SWARTLAND MUNICIPALITY

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Version Control:

Status	Description	Date	Reference
Draft	Draft 2021/2022 Annual WSDP Performance- and Water Services Audit Report	25 October 2022	Project No P07017
Approval	Final 2021/2022 Annual WSDP Performance- and Water Services Audit Report	With Annual Report	Council Resolution for the approval of the Audit Report will be forwarded to the DWS by the Municipality

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PROJECT P07017 - SWARTLAND MUNICIPALITY: ANNUAL WSDP PERFORMANCE AND WATER SERVICES AUDIT REPORT FOR 2021/2022

REV	DESCRIPTION	ORIG	REVIEW	IX ENGINEERS APPROVAL	DATE	CLIENT APPROVAL	DATE
Draft	Draft issued for external review	R Kuffner	JT Human		25/10/2022		27/10/2022.
		Author	A Reviewer	Approval		Approval	
Final	Final Report for Council approval	R Kuffner	JT Human		27/10/2022		27/10/2022
		Author	A Reviewer	Approval		Approval	

FOREWORD:

Swartland Municipality is 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, to report on the implementation of its WSDP during each financial year and to include a water services audit in such an annual report.

The WSDP Performance- and Water Services Audit is designed to monitor the compliance of Swartland Municipality with these regulations. It also assists the communities within Swartland Municipality's Management Area and the DWS to assess how well the Municipality is performing relative to their stated intentions and their capacity. The WSDP Performance- and Water Services Audit Report can be seen as an annexure to the Municipality's Annual Report. The Annual Report is compiled as required by the Local Government Municipal Systems Act, Act no 32 of 2000 (Section 46) and the Local Government: Municipal Finance Management Act, Act no 56 of 2003 (Section 121).

Swartland Municipality's Vulnerability Index for 2022 was indicated as 0.15 "Low Vulnerability". The only one area of concern evident from the 2022 assessment is Financial Asset Management, which obtained a score of 50% (High Vulnerability). The vulnerability of all the other key service areas are low, except basic sanitation that is moderate.

The water and sanitation services of Swartland Municipality is managed in a financially sustainable manner, with a surplus generated on the operation and maintenance budgets of both services for the last eight financial years. The Operation and Maintenance budget allocated towards the rehabilitation and maintenance of the existing water and sewerage infrastructure however can be increased. A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of existing infrastructure. In the case of the operations and maintenance of the systems, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the systems remain in good condition.

Swartland Municipality successfully completed various capital projects over the last financial year. The capital budget expenditure, for the 2021/2022 financial year, was R9.324 million (96.1% of the budget) for the water infrastructure projects and R63.297 million (113.3% of the budget) for the sewerage infrastructure projects.

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 2021/2022 was 1.68 %/a. The overall NRW for all the systems for the 2021/2022 financial year was 1 254 Ml (23.10%). The overall water losses were 1 123 Ml (20.70%).

The Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 to 2021 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.

Operational Sampling programmes are implemented by the West Coast District Municipality at their two bulk WTWs. Compliance Water Quality Monitoring Programmes are also implemented by the West Coast District Municipality and the Swartland Municipality throughout the water distribution systems. Operational and Compliance Effluent Monitoring Programmes are implemented by Swartland Municipality at their WWTWs.

The water quality of all the water distribution systems in Swartland Municipality is either “Good” or “Excellent”, according to the SANS0241 classification, except for Yzerfontein that is “Unacceptable” for Operational Efficiency, due to pH failures. The overall percentage compliance of the water quality samples taken over the period July to June for the last three financial years are indicated in the table below for all the systems combined.

Overall Percentage Compliance of the Water Quality Samples Taken Over the Period July to June for the Last Three Financial Years															
Distribution System	Acute Health (%)						Chronic Health (%)			Aesthetic (%)			Operational Efficiency (%)		
	Microbiological			Chemical											
	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20
All Systems	99.1	99.6	97.3	100.0	100.0	-	99.9	100.0	100.0	100.0	99.6	98.0	95.2	97.0	92.8

The overall percentage compliances of the final effluent samples taken over the last three financial years are summarised in the table below.

Overall Percentage Compliance of the Final Effluent Samples Taken Over the Last Three Financial Years									
WWTW	Microbiological (%)			Chemical (%)			Physical (%)		
	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20
All WWTWs	54.9	64.9	59.5	59.6	60.7	58.3	73.5	75.8	75.8

A comprehensive Performance Management System and Customer Services and Complaints system are also in place. The SDBIP is the process plan and performance indicator / evaluation process 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.

The Municipality has maintained a high and 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 per day basis. Requests are furthermore captured on an electronic mail or works-order system to ensure the execution thereof.

The Municipality also performed excellent with DWS’s 2021 Blue Drop Risk Assessments (All plants in the low-risk category) and the 2021 Green Drop Assessments (Sterling performance with an overall Green Drop Score of 89%). The Green Drop Scores for the Malmesbury-, Riebeek Valley- and Darling WWTW were between 89% and 95% (Three potential Green Drop Certified Systems). Swartland Municipality was also acknowledged by the DWS as one of the Top 3 Best Performing Municipalities for their Green Drop Results.

SWARTLAND MUNICIPALITY

WATER SERVICES AUDIT FOR 2021/2022

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ABBREVIATIONS AND DEFINITIONS

AADD	Average Annual Daily Demand
BDRR	Blue Drop Risk Rating
BH	Borehole
BPT	Break Pressure Tank
BRVAS	Berg River Voëlvlei Augmentation Scheme
BSP	Bulk Sewer Pipeline
BWP	Bulk Water Pipeline
CAH	Chemical Acute Health
CCH	Chemical Chronic Health
CCT	City of Cape Town
CF	Consequence of Failure
CNA	Chemical Non-Health Aesthetic
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
D	Disinfectant
DM	District Municipality
DRC	Depreciated Replacement Cost
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
ELEC	Electrical
ESETA	Energy Sector Education and Training Authority
ESKOM	Electricity Supply Commission
GAMAP	General Accepted Municipal Accounting Practice
GD	Green Drop
HIV	Human Immunodeficiency Virus
HL	High Level
HMI	Human Machine Interface
IAM	Infrastructure Asset Management
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
IMQS	Information Management Quality Systems
IRIS	Integrated Regulatory Information System
IT	Information Technology
IWA	International Water Association
Kl	Kilolitre
KPA	Key Performance Area
KPI	Key Performance Indicator
l/c/d	Litre per Capita per Day
LF	Likelihood of Failure
LGSETA	Local Government Sector Education and Training Authority
LGTAS	Local Government Turn Around Strategy
LL	Low Level

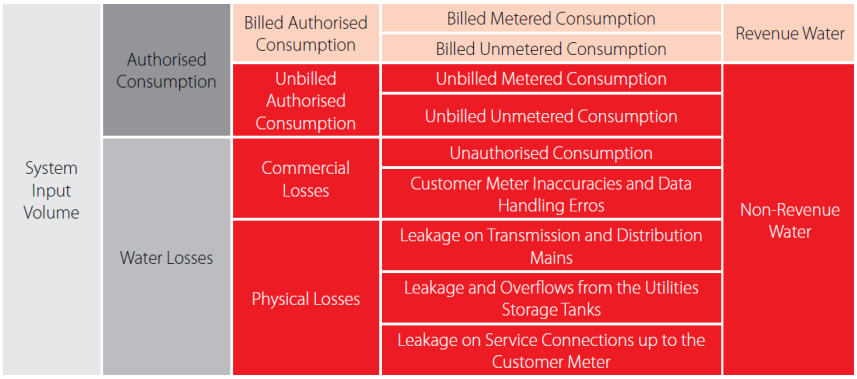
ABBREVIATIONS AND DEFINITIONS / Continue

LM	Local Municipality
l/p/d	Litre per Person per Day
m	Metre
MAP	Mean Annual Precipitation
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agent
Ml	Mega Litre
Ml/a	Mega Litre per Annum
Ml/d	Mega Litre per Day
MSDS	Material Safety Data Sheets
MuSSA	Municipal Strategic Self-Assessment
N/A	Not Applicable
NRW	Non-Revenue Water
O	Operational
O&M	Operation and Maintenance
OTH	Other
PAT	Progress Assessment Tool
PRP	Pipe Replacement Potential
PRV	Pressure Reducing Valve
PS	Pump Station
RDP	Reconstruction and Development Programme
RES	Reservoir
RUL	Remaining Useful Life
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
SL	Swartland
SPS	Sewer Pump Station
SRP	Sewer Reticulation Pipeline
SST	Secondary Settling Tank
STW	Sanitation Treatment Works
SWRO	Sea Water Reverse Osmosis
TCTA	Trans Caledon Tunnel Authority
TMG	Table Mountain Group
TSS	Total Suspended Solids
URV	Unit Reference Value
WCC	Water Consumer Connections
WC DM	West Coast District Municipality
WC/WDM	Water Conservation / Water Demand Management
WCWSS	Western Cape Water Supply System
WDM	Water Demand Management
WH	Withoogte

ABBREVIATIONS AND DEFINITIONS / Continue

WHO	World Health Organisation
WMA	Water Management Area
WPS	Water Pump Station
WRP	Water Reticulation Pipeline
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSDP-IDP	Water Services Development Plan – Integrated 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	Wastewater Treatment Works

KEY TERMS AND INTERPRETATIONS

KEY TERMS	INTERPRETATIONS
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.
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.
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	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.
Municipal Finance Management Act (MFMA)	Municipal Finance Management Act, 2003 (Act No. 56 of 2003)
MIG	A conditional grant from national government to support investment in basic municipal infrastructure.
Remaining useful life (RUL)	The time remaining over which an asset is expected to be used.
Service Delivery Budget Implementation Plan (SDBIP)	The SDBIP is a management, implementation and monitoring tool that enable the Municipal Manager to monitor the performance of senior managers, the Mayor to monitor the performance of the Municipal 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

KEY TERMS	INTERPRETATIONS
	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.
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 with 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 who provides water services to consumers or to another water services institution, but does not include a water services intermediary.

SWARTLAND MUNICIPALITY

ANNUAL WSDP PERFORMANCE AND WATER SERVICES AUDIT REPORT FOR 2021/2022

EXECUTIVE SUMMARY

Swartland Municipality is 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, to report on the implementation of its WSDP during each financial year and to include a water services audit in such an annual report.

Section 62 of the Water Services Act requires the Minister to monitor every WSI in order to ensure compliance with the prescribed national standards. This regulation requires a WSA to complete and submit a WSDP Performance- and Water Services Audit Report every financial year.

The WSDP Performance- and Water Services Audit is designed to monitor the compliance of the WSA and other WSIs with these regulations. The Water Services Act allows the audit to be used as a tool to compare actual performance of the WSA against the targets and indicators set in their WSDP. The WSDP Performance- and Water Services Audit also assists local communities and DWS to assess how well WSAs are performing relative to their stated intentions and their capacity.

The WSDP Performance- and Water Services Audit Report will give an overview of the implementation of the Municipality's previous year's WSDP, for the 2021/2022 financial year, and can be seen as an annexure to Swartland Municipality's Annual Report. The Annual Report is compiled as required by the Local Government: Municipal Systems Act, Act no 32 of 2000 (Section 46) and the Local Government: Municipal Finance Management Act, Act no 56 of 2003 (Section 121).

Availability of the Water Services Audit Report: The WSDP Performance- and Water Services Audit Report is a public document and must be made available within four months after the end of each financial year and must be available for inspection at the offices of the WSA. It is also recommended that the document be placed on the Municipality's website and that copies of the document be placed at the public libraries. The Water Services Audit Report also needs to be made available to the Minister of the DWS, the Minister of the Department of Cooperative Governance, the Province and to SALGA, as required by the Water Services Act, 1997.

The WSDP Performance- and Water Services Audit Report include the following detail information:

- The Municipality's performance with regard to their KPIs for water and sewerage services for the 2021/2022 financial year, as included in the Municipality's SDBIP.
- The Municipality's Performance with regard to DWS's Blue and Green Drop Assessments. Blue drop status is awarded to those water schemes that comply with 95% criteria on drinking water quality management. Green drop status is awarded to those WWTWs that comply with 90% criteria on key selected indicators on wastewater quality management.
- DWS's Scorecard for assessing the potential for WC/WDM efforts in the Municipality.
- Information to be included in a WSDP Performance- and Water Services Audit as stipulated under section 9 of the Water Services Act, "Guidelines for Compulsory National Standards" and also required by DWS's 2014 WSDP Performance- and Water Services Audit Report guidelines.
- Information on the implementation of the various WSDP activities, as included under the WSDP Business Elements in DWS's WSDP guidelines.

The Municipality has a comprehensive Performance Management System in place. 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.

The following water and sanitation related investigations were successfully completed during the last financial year.

- The WSDP Performance- and Water Services Audit Report for the 2020/2021 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 2021) as part of the WSDP Performance- and Water Services Audit Process.
- The 2022/2023 WSDP – IDP Water Sector Input Report was compiled and approved by Council with the IDP.
- The infrastructure constructed during the 2021/2022 financial year were added to the Asset Register and the Asset Register was updated.
- Sludge Management Plans were drafted for each of the WWTWs by Dr Elize Herselman.
- An Assessment of Loading, Capacity and Performance of the Darling Wastewater Treatment Works was done, Revision 1, August 2021.
- The following two MIG Technical Reports were compiled:
  - Upgrading of the External Water Supply for the De Hoop Development in Malmesbury, June 2021.
  - Upgrading of Bulk Water Supply for the De Hoop Development in Malmesbury, June 2021.
- 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.

The Municipality also received the following awards / acknowledgements:

- **Swartland Municipality's performed well with regard to DWS's 2021 Blue Drop Progress Assessment (Drinking Water Process and Quality). The Blue Drop Risk Ratings for the two systems were 23% and 30%, which fall in the low-risk category (<50%).**
- **Swartland Municipality is performing above average with regard to wastewater quality management, with an overall Green Drop Score of 89% for DWS's 2021 assessment.** The Green Drop Scores for the Malmesbury-, Riebeek Valley- and Darling WWTW were between 89% and 95% (Three potential Green Drop Certified Systems). The Wastewater Risk Ratings were at low risk (<50%) for the Riebeek Valley-, Malmesbury-, Darling- and Kalbaskraal WWTW and at high risk for the Chatsworth-, Moorreesburg- and Koringberg WWTW (70% - <90%).

  Swartland Municipality was also acknowledged by the DWS as one of the Top 3 Best Performing Municipalities for their Green Drop Results.

Quantity of Water Services Provided (Water Balance)

Detail IWA water balance models are in place for each of the distribution systems in Swartland Municipality's Management Area. These models include the volume of potable water supplied to the Swartland Municipality by the West Coast District Municipality (System Input Volume), the volume of water abstracted from the Municipality's own water resources and the NRW and Water Losses for each of the distribution systems. The flows at the WWTWs are also metered and recorded by the Municipality.

Water Services Delivery Profile

The number of consumer units per category or user type is available for each of the water distribution systems. The 2021/2022 number of formal water consumers in Swartland Municipality was 22 488. The average annual growth in the number of consumers for all the towns over the period 2012/2013 to 2021/2022, last ten financial years, was 2.13%. 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 provided 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. The only other areas where communal water services are in use is on some of the farms in the rural areas. Swartland Municipality is committed to work with the private landowners to ensure that at least basic water and sanitation services are provided to those households in the rural areas with existing services still below RDP standard.

All schools and medical facilities in the urban areas of Swartland Municipality's Management Area are supplied with adequate water and sanitation services.

Cost Recovery and Free Basic Services

A detail seven block step tariff system is implemented by Swartland Municipality. This tariff system discourages the wasteful or inefficient use of water. Various levels of water restriction tariffs are also in place for drought periods. It is expected that the current block step tariff structure will continue to be implemented in the future.

The first six (6) kl of water is provided free to all indigent registered 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 the Municipality's Indigent Policy and all indigent households therefore receive free basic water and sanitation services. This implies that either the equitable share is used to cover this cost, or higher consumption blocks are charged at a rate greater than the cost in order to generate a surplus to cross-subsidise indigent consumers who use up to six (6) kilolitres per month.

The actual operational and maintenance expenditure and income for the last seven financial years for water and sanitation services is summarised in the table below.

Operational and Maintenance expenditure and income budgets for water and sanitation services							
Expenditure / Income	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**
Expenditure	R79 784 692	R44 955 432	R61 301 899	R23 087 917	R47 486 198	R43 419 412	R42 952 023
Income	-R99 081 926	-R90 231 763	-R106 205 533	-R79 626 773	-R74 863 765	-R55 578 158	-R57 043 282
Surplus / Deficit	**-R19 297 234**	**-R45 276 331**	**-R44 903 634**	**-R56 538 856**	**-R27 377 567**	**-R12 158 746**	**-R14 091 259**
Expenditure	R56 552 156	R50 616 866	R49 817 322	R31 688 531	R48 691 211	R32 138 118	R30 931 945
Income	-R94 802 406	-R87 825 165	-R71 074 049	-R62 948 777	-R72 188 869	-R56 843 924	-R53 402 171
Surplus / Deficit	**-R38 250 250**	**-R37 208 299**	**-R21 256 727**	**-R31 260 246**	**-R23 497 658**	**-R24 705 806**	**-R22 470 226**

Water Quality

Operational Sampling programmes are implemented by the West Coast District Municipality at their two bulk WTWs. Compliance Water Quality Monitoring Programmes are also implemented by the West Coast District Municipality and the Swartland Municipality throughout the water distribution systems. Operational and Compliance Effluent Monitoring Programmes are implemented by Swartland Municipality at their WWTWs.

The water quality of all the water distribution systems in Swartland Municipality is either "Good" or "Excellent", according to the SANS0241 classification, except for Yzerfontein that is "Unacceptable" for Operational Efficiency, due to pH failures. A full SANS0241 analyses was done during the 2021/2022 financial year. The overall percentage of compliance of the water quality samples taken over the period July to June for the last three financial years is summarised in the table below per distribution system (SANS 241: 2015 Limits).

Percentage compliance of the final water quality samples for the last three financial years															
Distribution System	Acute Health (%)						Chronic Health			Aesthetic			Operational Efficiency		
	Chemical			Microbiological											
	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20
Moorreesburg	100.0	100.0	-	100.0	100.0	97.1	100.0	100.0	100.0	100.0	100.0	100.0	96.4	97.4	97.8
Koringberg	100.0	100.0	-	96.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.1	98.8	98.5
Malmesbury	100.0	100.0	-	98.6	100.0	98.1	100.0	100.0	100.0	100.0	98.9	98.4	97.4	97.8	94.1
Darling	100.0	100.0	-	98.5	100.0	98.2	100.0	100.0	100.0	100.0	99.2	100.0	91.3	97.7	96.6
Riebeek Kasteel	100.0	100.0	-	100.0	96.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.5	92.3	79.2
Riebeek Wes	100.0	100.0	-	100.0	100.0	100.0	98.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yzerfontein	100.0	100.0	-	100.0	100.0	97.4	100.0	100.0	100.0	100.0	100.0	100.0	88.3	97.5	95.6
Riverlands	100.0	100.0	-	100.0	100.0	96.0	100.0	100.0	100.0	100.0	100.0	100.0	96.0	93.0	88.0
Abbotsdale	100.0	100.0	-	100.0	100.0	92.9	100.0	100.0	100.0	100.0	100.0	60.7	95.0	96.0	53.6
Chatsworth	100.0	100.0	-	100.0	100.0	95.0	100.0	100.0	100.0	100.0	100.0	100.0	95.3	94.0	91.3
Kalbaskraal	100.0	100.0	-	100.0	100.0	89.5	100.0	100.0	100.0	100.0	100.0	100.0	94.1	100.0	92.1
All Systems	**100.0**	**100.0**	**-**	**99.1**	**99.6**	**97.3**	**99.9**	**100.0**	**100.0**	**100.0**	**99.6**	**98.0**	**95.2**	**97.0**	**92.8**

Note: *Unacceptable* (According to SANS241-2:2015, Table 4)

The table below indicates the compliance of the E.Coli monitoring frequency in the water distributions 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 2021 to June 2022.

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	1 797	2	4.4	7.5	11.9
Riebeek Wes and Ongegund	8 247	2	2.3	5.6	7.9
Riebeek Kasteel	9 366	2	4.1	5.6	9.7
Yzerfontein	1 687	2	4.1	5.6	9.7
Darling	12 702	2.5	5.1	5.6	10.7
Moorreesburg	19 061	3.8	2.8	7.5	10.3
Malmesbury	55 747	11.1	10.8	5.6	16.4
Abbotsdale	5 056	2	2	5.6	7.6
Kalbaskraal	3 927	2	2	5.6	7.6
Riverlands and Chatsworth	7 257	2	4.1	5.6	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.

The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the last three financial years at the Malmesbury-, Darling-, Moorreesburg-, Koringberg-, Chatsworth-, Kalbaskraal- and Riebeek Valley WWTW are summarised in the tables below.

Percentage microbiological, chemical and physical compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	Microbiological			Chemical			Physical		
	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20
Malmesbury	100.0%	100.0%	100.0%	**89.6%**	72.9%	83.3%	94.4%	83.3%	83.3%
Darling	75.0%	91.7%	75.0%	**70.8%**	100.0%	95.8%	77.8%	97.2%	94.4%
Moorreesburg	0.0%	40.0%	33.3%	**35.0%**	35.0%	31.3%	40.0%	40.0%	69.4%
Koringberg	0.0%	0.0%	0.0%	**31.3%**	27.1%	27.1%	33.3%	36.1%	36.1%
Chatsworth	25.0%	16.7%	33.3%	**33.3%**	31.3%	31.3%	72.2%	63.9%	66.7%
Kalbaskraal	100.0%	100.0%	100.0%	**33.3%**	16.7%	0.0%	100.0%	100.0%	83.3%
Riebeek Valley	75.0%	91.7%	75.0%	**100.0%**	93.8%	95.8%	100.0%	97.2%	100.0%
Overall Compliance %	**54.9%**	**64.9%**	**59.5%**	**59.6%**	**60.7%**	**58.3%**	**73.5%**	**75.8%**	**75.8%**

All industrial effluent discharge into the sewer system of Swartland Municipality is monitored. 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.

Compliance percentages of industrial effluent discharged by industrial consumers per parameter

Town	Industrial Consumer	pH Compliance			COD Compliance		
		21/22	20/21	19/20	21/22	20/21	19/20
Darling	Darling Breweries	84.9%	67.3%	72.3%	84.9%	77.6%	78.7%
	Darling Vleismark	40.4%	30.6%	81.6%	63.5%	71.4%	85.7%
	Romery	90.6%	57.1%	71.4%	92.5%	83.7%	89.8%
Moorreesburg	Wespin Abattoir	98.0%	88.0%	93.8%	100.0%	100.0%	93.8%
Malmesbury	Swartland Abattoir	100.0%	100.0%	97.9%	90.6%	88.2%	87.5%
	Roelcor Abattoir	98.1%	100.0%	100.0%	96.2%	98.0%	97.9%
	Sugar Bird	0.0%	0.0%	2.1%	16.0%	6.0%	2.1%
	O'Kin	34.6%	42.0%	54.2%	98.1%	98.0%	97.9%
	Fair Cape	17.0%	7.3%	15.4%	77.4%	76.4%	81.0%

WC/WDM

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 2021/2022 was 1.68 %/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.

NRW, Water Losses and ILIs for the various water distribution systems

Description	Component	Unit	21/22	Record: Prior (Ml/a)				
				20/21	19/20	18/19	17/18	16/17
Koringberg	NRW	Volume	12.099	13.395	16.976	14.694	14.213	8.863
		Percentage	21.8%	23.7%	32.7%	31.5%	32.2%	14.7%
	Water Losses	Volume	10.368	12.634	16.224	13.953	14.125	8.743
		Percentage	18.7%	22.4%	31.3%	29.9%	32.0%	14.5%
	ILI		**1.51**	**1.80**	**1.59**	**1.41**	**1.37**	**0.85**
	The NRW and Water Losses were drastically reduced during the last two financial years. The NRW and Water Losses stayed roughly the same for the period 2017/2018 to 2019/2020.							

NRW, Water Losses and ILIs for the various water distribution systems								
Description	**Component**	**Unit**	**21/22**	**Record: Prior (Ml/a)**				
				20/21	**19/20**	**18/19**	**17/18**	**16/17**
Ongegund	NRW	Volume	9.214	3.075	4.236	6.546	16.655	17.748
		Percentage	38.4%	17.4%	24.9%	36.4%	60.3%	45.2%
	Water Losses	Volume	8.986	2.968	4.130	6.438	16.600	17.669
		Percentage	37.4%	16.8%	24.2%	35.8%	60.1%	45.0%
	The NRW and Water Losses increased drastically during the last financial year. The Municipality needs to keep the NRW percentage for Ongegund less than 20%.							
Riebeek Wes	NRW	Volume	18.314	26.490	22.040	23.263	21.515	11.134
		Percentage	10.2%	15.5%	14.0%	16.6%	16.9%	6.7%
	Water Losses	Volume	6.255	21.468	17.044	18.302	21.261	10.804
		Percentage	3.5%	12.6%	10.8%	13.0%	16.7%	6.5%
	ILI		**0.23**	**0.80**	**0.82**	**1.09**	**1.27**	**0.64**
	The NRW and Water Losses were drastically reduced during the last financial year. The current percentage of NRW of 10.2% and the Water Losses below 5% are excellent.							
Riebeek Kasteel	NRW	Volume	98.088	52.790	47.762	25.377	52.180	43.154
		Percentage	29.6%	20.6%	21.4%	13.8%	30.9%	17.2%
	Water Losses	Volume	93.466	50.693	45.732	23.426	51.842	42.653
		Percentage	28.2%	19.8%	20.5%	12.8%	30.7%	17.0%
	ILI		**2.72**	**1.45**	**1.52**	**0.77**	**1.77**	**1.46**
	The NRW and Water Losses increased during the last financial year. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Yzerfontein	NRW	Volume	40.333	60.201	47.109	15.977	51.930	33.577
		Percentage	13.1%	20.1%	19.8%	9.1%	33.6%	13.5%
	Water Losses	Volume	27.117	54.562	41.593	10.585	51.621	33.079
		Percentage	8.80%	18.2%	17.5%	6.0%	33.4%	13.3%
	ILI		**0.50**	**1.03**	**0.97**	**0.25**	**1.37**	**0.91**
	The NRW and Water Losses were reduced during the last financial year. The current percentages of NRW below 15% and Water Losses below 10% are excellent.							
Darling	NRW	Volume	150.430	150.505	138.078	127.003	91.397	84.219
		Percentage	25.0%	26.4%	26.7%	25.8%	19.6%	14.0%
	Water Losses	Volume	142.205	146.555	134.234	123.212	90.466	83.012
		Percentage	23.6%	25.7%	25.9%	25.1%	19.4%	13.8%
	ILI		**3.09**	**3.20**	**2.08**	**1.90**	**1.42**	**1.31**
	The NRW and Water Losses stayed roughly the same for the last four financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Moorreesburg	NRW	Volume	169.718	136.476	119.301	110.213	110.910	89.636
		Percentage	24.5%	20.3%	20.2%	20.7%	23.1%	13.6%
	Water Losses	Volume	153.392	129.156	112.145	103.172	109.948	88.318
		Percentage	22.1%	19.2%	19.0%	19.4%	22.9%	13.4%
	ILI		**2.06**	**1.74**	**1.36**	**1.25**	**1.37**	**1.11**
	The NRW and Water Losses increased during the last financial year. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Malmesbury	NRW	Volume	755.496	595.795	379.300	308.070	290.408	364.912
		Percentage	23.4%	20.3%	15.0%	14.1%	14.7%	13.5%
	Water Losses	Volume	681.709	562.994	347.331	276.769	286.461	359.494
		Percentage	21.1%	19.2%	13.8%	12.7%	14.5%	13.3%
	ILI		**2.67**	**2.20**	**1.44**	**1.17**	**1.30**	**1.69**
	The NRW and Water Losses increased further during the last financial year. The Municipality needs to work towards a NRW percentage of less than 15%, as was done for the previous financial years up to 2019/2020.							
TOTAL	**NRW**	**Volume**	**1 253.692**	**1 038.727**	**774.802**	**631.143**	**649.208**	**653.243**
		Percentage	**23.10%**	**20.86%**	**17.95%**	**16.72%**	**18.86%**	**13.79%**
	Water Losses	**Volume**	**1 123.498**	**981.030**	**718.433**	**575.857**	**642.325**	**643.772**
		Percentage	**20.70%**	**19.70%**	**16.64%**	**15.25%**	**18.66%**	**13.59%**
	ILI		**2.40**	**2.11**	**1.60**	**1.41**	**1.51**	**1.49**
	The overall NRW and Water Losses increased further during the last financial year, mainly because of the increase in the NRW and Water Losses of Malmesbury, Moorreesburg and Riebeek Kasteel. The Municipality needs to work towards an overall NRW percentage of less than 20%.							

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

Category A = No specific intervention required.

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

Category C = Requires attention

Category D = Requires immediate water loss reduction interventions

DWS's WC/WDM scorecard was also populated as part of the Water Services Audit Process. The aim of the scorecard is to establish areas where the municipality has made good progress in relation to WC/WDM and where there is still room for improvement. **The status quo score for Swartland Municipality is 79 out of 100 suggesting that the Municipality is making good progress with regard to the implementation of specific WC/WDM activities.**

Water Services Asset Management

An Asset Register is in place, which include all the water and sewerage infrastructure. The CRC, DRC, RUL and Age distribution of the water and sewerage infrastructure in Swartland Municipality's Management Area is summarised in the table below (June 2022).

CRC, DRC, RUL and Age distribution of the water and sewerage infrastructure					
Asset Type			**CRC**	**DRC**	**%CRC / DRC**
Water Infrastructure			R872 940 278	R387 815 968	44%
Sewerage Infrastructure			R719 539 811	R348 402 420	48%
Remaining Useful Life					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Water Infrastructure	R27 748 074	R4 449 943	R97 695 005	R22 344 934	R720 702 322
Sewerage Infrastructure	R8 885 539	R14 054 765	R102 774 854	R26 065 118	R567 759 535
Age Distribution					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Water Infrastructure	R82 495 099	R37 738 476	R167 534 450	R62 545 369	R522 626 884
Sewerage Infrastructure	R43 814 928	R214 347 508	R76 501 242	R39 241 607	R345 634 526

The above implies that about 56% of the value of the water infrastructure and 52% of the value of the sewerage infrastructure has been consumed. The CRC of the water and sewerage infrastructure that will need to be replaced over the next five years (RUL < 5 yrs) is R36.634 million. The asset renewal needs for the water infrastructure assets over the next ten years is R3.220 million per year. The reinvestment required is R27.748 million in the first five years and R4.450 million in the second five-year period. The age of 59.87% 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 R2.294 million per year. The reinvestment required is R8.886 million in the first five years and R14.055 million in the second five-year period. The age of 48.04% of the sewerage infrastructure assets is greater than twenty years.

Most of the maintenance work currently carried out on the water and sewerage infrastructure are re-active and it is important for the Municipality to increase their maintenance budget for water and sewerage infrastructure in order to ensure that the required preventative maintenance work is also carried out. The Asset Management Plan needs to indicate the risks associated with the inadequate refurbishment and maintenance of the various water and sewerage infrastructure.

It is important for Swartland Municipality to allocate adequate funds for the refurbishment, replacement and maintenance of their existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. All possible external sources of funding to assist with the development of the bulk infrastructure and additional sources need to be identified.

Water Services Operation and Maintenance

Design-out Maintenance, Preventative Maintenance and Corrective or Breakdown Maintenance are practised by Swartland Municipality (Planned and unplanned preventative and corrective maintenance). Adequate resources, information and activity control and management are in place to ensure proper operation and maintenance of the water and sewerage infrastructure.

Water Resources

Treated water is supplied to Malmesbury, Moorreesburg, Yzerfontein, Darling, Riebeek Kasteel, Riebeek Wes, Koringberg and Ongegund by the West Coast District Municipality, from their Withoogte and Swartland WTWs, through the West Coast District Municipality's two bulk water distribution systems. A Service Level Agreement between the West Coast District Municipality and Swartland Municipality is in place for the provision of bulk potable water to the various towns.

The supply from Paardenberg Dam is to supplement the supply to Malmesbury, Abbotsdale, Kalbaskraal, Riverlands and Chatsworth from the Municipality's own local source. Three boreholes at Riverlands are also used as supplementary sources.

The Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 to 2021 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.

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.

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			**31 640.000**

DWS's Reconciliation Strategies, as completed during 2016, indicated that the current water sources do not have adequate supply to cater for the current and long-term future water requirements of the various towns. The DWS is currently busy with the updating of the All Towns Reconciliation Strategies for the Western Cape.

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.

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 2021/2022 Demand (Low Growth)**	**Annual Growth on 2021/2022 Demand (High Growth)**	**WSDP Projection Model**
Withoogte System	1 573.600	2037	>2046	>2046
Swartland System	7 900.000	2031	2027	2029

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 don't "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 last financial year. The following recommendations with regard to water resource augmentation options available to Swartland Municipality were made based on the findings and conclusions contained in the 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.

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 water to most of the towns in Swartland Municipality's Management Area. The 2017-2022 WSDP was approved by the Swartland Municipality's Council on the 30th of March 2016. A 2022/2023 WDP-IDP Water Sector Input Report was also compiled during the last financial year, which was approved by Council with the IDP. The Municipality plans to update their WSDP for the next five-year WSDP cycle (2022-2027). The WSDP Performance- and Water Services Audit Report is compiled annually and taken to Council with the Annual Report. The Water Services By-laws was promulgated.

Swartland Municipality's Vulnerability Index for 2022 was indicated as 0.15 "Low Vulnerability". The only one area of concern evident from the 2022 assessment is Financial Asset Management, which obtained a score of 50% (High Vulnerability). The vulnerability of all the other key service areas are low, except basic sanitation that is moderate.

The Municipal staff is continuously exposed to training opportunities, skills development and capacity building at a technical, operations and management level in an effort to create a more efficient overall service to the users. A Workplace Skills Plan is compiled annually and the specific training needs of the personnel, with regard to water and wastewater management are determined annually. An amount of R1 500 868 was spent on training of employed personnel during the 2021/2022 financial year.

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.

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

- Service Delivery Agreement between the West Coast District Municipality and Swartland Municipality. A Monitoring Committee is also in place.

- Protection at points of abstraction such as Paardenberg Dam and the boreholes (Abstraction Management).

- Protection and maintenance of the distribution systems. This includes ensuring an adequate disinfectant residual at all times, rapid response to pipe bursts and other leaks, regular cleaning of reservoirs, keeping all delivery points tidy and clean, etc.

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

- A well-informed Council and municipal managers that understand the extreme importance of and are committed to providing adequate resources for continuous professional operation and maintenance of the water supply system.

- Competent managers and supervisors in the technical department who are responsible for water supply services lead by example and are passionate about monitoring and safeguarding drinking water quality.

- Well informed community members and other consumers of water supply services that know how to protect the water from becoming contaminated once it has been delivered, that have respect for water as a precious resource and that adhere to safe hygiene and sanitation practices.

SWARTLAND MUNICIPALITY

ANNUAL WSDP PERFORMANCE AND WATER SERVICES AUDIT REPORT FOR 2021/2022

BACKGROUND

Appointment

iX engineers was appointed by Swartland Municipality to assist them with the compilation of their WSDP Performance- and Water Services Audit Report, which forms part of their annual report for the 2021/2022 financial year. The purpose of the WSDP Performance- and Water Services Audit Report is to report on the implementation of Swartland Municipality's previous year's WSDP, for the 2021/2022 financial year.

The DWS developed the "Annual Water Services Development Plan Performance- and Water Services Audit Report" template during 2014, to assist Municipalities with the drafting of their reports. iX engineers agreed with Swartland Municipality to follow this template as far as possible.

Purpose

Swartland Municipality is 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, to report on the implementation of its WSDP during each financial year and to include a water services audit in such an annual report.

Section 62 of the Water Services Act requires the Minister to monitor every WSI in order to ensure compliance with the prescribed national standards. This regulation requires a WSA to complete and submit a WSDP Performance- and Water Services Audit every financial year. The WSDP Performance- and Water Services Audit is designed to monitor the compliance of the WSA and other WSIs with these regulations. The Water Services Act allows the audit to be used as a tool to compare actual performance of the WSA against the targets and indicators set in their WSDP. The purpose of the WSDP Performance- and Water Services Audit is as follows:

- To monitor compliance with the Act and these regulations;
- To compare actual performance against targets contained in the WSDPs.
- To identify possibilities for improving water conservation and water demand management.

The WSDP Performance- and Water Services Audit Report will give an overview of the implementation of the Municipality's previous year's WSDP, for the 2021/2022 financial year, and can be seen as an annexure to Swartland Municipality's Annual Report. The Annual Report is compiled as required by the Local Government: Municipal Systems Act, Act no 32 of 2000 (Section 46) and the Local Government: Municipal Finance Management Act, Act no 56 of 2003 (Section 121). The WSDP Performance- and Water Services Audit Report contain the following detail information:

- The Municipality's performance with regard to their KPIs for water and sewerage services for the 2021/2022 financial year, as included in the Municipality's SDBIP.
- The Municipality's Performance with regard to DWS's Blue and Green Drop Assessments. Blue drop status is awarded to those water schemes that comply with 95% criteria on drinking water quality management. Green drop status is awarded to those WWTWs that comply with 90% criteria on key selected indicators on wastewater quality management.
- DWS's Scorecard for assessing the potential for WC/WDM efforts in the Municipality.

- Information to be included in a WSDP Performance- and Water Services Audit as stipulated under section 9 of the Water Services Act, “Guidelines for Compulsory National Standards” and also required by DWS’s 2014 WSDP Performance- and Water Services Audit Report guidelines.

- Information on the implementation of the various WSDP activities, as included under the WSDP Business Elements in DWS’s WSDP guidelines.

A. WATER SERVICES AUTHORITY PROFILE

A.1. Map of Water Services Authority Area of Jurisdiction

Swartland Municipality is located in the West Coast District of the Western Cape, as indicated on the figure below.

Figure A.1.1: Location of Swartland Municipality in the Western Cape

The figure below gives an overview of Swartland Municipality’s Management Area and the settlements located in the Area.

Figure A.1.2: Swartland Municipality’s Management Area

The various schemes supplied with bulk water by Swartland Municipality are discussed in more detail under Section A.3. The existing water and sewerage infrastructure of the various distribution systems are indicated on the Aerial Maps included in the Municipality's detail WSDP documents.

A.2. Water Services Administration and Organization

Swartland Municipality is the WSA for the entire Municipal Management Area. The West Coast District Municipality acts as Bulk Water Services Provider for Swartland Municipality and provides bulk potable water to all the towns in Swartland Municipality's Management Area. Swartland Municipality's approved Organogram is included in Annexure G (Municipal Manager approval 25 June 2021). The table below gives the contact details of the persons responsible for water services management and planning within Swartland Municipality.

Table A.2.1: Water Services Administrative Structure	
Accounting Officer	
Designation	Municipal Manager
Name	Joggie Scholtz
Telephone Nr.	022-4879 400
Fax Nr.	022-4879 440
Cell Nr.	082 823 7542
Email	joggiescholtz@swartland.org.za
WSA Manager	
Designation	Director: Civil Engineering Services
Name	Louis Zikmann
Telephone Nr.	022-487 9400
Fax Nr.	022-487 9440
Cell Nr.	082 823 7543
Email	louis@swartland.org.za
WSP Manager	
Designation	Director: Civil Engineering Services
Name	Louis Zikmann
Telephone Nr.	022-487 9400
Fax Nr.	022-487 9440
Cell Nr.	082 823 7543
Email	louis@swartland.org.za
WSDP Manager	
Designation	Senior Manager: Solid Waste and Trade Services
Name	Vacant
Telephone Nr.	
Fax Nr.	
Cell Nr.	
Email	
IDP Manager	
Designation	IDP Manager
Name	Olivia Fransman
Telephone Nr.	022-487 9400
Fax Nr.	022-487 9440
Cell Nr.	-
Email	fransmano@swartland.org.za

A.3. Water Services Overview

Swartland Municipality is situated within the Berg-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 supplied with bulk potable water by the West Coast District Municipality are Malmesbury (Abbotsdale, Riverlands, Chatsworth and Kalbaskraal), Moorreesburg, Yzerfontein, Darling, Riebeek Kasteel, Riebeek Wes, Koringberg and Ongegund (PPC).

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 Kalbaskraal. The groundwater is disinfected, before it is blended with the other potable water and distributed to the consumers in Riverlands and Kalbaskraal respectively.



Three Riverlands Boreholes

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). The following towns receive potable water from the Swartland Bulk System.*

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 two Ongegund reservoirs with a total capacity of 2.39 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 reservoir (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 to the Yzerfontein reservoirs (2 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 the following two towns in Swartland Municipality's Management Area.*

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 Koringberg reservoir of 0.27 Ml capacity, from where it is distributed to the consumers. The capacity of the West Coast DM's reservoir, adjacent to the Municipality's reservoir, is 0.23 Ml.

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

Table A.3.1: 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 design capacities of the various treatment components of the Swartland WTW are summarised in the table below.

Table A.3.2: Design capacities of the various components of the Swartland WTW		
Design Capacities		
Component	**m^3/a**	**m^3/d**
Overall capacity	10 590 000	29 000
Flocculation	11 000 000	30 140
Clarifying	11 000 000	30 140
Filtration	10 590 000	29 000
Chlorination	10 590 000	29 000

Table A.3.3: Swartland WTW's historical flows and operational capacity				
Year	**Maximum Month Average Daily Flow (Ml/d)**	**WTW Operational Capacity for Maximum Month Average Daily Flow (%)**	**Average Annual Daily Flow (Ml/d)**	**WTW Operational Capacity for Average Annual Daily Flow (%)**
2013/2014	25.032 (Febr)	86.32%	17.801	61.38%
2014/2015	26.496 (Febr)	91.37%	19.161	66.07%
2015/2016	24.226 (Febr)	83.54%	18.492	63.77%
2016/2017	19.816 (Febr)	68.33%	15.847	54.64%
2017/2018	13.958 (Jul)	48.13%	11.734	40.46%
2018/2019	16.171 (Febr)	55.76%	13.332	45.97%
2019/2020	17.663 (Febr)	60.91%	13.853	47.77%
2020/2021	21.089 (Febr)	72.72%	16.072	55.42%
2021/2022	23.392 (Febr)	80.66%	17.850	61.55%

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

A.3.4: Existing internal water infrastructure						
Water Distribution System	**Bulk Supply**	**WTW**		**Bulk and Network**	**Number of Water PS**	**Total Res Storage**
	(Resources)	**Operated by West Coast DM**	**Add Disinfection**	**(km)**	**(RW/PW)**	**(Ml)**
Malmesbury (Abbotsdale, Kalbaskraal, Riverlands, Chatsworth)	Berg River (Voëlvlei), Paardenberg Dam and three Riverlands bhs	29 Ml/d (Swartland WTW)	Malmesbury, Kalbaskraal, Riverlands	264.495	9 (PW)	37.543
Moorreesburg	Berg River (Misverstand)	72 Ml/d (Withoogte WTW)	-	72.538	1 (PW)	8.172
Riebeek Kasteel	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	23.084	1 (PW)	1.862
Riebeek Wes	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	22.308	1 (PW)	2.692
Ongegund	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	7.367	1 (PW)	2.391
Koringberg	Berg River (Misverstand)	72 Ml/d (Withoogte WTW)	-	10.353	-	0.508
Darling	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	46.285	-	3.432
Yzerfontein	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	38.698	-	4.375

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

A.3.5: Existing main sewerage infrastructure			
Sewer Drainage Systems	**Sewer Drainage Network (m)**	**Number of Sewer PS**	**WWTW (Capacity in Ml/d)**
Malmesbury and Abbotsdale	147.705	5	10.000
Kalbaskraal	7.197	2	0.157
Riverlands and Chatsworth	5.106	2	0.270
Moorreesburg	59.870	-	1.500
Riebeek Kasteel, Riebeek Wes and Ongegund	51.581	6	1.900
Koringberg	2.612	-	0.030
Darling	40.930	2	1.500

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 2021/2022 financial year (Ml/d).

Table A.3.6: 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 (2021/2022)	Average Wet Weather Flow (Jul'21, Aug'22, May'22, Jun'22,)	Average Daily Flow as a % of Design Capacity	Final Effluent Compliance for 2021/2022
Malmesbury	10.000	6.498 (Jul)	5.557	5.771	55.57%	Microbiological: 100.0% Chemical: 89.6% Physical: 94.4%
Kalbaskraal	0.157	Unknown	0.077	Unknown	49.04%	Microbiological: 100.0% Chemical: 33.3% Physical: 100.0%
Riverlands/Chatsworth	0.270	Unknown	0.245	Unknown	90.74%	Microbiological: 25.0% Chemical: 33.3% Physical: 72.2%
Moorreesburg	1.500	1.596 (Jun)	1.027	1.210	68.47%	Microbiological: 0.0% Chemical: 35.0% Physical: 40.0%
Riebeek Valley	1.900	1.353 (Jul)	0.861	0.992	45.32%	Microbiological: 75.0% Chemical: 100.0% Physical: 100.0%
Koringberg	0.030	Unknown	0.083	Unknown	276.67%	Microbiological: 0.0% Chemical: 31.3% Physical: 33.3%
Darling	1.500	2.630 (Jun)	1.263	1.433	84.20%	Microbiological: 75.0% Chemical: 70.8% Physical: 77.8%

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

Table A.3.7: Existing Organic Design Capacities and Historical Loadings at the Activated Sludge WWTWs

WWTW	Organic Design Capacity (kg COD/d)	2021/2022		2020/2021		2019/2020	
		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	7 213	72.13%	8 105	81.05%	7 522	75.22%
Moorreesburg	1 000	-	-	1 165	116.5%	1 357	135.7%
Riebeek Valley	1 500	967	64.47%	882	58.80%	531	35.40%
Darling	1 500	1 729	115.27%	1 675	111.67%	1 667	111.13%

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 2021 Socio Economic Profile for Swartland Municipality indicates the 2021 population at 137 567 persons and the estimated 2020 households at 32 272. This total population is estimated to increase to 146 940 by 2025, which equates to 1.70% average annual growth over this period. The current population in the WSDP Performance- and Water Services Audit Report is estimated higher, as well as the average annual future population growth percentage.

The 2021/2022 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.3.8: Estimated future annual population growth percentages, population and households per distribution system

Distribution System	Estimated future annual Population Growth %	Projected 2021/2022 Persons	Projected 2021/2022 Households
Darling	2.0%	12 702	3 413
Koringberg	4.0%	1 797	469
Malmesbury	4.5%	55 747	14 711
Abbotsdale	3.0%	5 056	1 242
Chatsworth & Riverlands	6.0%	7 257	1 981
Kalbaskraal	5.0%	3 927	1 073
Moorreesburg	4.0%	19 061	5 474
Riebeek Kasteel	7.0%	9 366	2 646
Ongegund (PPC)	3.0%	420	105
Riebeek Wes	6.0%	7 827	1 942
Yzerfontein	4.0%	1 687	725
Farms	3.5%	46 019	10 395
TOTALS	**4.1%**	**170 866**	**44 176**

The tables below give 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.3.9: Water Services Overview (Water)

Settlement Type	2011/2012 Households	2011/2012 Population	2021/2022 Households	2021/2022 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
URBAN														
Metropolitan Area					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Formal Town					Adequate			Below RDP					None	
Malmesbury	9 473	35 897	14 711	55 747	P		P							
Abbotsdale	924	3 762	1 242	5 056	P		P							
Chatsworth/Riverlands	1 017	3 696	1 281	4 457	P		P							
Kalbaskraal	659	2 411	1 073	3 927	P		P							
Riebeek Kasteel	1 345	4 761	2 646	9 366	P		P							
Riebeek Wes	1 049	4 229	1942	7827	P		P							
Darling	2 800	10 420	3 413	12 702	P		P							
Moorreesburg	3 698	12 877	5 474	19 061	P		P							
Koringberg	317	1 214	469	1 797	P		P							
Yzerfontein	490	1 140	725	1 687	P		P							
Sub-Total	**21 772**	**80 407**	**32 977**	**121 627**										
Townships					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Informal Settlements					Adequate			Below RDP					None	
Chatsworth/Riverlands	89	356	700	2 800									P	
Sub-Total	**89**	**356**	**700**	**2 800**										
Working towns & service centres					Adequate			Below RDP					None	
Ongegund (PPC)	94	376	105	420	P		P							
Sub-Total	**94**	**376**	**105**	**420**										
Sub-Total: (Urban)	**21 955**	**81 139**	**33 782**	**124 847**										
RURAL														
Rural / Farming					Adequate			Below RDP					None	
Farms	7 369	32 624	10 395	46 019	P		P							P
Sub-Total	**7 369**	**32 624**	**10 395**	**46 019**										
Informal Settlements					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Sub-Total (Rural)	**7 369**	**32 624**	**10 395**	**46 019**										
TOTAL	**29 324**	**113 763**	**44 176**	**170 866**										

Table A.3.10: Water Services Overview (Sanitation)

Settlement Type	2011/2012 Households	2011/2012 Population	2021/2022 Households	2021/2022 Population	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**	
Sub-Total	**0**	**0**	**0**	**0**										
Formal Town					**Adequate**			**Below RDP**					**None**	
Malmesbury	9 473	35 897	14 711	55 747	P		P							
Abbotsdale	924	3 762	1 242	5 056	P		P							
Chatsworth/Riverlands	1 017	3 696	1 281	4 457	P		P							
Kalbaskraal	659	2 411	1 073	3 927	P		P							
Riebeek Kasteel	1 345	4 761	2 646	9 366	P		P							
Riebeek Wes	1 049	4 229	1 942	7 827	P		P							
Darling	2 800	10 420	3 413	12 702	P		P							
Moorreesburg	3 698	12 877	5 474	19 061	P		P							
Koringberg	317	1 214	469	1 797	P		P							
Yzerfontein	490	1 140	725	1 687	P		P							
Sub-Total	**21 772**	**80 407**	**32 977**	**121 627**										
Townships					**Adequate**			**Below RDP**					**None**	
Sub-Total	**0**	**0**	**0**	**0**										
Informal Settlements					**Adequate**			**Below RDP**					**None**	
Chatsworth/Riverlands	89	356	700	2 800									P	
Sub-Total	**89**	**356**	**700**	**2 800**										
Working towns & service centres					**Adequate**			**Below RDP**					**None**	
Ongegund (PPC)	94	376	105	420	P		P							
Sub-Total	**94**	**376**	**105**	**420**										
Sub-Total: (Urban)	**21 955**	**81 139**	**33 782**	**124 847**										
RURAL														
Rural / Farming					**Adequate**			**Below RDP**					**None**	
Farms	7 369	32 624	10 395	46 019	P		P							P
Sub-Total	**7 369**	**32 624**	**10 395**	**46 019**										
Informal Settlements					**Adequate**			**Below RDP**					**None**	
Sub-Total	**0**	**0**	**0**	**0**										
Sub-Total (Rural)	**7 369**	**32 624**	**10 395**	**46 019**										
TOTAL	**29 324**	**113 763**	**44 176**	**170 866**										

B. WSDP PERFORMANCE REPORT

B.1. WSDP Reference and Status

The 2022/2023 WSDP-IDP Sector Input Report was compiled during the last financial year and was approved by Council with the IDP. DWS's new WSDP website was rolled-out to all the WSAs in the West Coast District on the 31st of October 2017. The Municipality plans to upgrade their WSDP during the 2022/2023 financial year according to DWS's new WSDP website requirements for the new five-year WSDP cycle (2022-2027). The table below gives an overview of Swartland Municipality's WSDP status.

Table B.1.1: WSDP and Reporting Reference

Nr	WSDP Title and Reference	Status	Date	WSDP Year	Financial Year	Reporting year
2	Water Services Development Plan, eWSDP, Module 2 and 3 Documents and WSDP-IDP Sector Input Report (2017-2022)	Drafted:	Febr 2016	Year 1	2017/18	Year - 4
		Comment submit:	Apr / May 2016	Year 2	2018/19	Year - 3
		Finalised:	Febr. 2016	Year 3	2019/20	Year - 2
		Adopted:	30 March 2016	Year 4	2020/21	Year - 1
		Published:	June 2016	Year 5	**2021/22**	Year 0

Legend:

- Past Financial Years
- Previous Financial Year (financial year of reporting)
- Future Years

B.2. Performance on Water Services Objectives and Strategies

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 and 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.

Finally, the Annual Report, of which the WSDP Performance- and Water Services Audit Report forms a part, records the success or otherwise of the previous year's implementation.

The table below gives an overview of the Municipality's performance on the water and sanitation objectives and strategies per WSDP topic.

Table B.2.1: Performance on Water Services Objectives and Strategies per WSDP Topic

Nr	Objective / Strategy	Key Performance Indicator	Inclusion (yes/no)		WSDP Year 1		WSDP Year 2		WSDP Year 3		WSDP Year 4		WSDP Year 5	
					FY 1	2017/18	FY 2	2018/19	FY 3	2019/20	FY 4	2020/21	FY 5	2021/22
			WSDP	IDP	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
WSDP Topic 1: Administration														
WSDP Topic 2: Demographics														
WSDP Topic 3: Service levels														
	Improved access to water, sanitation and refuse removal.	% of urban households with access to bsic water supply (at least piped (tap) water within 200 meters from dwelling).	Yes	Yes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Improved access to water, sanitation and refuse removal.	% of urban households with access to basic sanitation (at least a flush toilet, chemical toilet or pit toilet with ventilation (VIP)).	Yes	Yes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
WSDP Topic 4: Socio economic														
WSDP Topic 5: Water Services Infrastructure														
	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.	Yes	Yes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
WSDP Topic 6: Operation Maintenance														
	Improved water sustainability	% total water losses	Yes	Yes	< 17%	16.3%	< 17%	16.7%	< 17%	12.1%	< 17%	19.7%	< 17%	23.1%
WSDP Topic 7: Associated services														
WSDP Topic 8: Conservation and Demand management														
WSDP Topic 9: Water Resources														
WSDP Topic 10: Financial profile														
	Capital expenditure in line with budget and time frames	% of capital budget spent	Yes	Yes	90%	91%	90%-100%	97.3%	95%-105%	88.1%	95%-105%	98.4%	95%-105%	100.8%
	Capital project implementation	Average % completion of capital projects	Yes	Yes	90%	94%	90%	111.1%	90%	90.0%	90%	99.0%	90%	100.0%
	Operating expenditure in line with budget and time frames	% of operating budget spent	Yes	Yes	90%	97%	90%-100%	93.6%	90%-100%	99.0%	90%-100%	85.9%	90%-100%	98.0%
	Spending of grants	% spending of grants	Yes	Yes	100%	100%	100%	100%	100%	99%	100%	100%	100%	97%
WSDP Topic 11: Institutional Arrangements profile														
	Ensure that accurate revenue estimates are prepared in relation to operating requirements	Projected tariff increases determined for the budget of the new financial year	Yes	Yes	100%	100%	100%	100%	100%	100%	100%	100%	-	-
	Workforce training roll-out	% of planned training sessions according to the Workplace Skills Plan realised.	Yes	Yes			100%	100%	100%	100%	100%	100%	100%	100%
WSDP Topic 12: Social and Customer service requirements														
	Correspondence addressed in a timely manner	% of all correspondence recorded by Collaborator less than 60 days old	Yes	Yes			90%	93.7%	90%	95.3%	90%	95.2%	-	-
WSDP Topic 13: Needs development plan														

Legend:

- Past Financial Years
- Previous Financial Year (financial year of reporting)
- Future Years

KPIs for 2017/2018 onwards: Director Civil Engineering Services

The following water and sanitation related investigations were successfully completed during the last financial year.

- The WSDP Performance- and Water Services Audit Report for the 2020/2021 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 2021) as part of the WSDP Performance- and Water Services Audit Process.

- The 2022/2023 WSDP – IDP Water Sector Input Report was compiled and approved by Council with the IDP.

- The infrastructure constructed during the 2021/2022 financial year were added to the Asset Register and the Asset Register was updated.

- Sludge Management Plans were drafted for each of the WWTWs by Dr Elize Herselman.

- An Assessment of Loading, Capacity and Performance of the Darling Wastewater Treatment Works was done, Revision 1, August 2021.

- The following two MIG Technical Reports were compiled:
  - Upgrading of the External Water Supply for the De Hoop Development in Malmesbury, June 2021.
  - Upgrading of Bulk Water Supply for the De Hoop Development in Malmesbury, June 2021.

- 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.

The Municipality also received the following awards / acknowledgements:

- **Swartland Municipality's performed well with regard to DWS's 2021 Blue Drop Progress Assessment (Drinking Water Process and Quality). The Blue Drop Risk Ratings for the two systems were 23% and 30%, which fall in the low-risk category (<50%).** The risk ratings were determined based on the following system specific risk indicators.
  - Design capacity;
  - Operational capacity;
  - Water Quality Compliance;
  - Technical Skills; and
  - Water Safety Plans.

- **Swartland Municipality is performing above average with regard to wastewater quality management, with an overall Green Drop Score of 89% for DWS's 2021 assessment.** The Green Drop Scores for the Malmesbury-, Riebeek Valley- and Darling WWTW were between 89% and 95% (Three potential Green Drop Certified Systems). The Wastewater Risk Ratings were at low risk (<50%) for the Riebeek Valley-, Malmesbury-, Darling- and Kalbaskraal WWTW and at high risk for the Chatsworth-, Moorreesburg- and Koringberg WWTW (70% - <90%).

  Swartland Municipality was also acknowledged by the DWS as one of the Top 3 Best Performing Municipalities for their Green Drop Results.

B.3. Status of Water Services Projects

Most of the capital expenditure for the last financial year was for the upgrading of the Moorreesburg WWTW (R54.716 million) and the Darling WWTW (R7.333 million). The table below gives an overview of the capital expenditure per project for the last financial year.

Table B3.1: Water Services Projects Status and Performance

Nr	Project Title and Description	Inclusion		Total Project Cost R'000	Project Progress (%)	Year 0 Performance - FY2021/22			Funding Source(s)	Project Category / Type	Planned Period		Project Status	Actual Completion Year
		WSDP	IDP			FY Budget R'000	Expended R'000	%			From FY	To FY		
1	Water: Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	Yes	Yes	R7 536	95%	R100	R100	100%	CRR	Water	2012/2013	2024/2025	In Progress	-
2	Equipment water	Yes	Yes	R557	73%	R47	R46	97%	CRR	Water	2013/2014	2024/2025	In Progress	-
3	Bulk water infrastructure (emergency spending)	Yes	Yes	R2 791	46%	R1 103	R1 103	100%	CRR	Water	2020/2021	2024/2025	In Progress	-
4	Upgrade Riverlands and Kalbaskraal water pump stations	Yes	Yes	R991	100%	R1 000	R991	99%	CRR	Water	2021/2022	2021/2022	Completed	2021/2022
5	Connections: Water Meters (New /Replacements)	Yes	Yes	R3 866	38%	R600	R584	97%	CRR	Water	2019/2020	2024/2025	In Progress	-
6	Swartland Bulk Water System S3.3 S3.4 Panorama to Wesbank I1/4	Yes	Yes	R31 150	5%	R1 500	R1 500	100%	CRR, MIG	Water	2021/2022	2024/2025	In Progress	-
7	Riebeek Kasteel supply S2.4	Yes	Yes	R1 200	17%	R200	R200	100%	CRR	Water	2021/2022	2022/2023	In Progress	-
8	Equipment: Water (Donated)	Yes	Yes	R22	100%	R0	R22	0%	CRR	Water	2021/2022	2021/2022	Completed	2021/2022
9	Water networks: Upgrades and Replacement	Yes	Yes	R5 338	37%	R2 000	R2 000	100%	CRR, MIG	Water	2021/2022	2022/2023	In Progress	-
10	Housing: Malmesbury De Hoop - External Services (Water)	Yes	Yes	R7 238	38%	R2 754	R2 738	99%	CRR, MIG	Water	2021/2022	2022/2023	In Progress	-
11	Malmesbury De Hoop (395 Water Meters)	Yes	Yes	R40	100%	R40	R40	100%	CRR	Water	2021/2022	2021/2022	Completed	2021/2022
12	Darling Serviced Sites (Water)	Yes	Yes	R0	0%	R359	R0	0%	CRR	Water	2021/2022	2021/2022	Not implemented	-
13	Sewerage: Moorreesburg WWTW	Yes	Yes	R126 253	87%	R15 850	R15 850	100%	CRR	Sewerage	2016/2017	2022/2023	In Progress	-
						R32 837	R38 866	118%	MIG					
14	Equipment: Sewerage telemetry	Yes	Yes	R439	74%	R144	R55	38%	CRR	Sewerage	2013/2014	2024/2025	In Progress	-
15	Equipment: Sewerage	Yes	Yes	R321	70%	R28	R25	91%	CRR	Sewerage	2013/2014	2024/2025	In Progress	-
16	Sewerage: Darling WWTW	Yes	Yes	R35 083	98%	R3 028	R3 028	100%	CRR	Sewerage	2019/2020	2022/2023	In Progress	-
						R2 276	R4 305	189%	MIG					
17	Malmesbury: New Macerator	Yes	Yes	R526	100%	R650	R526	81%	CRR	Sewerage	2021/2022	2021/2022	Completed	2021/2022
18	Sewerage: CK18173 Nissan NP300	Yes	Yes	R321	100%	R321	R321	100%	CRR	Sewerage	2021/2022	2021/2022	Completed	2021/2022
19	Sewerage: CK11942 Nissan NP300	Yes	Yes	R321	100%	R321	R321	100%	CRR	Sewerage	2021/2022	2021/2022	Completed	2021/2022
20	Darling Serviced Sites (Sewerage)	Yes	Yes	R0	0%	R407	R0	0%	CRR	Sewerage	2021/2022	2021/2022	Not implemented	-
Total				**R222 825**		**R65 565**	**R72 621**	**111%**						

B.4. Past Financial Year Water Services Projects Impact Declaration

The impacts of the water and sewerage capital projects, which were implemented by Swartland Municipality in the previous financial year, were as follows:

Table B.4.1: Past Financial Year Project Impact Declaration

Nr	Project Title and Description	Project Category	Settlements which benefitted	Nr Beneficiaries		Impact Declaration
				Households	Population	
1	Water: Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	WC/WDM	Management Area	-	-	Reduce NRW and water losses and ensure adequate monitoring of water usage.
2	Equipment water	Other	Management Area	-	-	Ensure adequate O&M of systems.
3	Bulk water infrastructure (emergency spending)	Bulk Pipeline	Management Area	-	-	Ensure adequate O&M of systems.
4	Upgrade Riverlands and Kalbaskraal water pump stations	Pump Stations	Riverlands/Kalbaskraal	3054	11184	Ensure adequate potable water supply to Kalbaskraal and Riverlands.
5	Connections: Water Meters (New/Replacements)	WC/WDM	Management Area	-	-	Ensure all water usage is metered. Reduce NRW and Water Losses.
6	Swartland Bulk Water System S3.3 S3.4 Panorama to Wesbank I1/4	Bulk Pipeline	Malmesbury	3319	12612	Increase capacity of bulk water pipeline infrastructure in order to ensure adequate supply to Wesbank.
7	Riebeek Kasteel supply S2.4	Reticulation	Riebeek Kasteel	397	1405	Upgrade capacity of water reticulation pipeline to ensure adequate supply and pressure.
8	Equipment: Water (Donated)	Other	Management Area	-	-	Ensure adequate O&M of systems.
9	Water networks: Upgrades and Replacement	WC/WDM	Management Area	-	-	Reduce NRW and water losses and ensure adequate monitoring of water usage.
10	Housing: Malmesbury De Hoop - External Services (Water)	Reticulation	Malmesbury	395	1501	Install water reticulation network for new De Hoop housing development.
11	Malmesbury De Hoop (395 Water Meters)	WC/WDM	Malmesbury	395	1501	Monitor all water consumption. Reduce NRW and Water Losses.
12	Darling Serviced Sites (Water)	Reticulation	Darling	-	-	Project was not implemented.
13	Sewerage: Moorreesburg WWTW	WWTW	Moorreesburg	5474	19061	Increase capacity of WWTW and ensure final effluent compliance.
14	Equipment: Sewerage telemetry	Other	Management Area	-	-	Ensure proper process control and system management.
15	Equipment: Sewerage	Other	Management Area	-	-	Ensure adequate O&M of systems.
16	Sewerage: Darling WWTW	WWTW	Darling	3413	12702	Increase capacity of WWTW and ensure final effluent compliance.
17	Malmesbury: New Macerator	WWTW	Malmesbury	-	-	Install new macerator to reduce solids to small pieces in order to deal with rags and other solid waste.
18	Sewerage: CK18173 Nissan NP300	Other	Management Area	-	-	Ensure sufficient vehicles for the operation of the systems.
19	Sewerage: CK11942 Nissan NP300	Other	Management Area	-	-	Ensure sufficient vehicles for the operation of the systems.
20	Darling Serviced Sites (Sewerage)	Sewer drainage network	Darling	-	-	Project was not implemented.
	TOTAL			**16447**	**59966**	

C. WATER SERVICES AUDIT REPORT

C.1. Quantity of Water Services Provided (Water Balance)

The tables below give an overview of the volume of water supplied by the West Coast District Municipality through the Withoogte and Swartland bulk water schemes, the treatment losses at the Withoogte WTW and the Swartland WTW and the bulk water distribution losses for the two bulk schemes.

Table C.1.1: Volume of water supplied by the West Coast District Municipality (Ml/a)

Year	Raw Water			Treated Water (System Input Volume)		Billed Metered Consumption		Totals		
	WH	LOG	SL	WH	SL	WH	SL	Raw	Treated	Billed
2003/2004	14 874.980	867.392	5 267.300	13 759.357	4 872.253	14 349.383	4 613.652	21 009.672	19 499.001	18 963.035
2004/2005	14 340.236	1 279.771	5 310.791	13 264.718	4 912.482	13 373.190	4 416.873	20 930.798	19 456.971	17 790.063
2005/2006	14 709.035	1 241.188	5 587.953	13 997.380	5 270.022	14 630.476	4 728.972	21 538.176	20 508.590	19 359.448
2006/2007	15 645.447	1 162.414	6 536.925	14 652.629	6 084.440	15 633.075	5 163.068	23 344.786	21 899.483	20 796.143
2007/2008	16 179.454	1 014.826	6 572.601	15 163.558	6 035.104	15 826.004	5 336.768	23 766.881	22 213.488	21 162.772
2008/2009	17 487.890	436.312	6 661.635	16 425.249	6 221.938	16 067.399	5 722.786	24 585.837	23 083.499	21 790.185
2009/2010	16 932.258	621.476	6 761.867	15 768.546	6 379.743	16 471.427	5 605.095	24 315.601	22 769.765	22 076.522
2010/2011	16 705.674	972.433	6 636.187	15 469.275	6 336.233	15 657.437	5 838.737	24 314.294	22 777.941	21 496.174
2011/2012	17 525.046	1 088.030	6 592.732	16 347.850	6 256.296	16 622.986	5 867.488	25 205.808	23 692.176	22 490.474
2012/2013	18 692.770	931.778	6 595.709	17 429.487	6 189.326	17 569.427	5 759.405	26 220.257	24 550.591	23 328.832
2013/2014	20 363.425	0.000	6 497.447	18 772.020	6 124.786	18 116.985	5 545.097	26 860.872	24 896.806	23 662.082
2014/2015	20 738.318	0.000	6 993.623	19 473.750	6 572.495	18 082.462	6 128.899	27 731.941	26 046.245	24 211.361
2015/2016	20 230.454	583.318	6 749.603	18 955.808	6 326.667	17 738.149	5 992.835	27 563.375	25 865.793	23 730.984
2016/2017	16 952.798	928.765	5 784.056	16 196.973	5 455.098	16 854.138	5 122.162	23 665.619	22 580.836	21 976.300
2017/2018	12 129.606	1 055.105	4 282.906	11 898.399	4 208.092	12 614.429	3 783.008	17 467.617	17 161.596	16 397.437
2018/2019	12 626.990	412.341	4 866.029	12 320.023	4 770.391	12 410.194	4 384.439	17 905.360	17 502.755	16 794.633
2019/2020	13 127.882	118.869	5 056.347	12 480.771	4 920.110	12 526.147	4 623.505	18 303.098	17 519.750	17 149.652
2020/2021	12 918.000	170.146	5 866.143	12 534.000	5 732.805	12 792.298	5 190.546	18 954.289	18 436.951	17 982.844
2021/2022	14 560.000	224.112	6 515.111	13 774.000	6 241.020	12 712.535	5 812.752	21 299.223	20 239.132	18 525.287

Table C.1.2: Treatment and distribution losses for the Withoogte and Swartland bulk water schemes

Year	Purification				Distribution				Totals			
	WH		SL		WH		SL		Purification		Distribution	
	Ml	%	Ml	%	Ml	%	Ml	%	Ml	%	Ml	%
2003/2004	1 115.623	7.50	395.047	7.50	277.366	1.90	258.601	5.31	1 510.670	7.19	535.967	2.75
2004/2005	1 075.518	7.50	398.309	7.50	1 171.299	8.05	495.609	10.09	1 473.827	7.04	1 666.908	8.57
2005/2006	711.655	4.84	317.931	5.69	608.092	3.99	541.050	10.27	1 029.586	4.78	1 149.142	5.60
2006/2007	992.818	6.35	452.485	6.92	181.968	1.15	921.372	15.14	1 445.303	6.19	1 103.340	5.04
2007/2008	1 015.896	6.28	537.497	8.18	352.380	2.18	698.336	11.57	1 553.393	6.54	1 050.716	4.73
2008/2009	1 062.641	6.08	439.697	6.60	794.162	4.71	499.152	8.02	1 502.338	6.11	1 293.314	5.60
2009/2010	1 163.712	6.87	382.124	5.65	-81.405	-0.50	774.648	12.14	1 545.836	6.36	693.243	3.04
2010/2011	1 236.399	7.40	299.954	4.52	784.271	4.77	497.496	7.85	1 536.353	6.32	1 281.767	5.63
2011/2012	1 177.196	6.72	336.436	5.10	812.894	4.66	388.808	6.21	1 513.632	6.01	1 201.702	5.07
2012/2013	1 263.283	6.76	406.383	6.16	791.838	4.31	429.921	6.95	1 669.666	6.37	1 221.759	4.98
2013/2014	1 591.405	7.82	372.661	5.74	655.035	3.49	579.689	9.46	1 964.066	7.31	1 234.724	4.96
2014/2015	1 264.568	6.10	421.128	6.02	1 391.288	7.14	443.596	6.75	1 685.696	6.08	1 834.884	7.04
2015/2016	1 274.646	6.30	422.936	6.27	1 800.977	9.22	333.832	5.28	1 697.582	6.16	2 134.809	8.25
2016/2017	755.825	4.46	328.958	5.69	271.600	1.59	332.936	6.10	1 084.783	4.58	604.536	2.68
2017/2018	231.207	1.91	74.814	1.75	339.075	2.62	425.084	10.10	306.021	1.75	764.159	4.45
2018/2019	306.967	2.43	95.638	1.97	322.170	2.53	385.952	8.09	402.605	2.25	708.122	4.05
2019/2020	647.111	4.93	136.237	2.69	73.493	0.58	296.605	6.03	783.348	4.28	370.098	2.11
2020/2021	384.000	2.97	133.338	2.27	-88.152	-0.70	542.259	9.46	517.338	2.73	454.107	2.46
2021/2022	786.000	5.40	274.091	4.21	1 285.577	9.18	428.268	6.86	1 060.091	4.98	1 713.845	8.47

The treatment losses at both the Withoogte WTW and the Swartland WTW were less than 5.5% for the last five financial years, which is excellent. The bulk water distribution losses for the last five financial years for the Withoogte system were less than 9.2% and for the Swartland system it were between 6% and 10.1%. The treatment losses for the two systems combined were less than 5% for the last five financial years, which is excellent. The bulk distribution losses for the two systems combined increased from below 4.5% for the previous four financial years to 8.47% for the last financial year.

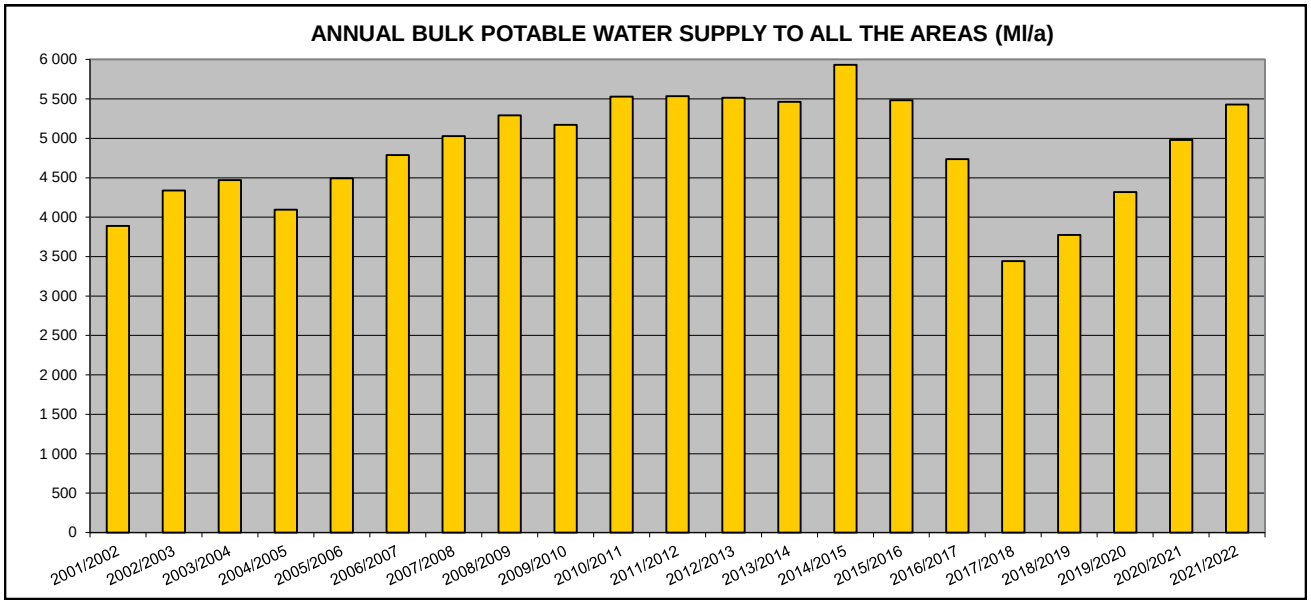


Figure C.1.1: Swartland Municipality's annual bulk potable water supply (System Input Volume) to all the areas

The graph below gives an overview of the total bulk potable water supplied (System Input Volume) for the various water distribution systems in Swartland Municipality's Management Area.

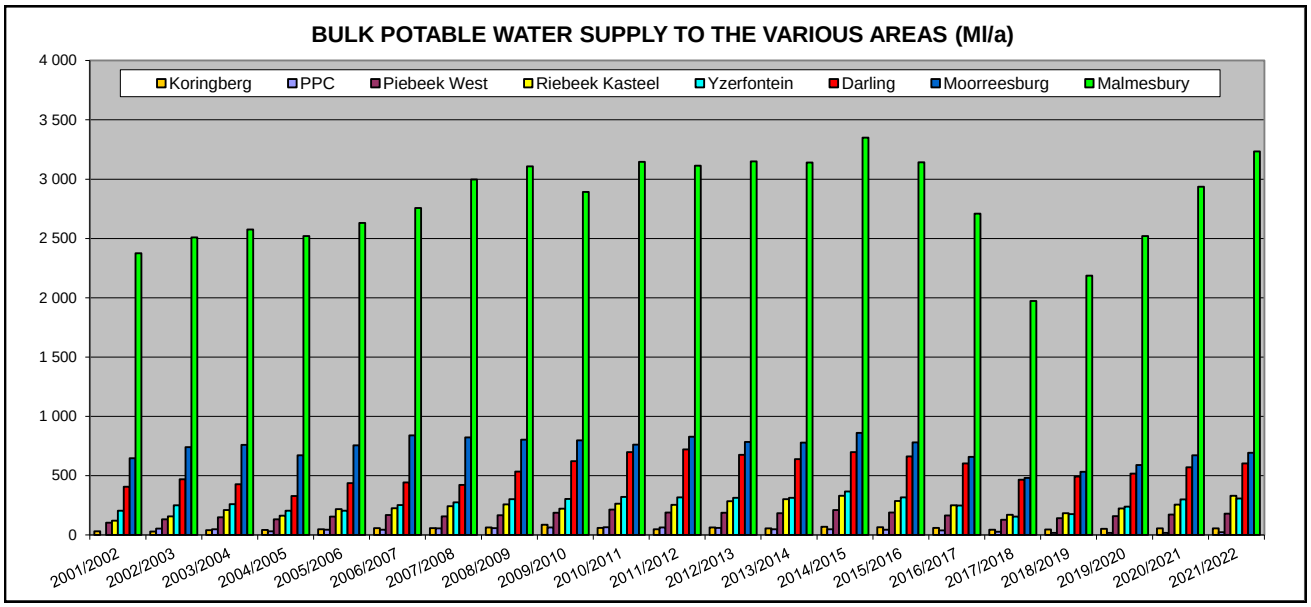


Figure C.1.2: Bulk potable water supply (System Input Volume) for the various distribution systems

The severe impact of the 2015 to 2017 drought on the total water requirements of the various towns can be noted from the previous two graphs and the table below. The total system input volume for all the towns came down from 15.020 Ml/d in 2015/2016 to 9.430 Ml/d in 2017/2018, with a steady recovery over the last four financial years. A significant part of this effort related to the Municipality's WC/WDM initiatives to reduce the overall water requirements and to reduce the NRW and Water Losses for the various systems.

Quantity of water provided by the WSA

The table below gives a summary of the total bulk raw water supply to the various towns within Swartland Municipality's Management Area.

Table C.1.3: Bulk water supply (System Input Volume) for the various towns

Distribution System	Source	21/22	Record: Prior (Ml/a)				
			20/21	19/20	18/19	17/18	16/17
Koringberg	Misverstand Scheme	55.417	56.412	51.908	46.609	44.157	60.128
Ongegund	Voëlvlei Scheme	24.013	17.662	17.033	18.004	27.612	39.286
Riebeek Wes	Voëlvlei Scheme	179.456	171.006	157.908	140.524	127.127	165.162
Riebeek Kasteel	Voëlvlei Scheme	330.992	256.218	223.405	183.446	169.061	250.636
Yzerfontein	Voëlvlei Scheme	308.290	299.537	238.116	175.903	154.611	248.845
Darling	Voëlvlei Scheme	602.718	570.859	518.097	491.479	465.322	603.442
Moorreesburg	Misverstand Scheme	692.967	671.591	590.106	532.506	480.789	659.185
Malmesbury	Voëlvlei Scheme, Paardenberg dam, Boreholes	3 233.662	2 936.354	2 520.750	2 186.436	1 973.521	2 708.884
Total		**5 427.515**	**4 979.639**	**4 317.323**	**3 774.907**	**3 442.200**	**4 735.568**

The graph below gives an overview of billed metered consumption per type of consumer for the last three financial years.

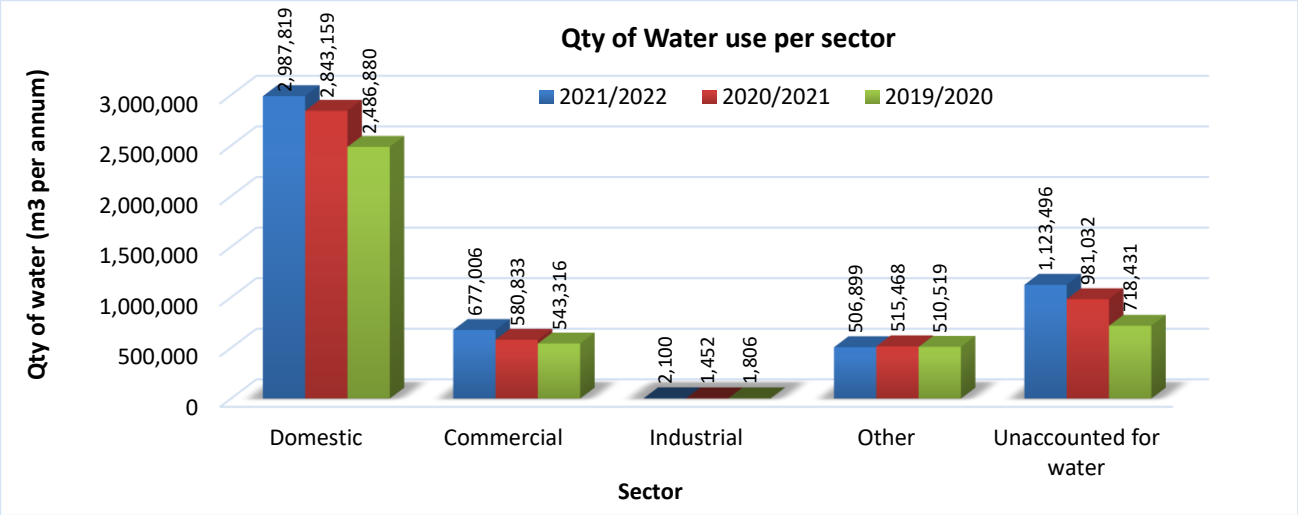


Figure C.1.3: Quantity of water services provided / water balance

Graphs of the water usage per sector for the various water distribution systems within Swartland Municipality's Management Area are included as part of the IWA water balance models included in Annexure A.

The table below gives an overview of the quantity of water services provided / water balance for all the water distribution systems in Swartland Municipality's Management Area.

Table C.1.4: Quantity of Water Services Provided / Water Balance									
WSDP Ref. #	Regulations Ref. #	Description	m^3 per annum			Ml/d		
			Year 0	Year - 1	Year - 2	Year 0	Year - 1	Year - 2
			FY2021/22	FY2020/21	FY2019/20	FY2021/22	FY2020/21	FY2019/20
		RAW WATER						
7.2.1		Surface water purchased	0	0	0	0.00	0.00	0.00
7.1 / 7.2.2		Surface water abstracted	338	692	73	0.00	0.00	0.00
7.1 / 7.2.3		Ground water abstracted	30,426	26,763	24,819	0.08	0.07	0.07
7.2.14		Effluent recycled	0	0	0	0.00	0.00	0.00
7.2.4		*less* Raw water supplied to others	0	0	0	0.00	0.00	0.00
7.2.5		**Sub-Total: Raw Water supplied**	**30,764**	**27,455**	**24,892**	**0.08**	**0.08**	**0.07**
	10.2 (g) (i)	**BULK WATER SUPPLY**						
7.2.6		Volume of water treated	30,764	27,455	24,892	0.08	0.08	0.07
7.2.7	10.2 (a) (ii)	Purchased treated water	5,396,751	4,952,184	4,292,431	14.79	13.57	11.76
7.2.7A		Ground water not treated	0	0	0	0.00	0.00	0.00
7.2.6A		*less* Treated water supplied to others	0	0	0	0.00	0.00	0.00
		Sub-Total: System Input Volume	**5,427,515**	**4,979,639**	**4,317,323**	**14.87**	**13.64**	**11.83**
		WATER CONSUMPTION						
7.2.8.1		Billed Metered:	4,173,824	3,940,912	3,542,521	11.44	10.80	9.71
	10.2 (a) (i)	Domestic	2,987,819	2,843,159	2,486,880	8.19	7.79	6.81
	10.2 (a) (i)	Commercial	677,006	580,833	543,316	1.85	1.59	1.49
	10.2 (a) (i)	Industrial	2,100	1,452	1,806			
	10.2 (a) (i)	etc.	506,899	515,468	510,519	1.39	1.41	1.40
7.2.8.2		Billed Unmetered	0	0	0	0.00	0.00	0.00
	10.2 (a) (i)	Domestic	0	0	0	0.00	0.00	0.00
	10.2 (a) (i)	Commercial	0	0	0	0.00	0.00	0.00
	10.2 (a) (i)	Industrial	0	0	0	0.00	0.00	0.00
	10.2 (a) (i)	etc.	0	0	0	0.00	0.00	0.00
7.2.8.3		Unbilled Metered	0	0	0	0.00	0.00	0.00
7.2.8.4		Unbilled Unmetered	130,195	57,695	56,371	0.36	0.16	0.15
	10.2 (g) (i)	**Sub-Total: Authorized consumption**	**4,304,019**	**3,998,607**	**3,598,892**	**11.79**	**10.96**	**9.86**
		UNACCOUNTED FOR WATER						
7.3.1		Raw water bulk loss	0	0	0	0.00	0.00	0.00
7.2.3/7.2.4		Billing losses	130,195	57,695	56,371	0.36	0.16	0.15
7.2.5		Apparent losses	190,994	166,775	122,133	0.52	0.46	0.33
7.2.5.1		Illegal connections	22,470	19,621	14,369	0.06	0.05	0.04
7.2.5.2		Inaccurate meters	112,350	98,103	71,843	0.31	0.27	0.20
7.2.5.3		Data errors	56,175	49,052	35,922	0.15	0.13	0.10
7.2.6		Real losses	932,502	814,257	596,298	2.55	2.23	1.63
	10.2 (g) (ii)	**Sub-Total: Unaccounted for water**	**1,123,496**	**981,032**	**718,431**	**3.08**	**2.69**	**1.97**
		WASTEWATER TREATMENT						
7.2.9	10.2 (a) (iii)	Total received at WWTW	3,325,892	3,243,830	2,901,289	9.11	8.89	7.95
7.2.11		Total discharged	2,579,412	2,511,102	2,263,778	7.07	6.88	6.20
7.2.13		Returned to environment	1,381,423	1,024,368	717,865	3.78	2.81	1.97
7.2.14		Recycled	1,197,989	1,486,734	1,545,913	3.28	4.07	4.24
	10.2 (a) (iv)	**Quantity of water supplied not discharged to WWTW's**	**978,127**	**754,777**	**697,603**	**2.68**	**2.07**	**1.91**

The table below gives a summary of the annual billed metered consumption volume per consumer type for the various distribution systems and financial years.

Table C.1.5: Quantity of water used by each user sector (Ml)						
Town	**Year**	**Residential**	**Business & Industrial**	**Other**	**Farms**	**Total**
Koringberg	08/09	50.193	4.588	0.306	0	55.087
	09/10	41.517	3.795	0.253	0	45.565
	10/11	42.454	3.880	0.259	0	46.594
	11/12	42.647	2.617	2.101	0	47.365
	12/13	41.440	2.698	1.929	0	46.067
	13/14	44.319	2.571	1.846	0	48.736
	14/15	52.873	3.583	2.525	0	58.981
	15/16	47.886	5.215	2.330	0	55.431
	16/17	44.529	5.340	1.396	0	51.265
	17/18	25.758	3.051	1.135	0	29.944
	18/19	27.862	3.061	0.992	0	31.915
	19/20	31.362	2.362	1.208	0	34.932
	20/21	40.579	1.216	1.222	0	43.017
	21/22	37.424	4.743	1.151	0	43.318
Ongegund	08/09	30.389	2.478	4.679	0	37.546
	09/10	32.532	2.653	5.009	0	40.194
	10/11	33.154	2.703	5.105	0	40.963
	11/12	30.993	2.305	5.066	0	38.364
	12/13	30.921	2.261	9.938	0	43.120
	13/14	28.788	2.846	12.852	0	44.486
	14/15	31.118	1.930	4.748	0	37.796
	15/16	22.268	3.091	3.204	0	28.563
	16/17	18.239	2.166	1.133	0	21.538
	17/18	9.202	0.919	0.836	0	10.957
	18/19	11.453	0	0.005	0	11.458
	19/20	12.793	0	0.004	0	12.797
	20/21	14.472	0.037	0.078	0	14.587
	21/22	14.553	0.181	0.065	0	14.799
Riebeek Wes	08/09	107.185	39.533	0.971	0	147.690
	09/10	107.127	39.512	0.971	0	147.610
	10/11	117.410	43.305	1.064	0	161.779
	11/12	122.743	20.629	26.231	0	169.603
	12/13	122.448	22.324	19.596	0	164.368
	13/14	136.046	28.436	26.614	0	191.096
	14/15	131.796	30.236	22.229	0	184.261
	15/16	121.093	25.304	11.473	0	157.870
	16/17	121.949	22.368	9.711	0	154.028
	17/18	73.064	15.210	17.338	0	105.612
	18/19	84.487	17.007	15.767	0	117.261
	19/20	96.265	17.084	22.519	0	135.868
	20/21	118.764	14.953	10.799	0	144.516
	21/22	121.425	25.891	13.827	0	161.143
Riebeek Kasteel	08/09	174.824	51.148	0.672	1.492	228.137
	09/10	165.851	48.523	0.638	1.416	216.428
	10/11	183.815	53.779	0.707	1.569	239.870
	11/12	194.738	28.691	8.078	2.830	234.337
	12/13	193.924	27.439	6.793	3.974	232.130

Table C.1.5: Quantity of water used by each user sector (Ml)						
Town	**Year**	**Residential**	**Business & Industrial**	**Other**	**Farms**	**Total**
	13/14	193.757	37.022	7.904	4.727	243.410
	14/15	224.115	24.410	13.490	4.995	267.010
	15/16	194.956	25.221	9.514	9.894	239.585
	16/17	165.532	22.359	8.153	11.438	207.482
	17/18	93.786	11.801	4.228	7.066	116.881
	18/19	125.625	16.629	8.325	7.490	158.069
	19/20	144.016	18.085	6.845	6.697	175.643
	20/21	171.842	10.802	11.934	8.850	203.428
	21/22	187.583	25.133	11.147	9.042	232.905
Yzerfontein	08/09	216.461	15.221	16.891	0	248.573
	09/10	228.769	16.086	17.851	0	262.706
	10/11	235.259	16.542	18.358	0	270.159
	11/12	246.413	11.670	14.858	0	272.941
	12/13	257.029	10.601	23.491	0	291.121
	13/14	278.539	10.805	16.454	0	305.798
	14/15	302.994	11.351	18.852	0	333.197
	15/16	247.560	11.503	14.738	0	273.801
	16/17	195.307	7.914	12.047	0	215.268
	17/18	88.626	5.087	8.968	0	102.681
	18/19	142.166	5.475	12.285	0	159.926
	19/20	165.718	6.243	19.046	0	191.007
	20/21	218.279	10.784	10.273	0	239.336
	21/22	231.664	12.000	24.292	0	267.956
Darling	08/09	272.375	147.604	4.815	0	424.793
	09/10	362.765	196.587	6.413	0	565.765
	10/11	417.677	226.345	7.383	0	651.406
	11/12	353.766	247.451	75.287	0	676.504
	12/13	357.922	182.954	113.861	0	654.737
	13/14	376.535	146.914	102.642	0	626.091
	14/15	389.988	155.304	81.533	0	626.825
	15/16	353.330	144.849	50.635	0	548.814
	16/17	355.139	134.866	29.218	0	519.223
	17/18	228.404	129.920	15.601	0	373.925
	18/19	254.530	96.992	12.954	0	364.476
	19/20	279.913	87.055	13.051	0	380.019
	20/21	324.719	78.725	16.910	0	420.354
	21/22	327.638	103.959	20.691	0	452.288
Moorreesburg	08/09	457.302	194.063	32.009	10.734	694.108
	09/10	438.732	186.182	30.709	10.298	665.921
	10/11	440.755	187.041	30.851	10.346	668.992
	11/12	516.230	125.075	44.591	9.747	695.643
	12/13	502.012	131.936	57.359	7.176	698.483
	13/14	521.407	141.826	37.986	8.968	710.187
	14/15	566.974	135.372	37.202	7.394	746.942
	15/16	502.598	123.776	24.287	8.207	658.868
	16/17	454.057	91.142	17.923	6.427	569.549
	17/18	293.675	61.312	11.675	3.217	369.879
	18/19	330.550	63.275	25.092	3.376	422.293
	19/20	369.022	58.184	40.022	3.577	470.805
	20/21	416.587	67.556	45.188	5.784	535.115

Table C.1.5: Quantity of water used by each user sector (Ml)						
Town	**Year**	**Residential**	**Business & Industrial**	**Other**	**Farms**	**Total**
	21/22	415.964	74.323	26.930	6.032	523.249
Malmesbury	08/09	1 644.012	818.184	126.551	69.044	2 657.791
	09/10	1 566.270	779.494	120.567	65.779	2 532.109
	10/11	1 577.950	785.307	121.466	66.269	2 550.992
	11/12	1 679.448	433.374	404.285	36.950	2 554.057
	12/13	1 678.406	298.303	393.901	37.101	2 407.711
	13/14	1 694.003	382.682	502.578	36.558	2 615.821
	14/15	1 852.113	407.323	427.192	46.441	2 733.069
	15/16	1 648.433	402.766	368.562	43.247	2 463.008
	16/17	1 567.750	430.508	315.334	30.380	2 343.972
	17/18	1 062.301	334.187	267.066	19.559	1 683.113
	18/19	1 241.947	291.858	253.886	90.675	1 878.366
	19/20	1 387.791	356.109	285.499	112.051	2 141.450
	20/21	1 537.917	398.212	293.799	110.631	2 340.559
	21/22	1 651.568	432.876	314.160	79.562	2 478.166
TOTAL	**08/09**	**2 952.741**	**1 272.819**	**186.894**	**81.270**	**4 493.725**
	09/10	**2 943.563**	**1 272.832**	**182.411**	**77.493**	**4 476.298**
	10/11	**3 048.474**	**1 318.902**	**185.193**	**78.184**	**4 630.755**
	11/12	**3 186.978**	**871.812**	**580.497**	**49.527**	**4 688.814**
	12/13	**3 184.102**	**678.516**	**626.868**	**48.251**	**4 537.737**
	13/14	**3 273.394**	**753.102**	**708.876**	**50.253**	**4 785.625**
	14/15	**3 551.971**	**769.509**	**607.771**	**58.830**	**4 988.081**
	15/16	**3 138.124**	**741.725**	**484.743**	**61.348**	**4 425.940**
	16/17	**2 922.502**	**716.663**	**394.915**	**48.245**	**4 082.325**
	17/18	**1 874.816**	**561.487**	**326.847**	**29.842**	**2 792.992**
	18/19	**2 218.620**	**494.297**	**329.306**	**101.541**	**3 143.764**
	19/20	**2 486.880**	**545.122**	**388.194**	**122.325**	**3 542.521**
	20/21	**2 843.159**	**582.285**	**390.203**	**125.265**	**3 940.912**
	21/22	**2 987.819**	**679.106**	**412.263**	**94.636**	**4 173.824**

Quantity of effluent received at the WWTWs (Ml/a):

Recorded flows are available for the Malmesbury-, Moorreesburg-, Darling- and Riebeek Valley WWTWs. The influent received at the other WWTWs is not metered and was therefore calculated as a percentage of the billed metered consumption. The monthly flows and rainfall at the various WWTWs are also summarised in Annexure A. The table below gives an overview of the metered and estimated volume of effluent received at the various WWTWs for the last six financial years.

Table C.1.6: Quantity of effluent received at the various WWTWs							
WWTWs	**% of Historic Water Demands**	**21/22**	**Record: Prior (Ml/a)**				
			20/21	**19/20**	**18/19**	**17/18**	**16/17**
Malmesbury	N/A (Metered)	2 028.272	1 932.526	1 764.088	1 494.426	1 423.288	1 590.479
Moorreesburg	N/A (Metered)	374.711	400.243	351.586	337.553	330.949	378.334
Darling	N/A (Metered)	461.005	452.898	401.561	383.607	357.313	339.337
Koringberg	70%	30.323	30.112	24.452	22.341	20.961	35.886
Kalbaskraal	40%	27.971	27.759	22.176	23.692	19.165	26.301
Chatsworth / Riverlands	40%	89.498	92.656	63.458	60.466	50.449	65.520
Riebeek Valley	N/A (Metered)	314.112	307.636	273.968	277.396	237.217	275.743
Total		**3 325.892**	**3 243.830**	**2 901.289**	**2 599.481**	**2 439.342**	**2 711.600**

Quantity of treated effluent returned to the water resource system:

The quantity of effluent treated by industrial consumers on their own premises and re-used by them is not known at this stage. All effluent discharged into the Municipal sewer system is however treated at the existing WWTWs. The current volume of treated effluent re-use from the various WWTWs and the current effluent re-use practices are as indicated in the table below.

Table C.1.7: Volume of effluent re-use and current re-use practices at the various WWTWs

WWTW	Re-use of treated effluent					Current effluent re-use practices
	Billed Volume (Ml)				Consumers	
	21/22	20/21	19/20	18/19		
Malmesbury	1 123.616	1 365.802	1 346.115	791.259	Rooiheuwel JV, Primary School Swartland, High School Swartland, Wesbank Sportsfields, Golf Course, Landbougenootskap, Ilinge Lethu Sportgrounds, St Thomas Primary, Alkana Childcare, Bowling Club, Alfa Street Sport Centre, Building Contractors.	Building Contractors, Rooiheuwels Irrigation Scheme, Irrigation of rugby and cricket fields at schools and golf course. Treated effluent not re-used is returned to the Diep River. In excess of 80% of the treated effluent is re-used.
Moorreesburg	43.667	63.444	105.896	64.790	WWTW, Gene Louw, Golf Course	Irrigation of rugby and cricket fields and golf course. During the summer months all treated effluent is re-used. Treated effluent not re-used is returned to the Nogo River.
Darling	16.232	46.757	69.706	24.800	Golf Course, Gabriel Faroa Sport	Irrigation of rugby fields and golf course. During the summer months all treated effluent is re-used. Treated effluent not re-used is returned to the Groen River.
Riebeek Valley	14.474	10.731	24.196	Unknown	Farmers	Re-use for agricultural purposes (Tender was awarded for 20-year period).
Koringberg	-	-	-	-	-	No re-use practices. Treated effluent returned into a local stream (Brak River)
Kalbaskraal	-	-	-	-	-	No re-use practices. Evaporate
Chatsworth / Riverlands	-	-	-	-	-	No re-use practices. Evaporate
Total	**1 197.989**	**1 486.734**	**1 545.913**	**880.849**		

The tender for the agricultural re-use of the final effluent discharged from the Riebeek Valley WWTW was awarded in 2018/2019 (20-year contract period).

C.2. Water Services Delivery Profile

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

Table C.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.

Table C.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.		

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

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.

C.2.1. User Connection Profile

The total number of user connections in each user sector, for the consumers provided with water services by Swartland Municipality, is as follows (June 2022).

Table C.2.1.1: User Connection Profile for Water Services

WSDP Ref. #	Category of users	Water Services						
		Year 0 FY2021/22		Year - 1 FY2020/21		Year - 2 FY2019/20		New Connections Year 0 FY2021/22
		Nr	%	Nr	%	Nr	%	Nr
	RESIDENTIAL (DOMESTIC)							
3.3	Metered: Uncontrolled	20,938	93%	20,829	93%	19,910	94%	109
3.3	Metered: Controlled	0	0%	0	0%	0	0%	0
	Unmetered (Flat rate)	0	0%	0	0%	0	0%	0
	Communal water supply	0	0%	0	0%	0	0%	0
	Sub-Total: Residential	**20,938**	**93%**	**20,829**	**93%**	**19,910**	**94%**	**109**
	EDUCATION							
3.3	Schools	30	0%	30	0%	30	0%	0
	Tertiary educaton facilities	1	0%	1	0%	1	0%	0
	Sub-Total: Education	**31**	**0%**	**31**	**0%**	**31**	**0%**	**0**
	HEALTH							
3.3	Clinics	4	0%	4	0%	4	0%	0
3.3	District Hospitals	1	0%	1	0%	1	0%	0
3.3	Health Centres	1	0%	1	0%	1	0%	0
	Sub-Total: Health	**6**	**0%**	**6**	**0%**	**6**	**0%**	**0**
	INSTITUTIONAL							
	Public Institutions (Est)	25	0%	25	0%	25	0%	0
3.3	Magistrate Offices	2	0%	2	0%	2	0%	0
3.3	Police Stations	5	0%	5	0%	5	0%	0
3.3	Prisons	1	0%	1	0%	1	0%	0
	etc	0	0%	0	0%	0	0%	0
	Sub-Total: Institutional	**33**	**0%**	**33**	**0%**	**33**	**0%**	**0**
	INDUSTRIAL							
3.3	Dry industries (Incl. with Businesses)	0	0%	0	0%	0	0%	0
3.3	Wet industries	9	0%	9	0%	8	0%	0
	Sub-Total: Industrial	**9**	**0%**	**9**	**0%**	**8**	**0%**	**0**
	COMMERCIAL							
3.3	Businesses	830	4%	827	4%	788	4%	3
3.3	Office Buildings (Incl. with Businesses)	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**830**	**4%**	**827**	**4%**	**788**	**4%**	**3**
	MINING							
	Mining	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**
	OTHER							
	Agriculture: raw water	0	0%	0	0%	0	0%	0
	etc	641	3%	635	3%	328	2%	6
	Sub-Total: Other	**641**	**3%**	**635**	**3%**	**328**	**2%**	**6**
	TOTAL	**22,488**	**100%**	**22,370**	**100%**	**21,104**	**100%**	**118**

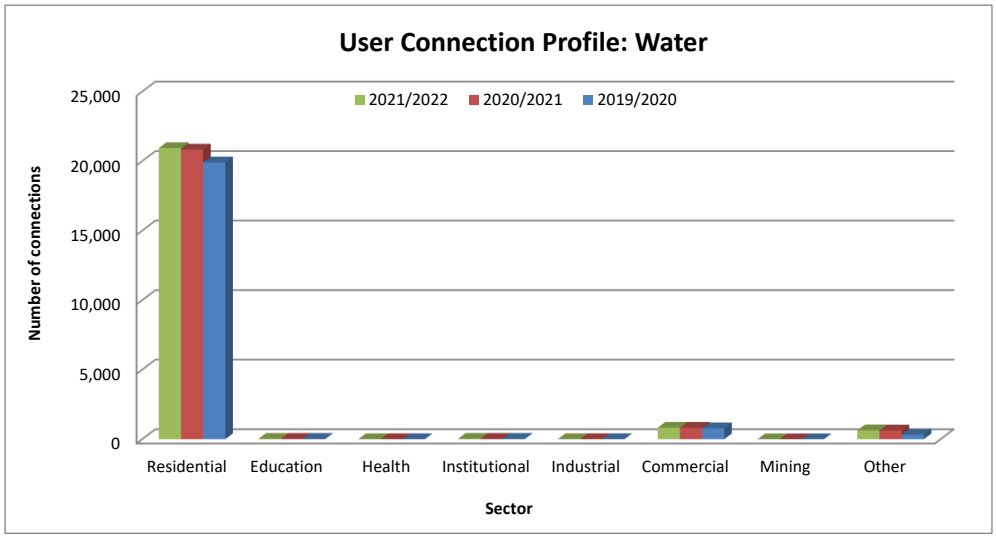


Figure C.2.1.1: User connection profile for water

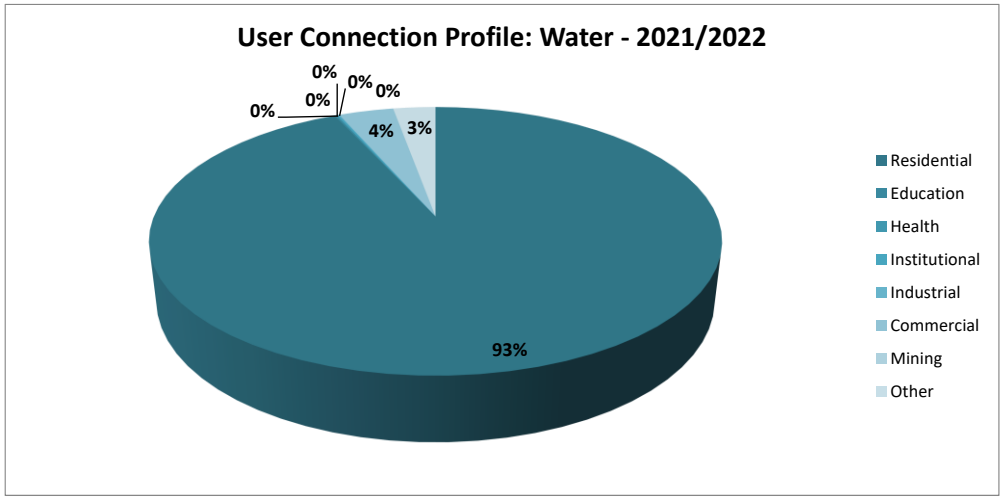


Figure C.2.1.2: User connection distribution for water – Year 2021/2022

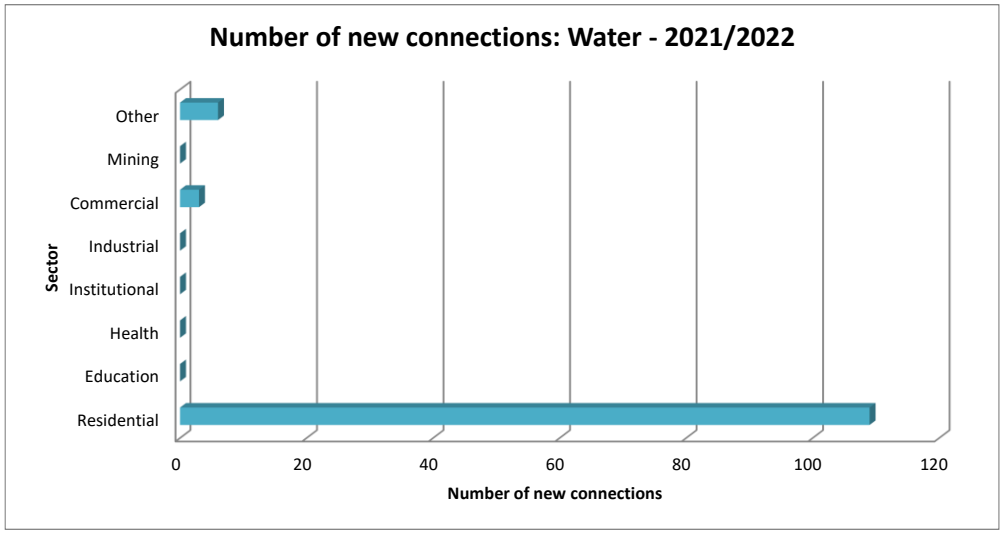


Figure C.2.1.3: Number of new water connections provided during 2021/2022

Table C.2.1.2: User Connection Profile for Wastewater Services								
WSDP Ref. #	Category of users	Wastewater Services						
		Year 0 FY2021/22		Year - 1 FY2020/21		Year - 2 FY2019/20		New Connections Year 0 FY2021/22
		Nr	%	Nr	%	Nr	%	Nr
	RESIDENTIAL (DOMESTIC)							
3.3	Metered: Uncontrolled	20,938	93%	20,829	93%	19,910	94%	109
3.3	Metered: Controlled	0	0%	0	0%	0	0%	0
	Unmetered (Flat rate)	0	0%	0	0%	0	0%	0
	Communal water supply	0	0%	0	0%	0	0%	0
	Sub-Total: Residential	**20,938**	**93%**	**20,829**	**93%**	**19,910**	**94%**	**109**
	EDUCATION							
3.3	Schools	30	0%	30	0%	30	0%	0
	Tertiary educaton facilities	1	0%	1	0%	1	0%	0
	Sub-Total: Education	**31**	**0%**	**31**	**0%**	**31**	**0%**	**0**
	HEALTH							
3.3	Clinics	4	0%	4	0%	4	0%	0
3.3	District Hospitals	1	0%	1	0%	1	0%	0
3.3	Health Centres	1	0%	1	0%	1	0%	0
	Sub-Total: Health	**6**	**0%**	**6**	**0%**	**6**	**0%**	**0**
	INSTITUTIONAL							
	Public Institutions (Est)	25	0%	25	0%	25	0%	0
3.3	Magistrate Offices	2	0%	2	0%	2	0%	0
3.3	Police Stations	5	0%	5	0%	5	0%	0
3.3	Prisons	1	0%	1	0%	1	0%	0
	etc	0	0%	0	0%	0	0%	0
	Sub-Total: Institutional	**33**	**0%**	**33**	**0%**	**33**	**0%**	**0**
	INDUSTRIAL							
3.3	Dry industries (Incl. with Businesses)	0	0%	0	0%	0	0%	0
3.3	Wet industries	9	0%	9	0%	8	0%	0
	Sub-Total: Industrial	**9**	**0%**	**9**	**0%**	**8**	**0%**	**0**
	COMMERCIAL							
3.3	Businesses	830	4%	827	4%	788	4%	3
3.3	Office Buildings (Incl. with Businesses)	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**830**	**4%**	**827**	**4%**	**788**	**4%**	**3**
	MINING							
	Mining	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**
	OTHER							
	Agriculture: raw water	0	0%	0	0%	0	0%	0
	etc	641	3%	635	3%	328	2%	6
	Sub-Total: Other	**641**	**3%**	**635**	**3%**	**328**	**2%**	**6**
	TOTAL	**22,488**	**100%**	**22,370**	**100%**	**21,104**	**100%**	**118**

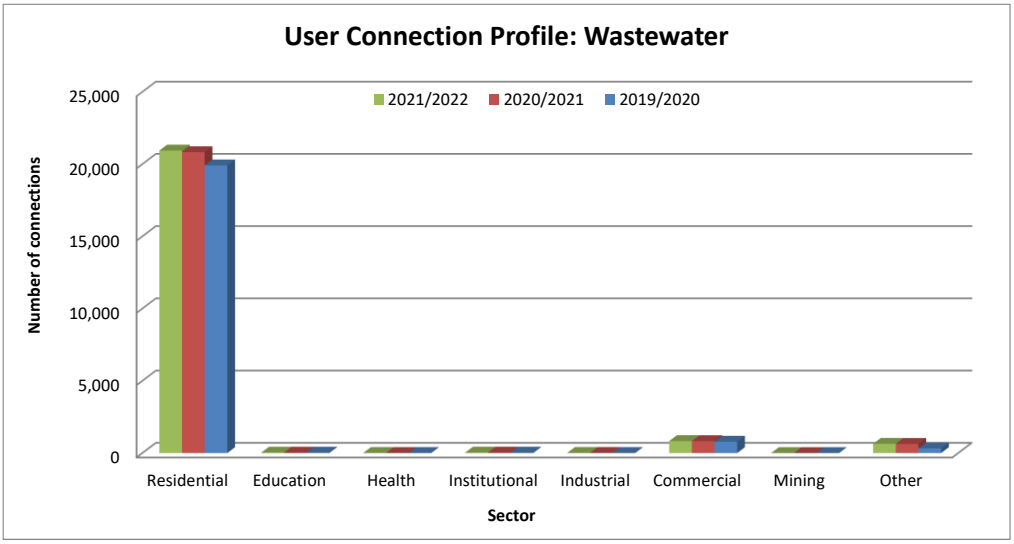


Figure C.2.1.4: User connection profile for wastewater

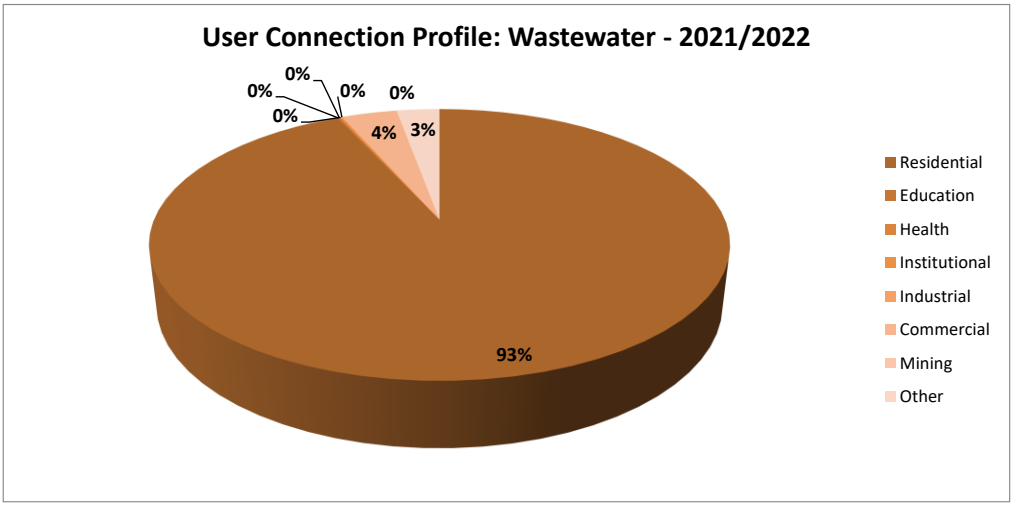


Figure C.2.1.5: User connection distribution for wastewater – Year 2021/2022

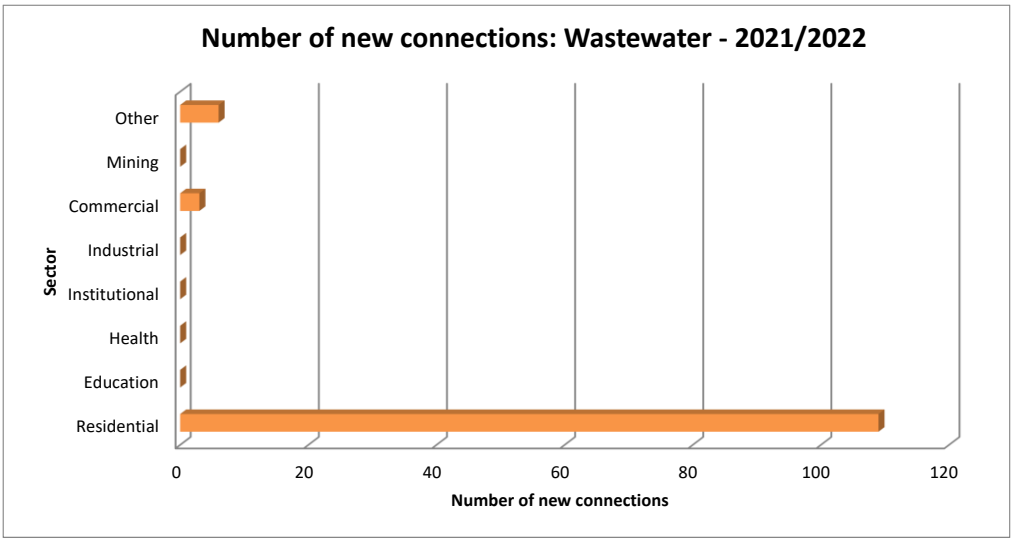


Figure C.2.1.6: Number of new wastewater connections provided during 2021/2022

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

Table C.2.1.3: Number of user connections in each user sector

Distribution System	21/22			20/21			19/20			18/19		
	Res	Bus	Other	Res	Bus	Other	Res	Bus	Other	Res	Bus	Other
Koringberg	335	11	8	332	11	8	329	11	7	328	10	8
Ongegund	88	2	19	88	2	19	86	1	7	84	2	19
Riebeek Wes	963	51	34	966	50	33	896	47	30	713	47	33
Riebeek Kasteel	1 527	38	30	1 564	38	29	1 126	39	24	1 118	38	28
Yzerfontein	1 626	24	39	1 590	24	36	1 528	23	26	1 474	22	32
Darling	2 519	112	46	2 503	112	46	2 495	107	34	2 477	113	48
Moorreesburg	2 892	194	59	2 876	192	58	2 842	184	47	2 824	190	63
Malmesbury	7 955	400	420	7 908	400	420	7 767	377	181	7 695	379	413
Abbotsdale	1 127	0	13	1 118	0	13	1 111	0	11	1 096	0	13
Kalbaskraal	581	4	16	589	5	16	461	5	13	457	4	13
Riverlands	330	1	9	330	1	10	327	1	5	325	1	7
Chatsworth	995	2	18	965	1	17	942	1	13	906	1	15
TOTALS	**20 938**	**839**	**711**	**20 829**	**836**	**705**	**19 910**	**796**	**398**	**19 497**	**807**	**692**

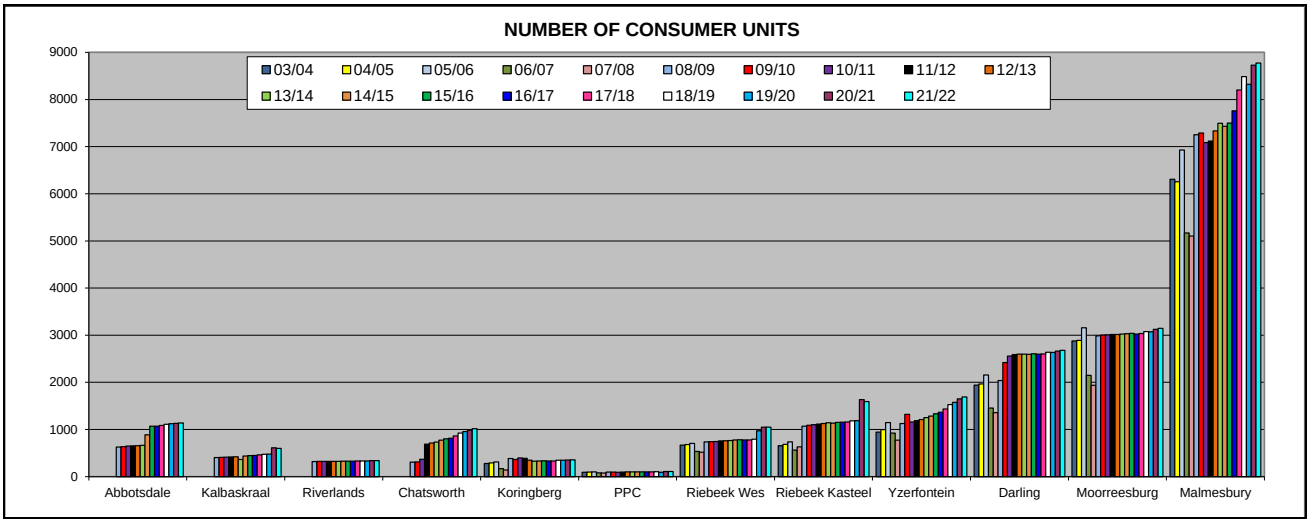


Figure C.2.1.7: Number of consumer units per distribution system

Table C.2.1.4: Total number of consumer units per town and percentage growth from 2012/2013 to 2021/2022

Distribution System	Annual Growth % 12/13 – 21/22	21/22	20/21	19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
Koringberg	0.25%	354	351	347	346	333	333	335	332	328	346
Ongegund	1.11%	109	109	94	105	99	100	102	101	100	99
Riebeek Wes	3.62%	1 048	1 049	973	793	777	779	783	777	766	761
Riebeek Kasteel	3.95%	1 595	1 631	1 189	1 184	1 158	1 154	1 151	1 136	1 141	1 125
Yzerfontein	3.76%	1 689	1 650	1 577	1 528	1 435	1 366	1 330	1 283	1 251	1 211
Darling	0.34%	2 678	2 661	2 636	2 638	2 602	2 598	2 607	2 596	2 598	2 598
Moorreesburg	0.46%	3 144	3 126	3 073	3 077	3 036	3 024	3 040	3 029	3 023	3 017
Malmesbury	2.01%	8 775	8 728	8 325	8 487	8 203	7 760	7 500	7 431	7 495	7 336
Abbotsdale	6.33%	1 140	1 131	1 122	1 109	1 087	1 069	1 071	889	663	656
Kalbaskraal	4.05%	601	610	479	474	462	450	446	436	365	421
Riverlands	0.63%	340	341	333	333	331	328	329	327	322	321
Chatsworth	3.99%	1 015	983	956	922	864	812	802	775	733	714
TOTALS	**2.13%**	**22 488**	**22 370**	**21 104**	**20 996**	**20 387**	**19 773**	**19 496**	**19 112**	**18 785**	**18 605**

The number of new water and sanitation connection made:

The financial system indicated that the residential consumers increased by 109 consumers for the 2021/2022 financial year. The "Business" and "Other" consumers increased by 9 consumers, as also indicated in Tables C.2.1.1, C.2.1.2 and C.2.1.3. The stats from the Engineering Department indicated that 216 new water connections and 35 new sewer connections were installed during the 2021/2022 financial year.

C.2.2. Residential Water Services Delivery Access Profile

The table below gives an overview of the water services delivery access profile of Swartland Municipality.

Table C.2.2.1: Residential Water Services Delivery Access Profile: Water

Census Category	Description	Year 0 FY2021/22		Year 0 FY2020/21		Year 1 FY2019/20	
		Nr	%	Nr	%	Nr	%
	WATER (ABOVE MIN LEVEL)						
Piped (tap) water inside dwelling/institution	House connections	29,322	65%	28,861	66%	27,603	66%
Piped (tap) water inside yard	Yard connections	14,677	32%	13,415	31%	12,741	31%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	335	1%	335	1%	595	1%
	Sub-Total: Minimum Serivce Level and Above	**44,334**	**98%**	**42,611**	**98%**	**40,939**	**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%	701	2%
	Sub-Total: Below Minimum Service Level	**857**	**2%**	**857**	**2%**	**783**	**2%**
	Total number of households	**45,191**	**100%**	**43,468**	**100%**	**41,722**	**100%**

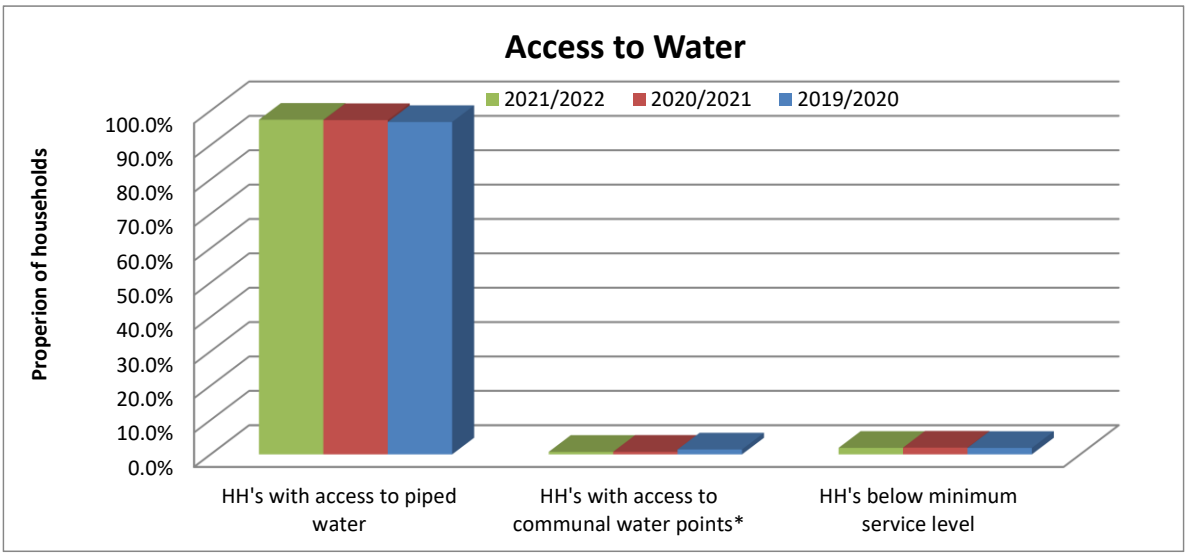


Figure C.2.2.1: Household water access profile

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

Table C.2.2.2: Residential water service levels (Consumer Units)													
Service Level	**Malmes-bury**	**Abbotsdale**	**Riverlands**	**Chatsworth**	**Kalbas-kraal**	**Riebeek Kasteel**	**Riebeek Wes**	**Darling**	**Moorrees-burg**	**Koringberg**	**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)]	6 756	115	30	40	492	1 119	996	894	2 582	134	0	1 519	**14 677**
House Connections [1)]	7 955	1 127	330	995	581	1 527	1 051	2 519	2 892	335	1 626	8 384	**29 322**
Total Adequate	**14 711**	**1 242**	**360**	**1 035**	**1 073**	**2 646**	**2 047**	**3 413**	**5 474**	**469**	**1 626**	**10 238**	**44 334**
Total per Area	**14 711**	**1 242**	**360**	**1 735**	**1 073**	**2 646**	**2 047**	**3 413**	**5 474**	**469**	**1 626**	**10 395**	**45 191**

Notes:
1) Number of residential consumer units for the various towns for 2021/2022, 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 (2021/2022) – Number of residential consumers units (2021/2022) = Estimated number of backyard dwellers.

The table below gives an overview of the sanitation services delivery access profile of Swartland Municipality.

Table C.2.2.3: Residential Water Services Delivery Access Profile: Sanitation

Census Category	Description	Year 0 FY2021/22		Year 0 FY2020/21		Year 1 FY2019/20	
		Nr	%	Nr	%	Nr	%
	SANITATION (ABOVE MIN LEVEL)						
Flush toilet (connected to sewerage system)	Waterborne	31 761	70%	30 516	70%	29 059	70%
	Waterborne: Low Flush	0	0%	0	0%	0	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	10 874	24%	10 396	24%	9 921	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	1%
Other / Communal Services		0	0%	0	0%	260	1%
	Sub-Total: Minimum Serivce Level and Above	**42 900**	**95%**	**41 177**	**95%**	**39 505**	**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%	1 133	3%
	Sub-Total: Below Minimum Service Level	**2 291**	**5%**	**2 291**	**5%**	**2 217**	**5%**
	Total number of households	**45 191**	**100%**	**43 468**	**100%**	**41 722**	**100%**

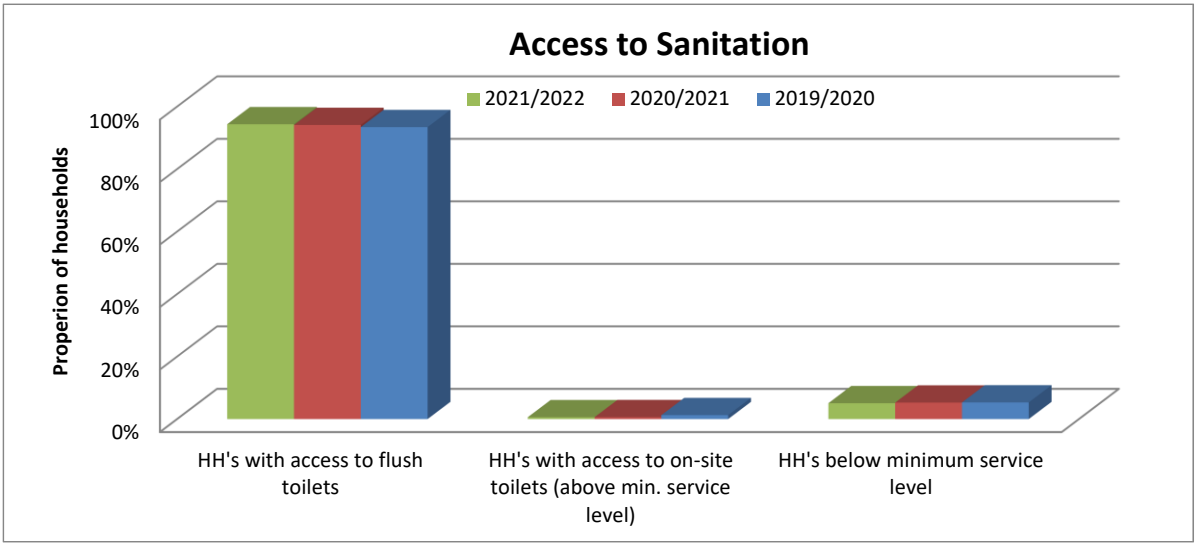


Figure C.2.2.2: Household sanitation access profile

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

Table C2.2.4: Residential sanitation service levels (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]	9	4	6	166	108	47	158	34	85	92	1 626	8 539	**10 874**
Waterborne WWTW [2]	14 702	1 238	354	869	965	2 599	1 889	3 379	5 389	377	0	0	**31 761**
Total Adequate	**14 711**	**1 242**	**360**	**1 035**	**1 073**	**2 646**	**2 047**	**3 413**	**5 474**	**469**	**1 626**	**8 750**	**42 846**
Total per Area	**14 711**	**1 242**	**360**	**1 735**	**1 073**	**2 646**	**2 047**	**3 413**	**5 474**	**469**	**1 626**	**10 395**	**45 191**

Notes:
1) The number of tanks per town was calculated from the total number of tanks pumped during 2021/2022 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 informal households 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.

Number of households provided with water through communal water services:

The National Norms and Standards for Domestic Water and Sanitation Services, as published in the Government Gazette No.41100 of 8 September 2017, include the following interim water and sanitation services:

Table C.2.2.5: Interim water and sanitation services (National Norms and Standards for Domestic Water and Sanitation Services)
Intermittent provision of water at a minimum level of water supply services
• A minimum volume of 1 500 litres of potable water shall be made available to a household per week. • The water provided shall comply with the SANS241 quality standards. • The access/delivery point shall be at a minimum a communal standpipe, or a storage facility in the yard (water container, yard tank, roof tank) of at least a volume of 1 500 litres. • In the case of a communal standpipe, it shall be within a reasonable walking distance of no more than 100m from the farthest household. • In the case of a storage facility in the yard (water container, yard tank, roof tank), it shall be refilled by a water tanker with potable water at least once a week. • The water shall be made available for 52 weeks per year. • All water use and/or supply shall be metered, but not tariffed. • Maintenance of the infrastructure for this level of service is the responsibility of the WSA. • Point-of-use water treatment systems and methods shall be advocated. • Efforts shall be made to ensure user acceptance and understanding for this level of service. • Users shall be educated in effective water use and hygiene. • This level of service shall be phased out by 2030 to comply with the National Development Plan's requirement of providing a basic service of at least a yard connection for water.
Interim sanitation services (Communal and shared facilities)

• Users shall be consulted on the siting and design, and the responsible cleaning and maintenance of shared toilets. Clean toilets are more likely to be frequently used.
• Plumbing in and for communal and shared facilities needs to be more robust than that installed on private premises and shall comply with the general principles of the National Building Regulations. Precautions need to be taken in the design against vandalism, theft and misuse.
• Efforts shall be made to provide people living with chronic illnesses, such as HIV and AIDS, with easy access to a toilet as they frequently suffer from chronic diarrhoea and reduced mobility.
• Where possible, communal and shared toilets must be provided with lighting, or users provided with torches. The input of the users must be sought with regard to ways of enhancing the safety of users.
• Efforts to build a sense of communal ownership and pride of possession shall be made so that cooperation is voluntarily given or assured by peer pressure.
• Sufficient sanitation facilities shall be provided for the number of users
  ➢ Communal toilet: Toilet seats – 1 seat per 50 users; Urinal units – 1 unit per 100 users; Hand washing – 1 basin per 10 toilet seats.
  ➢ Shared toilet mostly used all the time: Toilet seats – 1 seat per 20 users; Urinal units – 1 unit per 50 users; Hand washing – 1 basin per 4 toilet seats.
• Shared and communal facilities shall have separate toilet blocks for men and women with separate entries; waste bins with lids in toilet block for women – emptied once a week and disposed of appropriately; urinal facilities for men; seats for children in the section for women; waiting / circulating area; separate washing cubicles for men and women; facility to store large volumes of water (water-borne sanitation); appropriate wastewater disposal system; and store room for keeping the cleaning material / equipment.

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.

The only other areas where communal water services are in use is on some of the farms in the rural areas. Swartland Municipality is committed to work with the private landowners to ensure that at least basic water and sanitation services are provided to those households in the rural areas with existing services still below RDP standard.

All the schools and tertiary education facilities in Swartland Municipality's urban areas are provided with adequate water and sanitation services and there is no backlog with regard to water and sanitation services for the schools. The existing water and sanitation service levels for all the schools in the Swartland Municipality Management Area is summarised in the table below.

Table C.2.2.6: Service Levels at Schools

Associated Services Facility	Number of Facilities	Water			Sanitation		
		Facilities with Adequate Services	Facilities with no Services	Facilities with inadequate Services	Facilities with Adequate Services	Facilities with no Services	Facilities with inadequate Services
Schools	30	30	0	0	30	0	0

Source for number of facilities: Socio Economic Profile Swartland Municipality, Western Cape Government, 2021

All the medical facilities in Swartland Municipality's Management Area are provided with adequate water and sanitation services and there is no backlog with regard to water and sanitation services for the medical facilities. The existing water and sanitation service levels for all the Medical Facilities in Swartland Municipality's Management Area are summarised in the table below.

Table C.2.2.7: Service Levels at Medical Facilities

Associated Services Facility	Number of Facilities	Water			Sanitation		
		Facilities with Adequate Services	Facilities with no Services	Facilities with inadequate Services	Facilities with Adequate Services	Facilities with no Services	Facilities with inadequate Services
Hospitals (District)	1	1	0	0	1	0	0
Health Centres	1	1	0	0	1	0	0
Fixed Clinics	4	4	0	0	4	0	0
Mobile/Satellite Clinics	9	9	0	0	9	0	0

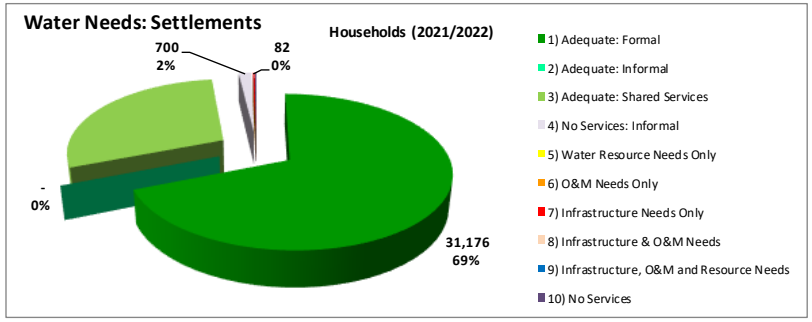
Source for number of facilities: Socio Economic Profile Swartland Municipality, Western Cape Government, 2021

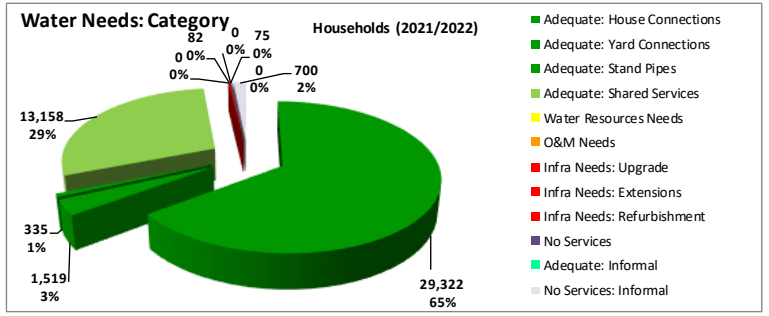
C.2.3. Residential Water Services Delivery Adequacy Profile

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

Table C.2.3.1: Residential Water Services Ddelivery Adequacy Profile (Water)

Water Categorisation	Number of settlements	FORMAL																				INFORMAL			
		Adequate								Water Resource needs		O & M Needs		Infrastructure Needs						No services		Adequate		No services	
		House Connections		Yard Connections		Stand Pipes		Shared Services						Upgrades		Extensions		Refurbishment							
		HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%
1	37	29,322	100%	1,519	100%	335	100%																		
2	1																								
3	10							13,158	100%																
4	1																							700	100%
5	0																								
6	0																								
7	3															82	100%								
8	0																								
9	0																								
10	3																			75	100%				
Total Household Interventions required		29,322		1,519		335		13,158		0		0		0		82		0		75		0		700	



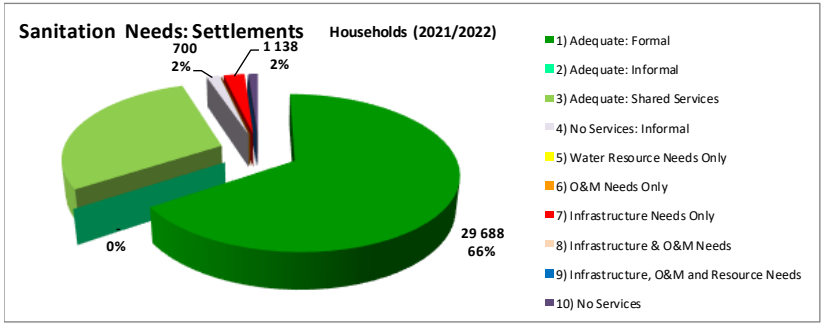


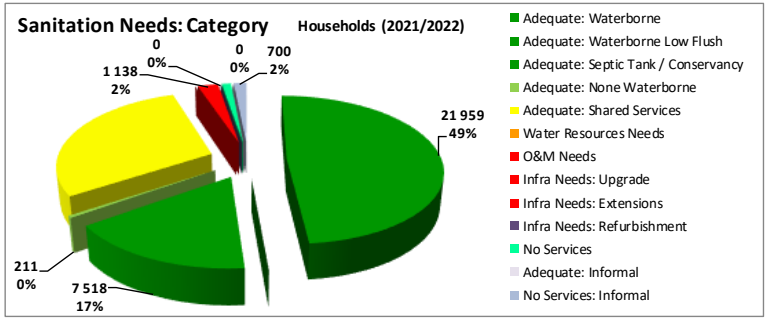
1	Adequate	3	Adequate: Shared services	5	Water Resources Needs **Only**	7	Infrastructure Needs **Only**	9	Infrastructure, O&M & Resource Needs
2	Adequate: Informal	4	No Services: Informal	6	O & M Needs **Only**	8	Infrastructure& O&M needs	10	No Services

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

Table C.2.3.2: Residential Water Services Delivery Adequacy Profile (Sanitation)

Water Categorisation	Number of settlements	FORMAL																				INFORMAL			
		Adequate										Water Resource needs		O & M Needs		Infrastructure Needs						No services		Adequate		No services	
		Waterborne		Waterborne Low flush		Septic Tank/ Conservancy		None Waterborne		Shared Services						Upgrades		Extensions		Refurbishment							
		HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%
1	37	21 959	100%			7 518	100%	211	100%																		
2	1																										
3	10									13 158	100%																
4	1																									700	100%
5	0																										
6	0																										
7	3															1 138	100%										
8	0																										
9	0																										
10	3																					507	100%				
Total Household Interventions required		21 959		0		7 518		211		13 158		0		0		1 138		0		0		507		0		700	





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

C.3. Cost Recovery and Free Basic Services

C.3.1. Tariffs

The water tariff structures for Swartland Municipality for the 2021/2022 financial year and the previous five financial years are summarised in the table below (Subject to 15% VAT).

Table C.3.1: Water tariffs for 2021/2022 and the previous five financial years

Consumer/Description	Category	21/22	20/21	19/20	18/19	17/18	16/17
All	Availability Fees per month	R91-69	R91-69	R91-69	R86-50	R75-47	R67-38
Residential Consumers	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R5-21	R5-03	R5-03	R5-04	R4-50	R0-00
	5 – 6 Kl				R14-09	R12-58	R11-23
	7 – 10 Kl	R8-94	R8-64	R8-64			
	11 – 15 Kl	R17-12	R16-54	R15-77	R14-60		
	16 – 20 Kl	R21-70	R20-97	R19-99	R15-10		
	21 – 25 Kl	R32-18	R31-09	R29-64	R27-44		
	26 – 35 Kl	R47-94	R64-78	R61-75	R57-18	R17-32	R15-46
	36 – 50 Kl	R89-40	R89-40	R85-22			
	51 kl and above				R78-91	R26-81	R23-94
Indigent Households	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	Free Water 6 Kl (6 Kl EQS)	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00
	7 Kl	R8-94	R8-64	R8-64	R14-09	R12-58	
	Free Water 8 Kl (2 Kl council + 6 Kl EQS)						
	Free Water 9 Kl (3 Kl council + 6 Kl EQS)						R11-23
	10 Kl						
	11 – 15 Kl	R17-12	R16-54	R15-77	R14-60		
	16 – 20 Kl	R21-70	R20-97	R19-99	R15-10		
	21 – 25 Kl	R32-18	R31-09	R29-64	R27-44		
	26 – 35 Kl	R47-94	R64-78	R61-75	R57-18	R17-32	R15.46
	36 – 50 Kl	R89-40	R89-40	R85-22			
	51 kl and above				R78-91	R26-81	R23-94
Any other Institution No fix minimum (Basic)	From 1 kl and above – R/Tariff per Kl	-	-	-	-	R17-86	R15-95
Agricultural (Residential)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R5-21	R5-03	R5-03	R5-04	R4-50	R0-00
	5 – 6 Kl				R14-09	R12-58	R11-23
	7 - 10 Kl	R8-94	R8-64	R8-64			
	11 – 15 Kl	R17-12	R16-54	R15-77	R14-60		
	16 – 20Kl	R21-70	R20-97	R19-99	R15-10		
	21 – 25 Kl	R32-18	R31-09	R29-64	R27-44		
	26 – 35 Kl	R47-94	R64-78	R61-75	R57-18	R17-32	R15-46
	36 – 50 Kl	R89-40	R89-40	R85-22			
	51 kl and above				R78-91	R26-81	R23-94
Farms (Businesses)	From first Kl	-	-	-	-	R17-86	R15-95
Business / Commercial / Industrial / etc.	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	Per Kl	R22-36	R21-60	R21-60	R20-00	-	-
Water: Agricultural Business	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	Per Kl	R22-36	R21-60	R21-60	R20-00	R17-86	R15-95
Schools, Government	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	

Table C.3.1: Water tariffs for 2021/2022 and the previous five financial years							
Consumer/Description	**Category**	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**
Institutions	Per Kl	R24-86	R24-02	R22-90	R21-20	-	-
Sport Clubs	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	Per Kl	R23-70	R22-90	R22-90	R21-20	R15-11	R13-49
Municipality (Departmental)	Per Kl	R6-46	R6-46	R8-64	R14-09	R12-58	R11-23
Spice Route and Country Fair	From first Kl	-	-	-	-	R17-86	R15-95
Raw Water (Untreated) to Anne Pienaar Primary School	From first Kl	R4-32	R4-08	R3-81	R3-56	R3-34	R3-11
5% Increase in Tariffs Residential and Agricultural Residential	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R5-47	R5-28	R5-28	R5-29	R4-73	R0-00
	5 – 6 Kl				R14-79	R13-21	R11-79
	7 - 10 Kl	R9-39	R9-07	R9-07			
	11 – 15 Kl	R17-97	R17-37	R16-56	R15-33		
	16 – 20 Kl	R22-79	R22-02	R20-99	R15-86		
	21 – 25 Kl	R33-79	R32-64	R31-12	R28-81		
	26 – 35 Kl	R50-34	R68-02	R64-84	R60-04	R18-19	R16-23
	36 – 50 Kl	R93-87	R93-87	R89-48			
	51 kl and above				R82-86	R28-15	R25-14
5% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	From first Kl	R23-47	R22-68	R22-68	R21-00	R18-75	R16-75
5% Increase in Tariffs Schools and Government Institutions	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	
	From first Kl	R26-10	R25-22	R24-05	R22-26	-	
5% Increase in Tariffs Sport Clubs	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	From first Kl	R24-89	R24-05	R24-05	R22-26	-	
10% Increase in Tariffs Residential and Agricultural Residential (Level 1)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R5-73	R5-53	R5-53	R5-54	R4-95	R0-00
	5 – 6 Kl				R15-50	R13-84	R12-35
	7 - 10 Kl	R9-84	R9-50	R9-50			
	11 – 15 Kl	R18-83	R18-19	R17-35	R16-06		
	16 – 20 Kl	R23-87	R23-07	R21-99	R16-61		
	21 – 25 Kl	R35-40	R34-20	R32-60	R30-18		
	26 – 35 Kl	R52-73	R71-26	R67-93	R62-90	R19-05	R17-01
	36 – 50 Kl	R98-34	R98-34	R93-74			
	51 kl and above				R86-80	R29-49	R26-33
10% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 1)	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	From first Kl	R24-59	R23-76	R23-76	R22-00	R19-65	R17-55
10% Increase in Tariffs Schools and Government Institutions (Level 1)	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	
	From first Kl	R27-35	R26-42	R25-19	R23-32	-	-
10% Increase in Tariffs Sport Clubs (Level 1)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	From first Kl	R26-07	R25-19	R25-19	R23-32	-	-
15% Increase in Tariffs Residential and Agricultural Residential (Level 1B)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R6-28	R6-07	R5-78	R5-80	R5-18	R0-00
	5 – 6 Kl				R16-20	R14-47	R12-91
	7 - 10 Kl	R10-79	R10-42	R9-94			
	11 – 15 Kl	R19-69	R19-02	R18-14	R16-79		
	16 – 20 Kl	R24-96	R24-12	R22-99	R17-37		
	21 – 25 Kl	R37-00	R35-75	R34-09	R31-56		
	26 – 35 Kl	R55-13	R74-50	R71-01	R65-76	R19-92	R17-78

Table C.3.1: Water tariffs for 2021/2022 and the previous five financial years							
Consumer/Description	**Category**	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**
	36 – 50 Kl	R106-41	R102-81	R98-00			
	51 kl and above				R90-75	R30-83	R27-53
15% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 1B)	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	From first Kl	R26-97	R26-06	R24-84	R23-00	R20-54	R18-34
15% Increase in Tariffs Schools and Government Institutions (Level 1B)	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	
	From first Kl	R28-59	R27-62	R26-34	R24-38	-	
15% Increase in Tariffs Sport Clubs (Level 1B)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	From first Kl	R28-60	R27-63	R26-34	R24-38	-	
20% Increase in Tariffs Residential and Agricultural Residential (Level 2)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R6-55	R6-33	R6-04	R6-05	R5-40	R0-00
	5 – 6 Kl				R16-91	R15-10	R13-48
	7 - 10 Kl	R11-26	R10-88	R10-37			
	11 – 15 Kl	R20-54	R19-85	R18-92	R17-52		
	16 – 20 Kl	R26-04	R25-16	R23-99	R18-12		
	21 – 25 Kl	R38-61	R37-31	R35-57	R32-93		
	26 – 35 Kl	R57-53	R77-74	R74-10	R68-62	R20-78	R18-55
	36 – 50 Kl	R111-03	R107-28	R102-26			
	51 kl and above				R94-69	R32-17	R28-73
20% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 2)	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	From first Kl	R28-14	R27-19	R25-92	R24-00	R21-43	R19-14
20% Increase in Tariffs Schools and Government Institutions (Level 2)	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	
	From first Kl	R29-83	R28-82	R27-48	R25-44	-	
20% Increase in Tariffs Sport Clubs (Level 2)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	From first Kl	R29-84	R28-83	R27-48	R25-44	-	
25% Increase in Tariffs Residential and Agricultural Residential (Level 2B)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R6-83	R6-60	R6-29	R6-30	R5-63	R0-00
	5 – 6 Kl				R17-61	R15-73	R14-04
	7 - 10 Kl	R11-73	R11-33	R10-80			
	11 – 15 Kl	R21-40	R20-68	R19-71	R18-25		
	16 – 20 Kl	R27-13	R26-21	R24-99	R18-88		
	21 – 25 Kl	R40-22	R38-86	R37-05	R34-30		
	26 – 35 Kl	R59-93	R80-98	R77-19	R71-48	R21-65	R19-33
	36 – 50 Kl	R115-66	R111-75	R106-53			
	51 kl and above				R98-64	R33-51	R29-93
25% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 2B)	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	From first Kl	R29-31	R28-32	R27-00	R25-00	R22-33	R19-94
25% Increase in Tariffs Schools and Government Institutions (Level 2B)	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	
	From first Kl	R31-08	R30-03	R28-63	R26-50	-	
25% Increase in Tariffs Sport Clubs (Level 2B)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	From first Kl	R31-08	R30-03	R28-63	R26-50	-	
30% Increase in Tariffs Residential and Agricultural Residential (Level 3)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R7-10	R6-86	R6-54	R6-55	R5-85	R0-00
	5 Kl				R18-32	R16-35	
	6 Kl						R14-60

Table C.3.1: Water tariffs for 2021/2022 and the previous five financial years							
Consumer/Description	**Category**	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**
	7 - 10 Kl	R12-19	R11-78	R11-23			
	11 – 15 Kl	R22-25	R21-50	R20-50	R18-98		
	16 – 20 Kl	R28-22	R27-26	R25-99	R19-63		
	21 – 25 Kl	R41-83	R40-42	R38-53	R35-67		
	26 – 35 Kl	R62-32	R84-21	R80-28	R74-33	R22-52	R20-10
	36 – 50 Kl	R120-29	R116-22	R110-79			
	51 kl and above				R102-58	R34-85	R31-12
30% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 3)	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	From first Kl	R30-49	R29-46	R28-08	R26-00	R23-22	R20-74
30% Increase in Tariffs Schools and Government Institutions (Level 3)	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	
	From first Kl	R32-32	R31-23	R29-77	R27-56	-	-
30% Increase in Tariffs Sport Clubs (Level 3)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	From first Kl	R32-32	R31-23	R29-77	R27-56	-	-
35% Increase in Tariffs Residential and Agricultural Residential (Level 3B)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R7-37	R7-12	R6-79	R6-80	R6-08	R0-00
	5 – 6 Kl				R19-02	R16-98	R15-16
	7 - 10 Kl	R12-67	R12-24	R11-66			
	11 – 15 Kl	R23-11	R22-33	R21-29	R19-71		
	16 – 20 Kl	R29-30	R28-31	R26-99	R20-39		
	21 – 25 Kl	R43-44	R41-97	R40-01	R37-04		
	26 – 35 Kl	R64-72	R87-45	R83-36	R77-19	R23-38	R20-87
	36 – 50 Kl	R124-91	R120-69	R115-05			
	51 kl and above				R106-53	R36-19	R32-32
35% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 3B)	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	From first Kl	R31-66	R30-59	R29-16	R27-00	R24-11	R21-53
35% Increase in Tariffs Schools and Government Institutions (Level 3B)	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	
	From first Kl	R33-56	R32-43	R30-92	R28-62	-	-
35% Increase in Tariffs Sport Clubs (Level 3B)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	From first Kl	R33-57	R32-43	R30-92	R28-62	-	-
40% Increase in Tariffs Residential and Agricultural Residential (Level 4)	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	
	0 – 4 Kl	R7-65	R7-39	R7-04	R7-06	R6-30	-
	5 – 6 Kl				R19-73	R17-61	
	7 – 10 Kl	R13-13	R12-69	R12-10			
	11 – 15 Kl	R23-97	R23-16	R22-08	R20-44		
	16 – 20 Kl	R30-39	R29-36	R27-99	R21-14		
	21 – 25 Kl	R45-05	R43-53	R41-50	R38-42		-
	26 – 35 Kl	R67-12	R90-69	R86-45	R80-05	R24-25	-
	36 – 50 Kl	R129-54	R125-16	R119-31			-
	51 Kl and above				R110-47	R37-53	-
40% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 4)	Water network charge	R113-85	R110-00	R110-00	R86-50	No Basic	
	From first Kl	R32-83	R31-72	R30-24	R28-00	R25-00	-
40% Increase in Tariffs Schools and Government Institutions (Level 4)	Water network charge	R70-43	R68-05	R64-87	R86-50	No Basic	
	From first Kl	R34-80	R33-63	R32-06	R29-68	-	-
40% Increase in Tariffs Sport	Water network charge	R67-14	R64-87	R64-87	R86-50	No Basic	

Table C.3.1: Water tariffs for 2021/2022 and the previous five financial years							
Consumer/Description	**Category**	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**
Clubs (Level 4)	From first Kl	R34-81	R33-63	R32-06	R29-68	-	-
50% Increase in Tariffs Residential and Agricultural Residential (Level 5)	Water network charge	R67-14	R64-87	R64-87	R86-50	-	-
	0 – 4 Kl	R8-19	R7-91	R7-55	R6-68	-	-
	5 – 6 Kl				R18-67		
	7 – 10 Kl	R14-08	R13-60	R12-96		-	-
	11 – 15 Kl	R25-68	R24-81	R23-66	R20-53	-	-
	16 – 20 Kl	R32-56	R31-46	R29-99	R58-30	-	-
	21 – 25 Kl	R48-27	R46-64	R44-46	R76-32	-	-
	26 – 35 Kl	R71-91	R97-17	R92-63	R105-99	-	-
	36 – 50 Kl	R138-79	R134-10	R127-83		-	-
	51 Kl and above				R281-03	-	-
50% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 5)	Water network charge	R113-85	R110-00	R110-00	R86-50	-	-
	From first Kl	R35-18	R33-99	R32-40	R26-50	-	-
50% Increase in Tariffs Schools and Government Institutions (Level 5)	Water network charge	R70-43	R68-05	R64-87	R86-50	-	-
	From first Kl	R37-29	R36-03	R34-35	R31-80	-	-
50% Increase in Tariffs Sport Clubs (Level 5)	Water network charge	R67-14	R64-87	R64-87	R86-50	-	-
	From first Kl	R37-29	R36-03	R34-35	R31-80	-	-
60% Increase in Tariffs Residential and Agricultural Residential (Level 6)	Water network charge	R67-14	R64-87	R64-87	R86-50	-	-
	0 – 4 Kl	R8-74	R8-44	R8-05	R7-08	-	-
	5 – 6 Kl				R19-79	-	-
	7 – 10 Kl	R15-01	R14-50	R13-82		-	-
	11 – 15 Kl	R27-39	R26-46	R25-23	R21-76	-	-
	16 – 20 Kl	R34-73	R33-55	R31-98	R61-80	-	-
	21 – 25 Kl	R51-49	R49-74	R47-42	R80-90	-	-
	26 – 35 Kl	R76-70	R103-65	R98-80	R112-35	-	-
	36 – 50 Kl	R148-05	R143-04	R136-35			
	51 Kl and above				R297-89	-	-
60% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 6)	Water network charge	R113-85	R110-00	R110-00	R86-50	-	-
	From first Kl	R37-52	R36-25	R34-56	R28-09	-	-
60% Increase in Tariffs Schools and Government Institutions (Level 6)	Water network charge	R70-43	R68-05	R64-87	R86-50	-	-
	From first Kl	R39-78	R38-43	R36-64	R33-71	-	-
60% Increase in Tariffs Sport Clubs (Level 6)	Water network charge	R67-14	R64-87	R64-87	R86-50	-	-
	From first Kl	R39-79	R38-44	R36-64	R33-71	-	-
70% Increase in Tariffs Residential and Agricultural Residential (Level 7)	Water network charge	R67-14	R64-87	R64-87	R86-50	-	-
	0 – 4 Kl	R9-28	R8-97	R8-55	R7-50	-	-
	5 – 6 Kl				R20-97		
	7 – 10 Kl	R15-95	R15-41	R14-69		-	-
	11 – 15 Kl	R29-10	R28-12	R26-81	R23-07	-	-
	16 – 20 Kl	R36-90	R35-65	R33-98	R65-51	-	-
	21 – 25 Kl	R54-70	R52-85	R50-39	R85-75	-	-
	26 – 35 Kl	R81-50	R110-13	R104-98	R119-09	-	-
	36 – 50 Kl	R157-30	R151-98	R144-87		-	-
	51 Kl and above				R315-76	-	-

Table C.3.1: Water tariffs for 2021/2022 and the previous five financial years							
Consumer/Description	**Category**	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**
70% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 7)	Water network charge	R113-85	R110-00	R110-00	R86-50	-	-
	From first Kl	R39-87	R38-52	R36-72	R29-78	-	-
70% Increase in Tariffs Schools and Government Institutions (Level 7)	Water network charge	R70-43	R68-05	R64-87	R86-50	-	-
	From first Kl	R42-26	R40-83	R38-93	R35-73	-	-
70% Increase in Tariffs Sport Clubs (Level 7)	Water network charge	R67-14	R64-87	R64-87	R86-50	-	-
	From first Kl	R42-27	R40-84	R38-93	R35-73	-	-
80% Increase in Tariffs Residential and Agricultural Residential (Level 8)	Water network charge	R67-14	R64-87	R64-87	R86-50	-	-
	0 – 4 Kl	R9-83	R9-50	R9-05	R7-95	-	-
	5 – 6 Kl				R22-23		
	7 – 10 Kl	R16-88	R16-31	R15-55		-	-
	11 – 15 Kl	R30-81	R29-77	R28-39	R24-45	-	-
	16 – 20 Kl	R39-07	R37-75	R35-98	R69-44	-	-
	21 – 25 Kl	R57-92	R55-96	R53-35	R90-90	-	-
	26 – 35 Kl	R86-29	R116-60	R111-15	R126-24	-	-
	36 – 50 Kl	R166-55	R160-92	R153-40		-	-
	51 Kl and above				R334-71	-	-
80% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 8)	Water network charge	R113-85	R110-00	R110-00	R86-50	-	-
	From first Kl	R42-22	R40-79	R38-88	R31-57	-	-
80% Increase in Tariffs Schools and Government Institutions (Level 8)	Water network charge	R70-43	R68-05	R64-87	R86-50	-	-
	From first Kl	R44-75	R43-24	R41-22	R37-87	-	-
80% Increase in Tariffs Sport Clubs (Level 8)	Water network charge	R67-14	R64-87	R64-87	R86-50	-	-
	From first Kl	R44-75	R43-24	R41-22	R37-87	-	-
Connection Low Cost		Contract	Contract	Contract	Contract	Contract	Contract
Connection (15mm)		R5 986-09	R5 459-13	R5 260-87	R5 008-70	R5 000-00	R4 385-96
Connection (22mm)		R6 676-52	R6 469-57	R6 469-57	R6 017-39	R6 008-77	R5 017-54
Connection 22mm Private Developments		R4 636-52	R4 460-87	R4 460-87	R4 113-04	R4 105-26	R3 736-84
Deposit Payable: Letting of Municipal Standpipe		R7 500-00	R6 521-74	R6 086-96	R5 269-57	R5 263-16	R4 824-56
Test of water meter – Refundable if result is faulty		R782-61	R782-61	R704-35	R660-87	R438-60	R350-88

The sewerage tariff structures for Swartland Municipality for the 2021/2022 financial year and the previous five financial years are summarised in the table below (Subject to 15% VAT).

Table C.3.2: Sewerage tariffs for 2021/2022 and the previous five financial years							
Consumer/Description	**Category**	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**
Basic Network Charge	Sewerage connection / pumping service	R105-10	-	-	-	-	-
Households, Flats, Semi-detached households	Availability Fees per month	R143-08	R234-35	R234-35	R217-97	R205-63	R193-99
Businesses, Industrial, Schools, Churches, Sport Facilities, etc.	Availability Fees per month	R143-08	R234-35	R234-35	R217-97	R205-63	R193-99
For each additional toilet	Businesses, etc. per month	R39-08	R36-87	R35-15	R32-70	R30-85	R29-10
Sewer connections	100mm PVC	R5 024-35	R4 789-57	R4 626-09	R4 434-78	R4 429-82	R4 412-28
Sewer connections	150mm PVC	R6 525-22	R6 673-04	R6 252-17	R5 791-30	R5 789-47	R5 315-79
Sewer blockages	Office hours	R556-52	R524-35	R487-83	R469-57	R447-37	R447-37
Sewer blockages	After hours and public holidays	R789-57	R743-48	R690-43	R660-87	R640-35	R640-35
Emptying of tanks	For two emptying per month	R143-08	R234-35	R234-35	R217-97	R205-63	R193-99

Table C.3.2: Sewerage tariffs for 2021/2022 and the previous five financial years							
Consumer/Description	**Category**	**21/22**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**
	Every additional emptying	R909-94	R858-43	R839-13	R791-30	R789-47	R789-47
	3rd pumping during Easter Weekend and school holidays in the same month will be charged.	R909-94	R858-43	R839-13	R791-30	R789-47	R789-47
Emptying of tanks (Riebeek Kasteel and Abbotsdale)	From the 1st sewerage pumping	R909-94	R858-43	R839-13	R791-30	R789-47	R789-47
	Plus fixed sewerage pan levy (Owner do not connect to the new waterborne system)	R285-41 (VAT incl.)	R266-00 (VAT incl.)	R266-00 (VAT incl.)	R250-67 (VAT incl.)	R234-42 (VAT incl.)	R221-15 (VAT incl.)
Ad-hoc emptying of tanks	After hours	R1 137-39	R1 081-91	R1 021-74	R921-74	R921-05	R921-05
Treated Waste Water	Per Kl	R3-13	R2-96	R2-86	R2-76	R2-61	R2-49
Treated Waste Water Rooiheuwel JV	Per Kl	R0-86	R0-81	R0-76	R0-71	R0-67	R0-63
Partially connection (Emptying)		R52-61	R125-98	R117-18	R108-98	R103-51	R96-99
Industrial effluent per Kl (COD)		R11-95	R11-27	R10-65	R10-03	R9-44	R8-80
Grotto Baai and Jakkelsfontein – Network Charge		R105-10	-	-	-	-	-
Grotto Baai and Jakkelsfontein for two emptying per month		R143-08	R234-35	R234-35	R217-97	R205-63	R1 101-75
Partial connection (pumping) sewerage tanks for two emptying per month, take consideration of the sewerage network monthly charge.		R71-60	-	-	-	-	-
Rural and Non-urban areas – emptying of sewerage tanks per pumping		R1 619-13	R1 545-22	R1 469-57	R1 382-61	R1 377-19	R1 377-19

C.3.2. Metering, Billing and Free Basic Services

The table below gives an overview of the metering, billing and free basic services of Swartland Municipality.

Table C.3.2.1: Overview of Metering, Billing and Free Basic Services

Regulations Ref. #	Description	Unit	Year 0	Year - 1	Year - 2
			FY2021/22	FY2020/21	FY2019/20
	UNITS SUPPLIED (as per water services access profile)				
10.2 (b) (i)	Household water connections (house and yard connections)	Nr	**43 999**	**42 276**	**40 344**
10.2 (b) (iv)	Household sewerage connections	Nr	**42 635**	**40 912**	**38 980**
	METERING				
	Metered Water Connections (aligned with Table C2.1)				
	Residential	Nr	20 938	20 829	19 910
	Commercial / Business	Nr	830	827	788
	Industrial	Nr	9	9	8
	Government / Institutional	Nr	70	70	70
	Other	Nr	641	635	328
	Sub-Total: Metered Water Connections	**Nr**	**22 488**	**22 370**	**21 104**
	Proportion of metered connections (residential)*	%	48%	49%	49%
	Total number of meters	Nr	**22 488**	**22 370**	**21 104**
10.2 (b) (vi)	Total number of new connections (aligned with Table C.2.1)	Nr	118	1 266	107
10.2 (e) (i)	Total number of new meters installed	Nr	118	1 266	107
	Proportion of new connections, metered	%	100.0%	100.0%	100.0%
	Number of meters tested	Nr	0	0	0
10.2 (e) (ii)	Proportion of meters tested to total number of meters	%	0.0%	0.0%	0.0%
	Number of meters replaced**	Nr	230	177	568
10.2 (e) (ii)	Proportion of meters replaced to total number of meters	%	1.0%	0.8%	2.7%
	BILLING				
	Customer billing (water and sewerage)		**Nr**	**Nr**	**Nr**
	Residential	Nr	20 938	20 829	19 910
	Commercial / Business	Nr	830	827	788
	Industrial	Nr	9	9	8
	Government / Institutional	Nr	70	70	70
	etc.		641	635	328
	Sub-Total: Customers billed	Nr	**22 488**	**22 370**	**21 104**
	Proportion of bills to metered connections	%	**100%**	**100%**	**100%**
	Residential	%	100%	100%	100%
	Commercial / Business	%	100%	100%	100%
	Industrial	%	100%	100%	100%
	Government / Institutional	%	100%	100%	100%
	etc.	%	100%	100%	100%
	FREE BASIC SERVICES				
	Nr customers receiving:				
	Free Basic Water	Nr	9 223	9 698	9 027
10.2 (b) (v)	Free Basic Sanitation	Nr	8 918	8 883	8 525
	Proportion of Free Basic Services				
	Water	%	44%	47%	45%
	Sewerage	%	21%	22%	22%

Note:

* All residential consumers in the urban areas of Swartland Municipality's Management Area are metered. The "Water Services Access Profile" however includes the consumers on the farms and the backyard dwellers on formal erven in the urban areas. Backyard dwellers use the service of the main house, which is metered. Consumers on the farms utilise their own water sources, which is not metered by the Municipality, therefore the 48% - 49% compliance in the above table.

** Include number of meters inspect / test / repair / install

C.3.3. Revenue Collection and Cost Recovery

The table and figures below give an overview of Swartland Municipality's water services revenue collection and cost recovery.

Table C.3.3.1: Overview of Water Services Revenue Collection and Cost Recovery				
Regulations Ref. #	Description	Year 0	Year - 1	Year - 2
		FY2021/22	FY2020/21	FY2019/20
	INCOME	**R'000**	**R'000**	**R'000**
	Billed			
	Water reticulation / provision	R 85 699	R 79 338	R 97 519
	Sewerage / wastewater	R 68 088	R 65 389	R 54 572
	Sub-Total: Billed	**R 153 787**	**R 144 728**	**R 152 092**
	Collections			
	Water reticulation / provision	R 86 449	R 79 539	R 95 978
	Sewerage / wastewater	R 87 654	R 82 802	R 69 034
	Sub-Total: Collections	**R 174 103**	**R 162 341**	**R 165 012**
	Equitable share income			
	Water reticulation / provision	R 13 383	R 10 894	R 8 686
	Sewerage / wastewater	R 26 715	R 22 436	R 16 502
	Sub-Total: Equitable share income	**R 40 097**	**R 33 329**	**R 25 188**
	EXPENDITURE (O&M)	**R'000**	**R'000**	**R'000**
	Water services	R 79 785	R 44 955	R 61 302
	Sewerage / wastewater services	R 56 552	R 50 617	R 49 817
	Total: Water Services O&M	**R 136 337**	**R 95 572**	**R 111 119**
	COST RECOVERY ANALYSIS / RATIO'S	**%**	**%**	**%**
10.2 (d) (ii)	**Billed as % of Cost**			
	Water	124%	201%	173%
	Sewerage	168%	174%	143%
	Total	**142%**	**186%**	**160%**
10.2 (d) (iii)	**Unrecovered as % of Cost**			
	Water services	16%	24%	17%
	Sewerage / wastewater services	13%	10%	4%
	Total	**15%**	**16%**	**11%**

The figure below gives an overview of the revenue collection and cost recovery profile for water services for Swartland Municipality.

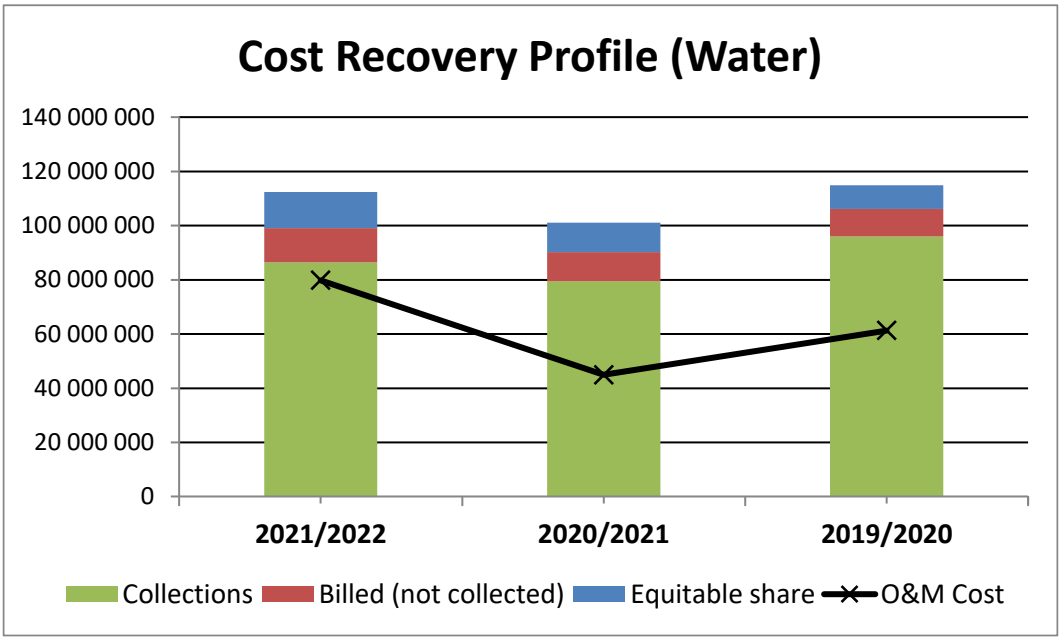


Figure C.3.3.1: Revenue collection and cost recovery profile (Water)

The figure below gives an overview of the revenue collection and cost recovery profile for wastewater services for Swartland Municipality.

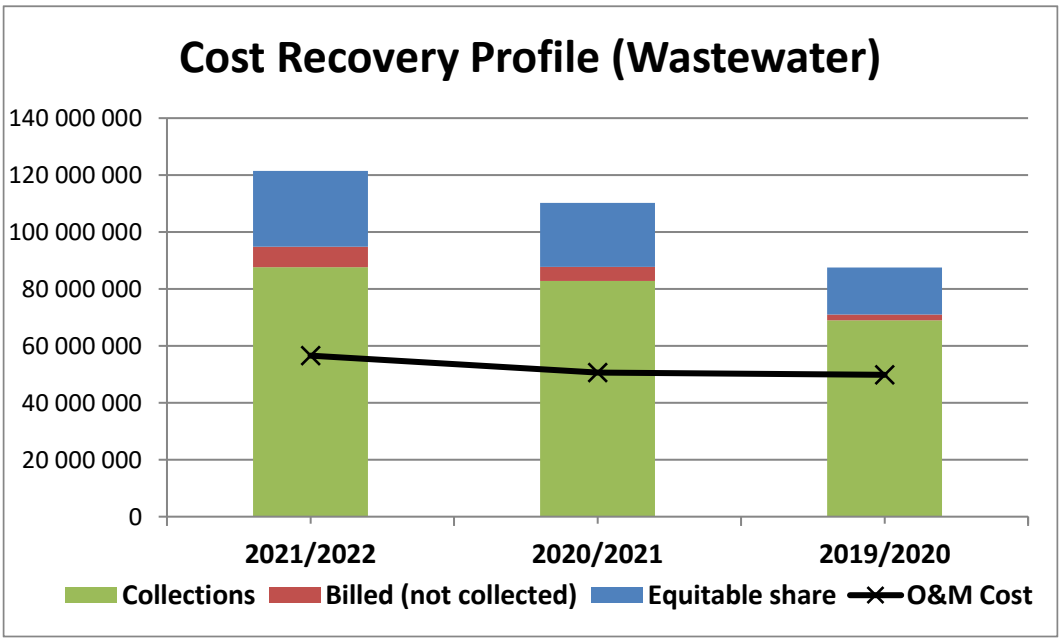


Figure C.3.3.2: Revenue collection and cost recovery profile (Wastewater)

Swartland Municipality's Operational and Maintenance Budget for water services for the last seven financial years are summarised in the table below. A more detailed breakdown of the water operational budgets are also included in Annexure F.

Table C.3.3.2: Operational and Maintenance budget for water services							
Description	**Actual 21/22**	**Record: Prior**					
		Actual 20/21	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**	**Actual 16/17**	**Actual 15/16**
EXPENDITURE							
Wages and Salaries	R18 280 445	R14 087 315	R13 729 548	R11 721 909	R10 478 480	R9 495 563	R9 381 352
Social Contributions	R2 784 942	R2 462 631	R2 292 675	R2 035 437	R1 721 005	R1 650 215	R1 550 889
Bad Debts	R2 096 897	R0	R6 462 307	R0	R200 950	R1 637 605	R907 476
Depreciation: Property, plant and equipment	R15 396 207	R14 639 011	R14 437 698	R0	R13 023 409	R0	R16 892
Repairs and Maintenance	R1 630 875	R1 021 131	R1 369 954	R1 341 566	R1 461 808	R1 329 269	R1 028 761
Interest Expense	R197 429	R387 675	R959 499	R1 552 598	R2 265 271	R94 487	R98 554
General Expenses: Bulk Purchases	R0	R0	R0	R0	R993 632	R24 540 151	R26 235 490
General Expenses: Departmental	R1 599 615	R1 453 743	R1 522 537	R742 701	R1 472 035	R1 480 952	R1 437 818
Inter Departmental Recoveries	R608 080	R0	R431 913	R304 742	R331 928	R374 781	R374 956
General Expenses: Other	R36 800 382	R10 903 926	R20 095 768	R5 388 964	R15 537 680	R2 816 389	R1 919 835
Loss on Disposal of Assets	R389 820	R0	R0	R0	R0	R0	R0
Expenditure Total	**R79 784 692**	**R44 955 432**	**R61 301 899**	**R23 087 917**	**R47 486 198**	**R43 419 412**	**R42 952 023**
INCOME							
Service Charges	-R78 150 261	-R72 183 322	-R71 489 657	-R60 146 111	-R52 670 179	-R53 509 950	-R46 895 602
Grants and Subsidies received: Operating	R0	-R141 591	-R123 760	R0	R0	R0	-R4 562 000
Unconditional and Other Grants	-R14 659 002	-R16 770 715	-R14 874 317	-R16 009 462	-R6 338 634	-R4 260 180	-R6 816 086
Grants and Subsidies received: Capital	-R350 000	R0	-R16 367 200	R0	-R12 329 552	R0	R0
Other Revenue	-R5 900 953	-R4 145 841	-R3 350 599	-R3 471 200	-R3 525 400	-R3 942 370	-R3 242 288
Unconditional and Other Grants	-R22 000						
Less Revenue Foregone	-R290	R3 009 706	R0	R0	R0	R6 134 342	R4 472 694
Income Total	**-R99 081 926**	**-R90 231 763**	**-R106 205 533**	**-R79 626 773**	**-R74 863 765**	**-R55 578 158**	**-R57 043 282**
Nett Surplus / Deficit	**-R19 297 234**	**-R45 276 331**	**-R44 903 634**	**-R56 538 856**	**-R27 377 567**	**-R12 158 746**	**-R14 091 259**

Swartland Municipality's Operational and Maintenance Budget for sanitation services for the last seven financial years are summarised in the table below. A more detail breakdown of the sanitation operational budgets are also included in Annexure F.

Table C.3.3.3: Operational and Maintenance budget for sanitation services							
Description	**Actual 21/22**	**Record: Prior**					
		Actual 20/21	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**	**Actual 16/17**	**Actual 15/16**
EXPENDITURE							
Wages and Salaries	R9 684 345	R8 189 332	R7 934 618	R6 882 200	R6 754 761	R6 138 713	R6 157 564
Social Contributions	R1 527 960	R1 483 313	R1 403 886	R1 308 109	R1 200 356	R1 109 066	R965 916
Bad Debts	R1 280 373	R0	R0	R0	R0	R386 778	R337 872
Depreciation: Property, plant and equipment	R16 317 745	R16 092 587	R16 134 374	R0	R16 006 871	R0	R114 840
Repairs and Maintenance	R6 019 299	R4 383 979	R3 915 063	R3 097 134	R2 809 945	R2 971 523	R2 790 922
Interest Expense: External Borrowings	R9 128 835	R9 642 519	R10 127 577	R10 518 757	R10 909 157	R11 267 960	R11 597 930
General Expenses: Bulk Purchases Electricity	R0	R0	R0	R0	R833 276	R832 793	R603 005
General Expenses: Departmental	R724 862	R353 591-00	R689 934	R336 553	R667 050	R681 008	R670 943
Interdepartmental Recoveries	R6 040 607	R5 259 223	R5 337 182	R4 950 888	R4 831 852	R4 660 252	R4 335 440
General Expenses: Other	R5 654 712	R5 212 322	R4 274 688	R4 594 890	R4 677 943	R4 090 025	R3 357 513
Loss on Disposal of Assets	R173 418	R0	R0	R0	R0	R0	R0
Nett Expenditure	**R56 552 156**	**R50 616 866**	**R49 817 322**	**R31 688 531**	**R48 691 211**	**R32 138 118**	**R30 931 945**
INCOME							
Service Charges	-R42 148 282	-R35 856 914	-R45 674 849	-R35 200 087	-R32 999 794	-R49 541 180	-R44 033 953
Grants and Subsidies Received Operational	-R41 400	-R38 511	-R53 040	R0	-R319 596	R0	-R9 007
Unconditional and Other grants	-R26 750 000	-R25 641 135	-R23 454 400	-R22 769 691	-R20 699 719	-R18 451 623	-R19 242 607
Grants and Subsidies Received Capital	-R18 877 474	-R20 156 251	-R4 933 800	R0	-R11 669 293	R0	R0
Transfer Revenue	R0	R0	R0	R0	R0	R0	-R1 500 000
Other Revenue	-R6 985 250	-R6 132 354	-R5 806 902	-R4 978 781	-R6 449 135	-R7 338 614	-R5 454 231
Less Revenue Foregone	R0	R0	-R2 344	-R218	R0	R18 487 493	R16 837 627
Reversal of Impairment Loss	R0	R0	R8 851 286	R0	-R51 332	R0	R0
Income Total	**-R94 802 406**	**-R87 825 165**	**-R71 074 049**	**-R62 948 777**	**-R72 188 869**	**-R56 843 924**	**-R53 402 171**
Nett Surplus / Deficit	**-R38 250 250**	**-R37 208 299**	**-R21 256 727**	**-R31 260 246**	**-R23 497 658**	**-R24 705 806**	**-R22 470 226**

The table below gives an overview of the analysis of the consumer debtors' age in days for the last five financial years as on the 30th of June.

Table C.3.3.4: Analysis of Consumer Debtors age in days as on the 30th of June						
Service	**Total**	**Current 0-30 Days**	**31 – 60 Days**	**61 – 90 Days**	**91 – 120 Days**	**120+ Days**
2021/2022						
Electricity	R49 720 423	R43 585 652	R4 041 464	R171 040	R61 179	R1 861 089
Water	R24 583 765	R13 314 376	R2 887 002	R682 515	R690 304	R7 009 568
Sewerage	R9 771 010	R3 894 606	R1 175 653	R335 443	R269 701	R4 095 606
Refuse Removal	R7 695 324	R2 667 891	R828 970	R249 298	R204 400	R 3 744 764
Housing Rentals	R79 820	R31 915	R20 212	R2 458	R2 038	R23 196
Other Debtors	R11 693 206	R9 879 525	R249 616	R94 671	R82 876	R1 386 518
Total	**R103 543 548**	**R73 373 966**	**R9 202 919**	**R1 535 425**	**R1 310 498**	**R18 120 740**
2020/2021						
Electricity	R45 169 248	R39 450 816	R3 002 076	R222 638	R251 079	R2 242 639
Water	R20 483 738	R10 720 585	R2 592 453	R710 719	R618 094	R5 841 887
Sewerage	R7 902 773	R3 309 940	R1 050 544	R285 657	R219 870	R3 036 762
Refuse Removal	R6 699 622	R2 495 606	R783 030	R229 113	R182 834	R3 009 039
Housing Rentals	R68 920	R30 438	R13 526	R2 916	R2 902	R19 138
Other Debtors	R13 053 274	R11 661 601	R191 860	R104 255	R59 665	R1 035 893
Total	**R93 377 575**	**R67 668 986**	**R7 633 489**	**R1 555 298**	**R1 334 444**	**R15 185 358**
2019/2020						
Electricity	R43 459 993	R35 519 028	R2 240 095	R548 277	R312 445	R4 840 148
Water	R27 633 016	R11 612 889	R1 196 526	R703 545	R898 116	R13 221 940
Sewerage	R22 306 177	R3 209 681	R1 054 899	R453 445	R362 495	R17 225 657
Refuse Removal	R15 161 724	R2 443 408	R781 252	R373 629	R309 326	R11 254 109
Housing Rentals	R71 421	R31 143	R19 691	R8 811	R6 176	R5 600
Other Debtors	R18 934 333	R17 380 805	R147 618	R91 245	R68 479	R1 246 186
Total	**R127 566 664**	**R70 196 954**	**R5 440 081**	**R2 178 952**	**R1 957 037**	**R47 793 640**
2018/2019						
Electricity	R38 953 867	R33 850 521	R2 605 709	R54 632	R42 123	R2 400 882
Water	R17 489 928	R7 294 075	R1 548 328	R383 583	R339 704	R7 924 238
Sewerage	R13 376 552	R2 975 313	R839 352	R167 326	R129 493	R9 265 068
Refuse Removal	R9 576 058	R2 242 985	R650 391	R139 262	R115 928	R6 427 492
Housing Rentals	R54 764	R30 384	R20 162	R447	R422	R3 349
Other Debtors	R12 232 079	R11 031 954	R235 775	R71 061	R42 285	R851 004
Total	**R91 683 248**	**R57 425 232**	**R5 899 717**	**R816 311**	**R669 955**	**R26 872 033**
2017/2018						
Electricity	R34 610 083	R31 392 802	R1 999 031	R126 953	R78 465	R1 012 832
Water	R12 558 092	R7 986 100	R1 275 909	R335 933	R325 134	R2 635 016
Sewerage	R5 783 698	R2 774 461	R772 673	R190 739	R131 494	R1 914 331
Refuse Removal	R4 851 971	R2 040 785	R589 320	R146 412	R111 169	R1 964 285
Housing Rentals	R51 501	R29 233	R17 660	R1 457	R894	R2 257
Other Debtors	R2 191 934	R1 189 462	R118 064	R93 549	R57 438	R733 421
Total	**R60 047 279**	**R45 412 843**	**R4 772 657**	**R895 043**	**R704 594**	**R8 262 142**

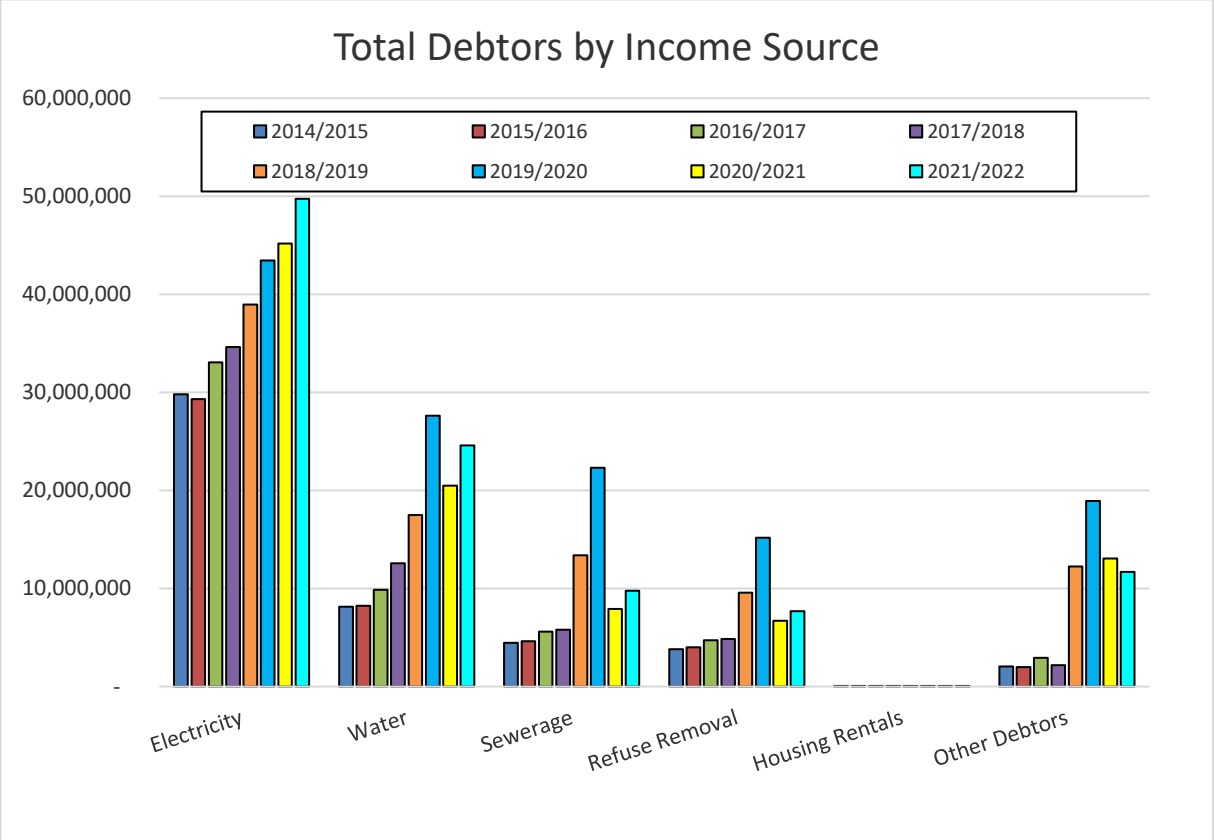


Figure C.3.3.3: Consumer Debtors by Income Source

C.4. Water Quality

C.4.1. Sampling Programme

Operational Sampling programmes are implemented by the West Coast District Municipality at their two bulk WTWs. Compliance Water Quality Monitoring Programmes are also implemented by the West Coast District Municipality and the Swartland Municipality throughout the water distribution systems. Operational and Compliance Effluent Monitoring Programmes are also implemented by Swartland Municipality at their WWTWs.

The two tables below give an overview of the West Coast District Municipality's and Swartland Municipality's compliance sampling programmes for potable water quality, as compiled from the compliance sample results.

Table C.4.1.1: Sampling Programme for Potable Water Quality
Treated Water Schemes: Withoogte and Swartland WTW Final (West Coast DM)

Registered Sites per Scheme		Active (yes/no)			Determinands per Category	Frequency (days)		
		Year 0	Year-1	Year-2		Year 0	Year-1	Year-2
#	Name	FY2021/22	FY2020/21	FY2019/20		FY2021/22	FY2020/21	FY2019/20
33687	Withoogte Final (WCDM)	Yes	Yes	Yes	**Microbiological (Health)**			
32210	Swartland Final (WCDM)	Yes	Yes	Yes	E.Coli (Count per 100 ml)	7	7	7
					Aesthetic			
					Conductivity at 25°C (mS/m)	7	7	7
					Colour (mg/l)	7	7	7
					Total Dissolved Solids (mg/l)	7	7	7
					Chloride as Cl⁻ (mg/l)	7	7	7
					Iron as Fe (ug/l)	30	30	30
					Manganese as Mn (ug/l)	30	30	30
					Operational			
					pH at 25°C	7	7	7
					Turbidity NTU	7	7	7
					Total Coliforms count per 100ml	7	7	7
					Heterotrophic Plate Count per 1 ml	15	-	30
					Aluminium as Al (ug/l)	30	30	30
					Disinfectant Residual			
					Free Chlorine	7	7	7
					Not in STD / Limit Set			
					Total Alkalinity (as CaCO3)	-	15	-

Table C.4.1.1: Sampling Programme for Potable Water Quality
Treated Water Schemes: Distribution Networks

Registered Sites per Scheme		Active (yes/no)			Determinands per Category	Frequency (days)		
		Year 0	Year-1	Year-2		Year 0	Year-1	Year-2
#	Name	FY2021/22	FY2020/21	FY2019/20		FY2021/22	FY2020/21	FY2019/20
33818	Yzerfontein (WCDM)	Yes	Yes	Yes	**Microbiological (Health)**			
25274	Darling (WCDM)	Yes	Yes	Yes	E.Coli (Count per 100 ml)	15	15	15
26627	Koringberg (WCDM)	Yes	Yes	Yes				
27846	Malmesbury (WCDM)	Yes	Yes	Yes	**Aesthetic**			
	Kasteelberg Reservoir (WCDM)	Yes	Yes	Yes	Conductivity at 25°C (mS/m)	15	15	15
	Abbotsdale School	Yes	Yes	Yes				
	Kalbaskraal Municipal Office / Shopping Center	Yes	Yes	Yes	**Operational**			
	Riverlands Primary School	Yes	Yes	Yes	pH at 25°C	15	15	15
	Chatsworth Clinic	Yes	Yes	Yes	Turbidity	15	15	15
	Moorreesburg Sewage	Yes	Yes	Yes	Total Coliforms count per 100ml	15	15	15
	Moorreesburg Municipal Office	Yes	Yes	Yes	Heterotrophic Plate Count per 1 ml	15	15	15
	Koringberg Municipal Office	Yes	Yes	Yes				
	Riebeek Wes Municipal Office	Yes	Yes	Yes	**Disinfectant Residual**			
	Riebeek Kasteel Municipal Office	Yes	Yes	Yes	Free Chlorine	15	15	15
	Yzerfontein Municipal Office	Yes	Yes	Yes				
	Darling Sewage	Yes	Yes	Yes				
	Darling Municipal Office	Yes	Yes	Yes				
	Malmesbury City Hall	Yes	Yes	Yes				
	Malmesbury Mount Royal Office	Yes	Yes	Yes				
	Malmesbury Municipal Office Abbattoir Str.	Yes	Yes	Yes				
	Malmesbury Traffic Office Wesbank	Yes	Yes	Yes				
	Malmesbury Swartland High School	Yes	Yes	Yes				

The current samples taken by the Swartland Municipality, over and above the existing Operational Sampling programme of the West Coast District Municipality, and the proposed additional samples to be taken are summarised in the table below.

Table C.4.1.2: 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*

The table below indicates the compliance of the E.Coli monitoring frequency in the water distributions 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 2021 to June 2022.

Table C.4.1.3: 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	1 797	2	4.4	7.5	11.9
Riebeek Wes and Ongegund	8 247	2	2.3	5.6	7.9
Riebeek Kasteel	9 366	2	4.1	5.6	9.7
Yzerfontein	1 687	2	4.1	5.6	9.7
Darling	12 702	2.5	5.1	5.6	10.7
Moorreesburg	19 061	3.8	2.8	7.5	10.3
Malmesbury	55 747	11.1	10.8	5.6	16.4
Abbotsdale	5 056	2	2	5.6	7.6
Kalbaskraal	3 927	2	2	5.6	7.6

Table C.4.1.3: 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**
Riverlands and Chatsworth	7 257	2	4.1	5.6	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.

The table below gives an overview of Swartland Municipality's compliance sampling programme for wastewater (final effluent) quality, as compiled from the final effluent compliance sample results.

Table C.4.1.4: Sampling Programme for Wastewater Effluent Quality								
Registered Sites		**Active**			**Determinands per Category**	**Frequency (days)**		
		Year 0	**Year-1**	**Year-2**		**Year 0**	**Year-1**	**Year-2**
#	**Name**	**FY2021/22**	**FY2020/21**	**FY2019/20**		**FY2021/22**	**FY2020/21**	**FY2019/20**
1	Malmesbury	Yes	Yes	Yes	**Microbiological**			
2	Darling	Yes	Yes	Yes	Faecal Coliforms (Count per 100mℓ)	30	30	30
3	Moorreesburg	Yes	Yes	Yes				
4	Riebeek Valley	Yes	Yes	Yes	**Chemical**			
5	Chatsworth	Yes	Yes	Yes	Ammonia Nitrogen (mg/ℓ as N)	30	30	30
6	Kalbaskraal	Yes	Yes	Yes	Nitrate Nitrogen (mg/ℓ as N)	30	30	30
7	Koringberg	Yes	Yes	Yes	Nitrite Nitrogen (mg/ℓ as N)	30	30	30
					Ortho Phosphate (mg/ℓ as P)	30	30	30
					COD Filtered (mg/ℓ)	30	30	30
					Physical			
					Free Chlorine	30	30	30
					Conductivity (mS/m at 25°C)	30	30	30
					pH	30	30	30
					TSS (mg/ℓ)	30	30	30

The table below gives an overview of the water quality compliance with regard to the Water Quality Sampling Programme and the wastewater quality compliance with regard to the Wastewater Quality Sampling Programme of Swartland Municipality, as taken from the DWS IRIS.

Table C.4.1.5: Compliance to the Sampling Programme (s)																							
Measurable / Enabling Factor	**Unit**	**Year 0**						**Year 1**						**Year 1**									
		FY2021/22						**FY2020/21**						**FY2019/20**									
		MAH	**CAH**	**CCH**	**CNA**	**O**	**D**	**MAH**	**CAH**	**CCH**	**CNA**	**O**	**D**	**MAH**	**CAH**	**CCH**	**CNA**	**O**	**D**				
Potable Water Quality																							
Supply system submissions	Nr registered							Information not available on IRIS						Information not available on IRIS									
	Nr submitted																						
	Annual %																						
Monitoring compliance	Average %																						
Certified Data	Average %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%				
In-Time Submission **(Information not correct in IRIS)**	Annual %	98%	100%	99%	98%	98%	97%	93%	100%	96%	94%	92%	92%	0%	0%	0%	0%	0%	0%				
Wastewater Quality																							
		M	**C**	**P**	**O**			**M**	**C**	**P**	**O**			**M**	**C**	**P**	**O**						
Monitoring compliance	Average %	54%	47%	56%	-			56%	50%	52%	-			50%	48%	53%	-						
Certified Data	Average %	100%	100%	100%	-			100%	100%	100%	-			100%	100%	100%	-						
In-Time Submission	Average %	96%	97%	97%	-			63%	62%	62%	-			6%	5%	5%	-						

Legend Water **MAH**: Microbiological Acute Health; **CAH**: Chemical Acute Health; **CCH**: Chemical Chronic Health; **CNA**: Chemical Non Health Aesthetic; **O**: Operational; **D**: Disinfectant

Legend Wastewater **M**: Microbiological; **C**: Chemical; **P**: Physical; **O**: Operational

The table below gives an overview of the water quality monitoring from the WSDP Guide Framework perspective.

Table C.4.1.6: Water Quality Monitoring Overview from WSDP Guide Framework Perspective					
WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2021/22	Year - 1 FY2020/21	Year - 2 FY2019/20
6.3	**Water Supply and Quality (West Coast Bulk WTWs)**				
6.3.2	Process Control in place	yes/total WTW in %	100%	100%	100%
6.3.3	Monitoring Programme in place	yes/total schemes in %	100%	100%	100%
6.3.4	Sample Analysis Credibility	Average %	100%	100%	100%
9.2	**Monitoring**				
9.2.1	% of water abstracted monitored: Surface water	Q monitored / Q abstracted in %	100%	100%	100%
9.2.2	% of water abstracted monitored: Ground water	Q monitored / Q abstracted in %	100%	100%	100%
9.2.3	% of water abstracted monitored: External Sources (Bulk purchase)	Q monitored own / Q purchased in %	100%	100%	100%
9.2.6	Water quality for formal schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	frequency	Monthly	Monthly	Monthly
9.2.7	Water quality for rudimentary schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	frequency	N/A	N/A	N/A
9.2.9	Is the number sufficient in accordance to the SANS241 requirements?	yes/no	Yes	Yes	No
9.3	**Water Quality**				
	Is there a water safety plan in place?	yes/no	Yes	Yes	Yes
9.3.1	Reporting on quality of water taken from source: urban & rural	yes/total schemes in %	Yes	Yes	Yes
9.3.5	Quality of water taken from source: urban - % monitored by WSA self?	monitored by WSA / total schemes in %	100%	100%	100%
9.3.6	Quality of water taken from source: rural - % monitored by WSA self?	monitored by WSA / total schemes in %	N/A	N/A	N/A
9.3.9	Are these results available in electronic format?	yes/no	Yes	Yes	Yes

The table below gives an overview of the wastewater quality monitoring from the WSDP Guide Framework perspective.

Table C.4.1.7 : Wastewater Quality Monitoring Overview from WSDP Guide Framework Perspective					
WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2021/22	Year - 1 FY2020/21	Year - 2 FY2019/20
5.3.1	**Monitoring and Sample Failure**				
5.3.1.1	Compliance Monitoring: % of tests performed as required by general limits /special limits/ license requirements (Average % over previous 12 months)	Annual %	52%	52%	50%
5.3.1.2	Operational: % of tests performed as required by general limits /special limits/ license requirements (Average % over previous 12 months)	Annual %	Not captured on IRIS and recorded by Process Controllers at each of the WWTW		
6.4	**Wastewater Supply and Quality**				
6.4.2	Process Control in place	yes/total WWTW in %	Yes	Yes	Yes
6.4.3	Monitoring Programme in place	yes/total WWTW in %	Yes	Yes	Yes
6.4.4	Sample Analysis Credibility	Average %	100%	100%	100%
9.2	**Monitoring**				
9.2.10	Is the number sufficient in accordance to licences?	yes/no	Yes	Yes	Yes
9.3	**Water Quality**				
	Is there a wastewater risk abatement plan in place?	yes/no	Yes	Yes	Yes
9.3.2	Reporting on quality of water returned to the resource: urban	yes/total WWTW in %	100%	100%	100%
9.3.3	Reporting on quality of water returned to the resource: rural	yes/total WWTW in %	N/A	N/A	N/A
9.3.7	Quality of water returned to resource: urban - % monitored by WSA self?	monitored by WSA / urban WWTW in %	100%	100%	100%
9.3.8	Quality of water returned to resource: rural - % monitored by WSA self?	monitored by WSA / rural WWTW in %	N/A	N/A	N/A
9.3.9	Are these results available in electronic format?	yes/no	Yes	Yes	Yes

DWS's Blue Drop Process

The DWS completed the Blue Drop PAT process for the WSAs in 2021. 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 2014 Blue Drop Report, which was the last complete assessment done by the DWS.

Table C.4.1.8: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)	
Municipal Blue Drop Score	**2011 (92.89%), 2012 (95.24%) 2014 (74.26%)**

Regulatory Impression: A substantial decrease has been observed in the Municipal Blue Drop Score and for each system in this assessment which have since lost their Blue Drop status from 2012. A number of issues were highlighted by the inspector during the assessment that needs to be addressed by the Municipality and their water service provider, the West Coast District Municipality. Although a Water Safety Plan for the distribution network has been compiled during the assessment period, it has not been informed by a water quality Risk Assessment. In addition, evidence could not be presented regarding the alignment of the municipal safety plan with risks identified by the bulk water supplier. A formal process to review and update the risks was not implemented by the West Coast District Municipality.

The WSA and WSP are reminded that they are required to regularly assess and review risks to producing drinking water of an acceptable standard and to implement corrective actions. Evidence should be maintained of interventions implemented to reduce identified risks. The Water Safety Plan should be informed by the recommendations of a process audit and any water quality risks identified through the SANS 241 analysis of the catchment, treatment, and reticulated water or water quality failures. The incident management protocol should also be informed by the risk assessment which defines alert levels and response times to guide all role players with regard to the response and corrective actions when water does not comply with the required quality standards. This must be formally communicated to municipal officials to ensure a common understanding of the protocol and its proper implementation.

Risk based monitoring that is informed by the risk assessment should be implemented. Monitoring should comply with the requirements of SANS 241 with regard to sampling points, frequency of analyses and the determinants that are analysed. Compliance monitoring comprised only microbiological analyses with no chemical and aesthetic determinants analysed and only total coliforms for operational determinants.

The Municipality is commended for the system implemented for management of non-revenue water. Comprehensive information has been gathered for each water system for development of water balances. Interventions are ongoing to reduce water losses from 18% to below 10%.

The commitment of management at the Municipality and more inclusive engagement with the West Coast District is essential to improve risk-based management of both water supply systems.

Performance Area	Malmesbury (Swartland LM, West Coast DM)	Moorreesburg (Swartland LM, West Coast DM)
Water Safety Planning (35%)	22.58	21.53
Treatment Process Management (8%)	8.00	6.00
DWQ Compliance (30%)	22.13	22.13
Management, Accountability (10%)	6.68	6.38
Asset Management (14%)	8.30	8.40
Use Efficiency, Loss Management (3%)	3.00	2.85
Bonus Scores	5.28	4.17
Penalties	1.00	1.00
Blue Drop Score (2014)	**74.95%**	**70.45%**
Blue Drop Score (2012)	95.2%	95.2%
Blue Drop Score (2011)	92.9%	92.9%
Blue Drop Score (2010)	71.94%	71.94%
System Design Capacity (Ml/d)	29.0	73.3
Operational Capacity (% i.t.o. Design)	62%	63%
Average daily consumption (l/p/d)	176.9	256.3
Microbiological Compliance (%)	**99.5%**	**99.9%**
Chemical Compliance (%)	**99.9%**	**99.9%**

Swartland Municipality also received their 2022 Blue Drop Risk Ratings early this year, as calculated from the 2021 assessment done by the DWS.

Table 4.1.9: BDRR for the Swartland Municipality (2022)

WSA Overview
The Malmesbury WSS and the Moorreesburg WSS falls in the low-risk category.
Criteria A: The information of the design capacities for both the Malmesbury WSS and the Moorreesburg WSS has been provided.
Criteria B: Both the Malmesbury WSS and the Moorreesburg WSS are operating within their design capacity.
Criteria C: The Malmesbury WSS achieved excellent Microbiological compliance, Chemical compliance and Chemical Monitoring compliance. The Moorreesburg WSS achieved excellent Microbiological compliance and Chemical compliance. There is insufficient microbiological monitoring taking place in both system sand insufficient chemical monitoring in the Moorreesburg WSS. The WSA must ensure there are sufficient sampling points as per SANS 241: 2015 to verify the quality of water at all points in the network.
Criteria D: Both the Malmesbury WSS and the Moorreesburg WSS indicated non-compliance with technical skills which is an indication of lack of relevant process controllers, supervisors and maintenance teams.
Criteria E: Both the Water Supply Systems achieved non-compliance for the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.
The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:
Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Assessment Areas	Malmesbury Supply System	Moorreesburg Supply System
Bulk / WSP	West Coast DM Bulk	West Coast DM Bulk
A: Total Design Capacity (Ml/d)	29.100	72.000
B: % Operational Capacity in terms of design	50.6%	47.9%
C1a: % Microbiological Compliance	98.7%	97.5%
C1b: % Microbiological Monitoring Compliance	72.1%	76.3%
C2a: % Chemical Compliance	98.6%	98.3%
C2b: % Chemical Monitoring Compliance	92.4%	55.9%
D: % Technical Skills	53.1%	62.5%
E: % Water Safety Plan Status	18.2%	18.2%
% BDRR/BDRR max	**30%**	**23%**

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

Table C.4.1.10: Average residential daily consumption (l/p/d) for the last four financial years.

Distribution System	2021/2022			2020/2021		
	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	1 797	102.531	**57.057**	1 728	111.175	**64.337**
Riebeek Wes and Ongegund	8 247	372.542	**45.173**	7 780	365.030	**46.919**
Riebeek Kasteel	9 366	513.926	**54.871**	8 753	470.800	**53.787**
Yzerfontein *	1 687	583.136	**345.664**	1 623	536.535	**330.582**
Darling	12 702	897.638	**70.669**	12 453	889.641	**71.440**
Moorreesburg	19 061	1 139.627	**59.788**	18 328	1 141.334	**62.273**
Malmesbury	71 987	4 524.843	**62.856**	68 841	4 213.471	**61.206**
Total	**124 847**	**7 790.455**	**62.400**	**119 506**	**7 789.477**	**65.181**

Distribution System	2019/2020			2018/2019		
	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	1 661	85.923	**51.730**	1 598	76.334	**47.768**
Riebeek Wes and Ongegund	7 340	298.789	**40.707**	6 924	262.849	**37.962**
Riebeek Kasteel	8 180	394.564	**48.235**	7 645	344.178	**45.020**
Yzerfontein *	1 560	393.680	**252.359**	1 500	361.811	**241.207**
Darling	12 209	766.885	**62.813**	11 969	697.342	**58.262**
Moorreesburg	17 623	1 011.019	**57.369**	16 945	905.616	**53.444**
Malmesbury	65 835	3 802.167	**57.753**	62 963	3 402.595	**54.041**
Total	**114 408**	**6 753.027**	**59.026**	**109 544**	**6 078.411**	**55.488**

Note: * The average daily billed metered residential consumption for Yzerfontein were calculated from March-November (Excluding January, February and December). The high l/c/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 4.1.11: Green Drop Performance of the 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 pumpstation 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.

Table 4.1.11: Green Drop Performance of the Swartland Municipality (DWS's 2022 Green Drop Report)

- Operational monitoring, daily logbook or maintenance records were kept on site.
- 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%**

C.4.2. Water Quality Compliance

The table below gives an overview of the Swartland Municipality's water quality compliance, as taken from the DWS IRIS.

Table C.4.2.1: Overview of Water Quality Compliance

WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2021/22						Year -1 FY2020/21						Year -2 FY2019/20					
			MAH	CAH	CCH	CNA	O	D	MAH	CAH	CCH	CNA	O	D	MAH	CAH	CCH	CNA	O	D
	Results from Integrated Regulatory Information System																			
n/a	Analysis compliance	Total	393	85	733	888	1469	718	412	95	791	941	1541	752	167	0	195	536	999	195
n/a		Nr Failures	0	0	1	3	63	636	5	0	1	6	67	613	9	0	0	2	44	181
n/a		Compliance %	100%	100%	100%	100%	96%	11%	99%	0%	100%	99%	96%	18%	95%	0%	100%	100%	96%	7%
n/a	Samples frequency	Total	355	17	355	355	355	355	341	19	341	341	341	341	167	0	195	268	268	195
n/a		Nr Failures	23	1	23	23	23	23	21	1	21	21	21	21	3	0	0	14	14	0
n/a		Compliance %	94%	94%	94%	94%	94%	94%	94%	0%	94%	94%	94%	94%	98%	0%	100%	95%	95%	100%
n/a	Sites compliance	Total	199	17	199	199	199	199	195	19	195	195	195	195	120	0	108	174	174	108
n/a		Nr Failures	12	1	12	12	12	12	11	1	11	11	11	11	3	0	0	9	9	0
n/a		Compliance %	94%	94%	94%	94%	94%	94%	94%	0%	94%	94%	94%	94%	98%	0%	100%	95%	95%	100%
6.3	**Water Supply and Quality**																			
6.3.6	Blue Drop Status	last year certified by DWS	2022 Blue Drop PAT						No Blue Drop assessment was done by DWS						No Blue Drop assessment was done by DWS					
9.3	**Water Quality**																			
9.3.10	% Time (days) within SANS 241 standards per year	Average of analysis compliance %	84%						69%						66%					

Legend **MAH**: Microbiological Acute Health; **CAH**: Chemical Acute Health; **CCH**: Chemical Chronic Health; **CNA**: Chemical Non Health Aesthetic; **O**: Operational; **D**: Disinfectant

The Table below gives an overview of the number of compliance samples taken over the period July 2021 to June 2022 for the various water distribution networks.

Table C.4.2.2: Number of water quality compliance samples taken throughout the various water distribution systems over the period July 2021 to June 2022

Number of Sampling points within the distribution system (Swartland Mun)	2	1	5	2	1	1	1	1	1	1	1
Parameter Sampled	**Moorreesburg**	**Koringberg**	**Malmesbury**	**Darling**	**Riebeek Kasteel**	**Riebeek Wes**	**Yzerfontein**	**Riverlands**	**Abbotsdale**	**Chatsworth**	**Kalbaskraal**
pH (at 25°C)	33	49	128	57	48	27	47	24	24	25	24
Conductivity	33	49	128	57	48	27	47	24	24	25	24
Turbidity	33	49	128	57	48	27	47	24	24	25	24
Free Chlorine	33	50	126	57	48	27	48	24	24	25	24
Total Coliform Bacteria	33	53	130	61	50	27	49	25	24	26	25
E.Coli	33	53	130	61	49	27	49	24	24	25	24
Heterotrophic Plate Count	33	49	128	59	49	27	49	24	24	25	24
Total number of samples	**231**	**352**	**898**	**409**	**340**	**189**	**336**	**169**	**168**	**176**	**169**
Total number of samples taken for the previous two financial years											
2020/2021	**252**	**290**	**886**	**370**	**321**	**168**	**286**	**168**	**168**	**168**	**168**
2019/2020	**226**	**230**	**670**	**358**	**81**	**79**	**238**	**172**	**95**	**135**	**130**

Note: Full SANS241:2015 analysis was also done for each of the above systems during the 2020/2021 and 2021/2022 financial years by Swartland Municipality, which include all the other parameters.

The water quality of all the water distribution systems in Swartland Municipality is either "Good" or "Excellent", according to the SANS0241 classification, except for Yzerfontein that is "Unacceptable" for Operational Efficiency, due to pH failures. The water quality compliance sample results are included in Annexure D for each of the distribution systems. A full SANS0241 analyses was done during the 2021/2022 financial year. The overall percentage of compliance of the water quality samples taken over the period July to June for the last three financial years is summarised in the table below per distribution system (SANS 241: 2015 Limits).

Table C.4.2.3: 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		
	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20
Moorreesburg									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	10	10	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	97.1%	37	40	34
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	79	82	26
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	90	96	68
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	96.4%	97.4%	97.8%	140	152	136
Koringberg									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	5	5	-
Acute Health Microbiological	No (Good)	No (Excellent)	No (Excellent)	96.4%	100.0%	100.0%	55	49	37
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	73	61	30
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	110	98	66
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	97.1%	98.8%	98.5%	204	166	130
Malmesbury									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	28	40	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	98.6%	100.0%	98.1%	140	148	103
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	279	311	80
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	98.9%	98.4%	334	368	192
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	97.4%	97.8%	94.1%	536	536	391
Darling									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	10	10	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	98.5%	100.0%	98.2%	65	63	57
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	103	96	43
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	99.2%	100.0%	138	132	100
Operational Efficiency	No (Good)	No (Excellent)	No (Excellent)	91.3%	97.7%	96.6%	242	215	208
Riebeek Kasteel									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	5	5	-
Acute Health Microbiological	No (Excellent)	No (Good)	No (Excellent)	100.0%	96.3%	100.0%	51	54	12
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	71	66	9
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	108	106	24
Operational Efficiency	No (Excellent)	No (Good)	Yes (Unacceptable)	95.5%	92.3%	79.2%	199	183	48
Riebeek Wes									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	10	5	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	31	26	12
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	98.6%	100.0%	100.0%	73	47	7
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	78	60	24
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	116	100	48
Yzerfontein									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	5	5	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	97.4%	51	51	39
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	71	60	30
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	106	94	66
Operational Efficiency	Yes (Unacceptable)	No (Excellent)	No (Excellent)	88.3%	97.5%	95.6%	196	163	136
Riverlands									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	5	5	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Good)	100.0%	100.0%	96.0%	26	26	25
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	47	22
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	60	50
Operational Efficiency	No (Excellent)	No (Excellent)	Yes (Unacceptable)	96.0%	93.0%	88.0%	101	100	100

Table C.4.2.3: 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		
	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20
Abbotsdale									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	5	5	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	Yes (Unacceptable)	100.0%	100.0%	92.9%	26	26	14
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	47	11
Aesthetic	No (Excellent)	No (Excellent)	Yes (Unacceptable)	100.0%	100.0%	60.7%	60	60	28
Operational Efficiency	No (Excellent)	No (Excellent)	Yes (Unacceptable)	95.0%	96.0%	53.6%	100	100	56
Chatsworth									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	5	5	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Good)	100.0%	100.0%	95.0%	27	26	20
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	50	47	15
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	63	60	40
Operational Efficiency	No (Excellent)	No (Excellent)	No (Good)	95.3%	94.0%	91.3%	106	100	80
Kalbaskraal									
Acute Health Chemical	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	5	5	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	Yes (Unacceptable)	100.0%	100.0%	89.5%	26	26	19
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	47	16
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	60	38
Operational Efficiency	No (Excellent)	No (Excellent)	No (Good)	94.1%	100.0%	92.1%	101	100	76

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 C.4.2.4: 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 gives an overview of Swartland Municipality's wastewater quality compliance, as taken from the IRIS.

Table C.4.2.5: Overview of Wastewater Quality Compliance														
WSDP Ref#	Measurable / Enabling Factor	Unit	Year 0 FY2021/22				Year-1 FY2020/21				Year-2 FY2019/20			
			M	C	P	O	M	C	P	O	M	C	P	O
	Results from Integrated Regulatory Information System													
n/a	Regulatory compliance	Total	69	157	230	-	79	191	259	-	72	151	210	-
n/a		Nr Failures	38	73	65	-	11	72	64	-	3	73	57	-
n/a		Compliance %	45%	54%	72%	N/A	86%	62%	75%	N/A	96%	52%	73%	N/A
n/a	Operational compliance	Total	Not captured on IRIS, but recorded by Process Controllers at each of the WWTW											
n/a		Nr Failures												
n/a		Compliance %												
5.3.1	**Monitoring and Sample Failure**													
5.3.1.3 5.3.1.4 5.3.1.5	Average % of sample failure	Failure %	55%	46%	28%	N/A	14%	38%	25%	N/A	4%	48%	27%	N/A
6.3	**Water Supply and Quality**													
6.4.6	Green Drop Status	last year certified by DWS	2022 Green Drop Assessment				No Green Drop assessment was done by DWS				No Green Drop assessment was done by DWS			

Legend **M**: Microbiological; **C**: Chemical; **P**: Physical; **O**: Operational

The final effluent quality compliance sample results are included in Annexure D for each of the WWTWs. The overall percentage compliance of the final effluent samples taken over the last three financial years at the Malmesbury-, Darling-, Moorreesburg-, Koringberg-, Chatsworth-, Kalbaskraal- and Riebeek Valley WWTW are summarised in the tables below.

Table C.4.2.6: Percentage Faecal Coliforms compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2021/2022	2020/2021	2019/2020
Malmesbury	100.0%	100.0%	100.0%
Darling	75.0%	91.7%	75.0%
Moorreesburg	0.0%	40.0%	33.3%
Koringberg	0.0%	0.0%	0.0%
Chatsworth	25.0%	16.7%	33.3%
Kalbaskraal	100.0%	100.0%	100.0%
Riebeek Valley	75.0%	91.7%	75.0%
Total	**54.9%**	**64.9%**	**59.5%**

Table C.4.2.7: Percentage Chemical compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2021/2022					2020/2021					2019/2020				
	Ammonia	Nitrates	COD Filtered	Ortho Phosphate	Overall	Ammonia	Nitrates	COD Filtered	Ortho Phosphate	Overall	Ammonia	Nitrates	COD Filtered	Ortho Phosphate	Overall
Malmesbury	91.7%	75.0%	100.0%	91.7%	**89.6%**	75.0%	66.7%	91.7%	58.3%	**72.9%**	91.7%	50.0%	100.0%	91.7%	**83.3%**
Darling	16.7%	100.0%	75.0%	91.7%	**70.8%**	100.0%	100.0%	100.0%	100.0%	**100.0%**	91.7%	100.0%	100.0%	91.7%	**95.8%**
Moorreesburg	0.0%	100.0%	0.0%	40.0%	**35.0%**	0.0%	80.0%	20.0%	40.0%	**35.0%**	0.0%	66.7%	33.3%	25.0%	**31.3%**
Koringberg	16.7%	91.7%	0.0%	16.7%	**31.3%**	0.0%	100.0%	0.0%	8.3%	**27.1%**	8.3%	91.7%	0.0%	8.3%	**27.1%**
Chatsworth	0.0%	100.0%	8.3%	25.0%	**33.3%**	0.0%	100.0%	0.0%	25.0%	**31.3%**	0.0%	100.0%	0.0%	25.0%	**31.3%**
Kalbaskraal	N/A	N/A	33.3%	N/A	**33.3%**	N/A	N/A	16.7%	N/A	**16.7%**	N/A	N/A	0.0%	N/A	**0.0%**
Riebeek Valley	100.0%	100.0%	100.0%	100.0%	**100.0%**	91.7%	100.0%	91.7%	91.7%	**93.8%**	100.0%	100.0%	100.0%	83.3%	**95.8%**
Total	**38.6%**	**94.3%**	**46.3%**	**61.4%**	**59.6%**	**49.2%**	**92.3%**	**48.1%**	**55.4%**	**60.7%**	**48.6%**	**84.7%**	**47.6%**	**54.2%**	**58.3%**

Table C.4.2.8: Percentage Physical compliance of the compliance samples taken at the various WWTWs for the last three financial years.

WWTW	2021/2022				2020/2021				2019/2020			
	pH	Electrical Conductivity	Suspended Total Solids	Overall	pH	Electrical Conductivity	Suspended Total Solids	Overall	pH	Electrical Conductivity	Suspended Total Solids	Overall
Malmesbury	83.3%	100.0%	100.0%	94.4%	50.0%	100.0%	100.0%	**83.3%**	58.3%	91.7%	100.0%	**83.3%**
Darling	100.0%	66.7%	66.7%	77.8%	100.0%	100.0%	91.7%	**97.2%**	100.0%	100.0%	83.3%	**94.4%**
Moorreesburg	100.0%	10.0%	10.0%	40.0%	100.0%	20.0%	0.0%	**40.0%**	100.0%	66.7%	41.7%	**69.4%**
Koringberg	100.0%	0.0%	0.0%	33.3%	100.0%	8.3%	0.0%	**36.1%**	100.0%	0.0%	8.3%	**36.1%**
Chatsworth	100.0%	83.3%	33.3%	72.2%	100.0%	83.3%	8.3%	**63.9%**	100.0%	75.0%	25.0%	**66.7%**
Kalbaskraal	100.0%	100.0%	N/A	100.0%	100.0%	100.0%	N/A	**100.0%**	100.0%	66.7%	N/A	**83.3%**
Riebeek Valley	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	91.7%	**97.2%**	100.0%	100.0%	100.0%	**100.0%**
Total	**97.6%**	**67.1%**	**52.9%**	**73.5%**	**92.2%**	**77.9%**	**53.8%**	**75.8%**	**94.0%**	**71.4%**	**59.7%**	**75.8%**

Detail WWTW Process Audits were done for each of the WWTWs during the 2020/2021 financial year. The conclusions and recommendations from these WTW Process Audits are summarised in the table below.

Table C.4.2.9: Recommendations from the detail WWTW Process Audits (July 2018 to June 2020)

WWTW	Component	Recommendation
Malmesbury	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	Conclusion	The Moorreesburg WTW experienced various challenges which could mainly be attributed to old and dysfunctional infrastructure. The structures and equipment have reached the end of their economic useful life and control systems are ineffective and outdated. This resulted in frequent breakdowns, high maintenance costs and therefore poor effluent quality. The "Technical Report for the MIG: Upgrading of the Moorreesburg WWTW" Report listed the following problems related to the infrastructure at the plant: • Structural integrity of water retaining structures and civil infrastructure pose significant risk (i.e. at the risk of collapse) • Deteriorated mechanical equipment. • Clogged media in trickling biofilter. • Blocked clarigester. • Excessive corrosion to pipework and valves. • Safety of access throughout plant. • De-sludge drying beds. • Final effluent disinfection systems which do not comply with legislated safety requirements. • Flooding of vehicle access bridge during rainfall events. Interventions to ensure reliable treatment capacity of the plant was urgently required and the upgrading of the plant is therefore welcomed.
	Recommendation: Design aspects	• All the design aspects are being addressed in the construction of the new WWTW.
	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.
Darling	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.
	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.

Table C.4.2.9: Recommendations from the detail WWTW Process Audits (July 2018 to June 2020)		
WWTW	**Component**	**Recommendation**
		• 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.
Koringberg	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	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	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

Table C.4.2.9: Recommendations from the detail WWTW Process Audits (July 2018 to June 2020)		
WWTW	**Component**	**Recommendation**
		W_2RAP, need to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.
Riebeek Valley	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.

C.4.3. Incident Management

Swartland Municipality's Maintenance Team mainly performs their own repair and preventative maintenance work to the equipment and infrastructure of the Municipality, except when specialised repair work is required, in which case the work is sub-contracted to approved sub-contractors on the municipal database.

A Water Safety Plan was drafted during the 2021/2022 financial year by the West Coast District Municipality for the Swartland bulk water distribution system. Swartland Municipality is also currently busy with the drafting of a Water Safety Plan for their internal network distribution systems. 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 for the various WWTWs and drainage networks are also in place (2018). 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.

Operational Alert Levels are also in place for the WWTWs in order to ensure that the various unit processes in the plant performs optimally. If these pre-determined Alert Levels are exceeded at any of the control points where samples are taken for operational purposes, specific actions are taken to bring the operational parameters back to within the target ranges.

Table C.4.3.1: Incident Management and Reporting Overview					
WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2021/22	Year - 1 FY2020/21	Year - 2 FY2019/20
6.3	**Water Supply and Quality**				
6.3.1	Incident Management Protocol in place	yes/total schemes in %	Yes	Yes	Yes
6.3.5	Failure Response Management in place	yes/total schemes in %	Yes	Yes	Yes
6.4	**Waste Water Supply and Quality**				
6.4.1	Incident Management Protocol in place	yes/total schemes in %	Yes	Yes	Yes
6.4.5	Failure Response Management in place	yes/total schemes in %	Yes	Yes	Yes

The water quality incident reporting compliance, as summarised in the table below, were calculated from the compliance sample results included in Annexure D.

Table C.4.3.2: Water Quality Incident Reporting Compliance (Health Oriented)										
Measurable / Enabling Factor	Unit	Year 0 FY2021/22			Year -1 FY2020/21			Year-2 FY2019/20		
		Acute Health Chemical	Acute Health Micriobiological	Chronic Health	Acute Health Chemical	Acute Health Micriobiological	Chronic Health	Acute Health Chemical	Acute Health Micriobiological	Chronic Health
Failures in terms of Analysis	Total nr	93	535	940	100	535	911	-	372	289
	Nr of failures	0	5	1	0	2	0	-	10	0
	Failure %	0%	1%	0%	0%	0%	0%	-	3%	0%
	Nr reported	0	5	1	0	2	0	-	10	0
	Reported % of failure	100%	100%	100%	100%	100%	100%	-	100%	100%
Failures in terms of Samples	Total	93	535	940	100	535	911	-	372	289
	Nr of failures	0	5	1	0	2	0	-	10	0
	Failure %	0%	1%	0%	0%	0%	0%	-	3%	0%
	Nr reported	0	5	1	0	2	0	-	10	0
	Reported % of failure	100%	100%	100%	100%	100%	100%	-	100%	100%
Failures in terms of Sites	Total	93	535	940	100	535	911	-	372	289
	Nr of failures	0	5	1	0	2	0	-	10	0
	Failure %	0%	1%	0%	0%	0%	0%	-	3%	0%
	Nr reported	0	5	1	0	2	0	-	10	0
	Reported % of failure	100%	100%	100%	100%	100%	100%	-	100%	100%

C.5. Water Conservation and Water Demand Management

The table below gives an overview of the WC/WDM activities implemented by Swartland Municipality.

Table C.5.1: Overview of WC/WDM Activities

WSDP Ref. #	Regulations Ref. #	Description	Urban Settlements						Rural Settlements					
			Year 0		Year - 1		Year - 2		Year 0		Year - 1		Year - 2	
			2021/22		2020/21		2019/20		2021/22		2020/21		2019/20	
7.1.1	10.2.g.iii	**REDUCING UNACCOUNTED FOR WATER AND WATER INEFFICIENCIES**												
		Number of customers where the following activities have been pursued:	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total
7.1.1.1		Night flow metering	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.1.2		Day flow metering	22 488	100%	22 370	100%	21 104	100%	0	0%	0	0%	0	0%
7.1.1.3		Reticulation leaks fixed	317	100%	263	100%	258	100%	0	0%	0	0%	0	0%
7.1.1.4		Illegal connections formalized	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.1.5		Un-metered connections, metered	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.2	10.2.g.iii	**REDUCING HIGH PRESSURES FOR RESIDENTIAL CONSUMERS**												
		Number of residential consumers with water supply pressure of:	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total
7.1.2.1		< 300 kPa	4 816	23.0%	4 791	23.0%	4 579	23.0%	0	0%	0	0%	0	0%
7.1.2.2		300 kPa - 600 kPa	6 805	32.5%	6 769	32.5%	6 471	32.5%	0	0%	0	0%	0	0%
7.1.2.3		600 kPa - 900 kPa	8 375	40.0%	8 332	40.0%	7 964	40.0%	0	0%	0	0%	0	0%
7.1.2.4	10.2.b.iii	> 900 kPa	942	4.5%	937	4.5%	896	4.5%	0	0%	0	0%	0	0%
7.1.3	10.2.g.iii	**LEAK AND METER REPAIR PROGRAMMES**												
		Number of consumer units targeted by:	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total
7.1.3.1		Leak repair assistance programme	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.3.2	10.2.g.iv	Retro-fitting of water inefficient toilets	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.3.3		Meter repair programme	230	1%	177	1%	568	3%	0	0%	0	0%	0	0%
7.1.4	10.2.g.iii	**CONSUMER / END-USE DEMAND MANAGEMENT: PUBLIC INFO AND EDUCATION PROGRAMMES**												
			Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total
7.1.4.1		Number of schools targeted by education programmes	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.4.2		Number of consumers (people) targeted by public information programmes	22 488	100%	22 370	100%	21 104	100%	0	0%	0	0%	0	0%

Quantity of water unaccounted for (Ml/year):

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 2021/2022 was 1.68 %/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 C.5.2: NRW, Water Losses and ILIs for the various water distribution systems

Description	Component	Unit	21/22	Record: Prior (Ml/a)				
				20/21	19/20	18/19	17/18	16/17
Koringberg	NRW	Volume	12.099	13.395	16.976	14.694	14.213	8.863
		Percentage	21.8%	23.7%	32.7%	31.5%	32.2%	14.7%
	Water Losses	Volume	10.368	12.634	16.224	13.953	14.125	8.743
		Percentage	18.7%	22.4%	31.3%	29.9%	32.0%	14.5%
	ILI		**1.51**	**1.80**	**1.59**	**1.41**	**1.37**	**0.85**
	The NRW and Water Losses were drastically reduced during the last two financial years. The NRW and Water Losses stayed roughly the same for the period 2017/2018 to 2019/2020.							
Ongegund	NRW	Volume	9.214	3.075	4.236	6.546	16.655	17.748
		Percentage	38.4%	17.4%	24.9%	36.4%	60.3%	45.2%
	Water Losses	Volume	8.986	2.968	4.130	6.438	16.600	17.669
		Percentage	37.4%	16.8%	24.2%	35.8%	60.1%	45.0%
	The NRW and Water Losses increased drastically during the last financial year. The Municipality needs to keep the NRW percentage for Ongegund less than 20%.							
Riebeek Wes	NRW	Volume	18.314	26.490	22.040	23.263	21.515	11.134
		Percentage	10.2%	15.5%	14.0%	16.6%	16.9%	6.7%
	Water Losses	Volume	6.255	21.468	17.044	18.302	21.261	10.804
		Percentage	3.5%	12.6%	10.8%	13.0%	16.7%	6.5%
	ILI		**0.23**	**0.80**	**0.82**	**1.09**	**1.27**	**0.64**
	The NRW and Water Losses were drastically reduced during the last financial year. The current percentage of NRW of 10.2% and the Water Losses below 5% are excellent.							
Riebeek Kasteel	NRW	Volume	98.088	52.790	47.762	25.377	52.180	43.154
		Percentage	29.6%	20.6%	21.4%	13.8%	30.9%	17.2%
	Water Losses	Volume	93.466	50.693	45.732	23.426	51.842	42.653
		Percentage	28.2%	19.8%	20.5%	12.8%	30.7%	17.0%
	ILI		**2.72**	**1.45**	**1.52**	**0.77**	**1.77**	**1.46**
	The NRW and Water Losses increased during the last financial year. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Yzerfontein	NRW	Volume	40.333	60.201	47.109	15.977	51.930	33.577
		Percentage	13.1%	20.1%	19.8%	9.1%	33.6%	13.5%
	Water Losses	Volume	27.117	54.562	41.593	10.585	51.621	33.079
		Percentage	8.80%	18.2%	17.5%	6.0%	33.4%	13.3%
	ILI		**0.50**	**1.03**	**0.97**	**0.25**	**1.37**	**0.91**
	The NRW and Water Losses were reduced during the last financial year. The current percentages of NRW below 15% and Water Losses below 10% are excellent.							
Darling	NRW	Volume	150.430	150.505	138.078	127.003	91.397	84.219
		Percentage	25.0%	26.4%	26.7%	25.8%	19.6%	14.0%
	Water Losses	Volume	142.205	146.555	134.234	123.212	90.466	83.012
		Percentage	23.6%	25.7%	25.9%	25.1%	19.4%	13.8%
	ILI		**3.09**	**3.20**	**2.08**	**1.90**	**1.42**	**1.31**
	The NRW and Water Losses stayed roughly the same for the last four financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Moorreesburg	NRW	Volume	169.718	136.476	119.301	110.213	110.910	89.636
		Percentage	24.5%	20.3%	20.2%	20.7%	23.1%	13.6%
	Water Losses	Volume	153.392	129.156	112.145	103.172	109.948	88.318
		Percentage	22.1%	19.2%	19.0%	19.4%	22.9%	13.4%
	ILI		**2.06**	**1.74**	**1.36**	**1.25**	**1.37**	**1.11**
	The NRW and Water Losses increased during the last financial year. Municipality needs to work towards a							

Table C.5.2: NRW, Water Losses and ILIs for the various water distribution systems								
Description	**Component**	**Unit**	**21/22**	**Record: Prior (Ml/a)**				
				20/21	**19/20**	**18/19**	**17/18**	**16/17**
	percentage of less than 20% for the NRW.							
Malmesbury	NRW	Volume	755.496	595.795	379.300	308.070	290.408	364.912
		Percentage	23.4%	20.3%	15.0%	14.1%	14.7%	13.5%
	Water Losses	Volume	681.709	562.994	347.331	276.769	286.461	359.494
		Percentage	21.1%	19.2%	13.8%	12.7%	14.5%	13.3%
	ILI		**2.67**	**2.20**	**1.44**	**1.17**	**1.30**	**1.69**
	The NRW and Water Losses increased further during the last financial year. The Municipality needs to work towards a NRW percentage of less than 15%, as was done for the previous financial years up to 2019/2020.							
TOTAL	**NRW**	**Volume**	**1 253.692**	**1 038.727**	**774.802**	**631.143**	**649.208**	**653.243**
		Percentage	**23.10%**	**20.86%**	**17.95%**	**16.72%**	**18.86%**	**13.79%**
	Water Losses	**Volume**	**1 123.498**	**981.030**	**718.433**	**575.857**	**642.325**	**643.772**
		Percentage	**20.70%**	**19.70%**	**16.64%**	**15.25%**	**18.66%**	**13.59%**
	ILI		**2.40**	**2.11**	**1.60**	**1.41**	**1.51**	**1.49**
	The overall NRW and Water Losses increased further during the last financial year, mainly because of the increase in the NRW and Water Losses of Malmesbury, Moorreesburg and Riebeek Kasteel. The Municipality needs to work towards an overall NRW percentage of less than 20%.							

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

Category A = No specific intervention required.

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

Category C = Requires attention

Category D = Requires immediate water loss reduction interventions

The Infrastructure Leakage Index (ILI) is also included in the above table, which 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. The parameters used to calculate the ILIs for the various distribution systems are included in the Models in Annexure B. 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 2021/2022 financial year.

Table C.5.3: System input volume, average billed metered consumption and non-revenue water in litre per connection per day for the various water distribution systems for 2021/2022								
Water Balance Component	**Koringberg**	**Ongegund**	**Riebeek Wes**	**Riebeek Kasteel**	**Yzerfontein**	**Darling**	**Moorreesburg**	**Malmesbury**
System Input Volume	429	604	469	569	500	617	604	746
Average Billed Metered Cons.	335	372	421	400	435	463	456	572
Non-Revenue Water	94	232	48	169	65	154	148	174

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. Ongegund is the town with the highest NRW per connection per day.

Number of consumers connected to a water reticulation system where pressures rise above 900 kPa at the consumer connection are as follows:

The table below gives an overview of the length of water pipelines and the average head for the different water distribution zones.

Tables C.5.4: Length and average head of water pipelines

System	Zone	Length (km)	Average Head
Bulk Water Pipelines			
Malmesbury	Malmesbury - Chatsworth Supply	4.750	50.05
	Malmesbury - Kalbaskraal Reservoir	0.029	4.29
	Malmesbury - Kleindam Reservoir	0.029	5.00
	Malmesbury - Kleindam to Kalbaskraal	18.232	43.72
	Malmesbury - Riverlands Supply	9.153	30.55
	Malmesbury - Wesbank Reservoir	0.348	7.25
	Malmesbury - Wesbank Spoelpype	0.016	21.47
	Malmesbury - Wesbank Tower	0.024	14.51
Moorreesburg	Moorreesburg - WCDM bulk PS	4.028	128.15
Riebeek Wes	Riebeek Wes - HL Reservoir	0.356	17.53
Swartland	Swartland - Glen Lilly reservoir	8.352	37.18
	Swartland - Kasteelberg reservoir	0.645	16.35
Withoogte	Withoogte - Moorreesburg PS	0.012	139.55
External Bulk Water Pipelines			
Swartland	Swartland - Darling town PS	0.933	57.99
	Swartland - Darling Yzerfontein PS	21.548	79.94
	Swartland - Glen Lilly reservoir	12.165	31.21
	Swartland - Gouda PS	6.842	70.72
	Swartland - Kamp reservoir	1.319	26.95
	Swartland - Kasteelberg reservoir	50.792	71.62
	Swartland - Malmesbury BPT	61.160	57.31
	Swartland - Rustfontein booster PS	8.719	27.59
	Swartland - Swavelberg booster PS	37.016	45.66
	Swartland - Voëlvlei PS	29.111	152.03
	Swartland - Voëlvlei WTP	0.060	2.03
	Swartland - Wildschutsvlei balancing reservoir	29.124	123.83
Withoogte	Withoogte - Byeneskop reservoir	25.235	97.14
	Withoogte - Misverstand dam	13.215	90.97
	Withoogte - Moorreesburg PS	7.767	153.04
	Withoogte - Withoogte reservoir	67.001	79.23
Reticulation Pipelines			
Darling	Darling Reservoir	20.715	41.26
	Darling Reservoir - Darling PRV	25.570	30.34
Koringberg	Koringberg - Koringberg PRV	4.936	29.27
	Koringberg - Koringberg Reservoir	5.417	38.60
Malmesbury	Malmesbury - Abbotsdale booster	0.497	35.54
	Malmesbury - Abbotsdale Reservoir	16.280	31.00
	Malmesbury - Chatsworth PRV1	25.333	53.79
	Malmesbury - Chatsworth PRV2	1.330	64.83
	Malmesbury - Chatsworth Reservoir	5.325	39.31
	Malmesbury - Glen Lily Booster PS	1.304	58.27
	Malmesbury - Kalbaskraal Booster PS	8.659	44.71
	Malmesbury - Kalbaskraal Reservoir	0.131	4.78
	Malmesbury - Kleindam Reservoir	19.337	30.86

Tables C.5.4: Length and average head of water pipelines			
System	**Zone**	**Length (km)**	**Average Head**
	Malmesbury - Kleindam to Kalbaskraal	0.017	4.97
	Malmesbury - Mount Royal Booster PS	1.692	38.17
	Malmesbury - Mount Royal Reservoir	3.545	55.64
	Malmesbury - Old Golf Course PRV	15.330	43.77
	Malmesbury - Old Golf Course Reservoir	1.135	21.79
	Malmesbury - Panorama Booster	0.051	41.82
	Malmesbury - Panorama Booster 1	1.587	46.85
	Malmesbury - Panorama Booster 2	9.383	65.18
	Malmesbury - Panorama Res PRV1	14.297	45.51
	Malmesbury - Panorama Res PRV2	4.143	43.31
	Malmesbury - Panorama Reservoir	5.894	30.95
	Malmesbury - Prison Reservoir	5.014	48.56
	Malmesbury - Riverlands PRV	5.782	38.09
	Malmesbury - Wesbank Reservoir	38.443	35.88
	Malmesbury - Wesbank Reservoir booster	9.863	31.50
	Malmesbury - Wesbank Tower	11.200	31.60
Moorreesburg	Moorreesburg - Moorreesburg Reservoir	42.384	50.19
	Moorreesburg - Moorreesburg PRV	26.114	35.11
Ongegund	Ongegund - PPC Factory Direct	1.202	39.32
	Ongegund - PPC Riebeek Wes Reservoir	6.160	45.10
Riebeek Kasteel	Riebeek Kasteel - Riebeek Kasteel PRV1	7.253	53.47
	Riebeek Kasteel - Riebeek Kasteel PRV2	2.821	45.17
	Riebeek Kasteel - Riebeek Kasteel PRV3	6.341	39.82
	Riebeek Kasteel - Riebeek Kasteel PRV4	0.177	24.55
	Riebeek Kasteel - Riebeek Kasteel Reservoir	6.494	45.35
Riebeek Wes	Riebeek Wes - HL Reservoir	5.993	53.18
	Riebeek Wes - LL Reservoir	15.314	47.25
Swartland	Swartland - Kasteelberg reservoir	0.006	14.71
Yzerfontein	Yzerfontein - Yzerfontein Booster	1.905	51.73
	Yzerfontein - Yzerfontein Reservoir	36.749	60.29
	Yzerfontein Reservoir	0.045	4.10
External Reticulation Pipelines			
Swartland	Swartland - Darling BPT	41.525	55.67
	Swartland - Darling Yzerfontein PS	0.022	31.74
	Swartland - Gouda PS	0.011	19.26
	Swartland - Kasteelberg reservoir	115.599	127.01
	Swartland - Riebeek Kasteel BPT	8.056	40.67
	Swartland - Voëlvlei PRVS	42.030	63.27
	Swartland - Wildschutsvlei balancing reservoir	0.011	64.85
Withoogte	Withoogte - Byeneskop BPT	26.584	60.34
	Withoogte - Byeneskop reservoir	105.068	87.70
	Withoogte - Koringberg BPT	14.221	34.38
	Withoogte - Koringberg reservoir	15.576	112.34
	Withoogte - WBK line PRV 1	9.738	80.47
	Withoogte - WBK line PRV 2	42.732	77.89
	Withoogte - Withoogte reservoir	95.088	75.88

Average Head: 0m - 30m; 31m – 60m; 61m – 90m; > 90m

The table below indicate the potential savings on bulk water supply for each town within the Swartland Management Area, through the implementation of pressure management. The towns that should consider pressure management as a measure of water demand management (where the % potential saving > 3% of the total water demand), as identified in the Swartland Municipality WDM Strategy developed by CES, are also indicated in the table below.

Table C.5.5: Potential savings on bulk water supply through the implementation of pressure management

Distribution System	Saving Potential	Pressure Management Priority (WDM Strategy)	Number of consumer connections where pressure rise above 900 kPa	
			Static Pressure	Residual Pressure
Koringberg	13%	**High**	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions
PPC	-	Medium	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions, except for the higher lying areas where the pressures are as low as 20m.
Riebeek Wes	6%	Medium	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions.
Riebeek Kasteel	6%	Medium	No areas where pressures exceed 90m. Three PRVs in the system.	In the 24m to 90m range under peak hour demand conditions.
Yzerfontein	11%	**High**	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions.
Darling	7%	Medium	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions, except for the higher lying areas close to the reservoir and in the low-cost housing development
Moorreesburg	7%	Medium	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions, except for the low-cost residential area where the pressures are as low as 20m, which is marginally less than the adopted design criteria.
Malmesbury	-	Medium	No areas where pressures exceed 90m. One PRV in the system.	The following areas could experience low residual pressures • Higher lying areas in Wesbank which is currently fed from the Wesbank reservoirs and not the tower. • Small area in the central part of Malmesbury, which is fed from the Kleindam reservoir.
Abbotsdale, Chatsworth, Kalbaskraal and Riverlands	9%	Medium	No areas where pressures exceed 90m. Four PRVs in the system (3 in Chatsworth and 1 in Riverlands)	In the 24m to 90m range under peak hour demand conditions

A **pressure reduction study** was completed for all the towns in Swartland Municipality's Management Area during the 2017/2018 financial year. The table below gives an overview of the existing PRV and the proposed future PRV zones.

Table C.5.6: Existing and proposed PRV zones

Zone	Description	Average Static Head (m)		Current AADD (kl/d)	Estimated Cost	Priority
		Current	Future			
Existing PRV zones						
Chatsworth PRV1	Chatsworth pressure management	54.1	54.1	374.8	-	-
Chatsworth PRV2		40.0	40.0		-	-
Chatsworth PRV3		40.0	40.0		-	-
Riverlands PRV	Riverlands pressure management	38.6	38.6	132.9	-	-
Panorama PRV1	Malmesbury pressure management: Panorama PRV1	45.2	35.2	348.2	-	7
Riebeek Kasteel PRV1	Riebeek Kasteel pressure management	50.9	39.5	195.36	-	-
Riebeek Kasteel PRV2		46.3	31.8	50.02	-	-
Riebeek Kasteel PRV3		29.5	26.5	275.5	-	-

Table C.5.6: Existing and proposed PRV zones						
Zone	Description	Average Static Head (m)		Current AADD (kl/d)	Estimated Cost	Priority
		Current	Future			
Total Existing PRV zones				**1 376.78**	**-**	
Proposed PRV zones						
Darling PRV	Darling pressure management	74.60	33.28	1 118.3	R337 540	1
Koringberg PRV	Koringberg pressure management	65.40	33.80	86.4	R222 600	8
Moorreesburg PRV	Moorreesburg pressure management	68.10	36.90	744.8	R595 000	3
Old Golf Course PRV	Malmesbury pressure management: Old Golf Course PRV	60.60	44.80	385.0	R278 600	6
Panorama PRV2	Malmesbury pressure management: Panorama PRV 2&3	77.40	43.40	836.8	R462 000	2
PPC Riebeek	Ongegund pressure management	63.35	37.30	62.1	R140 000	
Prison PRV	Malmesbury pressure management: Prison PRV	72.20	31.30	60.8	R140 000	9
Riebeek Wes PRV	Riebeek Wes pressure management	74.30	33.30	276.5	R434 000	4
					R930 860	
Yzerfontein PRV	Yzerfontein pressure management	63.00	36.75	427.5	R1 451 380	5
Total Proposed PRV zones				**3 998.2**	**R4 991 980**	

The following PRVs were installed and refurbished during the 2017/2018 financial year.

- New PRV installations: 1 x Darling, 1 x Koringberg, 2 x Moorreesburg, 4 x Malmesbury, 2 x Riebeek Valley and 1 x Yzerfontein,
- Refurbishment of existing PRVs: 4 x Chatsworth, 1 x Malmesbury and 6 x Riebeek Valley.

No further PRVs were installed during the last number of financial years.

Demand management activities undertaken:

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

Table C.5.7: 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; • 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;

Table C.5.7: WDM activities implemented by Swartland Municipality
• 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.

The WDM Strategy also 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 scorecard for assessing the potential for WC/WDM efforts, as completed for Swartland Municipality, is included in Annexure E. 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 79 out of 100 suggesting that the Municipality is making good progress with regard to the implementation of specific WC/WDM activities.**

Pipeline Replacement Study: A pipeline replacement study was performed for Swartland Municipality's entire water distribution system. The project entailed the verification of system data, establishment of a computer model for the pipe replacement network, performing an analysis and reporting. The pipe replacement potential was determined for each of the pipelines in the water distribution systems by assessing the likelihood of failure (LF) and the consequence of failure (CF). The independent factors and their weight factors used are summarised in the tables below:

Table C.5.8: The independent factors and the weight factors used to determine the pipe replacement potential

Likelihood of Failure Property	Weight	Weight (%)	Consequence of Failure Property	Weight	Weight (%)
Nominal diameter (mm)	20	19.0	High cost to consumer due to high water pressure (m)	2	3.0
Reserve water pressure ratio	10	9.5	High cost to consumer due to flow (l/s)	15	19.0
Catalogue remaining useful life (yr)	15	14.3	High repair cost due to pipe location	10	13.0
Master Plan Item	5	4.8	Flooding due to geography	5	6.0
Leakage volume (l/min/km)	10	9.5	Strategic location	20	26.0
Undesired material	20	19.0	Network redundancy (l/s)	10	13.0
Failure frequency (breaks/km/yr)	25	23.8	Pavement management system	15	19.0
		100.0			100.0

The total pipe replacement potential was calculated for each pipeline as an index

PRP = LF x CF (In the range of 1 to 25)

The total length of the water supply network is approximately 418 km with an estimated replacement value of R543 400 000. The average condition of the water network can be rated as fair to poor. The pipe replacement requirement amounts to R59 434 766 over the next three (3) years and 30.84 km. This new calibrated and tested pipe failure model identifies with a single geographical view where pipe failures are most likely to occur. It is foreseen that this model will greatly assist the pipe replacement prioritization process as it is completely based on a new scientific approach. By allocating funds to replacing those pipes most likely to fail in future, a limited budget can be spent effectively. The Municipality continued with their pipeline replacement programme during the last financial year.

Large Water Users: The Municipality also investigated the large water users during the 2019/2020 financial year. The table below list the 44 largest water users in Swartland Municipality's Management Area.

Table C.5.9: Large water users in Swartland Municipality's Management Area

No.	Address	Consumer	System	AADD May 2020 (kl/d)	Percentage of Town's Daily Billed Metered Consumption (19/20)
1	Dagbreek Street	RSA - Aandag: Zukiswa	Malmesbury	288	4.91%
2	Caledon Street 7	CLB Eiendomme Pty Ltd	Darling	136	13.06%
3	Abattoirweg	Roelcor Vleis EDMS BPK	Malmesbury	96	1.64%
4	Abattoir Street	Swartland Volstruise BPK	Malmesbury	68	1.16%
5	Piketbergweg Informal Settlement	Theron Dibert Familietrust	Moorreesburg	61	4.73%
6	Piketbergweg Correctional Services	Swartland Munisipaliteit Piketbergweg Plakkerskamp	Malmesbury	45	0.77%
7	Schoonspruitweg	Yara Africa Fertilizer Pty Ltd	Malmesbury	40	0.68%
8	Wagener Street 10	Pioneer Foods Groceries Pty LtD	Malmesbury	39	0.66%
9	Bokomoweg	Sasko EDMS Bpk Bokomoweg	Malmesbury	39	0.66%
10	Informal Settlement House 37	Theunis L Informele Nederset Huis	Riverlands	30	0.51%
11	Prospect Street	Du Plessis JT Prospectstraat	Malmesbury	27	0.46%
12	Fresia Street 96 Flats	Swartland Munisipaliteit	Wesbank	26	0.44%
13	Bokomoweg	Quantum Foods(Pty) Ltd Bokomoweg 0	Malmesbury	25	0.43%

Table C.5.9: Large water users in Swartland Municipality's Management Area					
No.	**Address**	**Consumer**	**System**	**AADD May 2020 (kl/d)**	**Percentage of Town's Daily Billed Metered Consumption (19/20)**
14	Abattoir Street	Roelcor Vleis (EDMS) BPK	Malmesbury	24	0.41%
15	Gladiola Street (Saspark)	Transnet Property	Wesbank	23	0.39%
16	Caledonstraat 4404	Brewery Pty Ltd	Darling	23	2.21%
17	Darlingweg Schoonspruit	Dept Van Onderwys & Kultuur	Wesbank	22	0.37%
18	PG Nelson Street – Hospital	Provincial Government W Cape Nelsonstr-Hospitaal PG	Malmesbury	21	0.36%
19	Voortrekkerweg Die Bron	Amrichprop 20 Prop Pty Ltd	Malmesbury	21	0.36%
20	Kotze Street 11	Swartland Eiendomme (Pty) Ltd	Moorreesburg	19	1.47%
21	Ark Str – Smuts Malan H/S	Government Western Arkstr	Riebeek Wes	18	4.84%
22	Uniestraat 0	Moorreesburg Koringboere Uniestraat	Moorreesburg	17	1.32%
23	Rozenburg Hilltop Views	Ikratshi Investment 113 BK	Malmesbury	17	0.29%
24	Kerkstr Pleinstraat Eiland	Swartland Munisipaliteit	Moorreesburg	17	1.32%
25	Nywerheidsingel 15	Intshona Milk Products Pty Ltd	Malmesbury	16	0.27%
26	Hugenote Street 31	Hugenote Park	Malmesbury	16	0.27%
27	Iris Street / Protea D1	Huysamen S	Wesbank	16	0.27%
28	Loopstraat Swembad	Swartland Munisipaliteit	Moorreesburg	16	1.24%
29	Schoonspruitweg 13	Brink & Heath Civils	Malmesbury	16	0.27%
30	Laan Af Kloof Street 215	Morester Trust Laan AF	Riebeek Kasteel	16	3.33%
31	Pieter Bergh Street 4	Property Holdings PT Pieter	Malmesbury	15	0.26%
32	KL Amoskuil	Spice Route Wine Comp	Malmesbury	14	0.24%
33	Alfastraat 9109	Swartland Munisipaliteit	Ilinge Lethu	14	0.24%
34	Langstraat Huis Van Zyl 0	Provinsiale Regering Wes-Kaap	Malmesbury	14	0.24%
35	Voortrekkerweg Maresa 4A 22	Bester Cornelia Elizabeth	Malmesbury	14	0.24%
36	Amoskuil 0	Fair View Trust	Malmesbury	14	0.24%
37	Pieter Cruythofflaan 298	Bader W	Riebeek Kasteel	13	2.70%
38	Swartland Street	Moorreesburg Privaat Abbattoir	Moorreesburg	13	1.01%
39	Darlingweg Liebenberg Pri	Provinsiale Regering Wes-Kaap	Wesbank	13	0.22%
40	Durbanstr Vooruitsig Pri 05	Provincial Government-Western	Darling	12	1.15%
41	Michiel Heyns Kraal	Attaway AH	Riverlands	12	0.20%
42	Langfonteinstraat 2	Anicol Prop Pty Ltd	Darling	11	1.06%
43	Dolfynstr Karavaanpark	Swartland Munisipaliteit	Yzerfontein	11	2.10%
44	H/V Tui St Thomas Street	Fidusie Beleggings (Edms) Bpk	Malmesbury	10	0.17%

Progress made with the installation of water efficient devices:

Swartland Municipality has investigated the possibility to replace all existing star pillar taps in all public ablution facilities throughout its whole jurisdiction and is considering committing to this proposal by including the replacement costs in its budget for the coming financial years. It should be noted that the replacement of taps will be done over a five-year period to allow Municipal staff capacity to execute the task themselves. No flow restrictors were installed during the last two financial years.

C.6. Water Services Asset Management

The tables below give an overview of the water and sewerage assets included in Swartland Municipality's Asset Register. The current and depreciated replacement costs of the water and sewerage infrastructure is summarised in the table below (June 2022).

Table C.6.1: Current and depreciated replacement costs of the water and sewerage infrastructure

Asset Type	GIS ID	CRC	DRC	% DRC / CRC
WATER				
Borehole	BH	R6 000 696	R5 765 457	96%
Pump Station	WPS	R17 285 316	R6 539 854	38%
Reservoir	RES	R135 231 874	R63 994 686	47%
Reticulation Pipeline	WRP	R348 266 612	R180 221 289	52%
Bulk Water Pipeline	BWP	R141 781 836	R67 785 558	48%
Dam	DAM	R36 350 585	R4 778 790	13%
Water Consumer Connections	WCC	R148 476 673	R31 428 434	21%
Electrical	ELEC	R997 031	R636 969	64%
Other Assets	OTH	R38 549 655	R26 664 931	69%
Totals		**R872 940 278**	**R387 815 968**	**44%**
SEWERAGE				
Sewer Pump Station	SPS	R15 338 466	R7 824 653	51%
Sewage Treatment Works	STW	R248 794 552	R165 880 252	67%
Sewer Reticulation Pipeline	SRP	R277 999 276	R113 694 623	41%
Bulk Sewer Pipeline	BSP	R60 769 892	R35 494 436	58%
Sewer Consumer Connections	SCC	R106 390 949	R21 455 528	20%
Other Assets	OTH	R10 246 676	R4 052 928	40%
Totals		**R719 539 811**	**R348 402 420**	**48%**

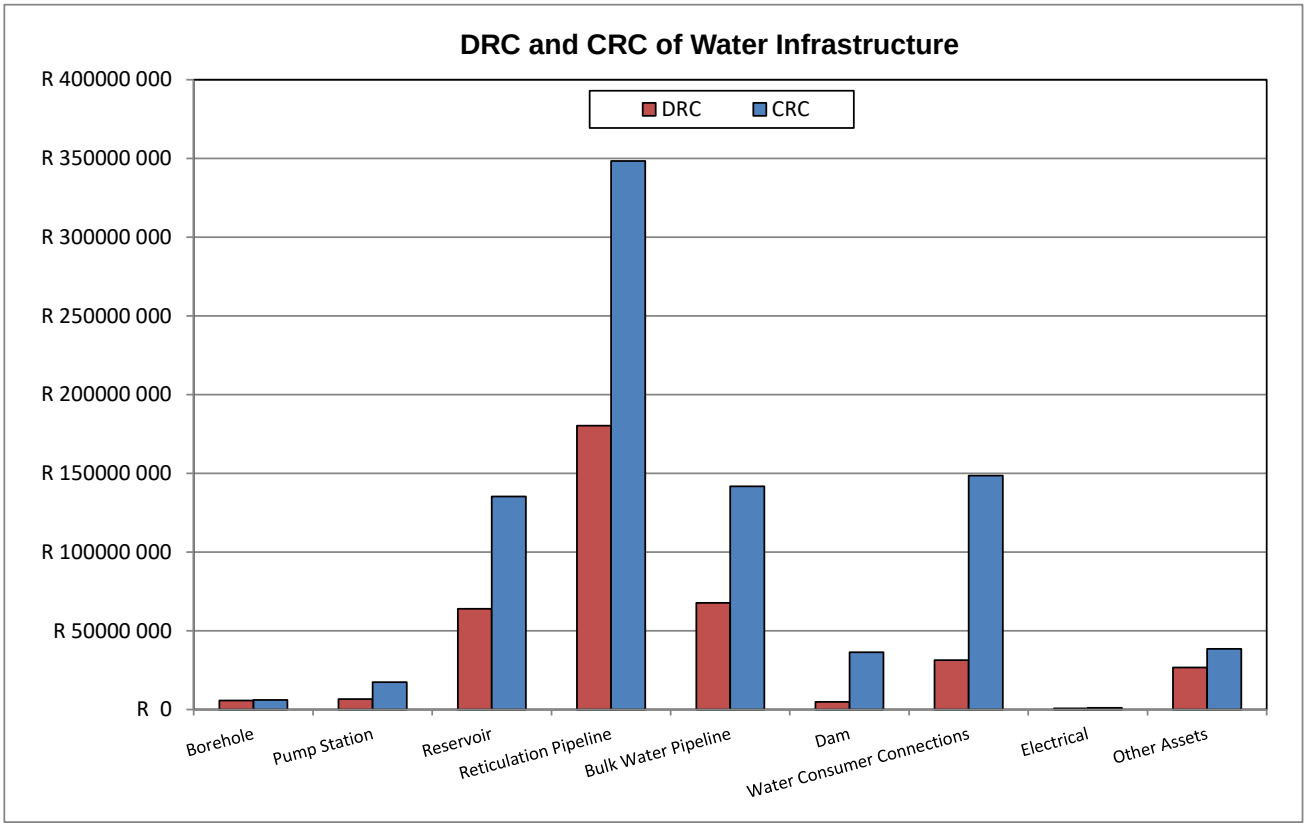


Figure C.6.1: DRC and CRC of the water infrastructure

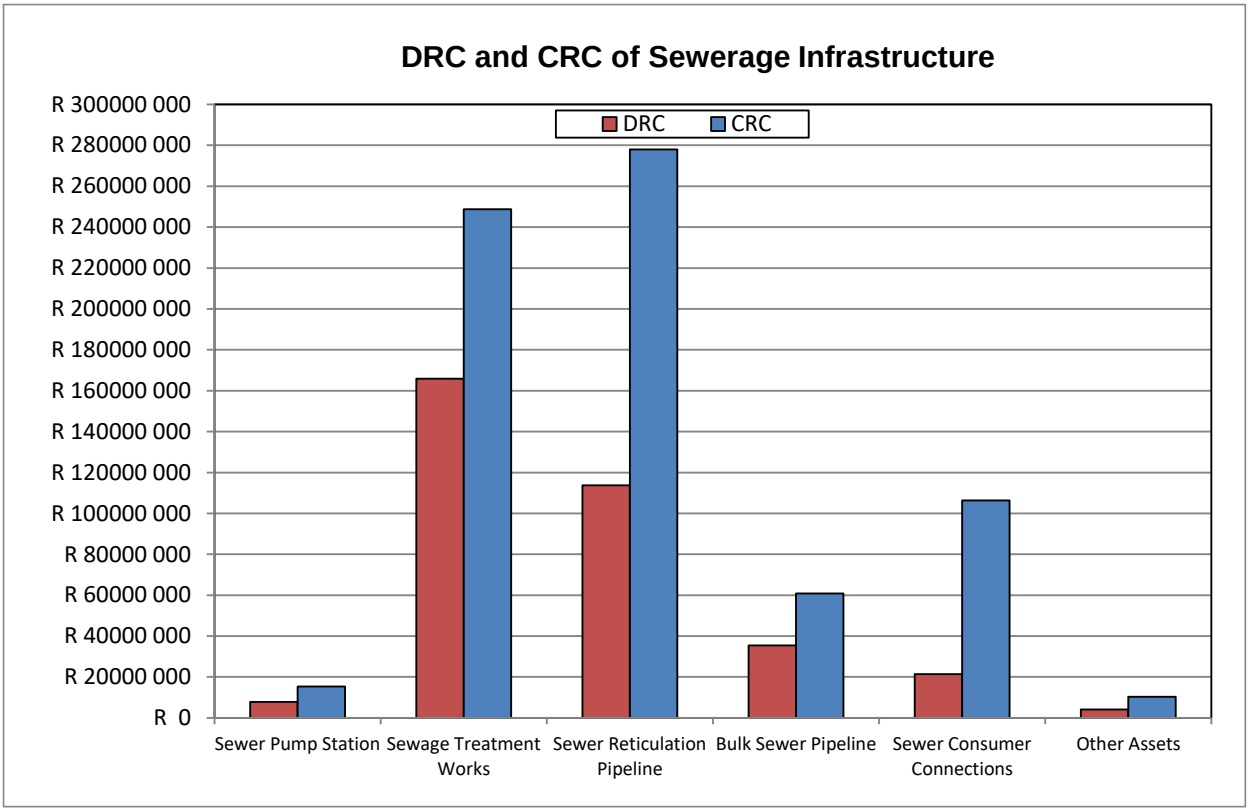


Figure C.6.2: DRC and CRC of the sewerage infrastructure

The above implies that about 56% of the value of the water infrastructure and 52% of the value of the sewerage infrastructure has been consumed.

The table below give's an overview of the RUL per facility type for the water and sewerage infrastructure (June 2022).

Table C.6.2: Overview of the remaining useful life by facility type for water and sewerage infrastructure (CRC)

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
WATER						
Borehole	BH	R10 000	R0	R91 536	R114 107	R5 785 053
Pump Station	WPS	R2 595 407	R1 411 726	R996 363	R7 446	R12 274 374
Reservoir	RES	R1 247 062	R0	R3 800 395	R1 376 342	R128 808 075
Reticulation Pipeline	WRP	R5 130 240	R0	R73 225 247	R11 733 123	R258 178 002
Bulk Water Pipeline	BWP	R563 639	R0	R14 487 984	R0	R126 730 213
Dam	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	R17 737 299	R3 038 217	R4 557 114	R7 948 553	R5 268 472
TOTALS		**R27 748 074**	**R4 449 943**	**R97 695 005**	**R22 344 934**	**R720 702 322**
SEWERAGE						
Sewer Pump Station	SPS	R3 979 311	R177 141	R2 089 592	R1 967 284	R7 125 138
Sewage Treatment Works	STW	R1 222 373	R2 267 300	R73 004 081	R10 496 545	R161 804 253
Sewer Reticulation Pipeline	SRP	R0	R0	R25 066 217	R13 019 068	R239 913 991
Bulk Sewer Pipeline	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	R3 683 855	R4 765 324	R0	R159 272	R1 638 225
TOTALS		**R8 885 539**	**R14 054 765**	**R102 774 854**	**R26 065 118**	**R567 759 535**

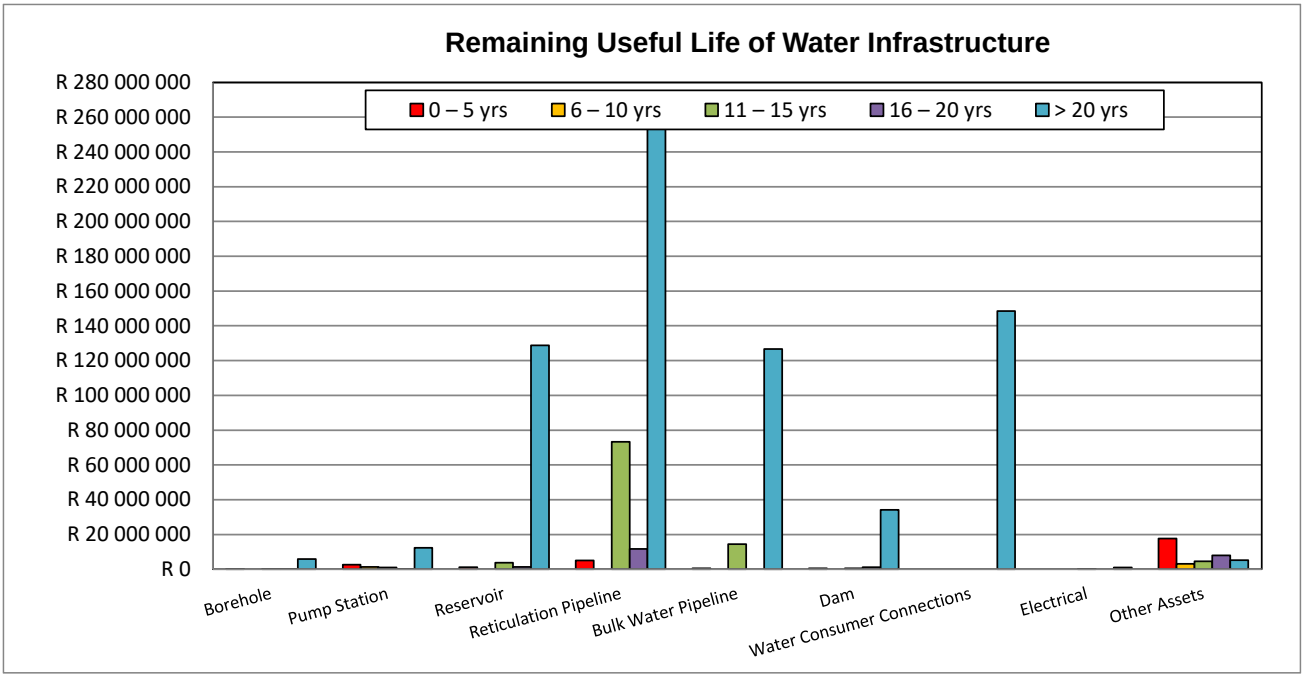


Figure C.6.3: Remaining Useful Life of the water infrastructure

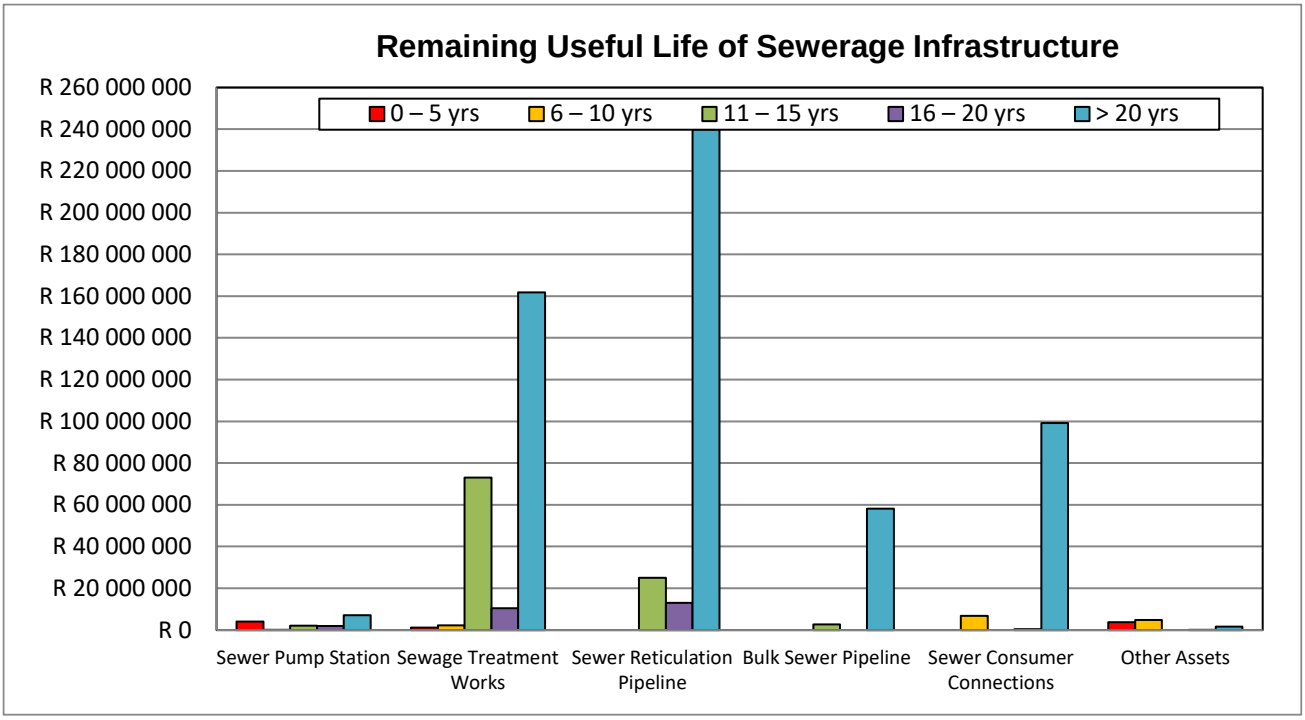


Figure C.6.4: Remaining Useful Life of the sewerage infrastructure

The table below gives an overview of the age distribution per facility for the water and sewerage infrastructure (June 2022).

Table C.6.3: Overview of the age distribution by facility type for water and sewerage infrastructure (CRC)						
Asset Type	**GIS ID**	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
WATER						
Borehole	BH	R5 645 053	R91 536	R114 107	R0	R150 000
Pump Station	WPS	R1 209 079	R739 616	R6 456 365	R2 896 782	R5 983 474
Reservoir	RES	R1 468 062	R7 242 325	R47 589 095	R15 781 478	R63 150 914
Reticulation Pipeline	WRP	R31 492 825	R22 414 093	R94 279 793	R16 633 024	R183 446 877
Bulk Water Pipeline	BWP	R15 013 616	R663 869	R11 682 478	R14 409 360	R100 012 513
Dam	DAM	R0	R1 483 432	R4 412 622	R410 781	R30 043 750
Water Consumer Connections	WCC	R0	R0	R27 842	R11 494 000	R136 954 831
Electrical	ELEC	R6 581	R525 216	R465 234	R0	R0
Other Assets	OTH	R27 659 883	R4 578 389	R2 506 914	R919 944	R2 884 525
TOTALS		**R82 495 099**	**R37 738 476**	**R167 534 450**	**R62 545 369**	**R522 626 884**
SEWERAGE						
Sewer Pump Station	SPS	R2 860 534	R2 819 420	R3 472 169	R2 190 802	R3 995 541
Sewage Treatment Works	STW	R3 196 328	R194 475 270	R34 509 836	R1 748 926	R14 864 192
Sewer Reticulation Pipeline	SRP	R20 843 802	R11 116 898	R30 023 094	R28 759 711	R187 255 771
Bulk Sewer Pipeline	BSP	R16 325 339	R0	R5 745 295	R5 808 429	R32 890 829
Sewer Consumer Connections	SCC	R0	R0	R580 949	R410 000	R105 400 000
Other Assets	OTH	R588 925	R5 935 920	R2 169 899	R323 739	R1 228 193
TOTALS		**R43 814 928**	**R214 347 508**	**R76 501 242**	**R39 241 607**	**R345 634 526**

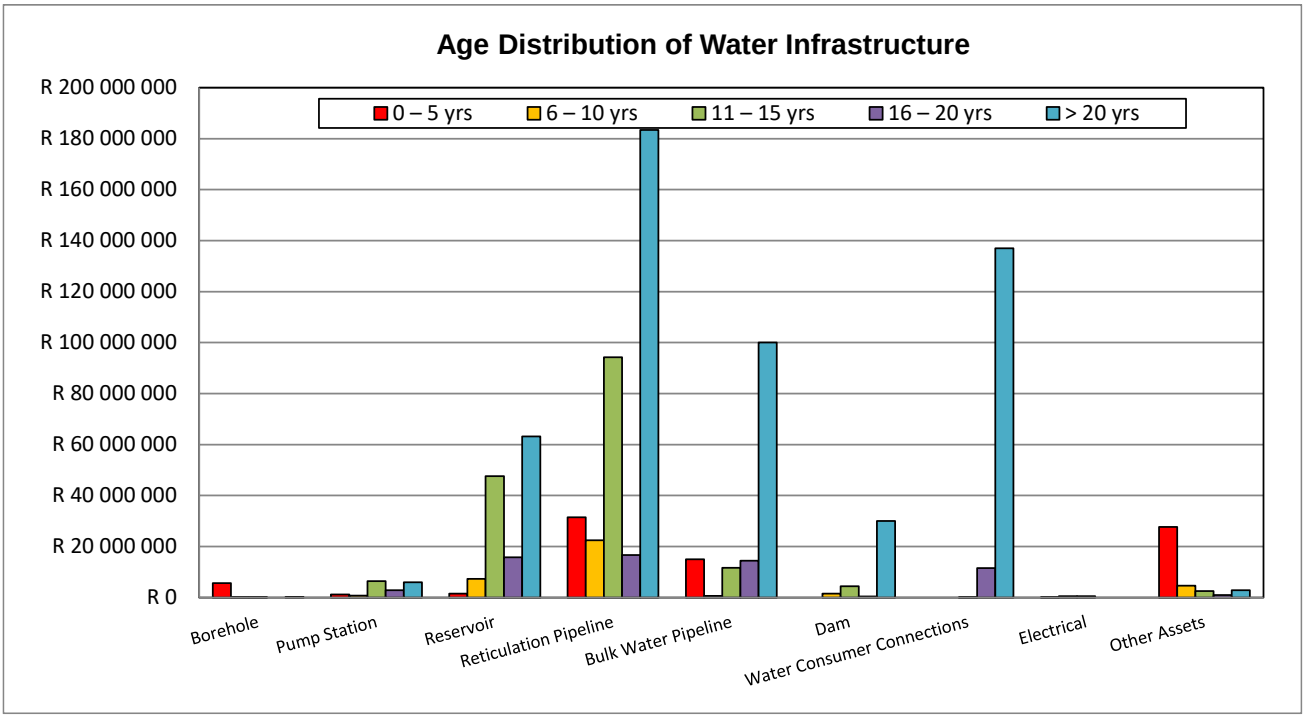


Figure C.6.5: Age distribution of the water infrastructure

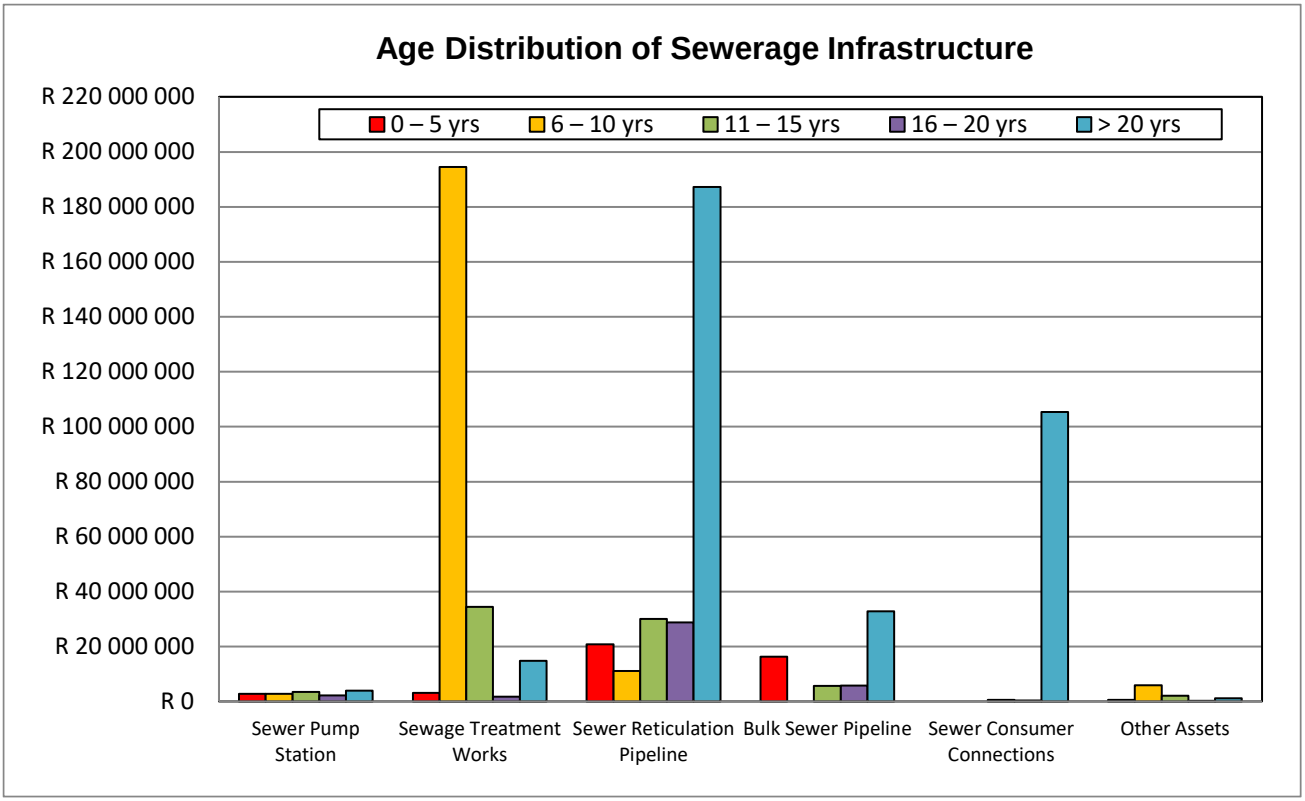


Figure C.6.6: Age distribution of the sewerage infrastructure

The CRC of the water and sewerage infrastructure that will need to be replaced over the next five years (RUL < 5 yrs) is R36.634 million. The asset renewal needs for the water infrastructure assets over the next ten years is R3.220 million per year. The reinvestment required is R27.748 million in the first five years and R4.450 million in the second five-year period. The age of 59.87% 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 R2.294 million per year. The reinvestment required is R8.886 million in the first five years and R14.055 million in the second five-year period. The age of 48.04% of the sewerage infrastructure assets is greater than twenty years.

Most of the maintenance work currently carried out on the water and sewerage infrastructure are re-active and it is critical for the Municipality to increase their maintenance budget for water and sewerage infrastructure in order to ensure that the required preventative maintenance work is also carried out. The Asset Management Plan needs to indicate the risks associated with the inadequate refurbishment and maintenance of the various water and sewerage infrastructure.

It is important for Swartland Municipality to allocate adequate funds for the refurbishment, replacement and maintenance of their existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. All possible external sources of funding to assist with the development of the bulk infrastructure and additional sources need to be identified.

C.7. Water Services Operation and Maintenance

Swartland Municipality implements the following planned and unplanned preventative and corrective maintenance, as summarised in the table below.

Table C.7.1: Types of Planned and Unplanned Preventative and Corrective Maintenance Implemented by Swartland Municipality	
Design-out Maintenance: Design-out Maintenance originates on the drawing board and is aimed at improving the operation, reliability or capacity of equipment. The engineer follows a life cycle approach to infrastructure development.	
Preventative Maintenance: Preventative maintenance is based on planning. For example, breakdowns at a plant can be reduced to a minimum if it is planned that all wearing parts are to be replaced before they fail.	Systematic (Periodic Maintenance): Systematic maintenance is periodic maintenance where the servicing of equipment takes place at regular intervals, either in accordance with a time schedule or on the basis of predetermined units of use, to eliminate possible causes of failure before a breakdown occurs. Systematic maintenance requires a servicing schedule, which is based on the manufacturer's guidelines for equipment. Condition-based (Predictive) Maintenance: Condition-based maintenance is predictive maintenance based on regularly inspecting equipment and infrastructure in order to assess the state of wear and tear. Any failures that are observed, complemented by the findings of the programmed inspections and checks, are then dealt with through corrective action, so as to avoid breakdowns or the deterioration of a condition that could pose a safety hazard.
Corrective or Breakdown Maintenance: It is important to work methodically to keep repair time as short as possible. Good work preparation, use of correct (and well maintained) tools and equipment, and gathering and processing of all data relevant to the repairs helps to avoid downtime, eliminate mistakes and improve operational conditions.	Planned (Scheduled Repairs) Unplanned repairs guided by Troubleshooting: Troubleshooting is used when poor condition causes either total or partial stoppages, or when operations take place under intolerable conditions.

Swartland Municipality's operation and maintenance assessments and plans for their water and sewerage infrastructure are indicated in the table below.

Table C.7.2: Swartland Municipality's Operation and Maintenance Assessments and Plans		
Element	**Assessment Criteria**	**Status Quo**
Resources		
Staff	Sufficient staff numbers. Competency level of staff at all levels. Level of service provided by staff. Empowerment and training (Adequately trained for position, Safety regulation and Commitment). Responsibility allocation (organisational structure) and acceptance thereof.	Below minimum requirement: Additional Process Controllers need to be appointed to comply with the legislative requirements with regard to the number and Class of Process Controller per shift per WWTW. Alternatively, the Municipality can apply for exemption from the DWS, w.r.t the number of Process Controllers per shift per plant, if the plants are automated. Work Place Skills Programme is compiled annually to ensure adequate training of staff.
External Resources	Need for external resource providers. Competency level and value for money. Management and control over these providers.	Adequate: The operation and maintenance of the bulk water pipelines and the Swartland WTW are done by the West Coast District Municipality, with adequate personnel. A Service Level Agreement is in place between the West Coast District Municipality and Swartland Municipality.
Spare Parts	Adequate materials provisioning. Store management (Sufficient stock kept, stock control and delivery time).	Adequate: Municipality ensures adequate spare parts are available in their stores for possible failures or breakdowns. Monitored by the Civil Engineering Services Directorate.
Tools and Equipment	Adequate tools and equipment provided. Control and maintenance.	Adequate: Municipality ensures adequate tools and equipment are available. Monitored by the Civil Engineering Services Directorate.
Budget	Adequate budget provided. Budget control. Identification and documentation of needs. Budget preparation and motivation.	Adequate: Required Financial Strategies, Policies and Systems are in place to ensure proper budget control.
Information		

Table C.7.2: Swartland Municipality's Operation and Maintenance Assessments and Plans		
Element	**Assessment Criteria**	**Status Quo**
Manuals	Existence of manuals (operation / maintenance or manufacturer). Record keeping / safekeeping and control. Utilisation of manuals by staff.	Adequate: O&M Manuals are in place for the bulk water and sewerage infrastructure and the WWTWs. These Manuals are also used by the Process Controllers at the plants.
Asset Register	Existence of an asset register. Maintenance / updating of asset register. Accessibility of information. Control over assets. Stock taking.	Adequate: An up-to-date Asset Register is in place, which include all the water and sewerage infrastructure. CRC, DRC, RUL and Age of infrastructure are included in the Asset Register. Asset Register is updated annually.
As-built Information	Existence of as-built drawings. Existence of important reports e.g. design reports etc. Record keeping / safekeeping and control. Accessibility of information. Updating of records.	Adequate: As-built information is available for all water and sewerage infrastructure. The information is also included in the IMQS of the Municipality. The information is regularly updated when the Water and Sewer Master Plans are updated.
Tools and Equipment	Existence of information on tools and equipment. Record keeping / safekeeping and control. Accessibility of information.	Adequate: Managed by the Operational Personnel at the various Municipal stores, with the required control forms that are in place. Monitored by the Civil Engineering Services Directorate.
Contingency and Safety Plans	Compliance to safety requirements. Safety equipment and maintenance thereof. Existence of safety plan where required. Existence of contingency plan where required.	Adequate: A Water Safety Plan and W_2RAPs are in place for all the areas. WWTW Process Audits are done when required. Incident Management Protocols, as included in the Water Safety Plan and W_2RAPs, are followed by the personnel.
Activity Control and Management		
Procedures	Existence of procedures for all activities. Existence of policies – standardisation, quality, operational and maintenance, etc. Correctness of procedures – if in place.	Adequate: Required Procedures and Policies are in place. Procedures and Policies with regard to the water and sewerage infrastructure are managed by the Civil Engineering Services Directorate.
Record Keeping	Existence of record keeping system. Process of data. Actions activated.	Adequate, but can be improved further: Record keeping of information required for the Monthly Reports are kept up to date. The record keeping of certain information is also linked to specific water and sanitation KPIs in the SDBIP. Municipality to implement recommended O&M Control Sheets for groundwater, surface water, bulk water and reticulation networks and fittings, WTWs, WWTWs, water and sewer PSs, reservoirs, remote monitoring and control systems and bulk and sewer drainage networks.
Quality Controls	Quality management plan. Quality assurance. Quality control (Inspections, Control charts, trend analysis). Process adjustment and rework. Quality improvement.	Adequate: Required quality control mechanisms are in place to ensure high quality of materials and to ensure that all work carried out on the water and sewerage infrastructure is of a high quality. The Civil Engineering Services Directorate monitors all work carried out by Consultants and Contractors.
Risk Management	Risk management planning. Risk identification. Risk probability and impact assessment. Risk response planning. Risk monitoring and control.	Adequate: Required Risk Management Protocols are in place, which is followed by the personnel. Potential risks/incidents and control measure to reduce or manage these risks were identified as part of the Water Safety Plan and W_2RAP processes.
Reporting	Production and activity reporting (Completeness, evaluation and action activation). Management reporting (Completeness and evaluation and action activation). Performance monitoring.	Adequate: The Director Civil Engineering Services report on a monthly basis to Council on all the required water and sanitation information. A SDBIP is also in place, linked to specific water and sanitation KPIs, which allows for proper performance monitoring.

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, requirements of the Municipality and DWS as the regulating authority, the availability of staff, plant, equipment, spares, money and other resources.

Swartland Municipality 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 Municipality also ensure that sufficient repair materials, consumables and back-up equipment are also readily available for any potential breakdowns.

A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of existing infrastructure. In the case of the operations and maintenance of the systems, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the systems remain in good condition.

The table below gives an overview of the CRC and DRC of the water and sewerage infrastructure included in Swartland Municipality's Asset Register (June 2022). The recommended budgets for the replacement of the existing infrastructure and the operation and maintenance of the existing infrastructure, based on the CRC, are also indicated.

Table C.7.3: Recommended budgets for the replacement and the operation and maintenance of the existing water and sewerage infrastructure.

Asset Type	Asset Register June 2022		Recommended Annual Replacement Budget (Best Practice)	Recommended Annual O&M Budget (Best Practice)	Depreciation, Property, Plant and Equipment: Actual Expenditure
	CRC	DRC	2.0%	1.5%	2021/2022
Borehole	R6 000 696	R5 765 457	R120 014	R90 010	R15 396 207
Pump Station	R17 285 316	R6 539 854	R345 706	R259 280	
Reservoir	R135 231 874	R63 994 686	R2 704 637	R2 028 478	
Reticulation Pipeline	R348 266 612	R180 221 289	R6 965 332	R5 223 999	
Bulk Water Pipeline	R141 781 836	R67 785 558	R2 835 637	R2 126 728	
Dam	R36 350 585	R4 778 790	R727 012	R545 259	
Water Consumer Connections	R148 476 673	R31 428 434	R2 969 533	R2 227 150	
Electrical	R997 031	R636 969	R19 941	R14 955	
Other Assets	R38 549 655	R26 664 931	R770 993	R578 245	
Sub Total Water	**R872 940 278**	**R387 815 968**	**R17 458 805**	**R13 094 104**	**R15 396 207**
Sewer Pump Station	R15 338 466	R7 824 653	R306 769	R230 077	R16 317 745
Sewage Treatment Works	R248 794 552	R165 880 252	R4 975 891	R3 731 918	
Sewer Reticulation Pipeline	R277 999 276	R113 694 623	R5 559 986	R4 169 989	
Bulk Sewer Pipeline	R60 769 892	R35 494 436	R1 215 398	R911 548	
Sewer Consumer Connections	R106 390 949	R21 455 528	R2 127 819	R1 595 864	
Other Assets	R10 246 676	R4 052 928	R204 934	R153 700	
Sub Total Sewerage	**R719 539 811**	**R348 402 420**	**R14 390 797**	**R10 793 096**	**R16 317 745**
Total Water and Sewerage	**R1 592 480 089**	**R736 218 388**	**R31 849 602**	**R23 887 200**	**R31 713 952**

Most of the major replacement of old water and sewerage infrastructure in Swartland Municipality is done through the Municipality's annual capital budget. The capital budget however also includes new infrastructure. The table below gives an overview of the total historical water and sewerage capital expenditure for the last five financial years.

Table C.7.4: Historical water and sewerage capital expenditure

Infrastructure	21/22	20/21	19/20	18/19	17/18	16/17
Water	R9 323 980	R64 161 385	R9 658 726	R14 797 042	R15 870 453	R7 878 897
Sewerage	R63 296 662	R2 353 219	R14 507 999	R8 976 513	R12 340 699	R5 984 731
Total	**R72 620 642**	**R66 514 604**	**R24 166 725**	**R23 773 555**	**R28 211 152**	**R13 863 629**

C.8. Water Resources

The Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 to 2021 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.

Future water requirement projection models were developed for each of the towns within Swartland Municipality's Management Area, which are included in Annexure C. IWA Water Balance models with graphs of the total water requirements (System Input Volume and billed metered consumption), peak month factors, annual NRW and water losses per town and water usage per sector are included in Annexure A.

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 C.8.1: 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			**31 640.000**

The DWS is currently busy with the updating of the All Towns Reconciliation Strategies for the Western Cape. 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.8.2: 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 (WCWSS). • 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.

Detailed future water requirement projection models were developed for each of the distribution system and the future water requirements are indicated in the table below per system. These models include the future projections up to 2046 and were calibrated by using historic billed metered consumption data and bulk abstraction data. The percentage of NRW was determined for each of the distribution systems and growth in future water requirement was based on agreed population and growth figures.

Table C.8.3: Projected future water requirements of towns

Distribution System	Model	PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)				
		2026	2031	2036	2041	2046
Moorreesburg	2% Annual Growth	765.092	844.723	932.642	1 029.713	1 136.886
	4% Annual Growth	843.100	1 025.760	1 247.994	1 518.376	1 847.337
	WSDP Model	764.044	862.903	977.995	1 112.206	1 268.964
Koringberg	2% Annual Growth	60.888	67.225	74.222	81.947	90.476
	4% Annual Growth	67.096	81.633	99.318	120.836	147.016
	WSDP Model	63.265	73.158	84.789	98.482	114.626
Total for Withoogte System	**Low Projection**	**825.980**	**911.948**	**1 006.864**	**1 111.660**	**1 227.362**
	High Projection	**910.196**	**1 107.393**	**1 347.312**	**1 639.212**	**1 994.353**
	WSDP Model	**827.309**	**936.062**	**1 062.784**	**1 210.688**	**1 383.590**
Malmesbury	2% Annual Growth	3 570.224	3 941.816	4 352.083	4 805.052	5 305.165
	4% Annual Growth	3 934.244	4 786.610	5 823.643	7 085.352	8 620.414
	WSDP Model	3 700.096	4 295.368	5 009.730	5 869.294	6 906.278
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	634.985	702.918	780.251	868.522	969.552
Riebeek Kasteel	2% Annual Growth	365.442	403.477	445.472	491.837	543.027
	4% Annual Growth	402.702	489.949	596.098	725.244	882.370
	WSDP Model	401.702	502.070	634.488	809.903	1 043.147
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	219.407	271.733	339.216	426.623	540.272
Ongegund (PPC)	2% Annual Growth	26.512	29.272	32.318	35.682	39.396
	4% Annual Growth	29.215	35.545	43.246	52.615	64.015
	WSDP Model	23.583	24.488	25.601	26.932	28.493
Yzerfontein	2% Annual Growth	340.377	375.804	414.918	458.103	505.782
	4% Annual Growth	375.082	456.345	555.213	675.501	821.851
	WSDP Model	350.143	412.368	486.817	576.017	683.031
Total for Swartland System	**Low Projection**	**5 162.926**	**5 700.289**	**6 293.579**	**6 948.621**	**7 671.837**
	High Projection	**5 689.338**	**6 921.952**	**8 421.612**	**10 246.177**	**12 466.043**
	WSDP Model	**5 329.916**	**6 208.945**	**7 276.103**	**8 577.290**	**10 170.773**
All towns in Swartland Municipality's Management Area	2% Annual Growth	**5 988.906**	**6 612.237**	**7 300.443**	**8 060.281**	**8 899.199**
	4% Annual Growth	**6 599.534**	**8 029.345**	**9 768.924**	**11 885.389**	**14 460.396**
	WSDP Model	**6 157.225**	**7 145.007**	**8 338.887**	**9 787.978**	**11 554.363**

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.8.4: 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 2021/2022 Demand (Low Growth)	Annual Growth on 2021/2022 Demand (High Growth)	WSDP Projection Model
Withoogte System	1 573.600	2037	>2046	>2046
Swartland System	7 900.000	2031	2027	2029

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 don't "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 last financial year. The Conclusions and the Recommendations from the desktop study are indicated below.

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, that 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/m^3 to R12-73/m^3.

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.

Industrial Effluent: Special application must be made to discharge industrial effluent into the sewage disposal system including detailed information to ensure the composition of the effluent meets the standards and criteria of the Municipality. 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 industrial effluent sample results and graphs indicating the pH and COD compliances are included in Annexure D. 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 C.8.5: Compliance percentages of industrial effluent discharged by industrial consumers per parameter

Town	Industrial Consumer	pH Compliance			COD Compliance		
		2021/2022	2020/2021	2019/2020	2021/2022	2020/2021	2019/2020
Darling	Darling Breweries	84.9%	67.3%	72.3%	84.9%	77.6%	78.7%
	Darling Vleismark	40.4%	30.6%	81.6%	63.5%	71.4%	85.7%
	Romery	90.6%	57.1%	71.4%	92.5%	83.7%	89.8%
Moorreesburg	Wespin Abattoir	98.0%	88.0%	93.8%	100.0%	100.0%	93.8%
Malmesbury	Swartland Abattoir	100.0%	100.0%	97.9%	90.6%	88.2%	87.5%
	Roelcor Abattoir	98.1%	100.0%	100.0%	96.2%	98.0%	97.9%
	Sugar Bird	0.0%	0.0%	2.1%	16.0%	6.0%	2.1%
	O'Kin	34.6%	42.0%	54.2%	98.1%	98.0%	97.9%
	Fair Cape	17.0%	7.3%	15.4%	77.4%	76.4%	81.0%

C.9. 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.

A Signed Agreement for the Operation and Maintenance of the Highlands Waste Disposal Facility and the Material Recovery Facility is also in place between Swartland Municipality and Wastegro.

The 2017-2022 WSDP was approved by the Swartland Municipality's Council on the 30th of March 2016. The Municipality plan to update the WSDP for the next five-year cycle (2022-2027). A 2022/2023 WDP-IDP Water Sector Input Report was also compiled during the last financial year, which was approved by Council with the IDP. The WSDP Performance- and Water Services Audit Report is compiled annually and taken to Council with the Annual Report. The Water Services By-laws was promulgated.

The education of users where sanitation facilities are upgraded to waterborne systems is on-going. This is primarily focussed on informing users of the appropriate use of and routine maintenance of such facilities.

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.

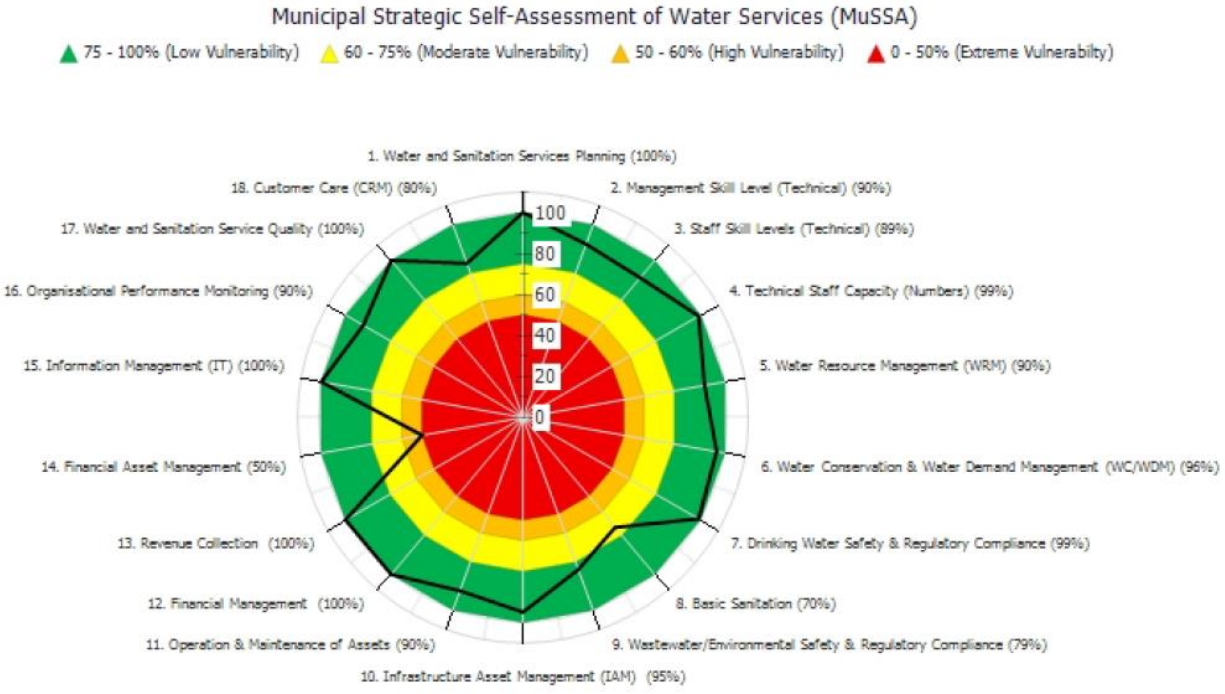


Figure C.9.1: Spider Diagram of the vulnerability levels of Swartland Municipality for 2022

Swartland Municipality's Vulnerability Index for 2022 was indicated as 0.15 "Low Vulnerability". The only one area of concern evident from the 2022 assessment is Financial Asset Management, which obtained a score of 50% (High Vulnerability). The vulnerability of all the other key service areas are low, except basic sanitation that is moderate.

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Swartland Municipality

Section	Vulnerability
Water and Sanitation Service Quality • Critical business databases and documents (e.g. as-built drawings, records, manuals, agreements, billing/revenue collection, project and scheme management data, etc.) are current, maintained and stored in secure locations (on-site and off-site, both paper and electronic). • Customers have a functional, reliable and safe water supply system with sufficient quantity and flow, good quality and minimal interruptions. • All consumers served experience interruptions of less than 48 hours (at any given time) and a cumulative interruption time during the year of less than 15 days. • Households in your WSA experience water pressure problems (no flow/partial flow less than 10 litres / minute) (not to be confused with interruption to supply). • Customers have a functional, reliable, dignified and safe sanitation system with no blockages resulting in overflows that impact on the environment, including effective collection and treatment of faecal sludge.	**Low (100%)**
Customer Care • A functional customer service system manned by appropriate customer services representatives and using a complaints register, is in place to address complaints and appropriately inform customers of service interruptions, contamination of water, boil water alert, etc. • Regular municipal wide customer satisfaction surveys are conducted to determine customer satisfaction levels and inform the Customer Care Management Plan. • Please indicate what percentage of the reported water related complaints/callouts are acknowledged, including consumer response, within 24 hours. • Please indicate what percentage of the reported wastewater/sanitation related complaints/callouts are acknowledged, including consumer response, within 24 hours. • A comprehensive customer awareness programme (informing customers of water and wastewater system O&M activities, water quality, resource protection / pollution, reporting incidents / security concerns, etc.) is in place and implemented.	**Low (80%)**
Water and Sanitation Services Planning • Your appropriate water and sanitation services planning (e.g. WSDP) and associated master planning processes include and are aligned with appropriate Water and Sewage Master Plans, Spatial Development Framework, Water Safety Plans and Wastewater Risk Abatement Plans (W_2RAPs), and are aligned to your IDP and associated SDBIP targets. • You are implementing an up-to-date and adopted municipal water and sanitation services plan (e.g. WSDP). • Your current project list addresses existing needs / shortcomings identified through the WSDP and associated master planning process. • Project progress is monitored, tracked and reported to municipal top management / council and the Regulator (through the annual water and sanitation services report). • Projects identified through your various planning processes have been implemented in the last 3 years.	**Low (100%)**
Water Resource Management (WRM) • The recommendations and actions from the Reconciliation Strategies (Large Systems / All Towns) have been incorporated into your WSDP, master planning and IDP processes. • The metered quantity of water available from the resources is sufficient for your future WSA needs (at the stipulated level of abstraction and assurance of supply, and considering possible climate change impacts) (i.e. no shortage in 10 years). • The quantity of water available from the resources is sufficient for your future WSA needs (at the stipulated level of assurance of supply) (i.e. no shortage in 10 years). • The source water quality is currently acceptable for its purpose. • The trend indicates a deteriorating source water quality.	**Low (90%)**
WC/WDM • Your WSA has developed a council approved WC/WDM Strategy, which includes a standard water balance (e.g.	**Low (96%)**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Swartland Municipality	
Section	**Vulnerability**
modified IWA). • Please indicate your percentage Non-Revenue Water (NRW) as per the modified IWA water balance. • System input volumes (bulk) to the WSA are accurately monitored using calibrated bulk meters (e.g. check metering). • Please indicate what percentage of all connections are metered and billed (residential and non-residential (commercial, industrial, etc.)) on a monthly basis. • Your WSA is implementing appropriate intervention programmes to reduce NRW (e.g. minimisation of night flows through pressure management, removal of unlawful connections, leak detection and repairs, consumer education / awareness).	
Drinking Water Safety and Regulatory Compliance • Please indicate your microbiological drinking- water quality compliance for E.Coli (or faecal coliforms) for the communities you are monitoring for the last 12 months. • ALL your supply schemes, WTWs, process controllers, monitoring programmes, sample points, laboratories, results, procedures, protocols, etc. are managed with a suitable Water Safety Planning framework. • Council have been made aware of high risk / critical water safety plan related issues (including those identified via the Blue Drop Certification programme) that require budget and auctioning, and these issues have been actioned (where applicable). • Sufficient funds have been made available to address all these identified water safety related issues. • Required corrective actions/remedial measures to address all these identified water safety related issues have been successfully implemented.	**Low (99%)**
Basic Sanitation • You have formal housing areas that are not fully serviced with sanitation infrastructure. • You have informal housing or rural areas that are not fully serviced with sanitation infrastructure. • You have a detailed plan and programme to provide safe sanitation to all households (including health and hygiene education and user awareness including Water, Sanitation and Health (WASH) aspects). • Your sanitation budget is appropriate for required sanitation programmes (implementation and O&M). • You are servicing your basic sanitation facilities (e.g. pit latrines) as per safe sanitation requirements (healthy, environmentally safe, structurally sound, regularly maintained, following faecal sludge management best practices).	**Moderate (70%)**
Wastewater / Environmental Safety and Regulatory Compliance • Please indicate your treated wastewater effluent compliance for COD for your (or your service provider's) WWTWs for the last 12 months. • ALL your WWTWs, process controllers, monitoring programmes, sample points, laboratories, results, procedures, protocols, etc. are managed with a suitable wastewater risk abatement framework. • Council have been made aware of all W_2RAP related issues (e.g. pollution incidents, Green Drop deficiencies) that require budget and auctioning, and these issues have been actioned (where applicable). • Sufficient funds have been made available to address all identified wastewater and environmental safety related issues. • Required corrective actions/remedial measures to address all identified wastewater and environmental safety related issues have been successfully implemented.	**Low (79%)**
Infrastructure Asset Management • You have an appropriate and up-to-date water and sanitation services technical Asset Register (includes asset name, location, condition, extent, remaining useful life, performance and risk). NOTE: This does only not refer to GRAP17 asset register requirements. • You have developed an appropriate Infrastructure Asset Management (IAM) Plan for your WSA. • You are implementing the IAM outcomes. • Budget allocated to implement IAM outcomes is sufficient and is being effectively spent. • You conduct annual technical assessments of your water and wastewater related systems (including sources, WTWs, WWTWs, pump stations, network, etc.) and implement required follow-up actions.	**Low (95%)**
Operation and Maintenance of Assets • Appropriate maintenance facility(ies) that is (are) secure and stocked with essential equipment (e.g. spare parts), plant and tools is (are) available.	**Low (90%)**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Swartland Municipality	
Section	**Vulnerability**
• Appropriate water and sanitation services infrastructure / equipment planned / preventative maintenance schedules are developed. • Appropriate planned / preventative maintenance is performed at all WTWs and associated reservoirs, pump stations and distribution networks. • Appropriate planned / preventative maintenance is performed at all WWTWs and associated collection systems and pump stations. • Please indicate your infrastructure repairs and maintenance costs as a function of total operating expenditure (%).	
Information Management • You have a developed, approved and implemented IT Master Systems Plan (e.g. covering 3-5 years) that addresses your IT business requirements. • You have a developed, approved and implemented ICT Technology Master Plan that addresses your current and future IT infrastructure requirements. • You have IT systems that support your full range of water and sanitation services business requirements (e.g. billing, GIS, customer care, O&M, asset management). • ICT service continuity – Adequate IT security exists with off-site back-ups / archiving of operation critical applications, databases, data, etc. routinely performed in terms of an IT disaster Recovery Plan. • You have sufficient budget and staff to keep key IT systems table and up to date as per IT policies and procedures.	**Low (100%)**
Organisational Performance Monitoring • Appropriate plans, policies and procedures to address Disaster Management / emergencies and other issues (safety, public participation, communication, etc.) are developed and implemented. NOTE: Although Disaster Management is a district function, LMs need to ensure they are aware of their associated roles and responsibilities and have developed a Disaster Management Framework. • An organisational performance management system is developed and implemented (i.e. effectively measure, monitor and track water and sanitation services performance indicators). • A municipal risk management framework is developed and implemented and includes monitoring and tracking of water and sanitation related risks. • Effective administration support is available to technical staff to assist with processing work orders, providing order numbers, handling correspondence, etc. • "Access to Basic Water and Sanitation Services" progress reports are frequently produced and presented to council for discussion, action and follow-up.	**Low (90%)**
Financial Management • Financial controls - Please state the audit opinion with regard to your last audit report on the financial statements. • Cash flow status – Please state your Cash / Cost Coverage Ratio (excluding Unspent Conditional Grants) • Your actual operating expenditure closely reflects your budgeted operating expenditure (i.e. Operating Expenditure Budget Implementation Indicator). • Your actual revenue closely reflects your budgeted operating revenue (i.e. Operating Revenue Budget Implementation Indicator). • Liabilities (Creditors) - Money is owed by your municipality to major / critical service providers (e.g. ESKOM, Water Board, largest contractors, etc.) for more than 30 days from receipt of invoice (NOTE: Ignore disputed invoices).	**Low (100%)**
Revenue Collection • Please indicate the frequency of actual consumer meter readings. • Net Surplus / Deficit – Please state your net surplus / deficit from water services activities for the last 12 months (NOTE: This question tests whether your WSA currently has fully cost reflective Water and Sanitation Tariffs, which take into account cost of maintenance and renewal of purification plants and networks and the cost of new infrastructure). • Revenue collections - Please state the revenue collection rate in respect to Water and Sanitation Services (%). • Revenue Growth – Please state your Water and Sanitation Services revenue growth for the last 12 months (%). • Grant dependency – Actual-operating revenue less operational grants / subsidies (e.g. equitable share) sufficiently covers actual operating expenditure.	**Low (100%)**
Financial Asset Management	**High**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Swartland Municipality	
Section	**Vulnerability**
• Capital Expenditure (Municipal). Please state your municipal Capital Expenditure as a percentage of Total Expenditure (i.e. Total Operating Expenditure + Capital Expenditure). • Capital Expenditure (Water Services). Please state your Capital Expenditure on Water and Sanitation Services as a percentage of Total Capital Expenditure (Capital Expenditure (Municipal)). • Asset Renewal. Please state your Asset Renewal investment as percentage of Depreciation Costs. • Repairs and Maintenance. Please state your Repairs and Maintenance expenditure as a percentage of Property, Plant and Equipment, Investment Property (Carrying Value). • Grant funding of capital expenditure – Please state your reliance on grant funding.	**(50%)**
Management Skill Level (Technical) • Your council approved technical management organisational organogram meets your business requirements, and key posts are filled (e.g. Technical Director, Water Services Manager, and Sanitation Services Manager). • You have sufficient technical management and technical support staff. • Technical management and technical support staff have the correct skills / qualifications and experience as per Job Description requirements (e.g. if Job Description requires Pr Eng, Pr Tech or CPM, the staff have these qualifications). • Managers and technical support staff regularly attend appropriate water and sanitation services skills development / training to support professionalisation. • Key technical managers (e.g. Section 56 and other Senior Management) have signed and monitored Performance Agreements.	**Low (90%)**
Staff Skill Levels (Technical) • WTWs are operated by staff with the correct skills / qualifications and experience (as per Regulation 2834). • WWTWs are operated by staff with the correct skills / qualifications and experience (as per Regulation 2834). • Water system plumbers, mechanics and electricians have the correct skills / qualifications and experience. • Sewage system plumbers, millwrights, mechanics and electricians have the correct skills/qualifications and experience (including contractors / outsourced resources). • Staff regularly attend appropriate water services skills development / training (including safety) (e.g. ESETA courses).	**Low (89%)**
Technical Staff Capacity (Numbers) • Your council approved technical staff organisational organogram meets your business requirements, and posts are filled (i.e. Superintendent of WTWs / WWTWs and below). • WTWs are operated by the appropriate number of staff (as per Regulation 2834). • WWTWs are operated by the appropriate number of staff (as per Regulation 2834). • You have sufficient water and sewerage/sanitation network operations and repair staff/plumbers including contractors / outsourced resources (i.e. you have the appropriate number of staff). • An active mentoring/shadowing programme is in place where experienced staff train younger, inexperienced municipal staff.	**Low (99%)**

The Municipal staff is continuously exposed to training opportunities, skills development and capacity building at a technical, operations and management level in an effort to create a more efficient overall service to the users. A Workplace Skills Plan is compiled annually and the specific training needs of the personnel, with regard to water and wastewater management are determined annually. An amount of R1 500 868 was spent on training of employed personnel during the 2021/2022 financial year. The table below gives an overview of the training provided during the 2021/2022 financial year, as taken from the Workplace Skills Plan.

Table C.9.2: Training Provided during the 2021/2022 Financial Year (Workplace Skills Plan)					
LGSETA Strategic Focus Area	**Municipal Key Performance Area**	**Main IDP Priority Linked to KPA**	**Female Employed**	**Male Employed**	**Total**
Enhancing Good Governance, Leadership and Management Capabilities	Good Governance and the linking of democracy	Ensure environmental integrity of district is improved.	10	12	22
Promoting Sound Financial Management & Financial Viability	Municipal Financial Viability and Management	Ensure good governance and financial viability.	20	72	92
Enhancing Infrastructure and Service Delivery	Basic Service Delivery and Infrastructure Development	To provide bulk service to the district regarding water	52	267	319

Table C.9.2: Training Provided during the 2021/2022 Financial Year (Workplace Skills Plan)					
LGSETA Strategic Focus Area	**Municipal Key Performance Area**	**Main IDP Priority Linked to KPA**	**Female Employed**	**Male Employed**	**Total**
		and roads.			
Enhancing Municipal Planning	Municipal Transformation and Institutional Development	To pursue economic growth and the facilitation of job opportunities.	4	5	9
Promoting Spatial Transformation and Inclusion	Sustainable Local Economic Development	To promote the social-well-being of residents, communities and targeted social groups in the district.	0	0	0
Total			**86**	**356**	**442**

The WWTWs in Swartland Municipality's Management Area and the Process Controllers working at these plants are registered with the DWS.

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 all their 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's Organogram, as approved on the 25th of June 2021, which include water and sanitation services, is included in Annexure G. Swartland Municipality is currently effectively managing its water and sanitation services. Urgent attention is however required to address the backlog in infrastructure replacement and refurbishment. All forward planning for water and sanitation services is guided by the Water and Sewer Master Plans, which were recently updated.

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 Object ref, Date time reported, Reported by, Contact telephone, Location description, Incident type, Capture by, Allocated to, Date and time attended and Status is recorded.

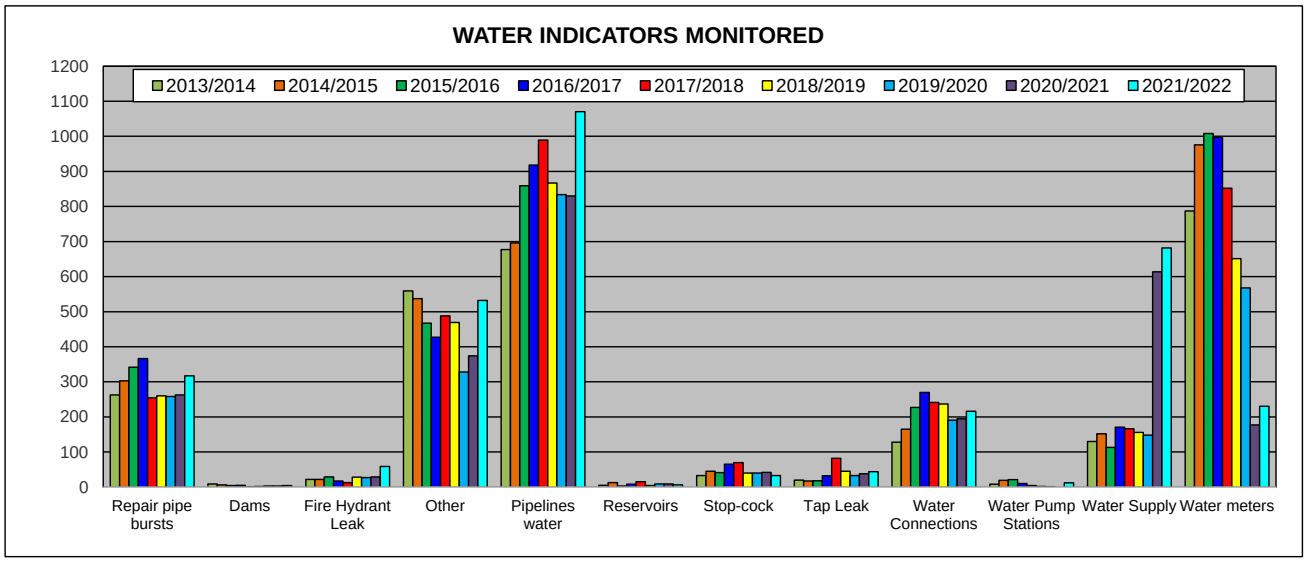


Figure C.9.2: Water indicators recorded for the last nine financial years.

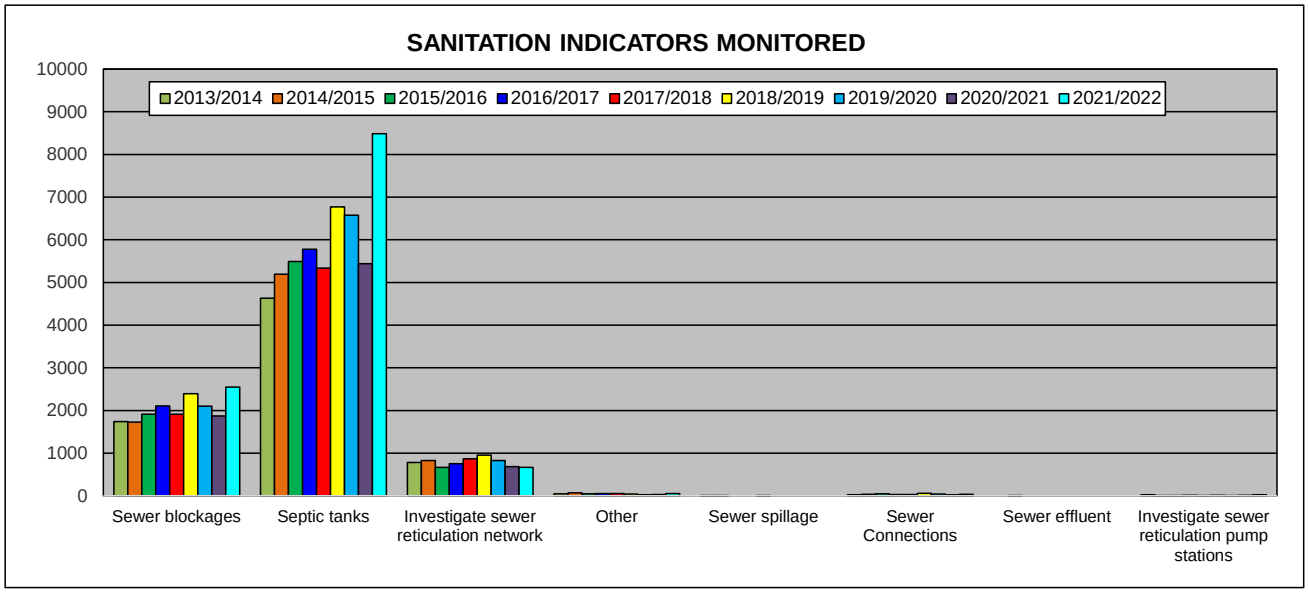


Figure C.9.3: Sanitation indicators recorded for the last nine financial years.

The table below gives an overview of the water customer services and maintenance work for the different areas for the last five financial years.

Table C.9.3: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work

Service	Indicator	Abbotsdale	Chatsworth	Darling	Kalbaskraal	Koringberg	Malmesbury	Moorrees-burg	Farms	Onggegund (PPC)	Riebeek Kasteel	Riebeek Wes	Riverlands	Yzerfontein	Total
Repair pipe bursts	Repair of burst water pipelines	3	19	20	7	1	157	19	1	6	33	20	24	7	**317**
Dams	Inspect / Repair faults at dams	0	0	0	1	0	3	0	0	0	0	0	0	0	**4**
Fire Hydrant Leak	Inspect / repair leaking hydrants	0	3	5	0	0	30	17	0	0	2	0	2	0	**59**
Other	Other water complaints (Not specified)	14	39	86	15	7	267	66	5	0	7	7	12	7	**532**
Pipelines water	Inspect / repair of faulty water pipelines	20	43	97	21	16	566	188	3	6	32	19	42	17	**1 070**
Reservoirs	Inspection of reservoirs and work carried out	0	0	0	1	0	5	0	0	0	0	0	0	0	**6**
Stop-cock	Inspect / Repair leaking stop-cocks	0	0	1	0	3	3	26	0	0	0	0	0	0	**33**
Tap Leak	Inspect / Repair leaking taps	1	0	4	3	0	27	7	0	0	0	0	0	2	**44**
Water Connections	New / Inspections and work carried out at water connections	6	31	5	6	5	92	21	0	0	9	8	0	33	**216**
Water Pump Stations	Inspections and work carried out at water PS	0	1	0	5	0	4	0	0	0	0	0	2	0	**12**
Water Supply	Faulty water supply	23	47	125	19	12	279	112	1	1	16	4	24	19	**682**
Water meters	Inspect / Test / Repair / Install	11	16	10	17	1	128	16	1	2	11	8	4	5	**230**
Total for 2021/2022		**78**	**199**	**353**	**95**	**45**	**1 561**	**472**	**11**	**15**	**110**	**66**	**110**	**90**	**3 205**
Repair pipe bursts	Repair of burst water pipelines	10	11	18	8	1	114	23	0	3	21	13	32	9	**263**
Dams	Inspect / Repair faults at dams	0	0	0	0	0	2	1	0	0	0	0	0	0	**3**
Fire Hydrant Leak	Inspect / repair leaking hydrants	1	2	4	0	0	14	5	0	2	1	0	0	0	**29**
Other	Other water complaints (Not specified)	16	12	80	3	1	190	47	1	0	8	4	7	5	**374**
Pipelines water	Inspect / repair of faulty water pipelines	25	30	89	23	7	477	109	0	2	16	6	35	11	**830**
Reservoirs	Inspection of reservoirs and work carried out	1	1	0	0	0	6	0	0	0	0	0	0	1	**9**
Stop-cock	Inspect / Repair leaking stop-cocks	0	0	10	0	1	0	30	0	0	0	0	0	1	**42**
Tap Leak	Inspect / Repair leaking taps	0	1	3	0	0	28	5	0	0	1	0	0	0	**38**
Water Connections	New / Inspections and work carried out at water connections	9	35	10	11	0	87	10	0	0	8	3	2	20	**195**
Water Pump Stations	Inspections and work carried out at water PS	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Water Supply	Faulty water supply	21	40	85	20	22	249	115	0	0	17	9	26	10	**614**
Water meters	Inspect / Test / Repair / Install	5	15	16	9	2	100	14	1	0	7	5	1	2	**177**
Total for 2020/2021		**88**	**147**	**315**	**74**	**34**	**1 267**	**359**	**2**	**7**	**79**	**40**	**103**	**59**	**2 574**
Repair pipe bursts	Repair of burst water pipelines	6	14	14	8	-	126	19	-	5	28	14	19	5	**258**

Table C.9.3: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Dams	Inspect / Repair faults at dams	-	-	-	-	-	3	-	-	-	-	-	-	-	**3**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	-	2	2	-	19	2	-	-	1	-	1	-	**27**
Other	Other water complaints (Not specified)	10	5	52	6	3	185	42	-	-	5	5	8	7	**328**
Pipelines water	Inspect / repair of faulty water pipelines	15	40	71	21	7	497	79	3	6	19	21	45	10	**834**
Reservoirs	Inspection of reservoirs and work carried out	-	-	-	2	-	5	-	-	-	1	-	1	-	**9**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	9	-	1	4	24	-	-	-	-	-	2	**40**
Tap Leak	Inspect / Repair leaking taps	-	-	4	-	-	25	2	-	-	1	-	-	1	**33**
Water Connections	New / Inspections and work carried out at water connections	10	23	13	5	1	87	8	-	2	6	2	-	34	**191**
Water Pump Stations	Inspections and work carried out at water PS	-	1	-	-	-	-	-	-	-	-	-	-	-	**1**
Water Supply	Faulty water supply	9	7	3	9	3	74	14	-	1	9	3	5	11	**148**
Water meters	Inspect / Test / Repair / Install	29	28	95	10	13	248	85	-	2	16	9	26	7	**568**
Total for 2019/2020		**79**	**118**	**263**	**63**	**28**	**1 273**	**275**	**3**	**16**	**86**	**54**	**105**	**77**	**2 440**
Repair pipe bursts	Repair of burst water pipelines	10	18	15	11	1	77	28	2	4	24	33	19	18	**260**
Dams	Inspect / Repair faults at dams	-	-	-	-	-	-	1	-	-	-	1	-	-	**2**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	1	-	-	1	16	9	-	1	-	-	-	-	**28**
Other	Other water complaints (Not specified)	17	15	111	13	3	195	73	-	2	14	6	6	14	**469**
Pipelines water	Inspect / repair of faulty water pipelines	41	47	91	31	11	424	86	-	7	21	28	56	24	**867**
Reservoirs	Inspection of reservoirs and work carried out	-	-	-	-	-	2	-	-	-	1	-	1	-	**4**
Stop-cock	Inspect / Repair leaking stop-cocks	-	1	11	-	2	3	21	-	-	-	-	-	2	**40**
Tap Leak	Inspect / Repair leaking taps	-	-	4	-	-	36	4	-	-	-	1	-	-	**45**
Water Connections	New / Inspections and work carried out at water connections	14	29	19	6	1	73	7	1	-	12	9	3	63	**237**
Water Pump Stations	Inspections and work carried out at water PS		-	-	-	-	2	-	-	-	-	-	-	-	**2**
Water Supply	Faulty water supply	22	8	6	9	2	71	7	4	-	12	7	4	4	**156**
Water meters	Inspect / Test / Repair / Install	24	57	99	26	9	237	101	1	4	22	13	40	18	**651**
Total for 2018/2019		**128**	**176**	**356**	**96**	**30**	**1 136**	**337**	**8**	**18**	**106**	**98**	**129**	**143**	**2 761**
Repair pipe bursts	Repair of burst water pipelines	12	10	28	25	1	70	23	2	6	26	23	18	10	**254**
Dams	Inspect / Repair faults at dams	-	-	-	1	-	-	-	-	-	-	-	-	-	**1**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	-	2	1	-	8	1	-	-	1	-	-	-	**13**
Other	Other water complaints (Not specified)	14	10	70	7	5	205	146	-	1	13	8	4	5	**488**

Table C.9.3: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Pipelines water	Inspect / repair of faulty water pipelines	44	37	146	41	8	483	123	2	8	28	10	33	26	**989**
Reservoirs	Inspection of reservoirs and work carried out	-	-	1	4	2	4	-	-	1	2	1	-	-	**15**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	10	1	3	12	44	-	-	-	-	-	-	**70**
Tap Leak	Inspect / Repair leaking taps	2	-	2	-	-	69	7	-	-	-	1	-	1	**82**
Water Connections	New / Inspections and work carried out at water connections	22	36	6	12	3	79	8	1	1	10	4	1	58	**241**
Water Pump Stations	Inspections and work carried out at water PS	-	-	-	2	-	1	-	-	-	-	-	1	-	**4**
Water Supply	Faulty water supply	26	7	3	10	1	82	10	2	2	7	9	6	1	**166**
Water meters	Inspect / Test / Repair / Install	36	41	125	22	27	362	156	1	4	19	17	38	4	**852**
Total for 2017/2018		**156**	**141**	**393**	**126**	**50**	**1 375**	**518**	**8**	**23**	**106**	**73**	**101**	**105**	**3 175**

The table below gives an overview of the sanitation customer services and maintenance work for the different areas for the last five financial years.

C.9.4: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	57	47	569	43	40	797	715	8	32	130	77	29	7	2 551
Septic tanks	Empty septic tanks	22	793	187	528	463	68	443	1 047	0	252	796	29	3 855	8 483
Investigate sewer reticulation network	Investigate and clear blockages in network	34	11	131	16	6	270	81	11	4	46	33	5	21	669
Other	Other sewer complaints (Not specified)	2	0	6	2	0	20	10	0	0	7	0	0	5	52
Sewer spillage	Investigate and clean sewer spillages	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sewer Connections	Installation of sewer connections	4	0	6	0	0	3	8	0	0	11	3	0	0	35
Sewer effluent	Investigate effluent distribution for irrigation purposes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	1	0	1	3	0	14	0	0	0	6	1	1	0	27

C.9.4: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Total for 2021/2022		**120**	**851**	**900**	**592**	**509**	**1 172**	**1 257**	**1 066**	**36**	**452**	**910**	**64**	**3 888**	**11 817**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	41	14	442	24	12	597	574	2	20	63	55	23	3	1 870
Septic tanks	Empty septic tanks	20	541	129	422	310	47	288	737	0	148	481	10	2 306	5 439
Investigate sewer reticulation network	Investigate and clear blockages in network	25	6	129	15	1	280	110	17	8	51	19	9	14	684
Other	Other sewer complaints (Not specified)	4	1	2	5	0	10	5	0	0	1	1	1	1	31
Sewer spillage	Investigate and clean sewer spillages	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sewer Connections	Installation of sewer connections	3	0	6	2	0	7	4	0	0	4	0	0	0	26
Sewer effluent	Investigate effluent distribution for irrigation purposes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	2	0	0	1	0	7	0	0	0	1	0	3	0	14
Total for 2020/2021		**95**	**562**	**708**	**469**	**323**	**948**	**981**	**756**	**28**	**268**	**556**	**46**	**2 324**	**8 064**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	57	11	446	39	24	690	589	2	18	121	75	18	12	2102
Septic tanks	Empty septic tanks	13	483	250	411	392	56	308	794	-	238	679	7	2 946	6 577
Investigate sewer reticulation network	Investigate and clear blockages in network	32	15	136	22	1	375	105	12	9	53	23	16	31	830
Other	Other sewer complaints (Not specified)	-	-	5	1	-	13	2	1	1	2	-	-	1	26
Sewer spillage	Investigate and clean sewer spillages	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sewer Connections	Installation of sewer connections	6	-	8	-	-	11	5	-	-	10	2	1	-	43
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	-	-	-	4	-	2	-	-	-	1	-	-	-	7

C.9.4: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Total for 2019/2020		**108**	**509**	**845**	**477**	**417**	**1 147**	**1 009**	**809**	**28**	**425**	**779**	**42**	**2 990**	**9 585**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	61	21	485	55	28	819	668	5	22	128	81	19	5	2 397
Septic tanks	Empty septic tanks	21	464	262	451	400	46	394	869	-	243	646	6	2 969	6 771
Investigate sewer reticulation network	Investigate and clear blockages in network	38	13	168	19	7	415	124	15	14	56	32	24	32	957
Other	Other sewer complaints (Not specified)	7	1	3	2	-	17	5	-	-	3	1	1	1	41
Sewer spillage	Investigate and clean sewer spillages	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sewer Connections	Installation of sewer connections	10	1	11	1	-	16	3	-	-	8	9	-	-	59
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	-	4	-	2	-	5	-	-	1	2	0	-	-	14
Total 2018/2019		**137**	**504**	**929**	**530**	**435**	**1 318**	**1 194**	**889**	**37**	**440**	**769**	**50**	**3 007**	**10 239**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	49	9	455	40	13	614	521	3	22	71	90	23	-	**1 910**
Septic tanks	Empty septic tanks	23	358	206	378	331	131	323	519	-	179	542	4	2 341	**5 335**
Investigate sewer reticulation network	Investigate and clear blockages in network	23	12	189	9	2	351	100	14	8	60	30	22	49	**869**
Other	Other sewer complaints (Not specified)	5	2	1	-	-	30	7	-	-	3	4	-	2	**54**
Sewer spillage	Investigate and clean sewer spillages	-	-	-	-	-	4	-	-	-	-	-	-	-	**4**
Sewer Connections	Installation of sewer connections	7	-	4	-	-	11	2	-	-	4	3	-	-	**31**
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	-	-	-	1	1	5	-	-	-	2	-	-	-	**9**
Total 2017/2018		**107**	**381**	**855**	**428**	**347**	**1 146**	**953**	**536**	**30**	**319**	**669**	**49**	**2 392**	**8 212**

The table below gives an overview of the number of tanks pumped during the last six financial years for the various towns.

Table C.9.5: Number of tanks pumped										
Town	2021/2022					2020/2021	2019/2020	2018/2019	2017/2018	2016/2017
	Pump 1	Pump 2	Pump 3	After Hours	Total	Total	Total	Total	Total	Total
Abbotsdale	14	8	0	0	**22**	24	13	17	25	25
Chatsworth	662	117	50	0	**829**	614	484	401	364	331
Darling	127	30	12	0	**169**	144	214	239	190	270
Kalbaskraal	428	100	10	0	**538**	556	392	368	365	384
Koringberg	317	123	21	0	**461**	374	373	374	306	347
Malmesbury	31	7	5	0	**43**	51	40	32	74	37
Moorreesburg	348	70	8	0	**426**	379	302	345	342	279
Farms / Other	765	243	123	2	**1 133**	952	834	815	576	568
Riebeek Kasteel	134	97	6	0	**237**	229	226	212	188	130
Riebeek Wes	491	231	68	0	**790**	703	672	541	538	571
Riverlands	22	5	2	0	**29**	17	7	4	5	15
Yzerfontein	2 750	672	359	5	**3 786**	3 186	2 736	2 676	2 202	2 623
Department	85	58	115	1	**259**	177	289	128	173	153
Total	**6 174**	**1 761**	**779**	**8**	**8 722**	**7 406**	**6 582**	**6 152**	**5 348**	**5 733**

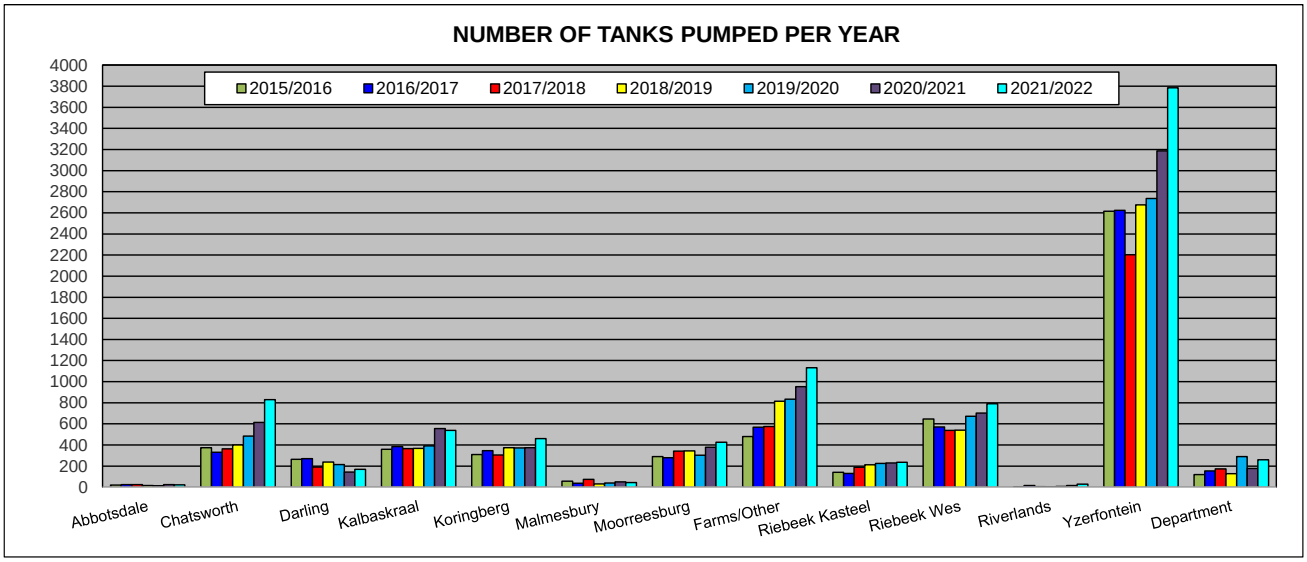


Figure C.9.4: Number of sewage tanks pumped per year for the different areas

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.

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

- Service Delivery Agreement between the West Coast District Municipality and Swartland Municipality. A Monitoring Committee with the following powers and functions are in place:
  - To co-ordinate integrated development planning in respect of the services;
  - To monitor the performance of the District Municipality in respect of service levels;

- To monitor the implementation of this agreement;
- To provide a forum for the local municipalities to interact with the District Municipality;
- To accept delivery, on behalf of the Local Municipalities, of reports which the District Municipality is required to produce in terms of this agreement;
- To consider and make recommendations to the District Municipality on the District Municipality's high-level budget and key performance indicators and targets;
- In consultation with the District Municipality, to handle, manage and make recommendations to the parties in respect of any matter related to the services which is not dealt with by this agreement;
- To ensure that the expenses incurred by the District Municipality in respect of the services do not exceed the amount allocated therefore in the District Municipality's annual budget;
- To formulate a written document that records the rules and procedures, which will be binding on itself, regulating the manner and legislative obligations, powers and functions to the Monitoring Committee.

- Protection at points of abstraction such as Paardenberg Dam and the boreholes (Abstraction Management).
- Protection and maintenance of the distribution systems. This includes ensuring an adequate disinfectant residual at all times, rapid response to pipe bursts and other leaks, regular cleaning of reservoirs, keeping all delivery points tidy and clean, etc.

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

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

D. APPROVAL AND PUBLICATION RECORD

This Annual WSDP Performance- and Water Services Audit Report is for the 2021/2022 Financial Year and is hereby approved for submission to the Minister of the Department of Water and Sanitation, the Minister for the Department of Cooperative Governance, the Western Cape Province and to SALGA, as required by the Water Services Act, 1997.

The Municipality will endeavour to publicise a summary of the report.

This report will be available for inspection at the offices of the municipality and is available on the Municipality's website. A Copy of the report is obtainable at a fee as determined by the Municipality

RECOMMENDED:

Signature
Name: Vacant
Title: Senior Manager: Solid Waste and Trade Services

27/10/2022
Date

Signature
Name: L Zikmann
Title: Director Civil Engineering Services

27/10/2022
Date

APPROVED:

Signature
Name: J Scholtz
Title: Municipal Manager

27/10/2022
Date

REFERENCES

- SA Census Data (2011), Community Profiles.
- Water Services Act, Act 108 of 1997. Regulations under Section 9 of the Water Services Act, which include the water services audit as Section 10 of the Guidelines for Compulsory National Standards.
- DWS's Annual Water Services Development Plan Performance- and Water Services Audit Report Template, August 2014.
- DWS's 2014 Blue Drop Report and 2022 Blue Drop PAT Results.
- DWS's 2022 Green Drop Report.
- Swartland Municipality's Municipal Services Strategic Assessment (MuSSA) Report, 2022, DWS.
- DWS's All Towns Reconciliation Strategy Documents for each of the towns in Swartland Municipality's Management Area, March 2016.
- Swartland Municipality's Water Services Audit Report for 2020/2021, Final Document, iX engineers.
- Swartland Municipality's Operational and Maintenance Budgets and Tariffs.
- Asset Register for Water and Sanitation Infrastructure Assets, June 2022.
- SDBIP of Swartland Municipality for 2021/2022.
- Socio-Economic Profile for Swartland Municipality, Provincial Treasury, 2021.
- Swartland Municipality: Resource Augmentation Study – Desktop Study, May 2021, iX engineers.
- Process Audit Reports for the WWTWs for the period July 2018 to June 2020, May 2021, Chris Swartz Water Utilization Engineers.

ATTENDANCE REGISTER (DISCUSSION OF DRAFT DOCUMENT)

iX engineers
Infrastructure Excellence

ATTENDANCE REGISTER

Meeting Subject	21/22 Water Services Audit Report – Discussion of Draft Report		
Location Of Meeting	Swartland Municipality – Engineering Department	**Document No**	
Chaired By	J Human	**Date of Meeting**	25 October 2022
Recorded By	iX engineers	**Time Start**	14:00
		Time Finish	15:30

Attended by:

Representative	Name of Firm	Postal Address	Contact Details				Signature
1. Margot Adonis	DWS	52 Voortrekker Road Bellville	Tel No	021 941 6334	E-mail	AdonisM@dws.gov.za	
			Cell No	0635053636	Fax No		
2. Nkosinathi Mkonto	DWS	52 Spectrum Building Bellville	Tel No	0219416057	E-mail	mkonton@dws.gov.za	
			Cell No	0823702978	Fax No		
3. Zolile Simawo	DWS-WC	52 Voortrekker Road Bellville	Tel No	0219416251	E-mail	simawoz@dws.gov.za	
			Cell No	0837176464	Fax No		
4 Clarke Fortuin	Swartland	1 Church Street Malmesbury	Tel No	082 053 8192	E-mail	dirksec@swartland.org.za	
			Cell No		Fax No		

iX engineers
Infrastructure Excellence

Representative	Name of Firm	Postal Address	Contact Details				Signature
5. J HUMAN	IX ENGINEERS	PO Box 398 BELLVILLE	Tel No	021-9123000	E-mail	jaco.h@ixengineers.co.za	
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6.			Tel No		E-mail		
			Cell No		Fax No		
7.			Tel No		E-mail		
			Cell No		Fax No		
8.			Tel No		E-mail		
			Cell No		Fax No		
9.			Tel No		E-mail		
			Cell No		Fax No		
10.			Tel No		E-mail		
			Cell No		Fax No		
11.			Tel No		E-mail		
			Cell No		Fax No		

ANNEXURE A

Monthly number of consumers per category and per town for the last ten financial years

Monthly volume of billed metered consumption per category and per town for the last ten financial years

IWA Water balance models for the various distribution systems

Rainfall and WWTWs flows and capacities

WTWs capacities

ANNEXURE B

No Drop Spreadsheets and ILI

ANNEXURE C

Future Water Requirement Projections for the various distribution systems

ANNEXURE D

Water Quality Compliance Sample Results

Final Effluent Quality Compliance Sample Results

Industrial Effluent Quality Compliance Sample Results

ANNEXURE E

DWS's scorecard for assessing the potential for WC/WDM efforts

ANNEXURE F

Water and Sanitation Operational and Maintenance Budget

ANNEXURE G

Swartland Municipality's Approved Organogram