SWARTLAND MUNICIPALITY

Water Services Development Plan Executive Summary

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

2022-2027

Draft Report

30 March 2024

SWARTLAND MUNICIPALITY

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PROJECT P09260: SWARTLAND MUNICIPALITY'S WSDP-IDP WATER SECTOR INPUT REPORT FOR 2024/2025

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SWARTLAND MUNICIPALITY

WSDP – IDP WATER SECTOR INPUT REPORT (EXECUTIVE SUMMARY OF WSDP)

ITEM **DESCRIPTION** **PAGE**

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Section B: State of Water Services Planning

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Section D: Water Services Strategies

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Section F: WSDP Projects

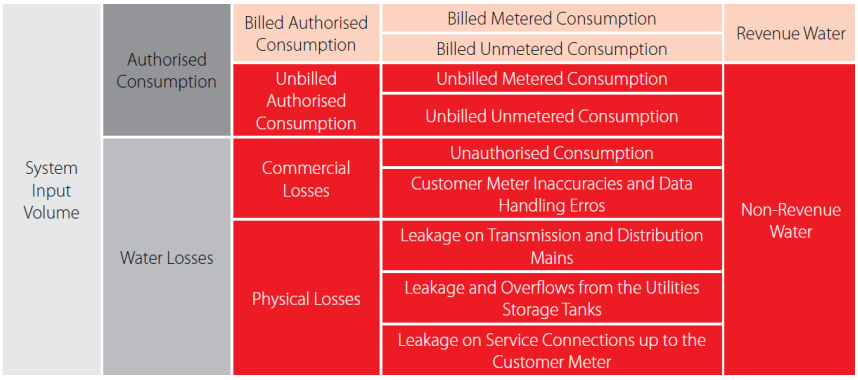
Figures

AADD	Average Annual Daily Demand
AC	Asbestos Cement
AIDS	Acquired Immune Deficiency Syndrome
AMP	Asset Management Plan
BDRR	Blue Drop Risk Rating
BGWMA	Breede-Gouritz Water Management Area
BH	Borehole
BOWMA	Breede-Olifants Water Management Area
BPT	Bulk Pressure Tank
BRVAS	Berg River Voëlvlei Augmentation Scheme
BSP	Bulk Sewer Pipeline
BV	Book Value
BWP	Bulk Water Pipeline
CAP	Corrective Action Plan
CCT	City of Cape Town
CMA	Catchment Management Agency
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
CWCBR	Cape West Coast Biosphere Reserve
DCoG	Department of Cooperative Government
DM	District Municipality
DO	Dissolved Oxygen
DRC	Depreciated Replacement Cost
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EHP	Environmental Health Practitioner
ELEC	Electrical
FDA	Future Development Area
GAMAP	General Accepted Municipal Accounting Practice
GD	Green Drop
GDIP	Green Drop Improvement Plan
GIS	Geographic Information Systems
H / HH	Household
HIV	Human Immunodeficiency Virus
HL	High Level
HMI	Human Machine Interface
IAMP	Infrastructure Asset Management Plan
IBT	Inclining Block Tariff
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
ILI	Infrastructure Leakage Index
IMQS	Infrastructure Management Query System
IRIS	Integrated Regulatory Information System
IWA	International Water Association
Kl	Kilolitre
KPI	Key Performance Indicator
l/c/d	Litre per Capita per Day
l/p/d	Litre per Person per Day

l/s	Litre per Second
LGTAS	Local Government Turn Around Strategy
LL	Low Level
LM	Local Municipality
m^3/a	Cubic Metre per Annum
MBR	Membrane Bioreactor
MFMA	Municipal Finance Management Act
MISA	Municipal Infrastructure Support Agent
Ml	Mega Litre
Ml/a	Mega Litre per Annum
Ml/d	Mega Litre per Day
Mm^3/a	Million Cubic Metre per Annum
MNF	Minimum Night Flow
mSCOA	Municipal Standard Chart of Accounts
MSDS	Material Safety Data Sheet
MTEF	Medium-Term Expenditure Framework
MTREF	Medium-Term Revenue Expenditure Framework
MuSSA	Municipal Strategic Self-Assessment
ND	Nominal Diameter
NGO	Non-Governmental Organisation
NRW	Non-Revenue Water
NWRS	National Water Resource Strategy
O&M	Operation and Maintenance
OC	Opening Cost
OTH	Other
PAT	Progress Assessment Tool
PDD	Peak Daily Demand
PPE	Property, Plant and Equipment
PRP	Pipe Replacement Potential
PRV	Pressure Reducing Valve
PS	Pump Station
PW	Potable Water
RDP	Reconstruction and Development Programme
RES	Reservoir
RUL	Remaining Useful Life
RW	Raw Water
SALGA	South African Local Government Association
SANS	South African National Standard
SCADA	Supervisory Control and Data Acquisition
SCC	Sewer Consumer Connections
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SLM	Swartland Local Municipality
SPLUMA	Spatial Planning and Land Use Management Act
SPS	Sewer Pump Station
SRP	Sewer Reticulation Pipelines
SST	Secondary Settling Tank
STW	Sewage Treatment Works
SWOT	Strengths, Weaknesses, Opportunities and Threats

TCTA	Trans Caledon Tunnel Authority
TSS	Total Suspended Solids
TWL	Top Water Level
URV	Unit Reference Value
VIP	Ventilated Improved Pit
WCC	Water Consumer Connections
WC/WDM	Water Conservation / Water Demand Management
WCDM	West Coast District Municipality
WCWSS	Western Cape Water Supply System
WDM	Water Demand Management
WPS	Water Pump Station
WRP	Water Reticulation Pipeline
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSI	Water Services Institution
WSP	Water Services Provider
WSS	Water Supply System
WTP	Water Treatment Plant
WTW	Water Treatment Works
W_2RAP	Wastewater Risk Abatement Plan
WWTW	Waste Water Treatment Works

KEY TERMS AND INTERPRETATIONS

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, which are expected to have significant consequences for rainfall and water availability on earth.
Current replacement cost (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.
Depreciated Replacement Cost (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.
Financial Year	Financial year means in relation to- • a national or provincial department, the year ending 31 March; or • a municipality, the year ending 30 June.
Global Warming	The increase in the average surface temperatures across the globe, usually measured over long periods of time; reported to have increased by 1ºC over the past hundred years.
Integrated Development Plan (IDP)	An IDP is a legislative requirement for municipalities, which identifies the municipality's key development priorities; formulates a clear vision, mission and values; formulates appropriate strategies; shows the appropriate organisational structure and systems to realise the vision and the mission and aligns resources with the development priorities.
National Water Resource Strategy 2	Sets out how we will achieve the following core objectives: • Water supports development and the elimination of poverty and inequality. • Water contributes to the economy and job creation, and • Water is protected, used, developed, conserved, managed and controlled sustainably and equitably.
International Water Association (IWA) Water Balance	
System Input Volume	The volume of treated water input to that part of the water supply system to which the water balance calculation relates.
Authorised Consumption	The volume of metered and/or un-metered water taken by registered customers, the water supplier and others who are implicitly or explicitly authorised to do so by the water supplier, for residential, commercial and industrial purposes. It also includes water exported across operational boundaries. Authorised consumption may include items such as fire-fighting and training, flushing of mains and sewers, street cleaning, watering of municipal gardens, public fountains, frost protection, building water, etc. These may be billed or unbilled, metered or unmetered.
Water Losses	The difference between System Input and Authorised Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission or distribution schemes, or individual zones. Water Losses consist of Physical Losses and Commercial Losses (also known as Real Losses and Apparent Losses).
Billed Authorised Consumption	Those components of Authorised Consumption which are billed and produce revenue (also known as Revenue Water). Equal to Billed Metered Consumption plus Billed Unmetered Consumption.
Unbilled Authorised Consumption	Those components of Authorised Consumption which are legitimate but not billed and therefore do not produce revenue. Equal to Unbilled Metered Consumption plus Unbilled Unmetered Consumption.
Commercial Losses	Includes all types of inaccuracies associated with customer metering as well as data handling errors (meter reading and billing), plus unauthorised consumption (theft or illegal use). Commercial losses are called "Apparent Losses" by the International Water Association and in some countries the misleading term "Non-Technical Losses" is used.

KEY TERMS AND INTERPRETATIONS

Physical Losses	Physical water losses from the pressurized system and the utility's storage tanks, up to the point of customer use. In metered systems this is the customer meter, in unmetered situations this is the first point of use (stop tap/tap) within the property. Physical losses are called "Real Losses" by the International Water Association and in some countries the misleading term "Technical Losses" is used.
Billed Metered Consumption	All metered consumption which is also billed. This includes all groups of customers such as domestic, commercial, industrial or institutional and also includes water transferred across operational boundaries (water exported) which is metered and billed.
Billed Unmetered Consumption	All billed consumption which is calculated based on estimates or norms but is not metered. This might be a very small component in fully metered systems (for example billing based on estimates for the period a customer meter is out of order) but can be the key consumption component in systems without universal metering. This component might also include water transferred across operational boundaries (water exported) which is unmetered but billed.
Unbilled Metered Consumption	Metered Consumption which is for any reason unbilled. This might for example include metered consumption by the utility itself or water provided to institutions free of charge, including water transferred across operational boundaries (water exported) which is metered but unbilled.
Unbilled Unmetered Consumption	Any kind of Authorised Consumption which is neither billed nor metered. This component typically includes items such as fire-fighting, flushing of mains and sewers, street cleaning, frost protection, etc. In a well-run utility it is a small component which is very often substantially overestimated. Theoretically this might also include water transferred across operational boundaries (water exported) which is unmetered and unbilled – although this is an unlikely case.
Unauthorised Consumption	Any unauthorised use of water. This may include illegal water withdrawal from hydrants (for example for construction purposes), illegal connections, bypasses to consumption meters or meter tampering.
Customer Metering Inaccuracies and Data Handling Errors	Commercial water losses caused by customer meter inaccuracies and data handling errors in the meter reading and billing system.
Leakage on Transmission and /or Distribution Mains	Water lost from leaks and breaks on transmission and distribution pipelines. These might either be small leaks which are still unreported (e.g. leaking joints) or large bursts which were reported and repaired but did obviously leak for a certain period before that.
Leakage and Overflows at Utility's Storage Tanks	Water lost from leaking storage tank structures or overflows of such tanks caused by e.g. operational or technical problems.
Leakage on Service Connections up to point of Customer Metering	Water lost from leaks and breaks of service connections from (and including) the tapping point until the point of customer use. In metered systems this is the customer meter, in unmetered situations this is the first point of use (stop tap/tap) within the property. Leakage on service connections might be reported breaks but will predominately be small leaks which do not surface and which run for long periods (often years).
Revenue Water	Those components of Authorised Consumption which are billed and produce revenue (also known as Billed Authorised Consumption). Equal to Billed Metered Consumption plus Billed Unmetered Consumption.
Non-Revenue Water	Those components of System Input which are not billed and do not produce revenue. Equal to Unbilled Authorised Consumption plus Physical and Commercial Water Losses.
Remaining useful life (RUL)	The time remaining over which an asset is expected to be used.
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.
Service Delivery Budget Implementation Plan (SDBIP)	The SDBIP is a management, implementation and monitoring tool that enable the City Manager to monitor the performance of senior managers, the Mayor to monitor the performance of the City Manager, and for the community to monitor the performance of the municipality.
Strategic Framework for Water Services	The Strategic Framework provides a comprehensive summary of policy with respect to the water services sector in South Africa and sets out a strategic framework for its implementation over the next ten years.
Water Conservation	The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.
Water Demand Management	The adaptation and implementation of a strategy 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.

KEY TERMS AND INTERPRETATIONS

Water Services Authority (WSA)	A water services authority means a municipality with the executive authority and the right to administer water services as authorised in terms of the Municipal Structures Act, 1998 (Act No.117 of 1998). 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.
Water Services Development Plan (WSDP)	A plan to be developed and adopted by the WSA in terms of the Water Services Act, 1997 (Act No.108 of 1997)
WSDP Guide Framework	Modular tool which has been developed by the DWS to support WSAs in complying to the Water Services Act with respect to Water Services Development Planning and which is also used by the DWS to regulate such compliance.
Water Services Provider (WSP)	A WSP means any person or institution that provides water services to consumers or to another water services institution, but does not include a water services intermediary.

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

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 set of WSDP guidelines to assist WSAs with the WSDP process and to provide a framework for the capturing of the data. The topics included in the guidelines and addressed in detail in Swartland Municipality's WSDP are as follows:

- Settlements and Demographics
- Service Levels
- Water Services Asset Management
- Water Services Operation and Management
- Conservation and Demand Management
- Water Resources
- Financial
- Institutional Arrangements and Customer Care

The primary instrument of planning in the water services sector is the WSDP. The following principles apply to the WSDP:

- 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 (Annual WSDP Performance- and Water Services Audit Report).

The purpose of this report is to provide relevant and summarised WSDP inputs for incorporation into Swartland 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 Swartland Municipality.

Section C: Water Services Existing Needs Perspective: Gives an overview of Swartland 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 Swartland Municipality, as aligned to the outflow from the situation analysis per water services business element.

The 2023/2024 IDP list the following biophysical, social and economic and built environments Strengths, Weaknesses, Opportunities and Threats for Swartland Municipality (SWOT Analysis).

Table 1: Institutional, Natural Capital, Economic and Social/Culture Strengths, Weaknesses, Opportunities and Threats.

Strengths	Weaknesses
• Settlements Malmesbury – regional development anchor, Moorreesburg and Darling – rural development centres – agricultural and agri-tourism). • Tourism nodes (Riebeek Valley and Yzerfontein) • Water sources / courses Berg-, Diep- and Groen River. • Land cover Mountains and hills (Paardeberg, Porseleinberg and Kasteelberg). • Diversity in agriculture Natural coastal belt (West Coast). • Infrastructure Roads (N7, R27, R45, R46, R315). • Economy Highest contributors To Employment - commercial services and agriculture. To Gross Domestic Product - Commercial services and manufacturing.	• Maintenance of infrastructure. Maintenance and upgrading of infrastructure to provide for future development. • Land demand and shelter. Housing backlog. • Low levels of income. Unemployment. Dependency on municipal support. • School drop-outs. Dependency on subsidies.
Opportunities	**Threats**
• Access value chains Industrial Development Zone (IDZ) in Saldanha. Proximity to Cape Town. • Access to information • Governance and regulation (Spatial Planning and Land Use Management Act (SPLUMA)). • Access to tertiary education. • World economy. • World nature conservation initiatives. • Catalytic projects enabling the provision of infrastructure.	• Economic globalization and exporting scarce resources. • Climate change. • Urbanization. Population growth. • Availability of and expensive potable water. • Poverty. • Loadshedding. • Limited water resources (and drought).

Swartland Municipality has also embarked on a strategic risk assessment process, where the following top strategic risks were identified as strategic risks in the Municipality (2023/2024 IDP).

- In-migration, population growth and land invasion;
- Ageing infrastructure;
- Lack of capacity in respect of infrastructure;
- Expansion in waste, pollution, road congestion and increasing pressure on existing infrastructure;
- Failed state (external risk);
- Global warming (external risk);
- Community safety and compliance with laws and regulations;
- Potential developers not investing in Swartland;
- Inadequate IT management and IT systems, business continuity and disaster recovery processes;
- Insufficient access to water resources;
- Unsafe and unhealthy working conditions and environment;
- Capacity limitations to increase electricity supply (Yzerfontein); and
- Imbalance between the three pillars of sustainable development i.e. environment, economy and people.

SECTION A: STATUS QUO OVERVIEW

Swartland Municipality is situated within the Breede-Olifants Water Management Area (WMA). The Municipality further falls within the West Coast Region of the Western Cape Province, in which the following municipalities are also located:

- Matzikama Municipality;
- Cederberg Municipality;
- Bergrivier Municipality; and
- Saldanha Bay Municipality
- West Coast District Municipality

Swartland Municipality consists of 12 individual wards and is the only WSA within the Swartland Municipality's Management Area. It is also the Water Services Provider (WSP). Potable bulk water is however provided to Swartland Municipality by the West Coast District Municipality through their Swartland and Withoogte bulk water distribution systems. Swartland Municipality's responsibility as WSA also extends to the rural areas within its Municipal boundary, which prior to July 2003 had fallen under the jurisdiction of the West Coast District Municipality. Swartland Municipality's Management Area includes the following areas:

- The large towns of Malmesbury (Wards 8, 9, 10 and 11) and Moorreesburg (Ward 2);
- The small towns of Yzerfontein (Ward 5), Darling (Ward 6), Koringberg (Ward 1), Riebeek Kasteel (Ward 12), Riebeek Wes (Ward 3);
- The rural hamlets of Abbotsdale and Kalbaskraal (Ward 7), Riverlands and Chatsworth (Ward 4); and
- The rural farm areas (Ward 1).

Swartland Municipality receives bulk potable water from the West Coast District Municipality. The District Municipality operates the Withoogte and Swartland bulk schemes, which is served by the Berg River as main raw water supply. The bulk supply of Withoogte is augmented by abstraction of groundwater from the Langebaan Road Groundwater Aquifer System. Both these bulk distribution schemes are cross-border schemes and supply water to Swartland Municipality, Bergrivier Municipality and Saldanha Bay Municipality. The towns in Swartland Municipality's Management Area which are supplied with bulk potable water by the West Coast District Municipality from their Swartland bulk scheme are Malmesbury (Abbotsdale, Riverlands, Chatsworth and Kalbaskraal), Yzerfontein, Darling, Riebeek Kasteel, Riebeek Wes, and Ongegund (PPC). Moorreesburg and Koringberg are supplied from the Withoogte bulk scheme.

Swartland Municipality supplements the water received from West Coast District Municipality in the Malmesbury distribution system with water from the Paardenberg Dam, which is treated by an automatic backwash rapid gravity sand filter, before it is distributed to Abbotsdale, Kalbaskraal, Riverlands and Chatsworth. A further three boreholes in Riverlands are also used as additional supply for Riverlands and Chatsworth. The groundwater is disinfected, before it is blended with the other potable water and distributed to the consumers in Riverlands and Chatsworth respectively.

The existing water distribution systems for which Swartland Municipality is responsible are as follows:

Swartland Bulk Distribution System: Raw water from the Voëlvlei dam gravitates to the Swartland WTW. The raw water is pumped through the Swartland WTW and the final treated water from the WTW is then further pumped into the bulk distribution network by the Gouda and Kasteelberg pump stations, which are located at the WTW. These two pump stations pump the final treated water to Gouda and the Kasteelberg reservoirs respectively. The water from the Kasteelberg reservoirs is further distributed to the towns in Swartland Municipality's Management Area.

Riebeek Wes and Ongegund: Potable water is distributed from the Kasteelberg Reservoirs on the Swartland Scheme (West Coast DM) to the Ongegund Reservoirs and the Riebeek Wes Reservoirs (Three Riebeek Wes reservoirs with a total capacity of 2.69 Ml and one Ongegund reservoir with a total capacity of 2.30 Ml). Potable water is distributed from these reservoirs to the Ongegund and Riebeek Wes consumers.

Riebeek Kasteel: Potable water is distributed from the Kasteelberg Reservoirs on the Swartland Scheme (West Coast DM) via Riebeek Wes to two storage reservoirs in Riebeek Kasteel, with a combined capacity of 1.86 Ml. Potable water is distributed from the two reservoirs to the Riebeek Kasteel consumers.

Malmesbury (Abbotsdale, Kalbaskraal, Riverlands and Chatsworth): Potable water is supplied via the Swavelberg and Rustfontein Pump Stations to the Glen Lilly reservoirs on the Swartland Scheme. The potable water is supplemented downstream with water from the Paardenberg Dam, which is treated by an automatic backwash rapid gravity sand filter and disinfected, before it is distributed to Abbotsdale, Kalbaskraal, Riverlands and Chatsworth. Additional groundwater is also supplied from three boreholes in Riverlands, which is pumped into the Chatsworth reservoirs (after disinfection) and blended with the other potable water, before it is distributed to the Riverlands and Chatsworth consumers.

Darling: Potable water is distributed from the Glen Lilly reservoirs on the Swartland Scheme (West Coast DM) via the Darling PS to the Darling Reservoirs (three reservoirs with a combined capacity of 3.43 Ml). Potable water is distributed from the three reservoirs to the Darling consumers.

Yzerfontein: Potable water is supplied from the Swartland Scheme (West Coast DM) via the Yzerfontein Pump Station in Darling to the Yzerfontein reservoirs (Two reservoirs with combined capacity of 4.37 Ml). Potable water is distributed from the two reservoirs to the Yzerfontein consumers.

Withoogte Bulk Distribution System: Raw water from the Misverstand dam on the Berg River is pumped via the Misverstand pump station to the Withoogte WTWs from where treated water is distributed to be various towns in Swartland-, Saldanha Bay- and Bergrivier Municipality's Management Areas.

Moorreesburg: Potable water is pumped from the Withoogte WTWs (West Coast DM) to the three reservoirs in Moorreesburg with a total capacity of 8.17 Ml. Potable water is distributed from the three reservoirs to the Moorreesburg consumers.

Koringberg: Potable water is pumped from the Withoogte WTWs (West Coast DM) to the two Koringberg reservoirs with a total capacity of 0.51 Ml capacity, from where it is distributed to the Koringberg consumers.

Physical Perspective:

Climate change: 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. Almost all the bulk water supplied to the towns in Swartland Municipality's Management Area is from surface water sources.

It is necessary for WSAs to develop climate response strategies and include these in their WSDPs, implement WC/WDM and reduce levels of non 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, processes and crops.

It is therefore advisable for Swartland Municipality and the West Coast District 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.

Floods: One of the climate change threats in some parts of the Western Cape is the likelihood of floods with greater intensity and longer-term impacts. There is likely to be increases in the severity and unpredictability of weather patterns. Flooding and storms are predicted which could have devastating effects on agricultural production.

Natural Environment:

Swartland region is home to a diverse fauna and marine life. The coastline along Yzerfontein and Dassen Island provide a unique environment for various marine based animals. Protected areas and threatened ecosystems include: Paardeberg, Riebeek and Porseleinberge, Areas around and between Darling and Riverlands, West of the R27 and Malmesbury.

The Swartland region is characterised by a variety of unique natural and cultural elements that must be protected in order to ensure continued conservation of these areas. The existing conservation areas are located throughout the region from the coastline in the west to the Berg River in the east. The formal conservation areas include National Parks, Provincial Nature Reserves and Municipal Nature Reserves. The western side of the Swartland Municipal area form part of the Cape West Coast Biosphere Reserve. The Cape West Coast Biosphere Reserve (CWCBR) is an initiative by Cape Nature to facilitate sustainable development along the West Coast through stewardship agreements with private land owners. The CWCBR stretches from Diep River in the Cape Metropolitan Area in the south northwards along the coastline and coastal plains towards the Bergrivier north of Saldanha and Vredenburg.

Swartland is one of the municipal areas that have the most critically endangered ecosystems, with four of the twenty-one national endangered ecosystems that occur within the area (Draft 2023-2028 SDF).

TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

The tables below gives an overview of the settlements, population and households in Swartland Municipality's Management Area for 2022/2023. The number of settlements were done according to the grouping of the different areas in DWS's GeoDatabase.

Table A.1.1: Settlement Summary

Section	Value	Assessment Score
1.1 Total Population	178 075	80%
1.2 Total Number of Households (Permanent)	46 056	80%
1.3 Average Household Size	3.9	80%
1.4 Total Number of Settlements (GeoDatabase)	26	80%

Note: The score of 80% in the above table is Excellent, which is the highest score in DWS's eWSDP website.

Table A.1.2: Summary by Settlement Group (Urban / Rural Split)

Settlement Type	Settlements	Population	Households	Assessment Score
Urban	23	130 445	35 297	80%
Rural	3	47 630	10 759	80%
Total	**26**	**178 075**	**46 056**	**80%**

Note: The score of 80% in the above table is Excellent, which is the highest score in DWS's eWSDP website.

Table A.1.3: Assessment Score by Settlement Type

Main Type	Settlement Type	Settlements	Population	Households	Avg. Household Size	Assessment Score
Rural	Farming	3	47 630	10 759	4.43	80%
Urban	Urban - Informal Settlements (Squatter Camp)	1	2 800	700	4.00	80%
Urban	Urban - Formal Town	22	127 645	34 597	3.69	80%
Total		**26**	**178 075**	**46 056**	**3.87**	**80%**

Note: The score of 80% in the above table is Excellent, which is the highest score in DWS's eWSDP website.

Table.A.1.4: Amenities Summary (Health & Educational facilities)

Amenity Type	Number of Amenities	Assessment Score
Health Facilities	15	80%
Educational facilities	62	60%

Note: The scores of 60% and 80% in the above table are Good and Excellent.

Following the 2011 Census survey it became evident that there was an extensive migration into the Municipal Area. The population figure for Swartland Municipality in 2001 was 72 108 (18 675 households). This figure increased substantially to 113 763 in 2011 (29 324 households) at an average annual population growth rate of 4.67%/a.

The Community Survey of 2016 from Statistics South Africa estimate the 2016 population for Swartland Municipality at 133 762 persons and the permanent households at 39 139, at an average household size of 3.4 persons per household.

The Socio-economic Profile of 2022 for Swartland Municipality estimated the 2022 population at 140 697 persons and the 2021 households at 32 515. This total population is estimated to increase to 152 921 by 2026. The current population in the is estimated higher, as well as the average annual future population growth percentage.

The published 2022 Census population for Swartland Municipality was 148 331 persons (Annual growth rate of 2.6% over the period 2011 to 2022) and the number of permanent households was 44 856, which is higher than the figures included in the IDP and the 2022 Socio Economic Profile. The projected population and households included in the Municipality's approved 2022/2023 WSDP Performance- and Water Services Audit Report is higher than the 2022 Census published data. The 2022 Census data is not yet available per town and it was therefore not possible to update Swartland Municipality's projected population and households per town (system) at this stage. It was therefore decided to keep the projected population and households for Swartland Municipality for the WSDP the same as the figures included in the approved 2022/2023 WSDP Performance- and Water Services Audit Report.

The 2022/2023 population for the various water distribution systems were estimated by applying the annual growth rates as indicated in the table below to the 2011 Census data. The current population figures and the annual population growth percentages used in the WSDP Performance- and Water Services Audit Report are aligned with the figures used in DWS's GeoDatabase. The future estimated annual population growth percentages, as listed in the table below, were agreed with the Municipality's Engineering Department during January 2014.

Table A.1.5: Estimated Future Annual Population Growth Percentages, Population and Households per Distribution System

Distribution System	Estimated future annual population growth %	Projected 2022/2023 population	Projected 2022/2023 households
Darling	2.0%	12 956	3 481
Koringberg	4.0%	1 869	488
Malmesbury	4.5%	58 256	15 373
Abbotsdale	3.0%	5 207	1 279
Chatsworth & Riverlands	6.0%	7 692	2 100
Kalbaskraal	5.0%	4 124	1 127
Moorreesburg	4.0%	19 824	5 693
Riebeek Kasteel	7.0%	10 021	2 831
Ongegund (PPC)	3.0%	420	105
Riebeek Wes	6.0%	8 322	2 066
Yzerfontein	4.0%	1 755	754
Farms	3.5%	47 630	10 759
TOTALS	**4.1%**	**178 075**	**46 056**

The current 2022/2023 population for Swartland Municipality is therefore estimated at 178 075 persons and the permanent households at 46 056, as indicated in the table above.

The table below gives an overview of the projected population and permanent number of households and the water and sanitation service levels in Swartland Municipality's Management Area.

Table A.1.6: Water Services Overview

Settlement Type	2011/2012 Households	2011/2012 Population	2022/2023 Households	2022/2023 Population	Water category: Adequate: Formal	Adequate: Informal	Adequate: Sahred 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	Sanitation category: Adequate: Formal	Adequate: Informal	Adequate: Sahred 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**																				
Formal Town					Adequate			Below RDP					None		Adequate			Below RDP					None	
Malmesbury	9 473	35 897	15 373	58 256	P		P								P		P							
Abbotsdale	924	3 762	1 279	5 207	P		P								P		P							
Chatsworth/Riverlands	1 017	3 696	1 400	4 892	P		P								P		P							
Kalbaskraal	659	2 411	1 127	4 124	P		P								P		P							
Riebeek Kasteel	1 345	4 761	2 831	10 021	P		P								P		P							
Riebeek Wes	1 049	4 229	2065	8322	P		P								P		P							
Darling	2 800	10 420	3 481	12 956	P		P								P		P							
Moorreesburg	3 698	12 877	5 693	19 824	P		P								P		P							
Koringberg	317	1 214	488	1 869	P		P								P		P							
Yzerfontein	490	1 140	754	1 755	P		P								P		P							
Sub-Total	**21 772**	**80 407**	**34 491**	**127 225**																				
Townships					Adequate			Below RDP					None		Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**																				
Informal Settlements					Adequate			Below RDP					None		Adequate			Below RDP					None	
Chatsworth/Riverlands	89	356	700	2 800									P										P	
Sub-Total	**89**	**356**	**700**	**2 800**																				
Working towns & service centres					Adequate			Below RDP					None		Adequate			Below RDP					None	
Ongegund (PPC)	94	376	105	420	P		P								P		P							
Sub-Total	**94**	**376**	**105**	**420**																				
Sub-Total: (Urban)	**21 955**	**81 139**	**35 296**	**130 445**																				
RURAL																								
Rural / Farming					Adequate			Below RDP					None		Adequate			Below RDP					None	
Farms	7 369	32 624	10 759	47 630	P		P							P	P		P							P
Sub-Total	**7 369**	**32 624**	**10 759**	**47 630**																				
Informal Settlements					Adequate			Below RDP					None		Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**																				
Sub-Total (Rural)	**7 369**	**32 624**	**10 759**	**47 630**																				
TOTAL	**29 324**	**113 763**	**46 055**	**178 075**																				

TOPIC 2: SERVICE LEVELS

The National Norms and Standards for Domestic Water and Sanitation Services, as published in the Government Gazette No.41100 of 8 September 2017, make provision for the following norms and standards for levels of water supply and sanitation services:

Table A.2.1: Norms and Standards for Levels of Water Supply Services		
Full level of service: People access and pay for more than 90 l/c/d at high pressure.	Interim **Full**	**Full provision**: People access a minimum of 50 l/c/d of SANS241 quality water on demand at the boundary of the yard, metered and tariffed.
Middle level of service: People access and pay for 51-90 l/c/d at medium pressure.	Interim **Upper**	**Upper provision**: People access a maximum of 90 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Intermediate**	Intermediate provision: People access more than 50 l/c/d but less than 90 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
Minimum level of service: People access 25-50 l/c/d at low to medium pressure, use of more than 25 l/c/d is paid for.	Interim **Basic Plus**	**Basic Plus provision**: People access more than 25 l/c/d but less than 50 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Basic**	**Basic provision**: People access a minimum of 25 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Free Basic**	**Free basic provision**: People access a minimum of 25 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered.
	Intermittent	**Intermittent provision**: People access a minimum of 1500 l/household/week of acceptable quality water on a weekly basis within 100m, which is metered.
Bulk service: Source of potable water to be provided to people, which is metered in all circumstances.		
No service / provision = backlog: People access water from insecure or unimproved sources, or sources that are too distant, too time consuming or are of poor quality.		

Interim provision: People access a minimum of 25 l/c/d of acceptable quality water within 24 hours of disruption, normal service to be restored within 7 days.

Proper disposal, clean platform, vector and rodent control, resource use and health protection.

Table A.2.2: Norms and Standards for Levels of Sanitation Services		
Hygiene promotion; Prevention of pollution; Re-use / recycle; Operation and Maintenance; Metering and tariffing; Solid Waste Management; Asset Management		
Full level: Full concern for human health, environment and sustainability of interconnected systems.	**Full services**	**In-house facility**: Storm water, wastewater/excreta, greywater, solid waste are collected and managed to achieve maximum benefits from treatment and re-use of water and nutrients.
		In-house facility: Access to a pleasant, safe, reliable and properly maintained facility for 24 hours a day, with control of nutrients in human excreta, wastewater and greywater.
Basic level: Remove excreta from the environment through treatment, pathogen reduction, resource recovery and nutrient reuse.	**Free basic services**	**Toilet with functional hand washing facility in the yard**: Access to a pleasant, safe and reliable facility for 24 hours a day, including privacy, personal safety and shelter through a subsidy for free. Maintenance of the facility is for free and is the responsibility of services provider.
	Basic services	**Toilet with functional hand washing facility in the yard**. Access to a pleasant, safe and reliable facility for 24 hours a day, including privacy, personal safety and shelter through a capital subsidy. Maintenance of the facilities is not for free and is the responsibility of the household / owner.
Interim level: Blocking the spread of faecal-oral diseases through proper excreta containment at a fixed point.	**Excreta containment**	**Household, shared or communal toilets with functional hand washing facilities**: Access to safe, reliable and properly maintained toilet and hand washing facility, free of charge, within 200m of the dwelling, which at a minimum safely contains human excreta. Maintenance is the responsibility of the services provider. To be phased out by 2030.
No service / provision = backlog: People practice open defecation or access an unimproved sanitation facility, such as pit toilets and bucket toilets. To be completely eliminated by 2030.		

Emergency level: People access pleasant, safe, reliable and properly maintained improved toilets and hand washing facility on the premises in close proximity to the temporary dwelling within 24 hours and for duration of event.

All the formal households in the urban areas of Swartland Municipality's Management Area are provided with water and sewer connections inside the erven. Informal areas are supplied with shared services as an intermediary measure. There are an estimated 700 informal households in Chatsworth with no access to shared water and sanitation services. Swartland Municipality works towards a ratio of at least 1 tap per twenty-five households and 1 communal toilet per five households for their shared services. Swartland Municipality is committed to ensure that private landowners provide at least basic water and sanitation services to those households in the rural areas with existing services below RDP standard.

Swartland Municipality's challenges with regard to the provision of basic water and sanitation services are as follows:

- To provide basic water and sanitation services in the informal areas to new citizens moving into the informal areas and to ensure that health and hygiene awareness and education is part of the process of providing basic services.
- To identify suitable land for the relocation of the people from informal areas, with existing communal services, to formal houses with a higher level of water and sanitation service (Services inside the erven).
- To identify adequate funding for the rehabilitation, maintenance, replacement and upgrading of the existing bulk and reticulation infrastructure in order to support the sustainability of the water and sanitation services.
- To monitor the provision of basic water and sanitation on privately owned land.

The table and graph below give an overview of the water service delivery access profile of Swartland Municipality.

Table A.2.3: Residential Water Services Delivery Access Profile: Water

Census Category	Description	Year 0 FY2022/23		Year - 1 FY2021/22		Year - 2 FY2020/21	
		Nr	%	Nr	%	Nr	%
	WATER (ABOVE MIN LEVEL)						
Piped (tap) water inside dwelling/institution	House connections	30 344	65%	29 322	65%	28 861	66%
Piped (tap) water inside yard	Yard connections	15 482	33%	14 677	32%	13 415	31%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	335	1%	335	1%	335	1%
	Sub-Total: Minimum Serivce Level and Above	**46 161**	**98%**	**44 334**	**98%**	**42 611**	**98%**
	WATER (BELOW MIN LEVEL)						
Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Standpipe connection: > 200 m < 500 m	61	0%	61	0%	61	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	Standpipe connection: > 500 m < 1 000 m	18	0%	18	0%	18	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	3	0%	3	0%	3	0%
No access to piped (tap) water	No services	775	2%	775	2%	775	2%
	Sub-Total: Below Minimum Service Level	**857**	**2%**	**857**	**2%**	**857**	**2%**
	Total number of households	**47 018**	**100%**	**45 191**	**100%**	**43 468**	**100%**

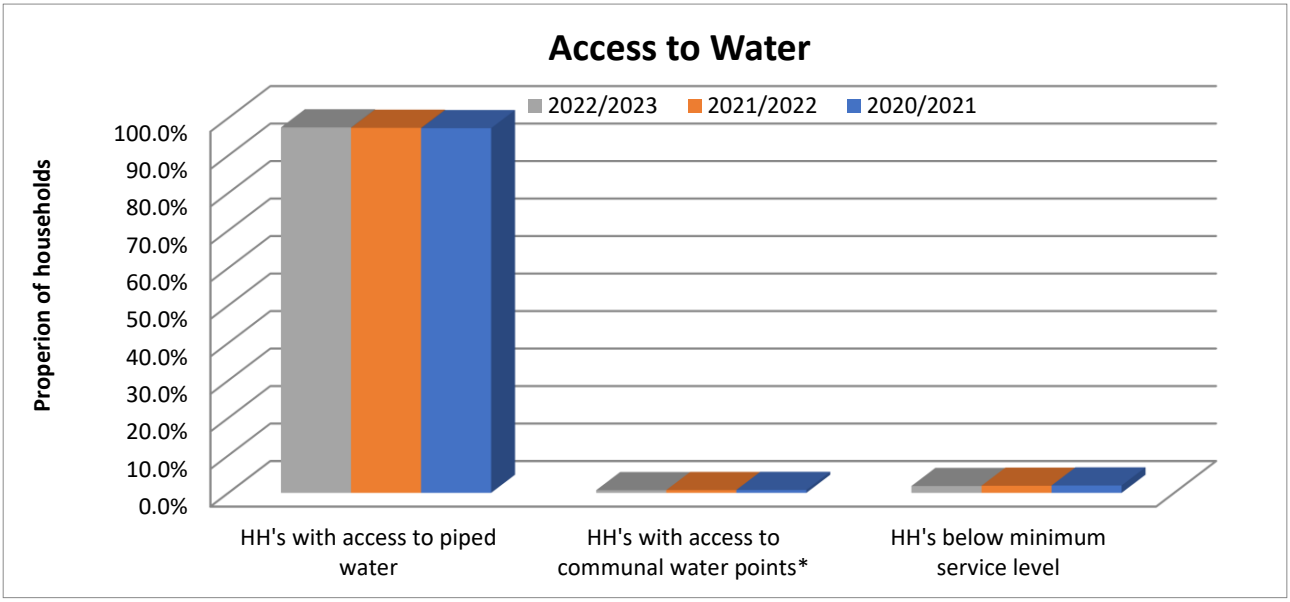


Figure A.2.1: Access to Water Services.

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

Table A.2.4: Residential Water Service Levels (Residential Consumer Units)

Service Level	Malmes-bury	Abbots-dale	River-lands	Chats-worth	Kalbas-kraal	Riebeek Kasteel	Riebeek Wes	Darling	Moorrees-burg	Koring-berg	Yzerfon-tein	Farms	Total
No Water Services	0	0	0	0	0	0	0	0	0	0	0	75 [2)]	**75**
Below RDP: Infrastructure Upgrade	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	0	0	0	82 [3)]	**82**
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Basic Need (RDP)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**157**	**157**
Below Housing Interim [4)]	0	0	0	700	0	0	0	0	0	0	0	0	**700**
Adequate Housing Permanent [5)]	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Housing Need	**0**	**0**	**0**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**700**
Standpipes	0	0	0	0	0	0	0	0	0	0	0	335	**335**
Yard Connections [6)]	7 046	144	30	10	521	1 245	1 107	943	2 773	144	0	1 519	**15 482**
House Connections [1)]	8 327	1 135	330	1 030	606	1 586	1 063	2 538	2 920	344	1 717	8 748	**30 344**
Total Adequate	**15 373**	**1 279**	**360**	**1 040**	**1 127**	**2 831**	**2 170**	**3 481**	**5 693**	**488**	**1 717**	**10 602**	**46 161**
Total per Area	**15 373**	**1 279**	**360**	**1 740**	**1 127**	**2 831**	**2 170**	**3 481**	**5 693**	**488**	**1 717**	**10 759**	**47 018**

Notes:
1) Number of residential consumer units for the various towns for 2022/2023, as calculated from the financial data.
2) Census 2011: Number of households with no access to piped (tap) water 75
3) Census 2011: Number of households with communal services (200m – 500m) 61, (500m – 1000m) 18 and (>1000m) 3
4) Below Housing Interim in the above table is the number of households in informal areas without basic water services. There is an estimated 700 informal households in Chatsworth without basic water services.
5) Adequate Housing Permanent in the above table is the number of informal households in informal areas with communal water services.
6) Projected number of residential households (2022/2023) – Number of residential consumers units (2022/2023) = Estimated number of backyard dwellers.

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Table A.2.5: Improvement in Eradicating the Water Backlog					
Settlement	Urban / Rural	2022/23		2021/22 (-Y1)	
		Water backlog HH	Water Backlog Population	Water backlog HH	Water Backlog Population
Malmesbury	Urban	0	0	0	0
Abbotsdale	Urban	0	0	0	0
Riverlands	Urban	0	0	0	0
Chatsworth	Urban	700	2 564	700	2 564
Kalbaskraal	Urban	0	0	0	0
Riebeek Kasteel	Urban	0	0	0	0
Riebeek West	Urban	0	0	0	0
Darling	Urban	0	0	0	0
Moorreesburg	Urban	0	0	0	0
Koringberg	Urban	0	0	0	0
Yzerfontein	Urban	0	0	0	0
Farms	Rural	157	695	157	695
		857		**857**	

Table A.2.6: Water Supply Level Profile (Households)		
Water Profile	Totals	Assessment Score
Total households with a water need (Irrelevant the type of need)	**857**	**80%**
Total households below RDP	**857**	**80%**
Piped water inside the dwelling/house-Households	30 344	80%
Piped water inside yard-Households	15 482	80%
Piped water distance <200m - Households	335	80%
Piped water distance >200m - Households	82	80%
Borehole in the yard – Households	0	80%
Rain-water tank in yard – Households	0	80%
Water vendor-carrier/tanker – Households	0	80%
Stagnant water – dam/pool – Households	0	80%
Flowing water/spring/stream/river – Households	0	80%
Water Other – Households (include no water)	775	60%

Note: The scores of 60% and 80% in the above table is Good and Excellent. 80% is the highest score in DWS's eWSDP website.

Table A.2.7: Water Reliability Profile (Households)		
Section: Water Reliability Profile	Totals	Assessment Score
Total Number of Households having Reliable Service	**46 161**	**80%**
Total Number of Households NOT having Reliable Service	**857**	**60%**

Note: The scores of 60% and 80% in the above table is Good and Excellent. 80% is the highest score in DWS's eWSDP website.

The projected figures in the previous tables for water services for the farms are still based on the 2011 Census data and can only be updated once the 2022 Census data becomes available per town or subplace.

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

Table A.2.8: Residential Water Services Delivery Access Profile: Sanitation

Census Category	Description	Year 0 FY2022/23		Year - 1 FY2021/22		Year - 2 FY2020/21	
		Nr	%	Nr	%	Nr	%
	SANITATION (ABOVE MIN LEVEL)						
Flush toilet (connected to sewerage system)	Waterborne	33 044	70%	31 761	70%	30 516	70%
	Waterborne: Low Flush	0	0%	0	0%	0	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	11 418	24%	10 874	24%	10 396	24%
Chemical toilet	Non-waterborne (above min. service level)	54	0%	54	0%	54	0%
Pit toilet with ventilation (VIP)		211	0%	211	0%	211	0%
Other / Communal Services		0	0%	0	0%	0	0%
	Sub-Total: Minimum Serivce Level and Above	**44 727**	**95%**	**42 900**	**95%**	**41 177**	**95%**
	SANITATION (BELOW MIN LEVEL)						
Pit toilet without ventilation	Pit toilet	401	1%	401	1%	401	1%
Bucket toilet	Bucket toilet	303	1%	303	1%	303	1%
Other toilet provision (below min. service level	Other	380	1%	380	1%	380	1%
No toilet provisions	No services	1 207	3%	1 207	3%	1 207	3%
	Sub-Total: Below Minimum Service Level	**2 291**	**5%**	**2 291**	**5%**	**2 291**	**5%**
	Total number of households	**47 018**	**100%**	**45 191**	**100%**	**43 468**	**100%**

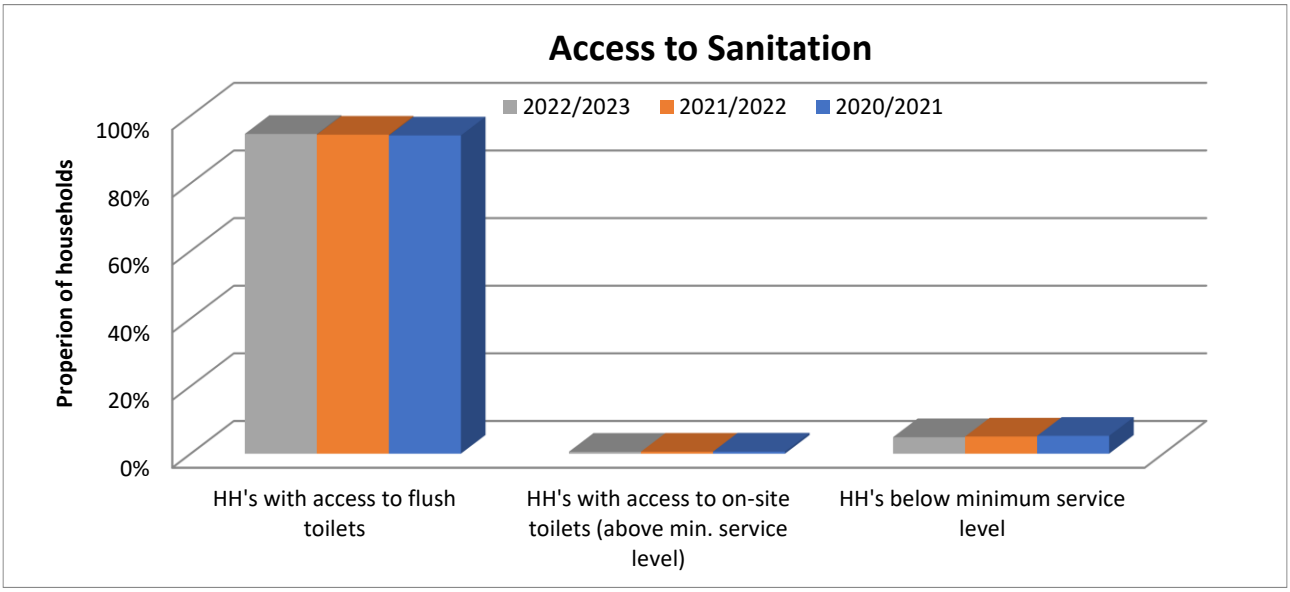

Figure A.2.2: Access to Sanitation Services.

The existing residential sanitation service levels in Swartland Municipality's Management Area are estimated as follows:

Table A.2.9: Residential Sanitation Service Levels (Residential Consumer Units)													
Service Levels	**Malmes-bury**	**Abbots-dale**	**River-lands**	**Chats-worth**	**Kalbas-kraal**	**Riebeek Kasteel**	**Riebeek Wes**	**Darling**	**Moorrees-burg**	**Koring-berg**	**Yzerfon-tein**	**Farms**	**Total**
No Sanitation Services	0	0	0	0	0	0	0	0	0	0	0	507 [3)]	**507**
Below RDP: Infrastructure Upgrade	0	0	0	0	0	0	0	0	0	0	0	1 138 [4)]	**1 138**
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Basic Need (RDP)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1 645**	**1 645**
Below Housing Interim [6)]	0	0	0	700	0	0	0	0	0	0	0	0	**700**
Adequate Housing Permanent [7)]	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Housing Need	**0**	**0**	**0**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**700**
Non Waterborne	0	0	0	0	0	0	0	0	0	0	0	211 [5)]	**211**
Waterborne Low Flush	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Septic Tanks / Conservancy [1)]	13	5	7	134	123	76	183	41	106	110	1 717	8 903	**11 418**
Waterborne WWTW [2)]	15 360	1 274	353	906	1 004	2 755	1 987	3 440	5 587	378	0	0	**33 044**
Total Adequate	**15 373**	**1 279**	**360**	**1 040**	**1 127**	**2 831**	**2 170**	**3 481**	**5 693**	**488**	**1 717**	**9 114**	**44 673**
Total per Area	**15 373**	**1 279**	**360**	**1 740**	**1 127**	**2 831**	**2 170**	**3 481**	**5 693**	**488**	**1 717**	**10 759**	**47 018**

Notes:
1) The number of tanks per town was calculated from the total number of tanks pumped during 2022/2023 divided by 5.
2) Include Backyard dwellers
3) Census 2011: Number of households with no toilet facility 507.
4) Census 2011: Number of households with existing buckets 303, chemical toilets 54, pit toilets without ventilation 401 and "other" 380
5) Census 2011: Number of households with pit toilets with ventilation 211.
6) Inadequate Housing Interim in the above table is the number of shacks in informal areas without basic sanitation services. There is an estimated 700 informal households in Chatsworth without basic sanitation services.
7) Inadequate Housing Permanent in the above table is the number of informal households in informal areas with communal ablution facilities.

Table A.2.10: Improvement in Eradicating the Sanitation Backlog					
Settlement	Urban / Rural	2022/23		2021/22 (-Y1)	
		Sanitation backlog HH	Sanitation Backlog Population	Sanitation backlog HH	Sanitation Backlog Population
Malmesbury	Urban	0	0	0	0
Abbotsdale	Urban	0	0	0	0
Riverlands	Urban	0	0	0	0
Chatsworth	Urban	700	2 564	700	2 564
Kalbaskraal	Urban	0	0	0	0
Riebeek Kasteel	Urban	0	0	0	0
Riebeek West	Urban	0	0	0	0
Darling	Urban	0	0	0	0
Moorreesburg	Urban	0	0	0	0
Koringberg	Urban	0	0	0	0
Yzerfontein	Urban	0	0	0	0
Farms	Rural	1 645	7 283	1 645	7 283
		2 345		**2 345**	

Table A.2.11: Sanitation Level of Service (Households)		
Section: Sanitation Service Infrastructure Supply Level Profile	Totals	Assessment Score
Bucket toilets	303	60%
Pit without ventilation	401	60%
Pit toilet with ventilation (VIP)	211	60%
Chemical Toilet	54	60%
Flush toilet (with septic / conservancy tank)	11 418	80%
Flush toilet (connected to sewerage system)	33 044	80%
None (Include other)	1 587	60%

Note: The scores of 60% and 80% in the above table is Good and Excellent. 80% is the highest score in DWS's eWSDP website.

Table A.2.12: Sanitation Reliability Profile (Households)		
Section: Sanitation Reliability Profile	Totals	Assessment Score
Total number of households having reliable service	**44 673**	**80%**
Total number of households not having reliable service	**2 345**	**60%**
Infrastructure to be upgraded: None to VIP	887	60%
Infrastructure requirement: Bucket to VIP	303	60%
Infrastructure requirement: None to waterborne	700	60%
Infrastructure to be upgraded: Pit to VIP	401	60%
Number of households NOT having reliable service due to: Functionality	54	60%

Note: The scores of 60% and 80% in the above table is Good and Excellent. 80% is the highest score in DWS's eWSDP website.

The projected figures in the previous tables for sanitation services for the farms are still based on the 2011 Census data and can only be updated once the 2022 Census data becomes available per town or subplace.

Table A.2.13: Direct Backlog (Water and Sanitation)		
Direct Backlog (Water & Sanitation)	Totals	Assessment Score
Direct settlement backlog water households. Total household of settlement with a water need (irrelevant the type of need)	857	60%
Direct settlement backlog water population. Total population of settlement with a water need (irrelevant the type of need)	3 259	60%
Direct settlement backlog sanitation households. Total household of settlement with a sanitation need (irrelevant the type of need)	2 345	60%
Direct settlement backlog sanitation population. Total population of settlement with a sanitation need (irrelevant the type of need)	9 847	60%

The number of user connections in each user sector, for the various distribution systems in Swartland Municipality's Management Area, is as follows.

Table A.2.14: Number of User Connections in Each User Sector												
Distribution System	**19/20**			**20/21**			**21/22**			**22/23**		
	Res	**Bus**	**Other**	**Res**	**Bus**	**Other**	**Res**	**Bus**	**Other**	**Res**	**Bus**	**Other**
Koringberg	329	11	7	332	11	8	335	11	8	344	11	8
Ongegund	86	1	7	88	2	19	88	2	19	88	2	19
Riebeek Wes	896	47	30	966	50	33	963	51	34	975	50	33
Riebeek Kasteel	1 126	39	24	1 564	38	29	1 527	38	30	1 586	38	29
Yzerfontein	1 528	23	26	1 590	24	36	1 626	24	39	1 717	29	45
Darling	2 495	107	34	2 503	112	46	2 519	112	46	2 538	114	45
Moorreesburg	2 842	184	47	2 876	192	58	2 892	194	59	2 920	196	59
Malmesbury	7 767	377	181	7 908	400	420	7 955	400	420	8 327	406	423
Abbotsdale	1 111	0	11	1 118	0	13	1 127	0	13	1 135	0	12
Kalbaskraal	461	5	13	589	5	16	581	4	16	606	4	17
Riverlands	327	1	5	330	1	10	330	1	9	330	1	10
Chatsworth	942	1	13	965	1	17	995	2	18	1 030	3	18
TOTALS	**19 910**	**796**	**398**	**20 829**	**836**	**705**	**20 938**	**839**	**711**	**21 596**	**854**	**718**

Note: Res – Residential and Bus - Business

The total number of consumer units per town and the percentage growth from 2013/2014 to 2022/2023 are indicated in the table below.

Table A.2.15: Total Number of Consumer Units per Town and Percentage Growth from 2013/2014 to 2022/2023											
Distribution System	**Annual Growth % 13/14 – 22/23**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**21/22**	**22/23**
Koringberg	1.13%	328	332	335	333	333	346	347	351	354	363
Ongegund	0.96%	100	101	102	100	99	105	94	109	109	109
Riebeek Wes	3.65%	766	777	783	779	777	793	973	1 049	1 048	1 058
Riebeek Kasteel	4.20%	1 141	1 136	1 151	1 154	1 158	1 184	1 189	1 631	1 595	1 653
Yzerfontein	4.07%	1 251	1 283	1 330	1 366	1 435	1 528	1 577	1 650	1 689	1 791
Darling	0.42%	2 598	2 596	2 607	2 598	2 602	2 638	2 636	2 661	2 678	2 697
Moorreesburg	0.55%	3 023	3 029	3 040	3 024	3 036	3 077	3 073	3 126	3 144	3 175
Malmesbury	2.25%	7 495	7 431	7 500	7 760	8 203	8 487	8 325	8 728	8 775	9 156
Abbotsdale	6.28%	663	889	1 071	1 069	1 087	1 109	1 122	1 131	1 140	1 147
Kalbaskraal	6.21%	365	436	446	450	462	474	479	610	601	627
Riverlands	0.64%	322	327	329	328	331	333	333	341	340	341
Chatsworth	4.09%	733	775	802	812	864	922	956	983	1 015	1 051
TOTALS	**2.36%**	**18 785**	**19 112**	**19 496**	**19 773**	**20 387**	**20 996**	**21 104**	**22 370**	**22 488**	**23 168**

The graph below indicates the number of billed metered consumers per system for the various financial years.

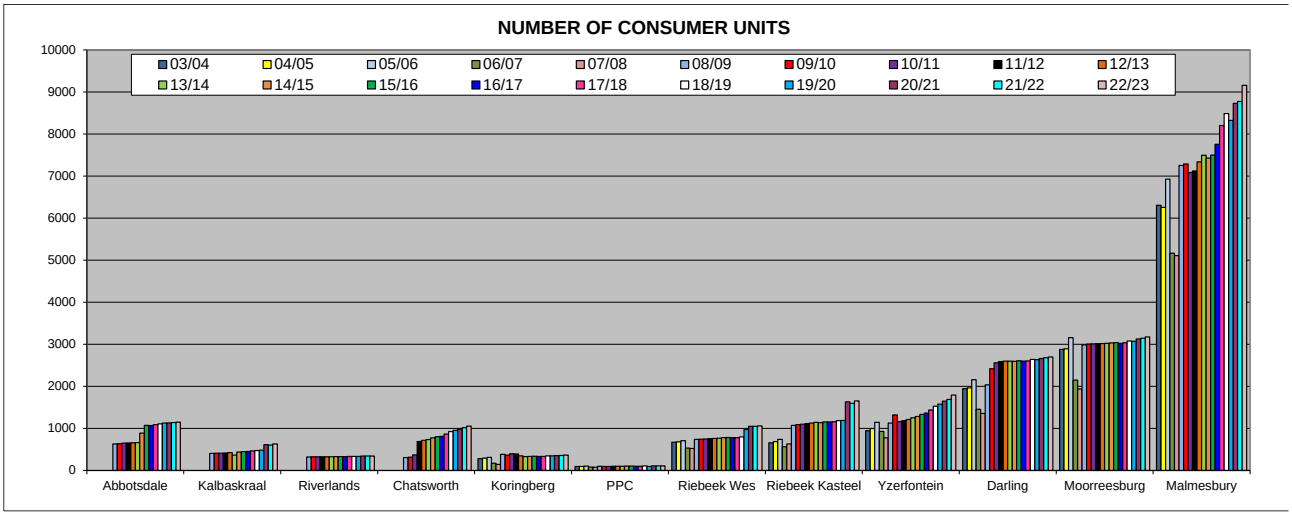

Figure A.2.3: Number of Billed Metered Consumers per System

Public Amenities

Table A.2.16: Water Service Levels: Education and Health Facilities					
Associated services facility	**Number of facilities**	**Facilities with adequate services**	**Facilities with no services**	**Facilities with inadequate services**	**Total potential cost (basic level) (Rmil)**
Education Plan					
Primary school	26	16	10 (To be verified)		Unknown
Secondary school	5	5	0	0	-
Tertiary	1	1	0	0	-
Combined	5	5	0	0	-
Special needs	1	1	0	0	-
Other	24	22	2 (To be verified)		Unknown
Total	**62**	**49**	**12 (To be verified)**		**Unknown**
Health Plan					
Hospitals	2	2	0	0	-
Health Centres	2	2	0	0	-
Clinics	4	4	0	0	-
Mobile & Satellite Clinics	7	7	0	0	-
Total	**15**	**15**	**0**	**0**	**-**

All the schools and Community Learning Centres in the urban areas are supplied with higher levels of water services. The water service levels of the primary schools in the rural areas however need to be verified. All the hospitals and clinics in the urban areas re0ceive potable water through the reticulation networks of the various towns.

Table A.2.17: Sanitation Service Levels: Education and Health Facilities					
Associated services facility	**Number of facilities**	**Facilities with adequate services**	**Facilities with no services**	**Facilities with inadequate services**	**Total potential cost (basic level) (Rmil)**
Education Plan					
Primary school	26	16	10 (To be verified)		
Secondary school	5	5	0	0	-
Tertiary	1	1	0	0	-
Combined	5	5	0	0	-
Special needs	1	1	0	0	-
Other	24	22	2 (To be verified)		Unknown
Total	**62**	**49**	**12 (To be verified)**		**Unknown**
Health Plan					
Hospitals	2	0	0	0	-
Health Centres	2	0	0	0	-
Clinics	4	0	0	0	-
Mobile & Satellite Clinics	7	0	0	0	-
Total	**15**	**0**	**0**	**0**	**-**

All the schools and Community Learning Centres in the urban areas are supplied with higher levels of sanitation services. The sanitation service levels of the primary schools in the rural areas however need to be verified. All the hospitals and clinics in the urban areas are supplied with waterborne sewer systems.

TOPIC 3: WATER SERVICES ASSET MANAGEMENT

Table A.3.1: Infrastructure Components										
Assets	**Boreholes**	**Abstraction Points**	**WTW**	**Water Pump Stations**	**Sewer Pump Stations**	**Water Bulk & Network Pipelines**	**Sewer Drainage Network**	**Reservoirs**	**WWTW**	**Assessment Score**
Total number of components / km of pipeline / units	3	2 *	2 *	23	22	951 km	315 km	41	7	80%

Note: * Include the one surface abstraction point managed by the West Coast District Municipality and the one bulk WTWs managed by the West Coast District Municipality.

The table below gives an overview of the major bulk infrastructure components of the Swartland bulk water distribution system.

Table A.3.2: Existing Water Infrastructure of the Swartland Bulk Water Distribution System						
Bulk and Network Pipelines						
Component	**Bulk (km)**	**Network (km)**	**Total (km)**			
Water Pipelines	251.903	207.244	459.146			
Reservoirs						
Name	**Type**	**Capacity (Ml)**	**TWL**			
Swartland WTW Clear well	WTW	Unknown	Unknown			
Kamp reservoir No.1	Reservoir	0.072	Unknown			
Kamp reservoir No.2	Reservoir	0.072	Unknown			
Kasteelberg No.1	Reservoir	4.525	286.0			
Kasteelberg No.2	Reservoir	4.525	286.0			
Kasteelberg No.3	Reservoir	4.525	286.0			
Kasteelberg No.4	Reservoir	4.525	286.0			
Glen Lilly No.1	Reservoir	8.000	263.5			
Glen Lilly No.2	Reservoir	8.000	263.5			
Glen Lilly No.3	Reservoir	25.000	263.5			
Wildschutsvlei	Balancing Tank	0.300	189.7			
Total		**59.544**				
Water Pump Stations						
Name	**Location / Description**	**No. of Pumps**	**Operate / Standby**	**Q (l/s)**	**H (m)**	**Capacity (Ml/d)**
Darling PS	At Darling: Boost to Darling reservoir	2	1/1	47 (1)	75	4.061
Yzerfontein PS	At Darling: Boost to Wildschutsvlei Balancing Tank	2	1/1	69 (1)	88	5.962
Rustfontein PS	Booster: Kasteelberg to Glen Lily reservoirs	2	0/2	235 (1)	40	20.304
Swavelberg PS	Booster: Kasteelberg to Glen Lily reservoirs	2	0/2	302 (1)	40	26.093
Swartland RW PS	Swartland WTW (Canal through WTW)	3	2/3	369 (2)	17	31.882
Swartland PS	Swartland WTW (WTW to Kasteelberg reservoirs)	4	2/2	354 (3)	46	30.586
Gouda PS	Swartland WTW (WTW to Gouda reservoir)	2	1/2	21.2 (2)	125	1.832
Kamp PS	Swartland WTW (WTW to Kamp reservoir)	2	1/1	Unknown	Unknown	Unknown

Note: ( ) Number of pumps used for calculation of Q in l/s

The table below gives an overview of the major bulk infrastructure components of the Withoogte bulk water distribution system.

Table A.3.3: Existing Water Infrastructure of the Withoogte Bulk Water Distribution System			
Bulk and Network Pipelines			
Component	**Bulk (km)**	**Network (km)**	**Total (km)**
Water Pipelines	314.205	376.610	**690.815**
Reservoirs			
Name	**Type**	**Capacity (Ml)**	**TWL**
Withoogte Raw Water Dam	Dam	260.000	180
Withoogte WTW Clearwell	WTW	22.500	175
Byeneskop No. 1	Reservoir	0.628	243.8
Byeneskop No. 2	Reservoir	0.873	243.8
Vergeleë No. 1	Reservoir	4.500	90
Vergeleë No. 2	Reservoir	4.500	90
Vergeleë No. 3	Reservoir	15.000	91
Besaansklip	Reservoir	45.000	99
Besaansklip Modular addition No.1	Reservoir	6.000	99
Besaansklip Modular addition No.1	Reservoir	6.000	99
Besaansklip Modular addition No.1	Reservoir	6.000	99
Besaansklip Modular addition No.1	Reservoir	6.000	99
New Besaansklip	Reservoir	15.000	100.14
Total		**392.001**	

Table A.3.3: Existing Water Infrastructure of the Withoogte Bulk Water Distribution System						
Water Pump Stations						
Name	**Location / Description**	**No. of Pumps**	**Operate / Standby**	**Q (l/s)**	**H (m)**	**Capacity (Ml/d)**
Misverstand Raw Water PS	Misverstand Dam	5	5/0	1 236	200	106.800
Byeneskop PS	WTW to Byeneskop Reservoirs	3	2/1	35.5	91	3.072
Moorreesburg PS	WTW to Moorreesburg PS (LM)	2	1/1	67.5	102	5.830

The table below gives an overview of the major water infrastructure components, for the various internal distribution systems, in Swartland Municipality's Management Area.

Table A.3.4: Existing Water Infrastructure for the Various Internal Distribution Systems							
Water Distribution System	**Bulk Supply**	**WTW**		**Bulk and Reticulation**	**Number of Water PS**	**Reservoir Storage**	
	(Resources)	**Managed by West Coast DM**	**Add Disinfection**	**(km)**	**(RW/PW)**	**(Ml)**	**No.**
Malmesbury (Abbotsdale, Kalbaskraal, Riverlands, Chatsworth)	Berg River (Voëlvlei), Paardenberg Dam and three Riverlands bhs	29 Ml/d (Swartland WTW)	Malmesbury, Kalbaskraal, Riverlands	264.495	11 (PW)	39.393	18
Moorreesburg	Berg River (Misverstand)	72 Ml/d (Withoogte WTW)	-	72.538	1 (PW)	8.172	3
Riebeek Kasteel	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	23.084	1 (PW)	1.862	2
Riebeek Wes	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	22.308	1 (PW)	2.692	3
Ongegund	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	7.367	1 (PW)	2.298	1
Koringberg	Berg River (Misverstand)	72 Ml/d (Withoogte WTW)	-	10.353	-	0.508	2
Darling	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	46.285	-	3.432	3
Yzerfontein	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	38.698	-	4.375	2

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

Table A.3.5: Existing Sewerage Infrastructure				
Sewer Drainage Systems	**Sewer Drainage Network (m)**	**Number of Sewer PS**	**WWTW**	
			Hydraulic Design Capacity (Ml/d)	**Organic Design Capacity (kg COD/d)**
Malmesbury and Abbotsdale	147.705	6	10.000	10 000
Kalbaskraal	7.197	2	0.157	To be confirmed
Riverlands and Chatsworth	5.106	2	0.270	To be confirmed
Moorreesburg	59.870	-	2.000	2 000
Riebeek Kasteel, Riebeek Wes and Ongegund	51.581	10	1.900	1 500
Koringberg	2.612	-	0.030	To be confirmed
Darling	40.930	2	1.500	1 500

The table below gives an overview of the refurbishment needs and O&M occurrence of the existing water and sewerage infrastructure.

Table A.3.6: Refurbishment Need and O&M Occurrence

Component	Refurbishment Need				O&M Occurrence				Observation			
	High	Medium	Low	None	Regular	Periodic	Sporadic	None	Dysfunctional	Operational	Prime Condition	Vandalised
Boreholes	-	-	-	3	3	-	-	-	-	3	-	-
Abstraction points	-	-	2	-	2	-	-	-	-	2	-	-
Bulk and reticulation pipelines	-	-	951	-	951	-	-	-	-	951	-	-
Reservoirs	2	1	-	38	41	-	-	-	-	35	6	-
Water pump stations	1	1	1	20	23	-	-	-	-	11	12	-
WTW	-	-	2	-	2	-	-	-	-	2	-	-
Sewer pipelines	-	-	315	-	315	-	-	-	-	315	-	-
Sewer pump stations	-	-	14	8	22	-	-	-	-	21	1	-
WWTW	2	2	-	3	7	-	-	-	-	4	3	-

Asset Management: An updated Asset Management Policy is in place (Reviewed and amended May 2023). Swartland Municipality has a large investment in property, plant and equipment (PPE). The carrying value of PPE is projected to be very constant as capital additions is projected to be approximately in line with the annual depreciation charge. The large investment in PPE is basically the result of a continued large capital program employed at the Municipality to ensure that basic services are delivered at all times and service delivery backlogs are addressed.

The complete nature of repairs and maintenance has changed from the norm as it was calculated, with the implementation of mSCOA on 1 July 2017.

Swartland Municipality updated their current Asset Register after June 2023, in order to include the new assets constructed during the 2022/2023 financial year. The tables that follow give an overview of the current water and sewerage infrastructure included in Swartland Municipality's Asset Register.

Water Infrastructure: The Opening Cost and Book Value of the water infrastructure included in Swartland Municipality's current Asset Register (June 2023) is summarised in the table below.

Table A.3.7: Opening Cost (OC) and Book Value (BV) of the Water Infrastructure

Asset Type	GIS ID	Opening Cost (OC)	Book Value (BV)	% BV / OC
Boreholes	BH	R6 169 524	R6 364 420	103%
Pump Stations	WPS	R17 770 078	R7 870 026	44%
Reservoirs	RES	R135 231 874	R61 711 730	46%
Reticulation Pipelines	WRP	R348 482 573	R173 704 719	50%
Bulk Water Pipelines	BWP	R146 680 189	R92 491 996	63%
Dams	DAM	R36 350 585	R4 379 828	12%
Water Consumer Connections	WCC	R148 476 673	R29 307 359	20%
Electrical	ELEC	R997 031	R614 612	62%
Other Assets	OTH	R39 904 296	R26 712 074	67%
Totals		**R880 062 823**	**R880 062 823**	**46%**

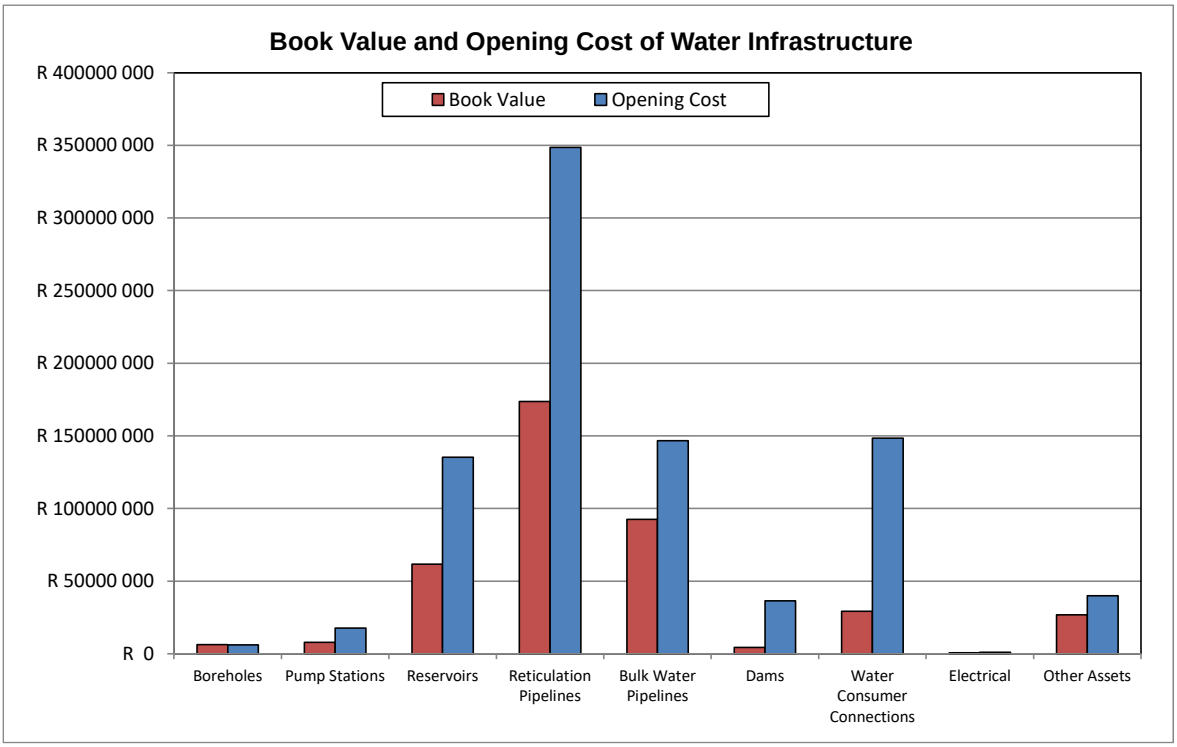

Figure A.3.1: Book Value and Opening Cost of the Water Infrastructure

The previous table indicates that 54.0% of the value of the water supply infrastructure has been consumed. The table and graph below give an overview of the RUL by facility type for the water infrastructure.

Table A.3.8: Overview of the RUL by Facility Type for the Water Infrastructure (OC)

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Boreholes	BH	R10 000	R90 320	R170 044	R114 107	R5 785 053
Pump Stations	WPS	R2 596 367	R1 463 903	R1 929 436	R7 446	R11 772 926
Reservoirs	RES	R1 247 062	R0	R3 800 395	R1 376 342	R128 808 075
Reticulation Pipelines	WRP	R5 147 878	R0	R73 225 247	R11 733 123	R258 376 325
Bulk Water Pipelines	BWP	R563 639	R0	R14 487 984	R4 898 353	R126 730 213
Dams	DAM	R464 427	R0	R529 785	R1 165 363	R34 191 010
Water Consumer Connections	WCC	R0	R0	R0	R0	R148 476 673
Electrical	ELEC	R0	R0	R6 581	R0	R990 450
Other Assets	OTH	R18 364 805	R3 836 510	R4 641 801	R7 948 553	R5 112 627
Totals		**R28 394 178**	**R5 390 733**	**R98 791 273**	**R27 243 287**	**R720 243 352**

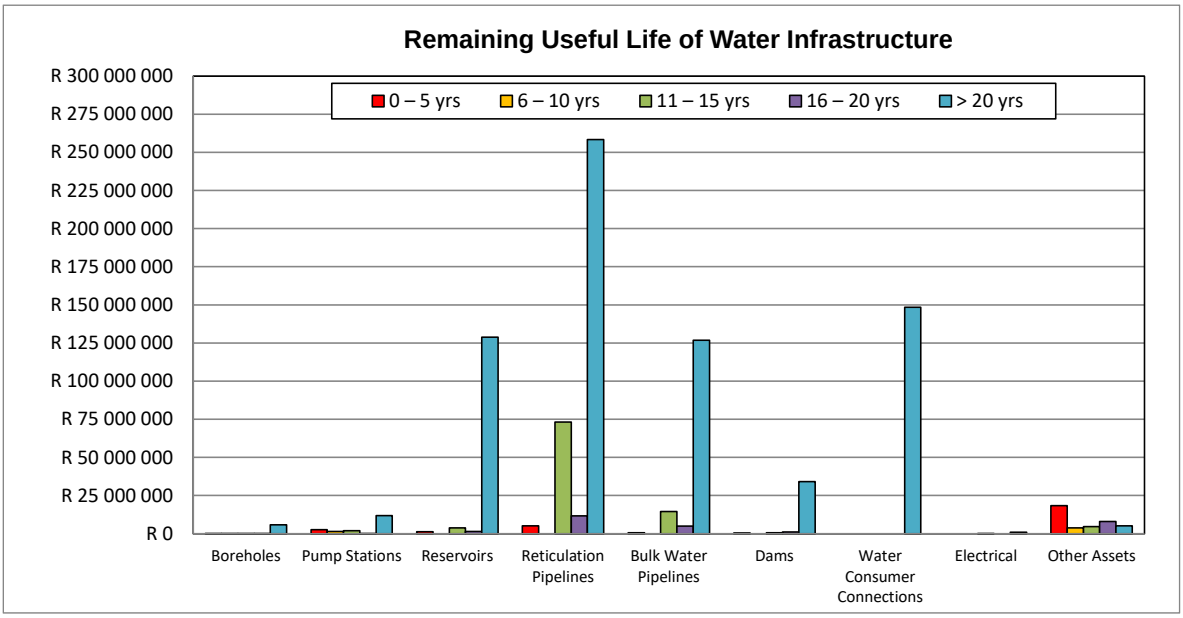

Figure A.3.2: Remaining Useful Life of the Water Infrastructure

The table and graph below give an overview of the age distribution by facility type for the water infrastructure.

Table A.3.9: Overview of the Age Distribution by Facility Type for the Water Infrastructure (OC)

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Boreholes	BH	R5 813 881	R91 536	R114 107	R0	R150 000
Pump Stations	WPS	R2 353 937	R656 128	R5 473 821	R3 311 152	R5 975 040
Reservoirs	RES	R1 021 422	R7 688 965	R47 589 095	R9 648 062	R69 284 330
Reticulation Pipelines	WRP	R27 966 457	R19 542 644	R96 447 147	R20 328 740	R184 197 585
Bulk Water Pipelines	BWP	R19 911 969	R663 869	R7 181 241	R18 632 684	R100 290 426
Dams	DAM	R0	R1 228 062	R4 374 981	R703 791	R30 043 751
Water Consumer Connections	WCC	R0	R0	R27 842	R11 494 000	R136 954 831
Electrical	ELEC	R6 581	R524 930	R465 520	R0	R0
Other Assets	OTH	R13 533 723	R19 946 320	R2 559 280	R813 568	R3 051 405
Totals		**R70 607 970**	**R50 342 454**	**R164 233 034**	**R64 931 997**	**R529 947 368**

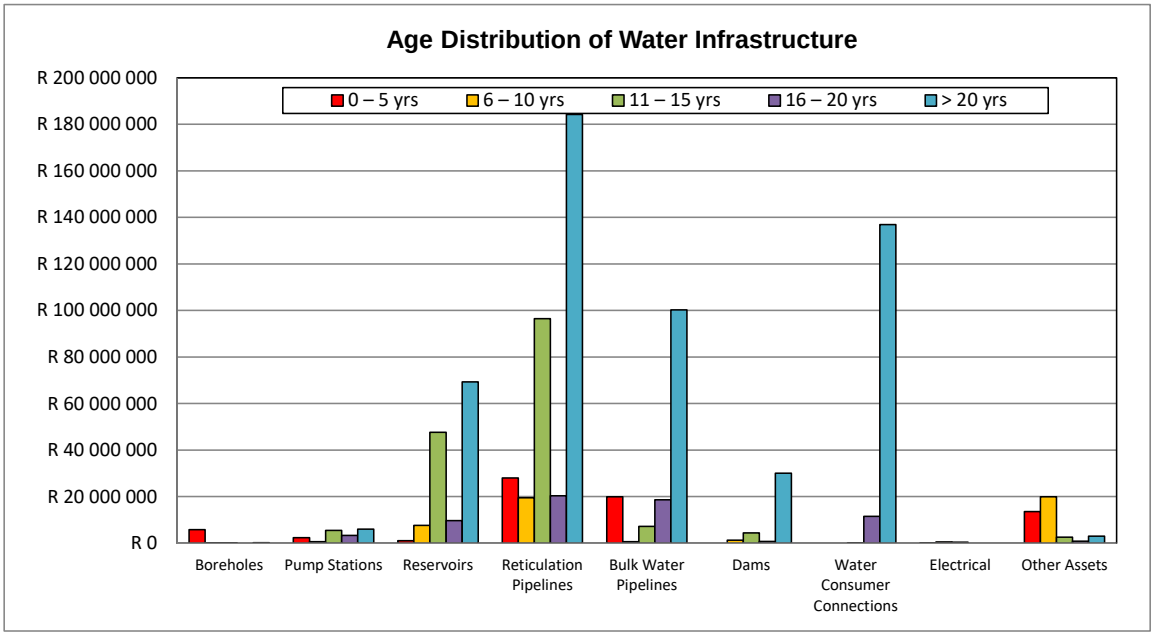

Figure A.3.3: Age Distribution of the Water Infrastructure

The tables below give an overview of the water infrastructure assets for the Swartland bulk water distribution system, which is owned by the Swartland Municipality, but operated and maintained by the West Coast District Municipality. The Opening Cost and Book Value of the bulk water infrastructure is summarised in the table below (June 2023).

Table A.3.10: Opening Cost and Book Value of the Bulk Water Infrastructure (Swartland Bulk Water Distribution System)			
Asset Type	**Opening Cost (OC)**	**Book Value (BV)**	**% OC / BV**
Pump Stations	R6 886 347	R4 453 668	65%
Reservoirs	R48 884 416	R33 359 602	68%
Reticulation Pipelines	R69 750 948	R39 433 654	57%
Water Meters	R389 711	R289 950	74%
WTW	R23 191 967	R15 271 540	66%
Electrical	R1 028 455	R636 220	62%
Totals	**R150 131 844**	**R93 444 634**	**62%**

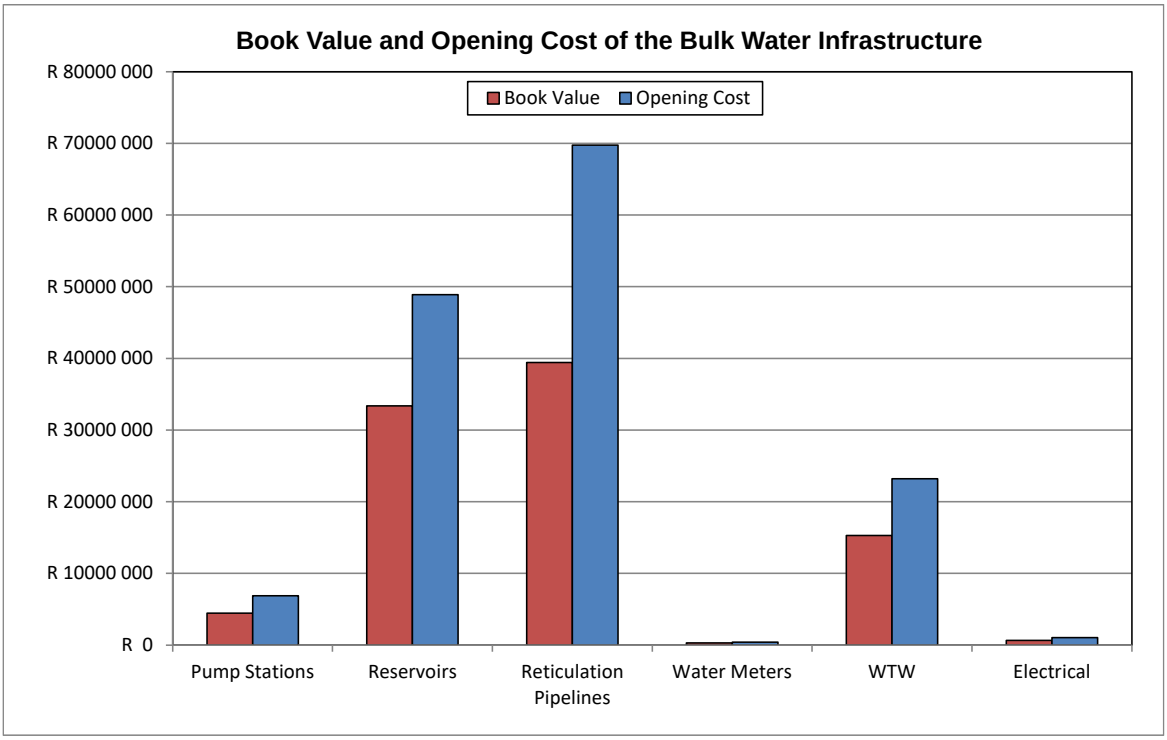

Figure A.3.4: Book Value and Opening Cost of the Bulk Water Infrastructure

The table and graph below give an overview of the RUL by facility type for the bulk water infrastructure.

Table A.3.11: Overview of the RUL by Facility Type for the Bulk Water Infrastructure (OC, Swartland Bulk Water Distribution System)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Pump Stations	R24 890	R0	R2 589 481	R50 490	R4 221 486
Reservoirs	R29 813	R0	R613 317	R27 662	R48 213 624
Reticulation Pipelines	R0	R0	R69 577 563	R106 315	R67 070
Water Meters	R0	R0	R266 416	R89 316	R33 979
WTW	R440 328	R0	R463 045	R2 209 689	R20 078 905
Electrical	R0	R0	R0	R0	R1 028 455
Totals	**R495 031**	**R0**	**R73 509 822**	**R2 483 472**	**R73 643 519**

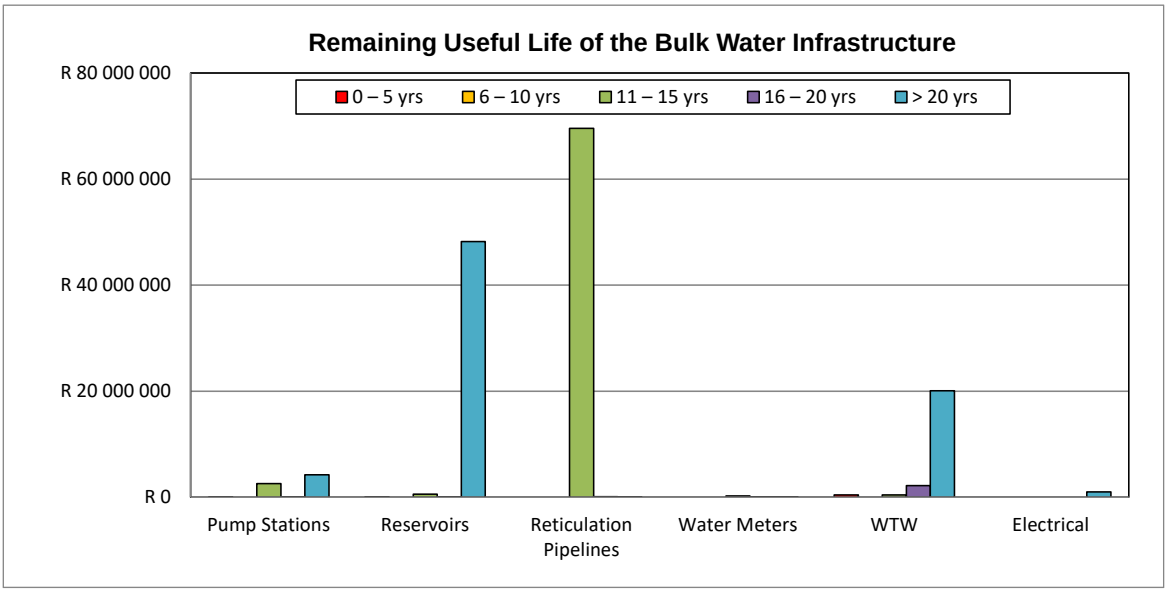

Figure A.3.5: Remaining Useful Life of the Bulk Water Infrastructure

The table and graph below give an overview of the age distribution by facility type for the bulk water infrastructure.

Table A.3.12: Overview of the Age Distribution by Facility Type for the Bulk Water Infrastructure (OC, Swartland Bulk Water Distribution System)

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Pump Stations	R0	R2 263 619	R4 290 439	R332 289	R0
Reservoirs	R0	R0	R48 784 536	R99 880	R0
Reticulation Pipelines	R20 215	R8 462 824	R61 267 909	R0	R0
Water Meters	R223 575	R104 350	R61 786	R0	R0
WTW	R173 009	R2 436 711	R20 136 377	R445 870	R0
Electrical	R0	R0	R1 028 455	R0	R0
Totals	**R416 799**	**R13 267 504**	**R135 569 502**	**R878 039**	**R0**

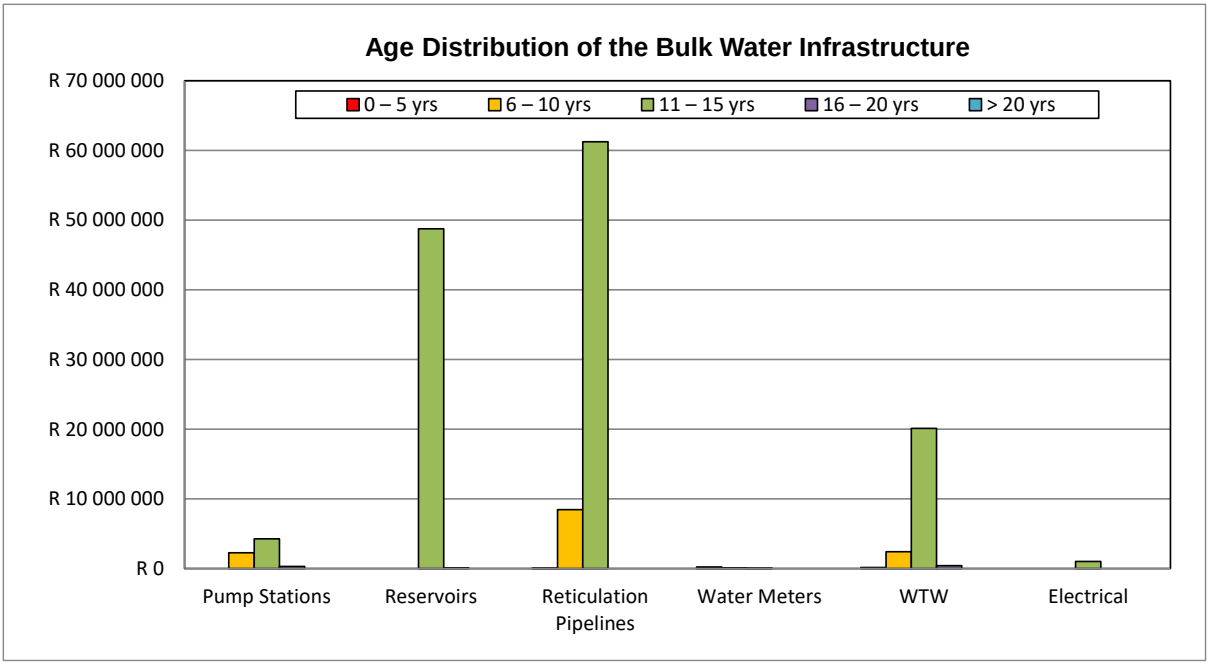

Figure A.3.6: Age Distribution of the Bulk Water Infrastructure

Sewerage Infrastructure: The Opening Cost and Book Value of the sewerage infrastructure included in Swartland Municipality's current Asset Register (June 2023) is summarised in the table below.

Table A.3.13: Opening Cost (OC) and Book Value (BV) of the Sewerage Infrastructure				
Asset Type	**GIS ID**	**Opening Cost (OC)**	**Book Value (BV)**	**% BV / OC**
Sewer Pump Stations	SPS	R16 655 331	R 7 149 256	43%
Sewage Treatment Works	STW	R249 463 337	R 201 844 640	81%
Sewer Reticulation Pipelines	SRP	R278 306 190	R 146 508 794	53%
Bulk Sewer Pipelines	BSP	R60 769 892	R 37 671 726	62%
Sewer Consumer Connections	SCC	R106 390 949	R 19 925 241	19%
Other Assets	OTH	R9 737 532	R 7 070 269*	73%
Totals		**R721 323 231**	**R 420 169 926**	**58%**

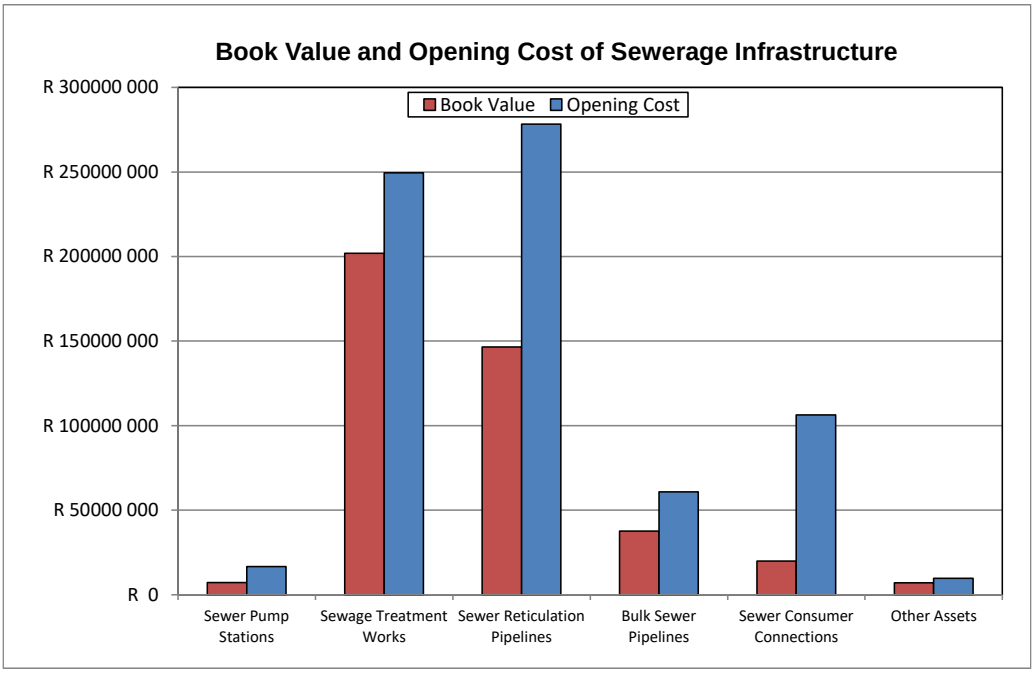

Figure A.3.7: Book Value and Opening Cost of the Sewerage Infrastructure

The previous table indicates that about 42.0% of the value of the sewerage infrastructure has been consumed.

The following table and graph give an overview of the RUL by facility type for the sewerage infrastructure.

Table A.3.14: Overview of the RUL by Facility Type for the Sewerage Infrastructure (OC)						
Asset Type	**GIS ID**	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Sewer Pump Stations	SPS	R4 655 802	R183 717	R2 137 131	R1 967 284	R7 711 397
Sewage Treatment Works	STW	R1 222 373	R2 266 340	R73 004 081	R10 496 545	R162 473 998
Sewer Reticulation Pipelines	SRP	R0	R0	R25 066 217	R13 019 068	R240 220 905
Bulk Sewer Pipelines	BSP	R0	R0	R2 614 964	R0	R58 154 928
Sewer Consumer Connections	SCC	R0	R6 845 000	R0	R422 949	R99 123 000
Other Assets	OTH	R4 091 918	R4 249 386	R0	R159 272	R1 236 956
Totals		**R9 970 093**	**R13 544 443**	**R102 822 393**	**R26 065 118**	**R568 921 184**

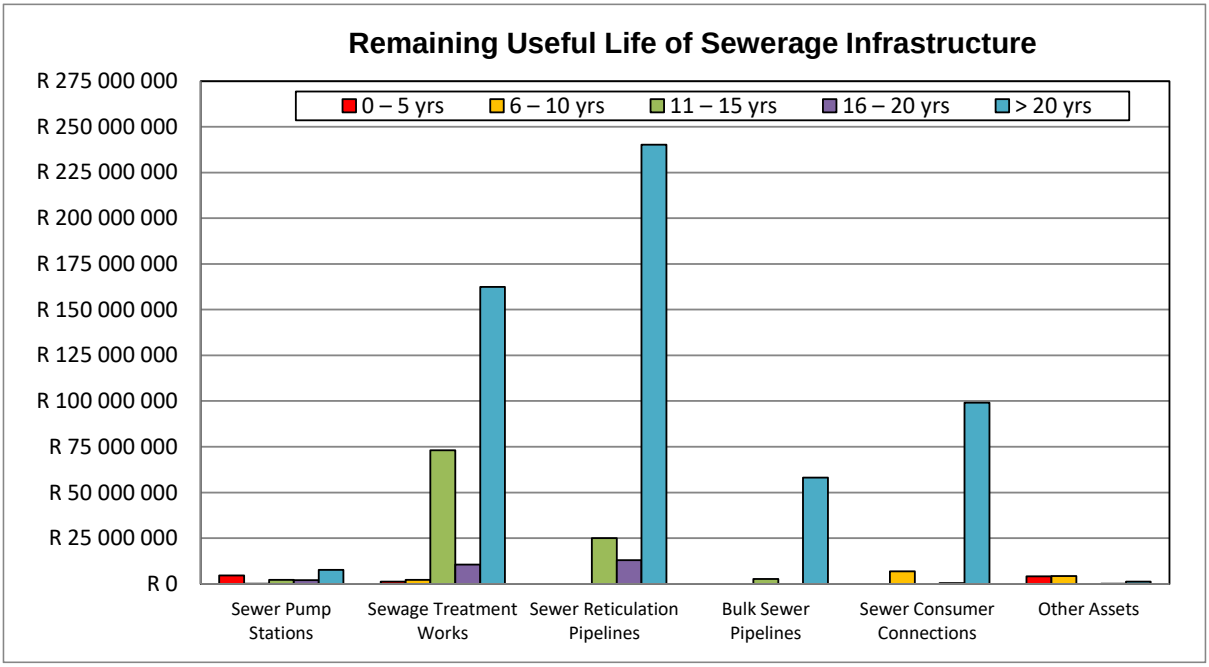

Figure A.3.8: Remaining Useful Life of the Sewerage Infrastructure

The following table and graph give an overview of the age distribution per facility for the sewerage infrastructure.

Table A.3.15: Overview of the Age Distribution by Facility Type for the Sewerage Infrastructure (OC)

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Sewer Pump Stations	SPS	R3 922 674	R1 161 879	R4 029 220	R3 546 017	R3 995 541
Sewage Treatment Works	STW	R755 131	R197 586 213	R34 509 836	R0	R16 612 157
Sewer Reticulation Pipelines	SRP	R19 758 239	R10 645 321	R20 555 847	R31 461 899	R195 884 884
Bulk Sewer Pipelines	BSP	R16 325 339	R0	R60 022	R8 890 427	R35 494 104
Sewer Consumer Connections	SCC	R0	R0	R580 949	R410 000	R105 400 000
Other Assets	OTH	R272 523	R4 443 560	R3 741 176	R93 772	R1 186 501
Totals		**R41 033 906**	**R213 836 973**	**R63 477 050**	**R44 402 115**	**R358 573 187**

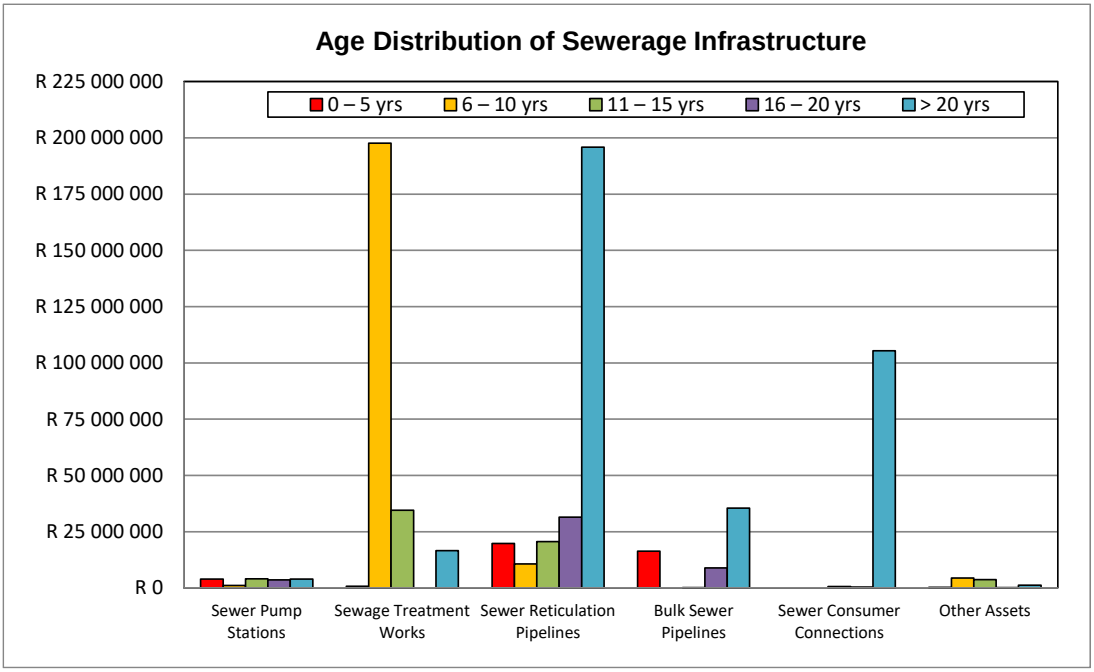

Figure A.3.9: Age Distribution of the Sewerage Infrastructure

Disaster Management Plan: The West Coast District Municipality has a functional Disaster Management Centre (DMC) located in Moorreesburg, which attends to all Disaster Risk Management (DRM) related issues. The West Coast District Municipality DMC has developed a Disaster Management Policy Framework and established a Municipal Disaster Management Advisory Forum to encourage participation of stakeholders in disaster management related matters.

Untreated Effluent Management Plan: All effluent discharged in the urban areas in Swartland Municipality are treated at the existing WWTWs and there is no known untreated effluent discharged to the environment. W_2RAPs were prepared for all the wastewater treatment systems.

TOPIC 4: WATER SERVICES OPERATION AND MAINTENANCE

Maintenance is usually practiced in two forms, preventative maintenance and corrective maintenance. A third form is called design-out maintenance, which is rather an aspect of the design considerations when the infrastructure is planned.

Pipe bursts and other serious damage to pipes immediately interrupts services to the affected area and is rapidly addressed by Swartland Municipality. O&M is a continuous process for Swartland Municipality involving various activities, with the ultimate purpose of delivering good quality services to all customers at all times and keeping the percentage of water lost through pipe bursts and other serious damage to pipes as low as possible. Swartland Municipality's O&M Plan depends on a range of factors such as the age and condition of the water supply system (Pipe Replacement Study), requirements of the Municipality and DWS as the regulating authority, the availability of staff, plant, equipment, spares, money and other resources.

Swartland Municipality also have standby teams available after hours and over weekends, besides the planned and scheduled O&M activities, in order to allow for unscheduled responses to service breakdowns due to mal-functioning equipment, vandalism, emergency situations, etc. This allows Swartland Municipality to be able to quickly assess service breakdowns and re-allocate staff and resources to do unscheduled repairs, and then quickly return to the regular and scheduled O&M activities. The technical personnel ensure that sufficient repair materials, consumables and back-up equipment are also available in the stores.

Table A.4.1: Operation and Maintenance

Compliancy	Existing Groundwater Infrastructure	Existing Surface Water Infrastructure	Existing WTW Infrastructure	Existing WWTW Infrastructure	Existing Pump Station Infrastructure	Existing Bulk Pipeline Infrastructure	Existing Tower & Reservoir Infrastructure	Existing Reticulation Infrastructure
Resources	Min. requirement	Min. requirement	Above min. requirement	Min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement
Information	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement
Activity Control & Management	Min. requirement	Min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement

TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

The implementation of Swartland Municipality's Water Demand Management Strategy has been extremely successful, and the Municipality was able to reduce the water requirements of the towns significantly. The average annual water requirement growth over the period 2001/2002 to 2022/2023 was 1.38 %/a. The table below gives a summary of the NRW, Water Losses and ILI for the various water distribution systems in Swartland Municipality's Management Area.

Table A.5.1: NRW, Water Losses and ILIs for the Various Water Distribution Systems

Description	Component	Unit	Record: Prior (Ml/a)					22/23
			17/18	18/19	19/20	20/21	21/22	
Koringberg	NRW	Volume	14.213	14.694	16.976	13.395	12.099	7.337
		Percentage	32.20%	31.50%	32.70%	23.70%	21.80%	13.5%
	Water Losses	Volume	14.125	13.953	16.224	12.634	10.368	5.608
		Percentage	32.00%	29.90%	31.30%	22.40%	18.70%	10.4%
	ILI		**1.37**	**1.41**	**1.59**	**1.8**	**1.51**	**0.83**
Ongegund	NRW	Volume	16.655	6.546	4.236	3.075	9.214	1.260
		Percentage	60.30%	36.40%	24.90%	17.40%	38.40%	5.9%
	Water Losses	Volume	16.6	6.438	4.13	2.968	8.986	1.037
		Percentage	60.10%	35.80%	24.20%	16.80%	37.40%	4.9%
Riebeek Wes	NRW	Volume	21.515	23.263	22.04	26.49	18.314	19.802
		Percentage	16.90%	16.60%	14.00%	15.50%	10.20%	11.2%
	Water Losses	Volume	21.261	18.302	17.044	21.468	6.255	7.749
		Percentage	16.70%	13.00%	10.80%	12.60%	3.50%	4.4%
	ILI		**1.27**	**1.09**	**0.82**	**0.8**	**0.23**	**0.29**
Riebeek Kasteel	NRW	Volume	52.18	25.377	47.762	52.79	98.088	153.504
		Percentage	30.90%	13.80%	21.40%	20.60%	29.60%	38.6%
	Water Losses	Volume	51.842	23.426	45.732	50.693	93.466	148.749
		Percentage	30.70%	12.80%	20.50%	19.80%	28.20%	37.4%
	ILI		**1.77**	**0.77**	**1.52**	**1.45**	**2.72**	**4.21**
Yzerfontein	NRW	Volume	51.93	15.977	47.109	60.201	40.333	24.725
		Percentage	33.60%	9.10%	19.80%	20.10%	13.10%	8.2%
	Water Losses	Volume	51.621	10.585	41.593	54.562	27.117	11.526
		Percentage	33.40%	6.00%	17.50%	18.20%	8.80%	3.8%
	ILI		**1.37**	**0.25**	**0.97**	**1.03**	**0.5**	**0.21**
Darling	NRW	Volume	91.397	127.003	138.078	150.505	150.43	-6.984
		Percentage	19.60%	25.80%	26.70%	26.40%	25.00%	-1.5%
	Water Losses	Volume	90.466	123.212	134.234	146.555	142.205	-14.918
		Percentage	19.40%	25.10%	25.90%	25.70%	23.60%	-3.3%
	ILI		**1.42**	**1.9**	**2.08**	**3.2**	**3.09**	**2.28**
Moorreesburg	NRW	Volume	110.91	110.213	119.301	136.476	169.718	196.685
		Percentage	23.10%	20.70%	20.20%	20.30%	24.50%	27.4%
	Water Losses	Volume	109.948	103.172	112.145	129.156	153.392	180.308
		Percentage	22.90%	19.40%	19.00%	19.20%	22.10%	25.1%
	ILI		**1.37**	**1.25**	**1.36**	**1.74**	**2.06**	**2.40**
Malmesbury	NRW	Volume	290.408	308.07	379.3	595.795	755.496	459.356
		Percentage	14.70%	14.10%	15.00%	20.30%	23.40%	15.0%
	Water Losses	Volume	286.461	276.769	347.331	562.994	681.709	385.917
		Percentage	14.50%	12.70%	13.80%	19.20%	21.10%	12.6%
	ILI		**1.3**	**1.17**	**1.44**	**2.2**	**2.67**	**1.46**
TOTAL	**NRW**	**Volume**	**649.208**	**631.143**	**774.802**	**1 038.73**	**1 253.692**	**855.685**
		Percentage	**18.86%**	**16.72%**	**17.95%**	**20.86%**	**23.10%**	**16.51%**
	Water Losses	**Volume**	**642.325**	**575.857**	**718.433**	**981.03**	**1 123.498**	**725.976**
		Percentage	**18.66%**	**15.25%**	**16.64%**	**19.70%**	**20.70%**	**14.00%**
	ILI		**1.51**	**1.41**	**1.6**	**2.11**	**2.4**	**1.83**

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 previous 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 an 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.

The table below gives an overview of the System Input Volume, Average Billed Metered Consumption and Non-Revenue Water in litre per connection per day for the various water distribution systems for the 2022/2023 financial year.

Table A.5.2: System Input Volume, Average Billed Metered Consumption and NRW in Litre per Connection per Day for the various Water Distribution Systems for 2022/2023

Water Balance Component	Koringberg	Ongegund	Riebeek Wes	Riebeek Kasteel	Yzerfontein	Darling	Moorreesburg	Malmesbury
System Input Volume	409	533	457	659	459	464	620	680
Average Billed Metered Cons.	353	501	406	404	421	471	450	578
Non-Revenue Water	55	32	51	254	38	-7	170	102

Malmesbury is the town with the highest system input volume and average billed metered consumption per connection per day, because it is main town of Swartland Municipality and the town with the biggest commercial centre. Riebeek Kasteel is the town with the highest NRW per connection per day.

The table below gives an overview of the various WC/WDM measures and whether the measures are adequately addressed by Swartland Municipality.

Table A.5.3: Reducing NRW and Water Losses		
Reducing NRW and Water Losses		**Assessment Score**
Night flow metering	Partially	60%
Day flow metering	Yes	80%
Reticulation leaks	Yes	80%
Illegal connections	Yes	80%
Un-metered connections	Yes	80%
Leak and meter repair programmes. Consumer units targeted by:		
Leak repair assistance programme	Partially	60%
Retro-fitting of water inefficient toilets	Partially	60%
Meter repair programme	Yes	80%
Consumer/end-use demand management: Public Information & Education Programmes		
Schools targeted by education programmes	Partially	40%
Consumers targeted by public information programmes	Yes	80%

The main **water demand management interventions** undertaken by Swartland Municipality over the last few years, as included in their WDM Strategy of September 2019, are summarised in the table below.

Table A.5.4: WDM activities implemented by Swartland Municipality
Reduce water losses and non-revenue water
• Metering of all water usage – households, standpipes, municipal parks, industrial, commercial and institutional. • Monthly reading and billing of all meters. • Inspection for illegal connections on an ongoing basis; • Formalising all illegal and/or unmetered connections immediately upon coming to attention; • Metering and billing of temporary consumption, typically by construction companies; • Annual audit of all meters 50mm and larger and replacement of the meters where necessary; • Monthly monitoring of all wet industries and large volume water users for deviations together with appropriate actions in the event of a deviation. • Monthly monitoring and inspection of zero usage consumers; • Repair of burst pipes within 3 hours; • Accurate calculation of water losses and record keeping; • Zone metering;

Table A.5.4: WDM activities implemented by Swartland Municipality
• Day flow metering; • Re-use of treated effluent for the irrigation of sport fields in Moorreesburg, Malmesbury, Darling and Riebeek Kasteel; • Watering of municipal parks during cooler early morning hours; and • Re-Use of treated effluent during construction projects instead of potable water, where possible.
Pressure Management
• Pressure control at high pressure zones in each of the towns in the Municipal Area.
Leak and Meter Repairs
• Leak repairs assistance programme for indigent households; • Meter replacement programme for all connections; • Annual fire hydrant inspection for leaks and functioning; • Retrofitting of municipal buildings with water efficient equipment; • Immediate leak repair in municipal buildings; and • Meter audits to determine the accuracy of meter readings.
Consumer / End User Demand Management
• Block tariffs to discourage inefficient and wasteful use of water; • Drought tariffs applicable during times of severe drought; • Central customer care service where leaks are reported by the public; • Incremental levels of stringency for water restrictions, to manage demand during periods of drought and water shortages; • Notices and communication media on billboards and municipal website raising awareness pertaining water conservation; and • Communicating information on municipal bills pertaining water use and target volume savings.
Infrastructure Management
• Operations and maintenance schedule; • Regular inspections of water distribution networks, pump stations and reservoirs; and • Current Water- and Sewer Masterplan based on current available growth projections.
Reduction in Municipal Water Demand
• Municipal parks have been re-landscaped to be less water intensive. Watering has been limited to before 08:00 am, in order to limit water losses through evaporation.
Alternative Resources
• Funding was secured for the development of groundwater as an alternative resource. Boreholes were drilled as an alternative water source and have yielded reasonable volumes.

DWS's scorecard for assessing the potential for WC/WDM efforts was completed for Swartland Municipality. The aim of the scorecard was to establish areas where the municipality has made good progress in relation to WC/WDM and where there is still room for improvement. It can be seen from the Scorecard that there are 25 questions each of which carries a maximum of 4 points providing a possible maximum score of 100. If the Municipality has the specific item completely under control, it receives the maximum points and if it is neglecting the item completely it receives no points. There are various levels between the maximum and the minimum number of points assigned to the municipality for each item depending on the level of completeness or lack thereof. **The status quo score for Swartland Municipality is 85 out of 100 suggesting that the Municipality is making good progress with regard to the implementation of specific WC/WDM activities.**

TOPIC 6: WATER RESOURCES

The West Coast District Municipality applied to the DWS in December 2013 to increase the allocation from the System to initially 18.087 million m^3/a for the Withoogte supply area, which is to be increased to 30.3 million m^3/a by 2033, and to 6.39 million m^3/a for the Swartland supply area (to be increased to 11.1 million m^3/a by 2033). The current raw water abstraction Licence No. 01/G10F/A/5903 of October 2017 list the following volumes allocated to the respective WSAs, which include operational, treatment and bulk conveyance losses.

Table A.6.1: Volumes Allocated to the Respective WSAs in Licence No. 01/G10F/A/5903			
Name	**Resource Name**	**WSA**	**Maximum Volume (Ml/a)**
Withoogte from Misverstand Weir	Berg River	Saldanha LM	20 427.000
		Swartland LM	**1 573.600**
		Berg River LM	1 439.400
Swartland from Voëlvlei Dam	Berg River	**Swartland LM**	**7 900.000**
		Drakenstein LM	300.000
Langebaan Aquifer Boreholes 1 & 2	Langebaan Aquifer	Saldanha Bay LM	675.000
Langebaan Aquifer Boreholes 3 & 4		Saldanha Bay LM	675.000
Total Allocation for the West Coast District Municipality			**32 990.000**
Total Allocation for the West Coast District Municipality from the WCWSS			**31 640.00**

The table below gives an overview of the current water resources, the current volumes abstracted and the authorised volumes.

Table A.6.2: Current Water Resources and Volumes

Source Type	Scheme	Number of Sources	Current 22/23 System Input Volumes or Returns (Mm^3/a)	Licensed Abstraction / Returns (Mm^3/a)	Community water supply		Assessment Score
					Rural	Urban	
Groundwater	-	-	-	-	-	-	80%
Surface Water	-	-	-	-	-	-	80%
External Sources (Bulk Purchase)	Koringberg	1	0.054	1.574	0%	100%	80%
	Moorreesburg	1	0.719		0%	100%	80%
	Riebeek Wes	1	0.177	7.900	0%	100%	80%
	Riebeek Kasteel	1	0.397		0%	100%	80%
	Yzerfontein	1	0.300		0%	100%	80%
	Darling	1	0.457		0%	100%	80%
	Ongegund	1	0.021		0%	100%	80%
Conjunctive Use	Malmesbury	5	3.059		0%	100%	80%
Water returned to source	Malmesbury	1 WWTW	0.534	2.781	N/A	N/A	80%
	Moorreesburg	1 WWTW	0.297	0.495	N/A	N/A	80%
	Darling	1 WWTW	0.364	0.338	N/A	N/A	80%
	Riebeek Valley	1 WWTW	0.228	0.548	N/A	N/A	80%

The table below indicates the potential additional future water resources for Swartland Municipality.

Table A.6.3: Additional Water Resources and Volumes

Source Type	Schemes	Number of Sources	Potential Volume (Mm^3/a)	Licensed Abstraction (Mm^3/a)
Groundwater	Yzerfontein	16	0.532	Not yet started
Surface Water	-	-	-	-
External Sources (Bulk Purchase)	Saldanha Bulk System	1	To be determined	1.574
	Swartland Bulk System	1	To be determined	7.900
	Supply from CCT *	1	To be determined	Not yet started

Note: * Supply from Atlantis to Chatsworth and Riverlands

Swartland Municipality has an established monitoring plan to monitor the volume of water supplied to the various towns by the West Coast District Municipality and the volume of water abstracted from their own surface and ground water resources and quality of the water abstracted.

Table A.6.4: Monitoring

Monitoring	Assessment Score	
% of water abstracted monitored: Surface water	80%	
% of water abstracted monitored: Ground water	80%	
Monitoring	**Interval**	**Assessment Score**
Surface water levels (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily	80%
Ground water levels (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Monthly	60%
Water quality for formal schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Monthly	80%
Water quality for rudimentary schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Monthly (WC DM)	80%
Borehole abstraction? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Monthly	60%

Detail IWA Water Balances are available for each of the water distribution systems (towns) in Swartland Municipality's Management Area. The graph below gives an overview of the annual bulk potable water supply volumes (System Input Volumes) for all the systems. The impact of the droughts experienced over the last number of years can be noted on the graphs.

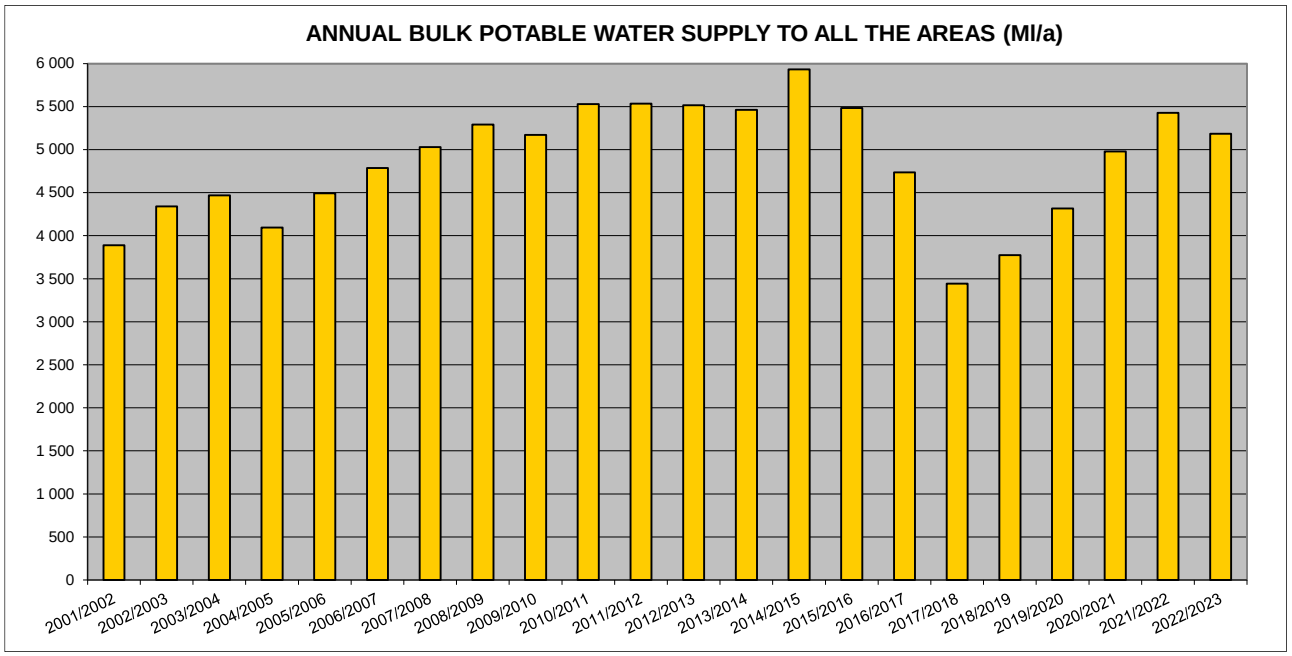

Figure A.6.1: Swartland Municipality's Annual Bulk Potable Water Supply (System Input Volume) to all the Areas

The graph below gives an overview of the historical bulk water supply (System Input Volumes) to the towns in Swartland Municipality's Management Area (Ml/a).

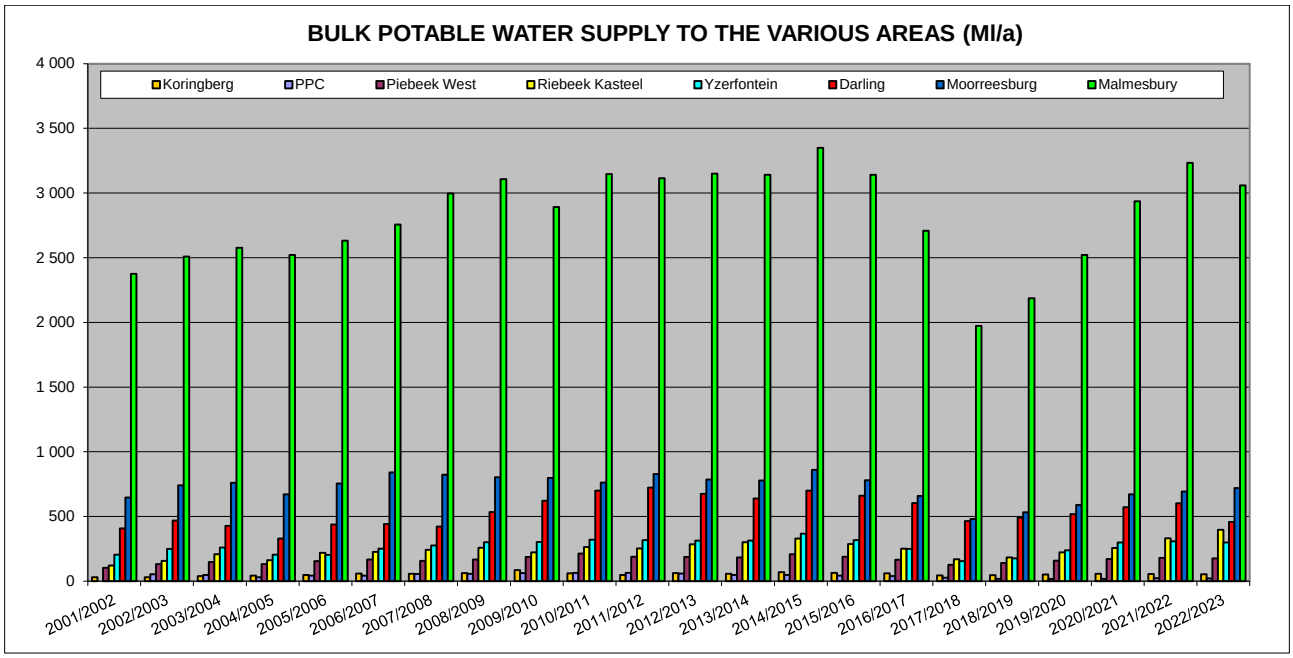

Figure A.6.2: Bulk Potable Water Supply per Distribution Network (System Input Volume)

The table below summarise the bulk potable water supplied to the various towns in Swartland Municipality's Management Area.

Table A.6.5: Bulk Water Supply (System Input Volume) for the Various Towns							
Distribution System	**Source**	**Record : Prior (Ml/a)**					**22/23**
		17/18	**18/19**	**19/20**	**20/21**	**21/22**	
Koringberg	Misverstand Scheme	44.157	46.609	51.908	56.412	55.417	54.168
PPC	Voëlvlei Scheme	27.612	18.004	17.033	17.662	24.013	21.200
Riebeek Wes	Voëlvlei Scheme	127.127	140.524	157.908	171.006	179.456	176.547
Riebeek Kasteel	Voëlvlei Scheme	169.061	183.446	223.405	256.218	330.992	397.478
Yzerfontein	Voëlvlei Scheme	154.611	175.903	238.116	299.537	308.290	299.729
Darling	Voëlvlei Scheme	465.322	491.479	518.097	570.859	602.718	456.832
Moorreesburg	Misverstand Scheme	480.789	532.506	590.106	671.591	692.967	718.573
Malmesbury	Voëlvlei Scheme, Paardenberg dam, Boreholes	1 973.521	2 186.436	2 520.750	2 936.354	3 233.662	3 059.176
Total Supply to all towns		**3 442.200**	**3 774.907**	**4 317.323**	**4 979.639**	**5 427.515**	**5 183.703**

Water Quality: A comprehensive Operational Sampling programme is implemented by the West Coast District Municipality at their two bulk WTWs. Monthly Compliance samples are also taken by the West Coast District Municipality and Swartland Municipality throughout the various towns. The water quality results are loaded onto DWS's IRIS system via the internet. Once entered the data is automatically compared to the SANS241 Drinking Water Quality Standards. This real-time system allows for immediate intervention to rectify any problems.

The table below gives an overview of the various water quality monitoring measures and whether it is in place for Swartland Municipality.

Table A.6.6: Water Quality			
Water Quality	**In place**	**Status Quo**	**Assessment Score**
Is there a Water Safety Plan in Place?	Yes	80%	80%
Reporting on quality of water taken from source: urban & rural	Yes	80%	80%
Quality of water returned to the resource: urban	Yes	80%	80%
Quality of water returned to the resource: rural	No	Not Applicable	80%
Is there a Pollution contingency measures plan in place?	Yes	60%	60%
Quality of water taken from source: urban - % monitored by WSA self?	Yes	80%	80%
Quality of water taken from source: rural - % monitored by WSA self?	No	Not Applicable	80%
Quality of water returned to the source: urban - % monitored by WSA self?	Yes	80%	80%
Quality of water returned to the source: rural - % monitored by WSA self?	No	Not Applicable	80%
Are these results available in electronic format? (Yes/no)	Yes	80%	80%
% Time (days) within SANS 241 standards per year	Yes	80%	80%
Abstraction IS registered with DWS	Yes	80%	80%
The abstraction IS NOT registered with DWS	-	-	-
The abstraction IS recorded	Yes	80%	80%
The abstraction IS NOT recorded	-	-	-

Note: The score of 80% in the above table is Excellent, which is the highest score in DWS's eWSDP website.

The water quality of all the water distribution systems in Swartland Municipality was either "Excellent" or "Good", according to the SANS0241 classification, except for Yzerfontein that was "Unacceptable" for Operational Efficiency, due to pH and turbidity failures, and Riverlands and Chatsworth that were "Unacceptable" for Acute Health Microbiological, due to E.Coli and Total Coliform Count failures.

The overall percentage of compliance of the water quality samples taken over the last three financial years are summarised in the table below per distribution system (SANS 241: 2015 Limits).

Table A.6.7: Percentage Compliance of the Final Water Quality Samples for the Last Three Financial Years									
Performance Indicator	Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)			% Sample Compliance according to SANS241-2015 Limits			Number of Samples taken into account		
	20/21	21/22	22/23	20/21	21/22	22/23	20/21	21/22	22/23
Moorreesburg									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	10	10	10
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	40	37	53
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	82	79	95
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	96	90	122
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	97.4%	96.4%	95.6%	152	140	205
Koringberg									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent	100.0%	100.0%	100.0%	5	5	5
Acute Health Microbiological	No (Excellent)	No (Good)	No (Excellent	100.0%	96.4%	100.0%	49	55	59
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent	100.0%	100.0%	100.0%	61	73	69
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent	100.0%	100.0%	100.0%	98	110	110
Operational Efficiency	No (Excellent)	No (Excellent)	No (Good)	98.8%	97.1%	92.5%	166	204	214
Malmesbury									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	40	28	33
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	98.6%	100.0%	148	140	163
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	311	279	305
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	98.9%	100.0%	99.7%	368	334	383
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	97.8%	97.4%	96.8%	536	536	627
Darling									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	10	10	10
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	98.5%	97.6%	63	65	82
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	96	103	122
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	99.2%	100.0%	98.3%	132	138	176
Operational Efficiency	No (Excellent)	No (Good)	No (Good)	97.7%	91.3%	90.7%	215	242	311
Riebeek Kasteel									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	5	5	5
Acute Health Microbiological	No (Good)	No (Excellent)	No (Excellent)	96.3%	100.0%	100.0%	54	51	51
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	66	71	72
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	106	108	110
Operational Efficiency	No (Good)	No (Excellent)	No (Excellent)	92.3%	95.5%	97.0%	183	199	199
Riebeek Wes									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	5	10	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	26	31	27
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	98.6%	100.0%	47	73	48
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	78	62
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	100	116	104
Yzerfontein									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	5	5	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	98.1%	51	51	52
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	71	71
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	94	106	108
Operational Efficiency	No (Excellent)	Yes (Unacceptable)	Yes (Unacceptable)	97.5%	88.3%	84.3%	163	196	197
Riverlands									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	5	5	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	Yes (Unacceptable)	100.0%	100.0%	90.0%	26	26	30
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	47	48
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	60	62
Operational Efficiency	No (Excellent)	No (Excellent)	No (Good)	93.0%	96.0%	90.0%	100	101	110
Abbotsdale									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	5	5	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	26	26	27
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	47	48
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	60	62
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	96.0%	95.0%	93.3%	100	100	105
Chatsworth									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	5	5	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	Yes (Unacceptable	100.0%	100.0%	89.7%	26	27	29

Table A.6.7: Percentage Compliance of the Final Water Quality Samples for the Last Three Financial Years									
Performance Indicator	**Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)**			**% Sample Compliance according to SANS241-2015 Limits**			**Number of Samples taken into account**		
	20/21	**21/22**	**22/23**	**20/21**	**21/22**	**22/23**	**20/21**	**21/22**	**22/23**
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	50	47
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	63	60
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	94.0%	95.3%	94.2%	100	106	104
Kalbaskraal									
Acute Health Chemical	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	5	5	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Good)	100.0%	100.0%	96.3%	26	26	27
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	47	48
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	60	62
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	94.1%	94.3%	100	101	106

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.6.8: 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 table below indicates the compliance of the E.Coli monitoring frequency in the water distribution systems of Swartland Municipality, in terms of the minimum requirements of SANS:241-2: 2015 (Table 2). The period assessed was for samples taken from July 2022 to June 2023.

Table A.6.9: Swartland Municipality's Compliance of the Monthly E.Coli Monitoring Frequency for the Water Distribution Systems and at the WTWs in terms of the Minimum Requirements of SANS 241-2:2015 (Table 2).					
Distribution System	**Population served**	**Required number of monthly samples (SANS 241-2:2015: Table 2)**	**Number of monthly E.Coli samples taken on the network by Swartland Mun. and the West Coast DM**	**Number of monthly E.Coli samples taken at the Withoogte and Swartland WTW by the West Coast DM**	**Total monthly E.Coli samples taken for the potable water**
Koringberg	1 869	2	4.8	8.8	13.6
Riebeek Wes and Ongegund	8 742	2	2.1	5.1	7.2
Riebeek Kasteel	10 021	2	4.1	5.1	9.2
Yzerfontein	1 755	2	4.2	5.1	9.3
Darling	12 956	2.6	6.5	5.1	11.6
Moorreesburg	19 824	4.0	4.1	8.8	12.9
Malmesbury	58 256	11.7	12.6	5.1	17.7
Abbotsdale	5 207	2	2.1	5.1	7.2
Kalbaskraal	4 124	2	2.1	5.1	7.2
Riverlands and Chatsworth	7 692	2	4.6	5.1	9.7

The above sampling done by the Swartland Municipality plus the daily sampling done at the Withoogte WTW and the Swartland WTW by the West Coast District Municipality, as well as their monthly E.Coli sampling throughout the various towns on the systems ensure that the number of monthly E.Coli samples taken, as required by SANS 241, is adequate.

Effluent Quality: The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the last three financial years at the various WWTWs in Swartland Municipality's Management Area are summarised in the tables below.

Table A.6.10: Percentage Microbiological (Faecal Coliforms) Compliance of the Compliance Samples taken at the Various WWTWs for the Last Three Financial Years

WWTW	2020/2021	2021/2022	2022/2023
Malmesbury	100.0%	100.0%	100.0%
Darling	91.7%	75.0%	100.0%
Moorreesburg	40.0%	0.0%	8.3%
Koringberg	0.0%	0.0%	0.0%
Chatsworth	16.7%	25.0%	8.3%
Kalbaskraal	100.0%	100.0%	100.0%
Riebeek Valley	91.7%	75.0%	83.3%
Overall Compliance %	**64.9%**	**54.9%**	**57.1%**

Table A.6.11: Percentage Chemical Compliance of the Compliance Samples taken at the Various WWTWs for the Last Three Financial Years

WWTW	2020/2021					2021/2022					2022/2023				
	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall
Malmesbury	75.0%	66.7%	91.7%	58.3%	**72.9%**	91.7%	75.0%	100.0%	91.7%	**89.6%**	50.0%	66.7%	100.0%	100.0%	**79.2%**
Darling	100.0%	100.0%	100.0%	100.0%	**100.0%**	16.7%	100.0%	75.0%	91.7%	**70.8%**	50.0%	100.0%	83.3%	100.0%	**83.3%**
Moorreesburg	0.0%	80.0%	20.0%	40.0%	**35.0%**	0.0%	100.0%	0.0%	40.0%	**35.0%**	16.7%	100.0%	25.0%	41.7%	**45.8%**
Koringberg	0.0%	100.0%	0.0%	8.3%	**27.1%**	16.7%	91.7%	0.0%	16.7%	**31.3%**	0.0%	100.0%	0.0%	8.3%	**27.1%**
Chatsworth	0.0%	100.0%	0.0%	25.0%	**31.3%**	0.0%	100.0%	8.3%	25.0%	**33.3%**	0.0%	100.0%	8.3%	16.7%	**31.3%**
Kalbaskraal	N/A	N/A	16.7%	N/A	**16.7%**	N/A	N/A	33.3%	N/A	**33.3%**	N/A	N/A	58.3%	N/A	**58.3%**
Riebeek Valley	91.7%	100.0%	91.7%	91.7%	**93.8%**	100.0%	100.0%	100.0%	100.0%	**100.0%**	75.0%	100.0%	100.0%	83.3%	**89.6%**
Overall Compliance %	**49.2%**	**92.3%**	**48.1%**	**55.4%**	**60.7%**	**38.6%**	**94.3%**	**46.3%**	**61.4%**	**59.6%**	**31.9%**	**94.4%**	**53.6%**	**58.3%**	**59.3%**

Table A.6.12: Percentage Physical Compliance of the Compliance Samples taken at the Various WWTWs for the Last Three Financial Years.

WWTW	2020/2021				2021/2022				2022/2023			
	pH	Electrical Conductivity	Total Suspended Solids	Overall	pH	Electrical Conductivity	Total Suspended Solids	Overall	pH	Electrical Conductivity	Total Suspended Solids	Overall
Malmesbury	50.0%	100.0%	100.0%	**83.3%**	83.3%	100.0%	100.0%	**94.4%**	66.7%	100.0%	91.7%	**86.1%**
Darling	100.0%	100.0%	91.7%	**97.2%**	100.0%	66.7%	66.7%	**77.8%**	100.0%	83.3%	66.7%	**83.3%**
Moorreesburg	100.0%	20.0%	0.0%	**40.0%**	100.0%	10.0%	10.0%	**40.0%**	100.0%	50.0%	33.3%	**60.0%**
Koringberg	100.0%	8.3%	0.0%	**36.1%**	100.0%	0.0%	0.0%	**33.3%**	100.0%	8.3%	0.0%	**36.1%**
Chatsworth	100.0%	83.3%	8.3%	**63.9%**	100.0%	83.3%	33.3%	**72.2%**	100.0%	66.7%	25.0%	**63.9%**
Kalbaskraal	100.0%	100.0%	N/A	**100.0%**	100.0%	100.0%	N/A	**100.0%**	100.0%	100.0%	N/A	**100.0%**
Riebeek Valley	100.0%	100.0%	91.7%	**97.2%**	100.0%	100.0%	100.0%	**100.0%**	100.0%	100.0%	100.0%	**100.0%**
Overall Compliance %	**92.2%**	**77.9%**	**53.8%**	**75.8%**	**97.6%**	**67.1%**	**52.9%**	**73.5%**	**95.2%**	**72.6%**	**52.8%**	**74.5%**

The trend of the wastewater quality compliance for the various WWTWs are summarised in the table below.

Table A.6.13: Trend of Microbiological, Chemical and Physical Compliance Percentages for the Various WWTWs.

WWTW	2016/2017 to 2018/2019			2018/2019 to 2020/2021			2020/2021 to 2022/2023		
	Micro.	Chemical	Physical	Micro.	Chemical	Physical	Micro.	Chemical	Physical
Malmesbury	Same	Increase	Decrease	Same	Decrease	Decrease	Same	Increase	Increase
Darling	Increase	Decrease	Decrease	Increase	Increase	Increase	Increase	Decrease	Decrease
Moorreesburg	Increase	Decrease	Decrease	Decrease	Increase	Decrease	Decrease	Increase	Increase
Koringberg	Decrease	Decrease	Same	Same	Increase	Increase	Same	Same	Same
Chatsworth	Increase	Decrease	Decrease	Decrease	Decrease	Increase	Decrease	Same	Same
Kalbaskraal	Increase	Decrease	Decrease	Same	Decrease	Increase	Same	Increase	Same
Riebeek Valley	Decrease	Same	Decrease	Increase	Decrease	Same	Decrease	Decrease	Increase

Industrial Consumers: 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. The Municipality's Water Services By-laws, with regard to the discharge of industrial effluent into the sewer system, were promulgated and all industrial consumers formally apply for the discharge of industrial effluent into the sewer system. An external accredited laboratory monitors the industrial effluent of the industrial consumers in Darling, Moorreesburg and Malmesbury on a weekly basis.

The compliance percentages for the quality of industrial effluent discharged into the municipality's sewer system are summarised in the table below for the last three financial years.

Table A.6.14: Compliance Percentages of Industrial Effluent Discharged by Industrial Consumers per Parameter

Town	Industrial Consumer	pH Compliance			COD Compliance		
		2020/2021	2021/2022	2022/2023	2020/2021	2021/2022	2022/2023
Darling	Consumer No.1	67.3%	84.9%	84.0%	77.6%	84.9%	92.0%
	Consumer No.2	30.6%	40.4%	51.0%	71.4%	63.5%	80.4%
	Consumer No.3	57.1%	90.6%	84.3%	83.7%	92.5%	100.0%
Moorreesburg	Consumer No.4	88.0%	98.0%	84.4%	100.0%	100.0%	100.0%
Malmesbury	Consumer No.5	100.0%	100.0%	100.0%	88.2%	90.6%	95.7%
	Consumer No.6	100.0%	98.1%	100.0%	98.0%	96.2%	100.0%
	Consumer No.7	0.0%	0.0%	1.9%	6.0%	16.0%	3.8%
	Consumer No.8	42.0%	34.6%	17.6%	98.0%	98.1%	100.0%
	Consumer No.9	7.3%	17.0%	7.1%	76.4%	77.4%	73.2%

TOPIC 7: FINANCIAL

Capital Budget: The table below gives an overview of Swartland Municipality's historical water and sewerage capital expenditure over the last ten financial years.

Table A.7.1: Historical Capital Expenditure of the Water and Sewerage Infrastructure Budgets

Financial Year	Water Infrastructure			Sewerage Infrastructure		
	Budget	Expenditure	% Spend	Budget	Expenditure	% Spend
2013/2014	R2 808 200	R2 254 474	80.28%	R34 490 585	R22 327 509	64.74%
2014/2015	R3 450 017	R3 364 531	97.52%	R42 068 111	R42 124 171	100.13%
2015/2016	R8 228 945	R8 028 190	97.56%	R4 690 450	R3 602 901	76.81%
2016/2017	R9 833 880	R7 878 897	80.12%	R5 988 699	R5 984 731	99.93%
2017/2018	R16 427 416	R15 870 453	96.61%	R11 706 146	R12 340 699	105.42%
2018/2019	R15 316 927	R14 797 042	96.61%	R9 814 283	R8 976 513	91.46%
2019/2020	R11 547 105	R9 658 727	83.65%	R17 385 266	R14 495 603	83.38%
2020/2021	R2 539 378	R2 353 219	92.67%	R64 164 100	R64 161 385	100.00%
2021/2022	R9 703 524	R9 323 980	96.09%	R55 861 122	R63 296 662	113.31%
2022/2023	R36 019 351	R29 405 458	81.64%	R18 542 495	R14 952 473	80.64%
Total for 10 yrs	**R115 874 743**	**R102 934 971**	**88.83%**	**R264 711 257**	**R252 262 647**	**95.30%**
Average per yr	**R11 587 474**	**R10 293 497**	**88.83%**	**R26 471 126**	**R25 226 265**	**95.30%**

Operational Budget: The table below gives a summary of the total operational costs and income for water and sanitation services for the last five financial years.

Table A.7.2: Summary of Operational Expenditure and Income Budgets for Water and Sanitation Services						
Service	**Expenditure / Income**	**Actual 2018/2019**	**Actual 2019/2020**	**Actual 2020/2021**	**Actual 2021/2022**	**Actual 2022/2023**
Water	Expenditure	R23 087 917	R61 301 899	R44 955 432	R79 784 692	R86 615 726
	Income	-R79 626 773	-R106 205 533	-R90 231 763	-R99 081 926	-R123 943 612
	Surplus / (Deficit)	**-R56 538 856**	**-R44 903 634**	**-R45 276 331**	**-R19 297 234**	**-R37 327 886**
Sanitation	Expenditure	R31 688 531	R49 817 322	R50 616 866	R56 552 156	R56 389 563
	Income	-R62 948 777	-R71 074 049	-R87 825 165	-R94 802 406	-R83 697 003
	Surplus / (Deficit)	**-R31 260 246**	**-R21 256 727**	**-R37 208 299**	**-R38 250 250**	**-R27 307 440**

Tariff and Charges: The first six (6) kl of water is provided free to all indigent residential consumers. Swartland 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 Swartland Municipality's Indigent Policy and all indigent households therefore receive free basic water and sanitation services.

Historically, water use in the highest tariff block provided a mechanism to subsidize lower-usage and indigent customers. However, after the drought, consumption in the highest block is greatly reduced. Thus, cross subsidization now hardly benefits low usage and indigent customers. The current tariff structure is largely based on volume of water consumed, meaning exogenous factors can control water revenues. Examples are climate change, industrial efficiency gains, domestic plumbing improvements, etc. that all reduce water consumed and revenues. Fixed charges, independent of water consumption, provide 24% of water's total revenues.

The cost consumers had to pay for their water services in Swartland Municipality's Management Area, for the various financial years, is presented in Figure A.7.1 (Normal residential water tariffs).

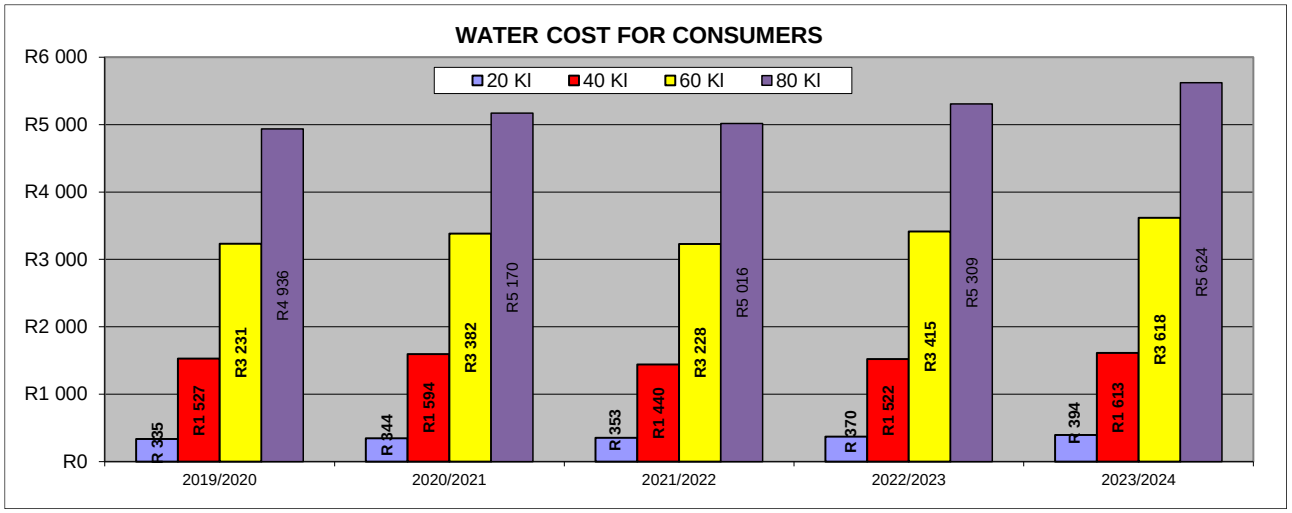

Figure A.7.1: Water Cost for Residential Consumers

The water tariff structures for Swartland Municipality for the 2023/2024 financial year and the previous four financial years are summarised in the table below (Subject to 15% VAT).

Table A.7.3: Water Tariffs for 2023/2024 and the Previous Four Financial Years						
Consumer/Description	**Category**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
All	Availability Fees per month	R91-69	R91-69	R91-69	R96-09	R101-18
Residential Consumers	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-03	R5-03	R5-21	R5-44	R6-02
	7 – 10 Kl	R8-64	R8-64	R8-94	R9-34	R9-99
	11 – 15 Kl	R15-77	R16-54	R17-12	R17-89	R18-95

Table A.7.3: Water Tariffs for 2023/2024 and the Previous Four Financial Years						
Consumer/Description	**Category**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
	16 – 20 Kl	R19-99	R20-97	R21-70	R22-98	R24-34
	21 – 25 Kl	R29-64	R31-09	R32-18	R34-08	R36-09
	26 – 35 Kl	R61-75	R64-78	R47-94	R50-77	R53-77
	36Kl and above	R85-22	R89-40	R89-40	R94-67	R100-26
Indigent Households	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	Free Water 6 Kl (6 Kl EQS)	R0-00	R0-00	R0-00	R0-00	R0-00
	7 – 10 Kl	R8-64	R8-64	R8-94	R9-34	R9-99
	11 – 15 Kl	R15-77	R16-54	R17-12	R17-89	R18-95
	16 – 20 Kl	R19-99	R20-97	R21-70	R22-98	R24-34
	21 – 25 Kl	R29-64	R31-09	R32-18	R34-08	R36-09
	26 – 35 Kl	R61-75	R64-78	R47-94	R50-77	R53-77
	36Kl and above	R85-22	R89-40	R89-40	R94-67	R100-26
Agricultural (Residential)	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-03	R5-03	R5-21	R5-44	R6-02
	7 – 10 Kl	R8-64	R8-64	R8-94	R9-34	R9-99
	11 – 15 Kl	R15-77	R16-54	R17-12	R17-89	R18-95
	16 – 20 Kl	R19-99	R20-97	R21-70	R22-98	R24-34
	21 – 25 Kl	R29-64	R31-09	R32-18	R34-08	R36-09
	26 – 35 Kl	R61-75	R64-78	R47-94	R50-77	R53-77
	36Kl and above	R85-22	R89-40	R89-40	R94-67	R100-26
Business / Commercial / Industrial / etc.	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	Per Kl	R21-60	R21-60	R22-36	R23-43	R24-58
Water: Agricultural Business	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	Per Kl	R21-60	R21-60	R22-36	R23-43	R24-58
Schools	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	Per Kl	R22-90	R24-02	R24-86	R26-33	R16-42
Government Institutions	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16
	Per Kl	R22-90	R24-02	R24-86	R26-33	R27-88
Sport Clubs	Water network charge	R64-87	R64-87	R67-14	R70-36	R73-81
	Per Kl	R22-90	R22-90	R23-70	R24-84	R26-06
Municipality (Departmental)	Per Kl	R8-64	R6-46	R6-46	R6-46	R6-12
Raw Water (Untreated) to Anne Pienaar Primary School	From first Kl	R3-81	R4-08	R4-32	R4-32	R5-79
5% Increase in Tariffs Residential and Agricultural Residential	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-28	R5-28	R5-47	R5-72	R6-32
	7 – 10 Kl	R9-07	R9-07	R9-39	R9-81	R10-49
	11 – 15 Kl	R16-56	R17-37	R17-97	R18-78	R19-90
	16 – 20 Kl	R20-99	R22-02	R22-79	R24-13	R25-56
	21 – 25 Kl	R31-12	R32-64	R33-79	R35-78	R37-90
	26 – 35 Kl	R64-84	R68-02	R50-34	R53-31	R56-46
	36Kl and above	R89-48	R93-87	R93-87	R99-40	R105-27
5% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	From first Kl	R22-68	R22-68	R23-47	R24-60	R25-81
5% Increase in Tariffs Schools	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	From first Kl	R24-05	R25-22	R26-10	R27-65	R14-50
5% Increase in Tariffs Government Institutions	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16
	From first Kl	R24-05	R25-22	R26-10	R27-65	R29-28
5% Increase in Tariffs Sport Clubs	Water network charge	R64-87	R64-87	R67-14	R70-36	R73-81
	From first Kl	R24-05	R24-05	R24-89	R26-08	R27-37

Table A.7.3: Water Tariffs for 2023/2024 and the Previous Four Financial Years						
Consumer/Description	**Category**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
10% Increase in Tariffs Residential and Agricultural Residential (Level 1)	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-53	R5-53	R5-73	R5-99	R6-63
	7 – 10 Kl	R9-50	R9-50	R9-84	R10-27	R10-99
	11 – 15 Kl	R17-35	R18-19	R18-83	R19-68	R20-84
	16 – 20 Kl	R21-99	R23-07	R23-87	R25-28	R26-77
	21 – 25 Kl	R32-60	R34-20	R35-40	R37-49	R39-70
	26 – 35 Kl	R67-93	R71-26	R52-73	R55-85	R59-15
	36Kl and above	R93-74	R98-34	R98-34	R104-14	R110-29
10% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 1)	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	From first Kl	R23-76	R23-76	R24-59	R25-77	R27-03
10% Increase in Tariffs Schools (Level 1)	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	From first Kl	R25-19	R26-42	R27-35	R28-96	R15-88
10% Increase in Tariffs Government Institutions (Level 1)	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16
	From first Kl	R25-19	R26-42	R27-35	R28-96	R32-06
10% Increase in Tariffs Sport Clubs (Level 1)	Water network charge	R64-87	R64-87	R67-14	R70-37	R73-81
	From first Kl	R25-19	R25-19	R26-07	R27-32	R29-97
15% Increase in Tariffs Residential and Agricultural Residential (Level 1B)	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-78	R6-07	R6-28	R6-26	R6-92
	7 – 10 Kl	R9-94	R10-42	R10-79	R10-74	R11-49
	11 – 15 Kl	R18-14	R19-02	R19-69	R20-57	R21-79
	16 – 20 Kl	R22-99	R24-12	R24-96	R26-43	R27-99
	21 – 25 Kl	R34-09	R35-75	R37-00	R39-19	R41-50
	26 – 35 Kl	R71-01	R74-50	R55-13	R58-38	R61-83
	36Kl and above	R98-00	R102-81	R106-41	R108-87	R115-30
15% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 1B)	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	From first Kl	R24-84	R26-06	R26-97	R26-94	R28-27
15% Increase in Tariffs Schools (Level 1B)	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	From first Kl	R26-34	R27-62	R28-59	R30-28	R15-88
15% Increase in Tariffs Government Institutions (Level 1B)	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16
	From first Kl	R26-34	R27-62	R28-59	R30-28	R32-06
15% Increase in Tariffs Sport Clubs (Level 1B)	Water network charge	R64-87	R64-87	R67-14	R70-37	R73-81
	From first Kl	R26-34	R27-63	R28-60	R28-57	R29-97
20% Increase in Tariffs Residential and Agricultural Residential (Level 2)	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R6-04	R6-33	R6-55	R6-53	R7-23
	7 – 10 Kl	R10-37	R10-88	R11-26	R11-21	R11-99
	11 – 15 Kl	R18-92	R19-85	R20-54	R21-47	R22-74
	16 – 20 Kl	R23-99	R25-16	R26-04	R27-57	R29-21
	21 – 25 Kl	R35-57	R37-31	R38-61	R40-90	R43-30
	26 – 35 Kl	R74-10	R77-74	R57-53	R60-92	R64-52
	36Kl and above	R102-26	R107-28	R111-03	R113-60	R120-31
20% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 2)	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	From first Kl	R25-92	R27-19	R28-14	R28-12	R29-50
20% Increase in Tariffs Schools (Level 2)	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	From first Kl	R27-48	R28-82	R29-83	R31-60	R16-57
	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16

Table A.7.3: Water Tariffs for 2023/2024 and the Previous Four Financial Years						
Consumer/Description	**Category**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
20% Increase in Tariffs Government Institutions (Level 2)	From first Kl	R27-48	R28-82	R29-83	R31-60	R33-45
20% Increase in Tariffs Sport Clubs (Level 2)	Water network charge	R64-87	R64-87	R67-14	R70-36	R73-81
	From first Kl	R27-48	R28-83	R29-84	R29-81	R31-27
Connection Low Cost		Contract	Contract	Contract	Contract	Contract
Connection (15mm)		R5 260-87	R5 459-13	R5 986-09	R5 913-04	R6 200-00
Connection (22mm)		R6 469-57	R6 469-57	R6 676-52	R8 260-87	R8 260-87
Connection 22mm Private Developments		R4 460-87	R4 460-87	R4 636-52	R4 469-57	R4 843-48
Deposit Payable: Letting of Municipal Standpipe		R6 086-96	R6 521-74	R7 500-00	R7 500-00	R7 500-00
Test of water meter – Refundable if result is faulty		R704-35	R782-61	R782-61	R826-09	R869-57

Note: 25% Increase in Tariffs (Level 2B), 30% Increase in Tariffs (Level 3), 35% Increase in Tariffs (Level 3B), 40% Increase in Tariffs (Level 4), 50% Increase in Tariffs (Level 5), 60% Increase in Tariffs (Level 6), 70% Increase in Tariffs (Level 7) and 80% Increase in Tariffs (Level 8) are also in place.

The sewerage tariff structures for Swartland Municipality for the 2023/2024 financial year and the previous four financial years are summarised in the table below (Subject to VAT).

Table 7.4: Sewerage Tariffs for 2023/2024 and the Previous Four Financial Years						
Consumer/Description	**Category**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
Basic Network Charge	Sewerage connection / pumping service	-	-	R105-10	-	-
Households, Flats, Semi-detached households	Availability Fees per month	R234-35	R234-35	R143-08	R262-82	R278-33
Businesses, Industrial, Schools, Churches, Sport Facilities, etc.	Availability Fees per month	R234-35	R234-35	R143-08	R262-82	R278-33
For each additional toilet	Businesses per month	R35-15	R36-87	R39-08	R41-04	R43-47
Sewer connections	100mm PVC	R4 626-09	R4 789-57	R5 024-35	R5 732-82	R6 852-17
Sewer connections	150mm PVC	R6 252-17	R6 673-04	R6 525-22	R6 663-18	R7 800-00
Sewer blockages	Office hours	R487-83	R524-35	R556-52	R560-06	R643-48
Sewer blockages	After hours and public holidays	R690-43	R743-48	R789-57	R795-05	R913-04
Emptying of tanks	For two emptying per month	R234-35	R234-35	R143-08	R303-91	R347-83
	Every additional emptying	R839-13	R858-43	R909-94	R1 149-10	R1 304-35
	3rd pumping during Easter Weekend and school holidays in the same month will be charged.	R839-13	R858-43	R909-94	R1 149-10	R1 304-35
Emptying of tanks (Riebeek Kasteel and Abbotsdale)	From the 1st sewerage pumping	R839-13	R858-43	R909-94	R1 149-10	R1 304-35
	Plus fixed sewerage pan levy (Owner do not connect to the new waterborne system)	R266-00 (VAT incl.)	R266-00 (VAT incl.)	R285-41 (VAT incl.)	R302-24 (VAT incl.)	R400-00 (VAT incl.)
Ad-hoc emptying of tanks	After hours	R1 021-74	R1 081-91	R1 137-39	R1 252-17	R1 391-30
Treated Waste Water	Per Kl	R2-86	R2-96	R3-13	R3-30	R3-57
Treated Waste Water Rooiheuwel JV	Per Kl	R0-76	R0-81	R0-86	R0-90	R0-96
Partially connection (Emptying)		R117-18	R125-98	R52-61	R131-41	R139-13
Industrial effluent per Kl (COD)		R10-65	R11-27	R11-95	R12-52	R13-30
Grotto Baai and Jakkelsfontein – Network Charge		-	-	R105-10	-	-
Grotto Baai and Jakkelsfontein for two emptying per month		R234-35	R234-35	R143-08	R303-91	R347-83
Partial connection (pumping) sewerage tanks for two emptying per month, take consideration of the sewerage network monthly charge.		-	-	R71-60	R303-91	R330-43
Rural and Non-urban areas – emptying of sewerage tanks per pumping		R1 469-57	R1 545-22	R1 619-13	R1 630-82	R1 956-52

TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

Swartland Municipality is the WSA for the entire Municipal Management Area. A Service Level Agreement is in place with the West Coast District Municipality for the provision of bulk potable water to most of the towns in Swartland Municipality's Management Area. The West Coast District Municipality operate and maintain the Withoogte and Swartland bulk water distribution systems.

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. It also forms the basis for the monthly, quarterly, mid-year and the annual assessment report and performance assessments of the Municipal Manager and Directors.

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 Swartland Municipality across the eighteen key service areas, as identified through the Municipal Strategic Self-Assessment of Water Services process.

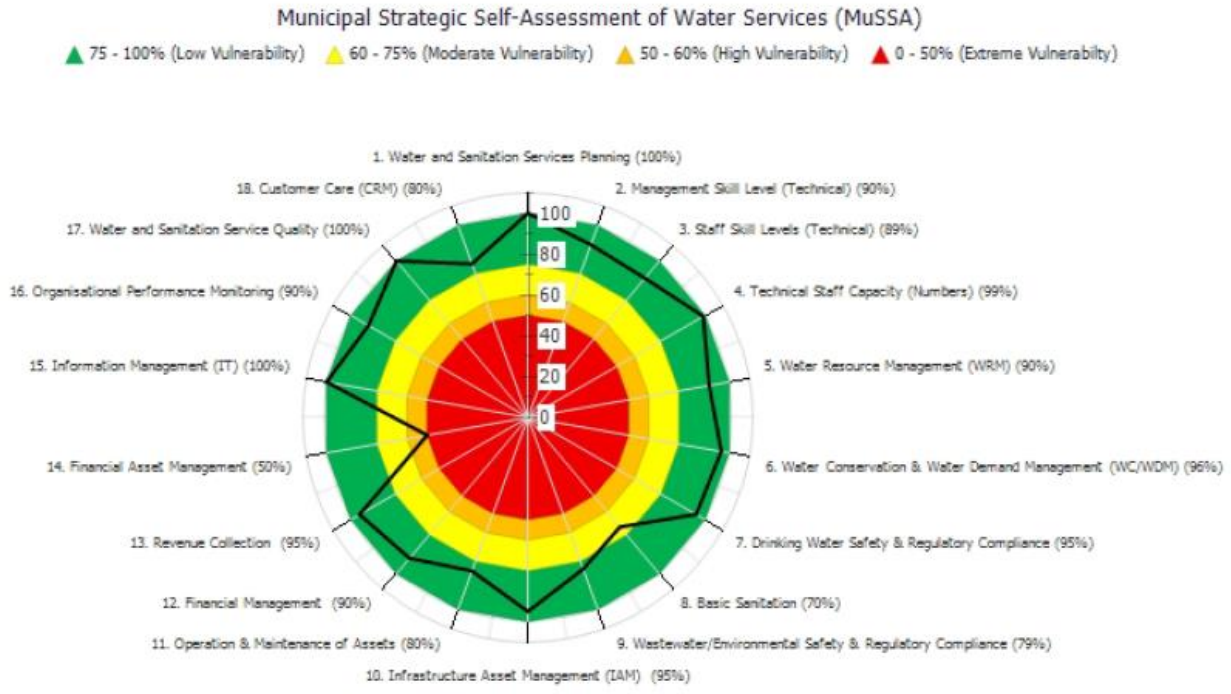

Figure A.8.1: Spider Diagram of the Vulnerability Levels of Swartland Municipality for 2023

Swartland Municipality's Vulnerability Index for 2023 was indicated as 0.19 "Low Vulnerability". The only one area of concern evident from the 2023 assessment is Financial Asset Management, which obtained a score of 50% (High Vulnerability).

A comprehensive Customer Services and Complaints system is in place at Swartland Municipality and the Municipality has maintained a high and a very consistent level of service to its urban water consumers. After hour emergency requests are being dealt with by the control room on a twenty-four-hour basis. All water and sanitation related complaints are logged through the system in order to ensure quick response to complaints.

The graphs and table below give an overview of the of the water and sanitation customer services and maintenance work that was done by Swartland Municipality on their water and sanitation networks.

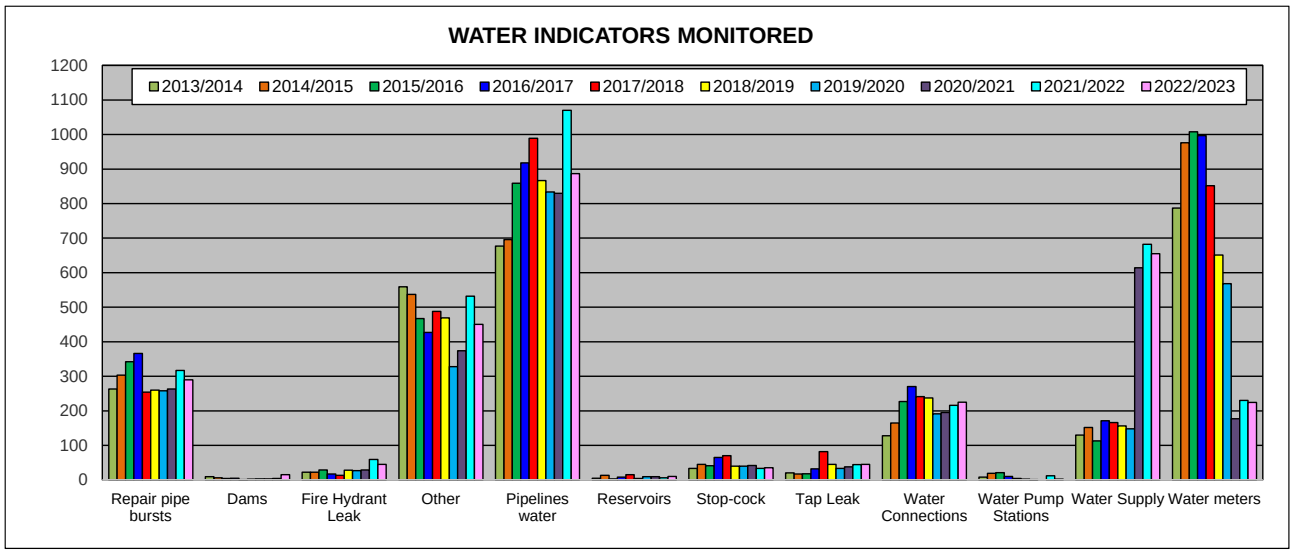

Figure A.8.2: Water Indicators Monitored by Swartland Municipality

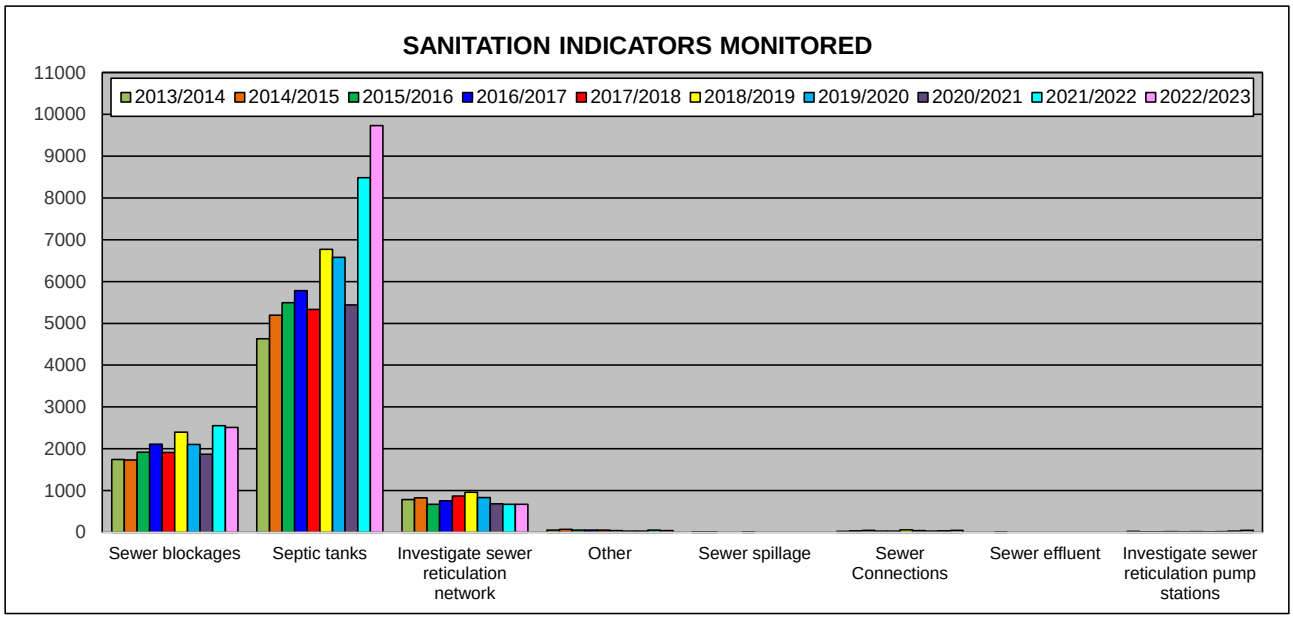

Figure A.8.3: Sanitation Indicators Monitored by Swartland Municipality

Table A.8.1: Water and Sanitation Indicators Monitored by Swartland Municipality with regard to Customer Services and Maintenance Work for the Last Seven Financial Years								
Service	**Indicator**	**22/23**	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**
Water Indicators								
Repair pipe bursts	Repair of burst water pipelines	366	254	260	258	263	317	290
Dams	Inspect / Repair faults at dams	5	1	2	3	3	4	15
Fire Hydrant Leak	Inspect / repair leaking hydrants	17	13	28	27	29	59	45
Other	Other water complaints (Not specified)	427	488	469	328	374	532	450
Pipelines water	Inspect / repair of faulty water pipelines	918	989	867	834	830	1 070	887
Reservoirs	Inspection of reservoirs and work carried out	8	15	4	9	9	6	10
Stop-cock	Inspect / Repair leaking stop-cocks	65	70	40	40	42	33	35
Tap Leak	Inspect / Repair leaking taps	32	82	45	33	38	44	45
Water Connections	New / Inspections and work carried out at water connections	270	241	237	191	195	216	225
Water Pump Stations	Inspections and work carried out at water PS	10	4	2	1	0	12	2
Water Supply	Faulty water supply	171	166	156	148	614	682	655
Water meters	Inspect / Test / Repair / Install	997	852	651	568	177	230	224
Total		**3 286**	**3 175**	**2 761**	**2 440**	**2 574**	**3 205**	**2 883**
Sanitation Indicators								
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	2 106	1 910	2 397	2 102	1 870	2 551	2 511
Septic tanks	Empty septic tanks	5 781	5 335	6 771	6 577	5 439	8 483	9 730
Investigate sewer reticulation network	Investigate and clear blockages in network	754	869	957	830	684	669	672
Other	Other sewer complaints (Not specified)	52	54	41	26	31	52	42
Sewer spillage	Investigate and clean sewer spillages	-	4	-	-	0	0	0
Sewer Connections	Installation of sewer connections	31	31	59	43	26	35	47
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	0	0	0
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	15	9	14	7	14	27	49
Total		**8 739**	**8 212**	**10 239**	**9 585**	**8 064**	**11 817**	**13 051**

Swartland Municipality also received their 2023 No Drop Score, as calculated through the 2023 Assessment done by the DWS. The 2023 No Drop assessments were performed using a reduced set of No Drop Criteria. These criteria were selected to assess a WSA's understanding of their WC/WDM status, the plans, strategies, budgets, and implementation of remedial projects. Below is a brief description of the Criteria used for the 2023 assessment.

Table A.8.2: Description of No Drop Criteria	
Criteria 1	WC/WDM status quo, plans and strategies, budgets, and implementation of projects (Water Resource Diagram, Water Balance, Council approved WC/WDM strategies and budgets)
Criteria 2	Asset management as it relates to meter replacement. Monitoring, analysis, and action of high loss District Metered Areas (DMAs) in metropolitan municipalities
Criteria 3	Technical skills of WC/WDM team
Criteria 5	Compliance and Performance based on the water loss and efficiency Key Performance Indicators (KPI) and year on year improvement there-of

The purpose of the 2023 No Drop Assessments was twofold:

- To complete the consultative assessment of the 144 WSAs as per the No Drop Requirements based on the 2021/22 financial year.
- To update the water balance and water loss benchmarking for the 2022/23 financial year. This is reported on in the Status of Water Loss, Water Use Efficiency and Non-Revenue Water in South African Municipalities (2012/13 to 2022/23).

The No Drop results for Swartland Municipality are presented in the table below.

Table A.8.3: No Drop Performance of the Municipality (DWS's 2023 No Drop Report)		
No Drop Score (2021/2022)		**91%**
Criteria	**Weight**	**Score**
1: WC/WDM Strategy, Planning and Implementation	45%	100% (Excellent)
2: Asset Management	10%	40% (Poor)
3: Technical Skills	10%	80% (Good)
5: Compliance and Performance	35%	69% (Average)
Weighted Sub-Total		81%
Bonus		10%
Score		91% (Excellent)
Penalty 1: No evidence of approved budget		0.0%
Penalty 2: Section 82 of the Water Servies Act		0.0%
Criteria 1 Sub-Items: WC/WDM Strategy, Planning and Implementation		
Item		**Score (Max = 1)**
1.1: Water Resources		1.0 (Excellent)
1.2: Water Balance		1.0 (Excellent)
1.2: WC/WDM Strategy and Business Plan		1.0 (Excellent)
Penalty 1: No evidence of approved budget		0.0
Criteria 5 Sub-Items: Compliance and Performance		
Item		**Score (Max = 1)**
5.1: Reticulation Leak Repair		1.0 (Excellent)
5.2: Physical Water Losses		0.6 (Average)
5.3: Commercial Water Losses		0.5 (Average)
5.4: Non-Revenue Water		0.7 (Average)
5.5: Water Use Efficiency		0.7 (Average)
Water Balance Integrity		**High (Excellent)**

DWS's Blue Drop Process: The DWS completed the Blue Drop process for the WSAs in 2023. Blue drop status is awarded to those towns that comply with 95% criteria on drinking water quality management. The blue drop performance of Swartland Municipality was summarised as follows in the DWS's 2023 Blue Drop Report.

Table A.8.4: Blue Drop Performance of the Municipality (DWS's 2023 Blue Drop Report)	
Municipal Blue Drop Score	**2011 - 92.89%, 2012 - 95.24%, 2014 - 74.26% and 2023 - 93.76%**

Introductions: The Swartland Local Municipality (SLM) supplies approximately 72 375 people with potable water from its Swartland system and 8 974 people from its Withoogte system, using a water service provider namely West Coast District Municipality (WCDM):

- The Swartland system receives treated water from the Swartland WTP, delivered at a SIV of 12.81 Ml/d of which 100% is distributed by the SLM.
- The Withoogte system receives treated water from the Withoogte WTP, delivered at a SIV of 2.05 Ml/d kl/d of which 100% is distributed by the SLM.

Regulatory Impression: The Swartland Local Municipality (SLM) was well prepared for the Blue Drop assessment and was represented by the Director of the Water and Sanitation Services and accompanied by a team of three technical managers as well as a representative from a private engineering company assisting the SLM with its Blue Drop related requirements. The SLM had a constant Blue drop score history in 2011 and 2012 of between 93% and 95% before ranging down to 74% in 2014. The WSI has an agreement in place with the WCDM which operates the two water treatment plants and delivery system on behalf of the SLM. Both the WSP and the WSI has water safety plans in place which are reviewed on an ongoing basis. Proof of the implementation of these plans were presented of which the installation of chlorine dioxide as additional treatment to counter deteriorating raw water qualities is a major step in ensuring safe water. Both the WSI with its WSP have sufficient technical capabilities in place as well as an operational supply chain system to ensure maintenance is done in time. Scientific services from the WSI are outsourced to a service provider. Incidents are adequately reported and actioned on to ensure good service delivery. The total capital budget for the municipality is R5.3 million, of which R8.2 million has been used mainly on the piping network.

Technical Findings:

Swartland WSS:

- The WTP site is adequately staffed with trained process controllers and with competent supervision.
- The design capacity was confirmed as 29.1 Ml/d and operating at 52% of its capacity.
- Implementation of the water safety plan and the process audit findings are taking place, with specifically the use of chlorine dioxide at the plant mentioned as an initiative to counter deteriorating raw water qualities.

Table A.8.4: Blue Drop Performance of the Municipality (DWS's 2023 Blue Drop Report)

- Vandalism, aging pipework, and load shedding remains the key high-risk areas in the distribution system and capital work done at this WSS was focused on upgrading and repairing key pump stations and network piping.
- The microbiological compliance was excellent while the chemical acute compliance was also excellent, resulting in a low-risk rating of 26.6% for this system.

Withoogte WSS:

- The WTP site has sufficient process controller attendance, as well as a competent supervisory section.
- Apart from the same capital work done as the Swartland system to counter vandalism and aging pipework, the WCDM's capital expenses was focused on laboratory equipment to improve monitoring, as well as movable items such as machinery and valves to attend to bulk pipeline repairs.
- The design capacity of the WTP was confirmed as 72 Ml/d and operating at 50% of its capacity.
- Both the microbiological compliance and chemical acute compliance of its final water were excellent, resulting in a low-risk rating of 23% for this system.

Technical Site Assessment:

Both plants from the WCDM were inspected to verify the Blue Drop audit findings and the Swartland WTP received a technical site score of 92%, while the Withoogte WTP received a technical site score of 95%. Both plants were found to be neat, well operated, and regularly monitored for performance.

Both plants have been testing the addition of chlorine dioxide to its treatment train, with the view of taste and odour removal, as well as ensuring a residual in the pipeline. This was also installed to counter the risk of low supplies of chlorine gas.

At Swartland WTP, the installation of lights at the sludge dams, and additional handrails at the filters to ensure safe working conditions, as well as the installation of one more air blower can be considered. The Withoogte plant should install emergency washes at the flocculant dosing station, while the filter backwash pumps should be regularly maintained to ensure sufficient standby.

Performance Area		Swartland	Withoogte
Bulk/WSP		West Coast DM Bulk	West Coast DM Bulk
Capacity Management	15%	82.00%	82.00%
DWQ Risk Management	20%	96.00%	96.00%
Financial Management	10%	87.95%	87.95%
Technical Management	20%	95.50%	95.50%
DWQ Compliance	35%	89.80%	98.80%
Bonus	10%	100.00%	100.00%
Penalties	10%	0.00%	0.00%
Disqualifiers		None	None
Blue Drop Score (2023)	**%**	**93.33%**	**96.48%**
Blue Drop Score (2014)	%	75.00%	70.50%
Blue Drop Score (2012)	%	95.20%	95.20%
Blue Drop Score (2011)	%	92.90%	92.90%
System Design Capacity	kl/d	29 100	72 000
System Available Capacity	kl/d	29 100	72 000
System Input Value	kl/d	12 810	2 050
Capacity utilization	%	51.55%	50.00%
Average Daily Consumption	l/p/d	177	228
Resource Abstracted From		Channel conveying water from the Voëlvlei Dam	Misverstand Weir on the Berg River
Microbiological Compliance	%	99.41%	99.35%
Chemical Health Compliance	%	99.90%	99.34%
Risk Defined Compliance	%	93.88%	96.86%
VROOM	Rand	R3 201 000	R2 160 000
BDRR 2023	%	26.55%	18.89%
BDRR 2022	%	30.00%	23.00%

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

Table A.8.5: Average Residential Daily Consumption (l/p/d) for the Last Four Financial Years.

Distribution System	2022/2023			2021/2022		
	Estimated Permanent Population	Aver. Daily Billed Metered Residential Consumption (kl)	Aver. Daily residential consumption (l/p/d)	Estimated Permanent Population	Aver. Daily Billed Metered Residential Consumption (kl)	Aver. Daily residential consumption (l/p/d)
Koringberg	1 869	107.225	**57.370**	1 797	102.531	**57.057**
Riebeek Wes and Ongegund	8 742	377.515	**43.184**	8 247	372.542	**45.173**
Riebeek Kasteel	10 021	574.290	**57.309**	9 366	513.926	**54.871**
Yzerfontein *	1 755	587.408	**334.705**	1 687	583.136	**345.664**
Darling	12 956	882.468	**68.113**	12 702	897.638	**70.669**
Moorreesburg	19 824	1 113.184	**56.153**	19 061	1 139.627	**59.788**
Malmesbury	75 279	4 717.603	**62.668**	71 987	4 524.843	**62.856**
Total	**130 446**	**8 359.693**	**64.085**	**124 847**	**7 790.455**	**62.400**
Distribution System	**2020/2021**			**2019/2020**		
	Estimated Permanent Population	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily residential consumption (l/p/d)**	**Estimated Permanent Population**	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily residential consumption (l/p/d)**
Koringberg	1 728	111.175	**64.337**	1 661	85.923	**51.730**
Riebeek Wes and Ongegund	7 780	365.030	**46.919**	7 340	298.789	**40.707**
Riebeek Kasteel	8 753	470.800	**53.787**	8 180	394.564	**48.235**
Yzerfontein *	1 623	536.535	**330.582**	1 560	393.680	**252.359**
Darling	12 453	889.641	**71.440**	12 209	766.885	**62.813**
Moorreesburg	18 328	1 141.334	**62.273**	17 623	1 011.019	**57.369**
Malmesbury	68 841	4 213.471	**61.206**	65 835	3 802.167	**57.753**
Total	**119 506**	**7 789.477**	**65.181**	**114 408**	**6 753.027**	**59.026**

Note: * The average daily billed metered residential consumption for Yzerfontein were calculated from March-November (Excluding January, February and December). The high l/d/d is due to the small number of permanent residents in Yzerfontein and the large number of holiday homes.

The residential consumption for the last four financial years for all the systems were very low, which indicate very efficient water usage by the residential consumers. The drought situation in the Western Cape and the water restrictions and other WC/WDM measures implemented by the Swartland Municipality contributed to the very low water usage per person.

DWS's Green Drop Process

The DWS completed the new Green Drop assessment for the WSAs in 2021 and the results were received early in 2022. Green drop status is awarded to those WSAs that comply with 90% criteria on key selected indicators on wastewater quality management. The green drop performance of Swartland Municipality is summarised as follows in the DWS's 2022 Green Drop Report.

Table A.8.6: Green Drop Performance of Swartland Municipality (DWS's 2022 Green Drop Report)	
Average Green Drop Score	**2009 – 75.0%, 2011 – 73.0%, 2013 – 72.0%, 2021 – 89.0%**

Regulator's Comment: Swartland LM delivered a sterling performance and improved from its 2013 baseline of 72% to a 2021 GD score of 89%. The team was well prepared for the assessment and displayed enthusiasm in their approach towards the audit. The WSA was represented by a technical team and supported by their consulting engineers. Notably the aspect of financial management and an ability to reflect on cost of treatment is commendable, this aspect account to a lion share of the GD Criteria for the year under review. The WSA was able to get a full score on this aspect even though it is a new requirement. The WSA is also praised for presenting Water Services Audit, which raises the level of accountability and best practice in South Africa.

There are areas that need attention such as the effluent compliance, which also account for the highest percentage of the overall audit score. Improved performance in this aspect will be able to sustain the WSAs performance and take it into an upward trajectory. Environmental Management is one particular area where Swartland can improve substantially, in particular dedicated monitoring of sludge streams, as well as desludging schedules at the oxidation pond facilities. Sampling of control boreholes needs to be implemented in order to have a fit for purpose impact monitoring programme. With respect to Capacity Management, the adoption of automation and control is commended for advanced systems, however, need to be discussed with DWS to ensure that all the risk associated with such interventions are aligned with regulatory processes.

Swartland has three (3) potential Green Drop Certified systems, which regrettably cannot be confirmed as the microbiological and/or chemical compliance was below the 90% excellent mark – thereby reducing the audit score to 89% default. The Regulator trust that the municipality will achieve >90% for all the effluent quality criteria in future and earn its Green Drop status in 2023. Well done to the Swartland LM water and wastewater team on the excellent performance and management of wastewater services.

Green Drop findings:

1. Process control staff partially compliant, noting the aid of automation and telemetry.
2. External Service providers competency could not be verified.
3. W_2RAP is in place and implemented and further backed by compliance monitoring presented.
4. Financial information was largely available, including budgets and expenditure, evidence of contracts for external services.
5. Lack of calibrated flow meters for the inlet and outlet meters.
6. Good sewage inspection and process audit reports.
7. Updated bylaws and enforcement thereof with regular inspections of restaurants and commercial properties. WSA encouraged to keep records of enforcement records for future references.
8. 12 months of data uploaded on IRIS and supported by availability of general authorisation and Water Use Licenses.
9. Generic stormwater management plan and water demand management plan – but lacking wastewater balances.
10. No penalties and no directives were issued for any system.
11. Three of the seven plants are in high-risk positions.
12. Budget had been secured for capital projects for replacement, upgrades, and addition of new unit process at some of the WWTWs and associated infrastructure:
    - R5 000 000: Multiyear project at Chatsworth WWTWs
    - R22 740 000: Darling WWTW for a construction of a sludge handling facility.
    - R41 802 000: Construction of a new works at Moorreesburg WWTW.

The Riebeek Valley WWTW was inspected to verify the Green Drop audit findings (**Technical Site Assessment: Riebeek Valley WWTW 97%)**:

- The network and pump station was in good condition, routine maintenance was in place and response to sewage blockages and records were kept.
- Plant was in very good condition: equipped with an office on site, there was display of certificates, plans, and other certificates.
- Operational monitoring, daily logbook or maintenance records were kept on site.

Table A.8.6: Green Drop Performance of Swartland Municipality (DWS's 2022 Green Drop Report)

- The site was tidy and well kept.
- Flow meters were in place and correctly converted, but not calibrated.
- All process units were in working order with the exception of the scum withdrawal at the SST.
- The screens and the grit removal were automated and maintenance records were kept for verification.
- The WWTW employs high end technology, operated using SCADA controllers and HMI system – this functionality is maintained as result of highly competent Process Controllers.
- The belt presses were well maintained, flocculants were stored in a suitable area with all safety signs and MSDS.
- There was a proper facility for chemical disinfection - with safety signs, ventilation, and the required monitoring and management systems.

GREEN DROP REPORT CARD								
Key Performance Area	**Weight**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Moorreesburg**	**Riebeek Valley**	**Malmesbury**	**Koringberg**
A: Capacity Management	15%	77.5%	94.0%	77.5%	94.0%	98.0%	94.0%	80.0%
B: Environmental Management	15%	88.8%	89.0%	87.5%	81.0%	85.0%	85.0%	87.5%
C: Financial Management	20%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	87.5%
D: Technical Management	20%	82.4%	90.0%	88.2%	90.0%	90.0%	90.0%	88.2%
E: Effluent & Sludge Compliance	30%	37.5%	81.0%	37.5%	41.0%	81.0%	81.0%	26.3%
F: Bonus		58.0%	65.5%	28.0%	65.5%	35.5%	35.5%	28.0%
G. Penalties		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-50.0%
H: Disqualifiers		None	None	None	None	None	None	None
2021 Green Drop Score		**85%**	**95% - > 89%**	**83%**	**87%**	**92% - >89% %**	**92% - >89%**	**70%**
2013 Green Drop Score		**60%**	**71%**	**68%**	**69%**	**62%**	**76%**	**69%**
2011 Green Drop Score		**62%**	**73%**	**69%**	**71%**	**64%**	**74%**	**64%**
2009 Green Drop Score		**0%**	**75%**	**0%**	**73%**	**0%**	**77%**	**0%**
System Design Capacity (Ml/d)		0.270	1.500	0.157	1.500	1.900	10.000	0.030
Design Capacity Utilisation (%)		91%	83%	48%	73%	44%	53%	273%
Resource Discharged into		Swart River	Groen River	Non-discharge	Sand River	Krom River and irrigation	Diep River	Brak River
Microbiological Compliance (%)		17%	71%	NMR	Insufficient Data	81%	100%	Insufficient Data
Chemical Compliance (%)		0%	96%	NMR	Insufficient Data	95%	87%	Insufficient Data
Physical Compliance (%)		61%	98%	NMR	Insufficient Data	98%	100%	Insufficient Data
Wastewater Risk Rating (CRR% of CRRmax)								
CRR (2011)		**72.0%**	**72.0%**	**72.0%**	**61.0%**	**67.0%**	**83.0%**	**56.0%**
CRR (2013)		**59.0%**	**53.0%**	**35.0%**	**53.0%**	**59.0%**	**71.0%**	**53.0%**
CRR (2021)		**70.6%**	**29.4%**	**23.5%**	**76.5%**	**23.5%**	**36.4%**	**88.2%**

Swartland Municipality also received their 2023 Green Drop Risk Ratings, as calculated from the 2023 assessment done by the DWS.

Table A.8.7: Green Drop Risk Rating of Swartland Municipality (DWS's 2023 Green Drop Progress Report)

Municipal CRR% 2023 (%CRR/CRRmax)	51.2%

Introduction:

Swartland Local Municipality (SLM) owns and operates seven (7) WWTWs which range in design capacity from 30 kl/day to 10 000 kl/day.

Regulator's Comment: The Swartland Local Municipality (SLM) has provided good information for the GD PAT in terms of the design capacities of the WWTWs and all the WWTWs are registered and approved. However, the operational flow at each works was not able to be verified as no flow data was provided to support the reported operational flows at the works, which represents a critical risk as these impacts on the CRR scores significantly. The WSA is encouraged to confirm the operational capacity of all works with accurate flow records as the lack of flow data increases the CRR risk rating. In addition, the WSA must ensure that inflow and outflow meters are installed if necessary or repaired if required and that daily flow readings are recorded. Annual flow meter calibration should also be performed to ensure that the operational capacity of the works does not exceed its design capacity.

The compliance of the final effluent is good at some sites (Darling, Malmesbury) and poor at the other sites including Chatsworth Kalbaskraal, Koringberg, Moorreesburg and Riebeek Valley.

Sufficient evidence exists for external maintenance teams to provide civil, electrical and mechanical assistance and organograms included relevant staff members at SLM. The competencies of the internal staff should be verified with their qualification as the availability of a preventative maintenance team is essential to ensure that routine preventative maintenance is performed regularly. In addition, the availability of supervisors and process controllers has a significant impact on the quality of final effluent discharged and the regulator notes that many sites have insufficient qualified and competent staff at the sites to operate and manage the WWTWs effectively. These impacts significantly on the CRR scores obtained for the different WWTWs.

The SLM has a good W_2RAP document for each site although outdated and therefore the WSA is encouraged to update the W_2RAP's as new risks may be present. The WSA is encouraged to review the W_2RAPs and implement the risk-based methodology of the W_2RAP as this ensures that the overall risk rating decreases with an improvement in effluent quality compliance. The WSA must also develop and implement a GDIP plan which identifies the shortcomings for all Green Drop criteria and allocates responsibility, budget and timeframes to address the gaps. A CAP was not required for SLM due to the previous scores awarded during the 2022 GD. There are some capital projects planned including a de-watering plant for Darling, a new macerator for Malmesbury and an upgrade for Moorreesburg WWTW which will assist in improving the effluent quality. The SLM is encouraged to prioritize the appointment of qualified competent process control staff and supervisors to ensure that the effluent quality is maintained within the regulatory limits.

Risk Assessment Areas	Weight	Chatsworth	Darling	Kalbaskraal	Moorreesburg	Riebeek Valley	Malmesbury	Koringberg
Class of Works		E: Approved	B: Approved	E: Approved	D: Approved	B: Approved	A: Approved	E: Approved
Treatment Technology		Oxidation Ponds	Activated Sludge	Oxidation Ponds	Activated Sludge	Activated Sludge	Activated Sludge	Oxidation Ponds
A: Total Design Capacity	Kl/d	270	1 500	157	1 500	1 900	10 000	30
B: Operational Capacity (% inflow/design)	%	90.7%	84.2%	49.0%	68.5%	45.3%	55.6%	276.7%
C: Effluent Quality Non-compliance	#	4	5	5	7	7	1	2
% Microbiological Compliance	%	30.0%	90.0%	10.0%	11.1%	9.1%	100.0%	0.0%
% Physical Compliance	%	73.3%	80.0%	10.0%	48.1%	78.8%	100.0%	50.0%
% Chemical Compliance	%	10.0%	60.0%	0.0%	22.2%	48.5%	93.3%	NMR
D: Technical Skills Compliance	%	33.3%	50.0%	33.3%	50.0%	33.3%	66.7%	33.3%
Process Controller Compliance	%	0%	50%	0%	50%	0%	100%	0%
Supervisor Compliance	%	0%	0%	0%	0%	0%	0%	0%
Maintenance Team Compliance	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
CRR (2023)	%	**66.7%**	**64.7%**	**66.7%**	**76.5%**	**70.6%**	**40.9%**	**83.3%**
CRR (2021)	%	**70.6%**	**29.4%**	**23.5%**	**76.5%**	**23.5%**	**36.4%**	**88.2%**
CRR (2013)	%	**59.0%**	**53.0%**	**35.0%**	**53.0%**	**59.0%**	**71.0%**	**53.0%**
CRR (2011)	%	**72.0%**	**72.0%**	**72.0%**	**61.0%**	**67.0%**	**83.0%**	**56.0%**

Table A.8.7: Green Drop Risk Rating of Swartland Municipality (DWS's 2023 Green Drop Progress Report)								
W_2RAP Status: 2022 Green Drop Report		Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)
W_2RAP Status: 2023 Green Drop PAT		Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)
Capital and Refurbishment Projects (Rand)		0	R7 332 537	0	R54 716 114	0	R526 248	0
Description of Capital and Refurbishment Projects		Non-Available	De-watering plant for Darling WWTW.	Non-Available	Moorreesburg WWTW upgrading.	Non-Available	New Macerator	Non-Available
2022 GD Score	%	85.0%	89.0%	83.0%	87.0%	89.0%	89.0%	70.0%
GD Improvement Plan (GDIP)	Y/N	No	No	No	No	No	No	No
Corrective Action Plan (CAP)	Y/N	No	No	No	No	No	No	No

SECTION B: STATE OF WATER SERVICES PLANNING

This updated WSDP is for the 2022-2027 five year cycle. The Municipality also annually compile the WSDP Performance- and Water Services Audit Report, as required by the Water Services Act and the DWS. 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 Swartland Municipality's Annual Report. The 2022/2023 WSDP Performance- and Water Services Audit Report will be approved by Council as part of the Municipality's Annual Report.

Swartland Municipality's Water and Sewer Master Plan process entails the establishment of computer models for the water systems and the sewer systems in Swartland 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 Swartland Municipality's water distribution and sewer drainage systems. The following Water and Sewer Master Plans were incorporated into the WSDP.

- Bulk Water Master Plan for Swartland Municipality (December 2021);
- Water Master Plan for Swartland Municipality (June 2020); and
- Sewer Master Plan for Swartland Municipality (June 2020).

All forward planning for water and sanitation services and water and sewerage infrastructure is guided by the Water and Sewer Master Plans.

Water Safety Plans for the two bulk WTWs and the bulk distribution systems were drafted in 2022 by the West Coast District Municipality and a Water Safety Plan for the internal water distribution systems was drafted by Swartland Municipality in 2022. A detailed risk assessment was executed as part of the process and the existing control measures implemented by Swartland Municipality and the West Coast District Municipality were evaluated as part of the process. An Improvement / Upgrade Plan is also in place with relevant Water and Safety Management Procedures for implementation.

W_2RAPs were also drafted in 2018 for the various WWTWs and sewer drainage networks. Detail WTWW Process Audits were compiled for the WWTWs during 2021. The W_2RAP 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.

The Water Safety Plan and W_2RAP Teams of Swartland Municipality are committed to meet regularly to review the implementation of all the aspects of the Water Safety Plan and W_2RAPs 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_2RAPs 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.

An Incident Response Management Protocol is in place and forms part of the Water Safety Plans and W_2RAPs. The Incident Response Management Protocol entails that certain reactive procedures are followed when an incident occurs, such as when a malfunction of the treatment processes occurs due to power failures, faulty equipment, adverse weather conditions or human error.

The following water and sanitation related investigations were successfully completed during the 2022/2023 financial year.

- The WSDP Performance- and Water Services Audit Report for the 2021/2022 financial year was finalised and approved by Council as part of the Annual Report. The non-revenue water balance models were updated for each of the distribution systems (Up to the end of June 2022) as part of the WSDP Performance- and Water Services Audit Process.

- The infrastructure constructed during the 2022/2023 financial year were added to the Asset Register and the Asset Register was updated.

- The following Technical Reports were completed during the last financial year.
  - Upgrading of the External Water Supply for Darling Housing Development – Remainder of Erf 551.
  - New Bulk Sewer for Moorreesburg Development.
  - Assessment of bulk water meters Malmesbury and Riebeek Kasteel, June 2023, Bigen.
  - Assessment of the Sulzer High Lift Pumps at the Swartland Water Treatment Works Pump Assessment Report, June 2023, Bigen.
- Swartland Municipality continues with the implementation of their Drinking Water Quality and Effluent Quality Sampling Programmes (Both Operational and Compliance Monitoring). The effluent discharged by industrial consumers is also monitored by Swartland Municipality on a monthly basis.

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:

- The intervention required to address the gap;
- The proposed solution to address the gap; and the
- The Future plan / identified project that would meet the requirement.

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.

The Vision statement of Swartland Municipality is "**Swartland forward-thinking 2040 - where people can live their dreams.**"

Swartland Municipality's Strategic Objectives, as included in the 2023/2024 IDP, are as follows:

- Community safety and wellbeing
- Economic transformation
- Quality and reliable services
- A healthy and sustainable environment
- A connected and innovative local government

Swartland Municipality's Management Area falls within the Breede-Olifants Catchment Management Area. The Breede-Olifants Catchment Management Agency was established by extending the boundary and area of operation of the Breede-Gouritz CMA Water Management Area (Government Gazette No.47559, 25 November 2022).

The area of operation of the Breede-Olifants Catchment Management Agency includes the previous Breede-Gouritz and Berg-Olifants water management areas as pronounced in the National Water Resource Strategy second edition, 2013.

A Catchment Management Strategy is not yet available for the Breede-Olifants Water Management Area (BOWMA), but the Catchment Management Strategy of the former Breede-Gouritz Water Management Area (BGWMA), July 2017, included the following Vision and three Strategic Focus Areas.

"Healthy water resources, for all, forever,"

- **Strategic Area 1: Protecting for People and Nature:** Focusing primarily on management of streamflow, water quality, habitat and riparian zones related to riverine, wetland, estuarine and groundwater resources, to maintain important ecosystem goods and services and biodiversity.

- **Strategic Area 2: Sharing for Equity and Development:** Focusing primarily on management of water use from surface and groundwater resources through the operation of infrastructure, in order to provide water for productive and social purposes within and outside of the WMA.
- **Strategic Area 3: Co-operating for Compliance and Resilience:** Focusing primarily on co-operation and management of institutional aspects to enable and facilitate the protection and sharing of water, including the more co-operative stakeholders, partnerships, information sharing, disaster risk and adaptation elements of the strategy.

TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

Topic C.1.1: Settlement Demographics and Public Amenities						
Section	**Intervention Required**	**% (1)**	**Solution description as identified by Master Plan**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Settlements Summary	No	100	Continue with the implementation of the recommended environmental strategies as included in the draft 2023-2028 SDF for each of the towns and ensure that new developments are in line with these priority action plans.	100	Yes	78.6
	No	100	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. Ensure that the provision of bulk water and sewerage infrastructure are aligned with the Housing Strategy (Human Settlement Housing Pipeline) and that housing projects only continue once the required bulk water and sewerage infrastructure are in place, as indicated in the Water and Sewer Master Plans and this WSDP.	100	Yes	78.6
Summary by Settlement Group	No	100				100.0
Assessment Score by Settlement Type	No	100				100.0
Amenities Summary	No	100				100.0

Notes: (1) Is this section addressed in the WSDP?
(2) Were solutions identified for the possible gaps?
(3) Percentage calculated based on the above two percentages and whether there is an existing project/activity addressing this problem? Does this current listed project/activity address the problem totally? Project/Activity approved by Council as part of WSDP database? Approved by Council in project activity database and part of 5yr IDP cycle projects? Project/Activity listed in 3yr MTEF Cycle?

The purpose of the SDF is to guide growth and development in the municipal area or space in a sustainable manner. Hence, future growth, development and land use planning departs from a vision and principles that underscore the protection, creation (development) and support (change) of integrated, sustainable settlements and liveable environments to enable economic and social prosperity.

The spatial objectives and strategies of the SDF will be informed by the IDP's strategic objectives and the Swartland SDF Vision as indicated in the table below (2023/2024 IDP).

Table C.1.2: SDF Spatial Objectives and Strategies	
Spatial Objective	**Strategy**
Objective 1: Grow economic prosperity [Economic Environment] IDP Strategic Goal 2 - Economic transformation	1. Protect Swartland's competitive trade advantage. 6. Grow (change) economic potential and trade advantage, strengthen mobility and economic links, stimulate diversification and product development. 11. Develop Swartland's competitive advantage, new markets and economic sectors (e.g. tourism).
Spatial Objective 2: Proximate convenient and equal access [Economic Environment] IDP Strategic Goal 3 – Quality and reliable services.	2. Protect economic vibrancy. 7. Provide (change) sustainable infrastructure and services (smart growth). 12. Provide land for residential and industrial development.
Objective 3: Sustain material, physical and social well-being [Social Environment] IDP Strategic Goal 1 - Community safety and wellbeing	3. Protect safety and security. 8. Provide (change) of social infrastructure and services (as per norm) to facilitate smart growth. 13. Manage risk and disaster (man-made and natural).
Objective 4: Protect and grow place identity and cultural integrity [Built Environment]	4. Protect heritage resources. 9. Grow cultural potential.

Table C.1.2: SDF Spatial Objectives and Strategies	
Spatial Objective	**Strategy**
IDP Strategic Goal 5 - A connected and innovative local government	11. Develop competitive advantage, new markets and economic sectors.
Objective 5: Protect ecological and agricultural integrity [Biophysical or Natural Environment] IDP Strategic Goal 4 - A healthy and sustainable environment	5. Protect food and water security and formalize conservation of Critical Biodiversity Areas. 10. Grow conservation potential and apply bioregional classification and coastal management. 11. Develop competitive advantage, new markets and economic sectors (e.g. tourism and utilities).

Swartland Municipality's 2023/2024 IDP list the following development proposals for the Swartland Region.

- Promotion of the N7 intensive rural corridor south and north of Malmesbury.
- Promotion of transport and tourism node development on N7 (R45 and Klein Dassenberg) and R27 (R415).
- Enhance the formalization of the Paardeberg as a world wine and conservation destination (cross border activity).
- Promote Darling and Yzerfontein as a world biodiversity and film destinations.
- Promote the coastal conservation park as an extension of the West Coast Park.
- Promote the Diep River as a historic link between Swartland and Cape Town (cross border activity).
- Finalization of declaration of Critical Biodiversity Areas (including Renosterbos remnants around Malmesbury and in Swartland).
- Enter into further negotiations with the national Department of Agriculture to exempt land earmarked for urban development.
- Implement economic mobility proposals according to ward needs.
- Enhance partnership through the establishment of a development forum.

The Housing pipeline for the three financial years from July 2023 until June 2026 focuses on Malmesbury, Chatsworth, Darling and Moorreesburg and is subject to the availability of funding from the Provincial Department of Human Settlements. The table below provides an overview of Swartland Municipality's Housing Pipeline as included in the 2023/2024 IDP.

Table C.1.3: Swartland Municipality's Housing Pipeline			
Town	**2023/2024**	**2024/2025**	**2025/2026**
Hoop Phase 2	506 sites	507 sites	500 sites
Phola Park	31 shared services	-	-
Darling Phase 1	-	187 sites	187 units
Darling Phase 2 (327)	-	Planning (PID)	-
Moorreesburg	-	645 sites	320 units
Chatsworth (130)	-	Planning (PID)	-

TOPIC 2: SERVICE LEVELS

Topic C.2.1: Service Levels Profile						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Direct Backlog Water	Yes	100	Install communal taps for the Chatsworth informal area.	100	No	57.1
	Yes	100	Assist private landowners as far as possible with the provision of basic water services to all the households in the Municipality's Management Area with existing water service levels below RDP standard, once practical guidelines and funding become available from the DWS.	100	No	57.1
Direct Backlog Sanitation	Yes	100	Install communal toilet facilities for the Chatsworth informal area.	100	No	57.1
	Yes	100	Assist private landowners as far as possible with the provision of basic sanitation services to all the households in the	100	No	57.1

Topic C.2.1: Service Levels Profile						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
			Municipality's Management Area with existing sanitation service levels below RDP standard, once practical guidelines and funding become available from the DWS.			
Water Services Infrastructure Supply Level Profile	No	100				100
Water Reliability Profile	Yes	100	Install communal water services for the Chatsworth informal area in order to ensure that the ratio of number of households per facility complies with the target of 25 or less households per tap. Assist private landowners as far as possible with the provision of basic water services to all the households on the farms in the rural areas with existing water service levels still below RDP standard, once practical guidelines and funding become available from DWS.	100	No	57.1
Sanitation Service Infrastructure Supply Level Profile	No	100				100
Sanitation Reliability Profile	Yes	100	Install communal sanitation services for the Chatsworth informal area in order to ensure that the ratio of number of households per facility complies with the target of 5 of less households per toilet facility. Assist private landowners as far as possible with the provision of basic sanitation services to all the households on the farms in the rural areas with existing sanitation service levels still below RDP standard, once practical guidelines and funding become available from DWS.	100	No	57.1
Water Services: Education	Yes	100	Confirm the water service levels of the primary schools in the rural areas. Provide basic water services to the schools if the current water service levels are below RDP standard.	100	No	57.1
Water Services: Health	No	100				100
Sanitation Services: Education	Yes	100	Confirm the sanitation service levels of the primary schools in the rural areas. Provide basic sanitation services to the schools if the current sanitation service levels are below RDP standard.	100	No	
Sanitation Services: Health	No	100				100
Health and Educational Facilities	No	100				100

Notes: (1) Is this section addressed in the WSDP?
(2) Were solutions identified for the possible gaps?
(3) Percentage calculated based on the above two percentages and whether there is an existing project/activity addressing this problem? Does this current listed project/activity address the problem totally? Project/Activity approved by Council as part of WSDP database? Approved by Council in project activity database and part of 5yr IDP cycle projects? Project/Activity listed in 3yr MTEF Cycle?

As a priority it is the responsibility of Swartland 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.

All water and sanitation services provided by Swartland Municipality to consumers within the Municipal Management Area are linked to the Municipality's Tariff Policy (May 2023) and poor households are incorporated through Swartland Municipality's Indigent Policy (May 2023).

All the formal households in the urban areas of Swartland Municipality's Management Area are provided with water connections and waterborne sanitation connections inside the erven. Standpipes and communal ablution facilities are provided in the informal areas as a temporary emergency service.

Swartland Municipality acknowledges the fact that communal standpipes represent probably the weakest part of a network's water supply services. Standpipes must be constructed in ways that can withstand excessive use and should not be neglected in terms of operation and maintenance. Malfunctioning standpipes may adversely affect the health of its already vulnerable and poor users. Communal standpipes are also used by poor households who normally do not pay for water. Poor people are the ones that suffer the most from water-related diseases due to:

- Poor quality and maintenance of standpipes and their surroundings. Standpipes are often leaking and poor drainage around standpipes results in standing pools of water and muddy soil.
- Standpipes are not protected and animals lick the taps.
- When people have to walk long distances to fetch water, it is used sparingly and not enough water is used for hygiene.
- Even if water is clean when it leaves the standpipe tap, it is often contaminated by dirty containers used for carrying and storage.

Swartland 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. Swartland Municipality is faced with various challenges with regard to the provision of services on private owned land in a financial sustainable manner (enabling the on-going 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 need it most.

Free basic sanitation policy:

- Provision of the most appropriate 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 West District Municipality responsible for environmental health and Swartland Municipality.
- Subsidising the operating and maintenance costs. If the basic service is to be provided free to the poor then Swartland Municipality must ensure that the costs of providing the service are covered by the local government equitable share and / or through cross-subsidies within Swartland 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.

Public Amenities Education: All education facilities in Swartland Municipality's urban areas are provided with adequate water and sanitation services. The water and sanitation service levels of the primary schools in the rural areas however need to be verified. Swartland Municipality is however committed to work with the Education Department to address any possible shortcomings with regard to the provision of water and sanitation services that might still exist at any of the schools in the rural areas.

It is important for the schools to focus on Water Demand Management activities and for Swartland Municipality to support the schools with WDM initiatives. This will not only aid in Swartland 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.

Public Amenities Health: All medical facilities in Swartland Municipality's Management Area are provided with adequate water and sanitation services and no specific strategies, with regard to the provision of water and sanitation services to these facilities, were therefore identified.

Swartland Municipality will strive to continue to ensure that the minimum required SANS241:2015 water quality standards are met through the systematic upgrading of their WTWs. The monitoring of provision of basic minimum services to farm dwellers remains a challenge, in view of the limited funding and human resources.

The establishment and functioning of effective health systems and health care services is critical for not only the upliftment of communities but more so for the sustainability of communities. Health services are rendered throughout the area by a network of clinics.

The environmental health function is currently with the West Coast District Municipality. The Municipal Health Services of the West Coast 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 factors 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 West Coast District Municipality and Swartland Municipality with regard to environmental health issues and that a good communication protocol is followed between the District Municipality and Swartland Municipality to report on health issues.

The health profile in relation to treated water is excellent. Within the urban context, drinking water throughout the municipal area is considered to be of a high quality. The most vulnerable groups within Swartland Municipality's Management Area are the persons living in informal areas with shared services. It is therefore of 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.

Swartland 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.

Swartland 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.

TOPIC 3: WATER SERVICES ASSET MANAGEMENT

Topic C.3.1: Water Services Asset Management						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
General Information	Yes	100	Develop an Asset Management Plan.	100	Partially	64.3
	No	100	Implement Groundwater Management Plan for three production boreholes (Water levels, abstraction volumes and water quality).	100	Partially	78.6
Operation	No	100	Implement recommendations from the Water Safety Plans and WTW Process Audits. Implement proposed interim solutions for improving the operation of the WTW, as well as proposed refurbishment and upgrade and extension work. Ensure adequate budget is allocated for the future upgrading and refurbishment work.	100	Partially	85.7
	No	100	Implement recommendations from the W_2RAPs and WWTW Process Audits. Implement proposed interim solutions for improving the operation of the WWTW, as well as proposed refurbishment and upgrade and extension work. Ensure adequate budget is allocated for the future upgrading and refurbishment work.	100	Partially	85.7
Functionality Observation	No	100	Provide additional reservoir storage capacity for the towns with inadequate storage capacity. Upgrade existing water pump stations and provide new water pump stations for the identified areas. Upgrade existing WTWs and WWTWs as recommended. Upgrade existing sewer pump stations and provide new sewer pump stations for the identified areas.	100	Partially	85.7
Asset Assessment Spectrum	No	100	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 the existing water and sewerage infrastructure (Best Practice). 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 (Best Practice).	100	Partially	85.7
Water and Sanitation schemes	No	100	Upgrade sections of the water reticulation network and sewer drainage network as proposed in the Water and Sewer Master Plans.	100	Partially	85.7

Notes: (1) Is this section addressed in the WSDP?
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(3) Percentage calculated based on the above two percentages and whether there is an existing project/activity addressing this problem? Does this current listed project/activity address the problem totally? Project/Activity approved by Council as part of WSDP database? Approved by Council in project activity database and part of 5yr IDP cycle projects? Project/Activity listed in 3yr MTEF Cycle?

The major backlogs with regard to water and sewerage infrastructure, as included in the 2023/2024 IDP, are indicated in the table below.

Table C.3.2: Water and Sewerage Infrastructure Backlogs (2023/2024 IDP)	
Water	**Sewerage**
Koringberg	
• Poorly developed network, small diameter pipes, low pressure and flow condition and open ring mains. • Sections of the water reticulation network are obsolete and must be upgraded. • Secondary chlorination at reservoirs must be implemented.	• Sewerage reticulation network poorly developed and must be expended. • WWTW is overloaded and must be upgraded.
Moorreesburg	
• Obsolete infrastructure, pipe breakages, leaking valves and leaking hydrants. • Poorly developed network, shortage in shut-off valves. • Secondary chlorination at reservoirs must be implemented.	• Illegal discharge of storm water in the sewer collection system results in overloading and failure during storm events. • Localised frequent blockages in the sewer collection system.
Riebeek Wes / Riebeek Kasteel	
• Poorly developed network, small diameter pipes, low pressure and flow condition and open ring mains. • Sections of the water reticulation network are obsolete and must be upgraded. • Secondary chlorination at reservoirs must be implemented.	• Illegal discharge of storm water in the sewer collection system results in overloading and failure during storm events. • Sewer reticulation network poorly developed in Riebeek West and must be extended.

Table C.3.2: Water and Sewerage Infrastructure Backlogs (2023/2024 IDP)	
Water	**Sewerage**
• Poor condition of Ongegund reservoir and pump station must be upgraded.	
Chatsworth and Riverlands	
• Secondary chlorination at reservoirs must be implemented. • Bulk supply system cannot supply in the demand during peak months. • Water supply is under pressure due to illegal connections and wastage of water.	• Sewerage system must be extended. • WWTW must be upgraded.
Kalbaskraal and Abbotsdale	
• Reservoir capacity must be increased for new developments. • Bulk supply system cannot supply in the demand during peak months. • Secondary chlorination at reservoirs.	• Sewerage system in Kalbaskraal is limited and should be expanded.
Darling	
• Poorly developed network, small diameter pipes, low pressure and flow conditions and open ring mains. • Sections of the water reticulation network are obsolete and must be upgraded. • Reservoir capacity must be increased for further developments. • Water supply to the industrial area must be increased to supply future demand.	• Regular blockages in Darling North. • WWTW is at capacity and must be upgraded to supply future demand. • Waterborne sewerage system must be extended to the industrial area.
Yzerfontein	
• Secondary chlorination at reservoirs must be implemented.	• Yzerfontein has no formal WWTW as well as no waterborne sewer system.
Malmesbury	
• Portions of the water network are outdated and needs to be upgraded. • Reservoir capacity should be increased for future development. • Secondary chlorination at reservoirs must be implemented.	• Illegal discharge of storm water in the sewer collection system results in overloading and failure during storm events. • Localised frequent blockages in the sewer collection system. • Obsolete infrastructure causing regular blockages. • Upgrading of the drainage network is needed. • Upgrading of main connectors in Voortrekker Street from swimming pool to Bokomo Road to accommodate future demand.

Asset Management Plan: The Municipality's current Asset Register is adequate for the information required for the WSDP. Swartland Municipality needs to compile an Asset Management Plan (AMP) to ensure efficient, effective and optimal management, operation and maintenance of all assets, which includes treatment plants, reservoirs, structures, buildings, pipelines, sites, etc. The purpose of the AMP is to:

- Ensure the operation and maintenance functions are well planned.
- Demonstrate responsible management.
- Justify and communicate funding requirements.
- Service provisioning complies with regulatory requirements.

An AMP normally includes the following:

- documents the nature, extent, age, utilisation, condition, performance and value of the infrastructure work;
- identifies existing and target levels of service, as well as expected changes in demand;
- identifies the life-cycle management needs of the infrastructure (development, renewal, operations and maintenance);
- assesses capital and operational budget needs; and
- identifies infrastructure asset management improvement needs.

Swartland Municipality needs to differentiate between budget allocated towards the operation and maintenance of the water and sewerage infrastructure and the budget allocated towards the replacement of the water and sewerage infrastructure. A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of the existing water and sewerage infrastructure (Best Practice). 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 (Best Practice).

A proxy for asset consumption can be considered the level of depreciation each asset incurs on an annual basis. Preserving the investment in existing infrastructure needs to be considered a significant strategy in ensuring the future sustainability of infrastructure and the Municipality's revenue base. Swartland Municipality considered the need for asset renewal as a priority, within this framework, and hence the capital programme was determined based on renewal of current assets versus new asset construction.

Further, continued improvements in technology generally allows many assets to be renewed at a lesser "real" cost than the original construction cost. Therefore, it is considered prudent to allow for a slightly lesser continual level of annual renewal than the average annual depreciation. The Asset Management Policy is therefore considered a strategic guide in ensuring a sustainable approach to asset renewal, repairs and maintenance and is utilised as a guide to the selection and prioritisation of individual capital projects. In addition the policy prescribes the accounting and administrative policies and procedures relating to property, plant and equipment (fixed assets).

It is important for Swartland Municipality to develop an AMP from their Asset Register. The objective of an AMP is to support the achievement of the strategic goals of the Municipality and facilitate prudent technical and financial decision-making. It is also a vehicle for improved internal communication and to demonstrate to external stakeholders the Municipality's ability to effectively maintain its existing infrastructure as well as the new infrastructure to be developed over the next 20 years.

Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increase in (operational) services level coverage 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. The potential renewal projects for water and sewerage infrastructure need to be identified from the Asset Register. All assets with a condition grading of "poor" and "very poor" need to be prioritised.

It is essential for Swartland Municipality to protect their assets by ensuring that an appropriate maintenance and rehabilitation plan (AMP) is developed and implemented. 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. Swartland Municipality must ensure that the maintenance and rehabilitation plan is part of the WSDP and that the plan is implemented. Assets must be rehabilitated and / or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose.

One of the key challenges of Swartland Municipality is to identify adequate funds for the rehabilitation and maintenance of their existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. It is important for the Municipality to secure adequate funding for major refurbishment and maintenance work, the provision of bulk infrastructure and the upgrading of the Swartland WTW and some of the WWTWs in order to keep up with the high demand for services.

Disaster Management Plan: A Disaster Management Plan is in place for the West Coast District Municipality.

Untreated Effluent Management Plan: There are no known untreated effluent discharged to the environment. The W_2RAPs for the WWTWs and sewer drainage networks include Management Procedures and Incident Response and Emergency Protocols to respond to incidents.

Future Water and Sewerage Infrastructure Requirements: 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.

GROUNDWATER INFRASTRUCTURE

Swartland Municipality will continue with the implementation of their Groundwater Monitoring Programme for their three Riverlands boreholes. The groundwater monitoring data is currently processed, analysed and reported on by an experienced hydrogeologists on an ad-hoc basis in order to ascertain whether the resources are being sustainably utilised and to ensure compliance with the approved Groundwater Monitoring Programme and water use license. 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. A botanical and streamflow monitoring programme is therefore also required. It is important for Swartland Municipality to continue to focus on aquifer protection, groundwater monitoring and wellfield management, in order to meet the town's future water requirements.

The table below gives an overview of the key groundwater management functions.

Table C.3.3: Key Groundwater Management Functions

Activity	Responsible Person	Skills and qualifications required	Resources, tools and equipment	Remarks
Measuring and recording of water levels.	Pump operator	Literacy, numeracy, trained in taking water levels	Dip meter, ruler, log book, pen.	Done as part of operators' regular O&M activities.
Measuring and recording abstraction	Pump operator	Literacy, numeracy, trained in reading water meters.	Log book, pen	Done as part of operators' regular O&M activities.
Providing data to the authority that is responsible for water supply on a regular basis.	Pump operator and pump operator supervisor	Literacy, numeracy, keeping records.	Postal service or public transport.	Including as part of the reporting requirements of the pump operator.
Taking water samples	The authority that is responsible for water supply.	Trained in taking water samples, driving license.	Transport, sample bottles, cooler box.	Sampling routine defined by sampling plan.
Sending water samples for testing.	The authority that is responsible for water supply.	Keeping records.	Transport to laboratory	Sent to nearest accredited laboratory.
Defining the monitoring requirements of an individual borehole.	Technical manager of operations or hydrogeologist.	Hydrogeological degree or diploma, experience of hydrogeological conditions.	Reports and records on borehole, monitoring data.	
Ensuring that boreholes are equipped with piezometer tubes for measuring water levels and water meters for measuring abstraction.	The authority that is responsible for water supply.	Project management	In house technical staff, suppliers, contractors, specifications.	
Ensuring that operators have the equipment and skills to do monitoring.	The authority that is responsible for water supply.	Project management	Trainers, suppliers, specifications.	
Monitoring the pump operator's competence to collect and record data.	Pump operator supervisor	Staff supervision, knowledge of pump operators' tasks.	Transport	Done as part of the supervision of O&M activities.
Processing data collected at the local level	Data clerk	Data capture, record keeping, filing, trained in operating software.	Computer, spreadsheet or groundwater management software, files.	Maintains an electronic and physical record of data.

Table C.3.3: Key Groundwater Management Functions				
Activity	**Responsible Person**	**Skills and qualifications required**	**Resources, tools and equipment**	**Remarks**
Studying water level, water quality and abstraction data on a regular basis.	Technical manager of operations.	Technical training, operations experience.	Project files, monitoring data	Done as part of the management of O&M
Revising pumping recommendations, and adjusting the monitoring requirements. Ensuring the recommendations are carried out and monitoring the implementation of the recommendations.	Technical manager with hydrogeologist as required.	Technical training, operations experience.	Reports and records on borehole, monitoring data, operational information.	Ongoing management of operations and groundwater resources.
Reporting to council and pump operator, providing summary data to the CMA.	Data clerk with supervision from technical manager.	Training in operating software.	Computer, spreadsheet or groundwater management software, printer.	Summary data defined by license (frequency, what data, form of data)

SURFACE WATER INFRASTRUCTURE

The Paardenberg Dam is the only other surface water source of Swartland Municipality. The dam is still in a good condition, in spite of its advanced age (93 years). The fourth dam safety inspection of the dam, as carried out on the 7th of May 2019, reported the following:

The wall appears to be structurally sound and stable and the buttresses are well founded on strong and hard foundation rock. There are a number of structural cracks, but these do not threaten the safety of the dam.

The dam does not meet the minimum freeboard; however, the dam has reportedly never been overtopped. In the case of overtopping the possible damage is not expected to jeopardise the safety of the dam. Despite this, the dam does not show any signs of distress.

In the event of failure, there would be some risk to lives and property. The released volume of water would likely inundate and possibly damage a number of farms and dams downstream. The following abbreviated recommendations were made following the evaluation of the dam's safety:

- Keep the current strip along the toe cleared of vegetation cut short (shorter than 0.3m);
- Routine inspections should be carried out quarterly and reports completed in accordance with the O&M Manual;
- Flow readings should then be taken during quarterly inspections;
- Monitor erosion at the end of the concrete dam wall on the right flank and the spillway discharge channels and repair the erosion as and when necessary;
- The outlet valves should receive some maintenance and operated through their full range at least quarterly.
- Keep crest walkway drains clear of debris;
- If ever any floods overtop the non-overspill crest, the rock surface below the dam must be examined, and any potentially dangerous erosion repaired without delay; and
- Public warning signs should be displayed at strategic positions to create an awareness of potential dangers at the dam.

WATER TREATMENT WORKS INFRASTRUCTURE

An automatic backwash rapid gravity sand filter is used to treat the surface water supplied from the Paardenberg dam. The filtration capacity is currently adequate to treat the authorised surface water supplied from the dam and no upgrades of the filtration capacity are planned for the nearby future.

The table below gives an overview of the design capacity, current flows and required treatment capacity of the Swartland WTW.

Table C.3.4: Design Capacity, Current Flows and Required Treatment Capacity of Swartland WTW

Year	Design Capacity	Maximum Month Average Daily Flow		Average Annual Daily Flow		Required Treatment Capacity
	(Ml/d)	Flow (Ml/d)	Operational Capacity (%)	Flow (Ml/d)	Operational Capacity (%)	1.5 x $AADD_{10yr}$ (Ml/d)
2013/2014	29.000	25.032 (Febr)	86.32%	17.801	61.38%	29.011
2014/2015	29.000	26.496 (Febr)	91.37%	19.161	66.07%	29.736
2015/2016	29.000	24.226 (Febr)	83.54%	18.492	63.77%	30.479
2016/2017	29.000	19.816 (Febr)	68.33%	15.847	54.64%	31.241
2017/2018	29.000	13.958 (Jul)	48.13%	11.734	40.46%	32.022
2018/2019	29.000	16.171 (Febr)	55.76%	13.332	45.97%	32.823
2019/2020	29.000	17.054 (Febr)	58.81%	13.853	47.77%	33.643
2020/2021	29.000	21.089 (Febr)	72.72%	16.072	55.42%	34.484
2021/2022	29.000	23.392 (Feb)	80.66%	17.850	61.55%	35.347
2022/2023	29.000	25.441 (Feb)	87.73%	18.869	65.07%	36.230

The following four options were investigated, as part of the Bulk Water Master Plan for Swartland Municipality, to augment the treatment capacity of the Swartland system in order to supply the future water demand.

- Option 1: Augment treatment capacity of the Swartland WTW from the current capacity of 29 Ml/d with 36.4 Ml/d to the future required capacity of 65.4 Ml/d. Supply total Swartland system with water from the Swartland WTW (as proposed in the June 2013 Water Master Plan for the WC DM). For this scenario the Swartland WTW is operated by the WC DM.

- Option 2: Capacity of Swartland WTW remain at 29 Ml/d. CCT to supply additional demand to the system from the existing CCT's Voëlvlei WTW. Treated water is pumped from the CCT's Voëlvlei WTW (up to 36.4 Ml/d for the future demand) to the Swartland WTW to augment peak weekly demand if it exceeds the existing capacity of the plant of 29 Ml/d. The total peak demand for the future system of 65.4 Ml/d is then pumped from the Swartland PS (located at the Swartland WTW) to the system. For this scenario the Swartland WTW is operated by the WC DM and the system from the CCT's Voëlvlei WTW up to the Swartland WTW is operated by the CCT. Alternatively CCT can take over the operation of the Swartland WTW from the WC DM and operate the total system up to the Swartland PS.

- Option 3a: The existing Swartland WTW is decommissioned and the future peak weekly demand for the system of 65.4 Ml/d is supplied from the CCT's Voëlvlei WTW. For this scenario the existing pumps at the Swartland WTW is retained and water is pumped from the CCT's Voëlvlei WTW to the decommissioned Swartland WTW, and then from the Swartland WTW site to the Swartland system via the Swartland PS (pump station should be upgraded to supply the future demand of 65.4 Ml/d). For this scenario the total system is operated by CCT up to the Swartland PS.

- Option 3b: This is the same as for scenario 3a, except that the Swartland PS (located at the Swartland WTW) is also decommissioned and the demand of the total system is supplied from the CCT's Voëlvlei WTW. For this scenario water is pumped from the CCT's Voëlvlei WTW to the Kasteelberg reservoirs, the Kamp reservoirs and the Gouda reservoirs (bulk pipeline from the CCT's Voëlvlei WTW is connected at the Swartland WTW site to the existing bulk pipelines to the Kasteelberg reservoirs, the Kamp reservoirs and the Gouda reservoirs). For this scenario the total system is operated by CCT up to the connections to the old bulk pipelines.

BULK WATER PIPELINE INFRASTRUCTURE

The Bulk Water Master Plan for Swartland Municipality (December 2021) has indicated that based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk water infrastructure (Components of the future system with the highest priorities).

- Malmesbury: Upgrade supply from Panorama reservoir to West Bank draw-off Phase 1 (450 mm dia.). Estimated cost of R10 397 000.
- Riebeeks: Upgrade 100 mm dia. feeder main to Riebeek Kasteel reservoirs (200 mm dia.). Estimated cost of R748 000.
- Upgrade bulk supply to Panorama reservoir (Part of Swartland Municipality's Reticulation Water Master Plan).
- New bulk supply from Atlantis to Chatsworth (Part of Swartland Municipality's Reticulation Water Master Plan).
- Yzerfontein: Additional balancing capacity at Wildschutsvlei balancing tank. Estimated cost of R2 683 000.
- Malmesbury: Upgrade supply from Panorama reservoir to West Bank draw-off Phase 2 (550 mm dia.). Estimated cost of R7 013 000.
- Upgrade bulk supply pipe from WC DM meter I1/4 to Wesbank reservoirs (Part of Swartland Municipality's Reticulation Master Plan).
- Riebeeks: Upgrade 100 mm dia. feeder main from Kasteelberg reservoirs to Ongegund PS (160 mm dia.) (Part of Swartland Municipality's Reticulation Water Master Plan).
- Moorreesburg: Upgrade 100 mm dia. feeder main (F-line) to Moorreesburg reservoirs (200 mm dia.) Estimated cost of R4 248 000
- Riebeeks: Upgrade supply from Kasteelberg reservoirs to Riebeek Kasteel (315, 250 and 200 mm dia.). Estimated cost of R22 197 000
- Swartland: Swartland WTP to Kasteelberg reservoir rising main upgrade (600 mm dia.). Estimated cost of R40 960 000
- Withoogte: Upgrade capacity of Withoogte WTP from 72.0 Ml/d by 16.5 Ml/d to 88.5 Ml/d (Part of Saldanha Bay Municipality's Bulk Water Master Plan).
- Withoogte: Additional raw water storage capacity at Withoogte WTP (Part of Saldanha Bay Municipality's Bulk Water Master Plan).

Table C.3.5: Future Bulk Water Infrastructure for the Swartland Bulk Water System as included in the Bulk Water Master Plan for Swartland Municipality

Bulk Master Plan Item	Year	Distance (m)	Diameter (mm)	Estimated cost 20/21 (R million)
CCT Voëlvlei WTW to Swartland WTW, Swartland WTW to Kasteelberg & Gouda (A, B & C lines)				
Swartland WTW to Kasteelberg pipeline - Phase 2	2025	3 469	600	R27.448
Swartland WTW to Kasteelberg pipeline - Phase 3	2025	1 821	600	R13.512
Decommission existing Swartland WTW infrastructure after system is supplied 100% from CCT Voëlvlei WTW) – 29 100 m³/d @ 0 m EGL Water Treatment Facility to be abandoned	2030	-	-	-
New 750 L/s @ 280 m Pump Station required to supply Swartland system from CCT Voëlvlei WTW	2030	-	-	R20.360
New bulk supply pipeline required to supply Swartland system from CCT Voëlvlei WTW	2030	5 440	900	R71.394
New bulk supply pipeline required to supply Gouda & Kamp systems from CCT Voëlvlei WTW	2035	18	200	R0.072
New PRV to reduced pressures to Gouda reservoir from CCT Voëlvlei WTW PS	2035	1 x PRV	150	R0.241
New PRV to reduced pressures to Kamp reservoir from CCT Voëlvlei WTW PS	2035	1 x PRV	100	R0.212

Table C.3.5: Future Bulk Water Infrastructure for the Swartland Bulk Water System as included in the Bulk Water Master Plan for Swartland Municipality				
Bulk Master Plan Item	**Year**	**Distance (m)**	**Diameter (mm)**	**Estimated cost 20/21 (R million)**
12000 m³ @ 286 m TWL Reservoir. Additional storage capacity at Kasteelberg reservoir site	2035	-	-	R30.450
Required when existing bulk supply to Gouda reaches capacity	2040	6 817	200	R12.419
Sub-total				**R176.108**
Kasteelberg to Riebeek Valley (D & E lines)				
Install pipeline to improve supply to Riebeek Kasteel reservoir	2022	388	200	R0.748
Install pipeline to improve bulk supply capacity (Swartland Municipality reticulation water master plan item).	2025	103	160	Part of Swartland Municipality reticulation water master plan
Install pipeline to improve supply to Riebeek Kasteel	2030	3 323	315	R11.056
Install pipeline to improve supply to Riebeek Kasteel	2030	4 086	250	R9.966
Install pipeline to improve supply to Riebeek Kasteel	2030	623	200	R1.175
Sub-total				**R22.945**
Kasteelberg to Glen Lily and Moorreesburg (F & H lines)				
Upgrade existing 100 mm to improve supply to Moorreesburg reservoirs from Swartland system	2025	2 537	200	R4.248
Upgrade existing 50 mm to improve network conveyance when pressure problems are experienced	2035	7 647	75	R6.169
Replace existing 300 Ø pipeline with 600 Ø to augment bulk supply to Malmesbury	2035	10 746	600	R75.219
Replace existing 300 Ø pipeline with 600 Ø to augment bulk supply to Malmesbury	2040	2 435	600	R17.754
Upgrade PS (600 L/s @ 47m) when existing PS reaches capacity	2040	-	-	R3.450
Upgrade PS (600 L/s @ 47m) when existing PS reaches capacity	2040	-	-	R3.450
Sub-total				**R110.290**
Glen Lily to Darling and Yzerfontein (I & J lines)				
Required to augment bulk supply to Wesbank, Darling and Yzerfontein, replace existing 200 mm Ø pipe with a new 450 mm Ø pipe	2022	673	450	R4.014
Required to augment bulk supply to Wesbank, Darling and Yzerfontein, replace existing 200 mm Ø pipe with a new 450 mm Ø pipe	2022	746	450	R4.434
Required to augment bulk supply to Wesbank, Darling and Yzerfontein Replace existing 300 mm Ø pipe with a new 450 mm Ø pipe	2022	316	450	R1.949
Required to improve bulk supply to Panorama reservoir (when future area MM_05 develops)	2022	132	200	Part of Swartland Municipality reticulation water master plan
Install 350 m³ @ 189.7 m TWL reservoir to ensure additional balancing capacity at Wildschutsvlei balancing tank site	2025	-	-	R2.683
Required to augment bulk supply to Wesbank, Darling and Yzerfontein, replace existing pipe under N7.	2025	71	650	R7.013
To improve supply to Darling and Yzerfontein. Replace existing 200 mm Ø pipe	2030	16 182	400	R75.631
To improve supply to Darling and Yzerfontein. Replace existing 200 mm Ø pipe	2035	14 307	400	R66.880
Install 25000 m³ @ 263.525 m TWL Reservoir. Additional storage capacity at Glen Lily reservoir site (can be phased).	2035	-	-	R54.013
Required to augment bulk supply to Wesbank, Darling and Yzerfontein, new parallel reinforcement 450 mm Ø pipe	2040	330	550	R3.230
Required to augment bulk supply to Wesbank, Darling and Yzerfontein. Replace existing 450 mm Ø pipe with a new 650 mm Ø pipe	2045	142	650	R2.309
Required to augment bulk supply to Wesbank, Darling and Yzerfontein. New 550 mm Ø parallel reinforcement pipe	2050	783	550	R6.400
New 315 mm Ø bulk supply from WC DM bulk pipeline to the new Wesbank Upper reservoir	2050	653	315	Part of Swartland Municipality

Table C.3.5: Future Bulk Water Infrastructure for the Swartland Bulk Water System as included in the Bulk Water Master Plan for Swartland Municipality				
Bulk Master Plan Item	**Year**	**Distance (m)**	**Diameter (mm)**	**Estimated cost 20/21 (R million)**
53 l/s FCV to sustain pressure in upstream bulk system	2050	1 x FCV	150	reticulation water master plan
New 5.0 ML Wesbank Upper reservoir (required when AADD supplied from Wesbank reservoirs exceeds 6.5 ML/d, or when future areas MM_02 or MM_09 develop)	2050	-	-	
Required to augment bulk supply to Wesbank, Darling and Yzerfontein, replace existing 300 mm Ø pipe with new 550 mm Ø pipe	2055	663	550	R5.559
Required to augment bulk supply to Wesbank, Darling and Yzerfontein, replace existing 300 mm Ø pipe with 400 mm Ø pipe	2055	753	550	R6.191
Required to augment bulk supply to Wesbank, Darling and Yzerfontein Replace existing two 300 mm Ø pipes with a new 600 mm Ø pipe (retain 350 Ø pipe)	2060	1 268	600	R10.617
Sub-total				**R250.923**
Rural Water Schemes (Weltevrede, Langgewens, Goudapad 1 and WBK line)				
PRV Required to reduce high static pressures within the Weltevrede rural water scheme	2025	PRV	100	-
Required to monitor water losses within the Weltevrede rural water scheme	2025	1 x Meter	100	R0.119
Emergency connection pipeline between Weltevrede and Goudapad 2 rural schemes (for redundancy)	2025	2 247	75	R1.832
Zone valve between Weltevrede and Goudapad 2 rural schemes (for redundancy)	2025	1 x Valve	75	R0.102
Valve required to move part of the WBK scheme from Swartland system to the Withoogte system to ensure adequate supply and pressures	2025	1 x Valve	200	R0.121
Open Valve. Required to move part of the WBK scheme from Swartland system to the Withoogte system to ensure adequate supply and pressures	2025	-	200	-
Required to monitor water losses within the Langgewens rural water scheme	2027	1 x Meter	180	R0.146
Replace existing 75 mm to improve network conveyance	2030	1 165	160	R1.544
Required to reduce high static pressures within the Langgewens rural water scheme	2030	1 x PRV	75	R0.182
Required to reduce high static pressures within the Langgewens rural water scheme	2030	1 x PRV	50	R0.160
Emergency connection pipeline between Langgewens rural scheme and F-line (for redundancy)	2030	2 732	75	R2.221
Zone valve between Langgewens rural scheme and F-line (for redundancy)	2030	1 x Valve	110	R0.114
Replace existing 50 mm pipelines to improve network conveyance (when pressure problems occur)	2030	3 851	110	R3.681
PRV required to reduce high static pressures within the Goudapad 1 rural water scheme	2035	1 x PRV	75	R0.182
Emergency connection pipeline between Goudapad 1 and Goudapad 2 rural schemes (for redundancy)	2035	1 216	75	R1.003
Zone valve between Goudapad 1 and Goudapad 2 rural schemes (for redundancy)	2035	1 x Valve	100	R0.108
Replace existing 75 mm pipeline to improve network conveyance (when pressure problems are experienced)	2055	3 272	110	R3.133
Replace existing 50 mm pipeline to improve network conveyance	2055	1 422	100	R1.372
Sub-total				**R16.020**
Total				**R576.286**

Table C.3.6: Future Bulk Water Infrastructure for the Withoogte Bulk Water System as included in the Bulk Water Master Plan for Swartland Municipality				
Bulk Master Plan Item	**Year**	**Distance (m)**	**Diameter (mm)**	**Estimated cost 20/21 (R million)**
Withoogte to Moorreesburg & Koringberg (MB, WB & G lines)				
New 1.500Ml reservoir at 243.8m TWL, when existing storage nears capacity	2030	-	-	R6.888
Sub-total				**R6.888**
Rural Water Schemes (Goudapad 2, Koringberg Rural and Nooitgedaght)				
Valve to insert and close. Verify if existing zone valve is closed	2022	1 x Valve	110	R0.114
Meter required to monitor water losses within the Koringberg rural water scheme	2022	1 x Meter	100	R0.137
Valve to insert and close. Verify if existing zone valve is closed	2022	1 x Valve	63	R0.102
Valve to insert and close. Verify if existing zone valve is closed	2022	1 x Valve	100	R0.108
Meter required to monitor water losses within the Koringberg rural water scheme	2025	1 x Meter	110	R0.129
Meter required to monitor water losses within the Nooitgedaght rural water scheme	2025	1 x Meter	100	R0.118
Meter required to monitor water losses within the Koringberg rural water scheme	2025	1 x Meter	150	R0.135
Replace existing 75 & 63 mm pipeline to improve network conveyance	2030	6 708	160	R8.681
Replace existing 50 mm pipeline to improve network conveyance	2030	5 973	110	R5.690
PRV required to reduce high static pressures within the Goudapad 2 rural water scheme	2030	1 x PRV	150	R0.241
Water meter required to monitor water losses within the Goudapad 2 rural water scheme	2030	1 x Meter	160	R0.144
PRV required to reduce high static pressures within the Nooitgedaght rural water scheme	2030	1 x PRV	75	R0.182
Replace existing 50 mm pipelines to improve network conveyance	2035	2 439	160	R3.184
Replace existing 63 mm and 100 mm pipelines to improve network conveyance	2035	4 535	160	R5.883
Replace existing 100 mm pipelines to improve network conveyance	2045	6 019	160	R7.794
Replace existing 100 mm pipeline to improve network conveyance (when pressure problems are experienced)	2045	11 397	160	R14.718
Replace existing 75 and 63 mm pipeline to improve network conveyance (if supply problems to Koringberg BPT are experienced)	2055	4 388	110	R4.284
Emergency connection pipeline Koringberg rural scheme to improve network conveyance and redundancy	2055	1 433	50	R0.927
Replace existing 50 mm pipeline to improve network conveyance (if supply problems to Koringberg BPT are experienced)	2065	4 339	110	R4.143
Sub-total				**R56.714**
Total				**R63.602**

The Water Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk internal water supply systems of the various towns (Feeder mains).

Malmesbury Feeder Mains:

- Upgrading of the existing bulk pipelines between the Glen Lily reservoirs and the draw-off points to the existing Wesbank Lower reservoirs and proposed Wesbank Upper reservoir is proposed in the Swartland bulk water master plan (items S3.2, S3.3, S3.4 and S3.5) in order to augment the capacity of the existing bulk system to supply water to Wesbank (Lower reservoir and proposed Upper reservoir), Darling and Yzerfontein.
- It is proposed in the water master plan that Abbotsdale, Kalbaskraal, Riverlands and Chatsworth is supplied with bulk water from the Wesbank reservoirs (through the implementation of projects SMW-001) as opposed to the current operation where these areas are supplied from the Kleindam reservoir. The implementation of project SMW-001 will improve the supply capacity from Malmesbury to Abbotsdale, Kalbaskraal, Riverlands and Kalbaskraal from the current capacity of 1.5 Ml/d (capacity when supplied

under gravity from the Kleindam reservoirs) to a capacity of 3.4 Ml/d (capacity when supplied under gravity from the Wesbank reservoirs).

- A new 315mm dia. supply pipeline is proposed from the I-line (between Malmesbury and Darling) to the proposed Wesbank Upper reservoir (item SMW.B1). It is proposed that flow into the reservoir is regulated through a flow-control valve for even withdrawal from the Swartland bulk system (item SMW.B2).
- Upgrading is proposed of the existing supply pipeline from meter I1/4 to the Wesbank reservoirs (new 500mm dia. parallel reinforcement pipe, item SMW.B6).
- Upgrading of the existing 150mm dia. feeder main to the Panorama reservoir with a new 200mm dia. pipe is proposed (item SMW.B5)
- Upgrading of the existing 100mm dia. feeder main to the Wesbank tower is proposed (item SMW.B10)
- A new 500mm dia. bulk pipeline is proposed from the existing Wesbank reservoirs in the Malmesbury system to the proposed draw-off point to the future De Hoop reservoirs in the Abbotsdale system (item SMW.B7).
- A new 400mm dia. bulk pipeline is proposed between the draw-off point to the De Hoop reservoir and the proposed draw-off point to the future Oranjefontein reservoir (item SMW.B8). It is proposed that item SMW.B8 connects to the existing 200mm dia. bulk pipeline between Malmesbury and Abbotsdale. Items SMW.B7 and SMW.B8 should then be the main supply of bulk water from the Wesbank reservoirs to Abbotsdale and Kalbaskraal and the existing 200mm dia. bulk pipeline from Malmesbury can be transferred to the existing Malmesbury reticulation network.

Abbotsdale Feeder Mains:

- It is proposed that the existing bulk pipeline between Malmesbury and the draw-off point to Abbotsdale is upgraded in order to augment supply to Abbotsdale and Kalbaskraal (items SAW.B9 and SAW.B10). Item SAW.B9 is the replacement of the existing 200mm dia. AC pipe from the proposed connection point to the new 500/400mm dia. bulk pipeline from the Wesbank reservoir up to the point where the diameter of the existing 200mm dia. AC pipe enlarged to a 250mm dia. ductile iron pipe. Item SAW.B10 is a 250mm dia. parallel reinforcement of the existing 250mm dia. ductile iron pipe up to the Abbotsdale draw-off point.
- A new 160mm dia. supply pipe is proposed from the De Hoop Lower reservoir to the De Hoop Upper reservoir (item SAW.B5).
- A new 200mm dia. bulk pipeline is proposed from the 500/400mm dia. bulk pipeline from the Wesbank reservoirs (future bulk supply pipe to Oranjefontein, Abbotsdale and Kalbaskraal reservoirs) to the proposed Oranjefontein reservoir (item SAW.B11). It is proposed that flow into the reservoir is regulated through a flow-control valve for even withdrawal from the upstream bulk system (item SAW.B12).

Kalbaskraal Feeder Mains:

- A new 200mm dia. bulk supply pipeline is proposed between the Kalbaskraal Lower and the proposed Kalbaskraal Upper reservoir (item SKW.B2).

Chatsworth and Riverlands Feeder Mains:

- It is proposed that the existing 160mm and 200mm dia. portions of the bulk pipeline between the Kalbaskraal Lower reservoir and the Riverlands break pressure tank are upgraded to improve bulk water supply to the Chatsworth reservoirs (items SCW.B2 and B3). Item SCW.B2 is a proposed 250mm dia. parallel reinforcement of the existing 3km 200mm dia. portion of the bulk pipeline. Item SCW.B3 is the replacement of the existing 160mm dia. portion of the bulk pipeline (3.1km) with a new 315mm dia. pipeline.
- It is proposed that the existing 160mm dia. bulk pipeline (4.7km) between the Riverlands break pressure tank and the Chatsworth reservoirs is upgraded to a 250mm dia. to improve bulk water supply to the Chatsworth reservoirs (items SCW.B5).
- Through the implementation of master plan items SCW.B2, SCW.B3 and SCW.B5 the capacity of the existing system to supply bulk water from Kalbaskraal to the Chatsworth reservoirs will improve from the current capacity of 1.3 Ml/d to a future capacity of 3.5 Ml/d. This will however not be sufficient to supply the potential peak day demand of 6.1 Ml/d that is calculated for Chatsworth and Riverlands.

- In order to supply a peak demand of more than 3.5 Ml/d to Chatsworth the existing 250mm dia. pipeline between Malmesbury and Kalbaskraal should be upgraded and the sizes of the master plan items from the Glen Lily reservoir to the Wesbank reservoir, from the Wesbank reservoir to the Abbotsdale draw-off point and from Kalbaskraal to Chatsworth should be enlarged. Alternatively a second supply pipeline should be constructed between the CCT Pella reservoirs and the Swartland Local Municipality Chatsworth reservoirs.
- It is therefore proposed that a new 355mm dia. bulk pipeline is constructed between the CCT Pella reservoirs and the SLM Chatsworth reservoirs (item SCW.B7) in order to augment bulk water supply to Chatsworth. This pipeline will alleviate pressure that currently exists on the bulk system between Malmesbury and Kalbaskraal, Chatsworth and Riverlands.

Darling Feeder Mains:

- Upgrading of the existing bulk pipeline between Malmesbury and Darling is proposed in the Swartland bulk water master plan (items S4.3 and S4.4) in order to augment the capacity of the existing bulk system to supply water to Darling and Yzerfontein.

Koringberg Feeder Mains:

- The only feeder main required in future is the feeder main to the proposed internal booster PS.

Moorreesburg Feeder Mains:

- Upgrading of the so-called “F-line” between the Kasteelberg reservoirs and Moorreesburg is proposed in the Swartland bulk water master plan (item S2.9) in order to improve the redundancy of the bulk supply system to Moorreesburg.

Riebeek Kasteel Feeder Mains:

- A new 250mm dia. feeder main is proposed from the so-called “D-line” (bulk pipeline from the Kasteelberg reservoirs) to the proposed Riebeek Kasteel Lower reservoir (item SRkW.B1). It is proposed that flow into the reservoir is regulated through a flow-control valve for even withdrawal from the upstream bulk system (item SRkW.B2).
- It is proposed in the Swartland bulk water master plan that the existing 100mm dia. feeder main from the D-line to the existing Riebeek Kasteel reservoirs is upgraded to a 200mm dia. pipe (item S2.4).
- Upgrading of the 150mm dia. portion of the D-line between Riebeek West and Riebeek Kasteel is proposed in the Swartland bulk water master plan (items S2.2 and S2.3).

Riebeek Wes Feeder Mains:

- It is proposed that the existing 100mm dia. feeder main from the so-called “D-line” (bulk pipeline from the Kasteelberg reservoirs) to the existing Riebeek West Lower reservoir is upgraded to a 200mm dia. pipe (item SRwW.B1).
- It is proposed that the existing 100mm dia. feeder main from the Riebeek West Lower reservoir to the Riebeek West Upper reservoir is upgraded to a 160mm dia. pipe (item SRwW.B3).
- Upgrading of the 200mm dia. portion of the D-line between the Kasteelberg reservoirs and Riebeek West is proposed in the Swartland bulk water master plan (items S2.1 and S2.2).

Ongegund Feeder Mains:

- Upgrading of the existing 100mm dia. feeder main to the Ongegund PS is proposed (item SOW.B1).
- A new 160mm dia. dedicated bulk supply line from the Ongegund PS to the Ongegund Lower reservoir is proposed (item SOW.B3).
- A new 110mm dia. feeder main from the Ongegund Lower reservoir to the Ongegund Upper reservoir is proposed (SOW.B5).

Yzerfontein Feeder Mains:

- No upgrades are required to the bulk system between Darling and Yzerfontein in order to accommodate the future water demand.

The Water Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, it will be necessary for the following future bulk water pipelines.

Table C.3.7: Future Bulk Water Infrastructure as included in Water Master Plans

Town	New feeder mains that are proposed or existing feeder mains that require upgrading in the future	Year	Distance (m)	Diameter (mm)	Estimated cost 19/20 (R million)
Malmesbury	New 315 mm Ø bulk supply from Wesbank to Kalbaskraal bulk pipeline (item SMW1.1)	2021	882	315	R3.554
	New 315 mm Ø bulk supply from Wesbank to Kalbaskraal bulk pipeline (including N7 National Road crossing) (item SMW1.3)	2021	806	315	R4.121
	New 250 mm Ø bulk supply from Wesbank to Kalbaskraal bulk pipeline (including 2x railway-crossings & 1x stream crossing) (item SMW1.4)	2021	712	250	R3.718
	1 x 200 mm Ø Valve required to isolate Kleindam and Wesbank bulk supply towards Kalbaskraal. Kleindam supply can be utilised as part of the reticulation network. (item SMW1.5)	2021	-	200	R0.117
	New 200 mm Ø Pipe required to improve bulk supply to Panorama reservoir (when future area MM_05 develops) (item SMW.B5)	2023	130	200	R0.270
	New 200 mm Ø Pipe to increase flow velocity in existing 100 Ø pipe > 2.5 m/s (item SMW.B10)	2030	28	200	R0.091
	New 500 mm Ø bulk supply from Wesbank to de Hoop & Oranjefonten reservoir and Kalbaskraal bulk pipeline (including railway crossing) (item SMW.B7)	2035	1 639	500	R9.857
	New 500 mm Ø Pipe to install to improve supply to West Bank reservoirs (item SMW.B6)	2040	2 199	500	R12.507
	New 400 mm Ø bulk supply from Wesbank to Oranjefonten reservoir & Kalbaskraal bulk pipeline (including N7 & stream crossings) (item SMW.B8)	2040	1 748	400	R9.475
	New 315 mm Ø bulk supply from WC DM bulk pipeline to the new Wesbank Upper reservoir (item SMW.B1)	2050	662	315	R1.974
	50 L/s 150 mm Ø Flow Control Valve required to sustain pressure in upstream bulk system (item SMW.B2)	2050	-	150	R0.233
Abbotsdale	New 315mm Ø bulk supply pipeline to De Hoop Lower reservoir (including stream-crossing) (item SAW.B1)	2035	1 543	315	R5.031
	65 L/s 200 mm Ø Flow Control Valve required to sustain pressure in upstream bulk system (item SAW.B2)	2035	-	200	R0.269
	23 L/s 150 mm Ø Flow Control Valve required to sustain pressure in upstream bulk system (required when bulk system is supplied from the Wesbank reservoirs) (item SAW.B8)	2040	-	150	R0.233
	Replace existing 200 Ø AC pipeline with a new 300 Ø pipeline (required to increase supply capacity to Abbotsdale and Kalbaskraal) (item SAW.B9)	2040	1 029	300	R3.060
	250 mm Ø Pipe required to increase supply capacity to Abbotsdale and Kalbaskraal (item SAW.B10)	2045	1 245	250	R3.668
	New supply pipeline to the De Hoop Upper reservoir (item SAW.B5)	2050	640	160	R0.830
	New 200 mm bulk supply pipeline to the new Oranjefontein reservoir (item SAW.B11)	2055	1 568	200	R2.790
	21 L/s 200 mm Ø Flow Control Valve to sustain pressure in upstream bulk system (item SAW.B12)	2055	-	200	R0.269
Kalbaskraal	New feeder main from old reservoir to new reservoir (item SKW.B2)	2023	1 287	200	R2.101
Chatsworth and Riverlands	Alternative supply to Chatsworth from CCT system. Required when future area CW_04 develops. (item SCW.B7)	2022	5 260	355	R15.320
	Parallel reinforcement of existing 200 mm Ø pipeline to improve bulk supply to Chatsworth (item SCW.B2)	2040	3 012	250	R7.108
	Upgrade existing 160 mm Ø pipeline to improve bulk supply to Chatsworth (item SCW.B3)	2040	6 147	315	R19.667
	Upgrade existing 160 Ø pipeline to improve bulk supply to Chatsworth (item SCW.B5)	2045	4 682	250	R11.020

Table C.3.7: Future Bulk Water Infrastructure as included in Water Master Plans					
Town	**New feeder mains that are proposed or existing feeder mains that require upgrading in the future**	**Year**	**Distance (m)**	**Diameter (mm)**	**Estimated cost 19/20 (R million)**
Riebeek Kasteel	New 250 mm Ø bulk supply pipeline to the new Riebeek Kasteel Lower reservoir (item SRkW.B1)	2025	118	250	R0.330
	42 L/s 150 mm Ø Flow Control Valve to sustain pressure in upstream bulk system (item SRkW.B2)	2025	-	150	R0.233
Riebeek Wes	Upgrade existing pipe when AADD for Riebeek West exceeds 650 Kl/d (item SRwW.B1)	2023	607	200	R1.106
	Replace existing 110 Ø feeder main to the reservoirs (required when PS is upgraded) (item SRwW.B3)	2030	343	160	R0.446
Ongegund	Replace existing 100 Ø feeder main to PS (item SOW.B1)	2025	74	160	R0.134
	New 160 mm Ø Pipe required for dedicated bulk supply to existing Ongegund reservoir (item SOW.B3)	2025	300	160	R0.440
	New 110 mm Ø bulk supply pipeline to Ongegund Upper reservoir (item SOW.B5)	2055	318	110	R0.317
Total					**R120.289**

WATER PUMP STATIONS

The water pump stations, as inspected during the WSDP site visits in May 2023, are all operational and well maintained. Duty and Standby pumps are available for all the pump stations. No leaks were observed at any of the water pump stations. The pump stations are also fenced and locked and some are supplied with alarms to prevent any possible vandalism. Some of the issues to be addressed at the water pump stations, as identified through the WSDP inspection process, are as follows.

- Secure perimeter fence needs to be installed for the Rustfontein booster pump stations (Remote area).
- Abbotsdale Bulk Water PS and Booster PS at reservoir site: Existing 1.8m high diamond-mesh razor wire fences need to be replaced with perimeter fences.
- Darling and Yzerfontein Bulk Water PSs: Pump Station located in urban area, but current fencing is not adequate. Install secure perimeter fence.
- Moorreesburg Booster PS: Existing fence is inadequate and a new perimeter fence needs to be installed.
- Ongegund PS and Sump: Existing fence is inadequate and a new perimeter fence needs to be installed.
- Riebeek Kasteel Booster PS: Pump Station is not fenced and a new perimeter fence needs to be installed.

The Water Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, it will be necessary for the following water pump stations.

Table C.3.8: Future Water Pump Stations Required for Swartland Municipality's Distribution Systems				
Pumps	**Future Capacity (l/s)**	**Head (m)**	**When**	**Estimated Cost 19/20 (R million)**
Malmesbury				
Upgrading of the Wesbank booster pumping station is proposed (item SMW.B4).	50	25	2021	R0.319
Upgrading of the Wesbank tower pumps is proposed (item SMW.B9).	45	20	2025	R0.290
New pump station when FDA MM_05 develops (item SMW7.2)	10	50	2025	R1.748
Upgrading of the pumps of the existing Mount Royal pumping station is proposed (item SMW9.3).	10	20	2035	R0.306
Abbotsdale				
Upgrading of the Abbotsdale bulk pumping station is proposed (item SAW.B7) in order to augment bulk supply to Abbotsdale for the current operational scenario where bulk water to Abbotsdale and Kalbaskraal is supplied from the Kleindam reservoir in Malmesbury. When the master plan items are implemented in order to supply Abbotsdale and Kalbaskraal with water from the Wesbank reservoirs, the operational pressure in the existing system will improve and the existing bulk PS will become redundant.	30	35	2021	R0.404
A new De Hoop PS is proposed to supply water to the De Hoop Upper reservoir (item SAW.B4).	20	60	2050	R1.959

Table C.3.8: Future Water Pump Stations Required for Swartland Municipality's Distribution Systems				
Pumps	**Future Capacity (l/s)**	**Head (m)**	**When**	**Estimated Cost 19/20 (R million)**
It is proposed that the existing Abbotsdale booster PS is decommissioned when the De Hoop Lower reservoir zone is implemented (item SAW2.13).	5	20	2045	R0.216
A new Abbotsdale booster PS is proposed in order to accommodate the higher lying erven of future area AD_05 (item SAW4.1).	10	40	2050	R1.736
Kalbaskraal				
A new pump station is proposed to supply water from the Kalbaskraal Lower reservoir to the proposed Kalbaskraal Upper reservoir (item SKW.B1).	40	40	2023	R2.266
It is proposed that the existing Kalbaskraal booster pumping station is decommissioned when the Kalbaskraal Upper reservoir zone is implemented (item SKW.B4).	12	20	2023	R0.216
A new bulk PS is proposed on the existing 250 mm Ø bulk pipeline between Abbotsdale and Kalbaskraal in order to augment the capacity of the existing bulk system from 40 L/s to 70 L/s (item SKW.B5).	70	40	2045	R2.789
A new Kalbaskraal Upper booster PS is proposed in order to accommodate the higher lying erven of future area KK_04 (item SKW2.1).	20	30	2060	R1.889
Chatsworth & Riverlands				
Upgrading of the Kalbaskraal to Riverlands PS is proposed (item SCW.B1) when the existing bulk pipeline between Kalbaskraal and the Riverlands BPT is upgraded. These items can be postponed through the implementation of a new bulk supply pipeline between the CCT Pella reservoirs and the SLM Chatsworth reservoir.	40	30	2040	R0.315
Upgrading of the Riverlands to Chatsworth PS is proposed (item SCW.B4) when the existing bulk pipeline between the Riverlands BPT and the Chatsworth reservoirs is upgraded. These items can be postponed through the implementation of a new bulk supply pipeline between the CCT Pella reservoirs and the SLM Chatsworth reservoir.	45	125	2040	R0.693
Darling				
New Pump Station required when future area DL_02 develops, cost to the developer (item SDW3.1)	3	20	2040	-
Upgrading of the pumps at the Darling PS that is pumping to the Darling reservoirs is proposed (item SDW.B2).	70	50	2045	R0.512
Koringberg				
Internal PS is required for the higher lying erven in development areas KB_02 & KB_06 (item SKoW1.5).	4	15	2045	-
Moorreesburg				
Upgrading of the pumps at the Moorreesburg booster PS is proposed (item SMoW.B1).	60	50	2040	R0.470
Riebeek Wes				
New Pump Station required when future area RW_05 develops, cost to the developer (item SRwW4.1)	2	25	2040	-
Upgrading of the pumps at the Riebeek West PS is proposed (item SRwW.B2).	15	45	2030	R0.269
Ongegund				
Upgrading of the pumps at the Ongegund Lower PS is proposed (item SOW.B2).	20	35	2025	R0.271
A new pumping station is proposed to supply water to the future Ongegund Upper reservoir (SOW.B4).	8	55	2035	R1.705
Total				**R18.373**

RESERVOIR INFRASTRUCTURE

The condition of most of the reservoirs in Swartland Municipality's Management Area is good and the reservoirs are well maintained. The levels of the bulk and internal reservoirs are monitored through telemetry systems. No leaks were noticed at any of the reservoirs during the WSDP site visits in May 2023. Not all the reservoirs are fenced and locked. Some of the issues to be addressed at the water reservoirs, as identified through the WSDP inspection process, are as follows.

- Abbotsdale reservoirs: Existing 1.8m high diamond-mesh razor wire fence needs to be replaced with perimeter fence.
- Darling reservoirs: Reservoirs and chlorine facility is not fenced and a secure fence needs to be installed.

- Panorama reservoir and chlorine facility: A new Shopping Mall is constructed next to the existing Panorama reservoir facility site. The site is not fenced and a new fence needs to be installed.
- Moorreesburg reservoirs: The existing reservoirs and disinfection facility is located on private property, but the site is not fenced. A new fence needs to be installed.
- Ongegund reservoir: The reservoir is located on private property, but the reservoir is not adequately fenced. A new fence needs to be installed.
- Riebeek Kasteel reservoirs: The two reservoirs are not fenced and a new fence needs to be installed.
- Chatsworth reservoirs: Existing 1.8m high diamond-mesh razor wire fence was vandalised at a number of places and needs to be replaced with perimeter fence.
- The asbestos roofs of the one Koringberg reservoir and the one Riebeek Kasteel reservoir failed and needs to be repaired or replaced.
- The covers of the Koringberg, Moorreesburg, Riebeek Wes LL, Wesbank No.2 and one of the Glen Lilly reservoirs needs to be locked. It was not locked during the WSDP site visits.
- The access ladders of the Kasteelberg and Glen Lilly reservoirs needs to be locked. It was not locked during the West Coast Water Safety Plan site visits. One of the Kasteelberg reservoir valve chambers is without a cover.
- Lockable cover needs to be installed for the Wildschutvlei balancing tank.

The 2022/2023 storage factors of the total reservoir storage capacity for the various towns, based on 1 x PDD (24 hours storage capacity), are 1.49 for Koringberg, 2.38 for Moorreesburg, 1.34 for Darling, 2.59 for Yzerfontein, 17.68 for Ongegund, 3.45 for Riebeek Wes, 0.94 for Riebeek Kasteel and 2.67 for Malmesbury. Even though the overall storage capacity might be adequate for all of the towns there can be distribution zones within some of the towns with inadequate storage capacity, which require additional reservoirs.

The Water Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, it will be necessary for the following future reservoirs.

Table C.3.9: Future Reservoir Storage Capacities Required

Town	Recommendations included in the Water Master Plan	Capacity (Ml)	When	Estimated Cost 19/20 (R million)
Malmesbury	New 5.0 Ml Wesbank Upper reservoir (item SMW.B3)	5.000	2050	R15.190
Abbotsdale	New 5.5 Ml de Hoop Lower reservoir (item SAW.B3)	5.500	2035	R16.324
	New 1.2 Ml De Hoop Upper reservoir (item SAW.B6)	1.200	2050	R5.757
	New 2.5 Ml Oranjefontein reservoir (item SAW.B13)	2.500	2055	R9.415
Kalbaskraal	New 3.6 Ml Kalbaskraal Upper reservoir (item SKW.B3).	3.600	2023	R12.172
Chatsworth and Riverlands	New 5.0 Ml reservoir (item SCW.B6).	5.000	2030	R15.190
Darling	New 3.5 Ml reservoir (item SDW.B1)	3.500	2035	R11.920
Koringberg	New 1.0 Ml reservoir (item SKoW.B1).	1.000	2035	R5.040
Riebeek Kasteel	New 4.5 Ml reservoir (item SRkW.B3).	4.500	2025	R14.223
Riebeek Wes	New 1.0 Ml reservoir (item SRwW.B4).	1.000	2030	R5.040
Ongegund	New 500 Kl Ongegund Upper reservoir (item SOW.B6)	0.500	2055	R3.206
Total				**R113.477**

The future bulk reservoirs required for the Swartland and Withoogte bulk water distribution systems are included in Tables C.3.7 and C.3.8.

WATER RETICULATION INFRASTRUCTURE

The Water Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary.

Table C.3.10: Future Water Reticulation Infrastructure Required

Malmesbury

Proposed distribution zones

- It is proposed that the boundaries of the existing zones are increased to accommodate future development areas.
- The zone boundary between the Panorama reservoir zone and the Panorama PRV zone is slightly adjusted in order to lower high static pressures within the network.
- A new Glen Lily local reservoir zone is proposed to accommodate future development areas MM_5 and MM_30 to the north east of Malmesbury and to replace the existing Panorama and Glen Lily booster zones in the higher lying areas of the Panorama reservoir zone. A new PRV is proposed for this zone to manage high static pressures at the lower lying erven.
- A new Wesbank Upper reservoir zone is proposed to accommodate future development areas MM_2, MM_7, MM_8.4 - MM_8.13, MM_9 & MM_24 to the north west of Malmesbury and to replace the existing Wesbank booster zone in the higher lying areas to the north of Wesbank.
- It is however proposed that future development areas MM_8.4 - MM_8.13 & MM_24 is in the interim (before the new Wesbank Upper reservoir is constructed) accommodated within the existing Wesbank booster zone.
- Alteration between the zone boundaries of the Wesbank booster and Wesbank tower zones are proposed in order to accommodate a portion of the existing tower zone within the existing Wesbank booster zone.
- Four new PRV zones are proposed to accommodate the lower lying future development areas in the Wesbank reservoir supply area.

Proposed future system and required works

- The existing Malmesbury water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Malmesbury distribution network and new distribution pipelines are proposed to supply future development areas with water when they develop.
- Project SMW-001 (New bulk water infrastructure: Wesbank to Kalbaskraal supply) will improve network conveyance and redundancy within the existing Wesbank reservoir distribution zone, enable the existing system to accommodate future development areas MM_21, MM_22 & MM_26 (proposed Winelands Pork abattoir) and improve bulk water supply to Abbotsdale and Kalbaskraal.
- Project SMW-003 (Wesbank booster PS zone upgrades) will be required to accommodate the higher lying areas of the De Hoop housing area. It is also proposed as part of this project that a portion of the existing Wesbank tower zone is accommodated within the existing Wesbank booster distribution zone. This will create additional spare capacity within the existing tower zone.
- Project SMW-004 (De Hoop main supply infrastructure (De Hoop housing)) will be required to accommodate the lower lying areas of the De Hoop housing area. This infrastructure will also be required to supply water in the interim (before the proposed De Hoop Lower reservoir is constructed in the Abbotsdale system) to the De Hoop mixed use area between Malmesbury and Abbotsdale (future areas AD_7.1, & AD_7.6 - AD_7.15).

Abbotsdale

Proposed distribution zones

- A new De Hoop Lower reservoir zone is proposed to accommodate future development areas between the existing Abbotsdale and Malmesbury systems.
- A new De Hoop Lower PRV zone is proposed to accommodate future development areas AD_02 & AD_08.
- It is proposed that the existing Abbotsdale booster PS is abandoned and the existing booster zone accommodated within the proposed De Hoop Lower reservoir zone.
- A new Oranjefontein reservoir zone is proposed to accommodate future development areas to the east of Abbotsdale.
- A new Abbotsdale booster zone is proposed to accommodate the higher lying erven of future development area AD_05.
- The boundary of the existing Abbotsdale reservoir zone is enlarged to accommodate future development area AD_04 and the lower lying erven of area AD_05.
- The boundary of the existing Abbotsdale reservoir zone is adjusted so that portions of the existing distribution zone are accommodated within the future De Hoop Lower reservoir, De Hoop Lower PRV and Oranjefontein reservoir distribution zones.
- A new De Hoop Upper reservoir zone is proposed to accommodate the higher lying future development area AD_7.16.

Proposed future system and required works

- The existing Abbotsdale water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Abbotsdale distribution network and new distribution pipelines are proposed to supply future development areas with water when they develop.
- Project SAW-001 (De Hoop mixed use main supply infrastructure (connection to Wesbank reservoir zone)) will be required to supply the proposed future development areas between Abbotsdale and Malmesbury in the interim (before the proposed De Hoop reservoir and supporting infrastructure are constructed) with water from the Malmesbury system.

Table C.3.10: Future Water Reticulation Infrastructure Required

- Project SAW-004 (Inter-connection pipeline between De Hoop Lower and Abbotsdale systems) will be required to connect the Abbotsdale system to the Malmesbury system. This will enable SLM to supply future development areas AD_02, AD_08 & AD_10 in the interim (before the proposed De Hoop Lower reservoir is constructed) with water from the Malmesbury system.

Kalbaskraal

Proposed distribution zones

- A new Kalbaskraal Upper reservoir zone is proposed to accommodate future development areas KK_01, KK_03 and the lower lying erven of area KK_04. It is proposed that the existing Kalbaskraal booster zone is accommodated within the Kalbaskraal Upper reservoir zone when the new Kalbaskraal Upper reservoir is constructed.
- A new Kalbaskraal Upper booster zone is proposed in order to accommodate the higher lying erven of future development area KK_04.

Proposed future system and required works

- The existing Kalbaskraal water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Kalbaskraal distribution network.
- New distribution pipelines are proposed to supply future development areas with water when they develop and to supply the existing Kalbaskraal network with water from the proposed Kalbaskraal Upper reservoir when it is constructed.

Chatsworth and Riverlands

Proposed distribution zones

- The only changes to the existing distribution zones are that the boundaries of the existing distribution zones are increased to accommodate future development areas.

Proposed future system and required works

- The existing Chatsworth & Riverlands water distribution systems have insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- New distribution pipelines are required to reinforce water supply within the existing Chatsworth distribution network in order to accommodate future development areas when they develop.

Darling

Proposed distribution zones

- Alterations to the zone boundaries between the tower and booster distribution zones are proposed in order to operate the existing system more effectively.

Proposed future system and required works

- The existing Darling water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Darling distribution network.
- New distribution pipelines are proposed to supply future development areas with water when they develop.

Koringberg

Proposed distribution zones

- A new Koringberg booster zone is proposed in order to accommodate the higher lying erven of future development areas KB_02 & KB_06.
- It is proposed that the boundaries of the existing distribution zones are increased to accommodate future development areas.

Proposed future system and required works

- The existing Koringberg water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Koringberg distribution network.
- New distribution pipelines are proposed to supply future development areas with water when they develop.

Moorreesburg

Proposed distribution zones

- It is proposed that the boundaries of the existing distribution zones are increased to accommodate future development areas.

Proposed future system and required works

- The existing Moorreesburg water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Moorreesburg distribution network.
- New distribution pipelines are proposed to supply future development areas with water when they develop.

Riebeek Kasteel

Proposed distribution zones

- A new Riebeek Kasteel Lower reservoir zone is proposed. It is proposed that the existing Riebeek Kasteel PRV 1 zone (which is currently supplied from the existing Riebeek Kasteel reservoirs through the Riebeek Kasteel no. 1 PRV) is supplied directly from this reservoir.
- It is proposed that the existing distribution zones are increased to accommodate future development areas.

Table C.3.10: Future Water Reticulation Infrastructure Required

Proposed future system and required works

- The existing Riebeek Kasteel water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Riebeek Kasteel distribution network.
- New distribution pipelines are proposed to supply future development areas with water when they develop.

Riebeek Wes

Proposed distribution zones

- A new Riebeek West Lower PRV zone is proposed to reduce high static pressures on the eastern side of Voortrekker Road.
- A new Riebeek West Upper booster zone is proposed to accommodate the higher lying erven of future development area RW_05.
- It is proposed that the boundaries of the existing distribution zones are increased to accommodate future development areas.

Proposed future system and required works

- The existing Riebeek West water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Riebeek West distribution network.
- New distribution pipelines are proposed to supply future development areas with water when they develop.

Ongegund

Proposed distribution zones

- A new Ongegund Upper reservoir zone is proposed to accommodate the higher lying future development area OG_02.
- The boundary of the existing Ongegund Lower PRV distribution zone is increased to accommodate future development areas.

Proposed future system and required works

- The existing Ongegund water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Ongegund distribution network.
- New distribution pipelines are proposed to supply future development areas with water when they develop.

Yzerfontein

Proposed distribution zones

- A new Yzerfontein PRV zone is proposed to regulate high static pressure at the lower lying erven in Yzerfontein.
- The boundary of the existing supply area is increased to accommodate future development areas.

Proposed future system and required works

- The existing Yzerfontein water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.
- A few distribution pipelines are required to reinforce water supply within the Yzerfontein distribution network and to supply water to future development areas when they develop.
- A new PRV zone is proposed in the Yzerfontein reservoir zone to reduce water pressure in the network (project SYW-001).

The Water Master Plan (2020) has indicated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary.

Table C.3.11: Future Water Reticulation Infrastructure Required (Projects)

Scheme	Year	Project	Estimated Cost 19/20 (R Million)
Malmesbury	2021	New bulk water infrastructure: Wesbank to Kalbaskraal supply (PRJ-SMW-001)	R0.108
		Development related infrastructure: Proposed Winelands Pork abattoir (PRJ-SMW-002)	R0.548
		Wesbank booster PS zone upgrades (PRJ-SMW-003)	R3.347
		Development related infrastructure: De Hoop housing (PRJ-SMW-005)	R1.114
	2022	De Hoop main supply infrastructure (De Hoop housing) (PRJ-SMW-004)	R5.280
		Network reinforcements: Wesbank reservoir zone (PRJ-SMW-007)	R1.110
	2023	Incorporate old bulk system to Abbotsdale as part of the Kleindam reservoir network (PRJ-SMW-016)	R0.127
		Upgrade main pipeline to and from Panorama reservoir (PRJ-SMW-017)	R0.343
	2025	Development related infrastructure: Panorama reservoir zone (PRJ-SMW-011)	R0.261
		Development related infrastructure: Wesbank PRV 2 zone (PRJ-SMW-021)	R0.524
	2030	Development related infrastructure: De Hoop housing (PRJ-SMW-005)	R2.439
		Development related infrastructure: Wesbank PRV 1 zone (PRJ-SMW-006)	R1.610
	2035	Development related infrastructure: Mount Royal (PRJ-SMW-022)	R1.150

Table C.3.11: Future Water Reticulation Infrastructure Required (Projects)			
Scheme	**Year**	**Project**	**Estimated Cost 19/20 (R Million)**
	2040	Development related infrastructure: De Hoop housing (PRJ-SMW-005)	R1.015
	2045	Development related infrastructure: Old Golf Course reservoir (PRJ-SMW-014)	R2.992
	2050	New bulk water infrastructure: Wesbank Upper reservoir (PRJ-SMW-008)	R8.316
		Development related infrastructure: Wesbank Upper reservoir zone (PRJ-SMW-009)	R0.475
		Development related infrastructure: Kleindam reservoir (PRJ-SMW-015)	R0.437
	2020 - 2050	Water Demand Management Items for Malmesbury	R9.529
	Sub-total		**R40.725**
Abbotsdale	2022	Network reinforcements: Abbotsdale (PRJ-SAW-007)	R0.693
	2025	De Hoop mixed use main supply infrastructure (connection to Wesbank reservoir zone) (PRJ-SAW-001)	R2.362
	2030	De Hoop mixed use main supply infrastructure (connection to Wesbank reservoir zone) (PRJ-SAW-001)	R1.457
	2035	Development related infrastructure: De Hoop mixed use (PRJ-SAW-002)	R2.311
		Implement De Hoop Lower reservoir (PRJ-SAW-003)	R3.853
		Inter-connection pipeline between De Hoop Lower and Abbotsdale systems (PRJ-SAW-004)	R3.260
	2040	Development related infrastructure: De Hoop mixed use (PRJ-SAW-002)	R1.521
		Development related infrastructure: Wesbank PRV2 zone (PRJ-SAW-005)	R1.866
		Development related infrastructure: Abbotsdale (PRJ-SAW-008)	R0.267
		Connection pipe between Abbotsdale, De Hoop & future Oranjefontein networks (PRJ-SAW-012)	R2.109
		Network reinforcements: Oranjefontein reservoir zone (PRJ-SAW-013)	R0.955
	2050	Implement De Hoop Upper reservoir (PRJ-SAW-006)	R0.866
	2055	Oranjefontein reservoir and supporting infrastructure (PRJ-SAW-014)	R4.025
	-	Water Demand Management Items for Abbotsdale	R0.305
	Sub-total		**R25.850**
Kalbaskraal	2023	Construct new Kalbaskraal reservoir & supporting infrastructure (PRJ-SKW-001)	R3.291
	2030	Network reinforcements: Kalbaskraal (PRJ-SKW-002)	R1.793
	2050	Development related infrastructure: Kalbaskraal (PRJ-SKW-003)	R0.976
	-	Water Demand Management Items for Kalbaskraal	R0.100
	Sub-total		**R6.160**
Chatsworth & Riverlands	2025	Network reinforcements: Chatsworth (PRJ-SCW-003)	R13.704
	-	Water Demand Management Items for Chatsworth & Riverlands	R0.100
	Sub-total		**R13.804**
Darling	2025	Darling network reinforcements: Phase 1 (PRJ-SDW-002)	R3.821
		Development related infrastructure: Darling PRV zone (PRJ-SDW-006)	R0.922
	2030	Darling network reinforcements: Phase 2 (PRJ-SDW-003)	R1.243
		Development related infrastructure: Darling PRV zone (PRJ-SDW-006)	R0.477
	2035	Development related infrastructure: Darling PRV zone (PRJ-SDW-006)	R0.404
	2040	Development related infrastructure: Darling reservoir zone (PRJ-SDW-005)	R1.186
	2045	Darling network reinforcements: Phase 3 (PRJ-SDW-004)	R2.380
	-	Water Demand Management Items for Darling	R0.100
	Sub-total		**R10.533**
Koringberg	2025	Koringberg network reinforcements (PRJ-SKoW-002)	R0.848
	2030	Development related infrastructure: Koringberg (PRJ-SKoW-003)	R0.588
	2045	Development related infrastructure: Koringberg (PRJ-SKoW-003)	R0.233
	-	Water Demand Management Items for Koringberg	R0.070
	Sub-total		**R1.739**
Moorreesburg	2030	Moorreesburg network reinforcements: Phase 1 (PRJ-SMoW-002)	R0.500
		Development related infrastructure: Moorreesburg PRV zone (PRJ-SMoW-006)	R1.334
	2035	Moorreesburg network reinforcements: Phase 2 (PRJ-SMoW-003)	R8.556
		Development related infrastructure: Moorreesburg PRV zone (PRJ-SMoW-006)	R0.365

Table C.3.11: Future Water Reticulation Infrastructure Required (Projects)			
Scheme	**Year**	**Project**	**Estimated Cost 19/20 (R Million)**
		Development related infrastructure: Moorreesburg reservoir zone (PRJ-SMoW-007)	R0.803
	2040	Moorreesburg network reinforcements: Phase 3 (PRJ-SMoW-004)	R1.576
	2045	Moorreesburg network reinforcements: Phase 4 (PRJ-SMoW-005)	R1.638
		Development related infrastructure: Moorreesburg reservoir zone (PRJ-SMoW-007)	R0.913
	2055	Development related infrastructure: Moorreesburg PRV zone (PRJ-SMoW-006)	R1.485
	-	Water Demand Management Items for Moorreesburg	R0.150
	Sub-total		**R17.320**
Riebeek Kasteel	2021	Network reinforcements: Riebeek Kasteel Upper reservoir zone (PRJ-SRkW-002)	R0.505
	2025	Riebeek Kasteel Lower reservoir & supporting infrastructure (PRJ-SRkW-001)	R1.951
		Network reinforcements: Riebeek Kasteel PRV 1 zone (PRJ-SRkW-003)	R0.317
		Network reinforcements: Riebeek Kasteel Lower PRV 5 zone (PRJ-SRkW-005)	R0.725
	2030	Development related infrastructure: Riebeek Kasteel (PRJ-SRkW-006)	R0.241
	2035	Riebeek Kasteel network reinforcements: Kloof Street pipeline (PRJ-SRkW-004)	R3.840
	2040	Development related infrastructure: Riebeek Kasteel (PRJ-SRkW-006)	R0.434
	-	Water Demand Management Items for Riebeek Kasteel	R0.070
	Sub-total		**R8.083**
Riebeek Wes	2021	Riebeek West network reinforcements: Phase 1 (PRJ-SRwW-001)	R0.726
	2025	Riebeek West network reinforcements: Phase 2 (PRJ-SRwW-003)	R0.448
		Development related infrastructure: Riebeek West (PRJ-SRwW-006)	R0.220
	2030	Additional reservoir storage capacity for Riebeek West (PRJ-SRwW-008)	R0.471
	2035	Riebeek West network reinforcements: Phase 3 (PRJ-SRwW-004)	R1.547
		Development related infrastructure: Riebeek West (PRJ-SRwW-006)	R0.147
	2040	Riebeek West network reinforcements: Phase 4 (PRJ-SRwW-005)	R1.079
		Development related infrastructure: Riebeek West (PRJ-SRwW-006)	R0.269
	2045	Development related infrastructure: Riebeek West (PRJ-SRwW-006)	R0.344
	2050	Development related infrastructure: Riebeek West (PRJ-SRwW-006)	R0.354
	2021	Water Demand Management Items for Riebeek Wes	R1.582
	Sub-total		**R7.187**
Ongegund	2035	Network reinforcements: Ongegund (PRJ-SOW-003)	R0.243
	2055	New Ongegund Upper reservoir & supporting infrastructure (PRJ-SOW-002)	R0.288
	2055	Water Demand Management Items for Ongegund	R0.100
	Sub-total		**R0.631**
Yzerfontein	2030	Development related infrastructure: Yzerfontein (PRJ-SYW-002)	R3.551
	2035	Development related infrastructure: Yzerfontein (PRJ-SYW-002)	R1.776
	-	Water Demand Management Items for Yzerfontein	R0.437
	Sub-total		**R5.764**
Total			**R137.796**

BULK SEWER PIPELINE AND SEWER DRAINAGE NETWORK INFRASTRUCTURE

The Sewer Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, the following further sewer reticulation infrastructure components will be necessary.

Table C.3.12: Future Sewer Reticulation Infrastructure Required
Malmesbury and Abbotsdale
• The boundaries of the existing drainage areas in Malmesbury and Abbotsdale are increased to accommodate proposed future development areas that fall within these drainage areas. • Verification projects are proposed to investigate if waterborne sewer infrastructure is available at existing occupied stands where no sewer network information was available. Pending verification, new sewers are proposed to service the existing erven in Malmesbury and Abbotsdale if they are currently not serviced with a full waterborne sanitation system. • The existing pumping station duty flows and rising main capacities of Abbotsdale need to be verified and upgraded to accommodate full occupation and future development.

Table C.3.12: Future Sewer Reticulation Infrastructure Required
• The new Malmesbury Future PS 1 drainage area is proposed to accommodate future development areas MM_02, MM_09 & MM_8.16 that cannot gravitate towards the existing De Hoop bulk sewer. • The new Malmesbury Future PS 2 drainage area, with pumped and gravity sub-drainage areas (Malmesbury Future PS 3, Malmesbury Future PS 6, Abbotsdale Future PS 3 & De Hoop Junction gravity), is proposed to accommodate future development areas located to the west of Malmesbury that cannot gravitate towards the existing De Hoop bulk sewer as well as the future development areas between Malmesbury and Abbotsdale north of the N7 National Road. • The new Malmesbury Future PS 4 & 5 drainage areas are proposed to accommodate future development areas MM_13, MM_14, MM_18, MM_19, MM_21 & MM_26, located to the south of Malmesbury. • The new Abbotsdale Future PS 1 drainage area is proposed to accommodate existing erven in the south west of Abbotsdale, without a formal waterborne sanitation system as well as a portion of future development area AD_01. • The new Abbotsdale Future PS 2 drainage area is proposed to accommodate future development area AD_02. • A number of existing outfall sewers require upgrading by replacement with larger sized future sewers and a number of new outfall sewers are proposed to accommodate future development areas that fall within the gravity drainage area of the Malmesbury WWTW, as well as for the Abbotsdale PS 1 drainage area.
Chatsworth, Kalbaskraal & Riverlands
• The boundaries of the existing drainage areas in Kalbaskraal & Riverlands are increased to accommodate proposed future development areas that fall within these drainage areas. • New formal waterborne sewer infrastructure is required in Chatsworth to accommodate all existing occupied and vacant erven as well as the proposed future development areas CW_01, CW_02, CW_03 & CW_04. The future Chatsworth drainage area can gravitate to the Chatsworth WWTW, except for the lower lying areas of future development area CW_04. A new Chatsworth Future PS 1 drainage area is proposed to service this area. A new pump station and rising main should be constructed for this drainage area that discharges at the Chatsworth WWTW. • A new Riverlands Future PS 1 drainage area is proposed to accommodate future development area RL_01 to the east of Riverlands. A new pump station and rising main should be constructed for this drainage area that discharges into the existing Riverlands PS 1 drainage area. • The new Kalbaskraal Future PS 1 and PS 2 drainage areas and new outfall sewers are proposed to accommodate existing erven in the south of Kalbaskraal without a formal waterborne sanitation system. • The new Kalbaskraal Future PS 3 drainage area is proposed to accommodate existing erven in the north of Kalbaskraal without a formal waterborne sanitation system, as well as proposed future development areas KK_03 & KK_04. • A number of existing outfall sewers require upgrading by replacement with larger sized future sewers and a number of new outfall sewers are proposed to accommodate future development areas that fall within the drainage areas of the Kalbaskraal WWTW.
Darling
• The boundaries of the existing drainage areas in Darling are increased to accommodate proposed future development areas that fall within these drainage areas. • Verification projects are proposed to investigate if waterborne sewer infrastructure is available at existing occupied stands where no sewer network information was available. • It is proposed that the existing Darling pump station is decommissioned and replaced with the new Darling Future PS 1 located just north of the existing pump station. New sewers will be required to divert sewage to the proposed future Darling Future PS 1. The new drainage area is proposed to accommodate future development areas DL_01, DL_03, DL_04, DL_05, DL_06 & DL_09. The new pump station and rising main, replacing the existing pump station drainage area, should be constructed and should discharge into a new outfall sewer that drains to the Darling WWTW. • The new outfall sewer is required to prevent the upgrade or replacement of existing outfall sewer due to increased flow from the new pumping station and future developments in the gravity drainage area.
Koringberg
• The boundary of the existing Koringberg gravity drainage area is increased to accommodate existing occupied and vacant erven as well as future development areas that fall within the drainage area. • New formal waterborne sewer infrastructure is required in Koringberg to accommodate all existing occupied and vacant erven as well as the proposed future development areas KB_01, KB_02, KB_03, KB_05 & KB_06.
Moorreesburg
• The boundary of the existing Moorreesburg gravity drainage area is increased to accommodate existing occupied and vacant erven as well as future development areas that fall within the drainage area. • Verification projects are proposed to investigate if waterborne sewer infrastructure is available at existing occupied stands in the south east where no sewer network information was available. • It is proposed that the outfall sewer, crossing the railway at the sportsfield, is upgraded if an investigation finds that the slope is inefficient. • New formal waterborne sewer infrastructure is required in the northern, lower density area of Moorreesburg to accommodate all existing occupied and vacant erven for the densification area MR_05.
Riebeek Kasteel, Riebeek West & Ongegund

Table C.3.12: Future Sewer Reticulation Infrastructure Required
• The boundaries of the existing drainage areas in Riebeek Kasteel, Riebeek West & Ongegund are increased to accommodate proposed future development areas that fall within these drainage areas. • Verification projects are proposed to investigate the duty flows of the minor pumping stations, and if waterborne sewer infrastructure is available at existing occupied stands within Riebeek Kasteel. • The existing outfall sewer in Riebeek Kasteel, which conveys sewage from west to east and connects to the new Riebeek Valley outfall, requires upgrading by replacement with larger sized sewers due to insufficient slope. • New formal waterborne sewer infrastructure is required in Riebeek West to accommodate all existing occupied and vacant erven as well as the proposed future development areas RW_01, RW_04, RW_05, RW07, RW_08 & RW_09 to the west of the main road. • A new Ongegund Future PS 1 drainage area is proposed to accommodate the low lying norther part of future development area OG_03 in the north of Ongegund. A new pump station and rising main should be constructed for this drainage area that discharges into the existing Ongegund Transfer PS drainage area. • A number of development related future sewers are proposed to accommodate future development areas that fall within the drainage areas of the Riebeek Valley WWTW.
Yzerfontein
• Yzerfontein has no formal waterborne sanitation system and therefore new formal waterborne sewer infrastructure is proposed to accommodate the future development areas YF_02, YF_03, YF_05, YF_06, YF_07 & YF_08, that fall outside of the boundary of existing occupied or vacant erven. • A new Yzerfontein Future PS 1 drainage area, draining to the north east of the urban edge development boundary, is proposed to accommodate these developments. The new pump station should discharge into a newly constructed Yzerfontein WWTW to the north of the town, at an environmentally appropriate location. • The proposed future development areas YF_01, YF_09 & YF_10, fall within the boundary of existing erven and it is proposed that these developments should be serviced by septic tanks as the rest of the existing town, until such time that a decision is reached to provide formal waterborne sanitation to the entire town of Yzerfontein.

The Sewer Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, the following future sewer reticulation infrastructure components will be necessary.

Table C.3.13: Future Bulk Sewer Pipeline and Sewer Drainage Network Infrastructure Required

Scheme	Year	Project	Estimated Cost 19/20 (R Million)
Malmesbury (Includes Abbotsdale)	2021	Provide sewer infrastructure for Winelands Pork Abattoir (PRJ-SMS-004)	R5.898
	2025	Sanitation system for unserviced erven in Malmesbury (PRJ-SMS-002)	R2.507
		Network reinforcements in Malmesbury (PRJ-SMS-003)	R0.993
		Implement future Malmesbury PS 2 drainage area (PRJ-SMS-005)	R1.201
		Development related infrastructure: De Hoop housing development (PRJ-SMS-006)	R4.151
	2030	Network reinforcements in Malmesbury (PRJ-SMS-003)	R1.723
		Implement future Malmesbury PS 5 drainage area (PRJ-SMS-009)	R1.382
		Development related infrastructure: De Hoop housing development (PRJ-SMS-006)	R0.896
		Development related infrastructure: Malmesbury future PS 2 drainage area (PRJ-SMS-007)	R1.003
	2035	Implement future Malmesbury PS 5 drainage area (PRJ-SMS-009)	R2.331
		Network reinforcements in Malmesbury (PRJ-SMS-003)	R5.463
		Development related infrastructure: De Hoop housing development (PRJ-SMS-006)	R1.600
	2040	Network reinforcements in Abbotsdale (PRJ-SAS-002)	R27.471
		Implement future Abbotsdale PS 3 drainage area (PRJ-SAS-003)	R0.407
		Development related infrastructure: De Hoop Junction (PRJ-SAS-009)	R3.489
		Development related infrastructure: De Hoop housing development (PRJ-SMS-006)	R2.348
		Implement future Malmesbury PS 3 drainage area (PRJ-SMS-008)	R0.509
	2045	Sanitation system for unserviced erven in Abbotsdale - Phase 1 (Abbotsdale PS 1 drainage area) (PRJ-SAS-004)	R5.341
		Development related infrastructure: De Hoop Junction (PRJ-SAS-009)	R1.172
	2050	Sanitation system for unserviced erven in Abbotsdale - Phase 2 (Abbotsdale future PS 3 drainage area) (PRJ-SAS-005)	R2.304
		Sanitation system for unserviced erven in Abbotsdale - Phase 2 (Abbotsdale future PS 1 drainage area) (PRJ-SAS-007)	R2.184
	2055	Implement future Abbotsdale PS 1 drainage area (PRJ-SAS-006)	R1.859
	Sub-total		**R76.232**

Table C.3.13: Future Bulk Sewer Pipeline and Sewer Drainage Network Infrastructure Required			
Scheme	**Year**	**Project**	**Estimated Cost 19/20 (R Million)**
Chatsworth & Riverlands	2021	Development related infrastructure in Chatsworth (PRJ-SCS-001)	R3.017
	2025	Sanitation system for unserviced erven in Chatsworth (PRJ-SCS-002)	R2.024
		Implement Chatsworth future PS 1 drainage area (PRJ-SCS-003)	R0.930
	2030	Sanitation system for unserviced erven in Chatsworth (PRJ-SCS-002)	R20.172
	2035	Sanitation system for unserviced erven in Chatsworth (PRJ-SCS-002)	R19.218
	2045	Sanitation system for unserviced erven in Chatsworth (PRJ-SCS-002)	R0.274
	Sub-total		**R45.635**
Kalbaskraal	2025	Network reinforcements in Kalbaskraal (PRJ-SKS-001)	R2.161
	2045	Sanitation system for unserviced erven in Kalbaskraal - Phase 1 (Kalbaskraal future PS 1 drainage area) (PRJ-SKS-002)	R3.567
	2050	Sanitation system for unserviced erven in Kalbaskraal - Phase 2 (Kalbaskraal future PS 2 drainage area) (PRJ-SKS-003)	R4.548
		Implement future Kalbaskraal PS 3 drainage area (PRJ-SKS-004)	R1.511
	2055	Sanitation system for unserviced erven in Kalbaskraal - Phase 3 (Kalbaskraal future PS 3 drainage area) (PRJ-SKS-005)	R1.893
	Sub-total		**R13.680**
Darling	2021	Network reinforcements in Darling (PRJ-SDS-001)	R0.221
		Relocate Darling PS and construct new outfall to WWTW (PRJ-SDS-002)	R4.056
	2030	New bulk sewer for future development area (PRJ-SDS-003)	R1.891
	Sub-total		**R6.168**
Koringberg	2030	Sanitation system for unserviced erven in Koringberg (PRJ-SKoS-001)	R6.796
	2035	Sanitation system for unserviced erven in Koringberg (PRJ-SKoS-001)	R8.901
	Sub-total		**R15.697**
Moorreesburg	2040	Network reinforcement in Moorreesburg (PRJ-SMoS-001)	R0.815
	2045	Sanitation system for unserviced erven in Moorreesburg (West of Railway) (PRJ-SMoS-003)	R4.042
	2050	Sanitation system for unserviced erven in Moorreesburg (West of Railway) (PRJ-SMoS-003)	R11.010
	2055	Sanitation system for unserviced erven in Moorreesburg (East of Railway) (PRJ-SMoS-004)	R9.380
	Sub-total		**R25.247**
Riebeek Valley	2021	Network reinforcements in Riebeek Kasteel (PRJ-SRkS-002)	R2.363
	2025	Development related infrastructure in Riebeek West (PRJ-SRwS-001)	R2.057
		Sanitation system for unserviced erven in Riebeek West (PRJ- SRwS-002)	R18.273
	2040	Development related infrastructure in Riebeek West (PRJ-SRwS-001)	R0.582
	2045	Development related infrastructure in Riebeek West (PRJ-SRwS-001)	R2.765
	Sub-total		**R26.040**
Yzerfontein	2030	Provide waterborne sanitation system for Yzerfontein developments (PRJ-SYS-001)	R6.038
	2035	Provide waterborne sanitation system for Yzerfontein developments (PRJ-SYS-001)	R1.296
	2045	Provide waterborne sanitation system for Yzerfontein developments (PRJ-SYS-001)	R1.468
	Sub-total		**R8.802**
Total			**R217.501**

SEWER PUMP STATIONS

Most of the sewer pump stations are fenced and locked, with duty and standby pumps. Key issues to be addressed at the sewer pump stations, as identified through the WSDP inspection process in May 2023, are as follows.

- Riebeek Kasteel Madeliefie sewer PS: Fence was vandalised, to be repaired or replaced.
- Riebeek Kasteel Esterhof main sewer PS: One of the three pumps was removed for required repairs.
- Darling Industrial sewer PS: One of the two pumps was removed for required repairs.
- Darling Asla (RD) sewer PS: One of the two pumps was removed for required repairs.

The Sewer Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, it will be necessary for the following future sewer pump stations.

Table C.3.14: Future Sewer Pump Stations Required

Drainage System	Recommendations included in the Sewer Master Plan	Capacity (l/s)	When	Estimated Cost 19/20 (R million)
Abbotsdale	Upgrade existing Pump Station, investigate first (item SAS1.5)	26	2040	R0.573
	Upgrade existing Pump Station, investigate first (item SAS2.1)		2040	R0.024
	Upgrade existing Pump Station, investigate first (item SAS3.1)	42	2040	R0.694
	New Pump Station (item SAS5.1)	4	2040	-
	New Pump Station (item SAS7.1)	10	2040	R1.658
	New Pump Station (item SAS4.1)	8	2055	R1.598
Malmesbury	New Pump Station (item SMS3.1)	60	2021	R3.118
	New Pump Station (item SMS5.1)	62	2025	R2.564
	New Pump Station (item SMS6.1)	7	2040	R1.568
	New Pump Station (item SMS7.1)	15	2040	R1.807
	New Pump Station (item SMS4.1)	7	2045	R1.568
	New Pump Station (item SMS8.1)	4	2050	-
Chatsworth and Riverlands	Upgrade existing Pump Station, investigate first (item SRiS1.1)		2022	R0.024
	New Pump Station (item SCS2.1)	20	2025	R1.955
	New Pump Station (item SRiS2.1)	4	2045	R1.206
Kalbaskraal	Upgrade existing Pump Station, investigate first (item SKS2.1)		2022	R0.024
	Upgrade existing Pump Station (item SKS1.3)	30	2025	R0.580
	New Pump Station (item SKS3.1)	4	2045	R1.206
	New Pump Station (item SKS4.1)	4	2050	R1.206
	New Pump Station (item SKS5.2)	16	2050	R1.837
Darling	Abandon existing Pump Station (item SDS2.3)		2021	R0.216
	New Pump Station (item SDS3.2)	21	2021	R1.985
Riebeek Valley	Upgrade existing Pump Station, investigate first (item SOS1.1)		2022	R0.024
	Upgrade existing Pump Station, investigate first (item SRkS1.1)		2022	R0.024
	Upgrade existing Pump Station, investigate first (item SRkS2.1)		2022	R0.024
	Upgrade existing Pump Station, investigate first (item SRkS3.1)		2022	R0.024
	Upgrade existing Pump Station, investigate first (item SRkS4.1)		2022	R0.024
	Upgrade existing Pump Station, investigate first (item SRkS5.1)		2022	R0.024
	Upgrade existing Pump Station, investigate first (item SRkS6.1)		2022	R0.024
	Upgrade existing Pump Station, investigate first (item SRkS7.1)		2022	R0.024
	New Pump Station (item SOS2.1)	4	2050	-
Yzerfontein	New Pump Station (item SYS1.1)	24	2030	R2.074
Total				**R27.677**

WASTE WATER TREATMENT INFRASTRUCTURE

The table below gives a summary of the existing hydraulic design capacities and current flows at each of the WWTWs, as well as the final effluent quality compliance percentages for the 2022/2023 financial year (Ml/d).

Table C.3.15: Existing Hydraulic Design Capacities and Flows at Each of the WWTWs (Ml/d)

WWTW	Existing Hydraulic Capacity	Peak Month Average Daily Flow	Average Daily Flow (2022/2023)	Average Wet Weather Flow (Jul'22, Aug'22, May'23, Jun'23)	Average Daily Flow as a % of Design Capacity	Final Effluent Compliance for 2022/2023
Malmesbury	10.000	7.022 (Jun)	5.807	6.093	58.07%	Microbiological: 100.0% Chemical: 79.2% Physical: 86.1%
Kalbaskraal	0.157	Unknown	0.084	Unknown	53.50%	Microbiological: 100.0% Chemical: 58.3% Physical: 100.0%
Riverlands/Chatsworth	0.270	Unknown	0.341	Unknown	126.30%	Microbiological: 8.3% Chemical: 31.1% Physical: 63.9%
Moorreesburg	1.500	1.570 (Jun)	1.234	1.322	61.70%	Microbiological: 8.3% Chemical: 45.8% Physical: 60.0%
Riebeek Valley	1.900	1.011 (Aug)	0.800	0.852	42.11%	Microbiological: 83.3% Chemical: 89.6% Physical: 100.0%
Koringberg	0.030	Unknown	0.090	Unknown	300.00%	Microbiological: 0.0% Chemical: 27.1% Physical: 36.1%
Darling	1.500	1.450 (Jul)	1.307	1.369	87.13%	Microbiological: 100.0% Chemical: 83.3% Physical: 83.3%

The organic design capacities of the WWTWs and the current loadings at the WWTWs are indicated in the table below.

Table C.3.16: Existing Organic Design Capacities and Current Loads at the WWTWs

WWTW	Organic Design Capacity (kg COD/d)	22/23		21/22		20/21	
		Average Load (kg COD/d)	% of Design Capacity	Average Load (kg COD/d)	% of Design Capacity	Average Load (kg COD/d)	% of Design Capacity
Malmesbury	10 000	7 690	76.9%	7 213	72.1%	8 105	81.1%
Moorreesburg	2 000	1 067	53.4%	-	-	1 165	116.5%
Darling	1 500	748	49.9%	929	61.9%	882	58.8%
Riebeek Valley	1 500	1 828	121.9%	1 725	115.0%	1 675	111.7%

The projected future WWTW flows are included in the future water requirement projection models. The table below gives an overview of the average daily future projected WWTW flows.

Table C.3.17: Average Daily and Peak Month Daily Future Projected WWTW flows (Ml/d)

WWTW	Existing Hydraulic Capacity	Average Daily Future Projected WWTW Flows					Peak Month Average Daily Future Projected WWTW Flows				
		2027	2032	2037	2042	2047	2027	2032	2037	2042	2047
Malmesbury	10.000	7.310	9.273	11.069	13.261	15.944	8.991	11.406	13.615	16.311	19.611
Moorreesburg	2.000	1.462	1.775	2.152	2.455	2.809	2.061	2.503	3.034	3.462	3.961
Darling	1.500	1.485	1.669	1.881	2.125	2.407	1.960	2.203	2.483	2.805	3.177
Riebeek Valley	1.900	0.884	1.241	1.738	2.190	2.784	1.432	2.010	2.816	3.548	4.510
Koringberg	0.030	0.103	0.143	0.193	0.230	0.274	0.155	0.215	0.290	0.345	0.411

Note: The peak month factors used in the above table is 1.23 for Malmesbury, 1.41 for Moorreesburg, 1.32 for Darling, 1.62 for Riebeek Valley and 1.50 for Koringberg (Maximum peak month factor over last five years).

Detail Process Audits were completed during 22/21 for all the WWTWs in Swartland Municipality's Management Area and the recommendations from these Process Audits are summarised under each of the WWTWs below.

Malmesbury WWTW: The WWTW is a hybrid Membrane Bioreactor nutrient removal system. The system was designed to accommodate seasonal flow variation and provide operational flexibility and energy saving. The upgrade increased the plant hydraulic capacity to a peak wet weather flow of 30 Ml/d and peak dry weather flow of 20 Ml/d, while achieving the most restrictive effluent requirements. The new Malmesbury WWTW has been operating successfully for already ten years and has consistently met stringent effluent quality standard requirements, with excellent removal of COD, Nitrogen, TP, TSS and faecal coliforms.

The existing treatment works was incorporated and a new MBR was constructed, which resulted in all flow up to the peak dry weather flow passing through the membranes and only the peak wet weather flow flowing through the existing clarifiers. Flow is split and recycled between the old and new units to create one integrated system, in which the MBR has hydraulic capacity for the design peak dry weather diurnal flow of 20 Ml/d. To accommodate the significant peak wet weather flows, the clarifiers are put into operation automatically along with the disinfection system. To accommodate this and ensure the clarifiers do not fail in flux overloading, the recycles are carefully designed to achieve conventional lower mixed-liquor concentrations in the Pasveer Ditch, whilst the MBR unit runs at 8 to 15 kg/m³.

The new WWTW was put into operation during 2013 and the capacity of the plant is adequate to meet the future treatment requirements.

Table C.3.18: Recommendations from Malmesbury WWTW Process Audit (July 2018 to June 2020)	
Component	**Recommendation**
Conclusion	Plant is functioning as intended and in excellent condition. The plant is currently operating at 45% of its hydraulic design capacity and 68% of its organic loading capacity. The mechanical and electrical equipment and process units are in good conditions. The processes are operated and maintained at their design specifications and the final effluent complies with the standards as set out in the Water Use Licence. Overall, it can be concluded that the Malmesbury WWTW is in an excellent condition, due to the efforts of the operational staff and management working together and striving to the same goal.
Recommendation: Design aspects	• Inlet pipeline: Solutions to alter and/or adjust the upward bend at the inlet works, should be investigated, e.g. using grit channels that precede the inlet works.
Recommendation: Operational aspects	• Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Monitoring: The proposed Operational Monitoring Program needs to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.

Moorreesburg WWTW: The Moorreesburg WWTW was upgraded over the last two financial years and the new WWTW was put into operation on the 13th of March 2023. The hydraulic design capacity of the new WWTW is 2.000 Ml/d and the organic design capacity 2 000 kg COD/day. **The capacity of the plant is adequate to meet the future treatment requirements and to ensure compliance with the required final effluent discharge limits.**

The previous Moorreesburg WWTW Process Audit was done for the old WWTW and is therefore not applicable anymore.

Darling WWTW: The WWTW was upgraded in 2008 from an oxidation pond system to an activated sludge treatment system with denitrification, using the Modified Ludzak-Ettinger (MLE) process configuration, consisting of an inlet works, anaerobic ponds, bioreactor (with two surface aerators), secondary settling tank, chlorination, maturation ponds and a belt-press sludge dewatering system, which was recently constructed. The works has a hydraulic design capacity of 1.5 Ml/d. **The current capacity is inadequate to meet the future treatment requirements.** The Municipality allocated budget for 2023/2024 for the installation of new mechanical screens at the inlet works.

Table C.3.19: Recommendations from Darling WWTW Process Audit (July 2018 to June 2020)	
Conclusion	The Darling WWTW is in a reasonable condition. The mechanical and electrical equipment are in good operating condition and the process controllers are performing their duties well as can be expected. The final effluent complies to the General Standard, except for ammonia and free chlorine. The plant is currently operating at 72% and 100% of the plant's hydraulic and organic capacity, respectively. Therefore, the plant is organically overloaded, leading to numerous operational issues.

Table C.3.19: Recommendations from Darling WWTW Process Audit (July 2018 to June 2020)	
Recommendation: Design aspects	• Inlet works screening: As the screen is too small to handle peak flows, resulting in floods, a new mechanical screen and a manual hand-raked by-pass screen is recommended. • Inlet works design: A new inlet works should be constructed, that is above ground level, with a higher Peak Wet Weather Flow design capacity.
Recommendation: Operational aspects	• Poor nitrification in bioreactor: Modifications to the recycle streams and aeration should be made, to improve the oxidation process efficiency. • Poor TSS removal in SSTs: The secondary sedimentation process should be investigated, to avoid the high amounts of TSS in the final effluent. • Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Monitoring: The proposed Operational Monitoring Program needs to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.

Riebeek Valley WWTW: The 1.9 Ml/d Riebeek Valley WWTW is an activated sludge system with biological nutrient removal that provide an effluent quality that meet the required final effluent discharge limits. **The WWTW was put into operation in 2016 and the capacity of the plant is adequate to meet the future treatment requirements for Riebeek Kasteel, Riebeek Wes and Ongegund.**

Table C.3.20: Recommendations from Riebeek Valley WWTW Process Audit (July 2018 to June 2020)	
Conclusion	The Riebeek Valley WWTW is performing well, operating at 40% of its hydraulic design capacity and 41% of its organic loading capacity. The mechanical and electrical equipment and process units are in good operating condition. The plant is in an excellent condition, due to the efforts of the operational staff and management working together and striving to the same goal.
Recommendation: Design aspects	• Inlet pipeline: Solutions to alter and/or adjust the upward bend at the inlet works, should be investigated.
Recommendation: Operational aspects	• Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Monitoring: The proposed Operational Monitoring Program needs to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.

Koringberg WWTW: The WWTW is an oxidation pond system with unlined ponds, with an estimated treatment capacity of 0.030 Ml/d. The WWTW includes two primary oxidation ponds and three secondary ponds. There is no re-use of treated effluent. Treated effluent is returned into a local stream (Brak River).

The Municipality plans to upgrade the oxidation dams so that it complies with the required final effluent discharge limits. The quantity of treated effluent expected from the Koringberg WWTW is so little that it does not justify constructing an activated sludge works. It was recommended that the wastewater be treated in a pond system and the effluent be irrigated. The estimated area required for irrigation is 0.77 ha. **The capacity of the WWTW is inadequate to meet the current and future treatment requirements.**

Table C.3.21: Recommendations from Koringberg WWTW Process Audit (July 2018 to June 2020)	
Conclusion	The Koringberg ponds system is in very poor condition. Based on the estimated flow to the ponds, the system is currently hydraulically overloaded, operating at 114% of the current design capacity of the pond system. It is recommended that the capacity of the system be upgraded to accommodate the flow to the plant, in order to ensure final effluent compliance. Regular maintenance tasks should be carried out to ensure that the pond embankments are kept in an immaculate condition and that no further nuisances can develop.
Recommendation: Design aspects	• WWTW capacity: The organic loading capacity of the ponds system should be investigated to determine if the WWTW has enough hydraulic capacity. A package plant could be a good solution.
Recommendation: Operational aspects	• Ponds condition: The ponds should be cleaned, by removing all vegetation, sludge, scum and pollution. • Embankments condition: The embankments should be cleared of vegetation. They should also be reinforced to avoid further damage. • Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.

Kalbaskraal WWTW: The WWTW is an oxidation pond system with unlined ponds, with an estimated treatment capacity of 0.157 Ml/d. The WWTW includes two primary oxidation ponds, three secondary ponds and one tertiary pond. **The current capacity is still adequate and no upgrading is planned at present.**

Table C.3.22: Recommendations from Kalbaskraal WWTW Process Audit (July 2018 to June 2020)	
Conclusion	The Kalbaskraal ponds system is in a poor condition. The plant is hydraulically still under capacity, operating at 40% of the plant's design capacity. It is recommended that regular maintenance tasks should be continued to ensure that the pond embankments are kept in an immaculate condition and that no nuisances can develop.
Recommendation: Design aspects	• WWTW capacity: The organic loading capacity of the ponds system should be investigated to determine if the WWTW has enough capacity to handle the incoming COD loads. • Discharge point: A platform should be built where the trucks position themselves to discharge their waste to the first pond, to avoid damage to the embankments.
Recommendation: Operational aspects	• Ponds condition: The ponds should be cleaned, by removing all vegetation, sludge, scum and pollution. • Embankments condition: The embankments should be cleared of vegetation. They should also be reinforced to avoid further damage. • Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.

Chatsworth / Riverlands WWTW: The WWTW is an oxidation pond system, which was upgraded during 2016/2017. The hydraulic design capacity of the WWTW was increased from 0.118 Ml/d to 0.270 Ml/d. The WWTW includes an anaerobic pond, facultative pond, one primary oxidation pond, five secondary ponds and a tertiary pond.

Dekker Envirotech completed a short report, during December 2011, on the proposed upgrading of the Chatsworth WWTW. They recommended upgrading of the works in two phases of 270 m³/day each. The problems that were identified were as follows:

- Sludge build-up in the primary ponds results in a reduction of effective treatment capacity due to hydraulic short circuiting. The primary ponds were erroneously designed being too shallow to promote sustained methanogenic activity.

- Nitrification is not achieved in the secondary oxidation ponds – these ponds were originally designed to achieve both COD removal and biological Nitrification. However, due to the failure of the primary ponds the higher organic load will prevent the development of nitrifying organisms as these require a constant free dissolved oxygen level above 1.5 mg DO/L.

The report recommended upgrading of the existing ponding system to receive 270 m³/day of raw sewage (Phase 1) and involves the following (Was implemented by Municipality during 2016/2017):

- New fermentation pit and new facultative pond needs to be constructed upstream of the existing primary ponds. The fermentation pit will be submerged within the new facultative pond to provide a total water depth of 5m inside the fermentation pit. The fermentation pit will be a rectangular concrete structure with volume approximately 1 700 m³. The facultative pond will surround the fermentation pit and provide an effective water volume of 16 000 m³ and average water depth of 3 m.

- A Rock Filter will be constructed in the final existing secondary pond – this unit will have to be drained and then filled with stone of size >80mm. The rock filter will provide additional surface area for biofilm growth to enhance nitrification and suspended solids (primarily algae) removal. This will be a submerged filter and not a trickling filter. The inlet and outlet structures to this unit will be altered to achieve a uniform distribution.

- The existing primary ponds will require in-situ sludge digestion utilising injection of specific microbial formulations to rapidly ferment the organic sludge.

- Continual weekly addition of a microbial blend to augment the system will ensure that the nitrifying population is properly maintained and mercaptan-odours are prevented. This will be part of the commissioning period for 12 months.

Phase 1: Makes provision for abovementioned, also note that the construction of the fermentation pit and facultative pond would be sufficient to accommodate Phase-2 (Was implemented).

Phase 2: Treatment of an additional 270 m³/day (therefore system total of 540 m³/day) requires duplication of ponding system (except for fermentation pit and facultative pond already constructed during Phase 1).

The pond system is in a very poor condition. The capacity of the WWTW is inadequate to meet the current and future treatment requirements and Phase 2 of the proposed upgrade needs to be implemented. The Municipality allocated budget in 2023/2024 for the fencing at the WWTW.

Table C.3.23: Recommendations from Chatsworth / Riverlands WWTW Process Audit (July 2018 to June 2020)	
Conclusion	The Chatsworth ponds system is in very poor condition. Based on the estimated flow to the ponds, the system is currently operating at 63% of its design capacity and is therefore still hydraulically under capacity. It is recommended that the system be investigated to plan for future upgrades to the system, as is currently happening. Regular maintenance tasks should be continued to ensure that the pond embankments are kept in an immaculate condition and that no nuisances can develop.
Recommendation: Design aspects	• The final effluent quality is complying with the Irrigation Standards. It is still well below the limits and therefore the ponds system is still sufficient. The Municipality is busy with upgrades. The upgrade consists of two phases. The first phase has already taken place in July 2017, which consisted of increasing the capacity to 270 kl/day. Phase 2 will consist of an additional 270m³/day, increasing the total capacity of the ponds system to 540 kl/day. This requires the duplication of the ponds system, after the Phase 1 upgrades, but excludes the fermentation pit and facultative pond.
Recommendation: Operational aspects	• Ponds condition: The ponds should be cleaned, by removing all vegetation, sludge, scum and pollution. • Embankments condition: The embankments should be cleared of vegetation. • Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.

Swartland Municipality evaluates the capacity and suitability of their WWTWs to meet the final effluent quality limits on an annual basis. When the water quality requirements for the final effluent becomes stricter and / or when the inflow to the WWTW has increased to such an extent that the capacity of the plant needs to be increase, 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 Sewer Master Plan (June 2020) has indicated that based on the most likely land-use development scenario, it will be necessary for the following bulk sewerage infrastructure.

Table C.3.24: Future Bulk Sewerage Infrastructure as Included in Sewer Master Plans

Town	Item	Short description	Scheduled date	Estimated cost 19/20 (R Million)
Chatsworth / Riverlands	SCS.B1	New WW Treatment Plant	2022	R53 285 000
Koringberg	SKoS.B1	Upgrade existing WW Treatment Plant	2025	R6 400 000
Kalbaskraal	SKS.B1	New WW Treatment Plant	2030	R25 947 000
Moorreesburg	SMoS.B1	Upgrade existing WW Treatment Plant	2030	R35 373 000
Yzerfontein	SYS.B1	New WW Treatment Plant	2030	R22 829 000
Darling	SDS.B1	Upgrade existing WW Treatment Plant	2035	R20 598 000
Riebeek Valley	SRkS.B1	Upgrade existing WW Treatment Plant	2035	R25 060 000
Malmesbury	SMS2.5 SMS2.11	480 m x 675 mm Ø Upgrade existing Gravity Sewer Upgrade existing Pump Station	2055	R3 644 000 R1 833 000
Total				**R194 969 000**

TOPIC 4: WATER SERVICES OPERATION AND MAINTENANCE

Topic C.4.1: Water Services O&M						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
O & M Plan Is There an O&M Plan?	No	100	Operation and Maintenance tasks for the various water and sewerage infrastructure components, as indicated under Sections 4.1.1 to 4.1.10 of the "Future Demand and Functionality Requirements" WSDP Master Plan should be implemented. Ensure the required O&M schedules are in place and signed off.	100	Partially	78.6
Resources	No	100	A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of existing water and sewerage infrastructure (Best Practice). 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 (Best Practice).	100	Partially	92.9
	No	100	Swartland Municipality needs to ensure that the number of process controllers at each of the WTWs and WWTWs and the class of process controller complies with the required number of process controllers and class of process controller per plant (New Regulation 3630).	100	Partially	78.6
Information	No	100	All incidents at the WTWs and WWTWs and on the water reticulation networks and sewer drainage networks need to be recorded and Incident Management Protocols, as included in the Water Safety Plans and W_2RAPs, need to be followed after an incident.	100	Yes	85.7
	No	100	Ensure that the required O&M Manuals are in place for all the water and sewerage infrastructure.	100	Partially	78.6
Activity Control & Management	No	100	Groundwater: Implement recommended daily, weekly, monthly and six monthly O&M activities for the boreholes.	100	Partially	85.7
	No	100	Surface water infrastructure: Implement preventative maintenance procedures.	100	Partially	85.7
	No	100	Bulk and water reticulation networks and fittings: Compile daily, weekly, monthly and annual maintenance checklists for the maintenance activities for the water reticulation networks and fittings.	100	Partially	85.7
	No	100	WTWs: Evaluate the existing O&M schedules for the WTWs against the recommended O&M tasks and ensure all required activities are adequately monitored and recorded.	100	Partially	85.7
	No	100	Water PSs: Compile weekly and monthly maintenance checklists for the recommended activities for all the water PSs and all PSs need to be inspected on at least a weekly basis.	100	Partially	85.7
	No	100	Reservoirs: Compile maintenance checklists for the recommended reservoir maintenance activities and document all inspections.	100	Partially	85.7
	No	100	Remote monitoring and Control Systems: Ensure adequate maintenance is carried out on the SCADA systems and compile maintenance checklists for the recommended activities.	100	Partially	85.7
	No	100	Sewer PSs: Compile weekly and quarterly maintenance checklists for the recommended activities for all the sewer PSs and all centrifugal pump stations need to be inspected on at least a weekly basis.	100	Partially	85.7
	No	100	Bulk and sewer drainage networks: Annual, monthly and weekly schedules for maintenance should be drawn up for the bulk and sewerage networks. Regular cleaning of sewer lines and all blockages and their precise locations should be recorded.	100	Partially	85.7
	No	100	WWTWs: Evaluate the existing O&M schedules for the WWTWs against the recommended O&M tasks and ensure all required activities are adequately monitored and recorded.	100	Partially	85.7

Notes: (1) Is this section addressed in the WSDP?
(2) Were solutions identified for the possible gaps?
(3) Percentage calculated based on the above two percentages and whether there is an existing project/activity addressing this problem? Does this current listed project/activity address the problem totally? Project/Activity approved by Council as part of WSDP database? Approved by Council in project activity database and part of 5yr IDP cycle projects? Project/Activity listed in 3yr MTEF Cycle?

It is important for Councils to understand the value of maintenance and provide the necessary funding to properly operate and maintain infrastructure. It is the responsibility of the municipal and technical managers to educate and inform Councils on this and help councillors explain these issues to their communities. **Successful municipalities depend to a large extent on a single principle – effective and efficient management!**

Much of the routine work of technical departments involves managing and undertaking the O&M of services that is done in-house by municipal staff. A second major aspect of work is managing O&M undertaken by external service providers. The third major area is new or capital projects, also usually undertaken by external service providers.

Each service area in Swartland Municipality needs an O&M system that monitors and assesses infrastructure condition and plans for the required preventative maintenance, and when necessary, rehabilitation, upgrading or replacement of the infrastructure. This is a major part of an overall Asset Management System, which

- records and describes all infrastructure assets;
- monitors and assesses their condition;
- plans and monitors maintenance;
- plans upgrading, rehabilitation and replacement; and
- values assets and the costs of maintenance, upgrading, rehabilitation and replacement.

There are a wide range of **desirable objectives** that should be achieved with the help of maintenance.

- Retain an asset in a serviceable condition during its designed life span.
- Optimize the reliability of equipment and infrastructure.
- Ensure that the equipment and infrastructure are kept in a good condition.
- Ensure prompt emergency repair of equipment and infrastructure to sustain service delivery.
- Take action before repair costs become too high.
- Ensure operation by eliminating breakdown risks or limiting them as much as possible.
- Improve delivery by upgrading infrastructure.
- Enable repairs under the best possible conditions.
- Improve operational safety and remove causes of accidents.
- Reduce the overall management burden through better work preparation and reduced unforeseen production stoppages.
- Protect the environment.

To achieve these objectives, it is necessary to train personnel in specific maintenance skills and to influence their attitudes, as better operational results depend on motivated staff who are committed to proper maintenance procedures and standards.

Setting up a preventative maintenance programme is one of the most effective ways of reducing breakdowns and keeping equipment and infrastructure in good condition. It is important to implement such a programme as soon as new equipment or infrastructure is put into service.

Implementing a preventative maintenance programme requires a **maintenance plan**, with particular emphasis placed on the following:

- Periodic inspection of equipment according to a pre-established programme so that working conditions may be checked.
- Systematic servicing – the first step in devising this programme is to forecast the life of parts and components subject to wear, i.e. the study of reliability, failure modes and effects and fault analysis.
- Overhauls, which often require considerable work, should be planned during low production periods.

The complexity of maintenance activities should be analysed to set up an efficient maintenance plan and to take management decisions, e.g. regarding use of own resources and unskilled or skilled resources. **Five levels of maintenance** can be distinguished, depending on the complexity of the work and the urgency of action.

- Simple adjustments are generally applicable to accessible components and require no dismantling or opening of the equipment. These adjustments involve the completely safe replacement of accessible consumable components such as signal lights or some types of fuses. Servicing of this type may be performed by the operator on site, without tools, following the instructions for use. The stock of consumable parts required is very small.

- Troubleshooting entails minor preventative maintenance operations such as greasing or checking for proper functioning. Servicing of this type may be performed on site by an authorised technician. An authorised technician has received training that enables him/her to perform such maintenance work safely and is well aware of potential problems.

- Breakdowns require identification, diagnosis and repairs by replacing components or working parts. Servicing of this type must be carried out by trained persons, on site or in the maintenance shop, using the documentation (manuals, spare part lists, etc.) necessary for maintenance of equipment.

- Major maintenance work covers all major corrective or preventative work except modernization and rebuilding. Servicing of this type must be carried out by a team that comprises highly skilled technical specialists, using the relevant documentation.

- Modernising and rebuilding equipment or executing major repairs is usually done by the manufacturer or builder. Resources are specified and usually very similar to those used in the original manufacturing or construction.

In order to ensure **good quality O&M**, technical managers firstly need to ensure that staff responsible for in-house O&M

- understand equipment and infrastructure;
- understand and implement the proper O&M requirements and procedures;
- understand the required service and operating standards;
- have and develop the necessary O&M skills;
- assess equipment and infrastructure conditions;
- understand and identify typical defects and problems;
- solve problems and make necessary repairs, or engage experts to do so; and
- record all activities to provide data for planning and analysis of O&M.

Secondly technical managers must ensure that they contract competent external service providers.

The bulk of O&M activities should be of a preventative nature. That is regular checking all the water and sewerage infrastructure and ensuring that everything is in good operational condition. There are a number of standard recommended O&M tasks, for the various water and sewerage infrastructure components, which should be implemented by Swartland Municipality.

TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

Topic C.5.1: Conservation and Demand Management - Water Resource Management						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Reducing unaccounted water and water inefficiencies	Yes	100	Implement the proposed WC/WDM Strategy and the 25 WC/WDM items. Ensure adequate budget is allocated under the Capital and Operational budgets towards the implementation of the WC/WDM initiatives.	100	Partially	85.7
	Yes	100	Set up meeting with the Large Water Users to discuss water consumption status, potential water saving volumes	100	Partially	85.7

Topic C.5.1: Conservation and Demand Management - Water Resource Management						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
			and to cultivate a water saving awareness within each large water user.			
Leak and meter repair programmes.	Yes	100	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.	100	No	71.4
	Yes	100	Continue with the implementation of the pipeline replacement programme. The location of pipe failures should in the future be recorded preferably with accurate GPS coordinates. This improves the integrity of the output of the pipe failure model. If a longer and more comprehensive pipe failure record could be established, the integrity of the output could be further enhanced. It was recommended in the pipe replacement study that the pipe replacement in Swartland Municipality is performed in accordance with the PRP values calculated in the study. Pipes with the highest PRP values should be considered to be replaced first.	100	Partially	92.9
	Yes	100	Install water meters at all the unmetered erven and inspect metered erven with zero consumption.	100	Partially	85.7
Consumer/end-use demand management: Public Information & Education Programmes	Yes	100	At least once a year, a schools education programme on water conservation should be undertaken. The Municipality should assist the school(s) with the monitoring (water audit) of their water consumption. Swartland Municipality can also focus on the implementation of an extensive schools WDM programme, which can include annual competitions between schools (Say with a prize for the lowest consumption, the lowest per capita consumption and for the best WDM Strategy poster design, etc.). A schools WDM programme should receive a high priority.	100	Partially	85.7
	Yes	100	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.	100	Partially	85.7
Conjunctive use of surface - and groundwater	No	100				100
Working for Water	No	100				100

Notes: (1) Is this section addressed in the WSDP?
(2) Were solutions identified for the possible gaps?
(3) Percentage calculated based on the above two percentages and whether there is an existing project/activity addressing this problem? Does this current listed project/activity address the problem totally? Project/Activity approved by Council as part of WSDP database? Approved by Council in project activity database and part of 5yr IDP cycle projects? Project/Activity listed in 3yr MTEF Cycle?

Topic C.5.2: Conservation and Demand Management - Water Balance						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Water Balance	No	100	Ensure that the volume of water supplied from all water resources are metered (each individual source separately), the raw water and final water at the WTWs and the volume of water supplied to the various zones (at Reservoirs). The inflow at the WWTWs, the volume of treated effluent re-used and the volume of treated effluent returned to the water resource system also need to be metered at all the WWTWs.	100	Partially	85.7

Notes: (1) Is this section addressed in the WSDP?
(2) Were solutions identified for the possible gaps?
(3) Percentage calculated based on the above two percentages and whether there is an existing project/activity addressing this problem? Does this current listed project/activity address the problem totally? Project/Activity approved by Council as part of WSDP database? Approved by Council in project activity database and part of 5yr IDP cycle projects? Project/Activity listed in 3yr MTEF Cycle?

Swartland Municipality's WC/WDM Strategy (September 2019) include the following future WDM measures that will be implemented by Swartland Municipality.

- Pressure Management
- Leak Repair and Assistance Programme
- Residential Measures
- Re-use of treated effluent
- Meter replacement
- Night Flow Analyses
- Leakage Detection
- Zone Metering
- Alternative water resources

DWS's Municipal Scorecard for assessing the potential for WC/WDM efforts in Municipalities was used to assess the potential for WC/WDM efforts in Swartland Municipality. The proposed WC/WDM Strategy for Swartland Municipality is based on the 25 items included in the Scorecard and the sections below discuss each of these items in detail.

Table C.5.3: Proposed WC/WDM Strategy Items for Swartland Municipality

Item 1: Development of a Standard Water Balance

Recommendation and Strategy:

- Continue with the monthly updating of the IWA Water Balances for all the systems and reporting on the NRW and Water Losses for each of the systems to management. Continue to manage NRW analysis on a monthly basis.
- Continue with the drafting of an annual WSDP Performance and Water Services Audit Report, as required by the Water Services Act, which include the IWA Water Balances.
- Implement the recommended WC/WDM activities in order to reduce the NRW and Water Losses even further.
- Determine all unbilled authorized consumption by firstly identify all the relevant consumers, e.g. Municipal buildings, parks, fire services, sport fields, etc. Unbilled consumption do not generate income, but will enable the municipality to better quantify their actual water losses.

Funding and Budget Requirements:

The IWA Water Balances for the systems are updated on a monthly basis by the municipality.

Item 2: Pressurised System at all times

Recommendation and Strategy:

- Adequate human resources, technical skills and O&M budgets need to be allocated towards the operation, maintenance and refurbishment of the existing infrastructure, in order to ensure that the systems are always pressurised.
- Ensure proper maintenance of the existing PRVs.
- The Water Master Plans to be consulted in conjunction with the WC/WDM priority projects to identify future areas where pressure reduction can be implemented. Recommended future PRV zones are included in Table 5.1.1.3.3. of the Future Demand and Functionality Requirements Report.

Funding and Budget Requirements:

- Budgets as indicated under the individual items of the WC/WDM Strategy.
- Increase O&M budget allocations towards the refurbishment and replacement of old water infrastructure.
- A budget of R5 000 000 is required for the implementation of the future recommended PRV zones.

Items 3 and 4: Metering System

Recommendation and Strategy:

- All un-metered water connections need to be provided with water meters. Meters need to be read on a monthly basis and consumers need to be billed monthly according to their actual water usage. In addition to water theft, many water accounts go unnoticed in the system or have some type of data inconsistency that results in no revenue being generated for the particular water use event. The SWIFT data needs to be used to clean the Treasury data and the municipality needs to identify and correct any inaccurate data in the system (Linkage of Treasury data with cadastral data).
- Consumer consumption checks / investigations need to be carried out where water usage are very low, but there are households on the property (Use SWIFT data). This project will give a clear indication of where illegal or unregistered connections is being made and whether the meter is under reading the actual consumption, thus water is being used but not billed or recorded.
- Use the SWIFT data to identify all unmetered erven and all meters with zero consumption. All illegible / broken / old meters should be replaced. Any un-metered stands should be metered and meter readings in the billing system should be updated where required. All meter boxes should also be cleaned as part of the inspections.
- Municipality needs to continue with the implementation of their Meter Management / Replacement program. An effective Meter Management / Replacement Program needs to achieve the following objectives:
  - Determine the on-going meter replacement programme;
  - Determine exception reports on meters which are suspected to be faulty;

Table C.5.3: Proposed WC/WDM Strategy Items for Swartland Municipality

- Test and replace faulty meters; and
- Size meters correctly.

The activities of this program that needs to be budgeted for are as follows:

- SWIFT analysis of treasury data.
- Research and development of a meter replacement policy and meter management / replacement programme;
- Implementation of a uniform meter management information system;
- Testing and replacing faulty meters reported by consumers (Part of reticulation function).
- Replacement of domestic meters with AMR enabled format (where appropriate) in accordance with meter management / replacement programme.

Funding and Budget Requirements:

Allow a budget of approximately R200 000 for an annual SWIFT analysis to identify unmetered erven and erven with no or very low consumption. Estimated annual budget requirement for the installation of individual water meters is R1 500 000.

Item 5: Effective and Informative Billing System

Recommendation and Strategy:

- Municipality needs to continue to ensure that all customer's meters are read on a monthly basis and that the customers are billed on a monthly basis according to the actual volume of water used for the specific month.
- Municipality needs to continue with the commercial data analysis done on the billed metered consumption data, which include the identification of un-metered erven, investigating meters with zero consumption, investigating abnormal low and high consumption readings, oversized / undersized meters, etc.
- The Municipality can consider the following additional measures to make the current consumer bills more informative.
  - Adding a graph of the previous 12 months' consumption and helpful hints on effective water usage on the monthly bills.
  - Alert consumers of possible leaks on their properties. For instance if the consumption for a particular month is >25% than the average consumption of the previous months the consumer may be alerted of a possible leak on the property.
  - Monitor trends and follow up telephonically.

Funding and Budget Requirements:

Estimated cost to enhance the user friendliness of the municipal bill is R400 000.

Items 6 and 7: General Complaints System

Recommendation and Strategy:

The municipality needs to continue to ensure that all consumers are familiar with the telephone numbers to lodge complaints and report leaks. Telephone numbers to lodge complaints and report leaks are included on the monthly water bills and on the Municipality's website. Suggestions would be to also include it on strategically located notice boards, radio broadcasts, etc.

The projects and measures that can be implemented for passive leakage control are as follows:

- Improve the help-line and install an automated answering system.
- Advertise the help-line.
- Investigate current problems in responding to leaks and allocate adequate resources to avoid lengthy delays.
- Review and develop a policy regarding responses to leaks with the aim of reducing response time, prioritising and keeping consumers informed.
- Develop a monitoring system and quality assurance measures to ensure problems are resolved adequately. Link such a KPI to the SDBIP.

The Consumer Services Charter should include the following information:

- Commitment to deliver excellent services to our clients (Executive Mayor and Municipal Manager).
- Standards of services (Enquiries written and telephonic; Accounts enquiries and distribution of accounts).
- Response times for different services (Water: Repairs to networks, installation of new household water connections, etc.)
- Contact details for different areas.

Funding and Budget Requirements:

Budget requirement for improved customer awareness raising with regard to the Municipality's Complaints System R150 000/annum.

Item 8: Asset Register for Water Infrastructure

Recommendation and Strategy:

- Continue with the annual updating of the Asset Register.
- Continue to ensure that all the existing water and sewerage infrastructure are included in the Asset Register.

Funding and Budget Requirements:

None - To be done as part of the annual updating of the Asset Register by the municipality.

Item 9: Asset Management Capital Works

Recommendation and Strategy:

Allocate a budget of at least 2% of the total water asset value per annum towards the replacement of existing infrastructure. Municipality needs to differentiate in their capital budget between new projects and projects that are for the replacement of existing infrastructure, in order to accurately calculate the annual percentage allocated towards the replacement of existing infrastructure (Best Practice).

Funding and Budget Requirements:

Capital budget of at least 2% of the total water and sewerage asset value allocated annually towards the replacement of the existing water and sewerage infrastructure (Best Practice).

Table C.5.3: Proposed WC/WDM Strategy Items for Swartland Municipality

Item 10: Asset Management Operation and Maintenance

Recommendation and Strategy:

The municipality needs to differentiate between budget allocated towards the operation and maintenance of the water infrastructure and the budget allocated towards the replacement of the water and sewerage infrastructure. A budget of approximately 1% to 2% of the value of the system is typically required for the operations and maintenance of the system to ensure that the system remains in good condition.

The municipality needs to compile an Asset Management Plan (AMP) to ensure efficient, effective and optimal management, operation and maintenance of all assets, which includes treatment plants, reservoirs, structures, buildings, pipelines, sites, etc. The purpose of the AMP is to:

- Ensure the operation and maintenance functions are well planned;
- Demonstrate responsible management;
- Justify and communicate funding requirements; and
- Service provisioning complies with regulatory requirements.

An AMP normally includes the following:

- documents the nature, extent, age, utilization, condition, performance and value of the infrastructure work;
- identifies existing and target levels of service, as well as expected changes in demand;
- identifies the life-cycle management needs of the infrastructure (development, renewal, operations and maintenance);
- assesses capital and operational budget needs; and
- identifies infrastructure asset management improvement needs.

It is important for the municipality to develop an AMP from their Asset Register. The objective of an AMP is to support the achievement of the strategic goals of the Municipality and facilitate prudent technical and financial decision-making. It is also a vehicle for improved internal communication and to demonstrate to external stakeholders the Municipality's ability to effectively manage its existing infrastructure as well as the new infrastructure to be developed over the next 20 years.

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. The municipality needs to ensure that the maintenance and rehabilitation plan is part of the WSDP and that the plan is implemented. Assets must be rehabilitated and / or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose. Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increase in (operational) services level coverage 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. The potential renewal projects for the water infrastructure need to be identified from the Asset Register. All assets with a condition grading of "poor" and "very poor" need to be prioritised.

The O&M Budget allocated towards repairs and maintenance should include the replacement of malfunctioning and old bulk water meters and consumer water meters, clearing of meter chambers, buying replacement mechanisms for bulk water meters, speedy repair of leaks, leak detection in areas with high water losses and NRW and higher than expected night flows, etc. The budget should also be used for preventative maintenance, which include the following:

- Inspection of isolation valves and packing.
- Control valve inspection and maintenance.
- Inspection of cathodic protection of steel pipes.

Funding and Budget Requirements:

Additional budget should be allocated towards the repairs and maintenance of the existing water and sewerage infrastructure. The additional budget should be determined by the municipality once an AMP is developed. A budget of approximately 1% to 2% of the value of the system is typically required for the operations and maintenance of the system to ensure that the system remains in good condition (Best Practice).

An estimated budget for the drafting of an AMP for all the water and sewerage infrastructure is R750 000.

Item 11: Dedicated WC/WDM Support

Recommendation and Strategy:

The municipality should allocate at least one (1) person to head WC/WDM for a start. The number of people involved with WC/WDM measures can later be increased as and when required.

Funding and Budget Requirements:

The municipality may be able to use one of their existing staff members. If a new person has to be appointed the municipality can determine the costs involved with such an appointment.

Item 12: Active Leakage Control

Recommendation and Strategy:

The following process needs to be followed for active leakage control of the reticulation network:

Decide on how the work will be undertaken:

- Option 1: The appointment and training of additional staff.
- Option 2: The training of existing staff.
- Option 3: Appoint an external contractor in the first few years with the objective of using this contractor to train the internal teams and build capacity to do all work internally.
- Option 4: Complete outsourcing of the activity.

The first three options need to include the purchase or re-allocation of equipment.

Leak detection: Identify areas with highest leaks and send teams into the field to detect leaks.

Table C.5.3: Proposed WC/WDM Strategy Items for Swartland Municipality
Repair of leaks once identified: Once leaks were detected they will need to be repaired. Depending on the extent of the leaks and other workloads, the leak repairs need to be carried out by either the internal teams or a contractor.
Funding and Budget Requirements: R400 000 to undertake leak detection in zones with high excess night flows. In addition allocate approximately R200 000 per year for general visual leak inspections.
Item 13: Sectorization of Reticulation Systems
Recommendation and Strategy: The billed metered data is currently linked to the distribution systems and should also be linked to the different zones in the future where possible, in order to accurately determine the NRW and water losses for the specific zones in the future. Faulty bulk water meters need to be replaced and new meters need to be installed for the zones with no bulk water meters. The current bulk water meters are indicated in Table 5.1.2.3.1 of Topic 5 of the Administration, Information and Comprehensive Overview Report. The Financial Department needs to provide the billed metered consumption data separately for the different zones in the future in order to assist with the following: • Clear indication of how much water is being used per area / zone. • Areas with high NRW and water losses can easily be identified. • Leakage and pressure control can be better managed. • Water demand per area / zone can be determined. Night flows need to be measured for zones with expected high water losses. It is recommended to re-log the night flows every few years to determine if there was an increase in leakage.
Funding and Budget Requirements: The estimated cost for the logging of flows and pressures for zones with expected high water losses is R450 000. The logging exercise should be repeated at least every three years. A budget should be allocated to investigate and resolve possible zone interconnections. It is however difficult to price such investigations at this stage.
Item 14: Effective Bulk Metering Management System
Recommendation and Strategy: • Municipality needs to continue to read all the bulk water meters at the existing WTWs, reservoirs and pump stations and need to record the readings on at least a monthly basis. • All bulk water meters need to be installed in lockable meter chambers and reservoir sites and water pump stations need to be secured in order to prevent unauthorised access and possible damage to the water meters. • New bulk water meters need to be installed correctly. Ideally a straight pipe section upstream of the meter of at least 5x the meter dia. and 3x the meter dia. downstream of the meter. Strainers need to be installed to protect the meters. These strainer elements must be removable from the top, for ease of cleaning. Gate valves are required for maintenance before and after meters. Every informal area with unmetered communal services to be supplied with a bulk water meter in order to determine the unbilled metered consumption. All discrete zones are to be supplied with a bulk water meter. The meter readings must be recorded on at least a monthly basis. The readings can be used to quantify both the water supplied and the leakage for a specific area.
Funding and Budget Requirements: Allow an annual budget of approximately R400 000 for the installation of new bulk water meters, the replacement of faulty bulk water meters and to adequately protect existing bulk water meters.
Item 15: Effective Zone Meter Management and Assessment of Night Flows
Recommendation and Strategy: See recommendations under Item 14.
Funding and Budget Requirements: See funding and budget requirements included under Item 14.
Item 16: Pressure Management
Recommendation and Strategy: See Item 2.
Funding and Budget Requirements: See Item 2.
Item 17: As-built Drawings of Bulk and Reticulation Infrastructure
Recommendation and Strategy: Continue with the updating of as-built drawings on an ongoing basis. Continue also with the regular updating of the Water and Sewer Master Plans.
Funding and Budget Requirements: Allow a budget of approximately R1.50 million for the updating of the Water and Sewer Master Plans every three to five years.
Item 18: Schematic Layouts of Water Reticulation Systems
Recommendation and Strategy: Municipality needs to continue to update the schematic layouts on a regular basis, in order to ensure they remain accurate.
Funding and Budget Requirements: None
Item 19: Regulation and Bylaws

Table C.5.3: Proposed WC/WDM Strategy Items for Swartland Municipality
Recommendation and Strategy: The existing By-law relating to Water Supply, Sanitation Services and Industrial Effluent needs to be updated, in order to ensure that the by-law adequately allow for WC/WDM measures.
Funding and Budget Requirements: Allow a budget of R180 000 for the updating of the existing Water Supply, Sanitation Services and Industrial Effluent By-law.
Item 20: Tariffs
Recommendation and Strategy: See Section 7.3 under Topic 7 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Financial study to determine the impact of changing the sanitation tariff structure from a fixed monthly amount, which is fix for residential consumers and based on the number of toilets for businesses, hotels, flats, schools, hostels and old age homes to a stepped tariff based on water consumption in the future. Estimated cost of a financial analysis is R250 000.
Item 21: Technical Support to Customers
Recommendation and Strategy: The objective of a Technical Support programme is not limited to assisting consumers in reducing their water demand, but is also to look at wastewater, monitor compliance with by-laws and service conditions and offer general customer support. Once a dedicated person has been allocated to WC/WDM it is recommended to engage with large customers and to identify areas where the municipality can provide assistance. The proposed activities of this programme that can be budgeted for are as follows: • Train existing staff; • Identify and visit large consumers (Checking that large consumers are correctly metered and billed, providing tips on WC/WDM, test the accuracy of all large consumer meters, install data-loggers on all large consumer meters and informing consumers of any sudden change in consumption patterns). • Arrange leakage inspections in public buildings; • Provide assistance and technical know-how for large consumers; and • Introduce compulsory water management plan for large consumers.
Funding and Budget Requirements: No additional funding – pending the appointment of a dedicated person for WC/WDM.
Item 22: Removal of Un-authorised Connections
Recommendation and Strategy: Swartland Municipality should continue to remove un-authorised connections as and when they are detected. See Section 5.1.1.5. of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Estimated annual budget of R200 000 is required to install water meters at any unmetered erven.
Item 23: Community Awareness on WDM
Recommendation and Strategy: See Section 5.1.3 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: It is estimated that R150 000 / year should be allocated for WC/WDM awareness campaigns and activities, material to be included with monthly water bills, placing notices in newspapers, billboards, competitions, etc.
Item 24: Schools Education on WDM
Recommendation and Strategy: See Section 5.1.3.1 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Allow a budget of approximately R50 000 per year for the implementation of WC/WDM measures at schools (Competitions, Awareness Raising events, etc.). The DWS can also assist the municipality with pamphlets and posters on WC/WDM initiatives.
Item 25: Retrofitting
Recommendation and Strategy: See Sections 5.1.2.1 and 5.1.2.2 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Leak repair assistance programmes: R250 000 per annum for ongoing exercise to repair leakages at indigent properties using in excess of 20 kl/month. WSIG funding or "War on Leaks" funding from DWS can be requested in this regard. Retrofitting: R500 000 for a pilot project in one of the public buildings.

The way forward for Swartland Municipality with the implementation of the proposed WC/WDM Strategy is as follows:

- Develop a detailed methodology for measuring the performance criteria for each of the twenty-five (25) WC/WDM Strategy items;
- Allow for budget required to implement the various measures;
- Monitor the impact of all WC/WDM measures on an on-going basis;

- Develop key benchmarks for all KPIs and categories and assign responsibility; and
- Review WC/WDM Strategy as necessary.

Swartland Municipality needs to ensure that adequate funding is allocated under their Capital and Operational budgets towards the implementation of the WC/WDM Strategy. Key WDM projects to be taken into account during Swartland Municipality's capital budgeting process are as follows:

- Replacement of old water networks (Areas with regular pipe bursts);
- Replacement of old bulk and consumer water meters (Meter replacement programme);
- Telemetry systems to provide for early warning;
- Installation of zone meters;
- Pressure Management;
- Leak detection; and
- Data loggers to establish MNFs

The WDM initiatives can deliver excellent return on investment if well implemented and well managed. All external funding that could be utilised by Swartland Municipality for this purpose should be sourced. The O&M Budget allocated to repairs and maintenance should be increased to address amongst other tasks the following:

- Replacement of malfunctioning and old bulk water meters and consumer meters;
- Construction of meter chambers for all bulk water meters not adequately protected against vandalism;
- Cleaning of bulk water meter boxes;
- Buying replacement mechanisms for bulk meters;
- Speedy repair of leaks; and
- Leak detection in areas with higher than expected night flows.

Swartland Municipality has responded to the need to address NRW and water losses within their jurisdiction by implementing various WC/WDM initiatives over the last number of years. The Municipality will also continue to actively implement their WC/WDM Strategy in order to reduce the percentage of NRW and Water Losses even further and improve water use efficiency within the various schemes as follows.

Table C.5.4: Commitment to reduce NRW and water inefficiencies

Distribution System	2022/2023		Committed Future NRW	
	NRW (%/a)	Water Losses (%/a)	2027 (%/a)	2047 (%/a)
Koringberg	13.5%	10.4%	10.0%	10.0%
Ongegund	5.9%	4.9%	10.0%	10.0%
Riebeek Wes	11.2%	4.4%	10.0%	10.0%
Riebeek Kasteel	38.6%	37.4%	30.0%	15.0%
Yzerfontein	8.2%	3.8%	10.0%	10.0%
Darling	-1.5%	-3.3%	10.0%	10.0%
Moorreesburg	27.4%	25.1%	20.0%	10.0%
Malmesbury	15.0%	12.6%	12.5%	10.0%

IWA Water Balance: A segregated single variable future water requirement model was developed for the WSDP and is available in electronic format. The future water requirement for each of the schemes is obtained by means of this model. It is used in this analysis to estimate the future water requirement for each of the distribution systems. The model differentiates between the different income levels.

Water services must be provided in a manner that is consistent with the broader goals of integrated water resources management. There is therefore a need for an integrated planning approach between the development of water services and water resources.

The Infrastructure Leakage Index (ILI) can be used by Swartland Municipality to determine an appropriate benchmark for managing the water losses according to their own specific circumstances. This ILI can also be compared with the averages for other towns within South Africa. The annual water losses within the various towns' distribution networks are therefore important indicators of the performance of the water supply and distribution systems.

Swartland Municipality should assess the strategic gaps in their IWA water balance data and record those flows, both water and sewerage, which are strategic in terms of medium to long term planning. A prioritisation of these locations should subsequently follow with budget allocated to improve the availability and accuracy of the IWA water balance data.

Swartland Municipality should continue to update their IWA water balance models on a monthly basis in order to determine the locations of wastage and to enable the Municipality to manage their NRW and Water Losses. 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. **All bulk zone water meters need to be recorded on at least a monthly basis (Meters at reservoirs and pump stations).**

Swartland Municipality needs to focus on the following for the IWA water balances of all the systems.

- Continue to use IMQS (Swift analysis) to identify treasury records that cannot be linked to GIS data, occupied stands with water meters, but with no water demand, occupied stands with no water meters, occupied stands with very low consumption and stands where the water demands have reduced or increased substantially in recent months.

The following areas need to be focused on for the IWA water balances of each of the systems.

- Koringberg: The WWTW flow at the WWTW needs to be metered.
- Ongegund: No additional requirements.
- Riebeek Wes: No additional requirements.
- Riebeek Kasteel: The oversized electromagnetic meters at the outlets of the Riebeek Kasteel reservoirs to be replaced with suitably sized smaller diameter mechanical (i.e. Sensus Meistream Plus) or electromagnetic (i.e. Siemens) water meters to enable accurate measuring of low flows (including MNF) and for WC/WDM and water balance purposes to effectively reduce NRW.
- Darling: The bulk water meter needs to be calibrated, because of the drastic reduction in System Input volume over the last financial year.
- Malmesbury (Abbotsdale, Kalbaskraal, Riverlands and Chatsworth included):
  - The oversized electromagnetic meters at the outlets of the Klein Dam, Old Golf Course, Panorama and Wesbank reservoirs to be replaced with suitably sized smaller diameter mechanical (i.e. Sensus Meistream Plus) or electromagnetic (i.e. Siemens) water meters to enable accurate measuring of low flows (including MNF) and for WC/WDM and water balance purposes to effectively reduce NRW.
  - The Old Golf Course Reservoir inlet flow meter should be replaced as the display is no longer attached to the meter body. The outlet meter needs to be dealt with in order to ensure that the meter is operational.
  - The pipework in the 150mm dia. Mount Royal Reservoir inlet chamber should be reconfigured to ensure that there is an adequate straight section of at least 5 ND upstream of the meter (upstream of the strainer), and at least 3 ND straight pipe downsteam of the meter.
  - The pipework in the 50mm dia. Tronk outlet chamber should be reconfigures to ensure that there is an adequate straight section of at least 3 ND downstream of the meter.
  - The WWTW flows at the Kalbaskraal and Chatsworth WWTWs need to be metered.
- Moorreesburg: No additional requirements.
- Yzerfontein: No additional requirements.

NRW and Water Losses:

Koringberg: The NRW and Water Losses were drastically reduced during the last three financial years. The NRW and Water Losses stayed roughly the same for the period 2017/2018 to 2019/2020. The Municipality needs to keep the NRW percentage for Koringberg less than 15%. The ILI of 0.93 indicates an excellent management system, with no specific intervention required.

Ongegund: The NRW and Water Losses decreased drastically during the last financial year. The Municipality needs to keep the NRW percentage for Ongegund less than 10%.

Riebeek Wes: The NRW and Water Losses stayed roughly the same for the last two financial years. The current percentage of NRW of 11.2% and the Water Losses below 5% are excellent. The ILI of 0.29 indicates an excellent management system, with no specific intervention required.

Riebeek Kasteel: The NRW and Water Losses increased drastically during the last two financial years. The Municipality needs to work towards a percentage of less than 20% for the NRW. The ILI of 4.21 indicates a poor management system, which requires attention.

Yzerfontein: The NRW and Water Losses were reduced over the last two financial years. The current percentages of NRW below 15% and Water Losses below 10% are excellent. The ILI of 0.21 indicates an excellent management system, with no specific intervention required.

Darling: The system input volume for Darling reduced drastically during the last financial year, which needs to be investigated. The NRW and Water Losses stayed roughly the same the four financial years prior to 2022/2023. The Municipality needs to keep the NRW below 15%. The ILI of 2.28 indicates a good management system, with no urgent action required. The ILI should however be monitored carefully.

Moorreesburg: The NRW and Water Losses increased over the last two financial years. The Municipality needs to work towards a percentage of less than 20% for the NRW. The ILI of 2.40 indicates a good management system, with no urgent action required. The ILI should however be monitored carefully.

Malmesbury: The NRW and Water Losses decreased during the last financial year. The Municipality needs to keep the NRW percentage less than 15%. The ILI of 1.46 indicates an excellent management system, with no specific intervention required.

The overall NRW and Water Losses decreased during the last financial year, mainly because of the decrease in the NRW and Water Losses of Malmesbury, Darling, Koringberg, Yzerfontein and Ongegund. The Municipality needs to work towards an overall NRW percentage of less than 20%.

TOPIC 6: WATER RESOURCES

Topic C.6.1: Water Resources						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Current Water Sources	No	100	Ensure the required authorisations (licences) are in place for all the water resources, as well as the required registrations.	100	Yes	100
Additional Sources Available	Yes	100	Continue to investigate the augmentation of the existing bulk water sources. The possible interventions that can be investigated include an increased allocation from the Berg River and supply from the CCT (Supply to Swartland WTW from CCT's Voëlvlei WTW and supply to Riverlands / Chatsworth from Atlantis)	100	Yes	100
Monitoring	No	100	Ensure that the key groundwater management functions are implemented. The monitoring data must be analysed by a geohydrologist on an annual basis in order to assess the effects of abstraction and recharge on the boreholes and aquifer. Groundwater monitoring must continue on at least a monthly basis. Monthly monitoring of water levels, water chemistry and abstraction must be conducted by the Municipal staff. Swartland Municipality needs to ensure that all electronic data (i.e. dataloggers) are downloaded once quarterly by a geohydrologist. Monitoring data must be annually reviewed by a geohydrologist.	100	Partially	100
Water Quality	No	100				100

Topic C.6.1: Water Resources						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Operation	No	100	The current approach adopted by Swartland 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.	100	Yes	100

Notes: (1) Is this section addressed in the WSDP?
(2) Were solutions identified for the possible gaps?
(3) Percentage calculated based on the above two percentages and whether there is an existing project/activity addressing this problem? Does this current listed project/activity address the problem totally? Project/Activity approved by Council as part of WSDP database? Approved by Council in project activity database and part of 5yr IDP cycle projects? Project/Activity listed in 3yr MTEF Cycle?

Metering of all water supplied is one of the most significant steps in order to properly plan and manage water sources. Without metering no management is possible. Swartland 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 experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 to 2022 winter months. This drought over the period 2015 to 2017 impacted severely on the availability of bulk water supply by the West Coast District Municipality to Swartland Municipality from the WCWSS and the yield of the Municipality's own existing surface and groundwater sources. WC/WDM measures to lower the current water requirements and the augmentation of the West Coast District Municipality's existing water sources, as well as the augmentation of Swartland Municipality's own water resources with groundwater were therefore critical over this period.

Detail future water requirement projection models were developed for each of the distribution systems in Swartland Municipality's Management Area. These models include the future projections up to 2047 and were calibrated by using historic billed metered consumption data and bulk metered abstraction data. The percentage NRW was determined for each of the distribution systems and growth in demand was based on agreed population and growth figures.

The table below gives an overview of the different future water requirement projections for the various distribution systems.

Table C.6.2: Projected Future Water Requirements of Towns

Distribution System	Model	PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)				
		2027	2032	2037	2042	2047
Moorreesburg	2% Annual Growth	793.363	875.936	967.105	1 067.762	1 178.895
	4% Annual Growth	874.254	1 063.664	1 294.109	1 574.482	1 915.598
	WSDP Model	762.355	863.648	981.820	1 119.905	1 281.509
Koringberg	2% Annual Growth	59.806	66.030	72.903	80.491	88.868
	4% Annual Growth	65.904	80.182	97.554	118.689	144.403
	WSDP Model	62.709	74.315	88.219	104.894	124.915
Total for Withoogte System	**Low Projection**	**853.169**	**941.967**	**1 040.008**	**1 148.252**	**1 267.764**
	High Projection	**940.158**	**1 143.845**	**1 391.663**	**1 693.171**	**2 060.001**
	WSDP Model	**825.064**	**937.962**	**1 070.039**	**1 224.800**	**1 406.424**
Malmesbury	2% Annual Growth	3 377.577	3 729.118	4 117.248	4 545.775	5 018.902
	4% Annual Growth	3 721.955	4 528.328	5 509.403	6 703.031	8 155.263
	WSDP Model	3 557.701	4 230.801	5 050.247	6 050.520	7 274.655
Darling	2% Annual Growth	665.449	734.710	811.179	895.607	988.823
	4% Annual Growth	733.299	892.170	1 085.461	1 320.629	1 606.748
	WSDP Model	677.446	761.673	858.386	969.727	1 098.246
Riebeek Kasteel	2% Annual Growth	438.848	484.523	534.953	590.631	652.105
	4% Annual Growth	483.593	588.365	715.835	870.923	1 059.611
	WSDP Model	450.406	561.019	707.114	900.802	1 158.493
Riebeek Wes	2% Annual Growth	194.922	215.210	237.609	262.340	289.644
	4% Annual Growth	214.796	261.333	317.951	386.836	470.645
	WSDP Model	212.887	259.908	320.022	397.284	497.061
Ongegund (PPC)	2% Annual Growth	23.407	25.843	28.532	31.502	34.781
	4% Annual Growth	25.793	31.381	38.180	46.452	56.516
	WSDP Model	24.811	27.542	30.658	34.223	38.310
Yzerfontein	2% Annual Growth	330.925	365.368	403.396	445.382	491.737
	4% Annual Growth	364.666	443.672	539.795	656.743	799.028
	WSDP Model	355.836	414.575	484.331	567.327	666.248
Total for Swartland System	**Low Projection**	**7 588.429**	**8 378.239**	**9 250.253**	**10 213.026**	**11 276.006**
	High Projection	**8 362.145**	**10 173.828**	**12 378.018**	**15 059.751**	**18 322.490**
	WSDP Model	**7 962.425**	**9 435.171**	**11 237.946**	**13 453.819**	**16 188.558**
All towns in Swartland Municipality's Management Area	2% Annual Growth	**8 441.598**	**9 320.206**	**10 290.261**	**11 361.278**	**12 543.770**
	4% Annual Growth	**9 302.303**	**11 317.673**	**13 769.681**	**16 752.922**	**20 382.491**
	WSDP Model	**8 787.489**	**10 373.133**	**12 307.985**	**14 678.619**	**17 594.982**

The table below gives an overview of the years in which the annual water requirements are likely to exceed the licence volumes from the WCWSS.

Table C.6.3: Years in which the Annual Water Requirements are Likely to Exceed the Total Licence Volumes for Swartland Municipality from the WCWSS

Distribution System	Total Licence Volume for Swartland Municipality (Ml/a)	Annual Growth on 2022/2023 Demand (Low Growth)	Annual Growth on 2022/2023 Demand (High Growth)	WSDP Projection Model
Withoogte System	1 573.600	2037	>2047	2047
Swartland System	7 900.000	2028	2025	2026

Note: The severe drought in the Western Cape, over the period 2015 to 2017, impacted on the water availability and the security of supply from the WCWSS, which resulted in severe water restrictions implemented by the Swartland Municipality in order to lower the current water requirements and to ensure that the systems do not "run dry" during the drought period.

A number of resource augmentation studies were previously completed by the DWS for the WCWSS, by the West Coast District Municipality for the West Coast Region and by Swartland Municipality for the towns in their Management Area. A desktop study of these previous augmentation studies was completed during the 2020/2021 financial year. The Conclusions and the Recommendations from the desktop study are in the section that follow.

Resource Augmentation Desktop Study Conclusions: The overall water requirements of the towns in Swartland Municipality in 2015/2016 was 5 483 Ml/a (15.025 Ml/d), which came down to a low of 3 442 Ml/a (9.431 Ml/d) in 2017/2018, due to the drought and the water restrictions and WC/WDM measures implemented by the Municipality. This is a reduction of 37.2% over a two-year period. There was a steady increase in water requirements again over the period 2018/2019 and 2019/2020. The likely "bounce back" after the drought is uncertain, but it is estimated that it would probably take about four to six years after 2017/2018 to reach the same water requirements as the period before the drought (2015/2016).

The future water requirements for the Swartland Voëlvlei and the Swartland Withoogte (Only Moorreesburg and Koringberg) bulk water distribution systems are expected to increase to 5 945 Ml/a and 1 180 Ml/a (High growth) by 2029. These volumes are still less than the new licence volumes of 7 900 Ml/a and 1 573.6 Ml/a that were issued in 2017.

Comprehensive historical metered data of the water requirements for the two bulk water distribution systems and the towns in Swartland Municipality's Management Area are available, which assist with the future requirement projections for the systems.

Various water resource augmentation studies/investigations were done over the last number of years for the West Coast Region, the WCWSS and the towns in Swartland Municipality's Management Area. These studies recommended various augmentation projects for the various systems. Most of the studies were done in the period before the drought in the Western Cape.

WC/WDM: The Withoogte and Swartland Voëlvlei bulk water distribution systems are already well managed with regard to reducing treatment losses and bulk water distribution losses. The scope to make additional water available through the implementation of specific WC/WDM measures is very limited. Swartland Municipality's NRW and Water Losses for their internal distribution systems (towns) for 2019/2020 was 15.93% and 15.73% respectively, which is also very low. A comprehensive WC/WDM Strategy is in place for the Municipality and the estimated volume of water saved on System Input Volume for the next five and ten years, with the implementation of the additional WC/WDM measures, is 342.098 Ml/a for 2024 and 441.191 Ml/a for 2029 respectively. Swartland Municipality is committed to continue with the implementation of their WC/WDM Strategy.

Reliability of Supply from the WCWSS: The towns in Swartland Municipality nearly ran out of water in 2018, due to the limited supply from the WCWSS and the low levels of the Voëlvlei dam. A combined effort by the Municipality, residents, business and government helped avoid a potential catastrophe through dramatic reduction of water use. Exclusive reliance on rainfall fed dams (WCWSS) is no longer wise over the longer term and Swartland Municipality must adopt a precautionary approach to water resource management in dealing with climate uncertainty and the future supply from the system.

WCWSS Augmentation Options: Various studies for the augmentation of the WCWSS were completed by the DWS over the last number of years. The Berg River to Voëlvlei Augmentation Scheme (BRVAS) was identified as the next surface water scheme in 2015 by the National DWS. It will form an integral part of the WCWSS and is being implemented by the TCTA. The URV of the proposed scheme was estimated at R1-31/kl in 2012. Assuming that the construction costs have escalated at 6% per annum in real terms then the 2021 URV would be R3-71/kl, including R1-50/kl for treatment costs. The growth in the West Coast's requirements could also be supplied from the BRVAS, depending on the actual growth in water requirements. The TCTA is currently in discussion with water users to formulate an institutional approach and to make a decision on a funding model. Indications are that water users from the WCWSS, including the CCT, are supportive of the project, currently scheduled for completion by mid-2023.

Supply from the CCT at their Bulk Tariff: One of the augmentation options available to Swartland Municipality is to purchase treated water from the CCT, for supply from Atlantis to Chatsworth and Riverlands. The estimated cost of a pipeline from Atlantis to Chatsworth and Riverlands is R15.320 million and the annual purchase cost of the potable water will be roughly R1.5 million per year, against the current bulk purchase tariff of R8-13/kl of the CCT.

One of the CCT's current resource augmentation projects is the Atlantis Managed Aquifer Recharge Scheme Refurbishment project, with which the City is currently busy, and this scheme will therefore be independent from the WCWSS. The benefits of supplying Chatsworth and Riverlands with potable water from Atlantis are as follows:

- The Atlantis scheme is a groundwater scheme and the risk associated with surface water sources and the impact of less rainfall on the yield of the system (WCWSS) will therefore not be applicable for the supply to Chatsworth and Riverlands.
- More water will be available for Swartland Municipality's other towns, which are still dependent on supply from the WCWSS, if Chatsworth and Riverlands are supplied from the CCT.
- It will not be necessary to supply potable water from Kalbaskraal to Chatsworth and Riverlands anymore.

Surface Water Source Options: There are no other surface water sources located in close proximity to the various towns in Swartland Municipality's Management Area. The current supply from the WCWSS (from the Misverstand weir and the Voëlvlei dam) is the only real surface water sources available to the Municipality and where the required bulk water infrastructure is already in place.

Groundwater Options: The Pre-Feasibility Study of Potential Water Sources for the Area Served by the West Coast District Municipality Phase 1: Assessment of Development Potential of Groundwater Resources identified various target areas that can be investigated further by Swartland Municipality for possible groundwater augmentation schemes. The URVs of developing groundwater within the various proposed exploration target areas varies from R3-07/m³ to R12-73/m³.

Three existing production boreholes are already utilised in Riverlands and there is a possibility that the two newly drilled boreholes can also be commissioned and connected to the system. Koringberg and Riebeek Wes are the only other towns where the yields of the newly drilled boreholes are adequate to provide a high percentage of the town's existing demand. The groundwater will however require additional treatment and blending options will need to be considered.

The Desktop Feasibility Study into water supply to Yzerfontein from the Grootwater Aquifer indicated a URV of R25-39/kl for a groundwater supply scheme for Yzerfontein for water supply. The Study also indicated that a separate investigation has to be carried out into the Colenso Fault Zone close to Darling, based on boreholes with depths of between 100m and 150m, if the Municipality considers supplying Darling with groundwater.

Water reuse Options: Adequate treated effluent needs to be available for any water reuse scheme to be sustainable. The effluent quality from the respective WWTWs and the design of the necessary barriers to ensure the health and safety of the public are some of the most important considerations.

53.3% Of the total treated effluent discharged from the WWTW in 2019/2020 was already reused by end-users for irrigation and agricultural purposes. Therefore, there is limited scope for additional reuse options to be implemented at the Darling-, Moorreesburg-, Riebeek Valley- and Malmesbury WWTW. Swartland Municipality will continue to reuse treated effluent from the four main WWTWs for irrigation purposes and options of "indirect use" and "direct use" are only seen as long-term possible interventions.

Desalination Options: The West Coast District Municipality previously proposed to construct and operate a sea water desalination plant in the Saldanha Bay area using sea water reverse osmosis (SWRO) technology. The proposed desalination plant and bulk infrastructure will cost an estimated R500 million, R300 million more than the original cost estimate. This project is however currently on hold, due to inadequate funding.

Yzerfontein is the only town in Swartland Municipality's Management Area where desalination is an option for future water supply. The town's 2019/2020 PDD was 1.552 Ml/d and it is expected to increase to a PDD of 1.887 Ml/d by 2029. The estimated capital cost for a desalination plant at Yzerfontein, with the marine infrastructure included, is roughly R35 million/Ml. It will also be very difficult to obtain environmental authorisation for the construction of a desalination plant at Yzerfontein due to the sensitivity of the coastal area.

Resource Augmentation Desktop Study Recommendations: The following recommendations with regard to water resource augmentation options available to Swartland Municipality were made based on the findings and conclusions contained in this desktop study:

- Swartland Municipality should continue to implement their WC/WDM Strategy for both the bulk water distribution systems and the internal water reticulation systems of the towns. Treatment Losses, NRW and Water Losses need to be monitored on a monthly basis.

- Investigate the cost of small groundwater schemes for Koringberg and Riebeek Wes. These are the only two towns where the yields of the newly drilled boreholes are adequate to provide a high percentage of the town's existing demand. The groundwater will require additional treatment and blending options will need to be considered.

- Compile a Feasibility Study for a bulk groundwater augmentation scheme for the Swartland Voëlvlei bulk water distribution system from the target areas included in the "Pre-Feasibility Study of Potential Water Sources for the Area Served by the West Coast District Municipality Phase 1: Assessment of Development Potential of Groundwater Resources" Report.

- The URV of R25-39/kl for a groundwater supply scheme for Yzerfontein from the Grootwater Aquifer is high and should be seen as a possible medium- to long-term possible intervention.

- An investigation has to be carried out into the Colenso Fault Zone close to Darling if the Municipality considers supplying Darling with groundwater. A possible groundwater scheme for Darling should be seen as a possible medium- to long-term possible intervention.

- Continue to reuse treated effluent from the four main WWTWs for irrigation purposes in order to reduce the demand for potable water used for irrigation purposes (Parks, Sport Fields, etc.). The options of "indirect potable reuse" and "direct potable reuse" of treated effluent should be seen as long-term possible interventions.

- Swartland Municipality should engage with the CCT with regard to the following:
  - The CCT's programme for implementing the additional infrastructure to provide the proposed 1 in 200 year level of assurance of supply (Atlantis Managed Aquifer Recharge Scheme Refurbishment Project).
  - The possibility of supplying the towns of Chatsworth and Riverlands with potable water from Atlantis.
  - The other options available to Swartland Municipality to purchase bulk potable water from the CCT, which include the following.
    (1) Purchase potable water from the CCT through their Voëlvlei bulk water pipeline, which supply the Plattekloof reservoir.
    (2) The possibility for the CCT to take over the Swartland WTW and to provide potable water to Gouda and the Swartland Municipality from the WTW.
    (3) Any possible other arrangements with the CCT.

- Swartland Municipality should engage with DWS and the TCTA to discuss the options available for an increased future allocation from the WCWSS for Swartland Municipality, through the implementation of the Berg River Voëlvlei Augmentation Scheme (BRVAS) project or the other future augmentation projects.

- Engage with Saldanha Bay Municipality and the West Coast District Municipality if the proposed Saldanha Bay desalination plant project is started. A possible desalination plant for Yzerfontein should only be seen as a long-term possible intervention.

The DWS is currently busy with the updating of the All Towns Reconciliation Strategies for the Western Cape, but updated strategies for Swartland Municipality are not yet available. The table below gives an overview of the recommended potential future water resources, as included in the 2016 All Towns Reconciliation Strategies, for the towns in Swartland Municipality.

Table C.6.4: Potential Future Water Resources for the Various Towns (Recommended Summary Options of DWS's All Towns Reconciliation Strategies, March 2016)

Distribution System	Recommended Summary Options
Koringberg	**The current water sources do not have adequate supply to cater for the projected future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the full implementation of the existing WC/WDM Strategy. • Increase the allocation from the Berg River for the Withoogte Regional Water Supply Scheme • Groundwater development.
Riebeek Wes and Ongegund	**The current water sources do not have adequate supply to cater for the current and longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy in order to reduce water losses and NRW and achieve savings in water consumption. • Increase the allocation from the Voëlvlei Dam for the Swartland Regional Water Supply Scheme. • Groundwater development.
Riebeek Kasteel	**The current water sources do not have adequate yields available to cater for the current and longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy. • Increased allocation for the Swartland Regional Water Supply Scheme from the Voëlvlei Dam (WCWSS). • Groundwater development • Re-use of water • Rainwater harvesting.
Yzerfontein	**The current water sources do not have adequate supply to cater for the current and longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy. • Increased allocation for the Swartland Regional Water Supply Scheme from the Voëlvlei Dam (WCWSS). • Desalination of seawater for Saldanha and environs to make more water available for Yzerfontein from the Voëlvlei Dam.
Darling	**The current water sources do not have adequate supply to cater for the projected future water requirements of Darling. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy. • Increased allocation for the Swartland Regional Water Supply Scheme from the Voëlvlei Dam (WC WSS). • Consider re-use of water. • Groundwater development.
Moorreesburg	**The current water sources do not have adequate supply to cater for the longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy. • An increased allocation from the Berg River for the Withoogte Regional Water Supply Scheme. • Groundwater development. • Re-use of water. • Rainwater harvesting
Malmesbury and Abbotsdale	**The current water sources do not have adequate supply to cater for the current and longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the full implementation of the existing WC/WDM Strategy in order to keep the water losses and NRW as low as possible and achieve savings in water consumption. • Increased allocation for the Swartland Regional Water Supply Scheme from the Voëlvlei Dam (WCWSS). • Water re-use. • Groundwater development for smaller communities.

Water Quality: The minimum monitoring requirements of the SANS 241-2:2015 (Table 1: Minimum monitoring for prescribed process risk indicators) for the various WTWs and distribution systems, are summarised below.

Table C.6.5: 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 [a]	Fortnightly
Turbidity	Daily	Once per shift [a]	Fortnightly
Disinfectant residuals	Not applicable	Once per shift [a]	Fortnightly
E.Coli (or faecal coliforms) [b]	Not applicable	Weekly	Fortnightly but dependent on population served [d]

Table C.6.5: Minimum Monitoring Frequency for Process Risk Indicators (SANS241-2:2015: Table 1)			
Determinand	**Raw Water**	**Final Water**	**Distribution System**
Heterotrophic plate count [c]	Not applicable	Weekly	Fortnightly
Treatment chemicals [d]	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.			

The water quality results from operational monitoring are used as a trigger for immediate short – term corrective action to operational procedures, to improve drinking water quality. The current samples taken by the West Coast District Municipality and Swartland Municipality, over and above the existing Operational Sampling programme at the bulk WTWs, and the proposed additional samples to be taken are summarised in the table below.

Table C.6.6: Current Parameters Sampled by the Swartland Municipality: Routine monitoring of Process Indicators			
System	**Sampling Point**	**Current Parameters Sampled by Swartland Municipality (Number of samples and frequency)**	**Additional Proposed Parameters to be sampled by Swartland Municipality (Number of samples and frequency)**
Abbotsdale, Kalbaskraal, Riverlands, Chatsworth	Intake Paardenberg	-	pH, Conductivity and Turbidity Daily
	Final Water Paardenberg	-	pH Daily
		-	Conductivity Morning and Afternoon
		-	Turbidity Morning and Afternoon
		-	E.Coli and Heterotrophic Plate Count Weekly
	Distribution Systems	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (4 Sample points fortnightly).	*Adequately covered by the sampling done by the Swartland LM.*
Moorreesburg	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (2 Sample points fortnightly	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality at the Withoogte WTW.*
Koringberg	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (1 Sample point fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality*
Malmesbury	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (5 Sample points fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality and the sampling done at the Swartland WTW (West Coast District Municipality)*
Riebeek Wes	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (1 Sample point fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality at the Swartland WTW.*
Riebeek Kasteel	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (1 Sample point fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality at the Swartland WTW.*
Yzerfontein	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (1 Sample point fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality*
Darling	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (2 Sample points fortnightly	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality*

Effluent Quality: Comprehensive Operational and Compliance Sampling programmes of the wastewater at the WWTWs are implemented by Swartland Municipality. The Compliance Monitoring Programme includes the monthly sampling of the final effluent at the various WWTWs and analyses of all the main quality criteria. Results of the samples taken are loaded onto DWS's IRIS. Monthly monitoring and inspection reports are also compiled by the external Service Provider for all the WWTWs. 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.

Operational Alert Levels are also in place 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, then the Process Controllers take certain actions to bring the operational parameters back to within the target ranges.

Industrial Consumers: Swartland 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.

Swartland 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.

Swartland 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 by-laws ("Limits of concentrations of substances that may be discharged into the Swartland Municipality's sewer system").

TOPIC 7: FINANCIAL

Expenditure:

Operational: The future planned operational expenditure by type for Swartland Municipality, as included in the 2023/2024 MTREF Budget, is indicated in the table below.

Table C.7.1: Operational Expenditure Items by Type, as included in the 2023/2024 Budget

Expenditure Items	% of total 2022/2023 Expenditure	2022/2023 Adjusted Budget	2023/2024 Budget	2024/2025 Budget	2025/2026 Budget
Employee related costs	29.1%	R298 367 000	R316 394 000	R332 235 000	R351 024 000
Remuneration of Councillors	1.1%	R11 560 000	R12 081 000	R12 565 000	R13 067 000
Bulk purchase – Electricity	30.5%	R312 398 000	R356 097 000	R408 444 000	R476 654 000
Inventory Consumed	5.1%	R52 621 000	R61 034 000	R67 025 000	R74 197 000
Debt Impairment	3.1%	R31 448 000	R4 424 000	R5 138 000	R5 405 000
Depreciation and Asset Impairment	10.5%	R106 565 000	R112 614 000	R126 454 000	R131 662 000
Interest	1.5%	R15 565 000	R14 486 000	R18 879 000	R18 143 000
Contracted Services	10.7%	R109 982 000	R70 092 000	R68 966 000	R163 056 000
Transfers and Subsidies	0.4%	R4 607 000	R5 060 000	R5 018 000	R5 229 000
Irrecoverable debts written off	-	-	R32 910 000	R35 961 000	R39 121 000
Operational costs	5.1%	R52 718 000	R57 831 000	R60 361 000	R62 552 000
Losses on disposal of Assets	2.9%	R29 745 000	R16 413 000	R19 695 000	R16 741 000

Table C.7.1: Operational Expenditure Items by Type, as included in the 2023/2024 Budget					
Expenditure Items	**% of total 2022/2023 Expenditure**	**2022/2023 Adjusted Budget**	**2023/2024 Budget**	**2024/2025 Budget**	**2025/2026 Budget**
Other Losses	-	-	R11 894 000	R13 392 000	R15 080 000
Total	**100.0%**	**R1 025 576 000**	**R1 071 330 000**	**R1 174 133 000**	**R1 371 931 000**

Source: Medium Term Revenue and Expenditure Framework for Swartland 2023/2024: Table A4 – Budgeted Financial Performance (Revenue and Expenditure)

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.

An Integrated Maintenance Plan is necessary that 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 Swartland 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 substantially over the next twenty years in real terms, in line with the envisaged pace of development and the upgrading of the wastewater treatment works that were completed over the last number of years. It is estimated that the budget requirements will double over this period.

The recommendations for Swartland Municipality, with regard to their 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. Current gaps include unrealistically low depreciation charges, which have to be rectified and ring-fenced into an asset replacement fund, as well as additional budget requirements above inflation for infrastructure development.

- The new depreciation charges will have to form part of the operating budget and subsequent tariffs, linked to a ring-fenced asset replacement fund.

- It is critical for Swartland Municipality to ensure that sufficient funding is allocated towards an asset replacement fund, in order to ensure adequate rehabilitation and maintenance of the existing water and sewerage infrastructure.

- Water services operational surpluses have to be allocated to essential water services requirements in the future.

- Swartland Municipality needs to continue with the strict enforcement of their Credit Control and Debt Collection Policy and By-law.

Capital: The future estimated capital expenditure per functional classification are summarised in the table below.

Table C.7.2: Estimated Capital Expenditure per Functional Classification of Swartland Municipality's Future Capital Budget				
Capital Expenditure Standard	**2022/2023 Adjusted Budget**	**2023/2024 Budget**	**2024/2025 Budget**	**2025/2026 Budget**
Executive and Council	R651 000	R704 000	R24 000	R24 000
Finance Administration	R4 441 000	R7 740 000	R1 836 000	R3 152 000
Community and social Services	R408 000	R1 250 000	R100 000	R400 000
Sports and Recreation	R2 817 000	R27 390 000	R6 848 000	R2 035 000
Public Safety	R4 047 000	R3 899 000	R944 000	R1 086 000
Planning and Development	R4 114 000	R14 612 000	R49 844 000	R906 000
Road Transport	R56 533 000	R67 231 000	R22 223 000	R37 075 000

Table C.7.2: Estimated Capital Expenditure per Functional Classification of Swartland Municipality's Future Capital Budget				
Capital Expenditure Standard	**2022/2023 Adjusted Budget**	**2023/2024 Budget**	**2024/2025 Budget**	**2025/2026 Budget**
Energy Sources	R44 253 000	R53 741 000	R71 180 000	R63 157 000
Water Management	R38 109 000	R14 564 000	R10 383 000	R32 584 000
Waste Water Management	R19 204 000	R13 915 000	R25 759 000	R35 276 000
Waste Management	R4 262 000	R4 007 000	R29 826 000	R32 607 000
Total Capital Expenditure	**R178 839 000**	**R209 053 000**	**R218 967 000**	**R208 302 000**

Source: Medium Term Revenue and Expenditure Framework for Swartland 2023/2024: Table A5 - Capital Expenditure by Vote, Functional Classification and Funding Source

The Opening Cost of the water and sewerage infrastructure that will need to be replaced over the next five years (RUL < 5 yrs) is R38.364 million. The asset renewal needs for the water infrastructure assets over the next ten years is R3.378 million per year. The reinvestment required is R28.394 million in the first five years and R5.391 million in the second five-year period. The age of 60.22% of the water infrastructure assets is greater than twenty years. The asset renewal needs for the sewerage infrastructure assets over the next ten years is R2.351 million per year. The reinvestment required is R9.970 million in the first five years and R13.544 million in the second five-year period. The age of 49.71% of the sewerage infrastructure assets is greater than twenty years. These values are based on the Opening Cost of the water and sewerage infrastructure currently included in the Asset Register.

The extent to which each type of water and sewerage asset portfolio has been consumed are indicated in Tables A.3.7 and A.3.15. The infrastructure components with low percentage figures (% BV/OC) need dedicated renewals programmes targeting these assets. If this is not done, there is the risk that the on-going deterioration will escalate to uncontrolled proportions, with considerable impact on consumers, the economy of the area and the service levels that can be provided in Swartland Municipality.

The recommendations for Swartland Municipality, with regard to their Capital Funding, 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 three to five years and to use the Master Plans to list the desired infrastructure development requirements and reflect these in the IDP.

- Assign a high priority to the implementation of the WC/WDM Strategy 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.

- 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.

- Balance land-use and development planning (SDFs) in accordance with the availability of water and the capacity of WTWs and WWTWs that are in place or that will be implemented.

- To focus strongly on revenue collection, in order to improve the Municipality's own funding sources, over and above the Grants received from National and Provincial Government. The Municipality also needs to continue to actively implement their Credit Control and Debt Collection Policy in order to minimize the percentage of non-payment for municipal services.

- To identify all possible sources of external funding over the next three years to assist Swartland Municipality to address the bulk infrastructure backlogs that exist in the various towns as indicated in the tables under Topic 3.

- Develop IAMPs 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. The renewals burden is set to increase sharply over the next 20 years and it is therefore important for Swartland Municipality to commit to a substantial and sustained programme of capital renewal works. The current level of expenditure on capital renewal is inadequate and there is a critical need for Council to commit to increase the budget for the maintenance and rehabilitation of the existing infrastructure substantially.

Income:

Operational: The future planned revenue by source for Swartland Municipality, as included in the 2023/2024 MTREF Budget, is as follows.

Table C.7.3: Revenue Items by Source, as Included in the 2023/2024 Budget

Revenue Item	2022/2023 Adjusted Budget	2023/2024 Budget	2024/2025 Budget	2025/2026 Budget
Service Charges - Electricity	R385 969 000	R421 006 000	R483 837 000	R556 046 000
Service Charges - Water	R80 786 000	R91 857 000	R98 465 000	R105 542 000
Service Charges – Waste Water Management	R51 797 000	R51 053 000	R53 679 000	R56 475 000
Service Charges – Waste Management	R32 591 000	R32 997 000	R37 089 000	R41 710 000
Sale of Goods and Rendering of Services	-	R13 113 000	R13 899 000	R14 732 000
Agency Services	R6 040 000	R6 403 000	R6 787 000	R7 194 000
Interest earned from Receivables	R3 161 000	R2 640 000	R2 798 000	R2 966 000
Interest earned from Current and Non-Current Assets	R55 754 000	R55 954 000	R52 954 000	R49 954 000
Rental from Fixed Assets	R1 807 000	R1 967 000	R2 085 000	R2 210 000
Operational Revenue	R16 412 000	R3 933 000	R4 149 000	R4 374 000
Property Rates	R148 224 000	R167 830 000	R183 323 000	R193 833 000
Fines, penalties and forfeits	R30 263 000	R32 076 000	R33 993 000	R36 025 000
Licences or Permits	R4 902 000	R5 158 000	R5 464 000	R5 787 000
Transfers and subsidies - Operational	R189 755 000	R168 036 000	R184 740 000	R286 976 000
Interest	-	R1 060 000	R1 124 000	R1 191 000
Operational Revenue	-	R15 402 000	R16 989 000	R18 681 000
Gains on disposal of Assets	R11 666 000	R14 613 000	R14 081 000	R14 340 000
Total	**R1 019 127 000**	**R1 085 098 000**	**R1 195 456 000**	**R1 398 036 000**

Source: Medium Term Revenue and Expenditure Framework for Swartland 2023/2024: Table A4 – Budgeted Financial Performance (Revenue and Expenditure)

Capital: The average capital expenditure over the last ten financial years were R10.293 million per year for water infrastructure and R25.226 million per year for sewerage infrastructure. Capital funding will have to increase substantially if existing service levels are to be sustained, which has to be the goal. In this regard Swartland Municipality's own funding, as well as grant funding must significantly exceed inflation. Other possible sources of funding and innovative funding mechanisms have to be explored.

It is important for Swartland Municipality to manage their charges for water and sanitation services and the control of consumer payments effectively, in order to ensure that adequate income is generated to fund their water and sewerage capital projects.

The future funding sources of Swartland Municipality's total capital budget are summarised in the table below.

Table C.7.4: Sources of Funding for the Future Capital Budgets of Swartland Municipality

Capital Funding Source	2022/2023 Adjusted Budget	2023/2024 Budget	2024/2025 Budget	2025/2026 Budget
National Government	R51 410 000	R48 366 000	R50 664 000	R61 660 000
Provincial Government	R16 277 000	R57 796 000	R64 930 000	R30 000 000
District Municipality	-	-	-	-
Transfers and Subsidies	R11 203 000	R1 225 000	-	-
Borrowing	-	-	R33 000 000	R17 000 000
Internally generated funds	R99 949 000	R101 665 000	R70 375 000	R99 643 000
Total Capital Funding	**R178 839 000**	**R209 052 000**	**R218 969 000**	**R208 303 000**

Source: Medium Term Revenue and Expenditure Framework for Swartland 2023/2024: Table A5 - Capital Expenditure by Vote, Standard Classification and Funding

Tariff and Charges: The state of the economy has an adverse effect on the consumers. As a result municipalities' revenues and cash flows are expected to remain under pressure. Furthermore municipalities should carefully consider affordability of tariff increases, especially as it relates to domestic consumers while considering the level of services versus the associated cost. Water tariffs should always be cost reflective and the water tariff structure must therefore ensure that:

- Water tariffs are fully cost-reflective, including the cost of maintenance and renewal of purification plants, water networks and the cost associated with reticulation expansion;
- Water tariffs are structured to protect basic levels of service and ensure the provision of free water to the poorest of the poor (indigent); and
- Water tariffs are designed to encourage efficient and sustainable consumption.

Swartland Municipality's current seven block step water tariff structure adequately promotes the efficient use of water by consumers and discourages the wastage of water. Higher tariffs are charged for the higher consumption blocks. The first 6 kl of water is provided free to residential consumers who qualify for indigent relief. It is expected that this tariff structure will continue to be implemented in the future.

The sustainable supply of potable water is becoming an ever increasing challenge. This scarce commodity has to be optimally managed. The increase in the price of electricity and chemicals for purification has contributed to the cost of delivering the service.

The table below gives some comments on the specific blocks, with regard to Swartland Municipality's residential block stepped tariff structure, for the various years for water services.

Table C.7.5: Comments on the Municipality's Residential Block Step Water Tariff Structure

Block (kl/month)	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Comments
0 - 6	R5-03	R5-03	R5-21	R5-44	R6-02	Free Basic Water
7 – 10	R8-64	R8-64	R8-94	R9-34	R9-99	Low volume use
11 – 15	R15-77	R16-54	R17-12	R17-89	R18-95	
16 – 20	R19-99	R20-97	R21-70	R22-98	R24-34	Typical use volume, including garden irrigation
21 – 25	R29-64	R31-09	R32-18	R34-08	R36-09	
26 – 30	R61-75	R64-78	R47-94	R50-77	R53-77	
31 - 35						Above average use, including garden irrigation
36 - 45	R85-22	R89-40	R89-40	R94-67	R100-26	
46 – 70						Wasteful use and/or severe garden irrigation
>70						Significant waste and/or unnecessary garden irrigation

Wasteful or inefficient use of water is discouraged through increased tariffs. It is suggested that the following tariff structure characteristics should remain in Swartland 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. Six blocks in a tariff often make good sense, as indicated in Table C.7.5.

- The volumetric steps should be kept the same for all the areas within Swartland 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 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."

The recommendations for the water and sewerage tariffs of Swartland Municipality are as follows:

- Swartland Municipality can investigate the financial viability of changing the sanitation tariff structure from a fixed monthly amount 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, similar for free water, for indigent registered households. This will also further deter wasteful water use.

- Swartland Municipality will continue to re-evaluate the tariffs they charge for their water and sanitation services on an annual basis in order to continue to ensure the good financial position of the Municipality and to ensure that all the O&M expenditure for water and sanitation services are always recovered through their water and sanitation services income, 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 large commercial and industrial consumers could lower their current water demand by means of improved practices or re-use of wastewater. Swartland Municipality should note that revenue could potentially decrease as a result of reuse practices.

- Swartland Municipality will continue to monitor the volume and nutrient loading of all industrial effluent discharged by industrial consumers into the sewer system. A formula for the calculation of the extraordinary treatment cost to industrial consumers for the industrial effluent they discharged into

Swartland Municipality's sewer system is in place and form part of the existing tariff structure. The performance of the WWTWs in general can be severely compromised by certain industrial effluent discharges. It is therefore also important for Swartland Municipality to recalculate their treatment costs annually, in order to ensure that there is no under or over recovery of costs from industrial consumers. The charges for wastewater discharged by industrial consumers can also be linked to their water usage in the future.

Swartland Municipality needs to continue to regularly sample the quality of industrial effluent discharged into the sewer system and all industrial consumers need to be charged according to the quality of the effluent discharged into the Municipality's sewer system.

- The current water tariff codes adequately differentiate between the different type of consumers and their water usage. The Municipality can investigate the possibility to uniquely describe the "Departmental" water usage with a distinction between the different user types, for example parks, office usage, fire-fighting, etc.

TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

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 WSDP of Swartland Municipality needs to be updated regularly.

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 Swartland Municipality's Annual Report, as required in terms of Section 18 of the Water Services Act, 1997 (Act No.108 of 1997), as well as the "Regulations relating to compulsory national standards and measures to conserve water", as issued in terms of Sections 9(1) and 73(1)(j) of the Water Services Act.

The Water Safety Plans for the various WTWs and water distribution systems and the W_2RAPs for the WWTWs and drainage networks need to be updated regularly. The WTW and WWTW Process Audits also needs to be updated regularly.

The 2020 Water and Sewer Master Plans and the 2021 Bulk Water Master Plan of Swartland Municipality summarise the projects (Master Plan Items) necessary in order to cope with the increased future demands and developments within the Swartland Municipality's systems. The Water and Sewer Master Plans need to be updated regularly.

A Work Place Skills Plan for Swartland Municipality is in place, which lists the training to be provided during the new financial year. The training of Swartland Municipality's personnel involved in the management of water and sanitation services are the most important factors that determine the ability of Swartland 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.

It is important for Swartland Municipality to classify all 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 new Regulation 3630 requirements. **The current Supervisors and Process Controllers at the two bulk WTWs comply with the required number and Class of Supervisors and Process Controllers according to the classification of the plants. It is further recommended that Swartland Municipality arrange for chlorine audits to be done at all their disinfection facilities, in order to identify any potential shortcomings. Additional Process Controllers need to be appointed from some of the WWTWs, as indicated under Section 8.1.3 of Topic 8 of the Administration, Information and Comprehensive Overview Report.**

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 Swartland Municipality to compile a Legal Compliance Audit of their WTWs and WWTWs, which will provide the management of Swartland Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.

Swartland Municipality has 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.

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

Swartland Municipality is committed to maintain the existing high level 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 Management System allows 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 required time period.

SECTION D: WATER SERVICES OBJECTIVES AND STRATEGIES

The water services strategies presented below were derived from the 2023/2024 SDBIP and the water services situational analysis as summarized in Section C: Water Services Existing Needs Perspective and presents the 5-year Water Services strategies as established in the WSA's WSDP.

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Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2022/2023 status quo)	WSDP FY2023/24 TARGET	WSDP FY2024/25 TARGET	WSDP FY2025/26 TARGET	WSDP FY2026/27 TARGET	WSDP FY2027/28 TARGET
Topic 1: Settlement Demographics & Public Amenities							
	Implemented by other Department	-	-	-	-	-	-
Topic 2: Service Levels							
Access to water, sanitation and refuse removal	Number of formal residential properties with piped water connections.	22 602	Targets still to be set	Targets still to be set	Targets still to be set	Targets still to be set	Targets still to be set
Access to water, sanitation and refuse removal	Number of formal residential properties with access to sewerage services.	20 409	Targets still to be set	Targets still to be set	Targets still to be set	Targets still to be set	Targets still to be set
Ensure all households on the farms are provided with at least basic water services, subject to DWS guidance.	*Support all applications received for basic water services on the farms (Subject to availability of financial resources and sustainability of type of service).*	-	-	-	*100% of applications received are supported (Subject to availability of funding and sustainability of type of service)*	*100% of applications received are supported (Subject to availability of funding and sustainability of type of service)*	*100% of applications received are supported (Subject to availability of funding and sustainability of type of service)*
Ensure all households on the farms are provided with at least basic sanitation services, subject to DWS guidance.	*Support all applications received for basic sanitation services on the farms (Subject to availability of financial resources and sustainability of type of service).*	-	-	-	*100% of applications received are supported (Subject to availability of funding and sustainability of type of service)*	*100% of applications received are supported (Subject to availability of funding and sustainability of type of service)*	*100% of applications received are supported (Subject to availability of funding and sustainability of type of service)*
Provision of communal taps to households in informal areas based on the standard of 1 water point to 25 households.	*Number of communal taps installed in relation to the number of informal households.*	-	-	-	*Provide at least 1 water point to every 25 households in informal areas*	*Provide at least 1 water point to every 25 households in informal areas*	*Provide at least 1 water point to every 25 households in informal areas*
Provision of communal toilet facilities to households in informal areas based on the standard of 1 toilet to 5 households.	*Number of toilet structures provided in relation to the number of informal households.*	-	-	-	*Provide at least 1 toilet to every 5 households in informal areas.*	*Provide at least 1 toilet to every 5 households in informal areas.*	*Provide at least 1 toilet to every 5 households in informal areas.*
Topic 3: Water Services Asset Management							
Asset safeguarding	A condition assessment and a review of the remaining useful life of all assets in the department done and a certification in this regard provided to the Head Asset Management.	100%	100%	100%	100%	100%	100%
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*
Implement projects included in the Water Master Plan	*Ensure adequate water pump station and water reticulation capacity.*	-	-	-	*Upgrade existing water pump stations and provide new pump stations as identified in the Water*	*Upgrade existing water pump stations and provide new pump stations as identified in the Water*	*Upgrade existing water pump stations and provide new pump stations as identified in the Water*

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2022/2023 status quo)	WSDP FY2023/24 TARGET	WSDP FY2024/25 TARGET	WSDP FY2025/26 TARGET	WSDP FY2026/27 TARGET	WSDP FY2027/28 TARGET
					Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	*Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.*	*Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.*
Implement projects included in the Sewer Master Plan	*Ensure adequate sewer pump station and sewer 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.*
Topic 4: Water Services Operation and Maintenance							
Implement recommendations from detail WTW Technical Process Audits.	*% Of recommendations, as included in the WTW Process Audits, implemented.*	-	-	-	*60% of recommendations implemented*	*75% of recommendations implemented*	*90% of recommendations implemented*
Implement recommendations from detail WWTW Technical Process Audits.	*% Of recommendations, as included in the WWTW Process Audits, implemented.*	-	-	-	*60% of recommendations implemented*	*75% of recommendations implemented*	*90% of recommendations implemented*
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.*	-	-	-	*60% of recommendations implemented*	*75% of recommendations implemented*	*90% of recommendations implemented*
Implement recommendations as included in the Improvement / Upgrade Plan of the W_2RAPs.	*% Of recommendations, as included in the Improvement / Upgrade Plan of the W_2RAPs, implemented.*	-	-	-	*60% of recommendations implemented*	*75% of recommendations implemented*	*90% of recommendations implemented*
Quality of potable water comply with SANS241	*% Compliance with SANS241*	-	-	-	*90%*	*93%*	*95%*
Quality of final effluent comply with authorisation limits for final effluent.	*% Compliance with WWTW final effluent authorisations*	-	-	-	*70%*	*80%*	*90%*
Water Quality sampling programme complies with requirements.	*Water Quality Sampling Programme complies with the minimum SANS241:2015 monitoring frequency for process indicators.*	-	-	-	*90%*	*95%*	*100%*
Ensure adequate budget for the O&M of the existing water and sewerage infrastructure	*Ensure a budget of at least 1.5% of the total value of the water and sewerage assets is allocated towards the annual O&M of the systems.*	-	-	-	*A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.*	*A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.*	*A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.*

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2022/2023 status quo)	WSDP FY2023/24 TARGET	WSDP FY2024/25 TARGET	WSDP FY2025/26 TARGET	WSDP FY2026/27 TARGET	WSDP FY2027/28 TARGET
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.*
Reporting on water quality and wastewater quality compliance percentages	*Report at least annually on the percentage of water quality and wastewater quality compliance.*	-	-	-	*At least annual publication of water quality and wastewater quality compliance percentages.*	*At least annual publication of water quality and wastewater quality compliance percentages.*	*At least annual publication of water quality and wastewater quality compliance percentages.*
Topic 5: Conservation and Demand Management (Topic 5.1: Water Resources)							
Improved water sustainability	% total water losses	< 17%	< 17%	< 17%	< 17%	< 17%	< 17%
Topic 5: Conservation and Demand Management (Topic 5.2: Water Balance)							
Detail IWA Water Balances for all the systems and monthly WTW flows for all the treatment plants.	*Ensure all bulk water is metered at source, at WTW (incoming and outgoing) and at all bulk storage reservoirs and the meters are read and recorded on at least a monthly basis.*	-	-	-	*90% Compliance*	*95% Compliance*	*100% Compliance*
Monthly WWTW flows for all the treatment plants.	*Ensure all incoming flow and outgoing flow at WWTWs are metered, as well as final effluent re-used for irrigation purposes and that meters are read and recorded on at least a monthly basis.*	-	-	-	*90% Compliance*	*95% Compliance*	*100% Compliance*
Topic 6: Water Resources							
Implementation of Groundwater Management Programme	*Ensure groundwater management programme for boreholes are implemented and raw water quality is monitored at least annually.*	-	-	-	*Implement Groundwater Management Programme and monitor raw water quality at least annually.*	*Implement Groundwater Management Programme and monitor raw water quality at least annually.*	*Implement Groundwater Management Programme and monitor raw water quality at least annually.*
All water sources are authorised.	*% of Abstraction from sources registered and authorised by the DWS.*	-	-	-	*95% Compliance*	*100% Compliance*	*100% Compliance*
Ensure adequate yield and allocations from water resources to meet the projected future water requirements.	*Ensure yields and allocations are adequate to meet the projected five year water requirements for all systems.*	-	-	-	*100% Adequate supply to meet water requirements for all systems*	*100% Adequate supply to meet water requirements for all systems*	*100% Adequate supply to meet water requirements for all systems*
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.*	-	-	-	*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*
Topic 7: Financial							

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2022/2023 status quo)	WSDP FY2023/24 TARGET	WSDP FY2024/25 TARGET	WSDP FY2025/26 TARGET	WSDP FY2026/27 TARGET	WSDP FY2027/28 TARGET
Capital expenditure in line with budget and time frames	% of capital budget spent	95% - 105%	95% - 105%	95% - 105%	95% - 105%	95% - 105%	95% - 105%
Capital project implementation	Average % completion of capital projects	95%	95%	95%	95%	95%	95%
Operating expenditure in line with budget and time frames	% of operating budget spent	90% - 100%	90% - 100%	90% - 100%	90% - 100%	90% - 100%	90% - 100%
Spending of grants	% spending of grants	100%	100%	100%	100%	100%	100%
Topic 8: Institutional Arrangements and Customer Care							
Workforce training roll-out	% of planned training sessions according to the Workplace Skills Plan realised.	100%	100%	100%	100%	100%	100%
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*	-	-	-	*Both WTWs meeting the requirements, w.r.t. the number of Process Controllers per shift.*	*Both WTWs meeting the requirements, w.r.t. the number of Process Controllers per shift.*	*Both WTWs meeting the requirements, w.r.t. the number of Process Controllers per shift.*
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*	-	-	-	*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.*

SECTION E: WATER SERVICES MTEF PROJECTS

The draft 2024/2025 Water Services Medium-Term Expenditure Framework (MTEF) projects are presented below and outline the water services projects which might be funded for implementation within the next three financial years. Table E.2a provides the projects identified for implementation in FY2024/25, Table E.2b provides the projects identified for implementation in FY2025/26 and Table E2c provides the projects identified for implementation in FY2026/27.

It should be highlighted that the projects included herein, represents only projects for which funding might be secured, and therefore does not comprise the comprehensive water services project requirements of Swartland Municipality.

The summary of the MTEF water services projects are indicated in the table below.

Table E.1: Summary of MTEF Projects

Project Main Category	FY2024/25		FY2025/26		FY2026/27		MTEF Total	
	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)
Water Projects	14	R15 242	10	R13 870	15	R47 658	**22**	**R76 770**
Sanitation Projects	8	R13 429	5	R2 458	6	R4 982	**13**	**R20 869**
Combined Water & Sanitation Projects	**22**	**R28 671**	**15**	**R16 328**	**21**	**R52 640**	**35**	**R97 639**

Table E.2a: Water Services MTEF Projects - FY2024/25 (1st year MTEF period)

Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2023/24	FY2024/25 Budget	Own	MIG	RBIG	WSIG	WCED	MWIG	Other	Total Cost	
1. Infrastructure Projects								**R0**	**R20 462**								**R20 462**	
4		Malmesbury WWTW: Replace clarifier mechanical equipment	Mechanical equipment of clarifier needs to be replaced.	Effluent quality requirements and treatment capacity.	Sanitation	Bulk	WWTW		**R1 500**	R1 500							**R1 500**	WWTW Process Audits
5		Upgrade Bulk Collectors: Darling (SDS3.1)	Upgrade sewer pipelines	Bulk sewer pipeline capacity inadequate	Sanitation	Bulk	Waterborne Sanitation		**R3 716**	R2 200	R1 516						**R3 716**	Sewer Master Plan
7 & 8		Upgrade Bulk Collectors: Moorreesburg	Upgrade sewer pipelines	Bulk sewer pipeline capacity inadequate	Sanitation	Bulk	Waterborne Sanitation		**R2 111**	R1 600	R511						**R2 111**	Sewer Master Plan
9		Sewer Reticulation and Connection: Illinge Lethu	Install waterborne sewer drainage network	Waterborne sanitation	Sanitation	Internal	Waterborne Sanitation		**R517**					R517			**R517**	Sewer Master Plan
57		Water Networks: Upgrades and Replacements	Upgrade / replace certain sections of the water reticulation network.	Reducting NRW and Water Losses	Water	Internal	Reticulation		**R2 000**	R2 000							**R2 000**	Water Master Plan
58 & 59		Darling SDW2.4 & SDW1.2 & SDW2.1 water network upgrades for housing project	Install water reticulation networks	Higher level of water services	Water	Internal	Reticulation		**R2 855**	R264	R2 591						**R2 855**	Water Master Plan
60 & 61		Moorreesburg SMoW2.3 water network upgrade for housing project	Install water reticulation networks	Higher level of water services	Water	Internal	Reticulation		**R604**	R124	R480						**R604**	Water Master Plan
64		Malmesbury SMW1.3 Wesbank reservoir to Malmesbury / Abbotsdale pipeline	Upgrade bulk water pipeline	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R500**	R500							**R500**	Water Master Plan
68		Chatsworth / Riverlands upgrade bulk water supply	Upgrade bulk water supply	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R500**	R500							**R500**	Water Master Plan
70		Water Reticulation and Connection: Illinge Lethu	Install water reticulation networks	Higher level of water services	Water	Internal	Reticulation		**R2 083**					R2 083			**R2 083**	Water Master Plan
71		Replace existing water pipe: Illinge Lethu	Upgrade existing water pipeline	Higher level of water services	Water	Internal	Reticulation		**R4 075**					R4 075			**R4 075**	Water Master Plan
2. Source Development Projects								**R0**	**R0**								**R0**	
									R0								**R0**	
3. Demand Management projects								**R0**	**R1 641**								**R1 641**	
62		Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	Installation of PRVs, flow control valves, zone metering, etc.	Reducing NRW and Water Losses	Water	Internal	Management		**R200**	R200							**R200**	WC/WDM Strategy
77		Bulk Water Emergency Spending	Emergency Water	Services	Water	Other	Reticulation		**R500**	R500							**R500**	WC/WDM Strategy
79		Connections: Water Meters (New/Replacements)	Installation of new water meters and replacement of old / faulty meters	Reducing NRW and Water Losses	Water	Other	Reticulation		**R941**	R941							**R941**	WC/WDM Strategy
4. O&M Commitments								**R0**	**R6 568**								**R6 568**	
Operations																		
10		Equipment: Sewerage Telemetry	Additional telemetry equipment	Operations	Sanitation	Other	Telemetry		**R40**	R40							**R40**	Operations
11		Equipment: Sewerage	Additional sewerage equipment	Operations	Sanitation	Other	Equipment		**R34**	R34							**R34**	Operations
16		Sewerage: CK18526 Isuzu FSR750	Replace existing vehicle	Operations	Sanitation	Other	Vehicle		**R2 511**	R2 511							**R2 511**	Operations
75		Mobile water pumps x 4 (Replacement)	Replace mobile water pumps.	Operations	Water	Other	Equipment		**R150**	R150							**R150**	Operations
76		Compactor replacement x 3	Replace compactors	Operations	Water	Other	Equipment		**R280**	R280							**R280**	Operations
78		Equipment: Water	Additional water equipment	Operations	Water	Other	Equipment		**R53**	R53							**R53**	Operations
Maintenance																		
13		Schoonspruit: Pipe Replacement	Implementation of Sewer Pipeline Replacement Programme	Refurbishment	Sanitation	Internal	Sewer network		**R3 000**	R3 000							**R3 000**	Sewer Pipeline Replacement Programme
73		Malmesbury Irrigation: Replace pumpsets	Existing pumpsets need to be replaced.	Refurbishment	Water	Bulk	Irrigation pump station		**R500**	R500							**R500**	Refurbishment Programme
5. Institutional								**R0**	**R0**								**R0**	
									R0								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness and WASH Programs																		
									R0								**R0**	
		Total						**R0**	**R28 671**								**R28 671**	

Table E.2b: Water Services MTEF Projects - FY2025/26 (2nd year MTEF period)

Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2023/24	FY2025/26 Budget	Own	MIG	RBIG	WSIG	WCED	MWIG	Other	Total Cost	
1. Infrastructure Projects								**R0**	**R11 300**								**R11 300**	
2		Sewerage: Darling WWTW	Upgrade WWTW	Effluent quality requirements and treatment capacity.	Sanitation	Bulk	WWTW		**R500**	R500							**R500**	WWTW Process Audits
57		Water Networks: Upgrades and Replacements	Upgrade / replace certain sections of the water reticulation network.	Reducting NRW and Water Losses	Water	Internal	Reticulation		**R4 000**	R4 000							**R4 000**	Water Master Plan
63		Upgrading: Ongegund Water Supply System (Reservoir and Pump station)	Upgrade water infrastructure	Bulk water requirements	Water	Bulk	Reservoir and Pump Station		**R500**	R500							**R500**	WSDP and Water Master Plan
64		Malmesbury SMW1.3 Wesbank reservoir to Malmesbury / Abbotsdale pipeline	Upgrade bulk water pipeline	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R800**	R800							**R800**	Water Master Plan
67		Swartland System S12.2 CoCT WTP to Swartland WTP pipe connection	Upgrade bulk water pipeline	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R500**	R500							**R500**	Water Master Plan
68		Chatsworth / Riverlands upgrade bulk water supply	Upgrade bulk water supply	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R5 000**	R5 000							**R5 000**	Water Master Plan
2. Source Development Projects								**R0**	**R0**								**R0**	
									R0								**R0**	
3. Demand Management projects								**R0**	**R2 535**								**R2 535**	
62		Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	Installation of PRVs, flow control valves, zone metering, etc.	Reducing NRW and Water Losses	Water	Internal	Management		**R800**	R800							**R800**	WC/WDM Strategy
77		Bulk Water Emergency Spending	Emergency Water	Services	Water	Other	Reticulation		**R700**	R700							**R700**	WC/WDM Strategy
79		Connections: Water Meters (New/Replacements)	Installation of new water meters and replacement of old / faulty meters	Reducing NRW and Water Losses	Water	Other	Reticulation		**R1 035**	R1 035							**R1 035**	WC/WDM Strategy
4. O&M Commitments								**R0**	**R2 493**								**R2 493**	
Operations																		
3		Replace Mobile Generator	Mobile generator needs to be replaced	Load Shedding	Sanitation	Other	Equipment		**R380**	R380							**R380**	Operations
10		Equipment: Sewerage Telemetry	Additional telemetry equipment	Operations	Sanitation	Other	Telemetry		**R42**	R42							**R42**	Operations
11		Equipment: Sewerage	Additional sewerage equipment	Operations	Sanitation	Other	Equipment		**R36**	R36							**R36**	Operations
78		Equipment: Water	Additional water equipment	Operations	Water	Other	Equipment		**R55**	R55							**R55**	Operations
Maintenance																		
12		Pipe Replacement: Obsolete Infrastructure	Implementation of Sewer Pipeline Replacement Programme	Refurbishment	Sanitation	Internal	Sewer network		**R1 500**	R1 500							**R1 500**	Sewer Pipeline Replacement Programme
72		Kalbaskraal Booster: Replace pumpsets	Existing pumpsets need to be replaced.	Refurbishment	Water	Bulk	Sewer pump station		**R480**	R480							**R480**	Refurbishment Programme
5. Institutional								**R0**	**R0**								**R0**	
									R0								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness and WASH Programs																		
									R0								**R0**	
		Total						**R0**	**R16 328**								**R16 328**	

Table E.2c: Water Services MTEF Projects - FY2026/27 (3rd year MTEF period)

Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2023/24	FY2026/27 Budget	Own	MIG	RBIG	WSIG	WCED	MWIG	Other	Total Cost	
1. Infrastructure Projects								**R0**	**R46 099**								**R46 099**	
2		Sewerage: Darling WWTW	Upgrade WWTW	Effluent quality requirements and treatment capacity.	Sanitation	Bulk	WWTW		**R500**	R500							**R500**	WWTW Process Audits
14		Abbotsdale: Rising main	Upgrade sewer rising main capacity.	Waterborne sanitation	Sanitation	Bulk	Sewer network		**R800**	R800							**R800**	Sewer Master Plan
15		Riebeek Kasteel network upgrade, Master Plan SRK51.2 and [illegible]	Upgrade sewer drainage network capacity.	Waterborne sanitation	Sanitation	Internal	Sewer network		**R600**	R600							**R600**	Sewer Master Plan
57		Water Networks: Upgrades and Replacements	Upgrade / replace certain sections of the water reticulation network.	Reducting NRW and Water Losses	Water	Internal	Reticulation		**R4 000**	R4 000							**R4 000**	Water Master Plan
58		Darling SDW2.4 & SDW1.2 & SDW2.1 water network upgrades for housing project	Install water reticulation networks	Higher level of water services	Water	Internal	Reticulation		**R1 500**	R1 500							**R1 500**	Water Master Plan
63		Upgrading: Ongegund Water Supply System (Reservoir and Pump station)	Upgrade water infrastructure	Bulk water requirements	Water	Bulk	Reservoir and Pump Station		**R4 500**	R4 500							**R4 500**	WSDP and Water Master Plan
64		Malmesbury SMW1.3 Wesbank reservoir to Malmesbury / Abbotsdale pipeline	Upgrade bulk water pipeline	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R4 346**	R4 346							**R4 346**	Water Master Plan
65		Malmesbury SMW1.4 Wesbank reservoir to Malmesbury / Abbotsdale pipeline	Upgrade bulk water pipeline	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R10 754**		R10 754						**R10 754**	Water Master Plan
66		Swartland System S2.1: Kasteelberg to Riebeek (D-line) Phase [illegible]	Upgrade bulk water pipeline	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R1 500**	R1 500							**R1 500**	Water Master Plan
67		Swartland System S12.2 CoCT WTP to Swartland WTP pipe connection	Upgrade bulk water pipeline	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R1 500**	R1 500							**R1 500**	Water Master Plan
68 & 69		Chatsworth / Riverlands upgrade bulk water supply	Upgrade bulk water supply	Bulk water requirements	Water	Bulk	Bulk water pipeline		**R15 099**	R4 761	R10 339						**R15 099**	Water Master Plan
74		Riebeek Kasteel new reservoir	Construct an additional reservoir	Storage capacity	Water	Bulk	Reservoir		**R1 000**	R1 000							**R1 000**	WSDP and Water Master Plan
2. Source Development Projects								**R0**	**R0**								**R0**	
									R0								**R0**	
3. Demand Management projects								**R0**	**R2 739**								**R2 739**	
62		Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	Installation of PRVs, flow control valves, zone metering, etc.	Reducing NRW and Water Losses	Water	Internal	Management		**R800**	R800							**R800**	WC/WDM Strategy
77		Bulk Water Emergency Spending	Emergency Water	Services	Water	Other	Reticulation		**R800**	R800							**R800**	WC/WDM Strategy
79		Connections: Water Meters (New/Replacements)	Installation of new water meters and replacement of old / faulty meters	Reducing NRW and Water Losses	Water	Other	Reticulation		**R1 139**	R1 139							**R1 139**	WC/WDM Strategy
4. O&M Commitments								**R0**	**R3 802**								**R3 802**	
Operations																		
10		Equipment: Sewerage Telemetry	Additional telemetry equipment	Operations	Sanitation	Other	Telemetry		**R44**	R44							**R44**	Operations
11		Equipment: Sewerage	Additional sewerage equipment	Operations	Sanitation	Other	Equipment		**R38**	R38							**R38**	Operations
78		Equipment: Water	Additional water equipment	Operations	Water	Other	Equipment		**R57**	R57							**R57**	Operations
80		Water: CK10564 Toyota Hilux 3.0 D4D 4x4	Purchase new vehicle	Operations	Water	Other	Vehicle		**R614**	R614							**R614**	Operations
81		Water: CK43172 Trailer	Purchase new trailer	Operations	Water	Other	Vehicle		**R49**	R49							**R49**	Operations
Maintenance																		
12		Pipe Replacement: Obsolete Infrastructure	Implementation of Sewer Pipeline Replacement Programme	Refurbishment	Sanitation	Internal	Sewer network		**R3 000**	R3 000							**R3 000**	Sewer Pipeline Replacement Programme
5. Institutional								**R0**	**R0**								**R0**	
									R0								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness and WASH Programs																		
									R0								**R0**	
		Total						**R0**	**R52 640**								**R52 640**	

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 Swartland Master Plans were incorporated into the WSDP.

The Master Plans represent the ideal infrastructure development required to meet projected future water requirements 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 by Swartland Municipality will be based on the following plans and processes:

- Water and Sewer Master Plans and Water and Waste Water Treatment Works Master Plans/studies;
- Infrastructure replacement needs (Asset Register);
- Ad-hoc technical investigations;
- Budget proposals; and
- Asset Management Plans.

Swartland Municipality's draft 2024/2025 MTEF Budget list the following major water and sewerage infrastructure projects (Value above R1 million), which are planned for the short term (Next three years).

- Upgrading of Darling and Moorreesburg water reticulation networks, in order to accommodate future housing projects.
- Upgrading of the water reticulation networks: PRVs, flow control valves, zone metering and water augmentation.
- Upgrading of the Ongegund reservoir and water pump station.
- Upgrade of the bulk water pipeline from Wesbank reservoir to Malmesbury / Abbotsdale.
- Upgrade of the bulk water pipeline from Kasteelberg to Riebeek.
- Bulk water pipeline connection between City of Cape Town WTW and Swartland WTW.
- Bulk water supply upgrade for Chatsworth / Riverlands.
- New reservoir for Riebeek Kasteel.
- Bulk water emergency spending.
- Installation of new water meters and the replacement of old or faulty water meters.
- Replacement and upgrades of the water and sewerage networks (Implementation of the Pipeline Replacement Programmes)
- Refurbishment / Upgrade work at the Darling WWTW.
- Replace mechanical equipment of the clarifier at the Malmesbury WWTW.
- Upgrade of bulk sewer pipelines for Darling and Moorreesburg.
- Purchase of required vehicles for water and sanitation services.

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

- Water must be placed at the center 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 current project needs are estimated at R149.848 million for the next three years of which 65% 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 Section 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 FY2024/25: 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?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
CURRENT NEEDS										
Topic 1: Settlements and Demographics										
	Done by other Department									
Topic 2: Service Levels										
2.1	Some households on the farms without basic water services	Ensure all households on farms are provided with at least basic water services	WSDP	No	2526001	Provide basic water services to the households on the farms without basic water services	R1 256	Yes	No	No
2.2	Some households on the farms without basic sanitation services	Ensure all households on farms are provided with at least basic sanitation services	WSDP	No	2526002	Provide basic sanitation services to the households on the farms without basic sanitation services	R13 160	Yes	No	No
Topic 3: Water Services Asset Management (Infrastructure)										
3.1	Capacities of existing bulk sewer pipelines are inadequate	Upgrade bulk sewer pipelines as recommended in Sewer MP	MTREF Project	Yes	2526003	Upgrading of bulk sewer collectors: Darling (SDS3.1)	R3 716	Partly	Yes	Yes
3.2	Capacities of existing bulk sewer pipelines are inadequate	Upgrade bulk sewer pipelines as recommended in Sewer MP	MTREF Project	Yes	2526004	Upgrading of bulk sewer collectors: Moorreesburg	R2 111	Partly	Yes	Yes
3.3	Existing sewer drainage network needs to be extended	Install waterborne sewer drainage network	MTREF Project	Yes	2526005	Sewer Reticulation and Connection: Illinge Lethu	R517	Yes	Yes	Yes
3.4	Capacity of existing rising main is inadequate	Upgrade sewer rising main capacity.	MTREF Project	Yes	2526006	Abbotsdale: Rising main	R800	Yes	Yes	Yes
3.5	Capacity of existing sewer drainage network is inadequate	Upgrade sewer drainage network capacity.	MTREF Project	Yes	2526007	Riebeek Kasteel network upgrade, Master Plan SRkS1.2 and 1.3	R600	Yes	Yes	Yes
3.6	Capacity of existing WWTW is inadequate to meet future requirements.	Upgrade WWTW in order meet future treatment requirements and to ensure final effluent quality complies with standards.	MTREF Project	Yes	2526008	Sewerage: Darling WWTW	R1 000	Yes	Yes	Yes
3.7	Mechanical equipment of clarifier needs to be replaced.	Implementation of Refurbishment Programme for WWTW	MTREF Project	Yes	2526009	Malmesbury WWTW: Replace Clarifier Mechanical Equipment	R1 500	Yes	Yes	Yes
3.8	Capacities of existing water reticulation networks are inadequate.	Upgrade water reticulation networks as recommended by Water MP	MTREF Project	Yes	2526010	Water networks: Upgrades and Replacements	R10 000	Partly	Yes	Yes
3.9	Capacities of existing water reticulation networks are inadequate.	Upgrade water reticulation networks for housing project	MTREF Project	Yes	2526011	Darling SDW2.4 & SDW1.2 & SDW2.1 water network upgrades for housing project	R4 355	Yes	Yes	Yes
3.10	Capacities of existing water reticulation networks are inadequate.	Upgrade water reticulation networks for housing project	MTREF Project	Yes	2526012	Moorreesburg SMoW2.3 water network upgrade for housing project	R604	Yes	Yes	Yes
3.11	Existing reservoir storage capacity and pump capacity are	Ensure adequate reservoir storage and pump capacity.	MTREF Project	Yes	2526013	Upgrading Ongegund Water Supply System (Reservoir and pump station)	R5 000	Yes	Yes	Yes
3.12	Existing bulk water pipeline capacity is inadequate.	Upgrade capacity of bulk water pipelines as recommended by Water MP	MTREF Project	Yes	2526014	Malmesbury SMW1.3 Wesbank reservoir to Malmesbury / Abbotsdale pipeline	R5 646	Yes	Yes	Yes
3.13	Existing bulk water pipeline capacity is inadequate.	Upgrade capacity of bulk water pipelines as recommended by Water MP	MTREF Project	Yes	2526015	Malmesbury SMW1.4 Wesbank reservoir to Malmesbury / Abbotsdale pipeline	R10 754	Yes	Yes	Yes
3.14	Existing bulk water pipeline capacity is inadequate.	Upgrade capacity of bulk water pipelines as recommended by Water MP	MTREF Project	Yes	2526016	Swartland System S2.1: Kasteelberg to Riebeek (D-line) Phase 1	R1 500	Yes	Yes	Yes
3.15	Existing bulk water pipeline capacity is inadequate.	Upgrade capacity of bulk water pipelines as recommended by Water MP	MTREF Project	Yes	2526017	Swartland System S12.2 CoCT WTP to Swartland WTP pipe connection	R2 000	Yes	Yes	Yes
3.16	Existing bulk water pipeline capacity is inadequate.	Upgrade capacity of bulk water pipelines as recommended by Water MP	MTREF Project	Yes	2526018	Chatsworth / Riverlands upgrade bulk water supply	R20 599	Yes	Yes	Yes
3.17	Existing water reticulation network needs to be extended.	Install water reticulation networks	MTREF Project	Yes	2526019	Water Reticulation and Connection: Illinge Lethu	R2 083	Yes	Yes	Yes
3.18	Capacity of existing water pipeline is inadequate.	Upgrade existing water pipeline	MTREF Project	Yes	2526020	Replace existing water pipe: Illinge Lethu	R4 075	Yes	Yes	Yes
3.19	Existing reservoir storage capacity is inadequate	Ensure adequate reservoir storage capacity	MTREF Project	Yes	2526021	Riebeek Kasteel new reservoir	R1 000	Yes	Yes	No
Topic 4: Water Services Operation and Maintenance										
4.1	Additional sewerage telemetry equipment is needed.	Purchase additional sewerage telemetry equipment.	MTREF Project	Yes	2526022	Equipment: Sewerage Telemetry	R126	Partly	Yes	Yes
4.2	Existing sewerage equipment is inadequate.	Purchase additional sewerage equipment.	MTREF Project	Yes	2526023	Equipment: Sewerage	R108	Partly	Yes	Yes
4.3	Existing vehicle needs to be replaced.	Purchase new vehicle	MTREF Project	Yes	2526024	Sewerage: CK18526 Isuzu FSR750	R2 511	Yes	Yes	Yes
4.4	Back-up generator is required for load shedding periods.	Ensure backup power supply during load shedding periods.	MTREF Project	Yes	2526024	Replace: Mobile Generator	R380	Yes	Yes	Yes
4.5	Old sections of the sewer drainage networks need to be replaced	Implementation of Sewer Pipeline Replacement Programme	MTREF Project	Yes	2526025	Pipe Replacement: Obsolete Infrastructure	R4 500	Partly	Yes	Yes
4.6	Old sections of the sewer drainage networks need to be replaced	Implementation of Sewer Pipeline Replacement Programme	MTREF Project	Yes	2526025	Schoonspruit: Pipe Replacement	R3 000	Yes	Yes	Yes
4.7	Existing pump capacities are inadequate	Ensure adequate pump capacity	MTREF Project	Yes	2526026	Replace pumpsets for Kalbaskraal Booster and Malmesbury Irrigation	R980	Yes	Yes	Yes
4.8	Mobile water pumps need to be replaced.	Replace mobile water pumps.	MTREF Project	Yes	2526026	Mobile water pumps x 4 (Replacement)	R150	Yes	Yes	Yes
4.9	Compactors need to be replaced.	Replace compactors	MTREF Project	Yes	2526027	Compactor replacement x 3	R280	Yes	Yes	Yes
4.10	Existing water equipment is inadequate.	Purchase additional water equipment.	MTREF Project	Yes	2526027	Equipment: Water	R165	Partly	Yes	Yes
4.11	Existing vehicle needs to be replaced.	Purchase new vehicle	MTREF Project	Yes	2526028	Water: CK10564 Toyota Hilux 3.0 D4D 4x4	R614	Yes	Yes	Yes
4.12	Existing trailer needs to be replaced.	Purchase new trailer	MTREF Project	Yes	2526028	Water: CK43172 Trailer	R49	Yes	Yes	Yes
4.13	Operational shortcomings were identified as part of the detail WWTW Process Audits.	Address operational aspects as identified in each WWTW Process Audit	WWTW Process Audits	Yes	2526029	Address operational aspects as identified in each WWTW Process Audit	R250	Yes	No	No
Topic 5: Conservation and Demand Management (Topic 5.1 Water Resources)										
5.1	Additional pressure reduction, flow control, zone metering and water augmentation are required.	ImplementWC/WDM measures to further reduce NRW and Water Losses	MTREF Project	Yes	2526030	Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	R1 800	Partly	Yes	Yes
5.2	Further reduce Water Losses and NRW.	Continue with the implementation of the WC/WDM Strategy	MTREF Project	Yes	2526031	Bulk Water Emergency Spending	R2 000	Partly	Yes	Yes
5.3	Further reduce Water Losses and NRW.	Continue with the implementation of the WC/WDM Strategy	MTREF Project	Yes	2526032	Connections: Water Meters (New/Replacements)	R3 115	Partly	Yes	Yes
5.4	Further reduce Water Losses and NRW.	Continue with the implementation of the WC/WDM Strategy	WC/WDM Strategy	Partly	2526033	Implement WC/WDM activities as included in the WC/WDM Strategy.	R12 543	Partly	Partly	Partly
Topic 5: Conservation and Demand Management (Topic 5.2 Water Balance)										
	Done internally through O&M Budget									
Topic 6: Water Resources										
6.1	Ensure adequate supply to meet future water demands	Provide bulk water supply to Chatsworth/Riverlands from Atlantis	WSDP	No	2526034	Chatsworth/Riverlands upgrade bulk water supply	R25 000	Yes	No	No
Topic 7: Financial										
	Done by other Department									
Topic 8: Institutional Arrangements and Customer Care										
	Done internally through O&M Budget									
TOTAL: CURRENT NEEDS							**R149 848**			
	Funded in next three years						R97 639			
	% funded						65%			

Table F.1: WSDP FY2024/25: 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?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
FUTURE NEEDS										
Infrastructure and Resources										
F.1	Inadequate capacity of existing bulk water infrastructure	Ensure adequate bulk water supply capacity.	Bulk Water Master Plan	No	2526035	Pipelines, reservoir and pump stations: CCT Voëlvlei WTW to Swartland WTW,	R176 108	Yes	No	No
F.2			Bulk Water Master Plan	No	2526036	Pipelines: Kasteelberg to Riebeek Valley (D&E lines)	R22 945	Yes	No	No
F.3			Bulk Water Master Plan	No	2526037	Pipelines and pump stations: Kasteelberg to Glen Lily and Moorreesburg (F & H lines)	R110 290	Yes	No	No
F.4			Bulk Water Master Plan	No	2526038	Pipelines and reservoirs: Glen Lily to Darling and Yzerfontein (I & J lines)	R250 923	Yes	No	No
F.5			Bulk Water Master Plan	No	2526039	Pipelines: Rural Water Schemes (Weltevrede, Langgewens, Goudapad1 and WBK line)	R16 020	Yes	No	No
F.6			Bulk Water Master Plan	No	2526040	Reservoir: Withoogte to Moorreesburg and Koringberg (MB, WB & G lines)	R6 888	Yes	No	No
F.7			Bulk Water Master Plan	No	2526041	Pipelines: Rural Water Schemes (Goudapad2, Koringberg rural and Nooitgedaght)	R56 714	Yes	No	No
F.8	Inadequate capacity of existing internal water reticulation networks.	Ensure adequate internal water reticulation capacity.	Water Master Plan	No	2526042	Malmesbury: Future internal reticulation network items	R31 196	Yes	No	No
F.9			Water Master Plan	No	2526043	Abbotsdale: Future internal reticulation network items	R25 545	Yes	No	No
F.10			Water Master Plan	No	2526044	Kalbaskraal: Future internal reticulation network items	R6 060	Yes	No	No
F.11			Water Master Plan	No	2526045	Chatsworth and Riverlands: Future internal reticulation network items	R13 704	Yes	No	No
F.12			Water Master Plan	No	2526046	Darling: Future internal reticulation network items	R10 433	Yes	No	No
F.13			Water Master Plan	No	2526047	Koringberg: Future internal reticulation network items	R1 669	Yes	No	No
F.14			Water Master Plan	No	2526048	Moorreesburg: Future internal reticulation network items	R17 170	Yes	No	No
F.15			Water Master Plan	No	2526049	Riebeek Kasteel: Future internal reticulation network items	R8 013	Yes	No	No
F.16			Water Master Plan	No	2526050	Riebeek Wes: Future internal reticulation network items	R5 605	Yes	No	No
F.17			Water Master Plan	No	2526051	Ongegund: Future internal reticulation network items	R531	Yes	No	No
F.18			Water Master Plan	No	2526052	Yzerfontein: Future internal reticulation network items	R5 327	Yes	No	No
F.19	Inadequate capacity of existing bulk water infrastructure (Bulk Pipelines)	Ensure adequate bulk water supply capacity.	Water Master Plan	No	2526053	Malmesbury: Future bulk pipeline infrastructure items	R45 917	Yes	No	No
F.20			Water Master Plan	No	2526054	Abbotsdale: Future bulk pipeline infrastructure items	R16 150	Yes	No	No
F.21			Water Master Plan	No	2526055	Kalbaskraal: Future bulk pipeline infrastructure items	R2 101	Yes	No	No
F.22			Water Master Plan	No	2526056	Chatsworth and Riverlands: Future bulk pipeline infrastructure items	R53 115	Yes	No	No
F.23			Water Master Plan	No	2526057	Riebeek Kasteel: Future bulk pipeline infrastructure items	R563	Yes	No	No
F.24			Water Master Plan	No	2526058	Riebeek Wes: Future bulk pipeline infrastructure items	R1 552	Yes	No	No
F.25			Water Master Plan	No	2526059	Ongegund: Future bulk pipeline infrastructure items	R891	Yes	No	No
F.26	Inadequate capacity of existing bulk water infrastructure (Reservoirs)	Ensure adequate bulk water supply capacity.	Water Master Plan	No	2526060	Malmesbury: Future reservoir infrastructure items	R15 190	Yes	No	No
F.27			Water Master Plan	No	2526061	Abbotsdale: Future reservoir infrastructure items	R31 496	Yes	No	No
F.28			Water Master Plan	No	2526062	Kalbaskraal: Future reservoir infrastructure items	R12 172	Yes	No	No
F.29			Water Master Plan	No	2526063	Chatsworth and Riverlands: Future reservoir infrastructure items	R15 190	Yes	No	No
F.30			Water Master Plan	No	2526064	Darling: Future reservoir infrastructure items	R11 920	Yes	No	No
F.31			Water Master Plan	No	2526065	Koringberg: Future reservoir infrastructure items	R5 040	Yes	No	No
F.32			Water Master Plan	No	2526066	Riebeek kasteel: Future reservoir infrastructure items	R14 223	Yes	No	No
F.33			Water Master Plan	No	2526067	Riebeek Wes: Future reservoir infrastructure items	R5 040	Yes	No	No
F.34			Water Master Plan	No	2526068	Ongegund: Future reservoir infrastructure items	R3 206	Yes	No	No
F.35	Inadequate capacity of existing bulk water infrastructure (Pump Stations)	Ensure adequate bulk water supply capacity.	Water Master Plan	No	2526069	Malmesbury: Future pump station infrastructure items	R2 663	Yes	No	No
F.36			Water Master Plan	No	2526070	Abbotsdale: Future pump station infrastructure items	R4 315	Yes	No	No
F.37			Water Master Plan	No	2526071	Kalbaskraal: Future pump station infrastructure items	R7 160	Yes	No	No
F.38			Water Master Plan	No	2526072	Chatsworth and Riverlands: Future pump station infrastructure items	R1 008	Yes	No	No
F.39			Water Master Plan	No	2526073	Darling: Future pump station infrastructure items	R512	Yes	No	No
F.40			Water Master Plan	No	2526074	Koringberg: Future pump station infrastructure items	R0	Yes	No	No
F.41			Water Master Plan	No	2526075	Moorreesburg: Future pump station infrastructure items	R470	Yes	No	No
F.42			Water Master Plan	No	2526076	Riebeek Wes: Future pump station infrastructure items	R269	Yes	No	No
F.43			Water Master Plan	No	2526077	Ongegund: Future pump station infrastructure items	R1 976	Yes	No	No
F.44	Inadequate capacity of existing internal sewer reticulation networks.	Ensure adequate internal sewer reticulation capacity.	Sewer Master Plan	No	2526078	Malmesbury and Abbotsdale: Future internal sewer network items	R76 232	Yes	No	No
F.45			Sewer Master Plan	No	2526079	Kalbaskraal: Future internal sewer network items	R13 680	Yes	No	No
F.46			Sewer Master Plan	No	2526080	Chatsworth and Riverlands: Future internal sewer network items	R45 635	Yes	No	No
F.47			Sewer Master Plan	No	2526081	Darling: Future internal sewer network items	R6 168	Yes	No	No
F.48			Sewer Master Plan	No	2526082	Koringberg: Future internal sewer network items	R15 697	Yes	No	No
F.49			Sewer Master Plan	No	2526083	Moorreesburg: Future internal sewer network items	R25 247	Yes	No	No
F.50			Sewer Master Plan	No	2526084	Riebeek Valley: Future internal sewer network items	R26 040	Yes	No	No
F.51			Sewer Master Plan	No	2526085	Yzerfontein: Future internal sewer network items	R8 802	Yes	No	No
F.52	Inadequate capacity of existing bulk sewer infrastructure.	Ensure adequate bulk wastewater treatment capacity.	Sewer Master Plan	No	2526086	Chatsworth / Riverlands: New WW Treatment Plant	R53 285	Yes	No	No
F.53			Sewer Master Plan	No	2526087	Koringberg: Upgrade existing WW Treatment Plant	R6 400	Yes	No	No
F.54			Sewer Master Plan	No	2526088	Kalbaskraal: New WW Treatment Plant	R25 947	Yes	No	No
F.55			Sewer Master Plan	No	2526089	Moorreesburg: Upgrade existing WW Treatment Plant	R35 373	Yes	No	No
F.56			Sewer Master Plan	No	2526090	Yzerfontein: New WW Treatment Plant	R22 829	Yes	No	No
F.57			Sewer Master Plan	No	2526091	Darling: Upgrade existing WW Treatment Plant	R20 598	Yes	No	No
F.58			Sewer Master Plan	No	2526092	Riebeek Valley: Upgrade existing WW Treatment Plant	R25 060	Yes	No	No
F.59			Sewer Master Plan	No	2526093	Malmesbury: 480 m x 675 mm Ø upgrade existing gravity sewer and upgrade existing pump station	R5 477	Yes	No	No
F.60	Inadequate capacity of existing sewer pump stations.	Ensure adequate sewer pump capacity.	Sewer Master Plan	No	2526094	Malmesbury New sewer PS	R10 625	Yes	No	No
F.61			Sewer Master Plan	No	2526095	Abbotsdale New sewer PS	R4 547	Yes	No	No
F.62			Sewer Master Plan	No	2526096	Chatsworth and Riverlands New sewer PS	R3 185	Yes	No	No
F.63			Sewer Master Plan	No	2526097	Kalbaskraal New sewer PS	R4 853	Yes	No	No
F.64			Sewer Master Plan	No	2526098	Darling New sewer PS	R2 201	Yes	No	No
F.65			Sewer Master Plan	No	2526099	Riebeek Valley New sewer PS	R192	Yes	No	No
F.66			Sewer Master Plan	No	2526100	Yzerfontein New sewer PS	R2 074	Yes	No	No
F.67	Inadequate capacity of existing Swartland WTW.	Ensure adequate bulk water treatment capacity.	WSDP	No	2526101	Upgrade the Swartland WTW with an additional 36.4 Ml/d	R728 000	Yes	No	No
TOTAL: FUTURE NEEDS							**R2 185 427**			