



**DRAKENSTEIN**  
MUNISIPALITEIT • MUNICIPALITY • UMASIPALA  
Paarl | Wellington | Gouda | Saron | Simondium

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# *Water Services Development Plan (WSDP) – IDP Water Sector Input Report*

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*For IDP incorporation as directed by the Water Services Act (Act 108 of 1997)*

**FY 2017/2018**

***Final – 4 June 2018***

<b>DRAKENSTEIN MUNICIPALITY</b>	
 <b>DRAKENSTEIN</b> MUNISIPALITEIT • MUNICIPALITY • UMASIPALA	PO Box 1 Paarl 7622 Tel: (021) 807 4500 Fax: (021) 872 8054
<b>Ref 300325</b>	<b>ixengineers (Pty) Ltd</b> Contact person: Jaco Human 31 Allen Drive, Loevenstein 7530 PO Box 398, Bellville 7535 South Africa Telephone: +27 (0)21 912 3000 email: <a href="mailto:jaco.h@ixengineers.co.za">jaco.h@ixengineers.co.za</a> 2016/275143/07 © Copyright 2017 ixengineers

## DRAKENSTEIN MUNICIPALITY

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### Version Control:

Status	Description	Date	Reference
Draft Documents	WSDP Documents for 2017-2022 (First Cycle): • WSDP-IDP Water Sector Input Report • eWSDP • Module 2: Base and Compliance Data • Module 3: Strategies	31 October 2017	Council Item 7.23
Approval	WSDP Documents for 2017-2022 (First Cycle): • WSDP-IDP Water Sector Input Report • eWSDP • Module 2: Base and Compliance Data • Module 3: Strategies	Will be submitted to Council	Council Resolution for approval will be forwarded by the Municipality to the DWS.

### Prepared by:

Designation	Name	Contact No.	E-mail
Engineer	Jaco Human	021 912 3000 / 084 431 8728	jaco.h@ixengineers.co.za

### PROJECT 300325 - DRAKENSTEIN MUNICIPALITY'S WSDP FOR 2017-2022 (FIRST CYCLE)

REV	DESCRIPTION	ORIG	REVIEW	IXENGINEERS APPROVAL	DATE	CLIENT APPROVAL	DATE
Draft	Draft issued for external review	R Kuffner Author	JT Human A Reviewer	Approval	31/10/2017	Approval	31/10/2017
Final	Final for Council approval	R Kuffner Author	JT Human A Reviewer	Approval	23/01/2018	Approval	

**DRAKENSTEIN MUNICIPALITY****WSDP – IDP WATER SECTOR INPUT REPORT (EXECUTIVE SUMMARY)**

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**ABBREVIATIONS AND DEFINITIONS**

ACIP	Accelerated Community Infrastructure Programme
ADWF	Average Dry Weather Flow
AMP	Asset Management Plan
AMR	Automatic Meter Reading
ART	Anti-Retroviral Treatment
BDS	Blue Drop System
BNG	Breaking New Ground
BNR	Biological Nutrient Removal
BSP	Bulk Supply Pipeline
BWP	Bulk Water Pipeline
CCT	City of Cape Town
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
CSP	Community, Social and Personal Services
CWD	Cape Winelands District
DEDAT	Department of Economic Development and Tourism
DRC	Depreciated Replacement Cost
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
ECD	Early Childhood Development
EIA	Environmental Impact Assessment
FDA	Future Development Area
FET	Future Education Training
GAMAP	General Accepted Municipal Accounting Practice
GDC	Green Drop Certification
GDIP	Green Drop Improvement Plan
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GDS	Green Drop System
GHG	Greenhouse gas
GIS	Geographic Information Systems
GRAP	Generally Recognized Accounting Practice
GWSA	Green Water Services Audit
HAZOP	Hazard and Operability
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
IBT	Inclining Block Tariff
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
IMP	Incident Management Protocol
IMQS	Infrastructure Management Query System
ISP	Internal Strategic Perspective

**ABBREVIATIONS AND DEFINITIONS / Continue**

km <sup>2</sup>	Square Kilometre
KPA	Key Performance Area
LED	Local Economic Development
LGTAS	Local Government Turn Around Strategy
LSDF	Local Spatial Development Framework
m	Metre
MAP	Mean Annual Precipitation
MCC	Motor Control Centre
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agent
Mℓ	Mega Litre
MI/a	Mega Litre per Annum
MLSS	Mixed Liquor Suspended Solids
mSCOA	Municipal Standard Chart of Accounts
MSDS	Material Safety Data Sheet
MTEF	Medium-Term Expenditure Framework
NGDB	National Groundwater Database
NMR	No Monitoring Required
NRW	Non-Revenue Water
NWRS	National Water Resource Strategy
PAT	Progress Assessment Tool
PDD	Peak Daily Demand
PGWC	Provincial Government Western Cape
PMS	Performance Management System
PPE	Personnel Protective Equipment
PRV	Pressure Reducing Valve
PSP	Professional Service Provider
PST	Pump Station
RAS	Return Activated Sludge
RBIG	Regional Bulk Infrastructure Grant
RDP	Reconstruction and Development Programme
RES	Reservoir
RTU	Remote Terminal Unit
RUL	Remaining Useful Life
SALGA	South African Local Government Association
SANS	South African National Standard
SCADA	Supervisory Control and Data Acquisition
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SPS	Sewer Pump Station
SRP	Sewer Reticulation Pipeline

**ABBREVIATIONS AND DEFINITIONS / Continue**

SST	Secondary Settling Tanks
SVI	Sludge Volume Index
TMG	Table Mountain Group
TWL	Top Water Level
UAW	Unaccounted for Water
UCT	University of Cape Town
URV	Unit Reference Value
VAT	Value Added Tax
VIP	Ventilated Improved Pit
WARMS	Water Authorisation Registration and Management System
WCDM	West Coast District Municipality
WCWSS	Western Cape Water Supply System
WDM	Water Demand Management
WIN	Water Information Network
WMA	Water Management Area
WRP	Water Reticulation Pipeline
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider
WTW	Water Treatment Works
WULA	Water User Licence Application
WWTP	Waste Water Treatment Plant
WWTW	Waste Water Treatment Works

<b>KEY TERMS</b>
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TERM	INTERPRETATION
Basic Water Supply Facility	The infrastructure necessary to supply 25 litres of potable water per person per day supplied within 200 metres of a household and with a minimum flow of 10 litres per minute (in the case of communal water points) or 6 000 litres of potable water supplied per formal connection per month (in the case of yard or house connections).
Basic Water Supply Service	The provision of a basic water supply facility, the sustainable operation of the facility (available for at least 350 days per year and not interrupted for more than 48 consecutive hours per incident) and the communication of good water-use, hygiene and related practices.
Basic Sanitation Facility	The infrastructure necessary to provide a sanitation facility which is safe, reliable, private, protected from the weather and ventilated, keeps smells to the minimum, is easy to keep clean, minimises the risk of the spread of sanitation-related diseases by facilitating the appropriate control of disease carrying flies and pests, and enables safe and appropriate treatment and/or removal of human waste and wastewater in an environmentally sound manner.
Basic Sanitation Service	The provision of a basic sanitation facility which is easily accessible to a household, the sustainable operation of the facility, including the safe removal of human waste and wastewater from the premises where this is appropriate and necessary, and the communication of good sanitation, hygiene and related practices.
Climate Change	Changes in climatic conditions due to natural causes or to anthropogenic (man-made) effects such as emissions of greenhouse gases, e.g. carbon dioxide, nitrous oxide, and methane, from industry, transport, farming and deforestation, that are expected to have significant consequences for rainfall and water availability on earth.
CRC	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset. GAMAP defines CRC as the cost the entity would incur to acquire the asset on the reporting date.
DRC	The replacement cost of an existing asset after deducting an allowance for wear or consumption to reflect the remaining economic life of the existing asset.
Global Warming	The increase in the average surface temperatures across the globe, usually measured over long periods of time; reported to have increased by 1°C over the past hundred years.
IDP	A municipal plan as defined in the Municipal Systems Act.
National Water Resource Strategy 2	<p>Sets out how we will achieve the following core objectives:</p> <ul style="list-style-type: none"> <li>• Water supports development and the elimination of poverty and inequality.</li> <li>• Water contributes to the economy and job creation, and</li> <li>• Water is protected, used, developed, conserved, managed and controlled sustainably and equitably.</li> </ul>

<b>KEY TERMS</b>
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TERM	INTERPRETATION
Re-use	Utilisation of treated or untreated wastewater for a process other than the one that generated it. For instance, the re-use of municipal wastewater for agricultural irrigation. Water re-use can be direct or indirect, intentional or unintentional, planned or unplanned, local, regional or national in terms of location, scale and significance. Water re-use may involve various kinds of treatment (or not) and the reclaimed water may be used for a variety of purposes.
RUL	The time remaining over which an asset is expected to be used.
Water Balance	The regulation or rationalisation of human activity to match the sustainable local water supply, rather than base, or a process of balancing water supply and demand to ensure that water use does not exceed supply.
WSA	A WSA is any municipality that has the executive authority to provide water services within its area of jurisdiction in terms of the Municipal Structures Act 118 of 1998 or the ministerial authorisations made in terms of this Act. There can only be one water services authority in any specific area. Water services authority area boundaries cannot overlap. Water services authorities are metropolitan municipalities, district municipalities and authorised local municipalities.
WSDP	A plan for water and sanitation services in terms of the Water Services Act.
WSP	<p>A Water services provider is</p> <ul style="list-style-type: none"> <li>Any person who has a contract with a WSA or another WSP to sell water to, and/or accept wastewater for the purpose of treatment from that Authority or Provider, who is usually a bulk water services provider); or</li> <li>Any person who has a contract with a WSA to take responsibility for providing retail water services to one or more consumers within a specific geographic area; or</li> <li>A WSA that provides either or both of the above services itself.</li> </ul>
WC	The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.
WDM	The adaptation and implementation of a strategy or a programme by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability.



## WSDP – IDP Water Sector Input Report (Executive Summary)

### Introduction

Every WSA has a duty to all customers or potential customers in its area of jurisdiction to progressively ensure efficient, affordable, economical and sustainable access to water services that promote sustainable livelihoods and economic development.

Sections 12 and 13 of the Water Services Act (Act No 108 of 1997) place a duty on WSAs to prepare and maintain a WSDP, as part of the process of preparing an IDP. The DWS has developed a new eWSDP website to assist WSAs with the WSDP process and to provide a framework for the capturing of the data. The business elements included in the website and also addressed in detail in the two Modules of Drakenstein Municipality's WSDP are as follows:

- Administration
- Demographics Profile
- Service Levels Profile
- Socio Economic Background Profile
- Water Services Infrastructure Profile
- Operation and Maintenance Profile
- Associated Services Profile
- Water Resources Profile
- Conservation and Demand Management Profile
- Financial Profile
- Institutional Arrangements Profile
- Social and Customer Service Requirements Profile
- Needs Development Plan

The 2017-2022 WSDP (First Cycle) of Drakenstein Municipality consists of the following documents.

- 2017/2018 WSDP-IDP Water Sector Input Report (For Council approval and Public Participation Process)
- eWSDP: Base data and an overview and assessment of the status of information and strategies on a WSA level.
- Module 2: Base Data and Compliance Data.
- Module 3: Strategies.

The primary instrument of planning in the water services sector is the WSDP. The following principles apply to the WSDP, as taken from the Strategic Framework for Water Services (2003):

- All WSAs must develop a WSDP.
- A new plan must be developed every five years and the plan should be updated as necessary and appropriate in the interim years.
- The WSDP must be integrated with the IDP of the municipality, as required in terms of the Municipal Systems Act.
- The WSDP must integrate water supply planning with sanitation planning.

- The WSDP must integrate technical planning with social, institutional, financial and environmental planning. The planning of capital expenditures must also be integrated with the associated operation and maintenance requirements and expenditures.
- The WSDP must be informed by the business plans developed by water services providers and with the plans of any regional water services providers, as relevant.
- The plan must take into account the impact of HIV/Aids on future water demand.
- The WSDP must integrate with the catchment management strategy.
- The planning process must take into account the views of all important stakeholders, including communities, through a consultative and participatory process. Every effort must be made to ensure the adequate and meaningful participation of women in consultation forums.
- The draft plan must be made available for public and stakeholder comment and all comments made must be considered when preparing the final plan.
- The contents of the WSDP must be communicated to all important stakeholders, including the DWS.
- A WSA must report annually and in a public way on progress in implementing the plan.

The purpose of this report is to provide relevant and summarised WSDP inputs for incorporation into Drakenstein Municipality's IDP process and is structured as follows:

**Section A: Status Quo Overview:** Provides a summarised overview of the water services status quo in terms of the water services functional business elements as aligned to the WSDP framework.

**Section B: State of Water Services Planning:** Presents the status of- and references the water services planning within Drakenstein Municipality.

**Section C: Water Services Existing Needs Perspective:** Gives an overview of Drakenstein Municipality's assessment and interpretation of its water services, with specific focus on problem definition statements.

**Section D: Water Services Objectives and Strategies:** Outlines the 5-year water services objectives and strategies as developed through the WSDP process for incorporation in terms of the IDP and aligned to the water services functional business elements.

**Section E: Water Services MTEF Projects:** The agreed water services projects for the medium-term expenditure framework and inclusive of funding sources.

**Section F: WSDP Projects:** Presents the projects identified during the WSDP process in order to meet the water services strategies of Drakenstein Municipality, as aligned to the outflow from the situation analysis per water services business element.

## SECTION A: STATUS QUO OVERVIEW

### Business Element 1: Administration

Section 14 of the Water Services Act requires that the WSA must take reasonable steps to bring its draft WSDP to the notice of a number of different stakeholders so that they have the opportunity to comment on it. Section 15 of the Act requires that the WSA must supply a copy of the WSDP to the Minister of Water and Sanitation, Minister of Provincial and Local Government, the relevant Province and all neighbouring WSAs.

The 2017-2022 (First Cycle) draft WSDP was approved by Council on the 31<sup>st</sup> of October 2017. The draft WSDP was thereafter distributed to various public venues for public comment (Public comment period was from November 2017 to January 2018). The draft WSDP was also distributed to the DLG and DWS for their comments. No comments were received on the draft WSDP and the final WSDP will now be submitted to Council for final approval.

## Business Element 2: Demographics

Drakenstein Municipality falls within the newly established Berg-Olifants Water Management Area (WMA) and is located within the Cape Winelands District of the Western Cape Province, in which the following local municipalities are also located:

- Stellenbosch;
- Witzenberg;
- Breede Valley; and
- Langeberg

Drakenstein Municipality consists of 33 individual wards, and is the only WSA within the Drakenstein Municipality's Management Area. The Municipality is also the Water Services Provider (WSP). Its responsibility as WSA also extends to the rural areas within its boundary, which prior to July 2003 had fallen under the jurisdiction of the former Boland District Municipality. Drakenstein Municipality's Management Area includes the following towns and **Water Distribution Systems**:

- The large towns of Paarl (including Mbekweni) and Wellington, which include the Pearl Valley and Boschenmeer developments and the rural hamlets of Simondium and Ben Bernard – **Paarl / Wellington System**

Paarl can be supplied from Paarl's own local mountain sources, namely the Bethel and Nantes Dams, from runoff within their own catchment areas. This can be supplemented by abstractions out of the Berg River (releases from the Theewaterskloof Tunnel), pumped into these dams. The two local sources of supply for Wellington are the Antoniesvlei Diversion, which makes use of a small storage dam at Withoogte, and a local irrigation supply to the town from the Spruit River. The balance of Paarl and Wellington's water demand is currently supplied as treated water, under agreement with the CCT, from their Wemmershoek Dam. The agreement with the CCT is currently being reviewed.

- Saron – **Saron System**

The town receives all of its raw water from a diversion scheme on the Leeu River (a tributary of the Klein Berg River). The diversion which has a capacity of 0.2 m<sup>3</sup>/s is shared on a 50:50 basis with the De Hoek irrigators, via an agreement formalised in 1978.

- Gouda – **Gouda System**

Gouda is supplied with bulk potable water by the West Coast District Municipality, with water from the Voëlvlei Dam (owned by the DWS).

- Hermon – **Hermon System**

Hermon is supplied with bulk potable water by the CCT, with water from the Voëlvlei Dam (owned by the DWS).

- Bainskloof – **Bainskloof System**

Bainskloof village is supplied with water through a run-of-river pumping scheme from a natural pool in the Wit River just below the village.

From a Water Services perspective, the most significant challenges are the augmentation of the existing water resources (Drought), replacement and upgrading of old water and sewerage infrastructure, the upgrading of the bulk water and sewerage infrastructure to meet future requirements (WTWs, WWTWs and bulk water and sewer pipelines), the provision of sustainable basic services to informal settlements and to ensure the provision of basic services to rural communities located on private farms. Strategies and action plans will need to be developed and implemented, in collaboration with farm owners, in order for the Municipality to fulfil its legal obligations and responsibilities as WSA. Initiatives such as the Rural Subsidy Scheme are being implemented already.

#### Physical Perspective

Global warming: In terms of adapting for climate change, water systems will need to be more robust and new / alternative sources of supply may need to be found. Increased skills will be required from water managers and long-term water projections are required. Although an overall decrease in rainfall is generally not forecasted, increased variability in the climate and frequency of extreme events, as well as increased temperature and wind could have an impact on water sources, particularly surface waters.

It is necessary for WSAs to develop climate response strategies and include these in their WSDPs, implement WC/WDM and reduce levels of NRW. Water-related climate change adaptation and mitigation planning should be incorporated into all WSDPs and IDPs. The implementation of WC/WDM is a critical element of adapting to climate change. This must be implemented by all water sector institutions and water users, and should include the optimisation of dam and groundwater operation, as well as the reduction of physical water losses and the introduction of water-efficient appliances and processes.

It is therefore advisable for Drakenstein Municipality that a conservative approach be followed regarding the management of water sources. It is proposed that the following approach be adopted to mitigate and adapt to the impacts of climate change:

- All resources, especially surface water resources, need to be re-evaluated, especially where demand is close to the safe one in twenty year yields. It is therefore important to establish assurance of supply levels of all water sources;
- increase assurance of supply of the water resources by ensuring that there is at least 10% additional capacity (headroom), when considering the maximum 24 hour demand on the peak month of the year;
- do not undertake new developments unless a proper investigation of the implication on water sources and sustainability in the long term has been undertaken;
- vigorously implement WDM measures, especially in terms of the following:
  - increased water efficiency
  - frequent monitoring of the water supply system, from the sources to the consumers; and
  - regular and adequate system maintenance and repairs.
- Diversify water resources, e.g. surface water, groundwater, wastewater re-use and sea water desalination.

A Draft Climate Change Adaptation Plan was completed for Drakenstein Municipality, which aims at addressing climate change impacts through all municipal operations. This section is currently working on finalising the draft plan. The section also completed a draft framework for the development of an Alien Species Management Plan.

The potential long-term impacts of climate change comprise key overarching informants to the SDF. It recognized the need to act on and enable the reduction in Greenhouse Gas emissions and adapt to global climate change. The risk of increased intensity of extreme weather events, such as flooding, changes in weather patterns and the potential impacts on agriculture crop futures places additional risk to human lives and health. These events are likely to impact on the tourism, infrastructure and insurance sectors of the economy in the Drakenstein Municipality into the future.

The six themes of the SDF are in line with the National Climate Change Response Policy and are informed by a two-pronged approach to addressing climate change:

- **Mitigation:** Contribute to national and global efforts to significantly reduce GHG emissions and build a sustainable low carbon economy, which simultaneously addresses the need for economic growth, job creation and improving socio-economic conditions; and
- **Adaptation:** Reduce climate vulnerability and develop the adaptive capacity of the Western Cape's economy, its people, its ecosystems and its critical infrastructure in a manner that simultaneously addresses the province's socio-economic and environmental goals.

#### Natural Environment

The Limietberg Mountains is a proclaimed natural heritage site. The Limietberg Provincial Nature Reserve extends from the Wemmershoek Dam catchment in the south, northwards along the eastern border of the municipality. It includes portions of the Du Toit's Kloof and Bain's Kloof Passes. It links with the Waterval Provincial Nature Reserve which then extends into the Cederberg Mountains. In the south, the Reserve extends into the Franschhoek Mountains. The Voëlvlei Provincial Nature Reserve is located around the shores of Voëlvlei Dam. To the south of Voëlvlei Dam, the Elandsberg and the Bontebok Ridge Nature Reserves are found. The Renosterveld and Foxenberg Nature Reserves, as well as the Groenberg Provincial Nature Reserve are located to the north-east of Wellington. Paarl's local water sources are located in the Paarl Mountain Nature Reserve immediately west of Paarl. To the west of that, the Renosterkop Nature Reserve is found.

The integrity of the environmental and cultural / historic heritage is under pressure. The quality of the natural environment is under threat due to the ongoing loss of bio-diversity and decay of essential ecological systems due to poor land use management practices, unsustainable resource utilisation and general environmental decay. The area has some unique and healthy natural environmental habitats that are at risk if not properly managed. There is also an awareness of and justified need to address the integrity of the cultural / historic heritage.

#### Demographic Perspective

**Economics:** The economy in Drakenstein grew by 3.1% on average between 2005 and 2015. The sectors that contributed the most to Drakenstein's GDP in 2015 was the finance, insurance, real estate and business services sector (24.3%); the wholesale and retail trade, catering and accommodation sector (18.5%); and the manufacturing sector (12.6%). Four economic sectors had negative GDP growth rates during the recession namely the agriculture, forestry and fishing sector; the mining and quarrying sector; the manufacturing sector; and the transport, storage and communication sector. After the recession (2009-2015) the agriculture, forestry and fishing sector and the manufacturing sector continued to experience negative GDP growth rates.

**Social:** A summary of the recent changes in various social indicators in the Cape Winelands District is given in the table below (Municipal Economic Review and Outlook 2016).

Indicator	Cape Winelands	Witzenberg	Drakenstein	Stellenbosch	Breede Valley	Langeberg
GDP growth (2005 – 2015)	3.6%	5.9%	3.1%	2.8%	3.9%	3.9%
Population growth (2011 – 2016)	10%	12.6%	11.5%	11.4%	5.9%	7.9%
HDI (2011 – 2015)	Increase	Increase	Increase	Increase	Increase	Increase
Indigent households (2014 – 2015)	Increase	Decrease	Increase	Increase	Decrease	Increase
Households with no income (2016)	13.1% of total	Below CWD average	Below CWD average	Above CWD average	Below CWD average	Below CWD average
Gini coefficient (2013 – 2015)	Increase	Increase	Decrease	Decrease	Increase	Increase
Poverty headcount (2011 – 2016)	Increase	Increase	Increase	Increase	Decrease	Decrease
Poverty intensity (2011 – 2016)	Decrease	Increase	Increase	Decrease	Increase	Decrease
Informal dwelling (2016)	16.6% of total dwellings	Below CWD average	Below CWD average	Above CWD average	Above CWD average	Below CWD average



Table A.1: Social indicators in the Cape Winelands District

Indicator	Cape Winelands	Witzenberg	Drakenstein	Stellenbosch	Breede Valley	Langeberg
Access to water (2011 – 2016)	Increase	Increase	Increase	Increase	Increase	Increase
Access to electricity (2011 - 2016)	Increase	Increase	Increase	Increase	Increase	Increase
Access to sanitation (2011 – 2016)	Increase	Increase	Increase	Increase	Increase	Increase
Access to refuse removal (2011 – 2016)	Increase	Increase	Increase	Increase	Increase	Increase
No schooling (2016)	3.2% of total population	Above CWD average	Below CWD average	Below CWD average	Below CWD average	Above CWD average
Grade 12 or higher certificate (2016)	38.1% of total population	Below CWD average	Above CWD average	Above CWD average	Above CWD average	Below CWD average
ART patient load (2013 – 2015)	Increase	Increase	Increase	Increase	Increase	Increase
No of TB patients (2013 – 2015)	Increase	Decrease	Decrease	Decrease	Increase	Increase
Immunisation coverage (2013 – 2015)	Below WC average	Below CWD average	Below CWD average	Above CWD average	Above CWD average	Below CWD average
Birth weight (2013 – 2015)	Equal WC average	Above CWD average	Below CWD average	Below CWD average	Above CWD average	Above CWD average
Teenage pregnancies (2013 – 2015)	Above WC average	Above CWD average	Below CWD average	Below CWD average	Above CWD average	Below CWD average

Lower education achievements, ART patient load, lower immunisation levels, and teenage pregnancies, among others. Drakenstein grew by 3.1% on average between 2005 and 2015 while population growth was 11.5% between 2011 and 2016. Although the HDI has risen from 0.681 in 2011 to 0.708 in 2015, it weakened slightly between 2014 and 2015. Social indicators that have moved in a positive direction include the increasing access to basic services, decreasing income inequality, below district average birth weight and teenage pregnancies. Indicators that are of concern include the increasing indigent households, rising poverty headcount and intensity levels, lower immunisation coverage and high ART patient loads, among others.

**Regional Perspective:** The 2015 Socio-Economic Profile for the Drakenstein Municipality includes the following conclusions from their socio-economic analysis (Western Cape Government, Provincial Treasury).

- The Drakenstein Municipality is the largest local municipality in the Cape Winelands with an estimated population of 263 912. There are furthermore an estimated 65 778 households in the Municipality.
- The Municipality faces many educational challenges, the most noteworthy being a high learner dropout rate which is particularly concerning given the low employment opportunities on offer for semi-skilled and unskilled workers. The average learner-teacher ratio has in recent years slightly increased which is problematic as it is commonly assumed that children receive less personalised attention in larger class environments and that high learner-teacher ratios are detrimental to educational outcomes. The majority schools in Drakenstein were at the end of 2014 no fee schools which bode well to improve access to quality education to those that cannot afford tuition. The presence of FET colleges is encouraging as it can potentially absorb the high number of high-school dropouts and offer alternative education and training opportunities. These educational challenges are however impacting on matric pass rate which decreased slightly from 89.4% in 2013 to 83.8% in 2014.
- Although there are a good overall presence of primary healthcare facilities, the Municipality has the lowest number of ambulances per 100 people. Cape Winelands also has a relatively above average healthcare personnel dispensation when compared to the other districts within the Province.
- Drakenstein has the highest anti-retroviral treatment load amongst all other local municipalities in the Cape Winelands. Mother-to-child transmissions are limited to 1.1% which is lower than the District and Provincial averages. The number of registered TB patients has gradually been decreasing.
- Drakenstein has the highest malnutrition rate in the Cape Winelands.
- Both the neonatal and maternal mortality rates for the Drakenstein Municipality are within the Province's 2019 targets.

- Although the delivery rate to women under the age of 18 is relatively low, the termination of pregnancy rate is significantly higher than the District's average.
- A large number of households within the Municipality were in 2011 still earning less than R400 a month which attests to high levels of inequality and an increased indigent dependency on municipal support. Although per capita income levels in Drakenstein are relatively high in comparison to other local municipalities within the District, the Municipality must still make significant progress if it is to improve general levels of wealth and prosperity.
- In comparison to the Cape Winelands District average, crime per 100 000 population has been relatively low in Drakenstein in 2014/15. Drug-related crimes and residential burglaries does however remain an obstinate concern which poses a serious threat to the social, emotional and economic well-being of the community.
- The Municipality in general performs well to provide citizens with access to basic services, i.e. the majority of households have access to piped water, electricity, sanitation and refuse removal above the minimum service standard. There are however concerns as to the number of households that must still rely on candles as source of lighting and the presence of bucket toilets.
- From an economic point of view, Drakenstein experienced moderate growth for the period 2005-2013. The construction and commercial services sectors performed particularly well during this period, whilst the manufacturing, general government and CSP services as well as the agriculture sectors performed less favourable. Although the Municipality was particularly hard hit by the global economy slowdown, it recovered well in the post –recession period and maintained the second highest economic growth rate in the Cape Winelands District for the period 2010-2013.
- The Municipality's growth across the period 2005-2013 was however characterised by net job losses, in particular within the agriculture, manufacturing and construction sectors. Such jobless growth is a distinctive feature of a post-recession economy that undergoes structural and cyclical changes as it follows a natural trend of consolidation and expansion. Although it is difficult to identify a single root cause of such jobless growth in Drakenstein, it is expected that this phenomenon was influenced by several socio-economic factors including a growing population and automation within the agriculture, manufacturing and construction sector that had a negative impact on semi-and unskilled employment levels.
- From an environmental perspective, the Municipality is urged to proactively implement the provisions of the Western Cape Land Use Planning Act, 2014 as to ensure that it fulfils its land-use planning and decision-making responsibilities.
- Drakenstein had the second highest internet penetration rate in the Cape Winelands District with 38.86% of all households having access to the internet in 2011. This high rate bodes well for enhanced economic growth by improving access, readiness and usage of the internet. The Provincial Government will over the next three years be rolling out Wi-Fi hotspots in each of the wards of the Municipality.

The 2015/2016 population of Drakenstein Municipality was established by applying an annual growth rate of 2.69% to the 2011 Census population figures. The annual population growth percentages for the individual towns were agreed with the Municipality's Engineering Department during January 2014. The current estimated population figures and the annual population growth percentages used in this WSDP-IDP Water Sector Input Report are aligned with the figures used in DWS's National GeoDatabase, which forms the baseline for the WSDP Guide Framework.

The table below gives an overview of the population and households and the water and sanitation service level categories in Drakenstein Municipality's Management Area.

Table A.2: Water Services Overview																									
Settlement Type	2011/2012		2015/2016		Water category										Sanitation category										
	Households	Population	Households	Population	Adequate: Formal	Adequate: Informal	Adequate: Sphred Services	Water resources needs only	O&M needs only	Infrastructure needs only	Infrastructure & O&M needs	Infrastructure, O&M & Resource need	No Services: Informal	No Services: Formal	Adequate: Formal	Adequate: Informal	Adequate: Sphred Services	Water resources needs only	O&M needs only	Infrastructure needs only	Infrastructure & O&M needs	Infrastructure, O&M & Resource need	No Services: Informal	No Services: Formal	
URBAN																									
Metropolitan Area					Adequate			Below RDP			None		Adequate			Below RDP			None						
Sub-Total					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Formal Town					Adequate			Below RDP			None		Adequate			Below RDP			None						
Paarl and Wellington					44,299	181,727	50,588	207,451	P		P					P		P							
Saron					1,908	7,814	2,025	8,293	P		P				P		P								
Gouda					719	2,985	778	3,231	P		P				P		P								
Hermon					165	711	175	755	P		P				P		P								
Bainskloof Village					6	24	6	24	P		P				P		P								
Sub-Total					47,097	193,261	53,573	219,755	5	0	5	0	0	0	0	5	0	5	0	0	0	0	0	0	0
Townships					Adequate			Below RDP			None		Adequate			Below RDP			None						
Sub-Total					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Informal Settlements					Adequate			Below RDP			None		Adequate			Below RDP			None						
Paarl and Wellington					3,960	15,840	3,728	14,912		P						P									
Sub-Total					3,960	15,840	3,728	14,912	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Working towns & service centres					Adequate			Below RDP			None		Adequate			Below RDP			None						
Sub-Total					0	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Sub-Total: (Urban)					51,057	209,101	57,301	234,667	6	1	6	0	0	0	0	6	1	6	0	0	0	0	0	0	0
RURAL																									
Rural / Farming					Adequate			Below RDP			None		Adequate			Below RDP			None						
Drakenstein Rural					8,739	42,241	9,275	44,833	P		P				P		P							P	
Sub-Total					8,739	42,241	9,275	44,833	1	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0	1
Informal Settlements					Adequate			Below RDP			None		Adequate			Below RDP			None						
Sub-Total					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total (Rural)					8,739	42,241	9,275	44,833	1	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0	1
TOTAL					59,796	251,342	66,576	279,500	7	1	7	0	0	0	0	7	1	7	0	0	0	0	0	1	1

The Community Survey of 2016 from Statistics South Africa estimate the 2016 population of Drakenstein Municipality at 280 195 persons and the permanent households at 71 686, at an average households size of 3.9 persons per household.



The Growth Potential Study 2014, of the Western Cape Government determined the growth potential and socio-economic needs of settlements in the Western Cape using quantitative data (e.g. factors relating to socio-economic, economic, physical-environmental, infrastructure and institutional aspects). The table below gives an overview of the growth potential indicators for the towns in Drakenstein Municipality's Management Area, as included in the Growth Potential Study.

Table A.3: Growth potential indicators for the towns in Drakenstein Municipality's Management Area (Settlement Level Classification)				
Indicator	Paarl	Wellington	Saron	Gouda
Absolute socio-economic needs	Very High	Very High	Low	Very Low
Proportional socio-economic needs	Low	Medium	Medium	Medium
Human capital index	High	Low	Medium	Medium
Economic index	Very High	High	Medium	Low
Physical index	High	Medium	Very High	High
Infrastructure	Very High	Very High	High	Medium
Institutional	Very High	Medium	Low	Low

The number of people on the Housing Demand Database for 2015/2016 was 40 506. The SDF (August 2015) however indicated the more realistic figure of the actual number of people in need of housing in Drakenstein Municipality's Management Area is 22 079, which is more in line with the PGWC estimate of approximately 19 000. The current housing backlog per settlement, according to the SDF, are indicated in the table below:

Table A.4: Current housing backlog per settlement (SDF)		
Settlement	BNG – fully subsidised housing	GAPP – partially subsidised housing
Paarl	8 539	2 670
Simondium	1 274	77
Wellington	3 302	880
Mbekweni	2 269	547
Saron	803	27
Gouda	1 440	251
<b>Total</b>	<b>17 627</b>	<b>4 452</b>

**Business Element 3: Service Levels**

The table and graph below give an overview of the water service delivery access profile in Drakenstein Municipality's Management Area.

Table A.5: Residential water services delivery access profile: Water							
Census Category	Description	Year 0		Year -1		Year -2	
		FY2015/16		FY2014/15		FY2013/14	
		Nr	%	Nr	%	Nr	%
	<b>WATER (ABOVE MIN LEVEL)</b>						
Piped (tap) water inside dwelling/institution	House connections	39,222	59%	38,565	60%	38,182	60%
Piped (tap) water inside yard	Yard connections	22,959	34%	21,829	32%	20,493	33%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	4,135	6%	4,157	7%	4,157	7%
	<b>Sub-Total: Minimum Service Level and Above</b>	<b>66,316</b>	<b>100%</b>	<b>64,551</b>	<b>100%</b>	<b>62,832</b>	<b>100%</b>
	<b>WATER (BELOW MIN LEVEL)</b>						
Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Standpipe connection: > 200 m < 500 m	82	0%	82	0%	82	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	Standpipe connection: > 500 m < 1 000 m	66	0%	66	0%	66	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	15	0%	15	0%	15	0%
No access to piped (tap) water	No services	134	0%	134	0%	134	0%
	<b>Sub-Total: Below Minimum Service Level</b>	<b>297</b>	<b>0%</b>	<b>297</b>	<b>0%</b>	<b>297</b>	<b>0%</b>
	<b>Total number of households</b>	<b>66,613</b>	<b>100%</b>	<b>64,848</b>	<b>100%</b>	<b>63,129</b>	<b>100%</b>

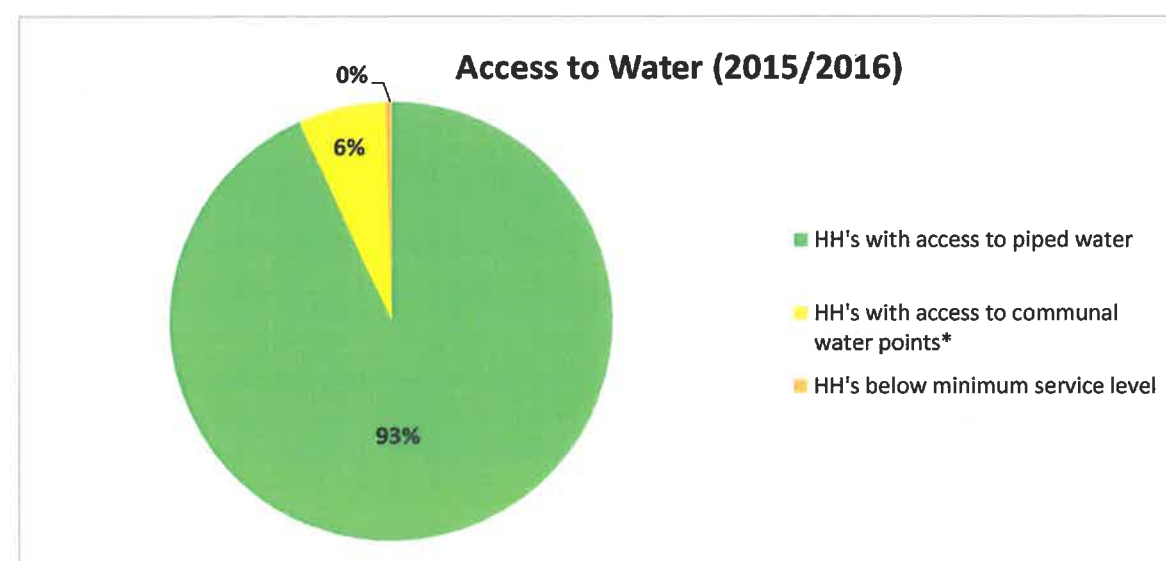


Figure A.1: Access to water services in 2015/2016.

The existing residential water service levels in Drakenstein Municipality's Management Area are estimated as follows.

Table A.6: Residential water service levels (Residential Consumer Units)							
Service Level	Paarl and Wellington	Saron	Gouda	Hermon	Bains-kloof	Farms	Total
No Water Services	0	0	0	0	0	134 <sup>2)</sup>	134
Below RDP: Infrastructure Upgrade	0	0	0	0	0	0	0
Below RDP: Infrastructure Extension	0	0	0	0	0	163 <sup>3)</sup>	163
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0
<b>Total Basic Need (RDP)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>297</b>	<b>297</b>
Below Housing Interim <sup>4)</sup>	0	0	0	0	0	0	0
Adequate Housing Permanent <sup>5)</sup>	3 728	0	0	0	0	0	3 728
<b>Total Housing Need</b>	<b>3 728</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3 728</b>
Standpipes	0	0	0	0	0	407	407
Yard Connections <sup>6)</sup>	21 156	407	141	0	0	1 255	22 959
House Connections <sup>1)</sup>	29 432	1 618	637	194	25	7 316	39 222
<b>Total Adequate</b>	<b>50 588</b>	<b>2 025</b>	<b>778</b>	<b>194</b>	<b>25</b>	<b>8 978</b>	<b>62 588</b>
<b>Total Residential Consumer Units for the Municipality</b>	<b>54 316</b>	<b>2 025</b>	<b>778</b>	<b>194</b>	<b>25</b>	<b>9 275</b>	<b>66 613</b>

Notes: 1) Number of residential consumer units for the urban areas for 2015/2016, as taken from the financial system.

2) Census 2011: Number of households with no access to piped (tap) water 134

3) Census 2011: Number of households with communal services (200m – 500m) 82, (500m – 1000m) 66 and (>1000m) 15.

4) Below Housing Interim in the above table is the number of shacks in informal areas without basic water services. All informal areas are provided with communal taps.

5) Adequate Housing Permanent in the above table is the number of shacks in informal areas with communal water services. Number of households with communal services in informal areas was taken from the "Provision of Basic Services to informal settlements in the Drakenstein Municipal Area, Status Quo Report, June 2016"

6) Estimated number of backyard dwellers (Projected number of households – residential CUs – households in informal areas).

7) There are no households on formal erven in the urban areas with water services below RDP standard.

Table A.7: Residential water services delivery access profile: Sanitation							
Census Category	Description	Year 0		Year -1		Year -2	
		FY2015/16		FY2014/15		FY2013/14	
		Nr	%	Nr	%	Nr	%
	SANITATION (ABOVE MIN LEVEL)						
Flush toilet (connected to sewerage system)	Waterborne	53,207	80%	51,557	79%	49,974	79%
	Waterborne: Low Flush	288	0%	288	0%	288	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	8,030	12%	7,893	12%	7,757	12%
Chemical toilet	Non-waterborne (above min. service level)	35	0%	35	0%	35	0%
Pit toilet with ventilation (VIP)		142	0%	142	0%	142	0%
Other / Communal Services		3,728	6%	3,750	6%	3,750	6%
	Sub-Total: Minimum Service Level and Above	65,430	98%	63,665	98%	61,946	98%
	SANITATION (BELOW MIN LEVEL)						
Pit toilet without ventilation	Pit toilet	133	0%	133	0%	133	0%
Bucket toilet	Bucket toilet	378	1%	378	1%	378	1%
Other toilet provision (below min. service level)	Other	318	0%	318	1%	318	1%
No toilet provisions	No services	354	1%	354	1%	354	1%
	Sub-Total: Below Minimum Service Level	1,183	2%	1,183	2%	1,183	2%
	Total number of households	66,613	100%	64,848	100%	63,129	100%

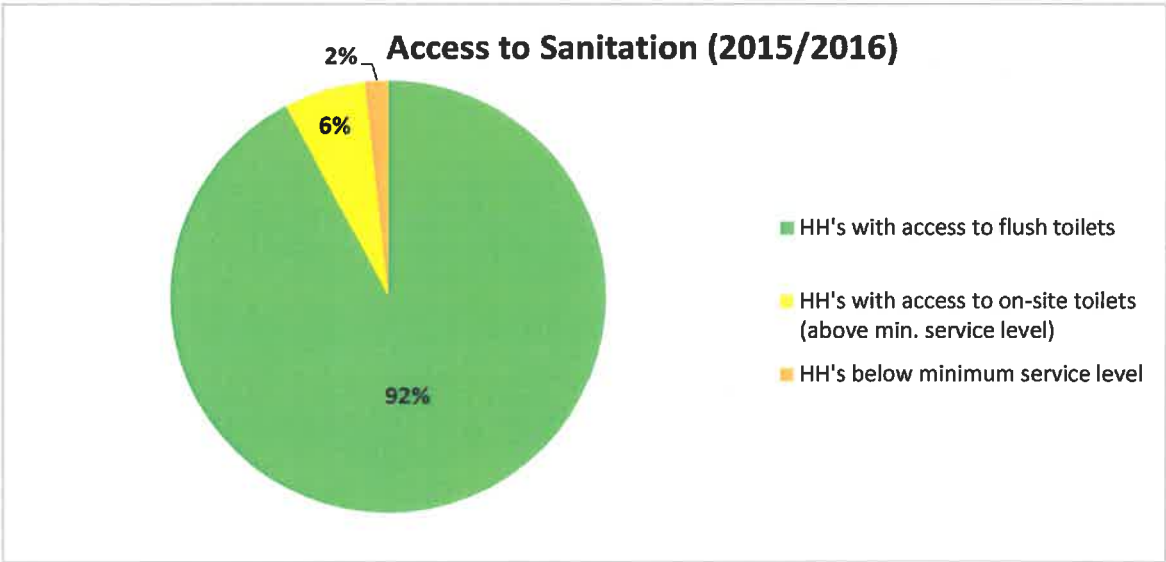


Figure A.2: Access to sanitation services in 2015/2016.

The existing sanitation service levels in Drakenstein Municipality's Management Area are estimated as follows.

Table A.8: Residential sanitation service levels (Consumer Units)							
Service Levels	Paarl and Wellington	Saron	Gouda	Hermon	Bains-kloof	Farms	Total
No Sanitation Services	0	0	0	0	0	354 <sup>2)</sup>	354
Below RDP: Infrastructure Upgrade	0	0	0	0	0	864 <sup>3)</sup>	864
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0
<b>Total Basic Need (RDP)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1 218</b>	<b>1 218</b>
Inadequate Housing Interim <sup>4)</sup>	0	0	0	0	0	0	0
Inadequate Housing Permanent <sup>5)</sup>	3 728	0	0	0	0	0	3 728
<b>Total Housing Need</b>	<b>3 728</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3 728</b>
No Waterborne (VIP)	0	0	0	0	0	142	142
Waterborne Low Flush	288	0	0	0	0	0	288
Septic Tanks / Conservancy Tanks	0	0	50	40	25	7 915	8 030
Waterborne	50 300	2 025	728	154	0	0	53 207
<b>Total Adequate <sup>1)</sup></b>	<b>50 588</b>	<b>2 025</b>	<b>778</b>	<b>194</b>	<b>25</b>	<b>8 057</b>	<b>61 667</b>
<b>Total Residential Consumer Units for the Municipality</b>	<b>54 316</b>	<b>2 025</b>	<b>778</b>	<b>194</b>	<b>25</b>	<b>9 275</b>	<b>66 613</b>

Notes: 1) Include Backyard dwellers

2) Census 2011: Number of households with no toilet facility 354.

3) Census 2011: Number of households with existing buckets 378, chemical toilets 35, pit toilets without ventilation 133 and "other" 318.

4) Below Housing Interim in the above table is the number of shacks in informal areas without basic sanitation services. All informal areas are provided with communal toilets.

5) Adequate Housing Permanent in the above table is the number of shacks in informal areas with communal ablution facilities. Number of households with communal services in informal areas was taken from the "Provision of Basic Services to informal settlements in the Drakenstein Municipal Area, Status Quo Report, June 2016"

6) There are no households on formal erven in the urban areas with sanitation services below RDP standard

The current number of households in the informal areas, with access to communal basic services, is 3 728. Drakenstein Municipality's target, with regard to the provision of communal services in informal areas, is to ensure that at least one toilet is provided for every five (5) households and one tap for every twenty five (25) households. The table below gives a summary of the communal services levels in the informal areas in Drakenstein Municipality's Management Area.

Table A.9: Communal service levels in informal areas					
Informal Settlement	No. of Households	Number of Toilets	Households / Toilet	Number of Taps	Households / Tap
Chester Williams	139	30	4.6	6	23.2
Kamp Fresh (Jangroentjie Street)	23	6	3.8	2	11.5
Janfiskaal Street	47	8	5.9	2	23.5
Kolbe Street (Lantana)	30	6	5.0	2	15.0
Lovers Lane	175	52	3.4	10	17.5
Kingston Town	64	34	1.9	4	16.0
Kudu Street (Flats and Near Shop)	86	34	2.5	8	10.8
Fairylands	338	135	2.5	37	9.1
Zakwaziwana 1	159	109	1.5	109	1.5
Zakwaziwana 2	244	116	2.1	111	2.2
Remainder of Zakwaziwana 2	80	24	3.3	8	10.0



Table A.9: Communal service levels in informal areas					
Informal Settlement	No. of Households	Number of Toilets	Households / Toilet	Number of Taps	Households / Tap
Drommedaris Street	220	100	2.2	40	5.5
Ntshamba Street (Next to Sportground)	96	10	9.6	4	24.0
Oliver Tambo (Mpumelelo Street)	626	130	4.8	24	26.1
Oliver Tambo (Swartberg Street)	156	70	2.2	14	11.1
Plankiesdorp (Dietman Street)	41	16	2.6	4	10.3
Dalvie	46	22	2.1	8	5.8
Silvertown 2 (Labola Street)	130	20	6.5	8	16.3
Langabuya (Unathi)	89	20	4.5	6	14.8
White City (Ntshamba Street)	157	50	3.1	7	22.4
Magnolia	60	16	3.8	6	10.0
Spooky Square (Springbok Street)	53	18	2.9	6	8.8
Ribbok Street (Palmiet River)	30	24	1.3	4	7.5
Alexa Street		6		2	
Rietbok Street	21	4	5.3	1	21.0
Bosbok Flats (Bosbok Street)	44	24	1.8	3	14.7
Azalia Street	45	2	22.5	1	45.0
Silvertown 3 (Lobola Street)	90	24	3.8	4	22.5
Azalia Street		6		2	
Pointsettia Street	7	6	1.2	2	3.5
Rusoord (Bauhinia Street)	122	8	15.3	2	61.0
Brickfields	106	8	13.3	3	35.3
Simondium	45	28	1.6	4	11.3
H1 Block (Luhlaza Street)	84	20	4.2	4	21.0
Grysbok	45	16	2.8	2	22.5
Interpace	30	8	3.8	4	7.5
Bauhinia		6		2	
Silvertown 2 (Diniso Street)		10		2	
Gemsbok Flats		6		2	
Plumbago Flats		8		2	
White City (Thembani Square)		20		4	
<b>Total</b>	<b>3 728</b>	<b>1 260</b>	<b>3.0</b>	<b>476</b>	<b>7.8</b>

Basic services are provided by Drakenstein Municipality to improve the living conditions of the people and to prevent the pollution of the Berg River. There were 1 266 toilets and 476 standpipes provided since 2004 within Drakenstein Municipality.

No additional toilets and standpipes were provided during the 2015/2016 financial year. A further 86 toilets are required. 57 Toilets are required to provide at least one toilet for every 5 families. Of the 1 266 toilets constructed, 977 need substantial repair work or needs to be replaced. 380 Of these toilets do not require replacement due to formal housing being developed or informal settlements being relocated. A total of 597 toilets therefore need to be repaired or replaced.

The number of user connections in each user sector for 2015/2016, for the various distribution systems in Drakenstein Municipality's Management Area, is summarised in the table below:

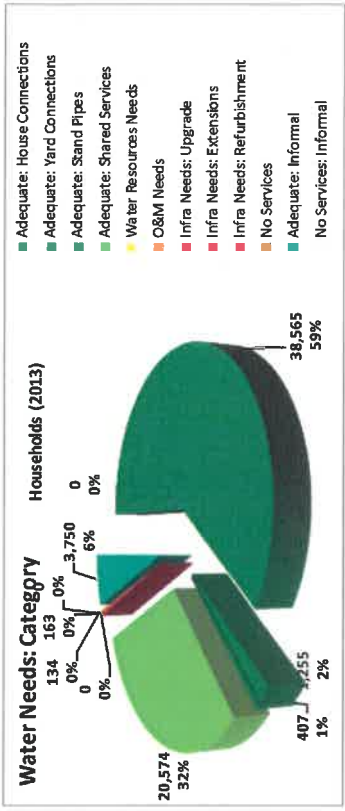
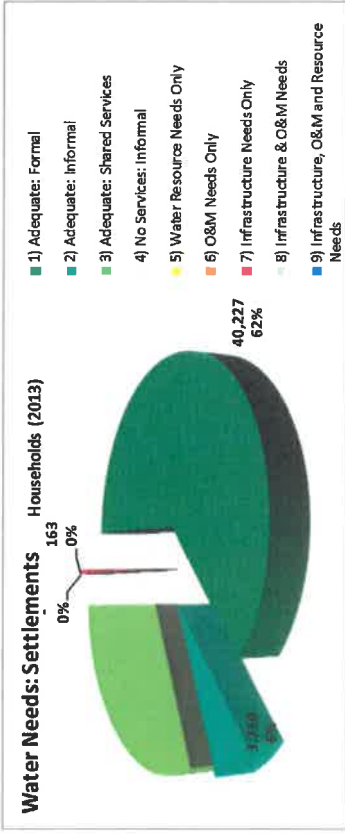
Table A.10: Number of user connections in each user sector for 2015/2016 for the various distribution systems				
Distribution System	Residential	Business and Industrial	Other	Total
Paarl	21 430	92	2 551	<b>24 073</b>
Wellington	8 002	433	198	<b>8 633</b>
Saron	1 618	5	9	<b>1 632</b>
Gouda	637	28	9	<b>674</b>
Hermon	194	2	2	<b>198</b>
Bainskloof	25	0	0	<b>25</b>
<b>Total for Drakenstein Municipality</b>	<b>31 906</b>	<b>560</b>	<b>2 769</b>	<b>35 235</b>

The table below gives an overview of the total number of consumer units for the last five financial years and the average annual growth per town for the period 2011/2012 to 2015/2016.

Table A.11: Total number of consumer units per town and percentage growth from 2011/2012 to 2015/2016						
Distribution System	11/12	12/13	13/14	14/15	15/16	Annual Growth % 11/12 – 15/16
Paarl	22 097	23 116	23 509	23 726	24 073	2.16%
Wellington	8 523	8 597	8 614	8 614	8 633	0.32%
Saron	1 623	1 618	1 622	1 625	1 632	0.14%
Gouda	543	539	535	548	674	5.55%
Hermon	134	188	194	197	198	10.25%
Bainskloof	24	24	24	25	25	1.03%
<b>TOTALS</b>	<b>32 944</b>	<b>34 082</b>	<b>34 498</b>	<b>34 735</b>	<b>35 235</b>	<b>1.69%</b>

Table A.12(a): Residential Water Services Delivery Adequacy Profile (Water)

Water Categorisation	Number of settlements	FORMAL																INFORMAL							
		Adequate					Water Resource needs		O & M Needs		Infrastructure Needs				No services		Adequate	No services							
		House Connections	HH	%	HH	%	Shared Services	HH	%	HH	%	Upgrades	HH	%	Extensions	HH			%	Refurbishment	HH	%			
1	32	39,222	100%	1,255	100%	407	100%																		
2	31																								
3	10									21,704	100%												3,728	100%	
4	0																								
5	0																								
6	0																								
7	3																								
8	0																								
9	0																								
10	3																								
Total Household Interventions required		38,565			1,255		407																134	3,750	0

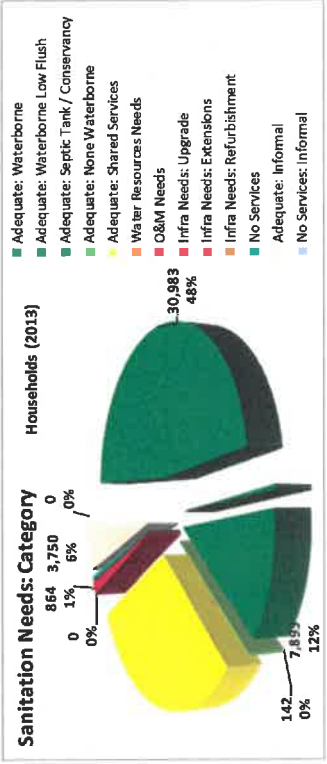
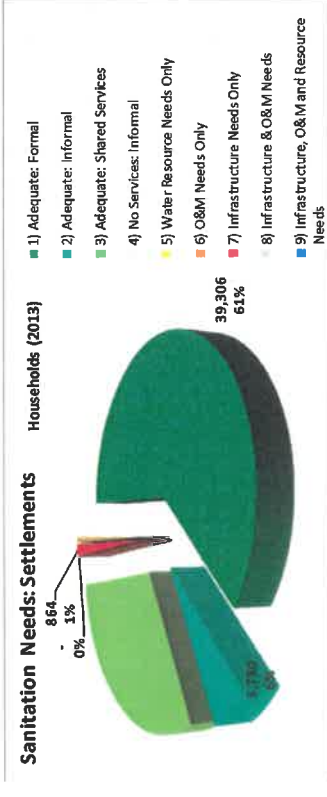


1	Adequate	3	Adequate: Shared services	5	Water Resources Needs Only	7	Infrastructure Needs Only	9	Infrastructure, O&M & Resource Needs
2	Adequate: Informal	4	No Services: Informal	6	O & M Needs Only	8	Infrastructure & O&M Needs	10	No Services



**Table A.12(b): Residential Water Services Delivery Adequacy Profile (Sanitation)**

Water Cateporisation	Number of settlements	FORMAL														INFORMAL											
		Adequate								Water Resource needs		O & M Needs		Infrastructure Needs				No services			Adequate			No services			
		HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%
1	57	31,503	100%	288	100%	8,030	100%	142	100%																		
2	31									21,704	100%																
3	10																										
4	0																										
5	0																										
6	0																										
7	6															864	100%										
8	0																										
9	0																										
10	2																										
Total Household Interventions required		30,383		288		7,893		142		20,574		0		0		864		0		354		3,750		0		0	



1	Adequate	3	Adequate: Shared services	5	Water Resources Needs <u>Only</u>	7	Infrastructure Needs <u>Only</u>	9	Infrastructure, O&M & Resource Needs
2	Adequate: Informal	4	No Services: Informal	6	O & M Needs <u>Only</u>	8	Infrastructure & O&M needs	10	No Services

Business Element 4: Socio Economic

The 2001 Census recorded the population in the Drakenstein Municipality's Management Area at 194 417 persons (44 410 Households) and the 2011 Census data recorded the population at 251 262 persons (59 774 Households). The population of Drakenstein Municipality is currently estimated at approximately 279 499 persons (66 575 Households) for 2015/2016.

The historical population and household figures and population growth rates and projected present population and number of households for Drakenstein Municipality, for the various areas, are summarised in the table below.

Table A.13: Historical population and household figures, population growth rates, projected present population and number of households								
Distribution System	Historical Population Growth per year (2001 – 2011)	Census 2011/2012			Future Population Growth per year (2011 Onwards)	Projected for 2015/2016		Number of Residential Consumer Units (Financial System)
		Population	Households	Person / HH		Population	Households	
Paarl / Wellington	2.78%	197 487	48 237	4.09	3.0%	222 363	54 316	33 160 *
Saron	0.87%	7 814	1 908	4.10	1.5%	8 293	2 025	1 618
Gouda	1.57%	2 985	719	4.15	2.0%	3 231	778	637
Hermon	0.93%	711	165	4.31	1.5%	755	175	194
Bainskloof	Unknown	24	6	4.00	0.5%	24	6	25
Farms	2.36%	42 241	8 739	4.83	1.5%	44 833	9 275	9 275
TOTALS	2.60%	251 262	59 774	4.20	2.69%	279 499	66 575	66 613

Note: \* Number of residential consumer units for Paarl / Wellington include the households in informal areas.

The graph below gives an overview of the 2011 Census male and female distribution per age category for Drakenstein Municipality.

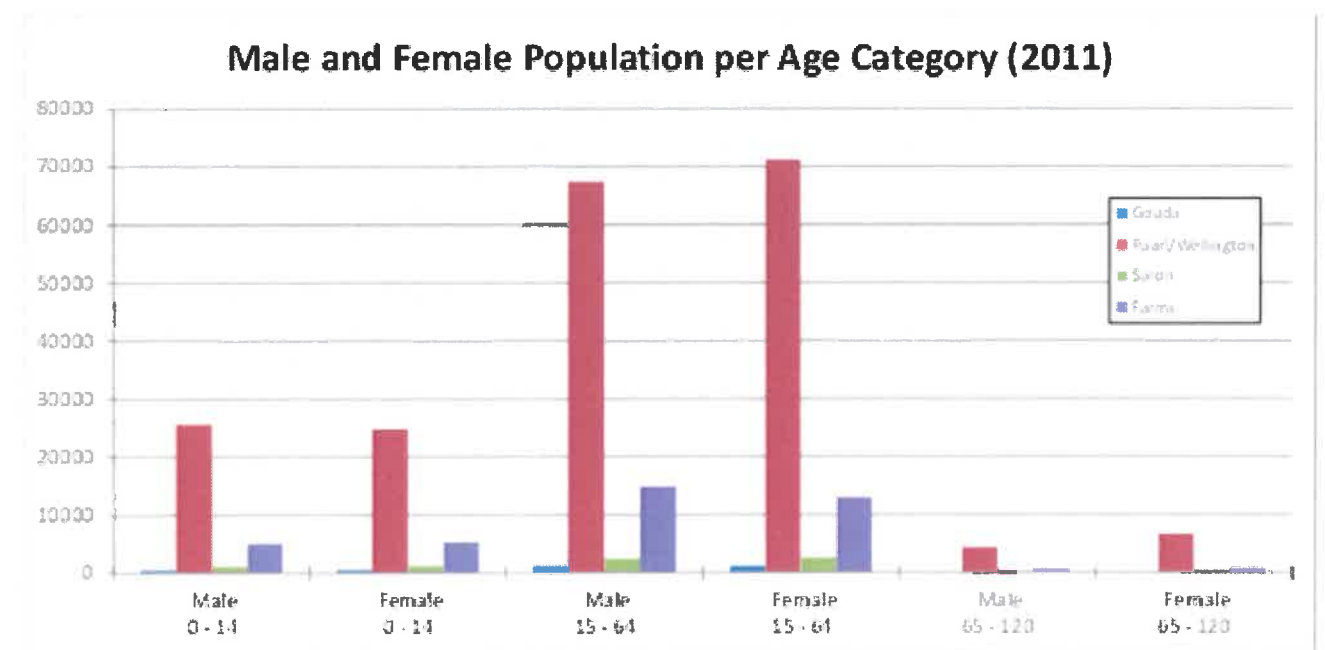


Figure A.3: Male and Female population per age category for 2011.

The graph below gives an overview of the 2011 Census population distribution per age category for Drakenstein Municipality.

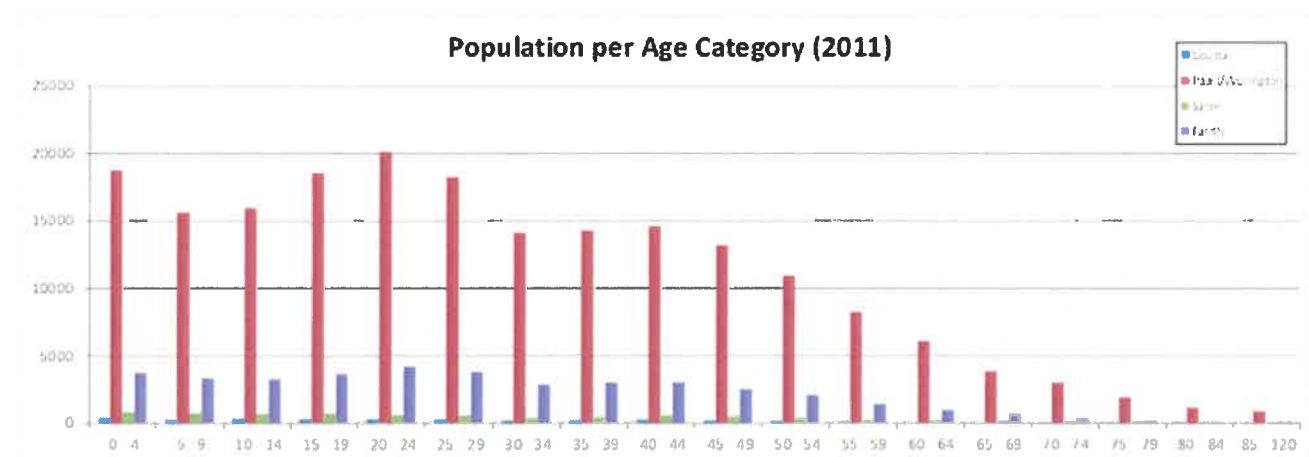


Figure A.4: Population distribution per age category for 2011.

The increase in the working population aged 20-24 compared to those aged 0-14 is an indication of in migration of workers looking for jobs in the area. The growth in the labour force will have a direct impact on a greater need for employment opportunities.

The child and age dependency ratio of Drakenstein Municipality for 2011 was 25.6% and 5.2% respectively. The total dependency ratio for Drakenstein Municipality was therefore 30.8%. In relation to the Age Distribution within the Drakenstein Municipality, the Working Age segment of the population accounts for 69.2%, while 25.6% is attributable to the “Children” category and 5.2% making up the “Aged” category in 2011. From an economic standpoint, the labour force appeared to be well endowed with a fair sparkling of youth.

Drakenstein employed 100 779 people in 2015. The sectors that contributed the most to Drakenstein's employment in 2015 were as follows:

- Wholesale and retail trade, catering and accommodation at 25.1%.
- Community, social and personal services at 16.5%
- Finance, insurance, real estate and business services at 15.9%.

These three sectors accounted for over 57.5% of the employment opportunities within the Drakenstein economy. Half of the economic sectors listed above shed jobs during the recession (2008 – 2009) and three of these sectors (agriculture, manufacturing and mining) continued to shed jobs after the recession (2009 – 2015). The agriculture, forestry and fishing sector has been shedding jobs throughout the different reporting cycles indicating that the global recession and current drought has been impacting the agriculture sector for the past several years.

The sectors that contributed the most to Drakenstein GDP in 2015 included:

- Finance, insurance, real estate and business services at 24.3%.
- Wholesale and retail trade, catering and accommodation at 18.5%.
- Manufacturing at 12.6%.

**Business Element 5: Water Services Infrastructure Management (Infrastructure)**

Drakenstein Municipality is responsible for the operation and maintenance of all the water and sewerage infrastructure summarised in the tables below:

Table A.14: Existing main water infrastructure						
Water Distribution System	Bulk Supply	WTW		Network Bulk and Reticulation	Number of Water PS	Total Reservoir Storage
	(Resources)	Capacity WTW (Disinfection)	Add Disinfection	(km)	(RW/PW)	(MI)
Paarl / Wellington	Wemmershoek Dam (CCT) Nantes & Bethel dams & Berg River Antoniesvlei / Withoogte & Spruit River	8.0 MI/d Meulwater WTW (Chlorine), 2.5 MI/d Welvanpas WTW (Chlorine)	Con Marine (Chlorine)	Bulk (56.455) Reticulation (629.480)	2 (RW) 12 (PW)	21 Reservoirs (235.1MI) and 1 Tower (0.150 MI)
Saron	Leeu River	4.838 MI/d Saron WTW (UV)	WTW (Chlorine)	Bulk (8.000) Reticulation (32.515)	-	1 (2.000 MI)
Gouda	Voëlvlei Dam (WC DM)	-	-	Bulk (7.485) Reticulation (18.380)	-	2 (2.820 MI)
Hermon	Wemmershoek Dam (CCT)	-	-	Bulk (1.385) Reticulation (5.755)	-	1 (0.5 MI)
Bainskloof	Witte River	0.4 MI/d Bainskloof WTW (UV)	Reservoir (Chlorine Tablets)	Bulk (0.404) Reticulation (1.210)	1 (RW)	1 (0.083 MI)

The table below gives an overview of the major sewerage infrastructure components, for the various drainage systems, in Drakenstein Municipality's Management Area.

Table A.15: Existing main sewerage infrastructure			
Sewer Drainage Systems	Sewer Drainage Network (km)	Number of Sewer PS	WWTW (Capacity in MI/d)
Paarl / Wellington	Rising mains (19.6 km), Gravity (532.8 km)	17 and 10 (Private)	35.0 MI/d Paarl WWTW, 7.0 MI/d Wellington WWTW, 2.0 MI/d Pearl Valley WWTW
Saron	Rising mains (5.0 km), Gravity (29.5 km)	2	0.830 MI/d Saron WWTW
Gouda	Rising mains (1.5 km), Gravity (10.9 km)	1	0.640 MI/d Gouda WWTW
Hermon	Rising mains (0.8 km), Gravity (1.1 km)	1	0.092 MI/d Hermon WWTW
Bainskloof	-	-	-

Drakenstein Municipality updated their current Asset Register after June 2016, in order to include the new assets constructed during the 2015/2016 financial year. The tables below give an overview of the water and sewerage infrastructure, as taken from the following two reports:

- Asset Register of Water Assets for Drakenstein Municipality, Summary Report Draft, 21 October 2016.
- Asset Register of Sanitation Assets for Drakenstein Municipality, Summary Report Draft, 21 October 2016.



**Water Infrastructure:** The current replacement cost and the required O&M Budgets of the water infrastructure of Drakenstein Municipality is summarised in the table below (June 2016):

Asset Type	GIS ID	CRC	Required O&M Budgets	O&M % CRC
Dams	DAM	R15 516 393	R146 714	0.95%
Bulk Water Pipeline	BWP	R228 489 162	R1 814 280	0.79%
Pump Station	PST	R25 492 750	R1 679 220	6.59%
Reservoir	RES	R296 982 839	R2 483 748	0.84%
Reticulation Pipeline	WRP	R290 990 529	R3 693 573	1.27%
Consumer Connections	WAT	R39 671 390	R829 004	2.09%
WTW	WTWs	R29 880 531	R164 144	0.55%
Other Assets	No Data	R6 625	R7	0.10%
<b>Total</b>		<b>R927 030 218</b>	<b>R10 810 691</b>	<b>1.17%</b>

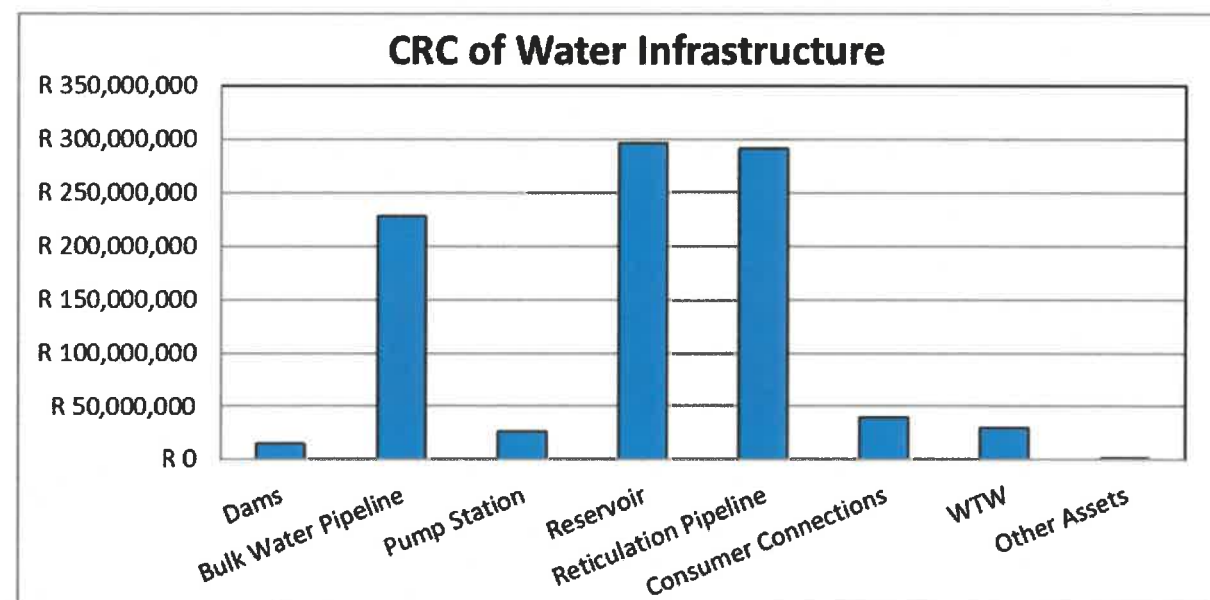


Figure A.5: CRC of the water infrastructure

The following table gives an overview of the remaining useful life by facility type for the water infrastructure (CRC):

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Dams	DAM	R316 940	R2 903 870	R263 636	R2 486 760	R9 545 187
Bulk Water Pipeline	BWP	R44 266 466	R73 589 911	R21 671 896	R15 101 599	R73 859 290
Pump Station	PST	R19 351 197	R4 432 697	R6 766	R704 630	R997 460
Reservoir	RES	R2 295 185	R42 982 536	R2 318 222	R55 293 884	R194 093 012
Reticulation Pipeline	WRP	R30 998 645	R35 307 690	R17 109 775	R13 439 484	R194 134 936
Consumer Connections	WAT	R5 069 651	R20 986 674	-	R8 627 125	R4 987 940
WTW	WTW's	R3 992 729	R771 806	R15 409 022	R448 522	R9 258 452
Other Assets	No Data	-	-	R6 625	-	-
<b>Total</b>		<b>R106 290 813</b>	<b>R180 975 184</b>	<b>R56 785 942</b>	<b>R96 102 003</b>	<b>R486 876 277</b>

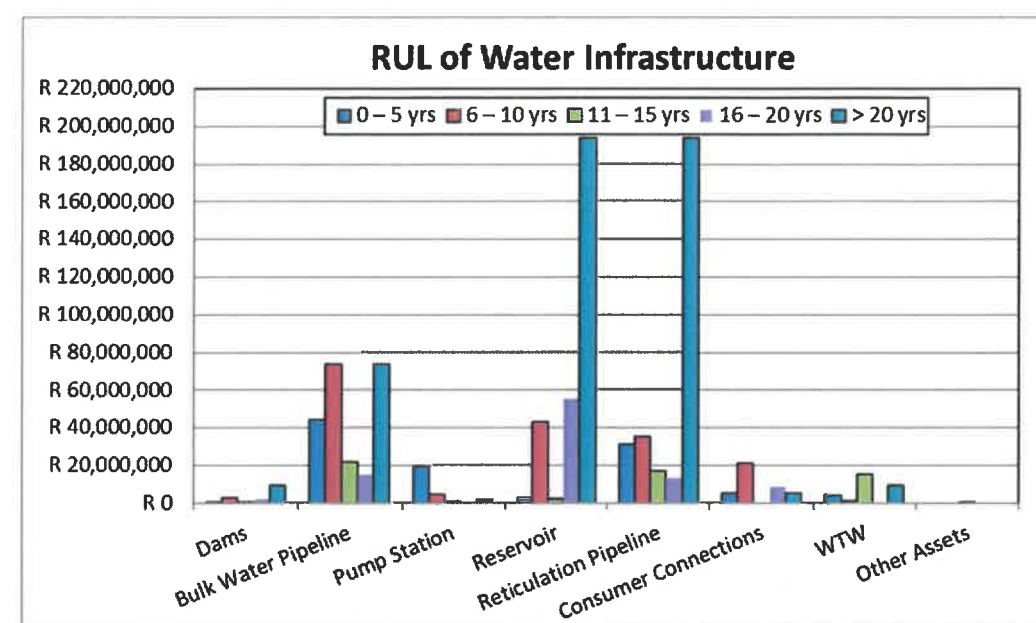


Figure A.6: RUL of the water infrastructure

The following table gives an overview of the age distribution by facility type for the water infrastructure (CRC):

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Dams	DAM	R399 998	-	R15 900	R159 000	R14 941 495
Bulk Water Pipeline	BWP	R27 582 657	R1 416 540	R674 749	R7 032 987	R191 782 230
Pump Station	PST	R95 470	R106 000	R5 228 604	R1 211 854	R18 850 822
Reservoir	RES	R80 112 431	R797 780	R7 003 146	R531 060	R208 538 423
Reticulation Pipeline	WRP	R96 622 574	R18 783 928	R518 602	R18 865 471	R156 199 954
Consumer Connections	WAT	R1 255 920	R58 643	-	R1 744 679	R36 612 149
WTW	WTW's	R25 020 780	R235 590	R339 301	R970 298	R3 314 563
Other Assets	No Data	R6 625	-	-	-	-
<b>Total</b>		<b>R231 096 454</b>	<b>R21 398 481</b>	<b>R13 780 301</b>	<b>R30 515 348</b>	<b>R630 239 635</b>

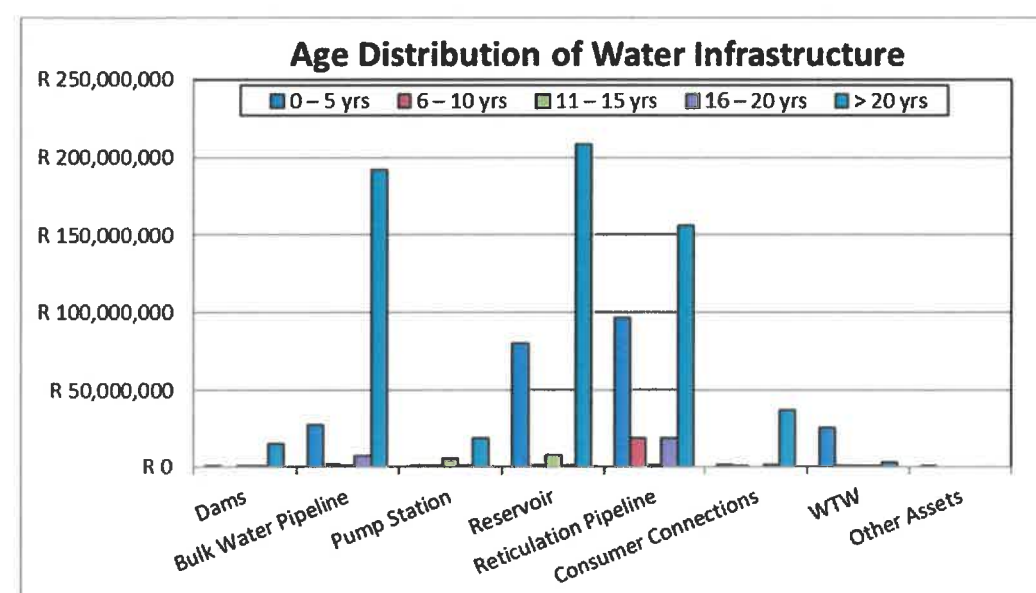


Figure A.7: Age distribution of the water infrastructure

The condition grading per water facility type is summarised in the table below:

Asset Type	GIS ID	Very Good	Good	Fair	Poor	Very Poor
Dams	DAM	R9 829 493	R2 613 960	R3 064 036	R8 904	-
Bulk Water Pipeline	BWP	R52 012 100	R31 822 753	R100 387 843	R2 536 465	R41 730 001
Pump Station	PST	R1 810 494	R9 318 521	R13 971 226	R163 770	R228 738
Reservoir	RES	R162 657 861	R86 780 115	R47 332 863	R63 600	R148 400
Reticulation Pipeline	WRP	R163 076 057	R44 680 954	R52 196 054	R7 196 462	R23 841 002
Consumer Connections	WAT	R3 059 241	R10 555 824	R20 986 674	R5 069 651	-
WTW	WTW's	R25 463 468	R369 262	R1 398 576	R64 312	R2 584 914
Other Assets	No Data	R6 625	-	-	-	-
<b>Total</b>		<b>R417 915 338</b>	<b>R186 141 388</b>	<b>R239 337 272</b>	<b>R15 103 164</b>	<b>R68 533 056</b>

About 9% of the water supply infrastructure is in a poor or very poor condition and the condition backlog is in the order of R83.636M. The bulk of the backlog is made up of bulk water pipeline and water reticulation pipeline assets.

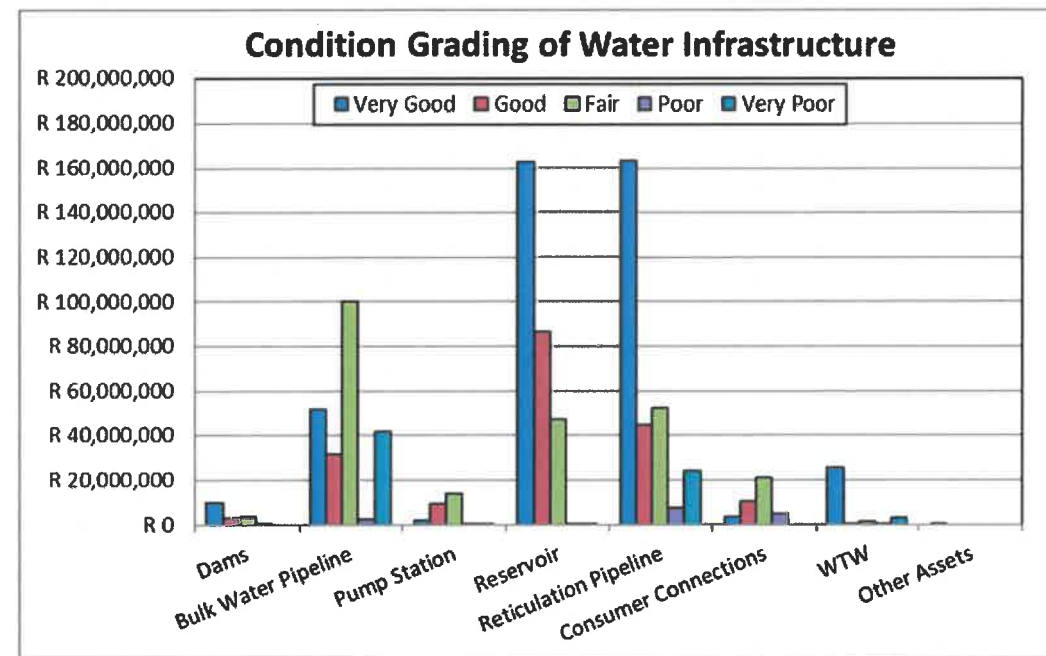


Figure A.8: Condition grading of the water infrastructure

Sewerage Infrastructure: The current and the required O&M Budgets of the sewerage infrastructure of Drakenstein Municipality is summarised in the table below (June 2016):

Asset Type	GIS ID	CRC	Required O&M Budgets	O&M % CRC
Bulk Sewer Pipelines	BSP	R174 968 262	R1 120 368	0.64%
Sewer Pump Stations	SPS	R48 724 482	R1 824 855	3.75%
Sewer Reticulation Pipelines	SRP	R262 739 192	R4 048 075	1.54%
WWTWs		R188 674 171	R5 475 479	2.90%
<b>Totals</b>		<b>R675 106 107</b>	<b>R12 468 777</b>	<b>1.85%</b>

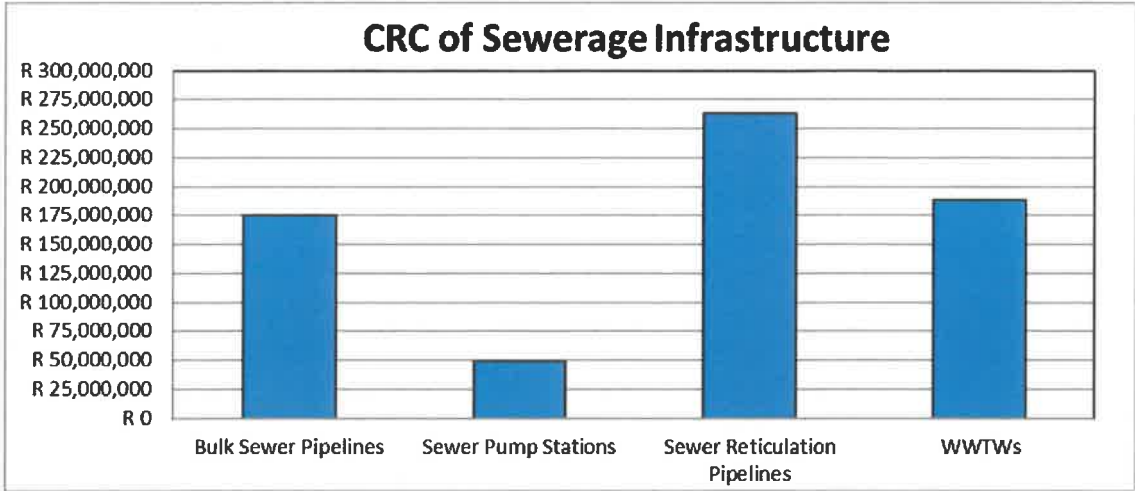


Figure A.9: CRC of the sewerage infrastructure

The following table gives an overview of the remaining useful life by facility type for the sewerage infrastructure (CRC):

Table A.21: Overview of the remaining useful life by facility type for the sewerage infrastructure (CRC)						
Asset Type	GIS ID	< 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Bulk Sewer Pipelines	BSP	R26 864 512	R681 888	R38 724 327	R7 019 813	R101 677 722
Sewer Pump Stations	SPS	R12 489 171	R1 716 672	R6 543 373	R8 824 394	R19 150 872
Sewer Reticulation Pipelines	SRP	R25 010 310	-	R52 765 648	-	R184 963 234
WWTWs		R49 900 833	R36 880 365	R6 093 509	R14 795 751	R81 003 712
Totals		R114 264 827	R39 278 925	R104 126 857	R30 639 959	R386 795 540

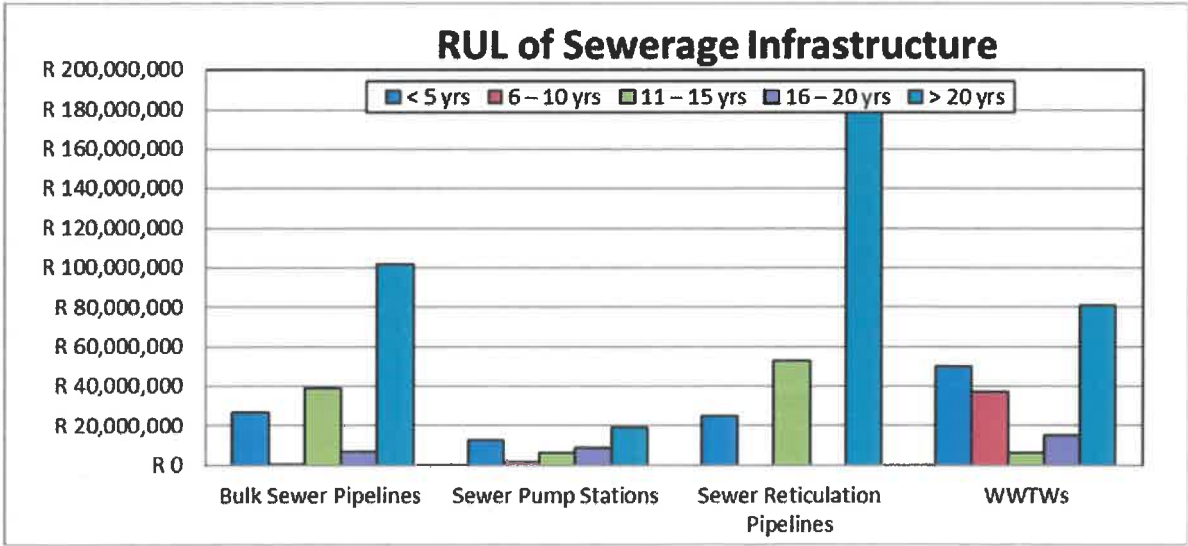


Figure A.10: RUL of the sewerage infrastructure



The following table gives an overview of the age distribution by facility type for the sewerage infrastructure (CRC):

Table A.22: Overview of the age distribution by facility type for the sewerage infrastructure (CRC)						
Asset Type	GIS ID	< 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Bulk Sewer Pipelines	BSP	R11 099 009	R19 428 157	R3 526 974	R19 405 325	R121 508 797
Sewer Pump Stations	SPS	R20 764 168	R2 741 967	R12 217 548	R5 374 352	R7 626 447
Sewer Reticulation Pipelines	SRP	R35 532 293	R4 196 985	R19 665 930	R38 769 887	R164 574 097
WWTWs		R27 698 788	R25 226 556	R916 180	R15 107 235	R119 725 412
Totals		R95 094 259	R51 593 665	R36 326 631	R78 656 799	R413 434 753

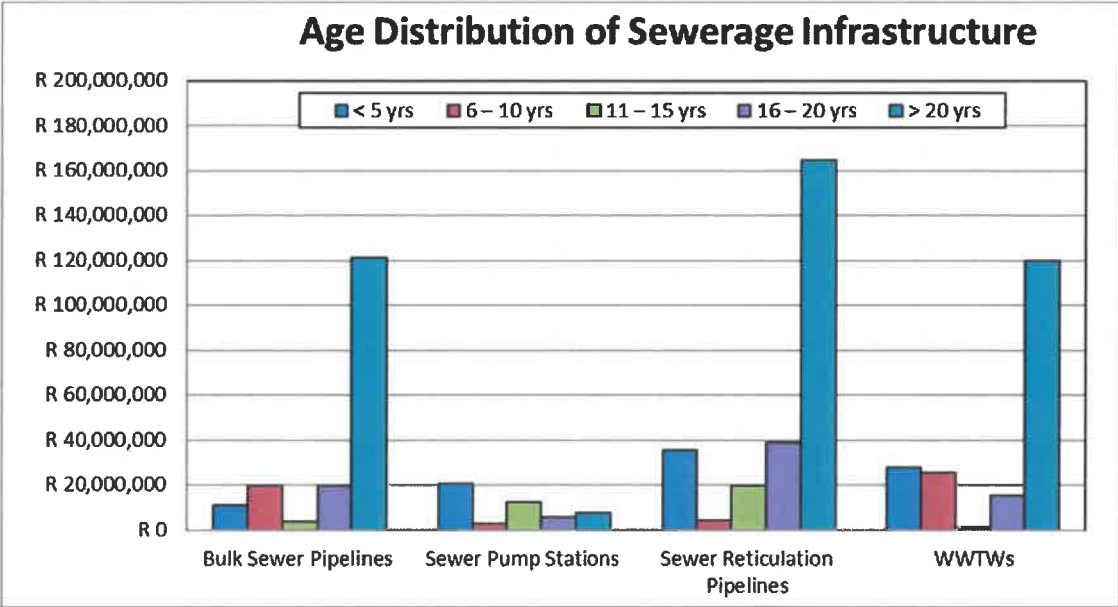


Figure A.11: Age distribution of sewerage infrastructure

The condition grading per sewerage facility type is summarised in the table below (CRC):

Table A.23: Condition grading per sewerage facility type						
Asset Type	GIS ID	Very Good	Good	Fair	Poor	Very Poor
Bulk Sewer Pipelines	BSP	R61,708,003	R31,158,865	R55,236,881	R6,265,313	R20,599,199
Sewer Pump Stations	SPS	R37,718,957	R2,874,927	R3,950,154	R4,122,144	R58,300
Sewer Reticulation Pipelines	SRP	R89,724,933	R54,908,003	R93,095,946	R5,461,196	R19,549,115
WWTWs		R68,387,266	R51,535,395	R36,660,189	R30,835,562	R1,255,759
Totals		R257,539,160	R140,477,189	R188,943,171	R46,684,216	R41,462,372

About 13.1% of the sewerage infrastructure is in a poor or very poor condition and the condition backlog is in the order of R88.147M. The bulk of the backlog is made up of the bulk sewer pipelines and the sewer reticulation pipelines.

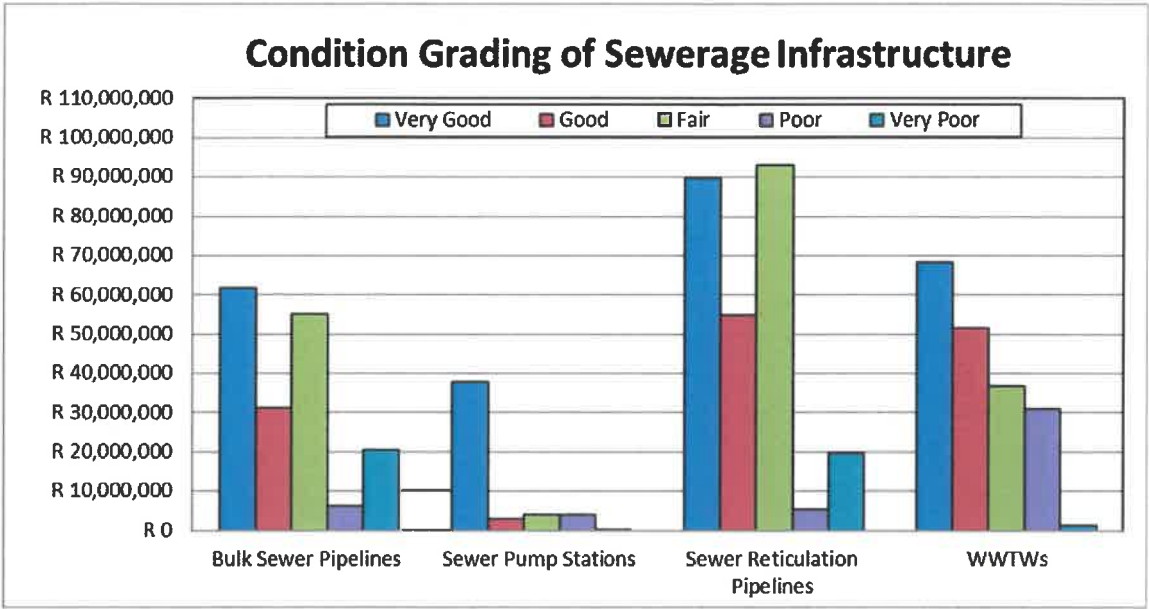


Figure A.12: Condition grading of sewerage infrastructure

The graphs below gives an overview of the length and diameter of water and sewer pipelines installed over the various financial years.

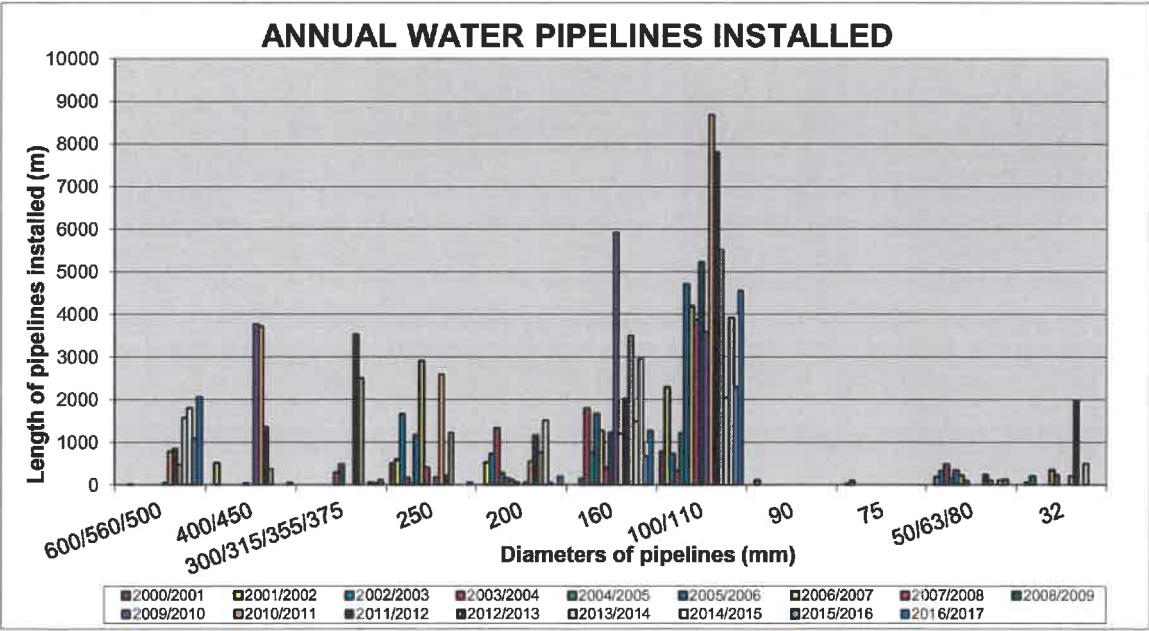


Figure A.13: Length of water pipelines installed

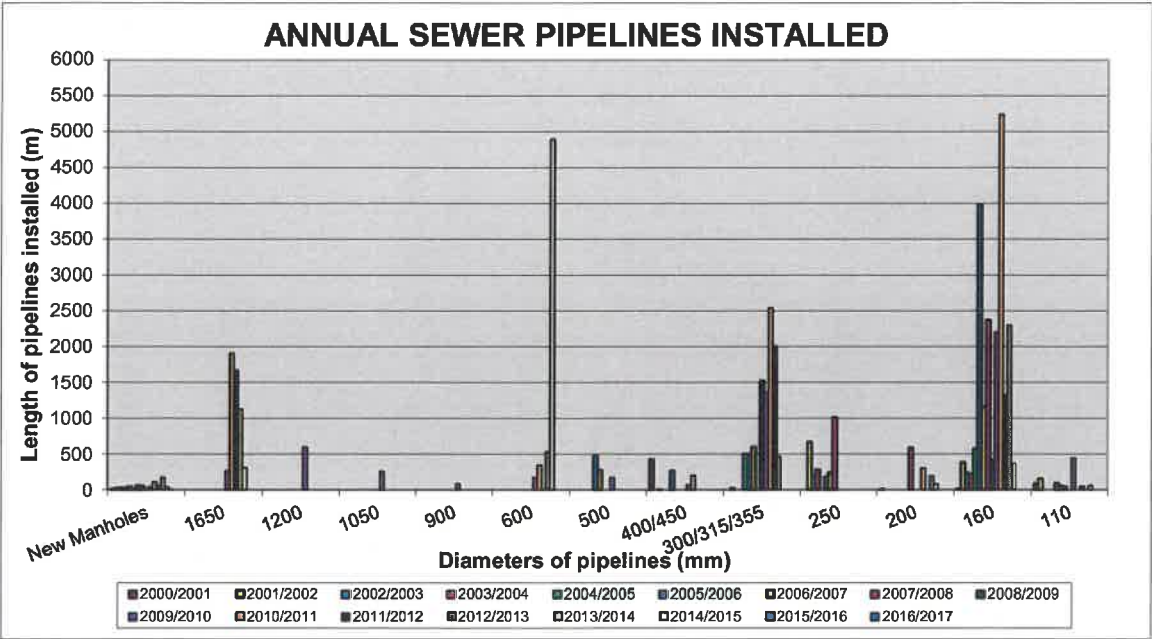


Figure A.14: Length of sewer pipelines installed

**Business Element 6: Water Services Infrastructure Management (O&M)**

A Water Safety Plan is in place for Drakenstein Municipality. A qualified, dedicated team was established by Drakenstein Municipality for the drafting of their Water Safety Plan. A detailed risk assessment was executed as part of the process and the existing control measures implemented by Drakenstein Municipality were evaluated as part of the Water Safety Plan process. An Improvement / Upgrade Plan was compiled for all the existing significant risks, where the existing controls were not effective or absent. Each identified improvement was linked to one of the Water Safety Plan Team members to take responsibility for implementation together with an appropriate time frame for implementation of these controls. Water and Safety Management Procedures were also developed for various types of incidents. The Municipality will review their Water Safety Plan in the nearby future.

Comprehensive Operational and Compliance Sampling programmes are implemented by Drakenstein Municipality at their WTWs and on their water reticulation networks.

A Disaster Management Plan for the Cape Winelands District Municipality is in place, which confirms the arrangements for managing disaster risk and for preparing for- and responding to disasters within the Cape Winelands Region as required by the Disaster Management Act. The Cape Winelands District Municipality's Disaster Management Plan clearly specify responsibilities for coordinating measures to be taken, a communication plan to alert and inform users of the drinking-water supply and practical plans for providing and distributing emergency supplies of drinking-water and plans to clean and remediate spillages to the receiving environment or water resource.

The Municipality is also busy with the finalisation of the individual W<sub>2</sub>RAPs for each of their drainage networks and WWTWs. The W<sub>2</sub>RAP is an all-inclusive risk analysis tool by which risks associated with the management of collection, treatment and disposal of wastewater, are identified and rated (quantified). The identified risks can then be managed according to its potential impacts on the receiving environment / community / resource.

Comprehensive Operational and Maintenance Manuals are in place for all the WTWs and WWTWs.

Operational and final effluent compliance sampling monitoring programmes are implemented by Drakenstein Municipality. Operational Alert Levels were also developed for the various WWTWs in order to ensure that the various unit processes in the plant performs optimally. If these pre-determined Alert Levels are exceeded at any of the control points where samples are taken for operational purposes, specific actions are taken to bring the operational parameters back to within the target ranges.

The operational samples taken at the various WWTWs are analysed at the Municipality's own laboratory at the Paarl WWTW. The monthly compliance samples that are taken at all the WWTWs are analysed by an external accredited laboratory, who also compiles monthly monitoring and inspection reports. The Municipality takes immediate action to rectify problems and / or improve operational aspects as and when may be required. For serious failures an Incident Response Management Protocol is followed to ensure rapid remedying of the problems, which includes notification to the DWS as may be necessary.

### DWS's Blue Drop Process

The DWS launched the blue and green drop certification, with regard to drinking water quality and wastewater quality management, at the Municipal Indaba during September 2008. Blue drop status is awarded to those towns that comply with 95% criteria on drinking water quality management. The Blue Drop Certification programme is in its seventh year of existence and promises to be the catalyst for sustainable improvement of South African drinking water quality management in its entirety. The blue drop performance of Drakenstein Municipality is summarised as follows in the DWS's 2014 Blue Drop Report:

Table A.24: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)	
Municipal Blue Drop Score	2011 – 95.72%, 2012 – 96.29% and 2014 – 72.14%
<p><b>Regulatory Impression:</b> The Drakenstein Local Municipality was well prepared for the assessment. The performance however during this assessment shows a substantial decrease in compliance with the Blue Drop criteria for all systems. A number of areas are identified where the Municipality should implement actions to improve compliance. These include:</p> <ul style="list-style-type: none"> <li>The water safety planning process was not well documented and sufficient evidence could not be presented regarding the risk assessment process and the identification of relevant risks. There was no evidence that the results of the SANS 241 analysis have been incorporated into the risk assessment.</li> <li>Operational and compliance monitoring has not been informed by the risk assessment. Limited chemical determinants are being monitored. A risk based monitoring programme that complies with the requirements of SANS 241 with regard to sampling points and coverage of the distribution system, frequency of analyses and the determinants analysed, should be developed and implemented.</li> <li>Poor operational compliance is reported in all systems.</li> <li>The IMP should be updated to be risk based and aligned with limits set out in the latest version of SANS 241. This must be communicated to all relevant stakeholders to ensure the appropriate response to any incidents.</li> <li>Asset registers do not fully incorporate all the treatment facilities.</li> <li>Operational staff at the treatment plants are not fully compliant with the requirements of Regulation 2834. Consideration needs to be given to the development of the required skills set to meet the requirements of R2834 and ultimately Regulation 813.</li> <li>Budget and cost information for the distribution systems was not provided.</li> </ul> <p>The Municipality is to be commended on the performance of their Water Conservation and Demand Management programme and the progress made with regard to reducing NRW.</p> <p>It is anticipated that through acknowledgement of the identified gaps that the Municipality will once again demonstrate progressive improvement in compliance in future assessments.</p> <p>Based on the above Audit results, the DWS has serious concerns on the poor microbiological drinking water quality and the resultant risk to consumers of the Bainskloof water supply system. These concerns have to be addressed as a matter of urgency and drinking water quality results and appropriate actions must be communicated to consumers should the water be found to be unfit for human consumption.</p> <p><b>Site Inspection (Meulwater WTW score 83%):</b> The site inspection impression at the Meulwater WTW was considered to be good. A number of drinking water quality management practices still require attention. Areas for improvement include:</p> <ol style="list-style-type: none"> <li>Incident management protocol and contact list not displayed.</li> <li>Although jar testing equipment is available, records could not be presented of regular water testing.</li> <li>Maintenance logbook not available. Incidents are reported in the daily logbook.</li> </ol>	



Performance Area (Water Services Provider)	Bainskloof (Drakenstein LM)	Drakenstein / Paarl (CCT)	Gouda (West Coast DM)	Hermon (CCT)	Saron (Drakenstein LM)
Water Safety Planning (35%)	21.18	25.03	17.50	27.83	21.70
Treatment Process Management (8%)	4.18	5.68	8.00	8.00	6.60
DWQ Compliance (30%)	3.38	17.48	25.80	25.88	21.75
Management, Accountability (10%)	7.25	7.35	7.30	7.50	6.80
Asset Management (14%)	8.96	9.91	7.60	9.91	9.03
Use Efficiency, Loss Management (3%)	3.00	2.85	3.00	3.00	3.00
Bonus Scores	4.50	3.78	5.91	3.62	4.20
Penalties	1.92	0.00	1.00	0.00	0.00
<b>Blue Drop Score (2014)</b>	<b>50.52%</b>	<b>72.07%</b>	<b>74.11%</b>	<b>85.73%</b>	<b>73.08%</b>
Blue Drop Score (2012)	95.14%	96.33%	96.30%	98.55%	95.00%
Blue Drop Score (2011)	96.80%	95.71%	95.97%	88.25%	91.79%
Blue Drop Score (2010)	72.00%	95.00%	95.25%	90.50%	97.25%
System Design Capacity (Ml/d)	0.000	52.300	29.100	1664.0	3.500
Operational Capacity (% i.t.o. Design)	23%	88%	61%	52%	44%
Average daily consumption (l/p/d)	142.9	243.5	152.5	139.3	193.3
<b>Microbiological Compliance (%)</b>	<b>93.8%</b>	<b>99.4%</b>	<b>99.9%</b>	<b>99.7%</b>	<b>99.9%</b>
<b>Chemical Compliance (%)</b>	<b>99.9%</b>	<b>99.9%</b>	<b>99.9%</b>	<b>99.9%</b>	<b>99.9%</b>

Table A.25: DWS's 2014 Blue Drop Risk Ratings for the various systems					
Municipal Blue Drop Risk Rating					38%
The overall 2014 Risk Rating for Drakenstein is 38% which translates into the 9th best performance in the Western Cape. Note that this value is based on the 3 specific areas indicated below and shows concerns (medium to critical risks) for Process Control (which risks reflect compliance in terms of draft Regulation 813) in 2 of the 5 systems; Drinking Water Quality in 1 out of the 5 systems; and Risk Management in none of 5 systems.					
Assessment Area	Bainskloof	Drakenstein / Paarl	Gouda	Hermon	Saron
<b>2014</b>					
<b>Blue Drop Risk Rating (2014)</b>	<b>51.9%</b>	<b>38.4%</b>	<b>38.6%</b>	<b>48.1%</b>	<b>37.3%</b>
Process Control RR	47.1%	56.5%	48.8%	52.5%	45.9%
Drinking Water Quality RR	70.4%	40.7%	40.7%	40.7%	40.7%
Risk Management RR	30.4%	30.4%	30.4%	30.4%	30.4%
<b>2013</b>					
<b>Blue Drop Risk Rating (2013)</b>	<b>26.3%</b>	<b>18.8%</b>	<b>16.5%</b>	<b>16.9%</b>	<b>36.1%</b>
Process Control RR	35.3%	43.5%	34.1%	32.5%	48.6%
Drinking Water Quality RR	11.1%	11.1%	11.1%	11.1%	11.1%
Risk Management RR	47.8%	34.8%	30.4%	34.8%	47.8%
<b>2012</b>					
<b>Blue Drop Risk Rating (2012)</b>	<b>52.7%</b>	<b>65.6%</b>	<b>78.3%</b>	<b>87.6%</b>	<b>61.6%</b>
Process Control RR	76.5%	82.6%	80.5%	80.0%	78.4%
Drinking Water Quality RR	11.1%	11.1%	11.1%	11.1%	11.1%
Risk Management RR	13.0%	17.4%	21.7%	17.4%	13.0%

The average daily consumption (l/p/d) for the last three financial years are summarised in the table below:

Table A.26: Average residential daily consumption (l/p/d) for the last three financial years.									
Distribution System	2014/2015			2015/2016			2016/2017		
	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)
Paarl and Wellington	215 887	22 548	104.4	222 363	22 500	101.2	229 034	18 316	80.0
Saron	8 171	1 319	161.4	8 293	1 330	160.4	8 418	1 300	154.4
Gouda	3 168	293	92.5	3 231	304	94.1	3 296	282	85.6
Hermon	743	155	208.6	755	173	229.1	766	163	212.8
Bainskloof	24	9	375.0	24	12	500.0	25	8	320.0

Note: It is important to note that the high l/c/d for Bainskloof is because of the camping site in Bainskloof and the billed metered consumption is compared to the very low permanent population.

DWS's Regulatory Impression:

Drakenstein's Municipal Score decreased slightly during the 2013 Green Drop Audit with an achievement of 77.79% compared to the previous 80.3%. Importantly, the Municipality however achieved a Green Drop for the Hermon wastewater system. The Municipality is congratulated with this accomplishment, and also with their continued good performance during the Green Drop audits.

The Municipality is continuing to provide good wastewater services within their municipal area. During the present 2013-14 Green Drop Progress Reporting, the Municipality managed to reduce the Wastewater Risk Rating further, except in the case of Paarl where a significant worsening (indicated by an increased rating) was reported. The main concerns of the DWS are the apparent lack of supervisory and process controller competencies at the wastewater works (as evident from the GDS classification of such staff), the generally non-compliant wastewater quality, and the high operating capacity at the Paarl, Saron and Wellington works (although these plants have all been upgraded since the audit or are in the process of being upgraded). All of these concerns are addressed in the Green Drop Implementation Plan developed as part of the municipal WzRAP process. Responsibilities are specified, as well as deadlines and the necessary budgets have been allocated.

Progress is reported at regular meetings held with the DWS. The Drakenstein Municipality is encouraged to improve their systems further and to strive for excellence in their Green Drop status. The Regulator trust that the risk abatement planning and implementation will progress further towards the upcoming Green Drop audits of 2015. Drakenstein is congratulated for their improvement on 5 out of 6 treatment systems.

**Business Element 7: Associated Services**

All the schools, hospitals and clinics in Drakenstein Municipality's Management Area are supplied with a higher level of water and sanitation services.

**Business Element 8: Conservation and Demand Management**

The implementation of the Municipality's WDM Strategy has been extremely successful, with the overall raw water requirements for all the systems decreasing by an annual average of -1.75% over the last nine financial years, from 17 618 MI in 2007/2008 to 15 031 MI in 2016/2017. The overall water losses for the 2016/2017 financial year was only 1 394 MI, which is a respectable 9.27%. The main water demand management interventions undertaken by Drakenstein Municipality over the last few years are as follows:

- Increasing public awareness
  - School participation in Water Week and Sanitation Week forums.
  - Incentives motivating schools to participate in subsequent Water and Sanitation Weeks.
  - Presentations and competitions at school level, based around water and sanitation awareness.
  - Water and sanitation exhibitions at shopping centres, municipal offices and libraries.
  - Site visits arranged for schools to the Berg River Project and other water services infrastructure in the area.
  - Pamphlet distribution with municipal accounts and media coverage via local newspapers and radio.
  - Plays and shows presented at many primary schools based on water, sanitation and solid waste issues during the past eighteen (18) years.
- Establishment of a dedicated Water Demand Management Unit. This consists of three full time municipal staff members, whose duties include:
  - Leak detection
  - Water meter replacement
  - Inspection of users showing exceptionally high or low consumption figures.
  - Organizing the Water Week Campaigns.
  - Retrofitting and promotion of water saving devices.
  - Internal leak repair (beyond the meter) in poor areas.

- Liaison with meter readers from the Finance Department.
- Pressure management. Paarl's large central zone was identified as the primary target area for potential savings due to the reduction of pressure. This was achieved through:
  - Modelling the network as part of the Paarl Water Master Plan to assess potential savings.
  - Identifying high-pressure zones (pressure greater than 9 bar were found to occur).
  - Installation of pressure reduction valves and non-return valves with electronic flow controllers.
  - Controlling pressures during different times of the day, keeping lowest pressure at night when demands are lowest.
- Water saving devices
  - Replacement of more than 150 automatic flush urinals and old large-volume cisterns in municipal buildings.
  - Providing water saving devices to schools as prizes for competitions.
  - Repair of internal plumbing leaks (beyond the meter) in high-density residential areas.
- Other interventions
  - Introduction of stepped tariff structure since 1998
  - Metering of districts, zones and parks.
  - Logging and metering of industrial fire-water connections.
  - Installation of telemetry to monitor water supplied and unaccounted for water (UAW).
  - Conducting a water meter audit (Residential and Non Residential erven).
  - Introduction of water restrictions in terms of garden watering.

The schools in Drakenstein Municipality's Management Area are targeted during Water Week with awareness around water education programmes and water conservation. Water Week was held during March 2016 and 26 of the 52 invited Primary Schools from Paarl, Wellington, Saron, Hermon, Gouda and Simondium participated in the poster competition. Exhibitions were held at the municipal building in Paarl and each Library in Paarl, Wellington, Saron and Gouda, as well as 8 satellite libraries. Learners (776 during September 2015 and 620 during May to June 2016) were taken to the Nantes and Bethel Dams and Meulwater Water Treatment Works to explain the water treatment and distribution process and a power point presentation was done on the distribution of the water and how not to waste water. Pamphlets were also distributed in February 2016 which included water saving tips, the irrigation of gardens, reporting of leaks, etc.



La Rochelle Girls Primary 1<sup>st</sup> Place Poster Competition (Grade 3)



Amstelhof Primary School 1<sup>st</sup> Place Poster (Grade 6)



The table and graph below gives a summary of some of the Water Demand Management Activities implemented by Drakenstein Municipality over the last seventeenth financial years:

Table A.29: Water Demand Management Activities implemented by Drakenstein Municipality			
Legend	Water Demand Management Activity	Legend	Water Demand Management Activity
A	Investigate applications for exemption from water restrictions	H	Inspections for Treasury
B	Notices served to transgressors of water restriction measures	I	Investigations into abnormal high / low pressures
C	Water saving devices installed	J	Investigations into unmetered water connections
D	Investigations into abnormal high / low consumption	K	Notices to unauthorized water users
E	Monitoring of water systems with portable flow / loggers	L	Leaks on private property in poor areas repaired
F	Schools visited	M	Leaks on municipal water systems repaired
G	Investigations into unmetered fire water connections		

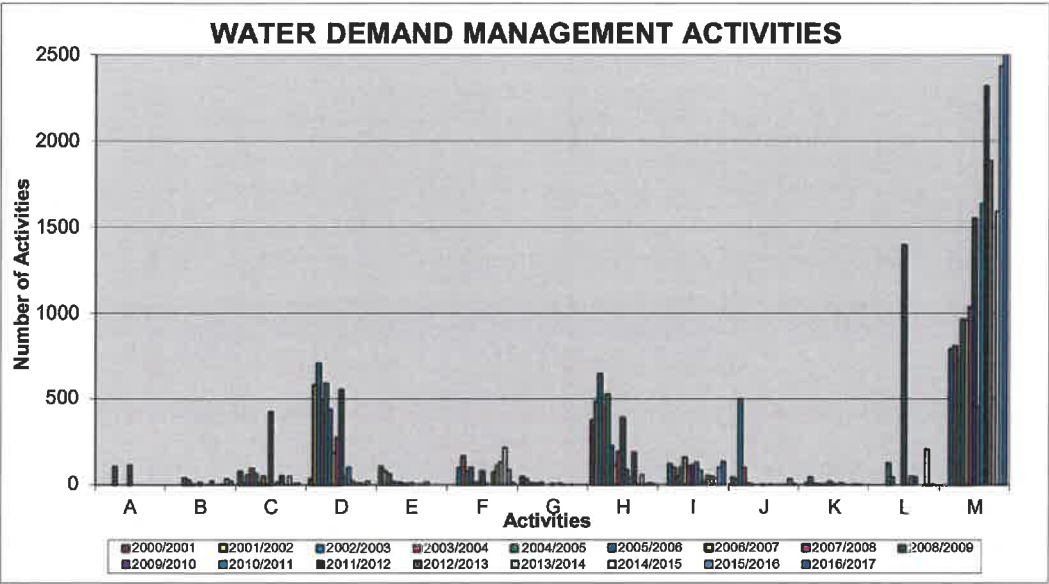


Figure A.15: WDM activities undertaken by Drakenstein Municipality over the last seventeenth years

The graph below gives an overview of the number of water meters replaced, uncovered, removed, repaired, tested and stolen for the last sixteen years.

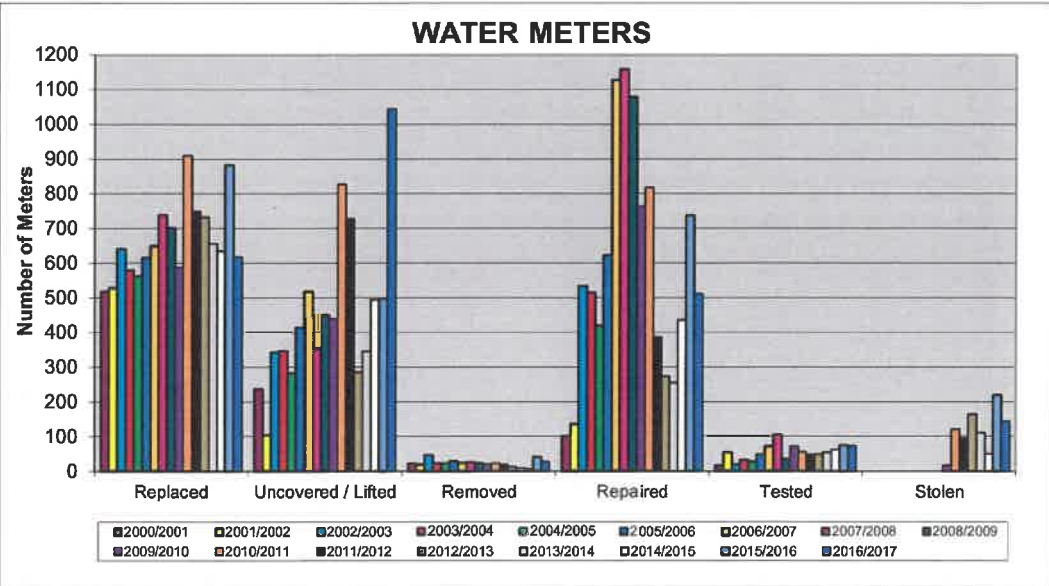


Figure A.16: Water meters repaired or replaced by Drakenstein Municipality over the last seventeenth years

The table below gives a summary of the water losses for the various distribution systems in Drakenstein Municipality's Management Area.

Table A.30: Water Losses for the various water distribution systems							
Description	Unit	16/17	Record : Prior (Ml/a)				
			15/16	14/15	13/14	12/13	11/12
Paarl and Wellington	Volume	1 273.997	2 375.156	2 783.251	2 395.480	2 031.439	1 839.764
	Percentage	8.96%	13.33%	15.12%	14.00%	12.08%	11.05%
	ILI	1.31	2.28	2.66	2.30	2.17	Paarl 2.39 Wel 1.14
Saron	Volume	115.128	56.247	95.455	183.080	60.456	63.060
	Percentage	19.39%	8.83%	15.83%	32.23%	10.87%	10.72%
	ILI	3.49	1.85	2.91	5.63	1.87	1.97
Gouda	Volume	28.293	47.444	60.952	60.212	34.809	30.885
	Percentage	16.24%	23.18%	27.16%	32.07%	19.98%	19.95%
	ILI	1.87	3.19	4.58	4.59	2.62	2.50
Hermon	Volume	-26.427	-26.505	-21.578	-17.173	1.958	16.885
	Percentage	-71.58%	-62.07%	-54.24%	-48.64%	5.24%	35.20%
	ILI	-	-	-	-	0.35	3.72
Bainskloof	Volume	2.537	0.104	1.397	1.646	0.671	1.649
	Percentage	46.43%	2.34%	28.76%	37.36%	17.41%	40.65%
TOTAL	Volume	1 393.528	2 452.446	2 919.477	2 623.245	2 129.333	1 952.243
	Percentage	9.27%	13.11%	15.14%	14.65%	12.11%	11.19%
	ILI	1.32	2.19	2.60	2.34	2.11	1.98

Note: Infrastructure Leakage Index (ILI) for Developed Countries = 1 – 2 Excellent (Category A), 2 – 4 Good (Category B), 4 – 8 Poor (Category C) and > 8 – Very Bad (Category D)

Category A = No specific intervention required.

Category B = No urgent action required although should be monitored carefully.

Category C = Requires attention

Category D = Requires immediate water loss reduction interventions

The Infrastructure Leakage Index (ILI) in the above table is the most recent and preferred performance indicator for comparing leakage from one system to another. It is a non-dimensional index representing the ratio of the current real leakage and the "Unavoidable Annual Real Losses". A high ILI value indicates a poor performance with large potential for improvement while a small ILI value indicates a well-managed system with less scope for improvement. Attaining and ILI = 1 is a theoretical limit, which is the minimum water loss in an operational water reticulation system. A value of less than 1 should not occur since this implies that the actual leakage is less than the theoretical minimum level of leakage.

### Business Element 9: Water Resources

The graph below gives an overview of the total bulk water supply and water losses for the various distribution systems in Drakenstein Municipality's Management Area.

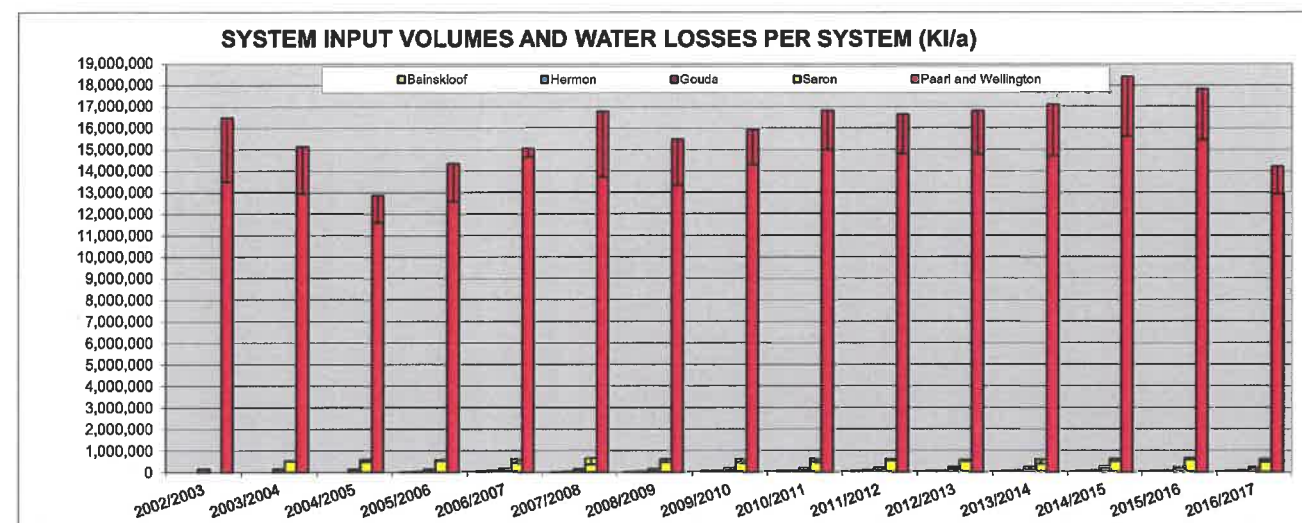


Figure A.17: System Input Volumes and water losses per system

Distribution System	Source	Record : Prior (MI/a)					
			15/16	14/15	13/14	12/13	11/12
Paarl and Wellington	Wemmershoek Dam (CCT)	13 317.713	16 615.896	16 881.629	15 735.197	15 739.475	15 771.466
	Nantes & Bethel dams & Berg River	897.022	1 065.578	1 167.210	1 013.000	916.163	632.409
	Antoniesvlei / Withoogte & Spruit River	5.771	139.575	356.084	357.319	157.594	249.286
	Sub Total	14 220.506	17 821.049	18 404.923	17 105.516	16 813.232	16 653.161
Saron	Leeu River	593.805	636.698	602.959	567.976	556.050	588.423
Gouda	Voëlvlei Dam (West Coast DM)	174.202	204.649	224.418	187.765	174.238	154.788
Hermon	Voëlvlei Dam (CCT)	36.917	42.703	39.785	35.304	37.346	47.962
Bainskloof	Witte River	5.464	4.448	4.857	4.406	3.855	4.057
Total		15 030.894	18 709.547	19 276.942	17 900.967	17 584.721	17 448.391

**Water Quality:** Water Quality Compliance samples are taken by an accredited external Laboratory. The water quality compliance sample results are loaded onto DWS's Blue Drop System (BDS) via the internet. Once entered the water quality data is automatically compared to SANS:241:2015. This real-time system allows for immediate intervention to rectify any problems.

The overall percentage of compliance of the water quality samples taken over the period July 2016 to June 2017 is summarised in the table below per distribution system. The additional monitoring required by Drakenstein Municipality for determinands identified during the risk assessment exceeding the numerical limits in SANS241:2015 are as follows.

<b>Table A.32: Additional monitoring required by Drakenstein Municipality for determinands identified during the risk assessment exceeding the SANS241:2015 numerical limits.</b>			
<b>Performance Indicator</b>	<b>Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)</b>	<b>% Sample Compliance according to SANS 241-2015 Limits</b>	<b>Frequency of Additional Monitoring due to failure (Table 3 of SANS 241-2:2015)</b>
<b>Paarl and Wellington</b>			
Acute Health Chemical	No (Excellent)	100.0%	-
Acute Health Microbiological	No (Good)	98.2%	-
Chronic Health	No (Excellent)	100.0%	-
Aesthetic	No (Excellent)	99.8%	-
Operational Efficiency	No (Good)	93.3%	-
<b>Saron</b>			
Acute Health Chemical	No (Excellent)	100.0%	-
Acute Health Microbiological	No (Excellent)	99.4%	-
Chronic Health	No (Excellent)	100.0%	-
Aesthetic	No (Excellent)	99.5%	-
Operational Efficiency	Yes (Unacceptable)	84.4%	Monthly
<b>Gouda</b>			
Acute Health Chemical	No (Excellent)	100.0%	-
Acute Health Microbiological	No (Excellent)	97.0%	-
Chronic Health	No (Excellent)	100.0%	-
Aesthetic	No (Excellent)	100.0%	-
Operational Efficiency	No (Excellent)	93.0%	-
<b>Hermon</b>			
Acute Health Chemical	No (Excellent)	100.0%	-
Acute Health Microbiological	No (Excellent)	98.8%	-
Chronic Health	No (Excellent)	100.0%	-
Aesthetic	No (Excellent)	100.0%	-
Operational Efficiency	No (Good)	90.9%	-
<b>Bainskloof</b>			
Acute Health Chemical	No (Excellent)	100.0%	-
Acute Health Microbiological	Yes (Unacceptable)	93.4%	Fortnightly
Chronic Health	No (Excellent)	100.0%	-
Aesthetic	No (Excellent)	100.0%	-
Operational Efficiency	No (Excellent)	99.5%	-

Notes: The compliance percentages for the Paarl distribution system were calculated against Table 4 of SANS241-2:2015 with a population above 100 000 persons.

The one sampling point in Saron was moved further away from the WTW, which will result in better microbiological compliance.



The table below gives an overview of the four categories under which the risks posed by micro-organism, physical or aesthetic property or chemical substance of potable water is normally classified:

Table A.33: Four categories under which the risks posed by micro-organism, physical or aesthetic property or chemical substance of potable water is normally classified	
Category	Risk
Acute Health	Determinand that poses an immediate unacceptable health risk if present at concentration values exceeding the numerical limits specified in this part of SANS 241.
Aesthetic	Determinand that taints water with respect to taste, odour and colour and that does not pose an unacceptable health risk if present at concentration values exceeding the numerical limits specified in SANS 241.
Chronic Health	Determinand that poses an unacceptable health risk if ingested over an extended period if present at concentration values exceeding the numerical limits specified in SANS 241.
Operational	Determinand that is essential for assessing the efficient operation of treatment systems and risks from infrastructure

The compliance percentages per individual parameter and the number of samples taken are also summarised in the table below.

Table A.34: Percentage compliance of the water quality samples for the period July 2016 to June 2017					
Category	Performance Indicator	SANS241: 2015 Limit	Performance Indicator	% Compliance	Number of Samples taken into account
<b>Paarl and Wellington</b>					
Microbiological	E.Coli	0	Acute Health Microbiological	98.2%	1 270
Chemical	Chloride	≤ 300	Aesthetic	100.0%	1 214
	Iron	≤ 2000	Chronic Health	99.9%	1 214
	Sodium	≤ 200	Aesthetic	100.0%	616
	Calcium	≤ 150	Aesthetic / Operational	100.0%	603
	Magnesium	≤ 70	Aesthetic / Health	100.0%	603
Physical	Electrical Conductivity	≤ 170	Aesthetic	100.0%	1 214
	Total Dissolved Solids	≤ 1 200	Aesthetic	100.0%	1 214
	Turbidity	≤ 5	Aesthetic	99.3%	1 217
Operational	Free Chlorine	≤ 5	Chronic Health	100.0%	1 263
	Heterotrophic Plate Count	≤ 1 000	Operational	100.0%	1 268
	pH	5.0 - 9.7	Operational	93.1%	1 213
	Turbidity	≤ 1	Operational	83.0%	1 217
<b>Saron</b>					
Microbiological	E.Coli	0	Acute Health Microbiological	99.4%	166
Chemical	Chloride	≤ 300	Aesthetic	100.0%	145
	Iron	≤ 2000	Chronic Health	100.0%	145
	Sodium	≤ 200	Aesthetic	100.0%	74
	Calcium	≤ 150	Aesthetic / Operational	100.0%	72
	Magnesium	≤ 70	Aesthetic / Health	100.0%	72
Physical	Electrical Conductivity	≤ 170	Aesthetic	100.0%	145
	Total Dissolved Solids	≤ 1 200	Aesthetic	100.0%	145
	Turbidity	≤ 5	Aesthetic	97.2%	145
Operational	Free Chlorine	≤ 5	Chronic Health	100.0%	165
	Heterotrophic Plate Count	≤ 1 000	Operational	100.0%	166
	pH	5.0 - 9.7	Operational	51.0%	145
	Turbidity	≤ 1	Operational	91.7%	145
<b>Gouda</b>					
Microbiological	E.Coli	0	Acute Health Microbiological	96.9%	97
Chemical	Chloride	≤ 300	Aesthetic	100.0%	97
	Iron	≤ 2000	Chronic Health	100.0%	101
	Sodium	≤ 200	Aesthetic	100.0%	49

Table A.34: Percentage compliance of the water quality samples for the period July 2016 to June 2017					
Category	Performance Indicator	SANS241: 2015 Limit	Performance Indicator	% Compliance	Number of Samples taken into account
Physical	Calcium	≤ 150	Aesthetic / Operational	100.0%	48
	Magnesium	≤ 70	Aesthetic / Health	100.0%	48
	Electrical Conductivity	≤ 170	Aesthetic	100.0%	97
	Total Dissolved Solids	≤ 1 200	Aesthetic	100.0%	97
	Turbidity	≤ 5	Aesthetic	100.0%	97
Operational	Free Chlorine	≤ 5	Chronic Health	100.0%	97
	Heterotrophic Plate Count	≤ 1 000	Operational	100.0%	97
	pH	5.0 - 9.7	Operational	83.5%	97
	Turbidity	≤ 1	Operational	92.8%	97
<b>Hermon</b>					
Microbiological	E.Coli	0	Acute Health Microbiological	98.6%	74
Chemical	Chloride	≤ 300	Aesthetic	100.0%	74
	Iron	≤ 2000	Chronic Health	100.0%	74
	Sodium	≤ 200	Aesthetic	100.0%	38
	Calcium	≤ 150	Aesthetic / Operational	100.0%	36
	Magnesium	≤ 70	Aesthetic / Health	100.0%	36
Physical	Electrical Conductivity	≤ 170	Aesthetic	100.0%	74
	Total Dissolved Solids	≤ 1 200	Aesthetic	100.0%	74
	Turbidity	≤ 5	Aesthetic	100.0%	74
Operational	Free Chlorine	≤ 5	Chronic Health	100.0%	74
	Heterotrophic Plate Count	≤ 1 000	Operational	100.0%	74
	pH	5.0 - 9.7	Operational	98.6%	74
	Turbidity	≤ 1	Operational	70.3%	74
<b>Bainskloof</b>					
Microbiological	E.Coli	0	Acute Health Microbiological	92.9%	70
Chemical	Chloride	≤ 300	Aesthetic	100.0%	50
	Iron	≤ 2000	Chronic Health	100.0%	50
	Sodium	≤ 200	Aesthetic	100.0%	26
	Calcium	≤ 150	Aesthetic / Operational	100.0%	24
	Magnesium	≤ 70	Aesthetic / Health	100.0%	24
Physical	Electrical Conductivity	≤ 170	Aesthetic	100.0%	50
	Total Dissolved Solids	≤ 1 200	Aesthetic	100.0%	50
	Turbidity	≤ 5	Aesthetic	100.0%	50
Operational	Free Chlorine	≤ 5	Chronic Health	100.0%	70
	Heterotrophic Plate Count	≤ 1 000	Operational	100.0%	70
	pH	5.0 - 9.7	Operational	100.0%	50
	Turbidity	≤ 1	Operational	98.0%	50

The results included in the tables above is for all the samples taken by the Municipality and also include sample points not registered on the BDS, which are used by Drakenstein Municipality to effectively manage the water quality in their distribution systems (Samples on dead end mains, in reservoirs, etc.). The results will therefore not correspond 100% with the results of the registered sample points, as loaded onto the BDS.

The operational water sampling programmes of Drakenstein Municipality complies with the minimum monitoring requirements of SANS:241 (Table 1: Minimum monitoring for process indicators) for the various WTWs and distribution systems. The table below indicates the compliance of the E.Coli monitoring frequency in the water distributions systems of Drakenstein Municipality, in terms of the minimum requirements of SANS: 241-2:2015. The period assessed was for samples taken from July 2016 to June 2017.

Table A.35: Drakenstein Municipality's compliance of the monthly E.Coli monitoring frequency in the water distributions systems in terms of the minimum requirements of SANS 241-2:2015 (Table 2).			
Distribution System	Projected population for 2016/2017	Required number of monthly samples (SANS 241-2:2015: Table 2)	Number of monthly E.Coli samples taken by Municipality during 2016/2017
Paarl and Wellington	229 034	45.8	105.8
Saron	8 418	2	13.8
Gouda	3 296	2	8.1
Hermon	766	2	6.2
Bainskloof	25	2	5.8
<b>Total</b>	<b>234 666</b>	<b>52.5</b>	<b>127.9</b>

It can be noted from the above table that the number of monthly E.Coli samples taken by the Municipality during the 2016/2017 financial year was more than the required number of samples for all the water distribution systems.

**Effluent Quality:** Final effluent quality compliance samples are taken by an accredited external Laboratory. The final effluent compliance sample results are loaded onto DWS's Green Drop System (GDS) via the internet. Once entered the effluent quality data is automatically compared to the General or Special Limits requirements for the WWTWs. The overall percentage compliances of the final effluent samples taken over the last three financial years at the Paarl, Wellington, Pearl Valley, Saron, Gouda and Hermon WWTW are summarised in the tables below. The compliance percentages were calculated against the following compliance limits.

- Paarl WWTW: Licence 19/G10D/FG/2863, 28 November 2016
- Wellington WWTW: General Limits
- Pearl Valley WWTW: Licence 01/G10C/FG/2859, 19 April 2015
- Gouda WWTW: General Limits, Irrigation up to 0.5 MI/d.
- Hermon WWTW: General Limits, Irrigation up to 0.5 MI/d.

Table A.36: Percentage Faecal Coliforms compliance of the compliance samples taken at the various WWTWs for the last three financial years			
WWTW	2016/2017	2015/2016	2014/2015
Paarl	63.2%	0.0%	4.3%
Wellington	100.0%	66.7%	50.0%
Pearl Valley	91.7%	50.0%	16.7%
Saron	58.3%	75.0%	50.0%
Gouda	100.0%	100.0%	100.0%
Hermon	-	-	-
<b>Total</b>	<b>82.6%</b>	<b>58.3%</b>	<b>44.2%</b>



**Table A.37: Percentage chemical compliance of the compliance samples taken at the various WWTWs for the last three financial years.**

WWTW	2016/2017					2015/2016					2014/2015				
	Ammonia	Nitrates	COD Unfiltered	Ortho Phosphate	Overall	Ammonia	Nitrates	COD Unfiltered	Ortho Phosphate	Overall	Ammonia	Nitrates	COD Unfiltered	Ortho Phosphate	Overall
Paarl	0.0%	100.0%	47.4%	0.0%	<b>36.9%</b>	43.5%	100.0%	73.9%	26.1%	<b>60.9%</b>	34.8%	100.0%	43.5%	17.4%	<b>48.9%</b>
Wellington	50.0%	100.0%	41.7%	91.7%	<b>70.9%</b>	75.0%	100.0%	50.0%	100.0%	<b>81.3%</b>	8.3%	100.0%	45.8%	83.3%	<b>59.4%</b>
Pearl Valley	83.3%	8.3%	66.7%	8.3%	<b>41.7%</b>	83.3%	41.7%	91.7%	50.0%	<b>66.7%</b>	33.3%	0.0%	50.0%	0.0%	<b>20.8%</b>
Saron	16.7%	91.7%	41.7%	100.0%	<b>62.5%</b>	50.0%	100.0%	58.3%	91.7%	<b>75.0%</b>	50.0%	100.0%	25.0%	100.0%	<b>68.8%</b>
Gouda	N/A	N/A	100.0%	N/A	<b>100.0%</b>	N/A	N/A	45.5%	N/A	<b>45.5%</b>	N/A	N/A	50.0%	N/A	<b>50.0%</b>
Hermon	N/A	N/A	100.0%	N/A	<b>41.7%</b>	N/A	N/A	16.7%	N/A	<b>16.7%</b>	N/A	N/A	8.3%	N/A	<b>8.3%</b>
<b>Total</b>	<b>37.5%</b>	<b>75.0%</b>	<b>56.5%</b>	<b>50.0%</b>	<b>59.0%</b>	<b>63.0%</b>	<b>85.4%</b>	<b>56.0%</b>	<b>67.0%</b>	<b>57.7%</b>	<b>31.6%</b>	<b>75.0%</b>	<b>37.1%</b>	<b>50.2%</b>	<b>42.7%</b>

**Table A.38: Percentage physical compliance of the compliance samples taken at the various WWTWs for the last three financial years.**

WWTW	2016/2017					2015/2016					2014/2015				
	pH	Electrical Conductivity	Total Suspended Solids	Overall		pH	Electrical Conductivity	Total Suspended Solids	Overall		pH	Electrical Conductivity	Total Suspended Solids	Overall	
Paarl	100.0%	47.4%	57.9%	<b>68.4%</b>		100.0%	95.7%	60.9%	<b>85.5%</b>		100.0%	95.7%	52.2%	<b>82.6%</b>	
Wellington	100.0%	100.0%	66.7%	<b>88.9%</b>		100.0%	100.0%	83.3%	<b>94.4%</b>		100.0%	100.0%	66.7%	<b>88.9%</b>	
Pearl Valley	75.0%	100.0%	100.0%	<b>91.7%</b>		50.0%	100.0%	75.0%	<b>75.0%</b>		58.3%	100.0%	58.3%	<b>72.2%</b>	
Saron	100.0%	100.0%	50.0%	<b>83.3%</b>		100.0%	100.0%	66.7%	<b>88.9%</b>		91.7%	100.0%	41.7%	<b>77.8%</b>	
Gouda	83.3%	83.3%	N/A	<b>83.3%</b>		45.5%	81.8%	N/A	<b>63.7%</b>		50.0%	41.7%	N/A	<b>45.9%</b>	
Hermon	100.0%	91.7%	N/A	<b>95.9%</b>		75.0%	83.3%	N/A	<b>79.2%</b>		91.7%	100.0%	N/A	<b>95.9%</b>	
<b>Total</b>	<b>93.1%</b>	<b>87.1%</b>	<b>68.7%</b>	<b>85.3%</b>		<b>78.4%</b>	<b>93.5%</b>	<b>71.5%</b>	<b>81.1%</b>		<b>82.0%</b>	<b>89.6%</b>	<b>54.7%</b>	<b>77.2%</b>	

**Industrial Consumers:** All the industrial effluent discharged from the “wet” industries into the sewerage systems of Drakenstein Municipality is treated at the various WWTWs. The volumes and nutrient loads of industrial effluent discharged by “Wet” industries in Drakenstein Municipality’s Management Area are monitored by the Municipality’s Laboratory on a monthly basis. There is no limit on the permitted volume of effluent that can be discharged into the sewerage system, but the concentration limits for the various parameters are specified in Drakenstein Municipality’s Tariff Structure.

#### Business Element 10: Financial

##### Capital Budget:

The largest water and sewerage capital projects implemented during the 2014/2015 financial year were as follows:

- Upgrading of the bulk sewer for Southern Paarl. The increased capacity of the bulk sewer pipelines will eliminate the risk of possible pollution of the Berg River and will allow for future development to take place.
- The rehabilitation and upgrading of the Wellington and Saron WWTWs.
- 11 MI Newton Reservoir. The project will increase the reservoir storage capacity for Wellington, Newton and Mbekweni areas and reduce the risk related to water retention and availability. The additional reservoir storage capacity will allow for future development to take place (low cost and gap housing).

- Replacement of the Strawberry King bulk water pipeline. The upgrading of the bulk pipeline will reduce the possible risk of water shortages in the Wellington, Newton and Mbekweni areas.
- The new 10 Ml/day Welvanpas WTW and Engineering Building.

The table below gives an overview of Drakenstein Municipality's historical water and sewerage capital expenditure over the last six financial years.

Table A.39: Historical expenditure of the water and sewerage infrastructure capital budgets						
Financial Year	Water Infrastructure			Sewerage Infrastructure		
	Budget	Expenditure	Percentage Spend	Budget	Expenditure	Percentage Spend
2010/2011	R39 686 000	R39 410 605	99.31%	R83 010 500	R82 674 944	99.60%
2011/2012	R50 731 850	R50 756 627	100.05%	R82 869 056	R77 020 374	92.94%
2012/2013	R38 414 161	R38 414 816	100.00%	R92 948 773	R92 927 823	99.98%
2013/2014	R41 609 190	R41 609 107	100.00%	R68 971 286	R68 971 126	100.00%
2014/2015	R53 498 163	R53 469 855	99.95%	R42 923 984	R42 909 851	99.97%
2015/2016	R72 157 525	R72 091 088	99.91%	R81 865 823	R81 540 480	99.60%

It can be noted from the previous table that the Municipality ensured almost 100% spending on their water and sewerage capital budgets over the last six financial years.

#### Operational Budget:

The table below gives a summary of the total operating costs and income for water and sanitation services for the last five years:

Table A.40: Summary of Operational Budget for water and sanitation services for the last five years						
Service	Expenditure / Income	Actual 15/16	Actual 14/15	Actual 13/14	Actual 12/13	Actual 11/12
Water	Expenditure	R87 660 320-06	R102 700 702-47	R93 724 654-72	R63 847 426-78	R66 234 783-65
	Income	-R196 450 183-23	-R156 418 213-96	-R142 609 249-97	-R128 989 062-13	-R115 672 584-07
	<b>Surplus / Deficit</b>	<b>-R108 789 863-17</b>	<b>-R53 717 511-49</b>	<b>-R48 884 595-25</b>	<b>-R65 141 635-35</b>	<b>-R49 437 800-42</b>
Sanitation	Expenditure	R85 319 112-68	R87 543 353-47	R84 673 341-11	R57 019 357-26	R56 194 347-66
	Income	-R155 668 511-58	-R124 242 230-13	-R132 431 106-00	-R94 728 642-43	-R97 938 948-57
	<b>Surplus / Deficit</b>	<b>-R70 349 398-90</b>	<b>-R36 698 876-66</b>	<b>-R47 757 764-89</b>	<b>-R37 709 285-17</b>	<b>-R41 744 600-91</b>

The water and sanitation services are being managed in a financial sustainable manner by Drakenstein Municipality. A surplus was generated on both water and sanitation services for the last five financial years.

#### Tariff and Charges:

The first ten (10) kl of water is provided free to all residential consumers. Drakenstein Municipality's tariffs support the viability and sustainability of water supply services to the poor through cross-subsidies (where feasible). Free basic water and sanitation services are linked to Drakenstein Municipality's Indigent Policy and all indigent households therefore receive free basic water and sanitation services. This implies that either the equitable share is used to cover this cost, or higher consumption blocks are charged at a rate greater than the cost in order to generate a surplus to cross-subsidies consumers who use up to ten (10) kilolitres per month.

Drakenstein Municipality's current six (6) block step tariff system discourages the wasteful or inefficient use of water. It is expected that this tariff structure will continue to be applied in the future. The sustainable supply of potable water is becoming an ever increasing challenge. This scarce commodity has to be optimally managed. The current drought situation and the continued increase in the price of electricity and chemicals for purification has contributed to the cost of delivering the service. The water usage block tariff has been structured for a basic affordable tariff for up to 30 kl per household per month. Punitive tariffs are in place for excessive water consumption.

**Business Element 11: Water Services Institutional Arrangements**

Drakenstein Municipality acts as both WSA and WSP to the consumers in their Municipal Management Area and therefore does not manage other WSPs. The provision of bulk water to Hermon and Gouda from Voëlvlei dam, as well as the provision of bulk water to Paarl/Wellington and surround from Wemmershoek Dam, requires that formal WSP contracts be put in place. Drakenstein Municipality entered into Service Delivery Agreements with the West Coast District Municipality and the CCT to provide bulk potable water to these towns through their bulk water distribution networks. Monitoring Committees are in place with specific powers and functions around the provision of bulk water services. The obligations of the Bulk Water Services Providers are to deliver the services to particular standards of supply and service and to report on the extent of its compliance with those standards. Drakenstein Municipality is currently busy working with the CCT to finalise the updated Service Delivery Agreement with them.

The previous WSDP for the 2011/2012 financial year was approved by the Executive Mayoral Committee on the 11<sup>th</sup> of August 2011. WSDP Performance- and Water Services Audit Reports were also compiled for the last number of years, which were taken to Council with the Annual Reports. The existing water services by-laws were updated during the 2015/2016 financial year and were promulgated. They cover the provision of services for water supply, sanitation and industrial effluent.

Drakenstein Municipality continues to undertake basic public awareness programmes, over and above the focussed Water Week and Sanitation Week initiatives. The education of users where sanitation facilities are upgraded to waterborne systems is on-going. This is primarily focussed at informing users of the appropriate use of and routine maintenance of such facilities.

The IDP is the Municipality's single most strategic document that drives and directs all implementation and related processes. The Municipality's budget is developed based on the priorities, programmes and projects of the IDP, after which a Service Delivery Budget Implementation Plan (SDBIP) is developed, to ensure that the organisation actually delivers on the IDP targets.

The SDBIP is the process plan and performance indicator / evaluation for the execution of the budget. The SDBIP is being used as a management, implementation and monitoring tool that assists and guide the Executive Mayor, Councillors, Municipal Manager, Senior Managers and the community. The plan serves as an input to the performance agreements of the Municipal Manager and Directors.

The total number of approved posts is 2 722. The Municipality employed 1 668 employees at the end of June 2015, which result in a vacancy rate of 38.7% for the Municipality. The Water Services Section has a vacancy rate of 45.8% in terms of the approved organogram, of which 36 posts are critical. The new posts need urgent funding. Eighteen of the critical posts are directly linked to service delivery and need to be filled as a matter of urgency. Some of these posts are required for statutory compliance with legislation and to ensure safe and sustainable water supply.

The Wastewater Section has a vacancy rate of 44.3% in terms of the approved organogram, of which 15 posts are critical. Five of the critical posts are directly linked to service delivery and need to be filled as a matter of urgency. Some of these posts are required for statutory compliance with the law to ensure safe and sustainable sanitary services.

At a technical, operations and management level, municipal staff is continuously exposed to training opportunities, skills development and capacity building in an effort to create a more efficient overall service to the users. Various Process Controllers at the WTWs and WWTWs also received further accredited training during the last financial year. The Process Controllers were previously classified by the DWS and the Municipality will re-apply for higher classifications once the specific training programmes were completed. All the WTWs and WWTWs in Drakenstein Municipality's Management Area are also registered with the DWS. A skills audit is conducted during each year, which leads to various training programmes in order to wipe out skills shortages and to provide employees with the necessary capacity. A Workplace Skills Plan for 2017/2018 is in place.

**Municipal Strategic Self-Assessment (MuSSA):** Overseen by the DWS the MuSSA conveys an overall business health of municipal water business and serves as a key source of information around municipal performance. The MuSSA also identifies key municipal vulnerabilities that are strategically important to DWS, the Department of Cooperative Government (DCoG), National Treasury, the planning Commission/Office of the Presidency, the South African Local Government Association (SALGA) and the municipalities themselves. The MuSSA team continues to engage (1) DWS directorates and their associated programmes (e.g. Water Services Development Plan, Water Services Regulation), and (2) other sector departments and their associated programmes (e.g. LGTAS, MISA) to minimize duplication and ensure alignment. Through the tracking of current and likely future performance, the key areas of vulnerability identified, allow municipalities to effectively plan and direct appropriate resources that will also enable DWS and the sector to provide more effective support.

The Spider Diagram below effectively indicates the vulnerability levels of Drakenstein Municipality across the sixteen key service areas, as identified through the Municipal Strategic Self-Assessment of Water Services process.

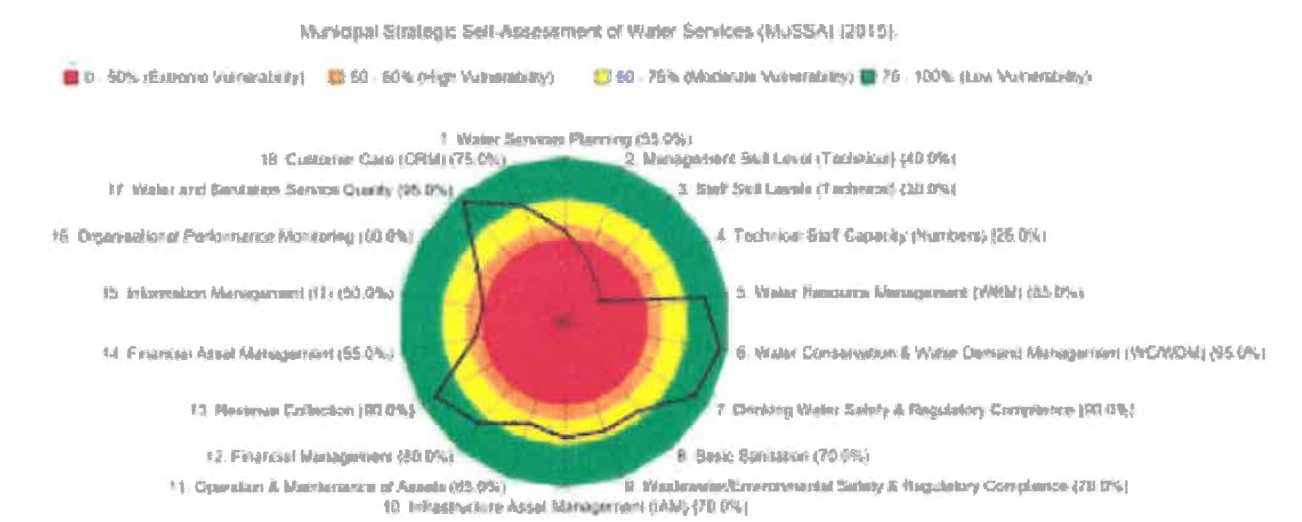


Figure A.18: Spider diagram for Drakenstein Municipality (MuSSA)

Drakenstein Municipality's Vulnerability Index for 2015 was indicated as 0.58 "High Vulnerability" in the "2015 Municipal Services Strategic Assessment (MuSSA) for Western Cape Province" Report.

Drakenstein Municipality is currently effectively managing their water and sanitation services. Special focus is however required to ensure adequate rehabilitation and maintenance of the existing water and sewerage infrastructure. All forward planning for water and sanitation services and water and sewerage infrastructure is guided by the Water and Sewer Master Plans.

**Business Element 12: Social and Customer Service Requirements**

A comprehensive Customer Services and Complaints system is in place at Drakenstein Municipality and the Municipality has maintained a high and a very consistent level of service to its urban water consumers.

A Consumer Charter for Water Services is also in place, with the following mission and commitment:

Our Mission is: *"To provide reliable, affordable and effective water services to all consumers in Drakenstein"*

We are committed to: "Serve you though adequate infrastructure, timely maintenance, accountable leadership, competent and dedicated staff and good customer relations to ensure all our consumers have access to clean and reliable water supply and appropriate sanitation services at affordable tariffs"



The Consumer Charter includes the following statements with regard to Water Quality, Transported Effluent and Industrial Effluent:

Water Quality: We commit ourselves to provide you with clean and safe water and treat effluent to a standard prescribed by law before disposal thereof back into our water sources.

We have a water quality programme in terms of which water is frequently sampled at various places and tested by an independent laboratory. The results of our treated water and effluent tests are monthly reported to the Department of Water and Sanitation and thus nationally monitored.

We strive to annually obtain Blue Drop status for our water treatment works and Green Drop status for our wastewater treatment works.

Industrial Effluent: Special application must be made to discharge industrial effluent into the sewage disposal system including detailed information to ensure the composition of the effluent meets the standards and criteria of the Municipality (see schedules to the by-law); a sewer plan and various other management plans.

If the Municipality suspects a person is discharging industrial effluent through a domestic sewer connection, this connection will be sealed until the person has applied for discharge of industrial effluent (including all the required information); the Municipality is satisfied that the domestic connection will only be used for its intended purpose and prescribed fees have been paid for the industrial effluent connection.

Transported Effluent: The Municipality may accept sewage for disposal via road haulage at its sewage treatment works subject to conditions regarding the nature, composition, time of delivery and payment of charges.

The owner or consumer must ensure that the septic tank or other on-site sanitation facility that must be emptied is at all times accessible via a safe, suitable and obstacle free access road.

The removal of conservancy tank and septic tank contents can be undertaken by the Municipality or a private service provider.

The graphs below give an overview of the of the maintenance and rehabilitation work that was done on the water and sewer networks in Drakenstein Municipality's Management Area.

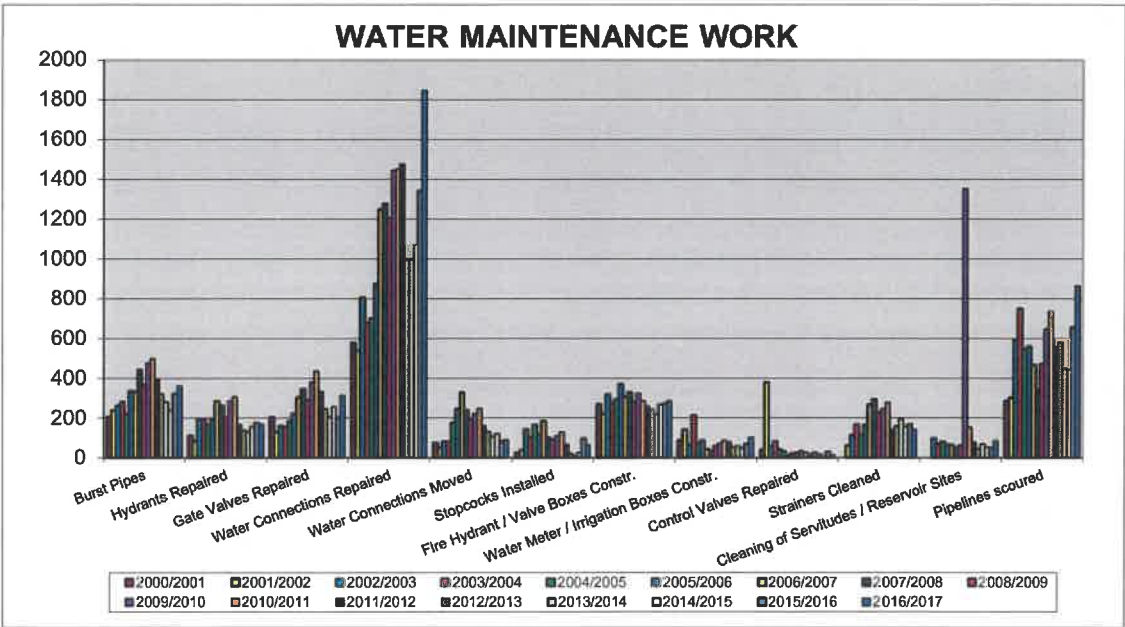


Figure A.19: Water maintenance work carried over the last seventeen financial years

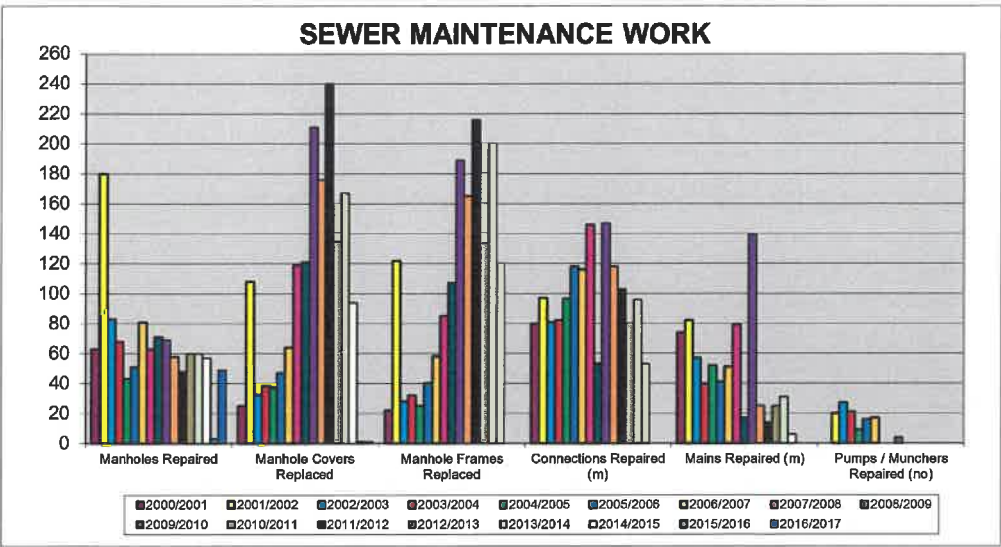


Figure A.20: Sewer maintenance work carried over the last seventeen financial years

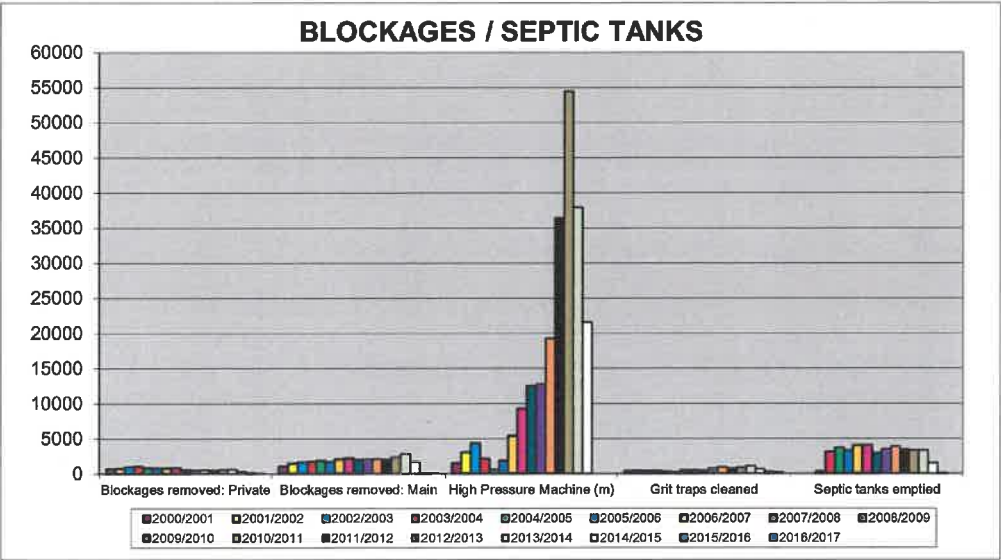


Figure A.21: Sewer blockages cleaned and septic tanks emptied over the last seventeen financial years

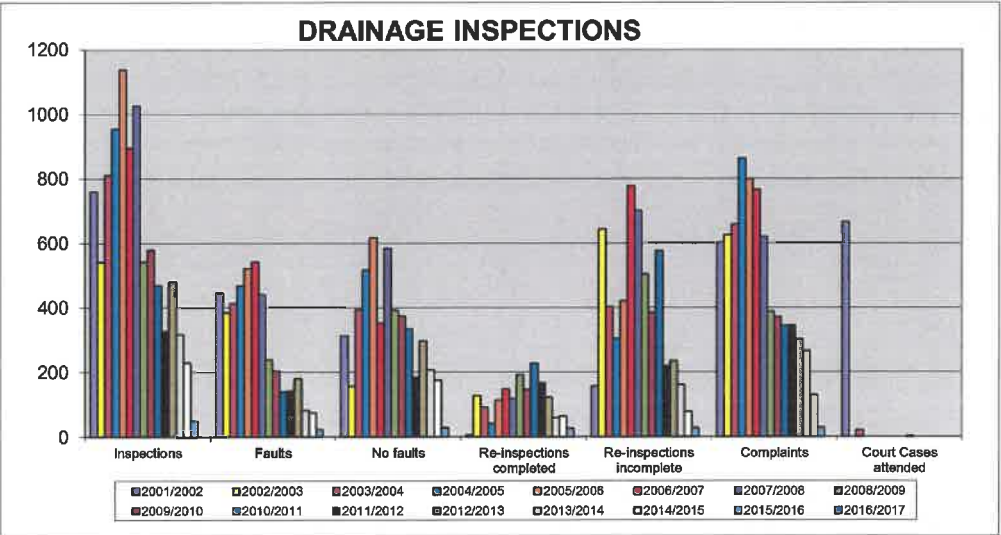


Figure A.22: Sewer drainage inspections carried out over the last sixteen financial years



## SECTION B: STATE OF WATER SERVICES PLANNING

This WSDP is for 2017-2022 (First Cycle) and Drakenstein Municipality is committed to update their WSDP for the interim years and to compile a new WSDP every five years, as required by legislation. The 2017-2022 (First Cycle) WSDP will also be populated on the new WSDP website of the DWS, which was rolled out to the Cape Winelands LM's on the 8<sup>th</sup> of November 2017.

Drakenstein Municipality also compiled annual WSDP Performance- and Water Services Audit Reports for the last number of years. The WSDP Performance- and Water Services Audit Report gives an overview of the implementation of the Municipality's previous year's WSDP and can be seen as an annexure to Drakenstein Municipality's Annual Report.

Drakenstein Municipality's Water and Sewer Master Plan process entails the establishment of computer models for the water systems and the sewer systems in Drakenstein Municipality, the linking of these models to the stand and water meter databases of the treasury financial system, evaluation and master planning of the networks and the posting of all the information to IMQS. The Water and Sewer Master Plans lists the analyses and findings of the study on Drakenstein Municipality's water distribution and sewer drainage systems. The latest Water and Sewer Master Plans, which were available for inclusion in Drakenstein Municipality's WSDP, were as follows:

- Water Master Plan, Drakenstein Municipality, February 2017, GLS Consulting
- Sewer Master Plan, Drakenstein Municipality, February 2017, GLS Consulting

The other water and sanitation related investigations, which were successfully completed during the last two financial years, were as follows:

- Detail Technical Process Audits were completed for all six WWTWs.
- Dam Safety Inspections were done for a number of dams (Bethel-, Nantes-, Victoria- and Withoogte Dam, as well as for the Leliefontein reservoir).
- A Flood and Drought Management Plan for Drakenstein Municipality's Management Area was compiled, Aurecon.
- The survey to confirm the service levels on the farms in the Rural Areas was completed, Lyners.
- The following Technical Investigations were completed for potential future projects:
  - › Bulk water and sewerage infrastructure needs for Simondium.
  - › Newton / Leliefontein Booster Pump Station, November 2015, Aurecon.
  - › Welvanpas WTW HAZOP, Project Assignments Process and Project Engineers, August 2015.
  - › The Donkervliet sewer pump station capacity was investigated, GIBB.
  - › The Newton and Saron sewer pump stations were investigated.
  - › The ingress of storm water into the sewer system in Saron was investigated.
  - › Conditional sewerage assessments were carried out for parts of the drainage networks in Paarl and Wellington.
  - › Camera inspection was carried out on the bulk sewer pipeline from Lady Grey to Sanddrift Sports Ground.
  - › Target areas were investigated for groundwater development.
  - › Preliminary design report was completed for the proposed Saron WTW.
  - › Technical report was completed for the upgrading of the bulk water pipeline at Saron.
  - › Technical report was completed, in support of the MIG application, for the bulk storage and treatment of water at Saron.

- A study of the Service Levels in the informal settlements in Drakenstein Municipality's Management Area was completed, "Provision of Basic Services to Informal Settlements in the Drakenstein Municipal Area", Status Quo Report 2017, Lyners.
- Drakenstein Municipality completed the detail Water Meter Audit (Survey) of all the residential water meters at the households in Paarl. The survey of the residential water meters in Wellington, Bainskloof and Hermon was completed during the 2014/2015 financial year.

## SECTION C: WATER SERVICES EXISTING NEEDS PERSPECTIVE

The existing needs perspective as presented below was developed through a systematic and comprehensive review of the water services function in terms of the WSDP Guide Framework. The output from this process is presented below and includes compliance assessment in terms of:

- Quality: Assessment current status against compliancy requirements.
- Quantity: An indication of the representation of the total area to address the issue.
- Future plan assessment: Degree in which future demand has been established.
- Strategy assessment: Whether a Strategy is in place to address the need.

The water services situation analysis prompted the development of problem statements which formed the input for the development of the water services objectives and strategies which follows in Section D.

### Business Element 1: Administration

Table C.1 : Business Element 1: Administration (Topic 1)					
Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
This topic provides knowledge on the status of the WSA's 5-year WSDP as well as with the contact particulars of the key role-players which have contributed to the development of the WSDP.		Item	Quality (%) assessment of current status against compliancy requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment
		n/a	n/a	n/a	n/a
		<b>TOTAL for Topic</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	Key issues raised in the WSDP need to be taken to the IDP	Ensure Executive Summary of WSDP (WSDP-IDP Water Sector Input Report) is included in the IDP.			

The Vision, Mission and Corporate Values of Drakenstein Municipality, as included in their 2015-2016 IDP, are as follows:

**Vision:** "A Place of Excellence"

**Mission:** Drakenstein Municipality will execute its vision through the following:

- Protecting and enhancing of the quality of life of our residents and the unique environment of our area;
- Providing efficient and effective delivery of services which is responsive to the community's needs;
- Promoting the principles of access, equity and social justice in the development of services;
- Delivering an effective organisational culture which strives for service excellence;
- Exercising regulatory functions of Council consistently and without bias;
- Encouraging community participation in the processes of Council by consulting widely on its activities and policies; and
- Create an enabling environment for economic growth, job creation and the alleviation of poverty.
- Promoting a future-oriented approach to planning.

The **Corporate Values (KPA's and KFA's)**, as included in the Municipality's 2017-2022 IDP, are as follows:

- **Governance and Stakeholder Participation:** Governance Structures; Risk Management; Stakeholder Participation; Policies and By-laws; Inter-Governmental Relations; Communications; Marketing.
- **Financial Sustainability:** Revenue Management; Expenditure and Cost Management; Budgeting / Funding; Capital Expenditure; Asset Management; Financial Viability; Supply Management; Financial Reporting.
- **Institutional Transformation:** Organisational Structure; Human Capital and Skills Development; Project and Programme Management; Performance Management and Monitoring and Evaluation; Systems and Technology; Processes and Procedures; Equipment and Fleet Management.
- **Physical Infrastructure and Service:** Service Charter and Standards; Customer Relations Management; Energy Supply Efficiency and Infrastructure; Transport, Roads and Stormwater Infrastructure; Water and Sanitation Services and Infrastructure; Solid Waste Management and Infrastructure; Municipal and Public Facilities; Sport and Recreational Facilities.
- **Planning and Economic Development:** Economic Development and Poverty Alleviation; Growth and Investment Promotion; Municipal Planning; Built environment Management; Urban Renewal; Skills Development and Education; Rural Development; Spatial and Urban Planning; Tourism; Land, Valuation and Property Management
- **Safety and Environmental Management:** Safety and Security; Disaster Management; Emergency Management; Traffic, Vehicle Licencing and Parking Control; Municipal Law Enforcement; Environmental Management and Climate Change; Natural Resources; Parks and Open Spaces.
- **Social and Community Development:** Health; Early and Childhood Development; Gender, Elderly, youth and Disabled; Sustainable Human Settlements (Housing); Sport and Recreation; Arts and Culture; Animal Control; Libraries; Cemeteries and Crematoria.

Community Participation: The Municipality has the following distinct structures through which formalised stakeholder participation takes place i.e.

- Ward Committees;
- IDP Representative Forum;
- Intergovernmental Stakeholder Management; and
- Other Media

**Business Element 2: Demographics**

Table C.2 : Business Element 2: Demographics (Topic 2)					
Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
This topic provides an overview of demographics of the WSA as sourced from the National Geo-Referenced Database, aligned to Census figures as well as the number of public amenities and private facilities within the jurisdictional area of the WSA.		Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment
		Settlement Types (Urban, Rural, Farming)	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.		
		Public Amenities Consumer types			
		<b>TOTAL for Topic</b>			
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	Conservative approach is followed regarding the management of water sources, due to the possible impact of climate change.	All resources, especially surface water resources, need to be re-evaluated, especially where demand is close to the safe one in twenty year yields. Establish assurance of supply levels of all water sources. Implement the recent developed Climate Change Adaptation Plan.			
2	The potential long-term impacts of climate change comprise key overarching informants to the SDF. It recognized the need to act on and enable the reduction in Greenhouse Gas emissions and adapt to global climate change. The risk of increased intensity of extreme weather events, such as flooding, changes in weather patterns and the potential impacts on agriculture crop futures places additional risk to human lives and health. These events are likely to impact on the tourism, infrastructure and insurance sectors of the economy in the Drakenstein Municipality into the future.	The six themes of the SDF are in line with the National Climate Change Response Policy and are informed by a two-pronged approach to addressing climate change: • Mitigation: Contribute to national and global efforts to significantly reduce CHG emissions and build a sustainable low carbon economy, which simultaneously addresses the need for economic growth, job creation and improving socio-economic conditions; and • Adaptation: Reduce climate vulnerability and develop the adaptive capacity of the Western Cape's economy, its people, its ecosystems and its critical infrastructure in a manner that simultaneously addresses the province's socio-economic and environmental goals.			
3	The integrity of the environmental and cultural / historic heritage is under pressure. The quality of the natural environment is under threat due to the ongoing loss of bio-diversity and decay of essential ecological systems due to poor land use management practices, unsustainable resource utilisation and general environmental decay. The area has some unique and healthy natural environmental habitats that are at risk if not properly managed. There is also an awareness of and justified need to address the integrity of the cultural / historic heritage.	Actively implement the Environmental Management Policy and Environmental Management System (EMS), which protects the integrity of the environment. The EMS integrates environmental functions of all sections and ensures compliance with Environmental Legislation and will be reviewed and updated as an on-going process			
4	Municipality needs to evaluate all land use planning applications against the broad SDF principles before recommendations for decision making are made.	The SDF has been adopted by Council on 28 October 2015. This document sets out broad principles to give direction to future developments, as well as where such developments can take place within the demarcated urban edges of all towns and in the rural areas.			
5	Ensure the required bulk water and sewerage infrastructure are in place before housing projects are implemented.	Ensure that the provision of bulk water and sewerage infrastructure are aligned with the Integrated Sustainable Human Settlement Plan (ISHSP) and the Integrated Housing Plan (IHP) and that housing projects only continue once the required bulk water and sewerage infrastructure are in place.			

All land use planning applications are being evaluated against the broad principles of the approved SDF, before recommendations for decision making are made. A number of policies have been accepted by Council which give further direction to planning requirements. The Municipality is furthermore also compiling a set of integrated zoning scheme regulations applicable to the total area of Drakenstein which will be completed in 2017. Both of these documents will be used in evaluating development applications, and together with sufficient bulk infrastructure, create the opportunities for economic development to take place in order to broaden the development footprint.

The SDF vision is as follows: “The Drakenstein Municipality located at the heart of the Winelands, and building on its assets – its dramatic scenic landscape, precious natural and cultural heritage, quality educational institutions and sporting facilities, thriving agricultural economy and unrivalled access to the regional access and logistics networks – will be a place of excellence for all its residents”

Drakenstein Municipality’s Spatial Principles are as follows:

- Integrate environmental management
  - To ensure integrated management and prioritisation of Drakenstein’s natural and man-made cultural landscape resources;
  - To facilitate disaster risk management in alignment with biodiversity management programmes; and
  - To align investment and resources for coordinated environmental management projects.
- Accommodate agrarian reform in peri-urban areas
 

A new model for accommodating land reform in peri-urban areas through the use of small-scale farming allotments; based on the delineation of intensified agricultural activity around existing urban centres to provide small farming plots with shared infrastructure and facilities with good access to existing public facilities for the whole household. Different typologies can be developed to support this concept.

  - Facilitate more sustainable land reform process;
  - Facilitate land reform in areas closer to urban centres;
  - Establishing an “agricultural edge” to contain urban expansion into the productive rural landscape;
  - Support local food chains; and
  - Provide opportunities for increased food security and economic development for rural dwellers.
- Ensure appropriate rural place-making:
 

The rethinking of the rural spatial structure through developing a new logic for appropriate development in the rural landscape – based on the concept of interlinked rural corridors that are reinforced through contained pockets of rural activity that is set back from the road and does not impact on the visual character and scenic qualities of the landscape. Lack of desirability for eco-estates / high income estates on farms outside the urban edge.

  - To maintain the dominance of wilderness.
  - To protect the working agricultural landscape
  - To protect the rural landscape as a scenic asset with an important cultural sense of place role.
- Integrate employment opportunities
  - To create local job opportunities in an integrated manner.
  - To ensure for sustainable livelihoods for all communities.
  - To attract business investment.
  - To preserve and build on existing economic base.
- Create vibrant activity streets
  - More liveable neighbourhoods and communities.
  - More sustainable employment opportunities.
  - Rejuvenation of settlements.
- Support and promote green development standards
  - Reducing reliance on costly municipal services networks.
  - Promoting off-grid development and making use of renewable energy.

- Facilitation and promotion of transport modal shifts to non-motorised transport options.
- Improving the provision of and access to public transportation.
- Job opportunities
- Recycling and converting waste into something productive.
- Cluster and share multipurpose sport facilities
  - Clustering and sharing of sporting facilities to optimise accessibility and community participation.
  - Capitalise on existing vacant land around schools to create sporting precincts associated with education.
- Clustering public facilities
  - More liveable neighbourhoods and communities.
  - Optimise strategic locations.
  - Provide public access to all facilities.
- Concentrate human settlement in urban centres
 

Shift in focus with regard to housing delivery in rural settlements. The travelling cost implications and lack of employment opportunities in the outlying rural settlements do not provide for sustainable livelihoods. Future housing delivery must be prioritised and concentrated in the existing urban centres. Focussed social development and investing within the rural settlements to encourage community development and sustainable livelihoods opportunities within existing settlements.

  - More sustainable rural communities.
  - Sustainable and accessible employment opportunities.
  - Integration and concentration of community facilities, employment and residential opportunities.
- Sustainable housing development – design and typologies
 

Focus on the importance of good design of housing for local income communities. Housing design should always include safe public spaces with adequate landscaping and positive street interfaces. The use of green technologies and off-grid facilities must also be incorporated. Row housing and medium density townhouses are the preferred models with mixed-use development located in strategic locations that includes apartments and office.

  - Safer communities.
  - More efficient use of land.
  - Investment in the public realm.
- Provide serviced plots to facilitate incremental housing
 

Implement a “sites and services” approach for housing delivery – either on ownership or land lease tenure through allowing access to a plot and the essential infrastructure. Providing a plot within a pre-designed layout plan within which different plot sizes and shapes are laid out in a logical structure.

  - Flexible housing typology.
  - Ownership and tenure
  - Personalization of property
  - More efficient use of land.
  - Fast track of housing delivery.



**Business Element 3: Service Levels**

Table C.3 : Business Element 3: Service Levels (Topic 3)					
Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
Topic 3 information is presented in terms of the Department of Water and Sanitation's service level classification which considers the adequacy of services in establishing the service level profile. The profile is presented in terms of settlements, population and households.	Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment	Strategy Assessment
	Water - Below : No Services (Formal)	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Water - Below : Infra. Needs				
	Water - Below : O&M Needs				
	Water - Below : No Services (Informal)				
	Sanitation – Below : No Services (Formal)				
	Sanitation – Below : Infra. Needs				
	Sanitation – Below : O&M Needs				
	Sanitation – Below : No Services (Informal)				
	Residential, Public Institutions and Industries Amenities				
	<b>TOTAL for Topic</b>				
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	Ensure that all households on the farms in the rural areas with existing services below RDP standard are provided with at least basic water and sanitation services	Assist private landowners as far as possible with the provision of basic water and sanitation services to all the households in the Municipality's Management Area with existing service levels below RDP standard, once practical guidelines become available from the DWS.			
2	There are still a number of households in informal areas where the ratios of the number of households per toilet and the number of households per tap are above the targets of 5 and 25.	Continue with the provision of communal services in informal areas in order to ensure that the ratio of number of households per facility complies with the target of 5 or less households per toilet facility and 25 or less households per tap.			
3	Communal standpipes and toilet facilities represent probably the weakest part of a network's water supply services.	Continue with the sufficient rehabilitation, operation and maintenance of the existing installations on an on-going basis to ensure healthy living conditions and to prevent pollution of the Berg River. Sufficient funding should be allocated to prevent a complete breakdown of the basic services. That funding amounting to R25 million (VAT inclusive) be made available to address the above. It includes R6 million per year for the operation and maintenance of the basic services facilities if this is contracted to a private sector supplier.			
4	Number of informal structures in the informal settlements needs to be verified.	Number of informal structures in the informal settlements needs to be re-determined / updated and the growth rate of the informal structures on an annual basis needs to be determined.			
5	Number of backyard dwellers needs to be verified.	Conduct a survey to confirm the number of backyard structures and their information and whether they are included on the municipal housing waiting list.			

As a priority it is the responsibility of Drakenstein Municipality to make sure that adequate and appropriate investments are made to ensure the progressive realisation of the right of all people in its area of jurisdiction to receive at least a basic level of water and sanitation services. Whilst the provision of basic water services is the most important and immediate priority, WSAs are expected to provide intermediate and higher levels of services (for example, water on-site) wherever it is practical and provided it is financially viable and sustainable to do so.

A separate water and sanitation service level policy is not yet in place, but the water and sanitation service levels to be provided by the Municipality to the consumers in their Management Area are however included in the Water Services By-laws and the Consumer Charter.

All water services provided by Drakenstein Municipality to consumers within the Municipal Management Area are linked to the Municipality's Tariff Policy and Rates Policy and poor households are incorporated through Drakenstein Municipality's Indigent Policy.

The large number of residents in the lowest income groups (living in informal areas) places a major challenge on Drakenstein Municipality to provide suitable housing. Drakenstein Municipality works towards providing all households in the towns with a water connection inside the house and connecting all households to a waterborne sanitation system.

All the formal households in the urban areas of Drakenstein Municipality's Management Area are provided with water connections inside the erven. Standpipes are provided in the informal areas as a temporary emergency service. Drakenstein Municipality takes note of the fact that communal standpipes represent probably the weakest part of a network's water supply services. Standpipes are often constructed in ways that cannot withstand excessive use (and abuse) and often neglected in terms of operation and maintenance adversely affecting the health of its already vulnerable and poor users. Communal standpipes are also used by poor households who normally don't pay for water.

Drakenstein Municipality is committed to support the private landowners as far as possible with regard to addressing the basic water services backlog that might still exist on the farms in the rural areas once clear and practical policy guidelines are available from the DWS and funding is made available. Drakenstein Municipality is however faced with various challenges with regard to the provision of services on private owned land in a financial sustainable manner (enabling the ongoing operation of services and adequate maintenance and rehabilitation of the assets), which include the following:

Free basic water policy:

- The provision of the infrastructure (facilities) necessary to provide access to water to all households in a sustainable and economically viable manner.
- The development of subsidy mechanisms which benefit those who most need it.

Free basic sanitation policy:

- Provision of the correct sanitation facility to the poor household.
- Health and hygiene promotion must be provided in a co-ordinated manner and must be properly managed and adequately funded if free basic sanitation is to become a reality. This requires close collaboration between the EHPs of the Cape Winelands District Municipality responsible for environmental health and Drakenstein Municipality.
- Subsidising the operating and maintenance costs. If the basic service is to be provided free to the poor then Drakenstein Municipality must ensure that the costs of providing the service are covered by the local government equitable share and / or through cross-subsidies within Drakenstein Municipality's Management Area.

The ownership of water services assets may be in the hands of the person owning the land where an "on-site" water or sanitation facility is provided to a household. There is no legal impediment to the use of government grants to fund infrastructure for a poor household on private land not owned by that household, provided that the intermediary (the private land owner) makes a financial contribution (This is because the intermediary becomes the owner of the infrastructure once it is installed). Government is looking at specific policies with regard to the appropriate level of contribution.

All the clinics and hospitals in Drakenstein Municipality's Management Area have adequate and safe water supply and sanitation services. All the schools in Drakenstein Municipality's Management Area also have adequate and safe water supply and sanitation services. It is important for the schools to focus on Water Demand Management activities and for Drakenstein Municipality to continue to support the schools with their WDM programmes. This will not only aid in Drakenstein Municipality's demand management initiative directly by reducing the water consumption, but the education of learners at a young age regarding wise water use is a key component for sustainable supply in the long term.

**Business Element 4: Socio Economic**

Table C.4 : Business Element 4: Socio-Economic (Topic 4)					
Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
The socio-economic information contained in the WSDP provides a broad overview of the socio-economic status of the municipality in terms of population growth rates, age and gender profile, employment profile, migration patterns, household income and economics. The topic also contains a quick reference to water services affordability by expressing the typical monthly water bill in terms of average monthly income in the municipal area.	Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment	Strategy Assessment
	General	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Age and gender profile				
	Employment profile				
	Demographic trends and migration patterns				
	Household income				
	Water Affordability				
	Sanitation Affordability				
	Economics				
TOTAL for Topic					
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	Limited funding to address needs in communities. People living below the household subsistence level. Maximisation of job creation through the execution of the Council budget.	Collaborating with department of Social Development and CBO's to address challenges of food and nutrition. Partnership agreement has been concluded with the Department of Social Development to support the food and nutrition centres in Drakenstein Municipal area. Engagement with other spheres of government. Job creation initiatives by the Municipality. Ensuring more projects is implemented in terms of the EPWP Guidelines to make the projects more labour intensive.			
2	Social and Community Development challenges	Establishment of an Integrated Drakenstein Health Forum and report quarterly on the functionality to MayCo. Information sessions held with unregistered ECDs. Establishment of a Drakenstein Youth Forum. Provide low cost houses in terms of the Integrated Human Settlement Plan.			
3	Gender, Elderly, Youth and Disabled issues, which include limited funding, unemployment within youth sector and fragmented youth structures.	The Municipality is committed to follow an integrated approach to youth development. Partnership initiative with other sectors to be developed to provide skills training to access job opportunities. Youth structures to be encouraged to work with ward committees.			
4	Challenges of poverty in the Management Area.	Continue with the alleviation of poverty by means of indigent support, Local Labour Promotion Projects, LED projects and the use of Supply Chain Management Policy as an instrument to enforce the maximum use of local labour. The Municipality's two programmes that provide short term work opportunities to unemployed people are the Expanded Public Works Programme and the Community Work Programme.			
5	Commission a skills audit and gap assessment within the communities.	Drakenstein Municipality needs to collaborate with the private sector and local non-profit organizations to provide needed skills at all levels and a skills development exercise focusing on specific priorities. The projects should focus on socio-economic upliftment, as part of Drakenstein Municipality's strategy to bring about poverty alleviation through job creation whilst enhancing the prospects of reducing outstanding municipal consumer debt.			
6	Growth and investment promotion challenges, which include decline in growth, excessive red tape, regulation and promotion of informal trading, lack of formal economic development opportunities, lack of informal trading infrastructure and overall reliance on the sustainability of the agricultural sector. Pollution of the Berg River, which may ultimately affect the export potential of agriculture produce.	Implement Business Retention and Expansion Strategy for existing sectors. Investigating the use of (broadband) as an economic development tool. Assist in the establishment of Special Rating Areas in key CBD and industrial areas. Inter-Governmental partnerships to implement a Red Tape Reduction programme to reduce the administrative burden to do business in Drakenstein. Develop an Economic Development Strategy. Identify land for local economic development initiatives. Allow use of residential and agricultural premises for occupational practice, business and tourism uses. Identify informal trading areas. Set up frameworks for the use of public land by communities in the creation of jobs, the job market and environment. Re-skilling of people with skills required by the job market and environment. Implementation of measures to reduce pollution in the Berg River.			

Social: Poverty alleviation focuses on 11 food and nutrition centres that have been established throughout the Drakenstein Municipality Areas. These centres are managed and supported by the Community Development Section and provide an average of 240 meals for 3 days per week.

The Drakenstein ECD forum consists of four forums from different areas within Drakenstein including Paarl, Wellington, Mbekweni, Saron, Hermon and Gouda. Simondium is included with the Paarl Area. All stakeholders including the Social Development Department and the ECD sector participated in completing the Drakenstein ECD strategy.

The youth projects are projects which aim to address the skills required to access employment opportunities for Youth. Skills training projects for youth included Waiter training, Beautification training, hairdressing training, Home Based Care and Learners / Drivers Licence. Approximately 120 people in this sector participated in skills training opportunities.

The skills development project focusses on providing skills training to unemployed people. The skills chosen allow people access to immediate job opportunities. These opportunities are not limited to youth.

Economics: Drakenstein Municipality is conscious of the challenges of poverty in the area and strives to contribute towards the alleviation thereof by means of e.g. the Indigent Policy, Labour intensive projects, LED projects and the use of their Supply Chain Management Policy as an instrument to enforce the maximum use of local labour.

A critical aspect of infrastructure development is the obligation and commitment to create jobs. Direct job creation takes place through the development, operation and management of water infrastructure, which indirect job creation flows from the associated water supplies to economic activities such as mining, manufacturing, power generation and agriculture.

Investment in infrastructure development could create employment for local workers and provide skills development and work experience at a number of levels, from the highly technical jobs to manual labour, particularly where labour-intensive construction methods are used. The operation and management of water infrastructure also offers opportunities for job creation.

Drakenstein Municipality's free basic services and indigent support caters for a proportion of the population not being able to afford water and sanitation services. The proportion of the population who cannot afford water and sanitation is also examined each year during the budgeting and tariff setting process and tariffs are adjusted accordingly. Households that cannot afford to pay can register as indigent on the Municipality's Indigent Register.

Investing in infrastructure creates an enabling environment for economic growth and is an important precondition for sustainable growth. Failure to adequately budget for the rehabilitation and maintenance of the existing infrastructure poses a serious threat to the local economy. The deterioration of the existing networks and rapid development, which is not always matched by growing capital expenditure, further exacerbates the situation. Adequate rehabilitation and maintenance of the existing infrastructure is critical in order to ensure the medium to long term sustainability of the existing infrastructure.

In order to foster and promote economic growth and development, the Drakenstein Municipality will focus on implementing the updated IDP in sectors that drive the local economy such as Agriculture, Wholesalers and Retail, Tourism, Finance and Manufacturing.

In consolidating key economic development priorities, the next phase of the proposed Integrated Economic Growth Plan will take into cognisance the following developmental themes:

- Project Khulisa – Strategic Sectors
- Agro-Processing, Manufacturing (re-industrialisation of Drakenstein) and Tourism. Other sectors which will enjoy focus include Logistics (Facilitate a Business Retention and Expansion Strategy).

- Improved Labour environment – Municipality will develop an Integrated Skills Development Plan for Drakenstein as part of the Joint Planning Initiative. This will be done in consultation with Private Sector to ensure that we meet the skills demand to ensure sustainable growth.
- Ease of doing Business – The Municipality was selected as a pilot site for a Municipal Red Tape Reduction Programme currently implemented by DEDAT. We also intend to lobby for the establishment of an Investment Facilitation unit to accelerate investment into the area.

The 2017-2022 IDP further list the following KFAs and Indicators for the KPA “Planning and Economic Development”

Table C.5: KFAs and indicators for the KPA “Planning and Economic Development”	
KFAs	Indicators
Economic Development and Poverty Alleviation	<ul style="list-style-type: none"> <li>• The number of jobs created through the Municipality's local economic development initiatives including capital projects.</li> <li>• Develop and submit to MayCo a Draft Informal Economy Enhancement Strategy.</li> <li>• Update Indigent Register.</li> <li>• Develop and submit to Council the Final Informal Economy Enhancement Strategy.</li> <li>• Implementation of the informal Economy Enhancement Strategy.</li> <li>• Provision of Free Basic Services.</li> </ul>
Growth and Investment Promotion	<ul style="list-style-type: none"> <li>• Draft integrated Economic Growth Strategy developed and submitted to MayCo.</li> <li>• Finalise and submit to Council the Investment Incentive Policy.</li> </ul>
Municipal Planning	<ul style="list-style-type: none"> <li>• Develop and implement an Electronic Land Use Management Process.</li> <li>• Compile and submit final Master Development Potential Plan for Farm 1341, Paarl to MayCo by 31 March.</li> </ul>
Built Environment Management	<ul style="list-style-type: none"> <li>• Compile a State of Readiness Report on the Devolution of Heritage Competency from Western Cape to the Municipality.</li> <li>• Compile and submit to MayCo a report on the improvement of the Building Plan Application Process.</li> </ul>
Urban Renewal	<ul style="list-style-type: none"> <li>• Develop a Local Spatial Development Framework for the Klein Drakenstein Road and Lady Grey Street.</li> <li>• Compile and submit a Special Rating Areas Policy to Council.</li> </ul>
Skills Development and Education	<ul style="list-style-type: none"> <li>• Conduct a Drakenstein wide Skills Development Survey.</li> <li>• Develop a Small Business Entrepreneurs Capacity Building Programme.</li> <li>• Implementation of the Small Business Entrepreneurs Capacity Building Programme.</li> </ul>
Rural Development	<ul style="list-style-type: none"> <li>• Implementation of economic growth initiatives emanating from the Rural Development Strategy.</li> </ul>
Spatial and Urban Planning	<ul style="list-style-type: none"> <li>• Final Zoning Scheme (Land Use Management System) developed and submitted to MayCo.</li> <li>• Compile a Draft Klapmuts Local Spatial Development Framework (LSDF)</li> <li>• Annual review of the Drakenstein SDF.</li> <li>• Compile a Five-year Drakenstein Municipal SDF.</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>• Submit to MayCo a progress report on the implementation of the Integrated Arts and Crafts Route.</li> <li>• Compile and submit to MayCo a Proposal of the Development of a Tourism Gateway on the De Poort.</li> </ul>
Land, Valuation and Property Management	<ul style="list-style-type: none"> <li>• Compile the 2020 General Valuation Roll.</li> </ul>



**Business Element 5: Water Services Infrastructure Management (Infrastructure)****Table C.6 : Business Element 5: Water Services Infrastructure (Topic 5)**

Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
Topic 5.1 provides an overview of the extent-, functionality- and asset status of the municipality's water services infrastructure. It also provides an overview of the municipality's compliance in terms of legislation- and regulations concerning asset management, disaster management, water quality management, water resource licensing, etc. It should be emphasized that the topic does not provide the detail per infrastructure element, but provides an overview per each main water services infrastructure component.	Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment	Strategy Assessment
	General Information	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Operation				
	Monitoring and sample failure				
	Functionality				
	Institutional status				
	Asset assessment spectrum				
	Type and capacity				
	<b>TOTAL for Topic</b>				
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	Ensure adequate reservoir storage capacity for the various towns.	Provide additional reservoir storage capacity to the towns with inadequate storage capacity, as identified through the WSDP and Water Master Plans.			
2	Inadequate capacities of water pump stations and reticulation networks.	Upgrade existing water pump stations and provide new pump stations for specific areas, as identified in the Water Master Plan. Upgrade sections of the reticulation network as proposed in the Water Master Plan.			
3	Inadequate capacities of sewer pump stations and sewer drainage networks.	Upgrade existing sewer pump stations and provide new sewer pump stations for specific areas, as identified in the Sewer Master Plan. Upgrade sections of the drainage network as proposed in the Sewer Master Plan.			
4	Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increased in (operational) services level coverage's most rapidly.	The preparation of maintenance plans and the allocation of sufficient funding for maintenance are required to prevent the development of a large condition backlog.			
5	Ensure that an appropriate maintenance and rehabilitation plan (AMP) is developed and implemented.	Develop an Asset Management Plan (AMP) from the updated Asset Register. This plan must be based on the principle of preventative maintenance in order to ensure that, as far as this is practical, damage to assets is prevented before it occurs.			
6	The O&M budget allocated to repairs and maintenance is low and additional budget should be allocated to address amongst other tasks the replacement of malfunctioning and old water and sewerage infrastructure. Drakenstein Municipality needs to differentiate between budget allocated towards the operation and maintenance of the water and sewerage infrastructure and budget allocated towards the replacement of the water and sewerage infrastructure.	Increase O&M budget for repairs and maintenance of infrastructure. A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of existing infrastructure. In the case of operations and maintenance of the system, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the system remains in good condition.			
7	Ensure that all the assets, as listed under the various tables in this chapter, are included in the Asset Register.	Update the Asset Register to include all the water and sewerage infrastructure assets.			
8	Capacities of WTWs and WWTWs are not adequate to meet future treatment requirements.	Continue with the upgrading of the WTWs and WWTWs as proposed by the WTW and WWTW Master Plans (Feasibility Studies)			

The future trend of Drakenstein Municipality is to become less dependent on outside suppliers of potable and raw water for the purpose of domestic and industrial water usage. In this regard, the goal is to make optimum use of the local sources of supply and optimise their infrastructure requirements in line with the likely projected water demand scenario, taking WC/WDM savings into account.

It is a major challenge to obtain sufficient funding to upgrade and maintain the existing water and sewer networks in Paarl, Hermon, Gouda, Saron and Wellington. Rehabilitation and maintenance of the existing infrastructure are critical to ensure the sustainability of the existing infrastructure.

The Water and Sewer Master Plans indicate the future water and sewerage requirements to accommodate the future developments and are updated roughly every three years by the Municipality. The sections below indicate the future water and sewerage requirements, as included in the 2017 Master Plans, but it is important to note that it can change as the Municipality might reprioritise some of the developments.

The Water and Sewer Master Plans (February 2017) for the various distribution and drainage systems in Drakenstein Municipality's Management Area recommends upgrades of the internal water and sewer reticulation networks to the values indicated in the tables below in the foreseeable future in order to accommodate development and population growth according to the SDF.

Table C.7: Summary of the future water and sewerage infrastructure requirements for Drakenstein Municipality, as included in the 2017 Water and Sewer Master Plans							
Zone / Area	Water Infrastructure (2016/2017 Values)			Sewerage Infrastructure (2016/2017 Values)			
	Distribution System	Bulk Items	WDM	Drainage System	Pumping Stations and Rising Mains	Bulk Items	Total
Paarl	R238 047 880	R96 263 860	R7 298 760	R62 938 100	R16 969 100	R0	R638 117 200
Pearl Valley				R154 947 800	R11 827 100	R49 824 600	
Wellington	R58 371 600	R168 746 200	R2 081 800	R31 220 100	R8 780 700	R21 180 400	R290 380 800
Klapmuts	R58 401 980	R74 005 260	R0	R28 113 500	R5 482 500	R0	R166 003 240
Windmeul	R10 491 460	R21 485 660	R0	R4 677 100	R4 915 200	R0	R41 569 420
Saron	R7 315 700	R11 088 000	R0	R5 297 300	R5 783 000	R0	R29 484 000
Gouda	R3 609 620	R2 702 000	R0	R2 948 400	R19 600	R0	R9 279 620
Hermon	R4 295 760	R7 097 580	R0	R2 769 600	R2 925 400	R0	R17 088 340
Bainskloof	R0	R0	R0	R0	R0	R0	R0
<b>Total</b>	<b>R380 534 000</b>	<b>R381 388 560</b>	<b>R9 380 560</b>	<b>R292 911 900</b>	<b>R56 702 600</b>	<b>R71 005 000</b>	<b>R1 191 922 620</b>

Note: Costs include P&G's, Contingencies & Fees, but exclude EIA studies, registration of servitudes and/or land acquisition and VAT.

#### **GROUNDWATER INFRASTRUCTURE (BOREHOLES)**

None of the towns in Drakenstein Municipality's Management Area are currently supplied with bulk potable water from boreholes. If Drakenstein Municipality however decides to develop groundwater resources in the future it is important for the Municipality to monitor on a monthly basis (at least) the static water level (i.e. the level prior to commencement of pumping for the day) in each of their production and monitoring boreholes and the volume of water abstracted. Water quality samples also will need to be taken on a seasonal or yearly basis. The daily rainfall for the area should also be recorded. Managing groundwater for water supply purposes should have the following three main functions:

- Ensure that the aquifer is used optimally: The aquifer should not be over-pumped as that would negatively impact on its long-term sustainable yield or on the environment. It also means that if the aquifer is being under-utilised, this will become known.
- Ensure that the water quality in the aquifer is not negatively affected: This may be as a result of high abstraction from the aquifer, or from poor groundwater protection (from latrines, animal enclosures, etc.).
- Optimise borehole pumping rates so that the pumping equipment operates efficiently: Pumping rates are frequently set too high and this cause unnecessarily high pumping heads, a waste of energy, and at times, pump failure.

An additional function, which is usually captured in the first two points, is to ensure that environmental integrity is maintained. It is important for Drakenstein Municipality to focus on aquifer protection, groundwater monitoring and wellfield management if groundwater is to be developed in the future.

**WATER TREATMENT WORKS INFRASTRUCTURE**

The previous detail WTW Process Audits were done in 2013 and the Municipality is currently busy with new WTW Process Audits for all their WTWs.

The Paarl/Wellington distribution system received three consecutive Blue Drop awards in 2010, 2011 and 2012. The distribution system received a Blue Drop score of 72.07% in 2014. The overall 2014 Risk Rating was 38.4% and was only above 50% for Process Control (56.5%).

**Meulwater WTW (Supply from Nantes and Bethel Dams and the Berg River):**

The construction of the new 8 MI/d Meulwater WTW on Paarl Mountain enables Drakenstein Municipality to fully utilise the bulk water supply from the Nantes and Bethel Dams and the water from the Berg River. The Meulwater WTW enables the Municipality to increase the utilisation of their own local sources, which is in line with the Municipality's Strategic Objective to become less dependent on the supply from the CCT. It provides additional treatment capacity for the projected growth of the town, instead of further increasing the dependence on the expensive Wemmershoek water.

The Meulwater WTW is currently well equipped and well-operated. The plant operates well within its design capacity. The natural mountain water is of a higher quality and if it is "polluted" by too much of the poorer quality Berg River water it could cause serious degradation, which will be difficult and costly to remedy. A Monitoring programmes (Water quality, various natural inflows, pumped flows, transfers from one dam to the other as well as draw-offs) was proposed, to facilitate proper management of the situation.

It is anticipated that the expanding of the Berg River pump scheme will result in the deterioration in the blended water quality. This deterioration in water quality will result in additional turbidity load on the existing sand filters, subsequently overloading the filters and hence shorter filter runs will be experienced. The recommended dissolved air flotation and filtration (DAFF) process is a solution to accommodate the anticipated deterioration in water quality, and to increase capacity of the WTW. The capacity of the WTW is currently 8 MI/d and a capacity of 15 MI/d is the desired target after retrofitting the treatment works to the DAFF system.

Only the filtration process is impacted by the introduction of DAFF. However, additional pipework and control equipment will be required impacting on the WTW as a whole. These include:

- Recycle pumps and air compressors in the machine room.
- A saturator and suitable shelter in the upper filter gallery.
- Additional pipework in the filter bar.
- Interconnecting pipework between the machine room and the filter building.
- Electrical control in the machine room.

Minor civil adjustments to the filtration basin will be required. Allowance for redundancy must be accommodated in the DAFF system, this allows for the repairing and maintenance of the mechanical equipment without complete shutdown of the DAFF system. It was recommended that two air receivers, compressors and recycle pumps are used.

**Welvanpas WTW:**

The previous Welvanpas WTW consisted of pressure filtration / straining, stabilisation (limestone contact tanks) and chlorination. The Municipality is currently busy with the construction of the first phase of the new Welvanpas WTW, with a treatment capacity of 10 MI/d. The WTW will accommodate the lower summer yields and will be able to operate in the range of 1-10 MI/d. The capacity of the WTW will be upgraded to 20 MI/d capacity in the future, as a second phase.

The new Welvanpas WTW will include the following treatment processes.

Table C.8: Treatment processes of the new Welvanpas WTW	
Treatment Process	Description
Inlet works and flash mixing	Water from the Spruit River and Withoogte dam will be measured separately via two individual magnetic flow meters. The inlet works will be hydraulically sized to accommodate the 2 <sup>nd</sup> Phase treatment capacity of 20 Ml/d. It will be designed to provide for flow measurement and control, pH measurement and control, as well as adequate flash mixing of dosed chemicals.  Rapid mixing is achieved with an inline-mixer due to the control needed to effectively mix the water over a significant range of flows. A bentonite solution will be dosed upstream of the rapid mixing unit (when required) while a coagulant chemical will then be dosed into the rapid mixing chamber. If pH control is required, a lime solution will be mixed into and dosed with the Bentonite.
Chemical dosing and pH control	It is recommended that a polyaluminium chloride coagulant be dosed followed by a rapid mixing phase to disperse the chemical into the raw water.
Flocculation	Mechanically mixed flocculators were recommended, in light of the fact that the flow through the works will vary drastically on a seasonal basis. Despite the higher maintenance requirements, the flexibility that they offer to flocculate differing flows and adaptability to the raw water characteristics are considered the decisive factor.
Filtration	Rapid Gravity Sand Filtration was selected as the preferred filtration option. Conventional rapid gravity sand filtration involves the removal of solids either by exclusion or by attachment in a bed of filter media. This technology has evolved towards a preference for higher filtration rates, coarser media and deeper media beds, encouraging filtration by chemical-physical mechanism (attachment), rather than by the slow-rate, fine media, physical mechanisms (exclusion) that was popular in the past.
Disinfection	To reduce operational risks and mechanical maintenance at the Welvanpas WTW, disinfection with calcium hypochlorite is the preferred option, and retention in a contact tank for 30min to ensure effective elimination of pathogens. The operational cost of calcium hypochlorite relative to chlorine gas is very similar.
Stabilisation	The existing stabilisation tanks have been demolished and removed as they were proving to be a maintenance headache to the municipality. A lime solution is dosed over a weir at the end of the chlorine contact tank in order to stabilise the water.
Increased clearwater storage capacity	A new 5MI reservoir will be constructed next to the existing 3MI reservoir so as to increase the Clearwater storage capacity of the network. With the added 5MI reservoir the storage capacity will be increased to 8MI, which will provide sufficient storage during the winter months until the water can be pumped to Con Marine Reservoir for use in the zones of Con Marine and Mbekweni.

#### Saron WTW:

The Saron distribution system received Blue Drop awards in 2010 and 2012. The distribution system received a Blue Drop score of 73.08% in 2014. The overall 2014 Risk Rating was 37.3% and was below 50% for all three indicators (Process Control, Drinking Water Quality and Risk Management).

The existing treatment system of Saron WTW is limited mainly to disinfection. The risk of Giardia lamblia or Cryptosporidium parasites in the raw water supply at Saron is considered to be low. This attributed to the fact that the diversion site is located in a pristine catchment area and the conveyance system is a confined (pipe) one. Nevertheless, it is quite possible that this source might also contain these organisms at times in the future, as has been the case at Wellington. Unless it is reasonably certain that this will never occur, best practise would be that suitable treatment of the water should be provided to minimise the risk of infecting the consumers. Such treatment would include chlorination, but cannot be limited to this, due to the fact that these organisms are resistant to chlorine disinfection. Best practise treatment facilities for Saron would include a filtration system to provide proper pathogen and turbidity removal, a proper chlorine dosing system, a chlorine contact tank and a limestone contact tank.

Drakenstein Municipality's future planning is to upgrade the existing Saron WTW to a capacity of 3 Ml/d. The principle treatment objectives, as included in the Preliminary Design Report for the Saron WTW of July 2017, include the following:

- Reduce SS and turbidity;
- Reduce Natural Organic Matter;
- Stabilise the final water to combat aggressiveness; and
- Remove harmful pathogens.



The principle components of the process configuration considered, in order to achieve the treatment objectives, are direct filtration, disinfection and stabilisation.

Table C.9: Drakenstein Municipality's future planning to upgrade the Saron WTWs	
Component	Recommended infrastructure
Slow sand filtration	<p>Slow sand filtration (SSF) is efficient at removing protozoa and viruses. SSF can reduce turbidity levels of raw water, provided the incoming turbidity is lower than 20 NTU. SSFs can also reduce the natural organic material in the water. SSF are moderately effective at removing turbidity and natural organic material, but with the addition of certain pre-treatment techniques it can be improved.</p> <p>Pre-treatment can be achieved by use of ozonation. It can also assist with removal of organic and inorganic matter, bacteria, viruses, pesticides, turbidity, odour, taste and colour from potable water. Further, ozone oxidises the iron, manganese, and Sulphur in the water to form insoluble metal oxides or elemental sulphur. These insoluble particles are then removed by filtration. Ozone will however not be included in the proposed upgrade, but allowance will be made for its possible inclusion in the future.</p> <p>Furthermore, SSFs should reduce the density of Giardia lamblia and Cryptosporidium by at least 2 to 4 logs (99 to 99.99 percent) if the system is operated properly. Over and above its appropriateness for treating the raw water from the Leeu River SSF was considered the most suitable filtration option for the following reasons:</p> <ul style="list-style-type: none"> <li>• SSF systems are simple to control and are ideally suited for small remote systems, such as at Saron.</li> <li>• SSFs require a large plant footprint per volume of water treated than a conventional works. Land is available at Saron thus making the SSF viable.</li> </ul>
Disinfection	<p>Disinfection would be accomplished by dosing chlorine gas into the water. Chlorine is selected for a number of reasons, including:</p> <ul style="list-style-type: none"> <li>• That it will provide a residual to protect against recontamination (at least to a reasonable degree) in the distribution network, whereas some disinfection alternatives (such as ozone and UV light) do not provide this.</li> <li>• Chlorine gas is by far the most commonly used disinfectant in SA, and indeed internationally. The equipment is thus relatively standard and familiar to most operators, and is simple to operate.</li> <li>• Disinfection via chlorine gas equipment is generally the most cost effective option, when taking account of both capital and operating costs.</li> </ul> <p>As chlorine is more effective at lower pH values, disinfection would take place before the pH of the water is increased by the stabilisation process, thus providing optimum conditions for deactivating of pathogens.</p> <p>The chlorine will be dosed into a chlorine contact tank to allow concentrated action on the pathogens before the water is distributed and diluted into the network. The chlorine dose concentration and the retention time in the contact tank will be designed so the product of concentration and retention time (the "CT value") achieves the abovementioned balance log removals according to industry CT guidelines.</p> <p>Chlorine dosing facilities, complying with the requirements of the Occupation Health and Safety Act would be required. The scale of operations at the Saron WTW require the use of 70 kg chlorine cylinders. During detailed design, the necessity for provision of a scrubber unit will be investigated.</p> <p>As mentioned earlier in the report the existing works comprise a UV disinfection unit. This unit will be relocated upstream of the new chlorine disinfection system to provide additional protection against harmful pathogens. It should however be noted that this UV system is outdated and no longer serviceable by local suppliers, as such the system should be replaced with a new and updated model when no longer operable.</p>
Stabilisation	<p>Stabilisation of the water will be achieved with fixed bed contact tanks which are periodically replenished with limestone chips. The flow of treated water through the limestone beds will increase the concentration of soluble calcium and alkalinity in the treated water (stability), reducing the risk of damaging downstream infrastructure (reservoirs and pipelines).</p> <p>The impurities present in the limestone chips will settle to the base of the stabilisation tanks and will be periodically flushed out by redirecting the direction of flow through the tanks.</p>
Control	<p>Automation of the works will be kept to a minimum, design of the plant is such that it enables ease of use and manual operation of the process by operators. All process areas of the works shall be monitored with the use of a remote terminal unit (RTU) and instrumentation, and linked to the existing viewing supervisory control and data acquisition (SCADA) system located at the municipal office.</p> <p>Basic process related and protection related interlocks will be handwired into the motor control centre (MCC), where relay logic will be used for control of all equipment. Full manual control of all equipment will be possible from the MCC.</p>
Telemetry	<p>A single RTU Telemetry Station will be installed at the Saron WTW. The Works will be connected to the Municipal Telemetry network via radio telemetry to allow monitoring of the system variables, statuses and reports. The telemetry station at Saron WTW will be integrated with the SCADA computer located in Municipal Offices if required.</p>
Instrumentation	<p>Inlet flow meter, filtered water turbidity meter, treated water flow meter, treated water pH meter, treated water turbidity meter, treated water chlorine residual meter and chlorine leak detectors.</p>



**Bainskloof WTW:**

The Bainskloof distribution system received two consecutive Blue Drop awards in 2011 and 2012. The distribution system received a Blue Drop score of 50.52% in 2014. The overall 2014 Risk Rating was 51.9% and was only above 50% for Drinking Water Quality (70.4%).

The potable water supplied to the “Eerste Tol” site on the Bainskloof Pass is abstracted from a mountain pool located downstream of mountain pools which are regularly used by the public. The water is pumped from the pool to a treatment system consisting of a Kleerflo filter and a UV system for disinfection, which was installed during 2010.

The Kleerflo is a fully automatic backwashing filter / strainer, which is used in a number of differing industries to remove suspended solids from water. The capacity of the existing Bainskloof WTW is 0.4 Ml/d, which is adequate to meet the future demands of Bainskloof.

**BULK WATER INFRASTRUCTURE**

The Paarl Mountain scheme including the Berg River pumping scheme from Ysterbrug, pipes leading from the dams to the WTW, the Meulwater Reservoir and pipes leading to the various supply reservoirs and zones all have sufficient capacity for the future.

The Water Master Plan (February 2017) has indicated that based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk water supply systems:

- **Paarl:** The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- **Wellington:** The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- **Saron:** The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- **Gouda:** The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- **Hermon:** The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.

Table C.10: Future bulk water supply pipelines required	
Area	New feeder mains that are proposed or existing feeder mains that require upgrading in the future
Paarl	The existing 525 mm Ø bulk pipeline from the Wemmershoek scheme to the Courtrai reservoirs (items DPW.B2a & DPW.2b). (According to information made available, this pipe is in a bad state of repair). A portion of this pipeline is however already replaced.
	Upgrade Pearl Valley supply pipeline from Wemmershoek to Pearl Valley reservoirs when existing pipeline reaches capacity (item DPW.B10).
	New 160 mm Ø bulk supply pipe is proposed from the Retief booster PS to the proposed Nieuwedrift reservoir (item DPW7.2).
	New 200 mm Ø feeder main is proposed from the existing Leliefontein reservoir to the proposed Leliefontein booster PS (item DPW6.1).
	A new dedicated 250 mm Ø bulk supply pipe is proposed from the Wemmershoek pipeline to the proposed Simondium reservoir (item DPW.B11).
	A new dedicated 400 mm Ø bulk supply pipe is proposed from the Wemmershoek pipeline to the proposed Ben Bernard reservoir site (item DPW.B13).
	A new 315 mm Ø feeder main is proposed from the existing Groenvlei 250 mm Ø bulk pipeline (item DPW.B4c) with a new flow-control valve on the inlet to the Bo-Langstraat reservoir (item DPW.B4b) to control flow into the reservoir.
Wellington	The existing 500 mm Ø supply pipeline between Leliefontein reservoir and the Con Marine reservoir will require reinforcement in future (items DWW.B9 & DWW.B12).

Table C.10: Future bulk water supply pipelines required	
Area	New feeder mains that are proposed or existing feeder mains that require upgrading in the future
	Upgrading of the remaining 200 mm Ø portion of the feeder main from Welvanpas pump station to Berg en Dal reservoir (item DWW.B22).
	Relocate feeder main to Berg en Dal reservoir when future area W.6.1 develops (item DWW.B18)
	Upgrading of the 100 mm Ø feeder main from Berg en Dal reservoir to Berg en Dal tower (item DWW.B13).
	The existing 375 mm Ø feeder main from Courtrai in Paarl to Newton in Wellington (the so-called “Strawberry King” pipeline) is in a bad state of repair and requires upgrading. It is proposed that this pipeline is upgraded to a diameter of 450 mm. A portion of this pipeline is already constructed, but not operational (items DWW.B23a & DWW.B24a). The remaining portions to be implemented are master plan items DWW.B23b, DWW.B24b and DWW.B25 and it is also proposed that a PRV is installed on the line in order to protect the downstream Newton/Van Blerk network against high static pressures (item DWW.B26).
	A new 500 mm Ø bulk pipeline is proposed between the Welvanpas reservoirs and the Welvanpas pump stations, to improve bulk water supply to the pump stations and the reservoir zone (item DWW.B22).
Windmeul	New 200 mm Ø rising main from Voëlvlei pipeline to proposed Windmeul reservoir (item DWmW.B3).
Klapmuts	New 500 mm Ø feeder main from Wemmershoek pipeline to the proposed Klapmuts 3 reservoir (item DKW.B9).
Saron	No feeder mains require upgrading in future.
Gouda	No feeder mains require upgrading in future.
Hermon	Upgrade existing 100 mm Ø feeder main to Hermon reservoir from Voëlvlei pipeline (item DHW.B2).

## WATER PUMP STATIONS

The Water Master Plan (February 2017) has indicated that based on the most likely land-use development scenario, it will be necessary for the following water pump stations:

Table C.11: Future water pump stations required					
Area	Recommendations included in the Water Master Plan	Year	Capacity (l/s)	Head (m)	Cost (R Million)
Paarl	Upgrade pumps of the existing Retief Street PS when future area PF104 develops (item DPW.B8).	2025	7	20	-
	Construct a new pump station when future area PF8.1, 8.2 & 9 develop, Leliefontein Booster PS (item DPW.B7).	2030	18	30	R1.708
Wellington	A new pumping station to supply water to the new Newton reservoir and boost supply through the Leliefontein/Con Marine bulk pipeline is proposed (item DWW.B5).	2017	700	10	-
	A new booster pump station for the Perdeskoen booster zone is proposed (item DWW.B2)	2019	10	30	R1.565
	A new booster pump station for the Blouville booster zone is proposed (item DWW.B7, the cost of the pump station is for the account of the private development).	2025	3	45	-
	Upgrading of the existing Blouville and Berg en Dal tower pumping stations are proposed (items DWW.B6 & DWW.B8).	2030 2020	100 30	60 16	R1.149 R0.537
Klapmuts	A pump station to supply the proposed Klapmuts no. 3 reservoir from the take off point on the Wemmershoek pipeline (item DKW.B8).	2026	230	75	R3.438
	3 New booster pump stations for the high lying areas in the Klapmuts 3 reservoir zone (items DKW4.1, DKW5.1 & DKW6.1).	2030	25	30	R5.607
		2035	10	30	R1.565
		2035	15	30	R1.653
Windmeul	A pump station to supply the proposed Windmeul reservoir from the take off point on the Voëlvlei pipeline (item DWmW.B2).	2025	25	170	R2.526
Gouda, Hermon, Saron	No future pump stations are required	-	-	-	-
<b>Total</b>					<b>R19.748</b>

**RESERVOIR INFRASTRUCTURE**

The condition of all the reservoirs in Drakenstein Municipality's Management Area is good and the reservoirs are well maintained. Drakenstein Municipality's overall storage factors of the reservoirs for the various towns for 2015/2016, based on 1 x PDD (24 hours storage capacity), are 2.73 for Paarl/Wellington, 0.63 for Saron, 2.36 for Gouda, 1.68 for Hermon and 3.07 for Bainskloof.

Even though the town's overall storage capacity might be adequate there might be some distribution zones within the town's network with inadequate storage capacity, as identified through the Water Master Planning process (February 2017) and indicated in the table below.

<b>Area</b>	<b>Recommendations included in the Water Master Plan</b>	<b>Year</b>	<b>Capacity (Ml)</b>	<b>Cost (R Million)</b>
Paarl	A new reservoir is proposed at the existing Courtrai reservoir site as a first phase to augment reservoir capacity for the existing Main Road, Courtrai Upper reservoir, Courtrai Upper booster, Retief Street booster and Courtrai PRV zones (construction of this reservoir is currently in progress).	2017	8.0	-
	The existing Bo-Langstraat reservoir that is currently not in use should be re-commissioned.	2020	2.3	-
	A new reservoir is proposed for the future development area PF104 (proposed Nieuwedrift reservoir).	2025	0.5	R2.702
	A new reservoir dedicated to Simondium and surrounding future developments is also proposed.	2025	3.0	R8.946
	A new reservoir is proposed at the existing Pearl Valley reservoir site to augment reservoir storage for this larger zone when future developments in the area develop (this reservoir can be phased).	2030	10.0	R21.560
	A second reservoir is proposed next to the existing Courtrai Lower reservoirs in future as a second phase to provide additional reservoir storage capacity for the future development areas in the Paarl south rural area west of the Berg River when they start to develop.	2030	8.0	R18.219
	Two new Ben Bernard reservoirs are proposed to supply future development areas in the Southern Paarl rural area.	2030 2035	3.0 3.0	R8.946 R8.946
Wellington	A new reservoir at the existing Blouvllei reservoir site is proposed to augment reservoir storage for this larger zone.	2035	3.0	R8.946
	A new reservoir at the existing Berg en Dal reservoir site is proposed to augment reservoir storage for this larger zone.	2035	2.0	R6.748
Klapmuts	A new reservoir is proposed as a first phase for the new future development areas north of the N1. A new flow control valve (item DKW.B6) at the bulk connection to the CCT's bulk supply pipeline from Wemmershoek with a sump (item DKW.B7) is also proposed for supply to this reservoir.	2025	10.0	R21.560
	A second reservoir is proposed next to the proposed first phase Klapmuts no. 3 reservoir as a second phase when the Klapmuts no. 3 phase 1 reservoir reaches capacity in future.	2035	10.0	R21.560
Windmeul	A new reservoir (TWL = 260 m) is proposed for the proposed future development areas in Windmeul. A new bulk connection to the CCT's bulk supply pipeline from Voëlvlei (item DWmW.B1) with a sump (item DWmW.B5) is also proposed for supply to this reservoir.	2025	2.3	R7.490
Saron	A new reservoir is proposed at the existing reservoir site.	2017	4.0	R11.088
Hermon	A new reservoir is proposed to augment reservoir storage for this larger zone.	2030	1.5	R5.593
<b>Total</b>				<b>R152.304</b>

**WATER AND SEWER RETICULATION INFRASTRUCTURE**

The Water Master Plan (February 2017) has indicated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary:

<b>Table C.13: Future water reticulation infrastructure required</b>
<b>PAARL</b>
<b>Proposed distribution zones</b> <ul style="list-style-type: none"> <li>The Leliefontein reservoir zone is increased to supply the rural areas north of the Val-de-Vie and east of the Boschenmeer developments. A new Leliefontein PRV zone is proposed to reduce high static pressures at the lower lying erven in the area.</li> <li>The Courtrai PRV zone is increased to supply water to future development areas in the southern rural areas of Paarl west of the Berg River.</li> <li>A new Leliefontein booster zone for the high lying future development areas below the Leliefontein reservoir is proposed.</li> <li>The existing Mbekweni suburb that is currently supplied by the Mbekweni PRV zone will be supplied from Wellington in the future.</li> <li>The rural areas east of the Groenheuvel suburb that is currently supplied by the Bo- Dal PRV zone will be supplied from Wellington in the future.</li> <li>It is proposed that the northern area of the Main Road zone in Paarl North is rezoned and supplied from the Bo-Langstraat reservoir in the future. A new PRV is proposed on the supply pipeline to the zone to reduce high static pressures in the zone.</li> <li>It is proposed that the zone boundaries of the Groenvlei zone is adjusted when the Bo-Langstraat reservoir zone is implemented in order to reduce the high static pressures of the lower lying erven in the Groenvlei reservoir zone. A new PRV is also proposed on the supply pipeline to the Groenvlei zone to reduce high static pressures at the higher lying erven in the zone.</li> <li>The Pearl Valley reservoir zone is increased to include future development areas PV1, PV2.1 - PV2.15, PV3, PV4.1, PV4.2, PF22a, PF22b, PF33, PF102b - PF102f, PF103 &amp; PF106.</li> <li>A new Nieuwedrift zone for future development area PF104 is proposed.</li> <li>A new Simondium reservoir zone is proposed for the existing Simondium town and the surrounding future developments.</li> <li>A new Ben Bernard reservoir zone is proposed to accommodate future development areas PF18.1 &amp; PF101.</li> <li>A new Courtrai Lower reservoir zone is proposed to accommodate future development areas in the rural areas south of the Courtrai reservoirs on the western side of the Berg River.</li> <li>The boundaries of the remaining existing zones are increased to accommodate future development areas.</li> </ul> <b>Proposed future system and required works</b> <ul style="list-style-type: none"> <li>The existing Paarl water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.</li> <li>A few distribution pipelines are required to reinforce water supply within the Paarl distribution network.</li> <li>New distribution pipelines are proposed to supply future development areas with water when they develop.</li> <li>The existing 375mm Ø supply pipeline in the Main Road zone along the Berg River Boulevard is in a bad state of repair and requires upgrading.</li> <li>Re-setting of existing PRVs, the expanding of existing PRV zones and the implementation of new PRV zones are proposed in order to improve water demand management in Paarl.</li> </ul>
<b>WELLINGTON</b>
<b>Proposed distribution zones</b> <ul style="list-style-type: none"> <li>The boundary of the Welvanpas reservoir zone is adjusted to include a portion of the Newton/Van Blerk reservoir zone.</li> <li>The existing Mbekweni PRV zone that is currently supplied from the Paarl is included in the Wellington system, supplied with water from the Newton/Van Blerk reservoir zone.</li> <li>The boundaries of the existing zones are increased to accommodate future development areas.</li> <li>A new Bloulei booster zone is proposed to accommodate the higher lying erven below the reservoir.</li> <li>A new Perdeskoen booster zone is proposed to accommodate the future Perdeskoen rural supply area.</li> <li>A new Industrial PRV zone is proposed in order to reduce the high static pressures in the Wellington Industrial Park area.</li> </ul> <b>Proposed future system and required works</b> <ul style="list-style-type: none"> <li>The existing Wellington water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.</li> <li>A few distribution pipelines are required to reinforce water supply within the Wellington distribution network.</li> <li>New distribution pipelines are proposed to supply future development areas with water when they develop.</li> <li>A pressure reducing valve and rezoning of the existing system are proposed in order to implement the Industrial PRV zone.</li> </ul>
<b>WINDMEUL</b>
<b>Proposed distribution zones</b> <ul style="list-style-type: none"> <li>A new Windmeul zone is proposed for future development areas in Windmeul.</li> <li>A new Rhebokskloof zone is proposed for the Rhebokskloof private development.</li> </ul>



Table C.13: Future water reticulation infrastructure required
<b>Proposed future system and required works</b> <ul style="list-style-type: none"> <li>A 160mm Ø pipeline between Windmeul and Paarl is also proposed as an emergency connection between the two systems (items DWmW1.7 and DWmW1.8).</li> </ul>
KLAPMUTS
<b>Proposed distribution zones</b> <ul style="list-style-type: none"> <li>A new Reservoir 3 zone is proposed to accommodate all the developments north of the N1. This zone should be supplied from a new reservoir with a TWL of 230 m. It is also proposed that future development areas PF16a &amp; PF17a (which are located between Klapmuts and Paarl on the southern side of the N1 National Road) are accommodated within this zone.</li> <li>3 New booster zones are proposed for the high lying areas north of the N1 in the Reservoir 3 zone.</li> </ul> <b>Proposed future system and required works</b> <ul style="list-style-type: none"> <li>A 355mm Ø pipeline is proposed to accommodate future development areas PF16a and PF17a. This pipeline can in future be connected to the Courtrai PRV zone in Paarl as an emergency connection between the two systems (items DKW3.14 and DKW3.15).</li> </ul>
SARON
<b>Proposed distribution zones</b> <ul style="list-style-type: none"> <li>The only changes to the existing distribution zone are that the boundaries are increased to accommodate the future development areas in Saron.</li> </ul> <b>Proposed future system and required works</b> <ul style="list-style-type: none"> <li>The existing Saron water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.</li> <li>A few distribution pipelines are required to reinforce water supply within the Saron distribution network.</li> </ul>
GOUDA
<b>Proposed distribution zones</b> <ul style="list-style-type: none"> <li>The only changes to the existing distribution zone are that the boundaries are increased to accommodate the future development areas in Gouda.</li> </ul> <b>Proposed future system and required works</b> <ul style="list-style-type: none"> <li>The existing Gouda water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.</li> <li>A few distribution pipelines are required to reinforce water supply within the Gouda distribution network as well as new supply pipelines for the new future development areas.</li> </ul>
HERMON
<b>Proposed distribution zones</b> <ul style="list-style-type: none"> <li>The only changes to the existing distribution zone are that the boundaries are increased to accommodate the future development areas in Hermon.</li> </ul> <b>Proposed future system and required works</b> <ul style="list-style-type: none"> <li>The existing Hermon water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.</li> <li>A few distribution pipelines are required to reinforce water supply within the Hermon distribution network as well as new supply pipelines for the new future development areas.</li> </ul>

The Sewer Master Plan (February 2017) has indicated that based on the most likely land-use development scenario, the following further sewer reticulation infrastructure components will be necessary:

Table C.14: Future sewer reticulation infrastructure required
PAARL
<ul style="list-style-type: none"> <li>It is proposed that the existing sewer flow of the areas south of the N1 National Road is diverted into the Paarl bulk sewer after the Paarl bulk sewer is extended to south of the N1 National Road and west of the Berg River (this project is in progress and will be commissioned within the first half of 2017 and is therefore not included in table DS6.5b).</li> <li>It is proposed that the existing Roodeberg PS is decommissioned in future when future areas P74E &amp; P71 develop (project DPS-015 in Table DS6.5b).</li> <li>A new Viakkeland bulk outfall sewer is proposed to accommodate the future low cost housing projects to the east of Mbekweni (future areas V1 to V7.2) in the Mbekweni drainage area (project DPS-006 in Table DS6.5b) and bulk sewers in the existing Mbekweni drainage area should be upgraded in order to reinforce the existing system (project DPS-007 in Table DS6.5b).</li> <li>The existing Mbekweni pump station and rising main will require upgrading and bulk sewers in the existing Mbekweni drainage area should be upgraded in order to reinforce the existing system to accommodate future flow (project DPS-022 in Table DS6.5b).</li> <li>It is proposed that new bulk sewers is constructed in the Groenheuwel area to accommodate future development areas PF5, PF6, P36 and the sewer flow of the areas east of Van der Stel Street, south of Sonstraal Road and north of Steenbok Street (project DPS-009 in table DS6.5b).</li> </ul>



**Table C.14: Future sewer reticulation infrastructure required**

- Phase 2 of the West Bank bulk sewer (from Dorp Street to Optenhorst Street) is required in future when the existing bulk sewer reaches capacity, or the condition of the existing sewer requires replacement (project DPS-023 in Table DS6.5b).
- The existing Donkervliet PS is currently operational (the PS has been vandalized and is currently serviced by suction trucks) and it is proposed that this PS is recommissioned in future (project DPS-025 in Table DS6.5b)
- A number of existing outfall sewers require upgrading by replacement with larger sized future sewers.
- New outfall sewers are proposed to accommodate future development areas that fall within the drainage areas of the Paarl WWTP.

**WELLINGTON**

- Future development areas in the Newton PS drainage area require new gravity mains and the upgrading of existing gravity mains (projects DWS-004 & DWS-005 in Table DS6.5b).
- The Wellington WWTP with a treatment capacity of 7.0 Ml/d is currently at capacity. Sewage can however be pumped from the Newton pump station (which falls within the larger Wellington WWTP drainage area) through a 400 mm diameter rising main to the Paarl WWTP. The capacity of this 400 mm diameter rising main is 170 l/s (14.6 Ml/day). The Paarl WWTP with a treatment capacity of 35 Ml/d has spare capacity available of roughly 7.0 Ml/d. The Wellington WWTP is however currently being upgraded to a capacity of 16.0 Ml/d.
- In future when Paarl WWTP reaches its upgraded capacity of 35.0 Ml/day, excess flows up to a maximum of 170 l/s should be diverted to Wellington WWTP via the Newton pumping station. The Wellington WWTP should then be upgraded from 16.0 Ml/d to 25.0 Ml/d in order to accommodate the additional flow (project DWS-014 in Table DS6.5b).
- A new bulk pumping station at the Paarl WWTP is proposed to pump excess flows from the Paarl WWTP through the existing 400 mm diameter rising main to the Newton pumping station. It is proposed that the Newton pumping station is then upgraded and a new 560 mm diameter rising main is constructed between the Newton pump station and the Wellington WWTP (project DWS-001 in Table DS6.5b).
- A new Future pump station W1 drainage area is proposed for future development areas W3 & W4. A new pump station at the lowest point of Lady Loch Street and accompanying rising main should be constructed for this new drainage area that discharges into the existing Pentz Street drainage area (project DWS-006 in Table DS6.5b).
- A new Future pump station W2 drainage area is proposed for the future development areas W1, W2 & W24 north of the Krom River in Wellington. A new pump station and rising main should be constructed for this new drainage area that discharges into the existing Pentz Street drainage area (project DWS-008 in Table DS6.5b).
- A new Future pump station W3 and rising main that discharges into the existing Industrial Park drainage area are proposed when future area W35 develops (project DWS-010 in Table DS6.5b).
- A number of existing outfall sewers require upgrading by replacement with enlarged future sewers. The most critical of these proposed upgrades are a number of outfall sewers in the existing Pentz Street drainage area (project DWS-002 in Table DS6.5b).
- New outfall sewers are proposed to accommodate future development areas that fall within the existing and proposed future drainage areas of the Wellington WWTP.

**PEARL VALLEY AND PAARL RURAL AREA****Pearl Valley**

- A new Pearl Valley 2 bulk sewer (project DRS-007 in Table DS6.5b) is proposed to accommodate the larger part of the proposed Pearl Valley 2 development. It is proposed that flow from this bulk sewer is connected in the interim (before the bulk sewers between Pearl Valley 2 and the existing Paarl bulk sewer is constructed) to the existing 150 mm Ø outfall sewer gravitating towards the Val-de-Vie PS 5 (to the north of Pearl Valley 2) through link services item DRS.11.4 (new 160 mm Ø outfall sewer).
- When the PDDWF for the areas gravitating towards the Val-de-Vie PS 5 exceeds 350 kl/d a new internal PS and accompanying rising main should be constructed (link services items DRS11.5 & DRS11.6; project DRS-0026 in Table DS6.5b) which pumps directly to the Pearl Valley WWTP. When the Paarl bulk sewer is extended to the Pearl Valley 2 development, the interim PS can be decommissioned and the sewer flow from the upstream areas diverted to the Paarl WWTP.
- A new Simondium outfall sewer that discharges into the proposed Pearl Valley 2 bulk sewer is proposed to accommodate future areas PF23 – PF26 in Simondium, rural development west of the Berg River (future area PF30), the Meerlust development south of Simondium (future area PF107) and future areas PF22, PF33 & PF106 south of Pearl Valley (project DRS-018 in Table DS6.5b).
- The Pearl Valley WWTP has a current treatment capacity of 2.0 Ml/d and a permit to increase the capacity to 3.0 Ml/d. It is proposed that the current 2.0 Ml/d Pearl Valley WWTP is upgraded to a capacity of 3.0 Ml/d (project DRS-035 in Table DS6.5b).
- Any excess sewer flow above 3.0 Ml/d should in future be diverted from the Pearl Valley WWTP drainage areas to the Paarl WWTP (through an extension of the Paarl bulk sewer adjacent to the Berg River; Rural bulk sewer West phase 1 and Rural bulk sewer East phases 1 & 2; projects DRS-001, DRS-005 & DRS-006 in Table DS6.5b).
- The existing Val-de-Vie pump stations 1, 2 and 5 should also then be decommissioned and sewage from their respective drainage areas diverted to the Paarl Gravity drainage area (project DRS-010 in Table DS6.5b).
- A number on new outfall sewers are proposed to accommodate future development areas that fall within the drainage areas of the Pearl Valley WWTP.
- A few existing outfall sewers require upgrading by replacement with enlarged future sewers when they reaches capacity.

**Paarl Rural Area**

- New collector sewers are proposed on the eastern side of the Berg River to accommodate future development areas to the east and south of the existing Boschenmeer Estate (projects DRS-029 & DRS-030 in Table DS6.5b).
- It is proposed that the existing Boschenmeer PS is decommissioned and that the flow from the Boschenmeer PS drainage area is diverted to the proposed gravity outfall sewer along the western boundary of the estate (project DRS-033 in Table DS6.5b).
- A new future pump station R3 drainage area is proposed for future area PF12.2 east of the Boschenmeer Estate. A new pump

<b>Table C.14: Future sewer reticulation infrastructure required</b>
<p>station, rising main and outfall sewers should be constructed for this new drainage area that discharges into the future Rural bulk PS 2 drainage area (project DRS-031 in Table DS6.5b)</p> <ul style="list-style-type: none"> <li>One of the major upgrades required in the larger Paarl rural drainage area is the extension of the Paarl bulk sewer along the Berg River in order to accommodate future areas in the Paarl Rural area south of the N1 National Road and north of the Pearl Valley WWTP (project DPS-004 in Table DS6.5b). It is proposed that the bulk sewers are constructed in phases as follows: <ul style="list-style-type: none"> <li><u>Areas west of the Berg River and south of the N1 National Road:</u> <ul style="list-style-type: none"> <li><u>Phase 1:</u> New 825mm diameter bulk sewer west of the Berg River from across the Val-de-Vie development to the N1 National Road (project DRS-001 in Table DS6.5b).</li> <li><u>Phase 2:</u> New 600mm diameter bulk sewers to accommodate future areas west of the Berg River and south of the N1 National Road (project DRS-002 in Table DS6.5b)</li> <li><u>Phase 3:</u> New 450mm diameter bulk sewer to accommodate future areas west of the Berg River and south of the N1 National Road (project DRS-003 in Table DS6.5b)</li> <li><u>Phase 4:</u> New 400mm diameter bulk sewer to accommodate future areas west of the Berg River (project DRS-004 in Table DS6.5b)</li> </ul> </li> <li><u>Areas east of the Berg River and south of the N1 National Road:</u> <ul style="list-style-type: none"> <li><u>Phase 1:</u> New 600mm diameter bulk sewer and crossing of the Berg River to accommodate the future areas east of the Berg River that fall outside the existing Pearl Valley drainage areas (project DRS-005 in Table DS6.5b).</li> <li><u>Phase 2:</u> New 450mm diameter bulk sewers to accommodate flow from the Val-de-Vie pump stations 2 and 5 when they are decommissioned as well as any excess flow from the Pearl Valley WWTP drainage area (project DRS-006 in Table DS6.5b).</li> </ul> </li> </ul> </li> <li>A new future pump station R1 drainage area is proposed for future development areas PF18 &amp; PF101. A new pump station and rising main should be constructed for this new drainage area that discharges into the proposed 400mm diameter (phase 4) rural west bulk sewer (project DRS-013 in Table DS6.5b).</li> <li>A new future pump station R2 drainage area is proposed for future areas PF16 &amp; PF17 that cannot gravitate to the third phase of the proposed rural west bulk sewer. A new pump station and rising main should be constructed for this new drainage area that discharges into the future Rural bulk PS1 drainage area (project DRS-024 in Table DS6.5b).</li> <li>A number of new outfall sewers are proposed to accommodate future development areas that fall within the rural drainage areas south of the N1 National Road.</li> <li>In future when the Paarl and Wellington WWTPs reach capacity it is proposed that a new Paarl Rural WWTP is constructed for the rural areas south of the N1 National Road. Two rural bulk pumping stations and accompanying rising mains are proposed to divert the flow south of the N1 National Road to the proposed Paarl Rural WWTP (project DRS-011 &amp; DRS-012 in Table DS6.5b).</li> <li>The treatment capacity of the proposed rural WWTP is calculated at 13.0 Ml/d (project DRS-036 in Table DS6.5b).</li> <li>When the new Paarl Rural WWTP is commissioned it is proposed that the rising main from the proposed future PS R1 is re-directed so that it discharges directly into the new WWTP (project DRS-015 in Table DS6.5b).</li> </ul>
<b>WINDMEUL</b>
<p>The area Windmeul west of Wellington presently has no sewer network. Three new drainage areas are proposed for the future development areas in Windmeul.</p> <p>It is proposed that Future Windmeul pump station 2 discharges into the proposed Windmeul pump station 1 drainage area, Windmeul pump station 1 discharge into the proposed Windmeul Gravity drainage area and Windmeul Gravity drainage area gravitates to a new Windmeul WWTP. The position of the future Windmeul WWTP should be determined by specialized studies.</p> <p>The treatment capacity of the proposed Windmeul WWTP is calculated at 0.6 Ml/d.</p>
<b>KLAPMUTS</b>
<p>The area north of the N1 National Road National Road in Klapmuts that falls within the boundary of Drakenstein Municipality presently has no sewer network.</p> <ul style="list-style-type: none"> <li>In the sewer master planning for the areas in Klapmuts south of the N1 National Road that falls within the boundary of Stellenbosch Municipality (which is currently in the process of being updated for the Stellenbosch Municipality), it is proposed that the option to construct a regional WWTP downstream of the existing site in Klapmuts should be investigated when the existing treatment plant reaches its current treatment capacity of 2.4 Ml/d.</li> <li>It is therefore proposed that the area north of the N1 National Road in Klapmuts gravitates to the proposed future treatment plant. A study to determine the preferred site for the new treatment plant should be performed.</li> <li>The treatment capacity of the proposed regional Klapmuts WWTP is calculated at 13.0 Ml/d (project DKS-013 in Table DS6.5b). The treatment capacity required for the areas north of the N1 National Road (which fall within the boundary of the Drakenstein Municipality) is calculated at 5.3 Ml/d and for the areas south of the N1 National Road (which fall within the boundary of the Stellenbosch Municipality) is calculated at 6.8 Ml/d.</li> </ul> <p>Three new drainage areas are proposed for the areas north of the N1 National Road.</p> <ul style="list-style-type: none"> <li>A new Klapmuts Gravity drainage area is proposed for future areas K18 - K21 &amp; K23 - K25 that gravitates to the proposed treatment plant. It is proposed that the new bulk sewers for the drainage area are sized in order to accommodate the potential flows of the areas in Klapmuts south of the N1 National Road (that falls within the boundary of Stellenbosch Municipality) in future (projects DKS-004 &amp; DKS-005 in Table DS6.5b).</li> <li>A new Future pump station K3 drainage area is proposed for future areas K24 &amp; K25 that cannot gravitate to the Klapmuts Gravity drainage area. A new pump station and rising main should be constructed for this new drainage area that discharges into the future Klapmuts Gravity drainage area (project DKS-011 in Table DS6.5b).</li> <li>A new Future pump station K4 drainage area is proposed for future area K22 that cannot gravitate to the Klapmuts Gravity drainage area. A new pump station and rising main should be constructed for this new drainage area that discharges into the future Klapmuts</li> </ul>

<b>Table C.14: Future sewer reticulation infrastructure required</b>
Gravity drainage area (project DKS-012 in Table DS6.5b).
<ul style="list-style-type: none"> <li>A number of new outfall sewers are proposed to accommodate the future development areas in Klappmuts north of the N1 National Road.</li> </ul>
<b>HERMON</b>
<ul style="list-style-type: none"> <li>The boundary of the existing Hermon pump station drainage area is increased to accommodate proposed future development areas and existing unserviced erven that fall within the drainage area.</li> <li>A new Future pump station H1 drainage area is proposed for future development area H9 and existing unserviced erven that fall within the drainage area. A new pump station and rising main should be constructed for this new drainage area that discharges into the existing Hermon WWTP.</li> </ul>
<b>GOUDA</b>
<ul style="list-style-type: none"> <li>The boundary of the existing Gouda pump station drainage area is increased to accommodate proposed future development areas.</li> <li>Upgrading of the Gouda PS is proposed when the existing pumping station reaches capacity (project DGS-001 in Table DS6.5b).</li> </ul>
<b>SARON</b>
<ul style="list-style-type: none"> <li>Upgrading of the Saron 2 pump station is proposed when the existing pumping station reaches capacity (project DSS-003 in Table DS6.5b).</li> <li>The Saron 1 pump station capacity should be verified and if necessary the pump station and rising main should be upgraded (project DSS-001 in Table DS6.5b).</li> <li>A few existing outfall sewers require upgrading by replacement with larger sized future sewers (project DSS-002 in Table DS6.5b).</li> </ul>

## SEWER PUMP STATIONS

The Sewer Master Plan (February 2017) has indicated that based on the most likely land-use development scenario, it will be necessary for the following sewer pump stations:

Table C.15: Future sewer pump stations required				
Town	Recommendations included in the Sewer Master Plan	Year	Capacity (l/s)	Cost (R Million)
Paarl	Upgrade existing PS (Existing PS vandalised) (DPS4.1)	2020	-	R2.750
	Upgrade existing PS when existing PS reaches capacity (DPS1.4)	2025	215	R7.828
	Upgrade existing PS when overflow problems occur – investigate first (DPS1.18)	2025	30	R2.134
	Abandon PS when flow is diverted to existing gravity system (DPS3.59a)	2030	-	R0.155
Pearl Valley	Abandon existing PS when flow is diverted to new Paarl Rural sewer	2020	-	R0.155
	New PS for Pearl Valley 2 development, cost to developer (DRS11.5)	2020	140	-
	New PS when future area PF12.2 develops (DRS2.16)	2030	22	R2.178
	New PS when Rural WWTP is commissioned (DRS.B3)	2030	580	R11.386
	Abandon PS when flow is diverted to new Paarl Rural sewer (DPS13.3)	2030	-	R0.155
	Abandon PS when flow is diverted to new Paarl Rural sewer (DPS13.5)	2030	-	R0.155
	Abandon PS when flow is diverted to new Paarl Rural sewer (DPS13.7)	2030	-	R0.155
	New PS when Paarl & Wellington WWTP's reaches capacity (DRS.B1)	2035	90	R3.835
	New PS when future areas PF18 & PF101 develop (DRS5.3)	2035	60	R3.374
	New PS when future areas PF16 & PF17 develop (DRS9.3)	2035	25	R2.274
Wellington	New PS when future areas W3 & W4 develop (DWS4.2)	2020	8	R1.726
	New PS to divert sewage from Paarl to Wellington WWTP in future (DWS.B1)	2020	150	R6.044
	Upgrade existing PS to divert sewerage from Paarl to Wellington WWTP in future (DWS.B3)	2020	280	R9.492
	New PS when future areas W1, W2 & W24 develop (DWS6.4)	2025	40	R2.750
	New PS when future area W35 develops (DWS7.1)	2030	5	R1.630
Klappmuts	New PS when future area K24 develops (DKS5.2)	2030	15	R1.953
	New PS when future area K22 develops (DKS6.1)	2037	16	R1.985
Windmeul	New PS when FDA Wind1 & Wind5 develops (DWmS2.4)	2027	24	R2.242
	New PS when FDA Wind5 develops (DWmS3.1)	2030	4	R1.304
Gouda	Upgrade existing PS, investigate and upgrade when pump capacity becomes insufficient (DGS2)	2020	30	R0.020
Saron	Upgrade existing PS when overflow problems occur (DSS1.1)	2025	32	R2.178



Table C.15: Future sewer pump stations required				
Town	Recommendations included in the Sewer Master Plan	Year	Capacity (l/s)	Cost (R Million)
	Upgrade existing PS when overflow problems occur (DSS2.5)	2030	65	R3.079
Hermon	Upgrade existing PS when overflow problems occur, verify duty point (DHS1.4)	2025		R0.692
	New PS when future area H9 or existing unserved erven in Hermon develop (DHS2.3)	2025		R1.758
Total				R73.387

## WASTE WATER TREATMENT INFRASTRUCTURE

The table below gives a summary of the existing capacities and current flows at each of the WWTWs (Ml/d).

Table C.16: Existing capacities and flows at each of the WWTWs (Ml/d)					
WWTW	Existing Hydraulic Capacity	Peak Daily Flow (July 2016 – June 2017)	Peak Month Average Daily Flow	Average Daily Flow (July 2016 – June 2017)	Average Wet Weather Flow (Jun'17, Jul'16, Aug'16)
Paarl	35.000	53.301	33.235 (Mar 17)	25.709	24.314
Wellington	7.000	24.881	9.299 (Jul 16)	6.752	7.184
Pearl Valley	2.000	2.553	1.075 (Jul 16)	0.814	0.943
Saron	0.830	2.727	1.266 (Jul 16)	0.813	0.839
Gouda	0.640	1.239	0.417 (Aug 16)	0.306	0.340
Hermon	0.092	0.239	0.061 (Jul 16)	0.037	0.046

Drakenstein Municipality revises on an annual basis the capacity and suitability of the WWTWs to meet the requirements of the authorisations and downstream users for the quality of the final effluent being discharged to the receiving water bodies (in this instance the Berg River and its tributaries). When the water quality requirements for the final effluent becomes stricter (as was indeed the case for the Paarl and Wellington WWTWs which now has to meet the requirements of the Special Standard), and / or when the inflow to the WWTW has increased to such an extent that the capacity of the plant needs to be increase, then the Municipality appoints reputed consulting engineering firms to undertake feasibility studies to perform technical and economical evaluation of the different options available for upgrading or extending the capacity of the treatment works.

### The updated Wastewater Strategy of Drakenstein Municipality proposes the following major schemes (February 2015):

- The completion of the 10Ml/d extension to the Wellington WWTW has been delayed due to funding constraints, and is now scheduled for completion by 2018, taking the total treatment capacity of the works to 16 Ml/d. This should be seen as a priority in terms of the overall treatment capacity of the area.
- As a short-term solution, the sludge pump station and the new inlet works which are planned for the Wellington WWTW will be constructed. This infrastructure will be used to divert incoming flows from Wellington to Paarl WWTW in order to limit the flow through the Wellington WWTW to 6 Ml/d until the extension mentioned above has been completed.
- Construction of the first lane of new Paarl South has been moved out from 2017 to 2021, catering for the medium term requirements of the area. It is proposed that the first lane be designed for a higher ADWF of 14 Ml/d.
- Decommissioning of the Kliprug WWTW by 2025 once the mechanical and electrical equipment has reached its design life and conveyance of these flows to the new Paarl South WWTW.
- Construction of the second lane of the Paarl South WWTW will be required by 2029, bringing the total capacity to around 24 Ml/d to cater for the long term requirements of the study area. It is recommended that the capacity of the second lane be confirmed during the next update of this strategy (in 2020).

The infrastructure requirements and projected costs for the updated wastewater strategy are summarised in the table below:

Table C.17: Infrastructure requirements and projected costs for the implementation of the updated wastewater strategy			
Financial Year	Infrastructure Requirement	Period (Months)	2015 Budget Cost
<b>SHORT TERM REQUIREMENTS (2015 - 2020)</b>			
2014/2015	Update Sewer Master Plan based on approved wastewater strategy.	6	R500 000
2014/2015 to 2015/2016	Construction of interim solution at Wellington WWTW.	12	R64 000 000
2015/2016	EIA and WULA process and conceptual design for future Paarl South WWTW (Phase 1).	12	R750 000
2015/2016	Procurement of the site for the future Paarl South WWTW	12	R3 780 000
2015/2016	Design of centralized sludge treatment facility at Paarl WWTW	12	R4 200 000
2016/2017 to 2017/2018	Construction Contract for extension of Wellington WWTW from 6 to 16 Ml/d.	24	R225 000 000
2016/2017 to 2017/2018	Construction Contract for centralized sludge treatment facility at Paarl WWTW	24	R116 000 000
2018/2019	The design of Phase 1 of the future Paarl South WWTW, namely a 14 Ml/d plant.	12	R9 000 000
<b>Total estimated cost for short term requirements</b>			<b>R423 230 000</b>
<b>MEDIUM TERM REQUIREMENTS (2020 – 2025)</b>			
2019/2020 to 2020/2021	Construction of Phase 1 of Paarl South WWTW, namely a 14 Ml/d plant	24	R199 000 000
2019/2020 to 2020/2021	Construction Contract for the extension of the centralized sludge treatment facility at Paarl WWTW to accommodate sludge from Paarl South WWTW.	18	R45 000 000
2020/2021	Update flow projections, review wastewater strategy and update Sewer Master Plan.	6	R500 000
2020/2021	Refurbishment of the older components of Paarl WWTW	12	R32 000 000
2022/2023	Bulk sewer mains for diversion from Pearl Valley developments to Paarl South WWTW	12	R15 000 000
2024/2025	Decommissioning of Kliprug WWTW	6	R5 000 000
<b>Total estimated cost for medium term requirements</b>			<b>R296 500 000</b>
<b>LONG TERM REQUIREMENTS (2025 – 2030)</b>			
2025/2026	Update flow projections, review wastewater strategy and update Sewer Master Plan	6	R500 000
2025/2026	Bulk sewer mains for Paarl North Developments to Paarl South WWTW	12	R15 000 000
2026/2027	EIA and license application processes of future Paarl South WWTW (Phase 2)	12	R400 000
2026/2027	The design of Phase 2 of Paarl South WWTW.	12	R8 120 000
2027/2028 to 2028/2029	Construction of Phase 2 of Paarl South WWTW, total treatment capacity of 24 Ml/d.	24	R116 000 000
2029/2030	Refurbishment of the newer components of Paarl WWTW	12	R40 000 000
<b>Total estimated cost for long term requirements</b>			<b>R180 020 000</b>
<b>Total estimated budget cost</b>			<b>R899 750 000</b>

#### Paarl WWTW:

The 2013 Green Drop score for the WWTW was 78.39% and the wastewater risk rating decreased from 51.85% in 2013 to 48.10% in 2014.

The Paarl WWTW was upgraded from a conventional bio-filtration / activated sludge process combination to a biological nutrient removal (BNR) wastewater treatment plant and the project was completed during the 2013/2014 financial year. This has become necessary to ensure that the nutrients (nitrates and phosphates) are reduced to low levels so as not to cause eutrophication in the Berg River. It was also decided that the capacity of the treatment works be increased from 18 Ml/d to 35 Ml/d.



The existing treatment processes were used as far as possible. The existing triangular aeration dam was converted to a BNR activated sludge reactor, employing the UCT processes. A further effluent bypass pipeline was constructed to bypass the maturation ponds to ensure the highest quality of effluent is discharged into the Berg River, which was completed during the 2014/2015 financial year. The maturation ponds will be decommissioned, dried and cleaned and be used in the event of any emergency, especially during peak wet weather flow or serious mechanical failures. The following work still needs to be completed at the Paarl WWTW (2015/2016 Annual Report).

- Road Works;
- Upgrade of the inlet works;
- Installation of a fully fledged telemetry / SCADA system;
- Preventative maintenance programme;
- Energy efficiency programmes;
- Mechanical and electrical backlog elimination programme;
- Upgrade of staff housing quarters;
- Achieving Green Drop accreditation; and
- Centralising of sludge management.

The recommendations included in the 2016 Process Audit Report for the Paarl WWTW were as follows:

Table C.18: Process Audit action list for the Paarl WWTW	
Component	Description / Action
Physical Appearance of the Plant	<ul style="list-style-type: none"> <li>• Terminate exposed electrical connection.</li> </ul>
Preliminary Treatment	<ul style="list-style-type: none"> <li>• Repair mechanical screen No.1.</li> </ul>
Primary Treatment	<ul style="list-style-type: none"> <li>• Repair mechanical failures on PST 1, 3 and 4.</li> <li>• Confirm desludging schedule.</li> </ul>
Secondary Treatment	<ul style="list-style-type: none"> <li>• Check distribution arms for blockages. Attend to corrosion problems.</li> <li>• Structural assessment of all biofilters is required.</li> <li>• Confirm reactor recycle rates, sludge age, MLSS and wasting protocol.</li> <li>• Repair aerators that are offline. Confirm adherence to maintenance schedule.</li> <li>• Repair a-recycle standby pump.</li> <li>• Add a flowmeter to measure RAS and WAS for Reactor No.1.</li> <li>• Refurbish or replace scum trough, weirs and baffles.</li> <li>• Sludge withdrawal equipment needs refurbishing or replacement. Confirm desludging schedule.</li> <li>• Confirm reactor recycle rates, sludge age, MLSS and wasting protocol.</li> </ul>
Tertiary Treatment	<ul style="list-style-type: none"> <li>• Automate lime dosing and install pH measuring instrumentation.</li> <li>• Post material safety data sheets at the lime and polyelectrolyte dosing stations.</li> <li>• Place eyewash apparatus in an accessible area within the lime and polyelectrolyte dosing stations.</li> <li>• Ensure proper stock control of chlorine bottles.</li> </ul>
Sludge Treatment	<ul style="list-style-type: none"> <li>• Compile filling and wasting schedules.</li> <li>• All digester equipment requires refurbishment or replacement.</li> <li>• Compile process monitoring schedule.</li> <li>• Install flowmeters to measure polyelectrolyte, dilution water and wash water on dewatering train No. 1 and 2.</li> <li>• Equipment supplier to service dewatering train No.1 and 2. Replace all worn out components.</li> </ul>
<b>Additional Items</b>	
Domestic primary raw sewage PS	<ul style="list-style-type: none"> <li>• Add gutter and fascia boards.</li> <li>• Attend to ultrasonic level sensor in poor condition.</li> <li>• Install a new pressure gauge on inlet pipe.</li> <li>• Install new sump cover.</li> </ul>

Table C.18: Process Audit action list for the Paarl WWTW	
Component	Description / Action
Electric Sub-Station	<ul style="list-style-type: none"> <li>Remove overgrown vegetation.</li> </ul>
Recreation Building	<ul style="list-style-type: none"> <li>Attend to collapsed braai wall.</li> <li>Terminate electrical cable.</li> <li>Service fire extinguisher</li> </ul>
Industrial Inlet Works	<ul style="list-style-type: none"> <li>Install missing hand railing sections.</li> </ul>
Primary Settling Distribution Box	<ul style="list-style-type: none"> <li>Install new grating.</li> </ul>
Domestic PST	<ul style="list-style-type: none"> <li>Repair structural crack on PST No.1</li> </ul>
Domestic/Industrial PSTs	<ul style="list-style-type: none"> <li>Redesign access to the PST and PST scum box.</li> </ul>
Biological Filter Distribution Box	<ul style="list-style-type: none"> <li>Repair damaged feed pipe.</li> </ul>
Biological Filters	<ul style="list-style-type: none"> <li>Remove obstructions in underdrain of filter No.5.</li> <li>Add grating on handrailings to open launders.</li> </ul>
Humus Tanks	<ul style="list-style-type: none"> <li>Attend to exposed light pole termination box</li> </ul>
Archimedes Screw Pump Station	<ul style="list-style-type: none"> <li>Repair faulty e-stop button.</li> <li>Remove redundant control box.</li> </ul>
BNRAS Plant	<ul style="list-style-type: none"> <li>Repair oil leak on anaerobic mixer No.8.</li> </ul>
Secondary Settling Tanks	<ul style="list-style-type: none"> <li>Add a cover to SST 1 and 2's motor control panel.</li> </ul>
Disinfection	<ul style="list-style-type: none"> <li>Improve access to weir and scour drain in contact channel.</li> </ul>
Sludge Dewatering	<ul style="list-style-type: none"> <li>Repair oil leak on mixer No.2.</li> <li>Install/Reconnect new pump seal flush/stator lubrication lines.</li> <li>Refurbish wash water pumps on old wash water system.</li> <li>Install standby blower for polyelectrolyte transfer.</li> <li>Install covers on polyelectrolyte dosing pumps.</li> <li>Neaten up the storeroom.</li> </ul>

#### Wellington WWTW:

The 2013 Green Drop score for the WWTW was 74.52% and the wastewater risk rating decreased from 86.36% in 2013 to 63.60% in 2014.

The Wellington WWTW is currently being upgraded from a hydraulic capacity of 7 MI/d to 16 MI/d. The refurbishment and extension of the WWTW from part of the 20-year long-term Wastewater Strategy of Drakenstein Municipality, ensuring that wastewater received at the works is treated appropriately.

The planning and design of the upgrade were completed during the 2013/2014 financial year. The refurbishment and extensions of the works include the following:

- Refurbishment of the existing process units at the works in order to ensure that it operates at its design capacity and discharges effluent which consistently meets the required standards; and
- Constructing new process units to increase the capacity of the works from 7 MI/d to 16 MI/d to accommodate the future flows, as well as accommodate the flow which is currently being diverted to Paarl WWTW via the Newtown pipeline.

The construction of the extensions and upgrading of the works will probably be completed in the second quarter of 2018 (2015/2016 Annual Report).

The recommendations included in the 2016 Process Audit Report for the Wellington WWTW were as follows:

Table C.19: Process Audit action list for the Wellington WWTW	
Component	Description / Action
General Aspects	<ul style="list-style-type: none"> <li>Process flow diagram to be updated.</li> <li>Update contact list number for Incident Management.</li> </ul>
Physical Appearance of the Plant	<ul style="list-style-type: none"> <li>Lunch area to be upgraded and showers to be provided.</li> <li>Repair electrical wiring in lunch area.</li> <li>Safety signs available should be posted.</li> </ul>
Preliminary Treatment	<ul style="list-style-type: none"> <li>Mechanical Screens No.2 to be serviced and placed in operation.</li> <li>Collection, storage and proper disposal of screenings to be addressed.</li> <li>Formal maintenance schedules to be kept.</li> <li>Actuated valve on degritter not operational.</li> <li>Collection, storage and proper disposal of grit to be addressed.</li> </ul>
Primary Treatment	<ul style="list-style-type: none"> <li>Mechanical equipment functioning satisfactorily but evidence of corrosion should be addressed.</li> <li>Hydraulic bottleneck should be addressed as a matter of urgency.</li> <li>Badly corroded weir plates should be replaced.</li> <li>Desludging activity not properly monitored and could not confirm whether effective. Evaluate possible optimization / monitoring options.</li> <li>Safety railings present, but access to structures can improve in terms of safety.</li> </ul>
Secondary Treatment	<ul style="list-style-type: none"> <li>Ladder access provided, but problematic. Safe access can be provided.</li> <li>Dead zone 300mm from tank sides. Distribution to be improved.</li> <li>Ponding due to debris on filter 1. Remove debris.</li> <li>Compile process monitoring schedule.</li> <li>Sludge age should be recorded for proper process monitoring.</li> <li>Breakdown of Mixer 2 should be fixed as matter of urgency as its absence is creating dead zones.</li> <li>Records of lime dosing for pH record to be kept.</li> <li>DO probe to be repaired / replaced.</li> <li>Attempt to reduce down time of aerators as it has significant process implications.</li> <li>A – Recycle pump should be repaired. No indication given when repairs will occur.</li> <li>Recycle ratios are neither known nor recorded.</li> <li>Mixer 1 to be repaired / motor replaced. Mixer 2 exposed to excessive turbulence and durability is questionable.</li> <li>Maintenance Schedule to be kept as part of O&amp;M procedures.</li> <li>The condition of the handrails poses a serious safety risk and should be repaired/replaced.</li> </ul>
Tertiary Treatment	<ul style="list-style-type: none"> <li>Refresher course in safe handling of chlorine gas recommended for all process controllers.</li> <li>General visibility of signage can improve.</li> <li>Check and update access to safety gear.</li> <li>No formal sampling point could be located. Location and sampling regime/schedule to be confirmed.</li> <li>Could neither confirm flow path nor overflow quality.</li> </ul>
Sludge Treatment	<ul style="list-style-type: none"> <li>No schedule available for filling and wasting.</li> <li>No schedule for supernatant and sludge withdrawal</li> <li>Equipment not operational</li> <li>No monitoring Schedules</li> <li>Strategy for disposal of sludge to be as per DWS regulations. To be confirmed</li> </ul>

**Pearl Valley WWTW:**

The 2013 Green Drop score for the WWTW was 79.46% and the wastewater risk rating decreased from 64.71% in 2013 to 52.90% in 2014. No upgrading is required at present. The recommendations included in the 2016 Process Audit Report for the Pearl Valley WWTW were as follows:

Table C.20: Process Audit action list for the Pearl Valley WWTW	
Component	Description / Action
Physical Appearance of the Plant	<ul style="list-style-type: none"> <li>No separate facilities for male and female operators</li> </ul>
Preliminary Treatment	<ul style="list-style-type: none"> <li>Screening disposed of on site. Discard at municipal solid waste site.</li> <li>Grit disposed of on site. Discard at municipal solid waste site.</li> </ul>
Secondary Treatment	<ul style="list-style-type: none"> <li>Sludge age and wastage rate needs to be recorded.</li> <li>Repair "a" recycle pump 1.</li> <li>Recycle rates are unknown.</li> <li>No formal maintenance schedule in place.</li> <li>Process controller needs to know how to interpret SVI results.</li> </ul>
Tertiary Treatment	<ul style="list-style-type: none"> <li>Equipment kits must be upgraded.</li> <li>Ground at the inlet to pond 1 must be compacted to prevent erosion.</li> </ul>
Sludge Treatment	<ul style="list-style-type: none"> <li>Recommission dewatering plant as the primary dewatering unit operation.</li> <li>No formal sand replacement schedule available.</li> <li>No monitoring system in place.</li> </ul>
<b>Additional Items</b>	
BNRAS plant, SSTs and Maturation Ponds	<ul style="list-style-type: none"> <li>Life buoys with extended ropes required.</li> </ul>
Disinfection	<ul style="list-style-type: none"> <li>The door in the chlorine storage room has a gap at the base. This needs to be repaired.</li> <li>The chlorine room has no extraction fan.</li> <li>No water supply to the safety shower.</li> </ul>

**Saron WWTW:**

The 2013 Green Drop score for the WWTW was 78.94% and the wastewater risk rating decreased from 70.59% in 2013 to 58.80% in 2014. The upgrading of the WWTW started in September 2015 and it is estimated to be completed in 2017. The hydraulic capacity of the works is currently being upgraded from 0.830 MI/d to 1.5 MI/d, which will improve the quality of final effluent discharged from the WWTW.

The recommendations included in the 2016 Process Audit Report for the Saron WWTW were as follows:

Table C.21: Process Audit action list for the Saron WWTW	
Component	Description / Action
General Aspects	<ul style="list-style-type: none"> <li>O&amp;M manual is incomplete. Update accordingly.</li> <li>Update incident management procedures to include emergency contact details.</li> <li>Record electrical usage of the WWTW.</li> </ul>
Physical Appearance of the Plant	<ul style="list-style-type: none"> <li>A new, multilingual Unauthorized Entry sign is required.</li> <li>Improve health and safety in chlorination room and control room.</li> <li>Fix misaligned fence sections.</li> <li>General plant safety signs must be posted.</li> </ul>
Preliminary Treatment	<ul style="list-style-type: none"> <li>Manual channel isolating gates cannot be located.</li> </ul>
Secondary Treatment	<ul style="list-style-type: none"> <li>Sludge age is not recorded. Process controller could not confirm sludge wasting protocol.</li> <li>General scum cover and dead zones on the periphery of the aerobic dam.</li> <li>New DO meter is required.</li> <li>Recycle ratio is unknown.</li> <li>Maintenance schedule is kept at Paarl WWTW not on site.</li> <li>Consider hand railings along periphery of dam or additional life buoys with extended ropes.</li> </ul>

Table C.21: Process Audit action list for the Saron WWTW	
Component	Description / Action
	<ul style="list-style-type: none"> <li>SVI is tested at Paarl WWTW, hence no real time adjustments can be made to the process.</li> <li>General layer of scum on the surface. Check upfront process as well as scraper blades and scum hopper.</li> </ul>
Tertiary Treatment	<ul style="list-style-type: none"> <li>Clean chlorine contact tank.</li> <li>Improve health and safety in chlorination room.</li> </ul>
Sludge Treatment	<ul style="list-style-type: none"> <li>Clear weeds from the drying beds.</li> <li>Repair structural damage on drying beds.</li> <li>Sand replacement and sludge removal schedule is required.</li> <li>A proper monitoring system is required.</li> <li>Composting of dried sludge may be a better option than transporting to municipal disposal site.</li> </ul>
<b>Additional Items</b>	
Anoxic and Aerobic Dams	<ul style="list-style-type: none"> <li>Refurbish dams - deteriorating concrete plus exposed Hyson Cell fabric.</li> <li>Inspect and service mixer and vertical shaft aerators.</li> </ul>
RAS/WAS Pump station	<ul style="list-style-type: none"> <li>Service pumps and ensure guide rails and duck foot bends are secure.</li> </ul>
Secondary Settling Tank	<ul style="list-style-type: none"> <li>Empty SST and check civil structure. Refurbish all mechanical components and apply suitable corrosion protection.</li> <li>Service electrical motor and drive train.</li> <li>Install over torque limit switch on drive train.</li> </ul>
Disinfection	<ul style="list-style-type: none"> <li>Clean motive water filter at the contact tank.</li> </ul>

#### Gouda WWTW:

The 2013 Green Drop score for the WWTW was 79.64% and the wastewater risk rating decreased from 47.06% in 2013 to 29.40% in 2014. The hydraulic capacity of the existing works is 0.64 Ml/d. The future upgrades of the Gouda WWTW will include the following:

- The construction of a new irrigation balancing dam with a capacity of 7 000 m<sup>3</sup>, which will be completed in the last quarter of 2017.
- The construction of a new administration building.
- The replacement of the existing gravity irrigation pipeline.

The recommendations included in the 2016 Process Audit Report for the Gouda WWTW were as follows:

Table C.22: Process Audit action list for the Gouda WWTW	
Component	Description / Action
General Aspects	<ul style="list-style-type: none"> <li>O&amp;M manual is incomplete. Update accordingly.</li> <li>Emergency contact list sign needs to be installed.</li> </ul>
Physical Appearance of the Plant	<ul style="list-style-type: none"> <li>Signage required at the raw sewage pump station.</li> <li>Ablution facilities required at the raw sewage pump station.</li> <li>Change screenings discharge to ground level.</li> <li>Irrigation pond requires fencing.</li> <li>Safety signs required at the waste stabilization ponds.</li> </ul>
Preliminary Treatment	<ul style="list-style-type: none"> <li>OEM to inspect mechanical screen and replace missing teeth.</li> <li>Confirm frequency of maintenance.</li> </ul>
Tertiary Treatment	<ul style="list-style-type: none"> <li>Disinfection occurring at anaerobic pond 1.</li> <li>Residual chlorine not tested.</li> <li>No MSDS or safety signage for chlorine pellets.</li> <li>Sampling point must be confirmed.</li> <li>Remove material from overflow weir at wetland system.</li> <li>Reeds need to be harvested. Reseeding and removal of alien species required.</li> </ul>



Table C.22: Process Audit action list for the Gouda WWTW

Component	Description / Action
	<ul style="list-style-type: none"> <li>Reed growth control and reed seeding schedules required.</li> </ul>

**Hermon WWTW:**

The 2013 Green Drop score for the WWTW was 90.70% and the wastewater risk rating decreased from 41.18% in 2013 to 29.40% in 2014. It is not foreseen that the WWTW will require upgrading on the current 20 year master plan, however the master plan is updated regularly and the situation will be monitored. Flow measurement is taken at the Hermon Sewage Pump Station. The recommendations included in the 2016 Process Audit Report for the Hermon WWTW were as follows:

Table C.23: Process Audit action list for the Hermon WWTW

Component	Description / Action
General Aspects	<ul style="list-style-type: none"> <li>Display Classification Certificate at the raw sewage pump station.</li> <li>Maintenance logbook should be kept at the raw sewage pump station.</li> <li>Operational logbook should be kept at the raw sewage pump station.</li> <li>An Operation and maintenance manual is required for the works.</li> <li>Incident management procedure and emergency contact numbers required at the raw sewage pump station.</li> <li>Electricity consumption must be monitored.</li> </ul>
Physical Appearance of the Plant	<ul style="list-style-type: none"> <li>Entrance of the raw sewage pump station must be signposted.</li> <li>Ablution facilities required at the raw sewage pump station.</li> <li>Safe working load for the lifting gantry needs to be displayed.</li> <li>New fencing required at the ponds.</li> <li>Safety signs required at the pump station.</li> </ul>
Primary Treatment	<ul style="list-style-type: none"> <li>Vegetation control required at edge of ponds.</li> </ul>

**ASSET MANAGEMENT**

Asset management at the Municipality is guided by the Asset Management Policy which, although originally focusing largely on the financial management of assets, has been expanded to cover the full scope of asset management. The intent of all of the clauses in the previous policy has been incorporated in the new Asset Management Policy, approved by Council on 20 May 2016.

The objectives of the Asset Management Policy and of related standard operating procedures, are to assist officials in understanding their legal and managerial responsibilities with regard to assets and to ensure:

- consistent application of asset management principles;
- application of accrual accounting;
- compliance with the MFMA, GRAP and other related legislation;
- optimisation of asset usage; and
- effective and efficient safeguarding and control of assets of the Municipality, through safeguarding procedures and through the proper recording of assets from authorisation to acquisition and to subsequent disposal.

A number of matters related to asset management currently impact on the Asset Management Strategy of the Municipality. The following are the most significant issues identified (2015/2016 Annual Report):

- Lack of capacity in sections responsible for management of assets and reporting of information regarding assets. In terms of the organisational structure and the higher demands and standards required regarding asset management, all relevant sections are inadequately staffed. The management of infrastructure assets is particularly challenging in that it necessitates the expertise of engineering staff with some accounting knowledge or background, a skill that is scarce. The Municipality still has to rely, to an extent, on external service providers to update and manage the infrastructure portion of the assets. Currently only four dedicated staff members are assigned to maintaining the Asset Register in the Financial Services Directorate.
- Lack of an appropriate integrated asset management system. Currently asset systems have either not sufficiently been linked to the GIS system, or they do not include photographic imagery, and all systems carrying asset data do not integrate automatically. The asset register sub-system on the SOLAR Management Information System is utilised to record and maintain mainly financial, and limited other technical data regarding assets and asset components. Management envisages that the limitation be addressed by implementing an Asset Management System that will provide more up-to-date spatial data and information on maintenance and renewal requirements. Ideally the system will integrate with the financial system and provide data to also maintain financial information to full adherence with GRAP requirements and the new mSCOA. This will however be a costly and time-consuming process due to the many aspects of asset management as well as the requirements of GRAP and the new mSCOA-structure.

The Municipality is focusing its efforts towards more efficient asset management. The Municipality's vision and intent regarding all aspects of asset management is defined in the Asset Management Policy, which commits the Municipality to providing municipal services for which the Municipality is responsible, according to certain core principles, in a transparent, accountable and sustainable manner, in pursuit of legislative requirements and in support of its strategic objectives.

It is envisaged that the Municipality's increased effort in focusing on asset management will assist in ensuring that assets are properly maintained and service delivery is enhanced.

**Business Element 6: Water Services Infrastructure Management (O&M)****Table C.24 : Business Element 6: Operation and Maintenance (Topic 6)**

Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
This topic provides an overview of the sufficiency of resources and processes in place to effectively operate and maintain the water services. It reflects whether the municipality has an Operation and Maintenance Plan in place. The topic also illustrates whether the WSA has implemented good practice as directed in the Blue- and Green Drop certification processes	Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment	Strategy Assessment
	Operation & Maintenance Plan	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Resources				
	Information				
	Activity Control & Management				
	Water Supply & Quality				
	Waste Water Supply & Quality				
TOTAL for Topic					
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	It is important for Drakenstein Municipality to classify all the treatment works and operators along the lines of the regulations by establishing a programme for certification of works, operators, technicians and managers. The process will include reviewing the skills needed and aligning resources to these needs as well as reviewing total staff numbers necessary to meet all the objectives in the National Water Act.	Establish a mentoring role for operators ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operators. Establish budgets to address the shortfall of skilled staff, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff. With such a program a source of specific resources of skilled operators, technicians and managers will be established.			
2	The Occupational Health and Safety Act contain provisions directing employers to maintain a safe workplace and to minimize the exposure of employees and the public to workplace hazards. It is therefore important for Drakenstein Municipality to compile a Legal Compliance Audit of all their WTWs and WWTWs, which will provide the management of Drakenstein Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.	Compile an Occupational Health and Safety Audit at all the WTWs and WWTWs. The recommendations and shortcomings identified through the chlorine audits, which were carried out at all the disinfection plants, need to be implemented and addressed.			
3	All incidents need to be recorded and the specific Incident Management Protocols need to be followed.	All incidents at the WTWs and WWTWs and on the water reticulation networks and sewer drainage networks need to be recorded and the Incident Management Protocols, as included in the Water Safety Plan and W <sub>2</sub> RAPs, need to be followed.			
4	Shortcomings were identified as part of the detail WTW and WWTW Technical Process Audits.	Implement recommendations from detail WTW and WWTW Process Audits.			
5	Shortcomings were identified as part of the Water Safety Plan and W <sub>2</sub> RAPs.	Implement Improvement / Upgrade Plans of the Water Safety Plan and W <sub>2</sub> RAPs.			
6	It is also important to note that all operational manuals of treatment unit processes such as chemical dosing, coagulation sedimentation, filtration, disinfection etc. should contain operational limits, monitoring programmes, verification procedures and pre-determined corrective actions. Corrective actions identified for each control measure need to be adhered to as soon as critical limits have been exceeded. The corrective actions are an important component of the management aspects of the Water Safety Plan and W <sub>2</sub> RAPs and should be effective in restoring performance to acceptable levels when critical limits are exceeded.	The Process Controllers at each WTWs and WWTWs need to ensure that operational limits, monitoring programmes, verification procedures and pre-determined corrective actions are in place for all the WTW and WWTW treatment processes. The Process Controllers also need to be monitored with regard to their compliance with regard hereto.			

The Water Safety Plan and W<sub>2</sub>RAP Teams of Drakenstein Municipality are committed to meet regularly to review the implementation of all the aspects of the Water Safety Plan and W<sub>2</sub>RAP to ensure that they are still accurate and to determine whether the field assessments need updates or modifications and whether the Incident Response Management Protocol is still adequate. In addition to the regular three year review, the Water Safety Plan and W<sub>2</sub>RAP will also be reviewed when, for example, a new water source is developed, major treatment improvements are planned and brought into use, or after a major incident.

It is important for Drakenstein Municipality to classify all the WTWs and WWTWs and operators along the lines of the regulations by establishing a programme for certification of works, operators, technicians and managers. The process will include reviewing the skills needed and aligning resources to these needs as well as reviewing total staff numbers necessary to meet all the objectives in the National Water Act.

Drakenstein Municipality is also committed to manage and operate sewage pump stations effectively to prevent any possible spillages. It is important for Drakenstein Municipality to continue with the upgrading of the WWTWs when necessary, in order to reduce the risk of source contamination. The WWTWs will be managed and operated to comply with the permitted standards.

It is important for Drakenstein Municipality to establish a mentoring role for operators ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operators. Budgets also need to be established to address the shortfall of skilled staff, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff. With such a program a source of specific resources of skilled operators, technicians and managers will be established.

The Occupational Health and Safety Act contain provisions directing employers to maintain a safe workplace and to minimize the exposure of employees and the public to workplace hazards. . It is therefore important for Drakenstein Municipality to compile a Legal Compliance Audit of all their WTWs and WWTWs, which will provide the management of Drakenstein Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.

Drakenstein Municipality is committed to work with the DWS and the other role-players in order to improve on their 2014 Blue Drop Score for the various distribution systems. The recommendations from the Chlorine Audit will be implemented and the Improvement / Upgrade Plan, which was compiled as part of the Water Safety Plan process, will also be implemented in order to address the potential risks identified through the Water Safety Plan process.

Drakenstein Municipality is also committed to work with the DWS and the other role-players in order to improve on their 2013 Green Drop Score and to reduce the Wastewater Risk Ratings for the various WWTWs and to get the Municipality ready for the next round of assessments. The W<sub>2</sub>RAPs that are in place for all the WWTWs will assist in reducing the current CRRs for the various WWTWs. The following will also further assist in the process of reducing the CRRs.

- Forward planning and upgrading / refurbishment of treatment plants to ensure adequate capacity for the flows received;
- Operate and maintain the WWTWs within design- and equipment specifications;
- Have trained, qualified and registered staff in place;
- Get support contracts in place where there is a great demand for adequately skilled process controllers and supervision;
- Monitoring of flow to- and from the plants;
- Sampling and monitoring of effluent quality;
- Appropriate authorisation in accordance with the National Water Act (36 of 1998); and / or
- Where plant is overloaded, introduce innovative methods to ensure enhancement of effluent quality.

**Business Element 7: Associated Services**

Table C.25 : Business Element 7: Associated Services (Topic 7)					
Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
This topic has been established to ensure adequate focus on the water services levels and needs of educational and health facilities. The water services planner will use this information to establish short-term solutions and to prioritize water services infrastructure projects to educational- and health facilities.	Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment	Strategy Assessment
	Water services – Education	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Water services - Hospitals				
	Water services – Health Centers				
	Water services - Clinics				
	Sanitation - Education				
	Sanitation - Hospitals				
	Sanitation – Health Centers				
	Sanitation - Clinics				
	TOTAL for Topic				
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	-	-			

**Education:** All education facilities in Drakenstein Municipality's Management Area are provided with adequate water services and no specific strategies, with regard to the provision of water services to these facilities, were therefore identified. Drakenstein Municipality is however committed to work with the Education Department to address any possible shortcomings with regard to the provision of water services that might exist at any schools or tertiary education facilities.

**Health:** Drakenstein Municipality will strive to continue to ensure that the minimum required SANS241:2015 water quality standards are met through proper management, operation and maintenance of their WTWs and the systematic upgrading of the WTWs when required. The monitoring of provision of basic minimum services to farm dwellers remains a challenge, in view of the limited funding and human resources. The environmental health function is currently with the Cape Winelands District Municipality. The Municipal Health Services of the Cape Winelands District Municipality also report monthly to the Department of Health on water quality. The quality of life of the people within a Municipality is influenced by the available health care. Various things influence the health conditions of people in any region, for example access to clean water, good sanitation, proper nutrition and adequate housing.

It is important that a co-operative relationship exist between the Cape Winelands District Municipality and Drakenstein Municipality with regard to environmental health issues and that a good communication protocol is followed between the District Municipality and Drakenstein Municipality to report on health issues.

The health profile in relation to treated water is good. Within the urban context, drinking water throughout the municipal area is considered to be of a high quality. The most vulnerable groups within Drakenstein Municipality's Management Area are the persons living in informal areas with shared services and the recommendations as included in the "Provision of Basic Services to Informal Settlements in the Drakenstein Municipal Area" Status Quo Report: June 2016, compiled by Lyners were as follows:

- That Drakenstein Municipality ensures that the rehabilitation, operation and maintenance of existing installations are done sufficiently and on an on-going basis to ensure healthy living conditions and to prevent pollution of the Berg River. Sufficient funding should be allocated to prevent a complete breakdown of the basic services.
- That funding be made available for the repair and replacement of 597 toilets which require urgent repairs or replacement.
- That funding be made available to provide a further 86 toilets and associated standpipes. Jan Fiskaal Street is regarded as the area with the highest priority.



- That all possible other funding sources be pursued.
- That a status quo report investigation be undertaken on a regular basis to monitor the condition of existing installations and to ensure backlogs are addressed.
- That the employment of a community facilitator be considered to engage with the community especially in areas where there is a high occurrence of broken or vandalized infrastructure such as Fairylands and Chicago.
- That funding amounting to R 25.000 million (VAT inclusive) be made available to address the above. It includes R 6.000 million per year for the operation and maintenance of the basic services facilities if this is contracted to a private sector supplier. This amount includes the R 4.000 million direct costs and R0.480 million site attendance and management costs.
- That the accurate number of informal structures in the informal settlements be re-determined / updated and that the growth rate of informal structures be determined on an annual basis.
- The number of backyard structures and their information and whether they are on the municipal housing waiting list should be confirmed.
- That operation, maintenance and repair work be improved and that accurate records of costs, type of maintenance and specific areas be held. Additional funding is required for the required maintenance. PPE and the required tools must be provided for people employed to undertake maintenance.
- That care be taken to ensure water is not wasted. Plumbing work and additional maintenance of standpipes are required. The bulk water meter readings should be taken on a monthly basis and should be compared with historic consumption figures. This with visual inspections of the area could assist with the identification of water leaks and broken taps.
- A clear system of reporting of defects and coordinated attendance thereto should be formulated.

It is outmost importance that the communal standpipes are properly maintained, to promote better health and hygiene among users. It is necessary to:

- keep the standpipe area clean and free from stagnant water;
- avoid water spillage by keeping the tap closed when not in use;
- report and rectify leakages immediately;
- keep straying animals away from standpipe area; and
- keep the tap outlet, standpipe slab and soak away clean.

Drakenstein Municipality further needs to promote health and hygiene awareness amongst standpipe users by focusing on the following:

- users must use the standpipe only for the filling of containers;
- no body or clothes washing is allowed at standpipes;
- no house pipes or other objects may be attached to the standpipes;
- use clean containers and close containers with a suitable lid when transporting water;
- disinfect containers when necessary; and
- immediately report any irregularities, contamination, tampering or vandalism at standpipes.

Basic services need to be provided by the private landowners to the households on the farms with existing services below standard. Farmers should be encouraged to partner with Drakenstein Municipality in the Rural Subsidy Scheme. Realistic, achievable time frames and budgets need to be set to reach the objectives of the subsidy scheme.

The supply of basic sanitation services on the farms needs to be linked to the provision of health and hygiene education. Improved health requires behaviour change, which also cannot be achieved with a single health education talk given by an outside expert. Behaviour change requires sustained monitoring and promotion within the community. This is the key-function of the community health workers employed on sanitation projects.

Drakenstein Municipality needs to continue to actively engage with service providers and NGO's in the fight against illnesses such as HIV/Aids and TB. A solution to the sustainability of the community health worker's position and employment within the community has been to link their position and function to the activities of the Department of Health. In addition support can be provided to the Community Health Workers through local clinics and through the programmes of the EHPs. Education on the HIV/Aids pandemic would play a key role in stemming the spread of the disease.

Drakenstein Municipality will therefore endeavour to improve their efforts to foster partnership-driven development in planning and implementation where partnerships include community members, CBOs, NGOs, the private sector and other spheres of government. In this regard the Department of Health is considered a particularly important partner whose collaboration is much needed.

#### Business Element 8: Conservation and Demand Management

Table C.26 : Business Element 8: Conservation and Demand Management (Topic 8.1)					
Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
The topic provides an overview of the activities pursued by the WSA in the past financial year towards water conservation and demand management. It also contains an overview of the water sources of the WSA.		Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment Strategy Assessment
		Reducing unaccounted water and water inefficiencies	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.		
		Reducing high pressures for residential consumers			
		Leak and meter repair programmes			
		Consumer/end-use demand management			
TOTAL for Topic					
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	The overall NRW for 2015/2016 was 13.11%. Further reduce the percentage of NRW and Water Losses for the various towns.	Continue with the active implementation of the WC/WDM Strategy and measures to reduce the percentage of NRW and Water Losses for the various towns even further. Ensure adequate budget is allocated under the Capital and Operational budgets towards the implementation of the WC/WDM initiatives.			
2	MNFs need to be used to prioritize leak detection and NRW and water losses need to be determined for specific zones.	Continue with the monitoring of the MNFs for specific zones in order to identify areas for the implementation of specific WDM activities (Pressure Management, Repair of leaks, etc.). Continue with the installation of zone meters in the various distribution systems and link these to the financial data, in order to accurately determine the percentage of NRW and water losses for the specific zones.			
3	The meters that need to be repaired or replaced were identified through the detail residential and industrial water meter audits, which were recently completed.	Start with the phased pro-active replacement of the old water meters. The faulty meters and the meters with existing leaks need to be replaced first.			
4	Leaks at indigent households need to be repaired.	Implement a Leak Repair and Assistance Programme that investigates and repairs leaks at all domestic households in low cost housing developments and poor areas with consumption above 15 kℓ/month. An exercise could also be initiated to check for visual leakage at public buildings, using more than 60 kℓ/month.			
5	Drakenstein Municipality needs to continue to focus on the installation of water saving devices (specific water efficient toilets). The Municipality also needs to focus on raising awareness regarding conservation projects and the installation of water efficient devices in order to reduce the water demand and their percentage of non-revenue water.	Continue to focus on the installation of water saving devices (specific water efficient toilets) and raising awareness regarding conservation projects and the installation of these products in order to reduce water demand. The use and installation of these fittings should be included as a condition for the approval of building plans as well as provided for in the Water Services By-law.			
6	Continue with the implementation of the extensive schools WDM programme, which include annual competitions between schools.	Continue to support schools with WDM initiatives (Especially during Water Week)			

Table C.27: Business Element 8: Conservation and Demand Management - Water Balance (Topic 8.2 & 8.3)					
Overview of Topic		Status Quo and Knowledge Interpretation Statistics		Future Plan Assessment	Strategy Assessment
The topic provides an overview of the activities pursued by the WSA in the past financial year towards water conservation and demand management. It also contains an overview of the water sources of the WSA.		Item	Quality (%) assessment of current status against compliance requirements		
		Surface water purchased	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.		
		Surface water abstraction			
		Ground water abstraction			
		Raw water supplied			
		Total Influent			
		Total treated TW			
		Potable water to other Neighbours			
		Purchased Treated water			
		Ground water not treated			
		Authorised consumption			
		Total losses			
		Billed unmetered			
		Apparent losses			
		Waste water treatment works			
		Recycled			
		<b>TOTAL for Topic</b>			
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	District zone meters are required to enable the identification of poor performing and leaking distribution infrastructure for specific zones. At present each town comprises a district zone. This is not considered to be sufficient for Paarl and Wellington.	The distribution networks should be broken down into smaller district zones. The district zones should also be provided with equipment that enables flow and pressure logging via the SCADA system. The zone meters need to be linked to the financial data, in order to accurately determine the percentage of non-revenue for the specific zones.			

Drakenstein Municipality has responded to the need to address water losses and NRW within their jurisdiction by actively implementing WC/WDM measures over the last number of years. The Municipality will continue to implement these measures in order to reduce the NRW and improve the water use efficiency within the various distributions even further. The table below gives an overview of the current NRW and the commitment w.r.t. the reduction of NRW over the next number of years.

Table C.28: Commitment to reduce NRW and water inefficiencies for the distribution systems			
Distribution System	2016/2017 (%/a)	2021 (%/a)	2041 (%/a)
Paarl and Wellington	9.0	10.0	10.0
Saron	19.4	15.0	10.0
Gouda	16.2	15.0	10.0
Hermon	0.0	10.0	10.0
Bainskloof	46.4	25.0	15.0

The Municipality will start with the phased pro-active replacement of the old water meters, as identified through the detail residential and industrial water meter audits, which were recently completed. The meters not working and the meters with existing leaks will be repaired first. Replacing all meters after a certain age is not economically feasible and a more sophisticated approach needs to be developed and implemented, which recognises that certain meters under certain conditions may be accurate for several more years than others.

A rough estimate of the number of meters that need to be replaced every year is the number of meters divided by 12, assuming that the life of the meters is not more than 12 years. Although it is assumed that the average lifespan of a meter is 12 years for budgeting purposes, it is necessary to carry out research to determine the most optimal replacement of age for each type of meter in various circumstances. The research should identify the different types of meters, in different pressure zones and carry out accuracy tests for a number of samples at different ages. In this way a policy can be developed of when each type of meter under various circumstances should be replaced. It is also recommended that, where deemed necessary new meters should be specified with AMR capacity to allow for remote meter reading. Such meters will assist in reducing meter-reading errors significantly.

The monthly consumption of all consumers should be checked to immediately identify a problem meter (where a reading suddenly becomes very high) and have it inspected. This will ensure that faulty or leaking meters are replaced as soon as possible and thus resulting in less water wastage and a greater revenue for the Municipality. Volume controllers can also be installed in areas where people cannot afford to pay for water. This ensures less water being wasted in the event of a leak or a tap left running.

A Leak Repair and Assistance Programme that investigates and repairs leaks at all domestic households in low cost housing developments and poor areas with consumption above 15 kl / month should be implemented. Mechanisms to ensure that customers repairs new water leaks, maintain an affordable consumption and does not build up arrears need to be addressed in the early stages of the project, in order to ensure the sustainability of the project. The consumptions of the repaired properties need to be monitored so that rapid action can be taken should leaks re-occur. Further efforts should be made to ensure that those who qualify as "Indigent" on an income basis will also qualify on a water consumption basis.

Drakenstein Municipality also needs to continue to focus on raising awareness regarding conservation projects and the installation of these products in order to reduce the water demand and their percentage of NRW. The use and installation of these fittings should be included as a condition for the approval of building plans as well as provided for in the Water Services By-law.

Drakenstein Municipality will continue with their Water Week activities and their active schools WDM programme (Poster and Song competitions). Education and awareness-raising campaigns are important mechanisms to bring the need for WC/WDM to the public and to trigger committed public actions and response. Social awareness is one of the key pillars of WC/WDM and is essential for the balanced and sustained use of South Africa's water resources. Engagement with the public and stakeholders through media and other mediums will highlight important principles of the efficient use of water, to ensure that relevant information is shared and the public is educated and that the profile of WC/WDM is heightened to achieve buy-in, involvement and accountability from citizens.

Drakenstein Municipality is committed to continue with the allocation of budget towards the implementation of their WC/WDM Strategy. The Municipality needs to ensure that adequate funding is allocated under their Capital and Operational budgets towards the implementation of the WC/WDM initiatives. All external funding that could be utilised by Drakenstein Municipality for this purpose should be sourced.

The current water information database appears adequate from a water services management perspective. The Municipality is committed to continue with the metering of all the influent received at their WWTWs, the quantity of treated effluent re-used and the quantity of treated effluent returned to the Water Resource System. This information is critical for planning purposes with regard to WWTWs upgrading.

Drakenstein Municipality is also committed to keep on updating the water balance models on a monthly basis in order to determine locations of wastage and to enable Drakenstein Municipality to actively implement their WC/WDM Strategy to reduce the percentage of NRW and water losses even further. The water balance will not directly lead to the reduction of the demand, but is an imperative management tool that will inform the implementation of demand- side management initiatives.



**Business Element 9: Water Resources**

Table C.29 : Business Element 9: Water Resources (Topic 9)					
Overview of Topic	Status Quo and Knowledge Interpretation Statistics				
The volumes and sources of raw water supply to the WSA are presented in this topic, which also presents the status of the WSA's abstraction licenses and future needs. An overview of the WSA's monitoring programme for its raw water sources is presented. The topic also outlines the degree of industrial and 'raw' water use and effluent discharge within the WSA.	Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment	Strategy Assessment
	Sources and Volumes	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Monitoring				
	Water Quality				
	Wet Industries				
	Raw Water consumers				
	Industrial Consumer Units				
	Permitted effluent releases				
TOTAL for Topic					
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	Augmentation of the Municipality's own water resources for supply to Paarl and Wellington.	Formalise the supply from the Leeuwin River and the Spruit River to the new Welvanpas WTW (Licence / Agreement). Development of groundwater resources.			
2	The WCWSS is currently under pressure to meet future requirements and the next augmentation schemes need to be implemented.	Update the Service Level Agreements between the Drakenstein Municipality and the CCT and the West Coast DM to include the specific volumes that can be supplied by the bulk water services providers for these two towns. It will enable Drakenstein Municipality to better plan for the possible augmentation of these two towns' water resources.			
3	The DWS registered volume of supply for Saron is exceeded.	Apply to the DWS for a Licence and ensure the correct volume is registered with the DWS for Saron.			
4	Lack of raw water storage capacity for Saron.	Construct off-channel storage dam to provide additional raw water storage capacity for the town.			
5	It is important for Drakenstein Municipality to work with the large water users to identify ways in which they can lower their current water demand by means of improved practices or re-use of waste water.	Drakenstein Municipality can promote WDM activities at the wet industrial consumers in order for them to potentially lower their current water demand by means of improved practices or reuse of waste water. The revenue could potentially decrease as a result of re-use practices. It is suggested that a detailed financial analysis should be conducted as part of the investigation into wastewater re-use. Drakenstein Municipality can further encourage the large users to implement suggested re-use practices by means of incentives, informative billing to communicate monthly water consumption and monitoring and communicating actual savings achieved.			
6	Continue with industrial effluent monitoring (Quality and quantity)	The current approach adopted by Drakenstein Municipality in which the various parameters at all industrial consumers are monitored should be continued, as well as volumetric monitoring at the larger users. Adaptation of the current procedures must be undertaken in accordance with any changes to the wastewater discharge criteria set by DWS. It will also be necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place.			

Metering of all water consumption is one of the most significant steps in order to properly plan and manage water resources. Without metering no management is possible. Drakenstein Municipality needs to continue with the monthly reading of all their existing bulk water meters, which is a valuable source of information.

The uncertainty in projected water-related climate change impacts is one of the biggest challenges facing water managers. The managers must understand how this uncertainty influences the management decisions to be made and that decisions must be appropriate to a possible range of scenarios. A critical tool in this regard is adaptive management, in which water resource systems are carefully monitored and management actions are tailored and revised in relation to the measured changes on the ground. One cannot predict climate change impacts with any certainty, and the recognition of this uncertainty must be built into all climate change response strategies.



The Western Cape is currently experiencing a severe drought, which also impacts on the availability and supply of bulk water from the WCWSS to Drakenstein Municipality and the yield of the Municipality's own existing surface water resources. WC/WDM measures to lower the future water requirements and the augmentation of the existing water resources with groundwater or other sources are therefore critical at this stage.

Re-use of water is becoming more acceptable and feasible because of increasing water shortages, improved purification technology and decreasing treatment costs. Improvements in membrane technologies and their affordability have made a significant contribution in recent years. At present, up to 14% of water use is reused, mostly through wastewater return flows to rivers from which it is abstracted downstream for indirect re-use. Re-use of return flows could be significantly increased, particularly in coastal cities where wastewater ordinarily drains into the sea.

The direct re-use of treated wastewater can pose a risk to public health and safety; must be managed carefully and be subject to water quality management and control. Advanced treatment and proper monitoring of all processes and quality of potable water produced is essential. Public perceptions and opinions vary on the topic of water re-use, specifically as it relates to direct potable water re-use. Public perceptions are strongly informed by the general awareness of the poor operation, maintenance and performance of municipal wastewater treatment plants at present. This poses a significant challenge to building public acceptance of direct water re-use in the current situation. The performance of municipal wastewater and effluent treatment plants nationwide will have to be improved to meet high standards, resulting in consistently good quality discharges to the environment before direct water re-use can be placed on the national water supply agenda.

Detail future water requirement projection models were developed for each of the distribution systems in Drakenstein Municipality's Management Area. These models include the future projections up to 2041 and were calibrated by using historic billed metered consumption data and bulk abstraction data. The percentage of water losses was determined for each of the distribution systems and growth in future water requirement was based on agreed population and growth figures. The projected future water requirements are indicated in the table below for each of the distribution systems.

Table C.30: Projected future water requirements and yield surplus (+) / shortfall (-) based on WSDP model						
Distribution System	Model	PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)				
		2021	2026	2031	2036	2041
Paarl and Wellington	3% Annual Growth	16 485.464	19 111.171	22 155.085	25 683.816	29 774.582
	5% Annual Growth	18 149.370	23 163.706	29 563.411	37 731.236	48 155.681
	<b>WSDP Model</b>	<b>16 590.514</b>	<b>19 299.738</b>	<b>22 501.760</b>	<b>26 294.518</b>	<b>30 797.084</b>
	<b>Allocation surplus (+) / shortfall (-)</b>	<b>19 721.453</b>	<b>17 012.229</b>	<b>13 810.207</b>	<b>10 017.449</b>	<b>5 514.883</b>
Saron	2% Annual Growth	655.609	723.845	799.183	882.363	974.200
	3% Annual Growth	688.383	798.024	925.129	1 072.478	1 243.296
	<b>WSDP Model</b>	<b>606.769</b>	<b>642.808</b>	<b>681.187</b>	<b>722.063</b>	<b>765.607</b>
	<b>Yield surplus (+) / shortfall (-)</b>	<b>962.731</b>	<b>926.692</b>	<b>888.313</b>	<b>847.437</b>	<b>803.893</b>
Gouda <sup>1)</sup>	2% Annual Growth	192.333	212.351	234.453	258.855	285.797
	4% Annual Growth	211.943	257.862	313.728	381.698	464.394
	<b>WSDP Model</b>	<b>193.250</b>	<b>212.110</b>	<b>233.080</b>	<b>256.416</b>	<b>282.410</b>
	<b>Allocation surplus (+) / shortfall (-)</b>	Future supply forms part of the WC DM water source investigations				
Hermon <sup>2)</sup>	2% Annual Growth	40.759	45.002	49.685	54.857	60.566
	4% Annual Growth	44.915	54.646	66.485	80.890	98.415
	<b>WSDP Model</b>	<b>44.479</b>	<b>48.138</b>	<b>52.122</b>	<b>56.461</b>	<b>61.193</b>
	<b>Allocation surplus (+) / shortfall (-)</b>	Future supply forms part of the CCT water source investigations				
Bainskloof <sup>3)</sup>	1% Annual Growth	5.337	5.609	5.895	6.196	6.512
	2% Annual Growth	5.607	6.190	6.834	7.546	8.331
	<b>WSDP Model</b>	<b>3.807</b>	<b>3.855</b>	<b>3.908</b>	<b>3.965</b>	<b>4.028</b>
	<b>Yield surplus (+) / shortfall (-)</b>	Sustainable yield of source is not known.				

Notes: 1) Future supply will come from the West Coast District Municipality. The District Municipality is currently busy investigating various source augmentation options for their two bulk distribution systems.

2) Future supply will come from the WCWSS. The CCT and the DWS are currently investigating various source augmentation options for the WCWSS.

3) The safe yield of the Wit River is not known.

The table below gives an overview of the years in which the annual water requirements are likely to exceed the total allocations from the various resources, if we did not experienced the current severe drought situation.

Table C.31: Years in which the annual water requirement is likely to exceed the total allocations from the various resources				
Distribution System	Total Allocation (x 10 <sup>6</sup> m³/a)	Annual Growth on 2015/2016 requirement (Percentage growth)	Annual Growth on 2015/2016 requirement (Percentage growth)	WSDP Projection Model
Paarl and Wellington*	36.312	2038 (3%)	2029 (5%)	2039
Saron (With possible off-channel dam)	1.569 (Delivery Capacity of bulk pipeline)	> 2040 (2%)	> 2040 (3%)	> 2040
Gouda & Hermon*	Not fix	Future supply forms part of the CCT's and the West Coast District Municipality's water source augmentation investigations		
Bainskloof	Sustainable yield of source not known			

Note: \* The severe drought in the Western Cape impacts on the water availability and the security of supply from the WCWSS, which resulted in severe water restrictions to be implemented by the Drakenstein Municipality in order to lower the current water requirements and to ensure that the systems don't "run dry" in the nearby future.

The augmentation options that are currently being investigated / considered by Drakenstein Municipality include the development of groundwater resources for the various towns, the upgrading of the Welvanpas WTW, the purchase of raw water from the Spruit River Irrigation Association and the provision of additional bulk storage capacity for Saron and the upgrading of the WTW.

The table below gives a summary of some of the conclusions included in the "Drakenstein Bulk Water Supply Study", which was completed during May 2009.

Table C.32: Conclusions of Drakenstein Municipality's Bulk Water Supply Study
<b>Paarl</b>
<ul style="list-style-type: none"> <li>Paarl Mountain WTWs should proceed as planned. The implementation of the WTWs is the most cost effective way to utilise more yield from Bethel and Nantes Dam and from Drakenstein's allocation from the Berg River. In addition to this, the Paarl Mountain WTWs is required in order to address potential water quality concerns (<b>Was Implemented</b>).</li> <li>Drakenstein's allocation of free and cheap water from the Berg River should be fully utilised. This can be achieved through: <ul style="list-style-type: none"> <li>Optimally utilising the surplus capacity of the existing infrastructure pumping water from the Berg River to Bethel and Nantes Dams.</li> <li>Increasing the capacity of the proposed Paarl Mountain WTWs beyond the planned capacity of 8 Ml/s to make use of the surplus yield/allocation available to Drakenstein Municipality. This option however could lead to water quality problems being experienced in Bethel and Nantes Dams, due to the poor quality of water being pumped up from the Berg River.</li> </ul> </li> <li>The development of the Upper Wit River Diversion Scheme and the Molenaars Scheme may yield URVs which would make them more attractive options to implement than purchasing water from the CCT. Development of major schemes like this cannot however be viewed in isolation of the CCT's future water resource requirements and in isolation to operating all schemes within the WCWSS as part of an integrated system. The DWS is currently studying both the Upper Wit River Diversion and the Molenaars River Diversion Scheme at pre-feasibility level as an option to further augment the supply of the WCWSS. The URVs obtained from this study should be compared to the URV of purchasing water from the CCT.</li> <li>The cost of water from the CCT should serve as the benchmark in any future comparison and decision-making with regard to future water resource development or implementation.</li> </ul>
<b>Wellington</b>
<ul style="list-style-type: none"> <li>Upgrading the Welvanpas WTWs to 8 Ml/d would enable the surplus winter water from Antoniesvlei and Spruit River to be fully utilised, and is a cost effective option in comparison to purchasing additional water from the CCT.</li> <li>The purchase of water from the SRIA Dam should be considered by Drakenstein Municipality as this would enable the upgraded Welvanpas WTWs to be utilised in the summer months. This option also represents a cost-effective alternative, to purchasing water from the CCT.</li> </ul>
<b>Saron</b>
<ul style="list-style-type: none"> <li>Shortages of supply have been experienced in Saron during the summer of 2003 and rationing had to be introduced through shutting off the supply to the town at night. Modelling of the diversion scheme by Ninham Shand (2007) showed that shortages during summer periods could be expected. Whilst the implementation of WC/WDM by Drakenstein Municipality has subsequently reduced the risk of water shortages, it is anticipated that this problem could re-occur as water requirements continue to grow, necessitating the need for additional storage in the system in the future. Saron requires additional bulk water supply infrastructure, and dependent on the water quality in the Leeu River, a more comprehensive water treatment system.</li> </ul>
<b>Gouda</b>
<ul style="list-style-type: none"> <li>Gouda receives treated water originating from Voëlsvlei Dam via the West Coast District Municipality's infrastructure.</li> </ul>

Table C.32: Conclusions of Drakenstein Municipality's Bulk Water Supply Study	
Hermon	
<ul style="list-style-type: none"> <li>Hermon receives its water from Voëlvlei Dam via the CCT's bulk water supply system.</li> </ul>	
Bainskloof	
<ul style="list-style-type: none"> <li>The water supply infrastructure supplying Bainskloof has sufficient capacity to supply the current day and future (full development) water demands. The only treatment currently is disinfection through chlorine pills in the reservoir. It is proposed that a more comprehensive water treatment system is installed to ensure that good quality water is supplied to the consumers in that area (Kleerflo filtration system and Ultra Violet Unit was installed).</li> </ul>	

**Paarl and Wellington:** The development of the Antoniesvlei and Spruit River sources is the most favourable bulk water augmentation scheme for Drakenstein Municipality after the Paarl Mountain WTW. The Municipality is currently busy with the construction of the new Welvanpas WTW to fully utilise these sources. Groundwater sources are also being developed.

**Saron:** The registered permit for water usage from the Leeu River is  $0.465 \times 10^6 \text{ m}^3/\text{a}$ , which has been exceeded in the last few years. The existing run-of-river scheme (Abstraction from the Leeu River) and the existing water sources and infrastructure and service reservoir are of adequate capacity in most years. However, the assurance of supply is at risk due to the lack of any balancing storage for raw water. The development of an off-channel dam of  $49\,900 \text{ m}^3$  capacity would assure supply for many years to come and the dam is critical to ensure sufficient carry-over storage to meet the peak water demands during the summer when the available yield on a run-of-river basis would not be sufficient in every year.

A more comprehensive treatment system needs to be installed in tandem with the construction of a storage dam. Best practise treatment facilities for Saron would include a filtration system to provide proper pathogen and turbidity removal, a proper chlorine dosing system, a chlorine contact tank and a limestone contact tank.

**Gouda:** Gouda, like Hermon, is supplied with treated water from Voëlvlei Dam, but from the West Coast District Municipality's Swartland WTW. The yield of Voëlvlei Dam is limited by water supply agreements and by the bulk water supply infrastructure capacity. Drakenstein Municipality needs to ensure that their current water use from Voëlvlei Dam is registered with the DWS. Should additional yield be required to satisfy the current or future water requirements of Gouda, Drakenstein Municipality could apply for an allocation from the next water augmentation scheme to be constructed for the WCWSS. Alternatively, Drakenstein Municipality could abstract their "entitlement" from the Berg Water Project from the Voëlvlei Dam.

**Hermon:** Hermon is supplied with water via the CCT pipeline from the Voëlvlei Dam (Owned by DWS). Drakenstein Municipality therefore purchases the water at the prevailing CCT Bulk Water Tariff. The CCT has registered this water use with the DWS. It is anticipated that sufficient water will be available from the WCWSS to meet the long term future water requirements of Hermon.

**Bainskloof:** Safe yield of the Wit River needs to be determined.

The table below gives an overview of the potential groundwater sources that will be explored by Drakenstein Municipality during the 2017/2018 financial year.

Table C.33: Potential groundwater sources in Drakenstein Municipality's Management Area		
Area	Borehole Number	Potential Yield
Simondium	S1	Highest potential and priority (Could be connected to the existing 200mm dia water pipeline in Watergat Road that leads to the R45).
	S2a & b	Will not be investigated further (Situated on an existing graveyard).
Groot Drakenstein Prison (Victor Verster)	R301_1a	High potential and priority (Could be connected to existing potable water infrastructure nearby).
	R301_1b	Second highest priority and high potential (Could be connected to existing potable water infrastructure nearby).
Pearl Valley	R301_1c & d	Less yield potential, but also seen as a priority (Located near Pearl Valley reservoirs).
	R301_2a, b & c	Less yield potential, but also seen as a priority (Located near Pearl Valley reservoirs).
Paarl	BL_1	High potential (Nearby bulk water pipeline).
	BL_3 & 4	High yields potential.



Table C.33: Potential groundwater sources in Drakenstein Municipality's Management Area		
Area	Borehole Number	Potential Yield
	BL_4	High yields potential.
	PCC 1, 2 & 3	High priority and could provide high yields (Could provide water to Civic Centre, Faure Street Rugby Field, Tennis Courts, Drakenstein Swimming Pool and Lawn bowls ground).
	PS_1, 2 & 3	Could provide high yields (Near the Paarl Cricket Sports field).
	PS_4 & 5	Could provide high yields.
	KD_1 & KD_2	High priority with possible high yields.
	LC_1 & 2	Not of the highest priority as low yields are expected (Near the existing Leliefontein reservoir).
	M_1, 2 & 3	Could provide potential high yields (Existing potable water pipelines in the area).
	Allandale Correctional Services	Would not be investigated further as they want to be self-sustainable through using their own boreholes.
	A_6	Could be drilled if the locations that are already mentioned does not provide sufficient yields.
	Courtrai area	Low yields potential and will not be investigated further.
	Windmeul	No existing potable water infrastructure that could serve water to the Paarl area.
Wellington	WVP_1a, 1b & 1c	High priority and could provide high yields.
	PBC_1	High priority and could provide high yields.
	MB_2a & 2b	Priority and could provide possible high yields.
	FS_1 & HR_1	High yields potential.
	CS_1	High priority and could deliver potential yields.
	LD_1 & 2	High priority and could deliver possible yields.
	SPCA_1 & 2	Priority, but would not deliver as high yields as the other locations in Wellington.
	At Wellington swimming pool	Not a high priority
	NR_1 & NR_2	High priority (Could be connected to the existing potable water infrastructure)
	Near Antoniesvlei	Could potentially provide high yields (Boreholes could be connected to the existing Antoniesvlei dam)
Bainskloof	BKP_4p	High priority (Near existing reservoir and could easily be connected to the existing reservoir).
	BKP_4a	Position to be confirmed
Hermon	H_3	Location should be trialled to investigate if any potential water is available in the area.
Gouda	G_1a, 1b & 1c	Potential and should be investigated (Exact position of bulk pipeline to be determined first).
Saron	S_1a, b, c, d & e	Highest priority (Could be connected to the existing potable water infrastructure in the area)
	S_2	Priority
	S_3cw1, 2 & 3	Located near the proposed WTW in Saron

Drakenstein Municipality recently developed a Drought and Flood Disaster Management Plan. It is anticipated that a situation may arise where Drakenstein Municipality chooses to institute pro-active contingency plans and emergency procedures in terms of section 49 of the Disaster Management Act in order to reduce the potential magnitude and severity of a drought or flood, or to declare a local state of disaster using section 49 and section 55 of the same act in order to access additional resources.

New and additional water restriction levels are also proposed, incorporating a level where sporadic water supply interruptions can be expected, and an emergency level with a failure in reticulated water supply where water rationing will need to be implemented. In such conditions, the trucking and prepositioning of mobile water storage to supply communities will need to be implemented. The option of establishing access to groundwater sources with new boreholes and temporary storage at selected municipal sports grounds will also be considered to supplement drinking water or to provide non-potable water that can replace potable water for irrigation.

This plan suggests that increased emphasis should be put on the early detection of drought conditions, water scarcity conditions and flooding risk, and that clear trigger points for the issue of alerts, watches and warnings should be established. The need to effectively manage sources and the infrastructure with which they are delivered is emphasised by the possible establishment of municipal wellfields and the need to carefully monitor and provide early warning of impending supply problems. The institutional capacity to deal with drought and flood risk and the response to the impact of these hazards is based both inside and outside of Drakenstein municipality and therefore coordination mechanisms and structures are described in the plan. In the case of drought, specific emphasis is placed on coordination with the CCT.

The main elements of the **drought plan** can be summarised as follows:

- **Pro-active water security management** incorporating demand management (water restrictions, public education, system integrity assurance) and bulk supply assurance and diversification (groundwater extraction, re-use, further development of bulk storage capacity).
- **Early warning & preparedness** (climate & weather monitoring and forecasting, pro-active production and consumption monitoring and forecasting with well-defined time-sensitive thresholds for the implementation of water demand management and security assurance measures).
- **Co-ordinated response** (Optimised resource management coordination between authorities, rapid and appropriate emergency relief, comprehensive whole-of-society response).
- **Recovery** with an emphasis on improving the situation rather than restoring the situation.

Drakenstein Municipality's implementation strategies with regard to their water sources, as also included as recommendations in the "Drakenstein Bulk Water Supply Study", are as follows:

- Proceed with the implementation of Paarl Mountain WTWs as this option is cost effective in comparison to purchasing treated water from the CCT, and also addresses water quality considerations (**Was implemented**).
- Ensure that the Municipality's water use from the various sources supplying Drakenstein Municipality is registered with the DWS.
- Consideration should be given by Drakenstein Municipality to upgrading the Welvanpas WTWs as this option is cost effective in comparison to purchasing treated water from the CCT. Drakenstein Municipality should conduct a more detailed investigation to determine the most optimal size of the proposed Welvanpas WTWs (**Welvanpas WTW Design Basis Report was completed and the Municipality started with the construction of the new WTW**).
- Consideration should be given by Drakenstein Municipality to fully utilise the capacity of the pumping infrastructure from the Berg River as well as the allocation from the Berg River Dam (**Was implemented, various raw water pump stations were upgraded**).
- Consideration should be given by Drakenstein Municipality to the purchase of water from the SRIA. The purchase price of this water should be based on the cost (URV) of developing the next most attractive water resource development option available to Drakenstein Municipality at the point on which the decision is taken. The formula to determine an equitable tariff should take into account the anticipated increase in electricity costs in the short to medium term, as well as the cost of future water resources development options.
- The proposed Agreement to be entered into with the CCT should capture Drakenstein Municipality "entitlement" to an allocation from the Berg Water Project. This allocation should be based on pro-rata usage and should take into account the fact that Drakenstein Municipality receives a certain portion of their bulk water purchase at a free or cheap tariff (**Busy with updating of Service Level Agreement**).
- Future water resource development options such as the Upper Wit River Diversion or the Molenaars River Diversion should be developed on the most optimal basis and should form an integral part of the



WCWSS. In order to ensure optimal development and usage of these resources, agreements may have to be entered into between DWS, the CCT and Drakenstein Municipality.

- All future interventions should be benchmarked against the current and proposed bulk water supply tariff of the CCT.
- The URVs obtained for the Upper Wit River Schemes and the Molenaars Scheme should confirm/checked by DWS's Western Cape Feasibility Study, as the URVs are dependent on scheme configuration and yield.
- Should the most optimal development for augmenting the WCWSS (Upper Wit River Diversion or the Molenaars Diversion) entail the development of the resource with the yield in excess of that required by Drakenstein Municipality, an agreement should be entered into with the CCT whereby Drakenstein Municipality would utilise the water from the Upper Wit River Diversion and/or Molenaars Diversion Scheme in lieu purchasing water from the CCT (at the bulk water tariff) or even in lieu of the free and cheap water obtained from the CCT. The financial arrangements would have to be negotiated between DWS, Drakenstein Municipality and the CCT in order to ensure that neither of the parties is negatively impacted on, including the free and cheap allocation which Drakenstein Municipality is entitled to. This approach would ensure that the most optimum water resource development takes place in an integrated manner in the WCWSS.
- Additional raw water supply infrastructure and potable water supply infrastructure will need to be implemented in Saron to alleviate potential water shortages during summer periods and to meet the future water requirement. Dependent on the water quality in the Leeu River, a more comprehensive water treatment system may also be required (**Reports were completed on best possible options**).
- A more comprehensive water treatment system should be installed at Bainskloof in order to ensure that good quality water is supplied to the consumers in that area (**Was implemented**).
- The proposed CCT/Drakenstein Agreement should be updated to include (**Busy with updating of Service Level Agreement**):
  - Drakenstein's "entitlement" from the Berg Water Project.
  - Future water resource development principles.
  - Operation of an integrated system.
- Drakenstein Municipality should approach DWS to utilise the Western Cape Strategy Steering Committee to assist with:
  - Reviewing and updating Drakenstein's scenario planning.
  - Updating of URVs for Drakenstein Municipality.
  - Monitoring of current and future water requirements.
  - Monitoring of implementation of WC/WDM.

The DWS also updated their 2010/2011 All Towns Reconciliation Strategies during 2015 and the table below gives an overview of the recommended potential future water resources as included in the updated Strategies for Drakenstein Municipality.

Table C.34: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	Option	Potential
Paarl and Wellington	Re-use of water	<p>Water re-use must be viewed as a suitable intervention for Paarl, Wellington and Pearl Valley, provided the Municipality can provide a 95% assurance of supply in terms of quality requirements. The potential re-use options must be considered in the short to medium term, through one of the following potential interventions:</p> <ul style="list-style-type: none"> <li>• Direct use for non-potable consumption, in specific for irrigation end-users.</li> <li>• The installation of dual reticulation systems for any new developments, where the re-use of water can be considered for garden irrigation purposes.</li> </ul>

Table C.34: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	Option	Potential
		<ul style="list-style-type: none"> <li>Indirect use, where effluent could undergo further treatment such as ultra-filtration and reverse osmosis before being pumped to the Bethel Dam and also to the Nantes Dam.</li> <li>The option of direct use (potable consumption) should be seen as a long-term intervention.</li> </ul>
	Groundwater	<ul style="list-style-type: none"> <li>Some farms and private users in the area make use of groundwater from the basement regolith and Quarternary alluvial aquifers. This trend should be further encouraged, as the use of private boreholes to water green spaces and other domestic activities that do not require potable water will reduce the total water stress.</li> <li>If groundwater is to be used to assist in meeting future high predicted shortfalls, then far-afield TMG exploration will be required. This could either be in the form of a TMG exploration in association with the CCT in the Wemmershoek area, or TMG exploration with the DWS in the Voëlvlei area. The Wemmershoek TMG compartment can only sustainably provide about 2 million m<sup>3</sup>/a, with the Voëlvlei TMG compartment providing a similar yield. Use of the Wemmershoek TMG compartment will also be in competition with other possible future groundwater users in the Franschhoek area. If the TMG in the Voëlvlei area is explored, a pipeline would be required to be constructed down or through the Elandsbloof Mountains and into Voëlvlei Dam, as well as from Voëlvlei Dam to Wellington and Paarl.</li> </ul>
	Surface Water	<ul style="list-style-type: none"> <li>Drakenstein Municipality will continue to fully utilise the Municipality's own water resources, which include the allocations from the Berg River, Nantes and Bethel Dams, Leeutuin River and Spruit River.</li> <li>The Spruit River Scheme currently does not supply potable water to Wellington and supplied irrigation water only to some users in the town. The bulk line from the abstraction point to the Welvanpas WTW has been decommissioned. If this scheme is considered a suitable source for future domestic supply, this pipeline should be re-commissioned. The Municipality is busy with the planning for the upgrading of the capacity of the Welvanpas WTW to 10 Ml/day.</li> <li>The full diversion capacity of the existing Antoniesvlei and Spruit River infrastructure should be fully utilised. This means also that water from other users might be reduced as the Berg River System are already under pressure. The implications of these options must be fully considered.</li> <li>In previous studies, the Molenaars River was considered as a supply option for Paarl and Wellington and for supply to the broader WCWSS. This option is subject to the environmental constraints in the sensitive Molenaars River valley and subject to permission from the DWS as it would be an inter basin transfer. Present analysis show that the environmental flows in the Breede River are not met and such a scheme would also be in competition with other schemes presently being investigated.</li> <li>The Drakenstein Municipality must investigate the option of purchasing more bulk water from the CCT. The cost of bulk water from the CCT should, however, serve as the benchmark for any future comparison or decision-making with regard to future water resource development or implementation. The WCWSS has been planned to cater for Cape Town and the environs. Paarl and Wellington will remain dependent on this system for future surface water options.</li> <li>Irrigators approached the Drakenstein Municipality with a view to selling winter water, which is stored in an irrigation dam, to the Municipality in the summer months. This could only be considered if the Welvanpas WTW is upgraded to a 10 Ml/day facility to utilise the available water from the Spruit River and Antoniesvlei. This also has legal implications that must be investigated. In the past, various schemes have been proposed to access water in the Upper Wit River, including a dam on the Upper Wit River and a diversion from this river to a dam at Doolhof, east of Wellington. This option is subject to the environmental constraints in the sensitive Wit River valley and subject to permission from the DWS as it is an inter basin transfer. Present analysis show that the environmental flows in the Breede River are not met and such a scheme is also in competition with other schemes presently being investigated.</li> </ul>
	Other Sources	<ul style="list-style-type: none"> <li>The MAP is acceptable to allow rainwater harvesting to be feasible financially, and this should be considered for implementation on a municipal level.</li> </ul>
	Summary	<p><b>The current water supply is adequate under all growth scenarios. Shortfalls of 0.283 million m<sup>3</sup>/a and 9.218 million m<sup>3</sup>/a are only expected by 2040 under the medium-growth and high-growth scenarios, respectively. The following sources are identified as potential sources to augment the water supply (In order of priority and implementation sequence):</b></p> <ul style="list-style-type: none"> <li>Full implementation of the WC/WDM Strategy measures.</li> <li>Full utilisation of the existing allocations from the Berg River and the Bethel and Nantes dams.</li> <li>Full utilisation of the Leeutuin River (Antoniesvlei Diversion) and the Spruit River, and an upgrade to the Welvanpas WTW.</li> <li>Re-use of water for irrigation purposes, to free up current potable water use for this purpose.</li> <li>Increase the annual bulk purchase from the CCT (through the WCWSS).</li> </ul>

Table C.34: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	Option	Potential
Saron	Re-use of water	<ul style="list-style-type: none"> <li>Water re-use must be seen as an appropriate resource for Saron provided that the municipality can provide a 95% assurance of supply in terms of quality requirements.</li> </ul>
	Groundwater	<ul style="list-style-type: none"> <li>Groundwater is relatively unused in the region surrounding Saron, with only a few low yielding boreholes being present within the Malmesbury Group west of the Sarons Mountain and Obiequa Mountains. Two potential groundwater targets do exist for Saron however. The Peninsula Formation is accessible within the Roodezandpas valley, up to the confluence of the three tributaries within the valley. The presence of the Roodezandpas valley is a result of a NW-SE orientated fault within the Peninsula Formation, hence providing a good potential fractured aquifer target. Yields are likely to be in the range of 5-10 l/s, with good quality water. Groundwater from any future boreholes could also be pumped into the stream within the valley, which in turn feeds into the Leeu River diversion canal system that provides water to Saron.</li> <li>The second groundwater options is targeting the Porterville Formation close to the contact with the Peninsula Formation, in the vicinity of an E-W orientated fault about 3.5 km south-east of Saron. This fault passes just north of the Roodezandberg, and groundwater from the Peninsula Formation is likely to flow along this fault zone and exit along the contact with the Malmesbury Group basement, recharging the basement regolith aquifer in close vicinity. Relatively high yields can be expected, as evidence by the eastern side of the Roodezandberg where yields of about 4 – 8 l/s have been recorded in boreholes within the Malmesbury Group close to the contact with the Peninsula Formation. Water quality may be slightly reduced in comparison to waters from the TMG, due to the composition of the Malmesbury Group basement shales.</li> <li>A combination of both groundwater options could possibly yield about 15 l/s (about 0.5 million m<sup>3</sup>/a), which would meet all predicted shortfalls for the next 25 years.</li> </ul>
	Surface Water	<ul style="list-style-type: none"> <li>Additional raw and potable water supply infrastructure must be constructed in Saron to alleviate potential water shortages during the summer months and to meet future water requirements.</li> <li>In 2007, the Drakenstein Local Municipality commissioned a PSP to investigate the various water supply options as a result of the shortages experienced in 2003. Some of the more feasible options are described below: <ul style="list-style-type: none"> <li>Construction of a 45 km pipeline in collaboration with Porterville, which also experiences water shortages, to lead from the WCDM treatment works at Voëlville Dam. Costs would be shared pro-rata and the potential cost of this option could be less than the dam option if it were implemented.</li> <li>The construction of a dam in the vicinity of the reservoirs was judged to be the optimal solution if the water quality in the Leeu River diversion scheme proved to be acceptable. The raw water dam option consisted of a dam with a capacity range of between 40 000 to 50 000 m<sup>3</sup>, but no more, so as to allow authorisation under the General Authorisation for this area.</li> <li>Use of the municipal dam for storage. This option was eliminated as a result of the poor quality of water from storm water run-off from those parts of Saron situated upstream of the dam.</li> <li>The 2004 ISP suggests additional abstraction from the Leeu River but a more comprehensive water treatment system is required in tandem with the construction of a storage dam.</li> </ul> </li> </ul>
	Other Sources	<ul style="list-style-type: none"> <li>The MAP is acceptable to allow rainwater harvesting to be feasible financially.</li> </ul>
	Summary	<p><b>Saron currently experiences water shortages as the water sources cannot cater for current water requirements. The following sources are identified as potential sources to augment the current water supply (In order of priority and implementation sequence):</b></p> <ul style="list-style-type: none"> <li>Additional abstraction from the Leeu River in tandem with the upgrade of the WTW and the construction of a storage dam.</li> <li>Groundwater development.</li> <li>The construction of a 45km pipeline from the WCDM treatment works at Voëlville Dam in collaboration with Porterville.</li> <li>Re-use of water.</li> <li>Rainwater harvesting.</li> </ul>
Gouda	Re-use of water	<ul style="list-style-type: none"> <li>Recycled water is currently not re-used for any irrigation purposes. Water re-use is not considered a feasible option for augmentation at this stage, but could become a potential future source once the existing WWTW process has been improved to a nutrient removal process.</li> </ul>
	Groundwater	<ul style="list-style-type: none"> <li>Groundwater is relatively unused in the region surrounding Gouda, with only a few low</li> </ul>



Table C.34: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	Option	Potential
		<p>yielding (&lt; 2 l/s) boreholes being present within the Malmesbury Group. The Peninsula Formation can be accessed in an unconfined state within the Nuwekloof Pass however. Yields of about 5 l/s with good quality water (Class 0-1) can be expected if the right geological structures are targeted, which are present as NW-SE orientated fractures and faults within the Peninsula Formation in the pass. This is evidenced by a ~ 4 l/s NGDB registered borehole within the pass. Groundwater could be fed into the Klein Berg River and into Gouda, or along a pipeline adjacent to the road or railway line.</p> <ul style="list-style-type: none"> <li>The more sandstone rich Norree Formation of the Malmesbury Group could also be targeted just to the southeast of Gouda, where the NW-SE orientated fractures and faults in the area intersect the Noree-Peninsula Formation contact. Yields are likely to be in the range of 2-5 l/s if the right geological structures are targeted. Water quality may be slightly reduced in comparison to waters from the TMG, due to the influence of the composition of the Malmesbury Group basement shales.</li> <li>A single 5 l/s borehole, or three 2 l/s boreholes (~ 0.15 mcm/a) would meet all future predicted shortfalls for Gouda.</li> </ul>
	Surface Water	<ul style="list-style-type: none"> <li>Gouda is situated in an area which is a resource for the Greater Cape Metropolitan area and the West Coast District Municipality. As such it receives its water from the Voëlvlei Dam, which is operated as part of the bigger WCWSS.</li> <li>A further allocation from the WCWSS for the West Coast District Municipality will be part of the West Coast District Municipality's initiatives to provide more water to the West Coast towns.</li> </ul>
	Other Sources	<ul style="list-style-type: none"> <li>The MAP is acceptable to allow rainwater harvesting to be feasible financially and this can be considered for implementation at a municipal level.</li> </ul>
	Summary	<p><b>According to the theoretical water balance, Gouda might experience water shortages, because there is no service agreement with the West Coast District Municipality in place. The following sources are identified as potential sources to augment the water supply (in order of priority and implementation sequence):</b></p> <ul style="list-style-type: none"> <li>Full implementation of the existing WC/WDM measures in order to reduce the current high percentage of NRW to target values.</li> <li>An increased supply from the Swartland WTW, if the Municipality's allocation from the Berg River is increased.</li> <li>Groundwater development.</li> </ul>
Hermon	Re-use of water	<ul style="list-style-type: none"> <li>Currently no water is re-used and all final effluent evaporates. The volumes available from the WWTW are limited and the irrigation of the sports fields and public open spaces are the only viable end-users.</li> </ul>
	Groundwater	<ul style="list-style-type: none"> <li>Groundwater is relatively unused in the region, in comparison to the rest of the Western Cape. This can be attributed to the intergranular and fractured regolith basement aquifers of the Malmesbury Group being generally groundwater poor in terms of quantity and quality. There are two registered WARMS boreholes in Hermon, although no volumes are provided. Minor groundwater resources do exist for Hermon, in the form of the Quaternary alluvium associated with the Berg River, and the fault contact between the Porterville and Moorreesburg Formations west of Hermon. Yields of about 0.5-2 l/s can be expected from both aquifer types, although the water quality is expected to be relatively poor and will probably require treatment to make it potable. The Quaternary alluvial and basement regolith aquifer are likely to be relatively saline from both agricultural contamination and the natural chemical composition of the Malmesbury Group shales.</li> <li>A single 1 l/s or two 0.5 l/s boreholes would meet all predicted shortfalls for Hermon.</li> </ul>
	Surface Water	<ul style="list-style-type: none"> <li>Hermon is supplied indirectly by the WCWSS, which is utilising the Berg River to its optimum.</li> </ul>
	Other Sources	<ul style="list-style-type: none"> <li>The MAP is acceptable to allow rainwater harvesting to be feasible financially, and this can be considered for implementation at a municipal level.</li> </ul>
	Summary	<p><b>According to the theoretical water balance, Hermon might experience water shortages.</b> The Water Service Provider (CCT) can increase the supply according to their existing Service Level Agreement with the Drakenstein Municipality.</p>
Bainskloof	Re-use of water	<ul style="list-style-type: none"> <li>Recycled water is not possible, because of the small number of households and there is no WWTW in Bainskloof.</li> </ul>
	Groundwater	<ul style="list-style-type: none"> <li>The local groundwater resources of Bainskloof are restricted to the intergranular aquifers and TMG Aquifer (with the unconfined Peninsula Formation at the top of the Bain's Kloof Pass).</li> <li>No groundwater use is evident in the settlement, as currently Bainskloof is supplied with raw water from the Wit River. If groundwater is to be used to assist in meeting future predicted shortfalls, the exploration and exploitation of the TMG will be required.</li> </ul>

Table C.34: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	Option	Potential
	Surface Water	<ul style="list-style-type: none"> <li>The Wit River is currently supplying Bainskloof with raw water and no other potential surface water resources are being investigated, because of the small volume of water required for Bainskloof.</li> </ul>
	Other Sources	<ul style="list-style-type: none"> <li>The MAP is acceptable to allow rainwater harvesting to be feasible financially and this should be considered for implementation at a local level to increase assurance of supply.</li> </ul>
	Summary	<p><b>The supply from the Wit River seems to be adequate to meet the future water requirements of Bainskloof. The following sources are identified as potential sources to augment the future water supply, should it become necessary in the future (In order of priority and implementation sequence):</b></p> <ul style="list-style-type: none"> <li>Full implementation of the existing WC/WDM measures in order to reduce the current high percentage of NRW to target values.</li> <li>An increased allocation from the Wit River.</li> <li>Rainwater harvesting.</li> <li>Groundwater development.</li> </ul>

**Water Quality:** The compliance of the E.Coli monitoring frequency in the water distributions systems of Drakenstein Municipality is indicated in Table A.35, in terms of the minimum requirements of SANS: 241-2:2015. It can be noted from the table that the number of monthly microbiological samples taken by Drakenstein Municipality for each of the distribution systems were adequate for the 2016/2017 financial year.

Operational monitoring of process indicators shall comply with the minimum requirement specified in SANS 241:2015 for characterising raw water quality, on-going levels of operational efficiency in a water treatment system and acceptable final water quality to the point of delivery, as summarised below.

Table C.35: Minimum monitoring frequency for process risk indicators (SANS241-2:2015: Table 1)			
Determinand	Raw Water	Final Water	Distribution System
Conductivity or total dissolved solids	Daily	Daily	Not applicable
pH value	Daily	Once per shift <sup>a</sup>	Fortnightly
Turbidity	Daily	Once per shift <sup>a</sup>	Fortnightly
Disinfectant residuals	Not applicable	Once per shift <sup>a</sup>	Fortnightly
E.Coli (or faecal coliforms) <sup>b</sup>	Not applicable	Weekly	Fortnightly but dependent on population served <sup>d</sup>
Heterotrophic plate count <sup>c</sup>	Not applicable	Weekly	Fortnightly
Treatment chemicals <sup>d</sup>	Not applicable	Monthly	Not applicable
a: A shift is defined as an eight-hour work period.			
b: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and immediate follow-up sampling at an increased sampling frequency.			
c: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and follow-up sampling.			
d: Includes all risk determinands that are added or formed as a result of the use of treatment chemicals (for example aluminium, iron and chlorine). If non-compliant with the numerical limits specified in SANS 241-1 in the final water, the distribution system monitoring frequencies of Table 3 in SANS241-2:2015 apply.			



Industrial Consumers:

Drakenstein Municipality can promote WDM activities at the wet industrial consumers in order for them to potentially lower their current water demand by means of improved practices or reuse of waste water. The revenue could potentially decrease as a result of re-use practices. It is suggested that a detailed financial analysis should be conducted as part of the investigation into wastewater re-use.

Drakenstein Municipality can encourage the large users to implement suggested re-use practices by means of incentives, informative billing to communicate monthly water consumption and monitoring and communicating actual savings achieved.

All industries formally apply for the discharge of industrial effluent into the Municipality's sewer system. The quality and volume of industrial effluent discharged into the sewer system are monitored by the Municipality, in order to determine whether the quality comply with the standards and criteria. It is also necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place. The Municipality needs to continue to ensure that all industrial consumers apply for discharge permits and they must supply and maintain a flow meter measuring the volume of water that is discharged into the sewer system. It is also recommended that the accounts generated by the Municipality include for each cycle a summary of the COD and flow results to enable industries to keep a record and look at ways of improving where possible.

Drakenstein Municipality is committed to ensure that no industrial effluent is discharged into the sewer system unless it complies with the standards and criteria, as included in the Tariff Structure ("Acceptance of Industrial Effluent for Discharge into the Sewage Disposal System").

**Business Element 10: Financial****Table C.36 : Business Element 10: Financial Profile (Topic 10)**

Overview of Topic	Status Quo and Knowledge Interpretation Statistics				
The financial profile is aligned with the Water Services Standard Chart of Accounts [SCOA] which addresses the expenditure, revenue & capex for the water services function.	Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment	Strategy Assessment
	Capital Expenditure	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Operation and Maintenance Budget				
	Tariff & Charges				
	Free Basic Services				
	Metering, Billing, Income and Sales				
	<b>TOTAL for Topic</b>				

**Problem Definition Statements**

Nr	Statements - Short Comings	Possible Improvement / Project
1	Maintenance activities have been increasingly focused on reactive maintenance as a result of the progressive deterioration and failure of old infrastructure. Consequently, there has been dilution of preventative maintenance of other infrastructure. Expenditure on repairs and maintenance does not keep track with the increase in asset values as well as the ageing of the infrastructure.	Drakenstein Municipality needs to continue with the implementation of their Asset Management Policy, which optimises maintenance activities, appropriate to its specific needs and the local environment, and identifies the systems and resources required to support this. A regime of planned preventative maintenance should be established for all infrastructure assets classified as critical and important in the Asset Register. Consideration should be given to the establishment of a maintenance management system to enable Drakenstein Municipality to better manage its risks, and more effectively plan and prioritise the wave of renewals that are going to be required over the next 20 years.
2	Consumer debt and the ability of the Council to finance the capital programme from internally-generated funds remains big challenges.	The Municipality will continue with their Revenue Enhancement Programme, which will look at closing off any revenue leakages to ensure the collection of revenue that was not collected before in order to increase the revenue base of Council. The continued efficient and effective management of expenditure will also be improved in order to limit the spending on unnecessary items.
3	The replacement value of the water infrastructure that is expected to come to the end of its useful life over the next 20 years is around R440 million (an average of R22 million per year) and for sewerage infrastructure the value is R288 million (an average of R14.4 million per year). The renewals burden is set to continue to increase sharply over the next 15 years, as is currently the case.	The Council will continue with their current committed capital renewal programme and to increase the budgets allocated towards the maintenance and rehabilitation of the existing infrastructure.
4	Detail residential and industrial water meter audits were completed recently, which indicate the existing system without meters, the age of the meters and meters that are leaking or not working.	Drakenstein Municipality is committed to ensure that all the identified unmetered connections are provided with meters, leaks at existing meters are repaired and faulty meters are replaced. A phased approach will also be followed for the replacement of the old water meters.
5	Investigate the possibility of linking the sewerage tariffs to the volume of water use. Volumetric usage, whereby charges are determined according to water usage with maximum ceilings and charged accordingly.	Investigate the financial impact of linking the sewerage tariffs to the water usage.
6	It is important for Drakenstein Municipality to enforce their indigent qualification criteria rigorously in order to ensure that those who do not qualify are removed from the allocation list. The Municipality needs to determine whether the current Indigent Policy is not too generous and creates a situation where too many citizens in Drakenstein Municipality's Management Area are making no monetary contribution towards the cost of delivering services to the community.	Investigate the current indigent qualification criteria in order to determine whether the existing criteria is not too generous.

The Municipality has a significant revenue base that continues to grow substantially when compared with previous years. This revenue base has enabled the organisation to aggressively increase the external gearing to address its capital infrastructure needs. The overall financial operational performance of the organisation can be considered as being finely balanced with very little room for budgetary mistakes.

The financial services challenges of Drakenstein Municipality and the actions to address these challenges were indicated as follows in the Municipality's 2015/2016 Annual Report.

- Consumer debt remains a challenge and a number of initiatives were implemented. Consumer debt increased by R16.5 million from R288.8 million as at 30 June 2015 to R305.3 million as at 30 June 2016. The relationship between the ever-increasing tariffs and outstanding debtors is an indication that consumers are struggling to meet their obligations in terms of payment for services. The worsening economic climate puts pressure not only on the world economy, but also filters down to households in municipalities globally.
- The ability of Council to finance the capital programme from internally-generated funds remains a big challenge. This challenge has an inverse relationship with the increasing external loan debt of Council, which amounted to 47.4% of the total operating expenditure at the end of the 2015/2016 financial year. Although the Council has capped the afore-mentioned percentage at 50%, urgent upgrades in infrastructure to enable increased development and therefore an increased revenue base necessitated that the Municipality accelerate their capital programme and will therefore go above the capping over the medium term. The Municipality envisages to start generating sustainable operating surpluses by the 2025/2026 financial year, the Municipality is still in the process of ensuring that it continues to achieve sustainable surpluses. Although a surplus was achieved of R43.5 million during 2015/2016 this, together with more government grants, will ease the pressure on external borrowings that Council would like to cap at about 40% by 2026/2027.
- Several other initiatives are envisaged for the 2016/2017 financial year, with the aim of improving Council's ability to finance future capital requirements. One of these initiatives is the Revenue Enhancement Programme, which will look at closing off any revenue leakages to ensure the collection of revenue that was not collected before in order to increase the revenue base of Council. The continued efficient and effective management of expenditure will also be improved in order to limit the spending on unnecessary items.

Capital funding will have to increase substantially if existing service levels are to be sustained, which has to be the goal. In this regard Drakenstein Municipality's own funding, as well as the MIG funding must significantly exceed inflation. Other possible sources of funding and innovative funding mechanisms have to be explored (RBIG, ACIP, etc.).

Capital Budget: The Water and Sewer Master Plans for the various towns in Drakenstein Municipality's Management Area recommends upgrades to the value of R631.839 million and R368.330 million (Projected 2016/2017 values) in the foreseeable future in order to accommodate development and population growth according to the SDF. Most of the capital projects for water and sanitation are currently funded through the Municipality's own budget.

The water supply systems in most of the Municipalities are under increasing threat of widespread failure, due to inadequate rehabilitation and maintenance of the networks. This is also the case in Drakenstein Municipality's Management Area about 9% of the water supply infrastructure is in a poor or very poor condition and the condition backlog is in the order of R83.636 million. The bulk of the backlog is made up of bulk water pipeline and water reticulation pipeline assets. This is placing considerable strain on Drakenstein Municipality's maintenance operations, but the real solution is for the municipality to commit to a substantial and sustained program of capital renewal works.

The replacement value of the water infrastructure that is expected to come to the end of its useful life over the next 20 years is around R440 million (an average of R22 million per year) and for sewerage infrastructure the value is R288 million (an average of R14.4 million per year). The renewals burden is set to continue to increase sharply over the next 15 years, as is currently the case. Water and sewerage infrastructure assets with a total current replacement value of about R287.3 million and R153.5 million will be reaching the end of their useful life over the next 10 years and will need to be replaced, rehabilitated or reconstructed.

It is therefore important for the Council to continue with their current committed capital renewal programme and to increase the budgets allocated towards the maintenance and rehabilitation of the existing infrastructure.

The Municipality's dedicated renewal programmes need to target the poor and very poor assets. If this is not done, there is a risk that the ongoing deterioration will escalate to uncontrollable proportions, with considerable impact on customers, the economy of the area and the image of Drakenstein Municipality.

The WSDP recommended implementation strategies with regard to capital funds are as follows:

- To focus strongly on revenue collection, because most of the funds for water and sewerage capital projects are from Drakenstein Municipality's own funding sources. Actively implement the Customer Care, Credit Control and Debt Collection By-Laws in order to minimize the percentage of non-payment for municipal services.
- To identify all possible sources of external funding over the next number of years to assist Drakenstein Municipality to address the bulk infrastructure backlogs that exist in the various towns and to ensure adequate rehabilitation and maintenance of the existing infrastructure.
- Develop AMPs for all water and sewerage infrastructure, which will indicate the real replacement values, the service life of the assets and the funds required to provide for adequate asset replacement.
- To carefully balance cost and affordability of future capital budgets.

Operational Budget: The repairs and maintenance ratio of 3.7% for 2015/2016 compared with the 4.5% for 2014/2015 could be viewed as unfavourable if compared with the industry norm of 7% to 8%. With the refinement of SCOA, better reporting of actual repairs and maintenance will be achieved in the future.

However, it needs to be noted that Drakenstein's infrastructure is very old and will need to be replaced or refurbished to maintain current service delivery levels. The repairs and maintenance ratio of 3.77% is well below the norm of 8% that National Treasury sets out in MFMA Circular 71 for repairs and maintenance expenditure as a percentage of the carrying value of infrastructure assets in the assets register. The norm is not reasonable, simply because all municipalities' asset registers are not compiled on the same monetary basis. If Drakenstein wants to adhere to this norm, the Municipality will have to increase all current property taxes and service charges with a further 23.08%, which in the current economic climate is not a proposition.

Maintenance activities have been increasingly focused on reactive maintenance as a result of the progressive deterioration and failure of old infrastructure. Consequently, there has been dilution of preventative maintenance of other infrastructure. Expenditure on repairs and maintenance does not keep track with the increase in asset values as well as the ageing of the infrastructure.

Drakenstein Municipality needs to continue with the implementation of their Asset Management Policy, which optimises maintenance activities, appropriate to its specific needs and the local environment, and identifies the systems and resources required to support this. A regime of planned preventative maintenance should be established for all infrastructure assets classified as critical and important in the Asset Register. Consideration should be given to the establishment of a maintenance management system to enable Drakenstein Municipality to better manage its risks, and more effectively plan and prioritise the wave of renewals that are going to be required over the next 20 years.

It is important to note that the maintenance budget requirements are going to increase over the next twenty years in real terms, in line with the envisaged pace of development and the upgrading of the bulk infrastructure. It is estimated that the budget requirements will double over this period.

The WSDP recommended implementation strategies with regard to operational budgets are as follows:

- Develop an AMP, which will indicate the real replacement values and service lives of the assets and the funds required to provide for adequate operation and maintenance of the infrastructure.
- The new depreciation charges, as included in the AMP, will have to form part of the operating budget and subsequent tariffs, linked to a ring-fenced asset replacement fund.
- Water services operational surpluses have to be allocated to essential water services requirements.



Tariff and Charges:

Drakenstein Municipality's current six block step water tariff structure adequately promotes the efficient use of water by consumers and discourages the wastage of water. Higher tariffs are charge for the higher consumption blocks. The table below gives some comments on the specific blocks, with regard to Drakenstein Municipality's water tariff structure for the last three financial years.

Table C.37: Comments on the Municipality's block step tariff structure						
Block (kl/month)	12/13	13/14	14/15	15/16	16/17	Comments
0 - 6	R0-00	R0-00	R0-00	R0-00	R0-00	Free Basic Water
7 - 10						Low volume use
11 - 20	R7-52	R8-72	R9-77	R10-75	R11-72	Typical use volume, including garden irrigation
21 - 30						
31 - 55	R12-06	R13-99	R15-66	R17-23	R18-78	Above average use, including garden irrigation
56 - 60	R15-55	R18-03	R20-20	R22-22	R24-21	
61 - 80						Wasteful use and/or severe garden irrigation
81 - 100	R20-96	R24-30	R27-23	R29-96	R32-66	
101 - 110						Significant waste and/or unnecessary garden irrigation
> 110	R28-04	R32-54	R36-45	R40-09	R43-71	

Wasteful or inefficient use of water is discouraged through increased tariffs. It is suggested that the following tariff structure characteristics should remain in Drakenstein Municipality's Structure in order to ensure efficient water use.

- Maintain a rising block tariff structure.
- Keep number of blocks in the tariff to a minimum. One block to address free basic water (the first step) and another to address the "cut-off" volume where consumers are discouraged to use water above this monthly volume (highest block) are required. In addition another three blocks could be used to distinguish between low users, typical use of high water use.
- The volumetric steps should be kept the same for all the areas within Drakenstein Municipality's Management Area.
- The cost of water in the maximum step should severely discourage use in this category. The volumetric use for the highest category could be 60 kl / month, above which residential water use could be considered to be wasteful or unnecessary. Garden use requiring in excess of this volume should be reduced in accordance with xeriscape practices.

The existing water tariff codes adequately differentiate between the different categories of water usage (Residential, Commercial, Industrial and Other).

Volume charges for residential sanitation services are not yet implemented. Drakenstein Municipality can investigate the financial viability of changing the sanitation tariff structure from a fixed monthly amount, which is based on the square meter of the erf and the number of toilets or urinals, to a stepped tariff based on water consumption in the future. Volumetric usage for sanitation services, whereby charges are determined according to water usage, with maximum ceilings and charged accordingly. This will need to include a free sanitation bracket for indigent households, similar for free water. This will also further deter wasteful water use.

The schools in Drakenstein Municipality's Management Area are not yet recorded under a unique billing code in the treasury system and are included in the same tariff code as other users in most cases. Drakenstein Municipality will be able to better monitor the water usage of the schools in their Management Area if their water usages are recorded under a unique billing code. This will also enable Drakenstein Municipality to monitor the success with the implementation of specific WDM activities more effectively.

Drakenstein Municipality will continue with their current approach whereby the various parameters at all their industrial consumers are monitored, as well as volumetric monitoring at the larger users. Adaptation of procedures will be undertaken in accordance with any changes to the wastewater discharge criteria set by the DWS. It will also be necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place.

Drakenstein Municipality will continue to re-evaluate the tariffs they charge for their water and sanitation services on an annual basis in order to put the Municipality in an even better financial position to address the bulk infrastructure backlogs and to ensure the adequate rehabilitation and maintenance of all existing water and sewerage infrastructure within the various towns.

The MFMA Circular No.78 of 7 December 2015 stipulated the following w.r.t. the water and sanitation tariff increases:

Municipalities should consider the full cost of rendering the water and sanitation services when determining tariffs related to these two services. If the tariffs are low and result in the municipality not recovering their full costs, the municipality should develop a pricing strategy to phase-in the necessary tariff increases in a manner that spreads the impact on consumers over a period of time.

Municipalities are urged to design an Inclining Block Tariff structure that is appropriate to its specific circumstances, and ensures an appropriate balance between low income consumers and other domestic, commercial and business customers, and the financial interests of the municipality. While considering this structure, municipalities are advised to evaluate if the IBT system will be beneficial to them depending on consumption patterns in their areas.

In light of the current drought being experienced across large parts of the country, and to mitigate the need for water tariff increases, municipalities must put in place appropriate strategies to limit water losses to acceptable levels. In this regard municipalities must ensure that water used by its own operations is charged to the relevant service, and not simply attributed to water losses.

Drakenstein Municipality's tariffs support the viability and sustainability of water supply services to the poor through cross-subsidies (where feasible). Free basic water and sanitation services are linked to Drakenstein Municipality's Indigent Policy and all indigent households therefore receive free basic water and sanitation services.

It is important for Drakenstein Municipality to enforce their indigent qualification criteria rigorously in order to ensure that those who do not qualify are removed from the allocation list. The Municipality needs to determine whether the current Indigent Policy is not too generous and creates a situation where too many citizens in Drakenstein Municipality's Management Area are making no monetary contribution toward the cost of delivering services to the community.

It is important for Drakenstein Municipality to continue with the reading of all their bulk water meters. The bulk meters and meter chambers also need to be properly maintained and the meters need to be protected from vandalism. Drakenstein Municipality will also continue with the process of dividing the distribution networks into smaller zones, with a bulk meter for each zone, in order to identify the NRW for each of the individual zones. Drakenstein Municipality is committed to ensure that all the standpipes and water used for irrigation purposes are metered.

Drakenstein Municipality's Credit Control and Debt Collection Policy and By-laws provide a framework to enable Drakenstein Municipality to proactively manage and collect all money due for services rendered and outstanding property taxes, subject to the provisions of the Municipal Systems Act of 2000 and any other applicable legislation and internal policies of Council. The Policy and relevant by-laws provides for credit control procedures which are fair and equitable, provide for warnings and adequate notice, provide for consumer representations, allow alternative payment arrangements and set out fair procedures that will be applied in the event of non-payment.

Drakenstein Municipality's Credit Control and Debt Collection By-laws allows for actions that will limit the Municipality's financial loss and promote good payment habits, where a consumer continues to fail to pay for services provided after the application of such procedures and a fair warning. Drakenstein Municipality is committed to actively implement their Credit Control and Debt Collection Policy and by-laws in order to reduce the percentage of non-payment by their consumers even further.

The recently completed detail water meter audits will assist the Engineering Department and the Financial Department to ensure that all water used is metered, which include the free basic water and also the water used for irrigation purposes on the parks.

#### Business Element 11: Water Services Institutional Arrangements

Table C.38 : Business Element 11: Water Services Institutional Arrangements (Topic 11)					
Overview of Topic		Status Quo and Knowledge Interpretation Statistics			
The institutional arrangements profiles presents an overview of the WSA's compliance with respect to water services regulations and policy and as aligned also with the Regulatory Performance Monitoring System. It also provides an overview of the water services provider arrangements which are in place, including the WSA's perception of the sufficiency of WSP staffing levels.	Item	Quality (%) assessment of current status against compliancy requirements	Quantity (%) an indication of the representation of the total area to address the issue	Future Plan Assessment	Strategy Assessment
	Policy development	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Regulation and tariffs				
	Infrastructure development (projects)				
	Performance management and monitoring				
	WSDP				
	Bulk and Retail functions				
TOTAL for Topic					
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	The updated Service Level Agreement between the Drakenstein Municipality and the CCT needs to be finalised	Finalise the updated Service Level Agreement between the Municipality and the CCT for the provision of bulk potable water to Paarl/Wellington and Hermon. Ensure the updated Service Level Agreement comply with DWS's requirements.			
2	Ensure the Service Level Agreement for the provision of bulk potable water to Gouda by the West Coast DM meets DWS's requirements.	Update the Service Level Agreement between the Municipality and the West Coast DM for the provision of bulk potable water to Gouda, in order for it to comply with DWS's requirements.			
3	The current vacancy rates for water and sanitation services personnel are very high and all critical vacant positions, as indicated on the approved Organogram, needs to be filled as soon as possible. Drakenstein Municipality needs to review the skills needed at each of their WTWs and WWTWs according to the classification of the plants and need to align resources to these needs as well as reviewing the total staff numbers necessary to meet all the objectives in the National Water Act.	Filling the vacant positions will ensure the adequate operation and maintenance of the existing infrastructure. Aligning the career paths to the occupational categories will assist the personnel to understand levels within across teams. Simplification of job titles to conform to respective occupational categories will assist in developing compatible and comparable career paths within the different Departments. Occupational categories will provide differentiation between levels. This approach will allow for more specific job designations in organograms with explicit career path connotations.			
4	Drakenstein Municipality will continue with their mentoring role for operational personnel ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operational personnel. Budgets need to be established to address the shortfall of skilled personnel, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff.	Ensure all required water and sanitation training is included in the Municipality's Workplace Skills Plan. Establish budgets to address the shortfall of skilled personnel, rethink methods to retain qualified personnel and plan for clear career paths. With such a program a source of specific resources of skilled operational personnel, technicians and managers will be established.			
5	Drakenstein Municipality can also continue to actively focus on in-house training, which requires the identification of trainers (from senior operators / officers / professional ranks) for the development and facilitation of courses which relate to specific organizational knowledge and systems requirements.	Drakenstein Municipality's internal reports such as the Water Safety Plan, Wastewater Risk Abatement Plan, Operation and Maintenance Manuals and this WSDP have the necessary information on which the in-house courses can be based. This will assist Drakenstein Municipality's Human Resource Department in general and the skills development facilitator in particular to develop and implement effective workplace skills plans relevant to Human Capacity Development requirements.			

Drakenstein Municipality is committed to develop a new WSDP every five years and to update the WSDP as necessary and appropriate in the interim years. The Municipality will also continue to report annually and in a public way on progress in implementing the plan (WSDP Performance and Water Services Audit Report), as part of Drakenstein Municipality's Annual Report. WSDP Performance- and Water Services Audit Reports were completed annually for the last seven financial years.

Mechanisms are in place to effectively monitor the compliance of consumers with regard to the Water Services By-laws

Drakenstein Municipality needs to continue to focus on the adequate rehabilitation and the maintenance of their existing infrastructure; upgrading of their WTWs and WWTWs and all planning for new services should be guided by the Water and Sewer Master Plans. Water and sanitation services are currently effectively managed by Drakenstein Municipality.

Drakenstein Municipality got a comprehensive Performance Management System in place. The performance indicators as included in the SDBIP are regularly reviewed in order to promote a culture of performance management among its political structures, political office bearers and councillors and in its administration and administer its affairs in an economical, effective, efficient and accountable manner.

Drakenstein Municipality further adopted a Performance Management Framework, and is currently reviewing and updating the framework to make it a comprehensive Policy Framework, which will cover holistically the legal aspect of PMS as well as the implementation thereof.

Drakenstein Municipality will continue with their mentoring role for operational personnel ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operational personnel. Budgets need to be established to address the shortfall of skilled personnel, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff. With such a program a source of specific resources of skilled operational personnel, technicians and managers will be established.

In ensuring that the Municipality addresses challenges towards achieving organisational cohesion and effectiveness, the Municipality drafted a Human Resources Plan to ensure fair, efficient, effective and transparent personnel administration.

All critical vacant water and sanitation positions as indicated on the approved Organogram needs to be filled as soon as possible. Drakenstein Municipality needs to review the skills needed at each of the WTWs and WWTWs according to the classification of the plants and need to align resources to these needs as well as reviewing the total staff numbers necessary to meet all the objectives in the National Water Act.

Aligning the career paths to the occupational categories will assist the personnel to understand levels within across teams. Simplification of job titles to conform to respective occupational categories will assist in developing compatible and comparable career paths within the different Departments. Occupational categories will provide differentiation between levels. This approach will allow for more specific job designations in organograms with explicit career path connotations.

The training of Drakenstein Municipality's personnel involved in the management of water and sanitation services is the most important factor that determines the ability of Drakenstein Municipality to deliver safe and reliable water and to treat the effluent at the WWTWs to an acceptable standard. Training of all staff involved in water supply and sanitation services on matters related to treatment processes and quality monitoring and control is essential because their actions (or failure to act) will have a major impact on the well-being of the communities and the environment.

Drakenstein Municipality can also continue to actively focus on in-house training, which requires the identification of trainers (from senior operators / officers / professional ranks) for the development and facilitation of courses which relate to specific organizational knowledge and systems requirements. Drakenstein Municipality's internal reports such as the Water Safety Plans, Wastewater Risk Abatement Plans, Operation and Maintenance Manuals and this WSDP have the necessary information on which the in-house courses can be based. This will assist Drakenstein Municipality's Human Resource Department in general and the skills development facilitator in particular to develop and implement effective workplace skills plans relevant to Human Capacity Development requirements.



**Business Element 12: Social and Customer Service Requirements**

Table C.39 : Business Element 12: Social and Customer Service Requirements (Topic 12)					
Overview of Topic	Status Quo and Knowledge Interpretation Statistics			Future Plan Assessment	Strategy Assessment
This topic provides an overview of the quality of the water services provision function when considered from a customer perspective including the summary of the WSA's responsiveness to customer complaints and queries.	Item	Quality (%) assessment of current status against compliance requirements	Quantity (%) an indication of the representation of the total area to address the issue		
	Resources available to perform this function	Scores will be finalised once the new eWSDP website is rolled out by the DWS to all the WSAs and the Drakenstein Municipality's information is populated from this WSDP onto the website.			
	Attending to complaints for water				
	Attending to complaints for Sanitation: Discharge to treatment works				
	Attending to complaints for Sanitation: Pit/ tank pumping				
TOTAL for Topic					
Problem Definition Statements					
Nr	Statements - Short Comings	Possible Improvement / Project			
1	Drakenstein Municipality needs to continue to record and monitor on a monthly basis all critical water and sanitation stats (Number of complaints; pipe breakages; sewer blockages; meters tested, replaced and repaired; septic tanks pumped, etc.)	Ensure all water and sanitation stats are kept up to date and included in the Monthly Reports.			

Drakenstein Municipality is committed to maintain the existing high levels of customer service in their urban areas and to record all the necessary information for the WSDP on an annual basis. The present Customer Services and Complaints System adequately allow for the recording and management of all water and sanitation related complaints. The Municipality is committed to ensure that all water and sanitation related complaints are recorded and that the complaints are addressed within the prescribed time period.

Access to safe drinking water is essential to health and is human right. Safe drinking water that complies with the SANS:241 Drinking Water specifications do not pose a significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages. Drakenstein Municipality is therefore committed to ensure that their water quality always complies with national safety standards.

The Improvement / Upgrade Plan that forms a critical part of the Water Safety Plan was also updated as part of the updating of the Water Safety Plan. The purpose of the Improvement / Upgrade Plan is to address the existing significant risks where the existing controls were not effective or absent.

Barriers implemented by Drakenstein Municipality against contamination and deteriorating water quality include the following:

- Participate in catchment management and water source protection initiatives.
- Protection at points of abstraction such as river intakes and dams (Abstraction Management).
- Correct operation and maintenance of WTWs (Coagulation, flocculation, sedimentation and filtration). The Meulwater 8 Ml/d WTW (Paarl) was constructed in order for the Municipality to treat more water from their own water sources, which is available at a lower cost. The Municipality is also busy with the construction of the new 10 Ml/d Welvanpas WTW (Wellington).
- Protection and maintenance of the distribution system. This includes ensuring an adequate disinfectant residual at all times, rapid response to pipe bursts and other leaks, regular cleaning of reservoirs, keeping all delivery points tidy and clean, etc.



Three other important barriers implemented by Drakenstein Municipality against poor quality drinking water that are a prerequisite to those listed above are as follows:

- A well informed Council and municipal managers that understand the extreme importance of and are committed to providing adequate resources for continuous professional operation and maintenance of the water supply system.
- Competent managers and supervisors in the technical department who are responsible for water supply services lead by example and are passionate about monitoring and safeguarding drinking water quality.
- Well informed community members and other consumers of water supply services that know how to protect the water from becoming contaminated once it has been delivered, that have respect for water as a precious resource and that adhere to safe hygiene and sanitation practices.

SECTION D: WATER SERVICES OBJECTIVES AND STRATEGIES

The recommended objectives, strategies and projects for each of the WSDP Business Elements were also discussed under Section C “Water Services Existing Needs Perspective” of this WSDP-IDP Water Sector Input Report and are therefore not repeated under this Section D.

The water services objectives and strategies presented below are however a summary of the KPIs developed from the water services situational analysis as summarised under Section C “Water Services Existing Needs Perspective” and as taken from the Municipality’s approved SDBIP and presents the 5-year Water Services Objectives and Strategies as established in the WSA’s WSDP.



Table D.1: WSDP FY2017/18: Water Services Objectives and Strategies

Nr	Objective	Strategy	Key Performance Indicator	Baseline (FY2016/17 status quo)	WSDP Year 1		WSDP Year 2		WSDP Year 3		WSDP Year 4		WSDP Year 5	
					FY2017/18		FY2018/19		FY2019/20		FY2020/21		FY2021/22	
					Target		Target		Target		Target		Target	
WSDP Topic 4: Socio economic														
KPI063	The number of jobs created through the Municipality's local economic development initiatives including capital projects.		Number of job opportunities created by 30 June		1000		1250		1500		1750		2000	
KPI064	Develop and submit to MayCo a Draft Informal Economy Enhancement Strategy		Draft Informal Economy Enhancement Strategy developed and submitted to MayCo by 30 June		1		N/A		N/A		N/A		N/A	
KPI065	Update Indigent Register		% Of all qualifying indigent applications processed by 30 June		99%		99%		99%		99%		99%	
KPI066	Develop and submit to Council the Final Informal Economy Enhancement Strategy		Final Informal Economy Enhancement Strategy submitted to Council by 31 December		N/A		1		N/A		N/A		N/A	
KPI067	Implementation of the Informal Economy Enhancement Strategy		Number of Informal Economy Enhancement Initiatives Implemented by 30 June		N/A		1		2		2		2	
S10(b)	Provision of Free Basic Services		Report by 30 June on the % of households earning less than 2 x social grant plus 25% per month with access to free basic services.		1		1		1		1		1	
KPI068	Draft Integrated Economic Growth Strategy submitted to MayCo		Draft Integrated Economic Growth Strategy submitted to MayCo by 30 June		1		N/A		N/A		N/A		N/A	
KPI069	Finalise and submit to Council the Investment Incentive Policy		Finalised Investment Incentive Policy submitted to Council by 30 June		1		N/A		N/A		N/A		N/A	
KPI066	Conduct a Drakenstein wide Skills Development Survey		Skills Development Survey conducted by 30 June		N/A		1		N/A		N/A		N/A	
KPI067	Develop a Small Business Entrepreneurs Capacity Building Programme		Business Entrepreneurs Capacity Building Programme		1		N/A		N/A		N/A		N/A	
KPI068	Implementation of the Small Business Entrepreneurs Capacity Building Programme		Number of Business Entrepreneurs Capacity Building Initiatives Implemented by 30 June		N/A		2		2		2		2	
KPI069	Implementation of economic growth initiatives emanating from the Rural Development Strategy		Number of Initiatives Implemented by 30 June		N/A		1		1		1		1	
KPI089	Establishment of an Integrated Drakenstein Health Forum and report quarterly on the functionality to MayCo.		Number of reports submitted to MayCo by 30 June		4		4		4		4		4	
KPI090	Information sessions held with unregistered ECDs		Number of information sessions held with unregistered ECDs by 30 June		8		8		8		8		8	
KPI091	Establishment of a Drakenstein Youth Forum		Drakenstein Youth Forum established by 30 June		1		N/A		N/A		N/A		N/A	
KPI092	Provide low cost houses in terms of the Integrated Human Settlement Plan		Number of houses provided by 30 June		400		400		400		400		400	
WSDP Topic 5: Water Services Infrastructure														
(New)	Implement recommendations from detail WTW Technical Process Audits.		% Of recommendations, as Included in the WTW Process Audits. Implemented.		-		45% of recommendations Implemented		60% of recommendations Implemented		75% of recommendations Implemented		90% of recommendations Implemented	
(New)	Implement recommendations from detail WWTW Technical Process Audits.		% Of recommendations, as Included in the WWTW Process Audits. Implemented.		-		45% of recommendations Implemented		60% of recommendations Implemented		75% of recommendations Implemented		90% of recommendations Implemented	
(New)	Implement recommendations as included in the Improvement / Upgrade Plan of the Water Safety Plan		% Of recommendations, as included in the Improvement / Upgrade Plan of the Water Safety Plan. Implemented.		-		45% of recommendations Implemented		60% of recommendations Implemented		75% of recommendations Implemented		90% of recommendations Implemented	
(New)	Implement recommendations as included in the Improvement / Upgrade Plan of the W2RAP.		% Of recommendations, as included in the Improvement / Upgrade Plan of the W2RAP. Implemented.		-		45% of recommendations Implemented		60% of recommendations Implemented		75% of recommendations Implemented		90% of recommendations Implemented	
(New)	Up to date Asset Register		Ensure all water and sewerage infrastructure assets are included in the Asset Register, with accurate CRC, DRC, RUL and conditions of assets.		-		Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL and condition in the Asset Register are not correct.		Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL and condition in the Asset Register are not correct.		Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL and condition in the Asset Register are not correct.		Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL and condition in the Asset Register are not correct.	
(New)	Ensure adequate storage capacity		Ensure adequate storage capacity for all towns (At least 48hrs AADD)		-		All towns with storage capacity above 48 hrs AADD		All towns with storage capacity above 48 hrs AADD		All towns with storage capacity above 48 hrs AADD		All towns with storage capacity above 48 hrs AADD	

Table D.1: WSDP FY2017/18: Water Services Objectives and Strategies

Nr	Objective	Strategy	Key Performance Indicator	Baseline (FY2016/17 status quo)	WSDP Year 1	WSDP Year 2	WSDP Year 3	WSDP Year 4	WSDP Year 5
					FY2017/18	FY2018/19	FY2019/20	FY2020/21	FY2021/22
					Target	Target	Target	Target	Target
(New)	Implement projects included in the Water Master Plan and sewerage Infrastructure		Ensure adequate water pump station and water reticulation capacity.		-	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.
(New)	Implement projects included in the Sewer Master Plan		Ensure adequate sewer pump station and drainage network capacity.		-	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.
(New)	Ensure adequate budget for the replacement of old water and sewerage Infrastructure		Ensure a budget of at least 2% of the total value of the water and sewerage assets is allocated towards the replacement of existing infrastructure per annum.		-	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.
(New)	Ensure adequate budget for the O&M of the existing water and sewerage Infrastructure		Ensure a budget of at least 1% of the total value of the water and sewerage assets is allocated towards the annual O&M of the systems.		-	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.
WSDP Topic 6: Operation and Maintenance									
KPI035	Review of Standard Operating Procedures (SOPs) and service standards		Number of reviewed SOPs and service standards submitted to the Executive Manager by 30 June		20	20	20	20	20
(New)	Water quality managed and measured quarterly (to the SANIS241 physical and micro parameters).		% water quality compliance as per analysis certificate.		-	95% Compliance	95% Compliance	95% Compliance	95% Compliance
(New)	Wastewater quality managed and measured quarterly (to the required General or Special Limits		% of waste water quality compliance as per analysis certificate.		-	90% Compliance	90% Compliance	90% Compliance	90% Compliance
(New)	Proper water quality management		Achieve Blue Drop Status		-	Overall Blue Drop Score above 80%	Blue Drop Risk Rating of less than 30%	Overall Blue Drop Score above 90%	Blue Drop Risk Rating of less than 20%
(New)	Proper wastewater quality management		Achieve Green Drop Status		-	Green Drop Risk Rating of less than 50% for 3 of the 6	Overall Green Drop Score above 85%	Green Drop Risk Rating of less than 50% for 4 of the 6	Overall Green Drop Score above 90%
(New)	Proper water quality monitoring		Ensure that the Municipality's Water Quality Sampling Programmes comply with the minimum SANIS241:2011 monitoring frequency for process indicators.		-	100% Compliance	100% Compliance	100% Compliance	100% Compliance
(New)	Reporting on water quality and wastewater quality compliance percentages		Report at least annually on the percentage of water quality and wastewater quality compliance.		-				
(New)	Ensure proper process control at WTWs.		Ensure proper process control at all the WTWs. Ensure all forms (checks) as included in the O&M Manuals of the WTWs are implemented by the Process Controllers		-	70% Compliance	80% Compliance	90% Compliance	90% Compliance
(New)	Ensure proper process control at WWTWs.		Ensure proper process control at all the WWTWs. Ensure all forms (checks) as included in the O&M Manuals of the WWTWs are implemented by the Process Controllers		-	70% Compliance	80% Compliance	90% Compliance	90% Compliance



Table D.1: WSDP FY2017/18: Water Services Objectives and Strategies

Table D.1: WSDP FY2017/18: Water Services Objectives and Strategies													
Nr	Objective	Strategy	Key Performance Indicator	Baseline (FY2016/17 status quo)	WSDP Year 1 FY2017/18	WSDP Year 2 FY2018/19	WSDP Year 3 FY2019/20	WSDP Year 4 FY2020/21	WSDP Year 5 FY2021/22				
					Target	Target	Target	Target	Target				
WSDP Topic 7: Associated services													
					-	-	-	-	-				
WSDP Topic 8.1: Conservation and Demand management - Water Resource Management													
KPI044	Install smart / prepaid water meters		Number of prepaid water meters installed by 30 June		200	200	200	200	200				
KPI086	Develop a Implementation Plan for the management of Alien Vegetation on Municipal land		Alien Vegetation Plan developed by 30 June		1	N/A	N/A	N/A	N/A				
WSDP Topic 8.2 & 8.3: Conservation and Demand management - Water Balance													
8.3.1 (New)	Metering of all water usage		Ensure all bulk water is metered at source, at WTW (incoming and outgoing) and at all bulk storage reservoirs.	-		90% Compliance	95% Compliance	95% Compliance	100% Compliance				
8.3.2 (New)	Metering of all wastewater		Ensure all incoming flow and outgoing flow at WWTWs are metered, as well as final effluent re-used for irrigation purposes.	-		80% Compliance	85% Compliance	90% Compliance	100% Compliance				
WSDP Topic 9: Water Resources													
KPI083	Finalise and submit to MaCo the final Climate Change Adaptation Plan		Final Climate Change Adaptation Plan submitted to MaCo by 30 June		1	N/A	N/A	N/A	N/A				
9.1 (New)	All water sources are authorised.		% of Abstraction from sources registered and authorised by the DWS.	-		80% Compliance	100% Compliance	100% Compliance	100% Compliance				
9.2 (New)	Ensure adequate yield and allocations from water resources to meet the projected future water requirements.		Ensure adequate yield and allocations to meet the projected five year water requirements for all five areas.	-		100% Adequate supply to meet water requirements for all five areas	100% Adequate supply to meet water requirements for all five areas	100% Adequate supply to meet water requirements for all five areas	100% Adequate supply to meet water requirements for all five areas				
9.3 (New)	Monitoring of industrial consumers.		% Monitoring of effluent discharged by industrial consumers (Quantity and Quality) and charged according to the quality of effluent discharged by them.	-		80% Of all industrial Consumers monitored w.r.t. quality and quantity of effluent discharged by them	85% Of all industrial Consumers monitored w.r.t. quality and quantity of effluent discharged by them	90% Of all industrial Consumers monitored w.r.t. quality and quantity of effluent discharged by them	95% Of all industrial Consumers monitored w.r.t. quality and quantity of effluent discharged by them				
WSDP Topic 10: Financial profile													
KPI011	Raise / collect operating budget revenue as per approved budget		% Of total Operating Budget revenue raised / received by 30 June		98%	98%	98%	98%	98%				
KPI013	Spend Operating Budget expenditure as per approved Budget		% Of total Operating Budget expenditure spent by 30 June		95%	95%	95%	95%	95%				
KPI014	Submit the Financial Plan for inclusion in the IDP for approval by Council by 30 April (Draft) and by 31 May		Financial Plan approved by Council by 30 April and 31 May		2	2	2	2	2				
KPI017	Spent at least 96% of the approved Capital Budget for the Municipality by 30 June		% Of approved Capital Budget spent for the Municipality by 30 June		96%	96%	96%	96%	96%				
KPI019	Compile a GRAP Compliant Fixed Asset Register		Completion of a GRAP Compliant Fixed Asset Register as at 30 June		1	1	1	1	1				
KPI020	Collect all billed revenue to ensure that sufficient cash is generated to meet Drakenstein's debt and operating commitments.		Net Debtors Days Ratio ((Gross Debtors - Bad Debt Provision) / (Billed Revenue)) x 365		50	48	47	46	45				
KPI023	Financial viability measured in terms of the available cash to cover fixed operating expenditure		Report on the Cost coverage ratio ((Available cash + investments) / (Monthly fixed operating		1	1	1	1	1				
KPI024	Financial viability measured in terms of the Municipality's ability to meet its service debt obligations.		Report on the Debt coverage ratio ((Total operating revenue - operating grants received) / (Debt service payments due within the year))		1	1	1	1	1				
KPI025	Financial viability measured in terms of the outstanding service debtors.		Report on the Service debtors to revenue ratio - (Total outstanding service debtors / revenue received for services)		1	1	1	1	1				
KPI042	Implement all Water Services Infrastructure capital projects measured quarterly in terms of the approved Capital Budget spent.		% Of approved Capital Budget spent by 30 June		96%	96%	96%	96%	96%				

Table D.1: WSDP FY2017/18: Water Services Objectives and Strategies

Nr	Objective	Strategy	Key Performance Indicator	Baseline (FY2016/17 status quo)	WSDP Year 1		WSDP Year 2		WSDP Year 3		WSDP Year 4		WSDP Year 5	
					FY2017/18		FY2018/19		FY2019/20		FY2020/21		FY2021/22	
					Target		Target		Target		Target		Target	
KP1043	Implement all Waste Water Services Infrastructure capital projects measured quarterly in terms of the approved Capital Budget spent.		% Of approved Capital Budget spent by 30 June		96%		96%		96%		96%		96%	
(New)	Review tariffs charge for sewerage services.		Investigate the possibility of linking the sewerage tariffs to the volume of water use. Volumetric usage, whereby charges are determined according to water usage with maximum ceilings and charged accordingly.											
Targets to be set by other Department														
WSDP Topic 11: Institutional Arrangements profile														
KP1006	Review policies and by-laws		% Of policies and by-laws reviewed by 30 June		100%		100%		100%		100%		100%	
KP1027	Spent the training budget to develop the skills of staff (Actual amount spent on training / total budget allocated for training)		% Of training budget spent by 30 June		85%		85%		85%		85%		85%	
KP1030	Submit the Mid-year 572 report to the Mayor		Number of mid-year reports submitted to the Mayor by 25 January		1		1		1		1		1	
KP1031	Performance management assessments held		Number of performance management assessments conducted by 30 June		2		2		2		2		2	
(New)	Ensure adequate Process Controllers at the WTWs		% Compliance w.r.t the number of existing Process Controllers at the WTWs and the required number of Process Controllers		-		60 % Of plants meeting the requirements, w.r.t. the number of Process Controllers per shift.		70 % Of plants meeting the requirements, w.r.t. the number of Process Controllers per shift.		80 % Of plants meeting the requirements, w.r.t. the number of Process Controllers per shift.		90 % Of plants meeting the requirements, w.r.t. the number of Process Controllers per shift.	
(New)	Ensure adequate Process Controllers at the WWTWs		% Compliance w.r.t the number of existing Process Controllers at the WWTWs and the required number of Process Controllers		-		60 % Of plants meeting the requirements, w.r.t. the number of Process Controllers per shift.		70 % Of plants meeting the requirements, w.r.t. the number of Process Controllers per shift.		80 % Of plants meeting the requirements, w.r.t. the number of Process Controllers per shift.		90 % Of plants meeting the requirements, w.r.t. the number of Process Controllers per shift.	
WSDP Topic 12: Social and Customer service requirements														
KP1003	Attend to formal public complaints received by Ombudsman		% Of complaints attended to within 30 days of receipt		100%		100%		100%		100%		100%	

SECTION E: WATER SERVICES MTEF PROJECTS

The Water Services Medium-Term Expenditure Framework (MTEF) projects are presented below and outline the water services projects which are funded for implementation within the next three years. Table E.2a provides the projects identified for implementation in FY2017/18, Table E.2b provides the projects identified for implementation in FY 2018/19 and Table E.2c provides the projects identified for implementation in FY2019/20. The table below gives an overview of the water services projects, as included in the MTEF.

Table E.1: Summary of MTEF Projects								
Project Main Category	FY2017/18		FY2018/19		FY2019/20		MTEF Total	
	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)
Water Projects	28	R116,793	18	R90,291	22	R75,646	39	R282,730
Sewerage Projects	11	R250,992	12	R100,771	6	R41,980	15	R393,744
Combined Water & Sewerage Projects	39	R367,785	30	R191,063	28	R117,626	54	R676,474

Table E.2a: Water Services MTEF Projects - FY2017/18 (1<sup>st</sup> year MTEF period)

Nr	Project Reference Number	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Prev spent FY2015/16	Project Budget / Funding Sources						Total Cost	MTEF Project Source	
									FY2017/18								
									Own (RR)	MIG	RBIG	ACIP	DR	MWVG			Other (Rans)
1. Infrastructure Projects																	
1.1	71566449026614PZ211	11 Mt Newton Reservoirs & Pump Station	New reservoir and pump station for Newton	Storage Capacity	Water	Bulk	Reservoir and Pump Station	R0	R328,172						R5,549	R11,128	Water Master Plan
1.2	71566449026614PZ211	Water supply to Newton / Mbekweni / Van Walsveld	Water reticulation for Newton / Mbekweni / Van Walsveld	Water Requirement	Water	Internal Reticulation	Reticulation		R11,128	R1,279					R500		Water Master Plan
1.3	71566449026614PZ211	Weivampas WTW and Our Buildings	Upgrade of Weivampas WTW	Utilize own water resources and water quality	Water	Bulk	WTW		R21,396	R4,081					R17,255		WTW Process Audits and Water Resource Study
1.4	71566449026614PZ211	Replacement of Strawberry King Bulk Water Pipe Line	Replace existing bulk water pipeline (increase capacity)	Bulk water requirement	Water	Bulk	Bulk Pipeline		R11,061	R5,772					R5,289		Water Master Plan
1.5	71564	Upgrade of Spuit River - Weivampas bulk water pipe (400mm dia.)	Upgrade bulk water pipeline	Water Requirement	Water	Bulk	Bulk Pipeline		R1,500	R1,500							Water Master Plan
1.6	71566449026614WZ211	Extension of Basic Services: Informal Settlements	Provide communal services in informal areas	Provide basic communal services	Water	Internal	Reticulation		R1,500	R1,500							Survey of Service Levels in Informal Areas
1.7	71566449026614PZ211	Water Connections for Housing Schemes	Provide water connections for Housing Schemes	Housing Delivery	Water	Internal	Reticulation		R165	R165							Housing Pipeline
1.8	71566449026614PZ211	Upgrade WTW: Melwater	Upgrade WTW	Water Quality	Water	Bulk	WTW		R6,500						R6,500		WTW Process Audits
1.9	71566449026614PZ211	8 Mt Gourma Reservoir X2 Plus Bulk Supply Pipelines	New Gourma Reservoirs and bulk pipelines	Storage Capacity and Bulk Pipeline Capacity	Water	Bulk	Reservoir and Bulk Pipeline		R18,500						R18,500		Water Master Plan
1.10	71586449026614PZ211	Simondium: Upgrade of bulk water supply (BM reservoir and booster pumps)	Reservoir and booster pumps	Storage Capacity and Water Requirement	Water	Bulk	Reservoir and Booster Pumps		R1,150						R1,150		Water Master Plan
1.11	7158	Drakenstein Rural Area: Ronge Project	Water reticulation for rural area	Water Requirement	Water	Internal Reticulation	Reticulation		R6,850						R6,850		Water Master Plan
1.12	71586449026614PZ211	Windmeul / Slot Van Die Paarl: New Reservoir & Pipeline	New reservoir and bulk pipeline	Storage Capacity and Bulk Pipeline Capacity	Water	Bulk	Reservoir and Bulk Pipeline		R740						R740		Water Master Plan
1.13	7158	Central Simondium pipeline 400mm dia.	Upgrade bulk water pipeline	Water Requirement	Water	Bulk	Bulk Pipeline		R450	R450					R450		Water Master Plan
1.14	7158	New 5 Mt Pearl Valley - Safariland reservoir and bulk pipeline	New Pearl Valley - Safariland reservoir and bulk pipeline	Storage Capacity and Bulk Pipeline Capacity	Water	Bulk	Reservoir and Bulk Pipeline		R650	R650					R650		Water Master Plan
1.15	7158	New water depot at Laron	Water depot	Other	Water	Other	Other		R500	R500					R500		Water Master Plan
1.16	72064494266113CZ211	Upgrade and extensions to Paarl WWTW	Upgrade and extensions to Paarl WWTW	Treatment capacity	Sanitation	Bulk	WWTW		R76,352						R76,352		WWTW Process Audits
1.17	72064494266113CZ211	Wellington WWTW: Rehabilitation and Extension	Rehabilitation and extension of WWTW	Treatment capacity	Sanitation	Bulk	WWTW		R151,083	R9,064					R141,968		WWTW Process Audits
1.18	72466449026614PZ211	Viakeland Housing Project Bulk Sewer	Increase bulk sewer pipeline capacity	Waterborne Sanitation	Sanitation	Bulk	Bulk Pipeline		R7,655						R7,655		Sewer Master Plan
1.19	72466449026614PZ211	Upgrade Bulk Sewer: Southern Paarl (Phase 3 & 4)	Increase bulk sewer pipelines capacity	Waterborne Sanitation	Sanitation	Bulk	Bulk Pipeline		R6,800						R6,800		Sewer Master Plan
1.20	72466449026614PZ211	New Bulk Sewer Simondium (Paarl Valley Pump Station Included)	Install bulk sewer pipeline	Waterborne Sanitation	Sanitation	Bulk	Bulk Pipeline		R3,108						R3,108		Sewer Master Plan
1.21	72466449026614PZ211	Minimum Basic Services to Informal Settlements	Provide communal services in informal areas	Provide basic communal services	Sanitation	Internal	Drainage Network		R700						R700		Survey of Service Levels in Informal Areas
									R0						R0		





Table E.2b: Water Services MTEF Projects - FY2018/19 (2nd year MTEF period)

Nr	Project Reference Number	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Prev spent FY2015/16	Project Budget / Funding Sources							MTEF Project Source	
									Own (Rm)	FY2018/19							Total Cost
										Budget	MIG	RBIG	ACIP	DR	MW/G		
1. Infrastructure Projects																	
1.1	71564640261139Z11	Water supply to Newton / Mbekeeni / Van Wyksdal	Water reticulation for Newton / Mbekeeni / Van Wyksdal	Water Requirement	Water	Internal Reticulation	Reticulation										R144,083
1.2	7156464026114VZ11	Replacement of Strawberry King Bulk Water Pipe Line	Replace existing bulk water pipeline (Increase capacity)	Bulk water requirement	Water	Bulk	Bulk Pipeline										
1.3	7156644928114WZ11	Extension of Basic Services: Informal Settlements	Provide communal services in informal areas	Provide basic communal services	Water	Internal	Reticulation										
1.4	71566449281154Z11	Water Connections for Housing Schemes	Provide water connections for Housing Schemes	Housing Delivery	Water	Internal	Reticulation										
1.5	7156644928114PZ11	8 Mil Courtni Reservoir X 2 Plus Bulk Supply Pipelines	New Courtni Reservoir and bulk pipeline	Storage Capacity and Bulk Pipeline Capacity	Water	Bulk	Reservoir and Bulk Pipeline										
1.6		Replacement of Booster pipeline from Yteibug to Veldside	Replace existing bulk water pipeline (Increase capacity)	Bulk water requirement	Water	Bulk	Bulk Pipeline										
1.7		Simondium: Upgrade of bulk water supply (3Ml reservoir and booster pumps)	Reservoir and booster pumps	Storage Capacity and Water Requirement	Water	Bulk	Reservoir and Booster Pumps										
1.8	7158	Drakenstein Rural Area: Roma Project	Water reticulation for rural area	Water Requirement	Water	Internal Reticulation	Reticulation										
1.9	7156644926114PZ11	Upgrade of Bulk Water Supply (3Ml Reservoir & Bulk Pipeline)	New reservoir and bulk pipeline	Storage Capacity and Bulk Pipeline Capacity	Water	Bulk	Reservoir and Bulk Pipeline										
1.10	7206449428113CZ11	Upgrade and extensions to Paarl WWTW	Upgrade and extensions to WWWTW	Treatment capacity	Sanitation	Bulk	WWWTW										
1.11	7206449428113CZ11	Upgrade Gouda WWWTW	Upgrade and extensions to WWWTW	Treatment capacity	Sanitation	Bulk	WWWTW										
1.12	72064494281154Z11	Pump Station & New Rising Main (Pentz Street)	Pump station and rising main in Pentz Street	Waterborne Sanitation	Sanitation	Bulk	Waterborne Sanitation and Rising										
	7206449428113CZ11	Wellington WWWTW: Rehabilitation and Extension	Rehabilitation and extension of WWWTW	Treatment capacity	Sanitation	Bulk	WWWTW										
1.13	7206449428113CZ11	Windrows for Sludge Management	Sludge Management	Treatment capacity	Sanitation	Bulk	WWWTW										
1.14	7206449428122Z11	New Bulk Sewer Simondium (Pearl Valley Pump Station included)	Install bulk sewer pipeline	Waterborne Sanitation	Sanitation	Bulk	Bulk Pipeline										
1.15	72666449281158Z11	Minimum Basic Services to Informal Settlements	Provide communal services in informal areas	Provide basic communal services	Sanitation	Internal	Drainage Network										
1.16	72666449281157Z11																

Table E.2b: Water Services MTEF Projects - FY2018/19 (2nd year MTEF period)

Nr	Project Reference Number	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub-Category	Component type	Prev FY2015/16	Project Budget / Funding Sources							MTEF Project Source	
									FY2018/19								Total Cost
									Own (Cn)	MIG	RBG	AOP	DR	MWIC	Other (Loan)		
2. Source Development Projects																	
2.1.	7158644902P6114PZ211 7158	Saron: Bulk Storage and WTW	Raw water storage dam for Saron and upgrade existing WTW drainage network	Water Requirement and Water Quality	Water	Bulk	Sources & WTW	RD	R20,536		R4,385					R20,536	Water Resource Study
3. Demand Management projects																	
3.1.	7156644902L6114WZ11	Industrial Water Connections Wellington	Provide bulk water meters for industrial connections	Ensure all industrial connections are metered	Water	Internal	Water Meters		R1,000							R1,000	Water Meter Audit
3.2.	7156644902F6114WZ11	Industrial Water Connections Pearl	Provide bulk water meters for industrial connections	Ensure all industrial connections are metered	Water	Internal	Water Meters		R1,000							R1,000	Water Meter Audit
4. O&M Commitments																	
Operations																	
4.1.	7206449040E61154Z211	Security Measures for Sewerage Pump Stations	Implement security measures at sewer pump stations	Security at sewer pump stations	Sanitation	Bulk	Pump Stations		R24,464							R24,464	Security
4.2.	720644904H1F3JZ211	Construction of Manholes (Ou-Dorp Saron)	Install manholes for sewer drainage network	Waterborne Sanitation	Sanitation	Internal	Drainage Network		R100							R100	Operations
Maintenance																	
4.3.	7156644902G6111XZ11	Replace / Upgrade Water Retention System	Upgrade water retention network	Water requirement	Water	Internal Retention	Retention		R4,400							R4,400	Water Master Plan
4.4.	7156644902L11E9MZ11	Upgrade / Replace Loggers (Telemetry Systems)	Upgrade Telemetry Systems	Management	Water	Internal Retention	Other		R55							R55	Water Master Plan
4.5.	7156644902E6111XZ11	Replace / Upgrade Water Retention System	Upgrade water retention network	Water requirement	Water	Internal Retention	Retention		R6,000							R6,000	Water Master Plan
4.6.	7156644902G6119Y211	Replacement of Controllers / Loggers	Upgrade Telemetry Systems	Management	Water	Internal Retention	Other		R250							R250	Water Master Plan
4.7.	7156644902H6111VZ11	Replacement of Valves on Wemmenhoek Bulk Supply Line	Replace valves on Wemmenhoek bulk water pipeline	Refurbishment	Water	Bulk	Bulk Pipeline		R450							R450	Water Master Plan
4.8.	7158	Saron: Bulk water pipe replacement	Replace bulk water pipe	Water requirement and refurbishment	Water	Bulk	Bulk Pipeline		R2,000							R2,000	Water Resource Study
4.9.	720644904F6131JZ11	Replace / Upgrade Sewerage Systems	Replace / Upgrade sewer drainage networks	Refurbishment and waterborne sanitation	Sanitation	Internal	Drainage Network		R8,959							R8,959	Sewer Master Plan
4.10.	720644905G6131JZ11	Replace / Upgrade Midlock Sewer Systems	Replace / Upgrade sewer drainage networks	Refurbishment and waterborne sanitation	Sanitation	Internal	Drainage Network		R400							R400	Sewer Master Plan
4.11.	720644904J11F56Z11	Replace Sewerage Pumps (Drikenstein)	Replace sewerage pumps	Refurbishment	Sanitation	Internal	Pump Stations		R700							R700	Refurbishment
5. Institutional																	
RD																	
RD																	
6. Water Services Programmes																	
Awareness Programs																	
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Table E.2c: Water Services MTEF Projects - FY2019/20 (3<sup>rd</sup> year MTEF period)

Nr	Project Reference Number	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources							MTEF Project Source		
								Prev spent FY2015/16	FY2019/20							Total Cost	
									Budget	Own (CRs)	MIG	MBG	ACIP	DR			MWIS
1. Infrastructure Projects																	
1.1	71586449026114WZ211	New Perdesteen Water Scheme, Wellington	Provide water reticulation network	Water requirement	Water	Internal Reticulation	Reticulation	RD	R66,176						R66,176	Water Master Plan	
1.2	715464406216119Z211	Water supply to Newton / Mbekweni / Van Witsiel	Water reticulation for Newton / Mbekweni / Van Witsiel	Water Requirement	Water	Internal Reticulation	Reticulation		R2,000						R2,000	Water Master Plan	
1.3	71546449027321VZ211	Replacement of Strawberry King Bulk Water Pipe Line	Replace existing bulk water pipeline (increase capacity)	Bulk water requirement	Water	Bulk	Bulk Pipeline		88,772		R8,772					88,772	Water Master Plan
1.4	7156644902611E4WZ211	Extension of Basic Services: Informal Settlements	Provide communal services in informal areas	Provide basic communal services	Water	Internal	Reticulation		R700	R700						R700	Survey of Service Levels in Informal Areas
1.5	7156644903911E4Z2211	Water Connections for Housing Schemes	Provide water connections for Housing Schemes	Housing Delivery	Water	Internal	Reticulation		R170	R170						R170	Housing Pipeline
1.6		Replacement of Booster pipeline from Yserberg to Victoria	Replace existing bulk water pipeline (increase capacity)	Bulk water requirement	Water	Bulk	Bulk Pipeline		R7,650							R7,650	Water Master Plan
1.7		Bainstloof Filters and Pump Line	Upgrade filter in pump line	Water requirement	Water	Bulk	WWTW and Bulk Pipeline		R204							R204	Water Master Plan
1.8	715864406216113Z2211	Simondium: Upgrade of bulk water supply (SM Reservoir and booster pumps)	Reservoir and booster pumps	Storage Capacity and Water Requirement	Water	Bulk	Reservoir and Booster Pumps Reticulation		R5,500		R4,500					R1,000	Water Master Plan
1.9	7158	Drakensberg Rural Area: Rorwe Project	Water reticulation for rural area	Water Requirement	Water	Internal Reticulation	Reticulation		R2,000							R2,000	Water Master Plan
1.10	7206449406113Z2211	Upgrade and extensions to Paarl WWTW	Upgrade and extensions to WWTW	Treatment capacity	Sanitation	Bulk	WWTW		R12,341							R12,341	WWTW Process Audits
1.11	724664490261158Z211	New Bulk Sewer Simondium (Pearl Valley Pump Station Included)	Install bulk sewer pipeline	Waterborne Sanitation	Sanitation	Bulk	Bulk Pipeline		R24,140		R4,500					R19,640	Sewer Master Plan
1.12	72466449406115Z2211	Minimum Basic Services to Informal Settlements	Provide communal services in informal areas	Provide basic communal services	Sanitation	Internal	Drainage Network		R700							R700	Survey of Service Levels in Informal Areas





## SECTION F: WSDP PROJECTS

The identification of projects necessary to ensure the provision of adequate levels of water and sanitation services is based primarily on the findings of the Water and Sewer Master Plans. Master Planning is typically based on a forward planning horizon of 20 years, but is usually updated every three to five years, taking into account improved water demand estimates and subsequent infrastructure developments which may have taken place. The recommended projects from the 2017 Master Plans were incorporated into the WSDP.

The Master Plans represent the ideal infrastructure development required to meet projected water demands over the next few years, while realistic capital investment in infrastructure projects is determined by budget availability. As a result, prioritization of projects is necessary to identify what can be done within the available and projected budget constraints. The prioritization of projects is done through the IDP and annual budget planning process. Recommended infrastructure projects for implementation in the future will be based on the following plans and processes:

- Water and Sewer Master Plans for the internal water reticulation and sewer drainage networks and Water and Waste Water Treatment Works Master Plans and Process Audits.
- Infrastructure replacement needs (Asset Register)
- Budget proposals
- Asset Management Plans

Drakenstein Municipality's key capital water and sewerage infrastructure projects for the next three years are as follows:

- New Perdeskoe Water Scheme, Wellington
- Replace / Upgrade of the Water Reticulation Networks and Sewer Drainage Networks.
- Replacement of the Strawberry King and Upper Long Street bulk water pipelines
- New 700mm dia. Leliefontein – Wellington bulk water pipeline
- New Berg en Dal, Courtrai and Blouville Reservoirs
- Replacement of the booster pipeline from Ysterbrug water pump station.
- Upgrade bulk water supply to Simondium
- Saron bulk water storage, water treatment and replacement of bulk water pipeline.
- Upgrade and extensions to the Paarl and Wellington WWTWs
- New Southern Paarl WWTW
- New bulk sewer pipeline for Simondium

The new NWRS 2 list the following steps to raise the water profile in development planning:

- Water must be placed at the centre of integrated planning and decision-making, with a specific aim to respond to and support the achievement of national development and sector goals.
- Current budgets need to adequately provide for water, which might mean they have to be doubled to cater for the present needs.
- Current financial values need to appreciate water as a scarce resource and should thus reflect the real value of water. This requires a new value system across all sectors and stakeholders.
- Water efficiency and curbing water losses should be high on the agenda of each individual and institution in the country.
- Water management must be formally embedded in the sector businesses with associated accountability.

The DWS will insist in the future that all water infrastructure which they fund is value engineered against the life-cycle cost with a specific emphasis on energy costs. Evidence will be required that the technical design is appropriate for the nature of the resource and that operation and maintenance of the assets is reasonably within the capability of the responsible institution. New water resources infrastructure will also not be developed or authorized unless effective WC/WDM interventions have been put in place in the affected area.

The recommended implementation strategies, with regard to new water and sewerage infrastructure, are as follows:

- Take the recommended projects, as identified through the Water and Sewer Master Plans and the WSDP, into account during the planning and prioritization process for new infrastructure. Prioritize from the desired list, those items which can be implemented from available funding in the particular financial year.
- Undertake revised master planning at least every two to three years and use the Master Plans to list the desired infrastructure development requirements and reflect these in the IDP.
- Ensure adequate funds are allocated on an annual basis towards the rehabilitation and maintenance of the existing water and sewerage infrastructure.
- To adopt appropriate technology solutions for the water and sewerage infrastructure challenges. Techniques such as value engineering should also be adopted to ensure that investments in infrastructure and other solutions are cost effective over the full life-cycle and designed to be fit for purpose.
- To ensure adequate funding for the full lifecycle cost of the new water and sewerage infrastructure, which will include funds for the operation and maintenance of the infrastructure and regular refurbishment.
- Give attention to the provision of basic water and sanitation services in the rural areas, once clear National Policy guidelines are available.
- Assign a high priority to the implementation of Drakenstein Municipality's WC/WDM Strategy (Demand Management) in order to postpone additional capital investment for as long as possible, both from the water availability perspective as well as from the treatment of increased effluent volumes. The costs of physical water loss, the capital requirements for new water resources infrastructure, and the constraints of poor water availability on water dependent economic growth means that WC/WDM is a critical management priority for stretching the financial resources of the Municipality. WC/WDM is almost always a more cost-effective solution than the implementation of new infrastructure, and no new infrastructure should be developed until unauthorized water has been reduced to manageable volumes.
- Balance land-use and development planning (SDFs and Growth Management Strategy) in accordance with the availability of water and the capacity of WTWs and WWTWs that are in place or that will be implemented.

The current needs projects are estimated at R689.619 million of which 98% are funded, as included in the MTEF project list. It should however be emphasised that additional funding will be required to address the full achievement of the water services strategies as outlined in Sections C and D, but that the extent of such additional funding can only be determined, once initial investigations and activities have been concluded.

Table F.1: WSDP FY2017/18: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Project Number	Project Title	Project Cost R'000	Does this current listed project address the problem totally?	Approved by Council, to project database and part of 5 year IDP cycle projects?	Project listed in 5yr MTEF - cycle?
CURRENT NEEDS										
Water Services Development Planning										
1.1	WSDP Performance and Water Services Audit Report needs to be drafted annually	Complete annual WSDP Performance and Water Services Audit Report	WSDP	Yes	O&M	Complete annual WSDP Performance and Water Services Audit Report	R175	Yes	Yes	Yes
1.2	Regular updating of WSDP	Update WSDP every two to three years	WSDP	Yes	O&M	Regular updating of WSDP	R400	Yes	Yes	Yes
Business Element 2: Demographics (Topic 2)										
Done by other Department										
Business Element 3: Service Levels (Topic 3)										
3.1	Not all townships are supplied with adequate basic water services (25hr/ communal tap)	Provide communal water services in informal areas	MTEF Project	Yes	715664490286114WZ211	Extension of Basic Services: Informal Settlements	R2,900	No	Yes	Yes
3.2	New developments not yet supplied with water services	Provide water services to all households	MTEF Project	Yes	71566449029114VZ211	Water Connections for Housing Schemes	R900	No	Yes	Yes
3.3	Some existing communal services need to be replaced.	Provide communal water services in informal areas	MTEF Project	Yes	7156	Extension of Basic Services: Informal Settlements - Replace Existing	R900	No	Yes	Yes
3.4	Not all households are supplied with adequate basic sanitation services (5hr/ communal toilet)	Provide communal sanitation services in informal areas	MTEF Project	Yes	724664490246115VZ211	Minimum Basic Services to Informal Settlements	R2,100	No	Yes	Yes
3.5	Some households on the farms without basic water services.	Ensure all households on farms are provided with at least basic water services, subject to DWS guidance.	WSDP	No	WSDP	Provide basic water services on the farms in the rural areas without basic water services.	R2,376	Yes	No	No
3.6	Some households on the farms without basic sanitation services.	Ensure all households on farms are provided with at least basic sanitation services, subject to DWS guidance.	WSDP	No	WSDP	Provide basic sanitation services on the farms in the rural areas without basic sanitation services.	R9,744	Yes	No	No
Business Element 4: Socio-Economic Background (Topic 4)										
Done by other Dept. Council										
Business Element 5: Water Services Infrastructure Management (Topic 5)										
5.1	Inadequate reservoir storage capacity and pump capacity	Provide additional storage capacity and pump capacity for the Newton area	MTEF Project	Yes	715664490206114PZ211	11 ML Newton Reservoirs & Pump Station	R11,128	Yes	Yes	Yes
5.2	Perdetstoon area not yet supplied with adequate water services	Provide water services to all households	MTEF Project	Yes	715664490246114VZ211	New Perdetstoon Water Scheme, Wellington	R2,000	No	Yes	Yes
5.3	Capacity of existing water reticulation network is inadequate	Provide water services to all households	MTEF Project	Yes	7156644902961139Z211	Upgrade BRB Water Services	R9,516	Yes	Yes	Yes
5.4	New developments not yet supplied with water services	Provide water services to all households	MTEF Project	Yes	7156644062161139Z211	Water Supply to Newton / Mshkweni / Van Wyksvlei	R3,500	No	Yes	Yes
5.5	Regular pipe bursts in certain sections of the reticulation network and inadequate capacity	Implement pipeline replacement programme	MTEF Project	Yes	715664490286111VZ211	Replace / Upgrade Water Reticulation System	R19,650	No	Yes	Yes
5.6	Capacity of WTW is inadequate to fully utilise supply from the Municipality's own resources.	Fully utilise the own water resources and increase WTW capacity to comply with water quality requirements.	MTEF Project	Yes	715664490236114OZ211	Welwapsa WTW & Out Buildings	R21,396	Yes	Yes	Yes
5.7	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	MTEF Project	Yes	715664490246111VZ211	Replacement of Strawberry King Bulk Water Pipeline	R30,926	No	Yes	Yes
5.8	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	MTEF Project	Yes	7154	Upgrade of Spruit River - Welwapsa bulk water pipe (400mm dia.)	R1,500	No	Yes	Yes
5.9	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	MTEF Project	Yes		Replace pipeline from Bulksant to Bosch Street	R7,500	No	Yes	Yes
5.10	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	MTEF Project	Yes	7156	Upgrade of BRB North to Dual Centralway	R1,195	Yes	Yes	Yes
5.11	Sections of the existing WTW need to be upgraded.	Ensure adequate water treatment capacity and compliance with water quality requirements.	MTEF Project	Yes	715664490246113VZ211	Upgrade WTW: Mshkweni	R6,500	Yes	Yes	Yes
5.12	Inadequate reservoir storage capacity and bulk pipeline capacity	Provide additional storage capacity and ensure adequate bulk pipeline capacity.	MTEF Project	Yes	715664490286114PZ211	8 ML Courtral Reservoir: X 2 Plus Bulk Supply Pipelines	R26,000	Yes	Yes	Yes
5.13	Capacity of existing bulk water pipeline is inadequate	Ensure adequate bulk pipeline capacity	MTEF Project	Yes	715664490206111VZ211	Replacement of Upper Long Street Bulk Water Pipeline	R14,829	Yes	Yes	Yes
5.14	Capacity of existing rising main is inadequate for supply from Vredenburg station to Victoria Park	Ensure adequate bulk pipeline capacity	MTEF Project	Yes		Replacement of Booster Pipe Line from Ysterburg to Victoria	R12,150	No	Yes	Yes
5.15	Capacity of existing water reticulation network is inadequate and sections of the network is set old	Implement pipeline replacement programme	MTEF Project	Yes	715664490286111VZ211	Replace / Upgrade Water Reticulation System	R20,000	No	Yes	Yes
5.16	Capacities of existing pump line and filter are inadequate.	Ensure adequate bulk pipeline capacity and treatment capacity.	MTEF Project	Yes		Balmskloof Filters and Pump Line	R204	Yes	Yes	Yes



Table F.1: WSDP FY2017/18: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Project Number	Project Title	Existing Projects Information		Project Cost R'000	Does this current listed project address the problem totally?	Approved by Council, In project database and part of 5 year IDP or MTEF - cycle?	Project listed in project database for MTEF - cycle?
CURRENT NEEDS												
5.17	Inadequate reservoir storage capacity and pump capacity for Simondium.	Provide additional storage capacity and pump capacity for Simondium.	MTEF Project	Yes	7158644062061131ZJ11	Simondium: Upgrade of Bulk Water Supply (BML Reservoir & Booster Pumps)			R8,536	No	Yes	Yes
5.18	Some households in the rural areas not yet supplied with water.	Provide water services to all households	MTEF Project	Yes	7158	Drakenstein Rural Areas: Rongwe Project			R12,737	No	Yes	Yes
5.19	Inadequate reservoir storage capacity and bulk pipeline capacity.	Provide additional storage capacity and ensure adequate bulk pipeline capacity.	MTEF Project	Yes	7158644902061149ZJ11	Windmeul / Slot Van Die Paarl: New Reservoir & Pipeline			R23,190	No	Yes	Yes
5.20	Capacity of existing bulk water pipeline is inadequate	Ensure adequate bulk pipeline capacity	MTEF Project	Yes	7158	Courtral - Simondium pipeline 400mm dia.			R450	No	Yes	Yes
5.21	Existing storage capacity and bulk water pipeline capacity are inadequate.	Ensure adequate storage capacity and bulk pipeline capacity	MTEF Project	Yes	7158	New 5Ml Paarl Valley - Safe-riland reservoir and bulk pipeline			R650	No	Yes	Yes
5.22	Water Depot needs to be upgraded	Ensure adequate working conditions	MTEF Project	Yes	7158	New Water Depot at Saron			R500	No	Yes	Yes
5.23	Sections of the existing WWTW need to be refurbished and upgraded to comply with future capacity requirements and effluent quality standards.	Refurbishment and upgrade to comply with effluent quality standards.	MTEF Project	Yes	7220644942061122ZJ11 722064494206113CZJ11	Upgrade And Extensions to Paarl WWTW			R123,244	No	Yes	Yes
5.24	Sections of the existing WWTW need to be refurbished and upgraded to comply with future capacity requirements and effluent quality standards.	Refurbishment and upgrade to comply with effluent quality standards.	MTEF Project	Yes	722064494216113CZJ11	Upgrade WWTW Gouda			R200	No	Yes	Yes
5.25	Capacity of existing pump station and rising main is inadequate to meet future requirements.	Ensure adequate pump station capacity and bulk sewer rising main capacity.	MTEF Project	Yes	722064494216113CZJ11	Pump Station & New Rising Main (Pentz Street)			R500	No	Yes	Yes
5.26	Capacity of existing WWTW is inadequate and quality of final effluent does not comply with required standards.	Upgrade capacity of WWTW in order to meet future requirements and ensure quality of final effluent comply with required standards.	MTEF Project	Yes	722064494236113CZJ11 722064494283CZJ11 722064494283CZJ11	Wellington WWTW: Rehabilitation & Extension			R172,799	Yes	Yes	Yes
5.27	Improvement of sludge management required	Ensure adequate sludge management	MTEF Project	Yes	7246644942061158ZJ11	Windrows for sludge management			R1,500	No	Yes	Yes
5.28	Bulk sewer pipeline is required for new Vlakkeland Housing Project	Ensure adequate bulk sewer pipeline capacity	MTEF Project	Yes	7246644942061158ZJ11	Vlakkeland Housing Project Bulk Sewer			R7,655	No	Yes	Yes
5.29	Capacity of existing bulk sewer pipelines is inadequate	Ensure adequate bulk sewer pipeline capacity	MTEF Project	Yes	7246644942061130ZJ11	Upgrade Bulk Sewer: Southern Paarl (Phasa 3 & 4)			R6,800	Yes	Yes	Yes
5.30	Capacity of existing bulk sewer pipeline is inadequate	Ensure adequate bulk sewer pipeline and pump capacity	MTEF Project	Yes	7246644942061158ZJ11	New Bulk Sewer Simondium (Paarl Valley Pump Station Included) MIG			R57,886	Yes	Yes	Yes
Business Element 6: Operation and Maintenance (Topic 6)												
6.1	Shortage in laboratory equipment	Ensure adequate operational and compliance sampling	MTEF Project	Yes	7158	Laboratory equipment: Walsvaarts			R150	No	Yes	Yes
6.2	Some of the existing water loggers need to be replaced.	Upgrade telemetry system in order to ensure the proper control and management of water supply.	MTEF Project	Yes	71586449021119M4ZJ11	Upgrade / Replace Loggers (Telemetry Systems)			R165	No	Yes	Yes
6.3	Some of the existing water loggers need to be replaced.	Upgrade telemetry system in order to ensure the proper control and management of water supply.	MTEF Project	Yes	7158644902061197ZJ11	Replacement of Controllers / Loggers			R750	No	Yes	Yes
6.4	Some of the existing valves on the bulk supply pipeline need to be replaced.	Implement replacement / refurbishment programme for valves.	MTEF Project	Yes	7158644902061197ZJ11	Replacement of Valves on Wemmershoek Bulk Supply Line			R900	No	Yes	Yes
6.5	Existing pipeline needs to be refurbished.	Refurbishment of bulk water pipeline	MTEF Project	Yes	7158	Saron Bulk Water Pipe Replacement			R8,750	No	Yes	Yes
6.6	Some of the existing sewerage pumps need to be refurbished	Implement refurbishment programme for sewerage pumps	MTEF Project	Yes	72466449421176ZJ11	Replace Sewerage Pumps (Drakenstein)			R2,250	No	Yes	Yes
6.7	Capacity of existing sewer drainage networks is inadequate and sections of the networks need to be replaced.	Refurbishment and upgrade drainage networks	MTEF Project	Yes	7246644942161130ZJ11	Replace / Upgrade Sewerage Systems			R19,959	No	Yes	Yes
6.8	Capacity of existing sewer drainage networks is inadequate and sections of the networks need to be replaced.	Refurbishment and upgrade drainage networks	MTEF Project	Yes	7246644942161130ZJ11	Replace / Upgrade Midsloot Sewer Systems			R1,200	No	Yes	Yes
6.9	Inadequate manholes on existing sewer drainage network	Install manholes for sewer drainage network	MTEF Project	Yes	7246644942161130ZJ11	Construction of Manholes On Deep (Saron)			R150	Yes	Yes	Yes
6.10	Security measures at existing sewer pump stations are inadequate.	Implement security measures at sewer pump stations	MTEF Project	Yes	7220644942061154ZJ11	Security Measures for Sewerage Pump Stations			R3,500	Yes	Yes	Yes
6.11	WWTW Process Audit is need to be done annually	Sustainable operation	WSDP	Yes	OBM	Annual WWTW Process Audits			R150	Yes	Yes	Yes
6.12	WWTW Process Audits need to be done annually	Sustainable operation	WSDP	Yes	OBM	Annual WWTW Process Audits			R300	Yes	Yes	Yes
Business Element 7: Associated Services (Topic 7)												
None												

Table F.1: WSDP FY2017/18: LIST OF CONCEPTUAL PROJECTS

Table F.1: WSPD FY2017/18: LIST OF CONCEPTUAL PROJECTS											
Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Project Number	Project Title	Existing Projects Information				
							Project Cost R'000	Does this current listed project address the problem totally?	Approved by Council, in project category and part of 5 year IDP cycle projects?	Project listed in 5yr MTEP - cycle?	
CURRENT NEEDS											
Business Element 8: Conservation and Demand Management - Water Resources (Topic 8.1, 8.2 and 8.3)											
8.1	Reduce Water Losses and NRW	Implement WC//WDM Strategy	MTEP Project	Yes		Wellington WDM Projects	R700	No	Yes	Yes	
8.2	Reduce water usage at Municipal Buildings	Implement WC//WDM Strategy	MTEP Project	Yes		Building Municipal Water Saving Devices	R352	No	Yes	Yes	
8.3	Ensure discrete zones	Implement WC//WDM Strategy	MTEP Project	Yes		Removal of links between pressure zones	R590	No	Yes	Yes	
8.4	Detail meter survey indicated some industrial water meters need to be replaced or new meters need to be installed for unmeasured connections.	Provide industrial water connections and ensure all industrial connections are metered	MTEP Project	Yes	7154644902J6114WZ11	Industrial Water Connections Wellington	R2,500	Yes	Yes	Yes	
8.5	Detail meter survey indicated some industrial water meters need to be replaced or new meters need to be installed for unmeasured connections.	Provide industrial water connections and ensure all industrial connections are metered	MTEP Project	Yes	7156644902F6114WZ11	Industrial Water Connections Paarl	R2,200	No	Yes	Yes	
Business Element 9: Water Resources (Topic 9)											
9.1	Climate change impact on the sustainability of surface water resources	Develop groundwater resources to increase the sustainable yield from the various water resources	MTEP Project	Yes	7130	Boreholes Infrastructure	R4,000	Yes	Yes	Yes	
9.2	No existing raw water storage capacity and capacity of existing WTW is inadequate to meet future water requirements.	Provide adequate bulk water storage capacity to improve water security and upgrade WTW to meet future water requirements and to comply with water quality requirements	MTEP Project	Yes	7158644902P6114PZ11 7158	Saron Bulk Storage & Water Treatment	R28,447	No	Yes	Yes	
Business Element 10: Financial Profile (Topic 10)											
Done by other Department											
Business Element 11: Water Services Institutional Arrangements (Topic 11)											
Done Internally											
Business Element 12: Social and Customer Service Requirements (Topic 12)											
Done Internally											
TOTAL: CURRENT NEEDS											
Funded							689,619,074				
% funded							676,474,024				
							98%				



Table F.1: WSDP FY2017/18: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Project Number	Project Title	Existing Projects Information	Project Cost R'000	Does this current project address the problem totally?	Approved by Council, is project database and part of 5 year IDP cycle project?	Project listed in 5yr MTEF - cycle?
FUTURE NEEDS											
Infrastructure											
F.1			Water Master Plan	No	Various	Various	Future reservoirs for the Paarl distribution system	R69,319	Yes	No	No
F.2			Water Master Plan	No	Various	Various	Future reservoirs for the Paarl distribution system	R15,694	Yes	No	No
F.3		Ensure adequate reservoir storage capacity	Water Master Plan	No	Various	Various	Future reservoirs for the Windmeul distribution system	R7,490	Yes	No	No
F.4			Water Master Plan	No	Various	Various	Future reservoirs for the Klipmuts distribution system	R43,120	Yes	No	No
F.5			Water Master Plan	No	Various	Various	Future reservoir for the Saron distribution system	R11,088	Yes	No	No
F.6			Water Master Plan	No	Various	Various	Future reservoir for the Gouda distribution system	R2,702	Yes	No	No
F.7			Water Master Plan	No	Various	Various	Future reservoir for the Hermon distribution system	R5,193	Yes	No	No
F.8			Water Master Plan	No	Various	Various	Future water PS required for the Paarl distribution system	R3,193	Yes	No	No
F.9		Ensure adequate water pump station capacity	Water Master Plan	No	Various	Various	Future water PS required for the Windmeul distribution system	R1,708	Yes	No	No
F.10			Water Master Plan	No	Various	Various	Future water PS required for the Windmeul distribution system	R1,698	Yes	No	No
F.11			Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Paarl	R2,516	Yes	No	No
F.12			Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Paarl	R2,63	Yes	No	No
F.13			Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Paarl	R2,63	Yes	No	No
F.14			Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Paarl	R2,63	Yes	No	No
F.15		Ensure adequate internal water reticulation capacity	Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Klipmuts	R58,372	Yes	No	No
F.16			Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Windmeul	R3,402	Yes	No	No
F.17			Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Hermon	R4,191	Yes	No	No
F.18			Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Gouda	R4,191	Yes	No	No
F.19			Water Master Plan	No	Various	Various	Future internal water reticulation network items required for Saron	R4,191	Yes	No	No
F.20			Water Master Plan	No	Various	Various	Future bulk water pipeline items required for Paarl	R7,316	Yes	No	No
F.21			Water Master Plan	No	Various	Various	Future bulk water pipeline items required for Paarl	R2,377	Yes	No	No
F.22			Water Master Plan	No	Various	Various	Future bulk water pipeline items required for Paarl	R1,166	Yes	No	No
F.23			Water Master Plan	No	Various	Various	Future bulk water pipeline items required for Klipmuts	R23,041	Yes	No	No
F.24			Water Master Plan	No	Various	Various	Future bulk water pipeline items required for Windmeul	R1,470	Yes	No	No
F.25	Water losses and NRW need to be reduced further	Implement WDM Infrastructure on internal water reticulation networks	Water Master Plan	No	Various	Various	Future bulk water pipeline items required for Hermon	R1,505	Yes	No	No
F.26			Water Master Plan	No	Various	Various	WDM Infrastructure for the Paarl distribution system	R7,299	Yes	No	No
F.27			Water Master Plan	No	Various	Various	WDM Infrastructure for the Paarl distribution system	R7,299	Yes	No	No
F.28			Water Master Plan	No	Various	Various	Future sewerage drainage network items for Paarl	R2,082	Yes	No	No
F.29			Water Master Plan	No	Various	Various	Future sewerage drainage network items for Paarl	R2,082	Yes	No	No
F.30	Inadequate capacity of existing internal sewer drainage network.	Ensure adequate internal sewer drainage capacity.	Water Master Plan	No	Various	Various	Future sewerage drainage network items for Paarl Valley	R168,775	Yes	No	No
F.31			Water Master Plan	No	Various	Various	Future sewerage drainage network items for Paarl Valley	R3,220	Yes	No	No
F.32			Water Master Plan	No	Various	Various	Future sewerage drainage network items for Klipmuts	R28,114	Yes	No	No
F.33			Water Master Plan	No	Various	Various	Future sewerage drainage network items for Windmeul	R2,877	Yes	No	No
F.34			Water Master Plan	No	Various	Various	Future sewerage drainage network items for Gouda	R2,877	Yes	No	No
F.35			Water Master Plan	No	Various	Various	Future sewerage drainage network items for Hermon	R2,770	Yes	No	No
F.36			Water Master Plan	No	Various	Various	Future sewerage drainage network items for Saron	R5,297	Yes	No	No
F.37			Water Master Plan	No	Various	Various	Future sewer PS and rising mains items required for Paarl	R15,969	Yes	No	No
F.38	Inadequate capacity of existing sewer pump stations.	Ensure adequate sewer pump capacity, rising mains capacity and bulk infrastructure capacity.	Water Master Plan	No	Various	Various	Future sewer PS and rising mains items required for Paarl Valley	R49,825	Yes	No	No
F.39			Water Master Plan	No	Various	Various	Future sewer PS and rising mains items required for Paarl Valley	R28,961	Yes	No	No
F.40			Water Master Plan	No	Various	Various	Future sewer PS and rising mains items required for Windmeul	R4,915	Yes	No	No
F.41			Water Master Plan	No	Various	Various	Future sewer PS and rising mains items required for Klipmuts	R5,483	Yes	No	No
F.42			Water Master Plan	No	Various	Various	Future sewer PS and rising mains items required for Saron	R5,783	Yes	No	No
F.43			Water Master Plan	No	Various	Various	Future sewer PS and rising mains items required for Gouda	R20	Yes	No	No
F.44	Small holding tanks supplied with water	Provide water services to all households	Water Master Plan	No	7152	7152	Future sewer PS and rising mains items required for Hermon	R2,975	Yes	No	No
F.45	Industrial area not yet supplied with water	Provide water services to all households	Water Master Plan	No	715464490256114XZ211	715464490256114XZ211	Water Supply to Small Holdings Gouda	R8,200	Yes	No	No
F.46	New development not yet supplied with water services	Provide water services to all households	Water Master Plan	No	715464490256114XZ211	715464490256114XZ211	New Pipedown Water Scheme, Wallington	R16,744	Yes	No	No
F.47	Regular pipe bursts in certain sections of the reticulation	Implement pipeline replacement programme	Water Master Plan	Yes	715464490256114XZ211	715464490256114XZ211	Water Supply to Newton / Mookwadi / Van Wykval	R8,794	Yes	Yes	Yes
F.48	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	Water Master Plan	Yes	715464490256114XZ211	715464490256114XZ211	Replacement of Old Water Reticulation System	R13,585	No	Yes	Yes
F.49	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	Water Master Plan	Yes	715464490256114XZ211	715464490256114XZ211	Replacement of Strawberry King Bulk Water Pipeline	R56,156	Yes	Yes	Yes
F.50	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	Water Master Plan	No	715464490256114XZ211	715464490256114XZ211	Leifonhlin Wallington Pipeline 700mm dia.	R100,000	Yes	Yes	No
F.51	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	Water Master Plan	Yes	7154	7154	Upgrade of Spruit River - Weirwaps bulk water pipe (400mm dia.)	R16,000	Yes	Yes	Yes
F.52	Detail meter survey indicated some industrial fire water connections need to be metered.	Provide industrial fire water connections with meters	Water Master Plan	No			Watermeters for industrial fire water connections	R7,500	No	Yes	No
F.53	Not all households are supplied with adequate basic water.	Provide communal water service in informal areas	Water Master Plan	Yes	715644490256114XZ211	715644490256114XZ211	Extension of Basic Services: Informal Settlements	R4,600	No	Yes	Yes

Table F.1: WSDP FY2017/18: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Project Number	Project Title	Project Cost R'000	Does this current listed project address the problem totally?	Approved by Council, in project cycle or as part of 5 - year MTEF - cycle?	Project listed in MTEF - cycle?
FUTURE NEEDS										
F.51	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	Draft MTRF	Yes		Replace pipeline from Bulleant to Bosch Street	R11,304	Yes	Yes	Yes
F.52	Capacity of existing bulk water pipeline is inadequate	Upgrade bulk water pipeline capacity in order to meet future water requirements.	Draft MTRF	No		Greenheuwel High Pressure Watermain	R3,000	Yes	No	No
F.53	Capacity of existing rising main is inadequate for supply from Ysterburg pump station to Victoria dam	Ensure adequate bulk pipeline capacity	Draft MTRF	Yes		Replacement of Booster Pipe Line from Ysterburg to Victoria	R2,650	Yes	Yes	Yes
F.54	Draft meter survey indicated some industrial water meters need to be replaced or new meters need to be installed for commercial connections.	Provide industrial water connections and ensure all industrial connections are metered	Draft MTRF	Yes	7156644907F6114WZ211	Industrial Water Connections Paarl	R4,560	Yes	Yes	Yes
F.55	Some existing communal services need to be replaced.	Provide communal water services to informal areas	Draft MTRF	Yes	7158	Extension of Basic Services Informal Settlements - Replace Existing	R3,600	No	Yes	Yes
F.56	Inadequate reservoir storage capacity and pump capacity	Provide additional storage capacity and pump capacity for Simondium	Draft MTRF	Yes	715864492F61131Z11	Simondium: Upgrade of Bulk Water Supply (SMI Reservoir & Booster Pumps)	R20,027	Yes	Yes	Yes
F.57	Some households in the rural areas not yet supplied with water service.	Provide water services to all households	Draft MTRF	Yes	7158	Drakenstein Rural Area: Renvue Project	R35,140	Yes	Yes	Yes
F.58	Inadequate reservoir storage capacity and bulk pipeline capacity	Provide additional storage capacity and ensure adequate bulk pipeline capacity.	Draft MTRF	Yes	7158644902G6114PZ211	Windmeul / Slot Van Die Paarl: New Reservoir & Pipeline	R25,793	Yes	Yes	Yes
F.59	No existing raw water storage capacity and capacity of existing WWTW is inadequate to meet future water requirements.	Provide adequate bulk water storage capacity to improve water security and upgrade WWTW to meet future water requirements and to comply with water quality requirements	Draft MTRF	Yes	7158644907F6114PZ211 7158	Saron: Bulk Storage & Water Treatment	R30,274	Yes	Yes	Yes
F.60	Existing pipeline needs to be refurbished.	Refurbishment of bulk water pipeline	Draft MTRF	Yes	7158644902W6111VZ11	Saron: Bulk Water Pipe Replacement	R40,150	Yes	Yes	Yes
F.61	Capacity of existing bulk water pipeline is inadequate	Ensure adequate bulk pipeline capacity	Draft MTRF	Yes	7158	Courteel - Simondium pipeline 400mm dia	R43,806	Yes	Yes	Yes
F.62	The volume of treated effluent currently re-used for irrigation purposes is small.	Reduce future water requirement by using treated effluent for irrigation purposes.	Draft MTRF	No		Recycle of Sewage Water for Non Domestic Purposes	R22,650	No	No	No
F.63	Water District needs to be upgraded	Ensure adequate working conditions	Draft MTRF	Yes	7158	New Water District at Saron	R10,750	Yes	Yes	Yes
F.64	Sections of the existing WWTW need to be refurbished and upgraded to comply with future capacity requirements and effluent quality standards	Refurbishment and upgrade to comply with effluent quality standards.	Draft MTRF	Yes	7220644920G6112Z211 7220644920G6113CZ11	Upgrade And Extensions to Paarl WWTW	R156,658	Yes	Yes	Yes
F.65	Capacity of existing pump station and rising main is inadequate	Ensure adequate pump station capacity and bulk sewer rising main	Draft MTRF	Yes	7220644922G61154Z11	Pump Station & New Rising Main Pentz Street	R5,250	Yes	Yes	Yes
F.66	Maturation Ponds need to be rehabilitated.	Ensure proper treatment processes	Draft MTRF	No	7220644922G61154Z11	Rehabilitation of Maturation Ponds	R10,300	Yes	No	Yes
F.67	Improvement of sludge management required	Ensure adequate sludge management	Draft MTRF	Yes	7220644922G61154Z11	Windrows for sludge management	R2,000	Yes	Yes	Yes
F.68	Capacity of existing pump station is inadequate to meet future requirements.	Ensure adequate pump station capacity.	Draft MTRF	No	7220	Upgrading of the Saron Main Sewerage Pump Station	R9,500	Yes	No	No
F.69	New sedimentation tank is required at Paarl	Ensure proper treatment processes	Draft MTRF	No	7220	Construction of new Sedimentation Tank Paarl	R5,800	Yes	No	No
F.70	Capacity of existing pump station is inadequate to meet future requirements.	Ensure adequate pump station capacity.	Draft MTRF	No	7220	Upgrade of the Newton Sewerage Pump Station	R5,200	Yes	No	No
F.71	New WWTW is required for Southern Paarl	Ensure adequate treatment capacity for Southern Paarl	Draft MTRF	No		Southern Paarl WWTW (Paarl Valley)	R157,093	Yes	Yes	No
F.72	Risks were identified in the W2RAPs that need to be addressed.	Implement improvement / Upgrade plans of W2RAPs	Draft MTRF	No	7228644920G6119M211	W2RAP Implementation: Risk Management	R9,200	No	Yes	No
F.73	The volume of treated effluent currently re-used for irrigation purposes is small.	Reduce future water requirement by using treated effluent for irrigation purposes.	Draft MTRF	No	7228	Recycling of WWTW Effluent	R23,294	No	Yes	No
F.74	Bulk sewer pipeline is required for new Vlakheid and Houtling	Ensure adequate bulk sewer pipeline capacity	Draft MTRF	Yes	7246544920G61158Z11	Vlakheid and Houtling Project Bulk Sewer	R15,795	Yes	Yes	Yes
F.75	Capacity of existing bulk sewer pipelines is inadequate	Ensure adequate bulk sewer pipeline capacity	Draft MTRF	Yes	7246544920G61158Z11	Upgrade Bulk Sewer Southern Paarl (Phase 3 & 4)	R13,609	Yes	Yes	Yes
F.76	Capacity of existing bulk sewer pipelines is inadequate	Ensure adequate bulk sewer pipeline capacity	Draft MTRF	No	7246	Boschmeyer Bulk Sewer	R12,849	Yes	Yes	Yes
F.77	Sewerage system is required	Ensure adequate bulk sewer pipeline capacity	Draft MTRF	No	7246	Windmeul Bulk Sewer	R6,391	Yes	Yes	No
F.78	Capacity of existing bulk sewer pipelines is inadequate	Ensure adequate bulk sewer pipeline capacity	Draft MTRF	No	7246	Upgraded Bulk Sewer and WWTW	R40,000	Yes	Yes	No
F.79	Climate change impact on the sustainability of surface water resources	Develop groundwater resources to increase the sustainable yield from the various water resources	Draft MTRF	Yes	7130	Boreholes Infrastructure	R5,000	Yes	Yes	Yes
TOTAL FUTURE NEEDS							R2,683,563			



## DWS's Green Drop Process

The DWS also completed their Third Order Assessment of Municipal Waste Water Treatment Plants, DWS's Green Drop Report for 2013, which provides a scientific and verifiable status of municipal waste water treatment. Green drop status is awarded to those WSAs that comply with 90% criteria on key selected indicators on waste water quality management. The green drop performance of Drakenstein Municipality is summarised as follows in the DWS's 2013 Green Drop Report.

Table A.27: Green Drop Performance of the Municipality (DWS's 2013 Green Drop Report)						
Average Green Drop Score				2009 – 0%, 2011 – 80.30%, 2013 - 77.79%,		
<b>Regulatory Impression:</b> Drakenstein continue to demonstrate a dogged commitment to perform well against the criteria of the Green Drop regulation programme, as can be demonstrated by the municipal Green Drop score of 77.8%. A special mention of the Hermon system for receiving Green Drop Certification for excellence and best management practice achieved. May this accolade inspire the municipality towards more awards in the future. It must however, be noted that the effluent standard applied for Hermon (NMR) will not be extended to the next GWSA cycle, as Drakenstein and DWS need to agree on the discharge status of the plant. This will be crucial if Hermon is to maintain its GDC status in 2014.						
Overall, the team is held back from a level of performance which can be described as excellent, as result of personnel compliance issues, outstanding licensing issues and overall water quality compliance. These issues are receiving attention and once resolved, should reflect a very good score in the next GWSA cycle 2014/15, should the current drive be sustained. The Regulator acknowledges the team's organised approach, excellent preparation, strong management input, disciplined and truly committed team work. The team is complimented for the emphasis on process and compliance monitoring and the process skill that is in place. Performances can be further improved by fully implementing an IMP and implementation of a pro-active maintenance plan on its treatment infrastructure.						
Drakenstein is commended for the work done on risk abatement, as commented by the inspector: "...A practical and site specific W2RAP was presented. The plan is integrated with the GDIP to tie risks to GD measurement criteria. It links tasks, responsibilities, deadlines and budgets into an action plan. An analysis has been presented on how the planned actions will impact on the CRR. Implementation is proven through confirmation of budgets. "It therefore comes as no surprise that Drakenstein was also selected as one of two best practice municipalities in South Africa in 2012 by WIN-SA to document its lessons." A well-deserved acknowledgement. Regrettable, the CRR ratings declined slightly, mostly as result of the Wellington plant’s insufficient capacity and the effluent quality. Four plants are in low and moderated risk, but Wellington and Saron reside in high risk positions.						
<b>Green Drop findings:</b>						
1. Evidence for electrical maintenance planning and competencies by mechanical contractors were lacking for all systems						
2. Most of the systems lacked operational logbooks with comprehensive process-related logs (not limited to flow readings only), signed off by the supervisor and actions escalated to decision-making.						
3. Full bonus scores could not be awarded for energy consumption and planning, as well as stormwater ingress management.						
4. Partial scores were awarded for pump stations maintenance and record keeping at 6 of the 6 systems.						
5. The Wellington WWTW is operated above its design capacity. Although the upgrade plans are noted (to 16 Ml/d), the project is only anticipated for 2015/16 financial year, whilst the effluent quality is already compromised, as can be seen by the above results (5-15% compliance). This will carry forward a high risk associated with the plant and its impact on human health and the environment.						
GREEN DROP REPORT CARD						
Key Performance Area	Gouda	Hermon	Paarl	Paarl Valley	Saron	Wellington
Process Control and Maintenance Skills	82	51	88	84	78	78
Monitoring Programme	100	86	86	100	100	86
Submission of Results	100	100	100	100	100	100
Effluent Quality Compliance	20	100	20	20	20	10
Risk Management	88	88	88	88	88	88
Local Regulation	100	100	100	100	100	100
Treatment Capacity	93	93	96	96	93	64
Asset Management	95	76	87	87	87	87
Bonus Scores	8.37	3.43	9.67	9.04	9.27	11.40
Penalties	0.00	0.00	0.00	0.00	0.00	0.00
Green Drop Score (2013)	79.64%	90.70%	78.39%	79.46%	78.94%	74.52%
Green Drop Score (2011)	76.60%	69.90%	84.80%	82.00%	79.50%	65.60%
Green Drop Score (2009)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
System Design Capacity (Ml/d)	0.640	0.092	27.000	2.000	0.850	7.000
Capacity Utilisation (% ADWF i.t.o. Design Capacity)	35.63%	41.30%	88.89%	29.50%	85.06%	104.00%
Resource Discharged into	Berg River catchment, no river discharge, effluent to land furrows during winter	No discharge, Berg River catchment	Berg River (special standards catchment)	Berg River (Special standard catchment)	Little Berg River (special standards catchment)	Berg River (special standards catchment)
Microbiological Compliance	0.00%	(NMR) 0.00%	37.50%	50.00%	0.00%	15.38%
Chemical Compliance	66.67%	(NMR) 16.67%	19.79%	52.08%	25.00%	5.77%
Physical Compliance	50.00%	(NMR) 100.00%	47.22%	66.67%	83.33%	15.38%
Overall Compliance	41.67%	(NMR) 54.17%	32.29%	57.29%	43.75%	10.58%
Wastewater Risk Rating (2012)	29.40%	29.40%	48.10%	52.90%	58.80%	63.60%
Wastewater Risk Rating (2013)	47.06%	41.18%	51.85%	64.71%	70.59%	86.36%
Site Inspection Score	-	-	-	-	75%	75%

The 2014 Green Drop Risk Profile Progress Report of the DWS is further the product of a “gap” year, whereby progress is reported in terms of the improvement or decline in the risk position of the particular WWTW, as compare to the previous year’s risks profile. This tool to collect, assess and report the risk profile is called the Green Drop Progress Assessment Tool (PAT). The PAT progress assessment period was done on compliance data and actions during 1 July 2012 – 30 June 2013, which represents the year immediately following the Green Drop 2013 assessment period. The results for Drakenstein Municipality were summarised as follow in DWS’s 2014 Green Drop Risk Profile Progress Report.

Table A.28: DWS's 2014 Green Drop Risk Profile Progress Report results for Drakenstein Municipality						
Technology Description	Gouda	Hermon	Paarl	Pearl Valley-Kliprug	Saron	Wellington
Technology (Liquid)	Aerated ponds/ Oxidation ponds	Evaporation ponds (no effluent)	Activated sludge & BNR and Biological filters	Activated sludge & BNR and Maturation ponds	Activated sludge and Maturation ponds	Biological filters and Activated sludge & BNR
Technology (Sludge)	None specified	None specified	Anaerobic digestion and Belt press dewatering	Solar drying beds	Solar drying beds	Anaerobic digestion and Sludge lagoon/pond
<b>Key Risk Areas</b>						
ADWF Design Capacity (MI/d)	0.640	0.092	27.000	2.000	0.850	7.000
Operational flow (% of Design Capacity)	45%	42%	99%	33%	97%	162%
Annual Average Effluent Quality Compliance (2012-2013)	NMR	NMR	72.0%	84.4%	84.4%	70.8%
Microbiological Compliance (%)	NMR	NMR	61.9%	50.0%	83.3%	50.0%
Physical Compliance (%)	NMR	NMR	90.5%	94.4%	91.7%	100.0%
Chemical Compliance (%)	NMR	NMR	60.7%	85.4%	79.2%	54.2%
Technical skills (Reg. 813)	No	No	No	No	Partial	No
2014 Wastewater Risk Rating (%CRR/CRR <sub>max</sub> )	38.3%	35.3%	66.7%	58.8%	58.8%	81.8%
2013 Wastewater Risk Rating (%CRR/CRR <sub>max</sub> )	47.1%	41.2%	51.9%	64.7%	70.6%	86.4%
<b>Risk Abatement Planning</b>						
Highest Risk Areas based on the CRR	Technical skills	Technical skills	Wastewater quality, technical skills	Wastewater quality, technical skills	Wastewater quality, technical skills	Wastewater quality, technical skills
WW Risk Abatement Status	Final document annual review no. 1	Final document annual review no. 1	Final document annual review no. 1	Final document annual review no. 1	Final document annual review no. 1	Final document annual review no. 1
Capital & Refurbishment expenditure for Fin Year 2012-2013 (Rand)	R1.4m	None	R15.55m	R0.088m	R4.764m	R5.774m
Description of Projects' Expenditure 2012-2013	Upgrade - construction of a wetland, recirculation of pump station and groundwater monitoring boreholes.	No capital projects were undertaken	Upgrade and extensions - construction of a bypass channel to AS works, 3 screw pump stations (pump treated flow from BFs into the AS system), existing bioreactor altered to accommodate a flow of 35MI, 2 new clarifiers, addition of 2m belt press and general additions such as pipeworks and sludge recycle pump station	Identification of suitable land for the proposed Paarl South WWTP	Upgrade of chlorination system; rehabilitated the sludge drying beds, maturation pond and groundwater monitoring boreholes	Design of new WWTP, security fence and refurbishment of existing WWTP (floating aerators)
W <sub>2</sub> RAP Abatement Document and Status Commentary	Dated June 2014. W <sub>2</sub> RAP multi-disciplinary team assembled, detail provided. Consists of supervisor, relevant PCs, Berg River Irrigation Board and DWS, consultants (involved in GD process audit, GD process audit laboratories). Regular feedback on implementation provided. Each wastewater system described i.t.o. catchment (including layout of area), collection, and treatment (including flow diagrams for each plant). Risk matrix used to determine risks (hazard assessment). Hazard analysis included wastewater source (including catchment, surface water, and groundwater), collector systems, treatment, and other factors. Four risk categories: electrical failure, mechanical failure, structural failure, process failures. Risk scores based on effect on receiving environment and end user. Full risk matrixes provided. Risk mitigation measures included for all risks. If mitigation measures implemented, overall risk classification may be regarded as low. Control measures: operational controls conducted according to comprehensive operational monitoring program - provided in W <sub>2</sub> RAP. Incident management response protocol containing reactive procedures when incident occurs. Specific compliance alert levels for specific variables of final effluent for 4 discharging plants provided indicate response protocol. Operational alert levels for all plants indicating specific variables and associated alert levels, for various units of process, as well as specific actions provided. Verification of functioning of W <sub>2</sub> RAP indicated. Detailed Wastewater Treatment and Management Incident Management Protocol included in document. Includes requirement for classification of incident (alert level I, II or III), effluent quality constituent and concentration, plant operational implication/risk, incident management, required response time, action and roles and responsibilities. Comprehensive GDIP provided indicating for each system, all GD criteria, improvements, budgets (present and future years as required), responsibilities, progress report with DWS, and others.					