Stellenbosch Municipality
Drought Response Plan

Water Conservation and Water Demand Management

Drought Response Plan

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HATCH

Drought Response Plan

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Revision History

Date	Rev No	Description	Revised By

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Schedule of Abbreviations

SM	Stellenbosch Municipality
CoCT	City of Cape Town
WCWSS	Western Cape Water Supply System
DWS	Department of Water and Sanitation
WCWDM	Water Conservation and Demand Management
WTP	Water Treatment Plant
DMA	Demand Management Area
Ml/day	Mega litres per day / Million litres per day
Mm^3/a	Million cubic meters per annum
PRV	Pressure Reducing Valve
FM	Flow Meter
MDG	Municipal Disaster Grants
PDG	Provincial Disaster Grants
MDRG	Municipal Disaster Recovery Grants

Foreword

The Western Cape is currently experiencing a severe drought which is affecting agricultural and municipal water supplies for many communities and local municipalities, particularly are faced with the possibility of water shortages. The City of Cape Town (CoCT) metropolitan area is particularly affected as it depends for the most part on water in the Drakenstein, Gouda, Grabouw and Theewaterskloof catchment areas for its potable water supply.

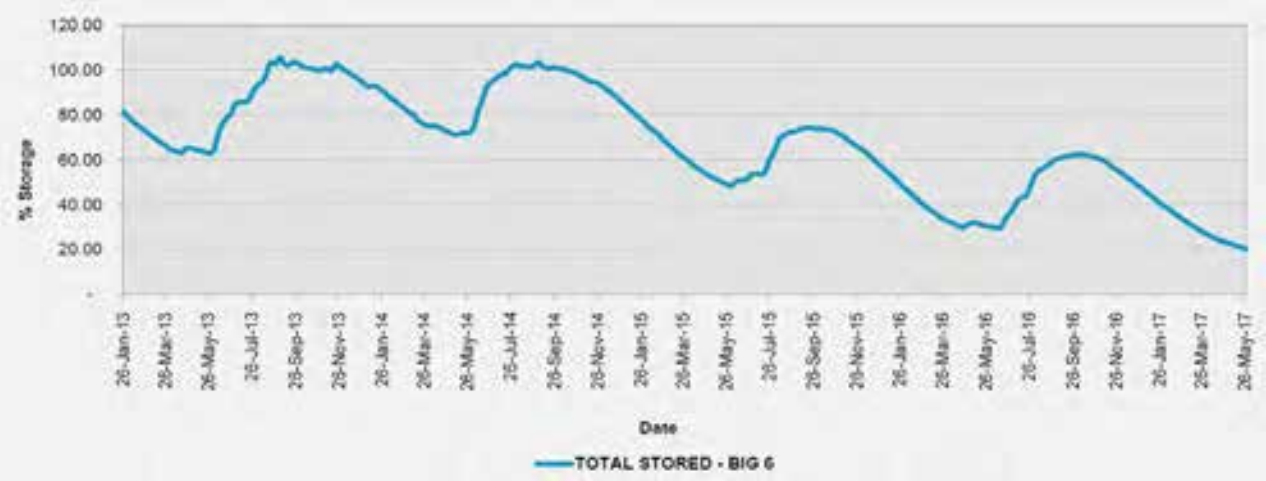
According to the latest statistics, dam levels under the control of the City of Cape Town and Department of Water & Sanitation (DWS) have dropped to 19.7 % as recorded on 29 May 2017. The six largest Dams as noted in the graph below supply Cape Town and other local municipalities by means of the Western Cape Water Supply System (WCWSS) which consists of a system of dams, tunnels, pipelines, treatment plants, reservoirs and distribution networks. The combined capacity of the six major dams of the WCWSS is 99.6% and that of the minor dams 0.4% of the combined total dam storage capacity.

Stellenbosch Municipality (SM) has three raw water sources/schmes i.e. the Riviersonderend Government Water Scheme (CoCT supply to Paradyskloof WTP via the Franschhoek, Dasbos and Jonkershoek tunnels), The Department of Water and Sanitation and the Idas Valley Dams owned by the SM. The SM is dependant on the Riviersonderend Government Water Scheme via the Franschhoek, Dasbos and Jonkershoek tunnels supply to Paradyskloof WTP for approximately 26% of its total daily water demand under normal conditions. Although the CoCT has implemented water restrictions and embarked on an extensive water conservation and water demand management (WCWDM) programme, the lower than normal rainfall in the catchment areas of the major dams is resulting in dam levels dropping below normal operational levels and there is now a real risk of water shortages and resulting water rationing within the coming 90 days. The CoCT is targeting a daily consumption of 600 Ml/day, although it is currently not achieving this target with actual consumption of 640-660 Ml/day with dam levels dropping around 0.8% per week.

The CoCT publishes a Water Report weekly on their website and the latest key figures are presented below.

http://resource.capetown.gov.za/documentcentre/Documents/City%20research%20reports%20and%20review/damlevels.pdf

Dam levels are significantly lower that in the preceding 3-4 years and are now reaching critically low levels which require special emergency interventions both on the demand management side as well as the supply side to find alternative sources.



Even in the early part of June, with the on set of winter, rainfall continues to be well below the long-term average for the major dam catchment areas.

RAINFALL (mm)	29-May	30-May	31-May	01-Jun	02-Jun	03-Jun	04-Jun	Jun	
								Total*	LT Average
Blackheath Upper	0.0	0.0	0.0	0.0	0.0	6.0	0.0	6.0	84.5
Brooklands	0.0	0.0	0.0	0.0	0.0	7.0	0.0	7.0	140.3
Newlands	0.0	0.0	0.0	0.0	0.0	24.0	0.0	24.0	287.4
Steenbras	0.0	0.0	0.0	0.0	0.0	10.5	0.0	10.5	153.1
Table Mountain (Woodhead)	0.0	0.0	0.0	0.0	0.0	14.0		14.0	242.0
Theewaterskloof	0.0	0.0	0.0	0.0	0.0	5.5	0.0	5.5	71.6
Tygerberg	0.0	0.0	0.0	0.0	0.0	19.2	0.0	19.2	95.2
Voëlvlei	0.0	0.0	0.0	0.0	0.0	10.0	0.0	10.0	108.5
Wemmershoek	0.0	0.0	0.0	0.0	0.0	21.0	0.0	21.0	180.4
Wynberg	0.0	0.0	0.0	0.0	0.0	12.0	0.0	12.0	207.4

Notes: *Total/cumulative rainfall for month indicated above
LT: Long Term

The Municipality and the DWS can only reduce the risk of the consequences of a drought hence the protection of critical water resources and water supply upon which communities depend is imperative. Developing and maintaining a drought management capability within the SM will contribute to reduce the effects of drought by addressing the following areas:

- Public awareness
- Removal of alien vegetation species
- Optimise water storage
- Reduce water consumption
- Implement early warning and response mechanisms

The 10-Step Drought Planning Process, founded by Dr Donald A. Wilhite, has been utilised in the development of a Drought Management Plan for the SM. This Plan as an organisational tool to be used for planning, decision making and guiding the implementation of a pro-active drought response to mitigate

against the effects of the drought. The 10-step process provides a set of guidelines of the key elements of a drought planning process and is summarised below.

10 Steps for Drought Planning:

1. Appoint a Drought Task Force/Committee
2. State the Purpose and Objectives of the Drought Action Plan
3. Seek Stakeholder Participation and Resolve Conflict
4. Inventory Resources and Identify Groups/Communities at Risk
5. Develop Organisational Structure and Prepare Drought Management Plan
6. Integrate Science and Policy, Close Institutional Gaps
7. Publicise the Proposed Plan, Solicit Stakeholder Participation
8. Implement the Plan
9. Develop Education Programs
10. Post-Drought Evaluation of Plan

This Drought Management Plan is intended to provide Municipal Officials tasked with or involved in water and sanitation related services with guidance when decision and actions need to be taken to effectively reduce the impacts of drought. The Plan may include preventative as well as emergency response actions and my include actions pre-/during and post-the drought event. The Plan also allows Municipal Officials to motivate for and acquire/access emergency funding for projects and initiatives to be implemented without necessarily having to go via the conventional procurement processes in order to ensure a timeous response.

Drought Management Plan Structure

This Drought Management Plan is structured to provide the following components:

- Foreword – Setting the Context
- Legislative Framework and Definitions
- Understanding a Drought
- Western Cape Water Supply System Overview
- Stellenbosch Water Supply System Overview
- Drought Management Actions by Stellenbosch Municipality to Date
- The Drought Management Plan:
- Part two: Introduces the basic objectives and operating principles of the Plan based on drought risk reduction strategies (mitigation and preparedness) within national legislative frameworks.
- Part three: Focuses on building and integrating institutional capacity (KPA 1) for drought management in the WM.
- Part four: Drought response and recovery (KPA 4) highlights activation levels for each drought phase and the procedure for the mobilisation of resources and funding.
- Accompanying annexures is structured according to the KPAs and provides examples of data collecting instruments and stakeholder contact lists.

Legislative Framework

The National Disaster Management Framework and the National Disaster Management Act (Act No. 57 of 2002) consists of four Key Performance Areas (KPAs) and three enablers.

The four KPA's are:

KPA1 *Integrated institutional capacity for (drought) disaster risk management*
KPA2 *Drought risk assessment*
KPA3 *Drought risk reduction*
KPA4 *Response and recovery*

The Drought Management Plan should be a proactive, effective and step-based to mitigate the effects of drought by providing a specific set of actions and risk based decision making tools to guide actions in a responsible manner. The Plan must be financially responsible, effective, and have a systematic approach to respond to the typically progressively negative effects of drought on communities, industry and the economy. Using a Risk Based Approach, the Plan must use early warning systems to define the risk and consequence of a drought induced event and set out a series of pre-determined actions and steps to be implemented to mitigate risk or reduce impact and consequence.

Mitigation actions must take account of both environmental and social impacts if implemented and must consider the medium to long-term effects of the actions taken as well as the policies and steps for recovery after the drought event and the steps required to return to normal operational conditions if at all possible. The Plan must focus on the short to medium term actions but also integrate as much as possible with long-terms resiliency of the water supply system to ensure financially responsible decisions are taken that will not compromise long-term water supply augmentation options/schemes.

Primary Objectives of the Plan must include:

- Appropriate actions and recommendations to maintain and protect water resources
- Actions to be taken at each stage of a drought setting in
- Needs determination of the users for which the Plan has an impact
- Public / Stakeholder participation in planning and decision-making
- Public / Stakeholder participation in implementation
- Up to date information on the drought situation and context to empower decision makers
- Institutional arrangements and / or structures required for the Plan to be executed
- Information flow and responsibilities between all stakeholders
- Define workable definitions of drought/drought phases, furthermore determine indicators to be used for establishing the criteria for declaring drought emergencies and triggering various mitigation and response activities
- Establish and pursue a strategy to remove "obstacles" to the equitable allocation of water during water shortages and establish requirements or provide incentives to encourage water conservation
- Establish a set of procedures to continually evaluate and exercise the Plan. Periodically revise the Plan so it will stay responsive to the needs of the WM

Secondary Objectives of the Plan are:

- Guarantee water availability in sufficient quantities to meet essential human needs during a drought to ensure the community's health and support health

- To assist in retaining jobs of industrial workers and support the economy during a drought
- Maintain a current inventory of stakeholder contact details
- Provide incentives to encourage water conservation

Key Definitions:

A disaster is defined as an "a sudden accident or a natural catastrophe that causes great damage or loss of life or an event or fact that has unfortunate consequences".

However, although disasters are not easily predictable and their effects are often unforeseen, their impact can be mitigated via a Disaster Risk Management Plan.

It is important to understand the following definitions:

Water Services Act (Act No 108 Of 1997)

The Water Services Act defines the following:

Water Services Authority:
Means a Municipality, including a District or Rural Council as defined in the Local Government Transition Act, 1993, responsible for ensuring access to water services.

Where, *Water Services*:
Means water supply services and sanitation services

Where *Water Services Provider*:
Means any person who provides water services to consumers or to another Water Services Institution, but does not include a Water Services Intermediary.

Where *Water Services Institution*:

Means a Water Services Authority, a Water Services Provider, a Water Board and a Water Services Committee.
A Water Services Authority has, amongst others, the following obligation in terms of the Act Duty to provide access to water services, which includes:

> *"….a duty to all consumers or potential consumers in its area of jurisdiction to progressively ensure efficient, affordable, economical, sustainable access to water services in emergency situations a Water Services Authority must take reasonable steps to provide basic water supply and basic sanitation services to any person within its area of jurisdiction and may do so at the cost of that authority a Water Services Authority may impose reasonable limitations on the use of water services Norms and standards for tariffs in terms of the Act: in prescribing the norms and standards, the Minister must consider, among other factors-the financial sustainability of the water services in the geographic area in question; the recovery of costs reasonably associated with providing the water services; the redemption period of any loans for the provision of water services; the need to provide for drought and excess water availability Offences in terms of the Act no person may continue the wasteful use of water after being called upon to stop by the Minister, a Province or any Water Services Authority, and any person who contravenes this stipulation is guilty of an offence and liable, on conviction, to a fine or to imprisonment or to both such fine and imprisonment Right of access to basic water supply and sanitation everyone has a right of access to basic water supply and basic sanitation. every Water Services Institution must take reasonable measures to realise these rights every Water Services Authority must, in its Water Services Development Plan, provide for measures to realise these rights…"*

Basic water supply

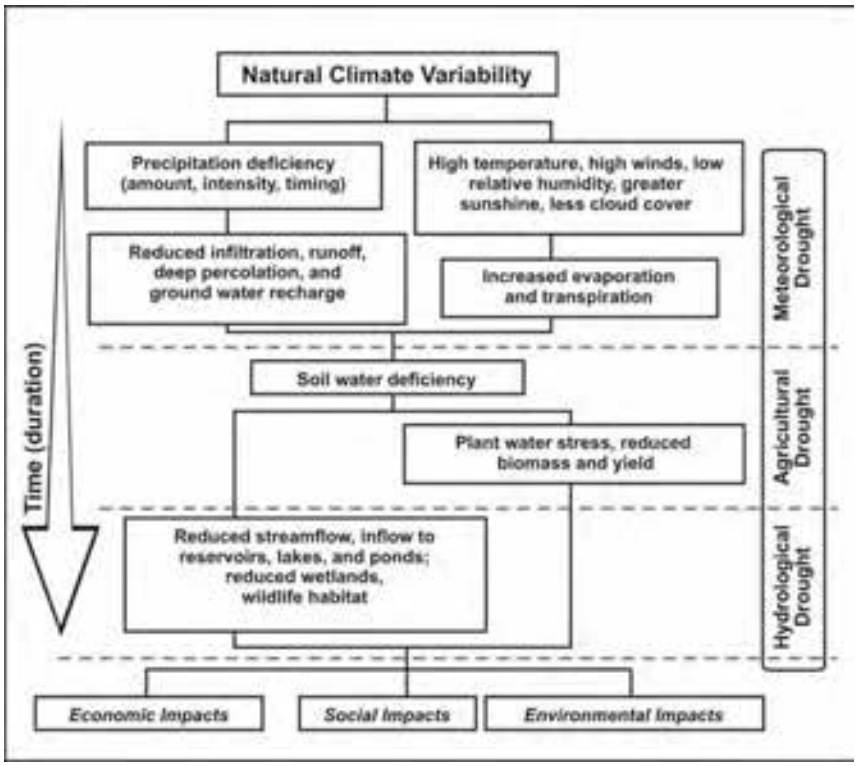
The minimum standard for basic water supply services is the provision of appropriate education in respect of water use; and a minimum quantity of potable water of 25 litres per person per day or 6 kilolitres per household per month. At a minimum flow rate of not less than 10 litres per minute; within 200 meters of a household; and with an effectiveness such that no consumer is without a supply for more than seven full days in any year. Provision of basic water supply and basic sanitation to have preference. If the water services provided by a Water Services Institution are unable to meet the requirements of all its existing consumers, it must give preference to the provision of basic water supply and basic sanitation to them.

Where;
"Basic Water Supply" means the prescribed minimum standard of water supply services necessary for the reliable supply of a sufficient quantity and quality of water to households, including informal households, to support life and personal hygiene.

Understanding a Drought

Understanding what causes drought helps us to attempt to predict droughts more accurately. The immediate cause of droughts is the downward movement of air (subsidence). This causes compressional warming or high pressure that inhibits cloud formation and results in lower relative humidity and less precipitation. Prolonged droughts occur when large-scale high-pressure anomalies in atmospheric circulation patterns persist for months or seasons (or longer).

Drought has no universal definition as droughts are region specific and each drought differs in intensity, duration, and spatial extent. The four most common definitions describing the different types of drought are (1) meteorological drought, (2) agricultural drought, (3) hydrological drought and (4) socio-economical drought. There are complex interrelationships between the various components of the hydrological cycle and impacts. See figure below.



All droughts originate from a deficiency of precipitation or meteorological drought but other types of drought and impacts cascade from this deficiency. (*Source: National Drought Mitigation Center, University of Nebraska-Lincoln, U.S.A.*)

Meteorological drought is usually defined by the measure of the departure of precipitation from the normal and the duration of the dry period. It is insufficient to meet the demands of human activities and the environment. This is the most important type of drought which drives the other type of droughts discussed below.

Agricultural drought links various characteristics of meteorological (or hydrological) drought to agricultural impacts, focusing on precipitation shortages, soil water deficits, reduced groundwater or reservoir levels below the optimal level required by a crop during each different growth stage needed for irrigation.

Hydrological drought usually refers to a period of below normal surface and subsurface water levels or supplies (such as stream flow, reservoir/lake levels, ground water). This can potentially result in significant societal impacts. Water in hydrologic storage systems such as reservoirs and rivers are often used for multiple purposes such as flood control, irrigation, recreation, navigation, hydropower, and wildlife habitat. Competition for water in these storage systems escalates during drought and conflicts between water users increase significantly.

Socio-economic drought refers to the situation that occurs when economic goods associated with the elements of meteorological, agricultural and hydrological drought fail to meet the demand. It represents the impact of drought on human activities, including both indirect and direct impacts. Droughts are predictable, slow-onset phenomena. Water scarcity, on one hand, and drought, on the other, should be considered different matters. Water scarcity refers to average water imbalances between supply and demand, while droughts, as a natural phenomenon, refer to important deviations from the average levels of natural water availability.

The Western Cape Water Supply System Overview

The WCWSS comprises an inter-linked system of six major dams, tunnels, large diameter pipelines, reservoirs, treatment plants and distribution networks that supply the Cape Town metro and some surrounding municipalities. Components of the system are owned and operated by the DWS and TCTA and some by the CoCT. The principal dams are all located in the Cape Fold Mountains to the east of Cape Town. The major dams are:

MAJOR DAMS	CAPACITY Ml
BERG RIVER	130 010
STEENBRAS LOWER	33 517
STEENBRAS UPPER	31 767
THEEWATERSKLOOF	480 188
VOËLVLEI	164 095
WEMMERSHOEK	58 644
TOTAL STORED	898 221

Major Dams in the WCWSS (Source: CoCT)

Approximately 63% of the water in the WCWSS is used for domestic and industrial purposes in the Cape Town metro, 5% is supplied to surrounding smaller municipalities and 32% is used for agriculture. The WCWSS is jointly operated by the DWS and CoCT. The WCWSS dams that directly influence the water supply to SM are Wemmershoek, Theewaterskloof/Bergrivier and Steenbras upper & lower dams. SM also has its own sources From own sources at Idas Valley (2 dams).

WCWSS Dams (Source DWS Website)

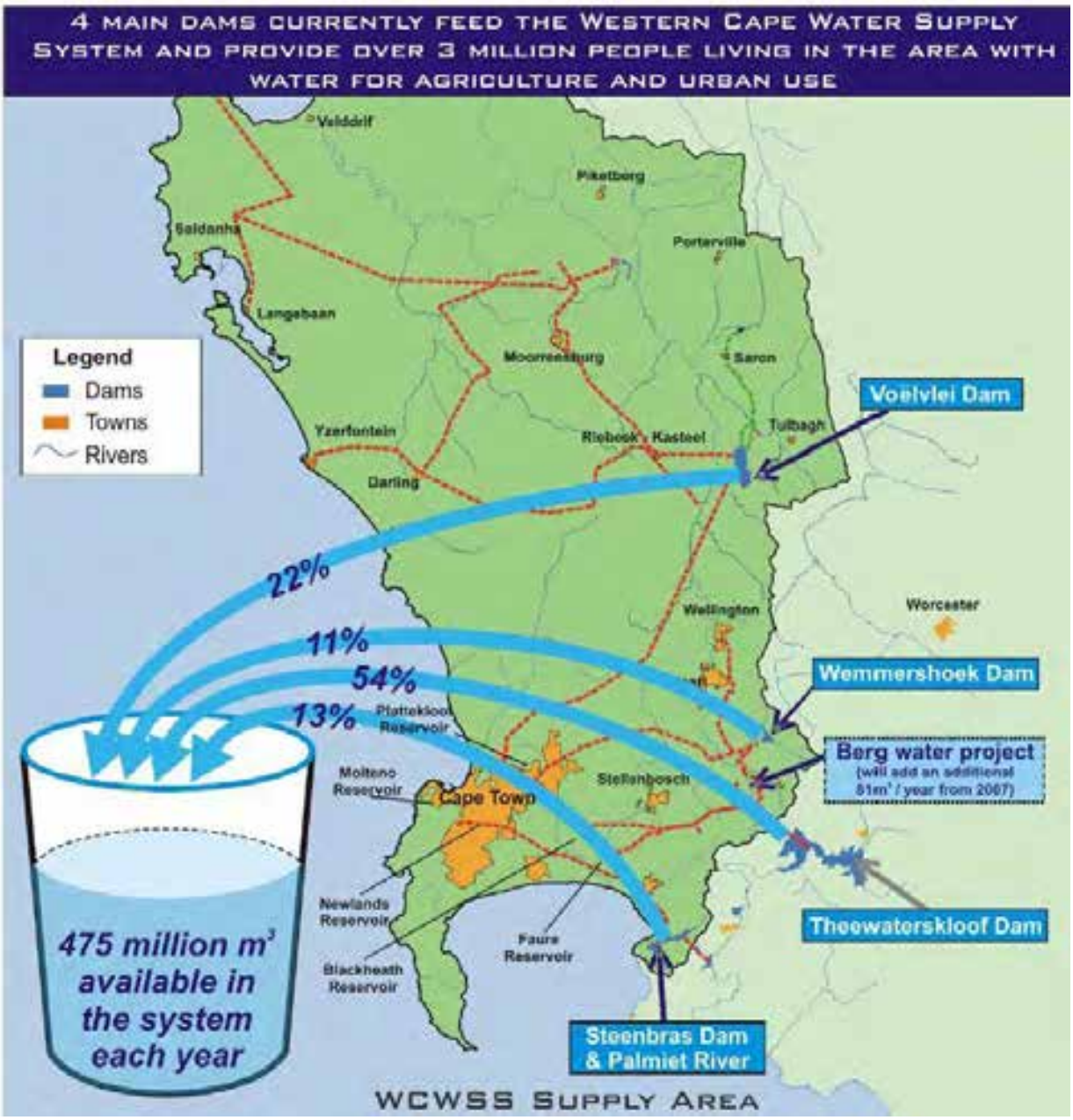
The largest component of the WCWSS is the Riviersonderend Government Water Scheme. This large inter-basin water transfer scheme regulates the flow of the Sonderend River flowing East towards the Indian Ocean, the Berg River flowing North-West towards the Atlantic Ocean and Eerste River that flows South into False Bay. The Theewaterskloof Dam, which is the largest of the six major dams in the WCWSS forms the heart of the scheme and is located at Villiersdorp on the Sonderend River. It has a storage capacity of 480 million cubic meter. The Theewatreskloof Dam is linked to the Berg River and Kleinplasie Dam via a tunnel system through the Franschhoek and Stellenbosch Mountains. During winter months, when water requirements are generally lower, this tunnel system conveys surplus winter flows from the Berg River and the tributaries of the Berg River to the Theewaterskloof Dam, where the water is stored for use during summer months. During summer, when water requirements are generally higher, water can be supplied fro Theewaterskloof Dam via the tunnel system into the Berg and Eerste River systems.

The Voëlvlei Dam located near Gouda supplies the WCWSS via two abstractions and pumped supplies with treatment plants located near the dam. The major supply from Voelvlie Dam is to the CoCT Plattekloof reservoir over a distance of some 80 km and a smaller supply to Kasteelberg Reservoirs under control of the West Coast District Municipality.

The Wemmershoek Dam is located in the Berg River basin and supplies Cape Town via the Wemmershoek Pipeline along the N1 national road to the Glen Garry Reservoir in Brackenfell.

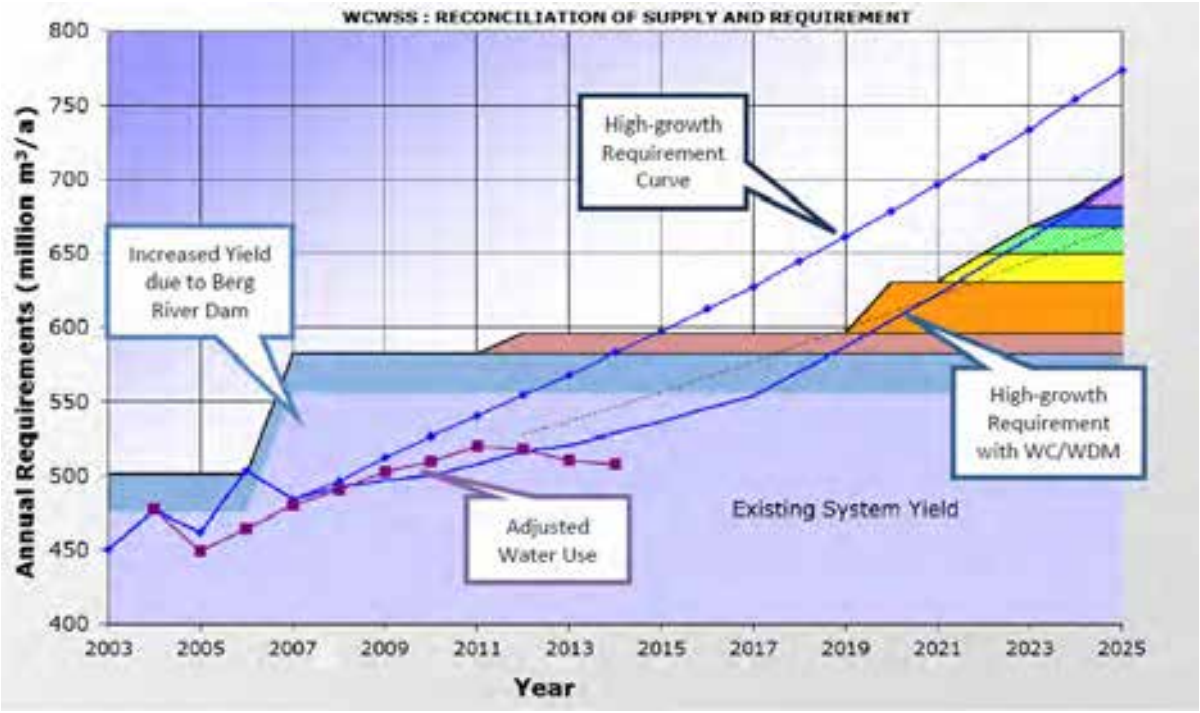
The Upper and Lower Steenbras Dams on the Steenbras River is operated together with the Palmiet Pumped Storage Scheme dams on the Palmiet River and water can be transferred from the Palmiet River to the Steenbras dams. Water is transferred from here to the Faure WTP from where it is distributed into the Cape metropole.

The Berg River Project was completed in 2009 and added an additional storage capacity of 898 million cubic metres. It is connected to the Riviersonderend GWS via the Dasbos tunnel and provide additional winter runoff storage capacity to the WCWSS.



The WCWSS: Source: DWS Website:
http://www.dwa.gov.za/Projects/RS_WC_WSS/Docs/Reconciliation%20Strategy.pdf

The Western Cape Water Supply Reconciliation Strategy Study (WCWSRSS) proposes a number of future water supply augmentation schemes for different development and demand scenarios. The figure below illustrates the different reconciliation Scenarios for water demand in the WCWSS as documented by the WCWSRSS. The High Growth scenario without WCWDM shows a deficit in available water from 2014. However, the CoCT and other dependant municipalities have made significant strides in WCWDM which has resulted in a lower demand growth rate in actual water consumption. A projected water demand with WCWDM indicates that the current system yield should be sufficient at least until 2019. However, due to the current drought, the WCWSS is not able to deliver the yield required and hence the WCWSS can only has approximately 90 days of potable water supply remaining if there is no or well below average rainfall this winter (2017). Even with normal rainfall during the 2017, 2018 and 2019 winters it could take several years for dam levels to return to normal operating levels and it is therefore highly likely that severe water restrictions will remain in place for the foreseeable future.



The WCWSS: Source: DWS Website:
http://www.dwa.gov.za/Projects/RS_WC_WSS/Docs/Reconciliation%20Strategy.pdf

The conclusion is that although the WCWSRSS has mapped out a plan for augmentation of water supplies for the region, the current impact of the drought requires immediate and concise action to prevent a disaster. The augmentation schemes planned are typically long-term projects which cannot be brought on line in less than 2-3 years which renders than unsuitable for a drought mitigation plan in the short term.

This however does not mean that the augmentation schemes presented in the WCWSRSS should be delayed in any way and it is imperative that the DWS and CoCT proceed with these projects along the planned timeline. However, in the short to medium term other actions need to be taken to mitigate the effects of the drought and resiliency planning in water supply schemes must be considered part of the operational procedures and planning for potable water supply schemes.

The Stellenbosch Municipality Water Supply System

SM falls within the Berg Management Area and includes towns such as Stellenbosch, Franschhoek, Klapmuts, Lanquedoc, Johannesdal, Kylemore, Pniel, Great Drakenstein, Wemmershoek, La Motte, De Novo, Muldersvlei, Elsenburg, Koelenhof, Vlottenburg, Lynedoch, Raithby and Jamestown.

Stellenbosch Town is supplied with raw water from mainly two sources;

- Eerste River – Kleinplaas Dam (7.224 Mm³/a)
- Western Cape Water Supply System (3 Mm³/a) – via Theewaterskloof Tunnel

Water from the Eerste River in the Jonkershoek Valley at Kleinplaas Dam is diverted by means of a weir and a gravity pipeline to two off-channel storage dams in Idas Valley. The registered abstraction from this source is 7.224 Mm³/a. This source is estimated in the 1/100 year drought analysis not to supply less than 6Ml/day. This combined with the two Idas Valley dams is the most important source of water for Stellenbosch town.

Kleinplaas Dam – Jonkershoek (Source: Google Earth)

Idas Valley Dams (Source: Google Earth)

Water is supplied out of the Idas Valley Dam to a slow sand filtration WTP and into the town via the Idas Valley Reservoirs. The treatment capacity of the Idas Valley WTP is 28 Ml/day.

The WCWSS supply to Paradyskloof WTP arrives via a pipeline leading from the Stellenboschberg Tunnel outlet from the Riviersonderend GWS tunnel system. A volume of 3 Mm^3/a is available from this source under normal operating conditions. The treatment capacity of the Paradyskloof WTP is 10 Ml/day.

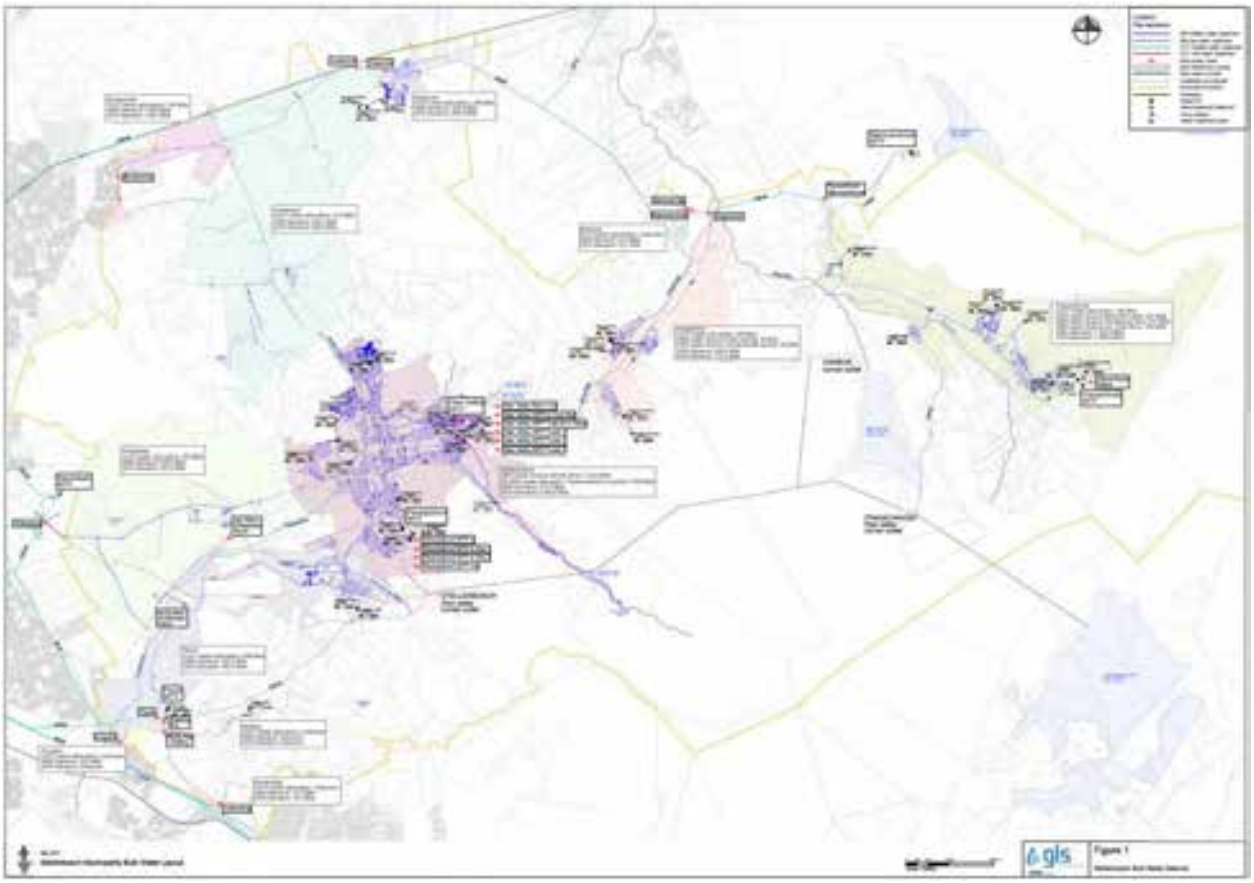
Paradyskloof WTP (Source: Google Earth)

Franschhoek which includes the smaller settlements of Groendal, La Motte, Wemmershoek and Robertsvlei is currently supplied with water from local sources in the catchments of the Mount Rochelle Nature Reserve and Perdekloof and with water purchased from the Wemmershoek Dam scheme from CoCT. The licensed abstraction from the perennial streams in the Mount Rochelle Nature Reserve is 0.221 M m³/a, from the Perdekloof Weir 0.577 M m³/a and from the Du Toits River 0.104 M m³/a.

Dwarsrivier which includes Pniel, Kylemore, Lanquedoc, Johannesdal and Groot Drakenstein receive treated water from the Wemmershoek Scheme directly from the CoCT bulk water pipeline with metered take-off local reservoirs. The local sources, which is currently not in use, include the Pniel Mountain stream (0.053 M m³/a), Pniel Spring (0.025 M m³/a), and the Pniel Kloof Street Borehole (0.079 M m³/a).

Klapmuts is supplied with treated water from the Wemmershoek Dam pipeline, which forms part of the WCWSS.

Boreholes exists in certain areas but is not in use for municipal potable supply and their condition and safe yield is unknown.



Stellenbosch Bulk Water System Layout (Source: GLS)

KPA1 – Integrated Institutional Capacity for Drought Response

SM has put in place the necessary institutional capacity for an effective Drought Response Plan. This includes the following key stakeholders who will act as the Drought Response Committee:

- Stellenbosch Municipality – Engineering Services
- Stellenbosch Municipality – Finance
- Stellenbosch Municipality – Disaster Response
- Department of Water & Sanitation – WC regional office
- Industry (high water consumers)
- Research Institutes – Stellenbosch University
- City of Cape Town
- Catchment Management Agencies – Eerste/Kuilsriver Catchment
- Consultants and Technical Advisors

Regular liaison between these stakeholders of the Drought Response Committee through formal progress meetings, distribution of weekly Drought Monitoring Report, sharing of ideas via workshops and ad-hoc meetings and telephone and email communication.

The Committee is chaired by the SM with Mr Adriaan Kurtz as the chairman. It is proposed that a weekly meeting be introduced to monitor progress on the Plan implementation and to share information on the drought and the impact of the Drought Response. A monthly report by the committee to the DWS and the Stellenbosch Municipal Council should also be introduced.

The role of each of the committee members is outlined below:

Stellenbosch Municipality – Engineering Services

- Formulate and implement technical solutions
- Prepare and distribute drought monitoring reporting
- Monitoring drought response impact
- Oversee the management of all interventions

Stellenbosch Municipality – Finance

- Allocate emergency funding for drought response
- Oversee the value for money monitoring of expenditure on drought response
- Allocate budget for drought recovery and resiliency planning

Stellenbosch Municipality – Disaster Response

- Implement emergency response actions
- Support Engineering Department on drought response

Department of Water & Sanitation – WC regional office

- Report on regional drought situation and augmentation schemes
- Inform the committee on Policy decisions and Drought Response for the region
- Allocate emergency funding for priority projects
- Report to National Government on regional response to the drought

Industry (high water consumers)

- Investigate water consumption and report on possible savings
- Implement water conservation measures
- Allow SM to intervene to reduce demand where possible
- Contribute to drought response plan and assist SM on emergency water supply projects

Research Institutes – Stellenbosch University

- Review technical solutions and evaluate against industry best practice
- Prepare drought response plan
- Implement own water sources as supplementary supply

City of Cape Town

- Inform SM and committee on WCWSS drought response
- Provide early warning of any drastic changes to the WCWSS operation and water allocations
- Monitoring drought response impact in Cape Metropole an provide feedback
- Provide technical advice and guidance from projects implemented in Metropole

Catchment Management Agencies – Eerste/Kuilsriver Catchment

- Monitor and report to SM on impact of drought on catchment

Consultants and Technical Advisors

- Technical guidance on drought response measures
- Provide designs for technical interventions
- Contract administration for projects implemented
- Costing of projects and initiatives
- Procurement of specialist services
- Monitoring of capital projects
- Reporting

It is proposed that the SM issue written communication to all stakeholder and request their active participation in the SM's Drought Response Plan.

KPA 2 - Drought Risk Assessment

The SM has implemented weekly drought monitoring to assess the drought risk and monitor the impact on its water availability. Refer to the latest Weekly Drought Monitoring Report below. The SM reports on availability of water as well as the latest progress on the drought intervention projects.

WEEKLY DROUGHT MONITORING STELLENBOSCH MUNICIPALITY					
Name of municipality: Stellenbosch Municipality				Date completed: 5/6/2017	
AVAILABILITY OF WATER:					
Dams (DWS and Municipal):					
Name of dam	% Full this week	% Full last week	% Full previous year	Month/weeks/days water supply left	Towns being supplied by this dam
Idas Valley 1 +2	42.70%	42.70%		+-3 months	Stellenbosch
Steenbras Upper	56.70%	57.20%	57.10%		Raithby, Polkadraai
Lower	23.50%	25.10%	57.10%		Helderberg SH, Croyden
(Faure WTW + Blackheath WTW)					
Theewaterskloof	13.70%	14.30%	30.20%		Stellenbosch
Wemmershoek					Koelenhof, Klapmuts, Meerlust, Muldersvlei, Franschhoek, Dwarsrivier
Level of Water Restrictions: 3 (4 Served before council for implementation)					
Alternative water sources					
Ground water					
Name	Number of boreholes	Status of water levels (normal/low)		% of bulk water supply volume	Towns being supplied by this borehole
Van der Stel borehole, erf 1947 (2350	7*	SM is in the process to do a borehole audit, yield and quality test.		To be verified with the borehole audit	Stellenbosch
Cloetesville borehole, erf 6296	*In process to audit old boreholes that were used before to determine total of boreholes.				
Die Braak borehole, erf 1908 (670)					
Doornbosch borehole, erf 1988 (292)					
Vredenburg borehole, erf 1995 (281)					
Municipal Nursery, erf 1887 (3363)					
Jan Marais Nature Reserve borehole, erf 1908 (2149)					
Other boreholes to be verified (Dwarsrivier, Franschhoek, Raithby, Klapmuts, Meerlust).					
Rivers					
Name	Flow rate (H/M/L)	Flow Rate	Towns being supplied by this river		
Du Toits River		0.7ml/d	Franschhoek		
Eerste River		15ml/d	Stellenbosch		

DROUGHT INTERVENTION PROJECTS IDENTIFIED:		
Name of project	Description	Status of the project
Consultants - WCWDM -Ground water Resource study	Consultants appointed to do a complete study of available water for short, medium and long term to form part of the Water Master Plan.	Consultants appointed and in process with phase 1 of the project. Stellenbosch, Franschhoek and Dwarsrivier
	Existing borehole audit.	
	Do Licence and allocation applications by DWS.	
Consultants - WCWDM -Surface water resource study	Consultants appointed to do a complete study of available water for short, medium and long term to form part of the Water Master Plan.	Consultants appointed and in process with phase 1 of the project.
	Existing allocation audit.	
	Do Licence and allocation applications by DWS.	
Consultants -	Consultants to do a complete Drought Action Plan Document	Consultants appointed. Document already in draft format.
Borehole project	Existing borehole audit.	Consultants appointed and in process with audit and getting quotations for drilling of new boreholes. Stellenbosch, Franschhoek and Dwarsrivier.
	Testing of existing boreholes.	
	Sinking and equipping new boreholes.	
WCWDM Pressure management	Pressure management in : Klapmuts	PRV Chamber design complete- Construction to follow after drought Emergency funds are approved internally in SM.
	Pressure management in : Franschhoek	PRV Chamber design complete- Construction to follow after drought Emergency funds are approved internally in SM.
	Pressure management in : Dwarsrivier	PRV Chamber design complete- Construction to follow after drought Emergency funds are approved internally in SM.
	Pressure management in : Kayamandi	Pressure management installations ready for pressure management to be implemented and PRV's to be set – this week (5-10 June 2017).
	Pressure management in : Stellenbosch	Pressure management installations ready for pressure management to be implemented. Controllers are at the suppliers to be serviced.
		Implementation set for 15 June 2017.
Telemtry/monitor/ coms	Installing logging/reading equipment/control room/telemetry	24 hour life data metering installed on all bulk connections. Installation to be functional 10 June 2017.Zonal critical loggers in process to be installed. Integration of telemetry, Zednet and MyCity in process. Control/monitoring facility in process to be equipped. Telemetry installing and upgrade-quotations in process.
Idas valley WTW	Making changes to the bulk water network to enable the transfer between Idas valley and Paradyskloof.	Design and Quotations for changes to system completed. Construction to follow after drought Emergency funds are approved internally in SM.
Resendal Reservoir	Making changes to the bulk water network to enable the transfer between Idas valley and Paradyskloof.	Design and Quotations for changes to system completed. Construction to follow after drought Emergency funds are approved internally in SM.

The current levels of the two Idas Valley Dams are at **42%** of full supply capacity. This will only be sufficient for approximately 3 months (90 days) of supply to Stellenbosch should the WCWSS supply to Paradyskloof WTP not be available due to the drought or restrictions applied by CoCT. The CoCT has notified the SM that the WCWSS supply to Paradyskloof WTP will be reduced by 18% from 1 June 2017 as part of the CoCT's Level 4 water restrictions and water demand management strategy.

KPA3 – Drought Risk Reduction and Mitigation

SM has implemented several initiatives as part of their WCWDM programme which form part of the Drought Risk Reduction programme. A WCWDM strategy was prepared in 2010 and over the past 7 years the SM has started implementing the plan through the following projects:

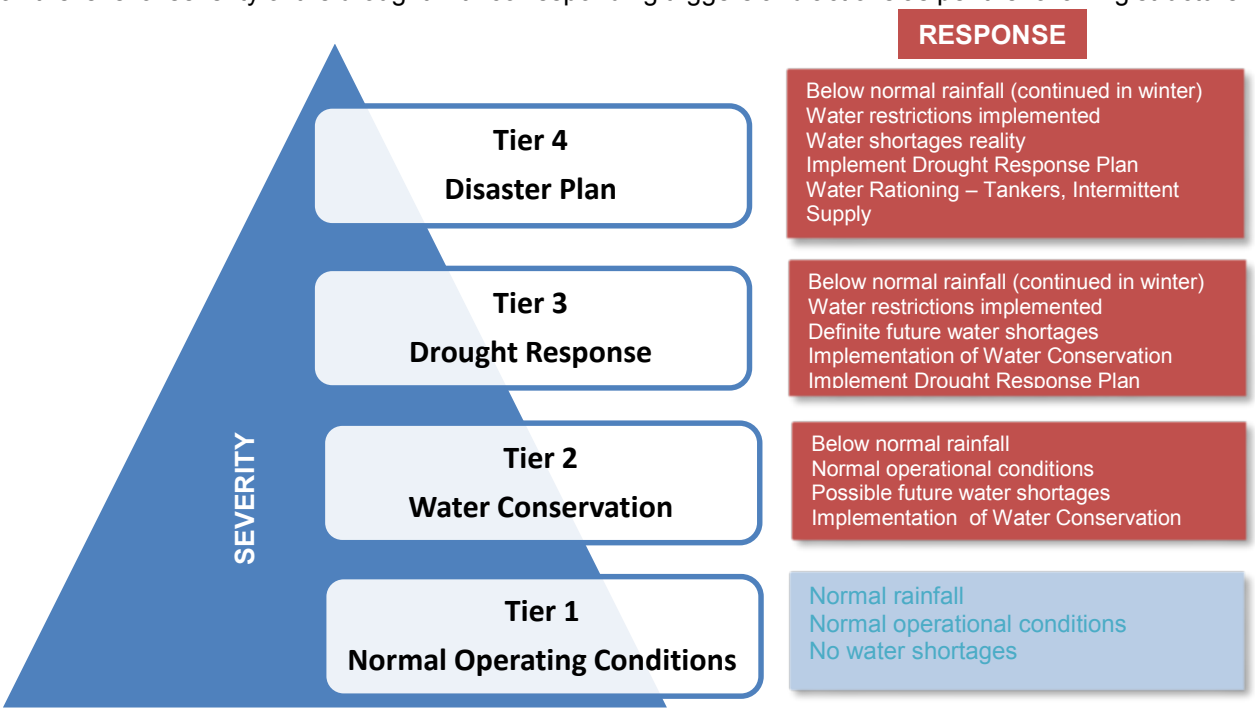
- Water restrictions and water demand management
- Weekly report and early warning mechanisms
- Identification of high water consumers and taking action to investigate these
- The publication of articles to increase public awareness via the media and posters
- Household Leak Repair and Water Meter Replacement Projects as part of the “War on Leaks” campaign
- Water Meter and Water Consumption Audit Projects
- Revenue Enhancement through customer meter billing database updating and data improvement
- Design and implementation of additional pressure managed zones
- Evaluation of emergency Drought Response Action Plan
- Scenario Planning for Water Rationing measures

The actions taken by the SM replicate and compliment many similar initiatives taken by the CoCT and other surrounding municipalities. The CoCT has implemented the following measures to date:

- A visual media campaign reflecting that is dam levels etc. on Electronic Sign Boards
- Workshop’s to discuss the water crisis with a panel of experts
- Various media campaigns and regular reporting by the Mayor’s office

Drought Response Plan

It is proposed that the Drought Response Plan is planned in accordance with pre-determined tiers based on the level of severity of the drought with corresponding triggers and actions as per the following structure.



The SM Drought Response Plan will define specific actions to be taken for each Tier up to Tier 4. If water shortages continues long-term and goes beyond Tier 5, the Municipality will have to consider more drastic actions which will revert back to Provincial Government for implementation.

Refer to Appendix A for the details of the actions associated with each Tier response.

Water Restrictions

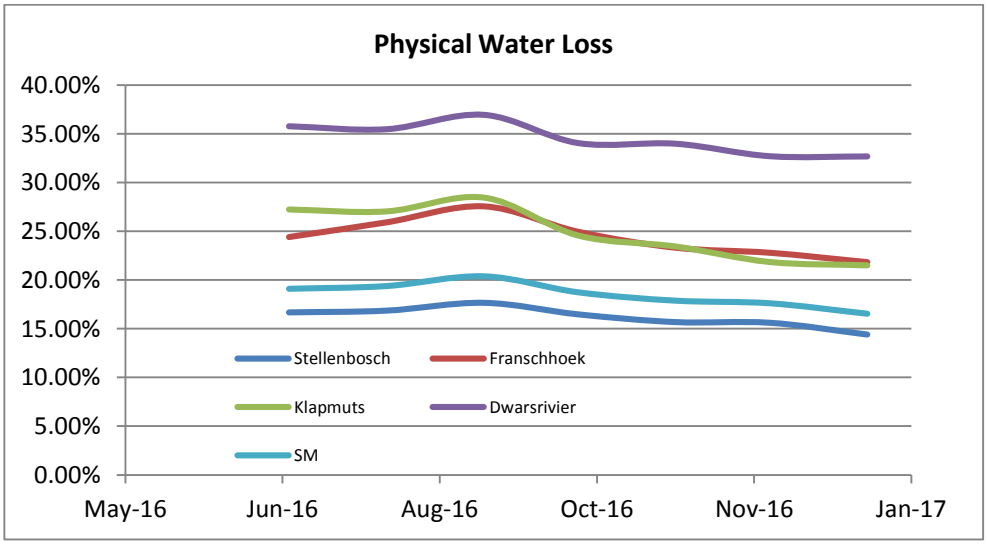
The SM implemented Level 1 water restrictions from the 1st of November 2015 to achieve a 10% water consumption decrease. This was due to low supply dam levels and low rainfall figures during the 2016 winter season. This was followed with the implementation of Level 2 water restrictions from March 2016 due to extreme heat conditions and even lower supply dam levels in Stellenbosch and the WCWSS. The Level 2 restrictions included the increased tariffs for water consumption to achieve a 20% savings on the water consumption. In Stellenbosch more stringent water restrictions, i.e. Level 3 water restrictions were imposed with effect from 1st December 2016 due to the lower than the normal dam levels and continued drought. Recently Level 3B Water restrictions were implemented due to continued dry conditions in autumn with below average rainfall in early winter.

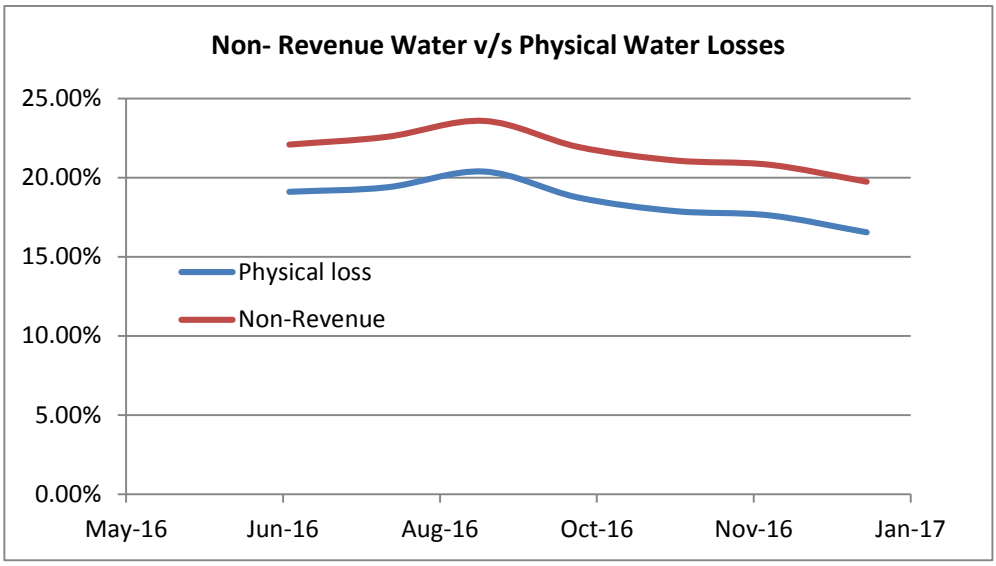
The CoCT will introduce Level 4 Water Restrictions from 1 June 2017. The associated punitive new water tariffs will be applied from 1 July 2017. The COCT has requested Drakenstein and Stellenbosch Municipalities to follow and SM will also be implementing Level 4 Ware Restrictions from 1 July 2017.

The SM recognises the inconvenience caused by severe water restrictions, however, in the light of the continued drought, these restriction are necessary and are currently the only option to prolong the remaining water supplies. The restrictions imposed to date are inline with the restrictions implemented by CoCT and other Western Cape municipalities.

War on Leaks Programme

As part of their 10 year WCWDM programme, the SM has implemented various short to medium term leak reduction and related water loss reduction interventions. These include domestic leak repairs, water meter replacement, water meter audits, billing database corrections and pressure management in selected areas. To date a meter audit in Klapmuts and Dwarsrivier has been undertaken along with domestic leak repairs and meter replacement to over 200 properties in Klapmuts, Lanquedoc and Kayamandi. These interventions have proven to be successful and the outcomes will be presented to the municipality in due course. Preliminary indications are that the water restrictions and leak repairs have made a significant impact on both physical water losses no non-revenue water reduction as illustrated below.





Stellenbosch Municipality Physical Losses and NRW trends

Domestic leak repairs and meter replacement in selected areas with higher than normal consumption will continue and will help reduce physical losses and non-revenue water.

Pressure management will also be implemented in selected areas. This is an effective method to reduce network pressures on a large scale for a selected supply zone and reduce leakage and background losses in the reticulation network especially at night in areas where pressures exceed 3-4 bar. GLS has identified, using their network models of the Stellenbosch reticulation network, a number of pressure management opportunities where pressures are as high as 8-9 bar and an excessive number of pipe bursts are recorded. The application of pressure management at these locations will require the rezoning of the network to create new pressure zones/DMA's. In order to implement this installation of new pressure reducing valves, flow meters and new zone boundary valves are required as detailed in the proposals by GLS.

Designs have been prepared for new PRV/Flow Meter Chambers to be installed at Klapmuts Merchant Street , at two locations in Franschhoek and at Technopark and a construction contract will be advertised to appoint a contractor to implemented these works along with other related civil works.

Stellenbosch Municipality is currently contracted with Ikapa Reticulation and Flow under contract no. B/SM 31/16 STELLENBOSCH – HOUSEHOLD LEAK REPAIR AND WATER METER REPLACEMENT on a Rates Tender for domestic leak repairs and household meter replacement which will continue until end of June 2017 and will have attended to domestic leaks and replaced meters at 250 No properties.

Reticulation Network Optimisation and Alternative Sources

The SM has appointed a contractor to install a new pipeline to connect the Idas Valley and Paradyskloof WTP supply zones to allow supplying water to the Paradyskloof system in the event that the Theewaterskloof tunnel supply is reduced or eventually possibly lost due to CoCT restrictions.

The SM has also recently identified 7 No existing boreholes in the town that are unused and will carry out pump tests on these to confirm their safe yield and water quality and consider how these borehole supplies could be incorporated into the reticulation network as a supplementary supply. GLS have been appointed to test the feasibility of this options using the network model.

The University of Stellenbosch has approached the SM to ensure that the campus water supply remains sustainable during the drought. The University has embarked on their own Drought Response Action plan which includes various initiatives such as a drought awareness campaign, a study to investigate grey water harvesting and re-use options, testing and commissioning 6 No existing unused boreholes for potable supply, finding alternative irrigation water sources for the gardens and sportsfield etc.

The SM has commissioned GLS to investigate options for sectioning the reticulation network for better water demand management and zone metering as well as pressure management. This will enable the SM to implement water rationing if required as a last resort.

Invasive Alien Plants

Invasive alien plants (IAP) are plant species that have been introduced, either intentionally or unintentionally, to South Africa. They can reproduce rapidly in their new environments and tend to out-compete indigenous plants. Invasive alien species pose the biggest threat to biodiversity after direct habitat destruction. IAPs can significantly alter the composition, structure and functionality of ecosystems. As a result, they degrade the productive potential of the land, intensify the damage caused by veld fires and flooding, increase soil erosion, and impact on water run-off, the health of rivers and estuaries.

The National Environmental Management Biodiversity Act, 10 of 2004, Section 76, states that all organs of state are required to draw up an invasive and alien monitoring, control and eradication plan for the land under their control. The SM: Alien Invasive Plants Management Plan was prepared in response to this obligation and brought before Council during February 2017. This plan was approved under condition that it is advertised from public comment. This was done and the plan will again serve before Council in May 2017 for final approval.

KPA4 – Drought Response and Recovery

If and when a drought occurs of such severity and magnitude that prevents Water Service Providers from continuing with normal water provision, despite the implementation of water conservation and drought mitigation measures, Section 23 of the Disaster Management Act (Act No. 57 of 2002) allows for the declaration of a state of disaster by the Minister of Water and Sanitation.

When a state of disaster is declared, a different set of operating rules and procedures come into effect and the implementation of these measures will largely shift to the Provincial and National Treasury for funding.

Although the Western Cape has been declared a Disaster Area, the SM still have at least 90 days of water remaining and will therefore continue to implement at Tier 3 Drought Response Plan which includes water restrictions, supplementary ground water sources and preparation for water rationing. The SM will continue to monitor the drought and the availability of water and will adjust its response as the drought situation develops and the impact on its water availability becomes more critical.

Annexure A

Drought Response Committee Contact Details

Name	Organisation	Contact Address	Tel no and email

Annexure B

Communication Plan

Key Messages	Communication Status	Target Audience	Delivery Method	Outcome	Delivery Frequency	Responsible/ Communicator

Annexure C

Stellenbosch Bulk Water Scheme Layout (A1)

Annexure D

Stellenbosch Water Balance (Typical)

Annexure E

Detailed Actions by Tier for Drought Response

Tier 1 – Normal Operating Conditions

TBC

Tier 2

TBC

Tier 3

TBC

Tier 4

TDC