to users erecting signage on the property indicating the use of borehole water. The signs were made available free of charge, subject to registering on the central borehole register. Some 6 774 borehole signs were issued between October 2004 and June 2005.

It is understood the CCT has recently initiated a project to investigate:

- Current extent of groundwater use
- Trends in use and impact on the resource over time
- Areas of high risk for saline or pollution intrusion.

4.3.9 Promote Grey Water Use

It is reported that the impact of the drought and the restrictions imposed resulted in a proliferation of private consumers installing grey water re-use systems. The costs and savings realised have not been established, as is the case for the extent to which CCT are promoting the use of such systems.

It can however be noted that during the IWRP Study, the CCT indicated that it would not actively promote the use of grey water systems until SANS standards had been established. Progress in this regard is not known.

4.3.10 By-laws

The institutional restructuring to form the seven MLCs brought together a number of individual local authorities, each with its own by-laws. After amalgamation, the Cape Town MLC republished its by-laws, which were later adopted by the Tygerberg MLC. Other MLCs like South Peninsula, inherited up to five different by-laws from the respective local authorities which made up the new MLC.

New consolidated water services by-laws, which incorporated the requirements of the Water Services Act and included requirements for water demand management, were promulgated on 1 September 2006. A copy of these by-laws is contained in Annexure D of this report.

4.4 The Recent Drought

4.4.1 Background

The water resources in the Western Cape are assessed twice a year, at the end of the hydrological year (end October; after the normal winter rainfall period) and at the onset of the winter rainfall period (end May). Based on the outcomes of these reviews, the need for restrictions and the severity thereof are determined in order to avoid possible supply failures during successive years.

The CCT has developed a set of water restriction measures, which are dependent on the degree of water curtailment required. These measures, which are described in more detail elsewhere in this section, are as follows:

- Level 1 Restrictions : To achieve a demand curtailment of 10%
- Level 2 Restrictions : To achieve a demand curtailment of 20%
- Level 3 Restrictions : To achieve a demand curtailment of 30%.

Following a review of the water resources and subsequent engagement with water users in the supply area, DWAF informed the CCT that a 20% reduction in water demand was required for the 2004/05 hydrological year in order to mitigate the impact of the drought and to ensure adequate supplies for subsequent years. In response to this request and in terms of the by-law allowing the CCT to limit or restrict the use of water, the CCT imposed Level 2 Restrictions effective from 1 October 2004. These restrictions, which were imposed following the publishing of Water Restriction Notices and associated water and sanitation tariff increases for public comment, equated to a 66 million m³ savings in water demand in the given time period.

The water levels in the dams and the effectiveness of the restrictions (area wide and sub-area wide demand reductions) were continuously monitored throughout the drought, prompting the CCT to impose revised Level 2 restriction (more severe) from 1 January 2005, when predetermined reduction targets were not being met.

The 20% demand curtailment requirement was achieved by the CCT and following subsequent moderate winter rainfalls, DWAF relaxed the demand reduction requirement to 5% as from November 2005. However, in addition to the above, DWAF requested the City to target an additional 5% and in response the CCT has imposed Level 1 restrictions (10% demand reduction).

4.4.2 Mitigating Actions Taken

Introduction

As stated above, the curtailment required was a 20% saving in consumption (66 million m³) by September 2005.

As domestic use amounts to about 65% of all water consumption within CCT, it was the main target area to extract the required savings. The other main target sectors/areas included commercial and industrial users (17% of total consumption), municipal buildings (5% of total consumption) and schools (2% of total consumption).

It was targeted that 50% of the total savings would be achieved inside the house (estimated to be about 42% of all CCT consumption) through public awareness campaigns and tariff increases, with baths, showers and toilets being the main target areas (estimated to be 50% of all domestic use). The remaining savings was to be achieved outside of the house (estimated to be about 23% of all CCT consumption), primarily through the curtailment of garden watering and other outdoor uses (36% of all domestic use). Given the Level 2 measures imposed in October 2004, it was not considered feasible/possible to extract the total demand reduction required through the curtailment of "outside of the house use", and hence consumers were requested to make savings "inside the house" as well.

The following formed the key activities of the drought mitigation intervention formulated by the CCT, with the business plan for the intervention summarised in **Table 4.10**:

- Media campaigns
- Facilitate the flow of information (internally and externally)
- Effective response times to enquiries (provide advice)
- Install water usage practices in municipal departments/offices
- Enforce restrictions
- Consumption tracking (total and sub-area based)
- Investigate implications of more severe restrictions; and
- Ensure stakeholder support.

Table 4.10 CCT's Business Plan to Achieve a 20% Reduction in Water Demand by the end of September 2005 (updated 23 January 2005)

Objective	Initiative/Activity	Description
1 Media Campaign to ensure public support and compliance with the restrictions and that the City reaches the targeted saving of 20% as set by DWAF (See Status update of Water Conservation Campaign dated 17 Jan)	Editorial and legal notice to public	Ensure everyone is aware of the restrictions
	Water-saving tips	Provide graphic with water-saving tips and information
	Radio Campaign (1)	Series of radio adverts in English, Afrikaans and Xhosa to be broadcasted across City
	Radio Campaign (2)	Series of radio adverts in English, Afrikaans and Xhosa to be broadcasted across City - this advert announces the revised restrictions
	Print Advert Campaign (1)	Legalistic print advert in English, Afrikaans and Xhosa to appear in media across City
	Print Advert Campaign (2)	Advert to inform the public of the revised water restrictions and give water tips
	Posters (1)	The legalistic advert placed at key municipal facilities in English, Afrikaans and Xhosa
	Posters (2)	Series of posters in English, Afrikaans and Xhosa to be placed in municipal facilities
	Billboards	To place a large water barometer on the side of the Civic Centre - further billboard sites to be identified
	Beach Advertising	Shower models to be displayed at Clifton, Camps Bay, Monwabisi,

Objective	Initiative/Activity	Description
		Blouberg and Muizenberg beaches
	Poster	Poster of the campaign logo with the contact number, intended to be placed on toilets, at taps, in hotels, to be given to residents, etc.
	Poster	Poster of the campaign logo with the contact number, intended to be placed on municipal vehicles
	Car wash	Focus on both formal and informal car-wash operators – one-on-one focus
	Ward Focus	Use the Ward system. Survey each Ward for potential opportunities, then cover each
		Ward via direct approach techniques. Will use a mixture of direct approach, street theatre
	School Campaign	Develop campaign for use in schools
	Business-to-Business	Engage with a selection of retailers, cellphone companies, textile industry and other selected industries for them to become actively involved in sending out water conservation messages
	Letter responses	Identify water-related letters in City media; compile appropriate responses
	News articles responses	Identify water-related news articles in City media; compile appropriate responses
	Instruction to staff	Written instructions from City Manager to Top 500 managers and staff re their responsibilities
	Public Tips Competition	
	Success Stories Campaign	Identify people who have successes in water saving; arrange for them to get appropriate exposure in media
	Ad on Cooling Towers at Athlone	Try and get sponsorship to print campaign logo on Cape Town Civic Centre
	Partnership with Media 24	
	Internal Staff Campaign	Provision of information/competitions/promotions to inform, educate and engender behaviour change in staff
	TV Advert	TV advert commercial as tactical intervention to inform public about the water shortage situation
2	Ensure flow of information with regard to restriction internally and externally	<ul style="list-style-type: none"> * Weekly update every Tuesday on dam levels and target savings * Weekly dam levels and savings stats to be sent to press and internal communication * Fortnightly stats on enforcement and TOC related issues to be sent to Waheed Patel * Monthly Progress Report with regard to water restrictions to be submitted to Mike Marsden/Cllr Mowzer * Ongoing engagement with press * Ongoing Updating of Frequently asked Questions * E-inform to be sent out to all managers * WEB site to be updated on a weekly basis
3	To have effective response time to enquiries and assist with advice	<ul style="list-style-type: none"> * Ensure rapid response to burst leak contravention reports * Appoint additional technical contract staff * Upgrade telephone exchange for improved communications with corporate call centre and other roleplayers * Develop and capture relevant information on database * Review of TOC operation by Accenture * Training of TOC Operators and ongoing training of operational response staff * Review of annual tenders in order to ensure improved operational efficiency
4	Instil water-wise practices in Council offices/departments	<ul style="list-style-type: none"> * Ongoing training of managers and other relevant officials * Expedite boreholes for Parks and Sports fields (DWAF requested for funding)
5	Enforcement of restrictions to ensure compliance	<ul style="list-style-type: none"> * Develop partnership with the City Police Directorate * 20 Peace Officers to have water restriction enforcement and compliance as primary function * Arrange vehicles for 20 temporary Peace Officers to monitor compliance with water restrictions

Objective	Initiative/Activity	Description
		* City Manager's letter to Executive Director Community Services to stop watering of City Parks and Public Open Spaces and reduce watering of strategic sportsfields by 50%
		* Enforcement to target high consumers and unlawful industrial use
		* Water Inspector blitzing after hours
		* Issuing of fines where appropriate
6	Ensure stakeholder support for restrictions	* Meetings to be held with religious leaders, horticultural industry, industry/commerce, education etc
		* Agreements to be drawn up with large water users
7	Promote and raise awareness of good WDM practices and issues - Primary focus on Water Week	* Develop informative material and finalised water-savings pamphlets
		* Plan and organise Water Week - Report to Portfolio Committee in February
		* Identify and visit high water users in Cape Metropolitan Area
		* Employment of 20 [in addition to first 20] Water Wardens/Ambassadors through EPWP
		* Assistance to schools on how and where to save water
8	Consumption tracking to inform on savings in City and in various areas	* Download various meter records from SAP on a monthly basis
		* Correct and verify data
		* Analyse meter records and consumption patterns and produce monthly report
		* Investigate the possibility of sending out letters to all consumers using in excess of 40/50 Kl per month
10	Regulation of WDM principles and practice	Investigate regulation of water-efficient fittings beginning with low-cost housing
		* Draft new Water Services By-law - under way
11	Understand consumption patterns in order to improve restriction measures and tariffs	* Draft Scope of Work for Study to understand/analyse consumer demand and usage patterns (this will help understanding target market for future restrictions)
		* Appoint Consultant to undertake proposed Study
12	Initiate CMA groundwater investigation in order to be able to minimise risks and regulate in the future	* Draft Scope of Work for Study to understand/analyse/monitor groundwater consumption in the Cape Metropolitan Area
		* Appoint Consultant to undertake proposed Study
13	Ensure alignment between WDM 10-Point Strategy and Restrictions	* Hold weekly Water Demand Management meetings with primary players - including DWAF
		* Report to Portfolio Committee on detailed WDM strategy
		* Regular reporting to be produced showing initiatives and progress

Restrictions

The summary of the restriction measures formulated by the CCT, which almost entirely target outdoor use, are presented below. Copies of the respective restriction notices are contained in **Appendix C** of this report.

Level 1: Restrictions (for curtailment of 10%)

- Watering of gardens
 - 1 hour per day
 - Alternate days only
 - Prohibited between 10:00 and 18:00
- AFUs to be turned off after hours.

Level 2: Restrictions (for curtailment of 20% - implemented as from 01 October 2004)

- Watering of gardens
 - 1 hour per day
 - 2 days per week
 - Use of sprinkler and irrigation systems prohibited
 - Only use:-

- ❖ Single hand-held hose
- ❖ Bucket
- ❖ Watering can
- Prohibited between 10:00 and 18:00
- Cleaning of motor vehicles/paths/paved areas by hosepipes prohibited
- AFUs to be turned off after hours.

Level 3: Restrictions (for curtailment of 30%)

- As per 2 above, but use of hosepipes prohibited, i.e. bucket/watering cans only.

The Level 2 restrictions were revised (made more severe) after it was noted that the required saving targets were not being achieved. The following restrictions were therefore imposed as from 1 January 2005.

Revised Level 2: Restrictions (for curtailment of 20% - implemented as from 01 January 2005)

- As per Level 2 above except for the following changes:
- Watering of gardens:
 - Use of sprinkler systems:- 20 minutes; 1 day a week; or
 - Single hand-held hose:- 30 minutes; 1 day per week; or
 - Use of buckets and watering cans:- 1 hour; 2 days per week
 - Prohibited between 10:00 and 18:00.

Tariffs

In terms of the Municipal Systems Act, municipalities are obliged to set tariffs to ensure cost recovery. The reduction in water demand due to the restrictions imposed would result in reduced revenue streams for the municipality and therefore the CCT increased its water and sanitation tariffs to recover the anticipated loss in revenue.

It was also anticipated by the CCT that the punitive restriction tariffs set would lead to a decrease in water usage both "in the house" and "outside the house".

A table indicating the possible impact on revenue streams, based on a consumer using 25 kl/month prior to the restrictions, is presented in **Table 4.11**.

Table 4.11 Consumer using 25 kl of Water per Month (2004/2005 Financial Year)

Consumption Block	Consumption Description	No Saving in Consumption			20% Saving no tariff increase			20% Saving and tariff increase		
		Tariff	kl Used	Charge	Tariff	kl Used	Charge	Tariff	kl Used	Charge
1	0kl - 6kl	R 0.00	6	R 0.00	R 0.00	6	R 0.00	R 0.00	6	R 0.00
2	+ 6kl - 12kl	R 2.15	6	R 12.90	R 2.15	6	R 12.90	R 2.32	6	R 13.92
3	+12kl - 20kl	R 4.30	8	R 34.40	R 4.30	8	R 34.40	R 6.15	8	R 49.20
4	+20kl - 40kl	R 5.48	5	R 27.40	R 5.48	0	R 0.00	R 10.41	0	R 0.00
5	+ 40kl - 60kl	R 6.67	0	R 0.00	R 6.67	0	R 0.00	R 13.34	0	R 0.00
6	60kl +	R 8.60	0	R 0.00	R 8.60	0	R 0.00	R 17.20	0	R 0.00
	Total		25	R 74.70		20	R 47.30		20	R 63.12

From the above it can be noted that CCT would under-recover by some R27 per consumer if no restrictions were imposed and by some R11 per consumer with the increased tariffs. Full recovery is only achieved at a consumption of 28 kl/month.

It can further be noted that the revised/drought tariffs resulted in a greater percentage increase in tariffs than the percentage reduction in demand. This is as a result of the revenue needing to be recovered from a lower base and because the water saved during the restrictions would have been sold at a higher

tariff (result of rising block tariff structure). The net effect is that high consumers would have to save more in order not to have to pay more, or would have to pay considerably more for the same water consumed.

It is important to note that water restrictions tariffs set on punitive tariffs are also meant to discourage consumers from using in excess of 30 kl/month.

Table 4.12 illustrates the punitive nature of the CCT's 20% restriction tariff and 30% restriction tariff compared to the 0% and 10% reduction tariff (which is currently the applicable tariff).

Table 4.12 2006/2007 CCT Domestic Tariffs

Consumption Block	Consumption kl/month	0% Reduction Tariff	10% Reduction Tariff	20% Restriction Tariff	30% Restriction Tariff
1	0-6	0	0	0	0
2	+6-12	R 2.44	R 2.56	R 2.63	R 2.80
3	+12 – 20	R 4.88	R 5.46	R 6.98	R 10.43
4	+20 – 40	R 6.22	R 8.08	R 11.81	R 26.75
5	+40 – 50	R 7.56	R 9.98	R 26.75	R 53.50
6	+50	R 9.76	R 13.17	R 53.50	R 107.00

Enforcement

A critical aspect of imposing restrictions is the ability to manage and enforce the restrictions imposed, including dealing with special exemptions, monitoring consumption and the imposition of the restrictions and dealing with consumers who contravene the restrictions.

Exemptions

Exemptions were permitted, if written applications were deemed appropriate by the Director Water Services. Some 4479 applications were received as at 30 January 2005, of which only 677 were refused.

Monitoring

Water inspectors, water pollution officers and water and sanitation officers were used to monitor compliance and to issue spot fines where required. A further 20 "peace officers" were temporarily employed to monitor compliance. The services of the City Police were also utilised to monitor compliance.

CCT staff also monitored and periodically reported on the total consumption, the demand reductions achieved and the extent to which reduction targets were met. This was also undertaken on a sub-area basis (i.e. suburb), with non-conforming areas being fingered.

Contraventions

All Magistrates in the Cape Metropolitan Area agreed to spot fines (admission of guilt) of R1 000 throughout the City in terms of the Water Restriction By-law. Repeat offenders could be summoned and be liable for prosecution resulting in a fine of up to R10 000 or imprisonment up to six months, or both.

Communication

Effective communication both within and external to the CCT, to raise awareness and commitment to the restrictions, was a key component of the drought mitigation intervention. Measures undertaken included:

- Air and print media campaigns (general awareness, stats on dam levels and demand reductions achieved)
- Direct engagement with certain key sectors/consumers
- Establishment of a 24 hour call centre
- Informative billing; and
- Routine internal reporting and auditing.

4.4.3 Effectiveness of Restrictions

General

The demand reduction target was met, although it initially appeared that only a 15% reduction in demand was achieved. Following a bulk water meter audit it was discovered that the Voëlvelei treated-water meter was over-reading. The meter has since been replaced by the CCT.

Excluding the corrections for the faulty meter, around 60% of the target was achieved as at the end of December 2005.

Response to drought

The following materialised in response to the drought:

- Large interest/demand for treated effluent; and
- High demand for private boreholes and wellpoints.

As a result of the above the CCT has initiated a study to analyse and monitor the impact of large-scale use of groundwater. CCT also initiated a study to review/analyse user demands and water use patterns.

4.4.4 Ability to Restrict

Based on preliminary reviews of winter and summer demands over the past few years, it can be seen that winter demands have remained nearly constant whilst summer demands have decreased, indicating some form of structural adjustment, i.e. consumers' demand patterns appear to be changing in response to the impact of the recent droughts and the WC/WDM measures implemented to date.

The implementation of WC/WDM interventions will therefore have the effect of reducing the municipality's ability to restrict demand in times of drought, as appears to have been the case with the 2004/05 restrictions where it was necessary to implement more severe Level 2 restrictions to achieve a 20% reduction in demand. In 2000/2001, (Level 1) restrictions targeting a 10% savings were imposed, and resulted in a 15.5% saving. This could in part be due to:

- The City's ongoing implementation of WC/WDM interventions; and
- Ongoing public awareness over water-related issues.

Adequate detailed information regarding the effectiveness of the restrictions, the specific areas and extent of the demand reductions and changes in demand use patterns is however not readily available at present. It is understood that such results will be available from a study initiated by the CCT to review demands and demand patterns.

From a social, financial and environmental perspective one cannot afford not to aggressively pursue WC/WDM, even though it may impact on a municipality's ability to curtail water demand during periods of drought.

It is however also important to draw the following distinction:

- Water restrictions usually rely on punitive measures to reduce or limit water demand for a specific period of time. These measures should include:
 - restricting garden watering times or duration
 - increased tariffs
 - water rationing
- WC/WDM is usually good practice and relates to using water effectively and efficiently.

5. WEST COAST DISTRICT MUNICIPALITY

5.1 Introduction

Limited information was obtained directly from the West Coast District Municipality (WCDM). Furthermore the structure, format and extent of completion of the WSDP reviewed, was such that limited information on WC/WDM activities undertaken could be ascertained. It can however be reported that:

- The WCDM appears not to have targets for reducing UAW and information concerning MNFs
- The WCDM does appear to run awareness and education programmes at schools, have retrofitting programmes (water-efficient fittings) and have meter-repair programmes
- WCDM does have rising-block water tariffs which make provision for both free basic water supplies and water-conservation incentives. The municipality has a mixture of fixed and volume-based sanitation tariffs.

5.2 Recent Studies

It is unknown whether the WCDM has undertaken any WC/WDM studies to date.

5.3 Recent and Current Interventions

It is unknown whether the WCDM has undertaken any WC/WDM projects to date.

6. DRAKENSTEIN DISTRICT MUNICIPALITY

6.1 Introduction

An overview of the Drakenstein District Municipality's (DDM's) water demand statistics as at March 2004 is as summarised below:

Population

- Total 195,000
- Paarl 107,000

Annual water requirement

- Total 17,226 MI
- Paarl 12,501 MI

Average Requirement per capita

- 1 242 litres/person/day

Prior to 1997 there was a 3.5% per year growth in water demand and unacceptably high levels of UAW in the Paarl area.

6.2 Recent Studies

As a result of the high growth rates and high levels of UAW, the then Paarl Council adopted a WDM strategy in 1997, which made provision for the following initiatives:

- Hydraulic modelling and master planning
- Rising block tariff structure
- Increased public awareness
- Universal metering
- Promotion of water saving devices; and
- Pressure control.

6.3 Recent and Current Interventions

6.3.1 Establishment of a WDM Unit

A WDM unit was established in 1998 comprising three full-time staff members, with the following duties:

- Leak detection
- Water meter replacement
- Investigations of exceptionally high/low consumptions
- Public awareness
- Water week campaign
- Retrofitting and promotion of water-saving devices
- Internal leak repairs
- Logging; and
- Liaison with finance department and meter readers, about suspect meter readings.

6.3.2 Pressure Management

A water master plan was completed for Paarl in 2000 and identified large areas with high static pressures (> 9 Bar). As a result, PRVs and NRVs were installed to control pressure, especially during off-peak periods.

6.3.3 Public Awareness

The following public awareness campaigns are/have been implemented:

- Advertising in local and regional newspapers
- Circulation of municipal newsletters
- Informative billing
- Advertising on the local radio station; and
- Water Week competitions, exhibitions and shows.

6.3.4 Retrofitting

The following activities have been undertaken to date:

- Replaced 145 AFUs and old cisterns in municipal buildings
- Offered water-saving equipment as prizes to schools in Water Week competitions; and
- Repair of internal leaks in poorer areas.

6.3.5 Other activities

- Introduced a 7-Step rising block tariff in 1998;
- Metering of districts, zones, parks and industrial fire hydrant water connections
- Installation of a telemetry system
- Water meter audit (SABS); and
- Co-operation with Parks section in order to:
- Implement water wise gardens on road medians
- Implement better irrigation practices.

6.4 Results of WC/WDM Interventions

The following results were reported as at 2004:

- Water requirement 41% lower than the 2003 projection
- A R11.3 million per year reduction in the cost of bulk water purchases
- UAW reduced from 30% to 16%
- Pipe bursts reduced by 28%; and
- Surplus capacity in existing water and sewer infrastructure resulting in the postponement of capital intensive upgrade projects

Figure 6.1 provides the historical and projected water requirements for Paarl and indicates the impact WC/WDM has had on reducing water requirements.

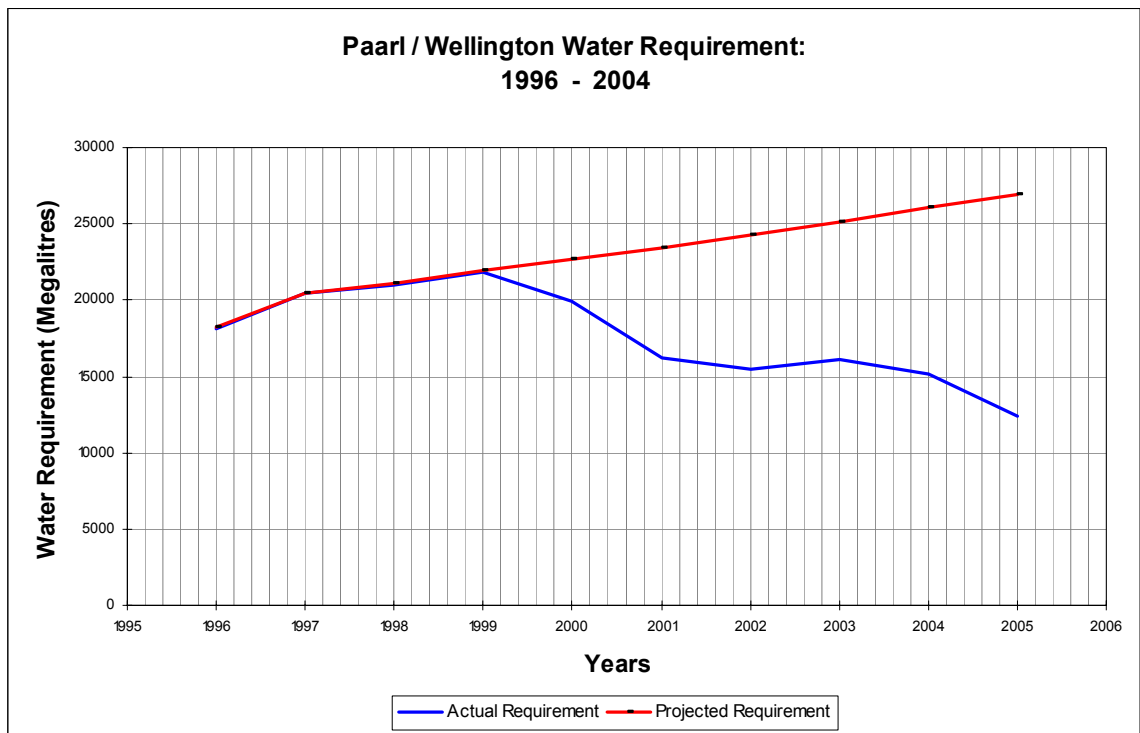


Figure 6.1 Actual and projected water requirements, indicating the effectiveness of WC/WDM

No costs were obtained for the project and/or interventions implemented and no budgets for future WC/WDM projects have been made available.

7. STELLENBOSCH MUNICIPALITY

7.1 Introduction

Limited information was obtained directly from the Stellenbosch Municipality and their WSDP is such that limited information with regard to WC/WDM could be obtained.

7.2 Recent Studies

Although limited information was obtained from the Stellenbosch Municipality, it is understood that the SM has implemented a number of WC/WDM projects. It is also understood that the Cape Winelands District Municipality has recently appointed a service provider to assist the Municipality with the development of a WC/WDM strategy. Progress in this regard is unknown.

7.3 Recent and Current Interventions

It is understood that pressure management has been implemented in Khayamandi outside Stellenbosch and that rising block tariffs have been introduced.

8. CONCLUSIONS

8.1 General

The following conclusions can be drawn from the investigations:

- If supported by all role-players in the water sector in the region and at all levels within the respective role-player institutions, WC/WDM can play a significant role in reconciling future water requirements with supply in the Western Cape. The extent to which WC/WDM will assist in this regard is however largely dependent on institutional constraints, e.g. the capacity of the respective institutions involved and the extent to which WC/WDM is supported/endorsed by these institutions;
- It is estimated that some 445 Ml/day (162.4 Mm³/a) could be saved through WC/WDM in CCT alone, although CCT's strategy is currently only targeting a savings of 258 Ml/day (94.2 Mm³/a);
- Not only does WC/WDM assist in reconciling water supply and requirement through the minimization of wastage and water use efficiency, its implementation also results in significant socio-economic and environmental benefits. Furthermore, secondary benefits such as reduced energy consumption can also be anticipated;
- Both the City of Cape Town and the Drakenstein District Municipality have developed WC/WDM policies, strategies and implementation plans and have established WC/WDM units to conduct studies and implement projects/interventions;
- The extent to which the West Coast District Municipality and the Stellenbosch Municipality (now Cape Winelands District Municipality) have implemented WC/WDM is unknown. It can however be noted that the CWDM has recently appointed a service provider to assist in the development of a WC/WDM policy and strategy for its region;
- The level of WC/WDM reporting by all the WSAs in the study area in general appears to be limited, and in particular the WSDPs reviewed as part of these investigations were noticeably lacking in WC/WDM content. Whereas some WSAs do report on WC/WDM interventions in more generic terms, key indicators such as UAWs and MNFs were absent in almost all cases;
- The extent of zoning and metering in most of the WSA, including the adequacy of databases and billing systems, etc in some of the WSAs, is such that they are not able to accurately account for all consumption, to determine key indicators such as UAW and MNF at a global and local level; and
- It appears that not enough emphasis is being placed by any of the WSAs in ensuring that water-efficiency practices are enforced for new consumers, e.g. proactive response as opposed to reactive responses.

8.2 Institutional Aspects

- CCT's past WC/WDM strategies have proven not to be sustainable, primarily due to institutional challenges and competing priorities for resources, resulting in the need to review/enhance these strategies to facilitate the establishment of an environment within the CCT conducive to the implementation of WC/WDM interventions on a sustained basis;
- The CCT's revised draft WC/WDM strategy has not yet been formally adopted by the CCT; and
- The DDM achieved good initial success in reducing demands in Paarl, but the sustainability of their strategy and the extent to which WC/WDM interventions have been extended to other towns is unknown.

8.3 Projects/Initiatives Implemented

- The CCT has implemented certain projects or undertaken certain WC/WDM initiatives either as part of dedicated WC/WDM interventions or as part of drought mitigation interventions. Whereas many of the drought mitigation measures implemented would have formed part of any long-term WC/WDM strategy, the objectives of the two interventions differ and should not be confused. Drought mitigation, which is punitive by nature, focuses on achieving demand reduction in the

short-term with potentially severe impacts on the consumer and municipality. WC/WDM, however, focuses on sustained demand reduction in the medium to long-term through the minimisation of wastage and the efficient use of water with nominal impact on the consumer and financial benefit to the municipality;

- The two recent droughts required the CCT to focus on implementing drought mitigation measures, which distracted from developing and implementing long-term sustainable WC/WDM strategies;
- CCT has implemented certain projects which have had a significant impact in reducing demand, e.g. iKapa Leaks Project - saved 1.8 % of CCT's total demand and the Khayelitsha Pressure Management Project - saved between 2% to 3% of CCT's total demand. CCT has also implemented a number of other projects and initiatives, all of which have proven to be cost-effective. These projects achieved significantly smaller total savings but did achieve significant percentage reductions in demands. Whereas the high-impact demand-reduction projects need to be identified and addressed first, the collective impact of a number of smaller demand-reduction projects and initiatives must not be overlooked;
- The URVs of the projects implemented by the CCT have generally tended to be lower than those determined in the IWRP Study;
- Insufficient information was available, possibly due to inadequate monitoring, to accurately assess the cost benefits of certain WC/WDM projects/interventions implemented. This information is required to assess the effectiveness of these projects/interventions, to assess the impact of diminishing returns and to compare WC/WDM projects with conventional supply augmentation projects;
- When evaluating the cost benefits of potential WC/WDM options or the actual cost benefits of projects implemented, the impact of savings due to the reduced bulk water purchases and/or wastewater treatment and the impact of delayed implementation of capital works infrastructure (water and wastewater), have invariably not been taken into consideration. It is reported that the annual savings of postponing a project is between 6% to 8% of the capital cost of the new project; and
- It appears that all the WSAs in the study area need to undertake detailed studies to identify future projects, i.e. whereas much work has been done in some instances to develop WC/WDM strategies, insufficient work seems to have been done to identify future projects/interventions.

8.4 Ability to Restrict

- Although inadequate information is currently available to confirm these findings, it does appear from the 2004/05 drought (20% curtailment measures initially imposed; 20% demand reduction achieved only after more stringent restriction measures were imposed), that WC/WDM may have the effect of reducing a WSA's ability to reduce/restrict demands in times of drought;
- This however needs to be confirmed and investigated further, as a clear understanding of consumer demands and demand patterns is currently not available. It may only be necessary to restructure the curtailment measures in order to achieve defined demand reductions; and
- It is not financially or environmentally viable to aggressively pursue demand reduction through WC/WDM, just to maintain the ability to impose restrictions in times of drought, and therefore this needs to be considered during future water resource planning.

9. RECOMMENDATIONS

9.1 General

Based on the findings of these investigations, the following recommendations are made to enhance the profile and effectiveness of WC/WDM, to assist in reconciling water supply and requirements in the Western Cape:

- All WSAs must develop and periodically review their WC/WDM strategies;
- Commitment to and endorsement of WC/WDM by all role-players in the water sector (and at all levels within the respective institutions) must be obtained and/or enhanced to ensure an environment conducive to the implementation of WC/WDM measures on a sustainable basis;
- Water use efficiency must become central to all WSAs' planning and WSPs' operations;
- The capacity of the respective institutions needs to be enhanced and where required, support provided, to ensure their ability to effectively implement WC/WDM measures;
- WSAs should ensure universal metering, the establishment, metering and periodical review of water supply zones and establish systems to effectively collect, assimilate and analyse water demands and demand patterns on a zone by zone basis;
- WSAs need to continuously review tariffs (pricing of water services) to ensure that they are appropriate and indicative of the scarcity of the commodity. Furthermore, an understanding of price elasticity in the area needs to be ascertained;
- WSAs must on a continuous basis maintain high profile community information and education campaigns, promoting water use efficiency;
- WSAs need to undertake studies to ensure that an adequate number of viable WC/WDM projects can be implemented at short notice, if required; and
- WSAs need to undertake measures to ensure appropriate water-efficiency measures/devices are implemented/installed from the outset for all new consumers.

9.2 Monitoring and Reporting

- WSAs must be encouraged and assisted where required, to ensure appropriate monitoring/tracking of all aspects (e.g. inclusive of the financial aspects) of WC/WDM projects/interventions to enable their effectiveness and cost benefits to be accurately determined;
- Reporting formats and procedures, at project and WSA level, need to be determined and as far as is practically possible to be standardised, to ensure comprehensive and uniform reporting. In particular key indicators need to be defined and reported on at a predetermined interval.
- CCT to monitor private boreholes.

10. REFERENCES

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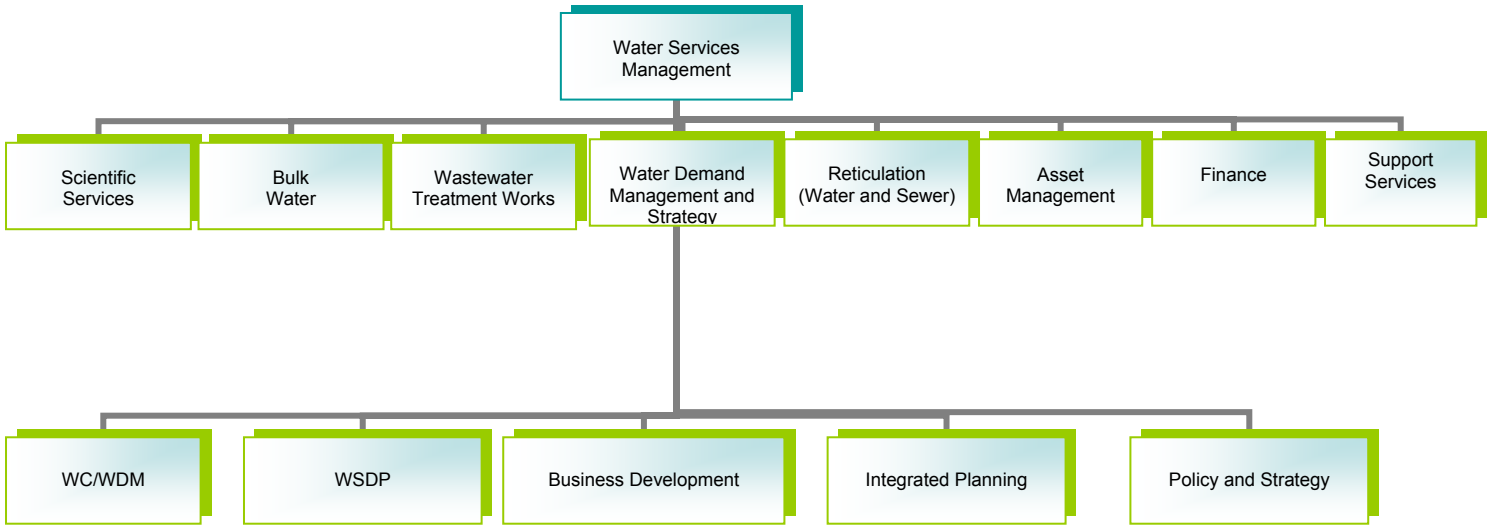
Drakenstein Municipality; Water Services Development Plan; December 2003.

Saldana Bay Municipality; Water Services Development Plan; July 2002.

Stellenbosch Municipality; Water Services Development Plan; February 2003.

APPENDIX A

ORGANOGRAM OF CCT'S WATER SERVICES BRANCH



APPENDIX B

SUMMARY OF CCTs WC/WDM STRATEGY FUNDING REQUIREMENTS

The CCT's WC/WDM Strategy and Programme as accepted by the CCT in May 2007. Please refer to the approved Strategy for the final implementation program and budget.

City of Cape Town Draft WC/WDM Strategy: Summary cost of main projects indicating potential savings in Mm3/a

Objective number	Programme	06/07		07/08		08/09		09/10		10/11		11/12		12/13		Total R		Mm3/a
		R	Mm3/a	R	Mm3/a	R	Mm3/a	R	Mm3/a	R	Mm3/a	R	Mm3/a					
Objective A1	A1.1	3,000	2.4	2,900	2.3	2,900	2.3	50	0.0	50	0.0	50	0.0	50	0.0	9,000	C	7.1
	A1.2	1,400	0.4	1,000	0.3	1,000	0.3	1,000	0.3	1,000	0.3	1,000	0.3	1,000	0.3	7,400	O	2.0
Objective A2	A2.1	8,000	1.3	8,020	1.3	8,000	1.3	8,000	1.3	1,000	0.2	1,000	0.2	1,000	0.2	35,020	O	5.5
Objective A3	A3.2	700	-	1,150	-	1,150	-	1,150	-	1,150	-	1,150	-	1,150	-	7,600	O	-
Objective A4	A4.2	4,200	0.1	4,050	0.1	4,000	0.1	4,000	0.1	4,050	0.1	4,000	0.1	4,000	0.1	28,300	C	0.8
Objective B1	B1.1	2,010	0.2	2,410	0.2	2,610	0.2	2,710	0.2	2,710	0.2	2,710	0.2	2,710	0.2	17,870	O	1.4
	B1.2	2,040	0.3	2,040	0.3	1,790	0.2	1,790	0.2	1,590	0.2	1,590	0.2	1,590	0.2	12,430	O	1.5
	B1.3	2,300	0.2	2,300	0.2	2,300	0.2	2,300	0.2	2,300	0.2	2,300	0.2	2,300	0.2	16,100	O	1.4
	B1.4	845	-	895	-	945	-	995	-	1,045	-	1,095	-	1,145	-	6,965	O	-
Objective B2	B2.2	705	-	705	-	860	-	715	-	715	-	715	-	715	-	5,130	O	-
Objective B5	B5.1	500	0.1	2,300	0.5	5,000	1.1	5,000	1.1	5,050	1.1	5,000	1.1	5,000	1.1	27,850	O	6.3
	B5.4	520	0.5	1,070	1.0	1,070	1.0	870	0.8	870	0.8	870	0.8	870	0.8	6,140	O	6.0
Objective E1	E1.3	40,772	10.0	2,575	-	2,575	-	2,575	-	2,575	-	2,575	-	2,575	-	56,222	C	10.0
Objective E2	E2.1	950	-	950	-	950	-	950	-	950	-	950	-	950	-	6,650	O	-
Objective C1	C1.1	1,500	-	1,500	-	-	-	-	-	-	-	-	-	-	-	3,000	O	-
Objective C2	C2.1	10,000	0.6	10,000	0.6	1,000	0.1	1,000	0.1	1,000	0.1	1,000	0.1	1,000	0.1	25,000	C	1.6
	C2.2	-	-	200	0.0	6,400	0.3	6,530	0.3	6,730	0.3	2,030	0.1	2,030	0.1	23,920	C	1.0
Total		79,442	16.0	44,065	6.8	42,550	7.1	39,635	4.7	32,785	3.5	28,035	3.3	28,085	3.3	336,382		44.8
Total, cumulative savings, Mm3/a			16		23		30		35		38		41		45			

Objective E1.3 only indicates treated effluent which is going to replace potable supply

APPENDIX C

CCT's RESTRICTION NOTICES

NOTICE TO ALL USERS OF MUNICIPAL POTABLE DRINKING WATER
Water Restrictions applicable from 1 October 2004

Notice is hereby given in terms of: ***"MUNICIPALITY OF THE CITY OF CAPE TOWN: WATER SERVICES BY-LAW TO LIMIT OR RESTRICT THE USE OF WATER"*** published in the Provincial Gazette No. 5994 on 28 March 2003, that, with effect from 1 October 2004 and until further notice, certain restrictions, subject to the exemptions provided for in paragraph 5 hereof, shall apply within the boundaries of the City of Cape Town.

Level 1 Restrictions

1. The use of potable water connected directly or indirectly to, or derived from, Council potable water mains for the purpose of watering gardens, lawns, parks and public open spaces is restricted to **up to one hour, only on even numbered days for even street numbered properties and uneven numbered days for uneven street numbered properties. Any property without a street number should revert to watering on even numbered days.**
2. The use of potable water connected directly or indirectly to, or derived from, Council potable water mains for the purpose of watering gardens, lawns, parks and public open spaces is **prohibited between the hours of 10:00 and 18:00.**
3. All automatic-flushing urinals shall be turned off in all buildings during times when such buildings are normally vacated by the public and/or staff other than cleaning staff. Attention is also drawn to Provincial Gazette Extraordinary Number 5014 (1996), which prohibits the use of automatic flushing urinals.
4. The restrictions referred to in paragraphs 1 shall not apply for the purpose of watering plants in nurseries that are conducted for gain, nurseries owned by the Council or State, collections maintained for research purposes, dune rehabilitation projects, cricket pitches, bowling greens, golf greens, croquet lawns, artificial turf fields and major sports stadia.
5. The restrictions referred to in paragraphs 1 and 2 shall not apply
 - (i) for the washing of certain paved areas at abattoirs, premises used for the processing of foods and to car valet services;
 - (ii) where special exemptions have been granted in writing by the City of Cape Town;
 - (iii) where other sources of non-potable water are used and a notice indicating the source is erected in a position clearly visible from a public thoroughfare.
6. The restrictions referred to above shall not apply where special exemptions have been granted in writing by the City of Cape Town. Special exemptions will only be granted in exceptional circumstances.

Any person who contravenes the provisions of this notice is guilty of an offence and is liable to payment of a fine not exceeding ten thousand rand or to imprisonment for a period not exceeding six months or to such imprisonment without the option of a fine or to both such fine and such imprisonment.

Any person who wishes to object to the intended restrictions must do so in writing within 14 days after the date on which this notice is first displayed.

DR. WALLACE MGOQI
CITY MANAGER

Date:.....

**NOTICE TO ALL USERS OF MUNICIPAL POTABLE DRINKING WATER
Water Restrictions applicable from 1 October 2004**

Notice is hereby given in terms of: **"MUNICIPALITY OF THE CITY OF CAPE TOWN: WATER SERVICES BY-LAW TO LIMIT OR RESTRICT THE USE OF WATER"** published in the Provincial Gazette No. 5994 on 28 March 2003, that, with effect from 1 October 2004 and until further notice, certain restrictions, subject to the exemptions provided for in paragraph 5 hereof, shall apply within the boundaries of the City of Cape Town.

Level 2 Restrictions

1. The use of potable water connected directly or indirectly to, or derived from, Council potable water mains for the purpose of watering gardens, lawns, parks and public open spaces is restricted to **up to one hour, on Mondays and Thursdays for even street numbered properties and Tuesdays and Fridays for uneven street numbered properties. The use of irrigation systems and sprinklers is prohibited. Only a single hand held hose, buckets or watering cans may be used. Any property without a street number should revert to watering on even numbered days.**
2. The use of potable water connected directly or indirectly to, or derived from, Council potable water mains for the purpose of watering gardens, lawns, parks and public open spaces is **prohibited between the hours of 10:00 and 18:00.**
3. The use of hosepipes connected directly or indirectly to Council potable water mains for the purpose of washing or rinsing motor vehicles, motor cycles or motor boats, movable or immovable structures, paths, pavements and paved areas (regardless of the nature of the material used for paving such areas), is prohibited.
4. All automatic-flushing urinals shall be turned off in all buildings during times when such buildings are normally vacated by the public and/or staff other than cleaning staff. Attention is also drawn to Provincial Gazette Extraordinary Number 5014 (1996), which prohibits the use of automatic flushing urinals.
5. The restrictions referred to in paragraphs 1 and 3 only, shall not apply for the purpose of watering plants in nurseries that are conducted for gain, nurseries owned by the Council or State, collections maintained for research purposes, dune rehabilitation projects, cricket pitches, bowling greens, golf greens, croquet lawns, artificial turf fields and major sports stadia.
6. The restrictions referred to in paragraphs 1, 2 and 3 only, shall not apply:
 - (i) for the washing of certain paved areas at abattoirs, premises used for the processing of foods and to car valet services;
 - (ii) where special exemptions have been granted in writing by the City of Cape Town;
 - (iii) where other sources of non-potable water are used and a notice indicating the source is erected in a position clearly visible from a public thoroughfare.
7. The restrictions referred to above shall not apply where special exemptions have been granted in writing by the City of Cape Town. Special exemptions will only be granted in exceptional circumstances.

Any person who contravenes the provisions of this notice is guilty of an offence and is liable to payment of a fine not exceeding ten thousand rand or to imprisonment for a period not exceeding six months or to such imprisonment without the option of a fine or to both such fine and such imprisonment.

Any person who wishes to object to the intended restrictions must do so in writing within 14 days after the date on which this notice is first displayed.

DR. WALLACE MGOQI
CITY MANAGER

Date:.....

NOTICE TO ALL USERS OF MUNICIPAL POTABLE (DRINKING) WATER : REVISED LEVEL TWO RESTRICTIONS SHALL APPLY FROM 1 JANUARY 2005

Notice is hereby given in terms of: "*MUNICIPALITY OF THE CITY OF CAPE TOWN: WATER SERVICES BY-LAW TO LIMIT OR RESTRICT THE USE OF WATER*" published in the Provincial Gazette No. 5994 on 28 March 2003, that, with effect from 1 January 2005 and until further notice, certain revised restrictions, subject to the exemptions provided for, shall apply within the boundaries of the City of Cape Town. These revised restrictions are required to achieve the 20% target savings as required by the Department of Water Affairs. The current tariffs for water and sanitation remain in place.

Any person who contravenes the provisions of this final notice will be guilty of an offence and be liable to payment of a fine not exceeding ten thousand rand or to imprisonment for a period not exceeding six months or to such imprisonment without the option of a fine or to both such fine and such imprisonment. Contraventions should be reported to the 24 hour number 086 010 3054.

Revised Restrictions (targeting 20% saving)

1. The use of potable water connected directly or indirectly to, or derived from, Council potable water mains for the purpose of watering gardens, lawns, parks and public open spaces is restricted to the following:
 - The use of drip irrigation systems (excluding sprinklers, sprayers and pop-ups) for up to 20 minutes on Mondays for even street numbered properties (or properties without street numbers) and
 - The use of drip irrigation systems (excluding sprinklers, sprayers and pop-ups) for up to 20 minutes on Tuesdays for uneven street numbered properties
- OR**
- The use of a single hand-held hose with a control nozzle for up to 30 minutes on Mondays for even street numbered properties (or properties without street numbers) and
- The use of a single hand-held hose with a control nozzle for up to 30 minutes on Tuesdays for uneven street numbered properties
- OR**
- The use of buckets or watering-cans for up to one hour on Mondays and Thursdays.
2. The use of potable water connected directly or indirectly to, or derived from, Council potable water mains for the purpose of watering gardens, lawns, parks and public open spaces is **prohibited between 10:00 and 18:00**.
3. The use of hosepipes connected directly or indirectly to Council potable water mains for the purpose of washing or rinsing motor vehicles, motor cycles or motor boats, movable or immovable structures, paths, pavements and paved areas (regardless of the nature of the material used for paving such areas), is prohibited.
4. All automatic-flushing urinals shall be turned off in all buildings during times when such buildings are normally vacated by the public and/or staff other than cleaning staff. Attention is also drawn to Provincial Gazette Extraordinary Number 5014 (1996), which prohibits the installation of automatic flushing urinal cisterns in new buildings.
5. The restrictions referred to in paragraphs 1 and 3 only, shall not apply for the purpose of watering plants in nurseries that are conducted for gain, nurseries owned by the Council or State, collections maintained for research purposes, dune rehabilitation projects, cricket pitches, bowling greens, golf greens, croquet lawns, artificial turf fields and major sports stadia.
6. The restrictions referred to in paragraphs 1, 2 and 3 only, shall not apply:
 - (i) for the washing of certain paved areas at abattoirs, premises used for the processing of foods and to car valet services;
 - (ii) where special exemptions have been granted in writing by the City of Cape Town;
 - (iii) where other sources of non-potable water are used and a notice indicating the source is erected in a position clearly visible from a public thoroughfare.
7. The restrictions referred to above shall not apply where special exemptions have been granted in writing by the City of Cape Town. Special exemptions will only be granted in exceptional circumstances. Exemptions that applied to the original Level 2 restrictions remain in force until further notice.

Applications for exemptions must be directed in writing to one of the following offices:

District Office	Street Address	Postal Address	Fax (021)
Bellville / Delft / Durbanville	1 st Floor, PX Building, Modderdam Road, Bellville South	Water Restrictions Exemptions City of Cape Town, Private Bag X26, Bellville 7535	918-2569
Blaauwberg	Royal Ascot Offices, Racecourse Road, Milnerton	Water Restrictions Exemptions City of Cape Town, PO Box 35, Milnerton 7435	550-1024
Cape Town	20th Floor, Civic Centre, 12 Hertzog Boulevard, Cape Town	Water Restrictions Exemptions City of Cape Town, PO Box 1694, Cape Town 8000	419-9667
Goodwood/ Parow	Cnr Tallent & Voortrekker Roads, Parow	Water Restrictions Exemptions City of Cape Town, PO Box 11, Parow 7499	938-8457
Helderberg	Cnr Victoria & Andries Pretorius Streets, Somerset West	Water Restrictions Exemptions City of Cape Town, PO Box 19, Somerset West 7139	850-4400
Khayelitsha	Stocks & Stocks, Ntlazana Road, Ilitha Park, Khayelitsha	Water Restrictions Exemptions City of Cape Town, Private Bag X93, Bellville 7535	360-1255
Oostenberg	Brighton Road, Kraaifontein	Water Restrictions Exemptions City of Cape Town, PO Box 25, Kraaifontein 7570	980-6117
South Peninsula	Waterworks Depot Kendal Road, Constantia	Water Restrictions Exemptions City of Cape Town, Private Bag X5, Plumstead 7800	712-0757

Copies of this notice will be displayed at the undermentioned Municipal Offices on weekdays between 08:30 and 16:30

<u>Area</u>	<u>Address</u>
Cape Town	Reception Desk, Concourse, Civic Centre, Hertzog Boulevard, Cape Town
South Peninsula	Municipal Offices, Cnr Main and Victoria Road, Plumstead
Subcouncil 1	Municipal Offices, Race Course Road, Milnerton
Subcouncil 2	Next to Kraaifontein Civic Centre, Brighton Way, Kraaifontein
Subcouncil 3	Municipal Offices, Oxford Street, Durbanville
Subcouncil 4	1 st Floor, cnr Voortrekker & Tallent Roads, Parow
Subcouncil 5	Goodwood Municipal Building, Voortrekker Road, Goodwood
Subcouncil 6	Cnr Voortrekker & Carinus Streets, Kuils River
Subcouncil 7	Milton Road Library, Cnr Fynbos and Melkbos Roads, Eersterivier
Subcouncil 8	Cnr Fagan Street & Main Road, Strand
Subcouncil 9	D Block Stocks & Stocks Complex, Ntlakohlaza Street, Town 2, Village 1, Khayelitsha
Subcouncil 10	Site B, Khayelitsha, Shopping Centre, Khayelitsha
Subcouncil 11	Fezeka Building, Cnr NY1 and Lansdowne Road, Gugulethu
Subcouncil 12	Parks & Bathing Building, Merrydale Avenue, Lentegour
Subcouncil 13	Fezeka Building, Cnr NY1 and Lansdowne Road, Gugulethu
Subcouncil 14	Fezeka Building, Cnr NY1 and Lansdowne Road, Gugulethu
Subcouncil 15	Pinelands Training Centre, St Stephens Road, Central Square, Pinelands
Subcouncil 16	11 th Floor, 44 Wale Street, Cape Town
Subcouncil 17	Athlone Civic Centre, Cnr Protea and Klipfontein Roads, Athlone
Subcouncil 18	3 Ottery Road, Ottery
Subcouncil 19	Fish Hoek Civic Centre, Central Circle, Recreation Road, Fish Hoek
Subcouncil 20	Alphen Centre, Constantia Main Road, Constantia

FIRST DATE OF PUBLICATION: 30 December 2004

MR MIKE MARSDEN
ACTING CITY MANAGER

NOTICE TO ALL USERS OF MUNICIPAL POTABLE DRINKING WATER
Water Restrictions applicable from 1 October 2004

Notice is hereby given in terms of: **"MUNICIPALITY OF THE CITY OF CAPE TOWN: WATER SERVICES BY-LAW TO LIMIT OR RESTRICT THE USE OF WATER"** published in the Provincial Gazette No. 5994 on 28 March 2003, that, with effect from 1 October 2004 and until further notice, certain restrictions, subject to the exemptions provided for in paragraph 5 hereof, shall apply within the boundaries of the City of Cape Town.

Level 3 Restrictions

1. The use of potable water connected directly or indirectly to, or derived from, Council potable water mains for the purpose of watering gardens, lawns, parks and public open spaces is restricted to **up to one hour, only on Mondays and Thursdays. The use of irrigation systems and sprinklers is prohibited. Only buckets or watering cans may be used. Hoses shall be disconnected.**
2. The use of potable water connected directly or indirectly to, or derived from, Council potable water mains for the purpose of watering gardens, lawns, parks and public open spaces is **prohibited between the hours of 10:00 and 18:00.**
3. The use of hosepipes connected directly or indirectly to Council potable water mains for the purpose of washing or rinsing motor vehicles, motor cycles or motor boats, movable or immovable structures, paths, pavements and paved areas (regardless of the nature of the material used for paving such areas), is prohibited.
4. All automatic-flushing urinals shall be turned off in all buildings during times when such buildings are normally vacated by the public and/or staff other than cleaning staff. Attention is also drawn to Provincial Gazette Extraordinary Number 5014 (1996), which prohibits the use of automatic flushing urinals.
5. The restrictions referred to in paragraphs 1 and 3 only, shall not apply for the purpose of watering plants in nurseries that are conducted for gain, nurseries owned by the Council or State, collections maintained for research purposes, dune rehabilitation projects, cricket pitches, bowling greens, golf greens, croquet lawns, artificial turf fields and major sports stadia.
6. The restrictions referred to in paragraphs 1, 2 and 3 only, shall not apply:
 - (i) for the washing of certain paved areas at abattoirs, premises used for the processing of foods and to car valet services;
 - (ii) where special exemptions have been granted in writing by the City of Cape Town;
 - (iii) where other sources of non-potable water are used and a notice indicating the source is erected in a position clearly visible from a public thoroughfare.
7. The restrictions referred to above shall not apply where special exemptions have been granted in writing by the City of Cape Town. Special exemptions will only be granted in exceptional circumstances.

Any person who contravenes the provisions of this notice is guilty of an offence and is liable to payment of a fine not exceeding ten thousand rand or to imprisonment for a period not exceeding six months or to such imprisonment without the option of a fine or to both such fine and such imprisonment.

Any person who wishes to object to the intended restrictions must do so in writing within 14 days after the date on which this notice is first displayed.

DR. WALLACE MGOQI
CITY MANAGER

Date.....

APPENDIX D

**CCT DRAFT WATER BY-LAWS PROMULGATED ON
1 SEPTEMBER 2006**

WATER BY-LAW

Approved by Council : 31 May 2006
C 32/05/06

Promulgated 1 September 2006
PG 6378; LA 18366

Provincial Gazette

Provinsiale Koerant

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CITY OF CAPE TOWN

WATER BY-LAW*To control and regulate water services in the City***ARRANGEMENT OF SECTIONS****Chapter 1: Definitions and General Provisions**

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CHAPTER 1**DEFINITIONS AND GENERAL PROVISIONS****1. Definitions**

In this by-law, unless the context otherwise indicates—

“**authorised official**” means an official of the municipality authorised by the City Manager to enforce the provisions of the by-law;

“**basic water supply**” means the minimum standards of water supply services necessary for the reliable supply of water to households to support life and personal hygiene prescribed in terms of the Water Services Act, No 108 of 1997 and the regulations promulgated in terms thereof;

“**borehole**” means a hole sunk into the earth for the purpose of locating, abstracting or using subterranean water; and includes a spring, well and wellpoint;

“**City**” means the area of jurisdiction of the municipality, demarcated in terms of the Local Government: Municipal Demarcation Act, 1998 (Act No. 27 of 1998);

“**City Manager**” means the person appointed by the council in the capacity of municipal manager;

“**connection pipe**” means a pipe, the ownership of which is vested in the municipality and installed by it for the purpose of conveying water from a main to a water installation, and includes a “communication pipe” referred to in SANS 10252: 2004 Part 1;

“**consumer**” means any person using water from any installation connected to a connection pipe which is supplied with water from a main;

“**council**” means the council of the municipality or any of the municipality’s other political structures, political office bearers, councillors, or staff members, duly authorised by delegation;

“**Credit Control and Debt Management Policy By-Law**”, means the Credit Control and Debt Management Policy By-Law, adopted by the council and published in the *Provincial Gazette*;

“**domestic purposes**” in relation to the supply of water means water supplied for drinking, ablution and culinary purposes to premises used solely for residential purposes;

“**Director: Water**” means the employee of the municipality in charge of the Water and Sanitation Services of the municipality;

“**health nuisance**” means a situation, or state of affairs, that endangers life or health or adversely affects the well-being or mental well-being of a person or community, or creates an environmental risk, and “health hazard” has a similar meaning;

“**installation work**” means work in respect of the construction of, or carried out on, a water installation;

“**JASWIC**” means the Joint Acceptance Scheme for Water Installation Components, to which the municipality subscribes;

“**main**” means a pipe, other than a communication pipe, the ownership of which is vested in the municipality and used by it for the purpose of conveying water to consumers;

“**meter**” means a device which measures the quantity of water passing through it;

“**municipality**” means the Municipality of the City of Cape Town;

“**occupier**” means a person who occupies any premises or part thereof, without regard to the title under which he or she occupies;

“**owner**” means—

- (a) the person in whom from time to time is vested the legal title to premises;
- (b) in a case where the person in whom the legal title to premises is vested is insolvent or dead, or is under any form of legal disability whatsoever, the person in whom the administration and control of such premises is vested as curator, trustee, executor, administrator, judicial manager, liquidator or other legal representative;
- (c) in any case where the council is unable to determine the identity of such person, a person who is entitled to the benefit of the use of such premises or a building or buildings thereon;
- (d) in the case of premises for which a lease agreement of 30 years or longer has been entered into, the lessee thereof;
- (e) the person who has purchased immovable property from the municipality, in terms of a scheme that allows for the purchase price to be paid in installments and who has not received transfer from the municipality;
- (f) in relation to—

- (i) a piece of land delineated on a sectional plan registered in terms of the Sectional Titles Act, 1986 (Act 95 of 1986), the developer or the body corporate in respect of the common property, or
- (ii) a section as defined in such Act, the person in whose name such section is registered under a sectional title deed; and includes the lawfully appointed agent of such a person;

“**person**” includes a juristic person;

“**pollution**” means the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it—

- (a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- (b) harmful or potentially harmful—
 - (i) to the welfare, health or safety of human beings;
 - (ii) to any aquatic or nonaquatic organisms;
 - (iii) to the resource quality; or
 - (iv) to property;

“**public notice**” means a notice published in a newspaper in at least two of the official languages in general use within the Province of the Western Cape and, where possible, the notice, must be published in a newspaper appearing predominantly in the language utilised in the publication of the notice;

“**publish**” means:—

- (a) to publish a notice in the *Provincial Gazette*, and
- (b) to provide interested parties with copies of such publication, and
- (c) to post the notice so published on the notice boards of the municipality.

“**prescribed charge**” means a fee, charge or tariff determined and imposed by the council in terms of the Tariff Policy By-law;

“**SABS**” means the South African Bureau of Standards referred to in the Standards Act, No. 29 of 1993;

“**SANS**” means a standard which has been set and issued by the SABS in terms of the provisions of the Standards Act, No. 29 of 1993;

“**service pipe**” means a pipe which is part of a water installation and is installed between the communication pipe and the meter;

“**storage tank**” means a tank forming part of a water installation and used for the storage of water, other than a cistern serving a water-closet pan or a urinal and a tank used for the storage of hot water;

“**Tariff Policy By-law**” means the tariff policy by-law promulgated by the council in terms of section 75 of the Local Government: Municipal Systems Act, No 32 of 2000, or pending such promulgation, a decision by the council in terms of section 75A of that Act to levy and recover fees, charges or tariffs.

“**terminal water fitting**” means a water fitting at an outlet of a water installation which controls the discharge of water from a water installation;

“**water**” means potable water unless otherwise stated;

“**water conservation**” means the act of saving or using water in an efficient manner;

“**water installation**” means the pipes and water fittings which are situated on any premises and vested in the owner thereof and used or intended to be used in connection with the use of water on such premises, and includes—

- (a) a pipe and water fitting situated outside the boundary of the premises, which either connects to the communication pipe relating to such premises or is otherwise laid with the permission of the municipality, and also includes,
- (b) a ‘consumer installation’ as contemplated by the Water Services Act, No 108 of 1997 and the regulations promulgated in terms thereof;

“**water services**” or any part thereof, means the abstraction, conveyance, treatment and distribution of potable water, water intended to be converted to potable water or water for commercial and industrial use and includes sanitation services;

“**water services facility**” means any land on which there is infrastructure, installed or used by the municipality, or a catchment area in connection with the supply of water;

“**water services intermediary**” means any person who is obliged to provide water services to another in terms of a contract where the obligation to provide water services is incidental to the main object of that contract;

“**water supply system**” means the structures, aqueducts, pipes, valves, pumps, meters or other apparatus relating thereto which are vested in the municipality and are used or intended to be used by it in connection with the supply of water, and includes any part of the system; and

“**well point**” means a small diameter pipe jetted into unconsolidated sandy or gravelly formations, with a pump situated at ground level to lift and distribute the water.

2. Application and purpose of this by-law

- (1) This by-law binds an organ of state.
- (2) Unless the contrary is proved, a breach of this by-law committed on premises in respect of—
 - (a) the water installation, other than a provision relating to the use of water in the installation, shall be deemed to be a breach by the owner of the premises, and
 - (b) the use of water from a water installation shall be deemed to be a breach by the consumer.
- (3) No owner shall be required to comply with this by-law by altering a water installation or part thereof which was installed in conformity with any law applicable immediately before the date of commencement of this by-law.
- (4) Water is supplied in terms of the provisions of this by-law, but where in the opinion of the Director: Water it is not reasonably possible or cost effective to supply water in the manner contemplated by this by-law to each consumer within a particular area, the Director: Water may, in consultation with the official in charge of health services of the municipality, determine an alternative manner of water supply.
- (5) Where the Director: Water has determined an alternative manner of water supply in terms of subsection (6), this by-law will, to the extent necessary, apply to the supply of water to such area, subject however to such conditions as the Director: Water may determine.
- (6) Where the municipality makes use of an external water services provider, this by-law remains applicable and the council remains the regulating authority.

3. Transitional arrangements

- (1) If authority was given before the date of commencement of this by-law for installation work to be done, or if authorised work is in progress on such date, such work shall comply with any laws governing such work which were in force in the City prior to such date.
- (2) The Director: Water may, for a period of 90 days after the commencement of this by-law, give authority for installation work to be done in accordance with any laws governing such work which were in force in the City prior to such date.
- (3) Any agreement for the supply of water, entered into between the municipality and a consumer, who is not the owner of the premises concerned, prior to the promulgation of this by-law, will remain in force, until such time as
 - (a) the consumer vacates the premises, or
 - (b) there is a change in the title of the owner of the premises,whereafter the municipality will only enter into an agreement with the owner of the premises.

4. Powers of the Director: Water

- (1) If, in the opinion of the Director: Water, the water installation or a part thereof on a premises is so defective or in such a condition or position as to cause, or be likely to cause, waste or undue consumption of water, pollution of the water supply, or a health or safety hazard, the Director: Water may by notice in writing require the owner to comply with the provisions of this by-law within a specified period.
- (2) The Director: Water must consult the official in charge of health services of the municipality in all matters where there is a likelihood of a health hazard or environmental pollution.
- (3) If the Director: Water has reason to believe that a water installation may be defective in a way that may pose or become a health or safety risk to the occupants of the premises, he or she may require that the water installation be tested or disinfected at the cost of the owner.

5. Service levels

- (1) The council may, from time to time, and in accordance with national policy, but subject to principles of sustainability and affordability, by public notice, determine the service levels it is able to provide to consumers.
- (2) The council may in determining service levels differentiate between types of consumers, geographical areas and socio-economic areas.
- (3) The following levels of service may, subject to subsection (1), be provided by the municipality on the promulgation of these by-laws—
 - (a) communal water supply services—
 - (i) constituting the minimum level of service provided by the municipality;
 - (ii) consisting of reticulated standpipes or stationary water tank serviced either through a network pipe or a water tanker located within a reasonable walking distance from any household;
 - (iii) installed free of charge;
 - (iv) provided free of any charge to consumers, and
 - (v) maintained by the municipality.
 - (b) yard connection not connected to any water installation—
 - (i) consisting of an un-metered standpipe on a premises not connected to any water installation;
 - (ii) installed free of charge, and

(iii) maintained by the municipality.

- (c) a metered pressured water connection—
- (i) installed against payment of the prescribed charges;
 - (ii) provided against payment of the prescribed charges, and
 - (iii) with the water installations maintained by the consumer.

6. Appointment of authorised officials

The City Manager may appoint authorised officials.

7. Delegation

- (1) The City Manager may delegate any of his or her powers and duties in terms of this by-law to any official of the municipality.
- (2) The Director: Water may delegate any of his or her powers and duties to any official of the municipality.

8. Entry upon water services facilities

- (1) Every person who enters upon a water services facility, must comply with the instructions of the Director: Water for use and conditions of entry to the site, displayed by means of a notice at the entrance.
- (2) A person who does not comply with the contents of a notice at the entrance of a water services facility is guilty of an offence.

9. Imminent emergencies and situations that require immediate action

- (1) The Director: Water may, in cases of imminent emergencies or situations that require immediate action take any reasonable measures to prevent or eradicate such imminent emergencies or situations.
- (2) When an imminent emergency or situation as contemplated by subsection (1) occurs on private property, the Director: Water may—
 - (a) by written notice direct the owner to take such measures as may be deemed necessary to prevent or eradicate the imminent emergency or the situation, or
 - (b) in the event that the owner cannot be found or the owner fails to immediately comply with the requirements of the Director: Water, take such measures as may be deemed necessary to prevent or eradicate the imminent emergency or the situation.
- (3) In the event where the emergency emanates from a water installation the owner of such water installation is liable for the costs incurred by the municipality.
- (4) In the case of action taken as contemplated by paragraph (b) of subsection (2), the Director: Water reports the matter to the City Manager without delay.
- (5) If in the opinion of the Director: Water such action is necessary as a matter of urgency to prevent wastage of water, damage to property, danger to life or pollution of water, he or she may—
 - (a) without prior notice, cut off the supply of water to any premises, and
 - (b) enter upon such premises and do such emergency work, at the owner's expense, as he or she may deem necessary, and in addition by written notice require the owner to do such further work as he or she may deem necessary within a specified period.

10. Duties of the public

- (1) Every member of the public must, on becoming aware of any emergency, imminent situation that requires immediate attention or a situation that may give rise to the wastage of water or pollution, immediately inform the Director: Water.
- (2) Any person acting in terms of subsection (1) who does not wish to be identified, may request that his or her name not be disclosed in any subsequent action.

11. Recovery of costs

- (1) Every person committing a breach of the provisions of this by-law is liable to compensate the municipality for any loss or damage suffered or sustained by it in consequence of such breach.
- (2) The municipality may recover any costs reasonably incurred in taking any measures in terms of this by-law from any person who was under a legal obligation to take those measures, including—
 - (a) a person on whom a compliance notice was served;
 - (b) the owner of the premises concerned, or
 - (c) the consumer.
- (3) The City Manager may issue a cost order requiring a person who is liable to pay costs incurred in terms of subsection (1) to pay those costs by a date specified in the order and such order constitutes *prima facie* evidence of the amount due.

12. Compliance notices

- (1) When an authorised official finds that a provision of this by-law is contravened or that a condition has arisen that has the potential to lead to a contravention of this by-law, such authorised official may issue a compliance notice to the consumer or owner concerned or person who is contravening the provisions of this by-law.
- (2) A notice issued in terms of subsection (1) must state—
 - (a) the provision of the by-law that is being contravened or will be contravened if the condition is allowed to continue;
 - (b) the measures that must be taken to rectify the condition, and
 - (c) the time period in which the notice must be complied with.
- (3) If a person on whom notice was served in terms of subsection (2), fails to comply with the requirements of the notice, the Director: Water may take such steps as may be necessary to rectify the condition at the cost of the person responsible, or take any other action deemed necessary to ensure compliance.

13. Responsibility for compliance with this by-law.

- (1) The owner is responsible for ensuring compliance with this by-law in respect of all or any matters relating to the water installation and the maintenance thereof.
- (2) The consumer is responsible for compliance with this by-law in respect of matters relating to the use of any water.

14. Offences and penalties

Any person who—

- (a) contravenes or fails to comply with any provisions of this by-law;
- (b) fails to comply with any notice issued in terms of this by-law;
- (c) fails to comply with any lawful instruction given in terms of this by-law, or
- (d) obstructs or hinders any authorised representative or employee of the municipality in the execution of his or her duties under this by-law,

is guilty of an offence and liable on conviction to a fine.

15. Exemption from liability

The municipality shall not be liable for damages or compensation arising from anything done by it in terms of this by-law.

16. Repeal

The by-laws previously adopted by the council or its constituent predecessors in respect of any portion of the City, are hereby repealed, to the extent set out in Schedule 1 hereto.

17. Appeals

A person whose rights are affected by a decision taken in terms of a power or duty delegated or sub-delegated in terms of this by-law, may appeal against that decision in accordance with section 62 of the Local Government: Municipal Systems Act, No 32 of 2000.

CHAPTER 2**PROVISIONS RELATING TO THE SUPPLY OF WATER****18. Unauthorised use of water**

No person may use water from the water supply system—

- (a) unless an agreement referred to in section 19 or 20 has been concluded, or
- (b) except through a communication pipe provided in terms of section 26 or from a hydrant in terms of section 35, or
- (c) except through a metered water supply point specifically installed by the municipality for the supply of water.

19. Application for supply of water

- (1) Water from the water supply system will not be supplied to any premises unless the owner has applied to the municipality for a supply and such application has been agreed to.
- (2) An application for the supply of water approved by the Director: Water constitutes an agreement between the municipality and the owner and takes effect on the date referred to in the application.
- (3) The owner is liable for all the fees in respect of the supply of water, determined in terms of the Tariff Policy By-law, until the supply has been interrupted at the request of the owner or the agreement has been terminated in accordance with this by-law, and is deemed to be the consumer for all purposes during the currency of the agreement.

- (4) An application must contain at least the following information—
 - (a) a declaration that the applicant is aware of and understands the contents of the agreement;
 - (b) acceptance by the applicant of the provisions of this by-law and acceptance of liability for the cost of the supply of water until the agreement is terminated;
 - (c) the name of the applicant and his or her identity number;
 - (d) the address or erf number of the premises to or on which water is to be supplied;
 - (e) the address where accounts must be sent;
 - (f) the purpose for which the water is to be used;
 - (g) the agreed date on which the supply of water will commence, and
 - (h) an undertaking by the applicant to inform the municipality of any change in regard to any of the above.
- (5) Water is supplied subject to the provisions of this by-law and the conditions imposed by the Director: Water.
- (6) Where the purpose for, or extent to which, the water applied for in subsection (4)(f) is changed, the owner must promptly in addition to advising the municipality of the change, enter into a new agreement with the municipality.

20. Special agreements for supply of water

- (1) The council may enter into a special agreement for the supply of water to an applicant outside the City.
- (2) If the council, in terms of a special agreement, agrees to supply water to an applicant outside the City it may permit him or her to sell such water to other persons, subject to such conditions as it may deem fit.

21. Pipes in streets or public places

No person may for the purpose of conveying water derived from whatever source, lay or construct a pipe or associated component on, in or under a street, public place or other land owned by or under the control of the municipality, except with the prior written permission of the Director: Water and subject to such conditions as he or she may impose.

22. Fees

All fees payable and related to the supply of water by the municipality must be in accordance with the Tariff Policy By-law.

23. Termination of agreements

- (1) An owner may terminate an agreement for the provision of water services by giving the municipality not less than seven days' notice in writing of his or her intention to do so.
- (2) The Director: Water may, by notice in writing of not less than fourteen days, advise an owner of the termination of his or her agreement for the supply of water if—
 - (a) he or she has not used water during the preceding six months and has not made arrangements to the satisfaction of the Director: Water for the continuation of the agreement, or
 - (b) he or she has failed to comply with the provisions of this by-law and has failed to rectify such failure to comply following the issue of a notice, or
 - (c) he or she has failed to pay any fees due and payable in terms of the Tariff Policy By-law.
- (3) The Director: Water may terminate an agreement for the supply of water if the premises to which such agreement relates have been vacated.

24. Interference with the water supply system

Unless authorised in terms of this by-law, no person other than the municipality may—

- (a) manage, operate or maintain infrastructure for the provision of water services, or
- (b) effect a connection to the water supply system.

25. Obstruction of access to the water supply system

No person may prevent or restrict the access of officials of the municipality to the water supply system.

26. Provision of communication pipe

- (1) No person may commence any development on any premises unless the Director: Water has installed a connection pipe and meter.
- (2) If an agreement for a supply of water in respect of premises has been concluded and no communication pipe (or appropriately sized communication pipe) exists in respect of the premises, the owner shall make application on the prescribed form and pay the prescribed charge as determined in terms of the Tariff Policy By-law for the installation of such a pipe.
- (3) The Director: Water may determine—

- (a) the diameter of the communication pipe on information provided by the applicant at the time of the application;
 - (b) the position of the communication pipe;
 - (c) the point of termination of the communication pipe within the boundary of the land owned by the municipality, or over which it has a servitude or other right;
 - (d) the type of joint which must be used to effect the connection, and
 - (e) the material of which that portion of the water installation between the communication pipe and the owner's isolating valve, referred to in section 56, must be made, and the method of installation of such portion.
- (4) If an application is made for a supply of water to premises which are so situated that it is necessary to extend the water supply system in order to supply water to the premises, the Director: Water may agree to the extension subject to such conditions as he or she may impose.
 - (5) Unless otherwise stipulated by the Director: Water, the owner must, at own expense, effect the connection between the water installation and the communication pipe or pipes serving the premises.
 - (6) The owner must secure the portion of the water installation referred to in subsection (3)(e) against movement.
 - (7) Unless otherwise agreed to by the Director: Water, only one communication pipe may be provided to any premises, irrespective of the number of accommodation units, business units or consumers located on such premises.
 - (8) The Director: Water may agree, subject to such conditions as may be imposed, to a connection to a main other than that which is readily available for the provision of water supply to the premises; provided that the owner is responsible for any extension of the water installation to the connecting point designated and agreed to by the Director: Water and for obtaining at his or her cost, such servitudes over other property as may be necessary.
 - (9) No water installation will be supplied with water through a communication pipe which was installed to provide water for building construction purposes until the certificate of compliance referred to in section 53 has been received by the municipality and if no such certificate has been received, the Director: Water may, at his or her discretion and without prejudice to the municipality, disconnect or restrict the water supply to that water installation.
 - (10) If the Director: Water considers that the size of an existing communication pipe is unsuitable by reason of the quantity of water supplied to a premises, he or she may by written notice require the owner to pay the prescribed charges for the removal of the existing communication pipe and the installation of a communication pipe of a suitable size.
 - (11) (a) The Director: Water may by written notice, require the owner of premises which are divided into separately occupied units, to at own expense and within the period specified in the notice—
 - (i) alter the water installation serving any one unit so that it is separate from, and independent of, the water installation serving any other unit;
 - (ii) make application for a communication pipe to serve each unit, and
 - (iii) connect the water installation referred to in paragraph (i) to the communication pipe referred to in paragraph (ii).
 - (b) The Director: Water may give the owner of the unit referred to in paragraph (a)(i) notice in writing that he or she is required to make application in terms of section 19 for a supply of water.
 - (12) If the Director: Water intends to replace a communication pipe, the Director: Water must give the owner concerned not less than ten working days' notice in writing of the date by which he or she will effect a connection between the water installation and the replacement communication pipe.
 - (13) Where premises are supplied by a number of communication pipes, the Director: Water may require the owner to reduce the number of connection points and alter the water installation accordingly.

27. Interconnection between premises

An owner of premises must ensure that no interconnection exists between the water installation on the premises and the water installation on other premises, unless the owner has obtained the prior written consent of the Director: Water and has complied with any conditions imposed by the Director: Water.

28. Provision and position of isolating valves

- (1) The Director: Water must install an isolating valve between every meter and the main.
- (2) The owner must, at own expense, and for his or her exclusive use, provide and install an isolating valve—
 - (a) in the case of a meter installed on the premises, at a suitable point on his or her side of the meter;
 - (b) in the case of a meter installed outside the premises, at a suitable point immediately inside the boundary of his or her premises, provided that the Director: Water may, on failure of the owner and at the owner's expense, provide and so install an isolating valve.
- (3) No person may without the approval of the Director: Water tamper with the isolating valve on the communication pipe.

29. General conditions of supply

- (1) The supply of water by the municipality does not constitute an undertaking to maintain at any time or at any point in its water supply system—
 - (a) an uninterrupted supply;
 - (b) a specific pressure or rate of flow in such supply, or
 - (c) a specific standard of quality of the water,provided that if the water supply to a consumer is interrupted for more than 24 hours, the municipality will endeavour to provide an alternative basic water supply as soon as reasonably possible.
- (2) The Director: Water may specify the maximum height to which water will be supplied from the water supply system.
- (3) If an owner requires an uninterrupted supply, a specific pressure or rate of flow or a specific standard of quality of water on the premises, the owner must make his or her own arrangements for compliance with such requirements.
- (4) The municipality may interrupt the supply of water to any premises without prior notice.
- (5) If in the opinion of the Director: Water the consumption of water on a premises adversely affects the supply of water to another premises, the Director: Water may apply such restrictions as he or she may deem fit to the supply of water to the first-mentioned premises in order to ensure a reasonable supply of water to the other premises, and must inform the owner and/or consumer of the first mentioned premises of such restrictions.

30. Restriction or cutting-off of supply

- (1) Subject to any other right the municipality may have, the City Manager may, if an owner has failed to pay a sum due in terms of the Tariff Policy By-law, by written notice inform him or her of the intention to restrict or cut off the supply of water on a specified date and to restrict or cut off such supply on or after that date.
- (2) Subject to any other right the municipality may have, the Director: Water may, if an owner has contravened this by-law and has failed to rectify such contravention within the period specified in a written notice served on him or her requiring him or her to do so; by written notice inform him or her of the intention to restrict or cut off his supply of water on a specified date and to restrict or cut off such supply on or after that date.
- (3) The consumer/owner must pay the fees for the restriction or cutting-off of supply and restoration of the water supply in terms of the Tariff Policy By-law: provided that all such fees are paid prior to the restoration of the water supply.
- (4) A consumer whose access to water supply services has been restricted or disconnected, who intentionally reconnects it, will on written notice be disconnected.

31. Interruption of supply at owner's request

- (1) The Director: Water may, at the written request of the owner and on the dates requested, if a property is vacant or unoccupied—
 - (a) cut off or restrict the supply of water to the premises, and
 - (b) restore the supply.
- (2) The owner must on approval of the request contemplated in subsection (1), pay the prescribed charges.

32. Removal of water connection

The Director: Water may disconnect a water installation from the communication pipe and remove the communication pipe if—

- (a) the agreement for supply has been terminated in terms of section 23 and the Director: Water has not received an application for a subsequent supply of water to the premises served by the pipe within a period of 90 days of such termination, or
- (b) the building on the premises concerned has been demolished, or
- (c) the owner or occupier has unlawfully interfered with the water supply system serving the premises concerned.

33. Metering of water supplied

- (1) Water supplied to a premises must pass through a meter, installed between the communication pipe and water installation in a position determined by the Director: Water, provided that a meter may be dispensed with in the case of—
 - (a) an automatic sprinkler fire installation;
 - (b) a fire installation in respect of which steps have been taken to detect unauthorised draw-off of water for purposes other than fire-fighting, or
 - (c) circumstances determined by the Director: Water.
- (2) A meter and its associated apparatus is provided and installed by the municipality, remains its property, and may be replaced when deemed necessary by the Director: Water.
- (3) The municipality may install a meter and associated apparatus—

- (a) at any point in the water installation serving the premises, and
 - (b) at any point in the connection pipe serving the premises.
- (4) A meter, installed in terms of subsection (3)(a), remains the property of the municipality.
- (5) If the municipality installs a meter together with its associated apparatus in a water installation in terms of subsection (3)(a), the owner—
- (a) must provide an installation point approved by the Director: Water;
 - (b) must ensure that unrestricted access is available to it at all times;
 - (c) is responsible for its protection and liable for the costs arising from damage thereto; excluding damages arising from normal fair wear and tear;
 - (d) must ensure that no connection is made to the pipe in which the meter is installed, between the meter and the communication pipe serving the water installation;
 - (e) must make provision for the drainage of water which may be discharged from the pipe in which the meter is installed, in the course of work done by the municipality on the meter, and
 - (f) may not use, nor permit to be used, on any water installation, any fitting, machine or appliance which causes damage or in the opinion of the Director: Water, is likely to cause damage to the water supply system inclusive of the meter.
- (6) Only the municipality may—
- (a) disconnect a meter and its associated apparatus from the pipe in which they are installed;
 - (b) break a seal on a meter, or
 - (c) in any other way interfere with a meter and its associated apparatus.
- (7) Any person contravening subsection (6) must pay the municipality the cost of such quantity of water as in the opinion of the Director: Water was supplied.
- (8) If the municipality installs a meter together with its associated fittings in accordance with subsection (3)(b), the service pipe is dispensed with and the water installation is deemed to commence at the connection to the communication pipe, such connecting joint being 150 mm inside the boundary on the land vested in the municipality or over which it has a servitude or other right.
- (9) The Director: Water may at the owner's expense, install or require the installation, of a meter or volume controlling device to each section, business or dwelling unit on any premises for use in determining the quantity of water supplied to each section, business or dwelling unit.
- (10) Any maintenance necessary in any portion of a service pipe that extends from the connection pipe of the premises to a meter and its associated fittings, situated within such premises, must be carried out by the Director: Water, notwithstanding that this section of pipe forms part of the water installation, provided that the owner must allow the Director: Water free access to this pipe and/or meter and be responsible for reinstatement of surroundings upon completion of repairs.
- (11) An occupier of a premises must, immediately upon detection of a leak in a service pipe or from the body of the meter or its associated fittings, inform the municipality, where such meter has been installed in accordance with subsection (3)(a).
- (12) If access to a meter, installed in terms of subsection (3)(a), is denied for reading purposes, the Director: Water may—
- (a) upon written notice to the owner of the premises, inform him or her of the intention to install at the owner's cost, another meter in the connection pipe;
 - (b) render an account for the quantity of water consumed at such premises as measured on the meter installed in the connection pipe, and
 - (c) recover from the owner the cost of the meter rendered inoperable.
- (13) If access to a meter, installed in terms of subsection (3)(a), is denied for reading purposes, the owner is, during the period of such denial, liable for the cost of the water wasted should a leak develop on such meter and its associated fittings or become visible on the section of the service pipe within such premises, and measured by a meter installed in accordance with subsection (12)(a).
- (14) If an owner submits a plan to the municipality, in terms of section 47, for the approval of the erection of a boundary structure, and where the existing meter has been installed in accordance with subsection (3)(a), such owner shall be required upon the approval of such plan, to apply for and pay the relevant tariff to have such meter removed from his or her premises and a new meter installed in the connection pipe.
- (15) If an owner submits a plan, in terms of section 47, for the approval of alterations or extensions to an existing un-metered fire installation, such owner shall after assessment of the revised installation, and upon approval of such plan, apply for and pay the relevant tariff to have a meter as specified in size and type by the Director: Water, installed by the municipality as part of the connection to such premises.
- (16) If an owner submits a plan, in terms of section 47, for the approval of alterations and additions to an existing metered water installation, he or she shall after the assessment of the revised installation, and upon approval of the plan apply for and pay the relevant tariff to have a meter as specified in size and type by the Director: Water installed by the municipality as part of a connection to such premises.
- (17) If the Director: Water determines that provision be made for separate water connections for a potable water installation and a fire installation on the same premises, standard water meters may be installed on such connections.
- (18) If the Director: Water determines that a combined domestic water and fire installation, which includes hydrants, must supply a premises, a combination meter or other similar meter to detect low flow rates must be installed on such a connection.

- (19) A separate communication pipe must be laid and used for every automatic sprinkler system.
- (20) Where the owner, or person having the charge or management of any premises on which several accommodation units are situated, requires the supply of water to such premises for the purpose of supply to the different accommodation units, the Director: Water may, at his/her discretion, provide and install either—
- (a) a single meter in respect of the premises as a whole or any number of such accommodation units; or
 - (b) a separate meter, situated at the property boundary on the land vested in the municipality, for each accommodation unit or any number thereof.
- (21) Where the Director: Water has installed a single meter as contemplated in subsection (20)(a), the owner or the person having the charge or management of the premises, as the case may be, must install and maintain on each branch pipe extending from the communication pipe to the different accommodation units—
- (a) a separate meter; and/or
 - (b) an isolating valve, and
 - (c) will be liable to the municipality for payment of the prescribed charges for all water supplied to the premises through such a single meter, irrespective of the different quantities consumed by the different consumers served by such meter.

34. Quantity of water supplied

For the purpose of assessing the quantity of water supplied through a meter over a specific period, it must be deemed, unless the contrary can be proved, that—

- (a) the quantity is represented by the difference between readings of the meter taken at the beginning and end of such period;
- (b) the meter was registering correctly during such period, and
- (c) the entries in the records of the municipality were correctly made;

provided that if water is supplied or taken without its passing through a meter, the estimate by the Director: Water of the quantity of such water shall be deemed to be correct.

35. Water supplied from municipal hydrants

- (1) The Director: Water may permit a temporary supply of water to be taken from a fire hydrant, subject to such terms and conditions as he or she may prescribe.
- (2) A person who desires a temporary supply of water referred to in subsection (1) shall make application in the manner prescribed in section 19.

36. Resale of water

- (1) No person who is supplied with water in terms of this by-law may sell such water unless—
 - (a) provision has been made therefore in a special agreement referred to in section 20, or
 - (b) has obtained the prior written permission of the Director: Water.
- (2) If the Director: Water grants the permission referred to in subsection (1)(b), he or she may stipulate the maximum price, determined by council, at which the water may be sold and impose such other conditions as he or she may deem fit.
- (3) Permission referred to in subsection (1)(b) may be withdrawn at any time.

37. Defective meters

- (1) If a consumer has reason to believe that a meter is defective he or she may, against payment of the prescribed charges, make application for the meter to be tested.
- (2) The prescribed charge referred to in subsection (1) will be—
 - (a) retained by the municipality if the meter is found in terms of subsection (3) or (4) not to be defective, or
 - (b) refunded to the applicant if the meter is found to be defective.
- (3) A meter to which the regulations relating to water meters published under the Trade Metrology Act, 1973 (Act 77 of 1973) are applicable shall be deemed to be defective if, when tested in accordance with such regulations, it is found to have a percentage error in over-registration or under-registration greater than that permitted for a meter in use in terms of those regulations.
- (4) A meter to which the regulations referred to in subsection (3) are not applicable shall be deemed to be defective if it is found to have a percentage error in over-registration or under-registration greater than that allowed in SABS 1529:1999 Part 4 and SANS 1525:1999 Part 1, or its amendments.

38. Estimation of quantity of water supplied to consumer through defective meter

- (1) If a meter is found to be defective in terms of subsection 37(3) or (4), the Director: Water may estimate the quantity of water supplied to the

consumer concerned during the period in which, in his or her opinion, such meter was defective, on the basis of the average daily quantity of water supplied over—

- (a) a period between two successive meter readings subsequent to the replacement of the meter, or
- (b) a period in the previous year corresponding to the period in which the meter was defective, or
- (c) the period between three successive meter readings prior to the meter becoming defective,

whichever the Director: Water considers the most appropriate.

- (2) If the quantity of water supplied to a consumer during the period when the meter was defective cannot be estimated in terms of subsection (1), the Director: Water may estimate the quantity on any basis that is available.
- (3) The consumer must be informed of the method used by the Director: Water to estimate the quantity of water supplied to him or her, as contemplated in subsection (1) and (2) and given an opportunity to make representations to the Director: Water before a final estimate is arrived at.

39. Adjustment of quantity of water supplied if meter is defective

- (1) The adjustment of the quantity of water supplied through a defective meter shall be made for the period determined in terms of section 38.
- (2) For the purpose of adjusting the quantity of water in terms of subsection (1) it shall be deemed that the same quantity of water was supplied in each interval of twenty-four hours during the period referred to in subsection (1).
- (3) An owner shall not be entitled to a reduction of the amount payable for water wasted or lost in a water installation, due to visible leaks.

40. Special Measurement

- (1) If the Director: Water requires, for purposes other than charging for water consumed, to ascertain the quantity of water which is used in a part of a water installation, may, by written notice, advise the owner concerned of his or her intention to install a measuring device at any point in the water installation that he or she may specify.
- (2) The installation of a measuring device referred to in subsection (1), its removal, and the restoration of the water installation after such a removal will be carried out at the expense of the municipality.
- (3) The provisions of sections 33(5)(b) and 34(6) apply, insofar as they may be applicable, in respect of a measuring device that has been installed in terms of subsection (1).
- (4) The municipality may on receipt of a written notice from the owner and subject to arrangement of payment of the relevant prescribed charge, read the meter to ascertain the quantity of water supplied at a time, or on a day, other than upon which the meter would normally be read.

CHAPTER 3

WATER RESTRICTIONS AND WATER CONSERVATION

41. Water Restrictions

- (1) The council may by public notice, whenever there is a scarcity of water available to it for distribution and supply to consumers, or for any other good cause—
 - (a) prohibit or restrict the consumption of water in the whole or part of the City
 - (i) in general or for specified purposes;
 - (ii) during specified hours of the day or on specified days, and
 - (iii) in a specified manner, and
 - (b) determine and impose limits on the quantity of water that may be consumed over a specified period;
 - (c) impose restrictions or prohibitions on the use or manner of use or disposition of an appliance by means of which water is used or consumed, or on the connection of such appliances to the water installation, and
 - (d) invoke the special tariffs in respect of water restrictions, determined in terms of the Tariff Policy By-law .
- (2) The council may limit the application of the provisions of a notice contemplated in subsection (1) to specified areas and/or categories of consumer, premises and activities, and may permit deviations and exemptions from, and the relaxation of, any of such provisions on reasonable grounds, provided that there will be no deviation from the tariffs referred to in subsection (1)(d).
- (3) The Director: Water may order a consumer to, at the consumers own expense, take such measures, including the installation of meters and devices for restricting the flow of water, as may in his or her opinion be necessary to ensure compliance with a notice published in terms of subsection (1).
- (4) The Director: Water—
 - (a) may discontinue or, for such period as he or she may deem fit, limit the supply of water to any premises in the event of a failure to comply with the terms of a notice referred to in subsection (1), and

- (b) must, where the supply has been discontinued in terms of paragraph (a), restore it only when the fee for discontinuation and reconnecting the supply has been paid.
- (5) The provisions of this section shall also apply in respect of water supplied directly by the municipality to consumers outside the City, notwithstanding anything to the contrary in the conditions governing such supply, unless otherwise specified in the notice published in terms of subsection (1).
- (6) Any person contravening the provisions of a notice published in terms of subsection (1) is guilty of an offence.

42. Wastage of Water

- (1) No person may, in the opinion of the Director: Water, negligently, purposefully or wastefully—
 - (a) discharge water from terminal water fittings or permit such discharge;
 - (b) permit pipes or water fittings to leak;
 - (c) use water fittings that are incorrectly adjusted or defective or permit such use;
 - (d) permit an overflow of water to persist, or
 - (e) inefficiently use water or allow an inefficient use of water to persist.
- (2) An owner must repair or replace any part of the water installation which is in such a state of disrepair that, in the opinion of the Director: Water, it is either causing or is likely to cause an occurrence listed in subsection (1).
- (3) If an owner fails to comply with subsection (2), the Director: Water may take such measures as he or she may deem fit and recover the cost from the owner.
- (4)
 - (a) A consumer must ensure that any equipment or plant connected to the water installation uses water in an efficient manner.
 - (b) If in the opinion of the Director: Water, the use of water by any equipment in a water installation is inefficient or wasteful, the Director: Water may, by written notice, prohibit the use of such equipment.
- (5) When the use of equipment has been prohibited in terms of subsection (4)(b), such equipment shall not be returned to use until its efficiency has been restored and a written application to do so has been approved by the Director: Water.

43. Water Conservation and Demand Management

Any owner or consumer must comply with the good water conservation and demand management practices as set out in Schedule 2 of this by-law.

CHAPTER 4

WATER SERVICES INTERMEDIARIES

44. Registration

The council may by public notice require water services intermediaries or classes of water services intermediaries to register with the municipality in a manner specified in the public notice.

45. Provision of water services

- (1) Water services intermediaries must ensure that water services, including basic services as determined by the council, are provided to such persons it is obliged to provide with water services.
- (2) The quality, quantity and sustainability of water services provided by a water services intermediary must at least be of the same standards as provided by the municipality to consumers.

46. Charges for water services provided

- (1) A water services intermediary may not charge for water services at a price which does not comply with the norms and standards as may be set by the Director: Water.
- (2) A water services intermediary must provide subsidised water services, as determined by the council in terms of the Credit Control and Debt Management Policy By-Law and provided by the municipality to consumers at a price that is the same or less than the prescribed charges at which the municipality provides such services.

CHAPTER 5

PLANS APPROVAL

47. Plans approval procedure

- (1) If an owner wishes to install a new water installation, he or she must first obtain the written approval of the Director: Water on plans submitted for scrutiny; provided that approval shall not be required for the repair or replacement of an existing pipe or water fitting other than a fixed water heater and its associated protective devices, in which instance a notice of notification is required.
- (2) Application for the approval referred to in subsection (1) must be made on the prescribed form and be accompanied by—

- (a) the prescribed charge, and
 - (b) the prescribed number of copies of the drawings of the proposed work, as referred to in section 49.
- (3) The provisions of subsections (1) and (2) do not apply to a registered contractor who replaces a fixed water heater or its associated protective devices.
- (4) Authority given in terms of subsection (1) will, subject to section 48, lapse at the expiry of a period of 24 months after the first day of the month succeeding the month in which the authority was given.

48. Extension of period of approval

The Director: Water may, on written application by the owner, prior to the expiry of the original period concerned and subject to payment of the prescribed charge, from time to time extend the period of validity of approval given in terms of section 47 for a period not exceeding 12 months at a time and subject to such conditions as he or she may deem fit.

49. Drawings

- (1) Unless the Director: Water has in writing determined otherwise, drawings must be on sheets of a size not smaller than A4 and must provide information in the form required by Clause 4.1.1 of SANS 10252: 2004 Part 1, a copy of which may be obtained from the Director: Water.
- (2) If the details of the water installation on more than one floor of a building are identical, such details may be drawn for one floor only.
- (3) If more than one water installation is to be installed in a building, such installations may be shown on the same drawing, provided they are clearly differentiated.
- (4) A schedule must be provided with each drawing or set of drawings, indicating the number of each type of terminal water fitting and its nominal size.

50. Copies of drawings to be kept on site

Until receipt by the Director: Water of the certificate of compliance submitted in terms of section 53, a complete set of approved drawings of the installation work must at all times be available at the site of the work.

51. Unauthorised work

If installation work has been done in contravention of section 47, the Director: Water may by written notice require the owner of the premises concerned to comply with that section within a specified period, and if work is in progress, to cease the work, and may further require the owner to remove all such work which does not comply with this by-law.

CHAPTER 6

INSTALLATION BY PLUMBERS

52. Persons permitted to do installation and other work

- (1) No person, who is not qualified and accredited in terms of the South African Qualifications Authority Act, No. 58 of 1995, may—
 - (a) do installation work for which approval is required in terms of section 47;
 - (b) replace a fixed water heater or its associated protective devices;
 - (c) inspect, disinfect and test a water installation, fire installation or storage tank, or
 - (d) service, repair or replace a backflow preventer in terms of section 59.
- (2) The Director: Water may maintain a register of such qualified plumbers.

53. Responsibilities of a property owner

- (1) A property owner must ensure that the installation work done on his or her premises is carried out by a qualified plumber and complies with this by-law.
- (2) If installation work is being done in contravention of section 52, the Director: Water may by written notice require the owner of the premises concerned to cease such work until he or she has employed a qualified plumber to—
 - (a) inspect such work and rectify any part of it which does not comply with this by-law;
 - (b) test and disinfect the work in terms of section 54, and
 - (c) ensure that a certificate of compliance, stating that the work carried out complies with this by-law, is submitted to the Director: Water.

CHAPTER 7

DISINFECTION

54. Disinfection of water installations, including storage tanks.

- (1) An owner must cause a new water installation to be flushed with water from the water supply system until clear water discharges from every terminal water fitting.

- (2) If the pipe work of a water installation which is connected to a main becomes contaminated, it must be disinfected in accordance with SANS 10252:2004 Part 1.
- (3) The owner of a premises on which a storage tank is installed must, not less than once in every five years, cause such tank to be drained, inspected and disinfected, in accordance with SANS 10252:2004 Part1.
- (4) Notwithstanding the provisions of subsection (3)—
 - (a) the Director: Water may, if he or she is of the opinion that the water in the storage tank or in the water installation served by the tank is unsuitable for use, by written notice, require the owner to cause the tank to be drained forthwith and inspected, and
 - (b) if a tank has become submerged, or is in any way subjected to a condition which could cause the contents thereof to become polluted, the owner must forthwith cause the tank to be drained and inspected.
- (5) Before the tank or the water installation served by it referred to in subsection (3) is returned to use, it must be cleaned and disinfected in accordance with SANS10252: 2004 Part 1.

CHAPTER 8

GENERAL WATER INSTALLATION REQUIREMENTS

55. Provision and maintenance of water installations

- (1) An owner must provide and maintain the water installation at own cost and, except—
 - (a) in the case of a connection to a communication pipe, or
 - (b) where permitted in terms of section 21, and
 must ensure that the installation is within the boundary of the premises.
- (2) Before work is commenced in connection with the maintenance of a portion of the water installation which is situated outside the boundary of the premises, an owner must obtain the written consent of the Director: Water or the owner of the land on which such portion is situated, as the case may be.

56. Schedule of accepted pipes and water fittings

- (1) No person may install or use a pipe or water fitting in a water installation unless it is listed in the Schedule of Accepted Pipes and Water Fittings, and otherwise in accordance with conditions imposed in terms of Schedule 3.
- (2) Notwithstanding the provision of subsection (1) the Director: Water may for a specific use in a specific installation, permit the installation or use of a pipe or water fitting which is not included in the schedule.
- (3) The Director: Water may, in respect of any pipe or water fitting included in the schedule, impose such conditions as he or she may deem necessary in respect of the use or method of installation thereof.
- (4) The Director: Water may at any time remove a pipe or water fitting from the schedule if the pipe or water fitting—
 - (a) no longer complies with the criteria upon which its inclusion was based, or
 - (b) in his or her opinion, is no longer suitable for the purpose for which its use was accepted.
- (5) Copies of the current schedule are available at the office of the municipality during working hours.
- (6) A pipe or water fitting will not be included in the schedule referred to in subsection (1) unless it—
 - (a) bears the standardisation mark of the SABS in respect of the relevant SANS specification issued by the Bureau;
 - (b) bears a certification mark issued by the SABS to certify that the pipe or water fitting complies with an SABS Mark specification or a provisional specification issued by the SABS, provided that no certification marks shall be issued for a period exceeding two years;
 - (c) is included in the list of water fittings accepted by JASWIC, or
 - (d) is acceptable to the Director: Water.

57. Design criteria for water installations

- (1) An owner must ensure that—
 - (a) water installations comply with SANS 10252: 2004 Part 1 , or as it may be amended;
 - (b) hot water cylinder installations comply with SANS 10254: 2004 or as it may be amended;
 - (c) solar heated water installations comply with SANS 10106:1972 or as it may be amended;
 - (d) the storage of a minimum quantity of water, to be used for purposes other than fire-fighting or air-conditioning, is provided in accordance with Table 1;
 - (e) the storage of a minimum quantity of water to be used for flushing of water closets and urinals in commercial and industrial premises is provided in accordance with Table 2;

- (f) the design of storage tanks is in accordance with SANS 10252: 2004 Part 1 and with section 58;
 - (g) the use of pipes supplying water in any installation is in accordance with SANS 10252: 2004 Part 1 and with Annexure "3" or as it may be amended;
 - (h) immediately downstream of the isolating valve, referred to in section 28(2)(a) and (b), a non-return valve of similar size as the service pipe is installed, and
 - (i) where the efficiency of functional valves or terminal fittings may be compromised by the passing through of solid material that could block or damage the same, an in-line strainer is installed, in a position so as to allow easy maintenance.
- (2) The Director: Water may, on application by an owner and on payment of the prescribed charge determine and furnish the owner with the value of the pressure in the water supply system relating to his or her premises over such period as the owner may request.
- (3) If the Director: Water is of the opinion that a pipe or water fitting of a particular type is unsuitable for use in a particular situation, he or she may by written notice to the owner—
- (a) prohibit the use thereof, or
 - (b) require acceptable protective measures to be applied.
- (4) No person may connect to a water installation a water fitting or apparatus which causes or is likely to cause damage to the water supply system or another water installation as a result of pressure surges.

Type of Consumer	Storage Required
Hospitals, clinics, nursing homes, old-age homes and other buildings from which the occupants cannot readily be removed in the event of an interruption of the water supply.	250 litres for every bed which the building is designed to accommodate.
Educational institutions.	40 litres to 50 litres per capita
Multiple dwelling units exceeding height determined in terms of section 29(2), or exceeding three stories, whichever is the lower.	135 litres per dwelling unit.
Hotels, boarding houses and hostels.	90 litres for every person whom the building is designed to accommodate (including staff).
Restaurant kitchens (full meal preparation)	8 to 12 litres per meal prepared.
Hairdressers and dentist	4 hours demand per day.
Industry (storage for production purposes)	8 hours demand per day.

TABLE 2

Type of Consumer	Storage Required
Commercial premises (including shops and offices)	70 litres for every 100 sq metres of gross floor area.
Factories	5 litres per capita
Super stores (such as Hyper markets)	125 litres per WC Pan or 600mm of slab urinal
Educational Institutions	5 litre per capita

58. Storage Tanks

- (1) Any person who installs a storage tank must install it in such a position that its exterior and interior can readily be inspected, cleaned, and maintained, unless it is a concrete reservoir that is buried or partly sunk into the ground and has been designed, constructed and tested in accordance with SANS 10100-1 and SANS 1200-G where only the interior is accessible for inspection and cleaning.
- (2) No persons may without the written consent of the Director: Water cause or allow a tank, buried or placed in the ground, to be used for reception or storage of water supplied by the municipality.
- (3) Any person who uses a storage tank to store water of potable quality must ensure that—
- (a) it is of contamination proof design and in accordance with the requirements of the Director: Water;
 - (b) the overflow and vent of a contamination proof tank is screened to prevent the ingress of insects, animals, and other sources of pollution, and
 - (c) a contamination proof tank is totally enclosed with no other access to its interior, other than an access panel in its side to facilitate inspection and cleaning, which must be at a level where the tank cannot be used unless the access panel cover is in place.
- (4) Unless authorised in writing by the Director: Water, every boiler, steam kettle, or other apparatus for generating steam, gas producer, gas engine, or oil engine or any other apparatus in, or by which water supplied by the municipality is used must be supplied only through a cold water feed tank which utilizes an air gap to separate the incoming mains water from the contents of the tank.

59. Prevention of Pollution of Water

- (1) An owner must provide and maintain measures approved by the Director: Water to prevent the entry of a substance which may be a danger to health or adversely affect the potability of water into-

- (a) the water supply system, and
 - (b) any part of the water installation on his or her premises.
- (2) The Director: Water must approve the appropriate level of backflow prevention required in each instance.

CHAPTER 9

FIRE INSTALLATIONS

60. Fire Installations

- (1) An owner must ensure that—
 - (a) hose reel and hydrant installations comply with SANS 10252: 2004 Part 1, and
 - (b) automatic sprinkler systems comply with SANS 10287: 2000.
- (2) The Director: Water may grant or refuse an application for the connection of a fire extinguishing installation to the municipality's main.
- (3) No water will be supplied to any fire extinguishing installation without a certificate of approval issued in terms of section 53 and that the installation complies with the requirements of this by-law.
- (4) If the Director: Water is of the opinion that a fire extinguishing installation, which he has allowed to be connected to the municipality's main, is not being kept in proper working order, or is otherwise improperly maintained, or is being used for purposes other than fire fighting, he or she may either require the installation to be disconnected from the main or disconnect it, at the owner's expense.
- (5) Whenever it is necessary to boost the pressure of a fire installation, the owner must install a dual pipe system, one for fire extinguishing purposes and the other for general domestic purposes.
- (6) All pipes and fittings must be capable of handling pressures in excess of 1800 kPa, if that pressure could be expected when boosting takes place and must be capable of maintaining their integrity when exposed to fire conditions.
- (7) A separate connection pipe must be installed and used for every fire sprinkler extinguishing system.
- (8) The Director: Water determines whether automatic sprinkler systems must be metered.

CHAPTER 10

MISCELLANEOUS PROVISIONS REGARDING NON-POTABLE WATER

61. Use of water from other sources than the municipal water supply

- (1) No one may use, or permit to be used, any water obtained from a source other than the municipal water supply for domestic consumption, unless the water concerned has been approved by the Director: Water for that purpose and in accordance with the conditions determined by the Director: Water.
- (2) No person may connect a water supply obtained from any source other than the municipal water supply to any water distribution system without the prior written approval of the Director: Water, and then only in accordance with the conditions determined by the Director: Water.
- (3) Any owner of premises on which a water source is located, must within 14 days of being called upon to do so, provide the Director: Water with such particulars regarding the water source as may be required.
- (4) An owner of premises contemplated by subsection (3), must at own cost, on being called upon to do so, furnish the Director: Water with such certificates of analysis and bacteriological investigation in respect of water sources on those premises as may be required.
- (5) The Director: Water may withdraw any consent given in terms of subsection (1) if, in the opinion of the Director: Water—
 - (a) a condition imposed in terms of that subsection is breached, or
 - (b) the water no longer conforms to the requirements imposed by the Director : Water.
- (6) The provisions of this section do not exempt any person from complying with the applicable provisions of the National Water Act, 1998 (Act 36 of 1998) or any other relevant national legislation.

62. Wells, boreholes, wellpoints and excavations

Every owner of premises must ensure that any well, wellpoint, borehole or other excavation located on his or her premises—

- (a) is adequately safeguarded from creating a health nuisance, and
- (b) is not filled in a way, or with material, that may cause an adjacent well, borehole or underground source of water to become polluted or contaminated.

63. Notice of the sinking or digging of boreholes, wells and wellpoints

- (1) No one may sink or dig, or cause or permit to be sunk or dug, a well, wellpoint or borehole, unless the Director : Water is provided with at least 14 days' written notice of his or her intention to do so.
- (2) The notice contemplated in subsection (1) must state the proposed location and purpose for which the water is to be used.

- (3) If water obtained from a borehole or other source of supply on any premises is used for a purpose which gives rise to the discharge of such water or a portion thereof into the municipality's sewerage system, the owner must install a meter to the municipality's specification in the pipe leading from such borehole or other source of supply to the point or points where it is so used.
- (4) The council may, by public notice, require the owner of any premises within any area of the municipality upon which a borehole exists or, if the owner is not in occupation of such premises, the occupier to notify it of the existence of a borehole on such premises, and provide it with such information about the borehole that it may require.
- (5) The Director: Water, if he or she finds it necessary, may require that a study be undertaken at the cost of the owner in order to assess any impact the proposed well, wellpoint or borehole may have on the wellbeing of the community.

64. Supply of non-potable water by the municipality

- (1) The Director: Water may on application in terms of section 19 grant a supply of non-potable water to a consumer and at such conditions as he or she may deem fit.
- (2) Any supply of water granted in terms of subsection (1) may not be used for domestic or any other purposes which, in the opinion of the Director: Water, may give rise to a health hazard.

65. Disclaimer in respect of non-potable water quality

- (1) No warranty, expressed or implied, applies to the purity of any non-potable water supplied by the municipality or its suitability for the purpose for which the supply was granted.
- (2) The use of non-potable water is entirely at the risk of the consumer, and the municipality is not liable for any consequential damage or loss arising directly or indirectly therefrom.

66. Warning notices

- (1) An owner of premises, on which non-potable water is used, must ensure that every terminal water fitting and every appliance which supplies or uses the water is clearly marked with a weatherproof notice indicating that such water is unsuitable for domestic purposes.
- (2) In an area where treated sewage effluent is used, the consumer shall erect weatherproof notices in prominent positions warning that such water is not suitable for domestic purposes.
- (3) Every warning notice prescribed in terms of subsections (1) and (2) must be in the three official languages used in the province.

SCHEDULE 1

REPEAL OF BY-LAWS

Brackenfell Municipality	Water Supply By-law: PN 499/1970
Cape Town, City of	Water By-law: PN 30/1996
Cape Town, City of	Water Services By-law to Limit or Restrict the Use of Water, Provincial Gazette 5994 of 28 March 2003
Durbanville Municipality	Water By-law: PN 665/1968
Durbanville Municipality	Additional Water Supply By-law: PN 612/1994
Goodwood Municipality	Water By-law: PN 337/1991 as amended
Ikapa Town Council	Water Supply By-law: GN R1107/1984
Kraaifontein Municipality	Water By-law: PN 842/1960, as amended
Kraaifontein Municipality	Additional Water Supply By-law: PN 848/1979, as amended
Kuils River Municipality	Water By-law: PN 581/1962
Kuils River Municipality	Additional Water Supply By-law: PN 216/1978, as amended
Lingeletu-West Town Council	Water Supply By-law: GN R1107/1984
Llwandle Town Council	Water Supply By-law: GN R1107/1984
Mfuleni Town Council	Water Supply By-law: GN R1107/1984
Milnerton Municipality	Additional Water Supply By-law: PN 110/1982
Parow Municipality	Additional Water Supply By-law: PN 98/1930, as amended
Pinelands Municipality:	Water Supply By-law: PN 198/1924, as amended
Simon's Town Municipality	Water Supply By-law: PN 662/1954, as amended
Simon's Town Municipality	Additional Water Supply By-law: PN 663/1954
Simon's Town Municipality	Water Supply By-law: PN 1059/1975, as amended
Somerset West Municipality	Water Supply By-law: PN 310/1910, as amended
West Coast Peninsula Municipality	Water Supply By-law: PN 14/1997

SCHEDULE 2**WATER DEMAND MANAGEMENT**

1. No person may without prior written authority from the Director: Water, water a garden, sports field, park, or other grassed area using potable water, between the hours of 10:00 and 16:00.
2. Where a hosepipe is used to irrigate a garden, park, or sports field from a potable water source a controlling device such as a sprayer shall be attached to the hose end.
3. No person may without prior written authority from the Director: Water hose down a hard-surfaced or paved area using water from a potable source.
4. A hosepipe used for washing vehicles, boats, and caravans must be fitted with an automatic self-closing device.
5. Automatic top up systems using a float valve fed from a potable water source to supply swimming pools and garden ponds are not allowed.
6. Commercial car wash industries must recycle a minimum of 50% of the water used in operations.
7. Wash-hand basins provided in public facilities must be fitted with demand type taps.
8. Showers provided at public facilities must be fitted with demand type valves.
9. Potable water may not be used to dampen building sand and other building material to prevent it from being blown away.
10. Stand pipe draw-off taps must be at a height of at least 450 mm, measured above ground level.
11. The maximum flow rate from any tap installed in a wash hand basin may not exceed 6 litres per minute.
12. The maximum flow rate from any showerhead may not exceed 10 litres per minute.
13. Water closet cisterns may not exceed 9,5 litres in capacity.
14. No automatic cistern or tipping tank may be used for flushing a urinal
15. Within two years after the promulgation of this by-law all automatic flushing cisterns fitted to urinals, must be replaced with either manually operated systems or non-manual apparatus which causes the flushing device to operate after each use of such urinal.
16. Terminal water fittings installed outside any buildings other than a residential dwelling must—
 - (a) incorporate a self-closing device, or
 - (b) have a removable handle for operating purposes, or
 - (c) be capable of being locked to prevent unauthorized use, or
 - (d) be of a demand type that limits the quantity of water discharged in each operation.
17. Water Audit
 - (a) Major water users (those using more than 3 650 kilolitres per annum), excluding those comprising multiple dwelling units, must undertake an annual water audit. The audit must be carried out no later than two weeks after the end of each financial year of the municipality. The audit report must be available for inspection by officials from the Department of Water Affairs and Forestry, the Water Board (where applicable) and the municipality.
 - (b) The audit must detail the following—
 - (i) amount of water used during a financial year;
 - (ii) amount paid for water for the financial year;
 - (iii) number of people living on the stand or premises;
 - (iv) number of people permanently working on the stand or premises;
 - (v) comparison of the above factors with those reported in each of the previous three years (where available);
 - (vi) seasonal variation in demand (monthly consumption figures);
 - (vii) details of water pollution monitoring methods;
 - (viii) details of current initiatives to manage their demand for water;
 - (ix) details of plans to manage their water demand;
 - (x) comparison of the above factors with those reported in each of the previous three years (where available), and
 - (xi) estimate of consumption by various components in use.
18. No person may allow water, used as a heat-exchange medium in any equipment or plant and supplied from a water installation, to run continuously to waste except for maintaining a prescribed level of total dissolved solids in a recirculating plant.

SCHEDULE 3**PIPES USED TO CONVEY POTABLE WATER****Copper Pipes**

Class 0 and Class 1 copper pipes may not be used in underground applications unless suitably protected in a sleeve.

Class 0 copper pipes may not be bent, flared, or have their ends expanded and formed in to a sleeve for capillary-type soldering.

Copper pipes may not be bronzed, welded or silver brazed.

Plastic Pipes (Polyethylene, Polypropylene, Polyvinyl)

Plastic pipe may not be used in fire or combined fire/domestic installations in an above ground position.

Plastic pipes conveying potable water must be protected from sunlight.

Plastic pipes may not be used in a position where permeation of gas or other chemical substance may cause contamination of the water conveyed in it, unless it is suitably protected in an impervious sleeve.

Where plastic pipe is used to convey hot water from a fixed hot water cylinder installation, the first 1,5 metres of piping on the outlet side of the cylinder must be in copper.

Black Steel Pipes

Black mild steel pipe and its associated fittings may not be used to convey water in domestic installations, unless it is suitably treated and coated on the inside, and shall also not be installed in the fire installation section of a combined installation, in such a manner which could compromise the potability of the water in the domestic installation section of such a combined installation.

Galvanised mild steel pipes and water fittings may not be used in installations which are connected to the municipality's main, and are supplied with water from it.

Any pipe conveying water from a main may not be installed as an integral part of a concrete structure.

STAD KAAPSTAD**WATERVERORDENING**

Om waterdienste in die Stad te beheer en reguleer

INDELING VAN ARTIKELS**Hoofstuk 1: Woordbepaling en Algemene Bepalings**

1. Woordbepaling
2. Toepassing van hierdie verordening
3. Oorgangsmatreëls
4. Magte van die Direkteur: Water
5. Diensvlakke
6. Aanstelling van gemagtigde beamptes
7. Delegasie
8. Betreding van 'n waterdienstefasiliteit
9. Dreigende noodgevalle en toestande wat dringende aandag verg
10. Plig van die publiek
11. Verhaal van koste
12. Voldoeningskennisgewings
13. Verantwoordelikheid om hierdie verordening na te kom
14. Misdrywe en strafbepaling
15. Nie-aanspreeklikheid
16. Herroeping
17. Appèlle

Hoofstuk 2: Bepalings in verband met die voorsiening van water

18. Ongemagtigde gebruik van water