CEDERBERG MUNICIPALITY

WSDP-IDP Water Sector Input Report (WSDP Executive Summary)

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

2022-2027

Draft

23 August 2023

CEDERBERGMUNICIPALITY

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PROJECT P07749 - CEDERBERG MUNICIPALITY'S WSDP EXECUTIVE SUMMARY 2022-2027

REV	DESCRIPTION	ORIG	REVIEW	IX ENGINEERS	DATE	CLIENT APPROVAL	DATE
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WSDP EXECUTIVE SUMMARY

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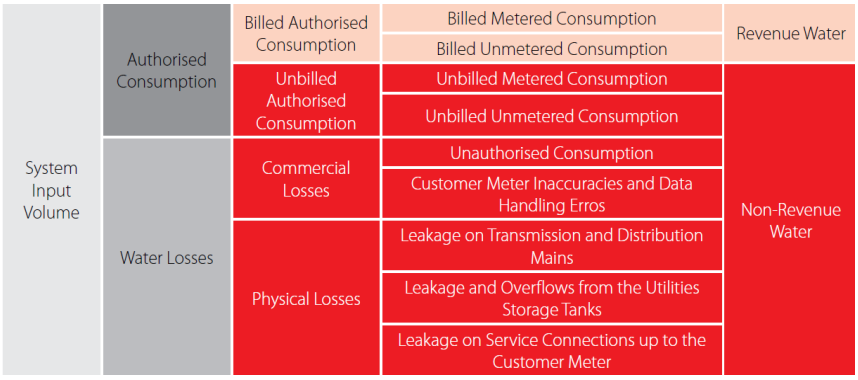
AADD	Average Annual Daily Demand
AIDS	Acquired Immune Deficiency Syndrome
AMP	Asset Management Plan
AMR	Automatic Meter Reading
BDRR	Blue Drop Risk Rating
CMA	Catchment Management Area
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
CV	Carrying Value
DLG	Department of Local Government
DMA	District Management Area
DoRA	Division of Revenue Act
DRA	Disaster Risk Assessment
DRC	Depreciated Replacement Cost
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
ECD	Early Childhood Development
EHP	Environmental Health Practitioner
EIA	Environmental Impact Assessment
GAMAP	General Accepted Municipal Accounting Practice
GIS	Geographical Information Systems
HIV	Human Immunodeficiency Virus
HL	High Level
IBT	Inclining Block Tariff
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
IMQS	Information Management Quality System
IRIS	Integrated Regulatory Information System
IWA	International Water Association
JOC	Joint Operation Centre
Kl	Kilolitre
Kl/d	Kilolitre per Day
KPI	Key Performance Indicator
l/c/d	Litre per Capita per Day
LED	Local Economic Development
LL	Low Level
LM	Local Municipality
l/p/d	Litre per Person per Day
l/s	Litre per Second
LGTAS	Local Government Turn Around Strategy
LWU	Legal Water Use
MAYCO	Mayoral Committee
m^3/a	Cubic Metres per Annum
Mm^3/a	Million Cubic Metres per Annum
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agent
Ml	Mega Litre

Ml/a	Mega Litre per Annum
Ml/d	Mega Litre per Day
MTEF	Medium-Term Expenditure Framework
MTREF	Medium-Term Revenue and Expenditure Framework
MuSSA	Municipal Strategic Self-Assessment
NERSA	National Energy Regulator of South Africa
NGO	Non-Governmental Organisation
NRW	Non-Revenue Water
NWA	National Water Act
NWRS	National Water Resource Strategy
OC	Opening Cost
O&M	Operation and Maintenance
PAT	Progress Assessment Tool
PC	Process Controller
PDD	Peak Daily Demand
PDO	Pre-determined Objective
PMU	Project Management Unit
PRP	Pipe Replacement Programme
PRV	Pressure Reducing Valve
PS	Pump Station
RDP	Reconstruction and Development Programme
RUL	Remaining Useful Life
SALGA	South African Local Government Association
SANS	South African National Standard
SCADA	Supervisory Control and Data Acquisition
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SST	Secondary Settling Tank
UDS	Urine Diversion System
VAT	Value Added Tax
VIP	Ventilated Improved Pit
WARMS	Water use Authorisation and Registration Management System
WCDMC	West Coast Disaster Management Centre
WC/WDM	Water Conservation Water Demand Management
WDM	Water Demand Management
WMA	Water Management Area
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSIG	Water Services Infrastructure Grant
WSP	Water Services Provider
WSS	Water Supply System
WTW	Water Treatment Works
WUL	Water User Licence
WULA	Water User Licence Application
W_2RAP	Waste Water Risk Abatement Plan
WWTP	Waste Water Treatment Plant
WWTW	Waste Water Treatment Works
Y	Yield

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

KEY TERMS AND INTERPRETATIONS

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

KEY TERMS AND INTERPRETATIONS

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

WSDP-IDP WATER SECTOR INPUT REPORT (WSDP EXECUTIVE SUMMARY)

Introduction

Every WSA has a duty to progressively ensure efficient, affordable, economical and sustainable access to water services to all customers or potential customers in its area of jurisdiction, in order to 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 Cederberg Municipality's WSDP are as follows:

- Settlements and Demographics
- Service Levels
- Water Services Infrastructure Management (Infrastructure)
- Water Services Infrastructure Management (O&M)
- Conservation and Demand Management
- Water Resources
- Financial
- Institutional Arrangements and Customer Care

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

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

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

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

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

SECTION A: STATUS QUO OVERVIEW

The Municipality is situated within the Berg-Olifants Catchment Management Area. Cederberg Municipality falls within the West Coast District of the Western Cape Province, in which the following Municipalities are also located:

- Matzikama Municipality;
- Bergrivier Municipality;
- Saldanha Bay Municipality;
- Swartland Municipality; and
- West Coast District Municipality.

The Municipality comprises of five (5) urban settlements and five (5) small rural settlements, approximately 60 kilometres of coastline and a vast rural area. Clanwilliam is the main town, which is the administrative head office and is located more or less in the middle of the municipal area. The other settlements are Citrusdal, Graafwater, Elands Bay, Lamberts Bay and the rural settlements of Leipoldtville, Paleisheuwel, Algeria, Wupperthal (Moravian Church) and Elandskloof (Moravian Church).

Cederberg Municipality consists of six (6) individual wards and is the only WSA within the Cederberg Municipality's Management Area. The Municipality is also the Water Services Provider (WSP). Cederberg Municipality's responsibility as WSA also extends to the rural areas within its boundary, which prior to July 2003 had fallen under the jurisdiction of the West Coast District Municipality. Cederberg Municipality's Management Area includes the following towns and ***Water Distribution Systems***:

- Citrusdal – ***Citrusdal Water Distribution System***

  Bulk water supply to Citrusdal is from both surface and groundwater sources. Citrusdal obtains water directly from the Olifants River and also abstracts water from three boreholes. The licensed abstraction from the Olifants River is 0.748 million m³/a, but most of the supply for the 2021/2022 financial year was from the three existing boreholes about 5 km away from the town. The flow in the Olifants River was too low for supply to the town during the last financial year. The total licensed abstraction from the boreholes is 0.8 million m³/a.

- Clanwilliam – ***Clanwilliam Water Distribution System***

  The town is supplied with water from the Clanwilliam Dam, which is located on the Olifants River adjacent to the town and direct abstraction from the Jan Dissels River, which runs along the north-eastern edge of Clanwilliam. The DWS is currently busy with the raising of the dam wall by 13 m, in order to increase the storage capacity and the safe yield of the dam.

  The authorised volume that can be abstracted from the Jan Dissels River is 0.600 million m^3/a of which 0.579 million m^3/a was supplied during 2021/2022 from this source. No abstraction is allowed from the Jan Dissels River over the period December to March. It is recommended that water not be abstracted from the Jan Dissels River during the dry summer months and, therefore, the Clanwilliam Dam should be regarded as the town's primary source. The supply from the Clanwilliam Dam for the 2021/2022 financial year was 0.169 million m^3/a.

- Elands Bay – ***Elands Bay Water Distribution System***

  The town is supplied with bulk water from three production boreholes on the Waaihoek farm (Boreholes OD00525, OD00526 and OD00528). The Graauwe Duvnen wellfield (Boreholes R1, R2 and R3) was previously also used, but there was no supply from these boreholes for the last two financial years, due to declining water levels (R1 and R2) and the water quality of borehole R3 which is easily affected by abstraction. The estimated safe yield from the six production boreholes is 0.650 million m^3/a.

- Graafwater – ***Graafwater Water Distribution System***

  The town is entirely dependent on groundwater for its water supply. There are currently three production boreholes in operation located approximately 11 km north-west of the town. The supply from the boreholes is stable at present, but it is important that the resource be properly managed, because the quality of the groundwater is deteriorating due to an increase in the iron content of the water and rehabilitation treatment should be done from time to time. The iron content of the third new borehole (OD00529) is high. Groundwater level data and less frequently groundwater quality data are collected. This data should at least be annually analysed and the operations should be adapted accordingly.

  The WARMS registered abstraction from the boreholes is 0.109 million m^3/a, but 0.288 million m^3/a was supplied from the boreholes during the 2021/2022 financial year. The estimated sustainable yield of the boreholes is 0.631 million m^3/a.

- Lamberts Bay – ***Lamberts Bay Water Distribution System***

  The town obtains bulk water directly from groundwater sources. There are three production boreholes currently in use to supply bulk water to Lamberts Bay. However, the safe yield from the three boreholes is 0.568 million m^3/a, but the 2021/2022 water abstraction was 0.727 million m^3/a, which is more than the safe yield volume. Lamberts Bay current groundwater supply to the town is not secure and the Municipality needs to engage with private landowners in Lamberts Bay / Upper Wadrif for future groundwater exploration.

  A 1.7 Ml/d desalination plant was constructed, but still needs to be put into operation to augment Lamberts Bay existing groundwater resources.

- Leipoldtville – ***Leipoldtville Water Distribution System***

  The settlement is supplied entirely by one borehole which is located 640 m from the town centre. The borehole was drilled in 2003 and is currently owned and operated by the Cederberg Local Municipality. The abstraction from the borehole is unknown, but the town of Leipoldtville may sustainably abstract 0.158 million m^3/a from the aquifer system.

- *Wupperthal* - ***Wupperthal Water Distribution System***

  The settlement of Wupperthal obtains bulk water directly from a mountain stream. The abstraction and yield of the source is unknown. It is assumed that the current yield is equal to the assumed water requirement. It is important that the yield and actual abstraction from the source be determined in order to make a more realistic prediction of the current and future water resource situation for Wupperthal. All abstraction needs to be metered.

- Elandskloof - ***Elandskloof Water Distribution System***

  The settlement obtains bulk water directly from the Elandskloof stream. Water is diverted from a small weir in the stream to a concrete storage dam, which is owned and operated by the Cederberg Municipality. The yield from the stream, the existing reservoir storage capacity and the current water requirement is unknown. It is important that all of the above be determined in order to manage the existing service, to be prepared for droughts and growth and to programme for future water requirements.

- Paleisheuwel – ***Paleisheuwel Water Distribution System***

  The water supply to the houses in Paleisheuwel is from one production borehole belonging to Mr Johan Visser (Sommergroen).

- Algeria – ***Algeria Water Distribution System***

  Algeria is supplied with surface water from mountain streams and with groundwater from a single borehole. The sustainable yield from the stream is not known.

- The rural farm areas.

Physical Perspective:

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

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

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

- All resources, especially surface water resources, need to be re-evaluated, especially where demand is close to the safe one in twenty-year yields. It is therefore important to establish assurance of supply levels of all water sources;

- increase assurance of supply of the water resources by ensuring that there is at least 10% additional capacity (headroom), when considering the maximum 24-hour demand on the peak month of the year;

- do not undertake new developments unless a proper investigation of the implication on water sources and sustainability in the long term has been undertaken;

- vigorously implement WDM measures, especially in terms of the following:
  - increased water efficiency;
  - frequent monitoring of the water supply system, from the sources to the consumers; and
  - regular and adequate system maintenance and repairs.

- Diversify water resources, e.g. surface water, groundwater, wastewater re-use and sea water desalination.

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

Natural Environment:

Important conservation areas in the Olifants / Doorn WMA include the Tankwa-Karoo National Park, the Verlorevlei wetland in the Sandveld (which enjoys Ramsar status), the Cederberg Wilderness Area and the northern section of the Groot Winterhoek Wilderness Area.

The Olifants River and its tributary are important from a conservation perspective because they contain a number of species of indigenous and endemic fish that occur in no other river systems and that are endangered. In addition, reaches of some of the tributaries are virtually unspoiled by human manipulation and are of high to very high ecological importance. The main rivers and their tributaries are also rich in sites of archaeological / cultural interest. The nature of these sites is diverse, but consists mainly of Late Stone Age artefacts, including rock paintings, cave deposits and open scatters of debris related to occupation. Earlier material, in the form of Middle and Early Stone Age artefact scatters, is also present but less numerous.

The Olifants estuary is one of only three permanently open estuaries on the west coast of South Africa. It therefore represents a critical habitat to many estuarine-associated fish species. The estuary also supports at least 86 species of estuarine water birds and has a wide range of habitats. It plays and important role in bird migration and is considered to be in the top ten South African locations of importance for conservation of water birds.

The coastal wetlands of Verlorevlei, Die Vlei (Wamakervlei), Wadriftsoutpan and Lambert's Bay in the Sandveld are vulnerable due to the pressure placed on the groundwater resource by over-utilisation and pollution. The wetland area at Verlorevlei has been designated Ramsar status as a wetland of international importance. Several rare species are found at the site including the white pelican and eight other threatened bird species.

TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

The tables below gives an overview of the settlements, population and households in Cederberg Municipality's Management Area for 2021/2022. 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 (Permanent)	60 201	80%
1.2 Total Number of Households (Permanent)	19 208	80%
1.3 Average Household Size	3.13	80%
1.4 Total Number of Settlements (GeoDatabase)	26	80%

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

Table A.1.2 Summary by settlement group (Urban / Rural Split)

Settlement Type	Settlements	Population	Households	Assessment Score
Rural	8	28 569	7 520	80%
Urban	18	31 632	11 688	80%
Total	**26**	**60 201**	**19 208**	**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**	**Average Household Size**	**Assessment Score**
Rural	Farming	1	26 332	6 832	3.85	80%
Rural	Small Village <= 5000	7	2 237	688	3.25	80%
Rural	Rural Scattered Very Low Density	0	-	-	-	80%
Rural	Rural - Informal Settlements (Squatter Camp)	0	-	-	-	80%
Rural	Working Towns and Service Centres - Mines, Prisons etc.	0	-	-	-	80%
Urban	Urban - Formal Town	14	18 754	6 936	2.70	80%
Urban	Urban - Informal Settlements (Squatter Camp)	4	12 878	4 752	2.71	80%
Urban	Working Towns and Service Centres - Mines, Prisons etc.	0	-	-	-	80%
Total		**26**	**60 201**	**19 208**	**3.13**	**80%**

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

Table.A.1.4 Amenities summary (Health & Educational facilities)		
Amenity Type	**Number of Amenities**	**Assessment Score**
Health Facilities	9	80%
Educational facilities	37	60%

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

The 2001 Census recorded the population in the Cederberg Municipality's Management Area at 39 355 persons (11 193 Households) and the 2011 Census data recorded the population at 49 757 persons (13 510 Households), which is indicative of extensive migration into the Municipal Area. **The population of Cederberg Municipality is currently estimated at approximately 60 201 persons (19 208 Households) for 2021/2022.** The Socio-economic Profile of 2021 for Cederberg Municipality estimated the 2021 population at 59 737 persons and the 2020 households at 16 721.

The 2021/2022 population was estimated by applying an annual growth rate of 1.91% to the 2011 Census population figure. The current population figures and the annual population growth percentages used in the WSDP are aligned with the figures used in DWS's GeoDatabase. The future estimated annual population growth percentages, as listed in the table below, were agreed with the Municipality's Civil Engineering Services Department during January 2014.

Table A.1.5: Estimated future annual population growth percentages, population and households per distribution system			
Town	**Estimated future annual population growth %**	**Projected 2021/2022 population**	**Projected 2021/2022 households**
Citrusdal	3.0%	8 438	3 184
Clanwilliam	3.5%	10 849	5 070
Elands Bay	1.0%	1 650	483
Graafwater	2.5%	2 885	771
Lamberts Bay	2.5%	7 810	2 180
Leipoldtville	1.0%	257	64
Wupperthal	0.6%	1 350	459
Paleisheuwel	0.6%	32	6
Elandskloof	0.6%	306	97
Algeria	0.6%	292	62
Farms	1.0%	26 332	6 832
Total	**1.91%**	**60 201**	**19 208**

The table below gives an overview of the projected population and permanent number of households and the water service level categories in Cederberg Municipality's Management Area.

Table A.1.6: Water Services Overview (Water)															
	2011/2012		2021/2022		Water category										
Settlement Type	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
URBAN															
Metropolitan Area					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**											
Formal Town					Adequate			Below RDP					None	
Citrusdal	1 538	6 135	1 417	3 137	P		P								
Clanwilliam	1 806	5 459	2 314	3 959	P		P								
Elands Bay	437	1 494	425	1 476	P		P								
Graafwater	602	2 254	771	2 885	P		P								
Lamberts Bay	1 641	5 853	2 009	7 297	P		P								
Leipoldtville	58	233	64	257	P										
Wupperthal	432	1 272	459	1 350	P										
Paleisheuwel	6	30	6	32	P										
Elandskloof	91	288	97	306	P										
Algeria	58	275	62	292	P										
Sub-Total	**6 669**	**23 293**	**7 623**	**20 991**											
Townships					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**											
Informal Settlements					Adequate			Below RDP					None	
Citrusdal	36	144	1 767	5 301		P									
Clanwilliam	558	2 232	2 756	6 890		P									
Elands Bay	0	0	58	174		P									
Lamberts Bay	62	248	171	513		P									
Sub-Total	**656**	**2 624**	**4 752**	**12 878**											
Working towns & service centres					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**											
Sub-Total: (Urban)	**7 325**	**25 917**	**12 375**	**33 869**											
RURAL															
Rural / Farming					Adequate			Below RDP					None	
Farms	6 185	23 838	6 832	26 332	P		P			P				P	
Sub-Total	**6 185**	**23 838**	**6 832**	**26 332**											
Informal Settlements					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**											
Sub-Total (Rural)	**6 185**	**23 838**	**6 832**	**26 332**											
TOTAL	**13 510**	**49 755**	**19 208**	**60 201**											

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.

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.		

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

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

All the formal households in the urban areas of Cederberg Municipality's Management Area are provided with water and sewer connections inside the premises. Informal areas are supplied with shared services as an intermediary measure. Cederberg Municipality works towards a ratio of at least 1 tap per twenty-five households and 1 communal toilet per five households for their shared services. Cederberg Municipality is committed to ensure that private landowners provide at least basic water and sanitation services to those households in the rural areas with existing services below RDP standard.

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

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

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

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

Census Category	Description	Year 0 FY2021/22		Year 0 FY2020/21		Year - 1 FY2019/20	
		Nr	%	Nr	%	Nr	%
	WATER (ABOVE MIN LEVEL)						
Piped (tap) water inside dwelling/institution	House connections	14 160	66%	13 326	65%	12 953	65%
Piped (tap) water inside yard	Yard connections	2 249	11%	2 249	11%	2 249	11%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	4 867	23%	4 666	23%	4 464	23%
	Sub-Total: Minimum Serivce Level and Above	**21 276**	**99%**	**20 241**	**99%**	**19 666**	**99%**
	WATER (BELOW MIN LEVEL)						
Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Standpipe connection: > 200 m < 500 m	30	0%	30	0%	30	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	Standpipe connection: > 500 m < 1 000 m	9	0%	9	0%	9	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	7	0%	7	0%	7	0%
No access to piped (tap) water	No services	83	0%	83	0%	98	0%
	Sub-Total: Below Minimum Service Level	**129**	**1%**	**129**	**1%**	**144**	**1%**
	Total number of households	**21 405**	**100%**	**20 370**	**100%**	**19 810**	**100%**

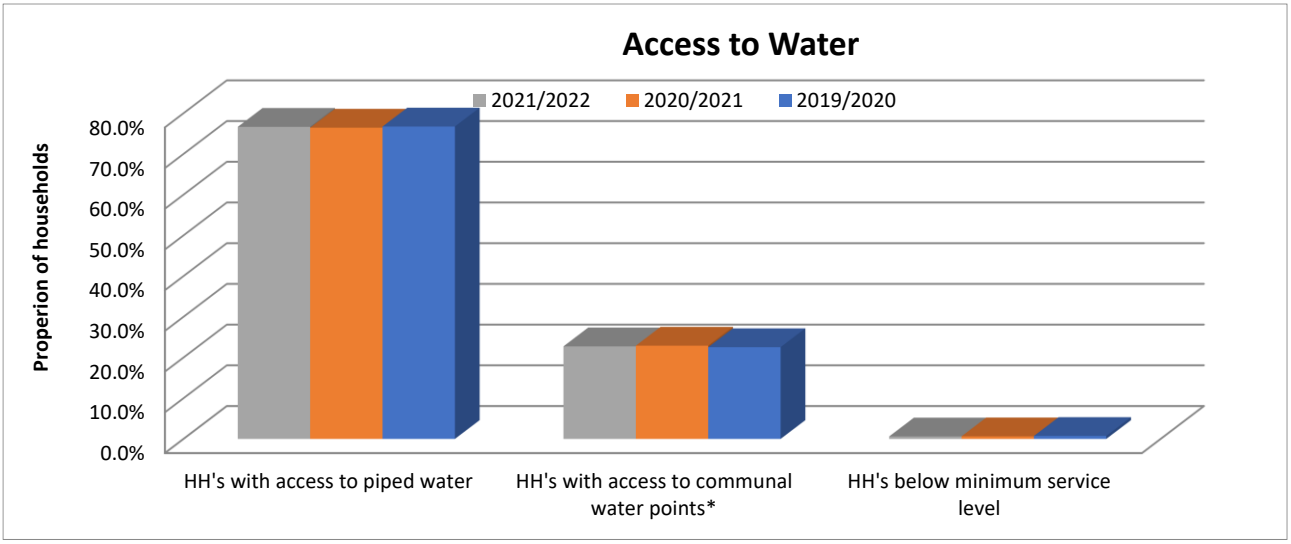


Figure A.2.1: Access to Water Services.

The existing residential water service levels in Cederberg Municipality's Management Area are estimated as follows (June 2022).

Table A.2.4: Residential water service levels (Residential Consumer Units)

Service Level	Citrusdal	Clanwilliam	Elands Bay	Graafwater	Lamberts Bay	Leipoldtville	Wupperthal	Paleisheuwel	Elandskloof	Algeria	Farms	Total
No Water Services	0	0	0	0	0	0	0	0	0	0	83 [2)]	83
Below RDP: Infrastructure Upgrade	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	0	0	46 [3)]	46
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0	0
Total Basic Need (RDP)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**129**	**129**
Below Housing Interim [4)]	0	0	0	0	0	0	0	0	0	0	0	0
Adequate Housing Permanent [5)]	1 767	2 756	58	0	171	0	0	0	0	0	0	4 752
Total Housing Need	**1 767**	**2 756**	**58**	**0**	**171**	**0**	**0**	**0**	**0**	**0**	**0**	**4 752**
Standpipes	0	0	0	0	0	0	0	0	0	0	115	115
Yard Connections [6)]	51	250	83	150	248	0	0	0	0	0	1 467	2 249
House Connections [1)]	1 578	2 547	687	1 230	2 309	64	459	6	97	62	5 121	14 160
Total Adequate	**1 629**	**2 797**	**770**	**1 380**	**2 557**	**64**	**459**	**6**	**97**	**62**	**6 703**	**16 524**
Total per Area	**3 396**	**5 553**	**828**	**1 380**	**2 728**	**64**	**459**	**6**	**97**	**62**	**6 832**	**21 405**

Notes: 1) Number of residential consumer units for Citrusdal, Clanwilliam, Elands Bay, Graafwater and Lamberts Bay for 2021/2022, as calculated from the financial data.

2) Census 2011: Number of households with no access to piped (tap) water in rural areas 83.

3) Census 2011: Number of households with communal services in rural areas (200m – 500m) 30, (500m – 1000m) 9 and (>1000m) 7.

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

5) Adequate Housing Permanent in the above table is the number of informal households in informal areas with communal water services as confirmed by the Municipality (January 2022).

6) Number of backyard dwellings as confirmed by the Municipality (September 2018).

Table A.2.5: Improvement in eradicating the water backlog					
Settlement	Urban / Rural	2021/22		2020/21 (-Y1)	
		Water backlog HH	Water Backlog Population	Water backlog HH	Water Backlog Population
Citrusdal	Urban	0	0	0	0
Clanwilliam	Urban	0	0	0	0
Elands Bay	Urban	0	0	0	0
Graafwater	Urban	0	0	0	0
Lamberts Bay	Urban	0	0	0	0
Leipoldtville	Rural	0	0	0	0
Wupperthal	Rural	0	0	0	0
Paleisheuwel	Rural	0	0	0	0
Elandskloof	Rural	0	0	0	0
Algeria	Rural	0	0	0	0
Farms	Rural	129	497	129	497
		129		**129**	

Table A.2.6: Water supply level profile (Households)		
Water Profile	Totals	Assessment Score
Total households with a water need (Irrelevant the type of need)	**129**	**80%**
Total households below RDP	**129**	**60%**
Piped water inside the dwelling/house	14 160	80%
Piped water inside yard	2 249	60%
Piped water distance <200m	4 867	60%
Piped water distance >200m	46	60%
Water other (Include no water)	83	60%

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

Table A.2.7: Water reliability profile (Households)		
Section: Water Reliability Profile	Totals	Assessment Score
Total Number of Households having Reliable Service	**21 276**	**60%**
Total Number of Households NOT having Reliable Service	**129**	**60%**

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

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

Table A.2.8: Residential Water Services Delivery Access Profile: Sanitation							
Census Category	**Description**	**Year 0 FY2021/22**		**Year 0 FY2020/21**		**Year - 1 FY2019/20**	
		Nr	**%**	**Nr**	**%**	**Nr**	**%**
	SANITATION (ABOVE MIN LEVEL)						
Flush toilet (connected to sewerage system)	Waterborne	8 687	41%	7 924	39%	7 634	39%
	Waterborne: Low Flush	233	1%	233	1%	233	1%
Flush toilet (with septic tank)	Septic tanks / Conservancy	5 829	27%	5 760	28%	5 693	29%
Chemical toilet	Non-waterborne (above min. service level)	18	0%	18	0%	18	0%
Pit toilet with ventilation (VIP)		89	0%	88	0%	88	0%
Other / Communal Services		4 752	22%	4 551	22%	4 349	22%
	Sub-Total: Minimum Serivce Level and Above	**19 608**	**92%**	**18 574**	**91%**	**18 015**	**91%**
	SANITATION (BELOW MIN LEVEL)						
Pit toilet without ventilation	Pit toilet	67	0%	67	0%	67	0%
Bucket toilet	Bucket toilet	84	0%	84	0%	84	0%
Other toilet provision (below min. service level	Other	892	4%	892	4%	892	5%
No toilet provisions	No services	754	4%	753	4%	752	4%
	Sub-Total: Below Minimum Service Level	**1 797**	**8%**	**1 796**	**9%**	**1 795**	**9%**
	Total number of households	**21 405**	**100%**	**20 370**	**100%**	**19 810**	**100%**

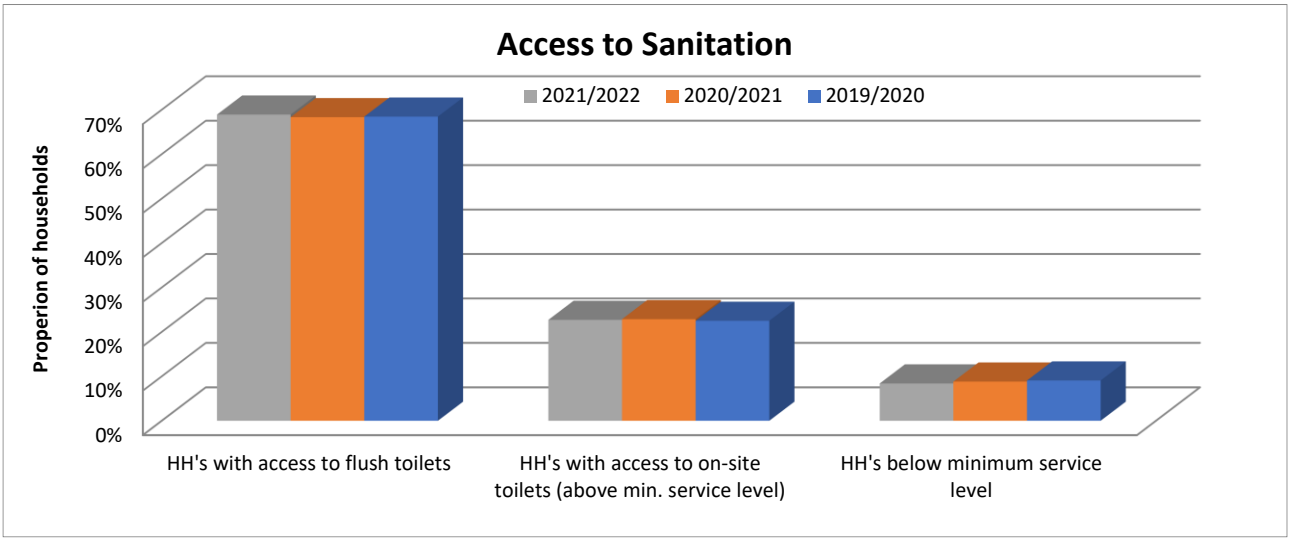


Figure A.2.2: Access to Sanitation Services.

The existing residential sanitation service levels in Cederberg Municipality's Management Area are estimated as follows (June 2022).

Table A.2.9: Residential sanitation service levels (Residential Consumer Units)

Service Levels	Citrusdal	Clanwilliam	Elands Bay	Graafwater	Lamberts Bay	Leipoldtville	Wupperthal	Paleisheuwel	Elandskloof	Algeria	Farms	Total
No Sanitation Services [3]	0	0	0	0	0	11	0	0	83	0	660	754
Below RDP: Infrastructure Upgrade [4]	0	0	0	0	0	27	0	0	0	0	1 034	1 061
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0	0
Total Basic Need (RDP)	**0**	**0**	**0**	**0**	**0**	**38**	**0**	**0**	**83**	**0**	**1 694**	**1 815**
Below Housing Interim [5]	0	0	0	0	0	0	0	0	0	0	0	0
Adequate Housing Permanent [6]	1 767	2 756	58	0	171	0	0	0	0	0	0	4 752
Total Housing Need	**1 767**	**2 756**	**58**	**0**	**171**	**0**	**0**	**0**	**0**	**0**	**0**	**4 752**
Non Waterborne (VIP / UDS)	0	0	0	0	0	0	0	0	14	0	75	89
Waterborne Low Flush [1]	0	0	0	0	0	0	233	0	0	0	0	233
Septic Tanks / Conservancy [1]	30	27	76	217	384	26	0	6	0	0	5 063	5 829
Waterborne WWTW [2]	1 599	2 770	694	1 163	2 173	0	226	0	0	62	0	8 687
Total Adequate	**1 629**	**2 797**	**770**	**1 380**	**2 557**	**26**	**459**	**6**	**14**	**62**	**5 138**	**14 838**
Total per Area	**3 396**	**5 553**	**828**	**1 380**	**2 728**	**64**	**459**	**6**	**97**	**62**	**6 832**	**21 405**

Notes: 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) Include all formal erven connected to the waterborne sewer system and backyard dwellers on formal erven. The number of backyard dwellers were confirmed by the Municipality (September 2018).

3) Census 2011: Number of households with no toilet facility 660 + 11.

4) Census 2011: Number of households with existing buckets 68 + 16, chemical toilets 18, pit toilets without ventilation 59 + 8 and "other" 889 + 3

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

6) Adequate Housing Permanent in the above table is the number of informal households in informal areas with communal toilet facilities as confirmed by the Municipality (January 2022).

Table A.2.10: Improvement in eradicating the sanitation backlog					
Settlement	Urban / Rural	2021/22		2020/21 (-Y1)	
		Sanitation backlog HH	Sanitation Backlog Population	Sanitation backlog HH	Sanitation Backlog Population
Citrusdal	Urban	0	0	0	0
Clanwilliam	Urban	0	0	0	0
Elands Bay	Urban	0	0	0	0
Graafwater	Urban	0	0	0	0
Lamberts Bay	Urban	0	0	0	0
Leipoldtville	Rural	38	153	38	153
Wupperthal	Rural	0	0	0	0
Paleisheuwel	Rural	0	0	0	0
Elandskloof	Rural	83	262	83	262
Algeria	Rural	0	0	0	0
Farms	Rural	1 694	6 529	1 694	6 529
		1 815		**1 815**	

Table A.2.11: Sanitation level of service (Households)		
Section: Sanitation Service Infrastructure Supply Level Profile	Totals	Assessment Score
Bucket toilet	84	60%
Pit without ventilation	67	60%
Pit toilet with ventilation (VIP)	89	60%
Chemical Toilet	18	60%
Flush toilet (with septic / conservancy tank)	6 602	80%
Flush toilet (connected to sewerage system)	13 439	80%
None	754	60%

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

Table A.2.12: Sanitation reliability profile (Households)		
Section: Sanitation Reliability Profile	Totals	Assessment Score
Total number of households having reliable service	**19 590**	**80%**
Total number of households not having reliable service	**1 815**	**60%**
Infrastructure to be upgraded: None to VIP	1 619	60%
Infrastructure requirement: Bucket to VIP	84	60%
Infrastructure requirement: None to waterborne	0	60%
Infrastructure to be upgraded: Pit to VIP	94	60%
Number of households NOT having reliable service due to: Functionality	18	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.2.13: Direct backlog (Water and Sanitation)		
Direct Backlog (Water & Sanitation)	Totals	Assessment Score
Direct settlement backlog water households. Total household of settlement with a water need (irrelevant the type of need)	129	60%
Direct settlement backlog water population. Total population of settlement with a water need (irrelevant the type of need)	497	60%
Direct settlement backlog sanitation households. Total household of settlement with a sanitation need (irrelevant the type of need)	1 815	60%
Direct settlement backlog sanitation population. Total population of settlement with a sanitation need (irrelevant the type of need)	6 944	60%

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

Table A.2.14: Interim Water and Sanitation Services (National Norms and Standards for Domestic Water and Sanitation Services)

Intermittent provision of water at a minimum level of water supply services

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

Interim sanitation services (Communal and shared facilities)

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

The current number of households in the informal areas is 4 752. The number of communal taps and toilets could not be confirmed by the Municipality.

There are informal areas in Citrusdal, Clanwilliam, Elands Bay and Lamberts Bay. The table below gives an overview of the households supplied with communal water and sanitation services as confirmed by the Municipality.

Table A.2.15: Number of households in informal areas with communal water and sanitation services

Urban Areas with Informal Settlements	Number of households in informal areas with communal services as confirmed by the Municipality				
	Households	Water Services		Sanitation Services	
		Number of Communal Taps	Households with no access to communal taps	Number of Communal Toilets	Households with no access to communal toilets
Citrusdal	1 767	Number of communal taps in informal areas could not be confirmed by the Municipality	0	Number of communal toilets in informal areas could not be confirmed by the Municipality	0
Clanwilliam	2 756		0		0
Elands Bay	58		0		0
Lamberts Bay	171		0		0
Total	**4 752**		**0**		**0**

It is important that accurate information be kept up to date on an annual basis with regard to the number of households in informal areas and the number of communal standpipes and communal toilet facilities available for these households.

The number of user connections (Billed Metered Consumers) in each user sector for the last eight financial years, for the various distribution systems in Cederberg Municipality's Management Area, is summarised in the table below.

Table A.2.16: Number of user connections in each user sector per town

Town	Year	Residential	Business	Municipal and Sport	Other	Total
Citrusdal	14/15	1 423	103	1	36	**1 563**
	15/16	1 439	103	1	48	**1 591**
	16/17	1 495	102	1	51	**1 649**
	17/18	1 536	105	1	52	**1 694**
	18/19	1 351	82	1	91	**1 525**
	19/20	1 410	103	2	86	**1 601**
	20/21	1 426	106	3	78	**1 613**
	21/22	1 578	109	4	82	**1 773**
Clanwilliam	14/15	2 164	95	36	28	**2 323**
	15/16	2 229	97	37	40	**2 403**
	16/17	2 122	102	39	39	**2 302**
	17/18	2 112	102	39	39	**2 292**
	18/19	2 193	91	24	85	**2 393**
	19/20	2 280	100	25	82	**2 487**
	20/21	2 351	102	26	78	**2 557**
	21/22	2 547	101	25	81	**2 754**
Elands Bay	14/15	812	17	1	2	**832**
	15/16	731	17	1	4	**753**
	16/17	780	17	1	5	**803**
	17/18	766	17	1	5	**789**
	18/19	628	12	1	3	**644**
	19/20	624	13	2	3	**642**
	20/21	670	13	2	3	**688**
	21/22	687	12	2	3	**704**
Graafwater	14/15	1 254	29	1	5	**1 289**
	15/16	1 351	29	1	13	**1 394**
	16/17	1 359	25	2	9	**1 395**
	17/18	1 414	26	2	9	**1 451**
	18/19	967	18	3	18	**1 005**
	19/20	1 064	21	4	19	**1 108**
	20/21	1 092	21	3	18	**1 134**
	21/22	1 230	22	3	24	**1 279**
Lamberts Bay	14/15	1 814	103	2	23	**1 942**
	15/16	1 854	100	2	29	**1 985**
	16/17	1 807	99	2	29	**1 937**
	17/18	1 804	99	2	29	**1 934**
	18/19	1 750	72	2	49	**1 872**
	19/20	1 911	72	3	44	**2 030**
	20/21	2 052	68	5	42	**2 167**
	21/22	2 309	66	6	52	**2 433**
Farms	14/15	1	3	-	-	**4**
	15/16	1	3	-	-	**4**
	16/17	1	3	-	-	**4**
	17/18	1	3	-	-	**4**
	18/19	-	-	-	-	-

Table A.2.16: Number of user connections in each user sector per town						
Town	**Year**	**Residential**	**Business**	**Municipal and Sport**	**Other**	**Total**
	19/20	-	-	-	-	-
	20/21	-	-	-	-	-
	21/22	-	-	-	-	-
TOTAL	**14/15**	**7 468**	**350**	**41**	**94**	**7 953**
	15/16	**7 604**	**349**	**42**	**134**	**8 129**
	16/17	**7 564**	**348**	**45**	**133**	**8 090**
	17/18)	**7 633**	**352**	**45**	**134**	**8 164**
	18/19	**6 889**	**274**	**30**	**245**	**7 439**
	19/20	**7 289**	**309**	**36**	**234**	**7 868**
	20/21	**7 591**	**310**	**39**	**219**	**8 159**
	21/22	**8 351**	**310**	**40**	**242**	**8 943**

The table below gives an overview of the total number of billed metered consumers and the average annual growth of the number of consumer units per system over the period 2014/2015 to 2021/2022.

Table A.2.17: Total number of consumer units per town and percentage growth from 2014/2015 to 2021/2022									
Distribution System	**Annual Growth % (14/15 – 21/22)**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**21/22**
Citrusdal	1.82%	1 563	1 591	1 649	1 694	1 525	1 601	1 613	1 773
Clanwilliam	2.46%	2 323	2 403	2 302	2 292	2 393	2 487	2 557	2 754
Elands Bay	-2.36%	832	753	803	789	644	642	688	704
Graafwater	-0.11%	1 289	1 394	1 395	1 451	1 005	1 108	1 134	1 279
Lamberts Bay	3.27%	1 942	1 985	1 937	1 934	1 872	2 030	2 167	2 433
Total	**1.69%**	**7 949**	**8 126**	**8 086**	**8 164**	**7 439**	**7 866**	**8 158**	**8 943**

The two graphs below provide an overview of the number of billed metered consumer units and the type of consumers, as calculated from the financial billing systems.

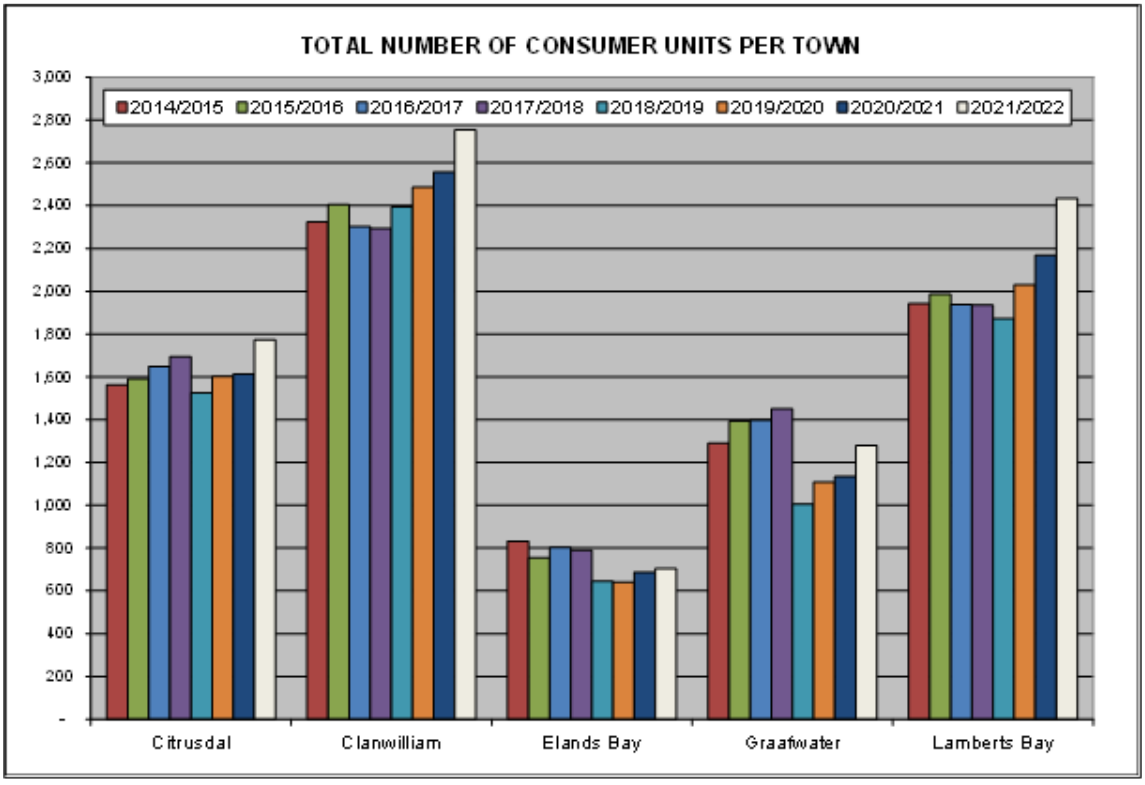


Figure A.2.3: Number of Billed Metered Consumer Units per System

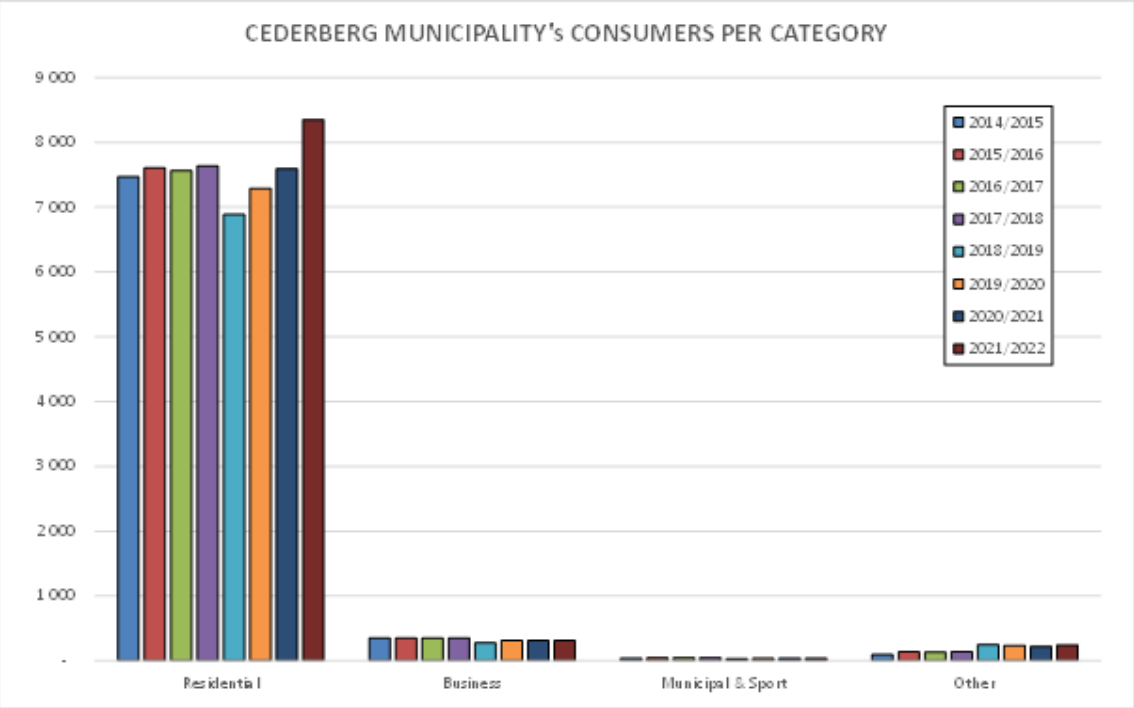


Figure A.2.4: Cederberg Municipality's Consumers per Category Type

Public Amenities

All the schools and Community Learning Centres in the urban areas are supplied with higher levels of water and sanitation services. **The water and sanitation service levels of the schools in the rural areas however need to be verified.** All the hospitals and clinics in the urban areas receive potable water through the reticulation networks of the various towns and are supplied with waterborne sewer systems. The existing water and sanitation service levels for all the health and education facilities in Cederberg Municipality's Management Area are summarised in the tables below.

Table A.2.18: Water service levels: Education and Health Facilities

Associated services facility	Number of facilities	Facilities with adequate services	Facilities with no services	Facilities with inadequate services	Total potential cost (basic level) (Rmil)
Education Plan					
Primary school	18	10	8 (To be verified)		Unknown
Secondary school	3	3	0	0	-
Tertiary	-	-	0	0	-
Combined	4	4	0	0	-
Special needs	-	-	0	0	-
Other	12	9	3 (To be verified)		Unknown
Total	**37**	**29**	**11 (To be verified)**		**Unknown**
Health Plan					
District Hospitals	2	2	0	0	-
Clinics	6	6	0	0	-
Mobile & Satellite Clinics	5	5	0	0	-
Total	**13**	**13**	**0**	**0**	**-**

Table A.2.19: Sanitation service levels: Education and Health Facilities					
Associated services facility	**Number of facilities**	**Facilities with adequate services**	**Facilities with no services**	**Facilities with inadequate services**	**Total potential cost (basic level) (Rmil)**
Education Plan					
Primary school	18	10	8 (To be verified)		Unknown
Secondary school	3	3	0	0	-
Tertiary	-	-	0	0	-
Combined	4	4	0	0	-
Special needs	-	-	0	0	-
Other	12	9	3 (To be verified)		Unknown
Total	**37**	**29**	**11 (To be verified)**		**Unknown**
Health Plan					
District Hospitals	2	2	0	0	-
Clinics	6	6	0	0	-
Mobile & Satellite Clinics	5	5	0	0	-
Total	**13**	**13**	**0**	**0**	**-**

TOPIC 3: WATER SERVICES ASSET MANAGEMENT

The table below provides a summary of the operational water and sewerage infrastructure of Cederberg Municipality.

Table A.3.1: Infrastructure components										
Assets	**Boreholes**	**Abstraction Points**	**WTW**	**Water Pump Stations**	**Sewer Pump Stations**	**Water Bulk Pipelines**	**Sewer Bulk Pipelines**	**Reservoirs**	**WWTW**	**Assessment Score**
Total number of components / km of pipeline / units	21	5	3	15	30	86.557 (Raw) 10.430 (Bulk) 139.099 (Retic)	17.025 (Rising) 82.533 (Gravity)	23 12 JoJo tanks	7	60%

The following two tables give an overview of the major water infrastructure components, for the various distribution systems, in Cederberg Municipality's Management Area.

Table A.3.2: Existing main water infrastructure (Resources and WTWs)			
Water Distribution System	**Bulk Supply**	**WTWs and Treatment Processes**	
	(Resources)	**WTW (Capacity in Ml/d)**	**Processes**
Citrusdal	Olifants River and Boskloof Boreholes	3.468	Filtration (Slow sand filters), Stabilization (Lime) and Disinfection (Chlorine Gas or Sodium Hypochlorite)
Clanwilliam	Clanwilliam Dam	-	Stabilization (Lime) and Disinfection (Chlorine Gas or Sodium Hypochlorite)
	Jan Dissels River	-	Disinfection (Chlorine Gas or Sodium Hypochlorite)
Elands Bay	Boreholes	-	Disinfection (Sodium Hypochlorite)
Graafwater	Boreholes	1.080	Filtration (Slow sand filters), Stabilization (Lime) and Disinfection (Chlorine Gas or Sodium Hypochlorite)
Lamberts Bay	Boreholes	-	Disinfection (Sodium Hypochlorite)
Leipoldtville	Borehole	-	Disinfection (Sodium Hypochlorite)
Wupperthal	Mountain Stream and Borehole	-	Filtration (Pressure sand filters) and Disinfection (Sodium Hypochlorite)
Elandskloof	Mountain Stream	-	-
Paleisheuwel	Borehole	-	Disinfection (Sodium Hypochlorite)
Algeria	Mountain Stream and Borehole	-	Disinfection (Chlorine Tablets)

Table A.3.3: Existing main water infrastructure (Reticulation, Pump Stations and Reservoirs)							
Water Distribution System	Water Pipelines			Number of Water PS		Reservoirs and Water Towers*	
	Raw	Bulk	Reticulation	Raw Water	Potable Water	Number of Reservoirs & Water Towers	Total Storage in Ml
	km	km	km	Number of PS	Number of PS		
Citrusdal	8.223	2.891	32.936	2	1	3	4.220
Clanwilliam	5.710	6.951	34.656	3	2	6	7.980
Elands Bay	13.279	0	11.074	1	0	2	1.000
Graafwater	12.496	0.304	17.514	-	1	2	2.500
Lamberts Bay	44.863	0.284	34.165	1	2	5	5.960
Leipoldtville	1.553	0	2.962	-	-	1	0.150
Wupperthal	0.433	0	4.745	-	-	2	0.716
Elandskloof	Unknown	Unknown	Unknown	-	-	1	Unknown
Paleisheuwel	Unknown	Unknown	Unknown	-	-	(4)	0.020*
Algeria	Unknown	Unknown	Unknown	-	-	1 (8)	0.175
Total	**86.557**	**10.430**	**139.099**	**7**	**6**	**23 (12)**	**22.721**

Notes: * Exclude raw water reservoirs
() Jo-Jo Tanks

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

Table A.3.4: Existing main 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	
Citrusdal	2.300	1 701	Activated Sludge System	4.984	23.798	7
Clanwilliam	2.100	650	Activated Sludge System	2.683	29.068	8
Elands Bay	0.225	Unknown	Oxidation Pond System	1.365	4.142	2
Graafwater	0.360	495	Oxidation Pond System	2.104	6.589	1
Lamberts Bay	3.000	1 950	Activated Sludge System	5.889	18.936	7
Leipoldtville	-	-	-	-	-	-
Wupperthal	Unknown	Unknown	Oxidation Pond System	Unknown	Unknown	2
Paleisheuwel	-	-	-	-	-	-
Elandskloof	-	-	-	-	-	-
Algeria	Unknown	Unknown	Aeration and Maturation Ponds	-	Unknown	-
Total				**17.025**	**82.533**	**27**

Note: * Exclude pump stations for irrigation (treated effluent)

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	3	0	15	3	0	0	15	6	3	15	0	3
Abstraction points	0	0	5	0	0	0	5	0	0	5	0	0
Bulk water pipelines	0	2	4	1	0	0	7	0	0	6	1	0
Reservoirs	5	6	7	16	0	0	34	0	2	22	10	0
Water pump stations	3	1	9	2	0	0	15	0	2	11	2	0
WTW	1	1	1	0	0	0	3	0	1	1	1	0
Bulk sewer pipelines	0	2	3	0	0	0	5	0	0	5	0	0
Sewer pump stations	1	10	16	3	0	0	28	2	0	27	3	0
WWTW	1	2	2	2	0	0	6	1	0	4	3	0

Asset Management Plan: An Asset Management Policy is in place for Cederberg Municipality, with various responsibilities with regard to the "Management and Operation of Assets" and the "Maintenance of Assets". Cederberg Municipality does not have an Integrated Infrastructure Asset Management Plan (AMP), but is continuously seeking funding to assist with the compilation of such a plan.

Cederberg Municipality updated their current Asset Register after June 2022, in order to include the new assets constructed during the 2021/2022 financial year. The tables that follow give an overview of the current water and sewerage infrastructure included in Cederberg Municipality's Asset Register.

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

Table A.3.6: Opening costs and carrying values of the water infrastructure – June 2022

Asset Type	Opening Cost (OC)	Carrying Value (CV)	% CV / OC
Borehole	R13 271 289	R8 395 248	63.26%
Bulk Mains	R44 583 412	R13 693 049	30.71%
Reservoirs	R31 489 037	R19 181 583	60.92%
Water Pump Station	R5 907 790	R1 835 182	31.06%
Water Reticulation Pipeline	R67 040 204	R45 239 649	67.48%
Citrusdal WTW	R494 727	R292 169	59.06%
Clanwilliam WTW	R188 414	R12 483	6.63%
Elands Bay WTW	R616 019	R25 821	4.19%
Graafwater WTW	R7 210 030	R3 912 881	54.27%
Lamberts Bay WTW	R1 299 876	R237 350	18.26%
Leipoldtville WTW	R198 625	R69 319	34.90%
Algeria WTW	R9 820	R4 365	44.45%
Total	**R172 309 243**	**R92 899 099**	**53.91%**

The previous table indicates that about 46.09% of the value of the water infrastructure has been consumed.

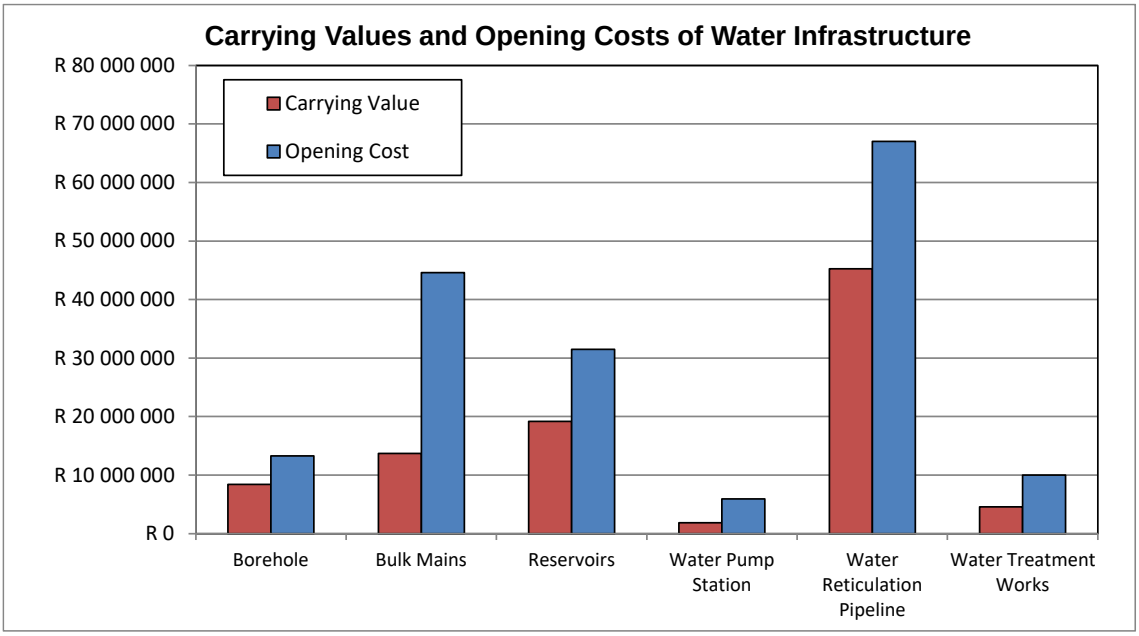


Figure A.3.1: Carrying Values and Opening Costs of the Water Infrastructure

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

Table A.3.7: Overview of the RUL by facility type for the water infrastructure – June 2022 (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Borehole	R2 614 815	R2 868 050	R6 392 174	R380 627	R1 015 623
Bulk Mains	R2 489 766	R238 943	R32 988 209	R108 218	R8 758 276
Reservoirs	R2 356 642	R1 050 424	R9 921 674	R57 998	R18 102 299
Water Pump Station	R4 276 425	R710 964	R538 832	R84 811	R296 758
Water Reticulation Pipeline	R720 735	R688 937	R23 737 748	R966 695	R40 926 089
Citrusdal WTW	R283 177	R42 750	R22 800	R0	R146 000
Clanwilliam WTW	R188 414	R0	R0	R0	R0
Elands Bay WTW	R610 669	R5 350	R0	R0	R0
Graafwater WTW	R2 045 641	R190 108	R173 298	R305 168	R4 495 815
Lamberts Bay WTW	R1 000 339	R147 076	R152 461	R0	R0
Leipoldtville WTW	R54 283	R144 342	R0	R0	R0
Algeria WTW	R9 820	R0	R0	R0	R0
Total	**R16 650 726**	**R6 086 944**	**R73 927 196**	**R1 903 517**	**R73 740 860**

The asset renewal needs for the water infrastructure assets over the next ten years is R2.274 million per year. The reinvestment required is R16.650 million in the first five years and R6.087 million in the second five-year period.

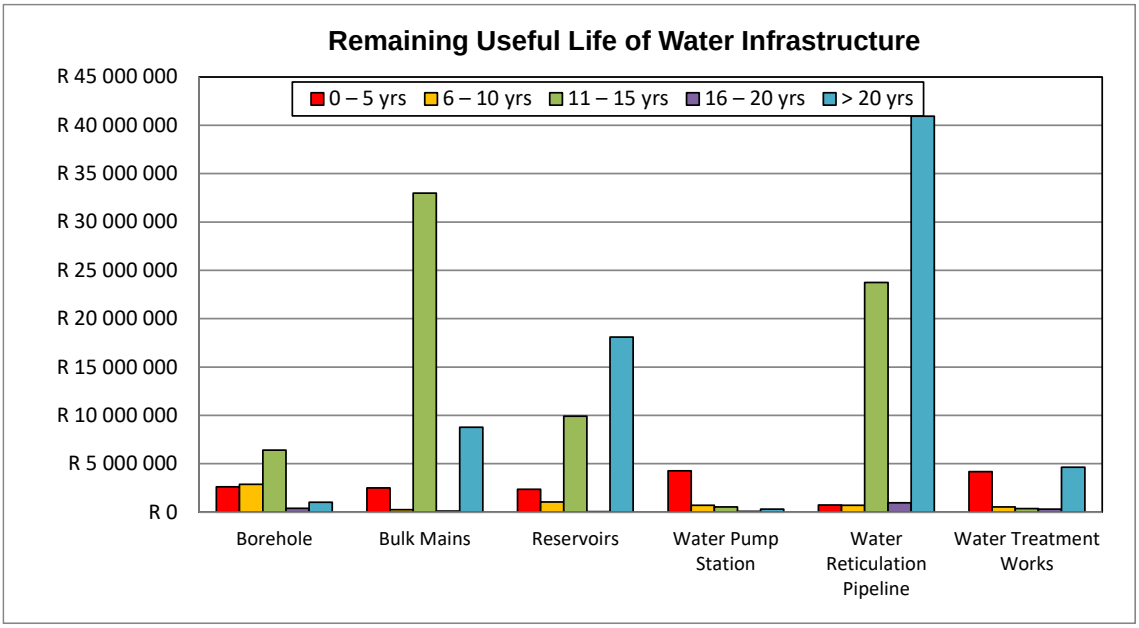


Figure A.3.2: Remaining Useful Life of the Water Infrastructure

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 – June 2022 (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Borehole	R7 022 047	R3 496 488	R2 117 324	R403 383	R232 047
Bulk Mains	R0	R5 605 893	R2 741 191	R42 514	R36 193 814
Reservoirs	R8 095 017	R10 857 006	R245 971	R416 281	R11 874 762
Water Pump Station	R256 333	R1 173 275	R879 441	R3 233 852	R364 889
Water Reticulation Pipeline	R37 417 647	R6 112 592	R241 861	R0	R23 268 104
Citrusdal WTW	R22 800	R42 750	R267 000	R107 182	R54 995
Clanwilliam WTW	R0	R0	R0	R94 476	R93 938
Elands Bay WTW	R0	R5 350	R48 097	R509 881	R52 691
Graafwater WTW	R34 492	R1 195 763	R5 529 891	R296 580	R153 304

Table A.3.8: Overview of the age distribution by facility type for the water infrastructure – June 2022 (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Lamberts Bay WTW	R99 757	R142 066	R515 418	R535 735	R6 900
Leipoldtville WTW	R0	R144 343	R54 282	R0	R0
Algeria WTW	R9 820	R0	R0	R0	R0
Total	**R52 957 913**	**R28 775 526**	**R12 640 476**	**R5 639 884**	**R72 295 444**

The age of 41.96% of the water infrastructure assets is greater than 20 years.

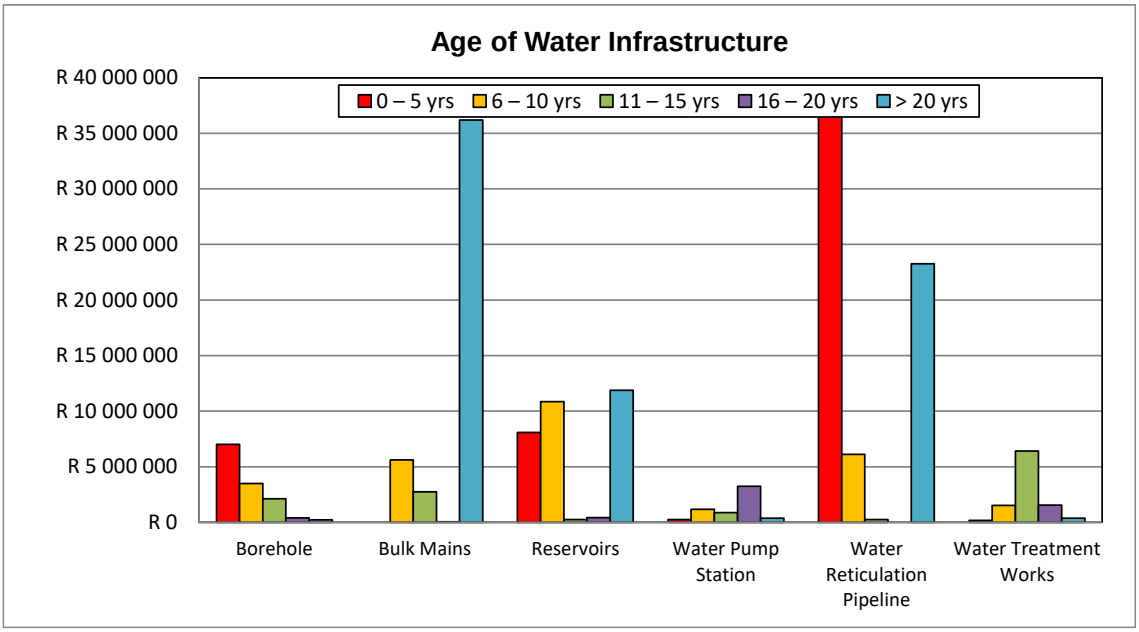


Figure A.3.3: Age Distribution of the Water Infrastructure

Sewerage Infrastructure: The opening costs and carrying values of the sewerage infrastructure of Cederberg Municipality is summarised in the table below.

Table A.3.9: Opening costs and carrying values of the sewerage infrastructure – June 2022			
Asset Type	**Opening Cost (OC)**	**Carrying Value (CV)**	**% CV / OC**
Sewer Pump Station	R8 821 804	R2 691 175	30.51%
Sewer Reticulation Pipeline	R41 886 863	R23 831 540	56.90%
Outfall Sewers	R4 457 432	R1 461 679	32.79%
Precast Toilets	R2 714 791	R2 351 327	86.61%
Algeria WWTW	R7 254 256	R1 072 515	14.78%
Citrusdal WWTW	R80 749 610	R76 111 886	94.26%
Clanwilliam WWTW	R10 548 778	R5 841 645	55.38%
Elands Bay WWTW	R2 222 433	R287 920	12.96%
Graafwater WWTW	R2 642 162	R1 004 737	38.03%
Lamberts Bay WWTW	R29 709 014	R26 108 971	87.88%
Totals	**R191 007 143**	**R140 763 395**	**73.70%**

The previous table indicates that about 26.30% of the value of the sewerage infrastructure has been consumed.

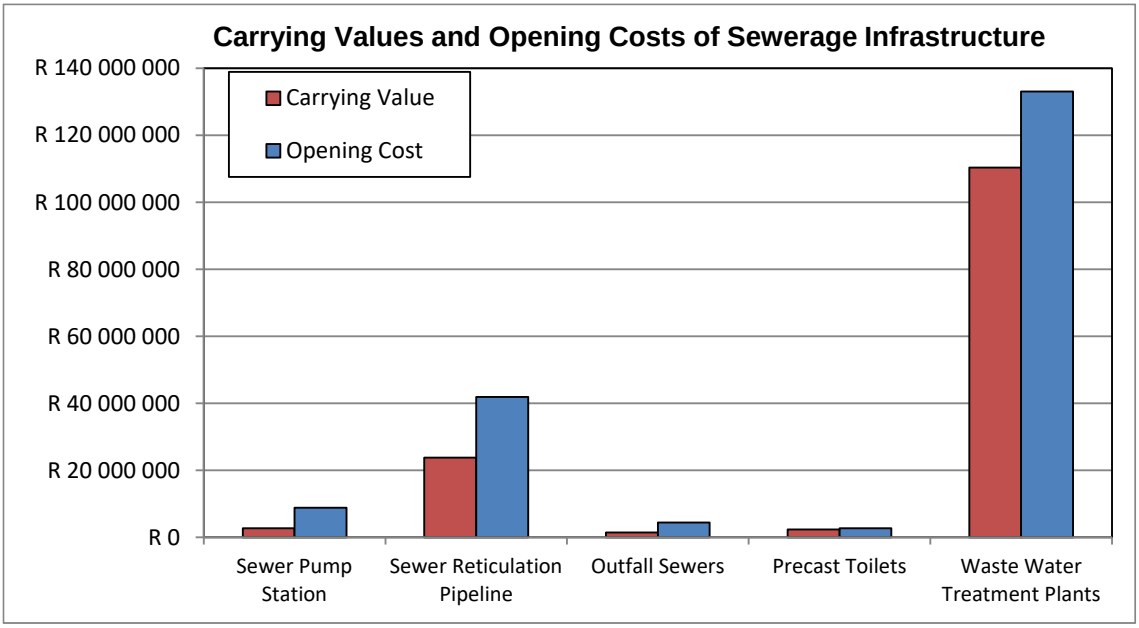


Figure A.3.4: Carrying Value and Opening Cost of the Sewerage Infrastructure

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

Table A.3.10: Overview of the RUL by facility type for the sewerage infrastructure – June 2022 (Opening Costs)

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Sewer Pump Station	R4 862 305	R1 235 271	R1 927 754	R89 799	R706 675
Sewer Reticulation Pipeline	R0	R0	R18 892 718	R0	R22 994 145
Outfall Sewers	R166 212	R0	R2 318 854	R0	R1 972 366
Precast Toilets	R0	R0	R0	R0	R2 714 791
Algeria WWTW	R2 910 824	R0	R4 007 029	R0	R336 403
Citrusdal WWTW	R69 217	R0	R127 638	R30 789 650	R49 763 105
Clanwilliam WWTW	R2 040 297	R16 250	R1 590 124	R1 418 651	R5 483 456
Elands Bay WWTW	R959 728	R11 755	R1 250 950	R0	R0
Graafwater WWTW	R513 393	R0	R1 962 101	R0	R166 668
Lamberts Bay WWTW	R0	R621 949	R2 699 369	R0	R26 387 696
Totals	**R11 521 976**	**R1 885 225**	**R34 776 537**	**R32 298 100**	**R110 525 305**

The asset renewal needs for the sewerage infrastructure assets over the next ten years is R1.341 million per year. The reinvestment required is R11.522 million in the first five years and R1.885 million in the second five-year period.

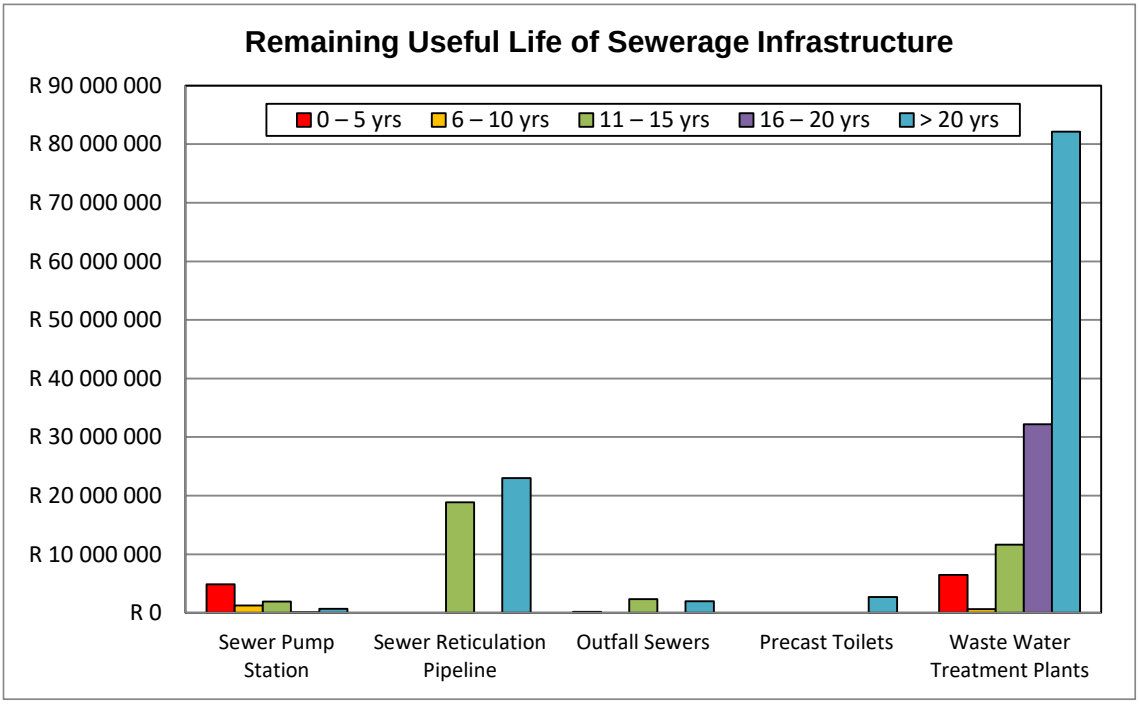


Figure A.3.5: Remaining Useful Life of the Sewerage Infrastructure

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

Table A.3.11: Overview of the age distribution by facility type for the sewerage infrastructure – June 2022 (Opening Costs)

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Sewer Pump Station	R1 496 696	R1 898 972	R1 476 756	R2 739 386	R1 209 994
Sewer Reticulation Pipeline	R9 520 016	R11 889 699	R1 600 661	R0	R18 876 487
Outfall Sewers	R0	R375 978	R43 153	R0	R4 038 301
Precast Toilets	R0	R2 714 791	R0	R0	R0
Algeria WWTW	R0	R0	R90 101	R0	R7 164 155
Citrusdal WWTW	R 80 552 755	R0	R0	R32 027	R164 828
Clanwilliam WWTW	R1 876 674	R16 250	R5 941 612	R31 492	R2 682 750
Elands Bay WWTW	R0	R11 755	R0	R131 983	R2 078 695
Graafwater WWTW	R296 667	R0	R320 000	R63 393	R1 962 102
Lamberts Bay WWTW	R21 946 326	R7 762 688	R0	R0	R0
Totals	**R115 689 134**	**R24 670 133**	**R9 472 283**	**R2 998 281**	**R38 177 312**

The age of 19.99% of the sewerage infrastructure assets is greater than 20 years.

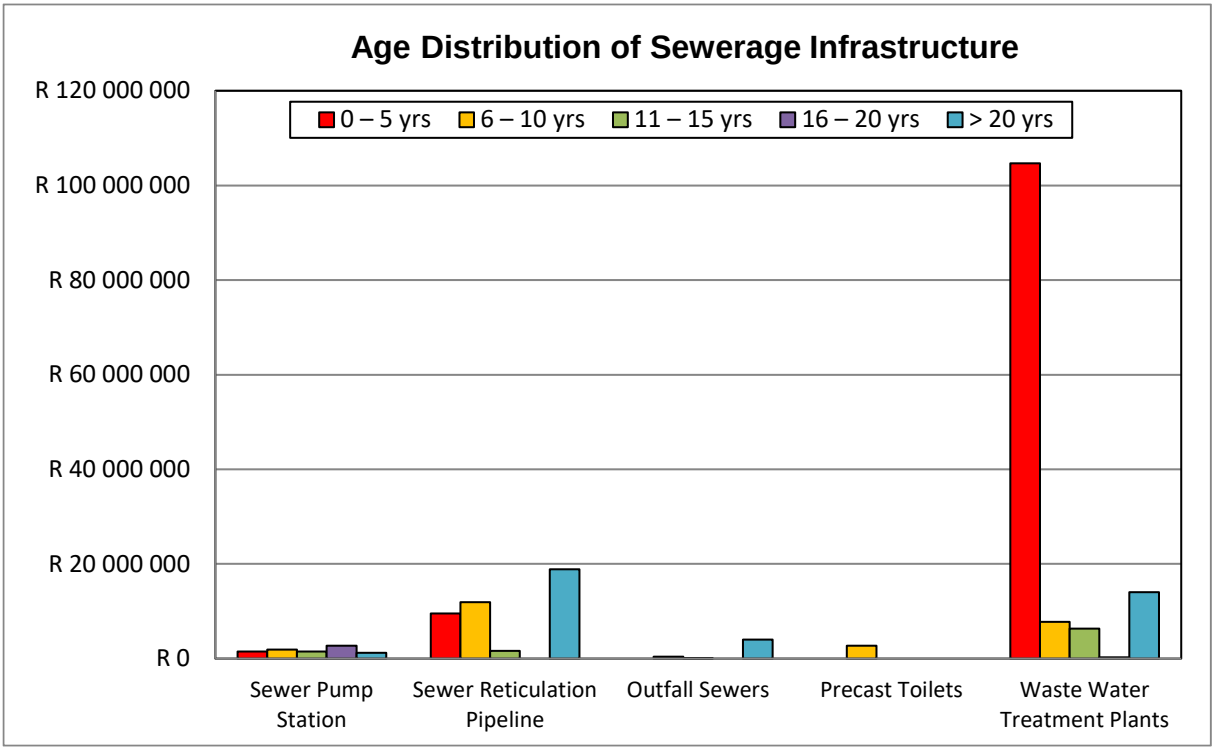


Figure A.3.6: Age Distribution of the Sewerage Infrastructure

Disaster Management Plan: The West Coast District Municipality in collaboration with Cederberg Municipality reviewed the Disaster Risk Assessment (DRA) as per the criteria listed in the Provincial Disaster Management Framework. The aim of the DRA is to assist the municipality in acquiring credible data to inform planning, budget and the accompanied prioritization with respect to policies.

The current risk profile of Cederberg requires having a current and verified risk assessment to inform and align all other disaster risk. The 2014 Disaster Risk Assessment of Cederberg have focused on the risks as highlighted in the 2012 district level District Risk Assessment (DRA) report of the West Coast District Municipality. Disasters, especially in the context of climate change, pose a threat to the achievement of the Millennium Development Goals (MDGs), to which South Africa is a signatory.

A fully equipped municipal disaster management centre for the west coast region is in Moorreesburg. The West Coast Disaster Management Centre (WCDMC) was officially opened in September 2008 and provides a 24-hour call taking and dispatch facility. An organisational facility is also available that is not only used as a Joint Operation Centre (JOC) during disasters, but also as a venue for planning sessions outside disaster periods.

A tactical facility is available as well as offices for various emergency services. The aim is to make it a one stop centre for all incident reporting. This centre is a big advantage to Cederberg Municipality as it is too costly for Cederberg to have its own disaster management centre, however the municipality are in the process of establish a satellite disaster office.

Untreated Effluent Management Plan: All effluent discharged in the urban areas in Cederberg Municipality are treated at the existing WWTWs and there is no known untreated effluent discharged to the environment. W_2RAPs still need to be compiled for all the sewer drainage networks and WWTWs.

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 Cederberg Municipality. O&M is a continuous process for Cederberg 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. Cederberg Municipality's O&M Plan depends on a range of factors such as the age and condition of the water supply system, requirements of the Municipality and DWS as the regulating authority, the availability of staff, plant, equipment, spares, money and other resources.

Cederberg 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 Cederberg 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. and below requirement	Min. and below requirement	Min. requirement	Min. requirement	Min. requirement	Min. requirement
Information	Min. requirement	Min. and below requirement	Min. requirement	Min. requirement	Min. and below requirement	Min. requirement	Min. requirement	Min. requirement
Activity Control & Management	Min. requirement	Min. and below requirement	Min. requirement	Min. requirement	Below requirement	Below requirement	Below requirement	Below requirement

TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

Cederberg Municipality is lacking human and financial resources to actively implement their proposed WC/WDM projects. The average annual growth percentage in total raw water requirements for Cederberg Municipality over the period 2005/2006 to 2021/2022 was 0.8 %/a. The drought and the water restrictions implemented by the Municipality from 2015/2016 onwards resulted in a drastic drop in total annual bulk raw water requirement of the Municipality. A WC/WDM Study was completed during the last financial year. **The NRW was 31.69% and the Water Losses 18.36% for the 2021/2022 financial year.** The main water demand management interventions implemented by Cederberg Municipality over the last number of years, were as follows:

- Study to Analyse Treasury Data and Identify Projects that promote WC/WDM in Cederberg Municipality was completed in June 2022.
- Meter and record all bulk water supply for the various distribution systems and improve the billed metered consumption data (Financial Department) in order to carry out more detail IWA water balances for the various distribution systems.
- Customer Services and Complaints System is implemented by the Municipality (Logbook system) for burst pipes, leaks, etc. Standby teams are also available after hours and over weekends for immediate repairs of burst pipes.
- Strict municipal services standards for the installation of new water reticulation networks for own and private developments.
- Implementation of pressure management in Clanwilliam and Citrusdal.

- Implement a four-block step water tariff structure that promotes the efficient use of water and discourage wastages.
- Re-use of treated effluent from the WWTW for irrigation purposes.
- A detail water meter audit was completed.
- "War on Leaks" Project.

The table below give a summary of the Treatment Losses, NRW, Water Losses and ILIs for the various distribution systems, as calculated through the WSDP process.

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

System	Component	Unit	Record: Prior (Ml/a)				21/22
			17/18	18/19	19/20	20/21	
Citrusdal	Treatment Losses	Volume	-7.166	47.961	18.062	4.268	44.548
		Percentage	-0.9%	5.6%	1.8%	0.4%	4.3%
	NRW	Volume	260.922	322.695	504.714	564.772	519.249
		Percentage	31.3%	39.8%	50.9%	52.4%	51.8%
	Water Losses	Volume	88.600	184.627	385.917	434.689	401.253
		Percentage	10.6%	22.7%	38.9%	40.3%	40.0%
	ILI		8.12	11.03			11.76
Clanwilliam	Treatment Losses	Volume	354.015	301.516	297.713	308.898	140.002
		Percentage	37.5%	39.3%	27.8%	29.4%	18.6%
	NRW	Volume	301.978	160.790	189.290	121.044	40.554
		Percentage	32.0%	20.9%	24.5%	16.3%	6.6%
	Water Losses	Volume	300.089	159.254	24.286	-45.577	-120.352
		Percentage	31.8%	20.7%	3.1%	-6.1%	-19.7%
	ILI		7.57	3.86			Negative
Elands Bay	Treatment Losses	Volume	24.202	5.515	41.246	4.236	5.904
		Percentage	13.53%	3.51%	20.4%	2.4%	3.2%
	NRW	Volume	33.853	54.538	55.885	55.004	56.643
		Percentage	21.9%	36.0%	34.7%	31.9%	31.7%
	Water Losses	Volume	33.544	54.235	40.751	39.130	39.061
		Percentage	21.7%	35.8%	25.3%	22.7%	21.8%
	ILI		2.14	5.30			3.92
Graafwater	Treatment Losses	Volume	25.043	33.887	44.910	55.443	41.645
		Percentage	12.5%	14.7%	16.5%	18.5%	14.5%
	NRW	Volume	27.286	45.414	64.773	67.842	73.454
		Percentage	15.6%	23.0%	28.6%	27.8%	29.8%
	Water Losses	Volume	26.936	45.020	54.527	56.965	62.482
		Percentage	15.4%	22.8%	24.1%	23.3%	25.3%
	ILI		1.24	2.81			3.30
Lamberts Bay	Treatment Losses	Volume	35.090	21.377	-8.289	8.866	17.626
		Percentage	4.1%	3.2%	-1.3%	1.4%	2.4%
	NRW	Volume	298.731	155.785	224.312	168.879	181.306
		Percentage	36.9%	23.9%	33.8%	26.8%	25.6%
	Water Losses	Volume	297.110	154.483	175.161	116.539	122.341
		Percentage	36.7%	23.7%	26.4%	18.5%	17.2%
	ILI		10.95	5.84			3.85
TOTAL	**NRW**	**Volume**	**922.770**	**739.222**	**1 038.974**	**977.541**	**871.206**
		Percentage	**31.63%**	**28.65%**	**36.90%**	**34.08%**	**31.69%**
	Water Losses	**Volume**	**746.279**	**597.619**	**680.640**	**601.746**	**504.785**
		Percentage	**25.58%**	**23.17%**	**24.17%**	**20.98%**	**18.36%**
	ILI		6.74	5.87			3.29

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.

Table A.5.2: Reducing Unaccounted Water		
Reducing unaccounted water and water inefficiencies		**Assessment Score**
Night flow metering	Yes	40%
Day flow metering	Yes	60%
Reticulation leaks	Yes	60%
Illegal connections	Yes	40%
Un-metered connections	Yes	40%
Leak and meter repair programmes. Consumer units targeted by:		
Leak repair assistance programme	Yes	20%
Retro-fitting of water inefficient toilets	Yes	20%
Meter repair programme	Yes	60%
Consumer/end-use demand management: Public Information & Education Programmes		
Schools targeted by education programmes	Yes	0%
Consumers targeted by public information programmes	Yes	40%

Note: The interpretation of the assessment scores in the table above is as follows: 0% - None, 20% - Limited, 40% - Partial, 60% - Good and 80% - Excellent.

The table below gives an overview of the System Input Volume, Average Billed Metered Consumption and Non-Revenue Water in litre per connection per day for the various water distribution systems for the 2021/2022 financial year.

Table A.5.3: System input volume, average billed metered consumption and NRW in litre per connection per day for the various water distribution systems for 2021/2022					
Water Balance Component	**Citrusdal**	**Clanwilliam**	**Elands Bay**	**Graafwater**	**Lamberts Bay**
System Input Volume	1 550	609	696	528	798
Average Billed Metered Cons.	747	568	475	371	594
Non-Revenue Water	803	40	220	157	204

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

DWS's scorecard for assessing the potential for WC/WDM efforts was completed for Cederberg 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 Cederberg Municipality is 60 out of 100 suggesting that the Municipality can further increase the implementation of specific WC/WDM activities.**

TOPIC 6: WATER RESOURCES

The Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 and 2021 winter months. The drought reduced the yield of the Municipality's own existing surface and groundwater resources and the Municipality had to implement drought restrictions to reduce the water requirements of the towns. WC/WDM measures to lower the future water requirements and the augmentation of the existing water resources with groundwater or other sources are therefore critical at this stage. New boreholes were drilled for Wupperthal and Algeria during the 2017/2018 financial year. New boreholes were also drilled for Clanwilliam and Citrusdal during the 2018/2019 financial year. The augmentation of Lamberts Bay groundwater resources is most critical at this stage.

The table below gives an overview of the current water resources, the current volumes abstracted and authorised and whether the abstractions are registered and recorded.

Table A.6.1: Current and additional water sources and volumes

Current Water Sources								
Source Type	Source	Number of Sources	Current 21/22 Abstraction or Returns (Mm³/a)	Licensed Abstraction / Returns (Mm³/a)	Community Water Supply		Abstraction registered? (Yes/No)	Abstraction recorded? (Yes/No)
					Rural	Urban		
Groundwater	Elands Bay	3	0.185	WULAs were submitted to DWS	0%	100%	Yes	Yes
	Graafwater	3	0.288		0%	100%	Yes	Yes
	Lamberts Bay	3	0.727		0%	100%	Yes	Yes
	Leipoldtville	1	Unknown		100%	0%	Unknown	Yes *
	Paleisheuwel	1	Unknown	Unknown	100%	0%	Unknown	Yes *
Surface Water	Clanwilliam	2	0.752	2.048	0%	100%	Yes	Yes
	Wupperthal	1	Unknown	0.000	0%	100%	No	No
	Elandskloof	1	Unknown	0.000	100%	0%	No	No
External Sources (Bulk Purchase)	-	-	-	-	-	-	-	-
Water Returned to Source	Citrusdal WWTW	1	0.287	0.767 (Winter months)	N/A	N/A	N/A	N/A
	Clanwilliam WWTW	1	0.194	Busy with WULAs	N/A	N/A	N/A	N/A
	Algeria WWTW	1	Unknown		N/A	N/A	N/A	N/A
	Wupperthal WWTW	1	Unknown		N/A	N/A	N/A	N/A
Conjunctive use	Citrusdal	4	1.047	1.548	0%	100%	Yes	Yes
	Algeria	2	Unknown	Unknown	100%	0%	No	Partly *

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

Table A.6.2: Additional sources available

Source Type	Schemes	Number of Sources	Potential Volume (Mm³/a)	Licensed Abstraction (Mm³/a)
Groundwater	Three new boreholes in Wadrif area	3	To be verified	To be completed
Surface Water	Lamberts Bay Desalination	1	0.621	-
External Sources (Bulk Purchase)	-	-	-	-

Table A.6.3: Monitoring of abstraction volumes, water levels and water quality

Monitoring	Assessment Score	
% of water abstracted monitored: Surface water	60%	
% of water abstracted monitored: Ground water	60%	
% of water abstracted monitored: External Sources	100%	
Monitoring	**Interval**	**Assessment Score**
Surface water levels (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Weekly	60%
Ground water levels (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Monthly	60%
Water quality for formal schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily and Monthly	60%
Water quality for rudimentary schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Not Applicable	80%
Borehole abstraction? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Monthly	60%

Detail IWA Water Balances are available for the Citrusdal, Clanwilliam, Graafwater, Elands Bay and Lamberts Bay water distribution systems (towns) in Cederberg Municipality's Management Area. The graph below gives an overview of the average daily raw water supply to all the towns. The impact of the droughts experienced over the last number of years can be noted on the graphs.

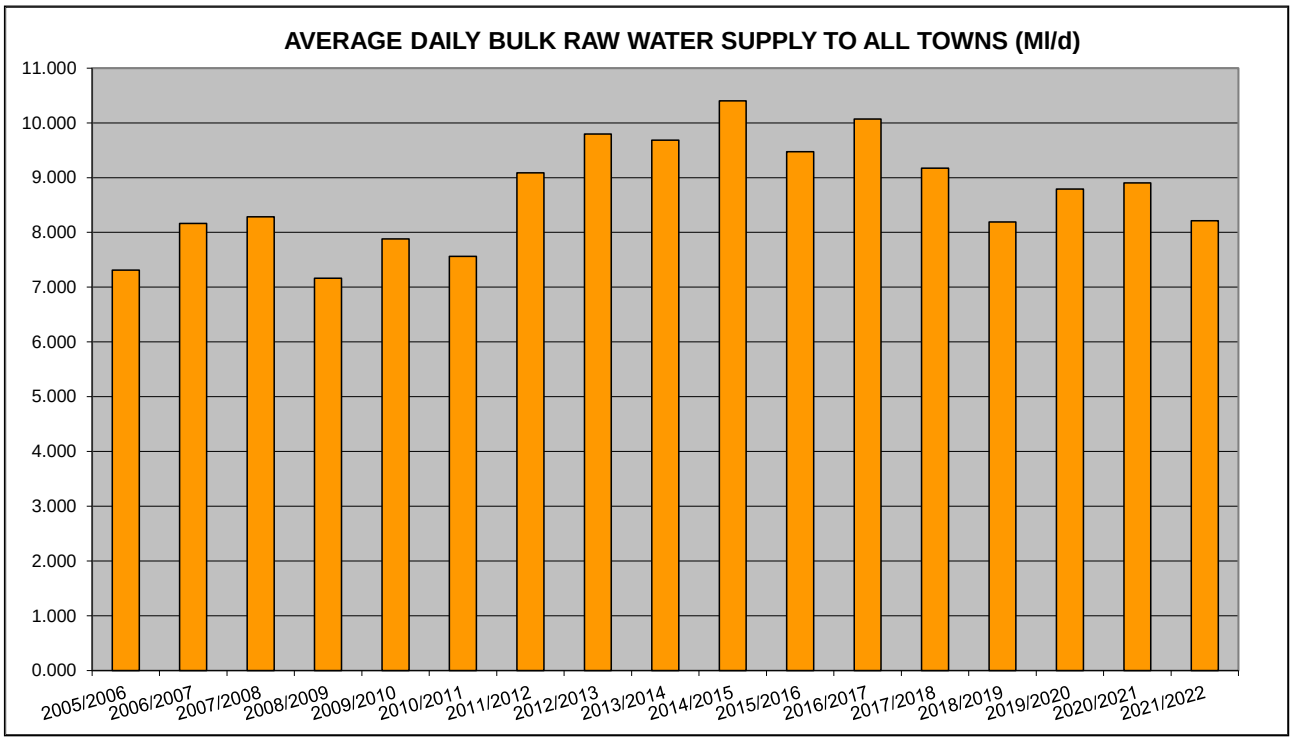


Figure A.6.1: Average Daily Bulk Raw Water Supply to all the Towns (Citrusdal, Clanwilliam, Graafwater, Elands Bay and Lamberts Bay)

The graph below gives an overview of the system input volume and NRW for the various distribution systems in Cederberg Municipality's Management Area.

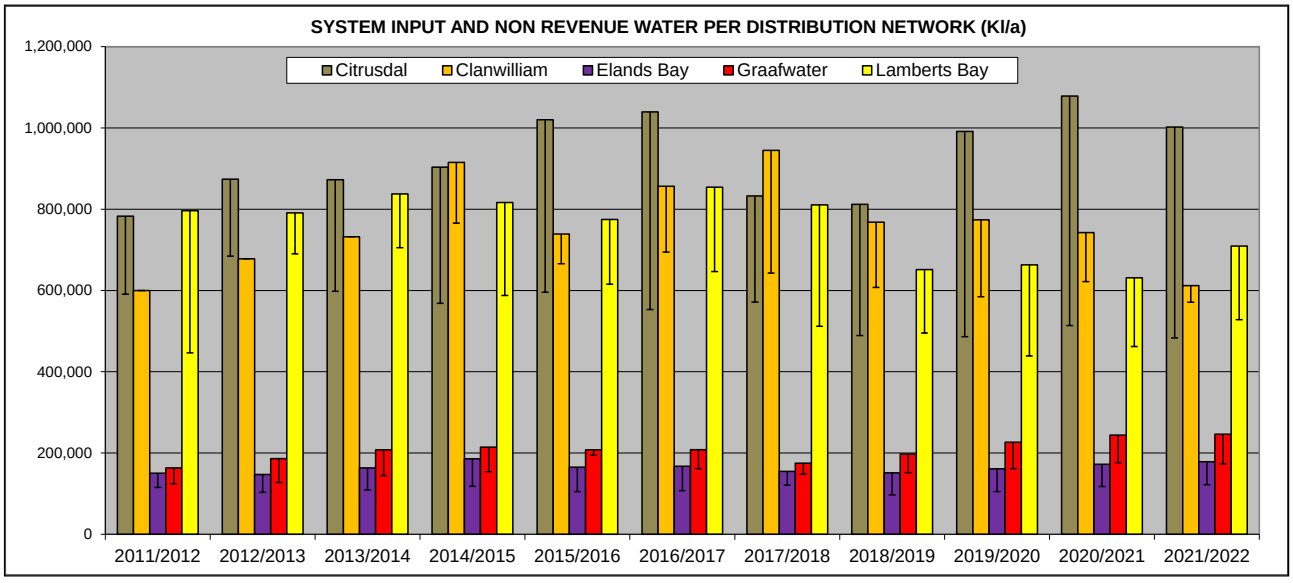


Figure A.6.2: Annual System Input Volumes and NRW per Distribution Network

Most of the water sources are supplied with bulk water meters and accurate records are kept of all bulk water meter readings. The table below gives an overview of the annual volume of raw water abstracted for each of the towns within Cederberg Municipality's Management Area.

Table A.6.4: Bulk raw water abstracted for the various towns

Distribution System	Source	Record : Prior (Ml/a)					
		16/17	17/18	18/19	19/20	20/21	21/22
Citrusdal	Olifants River and Boskloof Boreholes	991.709	827.516	859.711	1 009.266	1 082.527	1 046.857
Clanwilliam	Jan Dissels River and Clanwilliam Dam	1 404.709	1 298.677	1 069.635	1 071.672	1 051.500	751.726
Elands Bay	Boreholes	204.276	178.869	157.028	202.183	176.694	184.708
Graafwater	Boreholes	220.718	200.273	231.127	271.450	299.533	288.195
Lamberts Bay	Boreholes	854.052	845.709	672.559	654.866	639.987	726.974
Elandskloof	Mountain Stream	Not metered					
Wupperthal	Mountain Stream	Not metered					
Algeria	Mountain Stream and Borehole	Mountain stream not metered and abstraction volumes from borehole was not made available.					
Leipoldtville	Borehole	Abstraction volumes from borehole was not made available					
Paleisheuwel	Borehole	Abstraction volumes from borehole was not made available.					
Total		**3 675.464**	**3 351.044**	**2 990.060**	**3 209.437**	**3 250.241**	**2 998.460**

Water Quality: Cederberg Municipality makes use of an accredited external laboratory to conduct the drinking water compliance sampling and analysis. Samples are taken at various locations in each system and analysed to evaluate the compliance. The water quality results are loaded onto DWS's IRIS via the internet. Once entered the data is automatically compared to SANS241. 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 Cederberg Municipality.

Table A.6.5: Water Quality

Water Quality	In place	Status Quo	Assessment Score
Reporting on quality of water taken from source: urban & rural	Yes	40%	40%
Quality of water returned to the resource: urban	Yes	60%	60%
Quality of water returned to the resource: rural	No	Not Applicable	80%
Is there a Pollution contingency measures plan in place?	No	0%	0%
Quality of water taken from source: urban - % monitored by WSA self?	Yes	60%	60%
Quality of water taken from source: rural - % monitored by WSA self?	No	Not Applicable	80%
Quality of water returned to the source: urban - % monitored by WSA self?	Yes	80%	80%
Quality of water returned to the source: rural - % monitored by WSA self?	No	Not Applicable	80%
Are these results available in electronic format? (Yes/no)	Yes	80%	80%
% Time (days) within SANS 241 standards per year	Yes	60%	60%
Abstraction IS registered with DWS	Yes	60%	60%
The abstraction IS NOT registered with DWS	No	40%	40%
The abstraction IS recorded	Yes	60%	60%
The abstraction IS NOT recorded	No	40%	40%

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

Table A.6.6: Percentage compliance of the water quality samples for the last three financial years per performance indicator									
Performance Indicator	Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)			% Sample Compliance according to SANS 241-2015 Limits			Number of Samples taken into account		
	21/22	20/21	19/20	21/22	20/21	19/20	21/22	20/21	19/20
Citrusdal									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	15	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	39	38	36
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	78	130	92
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	99.2%	99.3%	100.0%	130	138	126
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	98.6%	100.0%	156	142	146
Clanwilliam									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	15	5
Acute Health Microbiological	No (Good)	Yes (Unacceptable)	No (Excellent)	95.1%	92.9%	97.1%	41	42	35
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	82	132	88
Aesthetic	Yes (Unacceptable)	No (Excellent)	Yes (Unacceptable)	84.5%	93.0%	85.6%	142	142	118
Operational Efficiency	Yes (Unacceptable)	Yes (Unacceptable)	Yes (Unacceptable)	70.1%	75.7%	71.1%	164	148	142
Elands Bay									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	15	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	Yes (Unacceptable)	97.5%	100.0%	88.9%	40	38	36
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	78	130	92
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	94.4%	130	138	126
Operational Efficiency	Yes (Unacceptable)	Yes (Unacceptable)	Yes (Unacceptable)	84.6%	82.4%	89.2%	156	142	148
Graafwater									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	15	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	38	39	36
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	108	153	103
Aesthetic	Yes (Unacceptable)	No (Good)	No (Good)	81.7%	90.1%	90.3%	164	162	154
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	93.5%	100.0%	95.9%	153	144	145
Lamberts Bay									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	15	5
Acute Health Microbiological	No (Excellent	No (Excellent)	No (Excellent)	100.0%	100.0%	97.2%	35	39	36
Chronic Health	No (Excellent	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	70	132	92
Aesthetic	No (Excellent	No (Excellent)	No (Excellent)	99.1%	98.6%	100.0%	116	142	126
Operational Efficiency	No (Excellent	No (Excellent)	No (Excellent)	94.5%	100.0%	98.6%	146	144	148
Leipoldtville									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	10	5
Acute Health Microbiological	No (Excellent	Yes (Unacceptable)	No (Excellent)	100.0%	88.0%	100.0%	26	25	22
Chronic Health	No (Excellent	No (Excellent)	No (Excellent)	100.0%	98.8%	100.0%	54	85	64
Aesthetic	Yes (Unacceptable)	Yes (Unacceptable)	Yes (Unacceptable)	49.0%	50.5%	48.8%	100	93	82
Operational Efficiency	Yes (Unacceptable)	Yes (Unacceptable)	Yes (Unacceptable)	74.8%	72.0%	80.0%	103	93	90
Wupperthal									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	10	5
Acute Health Microbiological	Yes (Unacceptable)	Yes (Unacceptable)	Yes (Unacceptable)	50.0%	23.1%	4.2%	18	26	24
Chronic Health	No (Excellent	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	36	88	68
Aesthetic	No (Good)	No (Excellent)	No (Excellent)	91.9%	99.0%	93.3%	62	98	89
Operational Efficiency	Yes (Unacceptable	Yes (Unacceptable)	Yes (Unacceptable)	68.1%	69.8%	69.4%	72	96	98
Paleisheuwel									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	10	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Good)	100.0%	100.0%	95.8%	22	25	24
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	44	86	66
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	94.7%	94.7%	100.0%	76	95	87
Operational Efficiency	No (Good)	Yes (Unacceptable)	No (Good)	92.2%	86.5%	91.8%	90	96	97
Algeria									
Acute Health Chemical	-	No (Excellent)	No (Excellent)	-	100.0%	100.0%	-	10	5
Acute Health Microbiological	No (Excellent)	Yes (Unacceptable)	Yes (Unacceptable)	100.0%	82.1%	48.4%	26	28	31

Table A.6.6: Percentage compliance of the water quality samples for the last three financial years per performance indicator									
Performance Indicator	**Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)**			**% Sample Compliance according to SANS 241-2015 Limits**			**Number of Samples taken into account**		
	21/22	**20/21**	**19/20**	**21/22**	**20/21**	**19/20**	**21/22**	**20/21**	**19/20**
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	52	84	68
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	96.7%	98.9%	89	91	90
Operational Efficiency	No (Excellent)	Yes (Unacceptable)	Yes (Unacceptable)	93.3%	88.4%	80.0%	104	95	110

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

Operational and Compliance Water Quality Monitoring Programmes are implemented by Cederberg Municipality. The current and proposed operational and compliance water quality sampling programmes of Cederberg Municipality for the various water distribution systems are summarised in the table below.

Table A.6.8: Current and required water quality parameters to be sampled by Cederberg Municipality for the various water distribution systems: Routine monitoring of Process Indicators				
Current / Required	**Sampling Point**	**Frequency of sampling**	**Samples taken by**	**Current and Proposed Parameters to be sampled**
Citrusdal				
Current	Raw Water (Borehole Water)	Daily	PC	Temperature, pH, Conductivity, Alkalinity, Total Hardness, Calcium Hardness, Magnesium Hardness, Iron, Turbidity, Free Chlorine
	Raw Water (River Water)	08:00; 10:00; 12:00; 14:00; 16:00	PC	pH, Turbidity, Conductivity
	Raw Water (Borehole Water)	08:00; 10:00; 12:00; 14:00; 16:00	PC	pH, Turbidity, Conductivity
	WTW Filtered Water Clear-well	08:00; 10:00; 12:00; 14:00; 16:00	PC	pH, Turbidity, Conductivity
	WTW Final Water	Daily	PC	Temperature, pH, Conductivity, Alkalinity, Total Hardness, Calcium Hardness, Magnesium Hardness, Iron, Turbidity, Free Chlorine
		Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Conductivity
	Feeding Reservoir	08:00; 10:00; 12:00; 14:00; 16:00	PC	pH, Turbidity, Free Chlorine
	3 Ml Reservoir	08:00; 10:00; 12:00; 14:00; 16:00	PC	pH, Turbidity, Conductivity, Free Chlorine
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine
Required	Raw Water (Borehole Water)	Daily	PC	Current sampling is adequate
	Raw Water (River Water)	08:00; 10:00; 12:00; 14:00; 16:00	PC	Current sampling is adequate
	Raw Water (Borehole Water)	08:00; 10:00; 12:00; 14:00; 16:00	PC	Current sampling is adequate
	WTW Filtered Water Clear-well	08:00; 10:00; 12:00; 14:00; 16:00	PC	Current sampling is adequate
	WTW	Daily	PC	Current sampling is adequate

Table A.6.8: Current and required water quality parameters to be sampled by Cederberg Municipality for the various water distribution systems: Routine monitoring of Process Indicators				
Current / Required	**Sampling Point**	**Frequency of sampling**	**Samples taken by**	**Current and Proposed Parameters to be sampled**
	Final Water	Monthly	External Lab	Current sampling is adequate
	Feeding Reservoir	08:00; 10:00; 12:00; 14:00; 16:00	PC	Current sampling is adequate
	3 Ml Reservoir	08:00; 10:00; 12:00; 14:00; 16:00	PC	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate
Clanwilliam				
Current	Raw Water (Clanwilliam dam)	-	-	-
	Raw Water (Jan Dissels River)	-	-	-
	Final Water	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Conductivity
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine
Required	Raw Water (Clanwilliam dam)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Raw Water (Jan Dissels River)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Final Water	Daily	PC	pH, Conductivity, Turbidity and Disinfectant residuals to be sampled
		Weekly	PC	E.Coli and Heterotrophic plate count to be sampled.
		Monthly	External Lab	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate
Elands Bay				
Current	Raw Water (Boreholes)	-	-	-
	Final Water	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Conductivity
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine
Required	Raw Water (Boreholes)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Final Water	Daily	PC	pH, Conductivity, Turbidity and Disinfectant residuals to be sampled
		Weekly	PC	E.Coli and Heterotrophic plate count to be sampled.
		Monthly	External Lab	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate
Graafwater				
Current	Raw Water (Borehole Water)	Daily	PC	Temperature, pH, Conductivity, Alkalinity, Total Hardness, Calcium Hardness, Magnesium Hardness, Iron, Turbidity, IND
		07:00; 09:00; 11:00; 13:00; 15:00	PC	pH, Turbidity, Conductivity, Iron (Only daily)
	WTW Before Filters	07:00; 09:00; 11:00; 13:00; 15:00	PC	pH, Turbidity, Conductivity, Iron (Only daily)
	WTW After Filters	07:00; 09:00; 11:00; 13:00; 15:00	PC	pH, Turbidity, Conductivity, Iron (Only daily), Free Chlorine (Only daily)
	WTW Final Water	Daily	PC	Temperature, pH, Conductivity, Alkalinity, Total Hardness, Calcium Hardness, Magnesium Hardness, Iron, Turbidity, IND, PHS

Table A.6.8: Current and required water quality parameters to be sampled by Cederberg Municipality for the various water distribution systems: Routine monitoring of Process Indicators				
Current / Required	**Sampling Point**	**Frequency of sampling**	**Samples taken by**	**Current and Proposed Parameters to be sampled**
		Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Iron, Conductivity
	Final Water After Reservoir	07:00; 09:00; 11:00; 13:00; 15:00	PC	pH, Turbidity, Conductivity, Iron (Only daily), Free Chlorine (Only daily)
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Iron
Required	Raw Water (Borehole Water)	Daily	PC	Current sampling is adequate
		07:00; 09:00; 11:00; 13:00; 15:00	PC	Current sampling is adequate
	WTW Before Filters	07:00; 09:00; 11:00; 13:00; 15:00	PC	Current sampling is adequate
	WTW After Filters	07:00; 09:00; 11:00; 13:00; 15:00	PC	Current sampling is adequate
	Final Water	Daily	PC	Current sampling is adequate
		Monthly	External Lab	Current sampling is adequate
	Final Water After Reservoir	07:00; 09:00; 11:00; 13:00; 15:00	PC	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate
Lamberts Bay				
Current	Raw Water (Borehole Water)	-	-	-
	WTW Final Water	Two Hourly	PC	pH, Conductivity, Turbidity, Free Chlorine
		Daily	PC	Temperature, pH, Conductivity, Alkalinity, Total Hardness, Calcium Hardness, Magnesium Hardness, Turbidity, Free Chlorine, Versind
		Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Conductivity
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine
Required	Raw Water (Borehole Water)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Final Water	Daily	PC	pH, Conductivity, Turbidity and Disinfectant residuals to be sampled
		Weekly	PC	E.Coli and Heterotrophic plate count to be sampled.
		Monthly	External Lab	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate
Wupperthal				
Current	Raw Water (Stream)	-	-	-
	Final Water	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Conductivity
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine
Required	Raw Water (Stream)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Final Water	Daily	PC	pH, Conductivity, Turbidity and Disinfectant residuals to be sampled
		Weekly	PC	E.Coli and Heterotrophic plate count to be sampled.
		Monthly	External Lab	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate

Table A.6.8: Current and required water quality parameters to be sampled by Cederberg Municipality for the various water distribution systems: Routine monitoring of Process Indicators				
Current / Required	**Sampling Point**	**Frequency of sampling**	**Samples taken by**	**Current and Proposed Parameters to be sampled**
Leipoldtville				
Current	Raw Water (Borehole Water)	-	-	-
	Final Water	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Conductivity
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine
Required	Raw Water (Borehole Water)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Final Water	Daily	PC	pH, Conductivity, Turbidity and Disinfectant residuals to be sampled
		Weekly	PC	E.Coli and Heterotrophic plate count to be sampled.
		Monthly	External Lab	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate
Algeria				
Current	Raw Water (Borehole Water)	-	-	-
	Raw Water (Stream)	-	-	-
	Final Water	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Conductivity
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine
Required	Raw Water (Borehole Water)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Raw Water (Stream)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Final Water	Daily	PC	pH, Conductivity, Turbidity and Disinfectant residuals to be sampled
		Weekly	PC	E.Coli and Heterotrophic plate count to be sampled.
		Monthly	External Lab	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate
Paleisheuwel				
Current	Raw Water (Borehole Water)	-	-	-
	Final Water	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine, Conductivity
	Distribution System	Monthly	External Lab	E.Coli, Heterotrophic Plate Count, Total Coliform Bacteria, Colour, pH, Turbidity, Chloride, Monochloramine, Free Chlorine
Required	Raw Water (Borehole Water)	Daily	PC	pH, Conductivity and Turbidity to be sampled
	Final Water	Daily	PC	pH, Conductivity, Turbidity and Disinfectant residuals to be sampled
		Weekly	PC	E.Coli and Heterotrophic plate count to be sampled.
		Monthly	External Lab	Current sampling is adequate
	Distribution System	Monthly	External Lab	Current sampling is adequate

The current operational sampling of the water quality is not adequate for all the systems. Appropriate data capturing and record keeping systems also need to be put in place to satisfy the requirements of the Water Services Act.

The table below indicates the compliance of the E.Coli monitoring frequency in the water distribution systems of Cederberg Municipality, in terms of the minimum requirements of SANS:241-2: 2015 (Table 2). The period assessed was for samples taken from July 2021 to June 2022.

Table A.6.9: Cederberg Municipality's compliance of the monthly E.Coli Monitoring frequency in the water distribution 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 E.Coli samples taken by Municipality during 2021/2022
Citrusdal	8 438	2	3.3
Clanwilliam	10 849	2	3.4
Elands Bay	1 650	2	3.3
Graafwater	2 885	2	3.2
Lamberts Bay	7 810	2	2.9
Leipoldtville	257	2	2.2
Wupperthal	1 350	2	1.5
Paleisheuwel	32	2	1.8
Elandskloof	306	2	-
Algeria	292	2	2.2
Total	**33 869**	**20**	**23.8**

It can be noted from the above table that the number of current monthly microbiological samples taken over the last financial year was sufficient for all the systems, except for one or two more samples that were required for Wupperthal and Paleisheuwel. No samples were also taken for Elandskloof.

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 Cederberg Municipality's Management Area are summarised in the tables below.

Table A.6.10: Percentage Microbiological (Faecal Coliforms) compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2019/2020	2020/2021	2021/2022
Citrusdal (Discharge)	0.0%	0.0%	25.0%
Citrusdal (Irrigation)	0.0%	0.0%	25.0%
Clanwilliam	11.1%	0.0%	37.5%
Elands Bay	100.0%	100.0%	100.0%
Graafwater	100.0%	100.0%	100.0%
Lamberts Bay	54.5%	72.7%	100.0%
Algeria	100.0%	100.0%	100.0%
Wupperthal	100.0%	100.0%	100.0%
Total	**58.0%**	**53.8%**	**75.8%**

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

WWTW	2019/2020					2020/2021					2021/2022				
	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall
Citrusdal (Discharge)	0.0%	100.0%	0.0%	0.0%	**25.0%**	27.3%	72.7%	36.4%	9.1%	**36.4%**	83.3%	0%	100.0%	0.0%	**45.8%**
Citrusdal (Irrigation)	0.0%	100.0%	0.0%	100.0%	**50.0%**	36.4%	90.9%	45.5%	100.0%	**68.2%**	100.0%	58.3%	100.0%	91.7%	**87.5%**
Clanwilliam	0.0%	100.0%	55.6%	100.0%	**63.9%**	9.1%	100.0%	45.5%	81.8%	**59.1%**	25.0%	100.0%	75.0%	100.0%	**75.0%**
Elands Bay	N/A	N/A	100.0%	N/A	**100.0%**	N/A	N/A	100.0%	N/A	**100.0%**	N/A	N/A	100.0%	N/A	**100.0%**
Graafwater	N/A	N/A	100.0%	N/A	**100.0%**	N/A	N/A	100.0%	N/A	**100.0%**	N/A	N/A	100.0%	N/A	**100.0%**
Lamberts Bay	18.2%	100.0%	18.2%	27.3%	**40.9%**	27.3%	100.0%	54.5%	36.4%	**54.6%**	61.5%	100.0%	69.2%	46.2%	**69.2%**
Algeria	N/A	N/A	100.0%	N/A	**100.0%**	N/A	N/A	100.0%	N/A	**100.0%**	N/A	N/A	100.0%	N/A	**100.0%**
Wupperthal	N/A	N/A	100.0%	N/A	**100.0%**	N/A	N/A	100.0%	N/A	**100.0%**	N/A	N/A	100.0%	N/A	**100.0%**

Table A.6.11: Percentage Chemical compliance of the compliance samples taken at the various WWTWs for the last three financial years															
WWTW	2019/2020					2020/2021					2021/2022				
	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall
Total	**4.5%**	**100.0%**	**58.0%**	**54.5%**	**56.8%**	**25.0%**	**90.9%**	**69.2%**	**56.8%**	**61.9%**	**71.1%**	**62.2%**	**93.7%**	**55.6%**	**75.7%**

Table A.6.12: Percentage Physical compliance of the compliance samples taken at the various WWTWs for the last three financial years.												
WWTW	2019/2020				2020/2021				2021/2022			
	pH	Electrical Conductivity	Total Suspended Solids	Overall	pH	Electrical Conductivity	Total Suspended Solids	Overall	pH	Electrical Conductivity	Total Suspended Solids	Overall
Citrusdal (Discharge)	100.0%	0.0%	-	50.0%	90.9%	36.4%	100.0%	65.2%	91.7%	100.0%	90.0%	94.1%
Citrusdal (Irrigation)	100.0%	100.0%	-	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	90.0%	97.1%
Clanwilliam	100.0%	100.0%	11.1%	70.4%	100.0%	100.0%	9.1%	69.7%	87.5%	87.5%	25.0%	66.7%
Elands Bay	100.0%	90.9%	-	95.5%	100.0%	100.0%	N/A	100.0%	100.0%	100.0%	N/A	100.0%
Graafwater	100.0%	0.0%	-	50.0%	100.0%	0.0%	N/A	50.0%	100.0%	25.0%	N/A	62.5%
Lamberts Bay	100.0%	100.0%	27.3%	75.8%	90.9%	100.0%	0.0%	63.6%	100.0%	92.3%	69.2%	87.2%
Algeria	100.0%	100.0%	-	100.0%	72.7%	100.0%	N/A	86.4%	76.9%	100.0%	N/A	88.5%
Wupperthal	91.7%	100.0%	-	95.8%	90.9%	100.0%	N/A	95.5%	100.0%	100.0%	N/A	100.0%
Total	**98.9%**	**75.0%**	**20.0%**	**80.1%**	**92.3%**	**89.7%**	**12.5%**	**80.6%**	**94.7%**	**88.4%**	**70.7%**	**87.9%**

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

Table A.6.13: Trend of Microbiological, Chemical and Physical compliance percentages for the various WWTWs									
WWTW	2014/2015 to 2016/2017			2016/2017 to 2018/2019			2018/2019 to 2020/2021		
	Micro.	Chemical	Physical	Micro.	Chemical	Physical	Micro.	Chemical	Physical
Citrusdal	Same	Same	Same	Same	Decrease	Decrease	Increase	Increase	Increase
Clanwilliam	Decrease	Decrease	Decrease	Increase	Increase	Increase	Increase	Increase	Decrease
Elands Bay	Same	Same	Decrease	Same	Same	Increase	Same	Same	Increase
Graafwater	Decrease	Decrease	Same	Increase	Increase	Same	Same	Same	Increase
Lamberts Bay	Same	Same	Same	Decrease	Decrease	Decrease	Increase	Increase	Increase
Algeria	Increase	Same	Increase	Increase	Same	Same	Same	Same	Decrease
Wupperthal	Decrease	Decrease	Increase	Increase	Increase	Decrease	Same	Same	Increase

Industrial Consumers: The industrial consumers in Cederberg Municipality's Management Area are not yet monitored, with regard to the quality and volume of effluent discharged by them. Very limited information regarding the discharge of effluent by industrial consumers in Cederberg Municipality Management Area is known.

TOPIC 7: FINANCIAL

Capital Budget: The table below gives an overview of Cederberg Municipality's historical water and sewerage capital expenditure over the last seven 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
2015/2016	R5 783 279	R3 871 132	66.9%	R24 807 148	R25 327 635	102.1%
2016/2017	R42 396 644	R20 934 496	49.4%	R16 062 322	R3 159 693	19.7%
2017/2018	R10 450 845	R6 169 500	59.0%	R28 907 384	R10 396 233	36.0%
2018/2019	R18 008 588	R16 710 966	92.8%	R2 840 240	R2 858 914	100.7%
2019/2020	R21 423 865	R5 974 199	27.9%	R12 204 669	R5 296 767	43.4%
2020/2021	R7 973 001	R7 364 363	92.4%	R18 426 665	R19 824 414	107.6%
2021/2022	R29 497 894	R19 448 606	65.9%	R6 207 586	R3 999 131	64.4%
Total for 7 yrs	**R135 534 116**	**R80 473 262**	**59.4%**	**R109 456 014**	**R70 862 787**	**64.7%**
Average per yr	**R19 362 047**	**R11 496 180**	**59.4%**	**R15 636 573**	**R10 123 255**	**64.7%**

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

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

Service	Expenditure / Income	Actual 17/18	Actual 18/19	Actual 19/20	Actual 20/21	Actual 21/22
Water	Expenditure	R19 083 654	R28 272 059	R30 070 969	R32 931 063	R30 227 126
	Income	-R41 484 976	-R44 312 179	-R36 587 863	-R41 148 365	-R73 793 480
	Surplus / (Deficit)	**-R22 401 322**	**-R16 040 120**	**-R6 516 894**	**-R8 217 302**	**-R43 566 354**
Sanitation	Expenditure	R8 306 697	R14 611 985	R13 726 113	R15 075 617	R14 945 580
	Income	-R18 004 671	-R13 271 403	-R13 956 929	-R35 686 913	-R28 707 822
	Surplus / (Deficit)	**-R9 697 974**	**R1 340 582**	**-R230 816**	**-R20 611 296**	**-R13 762 242**

Tariff and Charges: The first six (6) kl of water is provided free to all indigent registered households. Cederberg Municipality's tariffs support the viability and sustainability of water supply services to the poor through cross-subsidies (where feasible). Free basic water and sanitation services are linked to the Municipality's Indigent Support Policy and all indigent households therefore receive free basic water and sanitation services. Indigent registered households receive 6kl water free and no basic charges per month for water and sewerage. Indigent registered households also receive two free septic tank removals per month.

Cederberg Municipality's current (2022/2023) water and sewage tariffs are based on the following:

- A four block step rising residential tariff structure with the first 6 kl/month being free for all indigent registered households (Subsidised).
- A two block step rising tariff structure for Commercial, Business and Industrial consumers.
- A four block step rising tariff structure for Hotel and Holiday Accommodation, Old Age Homes, Churches, Schools, Hostels, Day Care and Hospital consumers with no free water.
- Drought and Emergency water restriction tariffs are also in place.
- Basic sewage charge and availability fee for residential consumers is a fixed charge irrespective of the number of toilets.
- The sewage tariff for business consumers is fix for up to 3 toilets, with an additional charge per toilet for more than three toilets.
- The sewage tariff for Hotels, Flats, Schools, Hostels and Old Age Homes is fix per toilet and consumers pay according to the number of toilets on their premises.
- Fix sewage tariffs are also in place for the emptying of septic or conservancy tanks, tariffs for single and double loads.

Cederberg Municipality's current water tariffs comprise both of a fixed and a variable charge based on consumption. The cost consumers had to pay for their water in Cederberg Municipality's Management Area, for the various years, is presented on the graph below.

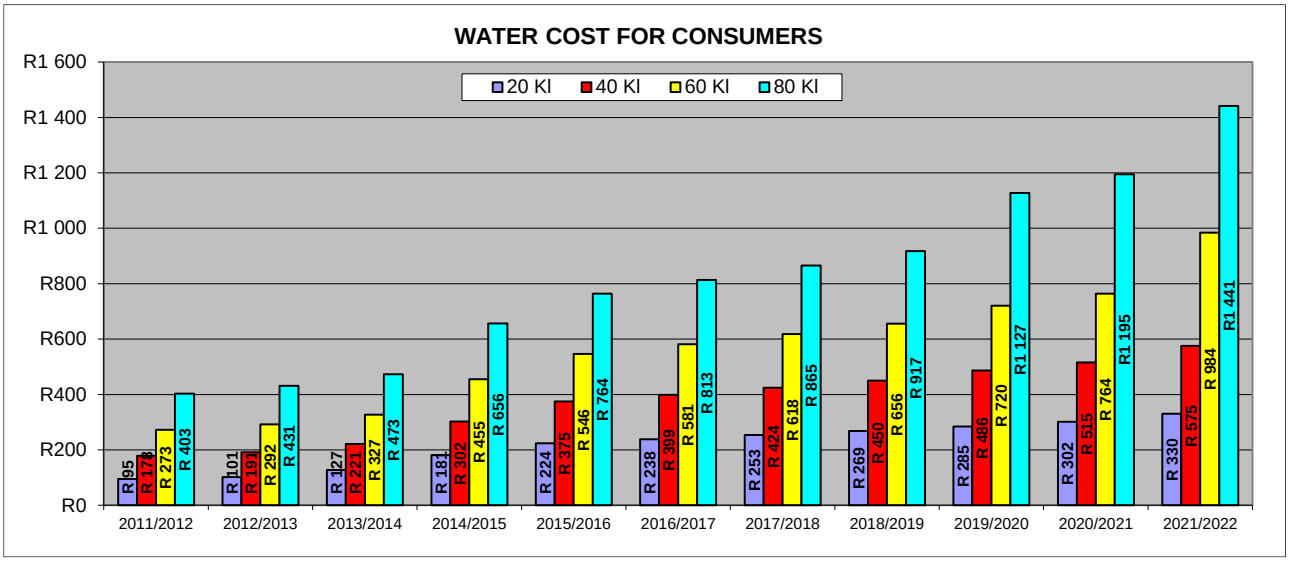


Figure A.7.1: Water Cost for Residential Consumers

TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

Cederberg Municipality is the WSA for the entire Municipal Management Area and also acts as the WSP for the whole area, except for Elandskloof and Wupperthal. SALGA, DLG and Cederberg Municipality are currently developing a Memorandum of Understanding between the Moravian Church and the Municipality with regard to service delivery.

Cederberg Municipality's latest Water and Sewer Master Plan process entails the establishment of computer models for the water systems and the sewer systems in Cederberg 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 Cederberg Municipality's water distribution and sewer drainage systems. The Water and Sewer Master Plans (2023) were incorporated into the WSDP. All forward planning for water and sanitation services and water and sewerage infrastructure is guided by the Water and Sewer Master Plans.

Water Safety Plans for the various WTWs and water distribution systems and W_2RAPs for the various WWTWs and sewer drainage networks are not in place. Detail WWTW Process Audits also still need to be compiled for all the WTWs and WWTWs. The Municipality annually compile the WSDP Performance- and Water Services Audit Report, as required by the Water Services Act and the DWS.

The table below gives an overview of the required number of Process Controllers at the various WTWs.

Table A.8.1: Required number of Process Controllers at the various WTWs
Citrusdal WTW Process Controllers
The minimum requirement for a Class C WTW is one Class III Process Controller per shift, plus one on standby. For the Citrusdal WTW, with one shift, there should therefore be two Process Controllers with minimum Class III classifications. The second Process Controller at the WTW needs to register as a Class III Process Controller as soon as possible.
Graafwater WTW Process Controllers
The minimum requirement for a Class A WTW is one Class IV Process Controller per shift, plus one on standby. For the Graafwater WTW, with one shift, there should therefore be two Process Controllers with minimum Class IV classifications. The second Process Controller at the WTW needs to register as a Class IV Process Controller as soon as possible.
Lamberts Bay WTW Process Controllers
The minimum requirement for a Class D WTW is one Class II Process Controller per shift, plus one on standby. For the Lamberts Bay WTW, with one shift, there should therefore be two Process Controllers with minimum Class II classifications.

The table below gives an overview of the required number of Process Controllers at the various WWTWs.

Table A.8.2: Required number of Process Controllers at the various WWTWs
Citrusdal WWTW
The minimum requirement for a Class D WWTW is one Class II Process Controller per shift, plus one on standby. For the Citrusdal WWTW, with one shift, there should therefore be two Process Controllers with minimum Class II classifications. Both Process Controllers at the WWTW need to register as a Class II Process Controller as soon as possible.
Clanwilliam WWTW
The minimum requirement for a Class D WWTW is one Class II Process Controller per shift, plus one on standby. For the Clanwilliam WWTW, with one shift, there should therefore be two Process Controllers with minimum Class II classifications. Both Process Controllers at the WWTW need to register as a Class II Process Controller as soon as possible.
Elands Bay WWTW
The minimum requirement for a Class E WWTW is one Class I Process Controller per shift, plus one on standby. For the Elands Bay WWTW, with one shift, there should therefore be two Process Controllers with minimum Class I classifications. There is currently no Process Controllers at the Elands Bay WWTW.
Graafwater WWTW
The minimum requirement for a Class E WWTW is one Class I Process Controller per shift, plus one on standby. For the Graafwater WWTW, with one shift, there should therefore be two Process Controllers with minimum Class I classifications. The one Process Controller at the WWTW needs to register as a Class I Process Controller as soon as possible and one additional Class I Process Controller needs to be appointed for the WWTW.
Lamberts Bay WWTW
The new Lamberts Bay WWTW still needs to be classified. For the Lamberts Bay WWTW, with one shift, there should therefore be two Process Controllers with the required classifications, once the WWTW is classified. Currently there is only one Class I and two unclassified Process Controllers at the WWTW.

The approved organogram for the municipality had 408 posts for the 2021/2022 financial year. Posts vacant at the end of 2020/21 resulted in a funded vacancy rate of 15.4% compared to 342 posts of which 66 posts were vacant in 2021/22, resulting in a funded vacancy rate of 16.1% (Annual Performance Report 2021-2022).

The vacancies rates for both water and sanitation services are extremely high and Cederberg Municipality's current personnel is insufficient to effectively manage the water and sanitation services. Special focus is also required to ensure adequate rehabilitation and maintenance of the existing water and sewerage infrastructure. All forward planning for water and sanitation services and water and sewerage infrastructure should be guided by the updated Water and Sewer Master Plans (2023).

A Workplace Skills Plan is compiled every year and the specific training needs of the personnel, with regard to water and wastewater management are determined annually.

The Performance Management System implemented at the municipality is a comprehensive, step by step planning approach helping the municipality to effectively manager performance through planning and measuring indicators. A performance management policy framework was approved by Council, which provides for performance implementation, monitoring and evaluation at organisational as well as individual levels.

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.

A comprehensive Customer Services and Complaints system is not yet in place for Cederberg Municipality, with response times to address the complaints. All received complaints are currently registered in a logbook system and given through to the relevant Department to address. Data with regard to the number of water and sanitation complaints received was however not made available for the WSDP. After hour emergency requests are being dealt with by the control room on a twenty four hour basis.

A Consumer Services Charter for Water Services was developed with support from SALGA. The purpose of the Charter is firstly to improve municipal efficiency and performance by providing reliable, responsive, competent, accessible, courteous, confidential and secure services to the residents. The Charter provides an explanation of the services offered for drinking water, wastewater collection and treatment. Secondly, the Charter provides information on a range of consumer service processes such as service connections, metering, billing, maintenance work, complaints and dispute resolution.

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

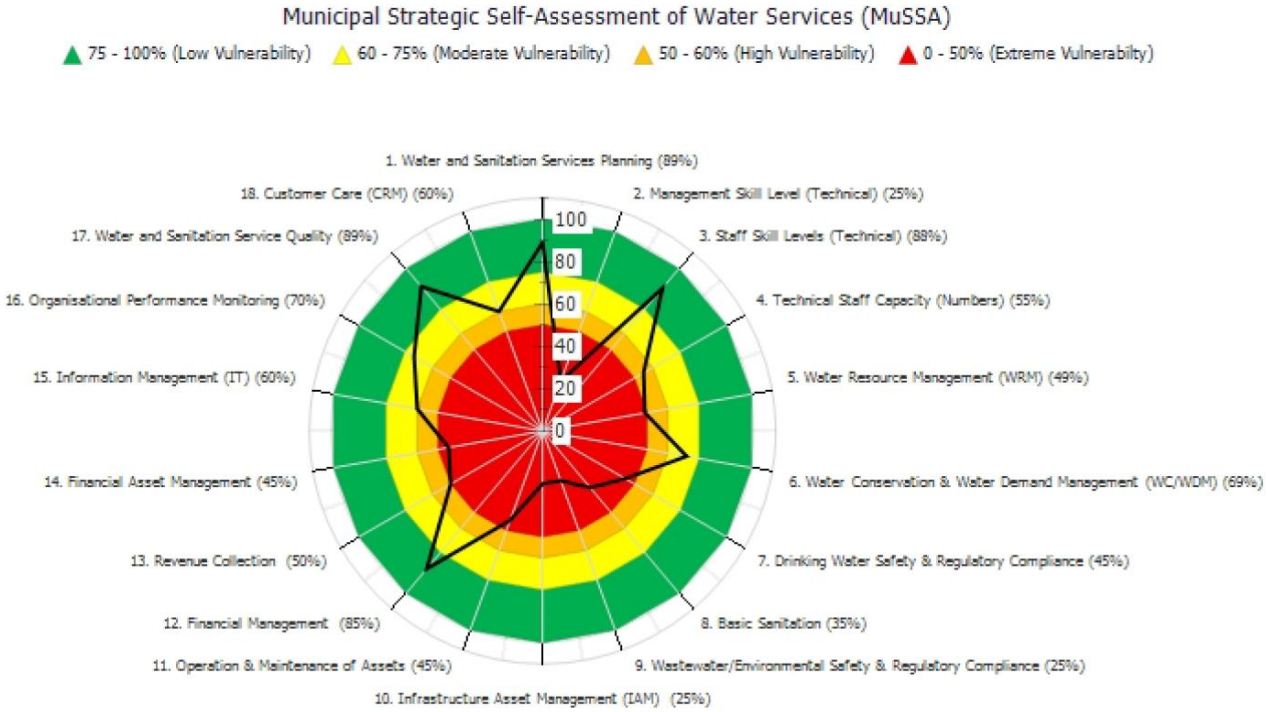


Figure A.8.1: Spider Diagram of the Vulnerability Levels of Cederberg Municipality for 2020

Cederberg Municipality's Vulnerability Index for 2020 was indicated as 0.74 "High Vulnerability". The areas of concern evident from the 2020 assessment are Infrastructure Asset Management (IAM) (25.0%), Operation & Maintenance of Assets (45.0%), Revenue Collection (50.0%), Financial Asset Management (45.0%), Management Skill Level (Technical) (25.0%), Technical Staff Capacity (Numbers) (55.0%), Water Resource Management (WRM) (49.0%), Drinking Water Safety & Regulatory Compliance (45.0%), Basic Sanitation (35.0%) and Wastewater/Environmental Safety & Regulatory Compliance (25.0%).

DWS's Blue Drop Process

The DWS completed the Blue Drop PAT process for the WSAs in 2021. Blue drop status is awarded to those towns that comply with 95% criteria on drinking water quality management. The blue drop performance of Cederberg Municipality was summarised as follows in the DWS's 2014 Blue Drop Report, which was the last complete assessment done by the DWS.

Table A.8.3: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)

Municipal Blue Drop Score	2011 – 51.05%, 2012 – 80.39% and 2014 – 39.96%

Regulatory Impression: The Cederberg Local Municipality failed to present the necessary evidence to assess compliance with the Blue Drop criteria resulting in a disappointing Municipal Score for this assessment and a significant and substantial decline for all criteria when compared with the 2012 Blue Drop score. With the exception of the Graafwater system, the Water Safety Plans which were found to be so promising in the previous assessment have not been reviewed nor updated, and no evidence could be presented of the implementation of any recommendations that were made. The Municipality is reminded that they are required to regularly assess and review risks to producing drinking water of an acceptable standard and to implement corrective actions. The Water Safety Plan should be informed by the recommendations of a process audit and any water quality risks identified through the SANS 241 analysis of the catchment, treatment, and reticulated water. The incident management protocol should also be informed by the risk assessment which defines alert levels and response times to guide all role players with regard to the response and corrective actions when water does not comply with the required quality standards. This must be formally communicated to municipal officials.

Risk based monitoring should be informed by the risk assessment and should comply with the requirements of SANS 241 with regard to sampling points, frequency of analyses and the determinants that are analysed. Currently, no chemical determinants are analysed to monitor the quality of the water and potential health impacts. In addition, no water quality results are available for the Paleisheuwel system and only limited data for the Algeria system. Although these systems were previously managed by the West Coast District Municipality, it is a legal requirement of the Cederberg Local Municipality to monitor the quality of water supplied to communities within its area of jurisdiction. It is noted that this remains an issue of concern during 2014. The poor microbiological quality water produced at the Elands Bay and Lamberts Bay is highlighted for urgent attention.

The Municipality is encouraged to continue with the development of water balances for all systems and to commence with the implementation of the Water Demand Management Strategy which has been approved by Council to reduce non-revenue water.

The Municipality was not prepared for the assessment which was attended by only one municipal official. The commitment of management at the Municipality must be strengthened and responsibilities for water quality formalised, in order to improve compliance and to ensure the production of excellent quality drinking water within all systems. Based on the above Audit results, the DWS has serious concerns on the lack of information or poor microbiological drinking water quality and the resultant risk to consumers of the Elands Bay, Lamberts Bay and Paleisheuwel water supply systems. These concerns have to be addressed as a matter of urgency and drinking water quality results and appropriate actions must be communicated to consumers should the water be found to be unfit for human consumption.

Site Inspection Score: Elands Bay WTW 62%

Performance Area	Algeria	Citrusdal	Clanwilliam	Elands Bay	Graafwater	Lamberts Bay	Leipoldtville	Paleisheuwel
Water Services Provider(s)	**Cederberg LM**	**Cederberg LM**	**Cederberg LM**	**Cederberg LM**	**Cederberg LM**	**Cederberg LM**	**Cederberg LM**	**Cederberg LM**
Water Safety Planning	7.35	14.18	11.03	12.08	21.18	15.23	12.08	4.73
Treatment Process Management	0.00	5.16	3.20	3.16	6.80	3.16	1.20	0.00
DWQ Compliance	3.90	15.75	15.00	4.95	15.75	4.95	15.75	0.00
Management Accountability	0.60	2.10	2.10	2.10	2.10	2.10	2.10	0.00
Asset Management	1.93	3.50	2.45	2.45	7.67	1.93	3.50	3.50
Use Efficiency, Loss Management	0.27	1.98	1.68	0.18	0.18	0.27	0.27	0.18
Bonus Scores	0.38	2.63	2.03	2.63	2.43	1.50	0.00	0.00
Penalties	1.40	0.00	0.00	0.00	0.00	0.83	0.00	0.50
Blue Drop Score (2014)	**13.02%**	**45.29%**	**37.48%**	**27.54%**	**56.10%**	**28.30%**	**34.90%**	**7.90%**
Blue Drop Score (2012)	N/A	82.9%	73.4%	79.6%	82.2%	87.3%	82.2%	N/A
Blue Drop Score (2011)	N/A	55.8%	40.2%	53.3%	51.5%	55.8%	54.9%	N/A
System Design Capacity (Ml/d)	N/A	3.000	N/A	N/A	1.100	2.300	0.300	N/A

Table A.8.3: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)								
Operational Capacity (% i.t.o. Design)	N/A	72%	N/A	N/A	51%	35%	N/A	N/A
Average daily consumption (l/p/d)	42.1	299.6	120.0	120.0	252.1	130.7	872.5	120.0
Microbiological Compliance (%)	**99.9%**	**97.1%**	**99.9%**	**94.1%**	**99.9%**	**94.1%**	**99.9%**	**0.0%**
Chemical Compliance (%)	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**99.9%**	**0.0%**

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

Table A.8.4: BDRR for the Cederberg Municipality (2022)

WSA Overview

The Citrusdal WSS, Clanwilliam WSS, Elands Bay WSS, Graafwater WSS and Lambert`s Bay WSS falls in the low-risk category followed by Algeria WSS and Leipoldtville WSS which fall in the medium-risk category followed by Paleisheuwel WSS and Wuppertal WSS which falls in the high-risk category.

Criteria A: The information of the Design Capacity for the Algeria WSS, Paleisheuwel WSS and Wuppertal WSS was not provided.

Criteria B: The Lambert`s Bay WSS, Citrusdal WSS, Clanwilliam WSS, Elands Bay WSS and Graafwater WSS are operating within their design capacity. The Leipoldtville WSS is operating above its design capacity and no operational capacity information was provided for the Algeria WSS, Paleisheuwel WSS and Wuppertal WSS. This is an indication of the absence of flow management and of Treatment Works Classification.

Criteria C: The Algeria WSS, Lambert`s Bay WSS, Citrusdal WSS, Clanwilliam WSS, Elands Bay WSS and Graafwater WSS achieved excellent compliance for Microbiological Compliance (>98%). The Clanwilliam WSS, Elands Bay WSS, Graafwater WSS and Wuppertal WSS achieved excellent compliance for Microbiological Monitoring compliance (>80%). The Algeria WSS, Citrusdal WSS and Lambert`s Bay WSS achieved excellent compliance for Chemical compliance (>98%). None of the WSS has achieved compliance for Chemical Monitoring compliance, this is an indication of non-compliance and must be addressed by the WSA.

Criteria D: None of the WSS has achieved excellent compliance for technical skills which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E: There is no Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015 presented for all the Water Supply Systems at this WSA.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

A and B: Verification of design capacity for the Water Supply Systems that have not provided the design capacity.

A and B: Installation of calibrated inflow meters to verify operational capacity.

Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.

Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.

D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.

E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Assessment Areas	Algeria	Citrusdal	Clanwilliam	Elands Bay	Graafwater	Lamberts Bay	Leipoldtville	Paleisheuwel	Wupperthal
A: Total Design Capacity (Ml/d)	N/I	8.300	6.900	1.000	7.5	5.2	0.5	N/I	N/I
B: % Operational Capacity in terms of design	N/I	34.9%	42%	50%	8%	34.6%	2680%	N/I	N/I
C1a: % Microbiological Compliance	100%	100%	100%	100%	100%	100%	87.5%	93.3%	3.3%
C1b: % Microbiological Monitoring Compliance	54.2%	91.7%	100%	100%	100%	91.7%	91.7%	50%	100%
C2a: % Chemical Compliance	98%	100%	87.8%	91.8%	95.9%	99.7%	72%	95.5%	85.7%
C2b: % Chemical Monitoring Compliance	5.8%	5.9%	5.9%	5.9%	8.8%	5.9%	5.9%	5.9%	5.9%
D: % Technical Skills	25%	43.8%	25%	25%	43.8%	43.8%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%	0%	0%	0%	0%	0%
% BDRR/BDRR max	**53.4%**	**17.7%**	**35.8%**	**35.4%**	**20.9%**	**17.7%**	**53.9%**	**74.4%**	**72.3%**

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

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

Distribution System	2021/2022			2020/2021			2019/2020		
	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)
Citrusdal	8 438	593	**70.3**	8 193	675	**82.4**	7 954	762	**95.8**
Clanwilliam	10 849	981	**90.4**	10 482	1 133	**108.1**	10 128	1 001	**98.8**
Elands Bay	1 650	230	**139.4**	1 634	263	**161.0**	1 618	227	**140.3**
Graafwater	2 885	420	**145.6**	2 815	431	**153.1**	2 746	396	**144.2**
Lamberts Bay	7 810	756	**96.8**	7 619	834	**109.5**	7 433	725	**97.5**
Distribution System	**2018/2019**			**2017/2018**			**2016/2017**		
	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)	Estimated Permanent Population	Aver. Daily Billed Metered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)
Citrusdal	7 722	790	**102.3**	7497	968	**129.1**	7 279	959	**131.7**
Clanwilliam	9 785	1 041	**106.4**	9454	1 060	**112.1**	9 134	1 144	**125.2**
Elands Bay	1 602	221	**138.0**	1586	300	**189.2**	1 570	254	**161.8**
Graafwater	2 679	355	**132.5**	2614	335	**128.2**	2 550	367	**143.9**
Lamberts Bay	7 252	711	**98.0**	7075	644	**91.0**	6 903	794	**115.0**

Notes: The average residential billed metered consumption in the above table is for the period July to June for each financial year, excluding the period November to February for Elands Bay and Lamberts Bay.

Bulk meter readings and billed metered consumption figures were not available for Leipoldtville, Paleisheuwel and Algeria

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

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

Average Green Drop Score	2009 – 3.00%, 2011 – 63.10%, 2013 – 35.50%, 2021 – 50.0%

Regulator's Comment: Cederberg Local Municipality has shown an impressive improvement in its overall Green Drop score from 36% to 50% in 2021. This is primarily attributed to by a cohesive team of dedicated municipal officials, despite challenging circumstances. Cederberg is congratulated for this remarkable improvement. The Regulator noted that the staff capacity is stretched, hence, not all required audit information was provided. Notably, none of the systems have risk abatement plans developed over the last few years, which compromises a risk-informed budget and action plan.

Citrusdal works has recently been upgraded, however, the WSA failed to present all evidence to convince the Regulator that the PMU report contains crucial information about the works. The visited WWTW appeared well managed in the field, but administration and monitoring aspects were lacking. The budget and expenditure reports presented during the assessment audit was unclear and difficult to interpret for each of the systems. Production cost and energy cost drivers need attention. Priority needs to be given to the classification of Process Controllers for all works.

Lack of basic data such as design capacities and organic loading was also noted. A thorough process audit (per unit process) and risk abatement planning process will likely resolve this gap, coupled with modelling of the available capacity (hydraulic and organic). Regrettably, as result of these gaps, three of the seven WWTWs are in high-risk positions and need to be prioritised for risk intervention. The Regulator is satisfied with the progress trend, and hopeful that this pattern will continue to break the 70% Green Drop mark in 2023**.**

Green Drop findings:

1. None of the systems have fully compliant Process Controllers in place.
2. No inhouse scientists are employed within the municipality – this may compromise the day-to-day operations at the treatment plants and need to be investigated.
3. No active sludge management planning or monitoring are taking place.
4. None of the 7 systems achieved compliance against their effluent quality limits – this may be more a function of lacking Process Control and scientific skills than that of infrastructure deficiencies.
5. Poor effluent compliance of all the treatment works is a concern, with zero of the systems complying with the collective three (3) effluent quality categories.
6. Three of the seven WWTWs are in high-risk positions and need to be prioritised for risk intervention.
7. Budget had been secured for capital projects for replacement and upgrades at selected WWTWs:
   a. R960 000: Clanwilliam covid 19 project - access to sanitation.
   b. R13 315 000: Citrusdal new WWTW MIG allocated but total project cost R57 711 531 MIG Portion: R6 000 000 MIG Balance: R 19 704 567. Estimated cost to complete WWTW: R23 223 176. R3 572 151 spent in 2019/20.
   c. R6 000 000: Lamberts Bay WWTWs upgrade in planning stage.

The Clanwilliam WWTW was inspected to verify the Green Drop audit findings (**Site Inspection Score for Clanwilliam WWTW 67%):**

- The inlet works with hand-rake screens, grit chamber and flow splitter box was in satisfactory condition and well managed with screenings removed daily.
- The flume metering system was dysfunctional and incoming flow was not measured.
- Two activated sludge modules (oxidation ditch type), one older and one recently refurbished, were both in good condition.
- MLSS for the older reactor was not optimal and would compromise nutrient removal.
- The two clarifiers were in good condition with overflow weirs and launders relatively clean and appeared well managed. Sludge recycle to the reactors took place, but no ratios were calculated or used to optimise the plant.
- Electrical gear inside the chlorine dosing room was in poor condition.
- Treated effluent was discharged to a maturation pond with 1125 m^3 storage capacity
- Disinfection was done by means of floating chlorine tablets as the chlorine gas system was dysfunctional – this was evident from the poor microbiological compliance that is seen at final sampling point.
- The maturation pond has internal division walls with a plug flow configuration - short-circuiting was evident as result of broken channel walls.

Table A.8.6: Green Drop Performance of the Cederberg Municipality (DWS's 2022 Green Drop Report)								
GREEN DROP REPORT CARD								
Key Performance Area	**Weight**	**Clanwilliam**	**Citrusdal**	**Lamberts Bay**	**Elands Bay**	**Algeria**	**Wupperthal**	**Graafwater**
A: Capacity Management	15%	84.0%	84.0%	84.0%	80.0%	55.0%	67.5%	67.5%
B: Environmental Management	15%	59.0%	60.0%	57.0%	73.8%	68.8%	68.8%	43.8%
C: Financial Management	20%	51.0%	51.0%	51.0%	38.8%	20.0%	38.8%	38.8%
D: Technical Management	20%	60.5%	40.5%	40.5%	29.4%	5.9%	14.7%	14.7%
E: Effluent and Sludge Compliance	30%	12.0%	44.0%	24.0%	11.3%	48.4%	64.4%	10.3%
F: Bonus		24.0%	37.5%	7.5%	15.0%	7.5%	7.5%	7.5%
G: Penalties		0.0%	-25.0%	0.0%	0.0%	0.0%	0.0%	0.0%
H: Disqualifiers		None	None	None	None	None	None	None
2021 Green Drop Score		**51%**	**55%**	**48%**	**42%**	**39%**	**51%**	**32%**
2013 Green Drop Score		**52%**	**40%**	**41%**	**24%**	**18%**	**10%**	**27%**
2011 Green Drop Score		**63%**	**67%**	**66%**	**57%**	**0%**	**0%**	**57%**
2009 Green Drop Score		**3%**	**3%**	**3%**	**3%**	**0%**	**0%**	**3%**
System Design Capacity (Ml/d)		3.000	2.300	3.000	0.500	0.050	0.500	0.500
Design Capacity Utilisation (%)		70%	22%	53%	50%	20%	50%	60%
Resource Discharged into		20% to Jan Diesel (80% irrigated)	Boontjies River	Irrigation	Jakkels River (100% Irrigated)	Rondegat River	Grootvis River	None (full irrigation use)
Microbiological Compliance (%)		Insufficient data set	18%	69%	58%	60%	100%	Insufficient data set
Chemical Compliance (%)		Insufficient data set	61%	23%	0%	50%	0%	Insufficient data set
Physical Compliance (%)		Insufficient data set	100%	81%	75%	90%	50%	Insufficient data set
Wastewater Risk Rating (CRR% of CRRmax)								
2011 CRR (%)		**82.4%**	**35.3%**	**35.5%**	**70.6%**	**NA**	**100.0%**	**35.5%**
2013 CRR (%)		**58.8%**	**64.7%**	**82.4%**	**64.7%**	**88.2%**	**100.0%**	**52.9%**
2021 CRR (%)		**82.4%**	**52.9%**	**64.7%**	**64.7%**	**70.6%**	**64.7%**	**82.4%**

SECTION B: STATE OF WATER SERVICES PLANNING

DWS's new WSDP website was rolled-out to all the WSAs in the West Coast District on the 31st of October 2017. This 2022-2027 WSDP was done according to the new WSDP guidelines and is an update of Cederberg Municipality's previous WSDP.

The Municipality annually compile the WSDP Performance- and Water Services Audit Report, which is submitted to Council with the Annual Report. 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 Cederberg Municipality's Annual Report. The 2021/2022 WSDP Performance- and Water Services Audit Report was approved by Council as part of the Municipality's Annual Report.

Water Safety Plans and W_2RAPs still need to be drafted for the various WTWs and water reticulation networks and WWTWs and sewer drainage networks. Detail WTW and WWTW Process Audits also need to be compiled for the treatment plants.

Water Safety Plans are a form of water quality assurance through a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. The multiple barrier principle implies that actions are required at all stages in the process of producing and distributing water in order to protect water quality.

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 W_2RAPs, once drafted, need to be used by Cederberg Municipality to manage the identified risks according to its potential impacts on the receiving environment / community / resources.

Updated Water and Sewer Master Plans are in place. The existing Water and Sewer Master Plans, which were available for inclusion in Cederberg Municipality's WSDP, were as follows:

- Water Master Plan, Cederberg Municipality, Feb 2023, GLS Consulting
- Sewer Master Plan, Cederberg Municipality, Feb 2023, GLS Consulting

The following water and sanitation related investigations were successfully completed during the 2021/2022 financial year.

- A Study to Analyse Treasury Data and Identify Projects that Promote WC/WDM in Cederberg Local Municipality, GLS, June 2022.
- Clanwilliam Wastewater Treatment Plant, Status Quo Report, UDS Africa, July 2021.
- Site Monitoring Reports, Lamberts Bay Boreholes, April 2022.
- Cederberg Municipality continues with the implementation of their Drinking Water Quality and Effluent Quality Compliance Sampling Programmes.
- The Asset Register was updated with all the new water and sewerage infrastructure completed during the last financial year.

SECTION C: WATER SERVICES EXISTING NEEDS PERSPECTIVE

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

- The intervention required to address the gap;
- The proposed solution to address the gap; and
- 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 Cederberg Municipality is "**Cederberg Municipality, your future of good governance, service excellence, opportunities and a better life**"

Cederberg Municipality's Strategic Objectives as included in the 2022/2023 IDP are as follows:

- SO1: Improve and sustain basic service delivery and infrastructure development.
- SO2: Financial viability and economically sustainability.
- SO3: Good Governance, Community Development and Public Participation.
- SO4: Facilitate, expand and nurture sustainable economic growth and eradicate poverty.
- SO5: Enable a resilient, sustainable, quality and inclusive living environment and human settlements i.e. Housing development and informal settlement upgrade.
- SO6: To facilitate social cohesion, safe and healthy communities.
- SO7: Development and transformation of the institution to provide a people-centered human resources and administrative service to citizens, staff and Council.

The Water Sector's Vision, Goal and Objectives as included in the NWRS 2, as aligned with the vision of South Africa 2030, are as follows:

- Vision: Sustainable, equitable and secure water for a better life and environment for all.
- Goal: Water is efficiently and effectively managed for equitable and sustainable growth and development.
- 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 in an equitable and sustainable manner.

Cederberg Municipality's Management Area falls within the Berg-Olifants Catchment Management Area. A Catchment Management Strategy for the Berg-Olifants CMA is not yet in place. The NWA envisages that all water resources management functions, excluding those that have national strategic implications, should be delegated to the CMAs.

TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

Table 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	Yes	100.0	Continue with the implementation of the proposals for the five Strategic Objectives, as included in the draft 2022-2027 SDF, for each of the towns and ensure that new developments are in line with these priority action plans.	100.0	Yes	78.6
	Yes	100.0	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 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.	100.0	Yes	78.6

Table 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)**
Summary by Settlement Group	No	100.0	-	-	-	100.0
Assessment Score by Settlement Type	No	100.0	-	-	-	100.0
Amenities Summary	No	100.0	-	-	-	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?

Cederberg Municipality's draft 2023-2027 SDF list the following five Spatial Objectives and specific Strategies to achieve them.

Table C.1.2: Draft Spatial Objectives and Strategies (2023-2027 SDF)	
Spatial Objective	**Spatial Strategies**
Objective 1: Grow and unlock economic prosperity.	• Strategy 1: Grow the economy and stimulate sector diversification and product development. • Strategy 2: Strengthen mobility and economic links (investor confidence). • Strategy 3: Develop product and trade advantages (export value chain & agri-industry corridors) and competitive advantage.
Objective 2: Proximate, convenient and equal access.	• Strategy 4: Protect economic vibrancy. • Strategy 5: Provide sustainable infrastructure and services (smart growth). • Strategy 6: Provide zoned land for residential and industrial development.
Objective 3: Sustain material, physical and social well-being.	• Strategy 7: Protect safety and security. • Strategy 8: Protect fundamental community resources (air, water and energy). • Strategy 9: Provide social infrastructure and services (as per norm) to facilitate smart growth. • Strategy 10: Manage risk and disaster (man-made and natural).
Objective 4: Protect and grow place identity (sense of place) and cultural integrity.	• Strategy 1: Grow economy (landscape and conservation, tourism and new markets and economic sectors) and stimulate sector diversification. • Strategy 11: Protect heritage resources and place of identity. • Strategy 12: Grow cultural potential.
Objective 5: Protect ecological and agricultural integrity.	• Strategy 4: Develop competitive advantage (Landscape and cultivation), new markets and economic sectors (e.g. tourism and utilities). • Strategy 13: Protect food and water security and apply bioregional classification. • Strategy 14: Grow conservation potential and formalize conservation of CBAs and apply coastal management. • Strategy 15: Protect and preserve sensitive habitats and enhancing Ecosystem services.

Cederberg Municipality approved a housing delivery pipeline to address the housing backlog. The implementation of the pipeline is dependent on funding allocation from the national and provincial government in terms of the Division of Revenue Act (DORA). Other aspects which also needs to be taken into consideration are the access to basic services (Electricity, water, sanitation, transport and economic amenities), which is a pre- determined requirement for the implementation of housing projects.

The housing delivery pipeline was amendment during 2020/21 financial year with aim of aligning it with the type of housing need in the area as guided by the housing demand profile to be established through the implementation of housing consumer education programmes.

All schools and medical facilities in the urban areas in Cederberg Municipality are provided with a higher level of water and sanitation service (Water connection inside the erven and a waterborne sewer system) and no specific strategies with regard to the provision of water and sanitation services for the educational and medical facilities in the urban areas were therefore developed.

The existing service levels (Water and Sanitation) of the primary schools in the rural areas need to be verified. All schools in the rural areas without basic water and sanitation services need to be provided with at least basic services.

TOPIC 2: SERVICE LEVELS

Topic C.2.1: Service Levels Profile						
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)**
Direct Backlog Water	Yes	100.0	Assist private landowners as far as possible with the provision of basic water services to all the households in the Municipality's Management Area with existing water service levels below RDP standard, once practical guidelines and funding become available from the DWS.	100	No	57.1
Direct Backlog Sanitation	Yes	100.0	Provide basic sanitation services to the households in Leipoldtville and Elandskloof (Moravian Church) without current sanitation services.	100	No	57.1
	Yes	100.0	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 RDP standard, once practical guidelines and funding become available from the DWS.	100	No	57.1
Water Services Infrastructure Supply Level Profile	No	100.0	-	-	-	100.0
Water Reliability Profile	Yes	100.0	Verify the current communal water facilities in the informal areas. Continue with the provision of communal services in the informal areas in order to ensure that the ratio of number of households per facility complies with the target of 25 or less households per tap. Assist private landowners as far as possible with the provision of basic water services to all the households on the farms in the rural areas with existing water service levels still below RDP standard, once practical guidelines and funding become available from DWS.	100	Partially	57.1
Sanitation Service Infrastructure Supply Level Profile	No	100.0	-	-	-	100.0
Sanitation Reliability Profile	Yes	100.0	Verify the current communal sanitation facilities in the informal areas. Continue with the provision of communal services in the informal areas in order to ensure that the ratio of number of households per facility complies with the target of 5 or less households per toilet facility. Provide basic sanitation services to the households in Leipoldtville and Elandskloof (Moravian Church) without current 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 RDP standard, once practical guidelines and funding become available from DWS.	100	Partially	57.1
Water Services: Education	Yes	100.0	Confirm the water service levels of the primary schools in the rural areas. Provide basic water services to the schools if the current water service levels are below RDP standard.	100	No	57.1
Water Services: Health	No	100.0	-	-	-	100.0
Sanitation Services: Education	Yes	100.0	Confirm the sanitation service levels of the primary schools in the rural areas. Provide basic sanitation services to the schools if the current sanitation service levels are below RDP standard.	100	No	57.1
Sanitation Services: Health	No	100.0	-	-	-	100.0
Health and Educational Facilities	No	100.0	-	-	-	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?

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

A separate water and sanitation service level policy is not in place, but the water and sanitation service levels to be provided by the Municipality to the consumers in their Management Area are however included in the Water Services By-laws. All water and sanitation services provided by Cederberg Municipality to consumers within the Municipal Management Area are linked to the Municipality's Tariff Policy and Rates Policy and poor households are incorporated through Cederberg Municipality's Indigent Policy.

The large number of residents in the lowest income groups (living in informal areas) places a major challenge on Cederberg Municipality to provide suitable housing. Cederberg 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.

All the formal households in the urban areas of Cederberg Municipality's Management Area are provided with water and sewer connections inside the erven. Communal standpipes and toilet facilities are provided in the informal areas as a temporary emergency service.

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

Free basic water policy:

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

Free basic sanitation policy:

- Provision of the most viable 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 Cederberg Municipality.
- Subsidising the operating and maintenance costs. If the basic service is to be provided free to the poor then Cederberg Municipality must ensure that the costs of providing the service are covered by the local government equitable share and / or through cross-subsidies within Cederberg Municipality's Management Area.

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

Public Amenities Education: All education facilities in the urban areas of Cederberg Municipality's Management Area are provided with adequate water and sanitation services and no specific strategies, with regard to the provision of water and sanitation services to these facilities, were therefore identified. Cederberg Municipality is however committed to work with the Education Department to address any possible shortcomings with regard to the provision of water and sanitation services that might still exist at any of the schools in the rural areas. **The water and sanitation service levels of the schools in the rural areas need to be verified.**

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

Cederberg Municipality will collaborate with the Non-Profit Organisations to conduct an audit of registered and unregistered pre-schools and creches in the Cederberg area. The outcome of this partnership will be to establish an inter-departmental action plan that will assist Cederberg Municipality to get unregistered creches and pre-schools registered. Training needs of ECD practitioners has also been identified and will be provided to ECD educators in due course. There is 21 Early Childhood Development Centres registered with the Department of Social Development and 8 unregistered centres. It will be the task of the Cederberg Municipality's Economic Social Development Unit to assist these unregistered ECD Centres.

Public Amenities Health: All the clinics and hospitals in Cederberg Municipality's Management Area have adequate and safe water supply and sanitation services and no specific strategies, with regard to the provision of water and sanitation services to these facilities, were therefore identified.

The Municipal Health Services of the West Coast District Municipality also report monthly to the Department of Health on water quality. The quality of life of the people within a Municipality is influenced by the available health care. Various factors influence the health conditions of people in any region, for example access to clean water, good sanitation, proper nutrition and adequate housing.

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

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

The most vulnerable groups within Cederberg Municipality's Management Area are the persons living in informal areas with shared services. It is therefore of outmost importance that the communal standpipes are properly maintained, to promote better health and hygiene among users. It is necessary to:

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

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

- users must use the standpipe only for the filling of containers;
- no body or clothes washing is allowed at standpipes;
- no house pipes or other objects may be attached to the standpipes;
- use clean containers and close containers with a suitable lid when transporting water;

- disinfect containers when necessary; and
- immediately report any irregularities, contamination, tampering or vandalism at standpipes

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

TOPIC 3: WATER SERVICES ASSET MANAGEMENT

Topic C.3.1: Water Services Asset Management						
Section	**Intervention Required?**	**% (1)**	**Solution description as identified by Master Plan**	**% (2)**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring % (3)**
General Information	Yes	100.0	Update the Asset Register to include all the water and sewerage infrastructure assets as included in the WSDP. CRC and Condition of the water and sewerage assets also need to be included.	100.0	Yes	92.9
	Yes	100.0	Develop an Asset Management Plan	100.0	No	57.1
Operation	Yes	100.0	Compile Water Safety Plans and WTW Process Audits. Recommended Improvement/Upgrade plans need to be implemented.	100.0	No	57.1
	Yes	100.0	Compile W_2RAPs and WWTW Process Audits. Recommended Improvement/Upgrade plans need to be implemented.	100.0	No	57.1
Functionality Observation	Yes	100.0	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.	100.0	Partially	92.9
Asset Assessment Spectrum	Yes	100.0	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).	100.0	Partially	92.9
Water and Sanitation schemes	Yes	100.0	Upgrade sections of the water reticulation network and sewer drainage network as proposed in the Water and Sewer Master Plan	100.0	Partially	92.9

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?

Asset Management Plan: Cederberg Municipality's Asset Register needs to be updated to include all the water and sewerage infrastructure as included in the WSDP and the CRC of the assets also needs to be included in the Asset Register.

It is essential for any service delivery organisation 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.

Cederberg 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. 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.

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'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 water and sanitation 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. Cederberg 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 Cederberg Municipality is to identify adequate funds for the rehabilitation and maintenance of their existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. It is important for the Municipality to secure adequate funding for major refurbishment and maintenance work, the provision of bulk infrastructure and the development of additional sources in order to keep up with the high demand for services.

Disaster Management Plan: The draft 2023/2024 IDP includes the following risk reduction measures:

- Ensure all necessary risk reduction measures in place to manage future droughts effectively.
- Standardization of water uses, water tariffs and restrictions, as well as enforcement measures where a disaster (drought) risks might be moderate to high .
- Protect groundwater resources (Geohydrologists required in Municipalities).
- Investigating the possible use of alternative water resources i.e. reclamation of water (reuse), groundwater, increased rainwater harvesting, etc.
- Model bylaw regarding for water use and water restrictions.
- The implementation of an area focussed Finalisation of disaster preparedness and response plans by all stakeholders.
- Include risk reduction measures and associated funding in all future Integrated Development Plans.

- S35 Disaster Management Act: all municipalities must take adequate measures to prevent water insecurity due to drought.
- Land use & Planning: Protect and invest in our natural water source areas – ensure good land use management and catchment management.
- Promote efficiency of water use:
  - Address water losses (especially Non-Revenue Water).
  - Actively promote the re-use of treated wastewater – target appropriate users.
  - Industrial water cascading, foot printing and setting of best practice benchmarks.
  - Actively promote Conservation Agriculture, drip irrigation and accurate water metering, especially in the Agricultural Sector.
- Undertake Water Sensitive Urban Design.
- Undertake continuous awareness drives to ensure permanent change in public and government behaviour and reduced per capita water utilization.

Untreated Effluent Management Plan: There are no known untreated effluent discharges to the environment. The W_2RAPs for the WWTWs and sewer drainage networks 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. The Water and Sewer Master Plans (Feb 2023) for the various distribution and drainage systems in Cederberg Municipality's Management Area recommends upgrades of the water and sewer reticulation networks to the values indicated in the tables below in the foreseeable future in order to accommodate development and population growth according to the SDF.

Table C.3.2: Summary of the future water and sewerage infrastructure requirements for Cederberg Municipality, as included in the 2023 Water and Sewer Master Plans

Zone / Area	Water Infrastructure			Sewerage Infrastructure			Total for Water and Sewerage
	Distribution System	Bulk Items	WDM	Drainage System	Pumping Stations and Rising Mains	Bulk Items	
Citrusdal	R12 473 000	R28 490 000	R2 058 000	R7 640 000	R6 310 000	R0	**R56 971 000**
Clanwilliam	R21 903 000	R66 472 000	R432 000	R16 855 000	R14 764 000	R8 278 000	**R128 704 000**
Elands Bay	R6 800 000	R8 255 000	R50 000	R8 825 000	R6 532 000	R3 146 000	**R33 608 000**
Graafwater	R7 929 000	R0	R20 000	R19 740 000	R2 832 000	R0	**R30 521 000**
Lamberts Bay	R3 540 000	R12 347 000	R1 652 000	R21 614 000	R8 724 000	R0	**R47 877 000**
Leipoldtville	R917 000	R2 400 000	R0	R3 919 000	R0	R0	**R7 236 000**
Total	**R53 562 000**	**R117 964 000**	**R4 212 000**	**R78 593 000**	**R39 162 000**	**R11 424 000**	**R304 917 000**

Notes: 1) Costs include P&G's, Contingencies & Fees, but exclude EIA studies, registration of servitudes and/or land acquisition and VAT.
2) The above requirements do not include the cost for the upgrading or the refurbishment of the WTWs and WWTWs or the cost for the augmentation of the water resources for the various towns.

GROUNDWATER INFRASTRUCTURE

Cederberg Municipality will continue with the implementation of their Groundwater Monitoring Programmes for areas where groundwater is abstracted. 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 Programmes and water use licenses. 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 Cederberg Municipality to continue to focus on aquifer protection, groundwater monitoring and wellfield management, in order to meet the town's future water requirements. The table below gives an overview of the key groundwater management functions.

Table C.3.3: Key Groundwater Management Functions

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

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

WATER TREATMENT WORKS INFRASTRUCTURE

The table below gives a summary of the existing capacities and current flows at each of the WTWs.

Table C.3.4: Existing capacities and flows at each of the WTWs (Ml/d)						
WTW	**Existing Hydraulic Capacity**	**Peak Month Average Daily Flow**	**Average Daily Flow (Jul 2021 – Jun 2022)**	**Average Daily Flow as a % of Capacity**	**Current Required Treatment Capacity (1.5 x AADD10yr)**	**2021/20212 Water Quality Failures (SANS0241:2015)**
Citrusdal	3.468	3.656 (Febr)	2.868	82.7%	4.790	-
Graafwater	1.080	1.278 (Nov)	0.790	73.1%	1.444	Turbidity and Chloride

Citrusdal WTW: The Citrusdal WTW treats water from the Olifants River and production boreholes for distribution to the Citrusdal area. The WTW has a design capacity of 3.468 Ml/day. The Blue Drop Score for the Citrusdal distribution system was 45.29% in 2014 and the 2022 Blue Drop Risk Rating is 17.7% (Low risk). Various sections of the WTW is in a poor condition, which need refurbishment.

Graafwater WTW: The Graafwater WTW treats water from the production boreholes for distribution to the Graafwater area. The WTW has a design capacity of 1.080 Ml/day. The Blue Drop Score for the Graafwater distribution system was 56.10% in 2014 and the 2022 Blue Drop Risk Rating is 20.9% (Low risk).

The WTWs to be upgraded in Cederberg Municipality are summarised in the table below.

Table C.3.5: WTWs to be upgraded or new WTWs to be constructed in the future		
WTW	**Short, Medium, Long Term**	**Estimated Cost (Vat Excluded)**
Increase capacity of the Citrusdal WTW and refurbishment	Medium Term	R15 000 000
New Clanwilliam WTW, pump station and rising main	Short Term	R65 516 000
Increase capacity of the Graafwater WTW	Medium Term	R10 000 000
Lamberts Bay Desalination Plant	Short Term	R41 382 000
Total		**R131 898 000**

Key issues to be addressed at the WTWs, as identified through the WSDP inspection process, are as follows:

Citrusdal WTW:

- Filters 8 and 9 are not operational and the supply pipe to one of the filters is leaking. Some of the filter valves are in a poor condition.
- Proper valve chambers to be constructed for some of the valves.
- The chlorine dosing building is not complying with safety requirements and needs to be refurbished.
- The WTW terrain needs to be improved (Stormwater management, general maintenance, etc.)

Graafwater WTW:

- The raw water meter is not registering on the SCADA system. Flow is calculated manually.
- The sand media needs to be replaced of the two slow sand filters.
- Both mechanisms of the floating control valve needs to be serviced.
- The actuator of the filter needs to be serviced, because it is not closing 100%.

BULK WATER INFRASTRUCTURE

The Water Master Plan (Feb 2023) has indicated that based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk water supply systems.

- **Citrusdal:** It is proposed that the existing 2 x 160mm dia. bulk supply pipes between the LL and HL reservoirs are replaced with a new 315mm dia. pipe (Item CCiW.B4).
- **Clanwilliam:** The following new feeder mains will be required.
  - New 355mm dia. rising main from the Clanwilliam dam PS to the Grootmaat reservoir (Item CClW.B9). This rising main is sized to replace the existing 200mm dia. rising main.
  - New 315mm dia. feeder main from the proposed Clanwilliam WTW to the Platdammetjies reservoirs (Item CClW.B11).
  - New 315mm dia. feeder main from the existing 200mm dia. and 315mm dia. feeder mains between the Grootmaat reservoirs and the Cederville No.1 reservoir in order to supply bulk water to the proposed Cederville No.2 reservoir (Item CClW.B12).
  - New 250mm dia. rising main from the Cederville No.2 reservoir (lower reservoir) to the proposed Cederville Upper reservoir (Item CClW.B13).
  - New 315mm dia. feeder main from the Cederville No.2 to the Cederville No.1 reservoir (Item CClW.B16).
- **Elands Bay:** No reinforcement to the existing feeder main is required in the future.
- **Graafwater:** No reinforcement to the existing feeder main is required in the future.
- **Lamberts bay:**
  - The existing feeder mains from the Lamberts Bay reservoirs to the existing Plat reservoir booster pump station is at capacity and should be upgraded (Item CLW.B2).
  - A new feeder main is proposed from the pump station to the proposed new tower when it is constructed (Item CLW.B6).
- **Leipoldtville**: No upgrades are required to the feeder mains of Leipoldtville.

WATER PUMP STATIONS

Most of the motors and pumps at the water pump stations are operational. Key issues to be addressed at the water pump stations, as identified through the WSDP inspection process are as follows:

- Citrusdal River raw water booster PS: Wiring of motors are exposed.
- Clanwilliam Crystal Water booster PS: One motor was removed, no duty/standby configuration.
- Clanwilliam Cederville booster PS: One of the pumps is leaking.
- Clanwilliam Jan Dissels Big PS: Pipe leaking and coupling guards for the pumps are not in place, which is a safety hazard.
- Elands Bay booster PS: One of the pumps is without a coupling guard, which is a safety hazard.
- Lamberts Bay Town booster PS: Valves in a very poor condition.

- Lamberts Bay Tower PS: Only one pump for supply to the Tower, no duty/standby configuration. Pump without coupling guard, which is a safety hazard.

The Water Master Plan (Feb 2023) has indicated that based on the most likely land-use development scenario, it will be necessary for the following water pump stations.

Table C.3.6: Future water pump stations required

Scheme	Recommendations included in the Water Master Plan	Year	Capacity (l/s)	Head (m)	Cost (R Million)
Citrusdal	Upgrade the capacity of the existing High Level PS (item CCiW.B2).	2030	75	55	R0.705
	Subtotal				**R0.705**
Clanwilliam	Upgrading of the existing Cederville booster pump station (item CClW.B2).	2023	30	36	R0.384
	New Clanwilliam dam bulk pump station (item CClW.B8). When this PS is commissioned the old Clanwilliam dam bulk pump station can be de-commissioned.	2025	95	90	R5.204
	New pump station to pump from the Cederville Lower reservoirs to the Cederville Upper reservoir (item CClW.B14).	2030	55	60	R3.730
	New booster pump station to service the higher lying future development areas CW25 & CW29 (item CClW6.7).	2040	15	25	R2.577
	De-commission the Cederville booster and Crystal Water booster pump station when the proposed Cederville Upper reservoir is commissioned, and the existing booster zones can be supplied from the Cederville Upper reservoir.	-	-	-	-
	Subtotal				**R11.895**
Elands Bay	-	-	-	-	-
	Subtotal				**-**
Graafwater	-	-	-	-	-
	Subtotal				**-**
Lamberts Bay	Upgrading of the existing Plat reservoir booster pump station (item CLW.B1) is required.	2025	60	30	R3.607
	It is proposed that this pump station accommodate the new booster pumps as well as the new pumps for the tower supply (item CLW.B4).	2030	70	25	R0.604
	Subtotal				**R4.211**
Leipoldtville	**-**	**-**	**-**	**-**	**-**
	Subtotal				-
Total					**R16.811**

RESERVOIR INFRASTRUCTURE

The condition of most of the reservoirs in Cederberg Municipality's Management Area is good and the reservoirs are well maintained. Key issues to be addressed at the reservoirs, as identified through the WSDP inspection process, are as follows:

- Citrusdal 0.320 Ml reservoir: Reservoir was leaking, but was recently sealed. The old inlet valve is in a chamber full of water with no cover. There is no pipe to take scour water to the stormwater system.
- Clanwilliam 1.500 Ml reservoir: Cover not locked.
- Leipoldtville 0.150 Ml reservoir: Reservoir is leaking.

Cederberg Municipality's overall storage factors of the reservoirs for the various schemes for 2021/2022, based on 1 x PDD (24 hours storage capacity of peak daily demand) are 0.90 for Citrusdal, 2.3 for Clanwilliam, 0.9 for Elands Bay, 1.6 for Graafwater and 1.0 for Lamberts Bay.

Even though the town's overall storage capacity might be adequate there might be some distribution zones within the town's network with inadequate storage capacity, as identified through the Water Master Planning process (Feb 2023) and indicated in the table below.

Table C.3.7: Future reservoir storage capacities required

Area	Recommendations included in the Water Master Plan	Year	Capacity (Ml)	Cost (R Million)
Citrusdal	A new 3.0 ML reservoir is proposed at the existing Citrusdal High Level reservoir site to augment reservoir capacity for the High Level reservoir and HL PRV 1, 2 & 3 distribution zones (item CCiW.B1).	2025	3.000	R13.442
	A new 1.5 ML reservoir is proposed at the existing Citrusdal LL reservoir site to augment reservoir capacity for the LL reservoir zone (item CCiW.B3)	2035	1.500	R8.255
	Subtotal			**R21.697**
Clanwilliam	A new 3.0 ML reservoir is proposed at the existing Cederville reservoir site to augment reservoir storage capacity for the Cederville reservoir and Cederville booster zones (item CClW.B1).	2024	3.000	R13.442
	A new 5.0 ML Cederville Upper reservoir is proposed to provide reservoir storage capacity for future development areas CW19a, CW19b, CW23, CW25 & CW29 to the south of Clanwilliam (item CClW.B15). It is proposed that when this reservoir is constructed the existing Cederville booster and Crystal Water booster pump stations are decommissioned and the respective supply areas are supplied with water from the new Cederville Upper reservoir.	2030	5.000	R19.648
	A new 3.0 ML reservoir is proposed at the existing Platdammetjies reservoir site to augment reservoir storage capacity for the Platdammetjies reservoir and Platdammetjies PRV zones (item CClW.B7).	2040	3.000	R13.442
	Subtotal			**R46.532**
Elands Bay	A new 1.5 ML reservoir is proposed at the Elands Bay reservoir site to provide reservoir storage volume for future development areas (item CEW.B1).	2025	1.500	R8.255
	Subtotal			**R8.255**
Graafwater	-	-	-	-
	Subtotal			**-**
Lamberts Bay	Additional storage capacity is provided at the Lamberts Bay tower when the AADD for the tower distribution zone exceeds 600 kL/d (item CLW.B7).	2030	0.250	R6.312
	Subtotal			**R6.312**
Leipoldtville	Additional reservoir storage capacity is proposed for Leipoldtville when the AADD for the town exceeds 75 kL/d (LLeW.B1).	2045	0.500	R2.400
	Subtotal			**R2.400**
Total				**R85.196**

WATER RETICULATION INFRASTRUCTURE

The Water Master Plan (Feb 2023) has indicated that based on the most likely land-use development scenario, it will be necessary for the following water reticulation infrastructure.

Table C.3.8: Future water reticulation infrastructure required

Scheme	Year	Project	Cost (R Million)
Citrusdal	2025	Citrusdal high level reservoir zone: Network reinforcement (phase 1) (PRJ-CCiW-002)	R2.790
		Development related infrastructure: Citrusdal HL PRV 3 zone (PRJ-CCiW-014)	R0.831
	2026	Citrusdal low level reservoir zone: Network reinforcement (phase 1) (PRJ-CCiW-001)	R0.330
	2030	Development related infrastructure: Citrusdal HL PRV 1 zone (PRJ-CCiW-012)	R0.807
		Citrusdal HL PRV 2 zone: Network reinforcements (PRJ-CCiW-013)	R1.690
	2035	Development related infrastructure: Citrusdal HL PRV 3 zone (PRJ-CCiW-011)	R0.606
	2040	Citrusdal low level reservoir zone: Network reinforcement (phase 2) (PRJ-CCiW-007)	R0.914
		Citrusdal HL PRV 2 zone: Network reinforcements (PRJ-CCiW-013)	R1.525
	2045	Development related infrastructure: Citrusdal LL reservoir zone (PRJ-CCiW-008)	R1.358
		Development related infrastructure: Citrusdal HL PRV 1 zone (PRJ-CCiW-012)	R0.995
	2050	Development related infrastructure: Citrusdal HL PRV 3 zone (PRJ-CCiW-014)	R0.627
	Subtotal		**R12.473**
Clanwilliam	2023	Cederville reservoir zone network reinforcement required to accommodate housing development (PRJ-CClW-001)	R3.760
	2024	Additional storage capacity for Cederville reservoir site (PRJ-CClW-008)	R0.198
	2025	Development related infrastructure: Clanwilliam - Cederville Lower reservoir zone (PRJ-CClW-012)	R0.975
	2030	Development related infrastructure: Clanwilliam - Cederville Lower reservoir zone (PRJ-CClW-012)	R1.805
		Implement Cederville Upper reservoir and supporting infrastructure (PRJ-CClW-014)	R5.403

Table C.3.8: Future water reticulation infrastructure required			
Scheme	**Year**	**Project**	**Cost (R Million)**
	2035	Development related infrastructure: Clanwilliam - Platdammetjies reservoir zone (PRJ-CClW-011)	R0.880
	2040	Platdammetjies PRV zone: Network reinforcement (PRJ-CClW-007)	R0.908
		Development related infrastructure: Clanwilliam - Platdammetjies reservoir zone (PRJ-CClW-011)	R0.783
		Development related infrastructure: Clanwilliam - Cederville Upper reservoir zone (PRJ-CClW-015)	R1.149
	2045	Platdammetjies reservoir zone: Network reinforcement (PRJ-CClW-009)	R1.619
		Development related infrastructure: Clanwilliam - Platdammetjies reservoir zone (PRJ-CClW-011)	R0.998
	2050	Development related infrastructure: Clanwilliam - Cederville Lower reservoir zone (PRJ-CClW-012)	R0.184
		Development related infrastructure: Clanwilliam - Cederville Upper reservoir zone (PRJ-CClW-015)	R0.664
	Subtotal		**R19.326**
Elands Bay	2025	Elandsbaai reservoir zone: Network reinforcement (Phase 1) - R366 Main Road upgrade (PRJ-CEW-002)	R1.671
	2030	Elandsbaai reservoir zone: Network reinforcement (Phase 2) - R366 Main Road & Strand Street upgrades) (PRJ-CEW-003)	R2.027
	2040	Elandsbaai reservoir zone: Network reinforcement (Phase 3) - From reservoir site to R366 Main Road upgrade (PRJ-CEW-004)	R2.260
	2045	Elandsbaai reservoir zone: Network reinforcement (Phase 4) - Main Street network upgrade (PRJ-CEW-002)	R0.842
	Subtotal		**R6.800**
Graafwater	2030	Graafwater reservoir zone: Network reinforcement (Phase 1) - From reservoirs to Lambertsbaai Rd (PRJ-CGW-002)	R4.961
	2035	Graafwater reservoir zone: Network reinforcement (Phase 1) - From reservoirs to Lambertsbaai Rd (PRJ-CGW-002)	R1.245
	2040	Graafwater reservoir zone: Network reinforcement (Phase 2) - Akasia Street upgrade (PRJ-CGW-003)	R.398
	2045	Graafwater reservoir zone: Network reinforcement (Phase 3) - Van der Stel Street upgrade (PRJ-CGW-004)	R1.325
	Subtotal		**R7.929**
Lamberts Bay	2030	New Lamberts Bay water tower, pumps and pipes (PRJ-CLW-003)	R0.452
		Lambertsbaai network reinforcements (PRJ-CLW-003)	R1.120
		Development related infrastructure: Lambertsbaai booster zone (PRJ-CLW-006)	R0.837
	2035	Development related infrastructure: Lambertsbaai tower zone (PRJ-CLW-005)	R0.811
	2050	Development related infrastructure: Lambertsbaai booster zone (PRJ-CLW-006)	R0.320
	Subtotal		**R3.540**
Leipoldtville	2040	Leipoldtville network upgrades (PRJ-CLeW-002)	R0.707
	2045	Leipoldtville network upgrades (PRJ-CLeW-002)	R0.210
	Subtotal		**R0.917**
Total			**R50.985**

BULK SEWER PIPELINE AND SEWER DRAINAGE NETWORK INFRASTRUCTURE

The Sewer Master Plan (Feb 2023) has indicated that based on the most likely land-use development scenario, it will be necessary for the following bulk sewer pipeline and sewer drainage network infrastructure.

Table C.3.9: Future bulk sewer pipeline and sewer drainage network infrastructure required			
Scheme	**Year**	**Project**	**Cost (R Million)**
Citrusdal	2023	Decommission Heuwelsig PS (PRJ-CCiS-003)	R0.377
	2025	(Citrusdal gravity drainage area network upgrades (Bulk sewer to Citrusdal PS no. 1) (PRJ-CCiS-001)	R0.641
		(Development related infrastructure: Citrusdal) PRJ-CCiS-008	R1.272
		Citrusdal sewer flow logging (PRJ-CCiS-009)	R0.060
		Upgrade/install telemetry at main sewer pumping stations in Citrusdal (PRJ-CCiS-010)	R0.080
	2030	Citrusdal gravity drainage area network upgrades (Nieuwoud Street) (PRJ-CCiS-002)	R0.962
		Implement Future Citrusdal North PS drainage area (PRJ-CCiS-004)	R2.112
		Sewer infrastructure for existing unserviced erven in Citrusdal North (PRJ-CCiS-005)	R2.085
		Upgrade capacity of Riverview PS (Investigate first) (PRJ-CCiS-006)	R0.624
	2045	(Development related infrastructure: Citrusdal) PRJ-CCiS-008	R0.283
	2050	(Development related infrastructure: Citrusdal) PRJ-CCiS-008	R1.014
	Subtotal		**R9.510**
Clanwilliam	2023	Bulk sewer upgrade: Clanwilliam Gravity drainage area (Denne Street to Clanwilliam WWTP) (PRJ-CCIS-001)	R5.516

Table C.3.9: Future bulk sewer pipeline and sewer drainage network infrastructure required			
Scheme	**Year**	**Project**	**Cost (R Million)**
	2024	Development related infrastructure: Clanwilliam (Priority housing areas) (PRJ-CCIS-008)	R3.508
	2025	Upgrade existing capacity: Clanwilliam Gravity drainage area (Ou Kaapse Rd to Bloekom Ave) (PRJ-CCIS-004)	R2.762
		Clanwilliam sewer flow logging (PRJ-CCIS-011)	R0.060
		Upgrade/install telemetry at main sewer pumping stations in Clanwilliam (PRJ-CCIS-012)	R0.060
	2030	Development related infrastructure: Clanwilliam (Foster Street PS drainage area) (PRJ-CCIS-007)	R1.579
		Upgrade existing capacity: Milnerstraat PS drainage area (PRJ-CCIS-002)	R4.537
		Development related infrastructure: Clanwilliam South (Clanwilliam Gravity drainage area) (PRJ-CCIS-009)	R0.754
	2031	Development related infrastructure: Clanwilliam South (Clanwilliam Gravity drainage area) (PRJ-CCIS-009)	R0.174
	2035	Upgrade existing capacity: Fosterstraat PS drainage area (Phase 1) (PRJ-CCIS-003a)	R2.791
		New outfall sewer for unserviced erven in Clanwilliam (River & Park Streets) (PRJ-CCIS-005)	R3.547
		Sewer infrastructure for existing unserviced erven in Clanwilliam (Terasse PS drainage area) (PRJ-CCIS-006)	R1.954
	2040	Upgrade existing capacity: Fosterstraat PS drainage area (Phase 2) (PRJ-CCIS-003b)	R1.388
		Development related infrastructure: Clanwilliam South (Clanwilliam Gravity drainage area) (PRJ-CCIS-009)	R1.232
	2050	Upgrade existing capacity: Fosterstraat PS drainage area (Phase 2) (PRJ-CCIS-003b)	R0.979
		Development related infrastructure: Clanwilliam South (Clanwilliam Gravity drainage area) (PRJ-CCIS-009)	R0.809
		Development related infrastructure: Clanwilliam South (Future PS CI3 drainage area) (PRJ-CCIS-010)	R0.558
	Subtotal		**R32.208**
Elands Bay	2025	Elandsbaai sewer flow logging (PRJ-CES-006)	R0.040
		Upgrade/install telemetry at main sewer pumping stations in Elandsbaai (PRJ-CES-007)	R0.040
	2030	Elandsbaai PS 1 drainage area network upgrades (Main Road to PS1) (PRJ-CES-001)	R1.141
	2035	Sewer infrastructure for existing unserviced erven: Elandsbaai North (PRJ-CES-002)	R4.526
	2040	Sewer infrastructure for existing unserviced erven: Elandsbaai South (PRJ-CES-003)	R4.834
		Elandsbaai PS 1 drainage area network upgrades (Lang Street upgrades) (PRJ-CES-004)	R0.819
		Upgrade Elandsbaai PS 1 and accompanying rising main (PRJ-CES-005)	R1.943
	Subtotal		**R13.343**
Graafwater	2025	Graafwater sewer flow logging (PRJ-CGS-006)	R0.025
	2030	Sewer infrastructure for existing unserviced erven in Graafwater (phase 1) (PRJ-CGS-001)	R4.898
	2035	Sewer infrastructure for existing unserviced erven in Graafwater (phase 2) (PRJ-CGS-002)	R9.029
		Development related infrastructure: Graafwater (PRJ-CGS-005)	R1.162
	2040	Upgrade existing capacity: Graafwater PS1 drainage area (PRJ-CGS-004)	R1.667
	2045	Sewer infrastructure for existing unserviced erven in Graafwater (phase 3) (PRJ-CGS-003)	R3.838
	Subtotal		**R20.619**
Lamberts Bay	2025	Upgrade Nuweland PS and construct new rising main (PRJ-CLS-001)	R4.658
		Lamberts Bay sewer flow logging (PRJ-CLS-008)	R0.100
		Upgrade/install telemetry at main sewer pumping stations in Lamberts Bay (PRJ-CLS-009)	R0.100
	2035	Upgrade existing capacity: Nuweland PS drainage area (Van Zyl Street upgrades) (PRJ-CLS-002)	R0.764
		Sewer infrastructure for existing unserviced erven in Lambertsbaai (Van Riebeeck PS drainage area) (PRJ-CLS-005)	R4.603
	2040	Sewer infrastructure for existing unserviced erven in Lambertsbaai (Voortrekker PS drainage area) (PRJ-CLS-006)	R11.503
	2045	Sewer infrastructure for existing unserviced erven in Lambertsbaai (Sybille and Hoog Streets) (PRJ-CLS-003)	R4.345
		Development related infrastructure: Lambertsbaai (Malkopbaai PS drainage area) (PRJ-CLS-004)	R1.068
	Subtotal		**R27.141**
Leipoldtville	2040	Sewer infrastructure for existing unserviced erven in Leipoldtville (PRJ-CLeS-001)	R3.919
	Subtotal		**R3.919**
Total			**R106.740**

SEWER PUMP STATIONS

Most of the sewer pump stations are not fenced and locked. Key issues to be addressed at the sewer pump stations, as identified through the WSDP inspection process, are as follows:

- Citrusdal Golfbaan sewer PS: Only one pump, no duty/standby configuration. Not fenced and not secure.
- Citrusdal Oranjeville sewer PS: Only one pump, no duty/standby configuration. Not fenced and not secure.
- Citrusdal Wynkelder sewer PS: Only one pump, no duty/standby configuration.
- Citrusdal Riverview sewer PS: Fence in a poor condition.
- Citrusdal Heuwelsig sewer PS: Only one pump, no duty/standby configuration. Fence was vandalised, not secure.
- Clanwilliam Oord Poel sewer PS: Only one pump, no duty/standby configuration. Does not switch on and is emptied by tanker. Not fenced and not secure.
- Clanwilliam Terasse sewer PS: Only one pump, no duty/standby configuration. Not fenced and not secure.
- Clanwilliam CMB sewer PS: Not fenced and not secure.
- Clanwilliam Forster sewer PS: Only one pump, no duty/standby configuration. Not fenced and not secure.
- Clanwilliam Augsberg sewer PS: Only one pump, no duty/standby configuration. Fence was vandalised.
- Clanwilliam Vlei Street sewer PS: Not fenced and not secure.
- Graafwater Cedar Street sewer PS: Lack of general maintenance at PS (Grass cutting, etc.). Alarm monitoring system (MCC) not working. Only one pump, no duty/standby configuration. Not fenced and not secure.
- Lamberts Bay Paul Kruger sewer PS: Only one pump, no duty/standby configuration. Fence was vandalised.
- Lamberts Bay Master sewer PS: Only one pump, no duty/standby configuration. Box panel to be replaced. Not fenced and not secure.
- Lamberts Bay Caravan Park Bo No 1 sewer PS: Only one pump, no duty/standby configuration. Box panel to be replaced.
- Lamberts Bay Caravan Park Onder No 2 sewer PS: Box panel to be replaced.
- Lamberts Bay Spar sewer PS. Not fenced and not secure.
- Lamberts Bay Malkopbaai sewer PS: Fence was vandalised.
- Elands Bay Ant Koekie sewer PS: One pump currently faulty.
- Elands Bay Charles se Blok sewer PS: Only one pump, no duty/standby configuration.

The Sewer Master Plan (Feb 2023) has indicated that based on the most likely land-use development scenario, it will be necessary for the following sewer pump stations.

Table C.3.10: Future sewer pump stations required

Scheme	Year	Project	Cost (R Million)
Citrusdal	2023	Decommission PS (PRJ-CCiS-003)	R0.275
	2030	Upgrade existing Pump Station. Verify existing pump station capacity first, upgrade capacity to 13 L/s when existing pumps reaches capacity (PRJ-CCiS-006)	R1.050
		New Pump Station when future areas CD1, CD27 & CD28 develop (PRJ-CCiS-004)	R2.320
	2045	Upgrade existing Pump Station. Verify existing pump station capacity first, upgrade capacity to 20 L/s when existing pumps reaches capacity (PRJ-CCiS-007)	R0.795
	Subtotal		**R4.440**
Clanwilliam	2024	New PS for Future PS Cl2 drainage area, capacity 20 L/s. (PRJ-CCIS-008)	R1.021
	2030	Upgrade existing Pump Station when existing pump station reaches capacity, upgrade to 55 L/s. (Investigate first). (PRJ-CCIS-002)	R1.194
	2035	Upgrade existing Pump Station when existing pump station reaches capacity, upgrade to 35 L/s. (PRJ-CCIS-003a)	R0.938
		New PS for Future PS Cl1 drainage area, capacity of 4 L/s. (PRJ-CCIS-005)	R2.216

Table C.3.10: Future sewer pump stations required			
Scheme	**Year**	**Project**	**Cost (R Million)**
	2050	New 10 L/s PS for future areas CW22 & CW23 (PRJ-CCIS-010)	R2.320
	Subtotal		**R7.689**
Elands Bay	2035	New pump station at 5L/s for Future PS E2 drainage area (PRJ-CES-002)	R1.846
	2040	New pump station at 5 L/s for Future PS E1 drainage area (PRJ-CES-003)	R2.111
		Upgrade existing Pump Station when existing pump station reaches capacity (verify existing capacity first). New capacity 30 L/s (PRJ-CES-005)	R1.203
	Subtotal		**R5.160**
Graafwater	2045	New pump station for Future PS G1 drainage area, capacity 4 L/s. (PRJ-CGS-003)	R1.953
	Subtotal		**R1.953**
Lamberts Bay	2025	Upgrade existing pump station capacity to 35 L/s when it reaches capacity. (PRJ-CLS-001)	R0.806
	2030	Upgrade existing pump station to 12 L/s when it reaches capacity. Verify existing capacity first. (PRJ-CLS-007)	R0.702
	2045	New pump station for Future PS L1 drainage area, capacity 4 L/s. (PRJ-CLS-003)	R1.689
	Subtotal		**R3.197**
Total			**R22.439**

WASTE WATER TREATMENT INFRASTRUCTURE

The table below gives a summary of the existing hydraulic design capacities and the estimated current flows at each of the WWTWs, as well as the final effluent quality compliance percentages for the 2021/2022 financial year (Ml/d).

Table C.3.11: Existing hydraulic design capacities and flows at each of the WWTWs (Ml/d)				
WWTW	**Existing Hydraulic Capacity**	**Average Daily Flow (2021/2022) ***	**Average Daily Flow as a % of Design Capacity**	**Final Effluent Compliance for 2021/2022**
Citrusdal	2.300	0.926	40.3%	Microbiological: 25.0%; Chemical: 45.8%; Physical: 94.1%
Clanwilliam	2.100	1.252	59.6%	Microbiological: 37.5%; Chemical: 75.0%; Physical: 66.7%
Elands Bay	0.225	0.100	44.4%	Microbiological: 100.0%; Chemical: 100.0%; Physical: 100.0%
Graafwater	0.360	0.190	52.8%	Microbiological: 100.0%; Chemical: 100.0%; Physical: 62.5%
Lamberts Bay	3.000	0.579	19.3%	Microbiological: 100.0%; Chemical: 69.2%; Physical: 87.2%
Wupperthal	Unknown	Unknown	Unknown	Microbiological: 100.0%; Chemical: 100.0%; Physical: 100.0%
Algeria	Unknown	Unknown	Unknown	Microbiological: 100.0%; Chemical: 100.0%; Physical: 88.5%

Note: * Calculated as a percentage of billed metered consumption, because flow meters at WWTWs are not all working

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.3.12: Average daily and peak month future projected WWTW flows											
WWTW	**Existing Hydraulic Capacity**	**Average Daily Future Projected WWTW Flows**					**Peak Month Daily Future Projected WWTW Flows**				
		2026	**2031**	**2036**	**2041**	**2046**	**2026**	**2031**	**2036**	**2041**	**2046**
Citrusdal	2.300	1.088	1.163	1.249	1.346	1.454	1.360	1.454	1.561	1.682	1.818
Clanwilliam	2.100	1.255	1.524	1.841	2.216	2.661	1.569	1.905	2.301	2.769	3.326
Elands Bay	0.225	0.122	0.150	0.179	0.209	0.241	0.153	0.187	0.223	0.261	0.301
Graafwater	0.360	0.243	0.343	0.410	0.533	0.672	0.303	0.429	0.512	0.666	0.840
Lamberts Bay	3.000	0.601	0.745	0.907	1.087	1.289	0.752	0.932	1.133	1.359	1.611

Note: A peak month factor of 1.25 was used for the calculation of the Peak Month Daily future projected flows, because most of the flow meters at the WWTWs are faulty and it was not possible to calculate the actual peak month factors.

Cederberg Municipality needs to revise on an annual basis the capacity and suitability of the WWTWs to meet the requirements of the authorisations and downstream users for the quality of the final effluent being discharged to the receiving water bodies. When the new WULs are received or 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, then the Municipality needs to appoint 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.

Citrusdal WWTW: The 2021 Green Drop Score for the Citrusdal WWTW was 55% and the DWS's Wastewater Risk Rating decreased from 64.7% (Medium Risk) in 2013 to 52.9% in 2021 (Medium Risk). **The new WWTW was recently constructed and the capacity of the WWTW is adequate to meet the short to medium term future treatment requirements.** The following operational problems were noticed during the WSDP site visit.

- The flow meter for the incoming flow needs to be calibrated.
- The emergency shower was without water due to a broken pipe, which poses a significant safety risk.

Clanwilliam WWTW: The 2021 Green Drop Score for the Clanwilliam WWTW was 51% and the DWS's Wastewater Risk Rating increased from 58.8% (Medium Risk) in 2013 to 82.4% (High Risk) in 2021. **The hydraulic capacity of the WWTW is still adequate for the short term, but the organic capacity is inadequate.** The recommendation from the "Clanwilliam Wastewater Treatment Plant, Status Quo Report, July 2021" was that both remedial works, as well as work to improve and increase treatment capacity of the WWTW be seriously considered, before commencement with any further housing developments in Clanwilliam. The correct long-term approach would be to add another module to the Clanwilliam WWTW providing capacity for at least the next 10 years. This means adding at least another 500 m³/day to 1000m³/day's treatment capacity. The following operational problems were noticed during the WSDP site visit.

- Both inlet and outlet flow meters were not working.
- The Old Pasveer system was not operational during the time of the site visit. The horizontal shaft surface aerators were also not working.
- One of the four horizontal shaft surface aerators at the New Pasveer system was not working.
- There was no disinfection of the final effluent at the time of the site visit, due to chlorine shortage.
- A section of the chlorine contact channel is broken, which needs to be repaired.
- The reeds and grass at the sludge ponds need to be removed. The dry sludge needs to be removed.

Elands Bay WWTW: The 2021 Green Drop Score for the Elands Bay WWTW was 42% and the DWS's Wastewater Risk Rating remained the same at 64.7% in 2013 and 2021 (Medium Risk). **The capacity of the WWTW is adequate to meet the short to medium term future treatment requirements.** The following operational problems were noticed during the WSDP site visit.

- No flow meter for incoming flow.
- The walls of the inlet works were damaged.
- The lining of the secondary and tertiary ponds were damaged at some places on the side walls, which need to be repaired.

Graafwater WWTW: The 2021 Green Drop Score for the Graafwater WWTW was 32% and the DWS's Wastewater Risk Rating increased from 52.9% (Medium Risk) in 2013 to 82.4% (High Risk) in 2021. **The new oxidation ponds were recently constructed and the capacity of the WWTW is adequate to meet the short to medium term future treatment requirements.** The following operational problems were noticed during the WSDP site visit.

- The flow meter at the Cedar Street main sewer PS is not working. The flow meter measure the total flow to the WWTW.
- No water or electricity at the treatment plant.

Lamberts Bay WWTW: The 2021 Green Drop Score for the Lamberts Bay WWTW was 48% and the DWS's Wastewater Risk Rating decreased from 82.4% (High Risk) in 2013 to 64.7% (Medium Risk) in 2021. The new activated sludge WWTW was recently constructed. **The capacity of the WWTW is adequate to meet the short to medium term future treatment requirements.** The following operational problems were noticed during the WSDP site visit.

- Only pH monitored due to a lack of equipment and agents for other tests.
- The incoming flow meter is not working.

- The openings between the bars of the hand rake screen, at the inlet works, are too big.
- The amps are reading out of order for Aerators 1, 2, 3, 7 and 8 and Mixers 1 and 2.
- Aerators 1, 3, 5 and 7 were not working.
- Mixer 1 was not working.
- The weir plate of SST No.1 is too high.
- The plate for the opening of the sluice to remove scum has been installed incorrectly for SST No.2, which result in sluice not opening fully.
- Corroded parts on motors of both SSTs has to be replaced.
- There was no water at the emergency shower.
- Chlorine disinfection facility was not operational during the time of the site visit.

Wupperthal WWTW: The 2021 Green Drop Score for the Wupperthal WWTW was 51% and the DWS's Wastewater Risk Rating decreased from 100.0% (Critical Risk) in 2013 to 64.7% (Medium Risk) in 2021. **The capacity of the WWTW is adequate to meet the short to medium term future treatment requirements.** The following operational problems were noticed during the WSDP site visit.

- The flow to the oxidation ponds is not metered.
- The inlet pond, lined primary pond and unlined secondary ponds were overgrown with grass, which needs to be removed.

Algeria WWTW: The 2021 Green Drop Score for the Algeria WWTW was 39% and the DWS's Wastewater Risk Rating decreased from 88.2% (High Risk) in 2013 to 70.6% (High Risk) in 2021. **The capacity of the WWTW is adequate to meet the short to medium term future treatment requirements.** The following operational problems were noticed during the WSDP site visit.

- The flow to the WWTW is not metered.

The WWTWs to be upgraded in Cederberg Municipality in the short to medium term are summarised in the table below.

Table C.3.13: WWTWs to be upgraded in the future

WWTW	Short, Medium, Long Term	Estimated Cost (Vat Excluded)
Refurbishment of faulty flow meters and other infrastructure at the various WWTWs	Short	R5 000 000
Clanwilliam	Medium	R18 500 000
Upgrade Elands Bay WWTW	Long	R10 000 000
Upgrade Graafwater WWTW	Long	R15 000 000
Total		**R48 500 000**

WATER SCHEMES

The Water Master Plan (Feb 2023) has indicated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary.

Table C.3.14: Future water reticulation infrastructure required

Citrusdal
Proposed distribution zones • It is proposed that the existing High Level PRV zone is split into two separate PRV zones (currently the PRV next to the low level reservoir is set to a higher Energy Grade Line (EGL) than the PRV in Schalk Patience Street). • A third PRV is proposed in the existing high level reservoir zone in order to establish the High Level PRV 3 zone. • It is further proposed that the boundaries of the existing Citrusdal distribution zones are increased to accommodate future development areas. **Proposed future system and required works** • The existing Citrusdal water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.

Table C.3.14: Future water reticulation infrastructure required
• A number of distribution pipelines are required to reinforce water supply within the Citrusdal High Level reservoir, High Level PRV and Low Level reservoir zones. • New distribution pipelines are proposed to supply future development areas with water when they develop.
Clanwilliam
Proposed distribution zones • Alterations are made to the boundary between the existing Cederville reservoir zone and the Platdammetjies PRV zone in order to improve network conveyance and redundancy within the zones. • New Cederville Upper reservoir, Cederville Upper booster and Cederville Upper PRV zones are proposed to accommodate future development areas CW19a, CW19b, CW23, CW25 & CW29 to the south of Clanwilliam. • It is proposed that when the Cederville Upper reservoir is constructed the existing Cederville booster and Grootmaat booster zones are incorporated within the new Cederville Upper reservoir zone. • The boundaries of the existing zones are increased to accommodate future development areas. **Proposed future system and required works** • The existing Clanwilliam water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. • A number of distribution pipelines are required to reinforce water supply within the Clanwilliam water network and to supply future development areas with water when they develop.
Elands Bay
Proposed distribution zones • The only change to the existing distribution zone is that the boundary of the existing zone is increased to accommodate future development areas. **Proposed future system and required works** • The existing Elands Bay water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. • A number of distribution pipelines are required to reinforce water supply within the Elands Bay water network and to supply future development areas with water when they develop.
Graafwater
Proposed distribution zones • The only change to the existing distribution zone is that the boundary of the existing zone is increased to accommodate future development areas. **Proposed future system and required works** • The existing Graafwater water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. • A number of distribution pipelines are required to reinforce water supply within the Graafwater water network and to supply future development areas with water when they develop.
Lamberts Bay
Proposed distribution zones • Alterations to the zone boundaries between the tower and booster distribution zones are proposed in order to operate the existing system more effectively. **Proposed future system and required works** • The existing Lamberts Bay water distribution system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. • A number of distribution pipelines are required to reinforce water supply within the Lamberts Bay water network and to supply future development areas with water when they develop.
Leipoldtville
Proposed distribution zones • No changes are proposed to the existing distribution zone boundary except for the extension of the zone to include proposed future development areas. **Proposed future system and required works** • The Leipoldtville water distribution system is so small that it is almost insignificant when compared to the other towns in Cederberg. The system has insufficient capacity to cater for the fully occupied existing and future development load on the system. • Network upgrades are proposed for Leipoldtville in future when additional development in the town occurs.
Algeria and Paleisheuwel
Proposed distribution zones • Insufficient network information was available to establish hydraulic water models for the Algeria and Paleisheuwel systems and consequently to verify and optimize the existing distribution zones. • It is proposed that the network information is sourced by Cederberg Local Municipality in order to include hydraulic modelling of these systems in future.
Elandskloof and Wupperthal

Table C.3.14: Future water reticulation infrastructure required
Proposed distribution zones • Insufficient network information was available to establish hydraulic water models for the Elandskloof and Wupperthal systems and consequently to verify and optimize the existing distribution zones. • It is proposed that the network information is sourced by CLM in order to include hydraulic modelling of these systems in future.

SANITATION SCHEMES

The Sewer Master Plan (Feb 2023) has indicated that based on the most likely land-use development scenario, the following further sewer reticulation infrastructure components will be necessary.

Table C.3.15: Future sewer reticulation infrastructure required
Citrusdal
• The existing drainage areas are increased to accommodate proposed future development areas that fall within these drainage areas. • New gravity outfall sewers are required to collect the sewage from future development areas including a new pumping station and rising main for future development areas CD1, CD27 and CD28. • When overflow problems occur in the existing Citrusdal drainage areas (when future areas develop) the outfall sewers should be upgraded with larger diameters. • New outfall sewers are proposed to service the existing erven (without a waterborne sanitation system) in the northern part of Citrusdal. • It is proposed that the capacity of the Riverview PS and the diameter of the accompanying rising main are verified and that the PS and rising main are upgraded if required. • Upgrading of the pumps at the Golfbaan PS is proposed when the existing pumps reaches capacity. • Further to the above, it is also proposed that the current Heuwelsig PS is decommissioned and the sewerage flow from the drainage area is diverted to the Citrusdal PS 2. • Sewer flow logging is proposed at the River View, Golfbaan and Citrusdal no. 1 pumping stations in order to verify the duty points of the respective pumping stations and to calibrate and improve the integrity of the Citrusdal hydraulic sewer model.
Clanwilliam
• The existing drainage areas are increased to accommodate proposed future development areas that fall within these drainage areas. • New gravity outfall sewers are required to collect the sewage from future development areas including a new pumping station and accompanying rising main for future development areas CW16b, CW122, CW28, CW30 & CW31 and a new pumping station and rising main for the lower lying erven of future development area CW23. • New outfall sewers, including a new pumping station and rising main, are proposed to service the existing erven in Clanwilliam without a waterborne sanitation system. • A number of existing outfall sewers require upgrading by replacement with enlarged future sewers. • Upgrading of the Fostersrtaat PS and rising main and upgrading of the Milnerstraat PS and rising main are proposed. • One of the major upgrades required is the reinforcement of the main gravity outfall sewer downstream of the discharge point of the Milnerstraat PS's rising main, gravitating towards the Clanwilliam WWTP. • Sewer flow logging is proposed at the Terasse, Milnerstraat & Fosterstraat pumping stations in order to verify the duty points of the respective pumping stations and to calibrate and improve the integrity of the Clanwilliam hydraulic sewer model.
Elands Bay
• 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 in Elands Bay. • When overflow problems occur in the main outfall sewers gravitating towards the Elands Bay PS 1 the existing outfall sewer should be replaced with enlarged future sewers. • When the main pumping station reaches capacity the PS and rising main should be upgraded. • Sewer flow logging is proposed at the Elands Bay no. 1 & no. 2 pumping stations in order to verify the duty points of the respective pumping stations and to calibrate and improve the integrity of the Elands Bay hydraulic sewer model.
Graafwater
• The existing drainage area is increased to accommodate proposed future development areas that fall within the drainage area. • New outfall sewers and a new pumping station and rising main are proposed to service the existing erven without a waterborne sanitation system in Graafwater. • When overflow problems occur in the main outfall sewers gravitating towards the Graafwater PS the existing outfall sewer should be replaced with enlarged future sewers. • Sewer flow logging is proposed at the existing Graafwater pumping station in order to verify the duty point of the pumping stations and to calibrate and improve the integrity of the Graafwater hydraulic sewer model.
Lamberts Bay

Table C.3.15: 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 and a new PS and accompanying rising main are proposed to service the existing erven without a waterborne sanitation system in Lamberts Bay. • A new rising main from the existing Nuweland pumping station directly to the Lamberts Bay WWTP is proposed, including upgrading of the pumps at the Nuweland PS. This will alleviate pressure on the existing system downstream of the Nuweland PS gravitating towards the Paul Kruger PS. • Upgrading of the pumps at the Voortrekker PS is proposed when the existing pumps reaches capacity. • When overflow problems occur in the existing Lamberts Bay drainage areas (when future areas develop) the outfall sewers should be upgraded with larger diameters. • Sewer flow logging is proposed at the existing Paul Kruger, Nuweland, Malkopbaai, Voortrekker & Jan van Riebeeck pumping stations to verify the duty points of respective pumping stations and to calibrate and improve the integrity of the Lamberts Bay hydraulic sewer model.
Leipoldtville
• Currently there is no information available for the layout of the sewer system in Leipoldtville. • New outfall sewers are proposed to service the existing erven without a waterborne sanitation system in Leipoldtville.
Algeria and Paleisheuwel
• No sewer reticulation network information was available for the rural settlements of Algeria and Paleisheuwel. It is proposed that the network information is sourced by Cederberg Local Municipality in order to include hydraulic modelling of these systems in future.
Elandskloof and Wupperthal
• No sewer reticulation network information was available for the Moravian Church settlements of Elandskloof and Wupperthal, except for the location of two sewer pumping stations in Wupperthal. It is proposed that the network information is sourced by Cederberg Local Municipality in order to include hydraulic modelling of these systems in future.

TOPIC 4: WATER SERVICES OPERATION AND MAINTENANCE

Table C.4.1: Water Services O&M

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)
O&M Plan Is There an O&M Plan?	Yes	100.0	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.	100.0	Partially	78.6
Resources	Yes	100.0	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).	100.0	Partially	92.9
	Yes	100.0	Cederberg 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.	100.0	Partially	78.6
Information	Yes	100.0	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 need to be drafted as part of the Water Safety Plans and W_2RAPs. Protocols need to be followed after an incident.	100.0	Yes	85.7
	Yes	100.0	Ensure that the required O&M Manuals are in place for all the water and sewerage infrastructure.	100.0	Partially	78.6
Activity Control & Management	Yes	100.0	Groundwater: Implement recommended daily, weekly, monthly and six monthly O&M activities for the boreholes.	100.0	Partially	78.6
	Yes	100.0	Surface water infrastructure: Implement preventative maintenance procedures.	100.0	Partially	78.6
	Yes	100.0	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.	100.0	Partially	78.6
	Yes	100.0	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.	100.0	Partially	78.6

Table C.4.1: Water Services O&M						
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)**
	Yes	100.0	Water PSs: Compile weekly and monthly maintenance checklists for the recommended activities for all the water PSs and continue to inspect all PSs on at least a weekly basis.	100.0	Partially	78.6
	Yes	100.0	Reservoirs: Compile maintenance checklists for the recommended reservoir maintenance activities and document all inspections.	100.0	Partially	78.6
	Yes	100.0	Remote monitoring and Control Systems: Ensure adequate maintenance is carried out on the SCADA systems and compile maintenance checklists for the recommended activities.	100.0	Partially	78.6
	Yes	100.0	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.	100.0	Partially	78.6
	Yes	100.0	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.	100.0	Partially	78.6
	Yes	100.0	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.	100.0	Partially	78.6

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

- records, 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 is 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 contact 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, that should be implemented by Cederberg Municipality.

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

Table C.4.2: Recommended budgets for the Replacement and the Operation and Maintenance of the existing water and sewerage infrastructure (Based on the CRC of the assets included in the WSDP)

Asset Type	Asset Register June 2022		WSDP Asset Value	Required Annual Replacement Budget (Best Practice)	Required Annual O&M Budget (Best Practice)
	Opening Cost	Carrying Value	CRC	2.0% of CRC	1.5% of CRC
Borehole	R13 271 289	R8 395 248	R17 850 000	R357 000	R267 750
Bulk Mains	R44 583 412	R13 693 049	R288 870 000	R5 777 400	R4 333 050
Reservoirs	R31 489 037	R19 181 583	R143 620 000	R2 872 400	R2 154 300
Water Pump Station	R5 907 790	R1 835 182	R41 560 000	R831 200	R623 400
Water Reticulation Pipeline	R67 040 204	R45 239 649	R230 000 000*	R4 600 000	R3 450 000
Citrusdal WTW	R494 727	R292 169	R33 289 000	R665 780	R499 335
Clanwilliam WTW	R188 414	R12 483	-	-	-
Elands Bay WTW	R616 019	R25 821	-	-	-
Graafwater WTW	R7 210 030	R3 912 881	R19 111 000	R382 220	R286 665
Lamberts Bay WTW **	R1 299 876	R237 350	-	-	-
Leipoldtville WTW	R198 625	R69 319	-	-	-
Algeria WTW	R9 820	R4 365	-	-	-
Sub Total Water	**R172 309 243**	**R92 899 099**	**R774 300 000**	**R15 486 000**	**R11 614 500**
Sewer Pump Station	R8 821 804	R2 691 175	R68 500 000	R1 370 000	R1 027 500
Sewer Reticulation Pipeline	R41 886 863	R23 831 540	R246 230 000*	R4 924 600	R3 693 450
Outfall Sewers	R4 457 432	R1 461 679	R41 430 000	R828 600	R621 450
Precast Toilets	R2 714 791	R2 351 327	-	-	-
Algeria WWTW	R7 254 256	R1 072 515	R2 500 000	R50 000	R37 500
Citrusdal WWTW	R80 749 610	R76 111 886	R63 560 000	R1 271 200	R953 400
Clanwilliam WWTW	R10 548 778	R5 841 645	R58 814 000	R1 176 280	R882 210
Elands Bay WWTW	R2 222 433	R287 920	R4 334 000	R86 680	R65 010
Graafwater WWTW	R2 642 162	R1 004 737	R6 780 000	R135 600	R101 700
Lamberts Bay WWTW	R29 709 014	R26 108 971	R79 685 000	R1 593 700	R1 195 275
Sub Total Sewerage	**R191 007 143**	**R140 763 395**	**R571 833 000**	**R11 436 660**	**R8 577 495**
Total Water and Sewerage	**R363 316 386**	**R233 662 494**	**R1 346 133 000**	**R26 922 660**	**R20 191 995**

Notes: * Include connections
** Exclude the desalination plant

TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

Table C.5.1: Conservation and Demand Management - Water Resource Management

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)
Reducing unaccounted water and water inefficiencies	Yes	100.0	The Municipality needs to continue with the implementation of the proposed WC/WDM Strategy to further reduce the NRW and Water Losses for the various water distribution systems.	100	Partially	92.9
	Yes	100.0	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	No	57.1
Leak and meter repair programmes.	Yes	100.0	A Leak Repair and Assistance Programme that investigates and repairs leaks at all domestic households in low cost housing developments and poor areas with consumption above 15 kl / month should be implemented.	100	No	57.1
	Yes	100.0	Continue with the implementation of the pipeline replacement programme. The location of pipe failures need to be recorded with accurate GPS coordinates. This improves the integrity of the output of the pipe failure model. It was recommended in the pipe replacement study that the pipe replacement in Cederberg 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	100.0	Implement recommendations under Section 5.2 with regard to bulk water meters.	100	Partially	78.6
	Yes	100.0	Install water meters at all the unmetered erven and replace faulty water meters at consumer connections.	100	Partially	64.3
Consumer/end-use demand management: Public Information & Education Programmes	Yes	100.0	Support schools with WDM initiatives	100	No	57.1
	Yes	100.0	Cederberg Municipality can consider adding helpful hints on effective water usage on the monthly bills. Community awareness programmes should be initiated to inform consumers of the importance of WC/WDM.	100	Partially	78.6
Conjunctive use of surface - and groundwater	No	100.0	-	-	-	100.0
Working for Water	No	100.0	-	-	-	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?

Table C.5.2: Conservation and Demand Management - Water Balance

Section	Intervention Required?	%	Solution description as defined by topic situation assessment	%	Is there an Existing project/activity addressing this problem?	Current Demand Overall Scoring %
Water Balance	Yes	100.0	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	78.6

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?

Cederberg Municipality completed a Study to Analyse Treasury Data and identify projects that promote WC/WDM in Cederberg Local Municipality during June 2022. The proposed WC/WDM projects for the towns in Cederberg Municipality are indicated in the table below.

Table C.5.3: Proposed WC/WDM projects for towns in Cederberg Municipality

No	Item	Description	Estimated Cost (Vat Excl.)
1	Improved billing by continued co-operation with Finance Department	Improve the integrity of metering and billing data through an investigation into the list of treasury records without a GIS link, the list of occupied stands with a zero water demand, the list of occupied stands without a water meter as well as investigations into the list of stands with substantial increases and decreases in water demands.	Can be performed by Cederberg Municipality or in combination with a contractor. Estimated cost to be determined.
2	Water Meter Replacement	Replace all eligible/broken meters and any unmetered stands identified should be metered. A new water meter audit will be beneficial to this process.	To be determined by Cederberg Municipality. Estimated cost to be determined.
3	Dedicated WC/WDM Control Officer with team	Cederberg Municipality should consider increasing the number of people involved with WC/WDM for Cederberg Municipality as and when required.	To be determined by Cederberg Municipality. Estimated cost to be determined.
4	Refine Zone Water Balancing	Replace existing old bulk meters within the Cederberg Municipality to improve the accuracy of NRW figures. Investigate and identify possible new bulk meter positions in order to create additional sub-zone district management areas (DMAs). Install new bulk meters at these locations and record bulk meter readings monthly for all bulk water meters.	Study investigation R100 000. Installation of bulk meters (first phase of roughly 10 meters) at assumed cost of R200 000 per meter = R2 000 000.
5	Large Water Users	Investigate the sites of large water users in order to assess potential water saving measures.	Can be performed by Cederberg Municipality or outsourced. Estimated cost if outsourced of R150 000.
6	Continue with Pipe Replacement	Continue with pipe replacement programme based on PRP study dated June 2016. Minimum targeted annual replacement of between 1% to 2% of total assets (calculated at between R2.1 million and R4.2 million per year for reticulation networks and at between R3 million and R6 million per year for bulk and raw water supply pipelines). Update PRP study whereby a list of the top 200 pipes with the highest priority to be replaced is produced including an estimated replacement cost for each pipe.	R6 000 000 required as indicated by Cederberg Municipality. Update PRP study R300 000.
7	Pressure Management	Investigate, including hydraulic analysis, identify and implement additional pressure management projects.	Study to identify new pressure management zones in separate investigation (Part of Water Master Plan). Budget to implement pressure management.
8	Monitoring of ILIs per Zone	Investigate and identify zones with high ILI values, determine which zones need to be monitored and where to implement additional WDM measure to lower ILIs.	To be determined by Cederberg Municipality.
9	Continue with Leak Detection and Repair	Continue with current process of leak detection and pipe repair throughout the Municipality.	To be determined by Cederberg Municipality.
10	Public / Schools awareness campaign	Continue with public awareness campaign in order to educate consumers to reduce water wastage. Once a year a schools education programme on water conservation should be undertaken.	R100 000 per year for WC/WDM awareness activities and material. R70 000 per year for school education programmes.

The immediate projects and interventions required to further promote WCWDM in order to reduce NRW in Cederberg Municipality include the following:

- Improved billing by continued co-operation with Finance Department;
- Water meter replacement;
- Appoint a dedicated WC/WDM team under the water loss control officer;
- Refine zone water balancing per DMA;
- Investigate large water users;

- Pipe replacement programme;
- Investigate additional pressure management projects;
- Monitoring of ILIs per zone;
- Leak detection and repair; and
- Public / Schools awareness campaign.

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 Cederberg Municipality. The proposed WC/WDM Strategy for Cederberg Municipality is based on the 25 items included in the Scorecard and the sections below discuss each of these items in detail.

Table C.5.4: Proposed WC/WDM Strategy Items for Cederberg 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 and Water Losses 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.
- Continue to calculate and quantify all unbilled authorized consumption by firstly identifying all the relevant consumers, e.g. Municipal buildings, parks, fire services, sport fields, etc. Unbilled consumption does not generate income, but will enable the municipality to better quantify their actual water losses.
- Ensure that all bulk water meters are read and recorded and that new bulk water meters are installed as recommended for Leipoldtville, Wupperthal, Algeria, Elandskloof and Paleisheuwel so that IWA Water Balances can also be compiled for these systems.

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.
- Existing water pump stations that are in a poor condition needs to be refurbished.
- Ensure proper maintenance of the existing PRVs in Citrusdal and Clanwilliam.
- 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.

Items 3 and 4: Metering System

Recommendation and Strategy:

- All un-metered water connections, as identified through the 2022 Swift Analysis, need to be provided with water meters. Meters need to be read on a monthly basis and consumers need to be billed monthly according to their actual water usage. In addition to water theft, many water accounts go unnoticed in the system or have some type of data inconsistency that results in no revenue being generated for the particular water use event. The SWIFT data needs to be used to clean the Treasury data and the municipality needs to identify and correct any inaccurate data in the system (Linkage of Treasury data with cadastral data). See Table 7.5.1 of the Administration, Information and Comprehensive Overview Report for the 2022 Swift results.
- Consumer consumption checks / investigations need to be carried out where water usage is very low, but there are households on the property (Use Swift data). This project will give a clear indication of where illegal or unregistered connections is being made and whether the meter is under reading the actual consumption, thus water is being used but not billed or recorded.
- Use the Swift data to identify all unmetered erven and all meters with zero consumption. All illegible / broken / old meters should be replaced. Any un-metered stands should be metered and meter readings in the billing system should be updated where required. All meter boxes should also be cleaned as part of the inspections.
- Municipality needs to continue with the implementation of their Meter Management / Replacement program. An effective Meter Management / Replacement Program needs to achieve the following objectives:
  - Determine the on-going meter replacement programme;
  - Determine exception reports on meters which are suspected to be faulty;
  - Test and replace faulty meters; and
  - Size meters correctly.

  The activities of this program that needs to be budgeted for are as follows:
  - Swift analysis of treasury data.
  - Research and development of a meter replacement policy and meter management / replacement programme;
  - Implementation of a uniform meter management information system;

Table C.5.4: Proposed WC/WDM Strategy Items for Cederberg Municipality

- Testing and replacing faulty meters reported by consumers (Part of reticulation function).
- Replacement of domestic meters with AMR enabled format (where appropriate) in accordance with meter management / replacement programme.

Funding and Budget Requirements:

Allow a budget of approximately R200 000 for an annual SWIFT analysis to identify unmetered erven and erven with no or very low consumption. Estimated annual budget requirement for the installation of individual water meters is R1 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.
- Commercial data analysis needs to be 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 R300 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.
- The conditions of the assets need to be included in 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:

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

Table C.5.4: Proposed WC/WDM Strategy Items for Cederberg Municipality

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 R750 000.

Item 11: Dedicated WC/WDM Support

Recommendation and Strategy:

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

Funding and Budget Requirements:

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

Item 12: Active Leakage Control

Recommendation and Strategy:

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

Decide on how the work will be undertaken:

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

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

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

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

Funding and Budget Requirements:

Table C.5.4: Proposed WC/WDM Strategy Items for Cederberg Municipality
R300 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 currently linked to the various water distribution systems should also be linked to the different reservoir zones in the future where possible, in order to accurately determine the NRW and water losses for the specific reservoir zones in the future. There are large number of faulty bulk water meters, which need to be replaced and new meters also need to be installed for the reservoirs with no bulk water meters. The Financial Department needs to provide the billed metered consumption data separately for the different zones in the future in order to assist with the following: • Clear indication of how much water is being used per area / zone. • Areas with high NRW and water losses can easily be identified. • Leakage and pressure control can be better managed. • Water demand per area / zone can be determined. Night flows need to be measured for zones with expected high water losses. It is recommended to re-log the night flows every few years to determine if there was an increase in leakage.
Funding and Budget Requirements: The estimated cost for the logging of flows and pressures for zones with expected high water losses is R450 000. The logging exercise should be repeated at least every three years. A budget should be allocated to investigate and resolve possible zone interconnections. It is however difficult to price such investigations at this stage.
Item 14: Effective Bulk Metering Management System
Recommendation and Strategy: • Continue to read and record all the bulk water meter readings at the existing WTWs, reservoirs and pump stations on at least a weekly basis. • Broken bulk water meters need to be repaired or replaced. • Meter chambers need to be cleaned. • 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 correctly installed. Ideally a straight pipe section upstream of the meter of at least 5x the meter diameter and 3x the meter diameter downstream of the meter. Strainers need to be installed to protect the meters. These strainer elements must be removable from the top, for ease of cleaning. Gate valves are required for maintenance before and after meters. • Every informal area with unmetered communal services to be supplied with a bulk water meter in order to determine the unbilled metered consumption. All discrete zones are to be supplied with a bulk water meter. The meter readings must be recorded on at least a weekly basis. The readings can be used to quantify both the water supplied and the leakage for a specific area.
Funding and Budget Requirements: Allow an annual budget of approximately R400 000 for the installation of new bulk water meters, the replacement of faulty bulk water meters and to adequately protect existing bulk water meters.
Item 15: Effective Zone Meter Management and Assessment of Night Flows
Recommendation and Strategy: See recommendations under Item 14: Effective Bulk Meter Management System.
Funding and Budget Requirements: See funding and budget requirements included under Item 14: Effective Bulk Meter Management System.
Item 16: Pressure Management
Recommendation and Strategy: See Item 2: Pressurised system at all time.
Funding and Budget Requirements: See Item 2: Pressurised system at all time.
Item 17: As-built Drawings of Bulk and Reticulation Infrastructure
Recommendation and Strategy: Continue with the current record system for all “as-built” drawings and the regular updating of the Water and Sewer Master Plans with this information.
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 and the Aerial Maps on a regular basis, in order to ensure they remain accurate.
Funding and Budget Requirements: None
Item 19: Regulation and Bylaws
Recommendation and Strategy:

Table C.5.4: Proposed WC/WDM Strategy Items for Cederberg Municipality
The existing Water Supply, Sanitation Services and Industrial Effluent By-law needs to be updated, in order to ensure that the by-law adequately allow for WC/WDM measures.
Funding and Budget Requirements: Allow a budget of R180 000 for the updating of the existing Water Supply, Sanitation Services and Industrial Effluent By-law.
Item 20: Tariffs
Recommendation and Strategy: See Section 7.3 under Topic 7 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Financial study to determine the impact of changing the sanitation tariff structure from a fixed monthly amount, which is fix for residential consumers and based on the number of toilets for businesses, hotels, flats, schools, hostels and old age homes to a stepped tariff based on water consumption in the future. Estimated cost of a financial analysis is R250 000.
Item 21: Technical Support to Customers
Recommendation and Strategy: The objective of a Technical Support programme is not limited to assisting consumers in reducing their water demand, but is also to look at wastewater, monitor compliance with by-laws and service conditions and offer general customer support. Once a dedicated person has been allocated to WC/WDM it is recommended to engage with large customers and to identify areas where the municipality can provide assistance. The proposed activities of this programme that can be budgeted for are as follows: • Train existing staff; • Identify and visit large consumers (Checking that large consumers are correctly metered and billed, providing tips on WC/WDM, test the accuracy of all large consumer meters, install data-loggers on all large consumer meters and informing consumers of any sudden change in consumption patterns). • Arrange leakage inspections in public buildings; • Provide assistance and technical know-how for large consumers; and • Introduce compulsory water management plan for large consumers.
Funding and Budget Requirements: No additional funding – pending the appointment of a dedicated person for WC/WDM.
Item 22: Removal of Un-authorised Connections
Recommendation and Strategy: Meters need to be installed at the 154 occupied stands in the treasury data without a water meter, as identified through the 2022 Swift analyses (Section 5.1.1.5 of the Administration, Information and Comprehensive Overview Report). The 135 occupied stands in the treasury data with a water meter, but with zero demand also need to be inspected (Section 5.1.1.4 of the Administration, Information and Comprehensive Overview Report).
Funding and Budget Requirements: Estimated budget of R1.445 million is required to install water meters at the unmetered erven.
Item 23: Community Awareness on WDM
Recommendation and Strategy: See Section 5.1.3 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: It is estimated that R150 000 / year should be allocated for WC/WDM awareness campaigns and activities, material to be included with monthly water bills, placing notices in newspapers, billboards, competitions, etc.
Item 24: Schools Education on WDM
Recommendation and Strategy: See Section 5.1.3.1 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Allow a budget of approximately R50 000 per year for the implementation of WC/WDM measures at schools (Competitions, Awareness Raising events, etc.)
Item 25: Retrofitting
Recommendation and Strategy: See Sections 5.1.2.1 and 5.1.2.2 of the Future Demand and Functionality Requirements Report.
Funding and Budget Requirements: Leak repair assistance programmes: R250 000 per annum for ongoing exercise to repair leakages at indigent properties using in excess of 20 kl/month. WSIG funding or "War on Leaks" funding from DWS can be requested in this regard. Retrofitting: R500 000 for a pilot project in one of the public buildings.

The way forward for Cederberg 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.

Cederberg 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 Cederberg Municipality's capital and operational budgeting process are as follows:

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

The WDM initiatives can deliver excellent return on investment if well implemented and well managed. All external funding that could be utilised by Cederberg 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.

During droughts (as experienced recently in the Western Cape), some WC/WDM measures are often enforced by local government through water restrictions; however, and appropriate municipal water control (metering) and pricing structure (billing and revenue collection) could ensure that these measures become routine. The sustainability of future water services will largely depend on the ability of municipalities to properly maintain the reticulation systems, to minimise household plumbing leakages and to maintain pressurised supplies (assurance of supply) to justify payment from their clients for those services.

Cederberg Municipality has responded to the need to address NRW and water losses within their jurisdiction by implementing some WC/WDM initiatives over the last number of years. The Municipality will start with the active implementation of the proposed WC/WDM Strategy in order to reduce the percentage of NRW and Water Losses and improve water use efficiency within the various schemes as follows.

Table C.5.5: Commitment to reduce NRW and water inefficiencies

Distribution System	2021/2022		Committed Future NRW	
	NRW (%/a)	Water Losses (%/a)	2026 (%/a)	2046 (%/a)
Citrusdal	51.8%	40.0%	45.0%	15.0%
Clanwilliam	6.6%	-19.7%	15.0%	15.0%
Elands Bay	31.7%	21.8%	25.0%	15.0%
Graafwater	29.8%	25.3%	25.0%	15.0%
Lamberts Bay	25.6%	17.2%	20.0%	15.0%

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

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

The Infrastructure Leakage Index (ILI) can be used by Cederberg 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.

Cederberg 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.

Cederberg Municipality is committed to keep record of all bulk meter readings, flows at their WWTWs and to update the IWA water balance models on a monthly basis in order to determine locations of wastage and to enable Cederberg Municipality to actively implement the WC/WDM Strategy in order to reduce their current NRW and water losses.

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

Citrusdal system:

- The identified unmetered erven, as identified through the 2022 Swift analysis, to be supplied with water meters. The identified erven with a water meter, but with zero demand, need to be inspected.
- The non-operational bulk water meters, as indicated in Table 5.1.2.3.1 of the Administration, Information and Comprehensive Overview Report, need to be repaired. Monthly meter readings of all bulk water meters need to be recorded.
- The flow meter that measures the incoming flow at the Citrusdal WWTW needs to be calibrated.

Clanwilliam system:

- The identified unmetered erven, as identified through the 2022 Swift analysis, to be supplied with water meters. The identified erven with a water meter, but with zero demand, need to be inspected.
- The bulk water meters need to be calibrated, because the NRW for the last financial year is extremely low and the water losses are negative. The Operational personnel need to ensure that all the bulk water meters for Clanwilliam are correctly read and recorded on at least a monthly basis.
- The two flow meters at the WWTW need to be repaired, in order to measure both the inflow and outflow at the plant.

Elands Bay system:

- The identified unmetered erven, as identified through the 2022 Swift analysis, to be supplied with water meters. The identified erven with a water meter, but with zero demand, need to be inspected.
- Bulk water meter needs to be installed at the Elands Bay reservoirs, in order to determine the bulk water distribution losses from the booster PS to the reservoirs.
- Flow meter needs to be installed at the WWTW in order to measure the inflow at the plant. The monthly readings of the flow meter for the effluent re-used from the plant need to be recorded.

Graafwater system:

- The identified unmetered erven, as identified through the 2022 Swift analysis, to be supplied with water meters. The identified erven with a water meter, but with zero demand, need to be inspected.
- The bulk water meter readings of the raw water supply to all the farmers with off-takes from the bulk water pipeline need to be recorded on at least a monthly basis.
- The flow meter at the Cedar main sewer pump station needs to be repaired in order to measure the inflow at the Graafwater oxidation ponds. The monthly readings of the flow meter at the final effluent irrigation PS need to be recorded.

Lamberts Bay system:

- The identified unmetered erven, as identified through the 2022 Swift analysis, to be supplied with water meters. The identified erven with a water meter, but with zero demand, need to be inspected.
- There are a large number of bulk water meters for the Lamberts Bay water distribution system that are not working, as indicated in Table 5.1.2.3.1 of the Administration, Information and Comprehensive Overview Report. These bulk water meters need to be repaired and the monthly readings of all the bulk water meters need to be recorded.
- The flow meter for the inflow at the WWTW needs to be repaired, in order to measure the inflow at the plant. A flow meter needs to be installed for the final effluent re-used for irrigation purposes from the plant.

Leipoldtville:

- The identified unmetered erven, as identified through the 2022 Swift analysis, to be supplied with water meters.
- Bulk water meter readings at the borehole (Abstraction) and the reservoir (System Input) need to be recorded on at least a monthly basis.

Wupperthal:

- A bulk water meter needs to be installed at the new reservoir, in order to measure the monthly system input volumes for Wupperthal. The bulk water meter readings need to be recorded on at least a monthly basis.
- A flow meter needs to be installed at the WWTW, in order to measure the inflow to the plant.

Algeria:

- Bulk water meter readings at the borehole (Abstraction) need to be recorded on at least a monthly basis.
- A bulk water meter needs to be installed at the reservoir in order to measure the supply to Algeria from the surface water stream. The bulk water meter readings need to be recorded on at least a monthly basis.
- A flow meter needs to be installed at the WWTW, in order to measure the inflow to the plant.

Elandskloof:

- A bulk water meter needs to be installed at the storage reservoir in order to measure the supply to Elandskloof from the surface water stream (System Input). The bulk water meter readings need to be recorded on at least a monthly basis.

Paleisheuwel:

- The water meter readings at the borehole (Abstraction) need to be recorded on at least a monthly basis.

Non-Revenue Water and Water Losses:

The effective implementation of the proposed WC/WDM Strategy will enable Cederberg Municipality to reduce their current NRW and Water Losses for the various distribution systems over the next five years.

Citrusdal: The current treatment losses are excellent. The NRW and Water Losses for the last five years are extremely high and WC/WDM measures need to be implemented to reduce the unbilled unmetered consumption. The Municipality needs to work towards a target NRW of 30% and Water Losses of 20%. The

ILI value above 8 indicates a very bad management system, with immediate water loss reduction measures to be implemented.

Clanwilliam: The high bulk distribution losses, the current low NRW and the negative Water Losses need to be investigated (Calibration of bulk flow meters, reading of bulk meters, etc.).

Elands Bay: The current bulk distribution losses of less than 5% are excellent. The NRW and Water Losses stayed roughly the same for the last two financial years. The Municipality needs to work towards a target of 25% for the NRW and 15% for the Water Losses. The ILI value of 3.92 indicates a good management system. No urgent action required, but the NRW and Water Losses should be monitored carefully.

Graafwater: Municipality needs to work towards a target of 10% for the treatment losses. The NRW and Water Losses increased slightly during the last financial year. The current NRW and Water Losses are high and the Municipality needs to work towards a target of 25% for the NRW and 20% for the Water Losses. The ILI value of 3.30 indicates a good management system. No urgent action required, but the NRW and Water Losses should be monitored carefully.

Lamberts Bay: The current bulk distribution losses of less than 5% are excellent. The NRW and Water Losses stayed roughly the same for the last two financial years. The Municipality needs to work towards a target of 20% for the NRW and 15% for the Water Losses. The ILI value of 3.85 indicates a good management system. No urgent action required, but the NRW and Water Losses should be monitored carefully.

The NRW and Water Losses for all the systems combined were further reduced during the last financial year. The Municipality needs to work towards a target of 25% for the overall NRW and 15% for the overall Water Losses.

TOPIC 6: WATER RESOURCES

Table C.6.1: Water Resource

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)
Current Water Sources	Yes	100.0	Ensure the required authorisations (licences) are in place for all the water resources, as well as the required registrations.	100	Partially	71.4
	Yes	100.0	Implement recommendations under Section 5.2 with regard to bulk water meters.	100	Partially	78.6
Additional Sources Available	Yes	100.0	Continue with the further augmentation of the Lamberts Bay water resources (Groundwater and Desalination).	100	Yes	71.4
Monitoring	Yes	100.0	Implement Groundwater Management Plan for all production boreholes (Water levels, abstraction volumes and water quality).	100	Partially	78.6
	Yes	100.0	Ensure that all industries apply for the discharge of industrial effluent into the sewer system, to monitor the quality and volume of industrial effluent discharged and to implement the set of by-laws with regard to the discharge of industrial effluent into Cederberg Municipality's sewer system in order to determine whether the quality comply with the standards and criteria.	100	Yes	71.4
Water Quality	Yes	100.0	Increase the water quality operational sampling programme to ensure compliance with SANS241:2015 requirements.	100	Partially	78.6
	Yes	100.0	Increase the effluent operational sampling programmes at the WWTWs, in order to ensure proper process control.	100	Partially	78.6
Operation	Yes	100.0	Ensure all surface and groundwater resources are registered with the DWS.	100	Partially	78.6

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. Cederberg 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.

Future water requirement projection models were developed for each of the towns within Cederberg Municipality's Management Area. These models include the future projections up to 2046 and were calibrated by using historic billed metered consumption data and bulk metered abstraction data. The percentage NRW was determined for each of the distribution systems and growth in demand was based on agreed population and growth figures. The table below gives an overview of the future water requirement projections for the various distribution systems and the yield / licence volume surplus or shortfall, based on the WSDP projection.

Table C.6.2: Projected future water requirements and yield / licence Surplus (+) / Shortfall (-) based on WSDP model

Distribution System	Projection	PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)				
		2026	2031	2036	2041	2046
Citrusdal	2.0% Annual Growth	1 155.815	1 276.113	1 408.932	1 555.574	1 717.480
	4.0% Annual Growth	1 273.662	1 549.604	1 885.330	2 293.793	2 790.749
	WSDP Model	992.475	943.363	911.580	892.924	884.788
	LWU surplus (+) / shortfall (-)	**+555.045**	**+604.157**	**+635.940**	**+654.596**	**+662.732**
Clanwilliam	2.0% Annual Growth	1 160.941	1 281.773	1 415.181	1 562.474	1 725.097
	4.0% Annual Growth	1 279.311	1 556.477	1 893.692	2 303.966	2 803.127
	WSDP Model	**1 280.886**	**1 413.077**	**1 563.970**	**1 736.701**	**1 934.971**
	LWU surplus (+) / shortfall (-)	**+767.114**	**+634.923**	**+484.030**	**+311.299**	**+113.029**
Elands Bay	2.0% Annual Growth	198.983	214.361	230.928	248.775	268.001
	4.0% Annual Growth	214.127	248.232	287.769	333.603	386.738
	WSDP Model	178.669	182.395	186.413	190.728	195.345
	Yield surplus (+) / shortfall (-)	**+470.972**	**+467.247**	**+463.229**	**+458.914**	**+454.297**
Graafwater	2.0% Annual Growth	310.468	334.462	360.311	388.157	418.155
	4.0% Annual Growth	334.097	387.310	448.998	520.512	603.416
	WSDP Model	295.398	313.007	332.401	353.752	377.252
	Yield surplus (+) / shortfall (-)	**+335.322**	**+317.713**	**+298.319**	**+276.968**	**+253.468**
Lamberts Bay	2.0% Annual Growth	802.638	886.177	978.411	1 080.245	1 192.678
	4.0% Annual Growth	884.475	1076.099	1 309.239	1 592.890	1 937.994
	WSDP Model	731.763	777.516	827.356	881.706	941.038
	Yield surplus (+) / shortfall (-)	**-164.115**	**-209.868**	**-259.708**	**-314.058**	**-373.390**

The table below gives an overview of the years in which the annual water requirement is likely to exceed the sustainable yields / allocations from the various water resources.

Table C.6.3: Years in which the annual water requirements are likely to exceed the sustainable yields / license volumes of the various resources

Distribution System	Legal Water Use (LWU) / Yield (Y) (Ml/a)	2% Annual Growth on water requirement	4% Annual Growth on water requirement	WSDP Projection Model
Citrusdal	1 547.520 (LWU)	2040	2031	>2046
Clanwilliam	2 048.000 (LWU)	>2046	2037	>2046
Elands Bay	649.642 (Y)	>2046	>2046	>2046
Graafwater	630.720 (Y)	>2046	>2046	>2046
Lamberts Bay	567.648 (Y)	Over	Over	Over

Citrusdal: The licence volumes for supply from the Olifants River and from the Boschkloof boreholes are adequate to meet the short to medium term future water requirements of the town.

Clanwilliam: The licence volumes for supply from the Jan Dissels River during the winter months and from the Clanwilliam dam are adequate to meet the short, medium and long term future water requirements of the town.

Elands Bay: The available yields from the Graauwe Duynen (Boreholes R1, R2 and R3) and Waaihoek wellfields (Boreholes OD00525, OD00526 and OD00528) are adequate to meet the short, medium and long term future water requirements of the town. A geohydrologist should review the abstraction from the boreholes annually in order to ensure optimal groundwater abstraction and management occurs. The recommendations from the WULA Geohydrological Assessment for Elands Bay, GEOSS Report 2018/12-24, 28 February 2019, were as follows:

- Servicing and possibly optimizing the entire pipeline infrastructure to ensure that the pipes have the capacity to allow for all the boreholes to be pumped together and to fix any leaks. Currently the Graauwe Duynen wellfield's pipeline is too small, pressure is extremely high when all the boreholes are turned on. There are also reportedly many leaks.
- Test the nitrate levels of the water in the reservoirs to make sure that the water that is being used for domestic use does not have a nitrate level over 10mg/L.
- Re-installation of new electronic water level loggers.
- Variable speed drives to control the flow of the pumps.
- The appropriate borehole pumps must be installed.
- The boreholes and pumps should be serviced annually. Water sample should also be collected annually and the flow rate and volume of water abstracted recorded monthly (along with the measured water levels).

Graafwater: The current available yield from the three production boreholes is adequate to meet the short, medium and long term future water requirements of the town. A geohydrologist should review the abstraction from the boreholes annually in order to ensure optimal groundwater abstraction and management occurs. Municipality should continue with the implementation of their Groundwater Management Plan (GEOSS Report 2020/02-23, 27 February 2020) for these boreholes.

Lamberts Bay Groundwater: The available yield from the three current production boreholes is already inadequate to meet the current water requirements of Lamberts Bay. The 7 August 2019 Geohydrological Assessment and Borehole Siting Report for the Wadrif Study area, south-east of Lamberts Bay, recommended the following six target sites for the drilling of production boreholes.

Table C.6.4: Target drilling sites for the Wadrif area in Lamberts Bay.

Site ID	Latitude	Longitude	Priority	Target	Drilling Depth (m)
LB PS1	-32.244567	18.440841	1	Water saturated sands. Results from a resistivity survey.	50-60
LB PS2	-32.241339	18.418870	2	Water saturated sands. Results from an electro-magnetic survey confirmed by a resistivity survey.	40-50
LB PS3	-32.246307	18.424487	3	Water saturated sands. Results from an electro-magnetic survey.	40-50
LB PS4	-32.243280	18.427631	4		40-50
LB PS5a	-32.238706	18.424717	5	Water saturated sands. Results from a resistivity survey.	40-50
LB PS5b	-32.238176	18.423437	6		40-50

From a groundwater potential perspective sites LB_PS1 and LB_PS2 are optimal for the drilling of production boreholes, although all other sites are also considered viable targets. It should be duly noted that LB_PS1 and LB_PS5a&b are not located within the initial demarcated study area, rather in areas most favourable for groundwater development in terms of geological conditions. All drill sites have been sited in locations that are relatively accessible for a drilling rig.

Note that all drilling targets are delineated in a primary aquifer, where higher groundwater flow is expected in areas of increased porosity, associated with coarse grained sand deposits. If the grain size is small and poorly sorted lower yields can be expected.

Cederberg Municipality needs to engage with private landowners in Lamberts Bay / Upper Wadrif area for future groundwater exploration.

Lamberts Bay Desalination: Cederberg Municipality is currently busy with the construction of the discharge infrastructure for the 1.7 Ml/d desalination plant at Lamberts Bay. All bulk infrastructure was designed for a future treatment capacity of 5.0 Ml/d, but the current treatment capacity of the plant is 1.7 Ml/d. The plant was not yet put into operation and various components of the plant need to be refurbished, before it can be put into operation.



Leipoldtville: The town of Leipoldtville may sustainably abstract 157 680 m³/a from the aquifer system. The projected water requirement for Leipoldtville is anticipated to be 147 310 m³/a in 2040 and the available yield from the existing production borehole is therefore adequate to meet the projected water requirements up to 2040 (WULA Geohydrological Assessment for Leipoldtville, GEOSS Report No. 2019/03-09, 11 March 2019). The Groundwater Monitoring Assessment for Cederberg Local Municipality in the Western Cape, Monitoring Report No.2, April 2022 however indicated that the total abstraction for 2020 was already 199 079 m³/a and for 2021 it was 159 817 m³/a.

Paleisheuwel: It was not possible to compile a future water requirement projection model for Paleisheuwel, because the abstraction volumes from the borehole were not made available. It is assumed that the current supply from the one borehole is adequate to meet the future water requirements of Paleisheuwel.

Algeria: It was not possible to compile a future water requirement projection model for Algeria, because the abstraction volumes from the borehole were not made available and the unmetered supply from the mountain stream. It is assumed that the current supply from the stream and the one borehole is adequate to meet the future water requirements of Algeria.

Wupperthal: It was not possible to compile a future water requirement projection model for Wupperthal, because the supply from the mountain stream is not metered. It is assumed that the current supply from the stream is adequate to meet the future water requirements of Wupperthal.

Elandskloof: It was not possible to compile a future water requirement projection model for Elandskloof, because the supply from the mountain stream is not metered. It is assumed that the current supply from the stream is adequate to meet the future water requirements of Elandskloof.

The DWS is currently busy with the updating of the All Towns Reconciliation Strategies for the Western Cape. The updated All Towns Reconciliation Strategies for Cederberg 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 Cederberg 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
Citrusdal	**The current water sources are adequate to cater for the low, medium and high-growth scenarios. The following sources are identified as potential sources to augment the current water supply beyond 2040, in order of priority and implementation sequence:** • Continue with the full implementation of the Long-Term WC/WDM Strategy.
Clanwilliam	**The current water sources are adequate to cater for the low-growth scenario, but not the medium and high-growth scenarios. The following sources are identified as potential sources to augment the current water supply should the high-growth scenario be realised, in order of priority and implementation sequence:** • Continue with full implementation of the Long-Term WC/WDM Strategy. • An increased allocation from the Clanwilliam Dam. • Apply for WUL from Clanwilliam Dam for demand up to 2040.

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**
Elands Bay	**The current water sources do not appear to have adequate supply to cater for the medium and longer-term future water requirements. It is recommended that the yield of the current sources be determined before any other interventions are considered. Thereafter, 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 Long-Term WC/WDM Strategy. • Further groundwater development, when required.
Graafwater	**The current water sources do not have adequate supply to cater for the current situation, as well as 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 the Long-Term WC/WDM Strategy. • Confirm and legalise current groundwater use. • Further groundwater development, when required.
Lamberts Bay	**The current water sources have adequate supply to cater for the current situation, and inadequate 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 the Long-Term WC/WDM Strategy. • Completion of the outlet works from the desalination plant and augment the current supply. • Further groundwater development. • Re-use when the WWTW has been upgraded, when required.
Leipoldtville	**The current water supply is sufficient to meet the long-term water requirements of Leipoldtville. The following sources are identified as potential sources to augment the current water supply, if needed in the future in order of priority and implementation sequence:** • Continue with the full implementation of the Long-Term WC/WDM Strategy. • Investigate and develop potential groundwater sources, when required.
Wupperthal	The yield of the current water sources must be determined before any future sources or interventions are considered. **Thereafter, the following sources are identified as potential sources to augment the current water supply should they be needed, in order of priority and sequence:** • Continue with the full implementation of the Long-Term WC/WDM Strategy. • Incremental groundwater development • Abstraction from the Tra-Tra River for Wupperthal, when required.
Elandskloof	**The current water sources do not appear to have adequate supply to cater for the medium and longer-term future water requirements. It is recommended that the yield of the current sources be determined before any other interventions are considered. Thereafter, 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 Long-Term WC/WDM Strategy. • Increased abstraction and storage from the Elandskloof Stream. • Incremental groundwater development, when the stream flow is not sufficient.

Volumes are registered on the DWS's WARMS for the various resources. A registered water use however does not guarantee that the water use is accurate or lawful. Validation and verification of the accuracy and lawfulness of the water use is needed to qualify as an Existing Lawful Use. **It is important for the municipality to confirm the correct registration volumes and existing lawful use volumes for all their sources. This information, with the safe yields of the surface and groundwater sources, is critical to accurately determine which sources need to be augmented for the different schemes. Cederberg Municipality further needs to continue to ensure that all the individual sources are metered and that the abstraction volumes are recorded on at least a monthly basis.**

Water Quality: Additional operational monitoring parameters are recommended for Cederberg Municipality (See Topic 6 under Section A) in order to comply with 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, as 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]

Table C.6.6: Minimum monitoring frequency for process risk indicators (SANS241-2:2015: Table 1)			
Determinand	**Raw Water**	**Final Water**	**Distribution System**
Heterotrophic plate count [c]	Not applicable	Weekly	Fortnightly
Treatment chemicals [d]	Not applicable	Monthly	Not applicable
a: A shift is defined as an eight-hour work period.			
b: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and immediate follow-up sampling at an increased sampling frequency.			
c: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and follow-up sampling. d: Includes all risk determinands that are added or formed as a result of the use of treatment chemicals (for example aluminium, iron and chlorine). If non-compliant with the numerical limits specified in SANS 241-1 in the final water, the distribution system monitoring frequencies of Table 3 in SANS241-2:2015 apply.			

Comprehensive Compliance Sampling Programmes are implemented for all the WTWs and water distribution systems.

Effluent Quality: The Municipality's existing Compliance Sampling Programmes for the final effluent at the various WWTWs are adequate and no additional sampling points are recommended. **The current Operational Sampling Programmes for the WWTWs needs to be improved in order to ensure proper process control.** 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 needs to be 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: The following gaps exist with regard to the discharge of industrial effluent into the sewer system of Cederberg Municipality:

- All Industrial effluent discharge into the sewer system needs to be metered.
- All persons need to formally apply for the discharge of industrial effluent into the sewer system.
- Regular sampling of the quality of industrial effluent discharged into the sewer system need to be done.
- Any returns from the industries directly into the Water Resource System needs to be metered.

The Municipality needs to adopt an approach whereby the various parameters at all the industrial consumers are monitored, as well as volumetric monitoring at the larger users. Adaptation of 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.

All current industrial consumers need to 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. Industrial consumers need to be billed according to the quality of effluent discharged into the Municipality's 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.

Cederberg Municipality is committed to ensure that all industries apply for the discharge of industrial effluent into the sewer system, to monitor the quality and volume of industrial effluent discharged and to implement the set of by-laws with regard to the discharge of industrial effluent into Cederberg Municipality's sewer system in order to determine whether the quality comply with the standards and criteria.

TOPIC 7: FINANCIAL

Cederberg Municipality strive to generate sufficient income to meet operating payments, debt commitments and, where applicable, to allow for growth, while maintaining service levels. The long-term financial viability of municipalities depends largely on:

- The extent to which improved and sustainable revenue capacity can be achieved; and
- The sound financial management of its resources.

These imperatives necessitate proper multi-year financial planning. Future impacts of and expenditure streams and the financial implications for the community (i.e. the potential influence on rates, tariffs and service charges) must be identified and assessed to determine the sustainability of planned interventions, programmes, projects and sundry service delivery actions.

Cederberg Municipality shall seek to maintain an adequate management, accounting and financial information system. The Municipality shall strive to maintain a high collection rate and ensure long-term financial sustainability and maintain an effective Supply Chain Management system which ensures fairness, competitiveness, equitable, transparency and cost effectiveness.

The overall strategy of the Cederberg Municipality regarding its finances is to stay/get out of technical insolvency and achieve financially and sustainable stability. The Cederberg Municipality has conducted its plans and business on the basis of a going concern. The municipality's strategic intention is to broaden its tax base through proper revenue enhancement and economic development. The municipality also aspires to align its resources in the most effective, efficient and economical way in order to enhance basic service delivery.

Through the aforementioned strategic intentions, the Cederberg Municipality intends to accomplish the following budget/resource criteria:

Credible budget:

- Activities consistent with the IDP and vice versa, ensuring that the IDP is realistically achievable given the financial constraints of the municipality.
- Financial viability of Municipality not jeopardised – ensure that the financial position is maintained/ improved within generally accepted prudential limits and that short-term and long-term obligations can be met.
- Capacity to spend the budget – institutional capacity (staff; infrastructure; institutional functioning; PMS operational / PDO / KPIs) and budget assumptions applied.

Sustainable budget:

- Financial sustainability/overall financial health of Municipality and to what extent is it sustained?
- Revenue budgeted realistic/reliable (both operating and capital).
- The intention of this is to determine whether the Municipality has enough revenue and adequate financial stability to fund and deliver on its proposed budget.

Responsive budget:

- To meet the needs of the community/public.
- Alignment of IDP – LED Strategies – Budget, and to what extent does it give effect to provincial and national priorities.
- Is the budget appropriately responsive to economic growth objectives and the socio- economic needs of the community.
- Process followed to identify strategic priorities/priority interventions in the IDP.

Affordability / tariffs:

- Tariffs must not be increased unreasonably, and consumers must be able to afford to pay. There should be a balance between affordability and level of service.

The 2021/2022 Annual Performance Report indicated the following challenges experienced by the Financial Services Department.

Table C.7.1: Challenges experienced by the Financial Department	
Description	**Actions to Address**
Implementing Municipal Standard Chart of Accounts (mSCOA)	Continuous challenges for the Municipality and service providers to integrate programmes and work streams. An action and project plan were compiled and closely adhered to.
Increase in indigent population	Council approved a new Indigent Policy and also provided for an increase in subsidising the Indigent client base.
Increase in bad debt	Council approved a new Credit Control Policy with incentives to clients with arrear accounts.
Unfunded budget	Provincial Treasury assessed that the budget is unfunded and the amended budget funding plan is to be tabled to Council.

Expenditure: Cederberg Municipality's expenditure framework for the 2022/2023 budget and MTREF is informed by the following:

- The asset renewal strategy and the repairs and maintenance plan.
- Balance budget constraints (operating expenditure should not exceed operating revenue) unless there are existing uncommitted cash-backed reserves to fund any deficit.
- The financial recovery of the municipality to ensure the required funding levels are achieved and maintained.
- Addressing and finalizing previous unfunded budgets, legacy issues in relation to ESKOM, payment of creditors on time and escalating wage bill in order to focus on service delivery and financial sustainability.
- Operational gains and efficiencies will be directed to ensure appropriate cash backing of statutory funds, provisions and reserves as well as funding the capital budget and other core services.
- Increasing staff productivity.
- Implement fully the cost containment policy and regulations.

Operational: The future planned expenditure by type for Cederberg Municipality, as included in the draft 2022/2023 MTREF Budget, is as follows.

Table C.7.2: Expenditure items by type, as included in the draft 2022/2023 budget					
Expenditure Items	**% of total 2021/2022 Expenditure**	**2021/2022 Pre-audit Outcome**	**2022/2023 Budget**	**2023/2024 Budget**	**2024/2025 Budget**
Employee related costs	33.62%	R132 846 000	R135 785 000	R143 413 000	R153 266 000
Remuneration of Councillors	1.23%	R4 840 000	R5 106 000	R5 331 000	R5 571 000
Debt Impairment	6.89%	R27 236 000	R35 203 000	R36 363 000	R37 478 000
Depreciation and Asset Impairment	6.82%	R26 957 000	R28 151 000	R29 322 000	R29 943 000
Finance Charges	2.98%	R11 757 000	R11 328 000	R11 868 000	R12 573 000
Bulk Purchases – Electricity	23.93%	R94 552 000	R103 638 000	R119 184 000	R131 102 000
Inventory Consumed	2.20%	R8 679 000	R6 972 000	R7 019 000	R7 117 000
Contracted Services	15.35%	R60 630 000	R50 654 000	R23 049 000	R29 338 000
Transfers and Subsidies	0.21%	R839 000	R1 980 000	R2 026 000	R2 073 000
Other Expenditure	6.26%	R24 716 000	R22 822 000	R23 042 000	R22 982 000
Losses	0.51%	R2 000 000	R2 000 000	R2 000 000	R2 000 000
Total	**100.00%**	**R395 052 000**	**R403 639 000**	**R402 617 000**	**R433 443 000**

Source: Medium Term Revenue and Expenditure Framework for Cederberg 2022/2023: Table A4 – Budgeted Financial Performance (Revenue and Expenditure)

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

An Integrated Maintenance Plan is necessary that optimises maintenance activities, appropriate to its specific needs and the local environment, and identifies the systems and resources required to support this. A regime of planned preventative maintenance should be established for all infrastructure assets classified as critical and important in the Asset Register. Consideration should be given to the establishment of a maintenance management system to enable Cederberg 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 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 Cederberg 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 Cederberg 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.

- Cederberg Municipality needs to ensure that their Credit Control and Debt Collection measures are strictly enforced. “Bad Debt Provision” forms a large portion of the existing water and sanitation operational expenditure budgets.

Capital: The extent to which each type of water and sewerage asset portfolio has been consumed are summarised under Topic 3 in the Tables under Section 3.1.1 of the Administration, Information and Comprehensive Overview Report. The infrastructure components with low percentage figures (% CV/OC) need dedicated renewals programmes targeting these assets. If this is not done, there is the risk that the on-going deterioration will escalate to uncontrolled proportions, with considerable impact on consumers, the economy of the area and the service levels that can be provided in Cederberg Municipality.

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 Cederberg Municipality’s future capital budget

Capital Expenditure Standard	2021/2022 Pre-Audit Outcome	2022/2023 Budget	2023/2024 Budget	2024/2025 Budget
Executive and Council	-	-	-	-
Office of the Municipal Manager	-	-	-	-
Finance Administrative Services	R13 000	R350 000	-	-
Community Development Services	R4 660 000	R2 871 000	-	-
Corporate and Strategic Services	R400 000	R480 000	-	-
Planning and Development Services	-	R35 000	-	-
Public Safety	R1 000	-	-	-
Electricity	R18 520 000	R26 880 000	R12 765 000	R9 995 000
Waste Management	R2 000 000	R1 105 000	-	-
Waste Water Management	R205 000	R5 514 000	R245 000	R7 679 000
Water	R6 381 000	R7 400 000	R8 807 000	R9 087 000
Housing	R1 528 000	-	-	-
Road Transport	R1 300 000	R960 000	R900 000	-

Table C.7.3: Estimated capital expenditure per functional classification of Cederberg Municipality's future capital budget				
Capital Expenditure Standard	**2021/2022 Pre-Audit Outcome**	**2022/2023 Budget**	**2023/2024 Budget**	**2024/2025 Budget**
Sports and Recreation	R1 628 000	-	-	-
Total	**R36 636 000**	**R45 594 000**	**R22 717 000**	**R26 761 000**

Source: Medium Term Revenue and Expenditure Framework for Cederberg 2022/2023: Table A5 - Capital Expenditure by Vote, Functional Classification and Funding Source

The Water and Sewer Master Plans for the various towns in Cederberg Municipality's Management Area recommends upgrades to the water and sewer reticulation networks to the value of R175.7 million and R129.2 million (Feb 2023) in the foreseeable future in order to accommodate development and population growth according to the SDF. These costs do not include the cost for the upgrading or the upgrading or the refurbishment of the WTWs and WWTWs or the cost for the augmentation of the water resources for the various towns. Most of the capital projects for water and sewerage are currently funded through grants received by the Municipality.

The CRC of the water and sewerage infrastructure that will need to be replaced over the next five years (RUL <5 yrs) is R28.173 million. The asset renewal needs for the water infrastructure assets over the next ten years is R2.274 million per year. The reinvestment required is R16.650 million in the first five years and R6.087 million in the second five-year period. The age of 41.96% of the water infrastructure assets is greater than 20 years. The asset renewal needs for the sewerage infrastructure assets over the next ten years is R1.341 million per year. The reinvestment required is R11.522 million in the first five years and R1.885 million in the second five-year period. The age of 19.99% of the sewerage infrastructure assets is greater than 20 years. These values are based on the Opening Cost of the water and sewerage infrastructure currently included in the Asset Register.

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

- Take the recommended projects, as identified through the Water and Sewer Master Plans and the WSDP, into account during the planning and prioritization process for new infrastructure. Prioritize from the desired list, those items which can be implemented from available funding in the particular financial year.
- Undertake revised master planning at least every three to five years and to use the Master Plans to list the desired infrastructure development requirements and reflect these in the IDP.
- Assign a high priority to the implementation of the WC/WDM Strategy in order to postpone additional capital investment for as long as possible, both from the water availability perspective as well as from the treatment of increased effluent volumes. The costs of physical water loss, the capital requirements for new water resources infrastructure, and the constraints of poor water availability on water dependent economic growth means that WC/WDM is a critical management priority for stretching the financial resources of the Municipality. WC/WDM is almost always a more cost-effective solution than the implementation of new infrastructure, and no new infrastructure should be developed until unauthorized water has been reduced to manageable volumes.
- To adopt appropriate technology solutions for the water and sewerage infrastructure challenges. Techniques such as value engineering should also be adopted to ensure that investments in infrastructure and other solutions are cost effective over the full life-cycle and designed to be fit for purpose.
- To ensure adequate funding for the full lifecycle cost of the new water and sewerage infrastructure, which will include funds for the operation and maintenance of the infrastructure and regular refurbishment.
- Balance land-use and development planning (SDFs) in accordance with the availability of water and the capacity of WTWs and WWTWs that are in place or that will be implemented.
- To focus strongly on revenue collection, in order to improve the Municipality's own funding sources, over and above the Grants received from National and Provincial Government. The Municipality also needs to actively implement their Customer Care, Credit Control, Debt Collection, Indigent and Tampering 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 Cederberg Municipality to address the bulk infrastructure backlogs that exist in the various towns as indicated in the tables under Topic 3 of the Future Demand and Functionality Requirements Report.

- 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 Cederberg 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: Cederberg Municipality's revenue strategy is built around the following key components:

- National Treasury's guidelines and macro-economic policy.
- Revenue enhancement and maximizing the revenue base.
- Efficient revenue management, which aims to ensure an average of 91.5% annual collection rate for property rates and other key service charges.
- Electricity tariff increases as approved by the National Electricity Regulator of South Africa (NERSA).
- Ensuring cost reflective tariff increases for water, electricity and rates collection over the MTREF.
- Budgeting for a moderate surplus to ensure availability of cash reserves to back statutory funds and provisions.
- Fully subsidizing all indigent households in terms of the relief offered by the municipality.

Operational: The future planned revenue by source for Cederberg Municipality, as included in the draft 2022/2023 MTREF Budget, is as follows.

Table C.7.4: Revenue items by source, as included in the draft 2022/2023 Budget

Revenue Item	% of total 2021/2022 Income	2021/2022 Pre-audit Outcome	2022/2023 Budget	2023/2024 Budget	2024/2025 Budget
Property Rates	13.8%	R49 294 000	R66 413 000	R70 398 000	R73 917 000
Service Charges - Electricity	33.1%	R118 364 000	R129 629 000	R149 079 000	R163 990 000
Service Charges - Water	8.8%	R31 317 000	R29 456 000	R30 630 000	R31 851 000
Service Charges - Sanitation	3.1%	R11 204 000	R14 656 000	R15 535 000	R16 467 000
Service Charges - Refuse	3.5%	R12 598 000	R13 794 000	R14 484 000	R15 208 000
Rental of facilities and equipment	0.2%	R800 000	R437 000	R461 000	R486 000
Interest earned – external investments	0.1%	R486 000	R634 000	R669 000	R706 000
Interest earned – outstanding debtors	1.7%	R6 041 000	R4 006 000	R4 226 000	R4 459 000
Fines, penalties and forfeits	2.2%	R7 897 000	R20 820 000	R20 824 000	R20 848 000
Licences and Permits	0.0%	R3 000	R3 000	R3 000	R3 000
Agency Services	1.1%	R3 935 000	R4 042 000	R4 264 000	R4 498 000
Transfers and subsidies	28.7%	R102 866 000	R104 175 000	R81 903 000	R93 509 000
Other Revenue	3.1%	R11 024 000	R8 812 000	R11 131 000	R11 468 000
Gains	0.6%	R2 000 000	R2 000 000	R2 000 000	R2 000 000
Total	100.0%	**R357 831 000**	**R398 876 000**	**R405 608 000**	**R439 412 000**

Source: Medium Term Revenue and Expenditure Framework for Cederberg 2022/2023: Table A4 – Budgeted Financial Performance (Revenue and Expenditure)

Capital: It is important for Cederberg 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 Cederberg Municipality's total capital budget are summarised in the table below.

Table C.7.5: Sources of funding for the future capital budgets of Cederberg Municipality

Capital Funding Source	2021/2022 Pre-Audit Outcome	2022/2023 Budget	2023/2024 Budget	2024/2025 Budget
National Government	R55 382 000	R48 418 000	R46 223 000	R48 184 000
Provincial Government	R160 000	-	-	-
District Municipality	-	-	-	-
Transfers and Subsidies	-	-	-	-
Borrowing	R10 800 000	R8 600 000	R3 400 000	-
Internally generated funds	R4 997 000	R3 530 000	R1 176 000	R335 000
Total Capital Funding	**R71 339 000**	**R60 548 000**	**R50 799 000**	**R48 519 000**

Source: Medium Term Revenue and Expenditure Framework for Cederberg 2022/2023: 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.

Cederberg Municipality's current four block stepped water tariff structure promotes the efficient use of water by consumers and discourages the wastage of water. Higher tariffs are charged for the higher consumption blocks. The first 6 kl of water is provided free to all indigent registered residential households 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 tariffs can also be ascribed to rising wage cost, the increase in electricity used in purification and pumping processes, the increase in fuel prices and the general increase in the price of goods and services as a result of the pandemic. It must also be emphasized that the municipality must ensure that purification processes complies with quality standards. A cost reflective exercise was also performed for sanitation as with the water services. The MAYCO considered the study and deliberated on the proposal given by administration. The proposal was to do away with the current structure for charging per point of connection (number of toilets) and introduce the percentage of water usage as a flat charge rate for sanitation. This is due to the unavailability of data for number of connection points on each property. The percentage of water usage structure would have meant an average increase of 26.0% if an 80.0% of water usage was applied.

However, considering that Council has appointed a service provider for the data cleansing and also revenue enhancement, MAYCO opted to continue with the point of connection and complete the cost reflective tariff only in the following financial year.

Special drought tariffs (Level 1, 2 and 3) are also in place. The table below gives some comments on the specific blocks, with regard to Cederberg Municipality's residential block stepped tariff structure, for the various years for water services.

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

Block (kl/month)	2019/2020	2020/2021	2021/2022	2022/2023	Comments
0 - 6	R8-21	R8-70	R9-23	R9-68	Free Basic Water
7 - 15					Low volume use
16 - 20			R11-33	R11-89	Typical use volume, including garden irrigation
21 - 30	R10-08	R10-69			
31 – 40			R13-16	R13-81	Above average use, including garden irrigation
41 - 45	R11-71	R12-42			
46 - 60			R22-86	R23-98	Wasteful use and/or severe garden irrigation
61 - 70	R20-35	R21-57			
> 70					Significant waste and/or unnecessary garden irrigation

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

- Maintain a rising block tariff structure.
- Keep number of blocks in the tariff to a minimum. One block to address free basic water (the first step) and another to address the "cut-off" volume where consumers are discouraged to use water above this monthly volume (highest block) are required. In addition another three blocks could be used to distinguish between low users, typical use of high water use. Six blocks in a tariff often make good sense, as indicated in Table C.7.6.
- The volumetric steps should be kept the same for all the areas within Cederberg 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 its own operations is charged to the relevant service, and not simply attributed to water losses."

The recommendations for the water and sewage tariffs of Cederberg Municipality are as follows:

- Cederberg Municipality will continue to re-evaluate the tariffs they charge for their water and sanitation services on an annual basis in order to put the Municipality in a better financial position 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. Cederberg 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.

- Add a further step in the current four block step rising residential water tariff structure for usage above 60kl/month. The cost of water in this highest category should severely discourage use in this category, above which residential water use could be considered to be wasteful or unnecessary.

- Do away with the current sewage tariff structure for charging per point of connection (number of toilets) and introduce the percentage of water usage as a flat charge rate for sanitation. 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.

- Cederberg 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 Cederberg 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 Cederberg 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 Cederberg 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 Cederberg 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.

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

The 2023 Water and Sewer Master Plans of Cederberg Municipality summarise the projects (Master Plan Items) necessary in order to cope with the increased future demands and developments within the Cederberg Municipality's systems. The Water and Sewer Master Plans need to be updated at least every three to five years.

Cederberg. 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.

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

All critical water vacant positions as indicated on the approved Organogram needs to be filled as soon as possible. Cederberg Municipality needs to review the skills needed at each of the WTWs and WWTWs according to the classification of the plants and need to align resources to these needs as well as reviewing total staff numbers necessary to meet all the objectives in the National Water Act. **Additional Process Controllers need to be appointed for some of the WWTWs and WTWs in order to ensure legislative compliance with regard to the number of Process Controllers per plant and their classifications. It is further recommended that Cederberg Municipality arrange for chlorine audits to be done at all their disinfection facilities, in order to identify any potential shortcomings.**

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

Cederberg Municipality needs to further improve their Customer Services Complaints system in order to ensure that response times are recorded for complaints received and that data with regard to the annual number of water and sanitation complaints received for the different types of complaints are made available for the WSDP. The present Customer Services and Complaints Logbook System allows for the recording and management of all water and sanitation related complaints to some extent. The Municipality is committed to ensure that all water and sanitation related complaints are recorded and that the complaints are addressed within the time period stipulated in the Consumer Services Charter for Water Services (Response standards included Table 8.1.18.2 of the Administration, Information and Comprehensive Overview Report).

SECTION D: WATER SERVICES OBJECTIVES AND STRATEGIES

The water services strategies presented below were derived from the 2022/2023 SDBIP and the water services situational analysis as summarized in Section C: Water Services Existing Needs Perspective and presents the 5-year Water Services strategies as established in Cederberg Municipality's WSDP.

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Table D.1: Strategies, Objectives and Key Performance Indicators for Cederberg Municipality									
Nr	**Objective / Strategy**	**Key Performance Indicator**	**Baseline 2021/2022**	**Linked Project**	**FY2022/23**	**FY2023/24**	**FY2024/25**	**FY2025/26**	**FY2025/26**
Topic 1: Settlement Demographics and Public Amenities									
-	-	-	-	-	-	-	-	-	-
Topic 2: Service Levels Profile									
	Provide free basic water to indigent households as per the requirements in the indigent policy as at 30 June	Number of households receiving free basic water	2 002	Part of O&M Budget	2 506	2 506	2 506	2 506	2 506
	Provide free basic sanitation to indigent households as per the requirements in the indigent policy as at 30 June	Number of households receiving free basic sanitation services	1 916	Part of O&M Budget	2 323	2 323	2 323	2 323	2 323
	Number of formal residential properties that receive piped water (credit and prepaid water) that is connected to the municipal water infrastructure network and billed for the service as at 30 June	Number of residential properties which are billed for water or have pre-paid meters	6 072	Part of O&M Budget	5 835	5 835	5 835	5 835	5 835
	Number of formal residential properties connected to the municipal waste water sanitation/sewerage network for sewerage service, irrespective of the number of water closets (toilets) and billed for the service as at 30 June	Number of residential properties which are billed for sewerage	5 047	Part of O&M Budget	4 854	4 854	4 854	4 854	4 854
New	Ensure all households on the farms are provided with at least basic water services, subject to DWS guidance.	Support all applications received for basic water services on the farms (Subject to availability of financial resources and sustainability of type of service).	-	CB2324001	-	-	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)
New	Ensure all households on the farms are provided with at least basic sanitation services, subject to DWS guidance.	Support all applications received for basic sanitation services on the farms (Subject to availability of financial resources and sustainability of type of service).	-	CB2324002	-	-	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)

Table D.1: Strategies, Objectives and Key Performance Indicators for Cederberg Municipality									
Nr	**Objective / Strategy**	**Key Performance Indicator**	**Baseline 2021/2022**	**Linked Project**	**FY2022/23**	**FY2023/24**	**FY2024/25**	**FY2025/26**	**FY2025/26**
New	Provision of communal taps to households in informal areas based on the standard of 1 water point to 25 households.	Number of communal taps installed in relation to the number of informal households.	-	CB2324003	-	-	Provide at least 1 water point to every 25 households in informal areas	Provide at least 1 water point to every 25 households in informal areas	Provide at least 1 water point to every 25 households in informal areas
New	Provision of communal toilet facilities to households in informal areas based on the standard of 1 toilet to 5 households.	Number of toilet structures provided in relation to the number of informal households.	-	CB2324004	-	-	Provide at least 1 toilet to every 5 households in informal areas.	Provide at least 1 toilet to every 5 households in informal areas.	Provide at least 1 toilet to every 5 households in informal areas.
Topic 3: Water Services Asset Management									
New	Compile Water Safety Plans and WTW Process Audits and implement recommendations.	Water Safety Plans and WTW Process Audits in place and % of recommendations as included in the Improvement / Upgrade Plan of the Water Safety Plans and the detail WTW Process Audits implemented.	-	CB2324010 CB2324012	-	-	Water Safety Plans and WTW Process Audits and 40% of recommendations implemented	Water Safety Plans and WTW Process Audits and 60% of recommendations implemented	Water Safety Plans and WTW Process Audits and 80% of recommendations implemented
New	Compile W_2RAPs and WWTW Process Audits and implement recommendations.	W_2RAPs and WWTW Process Audits in place and % of recommendations as included in the Improvement / Upgrade Plan of the W_2RAPs and the detail WWTW Process Audits implemented.	-	CB2324013 CB2324011	-	-	W_2RAPs and WWTW Process Audits and 40% of recommendations implemented	W_2RAPs and WWTW Process Audits and 60% of recommendations implemented	W_2RAPs and WWTW Process Audits and 80% of recommendations implemented
New	Ensure adequate storage capacity for all towns (At least 48hrs AADD).	Implement recommended reservoir projects, as included in the 2022 Water Master Plan.	-	Various	-	-	All areas with an overall storage capacity above 48hrs AADD.	All areas with an overall storage capacity above 48hrs AADD.	All areas with an overall storage capacity above 48hrs AADD.
New	Ensure adequate water pump station and water reticulation capacity.	Implement recommended water pump station and water reticulation projects, as included in the 2022 Water Master Plan.	-	Various	-	-	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.
New	Ensure adequate sewer pump station and sewer drainage network capacity.	Implement recommended sewer pump station and sewer drainage network		Various			Upgrade existing sewer pump stations and provide new	Upgrade existing sewer pump stations and provide new	Upgrade existing sewer pump stations and provide new

Table D.1: Strategies, Objectives and Key Performance Indicators for Cederberg Municipality									
Nr	**Objective / Strategy**	**Key Performance Indicator**	**Baseline 2021/2022**	**Linked Project**	**FY2022/23**	**FY2023/24**	**FY2024/25**	**FY2025/26**	**FY2025/26**
		projects, as included in the 2022 Sewer Master Plan.					pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.
New	Updated Asset Register, which include all the water and sewerage infrastructure.	Ensure all water and sewerage infrastructure assets are included in the Asset Register, with accurate CRC, DRC, RUL, Age and Condition.	-	Part of O&M Budget	-	-	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL, Age and Condition in the Asset Register is not correct.	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL, Age and Condition in the Asset Register is not correct.	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL, Age and Condition in the Asset Register is not correct.
New	Ensure adequate budget allocation towards the refurbishment of the existing 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.	-	Part of O&M Budget	-	-	A budget of 2% or more of the CRC of the water and sewerage assets is allocated annually towards the replacement of existing infrastructure.	A budget of 2% or more of the CRC of the water and sewerage assets is allocated annually towards the replacement of existing infrastructure.	A budget of 2% or more of the CRC of the water and sewerage assets is allocated annually towards the replacement of existing infrastructure.
Topic 4: Water Services Operation and Maintenance									
	95% of the water samples comply with SANS 241 micro biological parameters	% of water samples complying with SANS 241 micro biological parameters	83.0%	Part of O&M Budget	95.00%	95.00%	95.00%	95.00%	95.00%
New	Ensure adequate budget allocation towards the maintenance of the existing water and sewerage infrastructure.	Ensure a budget of at least 1% of the total value of the water and sewerage assets is allocated towards the annual O&M of the systems.	-	Part of O&M Budget	-	-	A budget of 1% or more of the CRC of the water and sewerage assets is allocated annually towards the O&M of the systems.	A budget of 1% or more of the CRC of the water and sewerage assets is allocated annually towards the O&M of the systems.	A budget of 1% or more of the CRC of the water and sewerage assets is allocated annually towards the O&M of the systems.
New	Reporting on water quality and final effluent quality compliances.	Report at least annually to the public on the percentage of water quality and final effluent quality compliance.	-	Part of O&M Budget	-	-	At least annual publication of water quality and wastewater quality	At least annual publication of water quality and wastewater quality	At least annual publication of water quality and wastewater quality

Table D.1: Strategies, Objectives and Key Performance Indicators for Cederberg Municipality									
Nr	**Objective / Strategy**	**Key Performance Indicator**	**Baseline 2021/2022**	**Linked Project**	**FY2022/23**	**FY2023/24**	**FY2024/25**	**FY2025/26**	**FY2025/26**
							compliance percentages.	compliance percentages.	compliance percentages.
Topic 5: Conservation and Demand Management (Topic 5.1: Water Resources)									
	Limit unaccounted for water to less than 15% by 30 June {(Number of Kiloliters Water Purchased or Purified - Number of Kiloliters Water Sold) / Number of Kiloliters Water Purchased or Purified × 100}	% unaccounted water	23.8%	Part of O&M Budget	15.00%	15.00%	15.00%	15.00%	15.00%
Topic 5: Conservation and Demand Management (Topic 5.2: Water Balance)									
New	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 bulk storage reservoirs and the meters are read and recorded on at least a monthly basis.	-	CB2324015	-	-	70% of all sources metered and bulk water meters read and recorded at least monthly.	85% of all sources metered and bulk water meters read and recorded at least monthly.	100% of all sources metered and bulk water meters read and recorded at least monthly.
New	Monthly WWTW flows for all the treatment plants.	Ensure all incoming and outgoing flows at the 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.	-	CB2324018	-	-	70% of all flows at WWTWs metered and meters read and recorded at least monthly.	85% of all flows at WWTWs metered and meters read and recorded at least monthly.	100% of all flows at WWTWs metered and meters read and recorded at least monthly.
Topic 6: Water Resources									
New	All water sources are authorized.	% Of abstraction from sources registered and authorized by the DWS.	-	CB2324020	-	-	60% Compliance	80% Compliance	95% Compliance
New	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.	-	Part of O&M Budget	-	-	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.
New	Monitoring of industrial consumers.	% Monitoring of effluent discharged by industrial consumers (Quantity and Quality)	-	CB2324021	-	-	40% of all industrial consumers monitored w.r.t. quality and quantity of effluent discharged by them.	60% 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.
New	Final Effluent Compliances for WWTWs	80% of final effluent samples comply with authorisation limits for WWTWs.	-	Part of O&M Budget	-	-	60%	70%	80

Table D.1: Strategies, Objectives and Key Performance Indicators for Cederberg Municipality									
Nr	**Objective / Strategy**	**Key Performance Indicator**	**Baseline 2021/2022**	**Linked Project**	**FY2022/23**	**FY2023/24**	**FY2024/25**	**FY2025/26**	**FY2025/26**
Topic 7: Financial									
	Spend 90% of the approved maintenance budget for waste water by 30 June [(Total expenditure on maintenance/ Approved budget for maintenance)x100]	% maintenance budget spent	83.9%	Part of O&M Budget	90.00%	90.00%	90.00%	90.00%	90.00%
	Spend 100% of the MIG grant by 30 June [(Total expenditure on MIG Grant / Approved MIG allocation)x100]	% of budget spent	84.0%	Various	100.00%	100.0%	100.0%	100.0%	100.0%
	Spend 90% of the approved maintenance budget for water by 30 June [(Total expenditure on maintenance/ Approved budget for maintenance)x100]	% maintenance budget spent	76.7%	Part of O&M Budget	90.00%	90.00%	90.00%	90.00%	90.00%
	Spend 90% of the approved capital budget for the upgrade of the Citrusdal WWTW by 30 June	% of budget spent	79.89%	Part of O&M Budget	90.00%	90.00%	90.00%	90.00%	90.00%
	The percentage of the municipal capital budget actually spent on capital projects by 30 June[(Amount actually spent on capital projects/ Amount budgeted for capital projects)x100]	% of capital budget spent on capital projects by 30 June	66.92%	Various	90.00%	90.00%	90.00%	90.00%	90.00%
	90% of the approved capital budget spent by 30 June 2022 for water pressure management in Citrusdal [(Total actual expenditure on the project/ Approved capital budget for the project)x100]	% of budget spent by 30 June 2022	67.9%	Part of O&M Budget	-	-	-	-	-
	90% of the approved capital budget spent by 30 June 2023 for the upgrade of Clanwilliam WWTW [(Total actual expenditure on the project/ Approved capital budget for the project)x100]	% of budget spent	-	-	90.00%	90.00%	90.00%	90.00%	90.00%
	90% of the approved capital budget spent by 30 June 2023 for the upgrade of the Lamberts Bay WWTW [(Total actual expenditure	% of budget spent	-	CB2324008 CB2324019	90.00%	90.00%	90.00%	90.00%	90.00%

Table D.1: Strategies, Objectives and Key Performance Indicators for Cederberg Municipality									
Nr	**Objective / Strategy**	**Key Performance Indicator**	**Baseline 2021/2022**	**Linked Project**	**FY2022/23**	**FY2023/24**	**FY2024/25**	**FY2025/26**	**FY2025/26**
	on the project/ Approved capital budget for the project)x100]								
	90% of the approved capital budget spent by 30 June 2023 for the Lamberts Bay Regional Water Supply [(Total actual expenditure on the project/ Approved capital budget for the project)x100]	% of budget spent	-	-	90.00%	90.00%	90.00%	90.00%	90.00%
	90% of the approved capital budget spent by 30 June 2023 for the upgrade of the Lamberts Bay water network [(Total actual expenditure on the project/ Approved capital budget for the project)x100]	% of budget spent	-	CB2324008	90.00%	90.00%	90.00%	90.00%	90.00%
Topic 8: Institutional Arrangements and Customer Care									
	Annual WSDP Performance- and Water Services Audit Report.	Report on the implementation of the WSDP annually by the end of October. Report submitted to Council and DWS.	-	Part of O&M Budget	-	-	1	1	1

SECTION E: WATER SERVICES MTEF PROJECTS

The Water Services Medium-Term Expenditure Framework (MTEF) projects are presented below and outlines the water services projects which are funded for implementation within the next three financial years.

Table E.2a provides the projects identified for implementation in FY2023/24, Table E.2b provides the projects identified for implementation in FY2024/25 and Table E2c provides the projects identified for implementation in FY2025/26, as taken from the draft 2023/2024 Capital Budget.

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

The summary of the MTEF water services projects are presented as follows:

Table E.1: Summary of MTEF Projects

Project Main Category	FY2023/24		FY2024/25		FY2025/26		MTEF Total	
	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)
Water Projects	3	R13 877	1	R13 177	1	R14 408	**3**	**R41 461**
Sanitation Projects	3	R12 618	0	R0	0	R0	**3**	**R12 618**
Combined Water & Sanitation Projects	**6**	**R26 494**	**1**	**R13 177**	**1**	**R14 408**	**6**	**R54 079**

Table E.2a: Water Services MTEF Projects - FY2023/24 (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 FY2022/23	FY2023/24 Budget	Own	IUDG	RBIG	ACIP	DR	WSIG	Grants	Total Cost	
1. Infrastructure Projects								**R0**	**R12 818**								**R12 818**	
76655230009	CB2324006	Upgrade Water Network: Clanwilliam	Upgrade section of the water reticulation network	Water services	Water	Reticulation	Reticulation network		**R200**	R200							**R200**	Water Master Plan
76642240004	CB2324007	Upgrade Sewer Network Citrusdal	Installation of waterborne sewer system	Waterborne sanitation	Sanitation	Internal Sanitation	Waterborne Sanitation		**R1 000**	R1 000							**R1 000**	Sewer Master Plan
76644240002	CB2324008	MIG: Upgrade WWTW Clanwilliam	Upgrade and refurbishment of the Clanwilliam WWTW	Final Effluent Compliance	Sanitation	Wastewater Treatment	WWTW		**R7 270**							R7 270	**R7 270**	Technical Report and WSDP
76644240003	CB2324008	WSIG: Upgrade WWTW Clanwilliam	Upgrade and refurbishment of the Clanwilliam WWTW	Final Effluent Compliance	Sanitation	Wastewater Treatment	WWTW		**R4 348**						R4 348		**R4 348**	Technical Report and WSDP
2. Source Development Projects								**R0**	**R13 177**								**R13 177**	
76655030001	CB2324019	RBIG - Lamberts Bay Regional Water Supply	Commission Desalination Plant	Water Source Requirements	Water	Source Development	Desalination Plant		**R13 177**			R13 177					**R13 177**	WSDP
3. Demand Management projects								**R0**	**R0**								**R0**	
4. O&M Commitments								**R0**	**R500**								**R500**	
Operations																		
									R0								**R0**	
Maintenance																		
76654041614	CB2324005	Replace Asbestos plate at Plattedamme CLW	Replace Asbestos roof of reservoir	Refurbishment and Maintenance	Water	Internal Bulk	Reservoir		**R500**	R500							**R500**	WSDP and Water Safety
5. Institutional								**R0**	**R0**								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
		Total						**R0**	**R26 494**								**R26 494**	

Table E.2b: Water Services MTEF Projects - FY2024/25 (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 FY2022/23	FY2024/25 Budget	Own	IUDG	RBIG	ACIP	DR	WSIG	Grants	Total Cost	
1. Infrastructure Projects								**R0**	**R0**								**R0**	
									R0								**R0**	
2. Source Development Projects								**R0**	**R13 177**								**R13 177**	
76655030001	CB2324019	RBIG - Lamberts Bay Regional Water Supply	Commission Desalination Plant	Water Source Requirements	Water	Source Development	Desalination Plant		**R13 177**			R13 177					**R13 177**	WSDP
3. Demand Management projects								**R0**	**R0**								**R0**	
4. O&M Commitments								**R0**	**R0**								**R0**	
Operations																		
									R0								**R0**	
Maintenance																		
									R0								**R0**	
5. Institutional								**R0**	**R0**								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness and WASH Programs																		
		Total						**R0**	**R13 177**								**R13 177**	

Table E.2c: Water Services MTEF Projects - FY2025/26 (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 FY2022/23	FY2025/26 Budget	Own	IUDG	RBIG	ACIP	DR	WSIG	Grants	Total Cost	
1. Infrastructure Projects								**R0**	**R0**								**R0**	
									R0								**R0**	
2. Source Development Projects								**R0**	**R14 408**								**R14 408**	
76655030001	CB2324019	RBIG - Lamberts Bay Regional Water Supply	Commission Desalination Plant	Water Source Requirements	Water	Source Development	Desalination Plant		**R14 408**			R14 408					**R14 408**	WSDP
3. Demand Management projects								**R0**	**R0**								**R0**	
4. O&M Commitments								**R0**	**R0**								**R0**	
Operations																		
									R0								**R0**	
Maintenance																		
5. Institutional								**R0**	**R0**								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness and WASH Programs																		
		Total						**R0**	**R14 408**								**R14 408**	

SECTION F: WSDP PROJECTS

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

- Water and Sewer Master Plans and Water and Waste Water Treatment Works Master Plans;
- Infrastructure replacement needs (Asset Register);
- Budget proposals; and
- Asset Management Plans.

Cederberg Municipality's draft 2023/2024 MTEF Budget list the following major water services project which are planned for the short to medium term.

- **Lamberts Bay Desalination Plant**

The following major sanitation services projects are planned for the short to medium term.

- **Upgrade of the sewer drainage network in Citrusdal.**
- **Upgrade of the Clanwilliam WWTW.**

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

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

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

The current needs projects are estimated at R90 050 000 of which 61% are funded, as included in the three year MTEF project list. It should however be emphasised that additional funding will be required to address the full achievement of the water services strategies as outlined in Section D, but that the extent of such additional funding can only be determined, once initial investigations and activities have been concluded.

Table F.1: WSDP FY2023/24: 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										
Topic 2: Service Levels										
2.1	Some households on the farms without basic water services.	Ensure all households on farms are provided with at least basic water services, subject to DWS guidance.	WSDP	No	CB2324001	Provide basic water services on the farms in the rural areas without basic water services.	R1 290	Yes	No	No
2.2	Some households in Leipoldtville, Elandskloof and on the farms without basic sanitation services.	Ensure all households in Leipoldtville, Elandskloof and on the farms are provided with at least basic sanitation services, subject to DWS guidance.	WSDP	No	CB2324002	Provide basic sanitation services on the farms in the rural areas without basic sanitation services.	R18 150	Yes	No	No
2.3	The water and sanitation service levels of the schools in the rural areas are not known.	Survey of the water and sanitation service levels of the schools in the rural areas.	WSDP	No	CB2324003	Confirm the water and sanitation service levels on the farms in the rural areas (Survey)	R100	Yes	No	No
2.4	The number of communal taps and toilets facilities available in each of the informal areas is not known.	Confirm the number of communal taps and toilet facilities in all the informal areas.	WSDP	No	CB2324004	Confirm the current number of communal taps and toilets facilities in all the informal areas (Survey)	R150	Yes	No	No
Topic 3: Water Services Asset Management (Infrastructure)										
3.1	Current old asbestos roof is a water quality safety risk	Install new reservoir roof	MTEF Project	Yes	CB2324005	Replace Asbestos plate at Plattedamme CLW	R500	Yes	Yes	Yes
3.2	Capacity of existing water reticulation network is inadequate	Ensure adequate water reticulation network capacity	MTEF Project	Yes	CB2324006	Upgrade Water Network: Clanwilliam	R200	No	Yes	Yes
3.3	Capacity of existing sewer drainage network is inadequate	Ensure adequate sewer drainage network capacity	MTEF Project	Yes	CB2324007	Upgrade Sewer Network Citrusdal	R1 000	No	Yes	Yes
3.4	Inadequate capacity of existing WWTWs	Ensure adequate WWTW capacity	MTEF Project	Yes	CB2324008	Upgrade WWTW Clanwilliam (MIG and WSIG)	R11 618	Yes	Yes	Yes
3.5	Asset Management Plan to ensure adequate refurbishment and replacement of existing water and sewerage infrastructure not yet in place.	Develop an Asset Management Plan to ensure adequate budget allocation towards the operation and maintenance of the existing water and sewerage infrastructure.	WSDP	No	CB2324009	Develop an Asset Management Plan	R750	Yes	No	No
Topic 4: Water Services Operation and Maintenance										
4.1	WTW Process Audits need to be done annually	Sustainable operation	WSDP	No	CB2324010	Annual WTW Process Audits	R150	Yes	No	No
4.2	WWTW Process Audits need to be done annually	Sustainable operation	WSDP	No	CB2324011	Annual WWTW Process Audits	R315	Yes	No	No
4.3	Water Safety Plans are not in place	Compile Water Safety Plans for all systems	WSDP	No	CB2324012	Compile Water Safety Plans for each of the water distribution systems and WTWs	R405	Yes	No	No
4.4	W2RAPs are not in place.	Compile W2RAPs for all systems	WSDP	No	CB2324013	Compile W2RAPs for each of the sewer drainage networks and WWTWs	R315	Yes	No	No
4.5	All of the required O&M Schedules and checklists are not in place for all the water and sewerage infrastructure.	Ensure required O&M Schedules and Checklists are in place for all water and sewerage infrastructure components.	WSDP	No	CB2324014	Draft required O&M Schedules for all water and sewerage infrastructure.	R250	Yes	No	No
Topic 5: Conservation and Demand Management (Topic 5.1 Water Resources)										
5.1	2021/2022 NRW 31.63% and Water Losses 25.58%	25 WC/WDM measures were proposed in the WSDP	WSDP	No	CB2324015	Implement the proposed WC/WDM measures	R2 980	Yes	No	No
Topic 5: Conservation and Demand Management (Topic 5.2 Water Balance)										
5.2	Unmetered erven were identified as part of the Swift process	Install water meters for all the unmetered erven	WSDP	No	CB2324016	Install water meters for all the un-metered water connections.	R1 445	Yes	No	No
5.3	Additional bulk water meters are required and faulty meters to be replaced.	Ensure adequate bulk water metering.	WSDP	No	CB2324017	Installation of new bulk zone water meters, replacement of faulty bulk water meters and ensure adequate protection of existing bulk water meters.	R3 000	Yes	No	No
5.4	Faulty WWTW flow meters to be replaced or refubished.	Ensure incoming flow and final flow at all the WWTWs are metered.	WSDP	No	CB2324018	Calibrate Citrusdal WWTW inflow meter. Install flow meters for Elands Bay-, Wupperthal- and Algeria WWTW. Repair faulty flow meters at Clanwilliam-, Graafwater and Lamberts Bay WWTWs.	R5 000	Yes	No	No
Topic 6: Water Resources										
6.1	Inadequate bulk water supply from current groundwater sources	Ensure adequate water sources for Lamberts Bay	MTEF Project	Yes	CB2324019	RBIG - Lamberts Bay Regional Water Supply	R41 382	Yes	Yes	Yes
6.2	The existing lawful use and registration volumes for all systems not yet known.	Confirm the existing lawful use and registration volumes for all systems.	WSDP	No	CB2324020	Confirm existing lawful use and registration volumes for all systems.	R150	Yes	No	No
6.3	Industrial consumers are yet monitored with regard to the quality of industrial effluent discharged into the sewer system.	Identify all wet industrial consumers and monitor the quality of industrial effluent discharged into the Mun.'s sewer system.	WSDP	No	CB2324021	Industrial effluent monitoring.	R300	Yes	No	No
6.4	Existing water quality operational sampling programme does not yet fully comply with SANS241:2015 requirements for all systems.	Ensure water quality operational sampling programme comply with SANS241:2015 requirements.	WSDP	Yes	CB2324022	Increase water quality operational sampling programme.	R300	Yes	No	No
6.5	Existing operational sampling programmes at WWTWs can be improved to ensure proper process control.	Increase operational sampling programme at WWTW to ensure proper process control.	WSDP	Yes	CB2324023	Increase wastewater operational sampling programme at WWTWs.	R300	Yes	No	No
Topic 7: Financial										
	Done by other Department									
Topic 8: Institutional Arrangements and Customer Care										
	Done by other Department									
TOTAL: CURRENT NEEDS							**R90 050**			
	Funded for next three years						R54 700			
	% Funded						61%			

Table F.1: WSDP FY2023/24: 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 reservoir storage capacity to meet future requirements	Ensure adequate reservoir storage capacity	Water Master Plan	No	CB2324024	Future reservoirs for the Citrusdal distribution system	R21 697	Yes	No	No
F.2			Water Master Plan	No	CB2324025	Future reservoirs for the Clanwilliam distribution system	R46 532	Yes	No	No
F.3			Water Master Plan	No	CB2324026	Future reservoirs for the Elands Bay distribution system	R8 255	Yes	No	No
F.4			Water Master Plan	No	CB2324027	Future reservoirs for the Lamberts Bay distribution system	R6 312	Yes	No	No
F.5			Water Master Plan	No	CB2324028	Future reservoirs for the Leipoldtville distribution system	R2 400	Yes	No	No
F.6	Inadequate water pump station capacity to meet future requirements	Ensure adequate water pump station capacity	Water Master Plan	No	CB2324029	Future water PS required for the Citrusdal distribution system	R705	Yes	No	No
F.7			Water Master Plan	No	CB2324030	Future water PS required for the Clanwilliam distribution system	R11 895	Yes	No	No
F.8			Water Master Plan	No	CB2324031	Future water PS required for the Lamberts Bay distribution system	R4 211	Yes	No	No
F.9	Inadequate internal water reticulation capacity to meet future requirements.	Ensure adequate internal water reticulation capacity	Water Master Plan	No	CB2324032	Future internal water reticulation network items required for Citrusdal	R12 473	Yes	No	No
F.10			Water Master Plan	No	CB2324033	Future internal water reticulation network items required for Clanwilliam	R19 326	Yes	No	No
F.11			Water Master Plan	No	CB2324034	Future internal water reticulation network items required for Elands Bay	R6 800	Yes	No	No
F.12			Water Master Plan	No	CB2324035	Future internal water reticulation network items required for Graafwater	R7 929	Yes	No	No
F.13			Water Master Plan	No	CB2324036	Future internal water reticulation network items required for Lamberts Bay	R3 540	Yes	No	No
F.14			Water Master Plan	No	CB2324037	Future internal water reticulation network items required for Leipoldtville	R917	Yes	No	No
F.15	Inadequate bulk water pipeline distribution capacity	Ensure adequate bulk water pipeline distribution capacity	Water Master Plan	No	CB2324038	Future bulk water pipeline items required for Citrusdal	R6 088	Yes	No	No
F.16			Water Master Plan	No	CB2324039	Future bulk water pipeline items required for Clanwilliam	R10 622	Yes	No	No
F.17			Water Master Plan	No	CB2324040	Future bulk water pipeline items required for Lamberts Bay	R1 824	Yes	No	No
F.18	Water losses and NRW need to be reduced further	Implement WDM infrastructure on internal water reticulation networks	Water Master Plan	No	CB2324041	WDM infrastructure for the Citrusdal distribution system	R2 058	Yes	No	No
F.19			Water Master Plan	No	CB2324042	WDM infrastructure for the Clanwilliam distribution system	R432	Yes	No	No
F.20			Water Master Plan	No	CB2324043	WDM infrastructure for the Elands Bay distribution system	R50	Yes	No	No
F.21			Water Master Plan	No	CB2324044	WDM infrastructure for the Graafwater distribution system	R20	Yes	No	No
F.22			Water Master Plan	No	CB2324045	WDM infrastructure for the Lamberts Bay distribution system	R1 652	Yes	No	No
F.23	Inadequate capacity of existing WTWs	Ensure adequate water treatment capacity	WSDP	No	CB2324046	Increase capacity of the Citrusdal WTW and refurbishment	R15 000	Yes	No	No
F.24			WSDP	No	CB2324047	New Clanwilliam WTW, pump station and rising main	R65 516	Yes	No	No
F.25			WSDP	No	CB2324048	Increase capacity of the Graafwater WTW	R10 000	Yes	No	No
F.26	Inadequate capacity of existing bulk and internal sewer drainage network	Ensure adequate bulk and internal sewer drainage capacity	Sewer Master Plan	No	CB2324049	Future bulk and internal sewer drainage network items for Citrusdal	R9 510	Yes	No	No
F.27			Sewer Master Plan	No	CB2324050	Future bulk and internal sewer drainage network items for Clanwilliam	R32 208	Yes	No	No
F.28			Sewer Master Plan	No	CB2324051	Future bulk and internal sewer drainage network items for Elands Bay	R13 343	Yes	No	No
F.29			Sewer Master Plan	No	CB2324052	Future bulk and internal sewer drainage network items for Graafwater	R20 619	Yes	No	No
F.30			Sewer Master Plan	No	CB2324053	Future bulk and internal sewer drainage network items for Lamberts Bay	R27 141	Yes	No	No
F.31			Sewer Master Plan	No	CB2324054	Future bulk and internal sewer drainage network items for Leipoldtville	R3 919	Yes	No	No
F.32	Inadequate capacity of existing sewer pump stations	Ensure adequate pump station capacity	Sewer Master Plan	No	CB2324055	Future sewer PS items required for Citrusdal	R4 440	Yes	No	No
F.33			Sewer Master Plan	No	CB2324056	Future sewer PS items required for Clanwilliam	R7 689	Yes	No	No
F.34			Sewer Master Plan	No	CB2324057	Future sewer PS items required for Elands Bay	R5 160	Yes	No	No
F.35			Sewer Master Plan	No	CB2324058	Future sewer PS items required for Graafwater	R1 953	Yes	No	No
F.36			Sewer Master Plan	No	CB2324059	Future sewer PS items required for Lamberts Bay	R3 197	Yes	No	No
F.37	Inadequate capacity of existing WWTWs	Ensure adequate WWTW capacity	WSDP	No	CB2324060	Upgrade Clanwilliam WWTW	R18 500	Yes	No	No
F.38			WSDP	No	CB2324061	Upgrade Elands Bay WWTW	R10 000	Yes	No	No
F.39			WSDP	No	CB2324062	Upgrade Graafwater WWTW	R15 000	Yes	No	No
TOTAL: FUTURE NEEDS							**R438 933**			