BERGRIVIER MUNICIPALITY

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Water Services Development Plan
Executive Summary

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

2022-2027

DRAFT REPORT

June 2025

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PROJECT P10158: BERGRIVIER MUNICIPALITY'S WSDP FOR 2022-2027 EXECUTIVE SUMMARY

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BERGRIVIER MUNICIPALITY

WSDP FOR 2022-2027: EXECUTIVE SUMMARY

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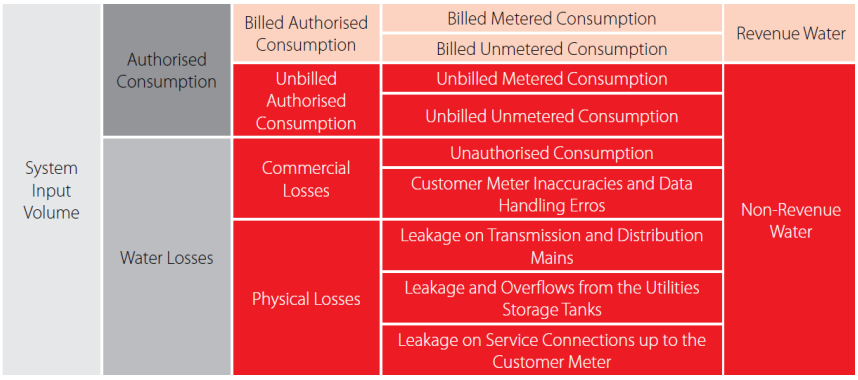
ABBREVIATIONS AND DEFINITIONS

AADD	Average Annual Daily Demand
AMP	Asset Management Plan
AMR	Automatic Meter Reading
BD	Blue Drop
BDRR	Blue Drop Risk Rating
BGWMA	Breede-Gouritz Water Management Area
BH	Borehole
BLM	Bergrivier Local Municipality
BMC	Billed Metered Consumption
BNR	Biological Nutrient Removal
BOWMA	Breede-Olifants Water Management Area
CAFES	Conserving, Adequate, Fair, Enforceable and Simple
CAP	Corrective Action Plan
CCT	Chlorine Contact Tank
CCTV	Closed-Circuit Television
CMA	Catchment Management Agency
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
DBSA	Development Bank of Sout Africa
DCoG	Department of Cooperative Government
DMC	Disaster Management Centre
DMP	Disaster Management Plan
DRC	Depreciated Replacement Cost
DRM	Disaster Risk Management
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EHP	Environmental Health Practitioner
EIA	Environmental Impact Assessment
FY	Financial Year
GAMAP	General Accepted Municipal Accounting Practice
GD	Green Drop
GDIP	Green Drop Improvement Plan
HDPE	High-density Polyethylene
HIV	Human Immunodeficiency Virus
HTH	High Test Hypochlorite
IAMP	Infrastructure Asset Management Plan
IBT	Inclining Block Tariff
ICT	Information and Communication Technology
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
ILI	Infrastructure Leakage Index
IMIS	Integrated Management Information System
IMP	Incident Management Protocol
IMQS	Infrastructure Management Query System
IRIS	Integrated Regulatory Information System
IRP	Integrated Resource Planning
IWA	International Water Association
Kl	Kilolitre

Kl/d	Kilolitre per Day
KPI	Key Performance Indicator
l/c/d	Litre per Capita per Day
l/p/d	Litre per Person per Day
LGTAS	Local Government Turn Around Strategy
LM	Local Municipality
m³	Cubic Metre
m³/a	Cubic Metre per Annum
m³/day	Cubic Metre per Day
MCC	Motor Control Centre
MFMA	Municipal Finance Management Act
MISA	Municipal Infrastructure Support Agent
Ml	Mega Litre
Ml/a	Mega Litre per Annum
Ml/d	Mega Litre per Day
Mm³/a	Million Cubic Metre per Annum
MNF	Minimum Night Flow
mSCOA	Municipal Standard Chart of Accounts
MTEF	Medium-Term Expenditure Framework
MTREF	Medium-Term Revenue Expenditure Framework
MuSSA	Municipal Strategic Self-Assessment
NRW	Non-Revenue Water
O&M	Operation and Maintenance
PC	Process Controller
PDD	Peak Daily Demand
PRV	Pressure Reducing Valve
PS	Pump Station
RDP	Reconstruction and Development Programme
RO	Reverse Osmosis
RUL	Remaining Useful Life
SALGA	South African Local Government Association
SANS	South African National Standard
SCADA	Supervisory Control and Data Acquisition
SCM	Supply Chain Management
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SIV	System Input Volume
SST	Secondary Settling Tank
TWL	Top Water Level
WARMS	Water use Authorisation and Registration Management System
WaSP	Water Safety Plan
WC/WDM	Water Conservation / Water Demand Management
WCDM	West Coast District Municipality
WCWSS	Western Cape Water Supply System
WDM	Water Demand Management
WESS	Water Efficient Sanitation Solutions
WMA	Water Management Area
WSA	Water Services Authority
WSDP	Water Services Development Plan

WSDP-IDP	Water Services Development Plan – Integrated Development Plan
WSI	Water Services Institution
WSIG	Water Services Infrastructure Grant
WSP	Water Services Provider
WSS	Water Supply System
WTP	Water Treatment Plant
WTW	Water Treatment Works
W_2RAP	Wastewater Risk Abatement Plan
WWTW	Waste Water Treatment Works

KEY TERMS AND INTERPRETATIONS

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

KEY TERMS AND INTERPRETATIONS

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

KEY TERMS AND INTERPRETATIONS

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

WSDP FOR 2022-2027: EXECUTIVE SUMMARY

Introduction

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

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

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

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

- All WSAs must develop a WSDP.
- A new plan must be developed every five years and the plan should be updated as necessary and appropriate in the interim years.
- The WSDP must be integrated with the IDP of the municipality, as required in terms of the Municipal Systems Act.
- The WSDP must integrate water supply planning with sanitation planning.
- The WSDP must integrate technical planning with social, institutional, financial and environmental planning. The planning of capital expenditures must also be integrated with the associated operation and maintenance requirements and expenditures.
- The WSDP must be informed by the business plans developed by water services providers and with the plans of any regional water services providers, as relevant.
- The plan must take into account the impact of HIV/Aids on future water demand.
- The WSDP must integrate with the catchment management strategy.
- The planning process must take into account the views of all important stakeholders, including communities, through a consultative and participatory process. Every effort must be made to ensure the adequate and meaningful participation of women in consultation forums.
- The draft plan must be made available for public and stakeholder comment and all comments made must be considered when preparing the final plan.
- The contents of the WSDP must be communicated to all important stakeholders, including the DWS.

- A WSA must report annually and in a public way on progress in implementing the plan (Annual WSDP Performance- and Water Services Audit Report).

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

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

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

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

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

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

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

SECTION A: STATUS QUO OVERVIEW

Bergrivier Municipality is situated within the newly established Breede-Olifants Water Management Area. The Municipality is located within the West Coast Region of the Western Cape Province, in which the following Local Municipalities are also located:

- Matzikama Municipality;
- Cederberg Municipality;
- Swartland Municipality; and
- Saldanha Bay Municipality.

The Municipality comprises of seven (7) urban settlements, approximately 40 kilometres of coastline and a vast rural area. The main urban settlements that constitute the Municipality are Piketberg, which is the administrative head office, Porterville, Velddrif (which include Port Owen, Laaiplek and Noordhoek), Dwarskersbos, Eendekuil, Aurora and Redelinghuys. The rural settlements of Goedverwacht and Wittewater are also located within the Municipality's Management Area, but falls under the Moravian Church. Bergrivier Municipality only provides a support service to these two settlements. Another settlement, De Hoek, also falls within the municipal boundary, but is also not serviced in respect of water by the Municipality.

The Municipality consists of seven (7) individual wards and is the only WSA within this municipal area. It is also the Water Services Provider (WSP). Bulk potable water is however provided to the towns of Velddrif and Dwarskersbos by the West Coast District Municipality through their Withoogte bulk water distribution system. The bulk potable water supplied from the Withoogte WTW is augmented by abstraction of groundwater from the Langebaan Road Groundwater Aquifer System. The bulk distribution scheme is a cross-border scheme and supply water to Bergrivier Municipality, Swartland Municipality and Saldanha Bay Municipality. A Service Level Agreement between the West Coast District Municipality and Bergrivier Municipality is in place for the provision of bulk potable water to these two towns. Bergrivier Municipality's responsibility as WSA also extends to the rural areas within its Municipal boundary.

The West Coast District Municipality supplies bulk potable water to Velddrif and Dwarskersbos. Bergrivier Municipality provides bulk potable water to all the other towns and settlements, except for Wittewater and Goedverwacht (Moravian Church).

Velddrif: Potable water is supplied to Velddrif by the West Coast District Municipality as part of the Withoogte Regional Scheme, which forms part of the Western Cape Water Supply System. The Voëlvlei Dam is the main storage dam to supply water to this part of the system, as well as the Berg River. Water can also be released from the Berg River Dam in the upper part of the Berg River should it be necessary. Raw water is pumped from the Misverstand Weir to the Withoogte WTW for treatment, before distribution to the various West Coast District Municipality's consumers. The potable water supplied by the West Coast District Municipality to Velddrif is stored in three reservoirs in Velddrif, with a total storage capacity of 10.000 Ml. There are also two water towers with a total storage capacity of 0.500 Ml in Velddrif.

The water reticulation network consists of 87.792 km of water pipelines. There is only one bulk potable water pump station at the reservoir terrain.

Velddrif is partly serviced with a formal waterborne sewer drainage system. The properties not connected to the sewer drainage system are supplied with septic tanks (Approximately 15% - 25%). The drainage system consists of 33.988 km of gravity pipelines and 15.507 km of rising pipelines. There are fifty-one (51) sewer pump stations in Velddrif. The capacity of the Activated Sludge WWTW is 1.995 Ml/day.

Dwarskersbos: Potable water is also supplied to Dwarskersbos from the Withoogte WTW. The potable water is stored in two reservoirs in Dwarskersbos, with a total storage capacity of 0.900 Ml and a water tower with a capacity of 0.228 Ml.

The water reticulation network consists of 15.912 km of water pipelines. There is only one bulk potable water pump station at the reservoir terrain.

Dwarskersbos is partly serviced with a formal waterborne sewer drainage system. The properties not connected to the sewer drainage system are supplied with septic tanks (Approximately 30%-40%). The reticulation system consists of 6.261 km of gravity pipelines and 5.212 km of rising pipelines. There are seven (7) sewer pump stations in Dwarskersbos. The capacity of the Oxidation pond system is 0.294 Ml/day.

Porterville: Bulk raw water is supplied to the Porterville WTW from two springs (South and North) and the Voorberg Stream. The raw water flows through a splitter box and a balancing tank to the WTW and the overflow water is stored in a dam just below the WTW from where it can also be pumped back to the WTW. A new bulk raw water pipeline was constructed during the 2015/2016 financial year to supply raw water to the farmers, according to a Service Level Agreement. The WTW consists of four pressure sand filters. The potable water is stored in the town's main reservoir with a storage capacity of 3.250 Ml from where it gravitates to the town and the two Monte Bertha reservoirs, with a total storage capacity of 0.735 Ml.

The water reticulation network consists of 40.481 km of water pipelines. There is one raw water pump station that pump the raw water from the dam back to the WTW and one potable booster water pump station at the Monte Bertha reservoirs.

Porterville is fully serviced with a formal waterborne sewer drainage system. The drainage system consists of 28.075 km of gravity sewer pipelines. The capacity of the Activated Sludge WWTW is 1.500 Ml/day.

Piketberg: Bulk raw water is primarily supplied to Piketberg from the Berg River. Water is pumped from the Berg River pump station to the Piketberg WTW, where the water is treated and the final water is pumped to the town. Piketberg is allowed to abstract up to 0.704 million m^3/a from the Berg River. Bulk water can also be supplied to Piketberg from the Voëlvlei Spring. There was no supply to Piketberg from this spring during the 2023/2024 financial year. Potable water is stored in three reservoirs with a total storage capacity of 9.700 Ml before it is distributed to the consumers in Piketberg.

The water reticulation network consists of 75.343 km of water pipelines. There is one raw water pump station that pump the raw water from the Berg River to the WTW, two bulk potable water pump stations that pump the water from the WTW to the town's reservoirs, one water pump station that pump the raw water from the Voëlvlei Spring to the reservoir and one booster pump station for the internal water network.

Piketberg is fully serviced with a formal waterborne sewer drainage system. The sewer drainage system consists of 47.166 km of gravity pipelines and 0.888 km of rising pipelines. There are only two sewer pump stations. The capacity of the Activated Sludge WWTW is 4.150 Ml/day.

Aurora: Bulk raw water supply to Aurora is from four production boreholes. The water is pumped from the boreholes to the Aurora WTW for treatment. The WTW consists of ten pressure sand filters and disinfection is with Hypochlorous Acid. The treated water from the WTW is pumped to the town's two reservoirs with a total storage capacity of 0.550 Ml. The water gravitates from the two reservoirs to the consumers in Aurora.

The water reticulation network consists of 15.599 km of water pipelines. There is one raw water pump that pump the raw water through the pressure filters and one potable water pump that pump the water from the WTW to the two reservoirs.

There is no WWTW or formal sewer drainage system in Aurora and the houses are supplied with septic tanks.

Eendekuil: Bulk raw water gravitates to the Eendekuil WTW from two raw water storage dams (Capacity of 64 Ml) outside the town. The drainage to the dams is from the Waboomfontein spring. The supply from the dams can also be supplemented with groundwater from one borehole outside the town. There are two pressure sand filters on the bulk supply pipeline to the WTW (Package Plant). Treated water from the WTW is stored in a 0.400 Ml reservoir form where it gravitates to the consumers in Eendekuil.

The water reticulation network consists of 20.843 km of water pipelines. There are no water pump stations in Eendekuil.

Eendekuil is partly serviced with a formal waterborne sewer drainage system. The properties not connected to the sewer drainage system are supplied with septic tanks (Approximately 25% - 35%). The drainage system consists of 2.359 km of gravity pipelines and 1.452 km of rising pipelines. There is only one (1) sewer pump station in Eendekuil. The capacity of the Oxidation Pond System is 0.140 Ml/day.

Redelinghuys: Bulk raw water gravitates to the Redelinghuys WTW from the Matroosfontein Spring via a 315mm diameter pipeline. The WTW consists of three pressure sand filters, with sodium hypochlorite and lime dosing. Final treated water from the WTW is pumped to the two storage reservoirs with a total capacity of 0.440 Ml. A booster pump station supply the water from the reservoirs to the consumers in Redelinghuys.

The water reticulation network consists of 11.823 km of water pipelines. There is one raw water pump station that pump the raw water through the pressure filters to the reservoirs and one booster pump station at the two reservoirs.

There is no WWTW or formal sewer drainage system in Redelinghuys and the houses are supplied with septic tanks.

Wittewater: The town relies on surface water supplied from a local mountain stream. Groundwater is also pumped from two boreholes to the WTW. The WTW consists of three pressure sand filters that treat the raw water. The water is disinfected with HTH Granular in the two 0.050 Ml reservoirs at the WTW, before it is pumped to the town's main storage reservoir with a storage capacity of 0.350 Ml.

The water reticulation network consists of 6.645 km of water pipelines. There is one bulk potable water pump station that pump the potable water from the WTW to the 0.350 Ml reservoir.

There is no WWTW or formal sewer drainage system in Wittewater and the houses are supplied with either septic or conservancy tanks or urine diversion toilets.

Goedverwacht: Raw water is abstracted from the Riet River and distributed via an old asbestos pipeline and a new HDPE pipeline to the WTW. The WTW consists of four pressure sand filters. From the WTW the treated water is distributed to four reservoirs, with a total capacity of 0.626 Ml. The water is disinfected at the reservoirs with HTH granular. Potable water gravitates from the four reservoirs to the consumers in Goedverwacht.

The water reticulation network consists of 16.381 km of water pipelines. There is one raw water pump station that pump the raw water through the pressure sand filters to the two high level reservoirs.

There is no WWTW or formal sewer drainage system in Goedverwacht and the houses are supplied with either septic or conservancy tanks or urine diversion toilets.

Physical Perspective:

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

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

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

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

Bergrivier Municipality's Adaptation Priority Action Plan for the Water Sector, as indicated in Bergrivier Municipality's Climate Change Response Strategy May 2024, was indicated as follows:

Table A.1: Adaptation Priority Action Plan for Water Sector in Bergrivier Municipality

Actions	Activities Required
Current stressors to systems: Water scarcity due to reduced groundwater levels, increasing water demands, variability in rainfall and deteriorating surface water quality. **Climate Change Risk:** Reduced water availability in the municipality. **Goal:** Ensure water security.	
Water Management Strategy	• Review and update the municipal WSDP to integrate the climate change risk on water resources. • Ensure climate considerations are taken into account when developing / revising infrastructure master plans. • Regularly review and update the strategy based on emerging climate data. • Implement emergency response plans for water scarcity periods. • Conduct feasibility studies for alternative water sources such as desalination of saline water sources. • Local Water Sector Plans – to be aligned with the Western Cape Integrated Drought and Water Response Plan.
Water Monitoring	• Implement a groundwater monitoring system. • Monitor stream flow and water levels, particularly for improved infrastructure planning and development. • Install water efficient taps in households, businesses and municipalities that have piped water.
Water Conservation	• Conduct awareness and education campaigns for water conservation. • Encourage rainwater harvesting for flushing toilets, car washing and irrigation. • Provide incentives to install gutters and tanks for rain harvesting in low-income communities.

Table A.1: Adaptation Priority Action Plan for Water Sector in Bergrivier Municipality	
Actions	**Activities Required**
	• Identify water losses in the water supply system and early leak detection mechanisms (within town infrastructure). • Accelerate the removal of alien invasive plant species (especially vegetation) and bug weeds (particularly from around water systems). • Collaborate with DWS and other institutions to establish water consumption targets for all sectors and monitor water use e.g. irrigation.
Conserve and restore aquatic ecosystems	• Protect and preserve wetlands and aquatic systems. • Implement policies that prevent development on wetlands. • Rehabilitate aquatic systems. • Conduct awareness and education campaigns. • Ensure adequate freshwater flow to estuaries as per required ecological reserve determinations.
Flood and stormwater management	• Storm water management plans to be updated with relevant and up to date flooding information and changes in rainfall patterns. • Promote the planting of indigenous vegetation around riverbanks to control runoff. • Rehabilitate riverbanks with natural vegetation. • Provide suitable access to rivers with erosion in mind. • Improve management of storm water. • Investigate alternative use of storm water. • Avoid and remove development within flood risk areas.
Water demand management / Water supply	• Monitor unlawful water use and Institute measures to optimise water consumption patterns. • Implement technologies and policies that enhance water use efficiency across sectors. • Establish a cross-sectoral, inter-departmental governance framework to help integrate and mainstream climate change adaptation into all water related operations.

Floods: One of the climate change threats in some parts of the Western Cape is the likelihood of floods with greater intensity and longer-term impacts. There is likely to be increases in the severity and unpredictability of weather patterns. Flooding and storms are predicted which could have devastating effects on agricultural production. It is important for Bergrivier Municipality to ensure that Stormwater Master Plans are in place for all the towns.

Natural Environment:

Biodiversity in the Bergrivier Municipality is characterized by the wide array of plant and animal species (including mammals, birds, reptiles, amphibians, insects, and invertebrates), as well as the genetic diversity and ecological interactions present within the region. The municipality falls within the Cape Floristic Region, which is recognised as the richest non-tropical biodiversity hotspot globally. The biodiversity within the Bergrivier Municipality provides essential ecosystem services that benefit human well-being.

Biodiversity provides essential ecosystem services that benefit human well-being. These services include air and water purification, pollination, soil fertility, climate regulation, and the provision of food and raw materials. Conservation and protection of biodiversity and habitats are important for maintaining these ecosystem services and ensuring the long-term sustainability of the region.

TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

The tables below gives an overview of the settlements, population and households in Bergrivier Municipality's Management Area for 2023/2024. The number of settlements were done according to the grouping of the different areas in DWS's GeoDatabase.

Table A.1.1: Settlement Summary		
Section	**Value**	**Assessment Score**
1.1 Total Population	81 288	80%
1.2 Total Number of Households (Permanent)	21 855	80%
1.3 Average Household Size	3.72	80%
1.4 Total Number of Settlements (GeoDatabase)	15	80%

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

Table A.1.2: Summary by Settlement Group (Urban / Rural Split)				
Settlement Type	**Settlements**	**Population**	**Households**	**Assessment Score**
Urban	9	44 104	12 750	80%
Rural	6	37 184	9 105	80%
Total	**15**	**81 288**	**21 855**	**80%**

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

Table A.1.3: Assessment Score by Settlement Type						
Main Type	**Settlement Type**	**Settlements**	**Population**	**Households**	**Avg. Household Size**	**Assessment Score**
Rural	Farming	1	30 572	7 367	4.15	80%
Rural	Rural - Small Village <= 5000	5	6 612	1 738	3.80	80%
Urban	Urban - Formal Town	9	44 104	12 750	3.46	80%
Total		**15**	**81 288**	**21 855**	**3.72**	**80%**

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

Table.A.1.4: Amenities Summary (Health and Educational facilities)		
Amenity Type	**Number of Amenities**	**Assessment Score**
Health Facilities	10	80%
Educational facilities	21	60%

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

The 2011 Census data indicated that there was an extensive migration into the Municipal Area. The population figure for Bergrivier Municipality in 2001 was 46 327 persons. This figure increased substantially to 61 898 persons in 2011. The Community Survey of 2016 from Statistics South Africa estimate the 2016 population for Bergrivier Municipality at 67 474 persons and the permanent households at 19 072, at an average household size of 3.54 persons per household.

The published 2022 Census population for Bergrivier Municipality was 70 276 persons (Annual growth rate of 1.2% over the period 2011 to 2022) and the number of permanent households was 20 412.

The 2024 Socio Economic Profile of Bergrivier Municipality includes a population figure of 78 257 persons and a permanent household figure of 20 557 households for 2024.

The 2023/2024 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 projected population figures and the annual population growth percentages, as indicated in the table below, 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 Civil Services and Community Services Departments during January 2014.

Table A.1.5: Estimated future annual population growth percentages, population and households per distribution system			
Distribution System	**Estimated future annual population growth %**	**Projected 2023/2024 population**	**Projected 2023/2024 households**
Porterville	1.50%	8 437	2 330
Piketberg	1.75%	14 870	3 596
Wittewater	0.50%	900	202
Goedverwacht	2.00%	2 510	684
Velddrif	5.00%	19 785	6 505
Dwarskersbos	3.50%	1 012	319
Aurora	1.00%	651	224
Eendekuil	2.00%	1 940	481
Redelinghuys	0.50%	609	148
Farms	1.50%	30 572	7 367
Total	**2.30%**	**81 288**	**21 855**

The current 2023/2024 population for Bergrivier Municipality is therefore estimated at 81 288 persons and the permanent households at 21 855, as indicated in the previous table.

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

Table A.1.6: Water Services Overview (Water)

Settlement Type	2011/2012		2023/2024		Water category										Sanitation category									
	Households	Population	Households	Population	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	Adequate: Formal	Adequate: Informal	Adequate: Sahred Services	Water resources needs only	O&M needs only	Infrastructure needs only	Infrastructure & O&M needs	Infrastructure, O&M & Resource need	No Services: Informal	No Services: Formal
URBAN																								
Metropolitan Area					Adequate			Below RDP					None		Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**																				
Formal Town					Adequate			Below RDP					None		Adequate			Below RDP					None	
Porterville	1 941	7 057	2 330	8 437	P		P								P		P							
Piketberg	2 912	12 075	3 596	14 870	P		P								P		P							
Wittewater	190	848	202	900						P				P	P		P			P				
Goedverwacht	539	1 979	684	2 510						P					P		P			P				P
Velddrif	3 529	10 677	6 505	19 785	P		P								P		P							
Dwarskersbos	211	670	319	1012	P		P								P		P							
Aurora	199	578	224	651	P		P								P		P							
Eendekuil	379	1 530	481	1 940	P		P								P		P							
Redelinghuys	139	574	148	609	P		P								P		P							
Sub-Total	**10 039**	**35 988**	**14 487**	**50 716**																				
Townships					Adequate			Below RDP					None		Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**																				
Informal Settlements					Adequate			Below RDP					None		Adequate			Below RDP					None	
Velddrif	85	340	0	0																				
Sub-Total	**85**	**340**	**0**	**0**																				
Working towns & service centres					Adequate			Below RDP					None		Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**																				
Sub-Total: (Urban)	**10 124**	**36 328**	**14 487**	**50 716**																				
RURAL																								
Rural / Farming					Adequate			Below RDP					None		Adequate			Below RDP					None	
Farms	6 150	25 570	7 367	30 572	P		P			P			P		P		P			P				P
Sub-Total	**6 150**	**25 570**	**7 367**	**30 572**																				
Informal Settlements					Adequate			Below RDP					None		Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**																				
Sub-Total (Rural)	**6 150**	**25 570**	**7 367**	**30 572**																				
TOTAL	**16 274**	**61 898**	**21 855**	**81 288**																				

TOPIC 2: SERVICE LEVELS

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

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

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

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

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

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

All the formal households in the urban areas of Bergrivier Municipality's Management Area are provided with water and sewer connections inside the erven. There are no informal areas in the urban areas of Bergrivier Municipality's Management Area and the only areas where communal water services are currently still in use is on some of the farms in the rural areas. Bergrivier Municipality will ensure compliance with the requirements for interim water and sanitation supply services for the provision of services in any future informal areas. Bergrivier Municipality is also committed to ensure that private landowners provide at least basic water and sanitation services to those households in the rural areas with existing services below basic standard.

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

Table A.2.3: Residential water services delivery access profile: Water							
Census Category	Description	Year 0 FY2023/24		Year - 1 FY2022/23		Year - 2 FY2021/22	
		Nr	%	Nr	%	Nr	%
	WATER (ABOVE MIN LEVEL)						
Piped (tap) water inside dwelling/institution	House connections	15 359	69%	15 220	70%	15 078	71%
Piped (tap) water inside yard	Yard connections	5 733	26%	5 342	25%	4 949	23%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	124	1%	128	1%	128	1%
	Sub-Total: Minimum Serivce Level and Above	**21 216**	**96%**	**20 690**	**96%**	**20 155**	**95%**
	WATER (BELOW MIN LEVEL)						
Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Standpipe connection: > 200 m < 500 m	12	0%	12	0%	12	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	Standpipe connection: > 500 m < 1 000 m	5	0%	5	0%	5	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	6	0%	6	0%	6	0%
Assurance of supply not adequate (Water Shedding implemented)	More than 7 days cumulative per year without water	884	4%	871	4%	857	4%
No access to piped (tap) water	No services	76	0%	76	0%	76	0%
	Sub-Total: Below Minimum Service Level	**983**	**4%**	**970**	**4%**	**956**	**5%**
	Total number of households	**22 199**	**100%**	**21 660**	**100%**	**21 111**	**100%**

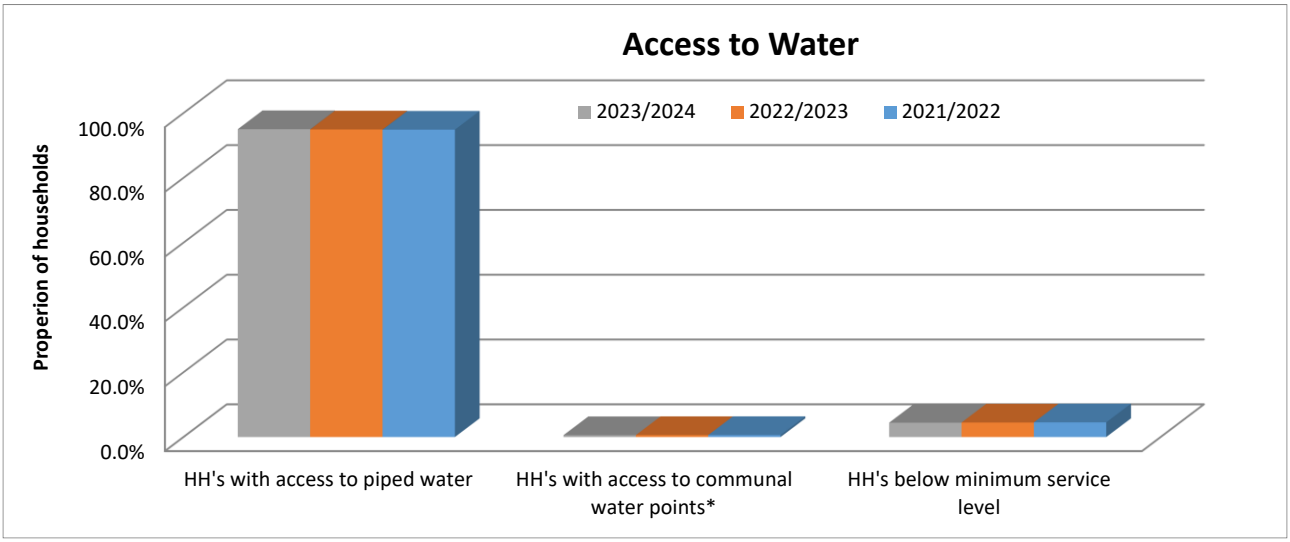


Figure A.2.1: Access to Water Services.

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

Table A.2.4: Residential water service levels

Service Level	Piketberg	Porterville	Velddrif	Dwarskersbos	Aurora	Wittewater	Redelinghuys	Eendekuil	Goedverwacht	Farms	Total
No Water Services	0	0	0	0	0	2 [2)]	0	0	0	74 [2)]	76
Below RDP: Infrastructure Upgrade	0	0	0	0	0	200	0	0	0	0	200
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	684	23 [3)]	707
Below RDP: Infrastructure Refurbishment	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
Below RDP: Water Resource Needs	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
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0
Total Basic Need (RDP)	**0**	**0**	**0**	**0**	**0**	**202**	**0**	**0**	**684**	**97**	**983**
Below Housing Interim [4)]	0	0	0	0	0	0	0	0	0	0	0
Adequate Housing Permanent [5)]	0	0	0	0	0	0	0	0	0	0	0
Total Housing Need	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Standpipes	0	0	0	0	0	0	0	0	0	124	124
Yard Connections [6)]	1 220	715	2 563	0	0	0	0	175	0	1 060	5 733
House Connections [1)]	2 376	1 615	3 942	605	230	0	199	306	0	6 086	15 359
Total Adequate	**3 596**	**2 330**	**6 505**	**605**	**230**	**0**	**199**	**481**	**0**	**7 270**	**21 216**
Total per Area	**3 596**	**2 330**	**6 505**	**605**	**230**	**202**	**199**	**481**	**684**	**7 367**	**22 199**

Notes: 1) Number of residential billed metered consumers for the various towns for 2023/2024, as calculated from the financial data.

2) Census 2011: Number of households with no access to piped (tap) water 74 and 2

3) Census 2011: Number of households with communal services (200m – 500m) 12, (500m – 1000m) 5 and (>1000m) 6.

4) Below Housing Interim in the above table is the number of households in informal areas without basic water services.

5) Adequate Housing Permanent in the above table is the number of households in informal areas with communal water services. Municipality confirmed there are no informal areas in their area.

6) Projected number of residential households (2023/2024) – Number of residential billed metered consumers (2023/2024) = Estimated number of backyard dwellers

Table A.2.5: Improvement in eradicating the Water Backlog					
Settlement	Urban / Rural	2023/24		2022/23 (-Y1)	
		Water backlog HH	Water Backlog Population	Water backlog HH	Water Backlog Population
Porterville	Urban	0	0	0	0
Piketberg	Urban	0	0	0	0
Wittewater	Urban	202	900	201	896
Goedverwacht	Urban	684	2 510	670	2 461
Velddrif	Urban	0	0	0	0
Dwarskersbos	Urban	0	0	0	0
Aurora	Urban	0	0	0	0
Eendekuil	Urban	0	0	0	0
Redelinghuys	Urban	0	0	0	0
Farms	Rural	97	402	97	402
Total		**983**	**3 812**	**968**	**3 759**

Table A.2.6: Water Supply Level Profile (Households)		
Section: Residential water services infrastructure supply level profile	Totals	Assessment Score
Total households with a water need (Irrelevant the type of need)	**99**	**80%**
Total households below RDP	**99**	**80%**
Piped water inside the dwelling/house-Households	16 239	80%
Piped water inside yard-Households	5 733	80%
Piped water distance <200m - Households	128	80%
Piped water distance >200m - Households	23	80%
Borehole in the yard – Households	0	80%
Rain-water tank in yard – Households	0	80%
Water vendor-carrier/tanker – Households	0	80%
Stagnant water – dam/pool – Households	0	80%
Flowing water/spring/stream/river – Households	0	80%
Water Other – Households (include no water)	76	60%
Total	**22 199**	**80%**

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

Table A.2.7: Water Reliability Profile (Households)		
Section: Residential water reliability profile	Totals	Assessment Score
Total Number of Households having Reliable Service	**21 216**	**80%**
Total Number of Households NOT having Reliable Service	**983**	**60%**

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

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

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

Table A.2.8: Residential water services delivery access profile: Sanitation							
Census Category	**Description**	**Year 0 FY2023/24**		**Year - 1 FY2022/23**		**Year - 2 FY2021/22**	
		Nr	**%**	**Nr**	**%**	**Nr**	**%**
	SANITATION (ABOVE MIN LEVEL)						
Flush toilet (connected to sewerage system)	Waterborne	11 893	54%	11 533	53%	11 188	53%
	Waterborne: Low Flush	0	0%	0	0%	0	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	9 095	41%	8 916	41%	8 712	41%
Chemical toilet	Non-waterborne (above min. service level)	35	0%	35	0%	35	0%
Pit toilet with ventilation (VIP)		83	0%	83	0%	83	0%
Other / Communal Services		0	0%	0	0%	0	0%
	Sub-Total: Minimum Serivce Level and Above	**21 106**	**95%**	**20 567**	**95%**	**20 018**	**95%**
	SANITATION (BELOW MIN LEVEL)						
Pit toilet without ventilation	Pit toilet	36	0%	36	0%	36	0%
Bucket toilet	Bucket toilet	177	1%	177	1%	177	1%
Other toilet provision (below min. service level	Other	364	2%	364	2%	364	2%
No toilet provisions	No services	516	2%	516	2%	516	2%
	Sub-Total: Below Minimum Service Level	**1 093**	**5%**	**1 093**	**5%**	**1 093**	**5%**
	Total number of households	**22 199**	**100%**	**21 660**	**100%**	**21 111**	**100%**

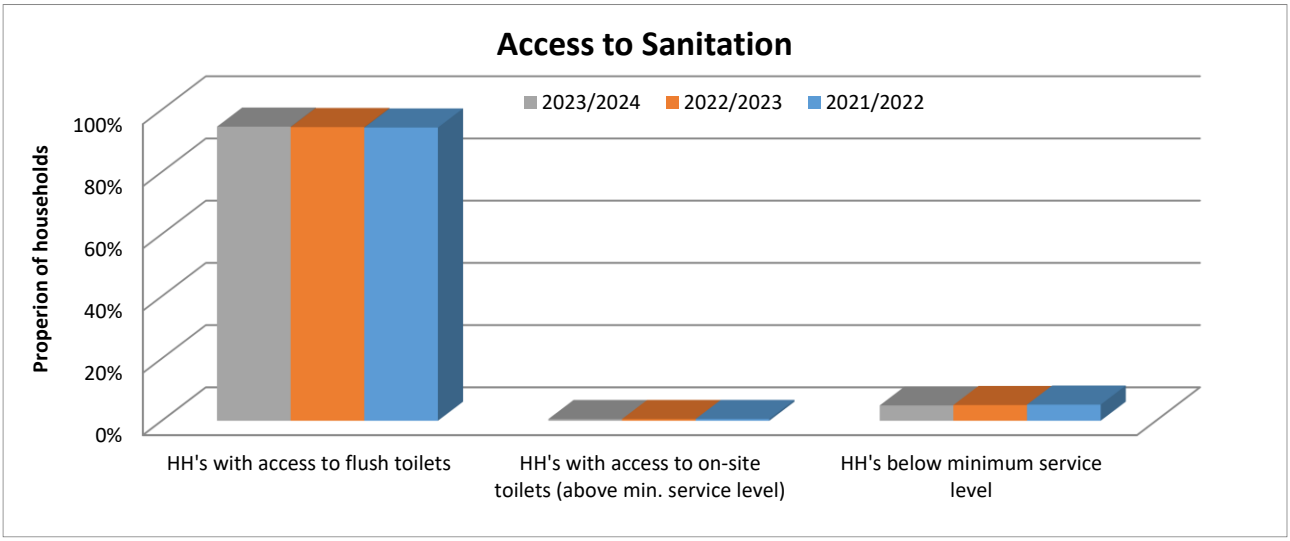


Figure A.2.2: Access to Sanitation Services.

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

Table A.2.9: Residential sanitation service levels											
Service Levels	**Piketberg**	**Porterville**	**Velddrif**	**Dwarskersbos**	**Aurora**	**Wittewater**	**Redelinghuys**	**Eendekuil**	**Goedverwacht**	**Farms**	**Total**
No Sanitation Services [3]	0	0	0	0	0	0	0	0	10	506	516
Below RDP: Infrastructure Upgrade [4]	0	0	0	0	0	24	0	0	70	518	612
Below RDP: Infrastructure Extension	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
Below RDP: O&M Needs	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
Below RDP: Infrastructure and O&M Needs	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
Total Basic Need (RDP)	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**0**	**80**	**1 024**	**1 128**
Below Housing Interim [5]	0	0	0	0	0	0	0	0	0	0	0
Adequate Housing Permanent [6]	0	0	0	0	0	0	0	0	0	0	0
Total Housing Need	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Non Waterborne	0	0	0	0	0	30	0	0	9	44	83
Waterborne Low Flush	0	0	0	0	0	0	0	0	0	0	0
Septic Tanks / Conservancy [1]	0	0	1 276	202	230	148	199	146	595	6 299	9 095
Waterborne WWTW	3 596	2 330	5 229	403	0	0	0	335	0	0	11 893
Total Adequate [2]	**3 596**	**2 330**	**6 505**	**605**	**230**	**178**	**199**	**481**	**604**	**6 343**	**21 071**
Total per Area	**3 596**	**2 330**	**6 505**	**605**	**230**	**202**	**199**	**481**	**684**	**7 367**	**22 199**

1) Waterborne Low Flush, Septic Tanks and Conservancy tanks as agreed with the Municipality during January 2014, as part of DWS's Backlog Eradication Strategy process.

2) House Connections for 2023/2024 were projected from the 2011 Census data, except for Dwarskersbos, Aurora and Redelinghuys where the number of billed metered consumers as calculated from the financial system were used. The Backyard dwellers are included in these figures.

3) Census 2011: Number of households with no toilet facility 506 + 10.

4) Census 2011: Number of households with existing buckets 131 + 39 +7, chemical toilets 23 + 12, pit toilets without ventilation 30 +2 + 4 and "other" 334 + 29 +1.

5) Below Housing Interim in the above table is the number of households in informal areas without basic sanitation services.

6) Adequate Housing Permanent in the above table is the number of households in informal areas with communal ablution facilities. Municipality confirmed there are no informal areas in their area.

Table A.2.10: Improvement in eradicating the Sanitation Backlog					
Settlement	Urban / Rural	2023/24		2023/24 (-Y1)	
		Sanitation backlog HH	Sanitation Backlog Population	Sanitation backlog HH	Sanitation Backlog Population
Porterville	Urban	0	0	0	0
Piketberg	Urban	0	0	0	0
Wittewater	Urban	24	107	24	107
Goedverwacht	Urban	80	294	80	294
Velddrif	Urban	0	0	0	0
Dwarskersbos	Urban	0	0	0	0
Aurora	Urban	0	0	0	0
Eendekuil	Urban	0	0	0	0
Redelinghuys	Urban	0	0	0	0
Farms	Rural	1 024	4 249	1 024	4 249
Total		**1 128**	**4 650**	**1 128**	**4 650**

Table A.2.11: Sanitation Level of Service (Households)		
Section: Residential sanitation services infrastructure supply level profile	Totals	Assessment Score
Bucket toilets	177	60%
Pit without ventilation	36	60%
Pit toilet with ventilation (VIP)	83	60%
Chemical Toilet	35	60%
Flush toilet (with septic / conservancy tank)	9 095	80%
Flush toilet (connected to sewerage system)	11 893	80%
None (Include other)	880	60%

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

Table A.2.12: Sanitation Reliability Profile (Households)		
Section: Residential sanitation reliability profile	Totals	Assessment Score
Total number of households having reliable service	**21 071**	**80%**
Total number of households not having reliable service	**1 128**	**60%**
Infrastructure to be upgraded: None to VIP	880	60%
Infrastructure requirement: Bucket to VIP	177	60%
Infrastructure requirement: None to waterborne	0	60%
Infrastructure to be upgraded: Pit to VIP	36	60%
Number of households NOT having reliable service due to: Functionality	35	60%

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

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

Table A.2.13: Direct Backlog (Water and Sanitation)		
Direct Backlog (Water and Sanitation)	Totals	Assessment Score
Direct settlement backlog water households. Total household of settlement with a water need (irrelevant the type of need)	983	60%
Direct settlement backlog water population. Total population of settlement with a water need (irrelevant the type of need)	3 812	60%
Direct settlement backlog sanitation households. Total household of settlement with a sanitation need (irrelevant the type of need)	1 128	60%
Direct settlement backlog sanitation population. Total population of settlement with a sanitation need (irrelevant the type of need)	4 650	60%

The number of billed metered consumers in each user sector, for the various distribution systems in Bergrivier Municipality's Management Area, are indicated in the table below.

Table A.2.14: Number of billed metered consumers in each user sector per town

Town	Year	Residential	Commercial	Industrial	Municipal	Other	Rural	Total
Porterville	14/15	1 595		-	-	-	-	**1 595**
	15/16	1 588		-	-	-	-	**1 588**
	16/17	1 656		-	-	-	-	**1 656**
	17/18	1 657		-	-	-	-	**1 657**
	18/19	1 542	50		19	15	-	**1 626**
	19/20	1 590	57		18	15	-	**1 680**
	20/21	1 584	57		20	15	-	**1 676**
	21/22	1 625	59		14	15	-	**1 713**
	22/23	1 617	56		15	15	-	**1 703**
	23/24	1 615	58		14	15	-	**1 702**
Piketberg	14/15	2 512		53	-	-	-	**2 565**
	15/16	2 500		54	-	-	-	**2 554**
	16/17	2 462		53	-	-	-	**2 515**
	17/18	2 424		49	-	-	-	**2 473**
	18/19	2 321	133		50	21	7	**2 532**
	19/20	2 302	133		48	20	7	**2 510**
	20/21	2 333	137		52	22	8	**2 552**
	21/22	2 361	138		56	23	8	**2 586**
	22/23	2 380	136		55	23	7	**2 601**
	23/24	2 376	135		48	22	7	**2 588**
Velddrif	14/15	3 288		-	-	-	-	**3 288**
	15/16	3 373		-	-	-	-	**3 373**
	16/17	3 467		-	-	-	-	**3 467**
	17/18	3 552		-	-	-	-	**3 552**
	18/19	3 577	78		49	4	9	**3 717**
	19/20	3 680	82		54	4	6	**3 826**
	20/21	3 823	84		53	3	6	**3 969**
	21/22	3 909	84		61	2	6	**4 062**
	22/23	3 897	102		58	3	6	**4 066**
	23/24	3 942	103		54	3	5	**4 107**
Dwarskersbos	14/15	373		-	-	-	-	**373**
	15/16	406		-	-	-	-	**406**
	16/17	423		-	-	-	-	**423**
	17/18	440		-	-	-	-	**440**
	18/19	477	4		6	-	7	**494**
	19/20	493	5		6	-	5	**509**
	20/21	527	8		6	-	5	**546**
	21/22	582	9		6	-	4	**601**
	22/23	593	10		6	-	4	**613**
	23/24	605	10		6	-	4	**625**
Aurora	14/15	251		-	-	-	-	**251**
	15/16	252		-	-	-	-	**252**
	16/17	250		-	-	-	-	**250**
	17/18	245		-	-	-	-	**245**
	18/19	228	15		5	2	-	**250**
	19/20	236	15		5	1	-	**257**
	20/21	239	17		6	1	-	**263**
	21/22	227	15		4	1	-	**247**
	22/23	243	17		7	1	-	**268**
	23/24	230	14		6	1	-	**251**
Eendekuil	14/15	349		4	-	-	-	**353**
	15/16	350		5	-	-	-	**355**
	16/17	345		5	-	-	-	**350**
	17/18	343		3	-	-	-	**346**

Table A.2.14: Number of billed metered consumers in each user sector per town								
Town	**Year**	**Residential**	**Commercial**	**Industrial**	**Municipal**	**Other**	**Rural**	**Total**
	18/19	321	22		4	3	11	**361**
	19/20	318	22		4	3	10	**357**
	20/21	310	16		3	3	8	**340**
	21/22	313	17		3	3	11	**347**
	22/23	320	18		3	3	9	**353**
	23/24	306	19		3	2	10	**340**
Redelinghuys	14/15	187		-	-	-	-	**187**
	15/16	193		-	-	-	-	**193**
	16/17	193		-	-	-	-	**193**
	17/18	193		-	-	-	-	**193**
	18/19	182	7		5	3	-	**197**
	19/20	185	7		6	3	-	**201**
	20/21	191	7		15	3	-	**216**
	21/22	197	7		20	3	-	**227**
	22/23	198	7		20	3	-	**228**
	23/24	199	6		19	3	-	**227**
TOTAL	**14/15**	**8 555**		**57**	**-**	-	**-**	**8 612**
	15/16	**8 662**		**59**	**-**	-	**-**	**8 721**
	16/17	**8 796**		**58**	**-**	-	**-**	**8 854**
	17/18	**8 854**		**52**	**-**	-	**-**	**8 906**
	18/19	**8 648**	**309**		**138**	**48**	**34**	**9 177**
	19/20	**8 804**	**321**		**141**	**46**	**28**	**9 340**
	20/21	**9 007**	**326**		**155**	**47**	**27**	**9 562**
	21/22	**9 214**	**329**		**164**	**47**	**29**	**9 783**
	22/23	**9 248**	**346**		**164**	**48**	**26**	**9 832**
	23/24	**9 273**	**345**		**150**	**46**	**26**	**9 840**

The total number of billed metered consumers per town and the percentage annual growth over the period 2016/2017 to 2023/2024 are indicated in the table below.

Table A.2.15: Total number of billed metered consumers per town and percentage annual growth from 2016/2017 to 2023/2024									
Distribution System	**Annual Growth % (16/17 – 23/24)**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
Porterville	0.39%	1 656	1 657	1 626	1 680	1 676	1 713	1 703	1 702
Piketberg	0.41%	2 515	2 473	2 532	2 510	2 552	2 586	2 601	2 588
Velddrif	2.45%	3 467	3 552	3 717	3 826	3 969	4 062	4 066	4 107
Dwarskersbos	5.74%	423	440	494	509	546	601	613	625
Aurora	0.06%	250	245	250	257	263	247	268	251
Eendekuil	-0.41%	350	346	361	357	340	347	353	340
Redelinghuys	2.35%	193	193	197	201	216	227	228	227
TOTALS	**1.52%**	**8 854**	**8 906**	**9 177**	**9 340**	**9 562**	**9 783**	**9 832**	**9 840**

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

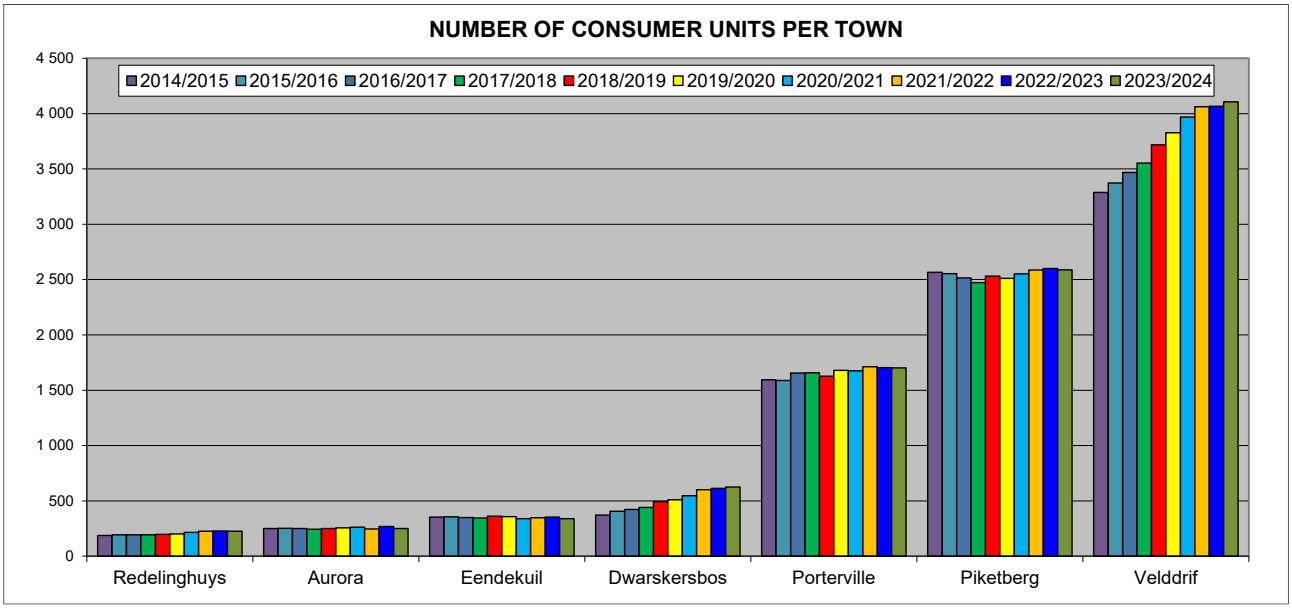


Figure A.2.3: Number of Billed Metered Consumers per Town

Public Amenities

Table A.2.16 Water Services of education and health facilities					
Associated services facility	**Number of facilities**	**Facilities with adequate services**	**Facilities with no services**	**Facilities with inadequate services**	**Total potential cost (basic level)**
Education Plan					
Primary school	16	7	7 (To be verified)	2	Unknown
Secondary school	5	5	0	0	-
Tertiary	0	0	0	0	-
Combined	0	0	0	0	-
Special needs	0	0	0	0	-
Other	0	0	0	0	-
Total	**21**	**12**	**7 (To be verified)**	**2**	**Unknown**
Health Plan					
Hospitals	2	2	0	0	-
Health Centres	0	0	0	0	-
Clinics	3	3	0	0	-
Mobile and Satellite Clinics	5	3	0	2	Unknown
Total	**10**	**8**	**0**	**2**	**Unknown**

All the schools and Community Learning Centres in the urban areas, which falls under the management of Bergrivier Municipality, are supplied with higher levels of water services. **The assurance of supply of the schools and clinics in Goedverwacht and Wittewater are not adequate (Water shedding is being implemented). The water service levels of the primary schools in the rural areas also need to be verified.** All the hospitals and clinics in the urban areas receive potable water through the reticulation networks of the various towns.

Table A.2.17: Sanitation Services of education and health facilities					
Associated services facility	**Number of facilities**	**Facilities with adequate services**	**Facilities with no services**	**Facilities with inadequate services**	**Total potential cost (basic level)**
Education Plan					
Primary school	16	9	7 (To be verified)		Unknown
Secondary school	5	5	0	0	-
Tertiary	0	0	0	0	-
Combined	0	0	0	0	-
Special needs	0	0	0	0	-

Table A.2.17: Sanitation Services of education and health facilities					
Associated services facility	**Number of facilities**	**Facilities with adequate services**	**Facilities with no services**	**Facilities with inadequate services**	**Total potential cost (basic level)**
Other	0	0	0	0	
Total	**21**	**14**	**7 (To be verified)**		**Unknown**
Health Plan					
Hospitals	2	2	0	0	-
Health Centres	0	0	0	0	-
Clinics	3	3	0	0	-
Mobile and Satellite Clinics	5	5	0	0	-
Total	**10**	**10**	**0**	**0**	**-**

All the schools and Community Learning Centres in the urban areas are supplied with higher levels of sanitation services. **The sanitation service levels of the seven primary schools in the rural areas need to be verified.** All the hospitals and clinics in the urban areas are supplied with higher levels of sanitation services and are connected to the waterborne sewer systems or make use of septic tanks / conservancy tanks.

TOPIC 3: WATER SERVICES ASSET MANAGEMENT

Table A.3.1: Infrastructure Components										
Assets	**Boreholes**	**Abstraction Points**	**WTW**	**Water Pump Stations**	**Sewer Pump Stations**	**Water Bulk & Network Pipelines**	**Sewer Drainage Network**	**Reservoirs**	**WWTW**	**Assessment Score**
Total number of components / km of pipeline / units	9	10	7	16	61	290.819	140.908	27	5	80%

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

Table A.3.2: Existing water infrastructure (Resources and WTWs)			
Water Distribution System	**Bulk Supply**	**WTWs and Treatment Processes**	
	Resources	**Capacity of WTW (Ml/d)**	**Processes**
Porterville	Voorberg Mountain Stream, two Springs and Porterville dam	2.270	Flow measurement, Stabilisation (Pre -Calcium Carbonate), Chemical Dosing (Activated Carbon), Filtration (Four pressure sand filters), Disinfection (Chlorine gas).
Piketberg	Berg River and Voëlvlei Spring	6.950	Flow measurement, Chemical dosing (Sudfloc), Sedimentation (Two Horizontal flow clarifiers and one circular clarifier), Filtration (Rapid gravity sand filters), Stabilisation (Pre - Calcium Carbonate), Disinfection (Chlorine gas).
Velddrif	Berg River (Withoogte Bulk Scheme)	-	Add disinfection: Sodium Hypochlorite at reservoirs.
Dwarskersbos	Berg River (Withoogte Bulk Scheme)	-	Add disinfection: Sodium Hypochlorite at reservoirs.
Aurora	Four Boreholes	0.200	Filtration (Ten pressure sand filters), Disinfection (Hypochlorous Acid).
Eendekuil	Waboomfontein River and Spring and Borehole	0.200	Flow measurement, Two pressure sand filters on bulk supply pipeline, WTW Package Plant: One pressure sand filter and Ultra filtration unit, Stabilisation (Calcium Carbonate), Disinfection (Calcium Hypochlorite) and HTH Granular as backup.
Redelinghuys	Matroosfontein Spring	0.260	Flow measurement, Filtration (Three pressure sand filters), Stabilisation (Calcium Carbonate), Disinfection (Sodium Hypochlorite) and HTH Granular as backup.
Wittewater	Mountain Stream and Two Boreholes	0.500	Filtration (Three pressure sand filters), Disinfection (HTH Granular).
Goedverwacht	Riet River	1.000	Filtration (Four pressure sand filters), Disinfection (HTH Granular).

The table below gives a summary of the kilometres of the bulk and internal water reticulation networks, the number of water pump stations and reservoirs and the total storage capacities of the reservoirs for each of the systems.

Table A.3.3: Existing water infrastructure (Reticulation, Pump Stations and Reservoirs)

Water Distribution System	Water Distribution Networks		Number of Water PS		Reservoirs and Water Towers	
	Bulk	Internal	Raw Water	Potable Water	Number of Reservoirs and Water Towers	Total Storage in Ml
	km	km	Number of PS	Number of PS		
Porterville	4.975	35.506	1	1	3	3.985
Piketberg	19.958	55.385	1	4	3	9.700
Velddrif	-	87.792	-	1	5	10.500
Dwarskersbos	-	15.912	-	1	3	1.128
Aurora	2.633	12.966	1 (WTW: Filters)	1	2	0.550
Eendekuil	13.436	7.407	-	-	1	0.400
Redelinghuys	3.208	8.615	1 (WTW: Filters)	1	2	0.440
Wittewater	0.514	6.131	1 (WTW: Filters)	1	4	0.500
Goedverwacht	1.839	14.542	1 (WTW: Filters)	-	4	0.626
Total Bergrivier	**46.563**	**244.256**	**6**	**10**	**27**	**27.829**

The table below gives an overview of the major sewerage infrastructure components for the various sewer drainage networks in Bergrivier Municipality's Management Area.

Table A.3.4: Existing sewerage infrastructure

Sewer Drainage Systems	WWTWs and Treatment Processes			Sewer Drainage Network		Number of Sewer PS
	Hydraulic Capacity	Organic Capacity	Treatment Processes	Rising	Gravity	
	Ml/d	kg COD/d		km	km	
Porterville	1.500	1 701	Activated Sludge: Inlet works, Biological Reactors, Secondary Settling Tanks, Disinfection (Chlorine gas), Sludge Treatment	0	28.075	-
Piketberg	4.150	3 366	Activated Sludge: Inlet works, Biological Reactor, Two Secondary Settling Tanks, Disinfection, Sludge Treatment (Dams)	0.888	47.166	2
Velddrif	1.995	3 200	Activated Sludge: Inlet works, Biological Reactor, Two Secondary Settling Tanks, Disinfection (Chlorine gas), Sludge Treatment	15.507	33.988	51
Dwarskersbos	0.294	Unknown	Oxidation Ponds: Inlet works, Lined Primary, Secondary and Tertiary Ponds.	5.212	6.261	7
Eendekuil	0.140	Unknown	Oxidation Ponds: Inlet works, Lined Primary-, Secondary- and Tertiary Pond	1.452	2.359	1
Total Bergrivier				**23.059**	**117.849**	**61**

Notes: No sewerage infrastructure in Wittewater, Goedverwacht, Aurora and Redelinghuys

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

Table A.3.5: Refurbishment Need and O&M Occurrence

Component	Refurbishment Need				O&M Occurrence				Observation			
	High	Medium	Low	None	Regular	Periodic	Sporadic	None	Dysfunctional	Operational	Prime Condition	Vandalised
Boreholes	0	1	7	1	5	0	0	4	2	7	0	0
Abstraction points	0	1	9	0	8	0	0	2	0	10	0	0
Bulk and reticulation pipelines	0	0	9	0	7	0	0	2	0	9	0	0

Table A.3.5: Refurbishment Need and O&M Occurrence												
Component	Refurbishment Need				O&M Occurrence				Observation			
	High	Medium	Low	None	Regular	Periodic	Sporadic	None	Dysfunctional	Operational	Prime Condition	Vandalised
Reservoirs	3	4	8	12	19	0	0	8	0	22	5	0
Water pump stations	2	4	7	3	16	0	0	3	0	12	3	1
WTW	1	2	3	1	5	0	0	2	1	6	0	0
Sewer pipelines	0	0	5	0	5	0	0	0	0	5	0	0
Sewer pump stations	1	6	48	6	61	0	0	0	1	47	13	0
WWTW	1	1	3	0	5	0	0	0	0	5	0	0

Asset Management: An updated Asset Management Policy is in place (2025/2026). Each Head of Department will ensure that a maintenance plan with regard to each new asset with an asset value and/or category, as determined from time to time by the Municipal Manager, is prepared and submitted to the Municipal Manager on time. If recommended by the Municipal Manager, the maintenance plan will be submitted to Council before any approval may be given for the acquisition or construction of the infrastructure asset involved.

The Head of Department that controls or uses the relevant infrastructure asset must report annually to Council, not later than July or the earliest Council meeting thereafter, to the extent that the relevant maintenance plan has been complied with and the likely effect that any noncompliance may have on the useful operating life of the asset concerned.

General Maintenance of Assets: Each Head of Department will be directly responsible for ensuring that all assets are properly maintained and in such a manner that will ensure that such an asset reaches its useful life.

Asset Register: Bergrivier Municipality's Asset Register also needs to include the CRC of all the water and sewerage infrastructure. The Municipality also needs to continue to ensure that all the existing water and sewerage infrastructure are included in the current Asset Register. The tables below give an overview of the water and sewerage infrastructure assets currently included in the Asset Register.

Water Infrastructure: The opening costs and carrying values of the water infrastructure included in Bergrivier Municipality's current Asset Register is summarised in the table below (June 2024).

Table A.3.6: Opening costs and carrying values of the water infrastructure			
Asset Type	Opening Costs	Carrying Values	Carrying Values / Opening Costs
Boreholes	R1 442 481	R894 775	62.03%
Bulk Mains	R11 513 212	R6 919 489	60.10%
Reticulation Pipeline	R43 943 620	R35 872 772	81.63%
Pump Stations	R10 743 996	R6 666 339	62.05%
Reservoirs	R60 118 596	R45 412 957	75.54%
WTWs	R12 983 590	R8 037 786	61.91%
Dams and Weirs	R13 258 517	R2 683 883	20.24%
Total	**R154 004 012**	**R106 488 001**	**69.15%**

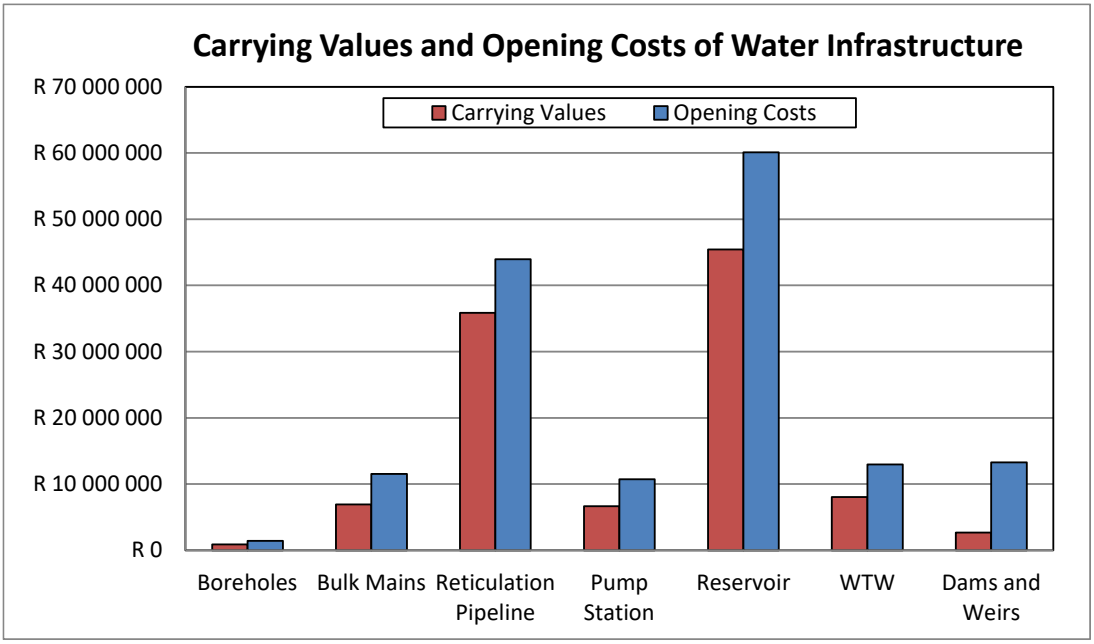


Figure A.3.1: Carrying Value and Opening Cost of the Water Infrastructure

The previous table indicates that 30.85% of the value of the water supply infrastructure has been consumed.

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

Table A.3.7: Overview of the RUL by facility type for water infrastructure (Opening Costs)

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Boreholes	R441 075	R0	R283 961	R0	R717 445
Bulk Mains	R551 677	R13 734	R771 521	R678 756	R9 497 524
Reticulation Pipeline	R1 712 059	R9 254 484	R1 133 470	R19 725	R31 823 882
Pump Stations	R2 029 537	R1 976 511	R672 896	R2 885 154	R3 179 898
Reservoirs	R338 667	R580 999	R1 740 391	R465 449	R56 993 090
WTWs	R1 866 115	R2 307 916	R302 326	R246 785	R8 260 448
Dams and Weirs	R114 243	R140 153	R1 864	R4 700	R12 997 557
Total	**R7 053 373**	**R14 273 797**	**R4 906 429**	**R4 300 569**	**R123 469 844**

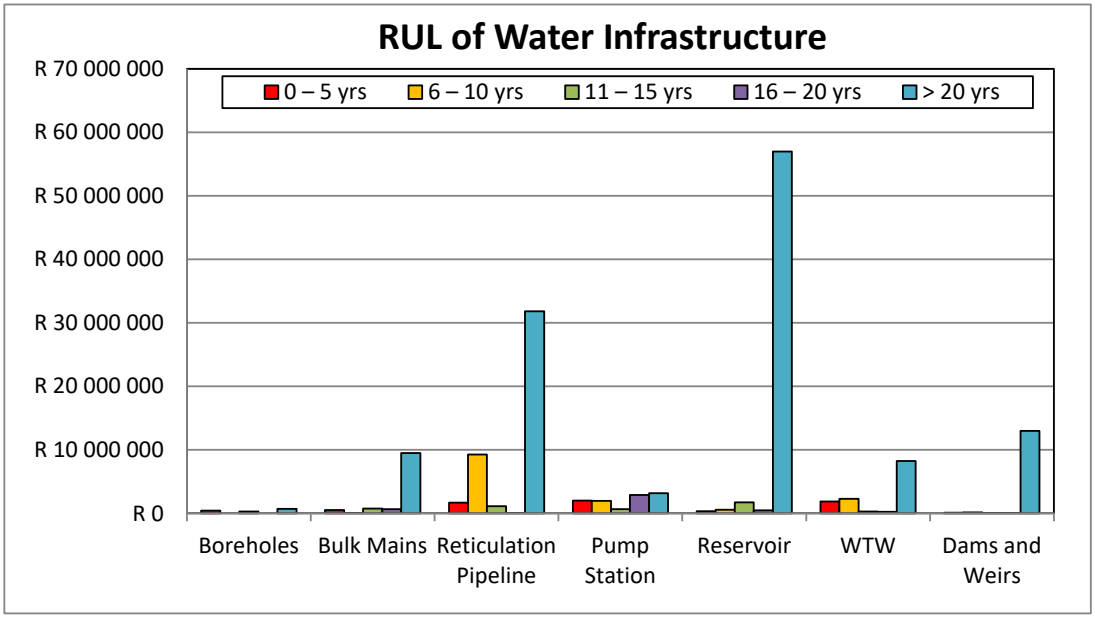


Figure A.3.2: Remaining Useful Life of the Water Infrastructure

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

Table A.3.8: Overview of the age distribution by facility type for the water infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Boreholes	R841 247	R413 258	R0	R148 700	R39 276
Bulk Mains	R718 309	R1 659 313	R520 785	R1 791 786	R6 823 019
Reticulation Pipeline	R30 221 903	R1 981 979	R2 595 821	R3 250 453	R5 893 464
Pump Stations	R4 488 849	R837 844	R688 134	R2 221 647	R2 507 522
Reservoirs	R16 790 436	R9 536 948	R72 072	R783 485	R32 935 655
WTWs	R1 758 523	R4 739 511	R2 024 398	R923 532	R3 537 626
Dams and Weirs	R29 932	R0	R0	R0	R13 228 585
Total	**R54 849 199**	**R19 168 853**	**R5 901 210**	**R9 119 603**	**R64 965 147**

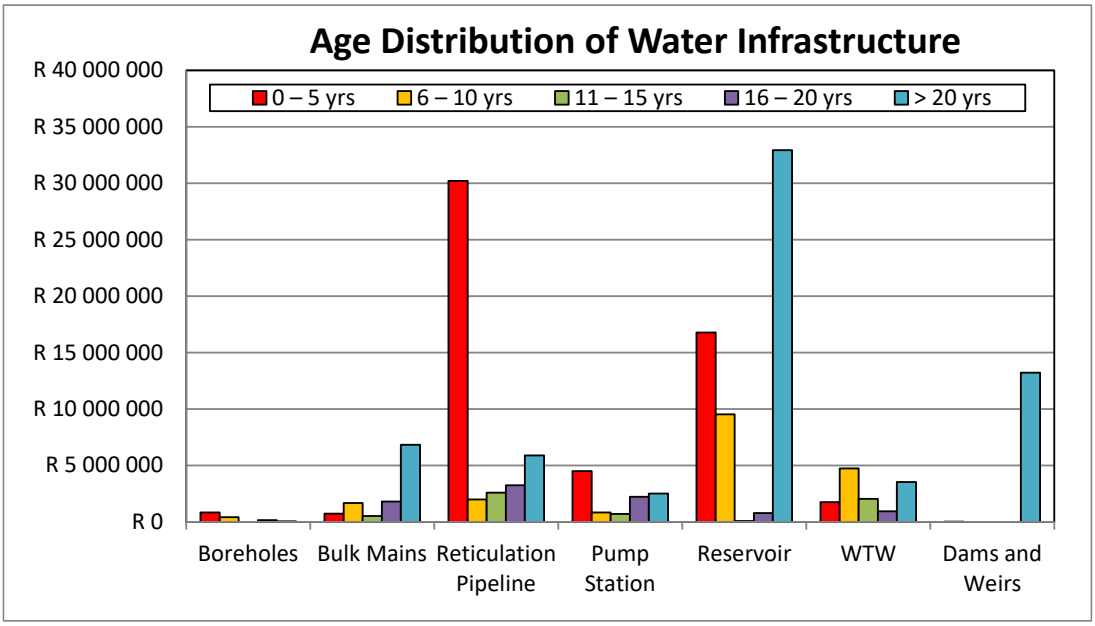


Figure A.3.3: Age Distribution of the Water Infrastructure

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

Table A.3.9: Overview of the condition grading by facility type for the water infrastructure (Opening Costs)					
Asset Type	**Very Good**	**Good**	**Fair**	**Poor**	**Very Poor**
Boreholes	R801 632	R61 290	R578 539	R1 020	R0
Bulk Mains	R5 532 883	R1 230 586	R3 587 387	R794 499	R367 857
Reticulation Pipeline	R32 227 417	R4 837 887	R6 385 247	R284 406	R208 663
Pump Stations	R4 653 226	R3 092 499	R2 784 297	R209 989	R3 985
Reservoirs	R18 141 712	R33 906 172	R8 005 621	R65 091	R0
WTWs	R2 090 770	R7 695 436	R3 182 778	R14 606	R0
Dams and Weirs	R49 010	R248 747	R12 960 760	R0	R0
Total	**R63 496 650**	**R51 072 617**	**R37 484 629**	**R1 369 611**	**R580 505**

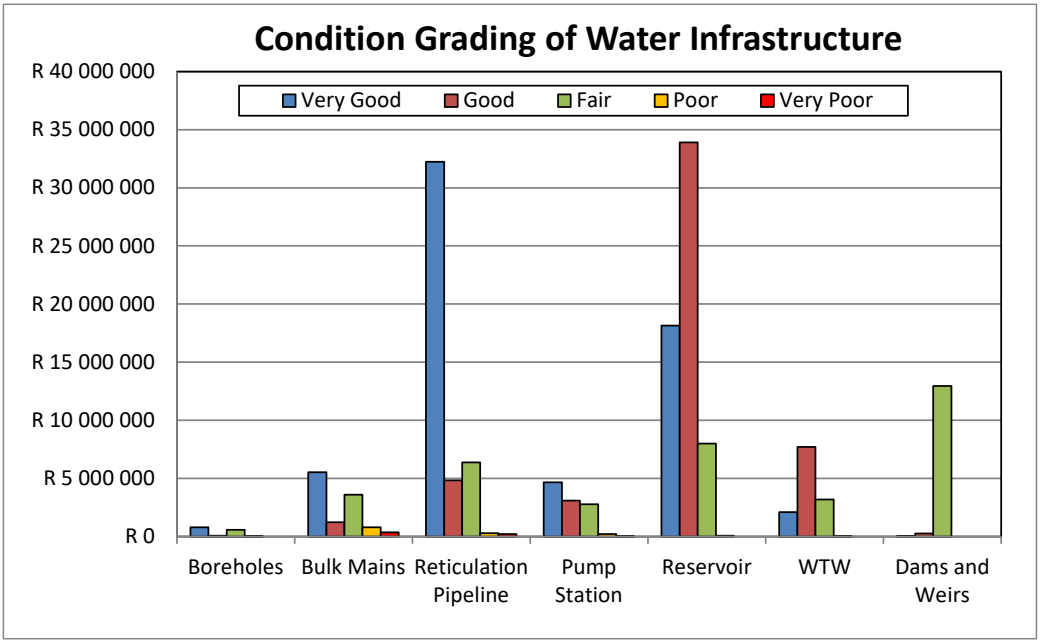


Figure A.3.4: Condition Grading of the Water Infrastructure

Sewerage Infrastructure: The opening costs and carrying values of the sewerage infrastructure included in Bergrivier Municipality's current Asset Register is summarised in the table below (June 2024).

Table A.3.10: Opening costs and carrying values of all sewerage infrastructure

Asset Type	Opening Costs	Carrying Values	Carrying Values / Opening Costs
Sewer Pump Stations	R20 598 642	R11 489 222	55.78%
Sewer Reticulation Pipelines	R23 816 475	R18 085 970	75.94%
Porterville WWTW (0001)	R30 631 269	R25 529 774	83.35%
Velddrif WWTW (0002)	R19 404 974	R15 741 354	81.12%
Eendekuil WWTW (0003)	R269 582	R128 563	47.69%
Piketberg WWTW (0004)	R14 084 773	R8 518 452	60.48%
Total	**R108 805 715**	**R79 493 335**	**73.06%**

The previous table indicates that 26.94% of the value of the sewerage infrastructure has been consumed.

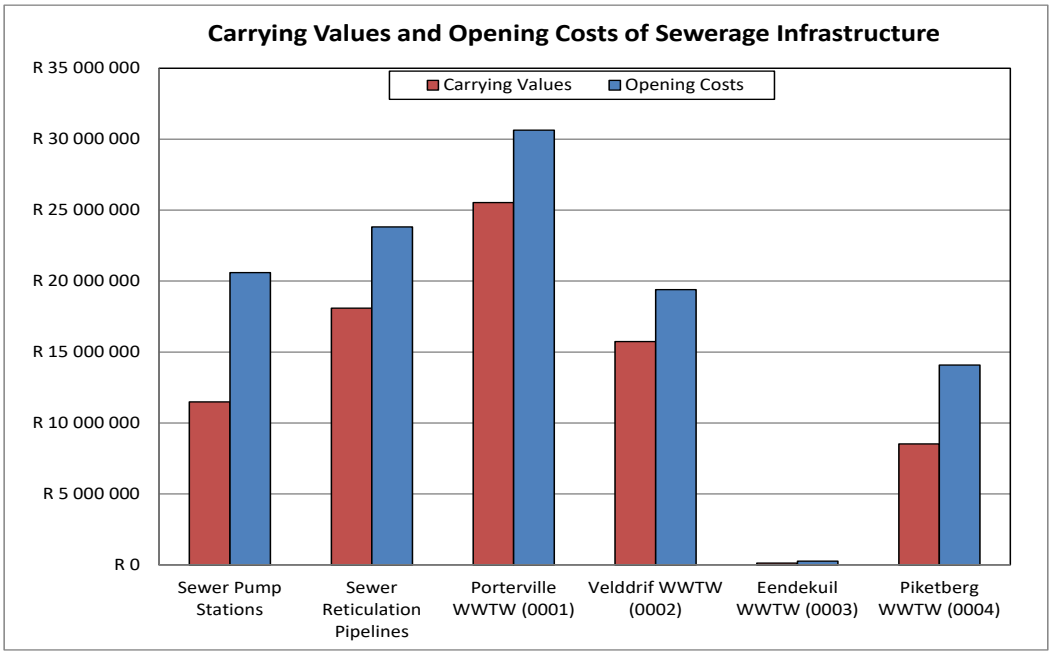


Figure A.3.5: Carrying Value and Opening Cost of the Sewerage Infrastructure

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

Table A.3.11: Overview of the RUL by facility type for the sewerage infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Sewer Pump Stations	R5 478 624	R6 233 531	R1 611 119	R189 241	R7 086 127
Sewer Reticulation Pipelines	R0	R0	R35 122	R1 587 172	R22 194 181
Porterville WWTW (0001)	R250 207	R338 842	R6 294 189	R36 468	R23 711 563
Velddrif WWTW (0002)	R1 004 503	R941 172	R1 262 121	R816 694	R15 380 484
Eendekuil WWTW (0003)	R0	R0	R38 778	R0	R230 804
Piketberg WWTW (0004)	R1 127 112	R2 569 370	R2 121 424	R259 174	R8 007 693
Total	**R7 860 446**	**R10 082 915**	**R11 362 753**	**R2 888 749**	**R76 610 852**

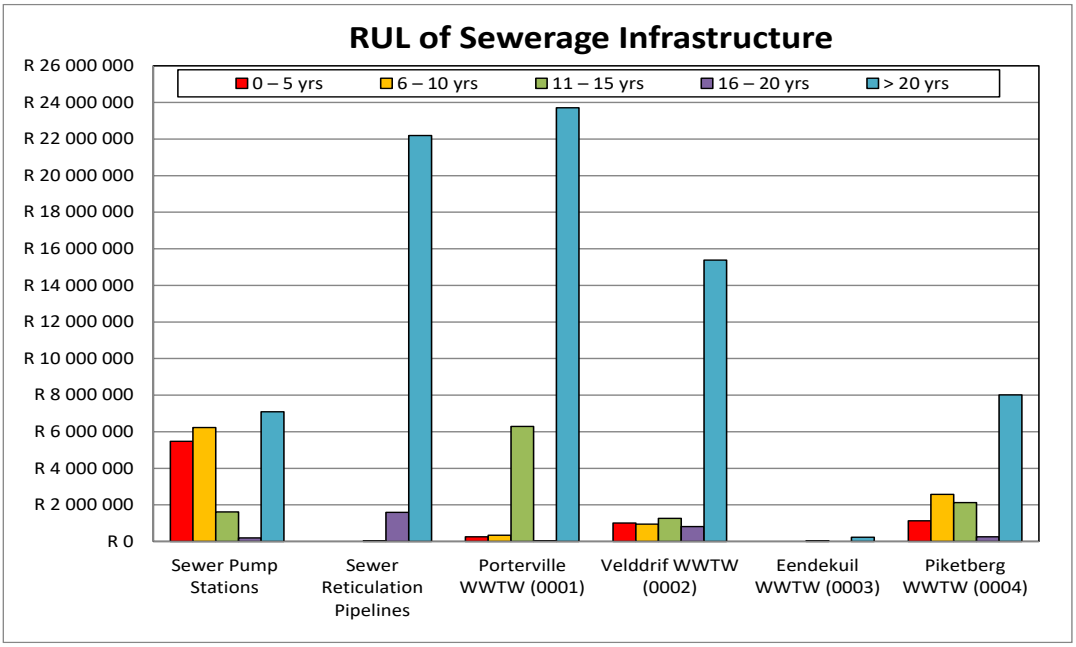


Figure A.3.6: Remaining Useful Life of the Sewerage Infrastructure

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

Table A.3.12: Overview of the age distribution by facility type for the sewerage infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Sewer Pump Stations	R8 813 438	R1 585 098	R1 042 252	R5 536 919	R3 620 935
Sewer Reticulation Pipelines	R8 136 778	R1 450 306	R1 471 668	R3 522 291	R9 235 432
Porterville WWTW (0001)	R25 908 165	R1 612 694	R35 303	R422 225	R2 652 882
Velddrif WWTW (0002)	R6 825 499	R10 578 114	R1 629 507	R371 854	R0
Eendekuil WWTW (0003)	R0	R0	R0	R0	R269 582
Piketberg WWTW (0004)	R3 018 576	R6 044	R7 922 914	R88 697	R3 048 542
Total	**R52 702 456**	**R15 232 256**	**R12 101 644**	**R9 941 986**	**R18 827 373**

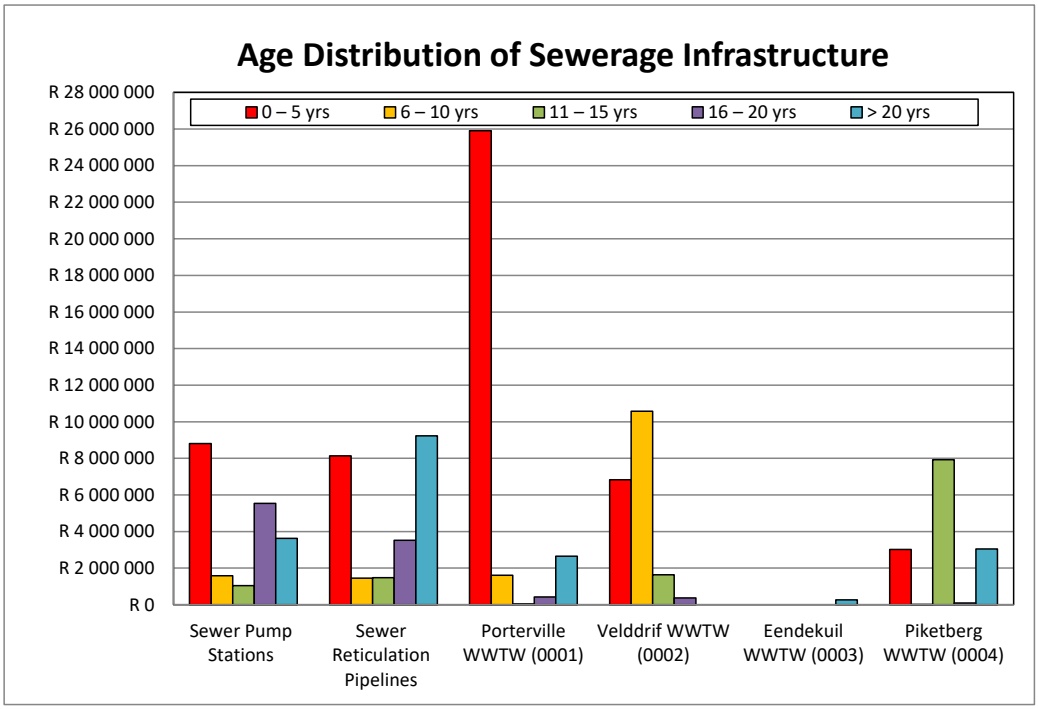


Figure A.3.7: Age Distribution of the Sewerage Infrastructure

The table and graph below give an overview of the condition grading per facility for the sewerage infrastructure.

Table A.3.13: Overview of the condition grading by facility type for the sewerage infrastructure (Opening Costs)

Asset Type	Very Good	Good	Fair	Poor	Very Poor
Sewer Pump Stations	R8 804 452	R6 952 199	R4 154 525	R241 031	R446 435
Sewer Reticulation Pipelines	R10 202 571	R9 971 332	R2 055 401	R1 587 171	R0
Porterville WWTW (0001)	R12 785 635	R14 907 454	R2 938 180	R0	R0
Velddrif WWTW (0002)	R6 852 750	R6 660 408	R5 401 110	R103 847	R386 859
Eendekuil WWTW (0003)	R0	R0	R269 582	R0	R0
Piketberg WWTW (0004)	R2 524 237	R4 229 765	R7 016 150	R203 707	R110 914
Total	**R41 169 645**	**R42 721 158**	**R21 834 948**	**R2 135 756**	**R944 208**

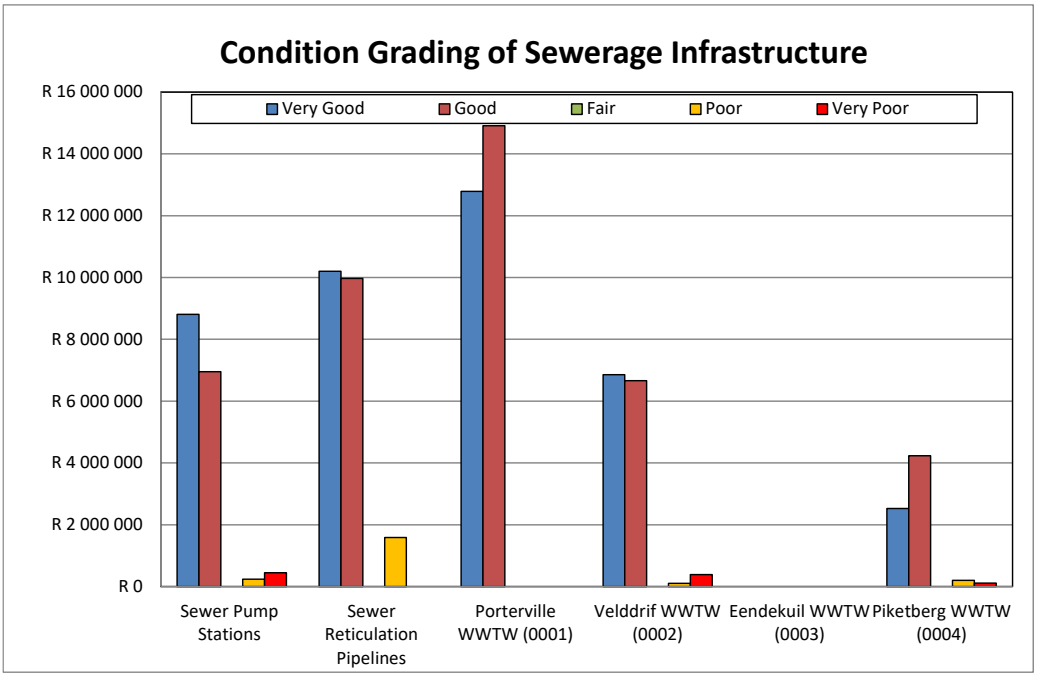


Figure A.3.8: Condition Grading of the Sewerage Infrastructure

Disaster Management Plan: A Municipal Disaster Plan is in place for Bergrivier Municipality. The Municipality is in the process of revising their risk assessment and to draw up a new Disaster Management Plan. Bergrivier Municipality must prepare and execute its disaster management plan within the Disaster Management Framework of the West Coast District Municipality. One of the KPIs of the Disaster Management Framework of the West Coast District Municipality is the drafting of detailed Disaster Management Plans by the local municipalities in the District.

The following disaster risks were identified during a risk assessment process conducted throughout the West Coast District, including Bergrivier Municipality.

- Risks requiring Risk Reduction Plans: Fire, drought, road accidents, winds, HIV/Aids, TP and Covid 19.
- Risks requiring Risk Preparedness (Contingency) Plans: Fire, drought, floods, storms, wind, diseases, food, poisoning, red tide, aircraft crash, storm surges, hazardous installations, road accidents, hazmat incidents (road, sea and rail), air pollution, water pollution, land degradation, deforestation, desertification and tornado.

A combined Risk Preparedness (Contingency) plan that addresses all the above was approved as part of the Disaster Management Plan.

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

Untreated Effluent Management Plan: All effluent discharged in the urban areas in Bergrivier Municipality are treated at the existing WWTWs and there is no known untreated effluent discharged to the environment. The existing W_2RAPs need to be updated.

TOPIC 4: WATER SERVICES OPERATION AND MAINTENANCE

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

Pipe bursts and other serious damage to pipes immediately interrupts services to the affected area and is rapidly addressed by Bergrivier Municipality. O&M is a continuous process for Bergrivier 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. Bergrivier Municipality's O&M Plan depends on a range of factors such as the age and condition of the water supply system (Pipe Replacement Study), requirements of the Municipality and DWS as the regulating authority, the availability of staff, plant, equipment, spares, money and other resources.

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

Table A.4.1: Operation and Maintenance

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

TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

A new WC/WDM Strategy was drafted for Bergrivier Municipality during the 2020/2021 financial year. The implementation of the WC/WDM measures by Bergrivier Municipality were extremely successful, especially over the drought period. The average annual growth percentage in total raw water requirements for Bergrivier Municipality over the period 2010/2011 to 2023/2024 was -0.02 %/a.

The table below gives a summary of the NRW, Water Losses and ILI for the various water distribution systems in Bergrivier Municipality's Management Area.

Table A.5.1: Treatment Losses, NRW, Water Losses and ILIs for the various water distribution systems

Description	Component	Unit	Record : Prior (Ml/a)					23/24
			18/19	19/20	20/21	21/22	22/23	
Porterville	Treatment Losses	Volume	80.321	45.414	45.681	35.989	21.304	46.007
		Percentage	17.00%	9.80%	9.80%	7.80%	5.20%	9.20%
	NRW	Volume	78.733	45.158	61.015	53.095	13.253	54.978
		Percentage	20.00%	10.80%	14.50%	12.40%	3.40%	12.10%
	Water Losses	Volume	77.947	44.323	60.171	52.239	12.474	54.068
		Percentage	19.80%	10.60%	14.30%	12.20%	3.20%	11.90%
	ILI			1.14	1.7	1.46	0.35	1.51
Piketberg	Treatment Losses	Volume	40.069	49.042	60.076	54.926	59.955	59.368
		Percentage	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%
	Bulk Distribution Losses	Volume	0.07	11.68	36.99	13.15	78.36	18.81
		Percentage	0.00%	1.90%	5.00%	1.90%	10.60%	2.60%
	NRW	Volume	113.793	116.729	150.126	95.732	100.691	68.378
		Percentage	18.80%	17.90%	20.90%	13.80%	15.20%	9.60%
	Water Losses	Volume	112.583	115.426	148.687	94.344	99.364	66.951
		Percentage	18.60%	17.70%	20.70%	13.60%	15.00%	9.40%
	ILI			1.46	2.17	1.36	1.43	0.97
Velddrif	NRW	Volume	16.774	126.55	82.662	134.744	199.882	153.86
		Percentage	2.70%	15.60%	10.30%	14.10%	18.40%	13.50%
	Water Losses	Volume	15.552	124.927	81.062	132.837	197.715	151.576
		Percentage	2.50%	15.40%	10.10%	13.90%	18.20%	13.30%
	ILI			2.47	2.2	3.54	5.27	4.01
Dwarskersbos	NRW	Volume	18.49	16.821	24.669	25.6	18.961	23.111
		Percentage	25.30%	19.50%	23.40%	21.80%	16.60%	16.60%
	Water Losses	Volume	18.344	16.649	24.458	25.365	18.733	22.833
		Percentage	25.10%	19.30%	23.20%	21.60%	16.40%	16.40%
	ILI			3.04	4.71	4.6	3.36	4.04
Aurora	Treatment Losses	Volume	7.686	7.879	4.117	3.66	4.677	3.666
		Percentage	19.80%	18.30%	9.40%	8.00%	9.80%	7.10%
	NRW	Volume	4.485	3.957	9.862	9.26	5.308	6.87
		Percentage	14.40%	11.20%	24.90%	21.90%	12.30%	14.40%
	Water Losses	Volume	4.423	3.887	9.783	9.175	5.221	6.775
		Percentage	14.20%	11.00%	24.70%	21.70%	12.10%	14.20%
	ILI			0.38	1.05	1.02	0.56	0.75
Eendekuil	Treatment Losses	Volume	-2.19	-10.423	-21.164	-18.15	-8.973	-10.964
		Percentage	-3.80%	-16.40%	-38.80%	-28.80%	-14.80%	-16.70%
	NRW	Volume	13.674	22.195	22.58	27.856	16.833	10.888
		Percentage	22.60%	30.00%	29.80%	34.30%	24.30%	14.20%
	Water Losses	Volume	13.553	22.047	22.428	27.694	16.744	10.735
		Percentage	22.40%	29.80%	29.60%	34.10%	24.10%	14.00%
	ILI			3.96	4.16	5.07	3.03	2.0
Redelinghuys	Treatment Losses	Volume	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
		Percentage	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
		Volume	3.959	10.534	9.379	9.565	6.887	4.892

Table A.5.1: Treatment Losses, NRW, Water Losses and ILIs for the various water distribution systems								
Description	**Component**	**Unit**	**Record : Prior (Ml/a)**					**23/24**
			18/19	**19/20**	**20/21**	**21/22**	**22/23**	
	Bulk Distribution Losses	Percentage	10.50%	21.90%	16.60%	16.40%	14.50%	9.40%
	NRW	Volume	9.626	11.352	13.573	17.465	11.283	-1.063
		Percentage	28.50%	30.20%	28.70%	35.80%	27.80%	-2.20%
	Water Losses	Volume	9.558	11.277	13.479	17.368	11.202	-1.158
		Percentage	28.30%	30.00%	28.50%	35.60%	27.60%	-2.40%
	ILI			4.29	4.93	6.18	3.98	**Negative**
Total	**NRW**	**Volume**	**255.575**	**342.762**	**364.487**	**363.752**	**366.261**	**317.022**
		Percentage	**14.10%**	**16.20%**	**16.50%**	**15.38%**	**15.24%**	**12.10%**
	Water Losses	**Volume**	**251.96**	**338.536**	**360.068**	**359.022**	**361.453**	**311.78**
		Percentage	**13.90%**	**16.00%**	**16.30%**	**15.18%**	**15.04%**	**11.90%**
	ILI			**2.06**	**2.15**	**2.11**	**2.12**	**1.83**

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

Category A = No specific intervention required.

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

Category C = Requires attention

Category D = Requires immediate water loss reduction interventions

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

The table below gives an overview of the System Input Volume, Average Billed Metered Consumption and Non-Revenue Water in litre per connection per day for the various water distribution systems for the 2023/2024 financial year.

Table A.5.2: System input volume, average billed metered consumption and non-revenue water in litre per connection per day for the various water distribution systems for 2023/2024							
Water Balance Component	**Porterville**	**Piketberg**	**Velddrif**	**Dwarskers-bos**	**Aurora**	**Eendekuil**	**Redelinghuys**
System Input Volume	733	756	762	610	520	619	573
Average Billed Metered Cons.	644	683	659	508	445	531	586
Non-Revenue Water	89	72	103	101	75	88	-13

Velddrif is the town with the highest system input volume and NRW per connection per day. Piketberg is the town with the highest average billed metered consumption per connection per day.

Bergrivier Municipality tries to keep their water losses below 15%. Bergrivier Municipality has no dedicated funding for WC/WDM measures, but most of the current WC/WDM measures are done through the Municipality's O&M budget. PRVs are in place in Porterville and Piketberg to reduce pressures within the various networks and all water pump stations are provided with standby pumps. Internal plumbing leaks are also repaired at low-income households on an ad-hoc basis.

Bergrivier Municipality implements the following WC/WDM measures to keep the NRW and water losses as low as possible.

- Reduce number of estimates for billed metered consumption or try to never estimate values (Monthly reading of all consumer water meters);

- Budget to replace old asbestos pipelines (Plot areas with the highest number of pipe bursts and use IMQS (database system) to identify specific areas). Continue with the implementation of the pipeline replacement programme.

- Continue with the implementation of pressure management measures (PRVs, Pressure management systems/Taps, etc.).

- Water meter audit – To determine which meters need to be replaced first, as well as determining the age and the accuracy of the meters.

- The use of telemetry systems and the correct installation of telemetry systems at strategic places (Data collection / monitoring, improved metering system and control, accurate flow monitoring, early warning system).

- Replacement of bulk, industrial and residential water meters on a regular basis. Replacement of faulty and old water meters and meters that became redundant (Implementation of Meter Management and Replacement Programme). Installation of smart water meters.

- Ensure all Municipal buildings are metered, as well as public open public spaces (If not known, determine and budget / install).

- Monthly reporting of WC/WDM measures.

- The logical identification of zones and the installation of bulk and residential water meters for monitoring, specific in problematic areas.

- Raise public awareness on WC/WDM measures (Pamphlets, Schools, Notice signs that indicate savings / losses.

- Try continuously to improve timelines for the calculation of losses (administrative losses).

- Install data loggers to determine MNFs in order to identify areas with high water losses.

Bergrivier Municipality's Water Conservation and Demand Management Plan (2020/2021) includes the following objectives and strategies.

Table A.5.3: Bergrivier Municipality's Water Conservation and Demand Management Plan: Objectives and Strategies

No	Objective	Strategy
A.1	Reduce and maintain low levels of water losses through the reticulation system.	Pressure reduction
		Establishment of reticulation leak detection teams.
A.2	Reduce and maintain low levels of non-revenue demand by consumers.	Water demand management in low-income areas.
		Implementation of debt management policy.
A.3	Adopt and implement proactive O&M measures.	Rehabilitation of the network system.
		Preventative maintenance of the system.
		Passive leakage control.
		Develop a uniform O&M policy.
A.4	Reduce and maintain low levels of billing and metering losses.	Data validation.
		Meter management and replacement program.
		Resolving billing exception reports.
		Management of large consumers.
		Reduction of illegal connections.
		Management of meter readings.
B.1	Promote efficient use of water to consumers and customers.	Generic consumer awareness campaign.
		Domestic consumer education campaign.
		School education.
		Special events.
		Establishment of horticultural and plumbing forums.
		Develop a webpage.
B.2		Revision the current by-laws

Table A.5.3: Bergrivier Municipality's Water Conservation and Demand Management Plan: Objectives and Strategies		
No	**Objective**	**Strategy**
	Regulate and enforce the prevention of wastage of water.	Enforcement of bylaws and restrictions
		Establishment of registration of plumbers
		Establishment of a municipal court
B.3	Ensure the efficient use of water in new developments and connections.	Incentive schemes for new developments.
		Revising engineering standards and development policies.
		Development of incentives for new customers.
		Sustainable delivery for new consumers
B.4	Introduce more equitable tariffs and informative billing.	Revise Water Services tariffs and structure
		Informative billing for customers.
		Monitoring of demand.
		Introduction of a voluntary insurance scheme.
B.5	Capacitate consumers to be more water efficient, including leak repair and retrofitting.	Plumbing retrofit program
		Promotion of water-wise gardening.
		Voluntary water audits for domestic consumers.
		Support programme for large consumers.
B.6	Reduce and maintain low levels of inefficient water use by the Municipality.	Water reduction by the parks department
		Reduction of water in Municipal owned buildings.
C.1	Maximise the use of treated effluent	Operations, maintenance and management of treated
C.2	Promote alternate water resources and technologies.	Rain harvesting
		Borehole extraction
		Grey water reuse
		Unconventional water sources
C.3	Conserve existing water resources.	The working for water program
		Catchment management
		Clean up rivers campaign
		Drought management policy
C.4	Ensure the quality of treated effluent is of suitable standards and operated efficiently.	Treated effluent of suitable standards and operated efficiently.
D.1	Establish appropriate management areas and monitor the unaccounted for water.	Establish district management areas.
		Monthly determination of the components of NRW.
D.2	Ensure there is information and policies to support decision making.	Management Information System (MIS).
		Installation and upgrading of telemetry system.
		End use and consumer behaviour research.
		Decision making policies on WCWDM.
D.3	Ensure all decisions are made in terms of Integrated Resource Planning (IRP).	Ensure the use of IRP principles for water resource planning.
		Review the impact of WCWDM on proposed new bulk infrastructure.
D.4	Monitor the impact of WC/WDM measures and KPIs.	Monitor the impact of WCWDM measures.
		KPI and benchmarks on WCWDM.
E.1	Ensure adequate financial resources.	Establishment of a WCWDM fund.
		Funding and joint ventures.
E.2	Ensure adequate human resources and processes.	Development of a suitable WCWDM section
		Development of WCWDM working procedures and responsibilities
E.3	Ensure adequate transparency, stakeholder buy in and commitment.	Political and management buy-in.
		Partnerships and cooperation with other institutions.
		Transparency and public participation.

The recommendations of the WC/WDM Strategy are as follows:

- The municipality must implement the strategy as the immediate option and review after a period of five years.
- WC/WDM must be advertised and continuously propagated.
- A budget should be allocated to WC/WDM, which is generated by extra revenue from water restriction tariffs or the savings achieved or the sale of treated effluent.
- WC/WDM should intensify over the next few years.

- Effluent treatment strategy must be fully implemented to generate income from effluent sales.
- All effluent sales revenue should be allocated to the WC/WDM budget.
- The finance department should estimate the financial impact of WC/WDM initiatives and the savings should be allocated to the WC/WDM budget.
- Human resource requirements must be addressed for the successful implementation of WC/WDM especially in a small municipality like Bergrivier Municipality where one person may hold more than one portfolio.
- The WC/WDM Strategy should be reviewed timeously to incorporate more accurate data and to reprioritise the various programs.
- A more accurate forecasting model for future consumption should be developed in conjunction with best international practices and Management Information Systems.

DWS's scorecard for assessing the potential for WC/WDM efforts was completed for Bergrivier Municipality. The aim of the scorecard was to establish areas where the municipality has made good progress in relation to WC/WDM and where there is still room for improvement. It can be seen from the Scorecard that there are 25 questions each of which carries a maximum of 4 points providing a possible maximum score of 100. If the Municipality has the specific item completely under control, it receives the maximum points and if it is neglecting the item completely it receives no points. There are various levels between the maximum and the minimum number of points assigned to the municipality for each item depending on the level of completeness or lack thereof. **The status quo score for Bergrivier Municipality is 72 out of 100 suggesting that the Municipality is making good progress with regard to the implementation of specific WC/WDM activities.**

TOPIC 6: WATER RESOURCES

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

Table A.6.1: Current water resources and volumes

Source Type	Scheme	Number of Sources	Current 23/24 Raw Water Volumes or Returns (Mm^3/a)	Licensed Abstraction / Returns (Mm^3/a)	Community water supply		Assessment Score
					Rural	Urban	
Groundwater	Aurora	4	0.051302	0.056000 (WARMS)	0%	100%	80%
	Eendekuil	1	0.000000	Unknown	0%	100%	60%
	Wittewater	2	Unknown	Not in place	0%	100%	0%
Surface Water	Porterville	4	0.501080	0.845566 (WARMS)	0%	100%	80%
	Piketberg	2	0.738200	0.945075 (WARMS)	0%	100%	80%
	Eendekuil	1	0.085107	0.075686 (WARMS)	0%	100%	80%
	Redelinghuys	1	0.052563	0.046500 (WARMS)	0%	100%	80%
	Wittewater	1	Unknown	Not in place	0%	100%	0%
	Goedverwacht	1	Unknown	Not in place	0%	100%	0%
External Sources (Bulk Purchase)	Velddrif	1	1.141928	1.439400 (Licence)	0%	100%	80%
	Dwarskersbos	1	0.139051		0%	100%	80%
Water returned to source	Porterville WWTW	1	0.324500	0.540	-	-	80%
	Piketberg WWTW	1	0.300158	Unknown	-	-	40%
	Velddrif WWTW	1	0.389185	0.355	-	-	60%
	Dwarskersbos WWTW	1	0.000000	Unknown	-	-	40%
	Eendekuil WWTW	1	0.019713	Not in place	-	-	20%

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

Table A.6.2: Additional water resources and volumes				
Source Type	**Schemes**	**Number of Sources**	**Potential Volume (Mm^3/a)**	**Licenced Abstraction (Mm^3/a)**
Groundwater	Aurora	1	0.016	Still to be done
	Eendekuil	1	0.020	Still to be done
Surface Water	Piketberg	1	0.300	Increased allocation from the WCWSS
External Sources (Bulk Purchase)	Velddrif	1	0.750	As part of augmentation of the WCWSS
	Dwarskersbos	1	0.075	

Bergrivier Municipality has an established monitoring plan to monitor the volume of water supplied to the various towns by the West Coast District Municipality and the volume of water abstracted from their own surface and ground water resources. IWA Water Balances figures are also reported to the DWS on a quarterly basis for all the water distribution systems.

Table A.6.3: Monitoring		
Monitoring	**Assessment Score**	
% of water abstracted monitored: Surface water	80%	
% of water abstracted monitored: Ground water	80%	
Monitoring	**Interval**	**Assessment Score**
Surface water levels (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily	80%
Ground water levels (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Never	0%
Water quality for formal schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily, Weekly, Bi-Weekly and Monthly	80%
Water quality for rudimentary schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Monthly (WC DM)	80%
Borehole abstraction? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily	80%

Detail IWA Water Balances are available for each of the water distribution systems (towns) in Bergrivier Municipality's Management Area. The graph below gives an overview of the average daily bulk raw water volume for all seven systems combined. The impact of the drought over the period 2016 to 2017 can be noted on the graph.

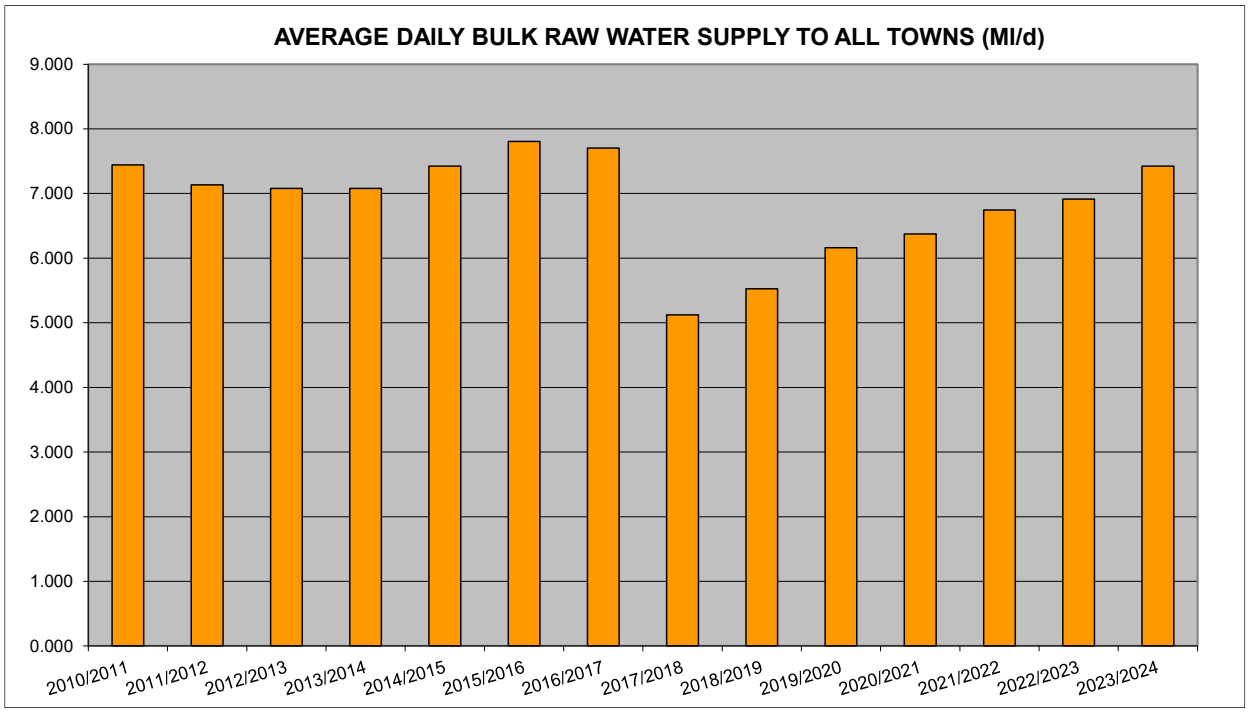


Figure A.6.1: Bergrivier Municipality's Average Daily Bulk Raw Water Volume

The graph below gives an overview of the annual bulk raw water supply volumes for the different systems.

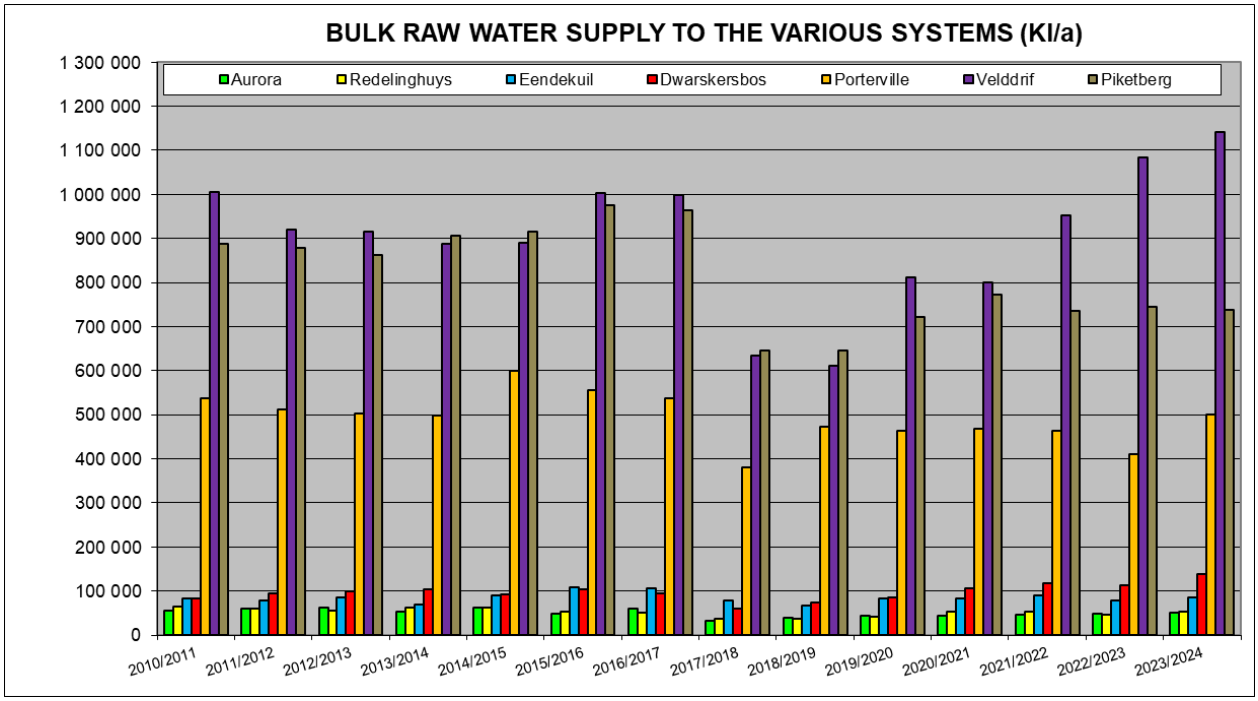


Figure A.6.2: Bulk Raw Water Supply per Distribution System

The table below summarise the bulk potable water (System Input Volume) supplied to the various towns in Bergrivier Municipality's Management Area.

Table A.6.4: Bulk potable water (System Input Volume) supply to the various towns

Distribution System	Source	Record : Prior (Ml/a)					23/24
		18/19	19/20	20/21	21/22	22/23	
Porterville	Voorberg Mountain Stream and two Fountains	473.286	462.667	467.864	464.219	410.580	501.080
Piketberg	Berg River and Voëlvlei Spring	645.058	721.456	772.214	736.740	744.482	738.200
Velddrif	Withoogte Scheme (Berg River)	611.198	811.611	800.185	953.371	1 083.530	1 141.928
Dwarskersbos	Withoogte Scheme (Berg River)	73.096	86.058	105.625	117.381	114.130	139.051
Aurora	Boreholes	38.802	43.074	43.793	45.914	47.962	51.302
Eendekuil	Waboomfontein Spring and Borehole	67.234	82.304	84.198	90.158	77.301	85.107
Redelinghuys	Matroosfontein Spring	37.551	41.818	52.458	54.140	45.164	52.563
Total		**1 946.225**	**2 248.988**	**2 326.337**	**2 461.923**	**2 523.150**	**2 709.231**

Water Quality: Operational and Compliance Water Quality Monitoring Programmes are implemented by the West Coast District Municipality and Bergrivier Municipality. The water quality results are loaded onto DWS's IRIS system via the internet. Once entered the data is automatically compared to the SANS241 Drinking Water Quality Standards. This real-time system allows for immediate intervention to rectify any problems.

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

Table A.6.5: Water Quality

Water Quality	In place	Status Quo	Assessment Score
Is there a Water Safety Plan in Place?	Yes	80%	80%
Reporting on quality of water taken from source: urban & rural	Yes	80%	80%
Quality of water returned to the resource: urban	Yes	80%	60%
Quality of water returned to the resource: rural	Not Applicable	Not Applicable	80%
Is there a Pollution contingency measures plan in place?	Yes	80%	80%

Table A.6.5: Water Quality			
Water Quality	**In place**	**Status Quo**	**Assessment Score**
Quality of water taken from source: Urban - % monitored by WSA self?	Yes	80%	80%
Quality of water taken from source: Rural - % monitored by WSA self?	Not Applicable	Not Applicable	80%
Quality of water returned to the source: Urban - % monitored by WSA self?	Yes	60%	60%
Quality of water returned to the source: Rural - % monitored by WSA self?	Not Applicable	Not Applicable	80%
Are these results available in electronic format?	Yes	80%	80%
% Time within SANS241 standards per year	Yes	60%	60%
Abstraction IS registered with DWS	Yes	80%	80%
The abstraction IS NOT registered with DWS	-	-	-
The abstraction IS recorded	Yes	80%	80%
The abstraction IS NOT recorded	-	-	-

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

The water quality performance indicators of all the water distribution systems in Bergrivier Municipality were categorised as either "Good" or "Excellent" for 2023/2024, except the "Acute Health Microbiological" indicator for Dwarskersbos, Piketberg, Velddrif and Redelinghuys and the "Operational Efficiency" indicator for Eendekuil that were categorised as "Unacceptable".

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

Table A.6.6: Percentage compliance of the water quality samples for the period July to June for the last two financial years						
Performance Indicator	**Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)**		**% Sample Compliance according to SANS 241-2015 Limits**		**Frequency of Additional Monitoring due to failure (Table 3 of SANS 241-2:2015)**	
	2022/2023	**2023/2024**	**2022/2023**	**2023/2024**	**2022/2023**	**2023/2024**
Porterville						
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Acute Health Microbiological	Yes (Unacceptable)	No (Good)	92.1%	96.0%	Monthly	Monthly
Chronic Health	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Aesthetic	No (Excellent)	No (Excellent)	99.0%	99.2%	-	-
Operational Efficiency	No (Good)	No (Good)	91.0%	91.9%	-	-
Piketberg						
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Acute Health Microbiological	Yes (Unacceptable)	Yes (Unacceptable)	81.3%	85.8%	Monthly	Monthly
Chronic Health	No (Excellent)	No (Excellent)	100.0%	99.2%	-	-
Aesthetic	No (Excellent)	No (Excellent)	98.8%	98.5%	-	-
Operational Efficiency	No (Good)	No (Good)	92.4%	90.9%	-	-
Dwarskersbos						
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Acute Health Microbiological	No (Good)	Yes (Unacceptable)	96.3%	79.4%	-	Monthly
Chronic Health	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Aesthetic	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Operational Efficiency	No (Excellent)	No (Excellent)	96.7%	95.8%	-	-
Velddrif						
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Acute Health Microbiological	No (Good)	Yes (Unacceptable)	96.1%	84.2%	-	Monthly
Chronic Health	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Aesthetic	No (Excellent)	No (Excellent)	99.8%	99.6%	-	-
Operational Efficiency	No (Excellent)	No (Excellent)	98.1%	97.7%	-	-
Aurora						
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Acute Health Microbiological	No (Excellent)	No (Good)	97.5%	96.1%	-	-

Table A.6.6: Percentage compliance of the water quality samples for the period July to June for the last two financial years						
Performance Indicator	**Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)**		**% Sample Compliance according to SANS 241-2015 Limits**		**Frequency of Additional Monitoring due to failure (Table 3 of SANS 241-2:2015)**	
	2022/2023	**2023/2024**	**2022/2023**	**2023/2024**	**2022/2023**	**2023/2024**
Chronic Health	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Aesthetic	No (Excellent)	No (Excellent)	94.4%	93.9%	-	-
Operational Efficiency	No (Excellent)	No (Excellent)	97.0%	94.8%	-	-
Eendekuil						
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Acute Health Microbiological	No (Excellent)	No (Excellent)	98.8%	100.0%	-	-
Chronic Health	No (Excellent)	No (Good)	100.0%	94.1%	-	-
Aesthetic	No (Excellent)	No (Excellent)	100.0%	99.3%	-	-
Operational Efficiency	Yes (Unacceptable)	Yes (Unacceptable)	87.9%	83.4%	Monthly	Monthly
Redelinghuys						
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Acute Health Microbiological	Yes (Unacceptable)	Yes (Unacceptable)	91.3%	94.9%	Monthly	Monthly
Chronic Health	No (Excellent)	No (Excellent)	100.0%	100.0%	-	-
Aesthetic	No (Excellent)	No (Excellent)	98.5%	99.7%	-	-
Operational Efficiency	No (Excellent)	No (Excellent)	93.0%	95.6%	-	-

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

Table A.6.7: Four Categories under which the Risks Posed by Micro-organism, Physical or Aesthetic Property or Chemical Substance of Potable Water is Normally Classified	
Category	**Risk**
Acute Health	Determinand that poses an immediate unacceptable health risk if present at concentration values exceeding the numerical limits specified in this part of SANS 241.
Aesthetic	Determinand that taints water with respect to taste, odour and colour and that does not pose an unacceptable health risk if present at concentration values exceeding the numerical limits specified in SANS 241.
Chronic Health	Determinand that poses an unacceptable health risk if ingested over an extended period if present at concentration values exceeding the numerical limits specified in SANS 241.
Operational	Determinand that is essential for assessing the efficient operation of treatment systems and risks from infrastructure

The table below indicates the compliance of the E.Coli monitoring frequency in the water distribution systems of Bergrivier Municipality, in terms of the minimum requirements of SANS:241-2: 2015 (Table 2). The period assessed was for samples taken from July 2023 to June 2024.

Table A.6.8: Bergrivier Municipality's compliance of the monthly E.Coli monitoring frequency in the water distributions systems in terms of the minimum requirements of SANS 241-2:2015 (Table 2).			
Distribution System	**Population served**	**Required number of monthly samples (SANS 241-2:2015: Table 2)**	**Average number of monthly microbiological compliance samples taken by the Bergrivier Municipality during 2023/2024**
Porterville	8 437	2	10.2
Piketberg	14 870	3	10.4
Velddrif	19 785	4	10.9
Dwarskersbos	1 012	2	5.1
Aurora	651	2	6.3
Eendekuil	1 940	2	6.0
Redelinghuys	609	2	6.4
Total	**47 304**	**17**	**55.3**

It can be noted from the above table that the number of monthly E.Coli samples taken by the Municipality during the 2023/2024 financial year was more than the required number of samples for all the water distribution systems.

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

Table A.6.9: Percentage Microbiological (Faecal Coliforms) compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2021/2022	2022/2023	2023/2024
Dwarskersbos	100.0%	100.0%	100.0%
Eendekuil	100.0%	100.0%	100.0%
Piketberg	25.0%	18.2%	66.7%
Porterville	33.3%	50.0%	58.3%
Velddrif	16.7%	0.0%	18.2%
Overall Compliance %	**55.0%**	**53.4%**	**69.0%**

Table A.6.10: Percentage Chemical compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2021/2022					2022/2023					2023/2024				
	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall
Dwarskersbos	N/A	N/A	83.3%	N/A	**83.3%**	N/A	N/A	75.0%	N/A	**75.0%**	N/A	N/A	100.0%	N/A	**100.0%**
Eendekuil	N/A	N/A	83.3%	N/A	**83.3%**	N/A	N/A	90.9%	N/A	**90.9%**	N/A	N/A	90.9%	N/A	**90.9%**
Piketberg	50.0%	100.0%	66.7%	83.3%	**75.0%**	18.2%	100.0%	54.5%	81.8%	**63.6%**	0.0%	100.0%	8.3%	50.0%	**39.6%**
Porterville	66.7%	83.3%	91.7%	75.0%	**79.2%**	91.7%	100.0%	100.0%	75.0%	**91.7%**	58.3%	100.0%	83.3%	66.7%	**77.1%**
Velddrif	0.0%	91.7%	0.0%	25.0%	**29.2%**	25.0%	83.3%	41.7%	58.3%	**52.1%**	18.2%	100.0%	45.5%	63.6%	**56.8%**
Overall Compliance %	**38.9%**	**91.7%**	**65.0%**	**61.1%**	**64.3%**	**45.7%**	**94.3%**	**72.4%**	**71.4%**	**71.2%**	**25.7%**	**100.0%**	**65.5%**	**60.0%**	**63.2%**

Table A.6.11: Percentage Physical compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2021/2022				2022/2023				2023/2024			
	pH	Electrical Conductivity	Total Suspended Solids	Overall	pH	Electrical Conductivity	Total Suspended Solids	Overall	pH	Electrical Conductivity	Total Suspended Solids	Overall
Dwarskersbos	58.3%	0.0%	N/A	**29.2%**	100.0%	0.0%	N/A	**50.0%**	100.0%	0.0%	N/A	**50.0%**
Eendekuil	100.0%	100.0%	N/A	**100.0%**	100.0%	100.0%	N/A	**100.0%**	100.0%	100.0%	N/A	**100.0%**
Piketberg	100.0%	75.0%	83.3%	**86.1%**	100.0%	45.5%	27.3%	**57.6%**	91.7%	25.0%	25.0%	**47.2%**
Porterville	100.0%	100.0%	75.0%	**91.7%**	100.0%	100.0%	83.3%	**94.4%**	100.0%	100.0%	66.7%	**88.9%**
Velddrif	100.0%	25.0%	16.7%	**47.2%**	83.3%	25.0%	41.7%	**50.0%**	100.0%	27.3%	45.5%	**57.6%**
Overall Compliance %	**91.7%**	**60.0%**	**58.3%**	**71.8%**	**96.6%**	**53.4%**	**51.4%**	**69.5%**	**98.3%**	**50.0%**	**45.7%**	**67.5%**

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

Table A.6.12: Trend of microbiological, chemical and physical compliance percentages for the various WWTWs.

WWTW	2019/2020 to 2021/2022			2021/2022 to 2023/2024		
	Micro.	Chemical	Physical	Micro.	Chemical	Physical
Dwarskersbos	Same	Decrease	Increase	Same	Increase	Increase
Eendekuil	Increase	Increase	Same	Same	Increase	Same
Piketberg	Decrease	Increase	Increase	Increase	Decrease	Decrease
Porterville	Decrease	Increase	Increase	Increase	Decrease	Decrease
Velddrif	Decrease	Decrease	Decrease	Increase	Increase	Increase

Industrial Consumers: Special application must be made to discharge industrial effluent into the sewage disposal system including detailed information to ensure the composition of the effluent meets the standards and criteria of the Municipality. The Municipality's Water Services By-law, with regard to the discharge of industrial effluent into the sewer system, were promulgated and all industrial consumers need to formally apply for the discharge of industrial effluent into the sewer system.

TOPIC 7: FINANCIAL

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

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

Financial Year	Water Infrastructure			Sewerage Infrastructure		
	Budget	Expenditure	% Spend	Budget	Expenditure	% Spend
2019/2020	R1 810 000	R1 824 449	101%	R7 126 704	R6 095 250	86%
2020/2021	R4 391 000	R2 594 724	59%	R8 493 437	R6 289 301	74%
2021/2022	R5 360 657	R5 309 758	99%	R11 032 744	R9 993 483	91%
2022/2023	R24 246 646	R23 360 486	96%	R6 117 716	R4 448 108	73%
2023/2024	R20 843 843	R19 723 429	95%	R12 196 004	R11 880 771	97%
Total for 5 yrs	**R56 652 146**	**R52 812 846**	**93%**	**R44 966 605**	**R38 706 913**	**86%**
Average per yr	**R11 330 429**	**R10 562 569**	**93%**	**R8 993 321**	**R7 741 383**	**86%**

Operational Budget: The table below gives a summary of the total O&M expenditure and income for water and sanitation services for the last five financial years.

Table A.7.2: Summary of Operational and Maintenance expenditure and income budgets for water and sanitation services

Description	Record Prior (R)				2023/2024
	2019/2020	2020/2021	2021/2022	2022/2023	
Water Services					
Expenditure	R21 304 717	R19 205 696	R22 961 276	R28 762 834	R32 168 236
Income	R30 870 115	R35 054 863	R39 397 815	R46 632 011	R58 727 549
Surplus / Deficit	**R9 565 398**	**R15 849 167**	**R16 436 539**	**R17 869 177**	**R26 559 313**
Sanitation Services					
Expenditure	R12 679 726	R13 100 560	R8 509 260	R13 780 464	R15 556 657
Income	R16 509 629	R22 569 830	R24 805 573	R21 816 264	R24 729 960
Surplus / Deficit	**R3 829 903**	**R9 469 270**	**R16 296 313**	**R8 035 800**	**R9 173 303**

Tariff and Charges: Bergrivier Municipality's current (2024/2025) water and sanitation tariffs are based on the following:

- An availability fee is payable annually for both water and sanitation services.
- A six block step rising residential water tariff structure with the first 6 kl/month being free for all indigent registered households (Subsidised). Residential consumers also pay a fix basic monthly charge per month.
- A nine block water tariff structure for commercial consumers, with rising water tariffs for the first six blocks up to 1 000 Kl/month, where after the water tariffs decrease for the next three blocks (1 000 – 1500 Kl; 1501 – 2 000 Kl and > 2 000 Kl).
- A two block step rising water tariff structure for Sport Clubs, Schools, Welfare Organisations, Municipal usage and consumers outside the previous municipal area.
- The sanitation tariffs for residential consumers, flats and old age homes are fix per month.
- The sanitation tariffs for Institutional consumers are fix per month, with an additional charge for each toilet / urinal more than four on the property.
- The sanitation tariffs for Commercial consumers are fix per month, with an additional charge for each toilet / urinal more than four on the property. There is also a fix charge per self-catering unit on a property per month.

- Fix sanitation tariffs are also in place for office hours, after office hours and for Sundays and Public Holidays for the emptying of septic or conservancy tanks.

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

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

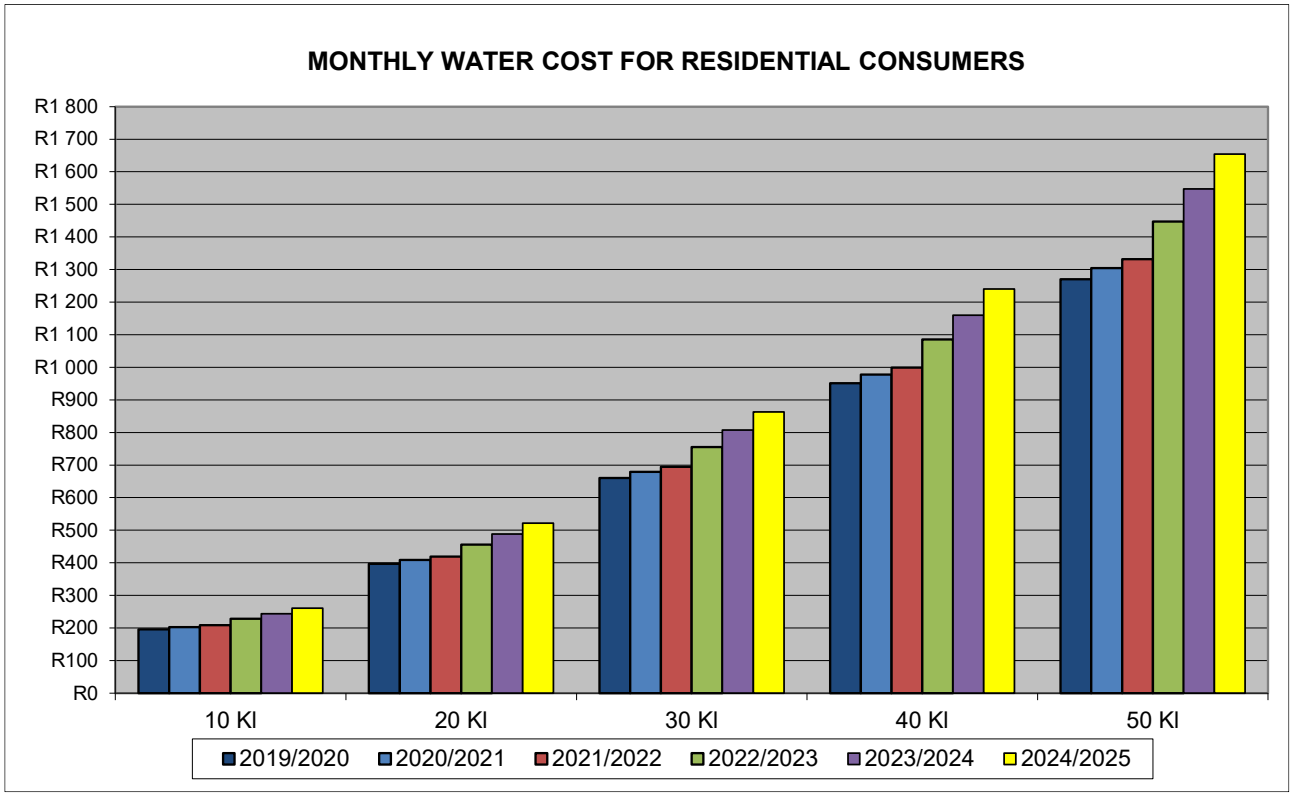


Figure A.7.1: Water Cost for Residential Consumers

TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

Bergrivier Municipality is the WSA and Water Services Provider for the various towns in the Municipality's Management Area. A Service Level Agreement is in place between Bergrivier Municipality and the West Coast District Municipality for the provision of bulk potable water to Velddrif and Dwarskersbos. The small rural settlements of Goedverwacht and Wittewater are Moravian Mission stations and the services are managed by the Church and Bergrivier Municipality only provides a support service to the Church.

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

The SDBIP is the process plan and performance indicator / evaluation for the execution of the budget. The SDBIP is being used as a management, implementation and monitoring tool that assists and guide the Executive Mayor, Councillors, Municipal Manager, Senior Managers and the community. The plan serves as an input to the performance agreements of the Municipal Manager and Directors. It also forms the basis for the monthly, quarterly, mid-year and the annual assessment report and performance assessments of the Municipal Manager and Directors.

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

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

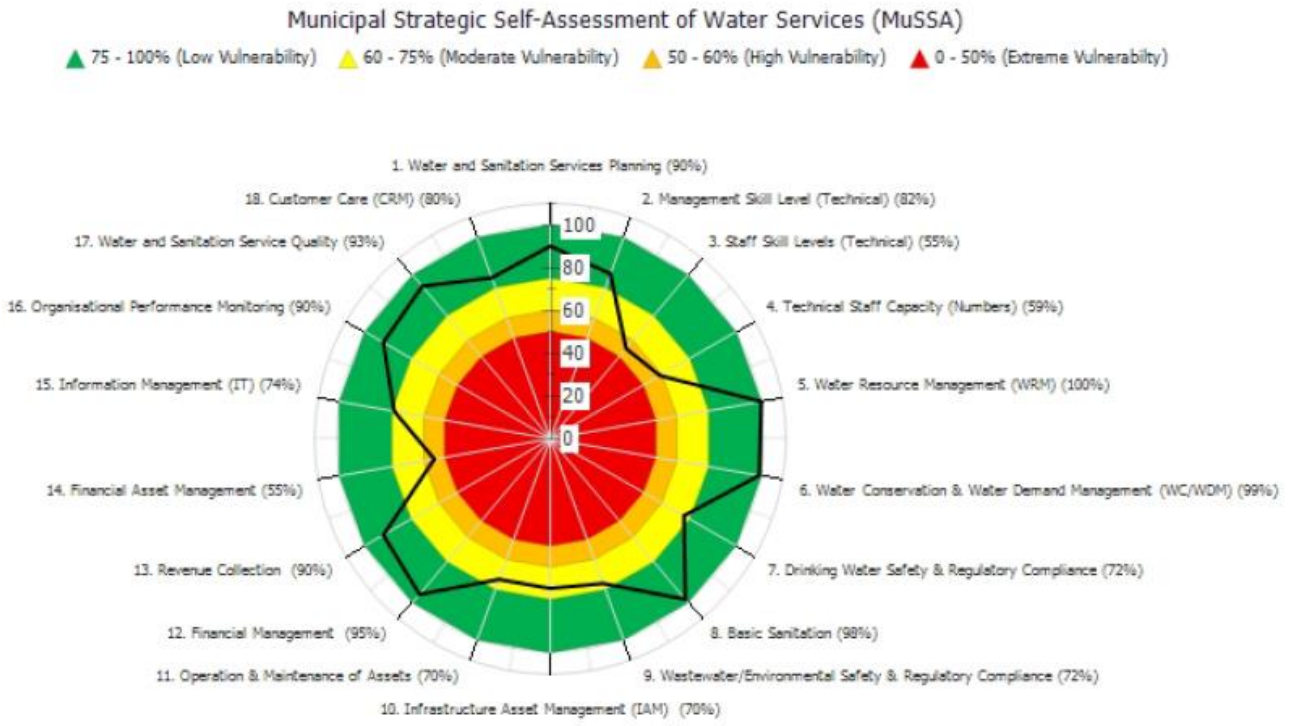


Figure A.8.1: Spider Diagram of the Vulnerability Levels of Bergrivier Municipality for 2024

Bergrivier Municipality's Vulnerability Index for 2024 was indicated as 0.40 "Moderate Vulnerability". The areas of concern evident from the 2024 assessment is Financial Asset Management: 55.0 %, Staff Skill Levels (Technical): 55.0% and Technical Staff Capacity (Numbers): 59.0%, all High Vulnerability.

A comprehensive Customer Services and Complaints system is in place at Bergrivier 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.

Bergrivier Municipality further developed a Client Services Charter in collaboration with various stakeholders to affirm their commitment to providing unsurpassed service delivery within the Bergrivier Municipality's Management Area. The standards for water and sewerage services, as stipulated in the Client Services Charter, are summarised in the table below.

Table A.8.1: Water and Sewerage standards as included in the Client Services Charter	
Water	
Connection	Done within five (5) working days after receipt of the completed application form.
Replacement of meters	Done within three (3) working days after the incident. Bulk meters are replaced within four (4) working days after receipt of completed application form.
Resumption of service	Within one (1) working day after payment.
Broken pipes	Repaired within one (1) working day after the incident. Repair main line broken pipes within two (2) days after the incident.
Storm damage of water source	Repaired within four (4) working days after the incident.
Sewerage	
Connection	Done within five (5) working days after receipt of the completed application form.
Collection	Done within one (1) working day after receipt of the request.
Obstruction and damage	Repaired within one (1) day after the incident.

"Community involvement and excellent client services are the building blocks of Bergrivier Municipality"

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

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

The purpose of the 2023 No Drop Assessments was twofold:

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

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

Table A.8.3: No Drop Performance of the Municipality (DWS's 2023 No Drop Report)		
No Drop Score (2021/2022)		**80%**
Criteria	**Weight**	**Score**
1: WC/WDM Strategy, Planning and Implementation	45%	70% (Average)
2: Asset Management	10%	40% (Poor)
3: Technical Skills	10%	80% (Good)
5: Compliance and Performance	35%	76% (Average)
Weighted Sub-Total		70%
Bonus		10%
Score		80% (Good)
Penalty 1: No evidence of approved budget		-2.4%
Penalty 2: Section 82 of the Water Servies Act		0.0%

Criteria 1 Sub-Items: WC/WDM Strategy, Planning and Implementation	
Item	**Score (Max = 1)**
1.1: Water Resources	1.0 (Excellent)
1.2: Water Balance	1.0 (Excellent)
1.2: WC/WDM Strategy and Business Plan	0.3 (Poor)
Penalty 1: No evidence of approved budget	0.0
Criteria 5 Sub-Items: Compliance and Performance	
Item	**Score (Max = 1)**
5.1: Reticulation Leak Repair	0.3 (Poor)
5.2: Physical Water Losses	1.0 (Excellent)
5.3: Commercial Water Losses	0.9 (Excellent)
5.4: Non-Revenue Water	0.9 (Excellent)
5.5: Water Use Efficiency	0.7 (Average)
Water Balance Integrity	**High (Excellent)**

Regulatory Impression: The score of 80% indicates a good performance for Bergrivier Municipality.

- Improvements should be implemented where gaps have been identified to shift to “excellent”. Bergrivier Municipality has demonstrated a good understanding of its water use situation and WC/WDM strategy.
- The IWA water balance included all the required components and covered the supply area. The integrity of the water balance was considered to be high.
- Proof of some consumer meter maintenance and replacements was provided, but an insufficient number of interventions were implemented during the 2021/22 audit period.
- There are staff at the WSA responsible for water loss management, but there were shortcomings in the team and/or the related documentation.
- Leak repairs were proven, but an insufficient number of repairs were completed in the 48-hour response time.
- The regulator calculated the key performance indicators for physical water losses (ILI), commercial water losses, NRW, water use efficiencies based on the water balance.

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

Table A.8.4: Blue Drop Performance of the Municipality (DWS's 2023 Blue Drop Report)	
Municipal Blue Drop Score	**2011 – 85.20%, 2012 – 90.60%, 2014 - 63.79% and 2023 – 85.08%**

Introductions: The Bergrivier Local Municipality (BLM) supplies approximately 39 622 people with potable water through its 6 water supply systems, mainly by its own personnel as well as 1 water service provider namely West Coast District Municipality (WCDM):

- The Aurora system abstracts raw water from 5 boreholes for treatment at the Aurora WTP, which serves 626 people, delivered at a SIV of 126 kl/d of which 100% is distributed by the BLM.
- The Eendekuil system abstracts raw water from the Waboomfontein Spring and a borehole for treatment at the Eendekuil WTP, which serves 1 790 people delivered at a SIV of 224 kl/d of which 100% is distributed by the BLM.
- The Piketberg system abstracts raw water from the Berg River (90%) and Voëlvlei spring (10%) for treatment at the Piketberg WTP, which serves 12 075 people delivered at a SIV of 1 862 kl/d of which 100% is distributed by the BLM.
- The Porterville system abstracts raw water from the Waterfall stream and North/South springs in the Winterhoek mountain for treatment at the Porterville WTP, which serves 7 057 people delivered at a SIV of 2 535 kl/d of which 100% is distributed by the BLM.
- The Redelinghuys system abstracts raw water from the Matroos fountain for treatment at the Redelinghuys WTP, which serves 574 people delivered at a SIV of 156 kl/d of which 100% is distributed by the BLM.
- The Velddrif system obtains water from the WCDM's Withoogte plant to serve 17 500 people delivered at a SIV of 2 611 kl/d of which 100% is distributed by the BLM once the water is received in the two receiving reservoirs at Velddrif.

Regulators Comments: The Bergrivier Local Municipality (BLM) was represented by the Head (Civil Services) as well as the Manager of Civil Services and accompanied by a team of three technical managers responsible for the systems. The team was familiar with the blue drop system procedure, and this was reflected in most of the required information already uploaded on IRIS. The BLM has a fairly constant Blue drop score history ranging from 85% in 2011 and 91% in 2012.

The WSI completed water safety plans in 2017 of which many items mentioned in these plans have been implemented while process audits were also presented for all the systems. The water safety plans are in the process of being updated with a service provider to be appointed soon. In general, it was seen that recommendations from these two documents are being attended to. The WSI's support functions on the maintenance side is in place while there is also a good complement of technical people appointed on the management side to oversee and implement operations. Scientific services are outsourced to a service provider, and it might be advantageous to the WSI to consider appointing in-house scientific capacity for the sake of continuity. Satisfactory handling of incidents and implementation of water demand management was seen. The WSI is requested to ensure that calibration of its flowmeters is done regularly to ensure correct reporting of volumes.

The total capital budget for the municipality is R42.2 million, of which R40.4 million has been used on several projects as set out in the individual systems hereunder.

Blue Drop Findings:

Aurora WSS:

- The site lacked sufficient process controller attendance, but the small system is adequately looked after on the supervision side.
- Findings from the process audit need to be implemented.
- The water safety plan of 2017 has in large been implemented, however, updating of this WaSP needs to continuously take place and the LM is encouraged to attend to this.
- Capital work done at this WSS was to strengthen the floor on which the package plant is situated as well as to reline the final reservoir.
- The design capacity was confirmed as 200 kl/d and operating at 63% of its capacity.
- The microbiological compliance was excellent while the chemical acute compliance was also excellent, resulting in a low-risk rating of 15.3% for this system.

Eendekuil WSS:

- The site lacked sufficient process controller attendance, but the small system is adequately looked after by the supervisor.
- Free chlorine and pH readings are done daily and the WSI is urged to comply with minimum requirements as per SANS241.

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

- Findings from the process audit were found not to be implemented.
- The water safety plan of 2017 has in large been implemented, however, updating of this WaSP needs to continuously take place and the LM is encouraged to attend to this.
- Capital work done at this WSS was to replace the roof of the reservoir and to fence the treatment facility.
- The design capacity was confirmed as 200 kl/d and operating at 112% of its capacity, and expansion is urgently needed.
- Microbiological- and chemical acute compliance of the final water were excellent, contributing to a low-risk rating.

Piketberg WSS:

- The site's process controller complement is insufficient, although the supervision of the site conforms to BD requirements.
- Findings from the process audit were found not to be implemented.
- The water safety plan of 2017 has in large been implemented, and the team demonstrated knowledge of the WaSP, with particularly deterioration of raw water qualities during heavy rain mentioned. As per WaSP, a new 5 Ml reservoir will be constructed soon and is out on tender. A pipe replacement program for replacing old asbestos lines is being done.
- Capital work done at this WSS was to upgrade sections of the WTP, while the majority of the work was done on the pipe replacement programme.
- The design capacity was confirmed as 3.15 Ml/d and operating at 59.1% of its capacity.
- The microbiological compliance is poor while the chemical acute compliance of its final water is excellent. The intermediate risk rating of 36.8% for this system reflects these numbers.

Porterville WSS:

- The site's process controller and supervisor complement comply with national regulations.
- Findings from the process audit were found not to be implemented.
- The water safety plan of 2017 has in large been implemented, and the team demonstrated partial knowledge of the WaSP, with mention made of the sustainability of the plant.
- No work of a capital nature was done at this plant in the past year.
- The design capacity was confirmed as 2.27 Ml/d and operating at 51.67 % of its capacity.
- The microbiological compliance is excellent while the chemical acute compliance of its final water is also excellent. The intermediate risk rating of 28.1% for this system reflects the limited treatment capacity of the WTP.

Redelinghuys WSS:

- The site lacked sufficient process controller attendance, but the small system is adequately looked after by the supervisor.
- Findings from the process audit were found not to be implemented.
- The water safety plan of 2017 has in large been implemented, and the team demonstrated partial knowledge of the WaSP, with mention made of the raw water supply to be the biggest risk.
- No work of a capital nature was done at this plant in the past year.
- The design capacity was confirmed as 260 kl/d and operating at 60% of its capacity.
- Both the microbiological compliance and chemical acute compliance of its final water were excellent, resulting in a low-risk rating of 16.2% for this system.

Velddrif WSS:

- No water safety plan for this system was presented and the WSI is urged to include this system for evaluation to the appointed service provider.
- Work of a capital nature in the reticulation system was the ongoing pipe replacement programme.
- Both the microbiological- and chemical acute compliance of its final water were excellent, with a low-risk rating of 19.9%.

Technical Site Assessment: Piketberg WTP:

The Piketberg WTP was inspected to verify the Blue Drop audit findings and received a technical site score of 89%. The plant was found to be in a good condition, well managed and only required some minor general repairs to be done to the staff facilities and general upkeeping of the buildings. Some adjustments to the raw water pumps and recycling of washing water can be considered. The final water produced by the treatment plant has a risk on the microbiological compliance side in that the micro compliance is only 90% which presents a risk to the end-user. As the chlorine dosing facility at

Table A.8.4: Blue Drop Performance of the Municipality (DWS's 2023 Blue Drop Report)							
the site is in working order, this is probably an operational issue and needs to be addressed. Detailed information is available in the BD Watch Report.							
Performance Area		**Aurora**	**Eendekuil**	**Piketberg**	**Porterville**	**Redelinghuys**	**Velddrif**
Bulk/WSP		-	-	-	-	-	West Coast DM Bulk
Capacity Management	15%	80.00%	80.00%	82.00%	98.00%	80.00%	85.20%
DWQ Risk Management	20%	81.00%	81.00%	81.00%	85.00%	85.00%	90.80%
Financial Management	10%	84.75%	84.75%	84.75%	84.75%	84.75%	84.75%
Technical Management	20%	65.00%	56.00%	65.00%	56.00%	56.00%	92.50%
DWQ Compliance	35%	80.00%	80.00%	50.00%	89.00%	100.00%	98.80%
Bonus	10%	75.00%	75.00%	100.00%	100.00%	75.00%	100.00%
Penalties	10%	0.00%	0.00%	50.00%	0.00%	0.00%	0.00%
Disqualifiers		None	None	None	None	None	None
Blue Drop Score (2023)	**%**	**83.30%**	**81.50%**	**69.98%**	**87.53%**	**87.43%**	**95.00%**
Blue Drop Score (2014)	%	62.30%	49.29%	57.01%	72.90%	54.80%	67.00%
Blue Drop Score (2012)	%	83.80%	90.20%	87.50%	95.00%	73.30%	97.60%
Blue Drop Score (2011)	%	70.40%	76.20%	68.80%	78.20%	52.70%	93.20%
System Design Capacity	kl/d	200	200	3 150	2 270	260	72 000
System Available Capacity	kl/d	200	200	3 150	2 270	260	72 000
System Input Value	kl/d	126	224	1 862	1 173	156	2 611
Capacity utilization	%	63.00%	112.00%	59.11%	51.67%	60.00%	50.00%
Average Daily Consumption	l/p/d	201	125	154	166	272	149
Resource Abstracted From		Underground Water	Waboomfontein Spring and Borehole	Bergrivier 90% and 10% Voëlvlei spring	Three fountains from the mountains - Waterfall stream and North/South springs from Winterhoek mountain	Matroosfontein Fountain	Misverstand Weir on the Berg River
Microbiological Compliance	%	99.99%	99.99%	90.29%	99.01%	97.44%	98.20%
Chemical Health Compliance	%	98.70%	98.68%	99.01%	99.27%	97.75%	98.69%
Risk Defined Compliance	%	92.95%	91.19%	91.30%	94.82%	96.65%	96.82%
VROOM	Rand	-	-	R1 893 100	-	-	R2 296 800
BDRR 2023	**%**	**15.32%**	**21.51%**	**36.79%**	**21.34%**	**16.21%**	**19.87%**
BDRR 2022	**%**	**16.10%**	**15.60%**	**32.00%**	**22.90%**	**14.30%**	**49.90%**

The average residential daily consumption (l/p/d) for the last eight financial years, as calculated from the IWA Water Balances for each of the water distribution systems, are summarised in the table below.

Table A.8.5: Average residential daily consumption (l/p/d) for the last eight financial years.

Distribution System	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024		
	Average Daily Billed Metered Residential Consumption (l/p/d)							Estimated Permanent Population	Aver. Daily Billed Metered Residential Consumption (kl)	Average Daily Billed Metered Residential Consumption (l/p/d)
Porterville	**121**	**102**	**79**	**98**	**96**	**96**	**93**	8 437	831	**98**
Piketberg	**106**	**73**	**63**	**74**	**77**	**78**	**77**	14 870	1 235	**83**
Velddrif *	**166**	**110**	**72**	**77**	**83**	**83**	**76**	19 785	1 732	**88**
Dwarskersbos *	**260**	**160**	**114**	**180**	**199**	**209**	**192**	1 012	254	**251**
Aurora	**145**	**103**	**100**	**99**	**107**	**118**	**133**	651	94	**144**
Eendekuil	**82**	**57**	**50**	**58**	**60**	**58**	**53**	1 940	130	**67**
Redelinghuys	**143**	**105**	**82**	**92**	**103**	**99**	**101**	609	93	**153**
All Systems	**136**	**95**	**77**	**84**	**88**	**86**	**82**	**47 304**	**4 369**	**92**

Note: * The average residential billed metered consumptions in the above table for Velddrif and Dwarskersbos are for the period July to June each financial year, excluding the period November to February.

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 Bergrivier Municipality is summarised as follows in the DWS's 2022 Green Drop Report.

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

Average Green Drop Score	2009 – 11.0%, 2011 – 70.0%, 2013 – 44.0%, 2021 – 72.0%

Regulator's Comment: Bergrivier Local Municipality delivered an impressive performance with a Green Drop score improvement from 44% in 2013 to 72% in 2021. This is exceptional and the teams are congratulated for the impressive turnaround. The Regulator commends the municipality for their dedication and preparedness during both audit events. The auditors were impressed by the diligence of this team, considering the challenges that impact on service delivery. The municipality has divided responsibilities to the respective area managers which appears to be a practical and efficient arrangement.

The Porterville WWTW is in process of upgrading and refurbishing, and it is expected that this system may achieve Green Drop status in the 2023 audit cycle. The risk rating of all WWTWs has consistently been in moderate and low CRR space, with the only negative risk indicator being the Supervisors and Process Controllers not being registered. A concerted effort must be taken to register and upload these certificates on IRIS. Further areas for improvement include the implementation of the W_2RAP, conducting process audits on the advanced systems, improving sludge management plans and monitoring, and ensure that flow meters are calibrated. It is claimed that the Eendekuil and Dwarskersbos WWTWs are evaporation ponds and must therefore be confirmed as such in the Authorisation by DWS, which will be beneficial when scoring effluent quality. Effluent qualities should target >90% for microbiological, chemical, and physical compliance, to work towards Green Drop Certification in 2023. The Regulator is confident that this target is achievable by this accomplished Bergrivier team, should they act on the recommendations provided herein. The Department is pleased to note that all WWTWs are in low risk- and medium risks positions. By implementing the recommendations contained hereunder, Bergrivier would be a candidate for Green Drop Certification in 2023.

Green Drop findings:

1. None of the five (5) treatment plants' Process Controllers or Supervisors are registered on IRIS.
2. There are no inhouse scientists employed within the municipality, although this gap is addressed via the outsourcing of analytical services.
3. None of the WWTWs have Sludge Management Plans or dedicated sludge stream (operational) monitoring in place.
4. Documents are in place and of good quality, but proof of implementation need to be readily available for most of the sections that were assessed, which prevented higher scoring during the assessments.
5. Non-compliant effluent quality compliance at all treatment works is a concern.
6. Calibration of the meters is not conducted timeously which places doubt on the credibility of flow records.
7. Bonus scores were not fully used, including training, water balances, wastewater balances, impact monitoring, and beneficial use of biosolids and energy efficiency initiatives.
8. Capital budgets had been secured for capital projects for replacement, upgrades, and addition of new unit process at some of the WWTWs and associated infrastructure:
    - R6,500,000: Piketberg WWTW upgrades through WSIG funding
    - R5,800,000: Porterville WWTW upgrades through WSIG funding
    - R2,000,000: Velddrif WWTW upgrades through WSIG funding
    - R15,000,000: Eendekuil WWTW upgrades through WSIG funding
    - R15,000,000: Dwarskersbos WWTW upgrades through WSIG funding.

The Piketberg WWTW was inspected to verify the Green Drop audit findings (**Technical Site Assessment: Piketberg WWTW 66%):**

- During the time of audit assessment, the inlet works mechanical screw was out for repairs for a period of 2 weeks.
- Two activated sludge modules, one new module and one aged module, are in place. The older module was not functional for 3 months prior to the audit, due to cable theft/vandalism.
- Two secondary clarifiers were both in good condition, however scum removal was inefficient and contribute to sub-standard final effluent quality.
- Two sludge ponds and one maturation dam were in fair condition, with good establishment of reedbeds.
- Disinfection via chlorine dosing was offline due to vandalism and theft.
- The plant generally appeared to be in good appearance, infrastructure mostly functional and groundskeeping well executed.

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

- Process optimisation and mechanical refurbishments would be beneficial to improve the performance of the plant and the final effluent and sludge quality.
- Energy efficiency initiatives and measurement would raise the standard of the plant and contribute to the professional status of the technical staff.
- Theft if a major problem, but limited anti-vandalism strategies seems to be in place – this needs to be captured in the revised W_2RAP, along with issues of potential flooding, droughts, climate impact, and pandemic situations.
- The practice whereby raw sewage is being diverted to the sludge ponds, due to stolen equipment and the second reactor is of major concern and must be addressed as a priority.
- There were no serious defects noted on the sewer network and pumpstations.

GREEN DROP REPORT CARD						
Key Performance Area	**Weight**	**Piketberg**	**Porterville**	**Velddrif**	**Eendekuil**	**Dwarskersbos**
A: Capacity Management	15%	66.0%	74.0%	66.0%	67.5%	57.5%
B: Environmental Management	15%	72.0%	72.0%	65.0%	66.3%	65.0%
C: Financial Management	20%	78.0%	78.0%	78.0%	72.5%	72.5%
D: Technical Management	20%	71.0%	71.0%	56.0%	41.2%	41.2%
E: Effluent & Sludge Compliance	30%	57.0%	72.0%	47.5%	53.8%	53.8%
F: Bonus		45.0%	49.0%	64.0%	49.0%	55.0%
G: Penalties		0.0%	0.0%	0.0%	0.0%	-25.0%
H: Disqualifiers		None	None	None	None	None
2021 Green Drop Score		**73%**	**81%**	**66%**	**61%**	**59%**
2013 Green Drop Score		**49%**	**63%**	**41%**	**24%**	**49%**
2011 Green Drop Score		**74%**	**82%**	**58%**	**38%**	**73%**
2009 Green Drop Score		**11%**	**17%**	**5%**	**0%**	**11%**
System Design Capacity (Ml/d)		3.150	1.500	1.992	0.1400	0.294
Design Capacity Utilisation (%)		70%	47%	85%	64%	32%
Resource Discharged into		Irrigation	Irrigation	Golf course + sportsfields	Evaporation	Evaporation Ponds
Microbiological Compliance (%)		44%	100%	44%	NMR	NMR
Chemical Compliance (%)		77%	80%	31%	NMR	NMR
Physical Compliance (%)		92%	94%	70%	NMR	NMR
Wastewater Risk Rating (CRR% of CRRmax)						
2011 CRR (%)		**58.8%**	**41.2%**	**58.8%**	**52.9%**	**52.9%**
2013 CRR (%)		**58.8%**	**41.2%**	**58.8%**	**76.5%**	**76.5%**
2021 CRR (%)		**58.8%**	**47.1%**	**64.7%**	**35.3%**	**29.4%**

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

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

Municipal CRR% 2023 (%CRR/CRRmax)	69.8%

Introduction:

The Berg Rivier Local Municipality owns and operates five WWTWs including two oxidation pond systems Dwarskersbos (Class E) and Eendekuil (Class E), as well as three activated sludge works namely Piketberg (Class D) Porterville (Class E) and Velddrif (Class C). These five systems serve a population of approximately 74 042 people.

Regulator's Comments: All WWTWs are registered and plant drawings and design as well as technical information were available. According to the records provided, all the works are operating within their design capacity, but flow measurement data was not available for some of the sites. However, three of the works, Dwarskersbos, Velddrif and Eendekuil are in the high-risk space and all three have shown an increase in the CRR risk rating since 2022. Of concern, is the lack of sufficiently qualified process controllers and supervisors to operate these sites and the WSA is encouraged to ensure that sufficiently qualified and competent Process Control and Supervisory staff is available at every site. Maintenance staff is also not available for every site, and this increases the risk of discharging non-compliant effluent.

Monitoring of the effluents from each site is performed regularly, but the discharge effluent quality is poor. The poor compliance of all works against the imposed limits is extremely concerning and it is strongly recommended that comprehensive process audits are carried out at each site and that this information is effectively used to optimize the treatment processes. This will also assist the municipality in generating an updated risk-based W_2RAP as an updated W_2RAP document is not available. Development of a W_2RAP will allow the municipality to follow a risk-based management approach that will ensure a gradual improvement in effluent quality compliance over time. In addition to this, development of a GDIP is strongly recommended to identify the shortcomings for all Green Drop criteria and to allocate responsibility, budget, and time frames to address the gaps. This will allow Berg Rivier LM to focus on the most important criteria to improve effluent quality and compliance to the GD criteria if sufficient budget is made available and projects are implemented to address the listed risks.

The ever-present threat of vandalism should be addressed, especially at Velddrif where there are no processes control staff available and only general workers on site, with the resultant non-compliant effluent being discharged. In addition, the impact of loadshedding at these sites is generating additional risk in terms of effluent non-compliance and opportunities for vandalism. The WSA must focus on these identified risks during the creation and implementation of the W_2RAP and GDIP to effectively mitigate the consequences of these risks. Maintenance staff is not adequate, and the maintenance plans are insufficient and the WSA is encouraged to address these gaps.

Risk Assessment Areas	Weight	Dwarskersbos	Eendekuil	Piketberg	Porterville	Velddrif
Class of Works		E: Approved	E: Approved	D: Approved	E: Approved	C: Approved
Treatment Technology		Oxidation ponds	Oxidation ponds	Activated Sludge	Activated Sludge	Activated Sludge
A: Total Design Capacity	Kl/d	294	140	3 000	1 500	972
B: Operational Capacity (% inflow/design)	%	61.2%	64.3%	66.7%	50.0%	144.0%
C: Effluent Quality Non-compliance	#	5	5	6	5	5
% Microbiological Compliance	%	33.3%	0.0%	25.0%	33.3%	16.7%
% Physical Compliance	%	47.9%	60.4%	89.6%	93.6%	60.4%
% Chemical Compliance	%	22.2%	0.0%	71.7%	81.7%	0.0%
D: Technical Skills Compliance	%	0.0%	0.0%	33.3%	33.3%	33.3%
Process Controller Compliance	%	0.0%	0.0%	0.0%	0.0%	0.0%
Supervisor Compliance	%	0.0%	0.0%	0.0%	0.0%	0.0%
Maintenance Team Compliance	%	0.0%	0.0%	100.0%	100.0%	100.0%
CRR (2023)	%	**80.0%**	**80.0%**	**70.6%**	**58.8%**	**80.0%**
CRR (2021)	%	**29.4%**	**35.3%**	**58.8%**	**47.1%**	**64.7%**
CRR (2013)	%	**76.5%**	**76.5%**	**58.8%**	**41.2%**	**58.8%**
CRR (2011)	%	**52.9%**	**52.9%**	**58.8%**	**41.2%**	**58.8%**

Table A.8.7: Green Drop Risk Rating of Bergrivier Municipality (DWS's 2023 Green Drop Progress Report)						
W_2RAP Status: 2022 Green Drop Report		In planning stage	In planning stage	In planning stage	In planning stage	In planning stage
W_2RAP Status: 2023 Green Drop PAT		In planning stage	In planning stage	In planning stage	No Proof	In planning stage
Capital and Refurbishment Projects (Rand)		0	0	7	428 230	953 371
Description of Capital and Refurbishment Projects		Currently busy with a pilot project for wind driven aerators.	None of the project in place.	Project scope entails the clearance or removal of sludge from existing maturation construction of newly maturation river, construction of new chlorination building	The Municipality is currently upgrading the works and process of building drying beds to keep the sludge is in the pipeline as well.	Refurbishment and replacement of vandalized equipment at the inlet works fencing and security improvements
2022 GD Score	%	59.0%	61.0%	73.0%	81.0%	66.0%
GD Improvement Plan (GDIP)	Y/N	No	No	No	No	No
Corrective Action Plan (CAP)	Y/N	Yes	No	No	No	No

SECTION B: STATE OF WATER SERVICES PLANNING

This updated WSDP is for the 2022-2027 five year cycle. The Municipality also annually compile the WSDP Performance- and Water Services Audit Report, as required by the Water Services Act and the DWS. The WSDP Performance- and Water Services Audit Report gives an overview of the implementation of the Municipality's previous year's WSDP and can be seen as an annexure to Bergrivier Municipality's Annual Report. The Municipality is currently busy compiling the 2024/2025 WSDP Performance- and Water Services Audit Report, which will be approved by Council with the Municipality's Annual Report.

Bergrivier Municipality's Water and Sewer Master Plan process entails the establishment of computer models for the water systems and the sewer systems in Bergrivier Municipality, the linking of these models to the stand and water meter databases of the treasury financial system, evaluation and master planning of the networks and the posting of all the information to IMQS. The Water and Sewer Master Plans lists the analyses and findings of the study on Bergrivier Municipality's water distribution and sewer drainage systems. The Municipality is currently busy compiling the 2025 Water and Sewer Master Plans. All forward planning for water and sanitation services and water and sewerage infrastructure is guided by the Water and Sewer Master Plans.

A Water Safety Plan was drafted during the 2021/2022 financial year by the West Coast District Municipality for the Withoogte bulk water distribution system. Bergrivier Municipality also drafted a Water Safety Plan for their water distribution systems during 2022/2023. A detailed risk assessment was executed as part of the process and the existing control measures implemented by Bergrivier 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.

The W_2RAPs for the WWTWs and sewer drainage networks in Bergrivier Municipality need to be updated. 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 Bergrivier Municipality are committed to meet regularly to review the implementation of all the aspects of the Water Safety Plan and W_2RAPs to ensure that they are still accurate and to determine whether the field assessments need updates or modifications and whether the Incident Response Management Protocol is still adequate. In addition to the regular three-year review, the Water Safety Plan and W_2RAPs will also be reviewed when, for example, a new water source is developed, major treatment improvements are planned and brought into use, or after a major incident.

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

The following water and sanitation related investigations were successfully completed during the 2023/2024 financial year.

- The WSDP Performance- and Water Services Audit Report for the 2022/2023 financial year was finalised and approved by Council as part of the Annual Report. The NRW water balance models were updated for each of the distribution systems (Up to the end of June 2023) as part of the Water Services Audit Process.

- Bergrivier Municipality continues with the implementation of their Drinking Water Quality and Effluent Quality Sampling Programmes (Both Operational and Compliance Monitoring). Sample results are loaded on a monthly basis onto DWS's IRIS. The Municipality started the process of registering all the WTWs and WWTWs and the Process Controllers working at these plants according to the new Regulation 3630 requirements.

- The Asset Register was updated to include all the water and sewerage capital projects completed during the 2023/2024 financial year.

- A Water Safety Plan for Bergrivier Municipality's Bulk Water Distribution Systems was compiled, June 2023, Virtual Consulting Engineers.

- Technical Feasibility Report was compiled for the Velddrif WWTW, June 2024, Lyners.
- Technical Report for WSIG funding application was compiled for the Aurora Water Treatment Works, June 2024, Lyners.
- Technical Report for WSIG funding application was compiled for the Eendekuil Water Treatment Works, June 2024, Lyners.

SECTION C: WATER SERVICES EXISTING NEEDS PERSPECTIVE

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

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

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

The Vision statement of Bergrivier Municipality is "**Bergrivier: a Prosperous community where all want to live, work, learn and play in a dignified manner".**

The Mission statement of Bergrivier Municipality is **"Commitment to sustainable development and the delivery of services that are responsive to the developmental needs of all communities in Bergrivier Municipality".**

Bergrivier Municipality's Strategic Goals and Objectives are as follows:

- Strengthen financial sustainability.
  - To budget strategically;
  - Entrench the Long-Term Financial Plan in the planning, implementation and management of the organization;
  - Diversify revenue and ensure value for money services;
  - Ensure sustainable financial risk and asset management;
  - Diversify by sourcing grant funding to support projects, programmes and initiatives of Council; and
  - Ensure transparency in financial management by ensuring that all financial records are accurate, reliable and timely.
- Ensure good governance.
  - Create an efficient, effective, economic and accountable administration;
  - Provide a transparent and corruption free municipality;
  - Accountable leadership supported by professional and skilled administration;
  - Communicate effectively with the public; and
  - A customer centered approach to everything.
- Sustainable service delivery.
  - Develop and provide bulk infrastructure within the climate change risks;
  - Maintain existing bulk infrastructure and services;
  - Develop, manage and regulate the built environment;
  - Source alternative sources of energy in the context of national electricity provision; and

  - Conserve and manage the natural environment and mitigate the impacts of climate change.

- Facilitate an enabling environment for a diversified economy and growth to alleviate poverty.
  - Improve the regulatory environment for ease of doing business;
  - Promote tourism;
  - Alleviate poverty through job creation in municipal driven projects and programmes;
  - Ensure all policies and systems in Bergrivier Municipality support poverty alleviation; and
  - Attract investment through catalytic infrastructure.

- Empowering people through innovation.
  - To promote healthy lifestyles through the provision of sport, recreational and other facilities and opportunities;
  - Promote continued partnerships for youth development;
  - Promote a safe environment for all who live in Bergrivier Municipal Area; and
  - Develop a Master Plan for “Smart Cities” in Bergrivier Municipal Area.

The 2025/2026 IDP includes the following Strategic Risks for Bergrivier Municipality.

- Provision of water to the households in Goedverwacht and Wittewater (High risk).
  - Directive was issued to the Moravian Church;
  - Inlet works was repaired by the Municipality to provide water to the towns; and
  - MCISA to collect the revenue from water users to purchase chemicals to treat the water and maintain the network.
- Energy security (Medium risk).
- Long-term financial sustainability and viability (Medium risk).
  - Implementation of stringent credit control measures;
  - Annual review of financial policies;
  - Annual review of assessment rates and tariffs;
  - Expenditure control and cost saving intervention plan;
  - Two supplementary valuations performed annually;
  - Monthly feedback on the debt action plan to the finance standing committee;
  - Participatory budget preparation process; and
  - Reduce applications for loans / reduce loan repayments.
- Insufficient preparation for business continuity and disaster recovery, which could lead to business interruption, service delivery failures and potential loss of business data (Medium risk).
- Management continuity and inadequate Human Resources (High risk).
- Lack / continuity of economic growth due to inadequate / insufficient capacity (Medium risk).
- Inadequately maintained and ageing infrastructure (High risk).
- Theft and vandalism (in the lines of security) (Medium risk).
- Inadequate opportunities for job creation (Low risk).
- Cyber security (High risk).
- Threats to the lives and safety of senior politicians and senior management of the Bergrivier municipality and their families (Medium risk).
- Inadequate provision of housing (Medium risk).

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

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

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

"Healthy water resources, for all, forever,"

- **Strategic Area 1: Protecting for People and Nature:** Focusing primarily on management of streamflow, water quality, habitat and riparian zones related to riverine, wetland, estuarine and groundwater resources, to maintain important ecosystem goods and services and biodiversity.
- **Strategic Area 2: Sharing for Equity and Development:** Focusing primarily on management of water use from surface and groundwater resources through the operation of infrastructure, in order to provide water for productive and social purposes within and outside of the WMA.
- **Strategic Area 3: Co-operating for Compliance and Resilience:** Focusing primarily on co-operation and management of institutional aspects to enable and facilitate the protection and sharing of water, including the more co-operative stakeholders, partnerships, information sharing, disaster risk and adaptation elements of the strategy.

TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

Topic C.1.1: Settlement Demographics and Public Amenities						
Section	**Intervention Required**	**% (1)**	**Solution description as identified by Master Plan**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Settlements Summary	No	100	Continue with the implementation of the recommended environmental strategies as included in the 2024-2029 SDF and the development proposals for each of the towns, as included in the 2025/26 IDP, and ensure that new developments are in line with the Strategic Objectives and Strategies.	100	Yes	78.6
	No	100	All resources, especially surface water resources, need to be re-evaluated, especially where demand is close to the safe one in twenty year yields. Establish assurance of supply levels of all water sources. Ensure that the provision of bulk water and sewerage infrastructure are aligned with the Housing Strategy (Human Settlements Pipeline) and that housing projects only continue once the required bulk water and sewerage infrastructure are in place, as indicated in the Water and Sewer Master Plans and this WSDP.	100	Yes	78.6
Summary by Settlement Group	No	100				100.0
Assessment Score by Settlement Type	No	100				100.0
Amenities Summary	No	100				100.0

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

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

Bergrivier Municipality's Spatial Development Framework 2024-2029 include the following Strategic Objectives and Strategies:

Objective 1: Grow (and unlock) economic sectors and prosperity.

- Grow economy and stimulate sector diversification and product development.
- Strengthen mobility and economic links (investor confidence).
- Develop product and trade advantages (export value chain and agroindustry corridors) and competitive advantage.

Objective 2: Proximate convenient and equal access

- Protect economic vibrancy.
- Provide (change) sustainable infrastructure and services (smart growth).
- Provide zoned land for residential and industrial development and education.

Objective 3: Sustain material, physical and social well-being.

- Protect safety and security.
- Protect fundamental community resources (air, water and energy).
- Provide (change) social infrastructure and services (as per norm) to facilitate smart growth.
- Manage risk and disaster (man-made and natural).

Objective 4: Protect and grow place identity (sense of place) and cultural integrity.

- Protect heritage resources, scenic resources and place identity.
- Grow cultural potential.
- Grow economy (landscape and conservation, tourism and new markets and economic sectors) and stimulate sector diversification.

Objective 5: Protect ecological and agricultural integrity.

- Protect food and water security and apply bioregional classification.
- Grow conservation potential and formalise conservation of CBAs and apply river management.
- Protect and preserve sensitive habitats and enhance Ecosystem services.

The Municipal Council approved a 10-year Human Settlements Pipeline in August 2018, which indicates how these backlogs will be jointly addressed over the next five to ten years, by the Municipality and the Provincial Department of Human Settlements. It is part of the municipality's strategic intend to provide a number of housing opportunities in the three major towns, namely Porterville, Velddrif and Piketberg, as well as in the smaller towns such as Eendekuil, Aurora and Redelinghuis. Where necessary and feasible, and within the available resources, suitable land must be secured and the provision of bulk services must be done on a proactive basis. The table below provides an overview of Bergrivier Municipality's Housing Pipeline as included in the 2025/2026 IDP.

Table C.1.2: Bergrivier Municipality's Housing Pipeline

No	Place	No of Units
1	Piketberg	1 977
2	Velddrif	1 314
3	Porterville	1 117
4	Aurora	67
5	Goedverwacht	23
6	Redelinghuys	249
7	Eendekuil	229

All schools and medical facilities in the urban areas, which falls under the management of Bergrivier Municipality, are supplied with higher levels of water and sanitation services (Water connection inside the erven and a sewer connection to the waterborne sewer system or serviced with septic or conservancy tanks).

The assurance of supply of the schools and clinics in Goedverwacht and Wittewater are not adequate (Water shedding is being implemented at both towns). The water and sanitation service levels of the primary schools in the rural areas also need to be verified.

TOPIC 2: SERVICE LEVELS

Topic C.2.1: Service Levels Profile						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Direct Backlog Water	Yes	100	Water Shedding implemented in Wittewater (Bulk water pipeline capacity insufficient). Upgrade bulk water pipeline from WTW to reservoir in order to ensure adequate supply capacity.	100	No	57.1
	Yes	100	Water Shedding implemented in Goedverwacht (No bulk raw water storage capacity). Provide raw water storage capacity.	100	No	57.1
	Yes	100	There are still an estimated 97 households on the farms in the rural areas without basic water services. Assist private landowners as far as possible with the provision of basic water services to all the households in the Municipality's Management Area with existing water service levels below basic water supply services.	100	No	57.1
Direct Backlog Sanitation	Yes	100	There are still an estimated 1 024 households on the farms in the rural areas without basic sanitation services. Assist private landowners as far as possible with the provision of basic sanitation services to all the households in the Municipality's Management Area with existing sanitation service levels below basic sanitation services.	100	No	57.1
Water Services Infrastructure Supply Level Profile	No	100	-	100	-	100
Water Reliability Profile	Yes	100	Water Shedding implemented in Wittewater (Bulk pipeline capacity insufficient). Upgrade bulk water pipeline from WTW to reservoir in order to ensure adequate water supply capacity.	100	No	57.1
	Yes	100	Water Shedding implemented in Goedverwacht (No bulk raw water storage capacity). Provide raw water storage capacity in order to ensure adequate water supply capacity.	100	No	57.1
	Yes	100	There are still an estimated 97 households on the farms without basic water services. Assist private landowners as far as possible with the provision of basic water services to all the households on the farms in the rural areas with existing water service levels still below basic water supply services.	100	No	57.1
Sanitation Service Infrastructure Supply Level Profile	No	100	-	100	-	100
Sanitation Reliability Profile	Yes	100	There are still an estimated 1 024 households on the farms without basic sanitation services. Assist private landowners as far as possible with the provision of basic sanitation services to all the households on the farms in the rural areas with existing sanitation service levels still below basic sanitation services.	100	No	57.1
Water Services: Education	Yes	100	Confirm the water service levels of the primary schools in the rural areas. Provide basic water services to the schools if the current water service levels are below basic water supply services.	100	No	57.1
Water Services: Health	Yes	100	Water Shedding implemented in Wittewater (Bulk water pipeline capacity insufficient). Upgrade bulk water pipeline from WTW to reservoir in order to ensure adequate water supply capacity.	100	No	57.1
	Yes	100	Water Shedding implemented in Goedverwacht (No bulk raw water storage capacity). Provide raw water storage capacity in order to ensure adequate water supply capacity.	100	No	57.1
Sanitation Services: Education	Yes	100	Confirm the sanitation service levels of the primary schools in the rural areas. Provide basic sanitation services to the schools if the current sanitation service levels are below basic sanitation services.	100	No	57.1
Sanitation Services: Health	No	100	-	100	-	100

Topic C.2.1: Service Levels Profile						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Health and Educational Facilities	No	100	-	100	-	100

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

A separate water and sanitation service level policy is not in place, but the water and sanitation service levels to be provided by the Municipality to the consumers in their Management Area are, however, included in the Water Supply, Sanitation Services and Industrial Effluent By-law. A Water and Sanitation Service Level Policy needs to be drafted. All sanitation services provided by Bergrivier Municipality to consumers within the Municipal Management Area are linked to the Municipality's Tariff Policy and poor households are incorporated through Bergrivier Municipality's Indigent Policy.

Bergrivier Municipality works towards providing all households in the towns with a water connection inside the erven and connecting all households to a waterborne sanitation system. It is however important to consider the Municipality's capacity (financial and institutional) to operate and maintain complex sewage systems if opting for higher service levels and in particular waterborne sanitation.

Water and Sanitation Services on Privately Owned Land Policy (November 2023)

The roles and responsibilities of the WSA are as follows:

- The role of the WSAs is to comply with the regulatory and support mandates of DWS over provision of water services and resources to residents living on privately owned land.
- WSAs must integrate this policy with their respective local mandates in terms of the Strategic Framework for Water Services.
- WSAs must ensure Water Service Providers perform their responsibilities, which include Operation, maintenance and capital development of water and sanitation services infrastructure outside the boundary and / or within the servitude / of the end user.
- WSAs must identify, register and regulate Water Service Intermediaries / Providers according to their policies, bylaws, national norms and standards.

The roles and responsibilities of the Private Landowner / Water Services Intermediary are as follows:

- Private landowners must provide basic water services to their employees (and the families of employees) living on their land.
- WSAs must ensure that this policy is implemented and must identify, register and regulate water services intermediaries according to their bylaws and national norms and standards.
- Landowners must make an appropriate contribution to the capital cost of basic services.
- While water and sanitation assets, which WSAs install, remain under the ownership of the State, landowners will however have economic rights to the infrastructure once they become intermediaries, and those economic rights will be linked to a contract term.
- Operations and maintenance (and capital development of water and sanitation services on privately owned land) remain the responsibility of property owners.

- The private landowner is encouraged to enter into a contract with the WSA and perform the duties of a Water Services Provider as stipulate din Section 25(1) and (2) of the Water Services Act.

- Private Landowners / Water Services Intermediaries / Water Services Providers should:
  - Support the regulatory and support mandates of DWS over the water services and resources provided to residents living on privately owned land.
  - Integrate and implement this policy in terms of their planning and implementation to ensure compliance with all relevant legislation concerning provision of water services on private land; and to
  - Ensure that this policy is communicated to any person, party or organization affiliated to the "private land" sector.
  - The employers is responsible for providing water and sanitation services to their labourers / employees as per Section 8(1) of the Occupational Health and Safety Act (Act 85 of 1993).

National Sanitation Policy, 2016.

Problem Statement: The ineffectual interpretation and implementation of the Section 78 of the Municipal Systems Act (No. 32 of 2000) process has contributed to municipalities primarily keeping the sanitation provision function in-house, even when the capacity to do so adequately was lacking. They are not appropriately implementing Section 78 provisions. WSAs are not responding to key responsibilities assigned to them in legislation and the SFWS.

Where a WSA has contracted a WSP to provide sanitation services, the responsibility of the two parties is not always clear in the contracts. There is a need for effective contract regulation.

A WSA have the following responsibility:

- Implementation of the Municipal Systems Act (Act 32 of 2000) and Water Services Act (Act 108 of 1997) provisions.

- Prepare sanitation plans such as WSDPs etc., aligned to national sanitation planning.

- Ensure the realisation of the right to access to sanitation services, particularly basic sanitation services, subject to available resources. This includes people living on privately-owned land, in recognised permanent informal settlements and vulnerable groups and others who are provided services by Water Services Intermediaries. Wherever practical and sustainable, Water Services Authorities are expected to plan for and provide higher levels of service.

- Ensure the provision of effective, efficient and sustainable sanitation services. The provision of sanitation services also includes communication activities related to, amongst other things, Hygiene Education, end-user education and the wise use of water.

- Develop an asset management strategy, a maintenance and rehabilitation plan and a register of sanitation services assets and must then put in place a system to manage these assets.

- Provide information concerning the provision of sanitation services as reasonably requested by the Provincial or National governments, end-users and / or organisations.

- Develop an appropriate institutional structure to adequately respond to key WSA functions and responsibilities.

- Account, as per the Municipal Finance Management Act (No. 56 of 2003), to the province and National Treasury for resource allocation (financial, human etc.).

- Provide sanitation hygiene and end user education.

WSAs have a right but not an obligation to accept industrial, agricultural and mining wastewater within their area of jurisdiction.

WSAs must adhere to the following requirements in a transparent manner and in close contact with end-users:

- Sanitation services must be designed, planned and implemented to consider operations and maintenance requirements and to reduce the environmental impact of unmanaged grey-water, human excreta and wastewater disposal.
- Sanitation services must be appropriate and minimise impact on and use of water resources. WSA should strive for systems which utilise minimal water resources.
- Sanitation technologies which consider settlement types.
- Geo-hydrological testing before use of on-site groundwater sources or on-site sanitation services. Exceptional situations may require independent review and advice.
- Technology choices must be appropriate and affordable.
- Roles and responsibility for payments for operations and maintenance must be clear.
- Only appropriate sanitation technologies must be adopted.
- The quality of all building materials used for construction must be durable and fully compliant with the requirements, norms and standards
- Local availability of materials and skills must be part of the choice of technology or construction method. The design of sanitation services facilities must maximise the use of local resources.
- Sanitation technology selection should include resources to develop the necessary local institutional capacity to manage the day to day and future operational needs. In some circumstances there may be considerable merit in engaging a sanitation services provider to carry out certain functions on behalf of a local authority. Government does encourage local authorities to consider various options in this regard.
- Social and cultural practices and preferences should be considered in the selection of appropriate sanitation technology.

WSA must have the billing systems in place to raise sufficient revenue for sanitation services.

WSA must ensure sufficient funds are transferred for a WSP to perform the agreed functions.

WSA must regulate all aspects of sanitation services provision locally.

The WSA is accountable to its citizens.

Sanitation services planning by WSAs should be in conjunction with municipal Environmental Health Practitioners, as well as other stakeholders and departments involved in the sector.

The Revised Compulsory National Water and Sanitation Standards, as published in the Government Gazette No.52814 of 6 June 2025, make provision for the following standards for basic water and sanitation supply services.

Table C.2.2: Basic water and sanitation supply services
Basic water supply services
• A WSA is responsible for the provision of basic water supply services to all consumers or potential consumers in its jurisdictional area inclusive of people residing on privately owned land as guided by the Water and Sanitation Services Policy on Privately Owned Land (2023). • The minimum standard for basic water services must consist of: ➢ Within two years of promulgation of these regulations an access or delivery point which must be at least at the end boundary of the yard (user connection point) of the existing settlement. ➢ A minimum quantity of drinking water of 6 kl/household per month - ▪ at a minimum flow rate of not less than 10 litres per minute. ▪ with an effectiveness such that water is made available for at least 358 days per year.

Table C.2.2: Basic water and sanitation supply services

Basic water supply services

- not interrupted for longer than 48 consecutive hours.
- at no cost to indigent households, upon depletion of the initial 6 kl per month allocation, qualifying indigent household will be subject to usage restrictions and will be responsible for payment based on the adopted tariff policy for any additional water consumed.

- Water provided which complies with the requirements of SANS 241.

- Maintenance of the infrastructure up to the user connection is the responsibility of the Water Services Institution and the maintenance of the infrastructure within the boundary of the property is the responsibility of the owner.
- All new users applications for water connections must be completed within 21 calendar days by a WSA in areas where the infrastructure allows or exist.
- All user connections for water supply must be metered or measured, controlled and tariffed by the relevant Water Services Institution.
- A Water Services Institution must replace stolen meters and or repair or replace damaged meters within 30 days of it being reported or detected.
- Water meters must be managed and replaced within their asset lifespan.
- The Water Services Institution must ensure the provision of appropriate education in respect of safe, effective and efficient water use, hygiene and groundwater use management.
- Within two years after promulgation of these Regulations, WSA must submit plans to the Department, using the WSDP platform as part of their WSDP on how they are going to upgrade all consumers in formal settlements to basic services (yard connection; user connection point).

Basic sanitation supply services

- A WSA is responsible for the provision of basic sanitation services to all consumers or potential consumers in its jurisdictional area inclusive of people residing on privately owned land as guided by the Water and Sanitation Services Policy on Privately Owned Land (2023).
- The standard for basic sanitation services must include the provision of a toilet with functional hand washing facility in the yard, which is safe, reliable for 24 hours a day, environmentally sound, easy to keep clean, provides privacy and protection against the weather, well ventilated, keeps smells to a minimum and prevents the entry and exit of flies and other disease-carrying pests, providing for an effective and acceptable sanitation technology.
- A WSA must ensure that human excreta and wastewater is safely contained at all times, throughout the sanitation service chain.
- Faecal sludge management must be an integral part of the sanitation service.
- Each household must have uninterrupted access to an adequate, appropriate sanitation facility.
- Hygiene and user education must be an integral part of sanitation service. Households should be supported with knowledge and any other relevant resources to take responsibility for the correct and consistent use of the sanitation service, including but not limited to the toilet facility.
- In providing basic sanitation service, a WSA must consider the following requirements:
  - The need for everyone, including persons with a disability to have a reasonable quality of life.
  - Water efficient sanitation solutions.
  - Groundwater pollution risks in accordance with the Protocol to manage the potential groundwater contamination from on-site sanitation (2003).
  - Water use authorisation in terms of the NWA.
  - Surface water pollution risks and the management thereof.
  - Population density.
  - Economies of scale.
- Subject to the above, a WSA must consider-
  - In high and medium density formal settlements:
    - waterborne sewered sanitation provided that the wastewater treatment system and works have adequate capacity and is performing to acceptable standards under the National Water Act (read with regulation 10); or
    - alternative water efficient sanitation solutions instead of waterborne sewered systems in areas of dense formal and medium settlement where there is resource scarcity and or inadequate capacity or functionality in the sewer system and or the wastewater treatment works.
  - In low density or sparsely populated settlements: water efficient sanitation solutions.
- Water efficient sanitation solutions, as described above, must be shown to include off-grid, on-site sanitation options such as Non-sewered Sanitation Systems (NSSS) as well as Decentralised Wastewater Treatment Systems (DWWTS).
- A WSA may not unreasonably decline a property development to have a water efficient sanitation solution that is not connected to the central system where development will manage the system as a Water Services Intermediary and where the water uses of the system is authorised under the National Water Act.
- Whenever a Water Services Institution is providing new innovative non-sewered sanitation systems, such must be guided by the requirements of SANS 30500 for Non-Sewered Sanitation Systems or the “SANS 24521:2020 Guidelines for the management of basic on-site domestic wastewater services”, whichever is applicable.

Table C.2.2: Basic water and sanitation supply services
Basic water supply services
• WSA must monitor and regulate safe emptying, transportation, treatment and disposal of faecal sludge to faecal sludge treatment facilities or any other authorised facility. • Faecal sludge treatment plants must be guided by ISO 31800 for prefabricated units or similar standards for non-prefabricated faecal sludge treatment units. • WSA must have community participation procedures of informing communities about the emptying processes, routes and health risks. • Within two years after promulgation of these Regulations, the WSA must submit plans as part of their WSDP, using the WSDP platform, on measures to eradicate unimproved pit toilets and open defaecation in human settlements.

The Revised Compulsory National Water and Sanitation Standards, as published in the Government Gazette No.52814 of 6 June 2025, also make provision for the following standards for interim water and sanitation supply services.

Table C.2.3: Interim water and sanitation supply services
Interim water supply services

• A WSA must take reasonable measures to provide interim water supply services in informal settlements.
• Upon realisation of a new informal settlement, the WSA must provide interim water supply services within 90 days of becoming aware thereof.
• A WSA is responsible for the capital, operation, maintenance and refurbishment actions and cost pertaining to interim water services.
• Where an informal settlement is formalised, a WSA must ensure access to basic water services.
• The minimum standard for interim water services must consist of:
  ➢ An access or delivery point which must be a communal standpipe, within a reasonable walking distance of no more than 200m from the furthest household.
  ➢ A minimum quantity of drinking water of 6 kl/household per month -
  ▪ at a minimum flow rate of not less than 10 litres per minute.
  ▪ with an effectiveness such that water is made available for at least 358 days per year.
  ▪ not interrupted for longer than 48 consecutive hours.
  ➢ Water provided which complies with the requirements of SANS 241.
• All areas supplied with interim water supply services must have zonal meters and measured by the relevant Water Services Institution.
• Whenever interim water supply services are provided through water tankers, it must not exceed 12 consecutive months and WSAs need to keep accurate records as specified in Regulation 4(3)(c).

Interim sanitation supply services

• A WSA is responsible for the capital, operation, maintenance and refurbishment actions and cost pertaining to interim sanitation services including the management of faecal sludge in the entire sanitation service chain.
• A WSA must take reasonable measures to provide appropriate interim sanitation services in informal settlements and during a disaster.
• Upon realisation of a new informal settlement, the WSA must provide interim sanitation services within 90 days.
• Interim sanitation services must provide at least the following:
  ➢ Communal and shared facilities in accordance with the following:
  ▪ Communal toilet: Toilet seat – 1 seat per 10 households; Urinal units – 1 unit per 20 households; Hand washing – 1 basin per 10 households.
  ▪ Shared toilets: Toilet seat – 1 unit per 4 households; Urinal units – 1 unit per 10 households; Hand washing – 1 basin per 4 households.
  ➢ The WSA must put measures in place to keep the toilets hygienic.
  ➢ The toilets must be separated according to gender to meet the needs for women, girls and persons with disability.
  ➢ All portable and mobile toilets must be emptied at least twice a week to appropriate licensed facilities for treatment.
• If the sanitation facility is communal, the maximum walking distance should be 100m, wherever possible.
• Parents and care givers must be provided with information by the Water Services Institution regarding safe disposal of infant's faeces, laundering practices and use of nappies, potties or scoops for effectively managing safe disposal.
• A WSA through its Environmental Health Practitioners are responsible for promoting hygiene and user education for ensuring an environmentally safe approach to sanitation and for monitoring the impact of sanitation processes on the environment.

All the formal households in the urban areas of Bergrivier Municipality's Management Area are provided with water and sanitation connection points inside the erven. There are no informal areas in Bergrivier Municipality. Communal standpipes and ablution facilities will however be provided for any informal area as a temporary emergency service when it becomes necessary.

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

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

Bergrivier Municipality is committed to support the private landowners as far as possible with regard to addressing the basic water services backlog that might still exist on the farms in the rural areas once the 2022 Census data becomes available for the farms and the locations of households without basic water services are known. Water Service Levels in the WSDP for the farms are based on the 2011 Census data, because the 2022 Census Community Profiles per subplace are not yet available.

The West Coast District Municipality takes various water quality samples on the farms in the rural areas of Bergrivier Municipality's Management Area and the water quality information needs to be shared with the private landowners and any Water Services Intermediaries, also the risks associated with storage of water in open reservoirs or tanks and where no filtration or disinfection takes place.

Bergrivier Municipality is faced with various challenges with regard to the provision of services on private owned land in a financial sustainable manner (enabling the on-going operation of services and adequate maintenance and rehabilitation of the assets), which include the following:

<u>Free basic water policy:</u>

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

<u>Free basic sanitation policy:</u>

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

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

Bergrivier Municipality needs to put the following measures in place with regard to water and sanitation services in their Management Area:

- A Water and Sanitation Service Level Policy needs to be compiled, which is aligned with the requirements of the National Sanitation Policy (2016), Water and Sanitation Services on Privately Owned Land Policy (November 2023) and the Compulsory National Water and Sanitation Services Standards, 2024 (Gazette No.52814, 6 June 2025).

- Bergrivier Municipality must comply with the regulatory and support mandates of DWS over provision of water services and resources to residents living on privately owned land.

- Bergrivier Municipality must ensure that the "Water and Sanitation Services on Privately Owned Land Policy" is implemented and must identify, register and regulate Water Service Intermediaries / Providers according to their policies, bylaws, national norms and standards.

- Bergrivier Municipality must make provision for private landowners to enter into a contract with them to perform the duties of a Water Services Provider as stipulated in Section 25(1) and (2) of the Water Services Act.

- Bergrivier Municipality must comply with the Basic water and sanitation supply services requirements as included in Table 2.4 and the Interim water and sanitation supply services requirements as included in Table 2.5 (Compulsory National Water and Sanitation Services Standards, 2024, Gazette No.52814, 6 June 2025).

- Bergrivier Municipality must ensure the realisation of the right to access to water and sanitation services, particularly basic water and sanitation services, subject to available resources. This includes people living on privately-owned land, in recognised permanent informal settlements and vulnerable groups and others who are provided services by Water Services Intermediaries. Wherever practical and sustainable, WSAs are expected to plan for and provide higher levels of service.

- Bergrivier Municipality must ensure the provision of effective, efficient and sustainable water and sanitation services. The provision of sanitation services also includes communication activities related to, amongst other things, hygiene education, end-user education and the wise use of water.

- Provide information concerning the provision of water and sanitation services as reasonably requested by the Provincial and National governments, end-users and / or organisations.

- Provide sanitation hygiene and end user education.

- Bergrivier Municipality must adhere to the sanitation requirements listed on page 2.7 of the "Revised Compulsory National Water and Sanitation Services Standards" in a transparent manner and in close contact with end-users.

- The billing system must make provision for the sufficient raising of revenue for water and sanitation services. Bergrivier Municipality must ensure sufficient funds are transferred for a WSP to perform the agreed functions when it becomes applicable.

- Bergrivier Municipality must regulate all aspects of water and sanitation services provision locally and is accountable to their citizens.

- The provision or distribution of bucket toilets to communities in both formal and informal settlements are prohibited.

- Bergrivier Municipality is prohibited from approving bulk user connections to existing water and wastewater systems without having the necessary capacity to service such user connections. This means that a municipality may not approve new / additional bulk user connections to an existing water or wastewater treatment system unless that system has the capacity to deal with the additional load (ability to operate according to technical specifications).

- Bergrivier Municipality may not approve any new developments that will connect to an existing wastewater treatment system unless such a system has the capacity to deal with the load from the development.

- Bergrivier Municipality must only accept the quantity and quality of industrial wastewater or any other substance into a sewerage system that the sewage treatment works linked to that system is capable of purifying or treating to ensure that any discharge to a water resource complies with the required authorisation and standard prescribed under the National Water Act.

- Bergrivier Municipality shall prescribe pre-treatment of any effluent to the required standard its wastewater treatment systems can process prior to it being disposed into municipal infrastructure.

All the clinics and hospitals in Bergrivier Municipality's Management Area have adequate and safe water supply and sanitation services. All the tertiary education facilities and schools in the urban areas of Bergrivier Municipality's Management Area have adequate and safe water supply and sanitation services. The water and sanitation service levels of the primary schools in the rural areas need to be verified.

It is important for the schools to focus on Water Demand Management activities and for Bergrivier Municipality to support the schools with WDM initiatives. This will not only aid in Bergrivier Municipality's demand management initiative directly by reducing the water consumption, but the education of learners at a young age regarding wise water use is a key component for sustainable supply in the long term.

TOPIC 3: WATER SERVICES ASSET MANAGEMENT

Topic C.3.1: Water Services Asset Management						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
General Information	Yes	100	Develop an Asset Management Plan.	100	Partially	64.3
Operation	No	100	Implement recommendations from the Water Safety Plans and WTW Process Audits. Implement proposed interim solutions for improving the operation of the WTW, as well as proposed refurbishment and upgrade and extension work. Ensure adequate budget is allocated for the future upgrading and refurbishment work.	100	Partially	85.7
	No	100	Implement recommendations from the W_2RAPs and WWTW Process Audits. Implement proposed interim solutions for improving the operation of the WWTW, as well as proposed refurbishment and upgrade and extension work. Ensure adequate budget is allocated for the future upgrading and refurbishment work.	100	Partially	85.7
Functionality Observation	No	100	Provide additional reservoir storage capacity for the towns with inadequate storage capacity. Upgrade existing water pump stations and provide new water pump stations for the identified areas. Upgrade existing WTWs and WWTWs as recommended. Upgrade existing sewer pump stations and provide new sewer pump stations for the identified areas.	100	Partially	85.7
Asset Assessment Spectrum	No	100	Increase O&M budget for repairs and maintenance of infrastructure. A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of the existing water and sewerage infrastructure (Best Practice). In the case of operations and maintenance of the system, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the system remains in good condition (Best Practice).	100	Partially	85.7
Water and Sanitation schemes	No	100	Upgrade sections of the water reticulation network and sewer drainage network as proposed in the Water and Sewer Master Plans.	100	Partially	85.7

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

The major challenges experienced by Bergrivier Municipality regarding water services, as included in Bergrivier Municipality's 2025/2026 IDP, are:

- Bulk service provision
- Compliance with Blue and No Drop Standards

The following development priorities were identified:

- Reducing bulk and service infrastructure capacity backlogs (water);
- Master Plan development and revision; and
- Water Services Development Plan.

The major challenges experienced by Bergrivier Municipality regarding sanitation services, as included in Bergrivier Municipality's 2025/2026 IDP, are:

- Bulk service provision
- Compliance with Green Drop Standards

The following development priorities were identified:

- Reducing bulk and service infrastructure capacity backlogs;
- Master Plan development and revision;
- W_2RAP update and revision; and
- Personnel.

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

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

An AMP normally includes the following:

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

Bergrivier Municipality needs to differentiate between budget allocated towards the operation and maintenance of the water and sewerage infrastructure and the budget allocated towards the replacement of the water and sewerage infrastructure. A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of the existing water and sewerage infrastructure (Best Practice). In the case of operations and maintenance of the system, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the system remains in good condition (Best Practice).

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

Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increase in (operational) services level coverage most rapidly. The preparation of maintenance plans and the allocation of sufficient funding for maintenance are required to prevent the development of a large condition backlog. The potential renewal projects for water and sewerage infrastructure need to be identified from the Asset Register. All assets with a condition grading of "poor" and "very poor" need to be prioritised.

The Asset Management Plan must be based on the principle of preventative maintenance in order to ensure that, as far as this is practical, damage to assets is prevented before it occurs. Bergrivier Municipality must ensure that the maintenance and rehabilitation plan is part of the WSDP and that the plan is implemented. Assets must be rehabilitated and / or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose.

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

Disaster Management Plan: Disaster Management is continued to be shared with the West Coast District Municipality. The responsibility for reducing disaster risk, preparing for disasters and responding to disasters is shared among:

- all disciplines and employees of the Bergrivier Municipality;
- all disciplines and employees of the West Coast District Municipality;
- neighbouring local municipalities within the West Coast District Municipality;
- all provincial and national organs of state operating within the municipality;
- all sectors of society within the municipality; and
- all the residents of the municipality.

The Municipality's risks are managed in terms of a strategic and operational risk register which is managed through an internet-based risk management system. A report on the management of risks is submitted to the Risk Committee and relevant Portfolio Committee on a quarterly basis.

Hazards that pose significant threats of disaster to local communities, the region and the country were identified. These are the types of disasters that could potentially occur within the municipal area. The list below describes these hazards and proposes mitigating measures (2025/2026 IDP).

Table C.3.2: Potential Hazards and Mitigation Measures for Bergrivier Municipality

Hazards	Description
Fires	The risk of fires, particularly in the dry season, is prevalent throughout the Municipal area. The establishment and staffing of a fire station in Piketberg and the implementation of public awareness initiatives are essential. The establishment of a fire station has been initiated in conjunction with the West Coast District Municipality and a mutual aid agreement concluded for the Fire Fighting function. Mr Noel Williams has been appointed as the new Fire Chief as from the 1st of December 2023.
Drought and water supplies	Drought risk is significant throughout the region, particularly in the Sandveld and Coastal areas. The water level in the ground water aquifers has dropped substantially in recent years and in some instances, boreholes are no longer productive. Water quality has also declined. In the long term, alternative, sustainable water supplies to the Sandveld and coastal areas are needed. This can be achieved either by desalination plants on the coast or by increasing the capacity of Clanwilliam dam and installing a pipeline to the relevant areas. To limit the current shortages, immediate implementation of a monitoring and control system for the existing boreholes is needed.
Severe weather (storms, wind, rain)	During periods of heavy rainfall in the catchment areas, several low-lying areas become inundated. Establishment of the 1:50 and 1:100-year flood-lines along rivers is imperative.
Hazardous materials incidents (esp. road accidents)	The state of the N7 and the currently unmonitored transportation of hazardous materials create a risk of accidents and exposure to contamination. Implementation of co-operative monitoring of heavy vehicle movements and load identification between the neighbouring traffic authorities is needed to reduce the risk of accidents and spillage. The upgrading of the N7 has just been completed and the road is now at a level that is conducive to the traffic it carries.
Red Tides	The annual phenomenon of rapid increase in the concentration of phytoplankton in the water along the coast results, at times, in the crayfish leaving the water in vast numbers and impacts on the fishing industry.
Power Outages	The problems experienced by Eskom and the projected inability to meet future demands indicate that power outages are likely to occur on an on-going basis. It is therefore imperative that emergency power facilities are put in place to maintain essential services. These include water and sewage treatment facilities.
Chronic Disaster	Chronic conditions relating to, inter alia, primary health, disease, unemployment, poverty, HIV/Aids, TB and substance abuse are of major social consequence. The situation in the country as a whole and in the Western Cape is well documented. Community and local government-driven initiatives are needed to improve and

Table C.3.2: Potential Hazards and Mitigation Measures for Bergrivier Municipality	
Hazards	**Description**
	maintain public awareness and to alter mind-sets with respect to responsible medication. Job creation and self-help initiatives will need to be financed and managed.

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

Future Water and Sewerage Infrastructure Requirements: The Water and Sewer Master Plans indicate the future water and sewerage requirements to accommodate the future developments and are updated roughly every five years by the Municipality.

GROUNDWATER INFRASTRUCTURE

Bergrivier Municipality will continue with the implementation of their Groundwater Monitoring Programme for the one Eendekuil borehole and the Aurora boreholes. The groundwater monitoring data is currently processed, analysed and reported on by an experienced hydrogeologists on an ad-hoc basis in order to ascertain whether the resources are being sustainably utilised and to ensure compliance with the approved Groundwater Monitoring Programme and water use license.

Managing groundwater for water supply purposes should have the following three main functions:

- Ensure that the aquifer is used optimally: The aquifer should not be over-pumped as that would negatively impact on its long-term sustainable yield or on the environment. It also means that if the aquifer is being under-utilised, this will become known.

- Ensure that the water quality in the aquifer is not negatively affected: This may be as a result of high abstraction from the aquifer, or from poor groundwater protection (from latrines, animal enclosures, etc.).

- Optimise borehole pumping rates so that the pumping equipment operates efficiently: Pumping rates are frequently set too high and this cause unnecessarily high pumping heads, a waste of energy, and at times, pump failure.

An additional function, which is usually captured in the first two points, is to ensure that environmental integrity is maintained. A botanical and streamflow monitoring programme is therefore also required. It is important for Bergrivier Municipality to continue to focus on aquifer protection, groundwater monitoring and wellfield management, in order to meet the town's future water requirements.

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

Table C.3.3: Key Groundwater Management Functions				
Activity	**Responsible Person**	**Skills and qualifications required**	**Resources, tools and equipment**	**Remarks**
Measuring and recording of water levels.	Pump operator	Literacy, numeracy, trained in taking water levels	Dip meter, ruler, log book, pen.	Done as part of operators' regular O&M activities.
Measuring and recording abstraction	Pump operator	Literacy, numeracy, trained in reading water meters.	Log book, pen	Done as part of operators' regular O&M activities.
Providing data to the authority that is responsible for water supply on a regular basis.	Pump operator and pump operator supervisor	Literacy, numeracy, keeping records.	Postal service or public transport.	Including as part of the reporting requirements of the pump operator.
Taking water samples	The authority that is responsible for water supply.	Trained in taking water samples, driving license.	Transport, sample bottles, cooler box.	Sampling routine defined by sampling plan.
Sending water samples for testing.	The authority that is responsible for water supply.	Keeping records.	Transport to laboratory	Sent to nearest accredited laboratory.
Defining the monitoring requirements of an individual borehole.	Technical manager of operations or hydrogeologist.	Hydrogeological degree or diploma, experience of hydrogeological conditions.	Reports and records on borehole, monitoring data.	

Table C.3.3: Key Groundwater Management Functions				
Activity	**Responsible Person**	**Skills and qualifications required**	**Resources, tools and equipment**	**Remarks**
Ensuring that boreholes are equipped with piezometer tubes for measuring water levels and water meters for measuring abstraction.	The authority that is responsible for water supply.	Project management	In house technical staff, suppliers, contractors, specifications.	
Ensuring that operators have the equipment and skills to do monitoring.	The authority that is responsible for water supply.	Project management	Trainers, suppliers, specifications.	
Monitoring the pump operator's competence to collect and record data.	Pump operator supervisor	Staff supervision, knowledge of pump operators' tasks.	Transport	Done as part of the supervision of O&M activities.
Processing data collected at the local level	Data clerk	Data capture, record keeping, filing, trained in operating software.	Computer, spreadsheet or groundwater management software, files.	Maintains an electronic and physical record of data.
Studying water level, water quality and abstraction data on a regular basis.	Technical manager of operations.	Technical training, operations experience.	Project files, monitoring data	Done as part of the management of O&M
Revising pumping recommendations, and adjusting the monitoring requirements. Ensuring the recommendations are carried out and monitoring the implementation of the recommendations.	Technical manager with hydrogeologist as required.	Technical training, operations experience.	Reports and records on borehole, monitoring data, operational information.	Ongoing management of operations and groundwater resources.
Reporting to council and pump operator, providing summary data to the CMA.	Data clerk with supervision from technical manager.	Training in operating software.	Computer, spreadsheet or groundwater management software, printer.	Summary data defined by license (frequency, what data, form of data)

SURFACE WATER INFRASTRUCTURE

The preventative maintenance activities, as included under Section 4.1.2 of the Future Demand and Functionality Requirements Report, are to be implemented by Bergrivier Municipality for their surface water infrastructure.

BULK WATER PIPELINE AND WATER RETICULATION NETWORK INFRASTRUCTURE

The updated 2025 Water Master Plan is not yet available and at this stage it is estimated that based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk water feeder mains.

Porterville: No reinforcement to the existing feeder mains is required in the future.

Piketberg: No reinforcement to the existing feeder mains is required in the future.

Velddrif: No reinforcement to the existing feeder mains is required in the future.

Dwarskersbos: New 315 mm dia. feeder main between the Dwarskersbos reservoir site and a new Dwarskersbos booster pump station (required when the AADD of Dwarskersbos reaches 500 kl/d, item BDW.B4).

Aurora: No reinforcement to the existing feeder mains is required in future.

Eendekuil: New 160 mm Ø feeder main between the Eendekuil reservoir zone and new Eendekuil booster 1 PS (required when future areas EK1 & EK7 develop to improve low static pressure, item BEW1.8). New 160 mm Ø feeder main between the Eendekuil reservoir zone and new Eendekuil booster 2 PS (required when future areas EK4 & EK5 develop to improve low static pressure, item BEW1.6).

Redelinghuys: No reinforcement to the existing feeder mains is required in future.

Goedverwacht: New 90 mm dia. rising main from the new Goedverwacht Very High PS to the proposed new 200 kl higher lying reservoir (item BGW.B3).

Wittewater: No reinforcement to the existing feeder mains is required in the future.

Future bulk water pipelines required are indicated in the table below.

Table C.3.4: Future bulk water supply pipelines required

Distribution System	Recommendations	Year	Diameter (mm)	Length (m)	Estimated Cost
Piketberg	New pipeline to augment bulk water supply to the lower reservoir	2027	315	470	R1 759 210
Dwarskersbos	New pipeline when the AADD exceeds 500 kl/d	2032	315	75	R280 725
Redelinghuys	New pipeline when new reservoir is constructed.	2039	160	45	R84 195
Goedverwacht	New pipeline when future area GV2 develops	2040	90	470	R658 000
Total				**1 060**	**R2 782 130**

The cost of the estimated future water reticulation infrastructure components is summarised in the table below.

Table C.3.5: Future water reticulation infrastructure required

Distribution System	Recommendations	Year	Diameter (mm)	Length (m)	Estimated Cost
Porterville	To improve network conveyance and when future areas PORT3, PORT5, PORT6, PORT7 and PORT8 develop	2030	110 and 160	155 and 1 580	R3 187 130
	To improve network conveyance and when future areas PORT14-PORT16 develop and when the AADD exceeds 1 750 kl/d	2035	250 and 315	640 and 2 555	R11 184 485
	When future areas PORT1, PORT4, PORT13 and PORT14 develop and when supply problems occurs to Mont Bertha	2040	160 and 200	555 and 1 775	R5 033 930
	When future areas PORT2, PORT15 and PORT16 develop	2045	160 and 250	155 and 605	R1 822 470
Piketberg	To improve network conveyance and when future areas PIK4 and PIK5 develop	2027	160	365	R682 915
	To improve network conveyance and when future areas PIK1 – PIK7, PIK12, PIK13 and PIK16-PIK19 develop	2030	160, 200 and 250	555, 1 580 and 1 775	R9 091 060
	When future areas PIK1 – PIK3 develop.	2040	160	1 095	R2 048 745
	When future area PIK16 develop	2045	200	700	R1 575 700
Velddrif	To improve network conveyance and when future areas V6 and V7 develop	2030	160, 200 and 250	1 515, 1 645 and 1 440	R10 184 980
	When future areas V3, V4, V11 and V12 develop	2035	110 and 160	250 and 595	R1 485 745
	When future areas V17 – V20 develop and when the AADD exceeds 4 000 kl/d	2040	160, 200 and 355	510, 895, 195	R3 825 100
Dwarskersbos	When future areas DW1, DW2, DW7 and DW8 develop	2032	250	655	R1 659 115
Aurora	When future areas A1, A7, A8 and A9 develop	2030	110	405	R603 450
	When future areas A1 and A2 develop	2035	160	790	R1 478 090
	When future areas A3 – A6 develop	2040	160	660	R1 234 860
Eendekuil	To improve network conveyance	2025	110, 160 and 200	570, 450 and 575	R2 985 575
	When future areas EK4 and EK5 develop	2030	160	440	R823 240
	To improve network conveyance	2035	160	715	R1 337 765
	When future areas EK1, EK2, EK6 and EK7 develop	2035	160	395	R739 045
Redelinghuys	Replace existing pipes when future areas RH1 and RH2 develop	2030	160	630	R1 178 730
	Replace existing pipes to improve network conveyance	2035	110	1 165	R1 735 850
	When future area RH3 develop	2040	160	210	R392 910
Goedverwacht	When future area GV4 develop	2035	160	330	R617 430
	When future area GV2 develop	2040	160	200	R374 200
Wittewater	When future areas WW1 and WW2 develop	2030	110	145	R216 050
Total				**29 470**	**R65 498 570**

WATER TREATMENT WORKS INFRASTRUCTURE

The existing hydraulic design capacities and the current average daily flows at each of the WTWs are summarised in the table below.

Table C.3.6: Existing hydraulic design capacities, average daily flows, required treatment capacity and water quality failures

WTW	Existing Hydraulic Capacity	Peak Month Average Daily Flow	Average Daily Flow (Jul 2023 – Jun 2024)	Average Daily Flow as a % of Design Capacity	Required Treatment Capacity (1.5 x AADD10yr)	2023/2024 Water Quality Network and WTW Failures (SANS0241:2015)
	Ml/d	Ml/d	Ml/d	%	Ml/d	
Porterville	2.270	1.909 (Jan)	1.373	60.5	2.510	Turbidity (Operational), pH
Piketberg	6.950	2.935 (Feb)	2.169	31.2	4.372	Turbidity (Operational), E.Coli, Iron, Total Coliforms
Aurora	0.200	0.191 (Jan)	0.141	70.5	0.257	Turbidity (Operational), Sodium, Chloride, Total Coliforms
Eendekuil	0.200	0.302 (Jan)	0.180	90.0	0.404	Aluminium, Turbidity (Operational), pH, Free chlorine
Redelinghuys	0.260	0.186 (Dec)	0.143	55.0	0.275	Turbidity (Operational), E.Coli

The WTWs are all operational and the treatment plants are in a good condition, with no non-functional treatment processes. Some of the minor items to be addressed at the WTWs, as identified through the WSDP inspection process during February 2025, are as follows.

- Porterville WTW: Current fencing is not adequate to prevent unauthorised access. No security gate at chlorination building. No burglar bars for filter backwash PS building or the office building, even though an alarm system is installed. Only one filter backwash pump, no standby. No control sheet for pH raw water sampling.
- Piketberg WTW: Missing door of chlorination building to be replaced, with a security gate. Electronic scale for chlorine gas cylinders is not working.
- Redelinghuys WTW: WTW building is not supplied with burglar bars or security gates. Current fencing is not adequate to prevent unauthorised access.
- Aurora WTW: Safety sign to be put up above door for low height entrance. No standby raw water or final water pumps. The WTW is not fenced.

The status with regard to the existing WTW hydraulic capacities and whether it need to be upgraded is as follows:

- Porterville: Capacity need to be increased in the short to medium term.
- Piketberg: Capacity is sufficient for the medium to long term.
- Eendekuil: Existing hydraulic capacity is inadequate and the WTW needs to be upgraded.
- Redelinghuys: The hydraulic capacity of the WTW (Pressure sand filters) will need to be increased in the short to medium term.
- Aurora: Existing hydraulic capacity is inadequate and the WTW needs to be upgraded.

Technical Reports were prepared during 2024 for the upgrading of the Eendekuil and Aurora WTWs. The objectives of the upgrades were indicated as follow in the Reports.

Eendekuil WTW:

- Provide sufficient treatment capacity for the next 20+ years based on population growth estimates.
- Install a treatment process that can consistently produce SANS241 compliant water: Optimize filter media and bed depth; Optimize backwashing procedure.

- Address all operational and treatment limitations: Automatic disinfection equipment; Adequately sized stabilization treatment capacity.
- Formalise the disinfection treatment step with a dedicated chlorine contact tank (CCT).
- Incorporate modern control instrumentation i.e. telemetry, process control functionality and Supervisory Control and Data Acquisition (SCADA) systems.

The total estimated cost for the upgrading of the Eendekuil WTW from 0.2 Ml/d to 0.3 Ml/d, which include the construction of a new reservoir, is R14 234 992 (VAT Excluded).

Aurora WTW:

- Provide sufficient treatment capacity for the next 20+ years based on population growth estimates.
- Recommission and optimize the iron and manganese removal process to be able to use borehole 5.
- Install a treatment process that can consistently produce SANS241 compliant water (Na and Cl removal).
- Address all operational and treatment limitations: Adequately sized stabilisation capacity; Sufficient buffer capacity for pumping to the treated water reservoirs; Integration of the disinfection equipment into the treatment train.
- Formalise the disinfection treatment step with a dedicated chlorine contact tank (CCT).
- Incorporate modern control instrumentation i.e. telemetry, process control functionality and Supervisory Control and Data Acquisition (SCADA) systems.

The total estimated cost for the upgrading of the Aurora WTW with RO and Brine ponds is R34 459 850 (VAT Excluded). The cost estimate given is quite substantial due to the cost of the RO plant, Brine pipeline and brine ponds. As an alternative one could first try and source new boreholes with less saline water to dilute the existing waters to come within SANS 241 requirements.

The total estimated cost for the upgrading of the Aurora WTW with a new water sources option is R28 412 614 (VAT Excluded). This option may provide a substantial saving if suitable additional sources can be found. For the potential saving through it could be advisable to complete the Geohydrological Study and exploratory boreholes as a minimum in the first financial year and then complete the upgrades in the years thereafter.

The following upgrades are required with regard to the WTWs.

Table C.3.7: Future upgrades of the WTWs

WTW	Short description	Time Frame	Estimated cost
Porterville	Upgrade WTW	2029	R15 000 000
Eendekuil	Upgrade WTW from 0.2 Ml/d to 0.3 Ml/d	2025	R15 400 000
Redelinghuys	Upgrade WTW	2030	R10 000 000
Aurora	Upgrade WTW from 0.2 Ml/d to 0.3 Ml/d	2026	R41 277 795
	Upgrade and refurbish Rooigat treatment facility	2030	R8 000 000
Total			**R89 677 795**

WATER PUMP STATIONS

Some of the water pump stations, as inspected during the WSDP site visits in February 2025, require refurbishment and maintenance. Duty and Standby pumps are also not available for all the pump stations. No leaks were observed at any of the water pump stations. The pump stations are also fenced and locked and some are supplied with alarms to prevent any possible vandalism. Some of the issues to be addressed at the water pump stations, as identified through the WSDP inspection process, are as follows.

- Porterville: Monte Bertha booster PS: One of the three motors was removed for repairs.
- Porterville: The Submersible raw water pump in the storage dam needs to be put back into operation, cables were stolen.

- Piketberg: The pumps of the Buitengracht booster PS are in a very poor condition and need to be refurbished.
- Piketberg: Fencing around Voëlvlei PS and Pressure Break Tank was vandalised and is not adequate.
- Redelinghuys: Raw water PS: Only one pump operational, flange coupling of the other pump was removed for repairs. No back-up generator for load shedding periods. WTW and PS building not supplied with any safety gates or burglar bars. Current fencing is not adequate.
- Redelinghuys: Booster PS: Only one motor and pump operational. Motors and pumps in a very poor condition.
- Aurora: Raw water and final water pumps at WTW: No standby pumps. No back-up generator for load shedding periods.
- Wittewater: Final water PS: Supply from the PS to the reservoir is inadequate, because the 75 mm dia. HDPE rising main is too small.

The updated 2025 Water Master Plan is not yet available and at this stage it is estimated that the following future water pump stations will be required for Bergrivier Municipality.

Table C.3.8: Future water pump stations required

Distribution System	Recommendations	Year	Capacity (l/s)	Head (m)	Estimated Cost
Porterville	Repair vandalised raw water PS and install second pump	2026	-	-	R1 500 000
Piketberg	Refurbishment of the Buitengracht Booster PS	2026	5.0	80.4	R1 500 000
	Install new security fencing around PBT and Voëlvlei PS	2026	-	-	R450 000
	Upgrade existing PS when PS reaches capacity	2029	105	180	R4 000 000
	Upgrade existing PS when PS reaches capacity	2029	105	135	R4 000 000
Velddrif	New booster PS when AADD exceeds 4 000 kl/d.	2025	-	-	R13 404 937
Dwarskersbos	Required when AADD exceeds 500 kl/d	2032	75.0	40	R4 764 000
Redelinghuys	Refurbishment of the Booster PS	2026	11.7	50	R2 000 000
	Install new security fencing around WTW and raw water PS building and provide back-up Generator	2026	-	-	R1 500 000
Aurora	Install standby raw water pump and final water pump	2027	10.8	30.1	R1 250 000
Eendekuil	New PS required when areas EK4 and EK5 develops	2030	7.5	35	R2 103 000
	New PS required when area EK7 develops	2035	1.5	35	R1 885 000
Goedverwacht	New PS required when area GV2 develops	2040	5.0	50	R2 000 000
Total					**R40 356 937**

RESERVOIR INFRASTRUCTURE

The condition of most of the reservoirs in Bergrivier Municipality's Management Area is good and the reservoirs are well maintained. The levels of the bulk and internal reservoirs are monitored through the scada systems. Only one leak was noticed at the one Aurora reservoir during the WSDP site visits in February 2025. Not all the reservoirs are adequately fenced and locked and some of the covers are not locked. The issues to be addressed at the reservoirs and water towers, as identified through the WSDP site inspections, are as follows.

- Porterville: Current fencing of Monthe Berta reservoirs is not adequate.
- Piketberg: Current fencing of 2.400 Ml and 3.300 Ml reservoirs is not adequate.
- Velddrif Reservoirs: Covers of reservoirs not locked. Some of the covers of the valve chambers were stolen.
- Dwarskersbos Reservoirs: Covers of reservoirs not locked and reservoirs are not fenced.
- Eendekuil: Reservoir in a very poor condition, with an asbestos roof, which is broken at a number of places.
- Redelinghuys: The old reservoir is in a poor condition, with an asbestos roof. Cover of 0.250 Ml reservoir not locked.

- Aurora: Reservoirs not fenced. Chamber for scour valve and outlet pipework to be repaired. 0.250 Ml Reservoir is leaking at the floor.
- Goedverwacht: Covers of reservoirs are left open and not locked, risk of animals that can fall into the reservoir.
- Wittewater: Cover left open and not locked, risk of animals that can fall into the reservoir.

The 2023/2024 storage factors of the total reservoir storage capacity for the various towns, based on 1 x PDD (24 hours storage capacity), are 1.58 for Porterville, 2.86 for Piketberg, 1.99 for Velddrif, 1.24 for Dwarskersbos, 2.20 for Aurora, 1.01 for Eendekuil and 1.53 for Redelinghuys. Even though the overall storage capacity might be adequate for the towns there can still be distribution zones within some of the towns with inadequate storage capacity, which require additional reservoirs.

The updated 2025 Water Master Plan is not yet available and at this stage it is estimated that the following future reservoirs will be required for Bergrivier Municipality.

Table C.3.9: Future reservoirs required

Distribution System	Recommendations	Year	Capacity (Ml)	Estimated Cost
Porterville	Install new security fencing around Monte Bertha reservoirs (240m)	2026	-	R720 000
	New reservoir when AADD exceeds 2 000 kl/d (TWL 235m)	2032	5.000	R13 000 000
Piketberg	Install new security fencing around two reservoirs (320m)	2026	-	R960 000
	New reservoir when AADD exceeds 4 850 kl/d (TWL 315m)	2048	3.500	R10 429 000
Velddrif	Refurbish Velddrif and Laaiplek water towers (On budget)	2026	-	R1 550 000
	New reservoir when AADD exceeds 5 000 kl/d (TWL 10.05m)	2035	5.000	R13 663 000
Dwarskersbos	Install new security fencing around two reservoirs (120m)	2026	-	R360 000
	Refurbish Dwarskersbos water tower (On budget)	2025	-	R700 000
	New reservoir when AADD exceeds 500 kl/d (TWL 5.27m)	2032	1.200	R4 863 000
	New reservoir when AADD exceeds 1 000 kl/d (TWL 5.27m)	2048	1.000	R4 309 000
Aurora	Install new security fencing around two reservoirs (125m)	2026	-	R375 000
	New reservoir when AADD exceeds 275 kl/d (TWL 165.2m)	2048	0.500	R2 697 000
Eendekuil	Replace asbestos reservoir roof (On budget)	2025	-	R400 000
	Required to augment reservoir storage capacity for Eendekuil (TWL 137.46m) and for replacement of old reservoir.	2026	1.000	R4 309 000
Redelinghuys	Replace asbestos reservoir roof (On budget)	2025	-	R400 000
	New reservoir when AADD exceeds 220 kl/d (TWL 25.3m)	2039	0.500	R2 697 000
Goedverwacht	New reservoir when AADD exceeds 310 kl/d (TWL 227.15m)	2030	0.500	R2 697 000
	New reservoir when FDA GV2 develops (TWL 265m)	2040	0.200	R1 282 000
Total			**18.400**	**R65 411 000**

BULK SEWER PIPELINE AND SEWER DRAINAGE NETWORK INFRASTRUCTURE

The updated 2025 Sewer Master Plan is not yet available and at this stage it is estimated that based on the most likely land-use development scenario, the following future sewer drainage infrastructure components will be necessary.

Table C.3.10: Future bulk sewer pipeline and sewer drainage network infrastructure required

Distribution System	Recommendations	Year	Diameter (mm)	Length (m)	Estimated Cost
Porterville	New gravity pipeline	2026	160, 200 and 250	640, 52 and 891	R3 271 532
	New gravity pipeline	2030	160	788	R1 894 352
	New rising main		110	231	R344 190
Piketberg	Upgrade existing gravity pipeline	2030	250	841	R2 593 644
	Upgrade existing gravity pipelines	2040	200 and 315	323 and 70	R1 121 862

Table C.3.10: Future bulk sewer pipeline and sewer drainage network infrastructure required					
Distribution System	**Recommendations**	**Year**	**Diameter (mm)**	**Length (m)**	**Estimated Cost**
Velddrif	New gravity pipelines to service Noordhoek, Hawe and Port Owen	2028	160	7 034	R16 909 736
	New gravity pipelines to service Velddrif and Hawe	2028	160	6 599	R15 863 996
	Upgrade existing rising main and new rising mains to service existing erven.		110 and 140	1 000 and 2 033	R4 962 364
	New gravity pipelines	2030	160, 200 and 250	8 760, 330 and 32	R22 040 148
	New rising main and upgrade existing rising main		140 and 200	1 956 and 937	R5 450 035
	New gravity pipelines to service existing erven.	2035	160	6 906	R16 602 024
	New rising mains to service existing erven		90 and 125	1 077 and 1 045	R3 174 575
	New rising main	2040	110	620	R923 800
Dwarskersbos	New gravity pipelines to service existing erven	2030	160 and 200	1 538 and 300	R4 499 552
	New rising main		200	1 367	R3 077 117
	New gravity pipelines to service existing erven	2035	160	1 273	R3 060 292
Aurora	New gravity pipelines required to service existing erven	2030	160	8 436	R20 280 144
Eendekuil	New gravity pipelines required to service existing erven	2030	160	1 573	R3 781 492
	New gravity pipelines required to service existing erven	2035	160	2 704	R6 500 416
Redelinghuys	New gravity pipelines required to service existing erven	2030	160	7 411	R17 816 044
	New rising main		125	1 557	R2 483 415
Goedverwacht	New gravity pipelines required to service existing erven	2035	160	7 865	R18 907 460
	New gravity pipelines required to service existing erven	2040	160	6 241	R15 003 364
Wittewater	New gravity pipelines required to service existing erven	2035	160	5 019	R12 065 676
Total				**87 449**	**R202 627 230**

SEWER PUMP STATIONS

Most of the sewer pump stations are fenced and locked or located within security estates. The scada systems of most of the sewer pump stations in Velddrif and Dwarskersbos were also recently upgraded and are in a very good condition. Not all the sewer pump stations are supplied with duty and standby pumps. Key issues to be addressed at the sewer pump stations, as identified through the WSDP inspection process in February 2025, are as follows.

- Piketberg: Silo sewer pump station. Overflow at pump station, because electrical box burned and the two submersible pumps are not operational. Pump station is not fenced.
- Eendekuil sewer pump station. Only one pump, because other pump was removed for repairs.
- Dwarskersbos sewer pump stations: Rocherpan, Gietenmelksfontein and Voëlvry sewer pump stations are not fenced. Gietenmelksfontein and Voëlvry sewer pump stations only supplied with one pump.
- Velddrif sewer pump stations: A number of pump stations only supplied with only one pump and not all the pump stations are fenced and locked.
  - Pump stations supplied with only one pump: Lepelaar, Malbaaitjie, Kelkiewyn, Troupand, Seder, Duiwelspiek, Blikkiesdorp, Spare Kiosk, Clinic, Malgas, Erf 1420, Fishermans Village, Jetty, Aan't Oewer Aftree Oord, Veldpark, Port Owen No.1 – No.9, Pelican, Cabanas, Marina and Admiral Island No.1 – No.5, No.7, No.8, No.10.

- Pump stations not fenced or locked: Erf 1420, Fishermans Village, Jetty, Port Owen No.4 – No.9.

The updated 2025 Sewer Master Plan is not yet available and at this stage it is estimated that the following future sewer pump stations will be required for Bergrivier Municipality.

Table C.3.11: Future sewer pump stations required

Drainage System	Recommendations included in the Sewer Master Plan	Year	Capacity (l/s)	Estimated Cost
Porterville	New sewer PS (BPoS1.2)	2030	5.5	R2 000 000
Velddrif	Upgrade Velddrif Noordhoek (Albatros) PS (BVS1.4)	2025	40	R4 000 000
	New PS required to service existing erven (BVS2.3)	2028	Unknown	R2 000 000
	New PS required to service existing erven - Investigate first (BVS4.2)	2028	Unknown	R2 000 000
	New PS required to service existing erven – Investigate first (BVS5.2)	2030	Unknown	R2 000 000
	New PS required to service existing erven – Investigate first (BVS5.5)	2035	Unknown	R2 000 000
	New PS required to service existing erven – Investigate first (BVS5.8)	2035	Unknown	R2 000 000
	New PS required to service existing erven – Investigate first (BVS5.11)	2035	Unknown	R2 000 000
	New PS required to service existing erven – Investigate first (BVS5.14)	2035	Unknown	R2 000 000
	New PS (BVS6.1)	2035	Unknown	R2 000 000
	New PS (BVS7.1)	2040	7	R2 000 000
Redelinghuys	New PS required to service existing erven (BRS1.2)	2030	Unknown	R2 000 000
Eendekuil	Upgrade Eendekuil PS	2030	Unknown	R4 000 000
Total				**R30 000 000**

WASTE WATER TREATMENT INFRASTRUCTURE

The table below gives a summary of the existing hydraulic design capacities and current flows at each of the WWTWs, as well as the final effluent quality compliance percentages for the 2023/2024 financial year.

Table C.3.12: Existing hydraulic design capacities and flows at each of the WWTWs

WWTW	Existing Hydraulic Capacity	Peak Month Average Daily Flow	Average Daily Flow (2023/2024)	Average Wet Weather Flow (Jun, Jul, Aug, Sept)	Average Daily Flow as a % of Design Capacity	Final Effluent Compliance for 2023/2024 *against Authorisation*
	Ml/d	Ml/d	Ml/d	Ml/d	%	
Porterville	1.500	2.623 (Oct)	1.590	1.954	106.0	Microbiological: 58.3% Chemical: 77.1% Physical: 88.9% *General Limits*
Piketberg	4.150	Unknown	1.759 (Estimated)	Unknown	42.4 (Estimated)	Microbiological: 66.7% Chemical: 39.6% Physical: 47.2% *General Limits*
Velddrif	1.995	Unknown	1.877 (Estimated)	Unknown	94.1 (Estimated)	Microbiological: 18.2% Chemical: 56.8% Physical: 57.6% *Licence Limits*
Dwarskersbos	0.294	Unknown	0.191 (Estimated)	Unknown	65.0 (Estimated)	Microbiological: 100.0% Chemical: 100.0% Physical: 50.0% *General Limits (Irrigation)*
Eendekuil	0.140	Unknown	0.108 (Estimated)	Unknown	77.1 (Estimated)	Microbiological: 100.0% Chemical: 90.9% Physical: 100.0% *General Limits (Irrigation)*

Note: Vandalised or damaged flow meters at WWTWs to be repaired.

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

Table C.3.13: Existing organic design capacities and historical loadings at the activated sludge WWTWs

WWTW	Organic Design Capacity	2021/2022		2022/2023		2023/2024	
		Average Load	% of Design Capacity	Average Load	% of Design Capacity	Average Load	% of Design Capacity
	kg COD/d	kg COD/d	%	kg COD/d	%	kg COD/d	%
Porterville	1 701	1 157	68.0	704	41.4	880	51.7
Piketberg	3 366	1 546	45.9	1 915	56.9	1 984	58.9
Velddrif	3 200	2 469	77.2	1 569	49.0	2 513	78.5

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

Table C.3.14: Average daily and peak month future projected WWTW flows (Ml/d)

WWTW	Existing Hydraulic Capacity	Average Daily Future Projected WWTW Flows					Peak Month Average Daily Future Projected WWTW Flows				
		2028	2033	2038	2043	2048	2028	2033	2038	2043	2048
Porterville	1.500	1.155	1.324	1.516	1.643	1.786	1.444	1.655	1.895	2.054	2.233
Piketberg	4.150	1.912	2.109	2.332	2.586	2.878	2.390	2.636	2.915	3.233	3.598
Velddrif	1.995	2.722	3.490	4.471	5.387	6.510	3.403	4.363	5.589	6.734	8.138
Dwarskersbos	0.294	0.254	0.330	0.420	0.469	0.525	0.318	0.413	0.525	0.586	0.656
Eendekuil	0.140	0.130	0.171	0.220	0.260	0.307	0.163	0.214	0.275	0.325	0.384

Notes: The peak month factors used in the above table is 1.25
The metered inflow for the Porterville WWTW for 22/23 and 23/24 was more than the raw water volume supplied to the Porterville WTW and it was therefore decided to rather work with 80% of the projected future raw water volumes for Porterville for the estimated future WWTW flows.

Not all the WWTWs were in a good condition and all the treatment processes were not fully operational during the WSDP site visits. The items to be addressed at the WWTWs, as identified through the WSDP inspection process during February 2025, are as follows.

The **Porterville WWTW** was in a good condition when it was inspected, with all treatment processes operational.

- The two inflow meters and the one outflow meter need to be calibrated, in order to confirm the accuracy of the current metered flows.
- The tools for the removal of the screenings and grit need to be replaced (Spade and rake). Ensure adequate operational equipment and PPE for the Process Controllers for their daily tasks.
- Old WWTW: Reactor aerobic zone. One of the two aerators was removed for repairs. In-line pH meter needs to be calibrated.
- New WWTW: Reactor anoxic zone: One of the two mixers was removed for repairs.
- New WWTW: Reactor aerobic zone: One of the four aerators was removed for repairs.
- New WWTW: Return PS: Only one of the two pumps is operational, timer needed for the other pump.
- Sludge dams No.1-No.4: Overgrown with reeds. The sludge dams need to be desludged.
- Final maturation pond needs to be cleaned.
- Site security is compromised due to the following:
  - Disinfection building without burglar bars and security gate.
  - Site not fully fenced with new fencing.
  - No security gates at MCC building for new plant.
  - WWTW Office without burglar bars.

  - No alarms for the buildings or CCTV system for the plant.
- Electric scale for the chlorine gas cylinders not operational.
- The on-site re-use irrigation pump is not operational.

The **Piketberg WWTW** was in a very poor condition when it was inspected and various treatment processes were not operational and require refurbishment.

- Not all sampling equipment is operational. pH meter not available from September 2024. HACH chlorine meter not working 100%.
- Inlet Works: No flow meter readings for the plant, because the cables of the inflow meter was vandalised. The mechanical front raked screen was vandalised and removed for repairs. Temporary hand raked screen was installed.
- Inlet Works Splitter Box: Not possible to regulate flow between the old and new BNR reactors, because sluices were removed. Currently no process control and BNR reactors are not working, due to faulty aerators and mixers.
- Old BNR reactor: Only one of the five mixers is operational, the others were removed for repairs. MCC for mixers and aerators was removed for repairs. Only one of the three aerators is operational, one aerator was removed for repairs and the other aerator trip the electricity. R-recycle PS, both pumps not working. A-recycle PS, only one pump working, the other without a belt.
- SST: Grease nipple for wheel to be repaired.
- Desludge PS: One pump was removed for repairs and other pump leak oil.
- New BNR reactor: Only one of the three mixers is operational. All three aerators are not working. Control sluice of aeration zone broken. R-recycle PS, one pump in for repairs and the other pump trip. A-recycle PS, one pump in for repairs and the other motor run, but the shaft do not turn.
- The WWTW site is in a poor condition. The grass was not cut and the weeds are not removed.
- The two sludge dams are overgrown with reeds and need to be desludge.

The **Velddrif WWTW** was in a good condition when it was inspected with all the treatment processes operational, except for the disinfection system. The sludge drying beds were also overgrown with grass and reeds.

- Inlet Works: Mechanical front raked screen was removed for repairs. Hand raked by-pass screen was in use.
- Reactor: Anoxic zone: One mixer was removed for repairs. Aerobic zone: One of the aerators was not working.
- Disinfection building (Chlorine gas): No emergency shower or eye wash facility. The chlorine dosing system was not operational.
- The eight sludge drying beds were overgrown with grass and reeds, which need to be cleaned. Not all the valves of the sludge drying beds are operational, some were vandalised.
- No flow meter for the final effluent re-use pump station.
- Sludge Lagoons: Sluices of splitter box were stolen. The lagoons need to be cleaned. Sludge flow meter not working.
- Security fencing still needs to be installed for the one side of the plant.

Dwarskersbos WWTW

- Sludge, screenings and debris left next to the primary pond need to be removed regularly.
- Safety ropes only installed for the final irrigation pond. All primary and secondary ponds without safety ropes.

Eendekuil WWTW

- The flow meter at the sewer pump station needs to be calibrated.
- No sluices to divert flow between the primary- and secondary pond.
- No safety ropes for the primary-, secondary- and evaporation pond.
- Blocked discharge pipe at evaporation pond, water flow around sides of structure.

Bergrivier Municipality evaluates the capacity and suitability of their WWTWs to meet the final effluent quality limits on an annual basis. When the water quality requirements for the final effluent becomes stricter and / or when the inflow to the WWTW has increased to such an extent that the capacity of the plant needs to be increase, the Municipality appoints reputed consulting engineering firms to undertake feasibility studies to perform technical and economical evaluation of the different options available for upgrading or extending the capacity of the treatment works. The following upgrades are required with regard to the WWTWs.

Table C.3.15: Future upgrades of the WWTWs

WWTW	Short description	Time Frame	Estimated Cost
Porterville	Improve security measures at plant, replace faulty equipment, calibration of flow meters and desludge sludge dams.	2026	R3 500 000
Piketberg	Refurbishment of the WWTW	2026	R25 000 000
Velddrif	Upgrade capacity of WWTW	2026	R173 658 499
Dwarskersbos	Upgrade oxidation pond system	2031	R40 000 000
Eendekuil	Upgrade oxidation pond system	2028	R12 000 000
Redelinghuys	Construct new WWTW (Phasing out Septic Tanks)	2029	R117 000 000
Aurora	Construct new WWTW (Phasing out Septic Tanks)	2030	R93 000 000
Wittewater	Construct new WWTW (Phasing out Septic Tanks)	2035	R10 000 000
Goedverwacht	Construct new WWTW (Phasing out Septic Tanks)	2035	R15 000 000
Total			**R489 158 499**

WATER SCHEMES

The updated 2025 Water Master Plan is not yet available and at this stage it is estimated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary.

Table C.3.16: Future water reticulation infrastructure required

Porterville
The existing Porterville water distribution system has sufficient capacity to supply the water demands for the fully occupied existing scenario. Additional storage capacity is required in future. Upgrading of certain distribution pipes is required to improve conveyance and redundancy in the network and to accommodate proposed future development areas. Proposed distribution zones: • There are no changes to the existing distribution zones besides the extensions to accommodate future development areas.
Piketberg
The existing Piketberg water distribution system has sufficient capacity to supply the water demands for the fully occupied existing scenario, but high static pressures are evident. Upgrading of certain distribution pipes is required to improve conveyance and redundancy in the network and to accommodate proposed future development areas. Proposed distribution zones: • The boundaries of several existing zones are increased to accommodate future development areas. • A new PRV is introduced for the south eastern part of the existing break pressure tank (BPT) zone, which then in turn feeds the Piketberg Industrial PRV zone. • A new PRV is introduced for the Lower reservoir zone and supplies the northern part of Piketberg.
Velddrif
The existing Velddrif water distribution system has insufficient capacity to supply the water demands for the fully occupied scenario. Additional storage capacity is required in future. Installation of new distribution pipes and upgrading of other distribution pipes is required to improve conveyance and redundancy in the network. Proposed distribution zones: • Several zone water meters are installed to separate the existing Velddrif booster zone into four separate zones, viz. the Laaiplek zone, the Port Owen zone, the Noordhoek zone and the Velddrif zone.

Table C.3.16: Future water reticulation infrastructure required
• The boundaries of the zones are increased to accommodate future development areas.
Dwarskersbos
The existing Dwarskersbos water distribution system has sufficient capacity to supply the future water demands for the fully occupied scenario. Additional storage capacity is required in future. Proposed distribution zones: • There are no changes to the existing distribution zones besides the extensions to accommodate future development areas.
Aurora
The existing Aurora water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. Upgrading of certain distribution pipes is required to improve conveyance and redundancy in the network. Proposed distribution zones: • There are no changes to the existing distribution zones besides the extensions to accommodate future development areas.
Eendekuil
The existing Eendekuil water distribution system has sufficient capacity to supply the future water demands for the fully occupied scenario. Additional storage capacity is required in future. Upgrading of certain distribution pipes is required to improve conveyance and redundancy in the network. Proposed distribution zones: • The boundary of the existing reservoir zone is increased to accommodate future development areas. • Two booster pump stations are required to supply the higher lying erven due to low static pressures.
Redelinghuys
The existing Redelinghuys water distribution system has insufficient capacity to supply the water demands for the fully occupied scenario. Additional storage capacity is required in future. Upgrading of certain distribution pipes is required to improve conveyance and redundancy in the network. Proposed distribution zones: There are no changes to the existing distribution zones besides the extensions to accommodate future development areas.
Goedverwacht
The existing Goedverwacht water distribution system has sufficient capacity to supply the future water demands for the fully occupied scenario. Additional storage capacity is required in future. Proposed distribution zones: • The boundary of the existing reservoir zone is increased to accommodate future development areas. • A new higher lying reservoir zone is proposed for the higher lying erven when future area GV2 develops.
Wittewater
The existing Wittewater water distribution system has sufficient capacity to supply the water demands for the fully occupied scenario. Proposed distribution zones: • Two zone valves are installed to create a new Wittewater West zone, which is supplied from the 350 kℓ Wittewater new reservoir which receives water from the Wittewater borehole. • The Wittewater East zone is supplied from the remaining reservoirs which receives water from the Jobskloof weir. The boundary of the Wittewater East zone is increased to accommodate future development areas.

SANITATION SCHEMES

The updated 2025 Sewer Master Plan is not yet available and at this stage it is estimated that based on the most likely land-use development scenario, the following future sewer reticulation infrastructure components will be necessary.

Table C.3.17: Future sewer reticulation infrastructure required
Porterville
The existing drainage areas are increased to accommodate proposed future development areas that fall within these drainage areas. New outfall sewers, along with a new pumping station and accompanying rising main, are proposed
Piketberg
The existing drainage areas are increased to accommodate proposed future development areas that fall within these drainage areas. A number of existing outfall sewers require upgrading by replacement with enlarged future sewers when overflow problems occur in the Piketberg system (when future areas develop).
Velddrif
The existing drainage areas are increased to accommodate proposed future development areas that fall within these drainage areas. New outfall sewers, pumping stations and accompanying rising mains are proposed to service the existing erven without a waterborne sanitation system and to collect the sewage from the proposed future development areas in Velddrif. It is proposed that the existing Noordhoek Main pumping station (located near the corner of Albatros street and Dolphin street) and the Hawe Main pumping station and their respective rising mains are upgraded to accommodate the new development areas and increased future flows. The capacity of the existing pumping stations and the diameter of the rising mains should however first be verified.
Dwarskersbos

Table C.3.17: Future sewer reticulation infrastructure required
The existing drainage areas are increased to accommodate proposed future development areas that fall within these drainage areas. New outfall sewers, pumping stations and accompanying rising mains are proposed to service the existing erven without a waterborne sanitation system and to collect the sewage from the proposed future development areas in Dwarskersbos. The capacity of the Dwarskersbos Main PS should be verified.
Aurora
New outfall sewers are proposed to service the existing erven (without a waterborne sanitation system) in Aurora and to collect the sewage from future development areas. A new WWTW will be required.
Eendekuil
The existing drainage areas are increased to accommodate proposed future development areas that fall within these drainage areas. New outfall sewers are proposed to service the existing erven (without a waterborne sanitation system) in Eendekuil and to collect the sewage from future development areas. The capacities of the Eendekuil PS should be verified.
Redelinghuys
New outfall sewers, along with a new pumping station and accompanying rising main, are proposed to service the existing erven without a waterborne sanitation system and to collect the sewage from the proposed future development areas in Redelinghuys. A new WWTW will be required.
Goedverwacht
New outfall sewers are proposed to service the existing erven (without a waterborne sanitation system) in Goedverwacht and to collect the sewage from future development areas. A new WWTW will be required.
Wittewater
New outfall sewers are proposed to service the existing erven (without a waterborne sanitation system) in Wittewater and to collect the sewage from future development areas. A new WWTW will be required.

TOPIC 4: WATER SERVICES OPERATION AND MAINTENANCE

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

Topic C.4.1: Water Services O&M						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
	No	100	Remote monitoring and Control Systems: Ensure adequate maintenance is carried out on the SCADA systems and compile maintenance checklists for the recommended activities.	100	Partially	85.7
	No	100	Sewer PSs: Compile weekly and quarterly maintenance checklists for the recommended activities for all the sewer PSs and all centrifugal pump stations need to be inspected on at least a weekly basis.	100	Partially	85.7
	No	100	Bulk and sewer drainage networks: Annual, monthly and weekly schedules for maintenance should be drawn up for the bulk and sewerage networks. Regular cleaning of sewer lines and all blockages and their precise locations should be recorded.	100	Partially	85.7
	No	100	WWTWs: Evaluate the existing O&M schedules for the WWTWs against the recommended O&M tasks and ensure all required activities are adequately monitored and recorded.	100	Partially	85.7

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

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

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

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

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

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

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

- Reduce the overall management burden through better work preparation and reduced unforeseen production stoppages.
- Protect the environment.

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

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

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

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

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

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

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

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

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

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

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

- understand equipment and infrastructure;
- understand and implement the proper O&M requirements and procedures;
- understand the required service and operating standards;
- have and develop the necessary O&M skills;
- assess equipment and infrastructure conditions;

- understand and identify typical defects and problems;
- solve problems and make necessary repairs, or engage experts to do so; and
- record all activities to provide data for planning and analysis of O&M.

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

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

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 (Best Practice).

The table below gives an overview opening costs and carrying values of the water and sewerage infrastructure included in Bergrivier Municipality's Asset Register (June 2024), as well as the CRC of the water and sewerage infrastructure as included in the WSDP. The recommended budgets for the replacement of the existing infrastructure and the operation and maintenance of the existing infrastructure, based on the CRC of the assets in the WSDP, are also indicated.

Table C.4.2: Recommended budgets for the replacement and the operation and maintenance of the existing water and sewerage infrastructure

Asset Type	Asset Register June 2024		CRC (WSDP)	Recommended Annual Replacement Budget (Best Practice)	Recommended Annual O&M Budget (Best Practice)	Bergrivier Actual Depreciation and Amortisation Expenditure
	Opening Costs	Carrying Values		2.0% of CRC	1.5% of CRC	2023/2024
Boreholes	R1 442 481	R894 775	R6 000 000	R120 000	R90 000	R3 136 276
Bulk & Ret. Pipelines	R11 513 212	R6 919 489	R424 633 000	R8 492 660	R6 369 495	
Pump Stations	R43 943 620	R35 872 772	R45 458 000	R909 160	R681 870	
Reservoirs, Dams & Weirs	R10 743 996	R6 666 339	R131 274 000	R2 625 480	R1 969 110	
WTWs	R60 118 596	R45 412 957	R199 900 000	R3 998 000	R2 998 500	
Sub Total Water	**R127 761 904**	**R95 766 331**	**R807 265 000**	**R16 145 300**	**R12 108 975**	**R3 136 276**
Sewer Pump Stations	R20 598 642	R11 489 222	R95 050 000	R1 901 000	R1 425 750	R3 251 866
Sewer Reticulation Pipelines	R23 816 475	R18 085 970	R335 214 000	R6 704 280	R5 028 210	
Porterville WWTW (0001)	R30 631 269	R25 529 774	R45 000 000	R900 000	R675 000	
Velddrif WWTW (0002)	R19 404 974	R15 741 354	R56 310 000	R1 126 200	R844 650	
Eendekuil WWTW (0003)	R269 582	R128 563	R3 500 000	R70 000	R52 500	
Piketberg WWTW (0004)	R14 084 773	R8 518 452	R124 500 000	R2 490 000	R1 867 500	
Dwarskersbos WWTW	R108 805 714	R79 493 335	R7 350 000	R147 000	R110 250	
Sub Total Sewerage	**R217 611 429**	**R158 986 670**	**R666 924 000**	**R13 338 480**	**R10 003 860**	**R3 251 866**
Total Water and Sewerage	**R345 373 333**	**R254 753 001**	**R1 474 189 000**	**R29 483 780**	**R22 112 835**	**R6 388 142**

TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

Topic C.5.1: Conservation and Demand Management - Water Resource Management						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Reducing unaccounted water and water inefficiencies	Yes	100	Implement the proposed WC/WDM Strategy and the 25 WC/WDM items. Ensure adequate budget is allocated under the Capital and Operational budgets towards the implementation of the WC/WDM initiatives.	100	Partially	85.7
	Yes	100	Set up meeting with the Large Water Users to discuss water consumption status, potential water saving volumes and to cultivate a water saving awareness within each large water user.	100	Partially	85.7
Leak and meter repair programmes.	Yes	100	Implement a Leak Repair and Assistance Programme that investigates and repairs leaks at all domestic households in low cost housing developments and poor areas with consumption above 15 kl/month. An exercise could also be initiated to check for visual leakage at public buildings, using more than 60 kl/month.	100	No	71.4
	Yes	100	Continue with the implementation of the pipeline replacement programme. The location of pipe failures should in the future be recorded preferably with accurate GPS coordinates. This improves the integrity of the output of the pipe failure model. If a longer and more comprehensive pipe failure record could be established, the integrity of the output could be further enhanced. It was recommended in the pipe replacement study that the pipe replacement in Bergrivier Municipality is performed in accordance with the PRP values calculated in the study. Pipes with the highest PRP values should be considered to be replaced first.	100	Partially	92.9
	Yes	100	Install water meters at all the unmetered erven and inspect metered erven with zero consumption.	100	Partially	85.7
Consumer/end-use demand management: Public Information & Education Programmes	Yes	100	At least once a year, a schools education programme on water conservation should be undertaken. The Municipality should assist the school(s) with the monitoring (water audit) of their water consumption. Bergrivier Municipality can also focus on the implementation of an extensive schools WDM programme, which can include annual competitions between schools (Say with a prize for the lowest consumption, the lowest per capita consumption and for the best WDM Strategy poster design, etc.). A schools WDM programme should receive a high priority.	100	Partially	85.7
	Yes	100	Continue to focus on the installation of water saving devices (specific water efficient toilets) and raising awareness regarding conservation projects and the installation of these products in order to reduce water demand. The use and installation of these fittings should be included as a condition for the approval of building plans as well as provided for in the Water Services By-law.	100	Partially	85.7
Conjunctive use of surface - and groundwater	No	100	-	100	-	100
Working for Water	No	100	-	100	-	100

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

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

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

The Revised Compulsory National Water and Sanitation Standards, as published in Government Gazette No.52814 of 6 June 2025, include the following WC/WDM requirements:

- Where spillages or leaks in its water supply network are detected or reported, a Water Services Institution must record such cases and ensure that they repair all leaks within 48 hours of becoming aware thereof.
- A Water Services Institution must isolate 95% of detected or reported water pipe bursts in its water supply system within a maximum of four (4) hours of becoming aware thereof.
- Where spillages or sewer blockages in its wastewater collection network are detected or reported, a Water Services Institution must record such cases and ensure that they are contained and must be repaired within 24 hours of becoming aware thereof. The affected surface area must be cleaned and or disinfected.
- A Water Services Institution must have a 24-hour consumer care facility supported by the system to which leaks, spillages or water service related enquiries and complaints can be reported and feedback be given to the consumer.
- Whenever emergency or alternative water supply is provided in terms of Regulation 4(1), the Water Services Institution must ensure that taking of water from a bulk line, if applicable, is appropriately metered and recorded (i.e. if alternative water is provided through tankering the number of tankers and their volume must be recorded when taking from a bulk metered pipeline).
- A Water Services Institution must implement a Pressure Management Programme allowing water reticulation systems to be operated at a minimum pressure of 20 m and maximum of 90 m.
- Where water pressure in a water reticulation system could rise above 90 m, a Water Services Institution must install a pressure control device to prevent the pressure at any domestic consumer connection from rising above 90m.
- A Water Services Institution must take steps to measure and progressively reduce losses, maintain the water use efficiency KPIs including the quantity of water losses, the quantity of NRW, ILI and per capita usage to within international accepted standards as follows:
  - NRW 20% – 30%;
  - Water Losses 10% - 20%;
  - Infrastructure Leakage Index 2 – 4; and
  - Per Capita Usage 120 l/c/d – 180 l/c/d
- Water Services Institutions must develop and implement a 10-year Council approved WC/WDM Strategy and an Annual Plan within 6 months of the publication to be uploaded on the IRIS system and must consist of at least the following:
  - Situation Assessment;
  - Key issues and challenges;
  - Focus areas of interventions;
  - List of proposed interventions;
  - Set targets for demand, NRW, water losses (commercial and real losses), ILI and per capita usage in line with subsection above; and
  - Budgets and Multi-year Implementation timelines.
- WSAs must require greenfield developments or major brownfield redevelopments, prior to planning approval, to indicate the manner and extent in which WC/WDM and water efficient sanitation solutions (WESS) has been accommodated and accounted for in their selected technology options, in terms of efficient water use and off-grid sanitation.

Bergrivier Municipality's WC/WDM Strategy (Objectives) is included under Topic 5 of the Administration, Information and Comprehensive Overview Report. The five goals of Bergrivier Municipality's WC/WDM strategy are as follows:

- Bergrivier Municipality must further reduce and maintain the NRW demand to below 5%.
- Water wastage by consumers should be reduced and maintained.
- Maintain management systems and implement Integrated Water Resource Planning in all decisions such as augmentation, bulk infrastructure and water efficiency projects.
- The WC/WDM must be adopted as a key Water Services delivery strategy and must give priority to its implementation.
- Reduce the potable water demand to 1% growth per annum for the next five years.

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

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

Item 1: Development of a Standard Water Balance

Recommendation and Strategy:

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

Funding and Budget Requirements:

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

Item 2: Pressurised System at all times

Recommendation and Strategy:

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

Funding and Budget Requirements:

- Budgets as indicated under the individual items of the WC/WDM Strategy.
- Increase O&M budget allocations towards the refurbishment and replacement of old water infrastructure.
- A budget of R3 000 000 is required for the identification and implementation of future recommended PRV zones.

Items 3 and 4: Metering System

Recommendation and Strategy:

- All un-metered water connections need to be provided with water meters. Meters need to be read on a monthly basis and consumers need to be billed monthly according to their actual water usage. In addition to water theft, many water accounts go unnoticed in the system or have some type of data inconsistency that results in no revenue being generated for the particular water use event. The 2025 SWIFT data needs to be used to clean the Treasury data and the municipality needs to identify and correct any inaccurate data in the system (Linkage of Treasury data with cadastral data).
- Consumer consumption checks / investigations need to be carried out where water usage are very low, but there are households on the property (Use SWIFT data). This project will give a clear indication of where illegal or unregistered connections is being made and whether the meter is under reading the actual consumption, thus water is being used but not billed or recorded.
- Use the 2025 SWIFT data to identify all unmetered erven and all meters with zero consumption. All illegible / broken / old meters should be replaced. Any un-metered stands should be metered and meter readings in the billing system should be updated where required. All meter boxes should also be cleaned as part of the inspections.
- Municipality needs to continue with the implementation of their Meter Management / Replacement program. An effective Meter Management / Replacement Program needs to achieve the following objectives:
  - Determine the on-going meter replacement programme;
  - Determine exception reports on meters which are suspected to be faulty;
  - Test and replace faulty meters; and
  - Size meters correctly.

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

Table C.5.3: Proposed WC/WDM Strategy Items for Bergrivier Municipality
➢ SWIFT analysis of treasury data, at least once every three years. ➢ Research and development of a meter replacement policy and meter management / replacement programme; ➢ Implementation of a uniform meter management information system; ➢ Testing and replacing faulty meters reported by consumers (Part of reticulation function). ➢ Replacement of domestic meters with AMR enabled format (where appropriate) in accordance with meter management / replacement programme.
Funding and Budget Requirements: Allow a budget of approximately R200 000 for a SWIFT analysis at least once every three years to identify unmetered erven and erven with no or very low consumption. Estimated annual budget requirement for the installation of individual water meters is R1 000 000.
Item 5: Effective and Informative Billing System
Recommendation and Strategy: • Municipality needs to continue to ensure that all customer's meters are read on a monthly basis and that the customers are billed on a monthly basis according to the actual volume of water used for the specific month. • Municipality needs to continue with the commercial data analysis done on the billed metered consumption data, which include the identification of un-metered erven, investigating meters with zero consumption, investigating abnormal low and high consumption readings, oversized / undersized meters, etc. • The Municipality can consider the following additional measures to make the current consumer bills more informative. ➢ Adding a graph of the previous 12 months' consumption and helpful hints on effective water usage on the monthly bills. ➢ Alert consumers of possible leaks on their properties. For instance if the consumption for a particular month is >25% than the average consumption of the previous months the consumer may be alerted of a possible leak on the property. ➢ Monitor trends and follow up telephonically.
Funding and Budget Requirements: Estimated cost to enhance the user friendliness of the municipal bill is R450 000.
Items 6 and 7: General Complaints System
Recommendation and Strategy: The municipality needs to continue to ensure that all consumers are familiar with the telephone numbers to lodge complaints and report leaks. Telephone numbers to lodge complaints and report leaks are included on the monthly water bills and on the Municipality's website. Suggestions would be to also include it on strategically located notice boards, radio broadcasts, etc. The projects and measures that can be implemented for passive leakage control are as follows: • Improve the help-line and install an automated answering system. • Advertise the help-line. • Investigate current problems in responding to leaks and allocate adequate resources to avoid lengthy delays. • Review and develop a policy regarding responses to leaks with the aim of reducing response time, prioritising and keeping consumers informed. • Develop a monitoring system and quality assurance measures to ensure problems are resolved adequately. Link such a KPI to the SDBIP. The Consumer Services Charter should include the following information: • Commitment to deliver excellent services to our clients (Executive Mayor and Municipal Manager). • Standards of services (Enquiries written and telephonic; Accounts enquiries and distribution of accounts). • Response times for different services (Water: Repairs to networks, installation of new household water connections, etc.) • Contact details for different areas.
Funding and Budget Requirements: Budget requirement for improved customer awareness raising with regard to the Municipality's Complaints System R150 000/annum.
Item 8: Asset Register for Water Infrastructure
Recommendation and Strategy: • Continue with the annual updating of the Asset Register. • Continue to ensure that all the existing water and sewerage infrastructure are included in the Asset Register.
Funding and Budget Requirements: None - To be done as part of the annual updating of the Asset Register by the municipality.
Item 9: Asset Management Capital Works
Recommendation and Strategy: Allocate a budget of at least 2% of the total water asset value per annum towards the replacement of existing infrastructure. Municipality needs to differentiate in their capital budget between new projects and projects that are for the replacement of existing infrastructure, in order to accurately calculate the annual percentage allocated towards the replacement of existing infrastructure (Best Practice).
Funding and Budget Requirements: Capital budget of at least 2% of the total water and sewerage asset value allocated annually towards the replacement of the existing water and sewerage infrastructure (Best Practice).
Item 10: Asset Management Operation and Maintenance
Recommendation and Strategy:

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

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

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

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

An AMP normally includes the following:

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

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

This plan must be based on the principle of preventative maintenance in order to ensure that, as far as this is practical, damage to assets is prevented before it occurs. The municipality needs to ensure that the maintenance and rehabilitation plan is part of the WSDP and that the plan is implemented. Assets must be rehabilitated and / or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose. Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increase in (operational) services level coverage's most rapidly. The preparation of maintenance plans and the allocation of sufficient funding for maintenance are required to prevent the development of a large condition backlog. The potential renewal projects for the water infrastructure need to be identified from the Asset Register. All assets with a condition grading of "poor" and "very poor" need to be prioritised.

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

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

Funding and Budget Requirements:

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

An estimated budget for the drafting of an AMP for all the water and sewerage infrastructure is R800 000.

Item 11: Dedicated WC/WDM Support

Recommendation and Strategy:

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

Funding and Budget Requirements:

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

Item 12: Active Leakage Control

Recommendation and Strategy:

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

Decide on how the work will be undertaken:

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

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

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

Repair of leaks once identified: Once leaks were detected they will need to be repaired. Depending on the extent of the leaks and other workloads, the leak repairs need to be carried out by either the internal teams or a contractor.

Table C.5.3: Proposed WC/WDM Strategy Items for Bergrivier Municipality
Funding and Budget Requirements: R450 000 to undertake leak detection in zones with high excess night flows. In addition allocate approximately R200 000 per year for general visual leak inspections.
Item 13: Sectorization of Reticulation Systems
Recommendation and Strategy: The billed metered data is currently linked to the distribution systems and should also be linked to the different zones in the future where possible, in order to accurately determine the NRW and water losses for the specific zones in the future. Faulty bulk water meters need to be replaced and new meters need to be installed for the zones with no bulk water meters. The current bulk water meters are indicated in Table 5.1.2.3.2 of Topic 5 of the Administration, Information and Comprehensive Overview Report. The Financial Department needs to provide the billed metered consumption data separately for the different zones in the future in order to assist with the following: • Clear indication of how much water is being used per area / zone. • Areas with high NRW and water losses can easily be identified. • Leakage and pressure control can be better managed. • Water demand per area / zone can be determined. Night flows need to be measured for zones with expected high water losses. It is recommended to re-log the night flows every few years to determine if there was an increase in leakage.
Funding and Budget Requirements: The estimated cost for the logging of flows and pressures for zones with expected high water losses is R500 000. The logging exercise should be repeated at least every three years. A budget should be allocated to investigate and resolve possible zone interconnections. It is however difficult to price such investigations at this stage.
Item 14: Effective Bulk Metering Management System
Recommendation and Strategy: • Municipality needs to continue to read all the bulk water meters at the existing WTWs, reservoirs and pump stations and need to record the readings on at least a monthly basis. • All bulk water meters need to be installed in lockable meter chambers and reservoir sites and water pump stations need to be secured in order to prevent unauthorised access and possible damage to the water meters. • New bulk water meters need to be installed correctly. Ideally a straight pipe section upstream of the meter of at least 5x the meter dia. and 3x the meter dia. downstream of the meter. Strainers need to be installed to protect the meters. These strainer elements must be removable from the top, for ease of cleaning. Gate valves are required for maintenance before and after meters. All discrete zones are to be supplied with a bulk water meter. The meter readings must be recorded on at least a monthly basis. The readings can be used to quantify both the water supplied and the leakage for specific zones.
Funding and Budget Requirements: Allow an annual budget of approximately R450 000 for the installation of new bulk water meters, the replacement of faulty bulk water meters and to adequately protect existing bulk water meters.
Item 15: Effective Zone Meter Management and Assessment of Night Flows
Recommendation and Strategy: See recommendations under Item 14.
Funding and Budget Requirements: See funding and budget requirements included under Item 14.
Item 16: Pressure Management
Recommendation and Strategy: See Item 2.
Funding and Budget Requirements: See Item 2.
Item 17: As-built Drawings of Bulk and Reticulation Infrastructure
Recommendation and Strategy: Continue with the updating of as-built drawings on an ongoing basis. Continue also with the regular updating of the Water and Sewer Master Plans.
Funding and Budget Requirements: Allow a budget of approximately R1.50 million for the updating of the Water and Sewer Master Plans every three to five years.
Item 18: Schematic Layouts of Water Reticulation Systems
Recommendation and Strategy: Municipality needs to continue to update the schematic layouts on a regular basis, in order to ensure they remain accurate.
Funding and Budget Requirements: None
Item 19: Regulation and Bylaws
Recommendation and Strategy: The existing By-law relating to Water Supply, Sanitation Services and Industrial Effluent needs to be updated, in order to ensure that the by-law adequately allow for WC/WDM measures.

Table C.5.3: Proposed WC/WDM Strategy Items for Bergrivier Municipality
Funding and Budget Requirements: Allow a budget of R200 000 for the updating of the existing Water Supply, Sanitation Services and Industrial Effluent By-law.
Item 20: Tariffs
Recommendation and Strategy: See Section 7.3 under Topic 7 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Financial study to determine the impact of changing the sanitation tariff structure from a fixed monthly amount, which is fixed for residential, commercial and institutional consumers to a stepped tariff based on water consumption in the future. Estimated cost of a financial analysis is R300 000.
Item 21: Technical Support to Customers
Recommendation and Strategy: The objective of a Technical Support programme is not limited to assisting consumers in reducing their water demand, but is also to look at wastewater, monitor compliance with by-laws and service conditions and offer general customer support. Once a dedicated person has been allocated to WC/WDM it is recommended to engage with large customers and to identify areas where the municipality can provide assistance. The proposed activities of this programme that can be budgeted for are as follows: • Train existing staff; • Identify and visit large consumers (Checking that large consumers are correctly metered and billed, providing tips on WC/WDM, test the accuracy of all large consumer meters, install data-loggers on all large consumer meters and informing consumers of any sudden change in consumption patterns). • Arrange leakage inspections in public buildings; • Provide assistance and technical know-how for large consumers; and • Introduce compulsory water management plan for large consumers.
Funding and Budget Requirements: No additional funding – pending the appointment of a dedicated person for WC/WDM.
Item 22: Removal of Un-authorised Connections
Recommendation and Strategy: Bergrivier Municipality should continue to remove any un-authorised connections as and when they are detected. See Section 5.1.1.5.
Funding and Budget Requirements: Estimated annual budget of R250 000 is required to install water meters at any unmetered erven.
Item 23: Community Awareness on WDM
Recommendation and Strategy: See Section 5.1.3 under Topic 5 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: It is estimated that R150 000 / year should be allocated for WC/WDM awareness campaigns and activities, material to be included with monthly water bills, placing notices in newspapers, billboards, competitions, etc.
Item 24: Schools Education on WDM
Recommendation and Strategy: See Section 5.1.3.1 under Topic 5 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Allow a budget of approximately R50 000 per year for the implementation of WC/WDM measures at schools (Competitions, Awareness Raising events, etc.). The DWS can also assist the municipality with pamphlets and posters on WC/WDM initiatives.
Item 25: Retrofitting
Recommendation and Strategy: See Sections 5.1.2.1 and 5.1.2.2 under Topic 5 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Leak repair assistance programmes: R300 000 per annum for ongoing exercise to repair leakages at indigent properties using in excess of 20 kl/month. WSIG funding from DWS can be requested in this regard. Retrofitting: R500 000 for a pilot project in one of the public buildings.

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

- Develop a detailed methodology for measuring the performance criteria for each of the twenty-five (25) WC/WDM Strategy items;
- Allow for budget required to implement the various measures;
- Monitor the impact of all WC/WDM measures on an on-going basis;
- Develop key benchmarks for all KPIs and categories and assign responsibility; and
- Review WC/WDM Strategy as necessary.

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

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

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

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

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

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

Distribution System	2023/2024		Committed Future NRW	
	NRW (%/a)	Water Losses (%/a)	2028 (%/a)	2048 (%/a)
Porterville	12.10%	11.90%	10.00%	10.00%
Piketberg	9.60%	9.40%	10.00%	10.00%
Velddrif	13.50%	13.30%	15.00%	10.00%
Dwarskersbos	16.60%	16.40%	15.00%	10.00%
Aurora	14.40%	14.20%	10.00%	10.00%
Eendekuil	14.20%	14.00%	15.00%	15.00%
Redelinghuys	Negative	Negative	10.00%	10.00%

IWA Water Balance: The Revised Compulsory National Water and Sanitation Standards, as published in Government Gazette No.52814 of 6 June 2025, include the following water and wastewater balance analysis and determination of water losses requirements:

- A Water Services Institution must install and monitor appropriate water measuring devices or volume controlling devices to measure, detect and account for the volume of water abstracted (surface or groundwater), treated and consumed, as applicable to the technical configuration of infrastructure and the water use authorisation conditions.

- A Water Services Institution must install and monitor appropriate water measuring devices or volume controlling devices to measure, detect and account for the volume of water consumed to all user connections as applicable to the technical configuration of infrastructure.

- A Water Services Institution must install and monitor appropriate measuring devices or volume controlling devices to measure, detect and account for the volume of wastewater received at pump stations and the inlet of the WWTW. A WSA shall record minimum night flows, peak wet weather flow and average dry weather flow received at the inlet of a WWTW received from all user connections conveyed, as applicable to the technical configuration of infrastructure and the water use authorisation conditions.

- A Water Services Institution must install and monitor appropriate measuring devices or volume controlling devices to measure, detect and account for the volume of wastewater discharged into the water resource as applicable to the technical configuration of infrastructure and the water use authorisation conditions.

- A Water Services Institution must ensure that all measuring devices or meters are properly maintained and in good working order, implementing a programme for meter in-situ verification and / or calibration.

- A Water Services Institution must account for its water balance on a monthly basis as follows:
  - Measure the daily volume abstracted and treated; and
  - Measure the quantity of water provided to each supply zone within its supply area.

- A Water Services Institution must account for its wastewater balance on a monthly basis as follows:
  - daily inflows in Ml/d; and
  - daily outflows in Ml/d.

- A Water Services Institution must determine the quantity of water losses and NRW in accordance with the Guideline for the preparation of an IWA Water Balance to determine NRW and Water Losses.

- The results of the water balance analysis and the records of the quantities of water measured must be reported to the Department's National Regulatory Information Management System on a quarterly basis.

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

Bergrivier Municipality is committed to address the challenges with regard to the flow meters at the various WWTWs for the inflow to the plants, the quantity of treated effluent re-used and the quantity of treated effluent returned to the Water Resource System.

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

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

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

Bergrivier Municipality should continue to update their IWA water balance models on a monthly basis in order to determine the locations of wastage and to enable the Municipality to manage their NRW and Water Losses. The water balance will not directly lead to the reduction of the demand, but is an imperative management tool that will inform the implementation of demand side management initiatives.

Bergrivier Municipality is committed to keep record of all bulk meter readings, flows at their WTWs and WWTWs and to update the IWA water balance models on a monthly basis in order to determine locations of wastage and to enable Bergrivier Municipality to actively implement the WC/WDM Strategy in order to reduce their current NRW and water losses even further. **All bulk zone water meters also need to be recorded on at least a monthly basis (Meters at reservoirs and pump stations).**

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

- The 2025 Swift Analysis needs to be used to inspect the following erven, once it becomes available.
  - Identified potential unmetered erven need to be inspected and water meters need to be installed if the connections are found to be unmetered.
  - Identified erven with water meters, but with zero demand, need to be inspected and new water meters need to be installed if the existing water meters are found to be faulty.
  - Metered erven with very low consumption need to be inspected.
  - Metered erven with a drastic increase or decrease in consumption need to be inspected.

The following areas need to be focused on for the IWA water balance of the Porterville system.

- Lockable meter chamber to be constructed for the Monte Bertha Booster PS bulk water meter.
- Drainage pipe to be installed for the meter chamber at the Splitter Box, in order to ensure that the meter chamber is not standing full of water.
- Vandalised bulk water meter at the raw water storage dam needs to be repaired.
- Continue with the daily reading and recording of all bulk water meters (Sources, WTW, WWTW, Reservoirs and Pump Stations).

The following areas need to be focused on for the IWA water balance of the Piketberg system.

- Repair WWTW inflow meter, which was vandalized. Ensure a flow meter is installed to measure the final effluent discharged from the WWTW, as well as a flow meter at the irrigation re-use PS.
- Construct lockable meter chambers for all the bulk water meters which are currently not in chambers. The existing meter chambers need to be cleaned.
- Continue with the daily reading and recording of all bulk water meters (Sources, WTW, WWTW, Reservoirs and Pump Stations).

The following areas need to be focused on for the IWA water balance of the Velddrif system.

- Continue with the daily reading and recording of the system input volume bulk water meters (Supply to Velddrif from the West Coast District Municipality).

The following areas need to be focused on for the IWA water balance of the Dwarskersbos system.

- Continue with the daily reading and recording of the system input volume bulk water meter (Supply to Dwarskersbos from the West Coast District Municipality).
- Continue with the daily reading and recording of the sewage flow meter on the rising main to the oxidation ponds, as well as the number of tankers discharging at the ponds.

The following areas need to be focused on for the IWA water balance of the Aurora system.

- Lockable meter chambers to be constructed for all bulk water meters. Existing meter chambers to be cleaned. Boreholes to be adequately fenced and locked.
- Install water meter for Borehole No.5 when it is put back into operation in the future.
- Continue with the daily reading and recording of all bulk water meters (Sources, WTW, Reservoirs and on bulk water pipelines).

The following areas need to be focused on for the IWA water balance of the Eendekuil system.

- Install bulk water meter on the gravity pipeline at the Waboomfontein storage dams, in order to calculate the bulk distribution losses.
- All bulk water meter chambers to be supplied with lockable covers.
- Continue with the daily reading and recording of all bulk water meters (WTW, Reservoir and on bulk water pipelines).
- Continue with the daily reading and recording of the sewage flow at the pump station, as well as the number of tankers discharging at the ponds.

The following areas need to be focused on for the IWA water balance of the Redelinghuys system.

- Bulk water meter needs to be installed at either the Matroosfontein Spring or at the WTW, in order to measure the raw water volume supplied to Redelinghuys.
- Lockable meter chambers to be constructed for the two bulk water meters at the reservoir and pump station terrain.
- Continue with the daily reading and recording of all bulk water meters (WTW, Reservoirs and Pump Station).

The following areas need to be focused on in order to compile an IWA water balance for the Wittewater system.

- Each of the two boreholes need to be supplied with bulk water meters.
- A bulk water meter needs to be installed at the WTW to measure the volume of water supplied from the mountain stream.
- A bulk water meter needs to be installed on the rising main of the PS at the WTW to measure the volume of water supplied from the WTW.
- A bulk water meter needs to be installed on the outlet of the Wittewater reservoir.
- The Moravian Church needs to ensure that all the consumer connections in Wittewater are metered and records need to be kept of the monthly volume of water supplied to each consumer.

The following areas need to be focused on in order to compile an IWA water balance for the Goedverwacht system.

- A bulk water meter needs to be installed at the Riet River weir to measure the raw water volume supplied from the source.
- The existing bulk water meter on the gravity asbestos pipeline near the existing High Level reservoirs needs to be inspected in order to ensure that it is operational and accurate (calibrated). A new bulk water meter needs to be installed on the new HDPE gravity pipeline at the High Level reservoirs. These meters are necessary to measure the raw water volume supplied to Goedverwacht before the WTW.
- A bulk water meter needs to be installed on the outlet of the two High Level reservoirs. This meter is necessary to measure the system input volume supplied to Goedverwacht after the WTW.
- A bulk water meter needs to be installed on the outlet of the Goedverwacht No.3 reservoir.

NRW and Water Losses:

Porterville: The Treatment Losses increased during the last financial year, but are still below 10%, which is good. The NRW and water losses increased during the last financial year, but are still at excellent levels. The Municipality needs to keep the NRW below 15% and needs to work towards a target of 10% for the water losses. The ILI value of 1.51 is excellent, with no immediate intervention required and the Municipality needs to keep the ILI level below 2.

Piketberg: The current treatment losses are an estimate and the Municipality needs to ensure that the raw water readings before the treatment plant is recorded. The bulk distribution losses of 2.6% is excellent. The NRW and water losses decreased drastically during the last financial year, which is good. The Municipality needs to keep the NRW below 15% and the water losses below 10%. The ILI value of 0.97 is excellent, with no immediate intervention required and the Municipality needs to keep the ILI level below 2.

Velddrif: The NRW and Water Losses decreased during the last financial year, which is good. The current NRW and Water Losses are however still below 20%, which are good. The Municipality needs to keep the NRW below 15% and needs to work towards a target of 10% for the water losses. The ILI of above 4 however indicates a poor management system, which requires attention and the Municipality needs to work towards an ILI level below 2.

Dwarskersbos: The NRW and Water Losses stayed the same for the last financial year. The current percentages of less than 20% are good. The Municipality needs to work towards a target of 15% for the NRW and 10% for the water losses. The current ILI value of 4.04 however indicates a poor management system, which requires attention and the Municipality needs to work towards an ILI level below 2.

Aurora: The NRW and water losses increased slightly during the last financial year, but are still below 15%, which is excellent. The Municipality needs to keep the NRW below 15% and needs to work towards a target of 10% for the water losses. The ILI value of 0.75 is excellent, with no immediate intervention required and the Municipality needs to keep the ILI level below 2.

Eendekuil: The NRW and Water Losses were further reduced during the last financial year to percentages below 20%, which is good. The raw water meter at the WTW register less than the two potable water meters after the WTW, therefore the negative treatment losses. The raw water meter needs to be calibrated or replaced in order to accurately calculate the treatment losses. It also suggested that a bulk raw water meter be installed at the source to determine the bulk distribution losses. The Municipality needs to keep the NRW below 15% and needs to work towards a target of 10% for the water losses. The ILI value of 2.0 is excellent, with no immediate intervention required and the Municipality needs to keep the ILI level below 2.

Redelinghuys: It is not possible to calculate the treatment losses, because there is no bulk raw water meter before the WTW. The bulk distribution losses between the WTW (System Input Volume) and the outlet of the reservoir is high and needs to be investigated. The NRW and Water Losses were negative for the last financial year and all bulk water meters of Redelinghuys need to be calibrated. The Municipality needs to keep the NRW and water losses below 10%. The current ILI value is also negative, because of the inaccurate system input volumes.

The overall NRW and Water Losses were further reduced during the last financial year. The percentages below 15% for both the NRW and the water losses are excellent. The Municipality needs to keep the NRW below 15% and needs to work towards a target of 10% for the water losses. The current ILI value of 1.83 for all the systems combined is excellent, with no immediate intervention required and the Municipality needs to keep the ILI level below 2.

TOPIC 6: WATER RESOURCES

Topic C.6.1: Water Resources						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
Current Water Sources	No	100	Ensure the required authorisations (licences) are in place for all the water resources, as well as the required registrations.	100	Yes	100.0
Additional Sources Available	Yes	100	Continue with investigations of the augmentation of the existing bulk water sources for the various towns.	100	Partially	85.7
Monitoring	No	100	Ensure that the key groundwater management functions are implemented. The monitoring data must be analysed by a geohydrologist on an annual basis in order to assess the effects of abstraction and recharge on the boreholes and aquifer. Groundwater monitoring must continue on at least a monthly basis. Monthly monitoring of water levels, water chemistry and abstraction must be conducted by the Municipal staff. Bergrivier Municipality needs to ensure that all electronic data (i.e. dataloggers) are	100	Partially	78.6

Topic C.6.1: Water Resources						
Section	**Intervention Required?**	**% (1)**	**Solution description as defined by topic situation assessment**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
			downloaded once quarterly by a geohydrologist. Monitoring data must be annually reviewed by a geohydrologist.			
Water Quality	No	100	-	100	-	100.0
Operation	No	100	The quality of industrial effluent discharged into the Municipality's sewer system needs to be monitored, as well as volumetric monitoring at the larger users. Adaptation of the current procedures must be undertaken in accordance with any changes to the wastewater discharge criteria set by DWS. It will also be necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place.	100	No	71.4

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

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

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

The Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the winter months of the following years. The drought over the period 2015 to 2017 reduced the assurance of supply from the WCWSS (Velddrif and Dwarskersbos) and the safe yields of the Municipality's own existing surface and groundwater resources. The Municipality therefore continue with their WC/WDM measures to lower the current and future water requirements and investigations of augmentation options for the existing water resources.

Future water requirement projection models were developed for each of the towns within Bergrivier Municipality's Management Area. These models include the future projections up to 2048 and were calibrated by using historic billed metered consumption data and bulk metered abstraction data. The percentage NRW was determined for each of the distribution systems and growth in demand was based on agreed population and growth figures. The reduction in NRW was taken into account for the projected future water requirements.

The projected future water requirements are indicated in the table below for each of the water distribution systems.

Table C.6.2: Projected future water requirements and allocation, licence or yield volumes surplus (+) / shortfall (-) based on WSDP model						
Distribution System	**Model**	**PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)**				
		2028	**2033**	**2038**	**2043**	**2048**
Porterville	1% Annual Growth	526.640	553.504	581.738	611.413	642.601
	2% Annual Growth	553.233	610.814	674.388	744.579	822.075
	WSDP Model	**526.939**	**568.562**	**614.843**	**666.474**	**724.273**
	Yield surplus (+) / shortfall (-)	**+184.446**	**+142.823**	**+96.542**	**+44.911**	**-12.888**
Piketberg	2.5% Annual Growth	835.206	944.958	1 069.134	1 209.627	1 368.582
	3.5% Annual Growth	876.750	1 041.304	1 236.743	1 468.862	1 744.547
	WSDP Model	**821.144**	**905.432**	**1 001.265**	**1 110.577**	**1 235.671**
	Allocation surplus (+) / shortfall (-)	**+123.931**	**+39.643**	**-56.190**	**-165.502**	**-290.596**
Velddrif	3% Annual Growth	1 323.808	1 534.656	1 779.087	2 062.449	2 390.944

Table C.6.2: Projected future water requirements and allocation, licence or yield volumes surplus (+) / shortfall (-) based on WSDP model						
Distribution System	**Model**	**PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)**				
		2028	**2033**	**2038**	**2043**	**2048**
	4% Annual Growth	1 389.330	1 690.332	2 056.548	2 502.105	3 044.193
	WSDP Model	**1 419.099**	**1 698.491**	**2 039.804**	**2 457.672**	**2 970.307**
	Licence surplus (+) / shortfall (-)	**-123.639**	**-403.031**	**-744.344**	**-1 162.212**	**-1 674.847**
Dwarskersbos	2% Annual Growth	153.524	169.502	187.144	206.622	228.128
	3% Annual Growth	161.198	186.873	216.637	251.142	291.142
	WSDP Model	**154.540**	**171.944**	**191.672**	**214.074**	**239.555**
	Licence surplus (+) / shortfall (-)	**-10.600**	**-28.004**	**-47.732**	**-70.134**	**-95.615**
Aurora	1.5% Annual Growth	59.538	64.139	69.096	74.436	59.538
	2.5% Annual Growth	65.671	74.301	84.064	95.111	65.671
	WSDP Model	**74.490**	**92.842**	**116.427**	**146.813**	**74.490**
	Yield surplus (+) / shortfall (-)	**+4.793**	**-9.526**	**-27.878**	**-51.463**	**-81.849**
Eendekuil	2% Annual Growth	93.965	103.745	114.542	126.464	139.627
	3% Annual Growth	98.662	114.376	132.593	153.712	178.194
	WSDP Model	**94.564**	**104.178**	**114.859**	**126.732**	**139.938**
	Yield surplus (+) / shortfall (-)	**+21.871**	**+12.257**	**+1.576**	**-10.297**	**-23.503**
Redelinghuys	1% Annual Growth	60.957	64.067	67.335	70.770	74.380
	2% Annual Growth	64.035	70.700	78.059	86.183	95.153
	WSDP Model	**60.905**	**64.081**	**67.561**	**71.385**	**75.596**
	Yield surplus (+) / shortfall (-)	**+516.204**	**+513.028**	**+509.548**	**+505.724**	**+501.513**

The table below gives an overview of the years in which the annual water requirement will exceed the allocations, licence volumes or sustainable yields of the various resources.

Table C.6.3 Years in which the annual water requirement will exceed the allocations, licence volumes or yields from the various water resources				
Distribution System	**Allocation (A) / Yield (Y) / Licence (L) (Ml/a)**	**High Annual Growth on 2023/2024 requirement (%)**	**Low Annual Growth on 2023/2024 requirement (%)**	**WSDP Projection Model**
Porterville	711.385 (Y)	2040 (2.0%)	> 2048 (1.0%)	2046
Piketberg	945.075 (A)	2030 (3.5%)	2033 (2.5%)	2034
Velddrif	1 295.460 (L)	2026 (4.0%)	2027 (3.0%)	2025
Dwarskersbos	143.940 (L)	2024 (3.0%)	2024 (2.0%)	2024
Aurora	64.964 (Y) *	2032 (2.5%)	2039 (1.5%)	2029
Eendekuil	116.435 (Y)	2033 (3.0%)	2038 (2.0%)	2038
Redelinghuys	577.109 (Y)	> 2048 (2.0%)	> 2048 (1.0%)	> 2048

Note: * Safe yield of existing four production boreholes (Exclude safe yield of newly drilled Au BH6)

Porterville: The yield from the existing water resources is adequate for the medium to long-term future water requirements of the town.

Piketberg: A Geohydrological investigation was completed for Piketberg during the 2017/2018 financial year. Five boreholes were drilled. The blowout yields ranged between 0.3 l/s and 5 l/s and based on the blow yields only two boreholes were considered for yield testing (PG1 and PG4). The recommendations from the exploration phase of the project for the two boreholes were as follows:

BH PG1:

- The borehole can be pumped at 0.5 l/s for 24 h/day (43m³/day) or 1.5 l/s for 12 h/day (65 m³/day);
- Pump to be installed at 250 mbgl; and
- Water quality is good although Fluoride is at 1.5 mg/l and should require treatment.

BH PG2:

- The borehole collapsed after drilling and additional casing needs to be installed; and
- Conduct aquifer test.

The additional recommendations were as follows:

- Investigate area close to the Piketberg Secondary School;
- Investigate the De Hoek fault along the pipeline servitude;
- Investigate the De Hoek fault along the R399;
- Flow meters to measure total water use should be installed;
- Automatic data loggers should be installed to record the water level;
- A low-level cut-off switch should be installed 5 m above the pump intakes; and
- The water use needs (not exceeding 20 m3/d) to be registered with the DWS.

A Water Augmentation Prefeasibility Study for the town of Piketberg was also completed during the 2021/2022 financial year. The following four options were investigated at prefeasibility level.

- Option 1: A pipeline from the Misverstand Dam wall to the Piketberg WTW. Lay a new 8.86km pipeline along the Berg River to Piketberg WTW from the Misverstand dam.
- Option 2: A pipeline from the current Berg River abstraction to a new holding dam on farmland, which is then treated as required.
- Option 3: A pipeline from current Berg River abstraction to the unused PPC cement quarry.
- Option 4: A pipeline from Withoogte WTW to Piketberg WTW (18km), purchasing potable water for resale. The proposed pipeline is routed along the N7 road.

The following recommendations were made, based on the conclusions of the preliminary feasibility study.

- Option 1 is economically the most feasible and would present the least challenges to implement, it is recommended that this option be further investigated.
- Options 2 and 3 would require an investigation into a PPP process, which include the following details.
  - Who acquires the management of the dam.
  - Who performs the municipal function for or on behalf of a municipality and acquires the management or use of municipal property for its own commercial purposes.
  - Upon whom is the substantial financial, technical and operational risks.
  - What benefit does the land owner accrue by way of water usage from the dam.

Velddrif and Dwarskersbos: In order to ensure sustainable economic development in the West Coast region the West Coast District Municipality started with a comprehensive study in 2007 to identify a sustainable long-term alternative water source for the region, in order to ensure sustainable economic development. Various alternative sources and combinations thereof were evaluated and eventually a 25.5 Ml/day sea water desalination plant in the Saldanha Bay area was identified as the most beneficial alternative, to be developed in 3 phases (8.5 Ml/d for each phase) as the water requirements grow.

Desalination: 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 intake capacity of the plant will be approximately 60 Ml/d (21.9 million Ml/a) producing 25.5Ml/d (9.3 million Ml/a) at final capacity. Approximately 36 Ml/d (13 million Ml/a) brine will be discharged into the sea. It will have a lifespan of 25 years with the potential of an extended lifespan.

It was proposed that the plant be constructed in three phases of 8.5 Ml/d each to reach its full capacity by 2026. All infrastructure, however, will be constructed for the full capacity in the first construction phase.

The environmental screening and technical evaluation reduced the ten possible sites, which were originally identified, to two proposed sites to be evaluated, i.e. the site at Arcelor Mittal in the Industrial Development Zone (IDZ) of Saldanha Bay and a site in Danger Bay. The Danger Bay site was identified as the most suitable site and the EIA approval was obtained during August 2013 for this site and the concomitant bulk infrastructure.

The proposed desalination plant and bulk infrastructure will cost an estimated R500 million, R300 million more than the original cost estimate. The first phase will include the construction of the desalination plant with a capacity of 8.5 Ml per day and the bulk infrastructure, with a capacity of 25.5 Ml per day. The desalination plant will be upgraded in three phases of 8.5Ml per day up to the final capacity of 25.5 Ml per day. Funding of this plant is currently a major challenge, as the West Coast District Municipality is not in a position to co-fund a project of this extent.

The levels of salinity in the Berg River have increased dramatically to the point where the level of assurance of 98% cannot be reached without major engineering effort. Urgent measuring devices must be put in place to monitor the Berg River, to find the reason for the high salinity readings and to mitigate these circumstances. Additional factors will have to be addressed through further investigations to determine the sources of contamination and to include these in the management options at Misverstand.

Increase storage at Withoogte: Although the modelling results from the 'Analysis of Management Options at Misverstand Weir" to mitigate the potential impact on salinity of the Berg Water Project and Voëlvlei Augmentation Scheme (DWS, 2007) indicated that the incremental impact of the Berg Water Project and the Voëlvlei Augmentation Scheme could be mitigated through the provision of an additional 250 000 m³ of off-channel storage capacity, the re-analysis showed that the desired 98% level of assurance would not be achievable. To obtain a 98% level of assurance an additional 0.7 million m³ of storage would be required over and above the readily available 0.5 million m³ at Withoogte.

Increased treatment capacity at Withoogte (Subject to available water from the Berg River)

Water from the Berg River is pumped to the Withoogte WTW from the Misverstand Weir. The current capacity of the WTW is 72 Ml/day, which is already critical and needs to be increased to be able to meet the future water requirements. The potable water gravitates to the Besaansklip reservoir at Vredenburg from Withoogte and it was established that the ultimate design capacity of the pipeline is 105 Ml/day. The Withoogte WTW therefore needs to be upgraded from the current 72 Ml/day to 105 Ml/day to be able to accommodate the full design flow of the pipeline. The allocation from the WCWSS therefore has to allow an additional 33 Ml/day increase in allocation and an extension to the WTW to treat a total of 105 Ml/day. This demand will be reached by 2032 when a sea water desalination plant will have to be in operation to supply the future requirement i.e. 31 Ml/day until 3045.

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.6.4: Volumes allocated to the respective WSAs in Licence No. 01/G10F/A/5903

Name	Resource Name	WSA	Maximum Volume (Ml/a)
Withoogte from Misverstand Weir	Berg River	Saldanha LM	20 427.000
		Swartland LM	1 573.600
		Berg River LM	1 439.400
Swartland from Voëlvlei Dam	Berg River	Swartland LM	7 900.000
		Drakenstein LM	300.000
Langebaan Aquifer Boreholes 1 & 2	Langebaan Aquifer	Saldanha Bay LM	675.000
Langebaan Aquifer Boreholes 3 & 4		Saldanha Bay LM	675.000
Total Allocation for the West Coast District Municipality			**32 990.000**
Total Allocation for the West Coast District Municipality from the WCWSS			**31 640.00**

Aurora: A number of geohydrological assessments were completed for Aurora during the 2019/2020 financial year. A new borehole (Au BH6) was drilled and the yields of the existing boreholes and the new borehole were tested during late February and early March 2020. The yield test data indicated that the municipality may sustainably abstract 80.732 Ml/a (Excluding Au BH5) from the aquifer system. The quality of the newly drilled borehole decreased substantially after it collapsed below end of casing at a depth of 62 mbgl. As the stronger "fresher" water strikes occurred at the deeper depths, it is a possibility that those fractures have been cut off by the collapse.

During the camera logging phase of the project, the current production boreholes all displayed instability issues, with boreholes being drilled into a highly fractured formation and cavities were observed at some of the fracture zones. The cavities contained loose rocks which can fall into the borehole (wedging in the pump) and also carrying the risk of complete collapse of the borehole. Due to the structural issues that were highlighted during the camera logging exercise of the Aurora production boreholes, it is recommended that all the production boreholes are re-habilitated. The new borehole collapsed shortly after drilling and the current production boreholes are all in very poor condition and at great risk of collapse. The poor construction of boreholes Au_Bh2 and Au_BH6 (which actually collapsed) reduced the yields of the boreholes greatly.

The Groundwater Management Plan for Aurora list the following recommendations to promote the sustainability of Aurora's boreholes:

Short-Term (To be completed by July 2020)

- It is recommended that the four current boreholes and Au BH6 are reamed out (drilled again within the open borehole) to clear the obstructions and blow out the fractures / cavities. Then uPVC casing needs to be installed in all production boreholes to bottom of the boreholes with an end cap, centralizers and gravel pack. uPVC casing must be solid until the first fractures at which point the casing will be slotted to allow water to pass through while still supplying stability to the boreholes. The annulus must be back filled with 3-7mm gravel. This will prevent future collapse and greatly improve the sustainability of the town's water supply.
- Installing the correct size of pumps in the production boreholes. Pumps should not be oversized and only be capable of abstracting the recommended abstraction volume at a continuous pumping schedule to reduce iron oxidation.
- Installing cut-off switches 1 m above the borehole pumps (Au_BH1, Au_BH2, Au_BH3 and Au_BH4).
- Installing observation pipes (Au_BH1, Au_BH2, Au_BH3 and Au_BH4).
- Rehabilitation of borehole site: checking and fixing wiring issues, borehole cover, piping, fixing leaks (for all production boreholes).
- Internal project manager appointed, budget allocated and sourcing company identified to proceed with the procurement of a water level dipmeter and field chemistry kit that would enable the borehole maintenance team to collect monthly monitoring data.

Long-Term (To be completed by December 2020)

- Equipping Au BH6 (Pump installed according to GEOSS's recommendations and installation of bulk flowmeter, pressure gauge, observation pipe, cut off switch 1m above borehole depth, secure electrical wiring box and a sampling tap).
- The procurement and equipping of all production boreholes with water level loggers.
- Continuation and streamlining of monthly borehole visits to measure water levels and EC and pH, as well as noting the bulk flow meter readings.
- Adequate budget plan should be set to ensure that on an annual basis, sufficient budget will be available for supplying consumables such as calibration fluids and allowing the municipality to quickly attend to broken infrastructure issues such as broken flow meters, sampling taps and broken dip meters.
- Visual inspection of pipelines and repairing leaks.
- Annual auditing report done by a specialist that has reviewed all the data collected on a monthly and quarterly basis to optimize and improve groundwater use and ensuring sustainability of water supply.

Eendekuil: The yield from the existing water resources is adequate for the medium to long-term future water requirements of the town. A Geohydrological Assessment and Borehole siting was completed for Eendekuil during the 2021/2022 financial year. Two areas of interest have been delineated for drilling of water supply boreholes. These areas are based on the 1:250 000 geological map series and information obtained from the current town supply borehole. Two inferred faults (within the Porterville Formation) cross cut the approximate municipal servitude location. The servitude is registered to the municipality for the purpose of the water supply pipeline running from the slopes of the Piketberg Mountain to the water treatment works just outside town. The dimensions of the servitude land at these areas of interest should be considered for drilling of water supply boreholes.

Redelinghuys: The yield from the existing water resources is adequate for the medium to long-term future water requirements of the town. A Groundwater Management Plan was completed for Redelinghuys during the 2021/2022 financial year. The recommendations to the current management and monitoring include the following:

- The infrastructure that provides water for Redelinghuys must be maintained and upgraded as required to prevent any water losses.
- It is recommended that a water level logger be permanently installed into the bottom of the distribution weir to monitor flow. Staff should also note the flow meter readings on each of the production boreholes during their daily visits to the weir.
- The monitor data from the production boreholes should also be acquired from the farming company.
- Water quality control needs to be conducted in the following four ways:
  - Annual SANS0241 testing of the raw and treated water.
  - The two weekly laboratory testing of selected parameters for both the raw and treated water.
  - Weekly microbiological testing.
  - Daily monitoring of selected parameters of the treated water.

Current water quality monitoring is efficient and should be continued as is. Redelinghuys water use is "still to be determined" therefore it is recommended that a water use licence is applied for to ensure that the town's water use is authorised. It is recommended that flow, quality and water level monitoring data be analysed by a geohydrologist bi-annually.

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

Table C.6.5: Potential future water resources for the various towns (Summary of DWS's All Towns Reconciliation Strategies)

Distribution System	Recommended Summary Options
Porterville	**The current water sources have adequate supply to cater for the medium and longer term future water requirements under all scenarios. The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Continue with the implementation of the existing WC/WDM measures to reduce the non-revenue water and water losses. • Development of alternative groundwater resources, when required.
Piketberg	**The current allocated water sources have inadequate supply to cater for the future water requirements under all scenarios. The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Continue with the full-implementation of the existing WC/WDM Strategy. • Increased allocation from the Berg River (WCWSS). • Groundwater development.
Velddrif	**The current water sources do not have adequate supply to cater for the short, medium and longer term future water requirements under all growth scenarios. The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Continue with the implementation of the existing WC/WDM Strategy to keep the water losses and non-revenue water low and achieve savings in water consumption. • Increased allocation from the WCWSS. • Incremental groundwater development. • Desalination of seawater
Dwarskersbos	**The current water sources do not have adequate supply to cater for the short, medium and longer term future water requirements under all growth scenarios. The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Continue with the implementation of the existing WC/WDM Strategy in order to keep the water losses and non-revenue water low and achieve savings in water consumption. • Increasing the allocation to the West Coast District Municipality from the WCWSS. • Incremental groundwater development. • Desalination of seawater.

Table C.6.5: Potential future water resources for the various towns (Summary of DWS's All Towns Reconciliation Strategies)	
Distribution System	**Recommended Summary Options**
Aurora	**It is not known whether the current water sources have adequate supply to cater for the medium and longer-term future water requirements, as their yields are unknown. It is recommended that the yields of all available sources be determined before any other interventions are considered. The following sources are identified as potential sources to augment the water supply, if the existing yield is not adequate, in order of priority and implementation sequence:** • Continue with the implementation of the existing WC/WDM Strategy in order to reduce the existing water losses and non-revenue water even further. • Incremental groundwater development. • Link up with the Saldanha Regional Scheme at Velddrif.
Eendekuil	**The current water sources have adequate supply to cater for the medium and longer-term future water requirements under a high-growth scenario until 2030.** Pending the outcome of a detailed groundwater study and the future development of Eendekuil, it is not recommended at this stage to develop surface water resources by constructing an additional dam. Should the boreholes not yield any water and growth takes place in Eendekuil, the construction of a new dam in the Diepkloof catchment area or the construction of an additional dam to store water from the Waboom River should be investigated in detail. **The following sources are identified as potential sources to augment the current water supply, in order of priority and implementation sequence:** • Continue with the full implementation of the existing WC/WDM Strategy. • Incremental groundwater development. • Recharge of aquifers from the Kruismans Stream, when required.
Redelinghuys	**The current water sources have inadequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the current water supply, in order of priority and implementation sequence:** • Continue with the full implementation of WC/WDM measures to reduce water losses and non-revenue water. • Incremental groundwater development.

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

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

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

Table C.6.6: Minimum Monitoring Frequency for Process Risk Indicators (SANS241-2:2015: Table 1)			
Determinand	**Raw Water**	**Final Water**	**Distribution System**
Conductivity or total dissolved solids	Daily	Daily	Not applicable
pH value	Daily	Once per shift [a]	Fortnightly
Turbidity	Daily	Once per shift [a]	Fortnightly
Disinfectant residuals	Not applicable	Once per shift [a]	Fortnightly
E.Coli (or faecal coliforms) [b]	Not applicable	Weekly	Fortnightly but dependent on population served [d]
Heterotrophic plate count [c]	Not applicable	Weekly	Fortnightly
Treatment chemicals [d]	Not applicable	Monthly	Not applicable
a: A shift is defined as an eight-hour work period.			
b: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and immediate follow-up sampling at an increased sampling frequency.			
c: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and follow-up sampling.			

Table C.6.6: Minimum Monitoring Frequency for Process Risk Indicators (SANS241-2:2015: Table 1)			
Determinand	**Raw Water**	**Final Water**	**Distribution System**
d: Includes all risk determinands that are added or formed as a result of the use of treatment chemicals (for example aluminium, iron and chlorine). If non-compliant with the numerical limits specified in SANS 241-1 in the final water, the distribution system monitoring frequencies of Table 3 in SANS241-2:2015 apply.			

The current and proposed operational and compliance water quality sampling programmes of Bergrivier Municipality for the various water distribution systems are summarised in the table below.

Table C.6.7: Current and proposed water quality parameters to be sampled by Bergrivier Municipality: Routine monitoring of Process Indicators

Current / Proposed	Sampling Point	Frequency of sampling	Samples taken by	Current and Proposed Parameters to be sampled
Porterville				
Current	Intake (Raw Water)	7 Days	PC	pH
		Monthly	External Lab	pH, Conductivity, Turbidity, Langelier Saturation Index, Colour, Alkalinity, Total Hardness, Calcium Hardness, Calcium, Magnesium Hardness, Magnesium, Sodium, Fluoride, Total Dissolved Solids, Iron, Manganese, Aluminium
		Annually	External Lab	All SANS241-2015 determinands
	Final Water	Daily	PC	pH, Free Chlorine
		14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, E.Coli, Heterotrophic Plate Count, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness, Total Coliform Count
		Monthly	External Lab	Fluoride, Iron, Sodium
		Annually	External Lab	All SANS241-2015 determinands
	Distribution System	14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, E.Coli, Heterotrophic Plate Count, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness
Proposed	Intake	Daily	PC	pH, Turbidity, Conductivity
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Final Water	Daily	PC	pH, Turbidity, Conductivity, Free Chlorine
		7 Days	External Lab	E.Coli, Heterotrophic Plate Count
		14 Days	External Lab	As currently implemented
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Distribution System	14 Days	External Lab	As currently implemented
Piketberg				
Current	Intake (Raw Water)	Once per Shift	PC	Turbidity
		Monthly	External Lab	pH, Conductivity, Turbidity, Langelier Saturation Index, Colour, Alkalinity, Total Hardness, Calcium Hardness, Calcium, Magnesium Hardness, Magnesium, Sodium, Chloride, Total Dissolved Solids, Aluminium
		Annually	External Lab	All SANS241-2015 determinands
	Settled Water	Once per Shift	PC	Turbidity
	Filtered Water	Once per Shift	PC	Turbidity
	Final Water	Once per Shift	PC	Turbidity, Free Chlorine
		14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, E.Coli, Heterotrophic Plate Count, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness
		Monthly	External Lab	Chloride, Sodium
		Annually	External Lab	All SANS241-2015 determinands
	Distribution System	14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, E.Coli, Heterotrophic Plate Count, Total

Table C.6.7: Current and proposed water quality parameters to be sampled by Bergrivier Municipality: Routine monitoring of Process Indicators				
Current / Proposed	**Sampling Point**	**Frequency of sampling**	**Samples taken by**	**Current and Proposed Parameters to be sampled**
				Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness, Total Coliform Count
Proposed	Intake	Daily	PC	pH, Turbidity, Conductivity
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Settled Water	Once per Shift	PC	As currently implemented
	Filtered Water	Once per Shift	PC	As currently implemented
	Final Water	Daily	PC	Conductivity
		Once per Shift	PC	pH, Turbidity, Free Chlorine
		7 Days	External Lab	E.Coli, Heterotrophic Plate Count
		14 Days	External Lab	As currently implemented
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Distribution System	14 Days	External Lab	As currently implemented
Velddrif and Dwarskersbos				
Current	Distribution System	7 Days	External Lab	E.Coli, Heterotrophic Plate Count
		14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness, Total Coliform Count
		Annually	External Lab	All SANS241-2015 determinands
Proposed	Distribution System	7 Days	External Lab	As currently implemented
		14 Days	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
Aurora				
Current	Intake (Raw Water)	Monthly	External Lab	pH, Conductivity, Turbidity, Langelier Saturation Index, Colour, Alkalinity, Total Hardness, Calcium Hardness, Calcium, Magnesium Hardness, Magnesium, Sodium, Chloride, Total Dissolved Solids, Aluminium
		Annually	External Lab	All SANS241-2015 determinands
	Final Water	7 Days	External Lab	E Coli, Heterotrophic Plate Count, Total Coliform Count
		14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness
		Monthly	External Lab	Chloride, Sodium
		Annually	External Lab	All SANS241-2015 determinands
	Distribution System	14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, E.Coli, Heterotrophic Plate Count, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness
Proposed	Intake	Daily	PC	pH, Turbidity, Conductivity
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Final Water	Daily	PC	pH, Turbidity, Conductivity, Free Chlorine
		7 Days	External Lab	As currently implemented
		14 Days	External Lab	As currently implemented
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Distribution System	14 Days	External Lab	As currently implemented
Eendekuil				
Current	Intake (Raw Water)	Monthly	External Lab	pH, Conductivity, Turbidity, Langelier Saturation Index, Colour, Alkalinity, Total Hardness, Calcium Hardness, Calcium, Magnesium Hardness, Magnesium, Sodium, Chloride, Total Dissolved Solids, Aluminium

Table C.6.7: Current and proposed water quality parameters to be sampled by Bergrivier Municipality: Routine monitoring of Process Indicators				
Current / Proposed	**Sampling Point**	**Frequency of sampling**	**Samples taken by**	**Current and Proposed Parameters to be sampled**
		Annually	External Lab	All SANS241-2015 determinands
	Final Water	Daily	PC	pH, Free Chlorine, Temperature
		7 Days	External Lab	E.Coli, Heterotrophic Plate Count
		14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness, Total Coliform Count
		Monthly	External Lab	Chloride, Sodium
		Annually	External Lab	All SANS241-2015 determinands
	Distribution System	14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, E.Coli, Heterotrophic Plate Count, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness
Proposed	Intake	Daily	PC	pH, Turbidity, Conductivity
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Final Water	Daily	PC	pH, Turbidity, Conductivity, Free Chlorine
		7 Days	External Lab	As currently implemented
		14 Days	External Lab	As currently implemented
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Distribution System	14 Days	External Lab	As currently implemented
Redelinghuys				
Current	Intake (Raw Water)	Monthly	External Lab	pH, Conductivity, Turbidity, Langelier Saturation Index, Colour, Alkalinity, Total Hardness, Calcium Hardness, Calcium, Magnesium Hardness, Magnesium, Sodium, Chloride, Sulphate, Total Dissolved Solids, Aluminium, Free Chlorine, E.Coli, Heterotrophic Plate Count
		Annually	External Lab	All SANS241-2015 determinands
	Final Water	Daily	PC	pH, Free Chlorine, Temperature
		7 Days	External Lab	E.Coli, Heterotrophic Plate Count
		14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness, Total Coliform Count
		Annually	External Lab	All SANS241-2015 determinands
	Distribution System	14 Days	External Lab	Conductivity, Alkalinity, Aluminium, Total Hardness, Magnesium, Langelier Saturation Index, Turbidity, pH, Free Chlorine, Calcium, E.Coli, Heterotrophic Plate Count, Total Dissolved Solids, Colour, Calcium Hardness, Magnesium Hardness
Proposed	Intake	Daily	PC	pH, Turbidity, Conductivity
		Monthly	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Final Water	Daily	PC	pH, Turbidity, Conductivity, Free Chlorine
		7 Days	External Lab	As currently implemented
		14 Days	External Lab	As currently implemented
		Annually	External Lab	As currently implemented
	Distribution System	14 Days	External Lab	As currently implemented

Effluent Quality: The Municipality's existing Operational and Compliance Sampling Programmes for the various WWTWs are adequate and no additional sampling points are recommended. The Compliance Monitoring Programme includes the monthly sampling of the final effluent at the various WWTWs and analyses of all the main quality criteria. Results of the samples taken are loaded onto DWS's IRIS. Monthly monitoring and inspection reports are also compiled by the external Service Provider for all the WWTWs. The Municipality takes immediate action to rectify problems and / or improve operational aspects as and when may be required.

For serious failures, an Incident Response Management Protocol is followed to ensure rapid remedying of the problems, which includes notification to the DWS as may be necessary.

The current Operational Alert Levels should be checked regularly by the municipality in order to ensure that the various unit processes in the plant performs optimally. If these pre-determined Alert Levels are exceeded at any of the control points where samples are taken for operational purposes, then certain actions should be taken to bring the operational parameters back to within the target ranges.

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

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

Industrial consumers that discharge industrial effluent into the Municipality's sewer system is not yet monitored with regard to quantity and quality. The quality and volume of industrial effluent discharged into the sewer system need to be monitored by the Municipality, in order to determine whether the quality comply with the standards and criteria. It is also necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place. The Municipality needs to ensure that all industrial consumers apply for discharge permits and they must supply and maintain a flow meter measuring the volume of water that is discharged into the sewer system. It is also recommended that the accounts generated by the Municipality include for each cycle a summary of the COD and flow results to enable industries to keep a record and look at ways of improving where possible.

Bergrivier Municipality is committed to ensure that no industrial effluent is discharged into the sewer system unless it complies with the required standards and criteria.

TOPIC 7: FINANCIAL

Bergrivier Municipality's Strategic Objectives to strengthen the financial sustainability of the Municipality, as included in the 2024/2025 IDP, are as follows:

- To budget strategically;
- Entrench the Long-Term Financial Plan in the planning, implementation and management of the organization;
- Diversify revenue and ensure value for money services;
- Ensure sustainable financial risk and asset management;
- Diversify by sourcing grant funding to support projects, programmes and initiatives of Council;
- Ensure transparency in financial management by ensuring that all financial records are accurate, reliable and timely.

The Challenges and the Development Priorities for the above six Strategic Objectives are indicated in the table below.

Table C.7.1: Challenges and Development Priorities for the six Strategic Objectives to strengthen the financial sustainability of the Municipality.

Challenges	Development Priorities
To budget strategically	
• **Indigent Households**: Poverty is impacting on a municipality's financial viability and manifests in a high number of indigent households who qualify for indigent support. This is being exacerbated by increased migration into the area as evidenced by the increase in population statistics as well as the effect of the failing state (for example Eskom) on the economic growth in SA and thereby making the poor even poorer.	• **Sound Financial Management**: The Municipality has sound financial management policies and procedures which it implements judiciously, and high priority is placed on financial compliance. • **Expenditure / Supply Chain Management / Assets**: The SCM unit needs to be fully developed and resourced to improve on procurement. Standard operating procedures have been implemented and this has proved to be effective.

Table C.7.1: Challenges and Development Priorities for the six Strategic Objectives to strengthen the financial sustainability of the Municipality.	
Challenges	**Development Priorities**
• **An inadequate and declining revenue base**: Existing sources of revenue are no longer adequate to financially sustain the Municipality. The Municipality has a narrow rate base but cannot consider excessive increases on rates and service fees as the ability of many of consumers to pay their accounts is already severally impaired by the declining economy. • **Unfunded mandates**: The Municipality performs several functions that are not core municipal functions for which the municipality are not subsidised or only partially subsidised for example housing, vehicle licencing and libraries. These services place additional pressure on the already inadequate and declining rates base but are essential to the community. • **Infrastructure and bulk service backlogs**: Bulk service and service infrastructure is exceeding design capacity and the inability to provide sufficient bulk capacity makes the municipality unable to respond to development opportunities. Furthermore, ageing infrastructure is becoming increasingly fragile and costly to replace • **The cost of compliance**: Compliance, although essential, comes at a substantial cost to the Municipality in terms of man hours and systems. All Municipalities have the same compliance obligations irrespective of the size of the Municipality and this is particularly challenging to smaller Municipalities such as Bergrivier who have limited personnel. • **Municipal Standard Chart of Accounts (mSCOA):** National Treasury introduced the mSCOA project during the past years. This reform is seen as the biggest reform in local government since the implementation of the MFMA since 2004. All municipalities had to be mSCOA compliant from 1 July 2017.	A centralized order system was put in place from 1 July 2013 and the electronic management of this system is the next step; Improved expenditure management, especially expenditure on consultants. An expenditure control and cost saving intervention plan has already been adopted by the Finance Portfolio Committee and this will continue to be implemented over the IDP cycle, and The SCM Unit which is also responsible for asset management has been centralised at the Municipality's main office in Piketberg. • **Financial Sustainability (Income / Debtors / Credit Control / Enquiries)**: The identification and application for alternate revenue sources and continuous efforts will be made to identify alternate revenue sources through IGR structures as well as other avenues; Stringent credit control measures and application of the credit control policy; Improving debtor management, especially alternative measures to collect overdue accounts. Debtor Management is a risk in terms of the Risk Register; Improving the management of water and electricity losses; The review of the indigent register to ensure that all indigents qualify for their indigent grant and expansion of the indigent grant programme to qualifying indigents. The increase in population could have a significant effect on the number of indigents; Improving debtor management, especially alternative measures to collect overdue accounts; and The development of a long-term financial plan. • **Budget / Reporting / Financial Statements**: Improved financial reporting as required by Legislation and National and Provincial Treasury Guidelines. • **Systems / Property Valuation and Rates**: Municipal property rates are one of our most important sources of income and it is imperative that the rates be based on credible valuations which are undertaken in terms of the Local Government: Municipal Property Rates Act. A General valuation was done during 2022/23. Two supplementary valuations will be done each year over the remainder of the IDP cycle; and Implementation of SCOA.
Entrench the Long-Term Financial Plan in the planning, implementation and management of the organization	
The Bergrivier Municipality is consistently being challenged by external factors that may have an impact on the operations and strategic plans. It is therefore critical that the long-term financial plan be updated continuously to incorporate the changes to the IDP, Master Plans, Asset Register and the latest annual financial statements. The impact of loadshedding on the municipality's revenue raising ability must be assessed and our long-term financial plan must be adjusted to provide for even higher levels of loadshedding and hence lower electricity revenue, while expenditure on items such as security, diesel and overtime will increase.	The Municipality must tighten its credit control measures as this could provide liquidity required to cushion against the impact of loadshedding and resultant loss of revenue. It is also imperative that the revenue section utilise technology to improve revenue collection and to complete the revenue enhancement project.
Diversify revenue and ensure value for money services	
As already highlighted above, the biggest challenge is the current outdated fiscal model which must be reviewed to keep track with the evolution of the system of local government in South Africa. Loadshedding will have a detrimental impact and will significantly reduce the municipality's revenue raising ability. This may hamper the ability of Bergrivier Municipality to deliver quality services and while every effort is being made to ensure sustainable service delivery, it is impossible to guarantee that no service disruptions will occur.	The Bergrivier Municipality will continue to lobby the various Inter Governmental Relations structures and advocate for an urgent review of the current fiscal model to prevent a total collapse of service delivery amongst all municipalities in the country. A greater focus and emphasis will be placed on data cleansing and revenue enhancement. In terms of the budget guidelines adopted by the Budget Steering Committee, our aim is to reduce the reliance on surpluses of electricity and to collect more revenue from property rates which provides better predictability and reliability of future revenue streams.
Ensure sustainable financial risk and asset management	
The municipality currently does not have a risk manager, and this is one of the critical positions to be considered for funding in the 2023/24 MTREF. The stores are currently under the management and supervision of the technical services while financial services are fulfilling the financial function. The aim is	• Finalise the development of a comprehensive Asset Management Framework through the existing Asset Care Programme.

Table C.7.1: Challenges and Development Priorities for the six Strategic Objectives to strengthen the financial sustainability of the Municipality.	
Challenges	**Development Priorities**
to move the stores function to Financial Services and to operate an electronic store with real time processing of financial information by 1 July 2024.	• Improve long term asset planning and budgeting though the existing Asset Care Programme as driven through the Strategic Asset Management Plan (SAMP). • The formalisation of work management will ensure that maintenance is done in a predictable preventive way, rather than reacting to asset failures. For Bergrivier Municipality this should be implemented through an external appointment that includes some basic Asset Management system information management activities. • Enabling staff to drive improved asset management through a project to sustainably reduce critical vacancies and improve succession planning. • Undertake a revenue improvement project that will identify the challenges to financial sustainability of the Municipality focusing at a minimum on debt management, revenue collection and cost control. • Formalise information management through the development of an asset information strategy, development of asset information standards, confirmation of asset data and enabling the asset management systems.
Diversify by sourcing grant funding to support projects, programmes and initiatives of Council	
The global macro-economic conditions are deteriorating, and the Russia-Ukraine war dampens market sentiment resulting in global economic decline, unemployment and increase in poverty levels. Countries across the world are still suffering and trying to recover from the devastating impact of the Covid-19 pandemic. The South African economic outlook has recently been articulated in the Minister's budget speech appears to worsen over the medium term and hence putting fiscal pressure on Government spending.	Since the Municipality's ability to generate own revenue is becoming increasingly under pressure, it is critical to approach Government (both SA and abroad) as well as public donors to provide financial support in the form of grants to fund our capital expenditure (most critical bulk services capacity and ageing infrastructure). The installation of smart water meters is a revenue generating project and old water meters should be replaced while the conventional type of water meters must be completely phased out. The replacement of water meters will also reduce water losses. We must, however, ensure that projects are bankable and implementation ready before approaching any external bodies for funding. It is also important to nurture and form partnerships with public bodies and institutions such as the DBSA to support our funding applications.
Ensure transparency in financial management by ensuring that all financial records are accurate, reliable and timely	
The implementation of mSCOA and the integration with various other ICT systems such as central supplier's database proves to be a challenge to municipalities as our systems is currently still in development phase and many different information systems exists within the Municipality. There is no central point where data is stored and as a result, optimal use of the different data sources hampers the timely availability of reliable and accurate financial information.	The development of our core financial management system must be prioritized to include functionality in all the different business processes. The use of third-party systems should be eliminated and/or limited to enable seamless integration and therefore improve the accuracy and the speed with which financial information is provided.

Expenditure:

Operational: The future planned O&M expenditure by type for Bergrivier Municipality, as included in the 2024/2025 MTREF Budget, is as follows.

Table C.7.2: O&M Expenditure items by type, as included in the 2024/2025 budget

Expenditure Items	% of total 2023/2024 Expenditure	2023/2024 Full Year Forecast	2024/2025 Budget	2025/2026 Budget	2026/2027 Budget
Executive and Council	5.5%	R29 970 000	R29 044 000	R30 384 000	R31 961 000
Finance Administration	18.5%	R100 298 000	R97 641 000	R104 114 000	R110 495 000
Internal Audit	0.2%	R1 231 000	R2 142 000	R2 308 000	R2 483 000
Community and social Services	2.8%	R15 173 000	R16 576 000	R17 694 000	R18 918 000
Sports and Recreation	4.0%	R21 897 000	R25 123 000	R26 855 000	R28 654 000
Public Safety	7.8%	R42 319 000	R43 666 000	R45 822 000	R48 105 000
Housing	0.5%	R2 747 000	R28 792 000	R63 443 000	R11 745 000
Planning and Development	4.1%	R22 226 000	R20 848 000	R20 555 000	R21 547 000

Table C.7.2: O&M Expenditure items by type, as included in the 2024/2025 budget					
Expenditure Items	**% of total 2023/2024 Expenditure**	**2023/2024 Full Year Forecast**	**2024/2025 Budget**	**2025/2026 Budget**	**2026/2027 Budget**
Road Transport	7.5%	R40 663 000	R42 825 000	R45 256 000	R47 800 000
Energy Sources	30.2%	R164 148 000	R178 342 000	R203 464 000	R231 824 000
Water Management	6.1%	R32 843 000	R36 273 000	R37 449 000	R38 820 000
Waste Water Management	3.2%	R17 534 000	R18 677 000	R19 785 000	R21 068 000
Waste Management	9.5%	R51 800 000	R51 467 000	R55 701 000	R58 879 000
Total	**100.0%**	**R542 849 000**	**R591 416 000**	**R672 830 000**	**R672 299 000**

Source: Medium Term Revenue and Expenditure Framework for Bergrivier 2024/2025: Table A2 – Budgeted Financial Performance (Revenue and Expenditure by Functional Classification)

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

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

It is important to note that the maintenance budget requirements are going to increase substantially over the next twenty years in real terms, in line with the envisaged pace of development and the upgrading of the water and wastewater treatment works that were completed over the last number of years. It is estimated that the budget requirements will double over this period.

The recommendations for Bergrivier Municipality, with regard to their Operational Budgets, are as follows:

- Develop an AMP, which will indicate the real replacement values and service lives of the assets and the funds required to provide for adequate operation and maintenance of the infrastructure. Current gaps include unrealistically low depreciation charges, which have to be rectified and ring-fenced into an asset replacement fund, as well as additional budget requirements above inflation for infrastructure development.

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

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

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

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

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

Table C.7.3: Estimated capital expenditure per functional classification of Bergrivier Municipality's future capital budget

Capital Expenditure Standard	2023/2024 Pre-audit Outcome	2024/2025 Budget	2025/2026 Budget	2026/2027 Budget
Executive and Council	R21 000	R45 000	R46 000	R0
Finance Administration	R7 627 000	R3 265 000	R5 128 000	R2 010 000
Community and social Services	R2 237 000	R785 000	R1 270 000	R1 330 000
Sports and Recreation	R3 866 000	R4 740 000	R3 040 000	R2 688 000
Public Safety	R2 296 000	R870 000	R500 000	R180 000
Housing	R3 807 000	R0	R10 000	R10 000
Planning and Development	R42 651 000	R4 403 000	R4 120 000	R0
Road Transport	R5 122 000	R8 755 000	R8 186 000	R10 122 000
Energy Sources	R9 006 000	R25 545 000	R14 940 000	R6 892 000
Water Management	R20 844 000	R12 818 000	R24 342 000	R21 430 000
Waste Water Management	R16 007 000	R12 703 000	R17 076 000	R25 997 000
Waste Management	R1 045 000	R1 665 000	R1 520 000	R4 171 000
Total Capital Expenditure	**R114 529 000**	**R75 594 000**	**R80 178 000**	**R74 830 000**

Source: Medium Term Revenue and Expenditure Framework for Bergrivier 2024/2025: Table A5 - Capital Expenditure by Vote, Functional Classification and Funding Source

The Opening Costs of the water and sewerage infrastructure that will need to be replaced over the next five years (RUL <5 yrs) is R14.914 million. The asset renewal needs for the **water infrastructure assets** over the next ten years is R2.133 million per year. The reinvestment required is R7.053 million in the first five years and R14.274 million in the second five-year period. The age of 42.2% 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 R1.794 million per year. The reinvestment required is R7.860 million in the first five years and R10.083 million in the second five-year period. The age of 17.3% of the sewerage infrastructure assets is greater than twenty years. These values are based on the Opening Cost of the water and sewerage infrastructure currently included in the Asset Register. Table C.4.2 however indicates the required annual budget for the replacement of the old water and sewerage infrastructure and the required annual O&M budget, which is based on the CRC of the water and sewerage infrastructure included in the WSDP.

The extent to which each type of water and sewerage asset portfolio has been consumed are summarised under Section A: Topic 3 of this Executive Summary. The infrastructure components with low percentage figures (% Carrying Value/Opening Cost) need dedicated renewals programmes targeting these assets. If this is not done, there is the risk that the on-going deterioration will escalate to uncontrolled proportions, with considerable impact on consumers, the economy of the area and the service levels that can be provided in Bergrivier Municipality.

The recommendations for Bergrivier Municipality, with regard to their Capital Funding, are as follows:

- Take the recommended projects, as identified through the Water and Sewer Master Plans and the WSDP, into account during the planning and prioritization process for new infrastructure. Prioritize from the desired list, those items which can be implemented from available funding in the particular financial year.

- Undertake revised master planning at least every three to five years and use the Master Plans to list the desired infrastructure development requirements and reflect these in the IDP.

- Assign a high priority to the implementation of the WC/WDM Strategy in order to postpone additional capital investment for as long as possible, both from the water availability perspective as well as from the treatment of increased effluent volumes. The costs of physical water loss, the capital requirements for new water resources infrastructure, and the constraints of poor water availability on water dependent economic growth means that WC/WDM is a critical management priority for stretching the financial resources of the Municipality. WC/WDM is almost always a more cost-effective solution than the implementation of new infrastructure, and no new infrastructure should be developed until unauthorized water has been reduced to manageable volumes.

- To adopt appropriate technology solutions for the water and sewerage infrastructure challenges. Techniques such as value engineering should also be adopted to ensure that investments in infrastructure and other solutions are cost effective over the full life-cycle and designed to be fit for purpose.

- To ensure adequate funding for the full lifecycle cost of the new water and sewerage infrastructure, which will include funds for the operation and maintenance of the infrastructure and regular refurbishment.

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

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

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

- Develop IAMPs for all water and sewerage infrastructure, which will indicate the real replacement values, the service life of the assets and the funds required to provide for adequate asset replacement. The renewals burden is set to increase sharply over the next 20 years and it is therefore important for Bergrivier Municipality to commit to a substantial and sustained programme of capital renewal works. The current level of expenditure on capital renewal is inadequate and there is a critical need for Council to commit to increase the budget for the maintenance and rehabilitation of the existing infrastructure substantially.

Income:

Operational: The future revenue by source for Bergrivier Municipality, as included in the 2024/2025 MTREF Budget, is as follows.

Table C.7.4: Revenue items by source, as included in the 2024/2025 Budget

Revenue Item	2023/2024 Pre-audit Outcome	2024/2025 Budget	2025/2026 Budget	2026/2027 Budget
Service Charges - Electricity	R151 469 000	R155 913 000	R176 711 000	R200 288 000
Service Charges - Water	R44 397 000	R45 105 000	R48 089 000	R52 119 000
Service Charges – Waste Water Management	R21 414 000	R18 559 000	R20 415 000	R22 472 000
Service Charges – Waste Management	R44 557 000	R45 962 000	R55 055 000	R61 491 000
Sale of Goods and Rendering of Services	R9 054 000	R10 280 000	R10 876 000	R11 529 000
Agency Services	R4 933 000	R5 253 000	R5 547 000	R5 880 000
Interest earned from Receivables	R5 739 000	R6 532 000	R6 925 000	R7 340 000
Interest earned from Current and Non-Current Assets	R18 033 000	R19 873 000	R20 569 000	R21 289 000
Rental from Fixed Assets	R1 735 000	R1 850 000	R1 961 000	R2 079 000
Licences or Permits	R28 000	R30 000	R32 000	R34 000
Operational Revenue	R2 008 000	R1 375 000	R1 452 000	R1 541 000
Property Rates	R107 034 000	R118 480 000	R127 545 000	R136 492 000
Fines, penalties and forfeits	R24 332 000	R24 947 000	R25 599 000	R26 268 000
Licences or Permits	-	R10 000	R11 000	R12 000
Transfers and subsidies - Operational	R83 405 000	R110 357 000	R149 914 000	R105 380 000
Interest	R3 305 000	R3 733 000	R3 958 000	R4 195 000
Operational Revenue	R10 454 000	R11 101 000	R11 646 000	R12 207 000
Gains on disposal of Assets	R1 000 000	R1 069 000	-	-
Other Gains	R2 800 000	R2 926 000	R3 064 000	R3 202 000
Total	**R535 697 000**	**R583 355 000**	**R669 369 000**	**R673 818 000**

Source: Medium Term Revenue and Expenditure Framework for Bergrivier 2024/2025: Table A4 – Budgeted Financial Performance (Revenue and Expenditure)

Capital: The average capital expenditure over the last five financial years were R10.563 million per year for water infrastructure and R7.741 million per year for sewerage infrastructure. Capital funding will have to increase substantially if existing service levels are to be sustained, which has to be the goal. In this regard Bergrivier Municipality's own funding, as well as grant funding must significantly exceed inflation. Other possible sources of funding and innovative funding mechanisms have to be explored.

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

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

Table C.7.5: Sources of funding for the future capital budget of Bergrivier Municipality

Capital Funding Source	2023/2024 Pre-audit outcome	2024/2025 Budget	2025/2026 Budget	2026/2027 Budget
National Government	R20 095 000	R22 693 000	R28 126 000	R34 844 000
Provincial Government	R36 116 000	R1 030 000	R50 000	-
District Municipality	R2 223 000	-	-	-
Transfers and Subsidies	R160 000	-	-	-
Borrowing	R36 197 000	R23 775 000	R26 200 000	R23 900 000
Internally generated funds	R19 738 000	R28 096 000	R25 802 000	R16 087 000
Total Capital Funding	**R114 529 000**	**R75 594 000**	**R80 178 000**	**R74 831 000**

Source: Medium Term Revenue and Expenditure Framework for Bergrivier 2024/2025: Table A5 - Capital Expenditure by Vote, Standard Classification and Funding

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

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

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

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

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

Table C.7.6: Comments on Bergrivier Municipality's residential block stepped water tariff structure

Block (kl/month)	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	Comments
0 – 6	R8-62	R8-79	R9-50	R10-20	R10-90	Free Basic Water
7– 13	R18-23	R18-59	R20-20	R21-60	R23-10	Low volume use
14 – 20	R21-63	R22-05	R23-90	R25-60	R27-40	Typical use volume, including garden irrigation
21 - 30	R26-99	R27-52	R29-90	R31-90	R34-10	
31 – 35						Above average use, including garden irrigation
36 – 45	R32-72	R33-35	R36-20	R38-70	R41-40	

Table C.7.6: Comments on Bergrivier Municipality's residential block stepped water tariff structure						
Block (kl/month)	**2020/2021**	**2021/2022**	**2022/2023**	**2023/2024**	**2024/2025**	**Comments**
46 - 50	R43-60	R44-45	R48-20	R51-60	R55-20	Wasteful use and/or severe garden irrigation
50 – 70						
> 70						Significant waste and/or unnecessary garden irrigation

Bergrivier Municipality's residential water tariffs for usage above 35 Kl should be increased further to more effectively promote the efficient use of water and discourage the wastage of water.

The water tariffs of Swartland Municipality, Drakenstein Municipality and Overstrand Municipality for the 2023/2024 financial year and their block stepped water tariff structures, that adequately promote the efficient use of water, are indicated in the table below.

Table C.7.7: 2023/2024 Residential water tariff structures of three Municipalities that adequately promote the efficient use of water					
Swartland Municipality		**Drakenstein Municipality**		**Overstrand Municipality**	
Block (kl/month)	**Rand per Kl**	**Block (kl/month)**	**Rand per Kl**	**Block (kl/month)**	**Rand per Kl**
0 - 6	R6-02	0 - 6	R6-38	0 – 6	R6-81
7 - 10	R9-99	7 - 10	R11-32	7 – 18	R13-97
11 - 15	R18-95	11 - 15	R16-24	19 – 45	R29-28
16 – 20	R24-34	16 - 30	R21-09	46 – 60	R58-55
21 – 25	R36-09	31 - 45	R29-44	> 60	R78-08
26 – 35	R53-77	46 - 55	R62-22		
> 35	R100-26	> 55	R93-77		

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

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

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

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

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

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

The recommendations for the water and sanitation tariffs of Bergrivier Municipality are as follows:

- Bergrivier Municipality's residential water tariffs for usage above 35 Kl should be increased further to more effectively promote the efficient use of water and discourage the wastage of water. A financial analysis of the tariffs first needs to be carried out to determine the most effective tariff adjustments (Blocks and Tariffs).

- Bergrivier Municipality can investigate the financial viability of changing the sanitation tariff structure from a fixed monthly amount, to a stepped tariff based on water consumption in the future (Financial analysis needs to be done). Volumetric usage for sanitation services, whereby charges are determined according to water usage, with maximum ceilings and charged accordingly. This will need to include a free sanitation bracket, similar for free water, for indigent registered households. This will also further deter wasteful water use.

- Bergrivier Municipality will continue to re-evaluate the tariffs they charge for their water and sanitation services on an annual basis in order to continue to ensure the good financial position of the Municipality and to ensure that all the O&M expenditure for water and sanitation services are always recovered through their water and sanitation services income, to address the bulk infrastructure backlogs and to ensure the adequate rehabilitation and maintenance of all existing water and sewerage infrastructure within the various towns.

- The large commercial and industrial consumers could lower their current water demand by means of improved practices or re-use of wastewater. Bergrivier Municipality should note that revenue could potentially decrease as a result of reuse practices.

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

- Bergrivier Municipality needs to start with the monitoring of the volume and nutrient loading of all industrial effluent discharged by industrial consumers into the sewer system. A formula for the calculation of the extraordinary treatment cost to industrial consumers for the industrial effluent they discharge into Bergrivier Municipality's sewer system needs to be put in place to form part of the existing tariff structure. The performance of WWTWs in general can be severely compromised by certain industrial effluent discharges. It is therefore also important for Bergrivier Municipality to recalculate their treatment costs annually, in order to ensure that there is no under or over recovery of costs from industrial consumers.

  Regular sampling of the quality of industrial effluent discharged into the sewer system needs to be done and all industrial consumers need to be charged according to the quality of the effluent discharged into the Municipality's sewer system.

TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

Sections 12 and 13 of the Water Services Act (Act No 108 of 1997) place a duty on WSAs to prepare and maintain a WSDP, as part of the process of preparing an IDP. The DWS has developed a new eWSDP website to assist WSAs with the WSDP process and to provide a framework for the capturing of the data. The WSDP of Bergrivier Municipality needs to be updated regularly.

The Municipality will also continue to report annually and in a public way on progress in implementing the plan (WSDP Performance- and Water Services Audit Report), as part of Bergrivier Municipality's Annual Report, as required in terms of Section 18 of the Water Services Act, 1997 (Act No.108 of 1997), as well as the "Regulations relating to compulsory national standards and measures to conserve water", as issued in terms of Sections 9(1) and 73(1)(j) of the Water Services Act.

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

The updated Water and Sewer Master Plans Plan (2025/2026) of Bergrivier Municipality will summarise the projects (Master Plan Items) necessary in order to cope with the increased future demands and developments within the Bergrivier Municipality's systems. The Water and Sewer Master Plans need to be updated regularly (At least once every five years).

A Work Place Skills Plan is in place, which lists the training to be provided during the new financial year. The training of Bergrivier Municipality's personnel involved in the management of water and sanitation services are the most important factors that determine the ability of Bergrivier Municipality to deliver safe and reliable water and to treat the effluent at the WWTWs to an acceptable standard. Training of all staff involved in water supply and sanitation services on matters related to treatment processes and quality monitoring and control is essential because their actions (or failure to act) will have a major impact on the well-being of the communities and the environment.

It is important for Bergrivier Municipality to classify all WTWs, WWTWs and Process Controllers along the lines of the new Regulation 3630 requirements by establishing a programme for certification of works, operators, technicians and managers. The process will include reviewing the skills needed and aligning resources to these needs as well as reviewing total staff numbers necessary to meet all the objectives in the National Water Act.

The table below provides an overview of the current Process Controllers at the WTWs and WWTWs and whether additional Process Controllers are required in order to comply with Regulation 3630.

Table C.8.1: Required number of Process Controllers at the WTWs and WWTWs	
WTWs	
Porterville	The minimum requirement for a Class C WTW is one Class III Process Controller per shift, plus one on standby. For the Porterville WTW, with one shift, there should therefore be two Process Controllers with minimum Class III classifications. The current Number and Class of Supervisor and Process Controllers for the Porterville WTW are therefore adequate.
Piketberg	The minimum requirement for a Class C WTW is one Class III Process Controller per shift, plus one on standby. For the Piketberg WTW, with two shifts, there should therefore be three Process Controllers with minimum Class III classifications. One additional Class III Process Controller is required for the Piketberg WTW or the existing Class II Process Controller needs to receive the required training to be classified as a Class III Process Controller in order to comply.
Aurora	The minimum requirement for a Class D WTW is one Class II Process Controller per shift, plus one on standby. For the Aurora WTW, with one shift, there should therefore be two Process Controllers with minimum Class II classifications. Two Class II Process Controllers are required for the Aurora WTW or the existing Learner Process Controllers need to receive the required training to be classified as Class II Process Controllers in order to comply.
Eendekuil	The minimum requirement for a Class D WTW is one Class II Process Controller per shift, plus one on standby. For the Eendekuil WTW, with one shift, there should therefore be two Process Controllers with minimum Class II classifications. One additional Class II Process Controller is required for the Eendekuil WTW.
Redelinghuys	The minimum requirement for a Class D WTW is one Class II Process Controller per shift, plus one on standby. For the Redelinghuys WTW, with one shift, there should therefore be two Process Controllers with minimum Class II classifications. Two Class II Process Controllers are required for the Redelinghuys WTW. The existing Learner Process Controller can also receive the required training to be classified as a Class II Process Controller, with one additional Class II to be appointed in order to comply.
WWTWs	
Porterville	The minimum requirement for a Class D WWTW is one Class II Process Controller per shift, plus one on standby. For the Porterville WWTW, with one shift, there should therefore be two Process Controllers with minimum Class II classifications. Municipality needs to submit the outstanding information to DWS with regard to the current Class II Process Controllers that were "rejected", in order to get them approved as Class II Process Controllers.
Piketberg	The minimum requirement for a Class C WWTW is one Class III Process Controller per shift, plus one on standby. For the Piketberg WWTW, with one shift, there should therefore be two Process Controllers with minimum Class III classifications. Municipality needs to submit the outstanding information to DWS with regard to the current Class IV Process Controller that was "rejected", as well as for the other Class II Process Controllers that were also "rejected". Two Class III approved Process Controllers are required for the WWTW.
Velddrif	The minimum requirement for a Class C WWTW is one Class III Process Controller per shift, plus one on standby. For the Velddrif WWTW, with one shift, there should therefore be two Process Controllers with minimum Class III classifications. Municipality needs to submit the outstanding information to DWS with regard to the current Learner Process Controllers. One additional Class III Process Controller needs to be appointed for the WWTW.
Dwarskersbos	The minimum requirement for a Class E WWTW is one Class I Process Controller per shift, plus one on standby. For the Dwarskersbos WWTW, with one shift, there should therefore be two Process Controllers with minimum Class I classifications. Municipality needs to submit the outstanding information to DWS with regard to the current Learner Process Controller that was "rejected". Two Class I Process Controllers need to be appointed for the WWTW.
Eendekuil	The minimum requirement for a Class E WWTW is one Class I Process Controller per shift, plus one on standby. For the Eendekuil WWTW, with one shift, there should therefore be two Process Controllers with minimum Class I

Table C.8.1: Required number of Process Controllers at the WTWs and WWTWs	
WTWs	
	classifications. Municipality needs to submit the outstanding information to DWS with regard to the current Class II Process Controller that was "rejected". One additional Class I Process Controller needs to be appointed for the WWTW.

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 Bergrivier Municipality to compile a Legal Compliance Audit of their WTWs and WWTWs, which will provide the management of Bergrivier Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not. **It is further recommended that Bergrivier Municipality arrange for chlorine audits to be done at all their disinfection facilities, in order to identify any potential shortcomings.**

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

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

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

SECTION D: WATER SERVICES OBJECTIVES AND STRATEGIES

The water services strategies presented below were derived from the 2023/2024 and 2024/2025 SDBIPs and the water services situational analysis as summarized in Section C: Water Services Existing Needs Perspective and presents the 5-year Water Services strategies as established in the WSA's WSDP.

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Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2023/2024 status quo)	WSDP FY2024/25 TARGET	WSDP FY2025/26 TARGET	WSDP FY2026/27 TARGET	WSDP FY2027/28 TARGET	WSDP FY2028/29 TARGET
Topic 1: Settlement Demographics & Public Amenities							
	Implemented by other Department	-	-	-	-	-	-
Topic 2: Service Levels							
Compile a Water and Sanitation Service Level Policy	Water and Sanitation Service Level Policy in place.	-	-	-	1	-	-
Ensure all households on the farms are provided with at least basic water services and complying with basic water service requirements as included in Gazette 52814 of 6 June 2025.	Support all applications received for basic water services on the farms (Subject to availability of financial resources and sustainability of type of service).	-	-	-	80% of applications received are supported (Subject to availability of funding and sustainability of type of service)	90% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)
Ensure all households on the farms are provided with at least basic sanitation services and complying with basic sanitation service requirements as included in Gazette 52814 of 6 June 2025.	Support all applications received for basic sanitation services on the farms (Subject to availability of financial resources and sustainability of type of service).	-	-	-	80% of applications received are supported (Subject to availability of funding and sustainability of type of service)	90% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)
Topic 3: Water Services Asset Management							
Ensure adequate storage capacity	Ensure adequate storage capacity for all towns (At least 48hrs AADD)	-	-	-	All towns with storage capacity above 48 hrs AADD	All towns with storage capacity above 48 hrs AADD	All towns with storage capacity above 48 hrs AADD
Implement projects included in the Water Master Plan	Ensure adequate water pump station and water reticulation capacity.	-	-	-	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.
Implement projects included in the Sewer Master Plan	Ensure adequate sewer pump station and sewer drainage network capacity.	-	-	-	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.
Topic 4: Water Services Operation and Maintenance							
95% water quality obtained as per SANS241 physical and	% water quality as at 31 December and 30 June	Target 95% Actual 92.29%	95%	95%	95%	95%	95%

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2023/2024 status quo)	WSDP FY2024/25 TARGET	WSDP FY2025/26 TARGET	WSDP FY2026/27 TARGET	WSDP FY2027/28 TARGET	WSDP FY2028/29 TARGET
micro parameters as at 31 December and 30 June							
Implement recommendations from detail WTW Technical Process Audits.	% Of recommendations, as included in the WTW Process Audits, implemented.	-	-	-	50% of recommendations implemented	70% of recommendations implemented	90% of recommendations implemented
Implement recommendations from detail WWTW Technical Process Audits.	% Of recommendations, as included in the WWTW Process Audits, implemented.	-	-	-	50% of recommendations implemented	70% of recommendations implemented	90% of recommendations implemented
Implement recommendations as included in the Improvement / Upgrade Plan of the Water Safety Plan	% Of recommendations, as included in the Improvement / Upgrade Plan of the Water Safety Plan, implemented.	-	-	-	50% of recommendations implemented	70% of recommendations implemented	90% of recommendations implemented
Implement recommendations as included in the Improvement / Upgrade Plan of the W_2RAPs.	% Of recommendations, as included in the Improvement / Upgrade Plan of the W_2RAPs, implemented.	-	-	-	50% of recommendations implemented	70% of recommendations implemented	90% of recommendations implemented
Quality of final effluent comply with authorisation limits for final effluent.	% Compliance with WWTW final effluent authorisations	-	-	-	70%	80%	90%
Water Quality sampling programme complies with requirements.	Water Quality Sampling Programme complies with the minimum SANS241:2015 monitoring frequency for process indicators.	-	-	-	90%	95%	100%
Ensure adequate budget for the O&M of the existing water and sewerage infrastructure	Ensure a budget of at least 1.5% of the total value of the water and sewerage assets is allocated towards the annual O&M of the systems.	-	-	-	A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.
Ensure adequate budget for the replacement of old water and sewerage infrastructure	Ensure a budget of at least 2% of the total value of the water and sewerage assets is allocated towards the replacement of existing infrastructure per annum.	-	-	-	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.
Reporting on water quality and wastewater quality compliance percentages	Annual reporting on the percentage of water quality and wastewater quality compliance.	-	-	-	At least annual publication of water quality and wastewater quality compliance percentages.	At least annual publication of water quality and wastewater quality compliance percentages.	At least annual publication of water quality and wastewater quality compliance percentages.
Topic 5: Conservation and Demand Management (Topic 5.1: Water Resources)							
Limit water losses to 12% by 30 June	% of water losses 12% or less by 30 June	Target < 12% Actual 12.10%	12%	12%	12%	12%	12%
Topic 5: Conservation and Demand Management (Topic 5.2: Water Balance)							

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2023/2024 status quo)	WSDP FY2024/25 TARGET	WSDP FY2025/26 TARGET	WSDP FY2026/27 TARGET	WSDP FY2027/28 TARGET	WSDP FY2028/29 TARGET
Detail IWA Water Balances for all the systems and monthly WTW flows for all the treatment plants.	Ensure all bulk water is metered at source, at WTW (incoming and outgoing) and at all bulk storage reservoirs and the meters are read and recorded on at least a monthly basis.	-	-	-	100% Compliance	100% Compliance	100% Compliance
Monthly WWTW flows for all the treatment plants.	Ensure all incoming flow and outgoing flow at WWTWs are metered, as well as final effluent re-used for irrigation purposes and that meters are read and recorded on at least a monthly basis.	-	-	-	80% Compliance	90% Compliance	100% Compliance
Topic 6: Water Resources							
Implementation of Groundwater Management Programme	Ensure groundwater management programme for boreholes are implemented and raw water quality is monitored at least annually.	-	-	-	Implement Groundwater Management Programme and monitor raw water quality at least annually.	Implement Groundwater Management Programme and monitor raw water quality at least annually.	Implement Groundwater Management Programme and monitor raw water quality at least annually.
All water sources are authorised.	% of Abstraction from sources registered and authorised by the DWS.	-	-	-	95% Compliance	100% Compliance	100% Compliance
Ensure adequate yield and allocations from water resources to meet the projected future water requirements.	Ensure yields and allocations are adequate to meet the projected five year water requirements for all systems.	-	-	-	100% Adequate supply to meet water requirements for all systems	100% Adequate supply to meet water requirements for all systems	100% Adequate supply to meet water requirements for all systems
Monitoring of industrial consumers.	% Monitoring of effluent discharged by industrial consumers (Quantity and Quality) and charged according to the quality of effluent discharged by them.	-	-	-	50% Of all Industrial Consumers monitored w.r.t. quality and quantity of effluent discharged by them	65% Of all Industrial Consumers monitored w.r.t. quality and quantity of effluent discharged by them	80% Of all Industrial Consumers monitored w.r.t. quality and quantity of effluent discharged by them
Topic 7: Financial							
95% of MIG conditional grant spent by 30 June to upgrade infrastructure.	% of MIG conditional grant spent by 30 June	Target 95% Actual 83.9%	95%	95%	95%	95%	95%
95% of the Capital budget of Directorate Technical Services spent by 30 June	% of Capital budget of Directorate Technical Services spent by 30 June	Target 95% Actual 95.0%	95%	95%	95%	95%	95%
Topic 8: Institutional Arrangements and Customer Care							
100% of all complaints registered on IMIS are being attended to within the Directorate based on clients service charter.	% of Complaints registered on IMIS being attended to within the Directorate and completed based on client services charter.	Target 100% Actual 100%	100%	100%	100%	100%	100%
Ensure adequate Process Controllers at the WTWs according to Regulation 3630	% Compliance w.r.t the number of existing Process Controllers at the WTWs and the required number of Process Controllers	-	-	-	70 % Of WTW plants meeting the requirements, w.r.t. the	80 % Of WTW plants meeting the requirements, w.r.t. the	90 % Of WTW plants meeting the requirements, w.r.t. the

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2023/2024 status quo)	WSDP FY2024/25 TARGET	WSDP FY2025/26 TARGET	WSDP FY2026/27 TARGET	WSDP FY2027/28 TARGET	WSDP FY2028/29 TARGET
					number of Process Controllers per shift.	number of Process Controllers per shift.	number of Process Controllers per shift.
Ensure adequate Process Controllers at the WWTWs according to Regulation 3630	% Compliance w.r.t the number of existing Process Controllers at the WWTWs and the required number of Process Controllers	-	-	-	70 % Of WWTW plants meeting the requirements, w.r.t. the number of Process Controllers per shift.	80 % Of WWTW plants meeting the requirements, w.r.t. the number of Process Controllers per shift.	90 % Of WWTW plants meeting the requirements, w.r.t. the number of Process Controllers per shift.

SECTION E: WATER SERVICES MTEF PROJECTS

The approved 2025/2026 Water Services Medium-Term Expenditure Framework (MTEF) projects are presented below and outline the water services projects which might be funded for implementation within the next three financial years. Table E.2a provides the projects identified for implementation in FY2025/26, Table E.2b provides the projects identified for implementation in FY2026/27 and Table E2c provides the projects identified for implementation in FY2027/28.

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

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

Table E.1: Summary of MTEF Projects

Project Main Category	FY2025/26		FY2026/27		FY2027/28		MTEF Total	
	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)
Water Projects	19	R34 506	13	R22 556	10	R33 998	**23**	**R91 059**
Sanitation Projects	10	R15 180	9	R6 560	5	R2 070	**12**	**R23 810**
Combined Water & Sanitation Projects	**29**	**R49 686**	**22**	**R29 116**	**15**	**R36 068**	**35**	**R114 869**

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Table E.2a: Water Services MTEF Projects - FY2025/26 (1st year MTEF period)

Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2024/25	FY2025/26							Total Cost	
									Budget	Own	MIG	WSIG	External Loans	WSIG			
1. Infrastructure Projects								**R0**	**R36 856**							**R36 856**	
	74511040119	Replace mid-block lines	Upgrade parts of water reticulation	Higher level of water services	Water	Internal	Reticulation		**R500**	R500						**R500**	Water Master Plan
	74512040109	Replace reservoir roof (Eendekuil and Redelinghuys)	Replace reservoir roofs	Water Quality and safety	Water	Bulk	Reservoir		**R400**	R400						**R400**	O&M Plan and WSDP
	74512040110	Upgrade WTW Building (Aurora)	Upgrade WTW building	Safety compliance	Water	Bulk	WTW		**R250**	R250						**R250**	O&M Plan and WSDP
	74512040111	Upgrade Aurora WTW	Upgrade capacity of WTW	Ensure adequate treatment capacity	Water	Bulk	WTW		**R300**	R300						**R300**	WSDP and WTW Process
	74512040201 & 74512040801	New Reservoir at Eendekuil	Construction of new reservoir	Ensure adequate storage capacity	Water	Bulk	Reservoir		**R8 435**	R435			R8 000			**R8 435**	WSDP
	74511040402	Velddrif pipe replacements in Noordhoek (Multi Year)	Implementation of pipeline replacement programme	Higher level of water services and reduce NRW and Water Losses	Water	Internal	Reticulation		**R10 105**		R10 105					**R10 105**	Water Master Plan
	74511040403	Redelinghuys Replacement Bulk Water Pipeline-multi year	Implementation of pipeline replacement programme	Higher level of water services and reduce NRW and Water Losses	Water	Bulk	Water pipeline		**R3 865**		R3 865					**R3 865**	Water Master Plan
	74291050109	Upgrade Albatros Pumpstation	Upgrade sewer pump station	Ensure adequate pump capacity	Sewer	Bulk	Pump Station		**R2 000**	R2 000						**R2 000**	Sewer Master Plan and WSDP
	74291050201	Sewerage network - Velddrif	Installation of sewer drainage network	Higher level of sanitation services	Sewer	Internal	Drainage network		**R2 000**				R2 000			**R2 000**	Sewer Master Plan
	74292050209	Upgrade Velddrif WWTW (critical) Own funds (EL)	Upgrade capacity of Velddrif WWTW	Ensure adequate treatment capacity	Sewer	Bulk	WWTW		**R9 000**				R9 000			**R9 000**	WSDP
2. Source Development Projects								**R0**	**R0**							**R0**	
									R0							**R0**	
3. Demand Management projects								**R0**	**R800**							**R800**	
3.1	74511040102	Water conservation demand management intervention	Implementation of WC/WDM measures	Reducing NRW and Water Losses	Water	Internal	Reticulation		**R250**	R250						**R250**	WC/WDM Strategy and WSDP
3.2	74511040120	Prepaid/ Smart Metering (CR)	Installation of prepaid / smart water	Ensure all connections are metered	Water	Internal	Reticulation		**R550**	R550						**R550**	WC/WDM Strategy and WSDP
4. O&M Commitments								**R0**	**R12 030**							**R12 030**	
Operations																	
	74511040108	Pumps (standby)	Installation of additional water pumps	Ensure adequate supply	Water	Bulk	Pump stations		**R200**	R200						**R200**	O&M Plan
	74511040112	Telemetry upgrade	Upgrade telemetry systems	Operations	Water	Other	Telemetry		**R300**	R300						**R300**	Operations
	74511040117	Booster Pumps at Velddrif	Upgrade booster pump station	Assurance of supply	Water	Bulk	Pump stations		**R3 000**	R3 000						**R3 000**	Water Master Plan
	74512040101	Purchase new borehole pumps	Installation of borehole pumps	Ensure adequate groundwater	Water	Bulk	Sources		**R50**	R50						**R50**	WSDP
	74512040103	Telemetery: Water	Upgrade telemetry systems	Operations	Water	Other	Telemetry		**R150**	R150						**R150**	O&M Plan
	74512040203	Disinfection at WTW	Upgrade disinfection facility at WTW	Water quality compliance	Water	Bulk	WTW		**R500**				R500			**R500**	WSDP
	74291050103	Telemetry	Upgrade telemetry systems	Operations	Sewer	Other	Telemetry		**R400**	R400						**R400**	O&M Plan
	74291050106	Sewerage stand by pumps	Installation of standby sewer pumps	Ensure adequate pump capacity	Sewer	Bulk	Pump stations		**R200**	R200						**R200**	O&M Plan and WSDP
	74292050103	Security at WWTW	Improved security measures at WWTW	Prevent theft and vandalism	Sewer	Bulk	WWTW		**R200**	R200						**R200**	O&M Plan and WSDP
	74292050105	Fencing at WWTW	Improved security measures at WWTW	Prevent theft and vandalism	Sewer	Bulk	WWTW		**R400**	R400						**R400**	O&M Plan and WSDP
Maintenance																	
	74511040105	Replace redundant meters	Replace redundant water meters	Ensure water is metered	Water	Internal	Reticulation		**R200**	R200						**R200**	WC/WDM Strategy and WSDP
	74511040202	Water Renewals (EL)	Replacement of old water infrastructure	Refurbishment	Water	Internal	Reticulation		**R4 000**				R4 000			**R4 000**	O&M Plan
	74511040209	Refurbish Dwarskersbos Water Tower	Refurbishment of water tower	Refurbishment	Water	Bulk	Water Tower		**R700**				R700			**R700**	O&M Plan
	74511040210	Refurbish Velddrif Water Tower	Refurbishment of water tower	Refurbishment	Water	Bulk	Water Tower		**R750**				R750			**R750**	O&M Plan
	74291050101	Replace rising mains in pump stations	Installation of new rising mains in pump stations	Refurbishment	Sewer	Bulk	Pump Stations		**R120**	R120						**R120**	O&M Plan
	74291050102	Sewer Renewals	Replacement of old sewerage	Refurbishment	Sewer	Internal	Drainage network		**R160**	R160						**R160**	O&M Plan
	74291050104	Switchgear and pumps	Replace sewer pump station switchgear	Refurbishment	Sewer	Bulk	Pump Stations		**R700**	R700						**R700**	O&M Plan
5. Institutional								**R0**	**R0**							**R0**	
									R0							**R0**	
6. Water Services Programmes								**R0**	**R0**							**R0**	
		Total						**R0**	**R49 686**							**R49 686**	

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Table E.2b: Water Services MTEF Projects - FY2026/27 (2nd year MTEF period)

Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2025/26	FY2026/27 Budget	Own	MIG	WSIG	External Loans	WSIG			Total Cost
1. Infrastructure Projects								**R0**	**R19 626**								**R19 626**	
	74512040111	Upgrade Aurora WTW	Upgrade capacity of WTW	Ensure adequate treatment capacity	Water	Bulk	WTW		**R300**	R300							**R300**	WSDP and WTW Process
	74511040403 & 74512040204	Redelinghuys Replacement Bulk Water Pipeline-multi year	Implementation of pipeline replacement programme	Higher level of water services and reduce NRW and Water Losses	Water	Bulk	Water pipeline		**R6 561**		R5 276		R1 285				**R6 561**	Water Master Plan
	74511040404	Porterville Replacement Water Pipeline-multi year	Implementation of pipeline replacement programme	Higher level of water services and reduce NRW and Water Losses	Water	Internal	Reticulation		**R9 605**		R9 605						**R9 605**	Water Master Plan
	74291050107	Fencing Sewer Pump Stations	Install fencing for sewer pump stations	Prevent theft and vandalism	Sewer	Bulk	Pump Stations		**R160**	R160							**R160**	WSDP
	74291050201	Sewerage network - Velddrif	Installation of sewer drainage network	Higher level of sanitation services	Sewer	Internal	Drainage network		**R3 000**				R3 000				**R3 000**	Sewer Master Plan
2. Source Development Projects								**R0**	**R0**								**R0**	
3. Demand Management projects								**R0**	**R850**								**R850**	
3.1	74511040102	Water conservation demand management intervention	Implementation of WC/WDM measures	Reducing NRW and Water Losses	Water	Internal	Reticulation		**R250**	R250							**R250**	WC/WDM Strategy and WSDP
	74511040120	Prepaid/ Smart Metering (CR)	Installation of prepaid / smart water	Ensure all connections are metered	Water	Internal	Reticulation		**R600**	R600							**R600**	WC/WDM Strategy and WSDP
4. O&M Commitments								**R0**	**R8 640**								**R8 640**	
Operations																		
	74512040107	Security at Reservoir/Pump Stations	Installation of improved security measures at reservoirs and pump stations	Prevent theft and vandalism	Water	Other	Reservoirs and Pump Stations		**R250**	R250							**R250**	O&M Plan
	74511040108	Pumps (standby)	Installation of additional water pumps	Ensure adequate supply	Water	Bulk	Pump stations		**R250**	R250							**R250**	O&M Plan
	74512040101	Purchase new borehole pumps	Installation of borehole pumps	Ensure adequate groundwater	Water	Bulk	Sources		**R60**	R60							**R60**	WSDP
	74512040103	Telemetery: Water	Upgrade telemetry systems	Operations	Water	Other	Telemetry		**R160**	R160							**R160**	O&M Plan
	74512040203	Disinfection at WTW	Upgrade disinfection facility at WTW	Water quality compliance	Water	Bulk	WTW		**R500**				R500				**R500**	WSDP
	74511040211	Refurbish Laaiplek Water Tower	Refurbishment of water tower	Refurbishment	Water	Bulk	Water Tower		**R800**				R800				**R800**	O&M Plan
	74291050103	Telemetry	Upgrade telemetry systems	Operations	Sewer	Other	Telemetry		**R480**	R480							**R480**	O&M Plan
	74291050106	Sewerage stand by pumps	Installation of standby sewer pumps	Ensure adequate pump capacity	Sewer	Bulk	Pump stations		**R380**	R380							**R380**	O&M Plan and WSDP
	74291510202	New vacuum tanker (jet vac)	Purchase new vacuum tanker	Ensure adequate service delivery	Sewer	Other	Tanker		**R1 500**				R1 500				**R1 500**	O&M Plan
	74292050105	Fencing at WWTW	Improved security measures at WWTW	Prevent theft and vandalism	Sewer	Bulk	WWTW		**R400**	R400							**R400**	O&M Plan and WSDP
Maintenance																		
	74511040105	Replace redundant meters	Replace redundant water meters	Ensure water is metered	Water	Internal	Reticulation		**R220**	R220							**R220**	WC/WDM Strategy and WSDP
	74511040202	Water Renewals (EL)	Replacement of old water infrastructure	Refurbishment	Water	Internal	Reticulation		**R3 000**				R3 000				**R3 000**	O&M Plan
	74291050101	Replace rising mains in pump stations	Installation of new rising mains in pump stations	Refurbishment	Sewer	Bulk	Pump Stations		**R130**	R130							**R130**	O&M Plan
	74291050102	Sewer Renewals	Replacement of old sewerage infrastructure	Refurbishment	Sewer	Internal	Drainage network		**R160**	R160							**R160**	O&M Plan
	74291050104	Switchgear and pumps	Replace sewer pump station switchgear	Refurbishment	Sewer	Bulk	Pump Stations		**R350**	R350							**R350**	O&M Plan
5. Institutional								**R0**	**R0**								**R0**	
									R0								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness and WASH Programs																		
		Total						**R0**	**R29 116**								**R29 116**	

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Table E.2c: Water Services MTEF Projects - FY2027/28 (3rd year MTEF period)

Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2026/27	FY2027/28							Total Cost	
									Budget	Own	MIG	WSIG	External Loans	WSIG			
1. Infrastructure Projects								**R0**	**R23 588**							**R23 588**	
	74512040206	New Reservoir and pumpstation	Construction of new reservoir and pump station	Ensure adequate storage and pump capacity	Water				**R8 000**				R8 000			**R8 000**	WSDP and Water Master Plan
	74511040404	Porterville Replacement Water Pipeline-multi year	Implementation of pipeline replacement programme	Higher level of water services and reduce NRW and Water Losses	Water	Internal	Reticulation		**R1 531**		R1 531					**R1 531**	Water Master Plan
	74292050401	Upgrade Aurora WTW	Upgrade capacity of WTW	Ensure adequate treatment capacity	Water	Bulk	WTW		**R13 877**		R13 877					**R13 877**	WSDP
	74291050107	Fencing Sewer Pump Stations	Install fencing for sewer pump stations	Prevent theft and vandalism	Sewer	Bulk	Pump Stations		**R180**	R180						**R180**	WSDP
2. Source Development Projects								**R0**	**R0**							**R0**	
3. Demand Management projects								**R0**	**R900**							**R900**	
3.1	74511040102	Water conservation demand management intervention	Implementation of WC/WDM measures	Reducing NRW and Water Losses	Water	Internal	Reticulation		**R250**	R250						**R250**	WC/WDM Strategy and WSDP
3.2	74511040120	Prepaid/ Smart Metering (CR)	Installation of prepaid / smart water	Ensure all connections are metered	Water	Internal	Reticulation		**R650**	R650						**R650**	WC/WDM Strategy and WSDP
4. O&M Commitments								**R0**	**R11 580**							**R11 580**	
Operations																	
	74511040108	Pumps (standby)	Installation of additional water pumps	Ensure adequate supply	Water	Bulk	Pump stations		**R250**	R250						**R250**	O&M Plan
	74512040101	Purchase new borehole pumps	Installation of borehole pumps	Ensure adequate groundwater	Water	Bulk	Sources		**R60**	R60						**R60**	WSDP
	74512040103	Telemetery: Water	Upgrade telemetry systems	Operations	Water	Other	Telemetry		**R160**	R160						**R160**	O&M Plan
	74511040212	Booster Pumps at Velddrif	Upgrade booster pump station	Assurance of supply	Water	Bulk	Pump stations		**R3 000**				R3 000			**R3 000**	Water Master Plan
	74291050103	Telemetry	Upgrade telemetry systems	Operations	Sewer	Other	Telemetry		**R490**	R490						**R490**	O&M Plan
	74292050105	Fencing at WWTW	Improved security measures at WWTW	Prevent theft and vandalism	Sewer	Bulk	WWTW		**R500**	R500						**R500**	O&M Plan and WSDP
Maintenance																	
	74511040105	Replace redundant meters	Replace redundant water meters	Ensure water is metered	Water	Internal	Reticulation		**R220**	R220						**R220**	WC/WDM Strategy and WSDP
	74511040202	Water Renewals (EL)	Replacement of old water infrastructure	Refurbishment	Water	Internal	Reticulation		**R6 000**				R6 000			**R6 000**	O&M Plan
	74291050101	Replace rising mains in pump stations	Installation of new rising mains in pump stations	Refurbishment	Sewer	Bulk	Pump Stations		**R140**	R140						**R140**	O&M Plan
	74291050104	Switchgear and pumps	Replace sewer pump station switchgear	Refurbishment	Sewer	Bulk	Pump Stations		**R760**	R760						**R760**	O&M Plan
5. Institutional								**R0**	**R0**							**R0**	
									R0							**R0**	
6. Water Services Programmes								**R0**	**R0**							**R0**	
Awareness and WASH Programs																	
		Total						**R0**	**R36 068**							**R36 068**	

SECTION F: WSDP PROJECTS

Bergrivier Municipality's approved 2025/2026 Capital Budget list the following major water and sewerage infrastructure projects (Value above R1 million over the three years), which are planned for the short term (Next three years).

- Bulk water pipeline replacements in Velddrif Noordhoek, Redelinghuys and Porterville.
- Upgrading of the booster water pumps in Velddrif.
- Water renewals.
- New reservoir for Eendekuil.
- New reservoir and pump station for Velddrif.
- Prepaid / Smart water metering.
- Upgrade Albatros sewer pump station.
- Upgrade sewer network in Velddrif.
- Switchgear and pumps for sewer pump stations.
- Upgrade sewer telemetry systems.
- New vacuum tanker.
- Improved WWTW fencing.
- Upgrade Velddrif WWTW.

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

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

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

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

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

Recommended infrastructure projects for implementation in the future by Bergrivier Municipality will be based on the following plans and processes:

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

The current project needs are estimated at R348.919 million for the next three years of which 33% are funded, as included in the MTEF project list. It should however be emphasised that additional funding will be required to address the full achievement of the water services strategies as outlined in Section D, but that the extent of such additional funding can only be determined, once initial investigations and activities have been concluded.

WSDP FOR 2022-2027: EXECUTIVE SUMMARY

Table F.1: WSDP FY2025/26: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
CURRENT NEEDS										
Topic 1: Settlements and Demographics										
	Managed by different Department									
Topic 2: Service Levels										
2.1	Some households on the farms without basic water services.	Ensure all households on the farms are provided with at least basic water services	WSDP	No		Provide basic water services to the households on the farms without basic water services	R970	Yes	No	No
2.2	Some households on the farms without basic sanitation services.	Ensure all households on the farms are provided with at least basic sanitation services	WSDP	No		Provide basic sanitation services to the households on the farms without basic sanitation services	R10 240	Yes	No	No
2.3	Water shedding implemented at Goedverwacht, no raw water storage capacity	Ensure basic water services, not more than 7 days per year without water.	WSDP	No		Construction of raw water storage dam for Goedverwacht.	R25 000	Yes	No	No
2.4	Water shedding implemented at Wittewater, capacity of bulk water supply pipeline inadequate.	Ensure basic water services, not more than 7 days per year without water.	WSDP	No		Upgrade bulk water pipeline from WTW to reservoir for Wittewater	R960	Yes	No	No
2.5	Service levels of schools in rural areas not known	Confirm service levels of schools in rural areas.	WSDP	No		Survey to confirm the service levels of the schools on the farms in the rural areas.	R25	Yes	No	No
2.6	Water and Sanitation Service Level Policy is not in place.	Ensure a Water and Sanitation Service Level Policy is in place.	WSDP	No		Draft a Water and Sanitation Service Level Policy.	R150	Yes	No	No
Topic 3: Water Services Asset Management (Infrastructure)										
3.1	Capacity of water reticulation network not adequate.	Implementation of Water Master Plan (Upgrade network capacity)	MTREF Project	Yes		Replace mid-block lines	R500	Partly	Yes	Yes
3.2	Old pipelines with regular pipe bursts need to be replaced.	Implementation of Water Pipeline Replacement Programme	MTREF Project	Yes		Velddrif pipe replacements in Noordhoek (Multi Year)	R10 105	Partly	Yes	Yes
3.3	Old bulk pipelines need to be replaced.	Implementation of Bulk Water Pipeline Replacement Programme	MTREF Project	Yes		Redelinghuys Replacement Bulk Water Pipeline-multi year	R10 426	Yes	Yes	Yes
3.4	Old pipelines with regular pipe bursts need to be replaced.	Implementation of Water Pipeline Replacement Programme	MTREF Project	Yes		Porterville Replacement Water Pipeline-multi year	R11 136	Partly	Yes	Yes
3.5	Reservoir roofs at Eendekuil and Redelinghuys in a very poor condition	Ensure water quality compliance (Storage of water)	MTREF Project	Yes		Replace reservoir roofs (Eendekuil and Redelinghuys)	R400	Yes	Yes	Yes
3.6	Condition of current WTW building is not adequate (Various risks)	Ensure WTW building comply with safety regulations	MTREF Project	Yes		Upgrade WTW Building (Aurora)	R250	Yes	Yes	Yes
3.7	Capacity of existing WTW is inadequate to meet future water treatment requirements.	Ensure adequate future water treatment capacity and water quality compliance.	MTREF Project	Yes		Upgrade Aurora WTW	R14 477	Yes	Yes	Yes
3.8	Existing reservoir storage capacity is not adequate.	Ensure 48hrs AADD storage capacity for all towns.	MTREF Project	Yes		New reservoir at Eendekuil	R8 435	Yes	Yes	Yes
3.9	Existing reservoir storage capacity and pump capacity are not adequate.	Ensure 48hrs AADD storage capacity for all towns and adequate pump capacity (assurance of supply)	MTREF Project	Yes		New Reservoir and pumpstation	R8 000	Yes	Yes	Yes
3.10	Not all sewer pump stations are adequately fenced and secured.	Prevent theft and vandalism	MTREF Project	Yes		Fencing Sewer Pump Stations	R340	Partly	Yes	Yes
3.11	Capacity of existing sewer pump station is inadequate.	Ensure adequate pump capacity	MTREF Project	Yes		Upgrade Albatros Pumpstation	R4 000	Yes	Yes	Yes
3.12	Not all areas fully serviced with waterborne sewer system	Upgrade sewer drainage network capacity.	MTREF Project	Yes		Sewerage network - Velddrif	R5 000	Partly	Yes	Yes
3.13	Existing capacity of the Velddrif WWTW is inadequate.	Ensure adequate wastewater treatment capacity	MTREF Project	Yes		Upgrade Velddrif WWTW (critical) Own funds	R9 000	Partly	Yes	Yes
3.14	Old pipelines with regular blockages need to be replaced.	Implementation of Sewer Pipeline Replacement Programme	WSDP	Partly		Implementation of Sewer Pipeline Replacement Programme	R36 000	Partly	Yes	Yes
3.15	Capacity of existing bulk feeder pipeline is inadequate.	Upgrade bulk feeder pipeline capacity in order to meet future supply requirements.	WSDP	No		Upgrade of bulk feeder pipeline from Vergelee reservoirs	R7 000	Yes	No	No
3.16	Capacity of existing bulk feeder pipeline is inadequate.	Upgrade bulk feeder pipeline capacity in order to meet future supply requirements.	WSDP	No		Upgrade of bulk feeder pipeline from Velddrif reservoirs to Dwarskersbos	R9 000	Yes	No	No
Topic 4: Water Services Operation and Maintenance										
4.1	Some water consumer meters are faulty and the water meters become less accurate over time	Ensure all water usage is accurately metered and billed. Implementation of Meter Replacement Programme.	MTREF Project	Yes		Replace redundant meters	R640	Partly	Yes	Yes
4.2	Not all water pump stations supplied with standby pumps	Ensure adequate pump capacity (Duty/Standby)	MTREF Project	Yes		Pumps (standby)	R700	Partly	Yes	Yes
4.3	Telemetry system needs to be upgraded.	Ensure water services are adequately monitored and managed	MTREF Project	Yes		Telemetry upgrade	R300	Partly	Yes	Yes
4.4	Capacity of existing booster pump station is inadequate.	Implementation of Water Master Plan (Upgrade pump capacity)	MTREF Project	Yes		Booster Pumps at Velddrif	R13 405	Yes	Yes	Yes
4.5	Some old water infrastructure needs to be refurbished / replaced.	Implementation of Maintenance Plan	MTREF Project	Yes		Water Renewals	R13 000	Partly	Yes	Yes
4.6	Existing water tower needs to be refurbished.	Implementation of Maintenance Plan	MTREF Project	Yes		Refurbish Dwarskersbos Water Tower	R700	Yes	Yes	Yes
4.7	Existing water tower needs to be refurbished.	Implementation of Maintenance Plan	MTREF Project	Yes		Refurbish Velddrif Water Tower	R750	Yes	Yes	Yes
4.8	Existing water tower needs to be refurbished.	Implementation of Maintenance Plan	MTREF Project	Yes		Refurbish Laaiplek Water Tower	R800	Yes	Yes	Yes
4.9	Faulty or old borehole pumps need to be replaced.	Ensure adequate supply from groundwater resources	MTREF Project	Yes		Purchase new borehole pumps	R170	Partly	Yes	Yes
4.10	Additional telemetry needs to be installed.	Ensure water services are adequately monitored and managed	MTREF Project	Yes		Telemetry: Water	R470	Partly	Yes	Yes
4.11	Existing security measures at some of the reservoirs and water pump stations are not adequate.	Implement security measures to prevent theft and vandalism	MTREF Project	Yes		Security at Reservoirs / Pump Stations	R250	Partly	Yes	Yes
4.12	Disinfection capacity is not adequate at all the WTWs	Ensure adequate disinfection capacity and water quality compliance.	MTREF Project	Yes		Disinfection at WTW	R1 000	Partly	Yes	Yes
4.13	Rising mains at some of the sewer pump stations are old	Implementation of Maintenance Plan	MTREF Project	Yes		Replace rising mains in pump stations	R390	Partly	Yes	Yes
4.14	Some old sewerage infrastructure needs to be refurbished / replaced.	Implementation of Maintenance Plan	MTREF Project	Yes		Sewer Renewals	R320	Partly	Yes	Yes
4.15	Additional telemetry needs to be installed.	Ensure sanitation services are adequately monitored and managed	MTREF Project	Yes		Telemetry: Sewerage	R1 370	Partly	Yes	Yes
4.16	Switchgear at some of the sewer pump stations are old and needs to be replaced.	Implementation of Maintenance Plan	MTREF Project	Yes		Switchgear and pumps	R1 810	Partly	Yes	Yes
4.17	Not all sewer pump stations supplied with standby pumps	Ensure adequate pump capacity (Duty/Standby)	MTREF Project	Yes		Sewerage stand by pumps	R580	Partly	Yes	Yes
4.18	A large number of erven still serviced with septic tanks, which need to be pumped.	Ensure adequate pump capacity to empty septic tanks	MTREF Project	Yes		New vacuum tanker (jet vac)	R1 500	Yes	Yes	Yes
1.19	Existing security measures at some of the WWTWs are not adequate.	Prevent theft and vandalism of sewerage infrastructure at WWTWs.	MTREF Project	Yes		Security at WWTW	R200	Partly	Yes	Yes
4.20	Existing fencing at the WWTWs are not adequate.	Improved fencing to prevent theft and vandalism at WWTWs.	MTREF Project	Yes		Fencing at WWTW	R1 300	Partly	Yes	Yes
4.21	Water Safety Plan not regularly updated.	Water Quality Risk Management - Regular updating of Water Safety Plan	WSDP	No		Regular updating of the Water Safety Plan	R250	Yes	No	No
4.22	W2RAP not regularly updated.	Wastewater Risk Management - Regular updating of W2RAP	WSDP	No		Regular updating of the W_2RAP	R250	Yes	No	No
4.23	WTW and WWTW Process Audits not regularly done.	Compile regular WTW and WWTW Process Audits	WSDP	No		WTW and WWTW Process Audits	R200	Yes	No	No
4.24	Asset Management Plan is not in place.	Ensure sufficient budget allocation toward refurbishment of existing water and sewerage infrastructure.	WSDP	No		Compile an Asset Management Plan	R750	Yes	No	No
4.25	Groundwater Monitoring currently being implemented on an adhoc basis.	Implement Groundwater Monitoring Programme	WSDP	Yes		Implementation of Groundwater Monitoring Programme	R250	Yes	No	No

WSDP FOR 2022-2027: EXECUTIVE SUMMARY

Table F.1: WSDP FY2025/26: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
CURRENT NEEDS										
Topic 5: Conservation and Demand Management (Topic 5.1 Water Resources)										
5.1	WC/WDM measures need to be implemented to further reduce NRW and Water Losses.	Implementation of WC/WDM Strategy measures	MTREF Project	Yes		Water conservation demand management intervention	R750	Partly	Yes	Yes
5.2	WC/WDM measures need to be implemented to further reduce NRW and	Implementation of WC/WDM Strategy measures	WSDP	No		Implement propopsed WC/WDM Strategy measures as included in WSDP (1-3 yrs)	R11 600	Yes	Partly	Partly
5.3	WC/WDM measures need to be implemented to further reduce NRW and	Implementation of WC/WDM Strategy measures	WSDP	No		Implement propopsed WC/WDM Strategy measures as included in WSDP (4-7 yrs)	R14 150	Yes	Partly	Partly
5.4	WC/WDM measures need to be implemented to further reduce NRW and	Implementation of WC/WDM Strategy measures	WSDP	No		Implement propopsed WC/WDM Strategy measures as included in WSDP (8-10	R9 850	Yes	Partly	Partly
5.5	Old pipelines with regular pipe bursts need to be replaced.	Implementation of Water Pipeline Replacement Programme	WSDP	Partly		Implementation of Water Pipeline Replacement Programme (Potable)	R52 000	Partly	Yes	Yes
Topic 5: Conservation and Demand Management (Topic 5.2 Water Balance)										
5.6	Not all water connections are adequately metered and billed.	Ensure all water usage is metered and billed	MTREF Project	Yes		Prepaid/ Smart Metering	R1 800	Partly	Yes	Yes
Topic 6: Water Resources										
6.1	Existing raw water storage capacity is inadequate.	Ensure adequate raw water storage capacity.	WSDP	No		Deepening of raw water storage dam	R6 000	Yes	No	No
6.2	No existing raw water storage capacity for Piketberg.	Ensure adequate raw water storage capacity.	WSDP	No		Pre-settling raw water dam	R40 000	Yes	No	No
Topic 7: Financial										
Topic 8: Institutional Arrangements and Customer Care										
	Done internally									
TOTAL: CURRENT NEEDS							**R348 919**			
							R114 869			
							33%			

Table F.1: WSDP FY2025/26: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
FUTURE NEEDS										
Infrastructure										
F.1	Inadequate capacity of existing bulk water pipeline and water reticulation network infrastructure.	Ensure adequate bulk water pipeline and water reticulation network capacity.	Water Master Plan	No		Porterville: Upgrade bulk water pipeline and reticulation networks.	R21 228	Yes	No	No
F.2			Water Master Plan	No		Piketberg: Upgrade bulk water pipeline and reticulation networks.	R13 398	Yes	No	No
F.3			Water Master Plan	No		Velddrif: Upgrade bulk water pipeline and reticulation networks.	R15 496	Yes	No	No
F.4			Water Master Plan	No		Dwarskersbos: Upgrade bulk water pipeline and reticulation networks.	R1 659	Yes	No	No
F.5			Water Master Plan	No		Aurora: Upgrade bulk water pipeline and reticulation networks.	R3 316	Yes	No	No
F.6			Water Master Plan	No		Eendekuil: Upgrade bulk water pipeline and reticulation networks.	R5 886	Yes	No	No
F.7			Water Master Plan	No		Redelinghuys: Upgrade bulk water pipeline and reticulation networks.	R3 307	Yes	No	No
F.8			Water Master Plan	No		Goedverwacht: Upgrade bulk water pipeline and reticulation networks.	R992	Yes	No	No
F.9			Water Master Plan	No		Wittewater: Upgrade bulk water pipeline and reticulation networks.	R216	Yes	No	No
F.10	Inadequate capacity of existing reservoir storage capacity.	Ensure adequate bulk water storage capacity.	WSDP	No		Porterville: Install new security fencing around Monte Bertha reservoirs (240m)	R720	Yes	No	No
F.11			Water Master Plan	No		Porterville: New reservoir when AADD exceeds 2 000 kl/d (TWL 235m)	R13 000	Yes	No	No
F.12			WSDP	No		Piketberg: Install new security fencing around two reservoirs (320m)	R960	Yes	No	No
F.13			Water Master Plan	No		Piketberg: New reservoir when AADD exceeds 4 850 kl/d (TWL 315m)	R10 429	Yes	No	No
F.14			Water Master Plan	No		Velddrif: New reservoir when AADD exceeds 5 000 kl/d (TWL 10.05m)	R13 663	Yes	No	No
F.15			WSDP	No		Dwarskersbos: Install new security fencing around two reservoirs (120m)	R360	Yes	No	No
F.16			Water Master Plan	No		Dwarskersbos: New reservoir when AADD exceeds 500 kl/d (TWL 5.27m)	R4 863	Yes	No	No
F.17			Water Master Plan	No		Dwarskersbos: New reservoir when AADD exceeds 1 000 kl/d (TWL 5.27m)	R4 309	Yes	No	No
F.18			WSDP	No		Aurora: Install new security fencing around two reservoirs (125m)	R375	Yes	No	No
F.19			Water Master Plan	No		Aurora: New reservoir when AADD exceeds 275 kl/d (TWL 165.2m)	R2 697	Yes	No	No
F.20			Water Master Plan	No		Redelinghuys: New reservoir when AADD exceeds 220 kl/d (TWL 25.3m)	R2 697	Yes	No	No
F.21			Water Master Plan	No		Goedverwacht: New reservoir when AADD exceeds 310 kl/d (TWL 227.15m)	R2 697	Yes	No	No
F.22			Water Master Plan	No		Goedverwacht: New reservoir when FDA GV2 develops (TWL 265m)	R1 282	Yes	No	No
F.23	Inadequate capacity of existing water pump stations	Ensure adequate water pump station capacity.	WSDP	No		Porterville: Repair vandalised raw water PS and install second pump	R1 500	Yes	No	No
F.24			WSDP	No		Piketberg: Refurbishment of the Buitengracht Booster PS	R1 500	Yes	No	No
F.25			WSDP	No		Piketberg: Install new security fencing around PBT and Voëlvlei PS	R450	Yes	No	No
F.26			Water Master Plan	No		Piketberg: Upgrade existing PS when PS reaches capacity (WTW).	R4 000	Yes	No	No
F.27			Water Master Plan	No		Piketberg: Upgrade existing PS when PS reaches capacity (De Hoek).	R4 000	Yes	No	No
F.28			Water Master Plan	Yes		Velddrif: New booster PS when AADD exceeds 4 000 kl/d.	R13 405	Yes	Yes	Yes
F.29			Water Master Plan	No		Dwarskersbos: Required when AADD exceeds 500 kl/d	R4 764	Yes	No	No
F.30			WSDP	No		Redelinghuys: Refurbishment of the Booster PS	R2 000	Yes	No	No
F.31			WSDP	No		Redelinghuys: Install new security fencing around WTW and raw water PS building and provide back-up Generator	R1 500	Yes	No	No
F.32			WSDP	No		Aurora: Install standby raw water pump and final water pump	R1 250	Yes	No	No
F.33			Water Master Plan	No		Eendekuil: New PS required when areas EK4 and EK5 develops	R2 103	Yes	No	No
F.34			Water Master Plan	No		Eendekuil: New PS required when area EK7 develops	R1 885	Yes	No	No
F.35			Water Master Plan	No		Goedverwacht: New PS required when area GV2 develops	R2 000	Yes	No	No

WSDP FOR 2022-2027: EXECUTIVE SUMMARY

Table F.1: WSDP FY2025/26: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
FUTURE NEEDS										
F.36	Inadequate capacity of existing WTWs	Ensure adequate water treatment capacity	WSDP	No		Upgrade Porterville WTW	R15 000	Yes	No	No
F.37			WSDP	Yes		Upgrade Eendekuil WTW from 0.2 Ml/d to 0.3 Ml/d	R15 400	Yes	Yes	Yes
F.38			WSDP	No		Upgrade Redelinghuys WTW	R10 000	Yes	No	No
F.39			WSDP	Yes		Upgrade Aurora WTW from 0.2 Ml/d to 0.3 Ml/d	R41 278	Yes	Yes	Yes
F.40			WSDP	No		Upgrade and refurbish Rooigat treatment facility	R8 000	Yes	No	No
F.41	Inadequate capacity of existing bulk sewer pipeline and sewer drainage network infrastructure.	Ensure adequate bulk sewer pipeline and sewer drainage network capacity.	Sewer Master Plan	No		Porterville: Upgrade bulk sewer pipeline and sewer drainage networks.	R5 510	Yes	No	No
F.42			Sewer Master Plan	No		Piketberg: Upgrade bulk sewer pipeline and sewer drainage networks.	R3 716	Yes	No	No
F.43			Sewer Master Plan	No		Velddrif: Upgrade bulk sewer pipeline and sewer drainage networks.	R85 927	Yes	No	No
F.44			Sewer Master Plan	No		Dwarskersbos: Upgrade bulk sewer pipeline and sewer drainage networks.	R10 637	Yes	No	No
F.45			Sewer Master Plan	No		Aurora: Install new waterborne sewer drainage network.	R20 280	Yes	No	No
F.46			Sewer Master Plan	No		Eendekuil: Upgrade bulk sewer pipeline and sewer drainage networks.	R10 282	Yes	No	No
F.47			Sewer Master Plan	No		Redelinghuys: Install new waterborne sewer drainage network.	R20 299	Yes	No	No
F.48			Sewer Master Plan	No		Goedverwacht: Install new waterborne sewer drainage network.	R33 911	Yes	No	No
F.49			Sewer Master Plan	No		Wittewater: Install new waterborne sewer drainage network.	R12 066	Yes	No	No
F.50	Inadequate capacity of existing sewer pump stations.	Ensure adequate sewer pump station capacity.	Sewer Master Plan	No		Porterville: New sewer PS (BPoS1.2)	R2 000	Yes	No	No
F.51			Sewer Master Plan	No		Velddrif: Construction of a number of new sewer pump stations.	R18 000	Yes	No	No
F.52			Sewer Master Plan	No		Redelinghuys: New PS required to service existing erven (BRS1.2)	R2 000	Yes	No	No
F.53			Sewer Master Plan	No		Eendekuil: Upgrade Eendekuil PS	R9 000	Yes	No	No
F.54	Inadequate capacity of existing WWTWs.	Ensure adequate wastewater treatment capacity.	WSDP	No		Porterville: Improve security measures at plant, replace faulty equipment, calibration of flow meters and desludge sludge dams.	R3 500	Yes	No	No
F.55			WSDP	No		Piketberg: Refurbishment of the WWTW	R25 000	Yes	No	No
F.56			WSDP	Yes		Velddrif: Upgrade capacity of WWTW	R173 658	Yes	Yes	Yes
F.57			WSDP	No		Dwarskersbos: Upgrade oxidation pond system.	R40 000	Yes	No	No
F.58			WSDP	No		Eendekuil: Upgrade of oxidation pond system.	R12 000	Yes	No	No
F.59			WSDP	No		Redelinghuys: Construction of new WWTW	R117 000	Yes	No	No
F.60			WSDP	No		Aurora: Construction of new WWTW	R93 000	Yes	No	No
F.61			WSDP	No		Wittewater: Construction of new WWTW	R10 000	Yes	No	No
F.62			WSDP	No		Goedverwacht: Construction of new WWTW	R15 000	Yes	No	No
Resources										
TOTAL: FUTURE NEEDS							**R976 371**			