



# ***GEORGE MUNICIPALITY***

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

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

***FY 2020/2021***

***MAY 2020***

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## GEORGE MUNICIPALITY

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### PROJECT 301147 - GEORGE MUNICIPALITY'S WSDP-IDP SECTOR INPUT REPORT FOR 2020/2021

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## GEORGE MUNICIPALITY

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**ABBREVIATIONS AND DEFINITIONS**

AADD	Average Annual Daily Demand
ACSA	Airports Company South Africa
ADWF	Average Dry Weather Flow
AIDS	Acquired Immune Deficiency Syndrome
AMP	Asset Management Plan
AMR	Automatic Meter Reading
BDS	Blue Drop System
BGCMA	Breede-Gouritz Catchment Management Area
BGWMA	Breede-Gouritz Water Management Area
BNR	Biological Nutrient Removal
BOCMA	Breede Overberg Catchment Management Agency
CBD	Central Business District
CF	Consequence of Failure
CFO	Chief Financial Officer
CMA	Catchment Management Agency
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
DAF	Dissolved Air Flotation
DMA	District Management Area
DRC	Depreciated Replacement Cost
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
EFR	Environmental Flow Requirements
GAMAP	General Accepted Municipal Accounting Practice
GD	Green Drop
GDP	Gross Domestic Product
GPS	Global Positioning System
GRD	Garden Route Dam
GRP	Glass Fiber Reinforced Plastics
HH	Households
HIV	Human Immunodeficiency Virus
HL	High Level
IBT	Inclining Block Tariff
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
IMQS	Infrastructure Management Query System
IRIS	Integrated Regulatory Information System
IWA	International Water Association
km <sup>2</sup>	Square Kilometre
KPI	Key Performance Indicator
LF	Likelihood of Failure
LGTAS	Local Government Turn Around Strategy
LL	Low Level
LM	Local Municipality
m	Metre
MCC	Motor Control Center
MFMA	Municipal Finance Management Act



**ABBREVIATIONS AND DEFINITIONS**

MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agent
MI	Mega Litre
MI/a	Mega Litre per Annum
MM	Municipal Management
MSDF	Municipal Spatial Development Framework
MTEF	Medium-Term Expenditure Framework
MTREF	Medium Term Revenue Expenditure Framework
NERSA	National Energy Regulator of South Africa
NMR	No Monitoring Required
NRW	Non-Revenue Water
NWRS	National Water Resource Strategy
PAT	Progress Assessment Tool
PDD	Peak Daily Demand
PPE	Personnel Protective Equipment
PRV	Pressure Reducing Valve
PS	Pump Station
PVC	Polyvinyl Chloride
RDP	Reconstruction and Development Programme
RM	Rand Million
RR	Risk Rating
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
SS	Suspended Solids
TB	Tuberculosis
TMG	Table Mountain Group
VAT	Value Added Tax
VIP	Ventilated Improved Pit
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
WTP	Water Treatment Plant
WTW	Water Treatment Works
WWTW	Waste Water Treatment Works

## KEY TERMS AND INTERPRETATIONS

Climate Change	Changes in climatic conditions due to natural causes or to anthropogenic (man-made) effects such as emissions of greenhouse gases, e.g. carbon dioxide, nitrous oxide, and methane, from industry, transport, farming and deforestation, 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- <ul style="list-style-type: none"><li>a national or provincial department, the year ending 31 March; or</li><li>a municipality, the year ending 30 June.</li></ul>																		
Global Warming	The increase in the average surface temperatures across the globe, usually measured over long periods of time; reported to have increased by 1°C over the past hundred years.																		
Integrated Development Plan (IDP)	An IDP is a legislative requirement for municipalities, which identifies the municipality's key development priorities; formulates a clear vision, mission and values; formulates appropriate strategies; shows the appropriate organisational structure and systems to realise the vision and the mission and aligns resources with the development priorities.																		
National Water Resource Strategy 2	Sets out how we will achieve the following core objectives: <ul style="list-style-type: none"><li>Water supports development and the elimination of poverty and inequality.</li><li>Water contributes to the economy and job creation, and</li><li>Water is protected, used, developed, conserved, managed and controlled sustainably and equitably.</li></ul>																		
International Water Association (IWA) Water Balance	<table><tr><td rowspan="7">System Input Volume</td><td rowspan="2">Authorised Consumption</td><td>Billed Authorised Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr><tr><td>Unbilled Authorised Consumption</td><td>Billed Unmetered Consumption</td></tr><tr><td rowspan="5">Water Losses</td><td>Commercial Losses</td><td>Unbilled Metered Consumption</td><td rowspan="5">Non-Revenue Water</td></tr><tr><td rowspan="4">Physical Losses</td><td>Unbilled Unmetered Consumption</td></tr><tr><td>Unauthorised Consumption</td></tr><tr><td>Customer Meter Inaccuracies and Data Handling Errors</td></tr><tr><td>Leakage on Transmission and Distribution Mains</td></tr><tr><td>Leakage and Overflows from the Utilities Storage Tanks</td></tr><tr><td>Leakage on Service Connections up to the Customer Meter</td></tr></table>	System Input Volume	Authorised Consumption	Billed Authorised Consumption	Billed Metered Consumption	Revenue Water	Unbilled Authorised Consumption	Billed Unmetered Consumption	Water Losses	Commercial Losses	Unbilled Metered Consumption	Non-Revenue Water	Physical Losses	Unbilled Unmetered Consumption	Unauthorised Consumption	Customer Meter Inaccuracies and Data Handling Errors	Leakage on Transmission and Distribution Mains	Leakage and Overflows from the Utilities Storage Tanks	Leakage on Service Connections up to the Customer Meter
System Input Volume	Authorised Consumption			Billed Authorised Consumption	Billed Metered Consumption		Revenue Water												
			Unbilled Authorised Consumption	Billed Unmetered Consumption															
	Water Losses		Commercial Losses	Unbilled Metered Consumption	Non-Revenue Water														
			Physical Losses	Unbilled Unmetered Consumption															
				Unauthorised Consumption															
				Customer Meter Inaccuracies and Data Handling Errors															
		Leakage on Transmission and Distribution Mains																	
Leakage and Overflows from the Utilities Storage Tanks																			
Leakage on Service Connections up to the Customer Meter																			
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	<p>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.</p> <p>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.</p>																		
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	<p>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).</p> <p>Commercial losses are called “Apparent Losses” by the International Water Association and in some countries the misleading term “Non-Technical Losses” is used.</p>																		

## 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 predominantly be small leaks which do not surface and which run for long periods (often years).
Revenue Water	Those components of Authorised Consumption which are billed and produce revenue (also known as Billed Authorised Consumption). Equal to Billed Metered Consumption plus Billed Unmetered Consumption.
Non-Revenue Water	Those components of System Input which are not billed and do not produce revenue. Equal to Unbilled Authorised Consumption plus Physical and Commercial Water Losses.
Remaining useful life (RUL)	The time remaining over which an asset is expected to be used.
Re-use	Utilisation of treated or untreated wastewater for a process other than the one that generated it. For instance, the re-use of municipal wastewater for agricultural irrigation. Water re-use can be direct or indirect, intentional or unintentional, planned or unplanned, local, regional or national in terms of location, scale and significance. Water re-use may involve various kinds of treatment (or not) and the reclaimed water may be used for a variety of purposes.
Service Delivery Budget Implementation Plan (SDBIP)	The SDBIP is a management, implementation and monitoring tool that enable the City Manager to monitor the performance of senior managers, the Mayor to monitor the performance of the City Manager, and for the community to monitor the performance of the municipality.
Strategic Framework for Water Services	The Strategic Framework provides a comprehensive summary of policy with respect to the water services sector in South Africa and sets out a strategic framework for its implementation over the next ten years.
Water Conservation	The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.
Water Demand Management	The adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services, and political acceptability.

**KEY TERMS AND INTERPRETATIONS**

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

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

### 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 George 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.

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

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

### SECTION A: STATUS QUO OVERVIEW

George Municipality consists of 27 individual wards and is the only WSA within the George Municipality's Management Area. The Municipality is also the Water Services Provider (WSP). The former Eden District Management Area, which constitutes of Uniondale, Haarlem and other smaller rural settlements also forms part of the newly demarcated municipal area after the Local Government Elections of 18 May 2011. George Municipality's Management Area includes the following towns and **Water Distribution Systems**:

- The City of George, the village of Herolds Bay and the coastal resorts of Victoria Bay, Kleinkrantz and Wilderness National Park – **George / Wilderness System**

Bulk raw water supply to the George / Wilderness system is from the following water resources.

#### Garden Route Dam (GRD) and Swart River Dam

The GRD was completed in 1979 on the Swart River downstream of its confluence with the Kat River. The GRD currently has a storage capacity of 9.03 million m<sup>3</sup> and a historic firm yield of 13.4 million m<sup>3</sup>/a. The municipality is currently busy with the raising of the dam wall by 2.5 metres, which will increase the storage capacity by approximately 25% to 12.5 million m<sup>3</sup>. The construction work on the dam wall and spillway area started on 13 May 2019.

A second dam, the Swart River Dam, exists further upstream on the Swart River. This dam was the original source of supply for the town, supplying the WTWs directly by gravity. Due to its small size compared to the GRD, it contributes relatively little and its pipeline has fallen into disuse. At present, the dam is leaking and its outlet works are in a poor state. It is not currently being used to support the GRD in directly supplying the WTWs. However, it is actively making releases into the downstream river and so into the GRD.

#### Kaaimans River

Flow from the Kaaimans River can be diverted into the GRD via the diversion of water at the Kaaimans weir via a 35 Ml/d pump station. The pump station was once active prior to the construction of the GRD, but fell into disuse due to the ample supply from the new dam in its early years. The weir and the pump station were however rehabilitated during 2008/2009. Instead of supply directly to the WTWs, as was previously the case, it now discharges its flow into the headwater of the GRD.

### Touw River

The Touw River provides raw water abstracted from a natural weir straight to the Wilderness WTW.

### Outeniqua Reclamation Plant

The first phase of the Outeniqua Reclamation Plant was completed. The reclamation plant treat the sewage effluent from the Outeniqua WWTW to a standard complying with national and international water quality standards. The treated effluent is pumped to the GRD, where it is blended with the raw water before being abstracted and pumped to the WTW. The first phase allows for 10 MI/d, which will be followed by an additional 5 to 10 MI/d for Phase 2 in the short to medium term. The 10 MI/d pump station will later be upgraded to 20 MI/d and ultimately to 25 MI/d (the pipeline was designed to accommodate 35 MI/d) when incorporating the effluent from the Gwaing WWTW.

### Malgas River Pumping Scheme

The Malgas Pumping Scheme was commissioned during 2012 and consists of an off-channel off-take just upstream of the existing Witfontein low level bridge, with a 6.3km 500mm dia. GRP pipeline to the WTW. A pump station was constructed at the offtake. The additional yield from this source is approximately 2 400 MI.

- The village of Uniondale – **Uniondale System**

Bulk water supply to Uniondale is from the Kammanassie River, which flows past the town. The town also has an allocation from the Haarlem Dam.

- The village of Haarlem – **Haarlem System**

Bulk raw water is supplied to Haarlem from the Haarlem Dam.

The most significant challenges, from a Water Services perspective, are the upgrading of the WTWs and WWTWs in order to meet future treatment capacity requirements, the provision of bulk water and sewerage infrastructure to service future development areas, the replacement and upgrading of the old infrastructure to ensure the sustainability of the existing infrastructure, the operation and maintenance of the WTWs and WWTWs in a sustainable manner, the provision of sustainable basic services to informal settlements and to ensure the provision of basic services to households located on privately owned farms. Strategies and action plans will need to be developed and implemented, in collaboration with farm owners, in order for the Municipality to fulfil its legal obligations and responsibilities as WSA, with regard to the provision of basic services once clear and practical policy guidelines are made available from the DWS and funding is made available.

### Physical Perspective:

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

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

Major vulnerabilities that are presently, and are likely to be experienced in the George municipal area; include the following:

- Extreme heat and water availability (reduced rainfall) resulting in for example, food insecurity and impermeable surfaces as a result of droughts increasing flooding of estuaries and floodplains;
- Sea level rise;
- Increasing frequency and intensity of storms and storm surges;
- Wildfires;
- High winds, etc.

It is therefore advisable for George 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:

George is endowed with a strong natural-resource base, including the Outeniqua Mountains, the Indian Ocean, numerous river valleys, coastal cliffs, bays and beaches, valuable agricultural land and a moderate climate. These natural resources form the basis for the tourism industry, agriculture and forestry as important contributors to the local and regional economy. The pristine natural areas in the municipality include the Outeniqua Mountains in the northern-most areas of the municipality, covered predominantly by indigenous fynbos species that form part of the Cape Floral community and the Indian Ocean coast, forming the southern boundary of the municipality.

George Municipality is blessed with a wealth of environmental attributes of which the sense of place is possibly its greatest asset. Such resources can only be conserved with responsible planning and development. The Strategic Environmental Assessment (SEA) Report, February 2008, presents an opportunity to ensure that sustainable development planning occurs within the municipality at a strategic level.

The need for more detailed Environmental Management Frameworks is recognised in certain areas of the Municipality, as a result of rapid urban development activity in certain areas of environmental sensitivity. The areas are as follows:

- Kaaimans and Swart River Gorge areas;



- Wilderness Lakes including Hoekwil and Wilderness Heights; and
- The Coastal Zone extending from Glentana to Victoria Bay.

## TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

The tables below gives an overview of the population and households in George Municipality's Management Area.

Table A.1.1: Settlement Summary		
Section	Value	Assessment Score
1.1 Total Population	233 109	80%
1.2 Total Number of Households (Permanent)	64 510	80%
1.3 Average Household Size	3.61	80%
1.4 Total Number of Settlements	133	80%

Table A.1.2 Summary by Settlement Group (Urban / Rural Split)				
Settlement Type	Settlements	Population	Households	Assessment Score
Rural	4	25 276	6 206	80%
Urban	129	207 833	58 304	80%

Table A.1.3 Assessment score by Settlement Type						
Main Type	Settlement Type	Settlements	Population	Households	Avg. Household Size	Assessment Score
Rural	Farming	1	24 220	5 942	4.9	80%
Rural	Rural - Informal Settlements (Squatter Camp)	3	1 056	264	4.0	80%
Urban	Urban - Formal Town	100	194 237	54 905	3.54	80%
Urban	Urban - Informal Settlements (Squatter Camp)	25	13 596	3 399	4.0	80%

Table A.1.4 Amenities summary (Health & Educational facilities)		
Amenity Type	Number of Amenities	Assessment Score
Health Facilities	17	80%
Educational facilities	80	80%

The Community Survey of 2016 from Statistics South Africa estimate the 2016 population for George Municipality at 208 237 persons and the permanent households at 62 722, at an average household size of 3.3 persons per household.

George Municipality's current population is estimated at 213 189 persons, according to the Department of Social Development's 2018 projections, as also included in the 2019/2020 IDP. This total population is estimated to increase to 236 655 by 2024, which equates to 1.8% average annual growth over this period. The current population in the WSDP is estimated a bit higher, as well as the estimated average annual future population growth percentage.

The size of the population provides an indication of the volume of demand for government services in a particular area. It also serves as a planning measure to assist budget planners to match available resources to the relative demand for infrastructural and social services including water, sanitation, electricity, housing and health care.

The 2018/2019 population was estimated by applying an annual growth rate of 2.68% to the 2011 Census population figure. The current population figures and the annual population growth percentages used in the WSDP IDP Sector Input Report are aligned with the figures used in DWS's GeoDatabase.

# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021



The future estimated annual population growth percentages, as listed in the table below, were agreed with the Municipality's Community Services and Engineering Planning Departments during January 2014.

Table A.1.5: Estimated Future Annual Population Growth Percentages per Distribution System	
Town	Estimated future annual Population Growth %
George / Wilderness	2.80%
Uniondale	2.50%
Haarlem	1.00%
Farms	2.0%
<b>Total</b>	<b>2.68%</b>

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

Table A.1.6: Water Services Overview																									
Settlement Type	2011/2012		2018/2019		Water category								Sanitation category												
	Households	Population	Households	Population	Adequate: Formal	Adequate: Informal	Adequate: Shared Services	Water resources needs only	O&M needs only	Infrastructure needs only	Infrastructure & O&M needs	Infrastructure, O&M & Resource need	No Services: Informal	No Services: Formal	Adequate: Formal	Adequate: Informal	Adequate: Shared Services	Water resources needs only	O&M needs only	Infrastructure needs only	Infrastructure & O&M needs	Infrastructure, O&M & Resource need	No Services: Informal	No Services: Formal	
URBAN																									
Metropolitan Area					Adequate	Below RDP				None	Adequate	Below RDP				None									
Sub-Total	0	0	0	0																					
Formal Town					Adequate	Below RDP				None	Adequate	Below RDP				None									
George and Wilderness	42,211	147,881	52,976	186,471	P		P								P		P								
Uniondale	1,094	4,429	1,307	5,291	P		P								P		P								
Haarlem	597	2,376	622	2,475	P		P								P		P								
Sub-Total	43,902	154,686	54,905	194,237	3	0	3	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0
Townships					Adequate	Below RDP				None	Adequate	Below RDP				None									
Sub-Total	0	0	0	0																					
Informal Settlements					Adequate	Below RDP				None	Adequate	Below RDP				None									
George and Wilderness	4,222	16,888	3,359	13,436		P										P									
Uniondale	24	96	22	88		P										P									
Haarlem			18	72		P										P									
Sub-Total	4,246	16,984	3,399	13,596	0	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Working towns & service centres					Adequate	Below RDP				None	Adequate	Below RDP				None									
Sub-Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sub-Total: (Urban)	48,148	171,670	58,304	207,833	3	3	3	0	0	0	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0
RURAL																									
Rural / Farming					Adequate	Below RDP				None	Adequate	Below RDP				None									
Farms	5,186	21,136	5,942	24,220	P		P							P										P	
Sub-Total	5,186	21,136	5,942	24,220	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
Informal Settlements					Adequate	Below RDP				None	Adequate	Below RDP				None									
Farms	217	868	264	1,056										P									P		
Sub-Total	217	868	264	1,056	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	
Sub-Total (Rural)	5,403	22,004	6,206	25,276	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	
TOTAL	53,551	193,674	64,510	233,109	4	3	4	0	0	0	0	0	1	1	3	3	3	0	0	0	0	0	1	1	

## 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		
<b>Full level of service:</b> People access and pay for more than 90 l/c/d at high pressure.	Interim <b>Full</b>	<b>Full provision:</b> People access a minimum of 50 l/c/d of SANS241 quality water on demand at the boundary of the yard, metered and tarified.
<b>Middle level of service:</b> People access and pay for 51-90 l/c/d at medium pressure.	Interim <b>Upper</b>	<b>Upper provision:</b> 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 tarified.
	Interim <b>Intermediate</b>	<b>Intermediate provision:</b> 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 tarified.
<b>Minimum level of service:</b> People access 25-50 l/c/d at low to medium pressure, use of more than 25 l/c/d is paid for.	Interim <b>Basic Plus</b>	<b>Basic Plus provision:</b> 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 tarified.
	Interim <b>Basic</b>	<b>Basic provision:</b> 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 tarified.
	Interim <b>Free Basic</b>	<b>Free basic provision:</b> People access a minimum of 25 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered.
	<b>Intermittent</b>	<b>Intermittent provision:</b> People access a minimum of 1500 l/household/week of acceptable quality water on a weekly basis within 100m, which is metered.
<b>Bulk service:</b> Source of potable water to be provided to people, which is metered in all circumstances.		
<b>No service / provision = backlog:</b> 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		
<b>Full level:</b> Full concern for human health, environment and sustainability of interconnected systems.	<b>Full services</b>	<b>In-house facility:</b> Storm water, wastewater/excreta, greywater, solid waste are collected and managed to achieve maximum benefits from treatment and re-use of water and nutrients. <b>In-house facility:</b> 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.
<b>Basic level:</b> Remove excreta from the environment through treatment, pathogen reduction, resource recovery and nutrient reuse.	<b>Free basic services</b>	<b>Toilet with functional hand washing facility in the yard:</b> 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.
	<b>Basic services</b>	<b>Toilet with functional hand washing facility in the yard.</b> 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.
<b>Interim level:</b> Blocking the spread of faecal-oral diseases through proper excreta containment at a fixed point.	<b>Excreta containment</b>	<b>Household, shared or communal toilets with functional hand washing facilities:</b> 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.
<b>No service / provision = backlog:</b> People practice open defecation or access an unimproved sanitation facility, such as pit toilets and bucket toilets. To be completely eliminated by 2030.		

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

Proper disposal, clean platform, vector and rodent control.

All residential consumers on formal erven in the urban areas of George Municipality's Management Area have access to water and sanitation services and free basic water services are provided to all households. Households in informal areas are provided with communal services as an intermediary measure. There are no informal areas in the urban areas without basic water and sanitation services. The Municipality works towards a service level ratio of not more than 25 households per communal tap and 5 households per communal toilet facility. It is estimated that there might still be some households on the farms in the rural areas with existing service levels below RDP standards, which can only be verified through a detail survey.

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

<b>Table A.2.3: Residential Water Services Delivery Access Profile: Water</b>							
<b>Census Category</b>	<b>Description</b>	<b>Year 0</b>		<b>Year -1</b>		<b>Year 2</b>	
		<b>FY2018/19</b>		<b>FY2017/18</b>		<b>FY2016/17</b>	
		<b>Nr</b>	<b>%</b>	<b>Nr</b>	<b>%</b>	<b>Nr</b>	<b>%</b>
	<b>WATER (ABOVE MIN LEVEL)</b>						
Piped (tap) water inside dwelling/institution	House connections	38,677	60%	37,799	60%	36,782	60%
Piped (tap) water inside yard	Yard connections	21,319	33%	20,626	33%	19,972	33%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	3,399	5%	3,277	5%	3,320	5%
	<b>Sub-Total: Minimum Service Level and Above</b>	<b>63,395</b>	<b>98%</b>	<b>61,702</b>	<b>98%</b>	<b>60,073</b>	<b>98%</b>
	<b>WATER (BELOW MIN LEVEL)</b>						
Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Standpipe connection: > 200 m < 500 m	74	0%	74	0%	74	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling/institution	Standpipe connection: > 500 m < 1 000 m	27	0%	27	0%	27	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	19	0%	19	0%	19	0%
No access to piped (tap) water	No services	995	2%	995	2%	995	2%
	<b>Sub-Total: Below Minimum Service Level</b>	<b>1,115</b>	<b>2%</b>	<b>1,115</b>	<b>2%</b>	<b>1,115</b>	<b>2%</b>
	<b>Total number of households</b>	<b>64,510</b>	<b>100%</b>	<b>62,817</b>	<b>100%</b>	<b>61,188</b>	<b>100%</b>

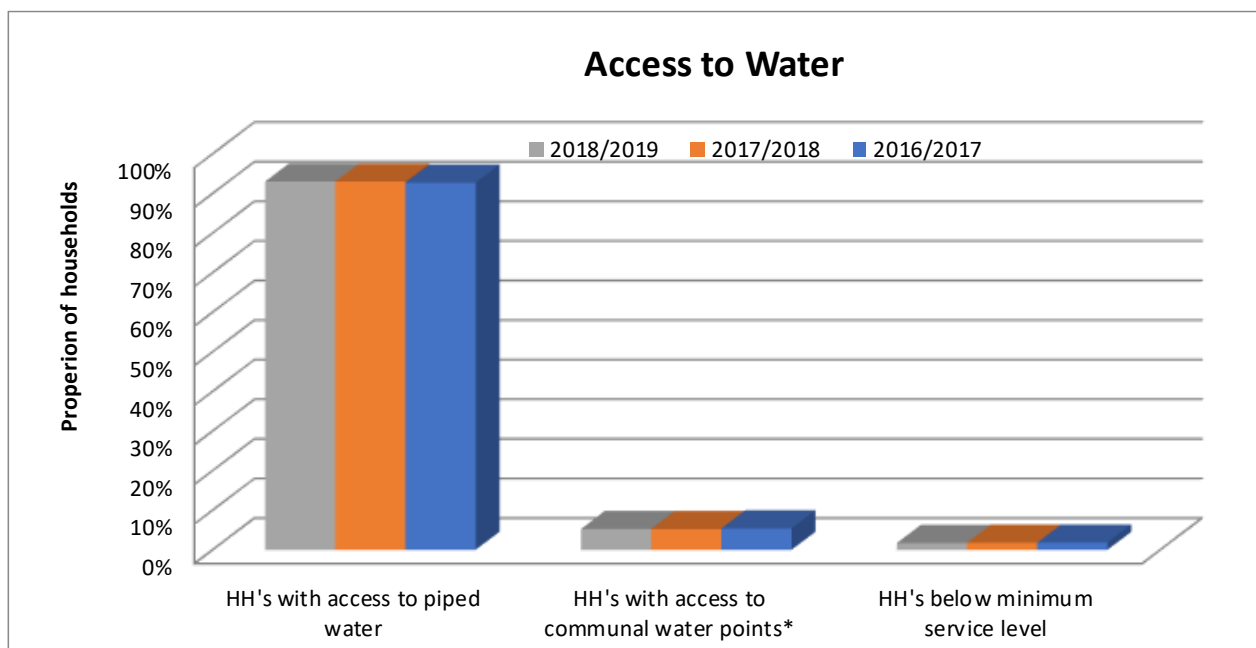


Figure A.2.1: Access to Water Services.

The existing residential water service levels in George Municipality's Management Area are estimated as follows (June 2019):

Service Level	George and Wilderness	Uniondale	Haarlem	Farms	Total
No Water Services	0	0	0	731 <sup>3)</sup>	731
Below RDP: Infrastructure Upgrade	0	0	0	0	0
Below RDP: Infrastructure Extension	0	0	0	120 <sup>4)</sup>	120
Below RDP: Infrastructure Refurbishment	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0
<b>Total Basic Need (RDP)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>851</b>	<b>851</b>
Below Housing Interim <sup>5)</sup>	0	0	0	264	264
Adequate Housing Permanent <sup>6)</sup>	3 359	22	18	0	3 399
<b>Total Housing Need</b>	<b>3 359</b>	<b>22</b>	<b>18</b>	<b>264</b>	<b>3 663</b>
Standpipes	0	0	0	0	0
Yard Connections <sup>7)</sup>	19 547	318	116	1 338	21 319
House Connections	33 429 <sup>2)</sup>	989 <sup>2)</sup>	506 <sup>2)</sup>	3 753	38 677
<b>Total Adequate</b>	<b>52 976</b>	<b>1 307</b>	<b>622</b>	<b>5 091</b>	<b>59 996</b>
<b>Total</b>	<b>56 335</b>	<b>1 329</b>	<b>640</b>	<b>6 206</b>	<b>64 510</b>

Notes: 1) There are no households in the urban areas with existing water service levels below RDP standard.

2) George / Wilderness, Uniondale and Haarlem: Average number of residential consumer units for 2018/2019, as calculated from the Financial Records.

3) Census 2011: Number of households with no access to piped (tap) water in rural areas (995 – 264 = 731).

4) Census 2011: Number of households with communal services in rural areas (200m – 500m) 74, (500m – 1000m) 27 and (>1000m) 19.

5) Below Housing Interim in the above table is the number of households in informal areas without basic water services, which was confirmed by the Housing Department.

6) Adequate Housing Permanent in the above table is the number of households in informal areas with communal water services. Number of households with communal services in informal areas was confirmed by the Housing Department.

7) Estimated number of backyard dwellers on formal erven in the urban areas, which was calculated from the 2018/2019 projected number of households.

**Table A.2.5: Improvement in Eradicating the Water Backlog**

Settlement	Urban / Rural	2018/19		2017/18 (-Y1)	
		Water backlog HH	Water Backlog Population	Water backlog HH	Water Backlog Population
George and Wilderness	Urban	0	0	0	0
Uniondale	Urban	0	0	0	0
Haarlem	Urban	0	0	0	0
Farms	Rural	1 115	4 541	1 115	4 541
		<b>1 115</b>		<b>1 115</b>	

**Table A.2.6: Residential Water Services Infrastructure Supply Level Profile**

Water Profile	Totals	Assessment Score
Piped water inside the dwelling/house-Households	38 677	80%
Piped water inside yard-Households	21 319	80%
Piped water distance <200m - Households	3 399	80%
Piped water distance >200m - Households	384	60%
Borehole in the yard - Households	0	80%
Rain-water tank in yard - Households	0	80%
Water vendor-carrier/tanker - Households	0	80%
Stagnant water - dam/pool - Households	0	80%
Flowing water/spring/ stream/river - Households	0	80%
Water Other - Households	731	60%

**Table A.2.7: Residential Water Reliability Profile**

Section: Water Reliability Profile	Totals	Assessment Score
Total Number of Households having Reliable Service	63 395	80%
Total Number of Households NOT having Reliable Service	1 115	60%

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

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

Census Category	Description	Year 0		Year -1		Year 2	
		FY2018/19		FY2017/18		FY2016/17	
		Nr	%	Nr	%	Nr	%
	<b>SANITATION (ABOVE MIN LEVEL)</b>						
Flush toilet (connected to sewerage system)	Waterborne	53,275	83%	51,825	83%	50,272	82%
	Waterborne: Low Flush	0	0%	0	0%	0	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	5,463	8%	5,342	9%	5,224	9%
Chemical toilet	Non-waterborne (min. service level)	18	0%	18	0%	18	0%
Pit toilet with ventilation (VIP)		811	1%	811	1%	811	1%
Other / Communal Services	Waterborne (min. service level, communal)	3,525	5%	3,403	5%	3,446	6%
	<b>Sub-Total: Minimum Service Level and Above</b>	<b>63,092</b>	<b>98%</b>	<b>61,399</b>	<b>98%</b>	<b>59,771</b>	<b>98%</b>
	<b>SANITATION (BELOW MIN LEVEL)</b>						
Pit toilet without ventilation	Pit toilet	655	1%	655	1%	655	1%
Bucket toilet	Bucket toilet	155	0%	155	0%	155	0%
Other toilet provision (below min. service level)	Other	157	0%	157	0%	157	0%
No toilet provisions	No services	451	1%	451	1%	451	1%
	<b>Sub-Total: Below Minimum Service Level</b>	<b>1,418</b>	<b>2%</b>	<b>1,418</b>	<b>2%</b>	<b>1,418</b>	<b>2%</b>
	<b>Total number of households</b>	<b>64,510</b>	<b>100%</b>	<b>62,817</b>	<b>100%</b>	<b>61,189</b>	<b>100%</b>

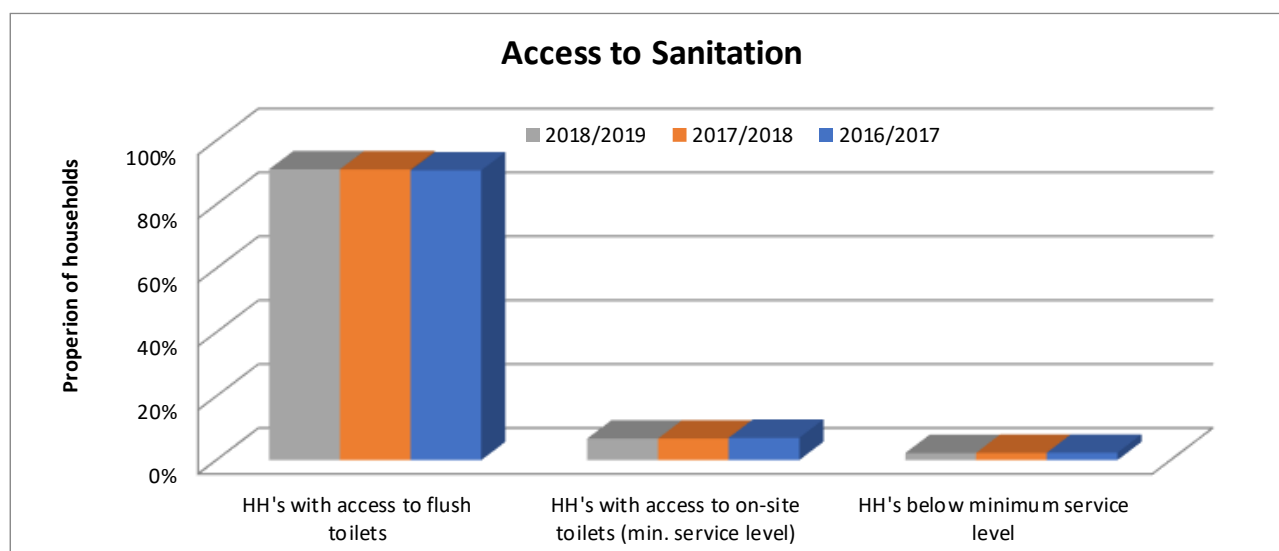


Figure A.2.2: Access to Sanitation Services.

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

Table A.2.9: Residential Sanitation Service Levels					
Service Levels	George and Wilderness	Uniondale	Haarlem	Farms	Total
No Sanitation Services	0	0	0	313 <sup>3)</sup>	313
Below RDP: Infrastructure Upgrade	0	0	0	985 <sup>4)</sup>	985
Below RDP: Infrastructure Extension	0	0	0	0	0
Below RDP: Infrastructure Refurbishment	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0
<b>Total Basic Need (RDP)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1 298</b>	<b>1 298</b>
Below Housing Interim <sup>5)</sup>	0	0	0	138	138
Adequate Housing Permanent <sup>6)</sup>	3 359	22	18	126	3 525
<b>Total Housing Need</b>	<b>3 359</b>	<b>22</b>	<b>18</b>	<b>264</b>	<b>3 663</b>
No Waterborne (VIP)	0	0	0	811 <sup>5)</sup>	811
Waterborne Low Flush	0	0	0	0	0
Septic Tanks & Conservancy	1 381 <sup>1)</sup>	165 <sup>1)</sup>	84 <sup>1)</sup>	3 833	5 463
Waterborne	51 595	1 142	538	0	53 275
<b>Total Adequate <sup>2)</sup></b>	<b>52 976</b>	<b>1 307</b>	<b>622</b>	<b>4 644</b>	<b>59 549</b>
<b>Total Residential Consumer Units for the Municipality</b>	<b>56 335</b>	<b>1 329</b>	<b>640</b>	<b>6 206</b>	<b>64 510</b>

Notes: 1) Septic Tanks as taken from 2011 Census data.

2) Include Backyard dwellers

3) Census 2011: Number of households with no toilet facility (451 – 138 = 313)

4) Census 2011: Number of households with existing buckets 155, chemical toilets 18, pit toilets without ventilation 655 and "other" 157

5) Census 2011: Number of households with pit toilets with ventilation 811.

6) Below Housing Interim in the above table is the number of households in informal areas without basic sanitation services, which was confirmed by the Housing Department.

7) Adequate Housing Permanent in the above table is the number of households in informal areas with communal ablution facilities. Number of households with communal services in informal areas was confirmed by the Housing Department.



Table A.2.10: Improvement in Eradicating the Sanitation Backlog					
Settlement	Urban / Rural	2018/19		2017/18 (-Y1)	
		Sanitation backlog HH	Sanitation Backlog Population	Sanitation backlog HH	Sanitation Backlog Population
George and Wilderness	Urban	0	0	0	0
Uniondale	Urban	0	0	0	0
Haarlem	Urban	0	0	0	0
Farms	Rural	1 436	5 847	1 436	5 847
		<b>1 436</b>		<b>1 436</b>	

Table A.2.11: Residential Sanitation Services Infrastructure Supply Level Profile		
Section: Sanitation Service Infrastructure Supply Level Profile	Totals	Assessment Score
Bucket toilet - Households	155	60%
Pit without ventilation - Households	655	60%
Pit toilet with ventilation (VIP) - Households	811	60%
Chemical Toilet - Households	18	60%
Flush toilet (with septic / conservancy tank) - Households	5 463	80%
Flush toilet (connected to sewerage system) - Households	56 800	80%
None - Households	608	60%

Table A.2.12: Residential Sanitation Reliability Profile		
Section: Sanitation Reliability Profile	Totals	Assessment Score
Infrastructure to be upgraded: None to VIP (HH)	608	60%
Infrastructure requirement: Bucket to VIP (HH)	155	60%
Infrastructure to be upgraded: Pit to VIP (HH)	655	60%
Number of households NOT having reliable service due to: Functionality	18	60%

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)	1 115	60%
Direct settlement backlog water population. Total population of settlement with a water need (irrelevant the type of need)	4 541	60%
Direct settlement backlog sanitation households. Total household of settlement with a sanitation need (irrelevant the type of need)	1 436	60%
Direct settlement backlog sanitation population. Total population of settlement with a sanitation need (irrelevant the type of need)	5 847	60%

The municipality renders basic services in terms of potable water, sewer facilities (toilets) and cleaning services to all informal settlements. Communal toilet facilities and potable water taps are provided according to the following national ratios, namely:

- Communal Taps: 1:25 households
- Communal Toilets: 1:5 households



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					
<ul style="list-style-type: none"> <li>A minimum volume of 1 500 litres of potable water shall be made available to a household per week.</li> <li>The water provided shall comply with the SANS241 quality standards.</li> <li>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.</li> <li>In the case of a communal standpipe, it shall be within a reasonable walking distance of no more than 100m from the farthest household.</li> <li>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.</li> <li>The water shall be made available for 52 weeks per year.</li> <li>All water use and/or supply shall be metered, but not tarified.</li> <li>Maintenance of the infrastructure for this level of service is the responsibility of the WSA.</li> <li>Point-of-use water treatment systems and methods shall be advocated.</li> <li>Efforts shall be made to ensure user acceptance and understanding for this level of service.</li> <li>Users shall be educated in effective water use and hygiene.</li> <li>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.</li> </ul>					
Interim sanitation services (Communal and shared facilities)					
<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>Sufficient sanitation facilities shall be provided for the number of users                         <ul style="list-style-type: none"> <li>Communal toilet: Toilet seats – 1 seat per 50 users; Urinal units – 1 unit per 100 users; Hand washing – 1 basin per 10 toilet seats.</li> <li>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.</li> </ul> </li> <li>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.</li> </ul>					

The current number of households in the informal areas, with access to communal basic services, is 3 399. The number of households with communal services in the informal areas and the number of households per facility type are summarised in the table below (June 2019).

Table A.2.15: Communal Service Levels in Informal Areas					
Informal Area	Sanitation Facility		Water Facility		Number of Structures
	Toilets	No. of Structures / Facility	Taps	No. of Structures / Facility	
Zone 9: France	35	4.9	9	19.0	171
Zone 9: Allbricks	43	3.6	9	17.0	153
Zone 9: Tsunami	77	3.2	23	10.9	250
Zone 9: ABSA	20	2.9	2	28.5	57
Zone 9: Erf 5088	23	5.0	6	19.2	115
Zone 8: Steybi-Teybi	23	4.3	9	11.1	100
Zone 8: Back 4360 down to 4351 (Mdywadeni)	20	2.6	7	7.4	52
Zone 8: Inn	88	4.8	20	21.2	423

# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Informal Area	Sanitation Facility		Water Facility		Number of Structures
	Toilets	No. of Structures / Facility	Taps	No. of Structures / Facility	
Zone 8: Eskom	5	4.6	2	11.5	23
Zone 7: Ikapa	12	4.7	4	14.0	56
Zone 7: Blondie (Erf 2962)	3	3.0	1	9.0	9
Zone 6: Ramaphosa	23	3.7	4	21.0	84
Zone 6: Zabalaza	21	4.7	3	33.0	99
Zone 6: Zama	27	4.6	9	13.7	123
Zone 6: Nyama Land (Erven 2417 & 2418) <sup>1)</sup>	5	5.8	1	29.0	29
<b>Totals for Thembalethu</b>	<b>425</b>	<b>4.1</b>	<b>109</b>	<b>16.0</b>	<b>1 744</b>
July Markeni Street	3	3.0	1	9.0	9
Mgoqi Street	3	3.3	2	5.0	10
Florence Ntondini Street	1	2.0	1	2.0	2
<b>Totals for Lawaaiikamp</b>	<b>7</b>	<b>3.0</b>	<b>4</b>	<b>5.3</b>	<b>21</b>
Erf 181 <sup>1)</sup>	7	2.1	2	7.5	15
Mingo Kamp <sup>1)</sup>	5	1.8	2	4.5	9
Noord Street <sup>1)</sup>	1	8.0	1	8.0	8
Agerstraat <sup>1)</sup>	2	6.0	1	12.0	12
Rosedale	110	4.5	17	29.4	500
<b>Totals for Pacaltsdorp</b>	<b>125</b>	<b>4.4</b>	<b>23</b>	<b>23.7</b>	<b>544</b>
<b>Parkdene (Saturnus Street)</b>	<b>21</b>	<b>3.3</b>	<b>5</b>	<b>13.8</b>	<b>69</b>
<b>Protea Park (Back Area)</b>	<b>7</b>	<b>3.9</b>	<b>2</b>	<b>13.5</b>	<b>27</b>
<b>Protea Park (Front Area)</b>	<b>71</b>	<b>1.1</b>	<b>70</b>	<b>1.1</b>	<b>79</b>
<b>Totals for Protea Park</b>	<b>78</b>	<b>1.4</b>	<b>72</b>	<b>1.5</b>	<b>106</b>
<b>Rosemoor (Spandiel Street)</b>	<b>6</b>	<b>6.7</b>	<b>4</b>	<b>10.0</b>	<b>40</b>
<b>Syferfontein (Syferfontein)</b>	<b>99</b>	<b>4.3</b>	<b>10</b>	<b>42.8</b>	<b>428</b>
Malgas River	5	8.4	5	8.4	42
Erf 1424	4	1.8	1	7.0	7
Sonop Avenue	1	6.0	1	6.0	6
Golden Valley	11	5.1	3	18.7	56
<b>Totals for Blanco</b>	<b>21</b>	<b>5.3</b>	<b>10</b>	<b>11.1</b>	<b>111</b>
Erf 4200 (Palana)	7	1.9	1	13.0	13
Spandiel Street	32	1.2	2	19.0	38
Figland Street	5	2.2	1	11.0	11
Nel Street	6	1.0	1	6.0	6
Bellair Street	3	1.0	3	1.0	3
Sunset- and De Beer Street	2	4.5	1	9.0	9
<b>Totals for Borchards</b>	<b>55</b>	<b>1.5</b>	<b>9</b>	<b>8.9</b>	<b>80</b>
<b>Conville (Makou Street)</b>	<b>2</b>	<b>3.5</b>	<b>2</b>	<b>3.5</b>	<b>7</b>
<b>Erf 329 (Wildernis Heights)</b>	<b>20</b>	<b>4.8</b>	<b>9</b>	<b>10.7</b>	<b>96</b>
<b>Kleinkrantz (Kleinkrantz)</b>	<b>21</b>	<b>3.0</b>	<b>5</b>	<b>12.6</b>	<b>63</b>
<b>Touwsrante</b>	<b>10</b>	<b>5.0</b>	<b>3</b>	<b>16.7</b>	<b>50</b>
<b>Uniondale</b>	<b>6</b>	<b>3.7</b>	<b>1</b>	<b>22.0</b>	<b>22</b>
<b>Haarlem</b>	<b>17</b>	<b>1.1</b>	<b>6</b>	<b>3.0</b>	<b>18</b>
<b>Total Urban Areas</b>	<b>913</b>	<b>3.7</b>	<b>272</b>	<b>12.5</b>	<b>3 399</b>

Notes: 1) Not Council Land

No Services, Ratios above Targets, Ratios meeting Targets

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021



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

Table A.2.16: Number of Consumer Units in each User Sector for the Last Six Financial Years					
Distribution System	Residential	Commercial	Industrial	Other	Total
<b>2013/2014</b>					
George and Wilderness	30 167	1 616	3	392	<b>32 178</b>
Uniondale	824	42	0	15	<b>881</b>
Haarlem	473	2	0	3	<b>478</b>
<b>TOTALS</b>	<b>31 464</b>	<b>1 660</b>	<b>3</b>	<b>410</b>	<b>33 537</b>
<b>2014/2015</b>					
George and Wilderness	30 572	1 642	4	533	<b>32 751</b>
Uniondale	955	48	0	15	<b>1 018</b>
Haarlem	372	2	0	3	<b>377</b>
<b>TOTALS</b>	<b>31 899</b>	<b>1 692</b>	<b>4</b>	<b>551</b>	<b>34 146</b>
<b>2015/2016</b>					
George and Wilderness	31 037	1 644	4	551	<b>33 236</b>
Uniondale	823	54	0	16	<b>893</b>
Haarlem	510	1	0	3	<b>514</b>
<b>TOTALS</b>	<b>32 370</b>	<b>1 699</b>	<b>4</b>	<b>570</b>	<b>34 643</b>
<b>2016/2017</b>					
George and Wilderness	31 633	1 660	4	583	<b>33 880</b>
Uniondale	867	55	0	16	<b>938</b>
Haarlem	490	1	0	3	<b>494</b>
<b>TOTALS</b>	<b>32 990</b>	<b>1 716</b>	<b>4</b>	<b>602</b>	<b>35 312</b>
<b>2017/2018</b>					
George and Wilderness	32 691	1 687	4	595	<b>34 977</b>
Uniondale	986	57	0	16	<b>1 059</b>
Haarlem	490	1	0	3	<b>494</b>
<b>TOTALS</b>	<b>34 167</b>	<b>1 745</b>	<b>4</b>	<b>614</b>	<b>36 530</b>
<b>2018/2019</b>					
George and Wilderness	33 429	1 714	4	574	<b>35 721</b>
Uniondale	989	60	0	16	<b>1 065</b>
Haarlem	506	1	0	3	<b>510</b>
<b>TOTALS</b>	<b>34 924</b>	<b>1 775</b>	<b>4</b>	<b>593</b>	<b>37 296</b>

The table below gives an overview of the number billed consumer units for the three systems and the average annual growth percentage over the last five financial years.

Table A.2.17: Total Number of Consumer Units per System and Percentage Annual Growth from 2013/2014 to 2018/2019							
Distribution System	Annual Growth % 13/14 – 18/19	13/14	14/15	15/16	16/17	17/18	18/19
George and Wilderness	2.11%	32 178	32 751	33 236	33 880	34 977	35 721
Uniondale	3.85%	881	1 018	893	938	1 059	1 065
Haarlem	1.30%	478	377	514	494	494	510
<b>TOTALS</b>	<b>2.15%</b>	<b>33 537</b>	<b>34 146</b>	<b>34 643</b>	<b>35 312</b>	<b>36 530</b>	<b>37 296</b>

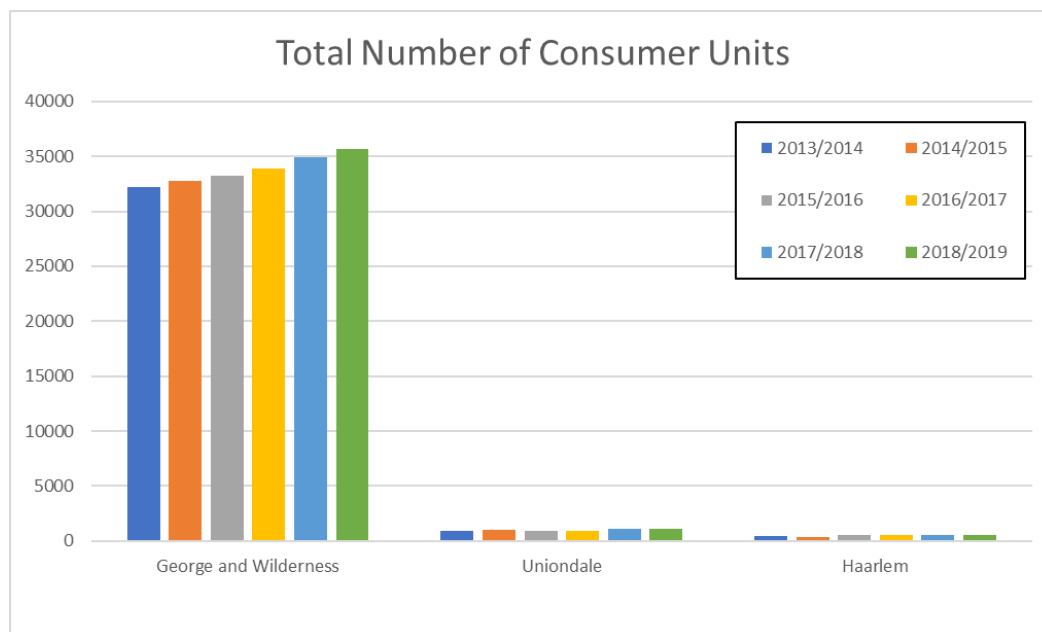


Figure A.2.3: Number of Billed Metered Consumer Units per System for the Last Six Financial Years

A “Swift Analysis” was done during November 2018 for George Municipality. The table below gives the totals for the number of meters, connections and number of stands.

Table A.2.18: Swift Analysis for George Municipality (November 2018)						
Description	Meters	Connections	Number of Stands			
			Estimated Supply	Metered Supply	Vacant Stands	Total Stands
Total for all Land Use Categories	37 110	41 325	4 289	33 310	17 915	55 514

## Public Amenities

Table A.2.19: Water Service Levels: Education and Health Facilities				
Associated services facility	Number of facilities	Facilities with No Services	Facilities with Inadequate Services	Total Potential Cost (basic level) (RM)
Water				
Education Plan				
Pre-Primary school	13	-	-	-
Primary school	37	Unknown	Unknown	Unknown
Secondary school	11	-	-	-
Tertiary	10	-	-	-
Combined	5	-	-	-
Special needs	4	-	-	-
Other	-	-	-	-
Total	80	0	0	R0
Health Plan				
Hospitals	5	-	-	-
Health Centres	2	-	-	-
Clinics	10	-	-	-
Other	-	-	-	-
Total	17	0	0	R0

All the schools and tertiary facilities in the urban areas are supplied with higher levels of water services. The water service levels of 11 Primary Schools in the rural areas need to be verified. All the hospitals and clinics in the urban areas receive potable water through the reticulation networks of the various towns.

Table A.2.20: Sanitation Service Levels: Education and Health Facilities				
Associated services facility	Number of facilities	Facilities with No Services	Facilities with Inadequate Services	Total Potential Cost (basic level) (RM)
Sanitation				
<b>Education Plan</b>				
Pre-Primary school	13	-	-	-
Primary school	37	Unknown	Unknown	Unknown
Secondary school	11	-	-	-
Tertiary	10	-	-	-
Combined	5	-	-	-
Special needs	4	-	-	-
Other	-	-	-	-
<b>Total</b>	<b>80</b>	<b>0</b>	<b>0</b>	<b>R0</b>
<b>Health Plan</b>				
Hospitals	5	-	-	-
Health Centres	2	-	-	-
Clinics	10	-	-	-
Other	-	-	-	-
<b>Total</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>R0</b>

All the schools and tertiary facilities in the urban areas are supplied with higher levels of sanitation services. The sanitation service levels of 11 Primary Schools in the rural areas need to be verified. All the hospitals and clinics in the urban areas are connected to the waterborne sewer systems.

### TOPIC 3: WATER SERVICES INFRASTRUCTURE MANAGEMENT (INFRASTRUCTURE)

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	3	9	6	25	110	81.94 km	73.41 km	41	6	80%

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

A.3.2: Existing Main Water Infrastructure (Resources and WTWs)			
Water Distribution System	Bulk Supply	WTWs and Treatment Processes	
	(Resources)	WTW (Capacity)	Processes
George / Wilderness	Garden Route Dam, Swart River Dam, Kaaimans River (Weir), Malgas River (Weir) and Boreholes	Old George WTW (25 MI/d)	Flow measurement (Inflow, Process flow and outflow); Coagulant dosing (Soda Ash and U3800 Ultrafloc); Flocculation; Sedimentation; Filtration (Three filters for each module); Stabilization (Soda Ash) Disinfection (Chlorine gas); and Sludge handling.
		New George WTW (20.0MI/d)	Flow measurement (Inflow, Process flow and outflow); Chemical dosing (Ferric Chloride, Soda Ash and U3800 Ultrafloc); Flocculation; Sedimentation; Filtration (Three filters); Stabilisation (Soda Ash) Disinfection (Chlorine gas), and Sludge handling.
	Touw River (Weir)	Ebb & Flow WTW (1.7 MI/d)	Flow measurement (Inflow, Process flow and outflow); Chemical dosing (Soda Ash and U3800 Ultrafloc); Flocculation; Sedimentation; Filtration (Three filters); Stabilisation (Soda Ash) Disinfection (Chlorine gas); and Sludge handling.
Uniondale	Kammanassie River (Weir) and Uniondale Dam	Uniondale WTW (1.5 MI/d)	Flow measurement (Inflow and outflow); Chemical dosing (Soda Ash and U3800 Ultrafloc); Flocculation; Sedimentation; Filtration (Three pressure sand filters); Disinfection (Chlorine gas); and Sludge handling.

A.3.2: Existing Main Water Infrastructure (Resources and WTWs)			
Water Distribution System	Bulk Supply	WTWs and Treatment Processes	
	(Resources)	WTW (Capacity)	Processes
Haarlem	Haarlem Dam	Haarlem WTW (1.0 MI/d)	Flow measurement (Inflow and outflow); Chemical dosing (Soda Ash and U3800 Ultrafloc); Flocculation (mixer); Sedimentation; Filtration (Four pressure sand filters); Disinfection (Sodium Hypochlorite); and Sludge handling.

A.3.3: Existing Main Water Infrastructure (Reticulation, Pump Stations and Reservoirs)						
Water Distribution System	Water Distribution Networks		Number of Water PS		Reservoirs and Water Towers	
	Bulk	Internal	Raw Water	Potable Water	Number of Reservoirs & Water Towers	Total Storage in MI
	km	km	Number of PS	Number of PS		
George / Wilderness	77.516	831.612	6	16	29	63.526
Uniondale	3.276	29.209	-	2	8	1.200
Haarlem	1.143	26.299	-	1	4	2.450
<b>Total George</b>	<b>81.935</b>	<b>887.120</b>	<b>6</b>	<b>19</b>	<b>41</b>	<b>67.176</b>

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

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 and Gravity	
	MI/d	kg COD/d		km	
Gwaing	7.300	6 935	Activated Sludge and BNR	875.965	106
Outeniqua	15.000	15 000	Activated Sludge		
Kleinkrantz	2.500	2 208	Activated Sludge		
Herolds Bay	0.300	210	Oxidation Pond System		
Uniondale	1.000	640	Activated Sludge	10.999	3
Haarlem	0.100	Unknown	Activated Sludge	3.390	1
<b>Total George</b>				<b>891.354</b>	<b>110</b>

The various areas in the George / Wilderness System are almost fully serviced with a conventional waterborne sewer system. A portion of Uniondale is fully serviced with a conventional waterborne sewer system, while the rest of the town is served by septic tanks. The low-income housing development areas of Haarlem are fully serviced with a conventional waterborne sewer system, while the rest of the town is served by septic tanks.

Table A.3.5: Refurbishment Need & O&M Occurrence												
Component	Refurbishment Need				O&M Occurrence				Observation			
	High	Medium	Low	None	Regular	Periodic	Sporadic	None	Dysfunctional	Operational	Prime Condition	Vandalised
Boreholes	0	0	0	3	3	0	0	0	0	0	3	0
Abstraction points	0	0	0	9	9	0	0	0	0	9	0	0
Bulk water pipelines	0	0	3	0	3	0	0	0	0	3	0	0
Reservoirs	0	2	3	36	0	0	41	0	0	40	1	0
Water pump stations	3	1	16	5	25	0	0	0	0	20	5	0
WTW	0	0	3	3	6	0	0	0	0	5	1	0

Table A.3.5: Refurbishment Need &amp; O&amp;M Occurrence

Component	Refurbishment Need				O&M Occurrence				Observation			
	High	Medium	Low	None	Regular	Periodic	Sporadic	None	Dysfunctional	Operational	Prime Condition	Vandalised
Bulk sewer pipelines	0	0	4	0	4	0	0	0	0	4	0	0
Sewer pump stations	0	0	110	0	0	0	110	0	0	110	0	0
WWTW	1	1	0	4	6	0	0	0	0	4	2	0

**Asset Management Plan:** George Municipality has an Asset Unit in place, which handles all matters regarding the financial classification and accounting of/for assets, as required by Section 63 of the MFMA. The Asset Unit falls under the Finance Directorate with the responsibility to ensure all municipal assets are accounted for in accordance with the relevant legislation.

All Departments remain the custodians of the assets under their control and should take the required steps to safeguard, as well as effectively manage and maintain their assets. George Municipality has an Asset Management and Accounting Policy (reviewed annually), which outlines amongst other things the following:

- Roles and responsibilities of various role players – i.e. Directors, CFO, Municipal Manager, Budget Office, Asset Unit, etc.;
- Acquisitions & disposal of assets;
- Verification process relating to assets;
- Financial classification of assets;
- The fixed asset register – required fields, information and layout;
- The useful lives allocated per asset type; and
- All operating procedures relating to Asset Unit functions.

George Municipality updated their current Asset Register during the 2018/2019 financial year. The tables below give an overview of George Municipality's Water and Sewerage assets as included in the Municipality's Asset Register on the 30<sup>th</sup> of June 2019, as received from the Finance Department.

**Water Infrastructure:** The current replacement cost and depreciated replacement cost of the water infrastructure of George Municipality is summarised in the table below (June 2019):

Table A.3.6: Current Replacement Cost and Depreciated Replacement Cost of the Water Infrastructure - June 2019			
Asset Type	Total Cost (CRC)	Book Value (DRC)	% DRC/CRC
Mains	R12 365 305	R6 407 078	51.81%
Meters	R7 802 956	R2 925 373	37.49%
Pipelines	R74 973 954	R44 899 087	59.89%
Pump Stations	R67 527 227	R37 022 384	54.83%
Reservoirs / Tanks	R66 875 514	R54 054 081	80.83%
Supply and Reticulation	R240 855 013	R118 987 747	49.40%
Purification Works	R102 356 375	R57 620 100	56.29%
Plant and Equipment	R48 973 656	R26 821 577	54.77%
<b>Total</b>	<b>R621 730 000</b>	<b>R348 737 427</b>	<b>56.09%</b>

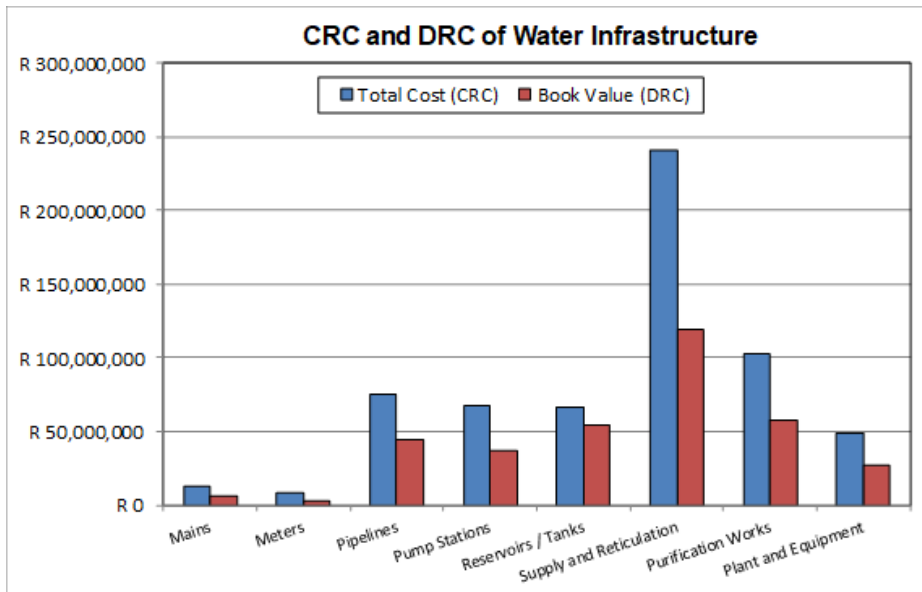


Figure A.3.1: CRC and DRC of the Water Infrastructure

The above table means that 43.91% of the value of the water supply infrastructure has been consumed.

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

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Remaining Useful Life					
Mains	R0	R12 057 084	R308 222	R0	R0
Meters	R1 890 323	R4 669 378	R1 243 256	R0	R0
Pipelines	R1 832 588	R0	R73 141 367	R0	R0
Pump Stations	R7 979 472	R34 883 664	R18 429 957	R6 234 134	R0
Reservoirs / Tanks	R2 233 879	R2 972 388	R14 453 824	R47 215 422	R0
Supply and Reticulation	R34 015 119	R94 402 305	R87 471 861	R24 965 727	R0
Purification Works	R1 050 235	R18 756 269	R74 978 315	R5 584 226	R1 987 329
Plant and Equipment	R24 385 875	R9 609 517	R14 442 672	R438 792	R96 800
<b>Total</b>	<b>R73 387 491</b>	<b>R177 350 605</b>	<b>R284 469 474</b>	<b>R84 438 301</b>	<b>R2 084 129</b>

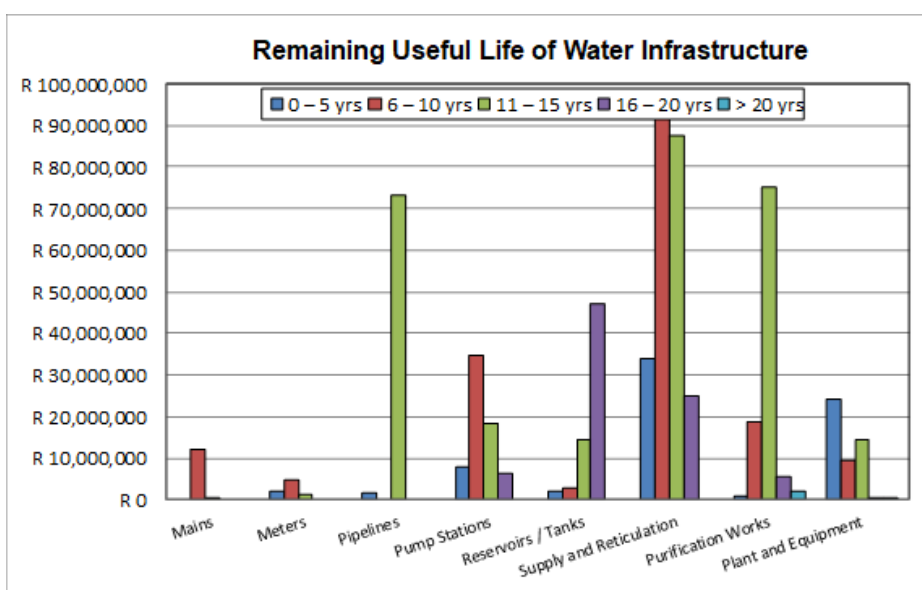


Figure A.3.2: Remaining Useful Life of the Water Infrastructure



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

<b>Table A.3.8: Overview of the Age Distribution by Facility Type for the Water Infrastructure – June 2019 (CRC)</b>					
<b>Asset Type</b>	<b>0 – 5 yrs</b>	<b>6 – 10 yrs</b>	<b>11 – 15 yrs</b>	<b>16 – 20 yrs</b>	<b>&gt; 20 yrs</b>
<b>Age distribution by Facility Type</b>					
Mains	R308 222	R12 049 829	R0	R0	R7 255
Meters	R1 243 256	R3 281 491	R786 790	R2 414 773	R76 647
Pipelines	R1 832 588	R73 141 367	R0	R0	R0
Pump Stations	R11 631 962	R18 503 673	R34 600 334	R2 593 262	R197 996
Reservoirs / Tanks	R47 215 422	R10 777 126	R1 698 483	R1 926 353	R5 258 130
Supply and Reticulation	R32 346 302	R69 902 144	R90 129 287	R17 073 841	R31 403 439
Purification Works	R8 291 202	R70 952 560	R17 962 580	R80 316	R5 069 716
Plant and Equipment	R16 808 032	R22 265 360	R6 589 638	R258 810	R3 051 815
<b>Total</b>	<b>R119 676 986</b>	<b>R280 873 548</b>	<b>R151 767 112</b>	<b>R24 347 355</b>	<b>R45 064 999</b>

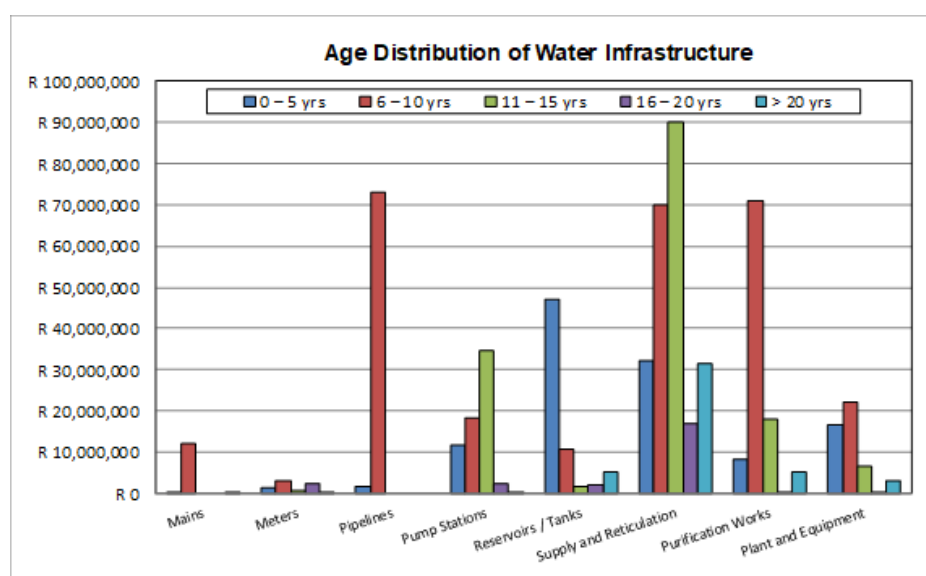


Figure A.3.3: Age Distribution of the Water Infrastructure

The asset renewal needs for the water infrastructure assets over the next 10 years is R25.074 million per year. The reinvestment required is R73.387 million in the first 5 years and R177.351 million in the second 5-year period. The age of 7.25% of the water infrastructure assets is greater than 20 years.

**Sewerage Infrastructure:** The current replacement cost and depreciated replacement cost of the sewerage infrastructure of George Municipality is summarised in the table below (June 2019):

<b>Table A.3.9: Current Replacement Cost and Depreciated Replacement Cost of the Sewerage Infrastructure – June 2019</b>			
<b>Asset Type</b>	<b>Total Cost (CRC)</b>	<b>Book Value (DRC)</b>	<b>% DRC / CRC</b>
Outfall Sewers	R7 169 056	R6 949 738	96.94%
Purification Works	R132 145 131	R110 301 822	83.47%
Pump Stations	R70 573 333	R53 346 028	75.59%
Sewers	R283 175 896	R164 836 255	58.21%
Sludge Machines	R4 791 182	R1 706 575	35.62%
Plant and Equipment	R82 196 624	R47 545 901	57.84%
<b>Totals</b>	<b>R580 051 222</b>	<b>R384 686 319</b>	<b>66.32%</b>

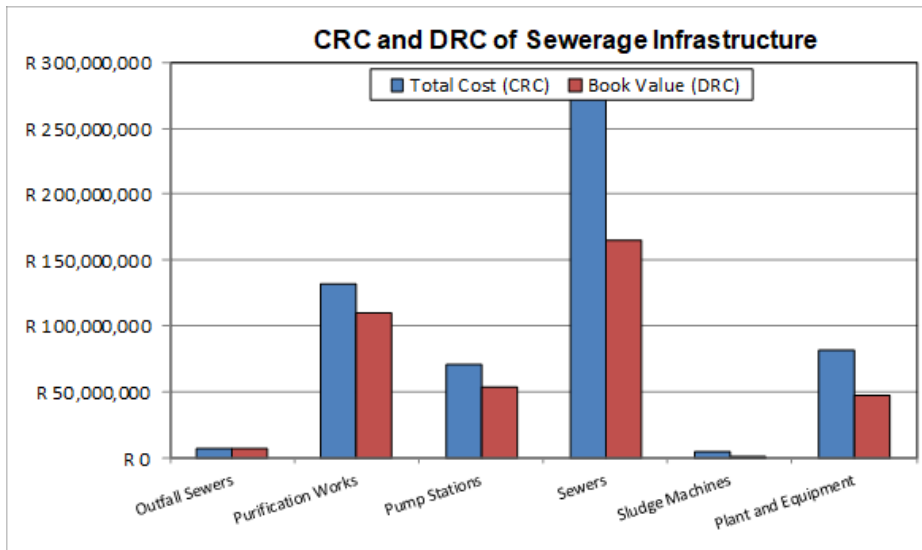


Figure A.3.4: CRC and DRC of the Sewerage Infrastructure

The information in the previous table means that 33.68 % of the value of the sewerage infrastructure has been consumed.

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

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Outfall Sewers	R5 889 100	R148 405	R363 038	R768 512	R0
Purification Works	R45 591 538	R8 732 792	R33 371 310	R43 937 320	R512 172
Pump Stations	R36 681 332	R20 808 039	R6 348 676	R6 229 543	R505 743
Sewers	R36 964 768	R85 085 097	R89 025 884	R72 100 148	R0
Sludge Machines	R0	R3 427 381	R1 363 801	R0	R0
Plant and Equipment	R20 568 284	R26 495 728	R18 255 086	R9 507 362	R7 370 164
<b>Totals</b>	<b>R145 695 021</b>	<b>R144 697 443</b>	<b>R148 727 795</b>	<b>R132 542 885</b>	<b>R8 388 079</b>

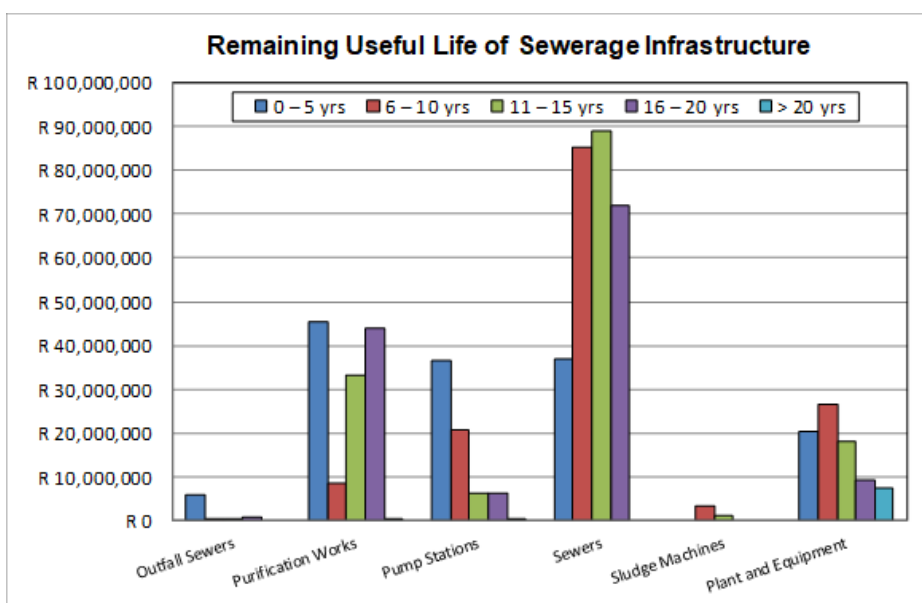


Figure A.3.5: Remaining Useful Life of the Sewerage Infrastructure

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

<b>Asset Type</b>	<b>0 – 5 yrs</b>	<b>6 – 10 yrs</b>	<b>11 – 15 yrs</b>	<b>16 – 20 yrs</b>	<b>&gt; 20 yrs</b>
Outfall Sewers	R6 871 416	R149 233	R148 405	R0	R0
Purification Works	R88 659 376	R33 075 497	R8 969 736	R325 986	R1 114 536
Pump Stations	R44 948 116	R10 423 001	R12 248 385	R1 382 346	R1 571 485
Sewers	R79 228 326	R71 588 248	R78 843 672	R28 707 072	R24 808 578
Sludge Machines	R1 363 801	R0	R0	R0	R3 427 381
Plant and Equipment	R35 448 266	R27 628 021	R13 077 508	R2 716 559	R3 326 272
<b>Totals</b>	<b>R256 519 301</b>	<b>R142 864 000</b>	<b>R113 287 706</b>	<b>R33 131 963</b>	<b>R34 248 252</b>

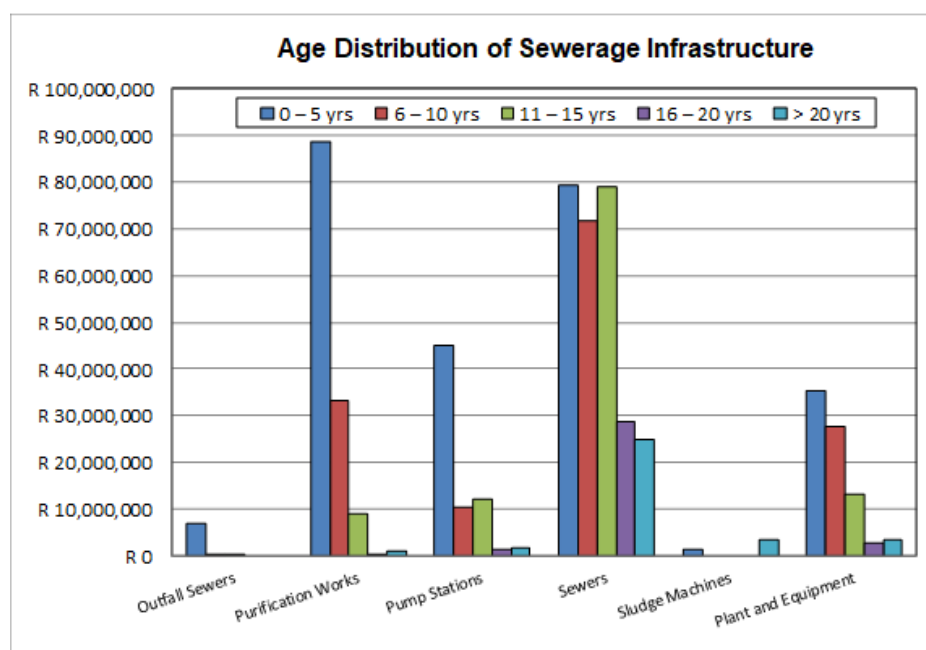


Figure A.3.6: Age Distribution of the Sewerage Infrastructure

The asset renewal needs for the sewerage infrastructure assets over the next 10 years is R29.039 million per year. The reinvestment required is R145.695 million in the first 5 years and R144.697 million in the second 5-year period. The age of 5.9% of the sewerage infrastructure assets is greater than 20 years.

**Disaster Management Plan:** A Disaster Management Policy Framework is in place and the George Municipality Disaster Management Coordinating Committee must implement the policy framework, aimed at ensuring an integrated and common approach to disaster management in George Municipality's Management Area. Individual Departments will be responsible for the compilation and maintenance of their own Departmental Disaster Management Plans. Departmental plans will be considered as integral parts of the Corporate Disaster Management Plan. There is currently a strong emphasis on preparedness and response planning. This means that capacity and planning in terms of mitigation and prevention should be strengthened.

The following were identified as critical Disaster Management issues and should receive priority.

- To utilise and maintain existing and the further development of infrastructure that will effectively satisfy disaster management needs;
- To constantly and orderly identify risks and emergency or potential disaster situations relating to the George Municipality and to evaluate the possible consequences;
- To develop and implement coordinated response and recovery plans to restore normality as rapidly and cost effectively as possible;

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- To develop and implement a training process that involves the acquisition of skills, understanding of concepts, rules and attitudes to increase preparedness to deal effectively with an emergency or potential disaster situation;
- To establish a culture of and creating an understanding of the need for regular evaluation and audit of the disaster management plan;
- To develop and implement a risk mitigation plan to effectively deal with potential losses.

**Untreated Effluent Management Plan:** All effluent discharged in the urban areas in George Municipality are treated at the existing WWTWs and there is no known untreated effluent discharged to the environment. A W<sub>2</sub>RAP was prepared during 2015 for all the wastewater treatment systems.

### TOPIC 4: WATER SERVICES INFRASTRUCTURE MANAGEMENT (O&M)

Maintenance is usually practices 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 George Municipality. O&M is a continuous process for George 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. George 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.

George 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 malfunctioning equipment, vandalism, emergency situations, etc. This allows George 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 readily available in a well-organised store.

Table A.4.1: Operation and Maintenance								
Compliance	Existing Groundwater Infrastructure	Existing Surface Water Infrastructure	Existing WWTW Infrastructure	Existing WTW Infrastructure	Existing Pump Station Infrastructure	Existing Bulk Pipeline Infrastructure	Existing Tower & Reservoir Infrastructure	Existing Reticulation Infrastructure
Resources	Min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement	Above min. requirement
Information	Min. requirement	Min. requirement	Above min. requirement	Above min. requirement	Min. requirement	Min. requirement	Min. requirement	Min. requirement
Activity Control & Management	Min. requirement	Min. requirement	Above min. requirement	Above min. requirement	Min. requirement	Min. requirement	Min. requirement	Min. requirement

## TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

The implementation of George Municipality's WDM Strategy assisted to reduce the overall water requirements of the towns significantly. The overall percentage of NRW was 30.19% (System Input – Revenue Water) and the percentage of Water losses was 24.88% (System Input – Authorised Consumption) for the 2018/2019 financial year. The table below gives a summary of the Treatment Losses, NRW and Water Losses for the various water distribution systems in George Municipality's Management Area.

Table A.5.1: Treatment Losses, NRW and Water Losses for the various water distribution systems							
Description	Component	Unit	Record: Prior (Ml/a)				18/19
			14/15	15/16	16/17	17/18	
George/Wilderness	Treatment Losses	Volume	1 403.163	1 226.708	661.091	1 292.431	1 345.142
		Percentage	11.64%	9.34%	4.95%	10.74%	10.70%
	NRW	Volume	2 489.150	3 340.090	4 179.788	3 302.744	3 312.114
		Percentage	23.38%	28.04%	32.96%	30.75%	29.50%
	Water Losses	Volume	1 928.073	2 750.922	3 583.104	2 704.040	2 703.652
		Percentage	18.11%	23.09%	28.25%	25.18%	24.08%
	ILI		1.78	2.44	3.06	2.28	2.14
Uniondale	Treatment Losses	Volume	19.930	15.899	13.178	13.827	15.054
		Percentage	6.30%	5.27%	4.42%	4.82%	5.14%
	NRW	Volume	112.486	116.115	112.123	100.747	107.445
		Percentage	37.95%	40.64%	39.30%	36.94%	38.66%
	Water Losses	Volume	107.141	110.792	106.800	95.449	100.553
		Percentage	36.15%	38.78%	37.44%	34.99%	36.18%
	ILI		5.00	3.66	3.37	2.96	4.05
Haarlem	Treatment Losses	Volume	31.310	15.111	13.671	18.994	7.545
		Percentage	14.86%	7.26%	6.73%	9.79%	3.87%
	NRW	Volume	96.549	100.920	95.779	93.713	110.344
		Percentage	53.80%	52.26%	50.53%	53.52%	58.91%
	Water Losses	Volume	91.582	95.926	90.792	88.755	104.353
		Percentage	51.03%	49.67%	47.90%	50.69%	55.71%
	ILI		7.01	6.42	6.18	6.05	6.59
TOTAL	NRW	Volume	2 698.185	3 557.125	4 387.690	3 497.204	3 529.903
		Percentage	24.26%	28.71%	33.35%	31.26%	30.19%
	Water Losses	Volume	2 126.796	2 957.639	3 780.696	2 888.244	2 908.558
		Percentage	19.12%	23.87%	28.74%	25.82%	24.88%

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

**Category A** = No specific intervention required.

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

**Category C** = Requires attention

**Category D** = Requires immediate water loss reduction interventions

The Infrastructure Leakage Index (ILI) in the above table is the most recent and preferred performance indicator for comparing leakage from one system to another. It is a non-dimensional index representing the ratio of the current real leakage and the "Unavoidable Annual Real Losses". A high ILI value indicates a poor performance with large potential for improvement while a small ILI value indicates a well-managed system with less scope for improvement. Attaining 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	60%
Day flow metering	Yes	80%
Reticulation leaks	Yes	80%
Illegal connections	Yes	60%
Un-metered connections	Yes	60%
Leak and meter repair programmes. Consumer units targeted by:		
Leak repair assistance programme	Yes	60%
Retro-fitting of water inefficient toilets	Yes	60%
Meter repair programme	Yes	60%
Consumer/end-use demand management: Public Information & Education Programmes		
Schools targeted by education programmes	Yes	40%
Consumers targeted by public information programmes	Yes	80%

A pipeline replacement study was performed for George Municipality's entire water and sewer distribution systems, during March 2018. The project entailed the verification of system data, establishment of a computer model for the pipe replacement network, performing an analysis and reporting. The pipe replacement potential was determined for each of the pipelines in the water and sewer distribution systems by assessing the likelihood of failure (LF) and the consequence of failure (CF). The table below gives an overview of the water and sewer pipeline replacement priorities.

Table A.5.3: Water and Sewer Pipeline Replacement Priorities (March 2018)							
System	Priority	Water Pipelines			Sewer Pipelines		
		Pipe Length		Replacement Cost	Pipe Length		Replacement Cost
		m	%	R	m	%	R
George/Wilderness	0% - 50%	391 268	46.44%	R854 171 289	324 366	37.08%	R669 874 725
Uniondale		32 283	98.81%	R37 260 803	8 199	74.54%	R16 094 028
Haarlem		1 156	4.2%	R1 834 350	0	0%	R0
<b>Total</b>		<b>424 707</b>	<b>47.05%</b>	<b>R893 266 442</b>	<b>332 565</b>	<b>37.40%</b>	<b>R685 968 753</b>
George/Wilderness	50% - 80%	251 898	29.90%	R388 467 731	348 150	39.80%	R605 965 626
Uniondale		388	1.19%	R405 589	2 028	18.44%	R3 130 150
Haarlem		26 345	95.80%	R24 969 532	3 390	100.00%	R6 530 802
<b>Total</b>			<b>30.87%</b>	<b>R413 842 852</b>	<b>353 568</b>	<b>39.77%</b>	<b>R615 626 578</b>
George/Wilderness	80% - 90%	95 682	11.36%	R161 081 075	100 222	11.46%	R162 791 043
Uniondale		0	0%	R0	40	0.36%	R77 652
Haarlem		0	0%	R0	0	0%	R0
<b>Total</b>		<b>95 682</b>	<b>10.60%</b>	<b>R161 081 075</b>	<b>100 262</b>	<b>11.28%</b>	<b>R162 868 695</b>
George/Wilderness	90% - 100%	103 702	12.31%	R158 453 845	101 990	11.66%	R145 525 164
Uniondale		0	0%	R0	732	6.66%	R900 429
Haarlem		0	0%	R0	0	0%	R0
<b>Total</b>		<b>103 702</b>	<b>11.49%</b>	<b>R158 453 845</b>	<b>102 722</b>	<b>11.55%</b>	<b>R146 425 593</b>

The pipeline replacement model will greatly assist the pipe replacement prioritization process as it is completely based on a new scientific approach. By allocating funds to prioritizing those pipes most likely to fail in future, a limited budget can be spent effectively.

The location of pipe failures should in future be recorded preferable with accurate GPS coordinates or directly linked to specific assets. This would enhance the quality of the output of this pipe failure model. It is recommended that this model be used as a primary tool to identify pipes for inspection before replacement and as a secondary tool to replace pipes directly.

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George Municipality's March 2019 "Swift data" indicated the following Billed-, Flat Rate-, No Consumption- and Informal connection counts for the three systems.

Table A.5.4: Billed-, Flat Rate-, No Consumption and Informal Connection Count (March 2019)				
System	Billed	Flat Rate	No Consumption	Informal
George/Wilderness	35 602	888	1 912	63
Uniondale	1 067	0	66	0
Haarlem	482	1	60	4
<b>Total</b>	<b>37 151</b>	<b>889</b>	<b>2 038</b>	<b>67</b>

The table below gives an overview of the large water users over the period April 2018 to March 2019 (AADD > 20 kl/d) in George Municipality, as identified through the Water Master Planning process.

Table A.5.5: Large Water Users over the Period April 2018 to March 2019 (AADD > 20 kl/d)			
Consumer	Address	Suburb Category	AADD (kl/d)
Lancewood Holdings	Ruby Crescent 11	Tamsui	672.216
George Municipality	Rietvlei Street	Uniondale (Area 1)	425.605
Oubaai Homeowners Association	Herolds Bay 406	Oubaai Golf Estate	252.718
Republic of South Africa	Union Street	George Industrial	240.230
Lancewood Holdings	Ruby Crescent 11	Tamsui	119.778
Attacq Retail Fund Pty Ltd	Farms	Garden Route Mall	110.452
Tradelink Dyeing Co. (Pty) Ltd	Industrial Street	George Industrial	109.633
Mr/Ms Van Rensburg Boerdery	Farms	Rural areas	107.885
Nelson Mandela University	Farms	Saasveld	94.595
Streekverteenw.	Gwayang	Fancourt South	92.373
PG Bison Southern Cape (Pty) Ltd	PW Botha Boulevard	Steinhoff Industrial Park	86.488
George Hospital Parking	Davidson Road 106	Heatherlands	65.852
Mediclinic Properties (Pty) Ltd	Gloucester Lane	Central Business District	54.948
Conville Swimming Pool	Ossie Urban Road 1	Sport Park	50.814
Municipality	Jan Meyer Avenue	Herolds Bay	48.510
Accelerate Prop Fund Ltd	Blue Mountain	Garden Route East	43.992
New Sewage Farm	Vaalkom Street	Herolds Bay	42.940
Roelcor George (Pty) Ltd	Rand Street	George Industrial	42.493
Mr/Ms MM Mateza Primary School	Ngcakani Road	Zone 1	39.882
SS Wilderness Resort Hotel	Water side Road Wilderness	Wilderness	39.110
Rosemore Service Centre for Old Age	Attakwa Street	Rosemoore	38.493
Syferfontein Plakkers	Joseph Crescent	Rural areas	38.156
District Road Engineer Province	York Street	CPA area	35.915
SS Meade Gardens	Laing Street	George South	34.137
Heidedal Primary School	Badnall Street	Borcherds	33.863
Department Social Development	Golf Street	Ballotsview	32.649
Tuiniqua Sentrum	Church Street	Bodorp	32.326
SS Bergville	Eight Avenue	Denneoord	32.202
SS Genevafontein Village	Stander Street	Genevafontein	30.630
The waves at Wilderness HOA	Six Avenue Wilderness	Wilderness	29.759
Rouxclean cc	Clay Road 6	George Industrial	29.581
Wilderness Beach Hotel	National Road Wilderness	Wilderness	28.186
Jan van Rensburg Family Trust	Abattoir Road	George Industrial	27.071
Council of Representatives	Courtenay Street 42	Bodorp	26.595
Far Hills Hotel Prop (Pty) Ltd	Farms	Far Hills Hotel	26.460
Tommy Joubert Trust	Meade Street Plaza	Central Business District	25.532
SS King George Golf Suites	George Rex Drive	King George Park	23.874
Department Public Works	Voortrekker Street	Uniondale (Area 1)	23.548
Senior Secondary School Pacaltzodorp	Beach Road 1	Rural areas	22.808
Water Junction Inv Pty Ltd	Long Street 2	Heather Park	22.310



Table A.5.5: Large Water Users over the Period April 2018 to March 2019 (AADD > 20 kl/d)			
Consumer	Address	Suburb Category	AADD (kl/d)
Airports Company SA Soc Ltd	Farms	George Airport	22.255
Department Health (Thembaletu Clinic)	Ngcakani Road	Zone 2	21.540
Mr/Ms Harry Comay Santa Centre	Sandkraal Road	Conville	21.427
Lancelot Terraces Legal Person	Fichat Street	Dormehlsdrift	21.074
Kenntner Wilderness Dune Dev. Pty Ltd	National Road Wilderness	Wilderness	20.323
Carpe Diem	Meade Street	George Industrial	20.208
Oubaai Home Owners Association	Herolds Bay 406	Oubaai Golf Estate	20.022

#### Progress made with the installation of water efficient devices:

Water efficient devices have been installed at all municipal buildings in the municipal area. One of the future WDM measures to be implemented by George Municipality is to include the installation of low flow shower heads, dual flush low flow toilet cisterns and any other measures specified by George Municipality in the Deed of Sales of erven.

### TOPIC 6: WATER RESOURCES

The two tables below give an overview of the current water resources and the potential additional water resources available for the various towns in George Municipality.

Table A.6.1: Water Resources								
Type of source	Source Name	Current abstraction 18/19 (Mm <sup>3</sup> /a)	Components abstraction registered	Components abstraction recorded	* Licensed abstraction (Mm <sup>3</sup> /a)	Community water supply		Assessment Score
						Rural	Urban	
Boreholes	Boreholes	0.000	3	3	Emergency	N/A	100%	80%
Surface Water Abstraction	GRD and Swart River	12.199	2	2	21.330	N/A	100%	80%
	Touw River	0.373	1	1	0.620	N/A	100%	80%
	Kammanassie River	0.293	1	1	0.567	N/A	100%	80%
External Sources (Bulk Purchase)	Haarlem Dam	Incl. Above	1	1	0.130	N/A	100%	80%
	Haarlem Dam	0.195	1	1	0.230	N/A	100%	80%
Conjunctive Use	Groundwater & Surface water	Included above						

Table A.6.2: Additional Sources						
Type of source	Source Name	Number of sources	Potential Volume	* Licensed abstraction (Mm <sup>3</sup> /a)	Assessment Score	
Ground Water	Boreholes	15	4.000	License applications to be submitted when sources are developed	80%	
Surface Water	Malgas Dam	1	2.800		80%	
	Maalgate Dam	1	5.800		80%	
External Sources (Bulk Purchase)	Haarlem Dam	1	The yield of 3 800 MI is split between an allocation of 3 600 MI for irrigation and 230 MI for domestic.		80%	
Other	Reclamation	1	3.650		80%	

**Source Studies:** The municipality is currently busy with the raising of the Garden Route dam spillway by 2.5 metres, which will increase the storage capacity by approximately 25% to 12.5 million m<sup>3</sup>. The construction work on the dam wall and spillway area started on 13 May 2019.



Table A.6.3: Monitoring		
Monitoring	Assessment Score	
% of water abstracted monitored: Surface water	80%	
% of water abstracted monitored: Ground water	80%	
Monitoring	Interval	Assessment Score
Surface water levels (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily	60%
Ground water levels (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily	60%
Water quality for formal schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily	80%
Water quality for rudimentary schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Never	40%
Borehole abstraction? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	Daily	60%

The graph below gives an overview of George Municipality's total annual bulk raw water requirements. The impact of the droughts on George Municipality's water requirements can be noted on the graph.

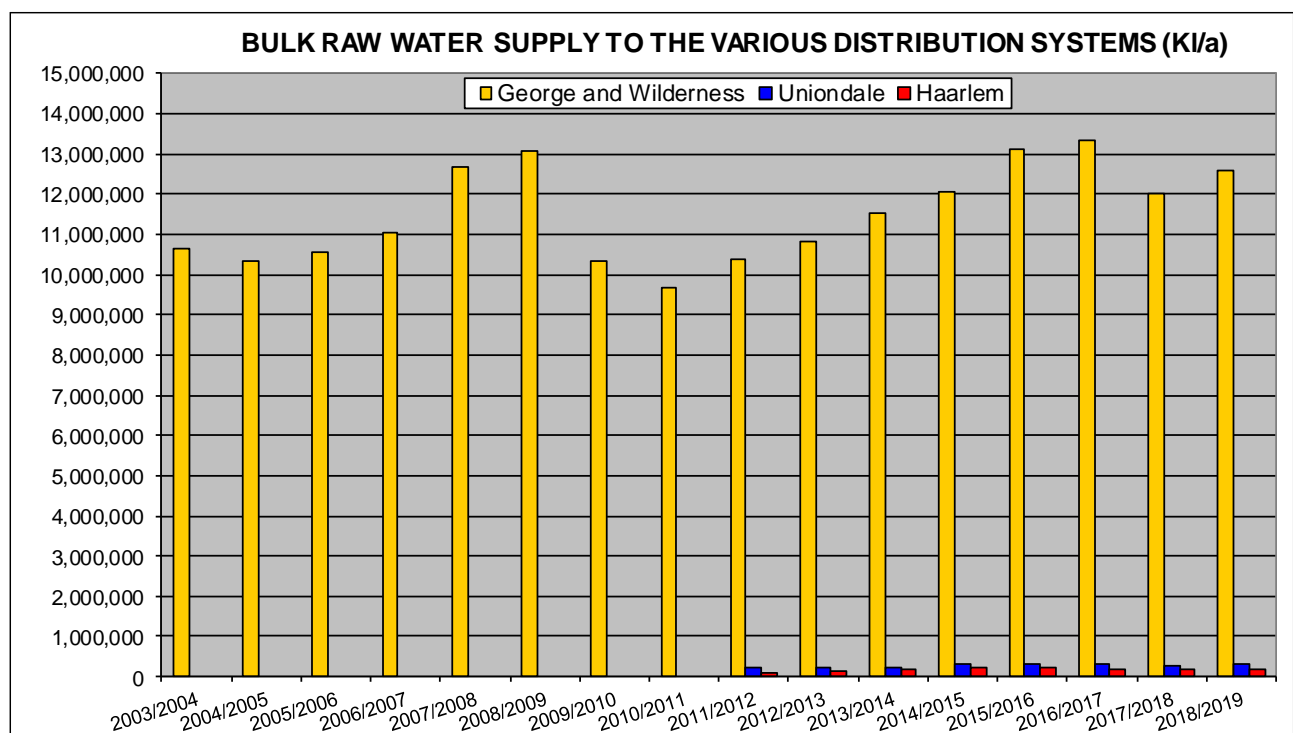


Figure A.6.1: Bulk Raw Water Supply to the Various Distribution Systems

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

Table A.6.4: Bulk Water Supply to the Various Towns							
Distribution System	Source	Record : Prior (MI/a)					18/19
		13/14	14/15	15/16	16/17	17/18	
George / Wilderness	Swart and Kaaimans Rivers (GRD)	11 177.349	11 557.084	12 781.539	12 825.832	11 472.853	12 198.833
	Touw River	300.680	400.345	357.273	343.092	327.185	373.408
	Groundwater	70.265	92.424	0.000	174.346	232.461	0.000
Sub Total		11 548.294	12 049.853	13 138.812	13 343.270	12 032.499	12 572.241
Uniondale	Haarlem Dam and Kammanassie River	226.366	316.304	301.614	298.451	286.582	292.995
Haarlem	Haarlem Dam	191.801	210.763	208.222	203.230	194.084	194.853
<b>Total Supply to all towns</b>		<b>11 966.461</b>	<b>12 576.920</b>	<b>13 648.648</b>	<b>13 844.951</b>	<b>12 513.165</b>	<b>13 060.089</b>

**Water Quality:** Operational and Compliance Water Quality Monitoring Programmes are implemented by George Municipality. Operational sampling is done on a frequent basis by the Process Controllers at the various WTWs and by George Municipality's own Laboratory. Compliance monitoring is also done by George Municipality's Laboratory. 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.

<b>Table A.6.5: Water Quality</b>			
<b>Water Quality</b>	<b>In place</b>	<b>Status Quo</b>	<b>Assessment Score</b>
Reporting on quality of water taken from source: urban & rural	Yes	80%	80%
Quality of water returned to the resource: urban	Yes	80%	80%
Quality of water returned to the resource: rural	No	Not applicable	80%
Is there a Pollution contingency measures plan in place?	Yes	60%	60%
Quality of water taken from source: urban - % monitored by WSA self?	Yes	80%	80%
Quality of water taken from source: rural - % monitored by WSA self?	No	Not applicable	80%
Quality of water returned to the source: urban - % monitored by WSA self?	Yes	80%	80%
Quality of water returned to the source: rural - % monitored by WSA self?	No	Not applicable	80%
Are these results available in electronic format? (Yes/no)	Yes	80%	80%
% Time (days) within SANS 241 standards per year	Yes	80%	80%
Abstraction IS registered with DWS	Yes	80%	80%
The abstraction IS NOT registered with DWS	-	-	-
The abstraction IS recorded	Yes	80%	80%
The abstraction IS NOT recorded	-	-	-

The overall percentage of compliance of the water quality samples taken over the period July to June for the last two financial years is summarised in the table below per distribution system (SANS 241: 2015 Limits).

<b>Table A.6.6: Percentage Compliance of the Water Quality Samples for the Last Two Financial Years</b>				
<b>Performance Indicator</b>	<b>Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)</b>		<b>% Sample Compliance according to SANS 241-2015 Limits</b>	
	<b>18/19</b>	<b>17/18</b>	<b>18/19</b>	<b>17/18</b>
<b>George</b>				
Acute Health Microbiological	No (Excellent)	No (Excellent)	100.0%	100.0%
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%
Chronic Health	No (Excellent)	No (Excellent)	100.0%	100.0%
Aesthetic	No (Excellent)	No (Excellent)	99.9%	99.5%
Operational Efficiency	No (Excellent)	No (Excellent)	100.0%	99.4%
<b>Wilderness</b>				
Acute Health Microbiological	No (Excellent)	No (Excellent)	100.0%	98.5%
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%
Chronic Health	No (Excellent)	No (Excellent)	99.8%	100.0%
Aesthetic	No (Excellent)	No (Excellent)	100.0%	98.4%
Operational Efficiency	No (Excellent)	No (Excellent)	99.5%	97.3%
<b>Uniondale</b>				
Acute Health Microbiological	No (Excellent)	No (Excellent)	100.0%	100.0%
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%
Chronic Health	No (Excellent)	No (Excellent)	100.0%	99.4%
Aesthetic	No (Excellent)	No (Excellent)	99.7%	95.6%
Operational Efficiency	No (Excellent)	No (Good)	94.9%	92.9%
<b>Haarlem</b>				
Acute Health Microbiological	No (Excellent)	No (Excellent)	100.0%	100.0%
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%
Chronic Health	No (Excellent)	No (Excellent)	100.0%	99.5%
Aesthetic	No (Excellent)	Yes (Unacceptable)	97.4%	89.0%
Operational Efficiency	No (Excellent)	Yes (Unacceptable)	95.3%	85.0%

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:

<b>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</b>	
<b>Category</b>	<b>Risk</b>
Acute Health	Determinand that poses an immediate unacceptable health risk if present at concentration values exceeding the numerical limits specified in this part of SANS 241.
Aesthetic	Determinand that taints water with respect to taste, odour and colour and that does not pose an unacceptable health risk if present at concentration values exceeding the numerical limits specified in SANS 241.
Chronic Health	Determinand that poses an unacceptable health risk if ingested over an extended period if present at concentration values exceeding the numerical limits specified in SANS 241.
Operational	Determinand that is essential for assessing the efficient operation of treatment systems and risks from infrastructure

The table below indicates the compliance of the E.Coli monitoring frequency in the water distribution systems of George Municipality, in terms of the minimum requirements of SANS:241-2: 2015 (Table 2). The period assessed was for samples taken from July 2018 to June 2019.

<b>Table A.6.8: George 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).</b>			
<b>Distribution System</b>	<b>Population served</b>	<b>Required number of monthly samples (SANS 241-2:2015: Table 2)</b>	<b>Number of monthly E.Coli samples taken by Municipality during 2018/2019 *</b>
George and Wilderness	199 907	40	46.3
Uniondale **	5 379	2	12.4
Haarlem **	2 547	2	8.3

Note: \* Include samples taken at the WTW

It can be noted from the above table that the number of monthly E.Coli samples taken over the last financial year for the George/Wilderness, Uniondale and Haarlem distribution systems were adequate.

**Effluent quality:** A comprehensive Wastewater Quality Sampling Programme is in place and implemented by George Municipality. The overall percentage compliance of the final effluent samples taken over the period July to June for the last two financial years, at the Outeniqua, Gwaing, Kleinkrantz, Herolds Bay, Uniondale and Haarlem WWTWs, are summarised in the table below.

<b>Table A.6.9: Percentage Microbiological (E.Coli) Compliance of the Compliance Samples Taken at the Various WWTWs for the Last Two Financial Years</b>		
<b>WWTW</b>	<b>2018/2019</b>	<b>2017/2018</b>
Outeniqua	58.3%	78.7%
Gwaing	85.4%	89.8%
Kleinkrantz	89.8%	91.7%
Herolds Bay	100.0%	100.0%
Uniondale	83.3%	100.0%
Haarlem	100.0%	100.0%
<b>Total</b>	<b>86.2%</b>	<b>93.5%</b>

**Table A.6.10: Percentage Chemical Compliance of the Compliance Samples Taken at the Various WWTWs for the Last Two Financial Years**

WWTW	2018/2019					2017/2018				
	Ammonia	Nitrites & Nitrates	COD	Ortho-Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho-Phosphate	Overall
Outeniqua	14.6%	100.0%	6.3%	100.0%	<b>55.2%</b>	48.9%	100.0%	40.4%	97.9%	<b>71.8%</b>
Gwaing	91.7%	100.0%	87.5%	97.9%	<b>94.3%</b>	100.0%	100.0%	100.0%	100.0%	<b>100.0%</b>
Kleinkrantz	73.5%	100.0%	100.0%	95.9%	<b>92.3%</b>	93.8%	100.0%	95.8%	95.8%	<b>96.3%</b>
Herolds Bay	N/A	N/A	100.0%	N/A	<b>100.0%</b>	N/A	N/A	100.0%	N/A	<b>100.0%</b>
Uniondale	N/A	N/A	100.0%	N/A	<b>100.0%</b>	N/A	N/A	100.0%	N/A	<b>100.0%</b>
Haarlem	N/A	N/A	100.0%	N/A	<b>100.0%</b>	N/A	N/A	100.0%	N/A	<b>100.0%</b>
<b>Total</b>	<b>60.0%</b>	<b>100.0%</b>	<b>82.4%</b>	<b>97.9%</b>	<b>84.5%</b>	<b>81.3%</b>	<b>100.0%</b>	<b>89.7%</b>	<b>97.9%</b>	<b>91.7%</b>

**Table A.6.11: Percentage Physical Compliance of the Compliance Samples Taken at the Various WWTWs for the Last Two Financial Years**

WWTW	2018/2019				2017/2018			
	pH	Electrical Conductivity	Suspended Solids	Overall	pH	Electrical Conductivity	Suspended Solids	Overall
Outeniqua	100.0%	8.3%	56.3%	<b>54.9%</b>	100.0%	6.4%	70.2%	<b>58.9%</b>
Gwaing	100.0%	81.3%	52.1%	<b>77.8%</b>	100.0%	59.2%	98.0%	<b>85.7%</b>
Kleinkrantz	100.0%	100.0%	63.3%	<b>87.8%</b>	100.0%	100.0%	100.0%	<b>100.0%</b>
Herolds Bay	91.7%	100.0%	N/A	<b>95.8%</b>	98.0%	100.0%	N/A	<b>99.0%</b>
Uniondale	100.0%	100.0%	N/A	<b>100.0%</b>	100.0%	100.0%	N/A	<b>100.0%</b>
Haarlem	100.0%	100.0%	N/A	<b>100.0%</b>	100.0%	100.0%	N/A	<b>100.0%</b>
<b>Total</b>	<b>98.6%</b>	<b>81.7%</b>	<b>57.2%</b>	<b>83.5%</b>	<b>99.7%</b>	<b>78.0%</b>	<b>89.6%</b>	<b>89.0%</b>

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

**Table A.6.12: Trend of Microbiological, Chemical and Physical Compliance Percentages for the various WWTWs.**

WWTW	2013/2014 to 2014/2015			2014/2015 to 2015/2016			2015/2016 to 2017/2018		
	Micro.	Chemical	Physical	Micro.	Chemical	Physical	Micro.	Chemical	Physical
Outeniqua	Increase	Decrease	Increase	Increase	Increase	Decrease	Decrease	Decrease	Decrease
Gwaing	Increase	Increase	Decrease	Increase	Decrease	Decrease	Decrease	Increase	Decrease
Kleinkrantz	Decrease	Decrease	Decrease	Decrease	Increase	Increase	Increase	Increase	Increase
Herolds Bay	Same	Increase	Decrease	Same	Same	Increase	Same	Same	Increase
Uniondale	Same	Same	Increase	Same	Same	Increase	Same	Same	Increase
Haarlem	Same	Same	Increase	Same	Same	Same	Same	Same	Same
<b>Overall</b>	<b>Increase</b>	<b>Increase</b>	<b>Decrease</b>	<b>Increase</b>	<b>Increase</b>	<b>Decrease</b>	<b>Decrease</b>	<b>Decrease</b>	<b>Decrease</b>

**Industrial Consumers:** All industrial effluent discharge into the sewer system of George Municipality is monitored through a comprehensive quality sampling programme. Water Services By-laws, with regard to the discharge of industrial effluent into the sewer system, are also in place and all industrial consumers formally apply for the discharge of industrial effluent into the sewer system.

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

Table A.6.13: Compliance Percentages of Industrial Effluent Discharged by Industrial Consumers per Parameter									
Industrial Consumer	pH	COD	EC	Caustic Alkalinity	Chloride	Settable Solids	Suspended Solids	Total Dissolved Solids	Average Compliance
<b>2018/2019</b>									
Lancewood Holdings 1	39.6%	29.2%	35.4%	97.9%	81.3%	100.0%	41.7%	93.8%	<b>64.8%</b>
Milchem	95.8%	12.5%	0.0%	70.8%	91.7%	100.0%	54.2%	4.2%	<b>53.6%</b>
SAB (Rob Roy)	100.0%	98.0%	100.0%	100.0%	100.0%	100.0%	98.0%	100.0%	<b>99.5%</b>
Watson Baconeries	100.0%	91.7%	77.1%	100.0%	81.3%	100.0%	89.6%	97.9%	<b>92.2%</b>
Nova Feeds	95.9%	98.0%	28.6%	100.0%	40.8%	98.0%	89.8%	65.3%	<b>77.0%</b>
Hartman 1	85.4%	44.9%	93.9%	100.0%	95.9%	95.9%	55.1%	100.0%	<b>83.9%</b>
Mr Meat	40.0%	100.0%	60.0%	100.0%	60.0%	100.0%	100.0%	100.0%	<b>82.5%</b>
Van Rensburg	82.1%	97.4%	48.7%	100.0%	56.4%	100.0%	94.9%	87.2%	<b>83.3%</b>
Tradelink	70.8%	95.8%	37.5%	100.0%	100.0%	100.0%	85.4%	97.9%	<b>85.9%</b>
Roelcor	97.7%	70.5%	90.9%	100.0%	95.5%	90.9%	63.6%	97.7%	<b>88.4%</b>
ACSA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	<b>100.0%</b>
<b>2017/2018</b>									
Lancewood Holdings 1	36.7%	18.4%	20.4%	98.0%	73.5%	98.0%	57.1%	87.8%	<b>61.2%</b>
Milchem	100.0%	4.2%	0.0%	75.0%	79.2%	100.0%	100.0%	12.5%	<b>58.9%</b>
SAB (Rob Roy)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	<b>100.0%</b>
Watson Baconeries	93.8%	83.3%	66.7%	97.9%	81.3%	95.8%	83.3%	93.8%	<b>87.0%</b>
Nova Feeds	83.7%	100.0%	46.9%	98.0%	63.3%	100.0%	98.0%	71.4%	<b>82.7%</b>
Hartman 1	79.6%	32.7%	69.4%	95.9%	98.0%	93.9%	71.4%	98.0%	<b>79.8%</b>
Mr Meat	75.0%	87.5%	50.0%	100.0%	56.3%	100.0%	93.8%	75.0%	<b>79.7%</b>
Van Rensburg	50.0%	75.0%	25.0%	100.0%	75.0%	100.0%	100.0%	50.0%	<b>71.9%</b>
Tradelink	68.8%	91.7%	47.9%	100.0%	100.0%	100.0%	97.9%	95.8%	<b>87.8%</b>
Roelcor	98.0%	59.2%	81.6%	95.9%	95.9%	83.7%	59.2%	98.0%	<b>83.9%</b>
ACSA	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	<b>100.0%</b>

## TOPIC 7: FINANCIAL

**Capital Budget:** The table below gives an overview of George 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
2012/2013	R35 987 518	R30 342 707	84.3	R43 112 025	R37 089 187	86.0
2013/2014	R11 154 994	R10 772 238	96.6	R55 869 206	R48 462 515	86.7
2014/2015	R7 628 511	R4 550 764	59.7	R56 842 375	R57 725 237	101.6
2015/2016	R22 516 000	R13 472 685	59.8	R33 677 840	R26 259 645	78.0
2016/2017	R46 009 583	R40 608 035	88.3	R37 250 207	R25 511 398	68.5
2017/2018	R41 479 680	R29 167 856	70.3	R61 068 000	R48 863 080	80.0
2018/2019	R34 630 368	R18 067 322	52.2	R63 609 559	R46 726 826	73.5

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

Table A.7.2: Summary of Operational and Maintenance Budget for Water and Sewerage Services for the Last Six Financial Years						
Description	Record Prior (R)					2018/2019
	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	
Water Services (Water Purification – 835, Water Distribution – 848 and Filtration Plant 836)						
Expenditure	R111 698 298-00	R147 374 715-38	R162 513 481-63	R156 579 182-18	R143 652 745-22	R138 338 735-94
Income	(R117 924 586-00)	(R157 286 219-13)	(R180 355 084-33)	(R190 482 436-29)	(R185 383 256-41)	(R184 272 622-48)
(Surplus) / Deficit before Appropriations	(R6 226 288-00)	(R9 911 503-75)	(R17 841 602-70)	(R33 903 254-11)	(R41 730 511-19)	(R45 933 886-54)
Appropriations	(R9 244 093-00)	(R7 591 394-65)	(R8 302 841-12)	(R0-00)	(R0-00)	(R0-00)
(Surplus) / Deficit after Appropriations	(R15 470 381-00)	(R17 502 898-40)	(R26 144 443-82)	(R33 903 254-11)	(R41 730 511-19)	(R45 933 886-54)
Sewerage Services (Sewerage Mainlines & Pump Stations – 521, Water Contamination Control – 563, Laboratory Services - 564)						
Expenditure	R110 075 084-00	R124 715 430-54	R129 773 796-05	R121 700 554-74	R118 396 714-10	R122 998 634-24
Income	(R163 188 053-00)	(R184 996 829-11)	(R160 476 846-35)	(R150 147 272-03)	(R199 193 935-36)	(R163 630 675-62)
(Surplus) / Deficit before Appropriations	(R53 112 969-00)	(R60 281 398-57)	(R30 703 050-30)	(R28 446 717-29)	(R80 797 221-26)	(R40 632 041-38)
Appropriations	R30 497 447-00	R45 317 730-14	R14 915 063-92	(R0-00)	(R0-00)	(R0-00)
(Surplus) / Deficit after Appropriations	(R22 615 522-00)	(R14 963 668-43)	(R15 787 986-38)	(R28 446 717-29)	(R80 797 221-26)	(R40 632 041-38)

**Tariff and Charges:** The first six (6) kl of water is provided free to all residential consumers. George Municipality's tariffs support the viability and sustainability of water supply services to the poor through cross-subsidies (where feasible). Free basic water and sanitation services are linked to the Municipality's Indigent Policy and all indigent households therefore receive free basic water and sanitation services.

George Municipality's current six (6) block step tariff system discourages the wasteful or inefficient use of water. It is expected that this tariff structure will continue to be applied in the future. The sustainable supply of potable water is however becoming an ever-increasing challenge. This scarce commodity has to be optimally managed. The continued increase in the price of electricity and chemicals for purification has contributed to the cost of delivering the service. The water usage block tariff has been structured for a basic affordable tariff for up to 20 kl per household per month. Punitive tariffs are in place for excessive water consumption.

George Municipality's 2018/2019 water and sewer tariffs are based on the following:

- A six block step rising residential water tariff structure with the first 6 kl/month being free to all residential households. The step rising tariff structure adequately discourages the wasteful or inefficient use of water.
- Water tariffs for all Industrial and Business consumers, with a consumption < 100kl / day consist also of a six block step rising tariff structure with no free basic water.
- Three level emergency water tariffs are also in place for drought periods.
- The sewer tariffs are still linked to the area of the respective property (Basic charges and charges for properties connected to the sewerage system). A separate sewer tariff is also charged for sewerage removals (Suction tank services).

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

The water tariff structures for George Municipality for the 2018/2019 financial year and the previous four financial years are summarised in the table below (Subject to 15% VAT).

Table A.7.3: Water Tariffs for George and Wilderness for the Last Five Financial Years						
Consumer/Description (Tariff Code)	Category	14/15	15/16	16/17	17/18	18/19
<u>Rising Block Tariffs are applicable to all consumers excluding:</u> 1) Schools, Colleges, Technicons and Universities 2) Children's Homes 3) Crèches 4) Sport Bodies 5) Old Age Homes 6) Nelson Mandela Campus at Saasveld 7) Churches and Church Buildings 8) Welfare Organizations 9) Municipal Directorates						
Block Tariff: Basic Tariff per meter per month, or where more than one consumer is served through the same meter, cost per consumer per month		R63-45	R67-89	R72-64	R78-45	R84-73
Block Tariff: Domestic and Domestic Indigent (1400, 1401)	0 – 6 KI	R0-00	R0-00	R0-00	R0-00	R0-00
	>6 – 12 KI	R11-11	R11-89	R12-72	R13-74	R14-84
	>12 – 15 KI	R12-79	R13-69	R14-65	R15-82	
	>15 – 20 KI					R17-09
	>20 – 30 KI	R15-34	R16-41	R17-56	R18-96	R20-48
	>30 – 50 KI	R18-41	R19-70	R21-08	R22-77	R24-59
	> 50 KI	R21-00	R22-47	R24-04	R25-96	R28-04
Block Tariff: Industries / Businesses with consumption < 100 kl per day (1402)	0 – 6 KI	R11-11	R11-89	R12-72	R13-74	R14-84
	>6 – 12 KI	R11-11	R11-89	R12-72	R13-74	R14-84
	>12 – 15 KI	R12-79	R13-69	R14-65	R15-82	
	>15 – 20 KI					R17-09
	>20 – 30 KI	R15-34	R16-41	R17-56	R18-96	R20-48
	>30 – 50 KI	R16-83	R18-01	R19-27	R20-81	R22-47
	> 50 KI	R18-41	R19-70	R21-08	R22-77	R24-59
Sport Bodies (1403)	Minimum charge per meter per month	R134-00	R143-38	R153-42	R165-69	R178-95
	Water consumption per KI	R11-11	R11-89	R12-72	R13-74	R14-84
Industries and businesses with a consumption of > 100 kl per day (1404)	Minimum charge per meter per month	R134-00	R143-38	R153-42	R165-69	R178-95
	Water consumption per KI	R12-23	R13-09	R14-01	R15-13	R16-34
Domestic consumers with no meter (1406)	Minimum charge	R63-45	R67-89	R72-64	R78-45	R84-73
Children's and Old Age Homes / Crèches (1414)	Minimum charge	R134-00	R143-38	R153-42	R165-69	R178-95
	Water consumption per KI	R11-11	R11-89	R12-72	R13-74	R14-84
Schools, Colleges, Technicons and Universities (1415)	Minimum charge	R134-00	R143-38	R153-42	R165-69	R178-95
	Water consumption per KI	R11-11	R11-89	R12-72	R13-74	R14-84
Sports fields and facilities (1416)	Water consumption per KI	R11-11	R11-89	R12-72	R13-74	R14-84
Welfare organizations (1417)	Minimum charge	R134-00	R143-38	R153-42	R165-69	R178-95
	Water consumption per KI	R11-11	R11-89	R12-72	R13-74	R14-84
Municipal Directorates, including Garden Route Botanical Garden (1410, 1418)	Minimum charge	R134-00	R143-38	R153-42	R165-69	R178-95
	Water consumption per KI	R11-11	R11-89	R12-72	R13-74	R14-84
Churches and Church Buildings (1419)	Minimum charge	R134-00	R143-38	R153-42	R165-69	R178-95
	Water consumption per KI	R11-11	R11-89	R12-72	R13-74	R14-84
Delivery of water with a tanker	Delivery costs per 8 KI or part thereof	R474-72	R507-95	R543-51	R586-99	R633-95
	Cost of water per 1 KI	R11-11	R11-89	R12-72	R13-74	R14-84



## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

**Table A.7.3: Water Tariffs for George and Wilderness for the Last Five Financial Years**

Consumer/Description (Tariff Code)	Category	14/15	15/16	16/17	17/18	18/19
Connection Fees	For a 20mm connection	R2 087-72	R2 213-16	R2 368-42	R2 510-53	R2 660-87
	For a 20mm connection where only a water meter is supplied	R1 473-68	R1 562-28	R1 671-93	R1 771-93	R1 878-26
	For a 25mm connection	R3 393-86	R3 597-37	R3 849-12	R4 079-82	R4 324-35
	For a 40mm connection	R7 928-95	R8 404-39	R8 992-98	R9 532-46	R10 104-35
	For a 50mm connection	R9 099-12	R9 644-74	R10 320-18	R10 939-47	R11 595-65
	For a 75mm connection	R14 535-09	R15 407-02	R16 485-09	R17 474-56	R18 522-61
Testing of meters	Cost per meter on request of an owner	R257-02	R272-81	R292-11	R309-65	R328-23
Special meter readings	Office hours	R93-86	R99-12	R106-14	R112-28	R119-02
After hour meter readings	Where access cannot be gained during normal working hours.	R52-63	R56-14	R59-65	R63-16	R66-95
	For audit purposes where consumers normally provide their own readings.	R52-63	R56-14	R59-65	R63-16	R66-95
Reconnection and disconnection	Current and new consumers	R93-86	R99-12	R106-14	R112-28	R119-02
	Tampering: Cost (including cost of new meter) and Fine	R2 140-00 + R300 Fine	R2 268-00 + R300 Fine	R2 427-00 + R300 Fine	R2 572-81 + R300 Fine	R2 727-18 + R300 Fine
	Non Payment: Delivery of final notices in respect of outstanding accounts	R35-09	R36-84	R39-47	R42-11	R44-64
	Non Payment: Admission of guilt and arrangements for payment of accounts	R71-05	R75-44	R80-70	R85-96	R91-12
	Disconnection of services Office Hours	R93-86	R99-12	R106-14	R112-28	R119-02
	Reconnection of services Office Hours	R93-86	R99-12	R106-14	R112-28	R119-02
	Reconnection of services After Hours	R112-28	R119-30	R128-07	R135-96	R144-12
Repairs to a damaged water connection		R336-84	R357-02	R381-58	R404-39	R428-65
To re-position a water meter (within a radius of one metre)		R611-40	R648-25	R693-86	R735-09	R779-20
To adjust the height of a water meter		R268-42	R284-21	R304-39	R322-81	R342-18
Replace an existing water meter with a meter in a plastic box		R1 081-58	R1 146-49	R1 226-32	R1 300-00	R1 378-00
Locating of water meter		R268-42	R284-21	R304-39	R322-81	R342-18
Replacement of an existing water meter with a flow control device		R1 869-30	R1 981-58	R2 120-18	R2 247-37	R2 382-21
Installation of a new 20 mm water connection with a flow control device		R3 064-91	R3 249-12	R3 476-32	R3 685-09	R3 906-20

**Table A.7.4: Basic Availability Charge Applicable to all Vacant Erven for the Last Five Financial Years**

Consumer/Description	14/15	15/16	16/17	17/18	18/19
Erven without improvements larger than 1 200m <sup>2</sup> (2301)	R1 494-33 + R14-22 / 100m <sup>2</sup> or part thereof calculated on portion of the erf in excess of 1 200m <sup>2</sup> to a max. R4 167-69	R1 613-88 + R15-36 per 100m <sup>2</sup> or part thereof calculated on portion of the erf in excess of 1 200m <sup>2</sup> to a max. of R4 501-56	R1 726-85 + R16-44 per 100m <sup>2</sup> or part thereof calculated on portion of the erf in excess of 1 200m <sup>2</sup> to a max. of R4 817-57	Basic min. charge of R155-42 + R1-48 per 100m <sup>2</sup> or part thereof calculated on portion of the erf in excess of 1 200m <sup>2</sup> to a max. of R433-66	Basic min. charge of R167-85 + R1-60 per 100m <sup>2</sup> or part thereof calculated on portion of the erf in excess of 1 200m <sup>2</sup> to a max. of R468-65
Housing Schemes (2306): Basic minimum charge per household per month	-	R68-53	R73-33	R79-20	R85-54



## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

**Table A.7.4: Basic Availability Charge Applicable to all Vacant Erven for the Last Five Financial Years**

Consumer/Description	14/15	15/16	16/17	17/18	18/19
Erven with improvements (Excluding schools) (2302)	R14-22 / 100m <sup>2</sup> or part thereof calculated on portion of erf > 2500m <sup>2</sup> to a max. R2 488-50	R15-22 / 100m <sup>2</sup> or part thereof calculated on portion of erf > 2500m <sup>2</sup> to a max. R2 663-50	R16-29 / 100m <sup>2</sup> or part thereof calculated on portion of erf > 2500m <sup>2</sup> to a max. R2 850-75	-	-
Glenwood: Erven without improvements < 5 000m <sup>2</sup>	R1 494-33 + R14-22 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 5000m <sup>2</sup> to a max. R2 916-33	-	-	-	-
Erven without improvements > 5 000m <sup>2</sup> (2304)	R1 494-33 + R14-22 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 10000m <sup>2</sup> to a max. R2 916-33	R1 613-88 + R15-36 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 5000m <sup>2</sup> to a max. R3 149-88	R1 726-85 + R16-44 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 5000m <sup>2</sup> to a max. R3 370-85	R155-42+ R1-48 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 5000m <sup>2</sup> to a max. R303-42	R167-85 + R1-60 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 5000m <sup>2</sup> to a max. R327-85
Glenwood: Erven with improvements < 5 000m <sup>2</sup>	R14-22 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 5 000m <sup>2</sup> to a max. R1 422-00	-	-	-	-
Glenwood: Erven with improvements > 5 000m <sup>2</sup> (2305)	R14-22 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 10 000m <sup>2</sup> to a max. R1 422-00	R15-22 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 5 000m <sup>2</sup> to a max. R1 522-00	R16-29 / 100m <sup>2</sup> or part thereof calculated on portion of property that exceeds 5 000m <sup>2</sup> to a max. R1 629-00	-	-

**Table A.7.5: Water Tariffs for Uniondale and Haarlem for the Last Five Financial Years**

Consumer/Description	Category	14/15	15/16	16/17	17/18	18/19
Block Tariff: Basic Tariff per meter per month, or where more than one consumer is served through the same meter, cost per consumer per month		R35-97	R38-49	R41-18	R44-47	R48-03
Domestic: Indigent Household Tariff Code – Haarlem: 1470 Uniondale: 1450	0 – 6 KI	R0-00	R0-00	R0-00	R0-00	R0-00
	>6 – 12 KI	R4-94	R5-29	R5-66	R6-11	R6-60
	>12 – 20 KI	R5-67	R6-07	R6-49	R7-01	R7-57
	>20 – 30 KI	R6-81	R7-29	R7-80	R8-42	R9-09
	>30 – 50 KI	R8-16	R8-73	R9-34	R10-09	R10-90
	> 50 KI	R9-32	R9-97	R10-67	R11-52	R12-44
Domestic Tariff Code – Haarlem: 1471 Uniondale: 1451	0 – 6 KI	R0-00	R0-00	R0-00	R0-00	R0-00
	>6 – 12 KI	R4-94	R5-29	R5-66	R6-11	R6-60
	>12 – 20 KI	R5-67	R6-07	R6-49	R7-01	R7-57
	>20 – 30 KI	R6-81	R7-29	R7-80	R8-42	R9-09
	>30 – 50 KI	R8-16	R8-73	R9-34	R10-09	R10-90
	> 50 KI	R9-32	R9-97	R10-67	R11-52	R12-44
Industries / Businesses Tariff Code – Haarlem: 1472 Uniondale: 1452	0 – 6 KI	R4-94	R5-29	R5-66	R6-11	R6-60
	>6 – 12 KI	R4-94	R5-29	R5-66	R6-11	R6-60
	>12 – 20 KI	R5-67	R6-07	R6-49	R7-01	R7-57
	>20 – 30 KI	R6-81	R7-29	R7-80	R8-42	R9-09
	>30 – 50 KI	R7-46	R7-98	R8-54	R9-22	R9-96

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table A.7.5: Water Tariffs for Uniondale and Haarlem for the Last Five Financial Years						
Consumer/Description	Category	14/15	15/16	16/17	17/18	18/19
Churches Tariff Code – Haarlem: 1475 Uniondale: 1455	> 50 KI	R8-18	R8-75	R9-36	R10-11	R10-92
	0 – 6 KI	R0-00	R0-00	R0-00	R0-00	R0-00
	>6 – 12 KI	R4-94	R5-29	R5-66	R6-11	R6-60
	>12 – 20 KI	R5-67	R6-07	R6-49	R7-01	R7-57
	>20 – 30 KI	R6-81	R7-29	R7-80	R8-42	R9-09
	>30 – 50 KI	R8-16	R8-73	R9-34	R10-09	R10-90
	> 50 KI	R9-32	R9-97	R10-67	R11-52	R12-44
Schools Tariff Code – Haarlem: 1474 Uniondale: 1454	0 – 6 KI	R4-94	R5-29	R5-66	R6-11	R6-60
	>6 – 12 KI	R4-94	R5-29	R5-66	R6-11	R6-60
	>12 – 20 KI	R5-67	R6-07	R6-49	R7-01	R7-57
	>20 – 30 KI	R6-81	R7-29	R7-80	R8-42	R9-09
	>30 – 50 KI	R7-46	R7-98	R8-54	R9-22	R9-96
	> 50 KI	R8-18	R8-75	R9-36	R10-11	R10-92
Irrigation Water	Haarlem Agriculture	R35-97 per erf / month	R38-49 per erf / month	R41-18 per erf / month	R44-47 per erf / month	R48-03 per erf / month
Availability Tariff Code 2303		R29-93 per erf / month	R32-03 per erf / month	R34-27 per erf/month	R37-01 per erf / month	R39-97 per erf / month

The sewerage tariff structures for George Municipality for the 2018/2019 financial year and the previous four financial years are summarised in the table below (Subject to VAT).

Table A.7.6: Sewerage Tariffs for George Municipality for the Last Five Financial Years						
Consumer/Description (Tariff Code)	Category	14/15 (Per Year)	15/16 (Per Year)	16/17 (Per Year)	17/18 (Per Month)	18/19 (Per Month)
Basic Charges: Uniondale / Haarlem	Properties connected to the sewerage system.	R682-91	R730-71	R781-86	R70-37	R76-35
Basic Charges George: All vacant erven (2601, 2620, 2621)	1 – 1 200 m <sup>2</sup>	R1 608-34	R1 737-01	R1 858-60	R167-27	R181-49
	1 201 – 3 400 m <sup>2</sup>	R1 608-34 + R23-27 per 100m <sup>2</sup> or part thereof	R1 737-01 + R25-13 per 100m <sup>2</sup> or part thereof	R1 858-60 + R26-89 per 100m <sup>2</sup> or part thereof	R167-27 + R2-42 per 100m <sup>2</sup> or part thereof	R181-49 + R2-63 per 100m <sup>2</sup> or part thereof
	3 401 – 10 000 m <sup>2</sup>	R2 120-28 + R 11-63 per 100m <sup>2</sup> or part thereof	R2 289-87 + R12-56 per 100m <sup>2</sup> or part thereof	R2 450-18+ R13-44 per 100m <sup>2</sup> or part thereof	R220-51 + R1-21 per 100m <sup>2</sup> or part thereof	R239-35 + R1-31 per 100m <sup>2</sup> or part thereof
	10 001 – 20 000 m <sup>2</sup>	R2 887-86 + R 5-85 per 100m <sup>2</sup> or part thereof	R3 118-83 + R6-32 per 100m <sup>2</sup> or part thereof	R3 337-22 + R6-76 per 100m <sup>2</sup> or part thereof	R300-37 + R0-61 per 100m <sup>2</sup> or part thereof	R325-81 + R0-66 per 100m <sup>2</sup> or part thereof
	Over 20 000 m <sup>2</sup>	R3 472-86	R3 750-83	R4 013-22	R361-37	R391-81
Properties connected to the sewerage system: All erven greater than 2 500 m <sup>2</sup> zoned for single	Basic service charges	R1 821-53	R1 949-03	R2 085-46	R187-69	R203-64
	2 501 – 3 400 m <sup>2</sup>	R1 821-53 + R23-27 / 100m <sup>2</sup> or part thereof	R1 949-03 + R24-90 / 100m <sup>2</sup> or part thereof	R2 085-46 + R26-64 / 100m <sup>2</sup> or part thereof	-	-
	3 401 – 10 000 m <sup>2</sup>	R2 030-96 + R 11-63 / 100m <sup>2</sup> or part thereof	R2 173-13+ R 12-44 / 100m <sup>2</sup> or part thereof	R2 325-22+ R13-31 / 100m <sup>2</sup> or part thereof	-	-

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table A.7.6: Sewerage Tariffs for George Municipality for the Last Five Financial Years						
Consumer/Description (Tariff Code)	Category	14/15 (Per Year)	15/16 (Per Year)	16/17 (Per Year)	17/18 (Per Month)	18/19 (Per Month)
residential purposes with improvements (2602)	10 001 – 20 000 m <sup>2</sup>	R2 798-54 + R 5-85 / 100m <sup>2</sup> or part thereof	R2 994-17 + R 6-26 / 100m <sup>2</sup> or part thereof	R3 203-68 + R6-70 / 100m <sup>2</sup> or part thereof	-	-
	Over 20 000 m <sup>2</sup>	R3 383-54	R3 620-17	R3 873-68	-	-
Erven in Glenwood: Properties connected to the sewerage system: Erven less than 10 000m <sup>2</sup> (2606, 2616)		R1 608-34 + R5-85 / 100m <sup>2</sup> or part thereof calculated on portion of property >5 000m <sup>2</sup> with a max. R2 193-34.	-	-	-	-
Erven in Glenwood: Properties connected to the sewerage system: Erven larger than 5 000m <sup>2</sup> (2606)	-		R1 737-01 + R6-32 / 100m <sup>2</sup> or part thereof calculated on portion of property >5 000m <sup>2</sup> with a max. R2 369-01.	R1 858-60 + R6-76 / 100m <sup>2</sup> or part thereof calculated on portion of property >5 000m <sup>2</sup> with a max. R2 534-60.	R167-27 + R0-61 / 100m <sup>2</sup> or part thereof calculated on portion of property >5 000m <sup>2</sup> with a max. R228-27.	R181-49 + R0-66 / 100m <sup>2</sup> or part thereof calculated on portion of property >5 000m <sup>2</sup> with a max. R247-49.
Erven in Glenwood: Properties connected to the sewerage system: Erven larger than 5 000m <sup>2</sup> (2616)	-		R1 720-92 + R6-26 / 100m <sup>2</sup> or part thereof calculated on portion of property >5 000m <sup>2</sup> with a max. R2 346-92.	R1 841-38 + R6-70 / 100m <sup>2</sup> or part thereof calculated on portion of property >5 000m <sup>2</sup> with a max. R2 511-38.	-	-
Properties connected to the sewerage system: Erven larger than 10 000m <sup>2</sup> (2607, 2617)		R1 608-34 + R5-85 / 100m <sup>2</sup> or part thereof calculated on portion of property > 10000m <sup>2</sup> with a max. R2 193-34	-	-	-	-
Properties connected to the sewerage system: Additional charges for erven in Glenwood with improvements		R213-19	R228-11	R244-08	-	-
Properties connected to the sewerage system	For every additional residence or residential unit erected on an erf zoned for single residential purposes (2608).	R1 821-53	R1 949-03	R2 085-46	R187-69	R203-64
	Houses in assisted housing schemes, Kleinkrantz Touwsrante and Rosemoor Cottage (2605, 2618, 2619)	R1 821-53	R1 949-03	R2 085-46	R187-69	R203-64
Blocks of flats (2603)	Per flat or residential unit	R1 821-53	R1 949-03	R2 085-46	R187-69	R203-64
Churches (2609)	For each cloakroom with a max. of two cloakrooms	R1 976-42	R2 114-77	R2 262-80	R203-65	R220-96
Sectional Scheme Units (Businesses) (2611)	For each water closet system or urinal	R1 976-42	R2 114-77	R2 262-80	R203-65	R220-96
Tourist camps and show organisations (2614)	For each water closet system or urinal	R658-79	R704-91	R754-25	R67-88	R73-65
Institutions for disabled persons (2604)	For each water closet system or room with a urinal	R1 976-42	R2 114-77	R2 262-80	R203-65	R220-96
Schools / School Hostels – Total charge (Including Basic): Less 60% discount (2613)	For each water closet system or urinal	R1 976-42	R2 114-77	R2 262-80	R203-65	R220-96
Sport bodies (2604)	For each water closet system or urinal	R1 976-42	R2 114-77	R2 262-80	R203-65	R220-96
Municipal Crèches	Per Crèche	R1 821-53	R1 949-03	R2 085-46	R187-69	R203-64

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table A.7.6: Sewerage Tariffs for George Municipality for the Last Five Financial Years						
Consumer/Description (Tariff Code)	Category	14/15 (Per Year)	15/16 (Per Year)	16/17 (Per Year)	17/18 (Per Month)	18/19 (Per Month)
Garden Route Botanical Garden (2627)		R1 821-53	R1 949-03	R2 085-46	R187-69	R203-64
Municipal Sport bodies (2623)	per Sports body	R3 643-06	R3 898-06	R4 170-92	R375-38	R407-29
Commercial and Industrial properties (2604)	For each water closet system or room with a urinal	R1 976-42	R2 114-77	R2 262-80	R203-65	R220-96
Guest houses and bed-and-breakfasts concerns (2604, 2624)	For each water closet system or room with a urinal	-	R2 114-77	R2 262-80	R203-65	R220-96
	3 Bedrooms or less	R1 821-53 + 25% of the tariff	R1 949-03 + 25% of the tariff	R2 085-46 +25 % of the tariff	R187-69 + 25% of the tariff	R203-64 + 25% of the tariff
	4 Bedrooms or more, for each water closet system or urinal	R1 976-42	R2 114-77	R2 262-80	R203-65	R220-96
Body Corporates (Businesses) (2622)	Basic Charge	R1 608-34	R1 720-92	R1 841-38	R165-72	R179-81
Sewerage Removal: Storage tank	Per 4000 litre or less	R378-07	R400-88	R534-21	R566-67	R600-87
	Per 4001 – 5000 litre	R417-54	R442-98			
	Per 5001 – 7000 litre	R504-39	R534-21			
Sewerage Removal: Storage tank – After hours	Per 4000 litre or less	R756-14	R801-76	R1 068-42	R1 132-46	R1 201-74
	Per 4001 – 5000 litre	R835-08	R885-96			
	Per 5001 – 7000 litre	R1 008-78	R1 068-42			
Sewerage Removal: Septic tank per load		R1 435-09	R1 521-05	R1 627-19	R1 724-56	R1 827-83
Sewerage Removal: Septic tank: After hours per load		R2 870-18	R3 042-10	R3 254-38	R3 449-12	R3 655-66
George Airport per Kl		R4-91	-	-	-	-
SA Breweries Hops Farm per Kl		R6-70	R7-10	-	-	-
Private delivery at WWTW – Storage Tank Waste per Kl		R3-70	R3-92	R4-19	R4-44	R4-71
Private delivery at WWTW – Septic Tank Waste per Kl		R147-22	R156-05	R166-97	R176-99	R187-61
Private delivery at WWTW – Chemical Toilet Waste per Kl		R184-66	R195-74	R209-44	R222-00	R235-32
Sewerage Removal (Suction Tank Services) Uniondale / Haarlem	Basic: First suction per erf per month	R99-12	R105-26	R112-28	R119-30	R126-09
	Extra suction (Per suction)	R192-11	R203-51	R217-54	R230-70	R244-35
	Extra suction After Hours (Per suction)	R384-22	R407-02	R435-08	R461-40	R488-70
	Rural Area DMA Area (Per suction)	R325-44	R344-74	R369-30	R391-23	R414-78
	Rural Area DMA Area After Hours (Per suction)	R650-88	R689-48	R738-60	R782-46	R829-56
	Avontuur “Agri” Basic per unit per month	-	R105-26	R112-28	R119-30	R126-09
	Avontuur “Agri” Cost per suction	-	R203-51	R217-54	R230-70	R244-35
	Avontuur “Agri” Cost per suction After Hours	-	R407-02	R435-08	R461-40	R488-70
<b>Industrial Effluent Charges:</b> The charge for industrial effluent per kiloliter for the disposal of effluent that does not comply with residential effluent standards and may include effluent discharged into a stormwater system shall be determined in accordance with the following formula; Formula: $T_c = X + Y(\text{COD}_i / \text{COD}_w) + Z + \text{Penalty}$ Where $T_c$ is the extraordinary treatment cost to the consumer per kl and X the conveyance cost per kl. Y is the variable treatment costs per kl and Z is the fixed costs per kl. $\text{COD}_i$ is the average of each industry, inclusive of both biodegradable and non-biodegradable portion of COD, while $\text{COD}_w$ is the average of works (weighted for more than one works), inclusive of both biodegradable and non-biodegradable portion of COD.						

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Table A.7.6: Sewerage Tariffs for George Municipality for the Last Five Financial Years					
Consumer/Description (Tariff Code)	Category	14/15 (Per Year)	15/16 (Per Year)	16/17 (Per Year)	17/18 (Per Month) 18/19 (Per Month)
Penalty per kl charged in addition to the effluent charge based on volume and COD, for prohibited effluents, for instances where CODi of the effluent exceeds 3000 mg/L or where any other quality parameter exceeds the maximum value allowed according to Annexure A of the by-laws, as contained in the permit for the industry. The following tariffs apply: X = R3-12/kl Y = R1-31/kl Z = R1-27/kl					
Sewerage connection		Actual cost + 10%	Actual cost + 10%	Actual cost + 10%	Actual cost + 10%
Sewerage connection, replacement of bucket system (Qualifies for the equitable fund). The cost that will be recovered from the equitable fund		R1 801-75	R1 909-65	R2 042-98	R2 165-79 R2 295-74
Sewerage connection, replacement of bucket system (Where a consumer does not qualify for the equitable fund).		R1 801-75	R1 909-65	R2 042-98	R2 165-79 R2 295-74

## TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

George Municipality is the WSA and Water Services Provider for the entire Municipal Management Area and no other bulk Water Services Providers provide any services to the Municipality.

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

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

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

The Municipal personnel is continuously exposed to training opportunities, skills development and capacity building at a technical, operations and management level in an effort to create a more efficient overall service to the users. A Workplace Skills Plan is compiled every year and the specific training needs of the personnel, with regard to water and wastewater management are determined annually.

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

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

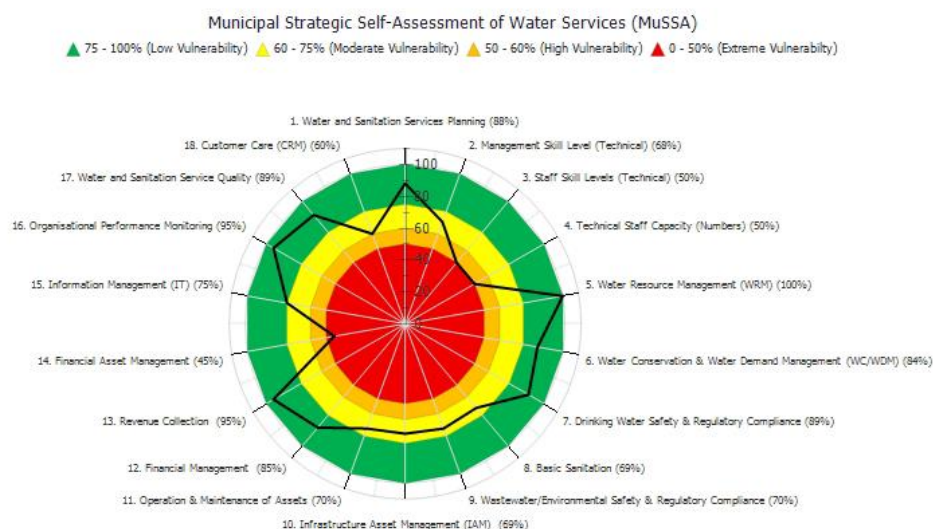


Figure A.8.1: Spider Diagram of the Vulnerability Levels of George Municipality for 2019

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George Municipality's Vulnerability Index for 2019 was indicated as 0.46 "Moderate Vulnerability" in the "2019 Municipal Services Strategic Assessment (MuSSA) for Western Cape Province" Report. The areas of concern evident from the 2019 assessment are: Staff Skill Levels (Technical) (50.0%), Technical Staff Capacity (Numbers) (50.0%) and Financial Asset Management (45.0%).

A comprehensive Customer Services and Complaints system is in place at George Municipality and the Municipality has maintained a high and a very consistent level of service to its urban water consumers. After hour emergency requests are being dealt with by the control room on a twenty four hour basis. Requests are furthermore captured on an electronic mail or works-order system to ensure execution thereof.

A new customer services system was put into operation during May 2014 and the next table gives an overview of the indicators that were logged for water and sanitation services during the 2018/2019 financial year, as well as the committed response times.

<b>Table A.8.1: Water and Sanitation Indicators Logged through George Municipality's Customer Services Complaints System for 2018/2019</b>			
<b>Water Service</b>	<b>Total received in period</b>	<b>Total completed of new in period</b>	<b>Still outstanding of new</b>
Indigent Water	34	34	0
Faulty Meters	414	387	27
Water Leakages: Connections	390	373	17
Water Leakages: Meters	1 779	1 656	123
Poor water pressure	90	90	90
Water Deliveries: Free	1	1	0
No water	267	256	11
Faulty Stopcocks	379	344	35
High consumption	13	11	2
Pipe Bursts	392	362	30
Water Leakages: Main Line	44	42	2
Valve Leakages	33	30	3
Fire Hydrant Leakages	47	46	1
Water Quality	10	9	1
After Hours Water Leakages: Faulty Meters	22	25	1
After Hours: Pipe Bursts	11	10	1
After Hours Water Leakages: Stopcocks	4	4	0
After Hours Water Leakages: Connections	45	43	2
Indigent Water	34	34	0
<b>Sewer Services</b>	<b>Total received in period</b>	<b>Total completed of new in period</b>	<b>Still outstanding of new</b>
Sewer Blockages	7 732	7 731	1
Sewer Smells	17	17	0
Broken Sewer Manholes (Incl. Cover)	30	30	0
Indigent Sewer	129	129	0
Sewer Connections	69	69	0
Broken Sewer Pipes: Connections	3	3	0
Sewer Removal (Tanks)	1 007	1 006	1
Broken Sewer Pipes: Main Line	22	22	0
After Hours Sewer Connection	3	3	0



The graph below gives an overview of the number of water complaints received for the various financial years.

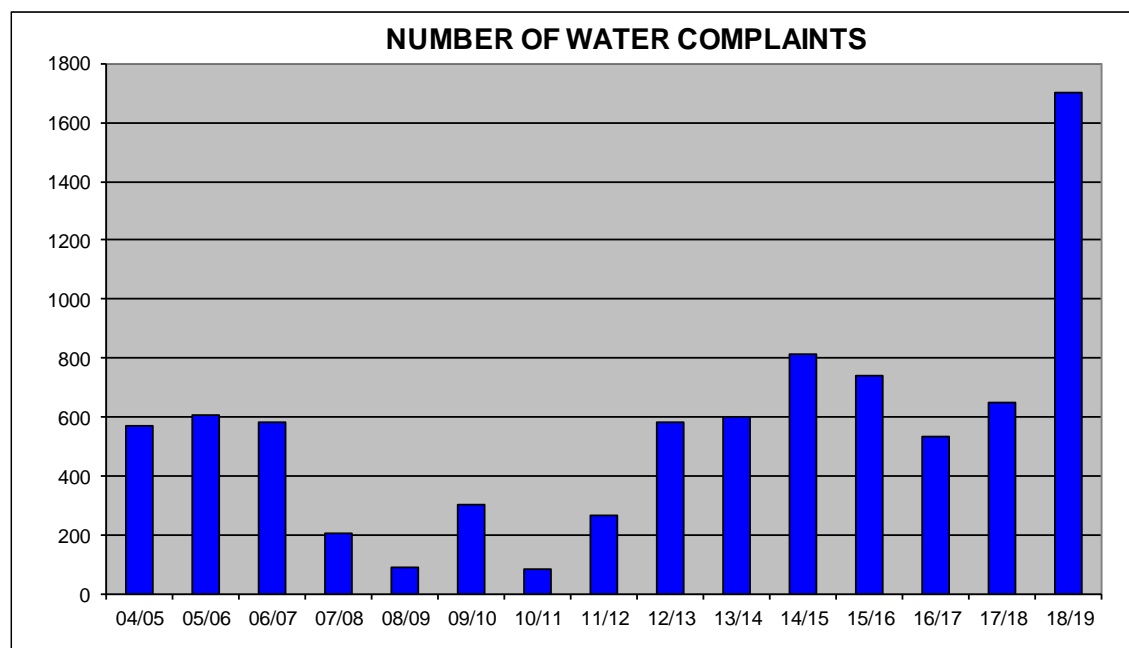


Figure A.8.2: Number of Water Related Complaints Received from the Public per Financial Year

### DWS's Blue Drop Process

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

Table A.8.2: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)				
Municipal Blue Drop Score		2011 – 96.26%, 2012 – 98.12%, 2014 – 82.77%		
<p><b>Regulatory Impression:</b> It is disappointing that the George Local Municipality Blue Drop score has decreased substantially during this assessment. Two key issues have impacted on the municipal compliance. Firstly, the Haarlem and Uniondale systems that were transferred from the Eden District Municipality have been included in the George Local Municipality assessment for the first time and secondly a change in personnel has impacted the ongoing maintenance of information. The inspector specifically identified the need for officials to take ownership of the Water Safety Plan and Risk Assessment in order to ensure mitigation of identified risks.</p> <p>A number of areas are identified where the George Local Municipality should implement actions to improve compliance. These include:</p> <ul style="list-style-type: none"><li>• Risk based monitoring programmes to comply with the requirements of SANS 241 with regard to sampling points, frequency of analyses and the determinants that are analysed. This includes a water quality risk assessment of the catchment, treatment and reticulation network water in all systems and the compliance monitoring programme. Water quality failures detected during the SANS analysis have not been included as risks and monitored accordingly. Limited chemical determinants have been monitored, specifically in the network system, to assess potential health impacts.</li><li>• Ensure that outstanding information required to finalise the registration and classification of process controllers is uploaded to the BDS, as well as the allocation of supervisors to each system. Appropriate training should be provided to meet the skills requirements for the future compliance with Regulations 17.</li><li>• Results of compliance monitoring should be timeously uploaded to the BDS.</li><li>• Acceptable levels of compliance from the proficiency testing scheme in which the municipal laboratory participates.</li></ul> <p>It is anticipated that with commitment and management support, that George Local Municipality will improve compliance and once again achieve the coveted Blue Drop status in the next assessment.</p>				
Performance Area	George	Haarlem	Uniondale	Wilderness
Water Safety Planning	26.78	19.25	23.45	25.03
Treatment Process Management	6.80	4.00	4.00	6.00
DWQ Compliance	23.25	16.35	23.10	16.50
Management, Accountability	8.80	8.50	8.50	8.80
Asset Management	11.59	10.33	10.54	11.06



Table A.8.2: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)				
Use Efficiency, Loss Management	2.64	2.64	2.64	2.64
Bonus Scores	3.48	3.21	3.96	5.62
Penalties	0.00	0.00	0.00	0.00
<b>Blue Drop Score (2014)</b>	<b>83.33%</b>	<b>64.28%</b>	<b>76.18%</b>	<b>75.65%</b>
<b>Blue Drop Score (2012)</b>	98.56%	N/A	N/A	85.47%
Blue Drop Score (2011)	96.32%	N/A	N/A	95.00%
System Design Capacity (Ml/d)	45.000	1.000	1.500	1.800
Operational Capacity (% i.t.o. Design)	59%	30%	37%	43%
Average daily consumption (l/p/d)	163.9	85.7	160.0	41.6
<b>Microbiological Compliance (%)</b>	<b>99.8%</b>	<b>98.0%</b>	<b>99.3%</b>	<b>99.3%</b>
<b>Chemical Compliance (%)</b>	<b>79.4%</b>	<b>99.9%</b>	<b>97.8%</b>	<b>88.2%</b>

Table A.8.3: DWS's 2014 Blue Drop Risk Ratings for the Various Towns				
<b>Municipal Blue Drop Risk Rating</b>				<b>34%</b>
The overall 2014 Risk Rating for George is 34%, which translates into the 7 <sup>th</sup> best performance in the Western Cape. Note that this value is based on the 3 specific areas indicated below and shows concerns (medium to critical risks) for Process Control (which risks reflect compliance in terms of draft Regulation 813) in 3 of the 4 systems; Drinking Water Quality in none of the 4 systems; and Risk Management in none of 4 systems.				
Assessment Area	George	Haarlem	Uniondale	Wilderness
<b>2014</b>				
<b>Blue Drop Risk Rating (2014)</b>	<b>33.1%</b>	<b>58.3%</b>	<b>58.2%</b>	<b>40.3%</b>
Process Control RR	52.2%	64.1%	64.1%	48.7%
Drinking Water Quality RR	40.7%	40.7%	40.7%	40.7%
Risk Management RR	30.4%	39.1%	34.8%	34.8%
<b>2013</b>				
<b>Blue Drop Risk Rating (2013)</b>	<b>17.7%</b>	<b>62.3%</b>	<b>55.5%</b>	<b>37.7%</b>
Process Control RR	41.3%	64.1%	64.1%	48.7%
Drinking Water Quality RR	18.5%	40.7%	14.8%	14.8%
Risk Management RR	21.7%	30.4%	26.1%	30.4%
<b>2012</b>				
<b>Blue Drop Risk Rating (2012)</b>	<b>65.6%</b>	<b>80.9%</b>	<b>80.9%</b>	<b>80.1%</b>
Process Control RR	82.6%	79.5%	79.5%	79.5%
Drinking Water Quality RR	11.1%	40.7%	40.7%	40.7%
Risk Management RR	17.4%	65.2%	65.2%	26.1%

The average daily consumption (l/p/d) for the last four financial years, based on system input volume and billed metered and unbilled unmetered residential consumption, are summarised in the table below:

Table A.8.4: Average Residential Daily Consumption (l/p/d) for the Last Four Financial Years.						
Distribution System	2018/2019			2017/2018		
	Estimated Permanent Population (WS Audit)	Aver. Daily Billed Metered and Unbilled Unmetered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)	Estimated Permanent Population (WS Audit)	Aver. Daily Billed Metered and Unbilled Unmetered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)
George and Wilderness	199 907	16 557	83	194 462	15 863	82
Uniondale	5 379	366	68	5 248	353	67
Haarlem	2 547	211	83	2 522	213	84
Distribution System	2016/2017			2015/2016		
	Estimated Permanent Population (WS Audit)	Aver. Daily Billed Metered and Unbilled Unmetered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)	Estimated Permanent Population (WS Audit)	Aver. Daily Billed Metered and Unbilled Unmetered Res. Consumption (kl)	Aver. Daily consumption (l/p/d)
George and Wilderness	189 165	18 048	95	184 013	17 757	96
Uniondale	5 120	370	72	4 995	366	73
Haarlem	2 497	247	99	2 472	246	100

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

**Green Drop Status:** The DWS also completed their Third Order Assessment of Municipal Waste Water Treatment Plants, DWS's Green Drop Report for 2013, which provides a scientific and verifiable status of municipal wastewater treatment. 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 George Municipality is summarised as follows in the DWS's 2013 Green Drop Report.

Table A.8.5: Green Drop Performance of the Municipality (DWS's 2013 Green Drop Report)						
Average Green Drop Score			2009 – 94.00%, 2011 – 91.00%, 2013 - 84.90%			
<p><b>Regulatory Impression:</b> George Municipality is an accomplished wastewater services authority and provider, as is evident by the award of three (3) Green Drop Certificates. Even more remarkable in the view of the Regulator, is the vast improvement of the Haarlem system (15% to 83%) and the Uniondale system (1% to 80%), which was previously managed by the Eden District Municipality. The municipality was exceptionally well prepared for the assessment, with all information organised per wastewater system. Officials responded positively to the audit process and demonstrated a first-class knowledge and understanding of each system. Sturdy management support and commitment were evident. The inspectorate was welcomed by the Technical Director and the Senior Manager Operations: Water and Sanitation Services, who then proceeded to partake in the assessment and the site inspection.</p> <p>George might experience some disappointment in the decline of the overall municipal Green Drop score. The determination of the overall score is reliant on design capacity. Regrettably, the Outeniqua plant carries a high capacity associated with &lt;90% effluent quality compliance. It is therefore important that the municipality prioritise this plant's performance prior to the next Green Drop cycle 2014/15. The additional shortcoming to be addressed going forward includes: technical skills registration and O&amp;M information, effluent quality compliance, treatment capacity, treatment and network planning, and asset management. Green Drop findings:</p> <ol style="list-style-type: none"><li>1. None of the systems are fully compliant in terms of Regulation 17, which deals with technical registration and requirements.</li><li>2. The Haarlem plant operated well above its design capacity (115%) which may impact on the effluent quality over time. At this stage, the plant is producing good effluent quality.</li><li>3. Three (3) of the six (6) treatment plants do not produce effluent compliant with microbiological standards, disinfection needs to be optimised.</li><li>4. The majority of plants did not score in full for authorisations / license that need to be in place.</li><li>5. The majority of systems did not score well in terms of process audits and sewer inspections, and some refining of these practices and evidence may be required.</li><li>6. Two (2) of the six (6) systems did not have asset registers in place.</li><li>7. Go forward, the CFO need to be involved in setting up (sub) cost centres to account for systems separately, to allow for ring-fenced cost reflection.</li></ol>						
GREEN DROP REPORT CARD						
Key Performance Area	Gwaing	Haarlem	Herolds Bay	Kleinkrantz	Outeniqua	Uniondale
Process Control, Maintenance and Management Skill	88	68	80	80	88	72
Monitoring Programme	100	100	100	100	100	98
Submission of Results	100	50	100	100	100	50
Effluent Quality Compliance	66	80	95	71	15	77
Risk Management	100	90	100	100	100	90
Local Regulation	100	100	100	100	100	100
Treatment Capacity	100	69	79	83	100	79
Asset Management	93	45	86	86	86	45
Bonus Scores	3.77	6.49	1.51	4.10	8.65	5.00
Penalties	0.00	0.69	0.00	0.00	0.00	1.40
Green Drop Score (2013)	91.24%	82.84%	94.90%	90.46%	79.88%	80.26%
Green Drop Score (2011)	95.00%	15.00%	64.60%	88.30%	88.80%	1.00%
Green Drop Score (2009)	83.00%	0.00%	0.00%	100.00%	100.00%	0.00%
System Design Capacity (Ml/d)	11.000	0.430	0.300	1.1	15.000	0.578

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**Table A.8.5: Green Drop Performance of the Municipality (DWS's 2013 Green Drop Report)**

Capacity Utilisation (% ADWF i.t.o. Design Capacity)	56.18%	115.35%	56.67%	50.00%	52.00%	86.51%
Resource Discharged into	Gwaing River	Irrigation to land. River unknown	No discharge	Unknown	Skaapkoprivier	Irrigation to land. River unknown
Microbiological Compliance	83.33%	91.67%	100.00%	70.37%	81.32%	91.67%
Chemical Compliance	99.07%	91.67%	96.00%	94.68%	84.62%	90.91%
Physical Compliance	98.25%	90.91%	98.00%	99.69%	84.19%	79.17%
Overall Compliance	96.82%	91.30%	98.00%	93.51%	84.04%	85.11%
<b>Wastewater Risk Rating (2012)</b>	<b>40.90%</b>	<b>88.20%</b>	<b>23.50%</b>	<b>29.40%</b>	<b>45.50%</b>	<b>100.00%</b>
<b>Wastewater Risk Rating (2013)</b>	<b>40.91%</b>	<b>41.18%</b>	<b>29.41%</b>	<b>29.41%</b>	<b>50.00%</b>	<b>35.29%</b>

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

**Table A.8.6: DWS’s 2014 Green Drop Risk Profile Progress Report Results for George Municipality**

Technology Description	Gwaing	Haarlem	Herolds Bay	Kleinkrantz	Outeniqua	Uniondale
Technology (Liquid)	Activated sludge and BNR	Activated sludge	Anaerobic ponds/ Facultative ponds	Activated sludge and mechanical aeration	Activated sludge	Anaerobic ponds/ Facultative ponds
Technology (Sludge)	Belt press dewatering	None specified	None specified	Solar drying beds	DAF thickening	None specified
<b>Key Risk Areas</b>						
ADWF Design Capacity (Ml/d)	11.000	0.430	0.300	1.100	15.000	0.578
Operational flow (% of Design Capacity)	62%	151% (NI)	58%	53%	79%	151%
Annual Average Effluent Quality Compliance (2012-2013)	96.6%	66.7%	NMR	94.9%	86.5%	66.7%
Microbiological Compliance (%)	88.6%	58.3%	NMR	88.3%	74.5%	83.3%
Physical Compliance (%)	97.5%	70.8%	NMR	99.0%	93.2%	54.2%
Chemical Compliance (%)	97.9%	66.7%	NMR	93.5%	84.3%	75.0%
Technical skills (Reg. 813)	Partial	Partial	Partial	Partial	Partial	Yes
<b>2014 Wastewater Risk Rating (%CRR/CRR<sub>max</sub>)</b>	<b>40.9%</b>	<b>64.7%</b>	<b>29.4%</b>	<b>47.1%</b>	<b>54.5%</b>	<b>58.8%</b>
<b>2013 Wastewater Risk Rating (%CRR/CRR<sub>max</sub>)</b>	<b>40.9%</b>	<b>41.2%</b>	<b>29.4%</b>	<b>29.4%</b>	<b>50.0%</b>	<b>35.3%</b>
<b>Risk Abatement Planning</b>						

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Table A.8.6: DWS's 2014 Green Drop Risk Profile Progress Report Results for George Municipality						
Highest Risk Areas based on the CRR	PC skills, microbial compliance	Flow measurement, PC skills, effluent compliance	PC skills	Supervisor & PC skills, microbial compliance	Supervisor & PC skills, microbial and chemical compliance	Flow measurement, PC skills, effluent compliance
WW Risk Abatement Status	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)
Capital & Refurbishment expenditure for Fin Year 2012-2013 (Rand)	R5.729m	R0.050m	R0.171m	R0.311m	R19.361m	R13.815m
Description of Projects' Expenditure 2012-2013	Upgrade to sludge handling facility & inlet works; provision of a belt press to accommodate excess sludge from the Outeniqua plant; sludge from the Outeniqua and Gwaing plants dewatered at a joint facility at the Gwaing site; a new mechanical sludge acceptance unit to tanker and night soil discharges system also constructed.	Serviced pump stations	Pump station equipment, 90 kW soft starter 380V ATS/22 at Herolds Bay pump station, serviced pump stations in Herolds Bay	Replaced and installed new air valve at raising main at Ebb and Flow and sewer line PVC 110 pipes; serviced pump stations	Maintained and serviced all pump stations; upgraded pump stations; refurbished pump station rising mains; Installed new equipment at various pump stations; upgrading storm water pipes; installed gabions at Schaapkop pump station; Installed Ozone Generator/Pump station at Kraaibosch; new panel at Delville Park pump station; replaced electrical panels; George Municipality; Installed soft starters, MCU 901 P X A Mobrey	Constructed a 800 kl/d Activated Sludge plant with a fine screen, grit removal systems, clarifiers, sludge recycling pumps, sludge waste pumps and new sludge drying beds
<b>W<sub>2</sub>RAP Abatement Document and Status Commentary</b>	No W <sub>2</sub> RAP provided for commentary					

### Regulatory Impression

George Municipality has an impressive and proud record in achieving Green Drop compliance. In 2009 two wastewater systems achieved 100% compliance, in 2011 one system achieved Green Drop status and in the 2013 GD audit 3 systems achieved Green Drop status (Gwaing, Herolds Bay and Kleinkrantz).

Regrettably, the Municipal Green Drop status has decreased from 91% in 2011 to 84.90% in 2013. The Municipality is nevertheless congratulated with their continued performance. In the present 2013-14 Green Drop Progress Reporting, the wastewater Risk Rating either remained the same (for 2 systems) or deteriorated significantly. The Municipality is cautioned to guard against losing the steady gains made in improving their systems since 2011. The upgrading and maintenance projects listed at all treatment facilities will stretch positively into the desired improvements. The Municipality should also pay attention to improving supervisor competencies in the Outeniqua and Kleinkrantz systems, while the process controller competencies should be improved in all systems. The wastewater capacity should also be increased urgently in Haarlem and Uniondale.

The Municipality should also prioritise obtaining the necessary water use authorisation from the Department, and then comply with the conditions set. The Municipality is also encouraged to respond to the DWS's request for information. During the 2013-14 no additional information was received from the Municipality despite a few requests.

### SECTION B: STATE OF WATER SERVICES PLANNING

DWS's new WSDP website was rolled-out to all the WSAs in the Garden Route District on the 23<sup>rd</sup> of October 2017. This WSDP is George Municipality's new WSDP according to DWS's requirements.

George Municipality also compiled annual WSDP Performance- and Water Services Audit Reports for the last number of years. The WSDP Performance- and Water Services Audit Report gives an overview of the implementation of the Municipality's previous year's WSDP and can be seen as an annexure to George Municipality's Annual Report. The 2018/2019 WSDP Performance- and Water Services Audit Report will be approved by Council as part of the Municipality's 2018/2019 Annual Report.

George Municipality's Water and Sewer Master Plan process entails the establishment of computer models for the water systems and the sewer systems in George 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 George Municipality's water distribution and sewer drainage systems.

The latest Water and Sewer Master Plans, which were available for inclusion in George Municipality's WSDP, were as follows:

- Water Master Plan, George Municipality, March 2019.
- Sewer Master Plan, George Municipality, March 2019.

The following water and sanitation related investigations were successfully completed during the 2018/2019 financial year.

- The WSDP Performance- and Water Services Audit Report for the 2017/2018 financial year was finalised and approved by Council as part of the Annual Report.
- George Municipality continues with the implementation of their Drinking Water Quality and Effluent Quality Sampling Programmes (Both Operational and Compliance Monitoring). Sample results are loaded on a monthly basis onto DWS's IRIS. All the WTWs and WWTWs are also registered on the IRIS website. The effluent discharged by the industrial consumers is also monitored by George Municipality on a monthly basis.
- The Water and Sewer Master Plans for the various distribution and drainage systems are updated on a quarterly basis by GLS Consulting. GLS Consulting provides an extensive specialist service related to the optimal analysis, planning and management of water distribution and sewer reticulation systems. The Master Plans are also worked through with the personnel of the Civil Engineering Services Directorate.
- The Asset Register was updated to include all the water and sewerage capital projects completed during the 2018/2019 financial year.
- Investigation into additional remedial works at the Biofiltration Plant at the Gwaing WWTW was completed.
- Technical Feasibility Report on the Outeniqua WWTW was compiled as part of the MIG application.
- Technical Report for the 20MI extension to the George new WTW was compiled as part of the MIG application.
- Proposal for Option Analysis for upgrading of the Caroussel Aeration at the Outeniqua WWTWs was compiled.
- Technical Feasibility Report for the new 14.5MI Pacaltsdorp (George) reservoir was compiled as part of the MIG application.
- Investigation was completed for the Glenwood, Eden George, Meul and Schaapkop pump stations and associated gravity and rising mains.

- Concept analyses of the proposed Short and Medium to Long Term Upgrades of the Herolds Bay Sewerage Pump Station was completed.
- Reports on the status of the existing electrical and telemetry installations at the Kaaimans raw water pump station and the Malgas raw water pump station were compiled.

### SECTION C: WATER SERVICES EXISTING NEEDS PERSPECTIVE

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

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

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

The Vision and Mission statements of George Municipality are as follows:

Vision: "A City for a Sustainable Future"

Mission: "To deliver affordable quality service; develop and grow George; keep George clean, safe and green; ensure good governance and human capital in George and to participate in George."

The Strategic Goals of George Municipality are as follows:

- Develop and grow George;
- Safe, Clean and Green;
- Affordable Quality Service;
- Participative Partnership; and
- Good Governance and Human Capital.

The Water Sector's Vision, Goal and Objectives for 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.

The Breede-Gouritz Catchment Management Agency (BGCMA) was established in 2014 (Government Notice 412, 23 May 2014) by extending the boundary and area of operation of the Breede-Overberg Catchment Management Agency (BOCMA) in terms of Section 80 of the National Water Act, 1998 (Act No.36 of 1998).



The Catchment Management Strategy for the Breede-Gouritz Water Management Area (BGWMA), July 2017, include the following Vision and three Strategic Focus Areas.

**“Healthy water resources, for all, forever,”**

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

**TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS**

Topic C.1.1: Settlement Demographics and Public Amenities						
Section	Intervention Required	%	Solution description as identified by Master Plan	%	Is there an Existing project/activity addressing this problem?	Current Demand Overall Scoring %
Settlements Summary	Yes	100.00	All resources, especially surface water resources, need to be re-evaluated, especially where demands are close to the safe one in twenty year yields. Establish assurance of supply levels of all water sources. Continue with the implementation of the SDF, Human Settlement Plan and Housing Strategy and ensure that new developments are in line with these priority action plans. Ensure that the provision of bulk water and sewerage infrastructure are aligned with the Water and Sewer Master Plans and that housing projects only continue once the required bulk water and sewerage infrastructure are in place.	100.00	Yes	92.86
Summary by Settlement Group	No	100.00				100.00
Assessment Score by Settlement Type	No	100.00				100.00
Amenities Summary	No	100.00				100.00

A Human Settlement Plan and a Housing Strategy is in place for George Municipality's Management Area. There is increasing pressure on municipalities to deliver housing opportunities with little funding and capacity available at their disposal. Regardless of these realities the provision of human settlements is still a high priority for most municipalities. Diverse challenges do however exist regarding the capacity of bulk infrastructure services with specific reference to supply of basic services in form of water, electricity, sanitation and waste removal. These infrastructure backlogs, which are also evident in George Municipality, thus influences the delivery of human settlements.

Over the past few years the Municipality has enjoyed accelerated housing provision, but the recent bulk infrastructure challenges are creating pressure on the municipality to deliver.

The non-availability of homes for the group consisting of municipal workers, nurses, teachers, government officials, ordinary factory workers and policemen has highlighted the demand for affordable housing. Given the demand for low- and middle-income earners settlements, there is a serious need for a credible Human Settlement Plan. The plan will ensure medium to long term planning regarding the delivery of the appropriate infrastructure that will enable the municipality to address the backlog for low cost housing and make land available for affordable housing market segment. A portion of affordable housing is also subsidised by the Department of Human Settlements depending on the income bracket. Within the context of using human settlement development as a catalyst for other municipal service delivery a credible human settlement plan will combat all the issues associated with the municipality to manage the housing situation.

An updated SDF is in place (George MSDF, 29 May 2019), which will guide all future urban and rural settlement developments. The key Spatial Development Strategies and Policies included in George Municipality's draft SDF are as follows:

**Strategy 1: Consolidate: Making what we have work better for our people.**

- Policy A: Prioritise infrastructure that invests in people and their socio-economic mobility and resilience.
  - A1: Maintain, improve and expand basic services.
  - A2: Prioritise investment in the roll-out, maintenance and improvement of social infrastructure targeting poor households.
  - A3: Enhance public transport and non-motorised transport connectivity within and between settlements regionally and within the George city area.
  - A4: Provide and maintain a high quality, safe open space system through maintaining the integrity of existing spaces and actively seek to link viable open spaces into a continuous green web that, with the public transport corridors, forms the basis for the non-motorized transport network.
- Policy B: Direct public and private fixed investment to existing settlements reinforcing their economic development potential. In this way, the impact of public and private investment is maximized, the majority of residents benefit, and the Municipality's natural and productive landscapes are protected.
- Policy C: Maintain a compact settlement form to achieve better efficiency in service delivery and resource use, and to facilitate inclusion and integration.
  - C1: Within the George city area, direct public investment (public facilities, amenities and services), commercial activity and residential densification, in particular affordable residential opportunities, towards consolidating and reinforcing the principal public transport / activity corridors and in particular the priority nodal centres identified.
  - C2: Restructure settlement patterns through infill development of vacant and underutilised land in the settlements in the George Municipal Area.
  - C3: Restructure settlement patterns through densification of the urban areas in the George city area in order to reduce land consumption, deliver services and facilities to households more cost effectively, and to establish the thresholds for viable public transport systems. National and Provincial government have set municipalities the target of increasing the density of urban areas to an average gross based density of 25 dwelling units / hectare.

**Strategy 2: Strengthen: Build on Georg's foundations for growth and resilience.**

- Policy D: Manage the use of land in the Municipal area in a manner which protects natural ecosystem functioning and values ecosystem services, respecting that these are assets that underpin the economy and settlement and their resilience.
  - D1: Support and maintain the functionality of biodiversity areas.
  - D2: Manage development along the coastline and wetlands in a sustainable and precautionary manner, no further development should take place seaward of the Coastal Management Line as demarcated in this MSDF and delineated by the Protected Areas, sensitive biodiversity in terms of the Western Cape Biodiversity Spatial Plan, 2017, steep coastal cliffs / primary dunes and a 5 amsl contour.
  - D3: Facilitate inclusive and equitable, managed public access to the coastline and estuaries at defined points.
  - D4: Manage watercourses so that they remain in a natural state or their present ecological status is improved or at least does not deteriorate.
  - D5: Land use management mechanisms such as an asset protection overlay zone should be used to assist Disaster Risk Management with the mitigation of veldfire risk on vulnerable urban edges.
  - D6: Minimise the impact of developments on visual landscapes and corridors.
  - D7: Manage the Municipal area in a manner that supports sustainable resource demand and use.



- D8: Support the opening-up and development of destinations at entry points to special, unique places of scenic, heritage and recreational value that provide public access, amenity and activities, and tourist attractions in the rural and natural landscape, designed sensitively and in harmony with their surrounds.
- Policy E: Safeguard the municipality's farming and forestry areas as productive landscapes, equal in value to urban land.
  - E1: Promote rural development that enhances the agricultural economy, its value chain into the broader economy and rural livelihoods as crucial to growing and balancing the urban-rural municipal space economy.
  - E2: The subdivision of rural land into small holdings is not supported.
  - E3: Manage rural land use in terms of the Western Cape Government's rural development guidelines and the Spatial Planning Categories identified therein.
- Policy F: Manage the growth of urban settlement in George to ensure the optimum and efficient use of existing infrastructure and resources and in turn, secure the Municipality's fiscal sustainability and resilience, while preventing further loss of natural and agricultural assets.
  - F1: Maintain the urban edge as the development boundary where identified for settlements in the Greater George Area including George City Area.
  - F2: Direct the long term growth of the George city area, when necessary, contiguous to the existing urban footprint in a manner that reinforces existing accessibility and infrastructure networks and minimises impact on natural landscapes and agricultural resources.
  - F3: Proposals for lateral urban growth of the George city area or new remote / isolated settlement of an urban or suburban nature must be reviewed in terms of a framework that assures the Municipality of no short or long term impact on its sustainability, from a capital and operating perspective.

**Strategy 3: Smart Growth: Invest in the Catalysts for Social and Economic Prosperity.**

- Policy G: Support place-making interventions through building economic infrastructure and upgrading the public environment in priority investment locations to promote inclusivity and invite private sector response.
  - G1: Promote walkability within the intensification zone and especially within the priority nodes.
  - G2: Implement a more articulated approach to the development of human settlement opportunities that supports the spatial development vision of the MSDF and stimulates economic development.
- Policy H: Celebrate built heritage assets in a manner that contributes to renewal, urban quality and opportunity.

George Municipality adopted the following **Housing objectives**:

- To provide for the needs of the homeless by providing safe integrated human settlements.
- To investigate the need, feasibility, desirability and location issues regarding rural housing delivery.
- To accelerate delivery in addressing housing.
- To increase GAP Housing.
- Improving the functioning of settlements for the poor, specifically through providing increased housing choice in well-located areas, improved access between poorer settlements and opportunity rich areas, and the upgrading of poorer areas.

George Municipality adopted the following **Sustainable Human Settlements objectives**:

- The MSDF promotes restructuring and integrating the dysfunctional urban fabric through:
  - Integration of segregated communities into the larger space economy of the emerging city;
  - Containment of urban sprawl;
  - Revitalisation of the historic CBD and strengthening the roles of other urban nodes;
  - Integration of communities through public transport and promotion of non-motorised transport.
- Decision making is guided by the objective of strengthening the economic vitality by:
  - Harnessing opportunities to diversify the local economy;
  - Targeting strategic land parcels for development of catalytic investments;
  - Increasing residential densities in nodes and along public transport routes to improve thresholds.
- The MSDF also promotes creating quality living environments through:
  - Management of the direction and form of new urban growth in a sustainable manner;
  - Developing a system of interdependent settlements with distinct roles and a complementary mix of activities;
  - Maintain a compact settlement form to promote restructuring and more efficient service delivery;
- The MSDF objective of enhancing the rural character and livelihood is achieved through:
  - Safeguarding the productive landscape to preserve employment opportunities in the primary sector.
  - Support existing rural settlements by broadening their economic base and provision of basic services.

The majority of infrastructure investments in the George municipal area will be directed towards human settlements to the value of R409.7 million to fund a wide array of projects. These include, but are not limited to, the construction of top structures in Thembaletu PHEP (R58.5 million), Blanco Golden Valley (R18.2 million) as well as Thembaletu Extensions 42 & 58 (R11.7 million). Service sites will further be developed at the Metro Grounds: Erf 464 (R67.5 million) and Europe extensions (R30.0 million) while planning is currently underway for additional service sites at Rosedale: Syferfontein (R181.6 million), Wilderness Heights: Erf 329 (R13.8 million) and the Thembaletu N2 Project (R1.0 million) (Western Cape Government Provincial Treasury, Municipal Economic Review and Outlook 2018).

## TOPIC 2: SERVICE LEVELS

Topic C.2.1: Service Levels Profile						
Section	Intervention Required?	%	Solution description as defined by topic situation assessment	%	Is there an Existing project/activity addressing this problem?	Current Demand Overall Scoring %
Direct Backlog Water	Yes	100.00	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 still below RDP standard, once practical guidelines become available from the DWS.	100.00	No	92.86
Direct Backlog Sanitation	Yes	100.00	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 still below RDP standard, once practical guidelines become available from the DWS.	100.00	No	71.43
Water Services Infrastructure Supply Level Profile	No	100.00	Continue with the provision of communal water services to all households in informal areas at a ratio of at least 25 households per 1 communal tap.	100.00	Yes	100.00
Water Reliability Profile	No	100.00				100.00

Topic C.2.1: Service Levels Profile						
Section	Intervention Required?	%	Solution description as defined by topic situation assessment	%	Is there an Existing project/activity addressing this problem?	Current Demand Overall Scoring %
Sanitation Service Infrastructure Supply Level Profile	No	100.00	Continue with the provision of communal sanitation services to all households in informal areas at a ratio of at least 5 households per 1 communal toilet.	100.00	Yes	100.00
Sanitation Reliability Profile	No	100.00				100.00
Water Services: Education	Yes	100.00	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.	100.0	No	71.43
Water Services: Health	No	100.00				100.00
Sanitation Services: Education	Yes	100.00	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.	100.0	No	71.43
Sanitation Services: Health	No	100.00				100.00
Health and Educational Facilities	No	100.00				100.00

As a priority it is the responsibility of George 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.

The service levels to be provided by George Municipality to the consumers in their Management Area are included in the Municipality's Water Services By-laws. All water and sanitation services provided by George 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 George Municipality's Indigent Policy.

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

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

George Municipality is committed to support the private landowners as far as possible with regard to addressing the basic water services backlog that might still exist on the farms in the rural areas once clear and practical policy guidelines are available from the DWS and funding is made available. George 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 Garden Route District Municipality responsible for environmental health and George Municipality.
- Subsidising the operating and maintenance costs. If the basic service is to be provided free to the poor, then George Municipality must ensure that the costs of providing the service are covered by the local government equitable share and / or through cross-subsidies within George 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 the education facilities and schools in the urban areas of George Municipality's Management Area have adequate and safe water and sanitation services. George Municipality however needs to verify the water and sanitation service levels of the primary schools in the rural areas. George Municipality is however committed to work with the Education Department to address any possible shortcomings with regard to the provision of basic water and sanitation services that might still exist at any of the primary schools in the rural areas.

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

**Public Amenities Health:** All the clinics and hospitals in George Municipality's Management Area have adequate and safe water and sanitation services. George Municipality will strive to continue to ensure that the minimum required SANS241:2015 water quality standards are met through the systematic upgrading of their WTWs. The monitoring of provision of basic minimum services to farm dwellers remains a challenge, in view of the limited funding and human resources. The environmental health function is currently with the Garden Route District Municipality. The Municipal Health Services of the Garden Route District Municipality also report monthly to the Department of Health on water quality. The quality of life of the people within a Municipality is influenced by the available health care. Various things influence the health conditions of people in any region, for example access to clean water, good sanitation, proper nutrition and adequate housing.

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

The health profile in relation to treated water is excellent. The most vulnerable groups within George 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.

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

Damp and sometimes unsanitary conditions present in informal settlements provide an ideal breeding environment for bacteria. Some of the challenges WSAs phase in the informal settlements include the following:

- It is difficult to supply toilets to the dense informal settlements.
- Grey water pollution.
- Grey water run-off from standpipes.

George 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 INFRASTRUCTURE MANAGEMENT (INFRASTRUCTURE)

Topic C.3.1: Water Services Asset Management						
Section	Intervention Required?	%	Solution description as defined by topic situation assessment	%	Is there an Existing project/activity addressing this problem?	Current Demand Overall Scoring %
General Information	Yes	100.00	Update the Asset Register to include all the water and sewerage infrastructure assets. CRC, DRC, RUL, Age and Condition of the assets need to be accurate.	100.00	Yes	100.00
	Yes	100.00	Develop an Asset Management Plan	100.00	No	71.43
Operation	No	100.00	Continue with the implementation of the Groundwater Management Plan for all the production boreholes	100.00	Yes	100.00
	No	100.00	Implement recommendations from the Water Safety Plan. Improvement/Upgrade plan to be implemented.	100.00	Yes	100.00
	No	100.00	Implement recommendations from the WzRAP. Improvement/Upgrade plan to be implemented.	100.00	Yes	100.00
	No	100.00	Detail Technical Process Audits to be carried out annually on all WTWs and WWTWs	100.00	Yes	100.00
Functionality Observation	No	100.00	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.	100.00	Yes	92.86
Asset Assessment Spectrum	Yes	100.00	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.	100.00	Yes	92.86
Water and Sanitation schemes	No	100.00	Upgrade sections of the water reticulation network and sewer drainage network as proposed in the Water and Sewer Master Plan.	100.00	Yes	92.86

The 2017/2018 Annual Report list the following Water and Sanitation Services challenges.

Table C.3.2: Water and Sanitation Services Challenges		
Service	Challenge	Action to Address
Water	Staff shortage	More funding must be provided to fill vacancies.
Sanitation	Deteriorating infrastructure	More funding must be provided.
	Further staff shortages	More funding must be provided to fill vacancies.
	Financial shortfalls	Further funding must be provided.
	Sludge management of the Water Pollution Control Section.	Apply for more capital funds.
	Insufficient oxygen supply at Outeniqua WWTW due to major break-downs.	Applied for funding to address this problem.
	The upgrading of Outeniqua WWTW to increase the capacity.	Current capital project underway.

The following Infrastructure and effective service delivery-, waste-water management- and water objectives were adopted by George Municipality (2019/2020 Amended IDP)

## Infrastructure and effective service delivery:

- To ensure infrastructure planning and development keeps pace with growing city needs by aligning all strategic documents and efforts.
- To identify and access grant funding for prioritised capital projects.
- To ensure proper asset management by providing sufficient funding and operating capacity for maintenance of existing infrastructure.
- To explore and implement measures to preserve resources and ensure sustainable development.
- To focus on the new wards (DMA) as a priority area for service delivery for the rural areas which are relevant to their unique environment.
- The MSDF promotes the efficient use of existing assets and maximisation of development opportunities associated with them, existing infrastructure within the urban edge of George must be used to leverage more intensive forms of urban development, specifically economic and housing backlogs.

## Waste-water management:

- To provide and maintain safe and sustainable sanitation management and infrastructure.
- Accelerated delivery in addressing sanitation backlogs.
- To provide basic services to informal settlements that complies with the minimum standards.
- To enhance the quality of sanitation.
- Ensure legislative compliance.

## Water:

- To provide world-class water services in George to promote development and fulfil basic needs.
- To provide basic services to informal settlements that comply with the minimum standards.
- To improve service-delivery practices.
- Ensure legislative compliance.



**Asset Management Plan:** 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.

George 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.

A proxy for asset consumption can be considered the level of depreciation each asset incurs on an annual basis. Preserving the investment in existing infrastructure needs to be considered a significant strategy in ensuring the future sustainability of infrastructure and the Municipality's revenue base.

It is important for George 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.

Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increased in (operational) services level coverage's most rapidly. The preparation of maintenance plans and the allocation of sufficient funding for maintenance are required to prevent the development of a large condition backlog.

It is essential for George Municipality to protect their assets by ensuring that an appropriate maintenance and rehabilitation plan (AMP) is developed and implemented. This plan must be based on the principle of preventative maintenance in order to ensure that, as far as this is practical, damage to assets is prevented before it occurs. George 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.

**Disaster Management Plan:** It is the responsibility of the Disaster Management Committee to ensure the compilation and maintenance of a corporate disaster management policy by the Municipality, as well as the relevant supportive hazard specific plans.

The Disaster Management Committee shall be responsible to make recommendations for changes that are considered appropriate and the verification of the required support documents, resources, training and facilities to ensure that the plan is maintained. They also have the responsibility of assigning project teams to address specific risks and develop risk-specific plans. The Disaster Management Committee will be activated through the Disaster Response Procedure.

**Untreated Effluent Management Plan:** There is no known untreated effluent discharged to the environment. The W<sub>2</sub>RAP includes Management Procedures and Incident Response and Emergency Protocols that are implemented by the Municipality.

### Future Water and Sewerage Infrastructure Requirements:

The Water and Sewer Master Plans (March 2019) for the various distribution and drainage systems in George 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.

<b>Table C.3.3: Summary of the Future Water and Sewerage Infrastructure Requirements for George Municipality, as included in the 2019 Water and Sewer Master Plans</b>			
<b>Component</b>	<b>Water Infrastructure (R Million)</b>	<b>Sewerage Infrastructure (R Million)</b>	<b>Total (R Million)</b>
<b>George/Wilderness</b>			
Bulk pipelines	R453.888	R567.601	<b>R1 502.779</b>
Reticulation and Drainage networks	R481.290		
Pump Stations	R73.215	R246.910	<b>R320.125</b>
Reservoirs	R294.237	-	<b>R294.237</b>
WTWs and WWTWs	R1 044.264	R844.970	<b>R1 889.234</b>
<b>Sub Total</b>	<b>R2 346.894</b>	<b>R1 659.481</b>	<b>R4 006.375</b>
<b>Uniondale</b>			
Bulk pipelines	R6.737	R19.698	<b>R33.791</b>
Reticulation and Drainage networks	R7.356		
Pump Stations	R2.311	R6.186	<b>R8.497</b>
Reservoirs	R6.436	-	<b>R6.436</b>
WTWs and WWTWs	R19.761	R16.128	<b>R35.889</b>
<b>Sub Total</b>	<b>R42.601</b>	<b>R42.012</b>	<b>R84.613</b>
<b>Haarlem</b>			
Bulk pipelines	R1.502	R20.137	<b>R22.293</b>
Reticulation and Drainage networks	R0.654		
Pump Stations	R2.592	R2.589	<b>R5.181</b>
Reservoirs	-	-	<b>-</b>
WTWs and WWTWs	R6.357	R19.083	<b>R25.440</b>
<b>Sub Total</b>	<b>R11.105</b>	<b>R41.809</b>	<b>R52.914</b>
<b>Total</b>	<b>R2 400.600</b>	<b>R1 743.302</b>	<b>R4 143.902</b>

### GROUNDWATER INFRASTRUCTURE

George Municipality also needs to keep on monitoring on a monthly basis (at least) the static water level (i.e. the level prior to commencement of pumping for the day) in each of their production and monitoring boreholes. Water quality samples also need to be taken on a seasonal or yearly basis. The daily rainfall for the area should also be recorded. This monitoring data should be processed, analysed and reported on by an experienced hydrogeologist in order to ascertain whether the resource is being sustainably utilised or whether groundwater mining is taking place. Managing groundwater for water supply purposes should have the following three main functions:

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



An additional function, which is usually captured in the first two points, is to ensure that environmental integrity is maintained. It is important for George Municipality 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.

<b>Table C.3.4: Key Groundwater Management Functions</b>				
<b>Activity</b>	<b>Responsible Person</b>	<b>Skills and qualifications required</b>	<b>Resources, tools and equipment</b>	<b>Remarks</b>
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.
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)

## **BULK WATER INFRASTRUCTURE**

The Water Master Plan (March 2019) has indicated that based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk water supply systems.

<b>Table C.3.5: Proposed Future Bulk Water Pipeline Infrastructure (RAW, PDBM, DBM and BLK) for the different Water Zones, as included in the Latest Water Master Plans (CVs, FCVs, PRVs and Pipes)</b>		
<b>Master Plan Item Reference</b>	<b>Zones and Sub-Zones</b>	<b>Cost (R Million)</b>
<b>Blanco Main Zone</b>		
BMR	Blanco main zone	R4.534
DRR	Die Rus reservoir sub zone	R4.651
GVR	Golden Valley reservoir sub zone	R1.452
MTR	Montinequa	R2.021
SPR, SVR	Saasveld reservoir sub zone	R7.085
<b>Sub Total</b>		<b>R19.743</b>
<b>George Main Zone</b>		
GMR	George Main Zone	R299.849
GRW	Garden Route Dam	R3.437
<b>Sub Total</b>		<b>R303.286</b>
<b>Herolds Bay and Oubaai Sub Zones</b>		
HBR	Herolds Bay reservoir sub zone	R0.233
OBR	Oubaai reservoir sub zone	R0.476
<b>Sub Total</b>		<b>R0.709</b>
<b>Pacaltzorp Sub Zone</b>		
PER	Pacaltzorp (East) reservoir sub zone	R2.026
PET	Pacaltzorp (East) tower sub zone	R0.779
PWR	Pacaltzorp (West) reservoir sub zone	R41.401
PWT	Pacaltzorp (West) tower sub zone	R0.449
<b>Sub Total</b>		<b>R44.655</b>
<b>Thembaletu Sub Zone</b>		
TER	Thembaletu (East) reservoir sub zone	R0.441
TET	Thembaletu (East) water tower sub zone	R0.093
TWR	Thembaletu (West) reservoir sub zone	R0.347
TWT	Thembaletu (West) water tower sub zone	R0.373
<b>Sub Total</b>		<b>R1.254</b>
<b>Kraaibosch Sub Zone</b>		
KBR	Kraaibosch reservoir sub zone	R3.040
KBT	Kraaibosch water tower sub zone	R0.598
<b>Sub Total</b>		<b>R3.638</b>
<b>Akela and Wilderness Sub Zone</b>		
AWR, WNR	Akela and Ebb-and-Flow reservoir sub zone and Wilderness reservoir sub zone	R52.434
EFR	Akela and Ebb-and-Flow reservoir sub zone	R0.466
KER	Kleinkrantz reservoir sub zone	R2.510
LSR	Liebestraum reservoir sub zone	R10.383
TRR	Touwsrante reservoir sub zone	R14.606
VBR	Victoria Bay reservoir sub zone	R0.204
<b>Sub Total</b>		<b>R80.603</b>
<b>Uniondale</b>		
UAR	Uniondale Site A	R0.295
UBR	Uniondale Site B	R0.204
UCR	Uniondale Site C	R0.204
UWT	Uniondale WTW	R6.034
<b>Sub Total</b>		<b>R6.737</b>
<b>Haarlem</b>		
HCR	LCH Reservoirs	0.233
HLR	LL Reservoirs	0.388

**Table C.3.5: Proposed Future Bulk Water Pipeline Infrastructure (RAW, PDBM, DBM and BLK) for the different Water Zones, as included in the Latest Water Master Plans (CVs, FCVs, PRVs and Pipes)**

Master Plan Item Reference	Zones and Sub-Zones	Cost (R Million)
HWT	Haarlem WTW	0.881
<b>Sub Total</b>		<b>R1.502</b>
<b>Total</b>		<b>R462.127</b>

## **WATER TREATMENT WORKS INFRASTRUCTURE**

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

<b>Table C.3.6: Existing Capacities and Flows at each of the WTWs (MI/d)</b>					
WTW	Existing Hydraulic Capacity	2018/2019 Peak Month Average Daily Flow	Average Daily Flow (July 2018 – June 2019)	Required Treatment Capacity (1.5 x AADD <sub>10yr</sub> )	2018/2019 Water Quality Failures (SANS0214:2015)
George New	20.000	21.090 (Jan)	18.766	-	-
George Old	25.000	15.897 (July)	14.656	-	-
George New & Old	45.000	35.356 (Mar)	33.421	61.111	-
Wilderness	1.700	1.261 (Jan)	1.023	1.871	-
Uniondale	1.500	1.024 (Jan)	0.803	1.397	Turbidity
Haarlem	1.000	0.838 (Aug)	0.534	0.929	Turbidity, Colour

The Water Master plan (March 2019) has indicated that it will be necessary to upgrade the following WTWs:

<b>Table C.3.7: Proposed WTWs to be Upgraded as included in the Latest Water Master Plans</b>			
Scheme	Recommendations included in the Water Master Plan	Year	Cost (R million)
George / Wilderness	Refurbishment of Old WTW (4 MI/d additional capacity) (GMR B15.01)	2018	R54.900
	Upgrade New WTW (10 MI/d additional capacity) & add pump: Phase 1a (GMR B01.01)	2018	R118.950
	Upgrade New WTW (10 MI/d additional capacity): Phase 1b (GMR B01.02)	2023	R118.950
	Upgrade New WTW (25 MI/d additional capacity), new PS & rising main: Phase 2 (GMR B01.03)	2033	R250.488
	Upgrade New WTW (25 MI/d additional capacity) & add pump: Phase 3 (GMR B01.04)	2048	R250.488
	Upgrade New WTW (25 MI/d additional capacity) & add pump: Phase 4 (GMR B01.05)	2063	R250.488
Uniondale	Upgrade Uniondale WTW (1.2 MI/d additional capacity) (UWT B01.01)	2028	R19.761
Haarlem	Upgrade Haarlem WTW (0.3 MI/d additional capacity) (HWT B01.01)	2033	R6.357
<b>Total</b>			<b>R1 070.382</b>

**George Old and New WTW:** The current total capacity of the Old and New George WTWs is inadequate and the Municipality plans for the extension of the New WTW with an additional 20 MI/d treatment capacity. The rehabilitation of the old WTW is also included in the Municipality's approved 2019/2020 three-year capital budget.

**Wilderness WTW:** The WTW is operated at 60.2% of its design capacity. No major upgrading is required in the short term. The WTW is generally operated and maintained satisfactorily and the Municipality's biggest challenge is the rehabilitation and maintenance of the existing infrastructure. No major upgrades are required for the short term.

**Uniondale WTW:** The WTW was upgraded during 2012/2013 and currently operates at 68.3% of its design capacity. No further upgrades are required for the short to medium term. The Municipality will however construct an office building for the Process Controllers at the plant during 2019/2020.

**Haarlem WTW:** The WTW is operated at 53.4% of its design capacity. The condition of the WTW is good and no major upgrading is required in the short to medium term. The Municipality will however construct an office building for the Process Controllers at the plant during 2019/2020.

## WATER PUMP STATIONS

The Water Master Plan (March 2019) has indicated that based on the most likely land-use development scenario, it will be necessary for the following future water pump stations:

<b>Scheme</b>	<b>Recommendations included in the Water Master Plan</b>	<b>Year</b>	<b>Capacity (l/s)</b>	<b>Head (m)</b>	<b>Cost (R million)</b>
George / Wilderness	Upgrade new WTW (10 Ml/d add) & add pump: Phase 1a	2018	160	50	R1.191
	Blanco PS (GVR B01.02))	2023	34	40	R3.034
	New Pacaltzdorp (East) Tower PS (PET B01.01)	2023	90	25	R2.990
	Investigate and upgrade Outeniqua Raw Water PS (GRW 04.03)	2028	200	30	R5.776
	Additional Pump Kraaibosch Tower PS (KBT B01.02)	2028	124	25	R4.169
	Kleinkrantz East Res PS (KER B01.02)	2028	17	60	R1.905
	New Montinequa Res Booster PS (MTR B01.01)	2028	11	110	R1.844
	Additional Pacaltzdorp (West) PS (BLK PWT 01)	2028	620	25	R13.469
	Additional Thembaletu (West) Tower PS (TWT B01.01)	2028	40	25	R2.202
	Upgrade new WTW (25 Ml/d add), new PS & rising main: Phase 2	2033	900	50	R21.010
	Upgrade existing Touwsrante pumps (TRR B01.01)	2033	39	220	R5.554
	New Thembaletu (East) Tower PS (TET B01.01)	2038	91	25	R3.007
	Upgrade new WTW (25 Ml/d add) & add pump: Phase 3	2048	300	50	R1.964
	Investigate and upgrade Liebestraum Res PS (LSR B02.02)	2053	22	200	R3.136
	Upgrade new WTW (25 Ml/d add) & add pump: Phase 4	2063	300	50	R1.964
Uniondale	Site A Reservoir Booster PS (UAR F01.02)	2033	21	40	R2.311
Haarlem	Upgrade Haarlem WTP Pumps (HWT B02.01)	2028	20	60	R2.592
<b>Total</b>					<b>R78.118</b>

## RESERVOIR INFRASTRUCTURE

The condition of all the reservoirs in George Municipality's Management Area is good and the reservoirs are well maintained. George Municipality's overall storage factors of the reservoirs for the various towns, based on 1 x PDD (24 hours storage capacity), are 1.43 for George / Wilderness, 0.86 for Uniondale and 2.57 for Haarlem.

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 (March 2019) and indicated in the table below.

<b>Area</b>	<b>Recommendations included in the Water Master Plan</b>	<b>Year</b>	<b>Capacity (Ml)</b>	<b>Cost (R Million)</b>
George / Wilderness	Airport reservoir (Private)(GMR 43.05)	2018	0.200	R1.548
	Die Rus x1 Reservoir (DRR B01.08)	2023	1.000	R5.040
	Additional 4 <sup>th</sup> Reservoir at old WTW (GMR B11.03) <i>Was implemented</i>	2023	12.500	-
	1 <sup>st</sup> Additional Kraaibosch Reservoir (KBR B01.03)	2023	3.700	R12.457
	New Pacaltzdorp East Reservoir (PER B01.02)	2023	2.500	R9.432
	New Pacaltzdorp East Tower (PET B01.03)	2023	0.300	R5.832
	1 <sup>st</sup> Additional Pacaltzdorp West Reservoir (PWR B01.05)	2028	14.500	R34.184
	New Kleinkrantz East Reservoir (KER B01.05)	2028	0.500	R3.218
	New Montinequa Reservoir (MTR B01.05)	2028	0.800	R4.356
	Additional Pacaltzdorp West Tower (PWT B01.05)	2028	2.500	R27.900
	Thembaletu West Reservoir (TWR B01.03)	2028	3.000	R10.620
	New Blanco Reservoir (BMR B03.03)	2033	6.000	R17.370
	Thembaletu East Reservoir (TER B01.03)	2038	5.000	R15.225
	Thembaletu East Tower (TET B01.04)	2038	0.600	R9.009
	Additional 5 <sup>th</sup> Reservoir at old WTW (GMR B10.04)	2043	12.500	R30.344

Table C.3.9: Proposed Future Reservoirs and Water Towers as included in the Latest Water Master Plans				
Area	Recommendations included in the Water Master Plan	Year	Capacity (MI)	Cost (R Million)
	Additional Akela Reservoir (AWR B01.03)	2043	1.000	R5.040
	Additional Oubaai Reservoir (OBR B02.02)	2048	1.300	R6.075
	Additional Liebestraum Reservoir (LSR B01.02)	2053	1.500	R6.642
	2 <sup>nd</sup> Additional Pacaltzorp West Reservoir (PWR B01.07)	2053	14.500	R34.184
	Additional Kraaibosch Tower (KBT B01.04)	2058	1.000	R12.960
	2 <sup>nd</sup> Additional Kraaibosch Reservoir (KBR B01.05)	2058	3.700	R12.457
	Additional 6 <sup>th</sup> Reservoir at old WTW (GMR B12.03)	2063	12.500	R30.344
Uniondale	Additional Uniondale Site C Reservoir	2018	0.500	R3.218
	Additional Uniondale Site A Reservoir	2033	0.500	R3.218
<b>Total</b>				<b>R300.673</b>

## WATER RETICULATION INFRASTRUCTURE

The Water Master Plan (March 2019) has indicated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary.

Table C.3.10: Proposed Future Water Reticulation Infrastructure (PRET and RET) for the different Water Zones, as included in the Latest Water Master Plans (CVs, FCVs, PRVs and Pipes)		
Master Plan Item Reference	Zones and Sub-Zones	Cost (R Million)
<b>Blanco Main Zone</b>		
BMR	Blanco main zone	R40.824
DRR	Die Rus reservoir sub zone	R3.116
GVR	Golden Valley reservoir sub zone	R0.131
MTR	Montinequa	R0.769
SPR, SVR	Saasveld reservoir sub zone	-
<b>Sub Total</b>		<b>R44.840</b>
<b>George Main Zone</b>		
GMR	George Main Zone	R106.150
GRW	Garden Route Dam	-
<b>Sub Total</b>		<b>R106.150</b>
<b>Herolds Bay and Oubaai Sub Zones</b>		
HBR	Herolds Bay reservoir sub zone	R0.208
OBR	Oubaai reservoir sub zone	R15.869
<b>Sub Total</b>		<b>R16.077</b>
<b>Pacaltzorp Sub Zone</b>		
LGR	Le Grand reservoir sub zone	R1.475
PER	Pacaltzorp (East) reservoir sub zone	R0.615
PET	Pacaltzorp (East) tower sub zone	R3.026
PWR	Pacaltzorp (West) reservoir sub zone	R66.444
PWT	Pacaltzorp (West) tower sub zone	R126.525
<b>Sub Total</b>		<b>R198.085</b>
<b>Thembaletu Sub Zone</b>		
TER	Thembaletu (East) reservoir sub zone	-
TET	Thembaletu (East) water tower sub zone	R15.950
TWR	Thembaletu (West) reservoir sub zone	-
TWT	Thembaletu (West) water tower sub zone	R2.776
<b>Sub Total</b>		<b>R18.726</b>
<b>Kraaibosch Sub Zone</b>		
KBR	Kraaibosch reservoir sub zone	-
KBT	Kraaibosch water tower sub zone	R62.717
<b>Sub Total</b>		<b>R62.717</b>
<b>Akela and Wilderness Sub Zone</b>		

Table C.3.10: Proposed Future Water Reticulation Infrastructure (PRET and RET) for the different Water Zones, as included in the Latest Water Master Plans (CVs, FCVs, PRVs and Pipes)		
Master Plan Item Reference	Zones and Sub-Zones	Cost (R Million)
AWR, WNR	Akela and Ebb-and-Flow reservoir sub zone and Wilderness reservoir sub zone	R3.164
EFR	Akela and Ebb-and-Flow reservoir sub zone	-
KER	Kleinkrantz reservoir sub zone	R4.944
KKR	Konstantiakloof reservoir sub zone	R0.826
LSR	Liebestraum reservoir sub zone	R19.076
TRR	Touwsrante reservoir sub zone	R5.511
VBR	Victoria Bay reservoir sub zone	R1.174
<b>Sub Total</b>		<b>R34.695</b>
<b>Uniondale</b>		
UAR	Uniondale Site A	R4.338
UDR	Uniondale Site D	R2.414
UCR	Uniondale Site C	R0.604
UWT	Uniondale WTW	-
<b>Sub Total</b>		<b>R7.356</b>
<b>Haarlem</b>		
HHR	HL Reservoirs	R0.271
HLR	LL Reservoirs	R0.383
HWT	Haarlem WTW	-
<b>Sub Total</b>		<b>R0.654</b>
<b>Total</b>		<b>R489.300</b>

## SEWER PUMP STATIONS

The Sewer Master Plan (March 2019) has indicated that based on the most likely land-use development scenario, it will be necessary for the following sewer pump stations:

Table C.3.11: Future Sewer Pump Stations Required				
Recommendations included in the Sewer Master Plan		Year	Design Flow (l/s)	Cost (R Million)
<b>Gwaing WWTW</b>				
Groeneweide Ext PS F2	New PS (BLK GW 009)	2018	585.936	R14.368
Kingswood PS F2	New interim PS (RET GW 100)	2018	12.000	R0
Fancourt PS C	Abandon existing PS (Investigate Flow) (RET GW 029)	2018	0	R0.216
Die Rus PS	Abandon existing PS (RET GW 041)	2018	0	R0.216
Kingswood PS	Investigate existing pump flow (RET GW 009)	2018	5.000	R0.024
Airport PS 2	Downsize existing pump flow (Investigate flow)(RET GW 085)	2018	5.000	R0.024
Fancourt PS D	Investigate existing pump flow (RET GW 018)	2018	6.000	R0.024
Gwaing PS	Downsize existing pump flow (BLK GW 005)	2018	128.754	R0.897
Roorriver PS	Downsize existing pump flow (RET GW 008)	2018	111.493	R0.846
Airport PS No.1	Abandon existing PS (Investigate Flow) (RET GW 084)	2018	0	R0.216
Kingswood PS F1	New PS (RET GW 050)	2023	5.000	R2.027
Bos-en-Dal PS	Abandon existing PS (RET OT 016)	2023	0	R0.216
Pacaltzorp PS 7	Abandon existing PS (Investigate Flow) (RET GW 060)	2023	0	R0.216
Pacaltzorp PS 5	Abandon existing PS (RET GW 059)	2023	0	R0.216
Groeneweide Ext PS F1	New PS (RET GW 053)	2023	25.754	R2.859
Montinequa PS	New PS (RET GW 042)	2028	5.000	R2.027
Fancourt PS E	Abandon existing PS (Investigate Flow) (RET GW 025)	2033	0	R0.216
Fancourt PS	Abandon existing PS (RET GW 023)	2033	0	R0.216
Fancourt PS A	Abandon existing PS (Investigate Flow) (RET GW 027)	2033	0	R0.216
Fancourt PS B	Abandon existing PS (Investigate Flow) (RET GW 031)	2033	0	R0.216
Gwayang River Estate PS No.3	New PS (BLK GW 007)	2033	216.252	R9.776
Buffelsfontein PS No.2	New PS (BLK GW 008)	2033	285.918	R11.881



Table C.3.11: Future Sewer Pump Stations Required				
Recommendations included in the Sewer Master Plan		Year	Design Flow (l/s)	Cost (R Million)
Bramble Hill PS	Abandon existing PS (Investigate Flow) (RET GW 038)	2038	0	R0.216
Hansmoeskraal PS No.7	New PS (RET GW 079)	2053	48.100	R3.738
<b>Sub Total</b>				<b>R50.867</b>
Herolds Bay WWTW				
Herold's Bay PS No.2	Upgrade existing PS (Investigate Flow) (RET HB 004)	2018	4.585	R0.736
Herold's Bay PS No.1	Upgrade existing pump flow (RET HB 001)	2018	54.756	R1.534
Herold's Bay PS No.3	Investigate existing pump flow (RET HB 005)	2018	4.000	R0.024
Dultons Cove PS F.2	New PS (RET HB 007)	2018	5.000	R2.027
Dultons Cove PS F.1	New PS (RET HB 010)	2023	5.000	R2.027
Brakfontein PS F.1	New PS (RET HB 012)	2063	5.000	R2.027
Brakfontein PS F.2	New PS (RET HB 016)	2063	5.000	R2.027
Brakfontein PS F.3	New PS (RET HB 017)	2063	5.000	R2.027
Brakfontein PS F.4	New PS (RET HB 018)	2063	5.000	R2.027
Brakfontein PS F.5	New PS (RET HB 019)	2063	5.000	R2.027
<b>Sub Total</b>				<b>R16.483</b>
Kleinkrantz WWTW				
Touwsranten Ps No.2	Upgrade existing pump flow (RET KK 019)	2018	12.811	R0.897
Touwsranten PS No.3	Upgrade existing pump flow (RET KK 008)	2018	4.619	R0.718
Touwsranten PS No.1	Upgrade existing pump flow (RET KK 021)	2018	30.450	R1.167
Serpentine Booster PS	Upgrade existing pump flow (RET KK 023)	2018	40.670	R1.322
Central PS	Upgrade existing pump flow (RET KK 005)	2018	32.977	R1.205
Estuary PS	Upgrade existing pump flow (RET KK 007)	2018	38.963	R1.296
Anchorage Lane PS	Upgrade existing pump flow (RET KK 013)	2018	22.468	R1.045
Freezia PS No.2	Upgrade existing pump flow (RET KK 016)	2018	84.580	R1.977
Ebb and Flow PS	Upgrade existing pump flow (BKL KK 001)	2018	136.612	R2.729
Kentner PS No.1	Upgrade existing pump flow (RET KK 027)	2018	6.761	R0.804
Kentner PS No.2	Upgrade existing pump flow (RET KK 028)	2018	13.252	R0.904
Wilderness East PS	Upgrade existing pump flow (BKL KK 002)	2018	172.942	R3.239
Kleinkrantz PS	Upgrade existing pump flow (BKL KK 004)	2018	201.017	R3.625
Southside PS A	Downsize existing pump flow (RET KK 010)	2018	4.619	R0.240
Fairy Knowe PS	Downsize existing pump flow (RET KK 015)	2018	4.619	R0.240
Jacobsz Hoekwil Trust PS	Investigate existing pump station (RET KK 026)	2018	6.000	R0.024
Holiday Inn PS	Investigate existing pump station (RET KK 029)	2018	6.000	R0.024
Garage PS	Investigate existing pump flow (RET KK 030)	2018	5.000	R0.024
Leentjies Klip PS 3	Investigate existing pump flow (RET KK 002)	2018	5.000	R0.024
Wilderness PS F.3	New PS (RET KK 036)	2018	5.000	R2.027
Wilderness PS F.4	New PS (RET KK 039)	2018	5.000	R2.027
Wilderness PS F.5	New PS (RET KK 050)	2018	5.000	R2.027
Wilderness PS F.6	New PS (RET KK 051)	2018	5.193	R2.035
Wilderness PS F.8	New PS (RET KK 053)	2018	5.000	R2.027
Wilderness PS F.9	New PS (RET KK 055)	2018	7.927	R2.146
Wilderness PS F.10	New PS (RET KK 057)	2018	5.000	R2.027
Wilderness PS F.11	New PS (RET KK 058)	2018	5.000	R2.027
Wilderness PS F.12	New PS (RET KK 060)	2018	5.966	R2.066
Touwsranten PS F.4	New PS (RET KK 044)	2018	5.000	R2.027
Leentjies Klip PS 2	Upgrade existing pump flow (RET KK 001)	2023	12.896	R0.899
WildernessHoogte 2 PS	New PS (RET KK 034)	2028	5.000	R2.027
Hoekwil3 PS F.1	New PS (RET KK 046)	2028	5.000	R2.027
Hoekwil3 PS F.2	New PS (RET KK 047)	2028	5.000	R2.027
Kleinkrantz1 PS	New PS (RET KK 062)	2028	5.000	R2.027
Touwsranten PS F.3	New PS (RET KK 045)	2033	5.000	R2.027
Kleinkrantz2 PS	New PS (RET KK 061)	2033	5.000	R2.027
Touwsranten PS F.5	New PS (RET KK 041)	2053	5.000	R2.027

Table C.3.11: Future Sewer Pump Stations Required				
Recommendations included in the Sewer Master Plan		Year	Design Flow (l/s)	Cost (R Million)
Touwsrante PS F.6	New PS (RET KK 043)	2053	5.777	R2.058
<b>Sub Total</b>				<b>R59.086</b>
<b>Oubaai WWTW</b>				
Oubaai PS No.5	Upgrade existing pump flow (Investigate flow) (RET OB 008)	2018	4.439	R0.714
Oubaai PS No.6	Upgrade existing pump flow (Investigate flow) (RET OB 010)	2018	7.073	R0.833
Oubaai PS No.8	Upgrade existing pump flow (Investigate flow) (RET OB 013)	2018	14.826	R0.952
Oubaai PS No.9	Upgrade existing pump flow (Investigate flow) (RET OB 015)	2018	15.705	R0.966
Oubaai PS No.10	Upgrade existing pump flow (Investigate flow) (RET OB 017)	2018	17.325	R0.990
Oubaai PS No.2	Upgrade existing pump flow (Investigate flow) (RET OB 002)	2018	6.358	R0.822
Oubaai PS No.3	Upgrade existing pump flow (Investigate flow) (RET OB 004)	2018	8.110	R0.849
Oubaai PS No.1	Upgrade existing pump flow (Investigate flow) (RET OB 001)	2018	4.000	R0.024
Oubaai PS No.4	Investigate existing pump flow (RET OB 007)	2018	4.000	R0.024
Oubaai PS No.7	Investigate existing pump flow (RET OB 012)	2018	4.000	R0.024
<b>Sub Total</b>				<b>R6.198</b>
<b>Breakwater Bay WWTW</b>				
Breakwater Bay PS 1 Cap.	Upgrade existing PS (Investigate First) (RET BB 004)	2018	5.000	R0.024
Breakwater Bay PS 2 Cap.	Upgrade existing PS (Investigate First) (RET BB005)	2018	5.000	R0.024
Breakwater Bay PS 3 Cap.	Upgrade existing PS (Investigate First) (RET BB 003)	2018	5.000	R0.024
<b>Sub Total</b>				<b>R0.072</b>
<b>Outeniqua WWTW</b>				
Pacaltzorp PS4	Abandon existing PS (RET GW 071)	2033	0	R0.216
Pacaltzorp West PS	New interim PS (RET GW 068)	2033	23.000	R0
Eden George PS	Upgrade existing pump flow (BLK OT 004)	2018	131.134	R2.651
Glenwood PS	Upgrade existing pump flow (Investigate Flow) (RET OT 001)	2028	36.733	R1.286
Meul PS	Upgrade existing pump flow (BLK OT 005)	2018	360.563	R5.011
Thembalethu PS No.2	Abandon existing PS (RET OT 045)	2023	0	R0.216
Schaapkop PS	Upgrade existing pump flow (BLK OT 008)	2018	447.147	R5.896
Thembalethu PS No.3	Abandon existing PS (RET OT 052)	2018	0	R0.216
Pacaltzorp PS No.6	Abandon existing PS (RET OT 056)	2018	0	R0.216
Pacaltzorp PS No.3	Upgrade existing PS (BLK OT 015)	2023	190.840	R4.648
Pacaltzorp PS No.1	Upgrade existing pump flow (BLK OT 013)	2058	666.707	R7.825
Pacaltzorp PS No.2	Abandon existing PS (RET GW 063)	2038	0	R0.216
Blue Mountain PS No.2	Upgrade existing pump flow (RET OT 012)	2018	12.792	R0.897
Thembalethu PS No.1	Abandon existing PS (RET OT 040)	2023	0	R0.216
Thembalethu PS No.4	Abandon existing PS (RET OT 053)	2018	0	R0.216
Thembalethu PS No.5	Abandon existing PS (RET OT 065)	2028	0	R0.216
Kraaibosch PS	Upgrade existing pump flow (RET OT 010)	2033	90.049	R2.057
Thembalethu PS B	Abandon existing PS (RET OT 043)	2023	0	R0.216
Thembalethu PS A	Abandon existing PS (RET OT 041)	2023	0	R0.216
Rosedale PS 2	Abandon existing PS (RET OT 022)	2028	0	R0.216
Tamsui PS	Abandon existing PS (RET OT 021)	2018	0	R0.216
Blue Mountain PS 1	Upgrade existing pump flow (RET OT 011)	2018	12.652	R0.895
Parkdene PS 1	Abandon existing PS (RET OT 035)	2023	0	R0.216
Parkdene PS 2	Abandon existing PS (RET OT 031)	2023	0	R0.216
Parkdene PS 3	Abandon existing PS (RET OT 029)	2023	0	R0.216
Rosedale PS 1	Abandon existing PS (RET OT 026)	2028	0	R0.216
Thembalethu PS 6	Upgrade existing pump flow (Investigate Flow) (BLK OT 011)	2023	361.032	R4.697
Thembalethu PS 7	Abandon existing PS (RET OT 120)	2023	0	R0.216
Loerie Ext 1A PS	New PS (RET OT 081)	2043	9.264	R2.200
Kraaibosch 3 PS	New PS (RET OT 091)	2028	20.239	R3.004
Pacaltzorp PS F.9	New interim PS (RET OT 027)	2028	15.000	R0
Pacaltzorp Ext.3A PS	New PS (RET OT 020)	2028	42.519	R3.520
Woodfields PS F.1	New PS (RET OT 115)	2063	5.000	R2.027



Table C.3.11: Future Sewer Pump Stations Required				
Recommendations included in the Sewer Master Plan		Year	Design Flow (l/s)	Cost (R Million)
Woodfields PS F.2	New PS (RET OT 117)	2063	11.341	R2.283
Woodfields PS F.3	New PS (RET OT 110)	2063	23.793	R2.781
Woodfields PS F.4	New PS (RET OT 113)	2063	46.993	R3.695
Kraaibosch5 PS	New PS (RET OT 108)	2028	56.225	R4.053
Victoria Bay PS 2	New pumps (RET OT 075)	2023	14.387	R0.921
Ballots Bay PS	New PS (RET OT 097)	2028	5.000	R2.027
Thembaletu Ext.10 PS	New PS, else siphon (RET OT 095)	2028	15.880	R2.466
Kraaibosch4 PS	New PS (RET OT 019)	2023	169.065	R8.182
Destiny Africa PS	New PS (RET OT 021)	2023	240.490	R10.563
Thembaletu Ext.12A PS	New PS (RET OT 101)	2053	42.137	R3.505
Thembaletu Ext.11B PS	New PS (RET OT 104)	2053	44.816	R3.610
Le Grand 2 PS F2	New PS (RET OT 123)	2028	8.539	R2.170
Le Grand 1 PS	New PS (RET OT 126)	2053	5.000	R2.027
Le Grand 2 PS F1	New PS (RET OT 124)	2028	5.000	R2.027
Le Grand PS	New pumps (RET OT 057)	2018	33.543	R1.214
Hansmoeskraal 4 PS	New PS (RET OT 128)	2043	14.951	R2.429
Hansmoeskraal 5 PS1	New PS (RET OT 132)	2023	9.780	R2.221
Hansmoeskraal 5 PS 2	New PS (RET OT 135)	2043	12.734	R2.339
Hansmoeskraal 2 PS	New PS (RET OT 134)	2023	63.048	R4.315
Saasveld PS 4	Upgrade existing pump flow (Investigate Flow) (RET OT 069)	2018	5.083	R0.802
Saasveld PS 1	Investigate existing pump flow (RET OT 071)	2018	5.000	R0.024
Saasveld PS 2	Investigate existing pump flow (RET OT 070)	2018	5.000	R0.024
Saasveld PS 3	Investigate existing pump flow (RET OT 068)	2018	5.000	R0.024
Saasveld PS 6	Abandon existing PS (RET OT 114)	2063	0	R0.216
<b>Sub Total</b>				<b>R114.204</b>
Uniondale WWTW				
Uniondale PS No.1	Abandon existing PS (RET UD 007)	2018	0	R0.216
Uniondale PS No.2	Abandon existing PS (RET UF 009)	2018	0	R0.216
Uniondale PS No.4	Upgrade existing PS (Investigate First) (RET UD 002)	2018	11.932	R0.908
Uniondale PS No.5	New PS (RET UD 005)	2018	24.737	R2.819
Uniondale PS No.6	New PS (RET UD 001)	2028	5.000	R2.027
<b>Sub Total</b>				<b>R6.186</b>
Haarlem WWTW				
Investigated existing pump flow	Upgrade existing PS (Investigate First) (RET HL 002)	2018	5.000	R0.024
Haarlem PS No.2	New PS (RET HL 003)	2018	18.362	R2.565
<b>Sub Total</b>				<b>R2.589</b>
<b>Total</b>				<b>R255.685</b>

## **BULK SEWER RETICULATION AND SEWER DRAINAGE NETWORK INFRASTRUCTURE**

The Sewer Master Plan (March 2019) has indicated that based on the most likely land-use development scenario, the following future bulk sewer and sewer drainage infrastructure components will be necessary. Anticipated full development and existing developed areas not currently served by a sewer reticulation system were incorporated into the existing sewer systems for each town or drainage area in the Sewer Master Plans.

Table C.3.12: Proposed Future Bulk Sewer and Sewer Drainage Infrastructure for the different Drainage Zones, as included in the Latest Sewer Master Plans (Diversion, Gravity Pipes and Rising Pipes)		
Master Plan Item Reference	Drainage Zone	Cost (R Million)
GW	Gwaing	R240.003
OT, SV, GW	Outeniqua	R209.347
KK	Kleinkrantz	R86.599
HB	Herolds Bay	R22.996

**Table C.3.12: Proposed Future Bulk Sewer and Sewer Drainage Infrastructure for the different Drainage Zones, as included in the Latest Sewer Master Plans (Diversions, Gravity Pipes and Rising Pipes)**

Master Plan Item Reference	Drainage Zone	Cost (R Million)
BB	Breakwater Bay	R0.785
OB	Oubaii	R7.871
UD	Uniondale	R19.698
HL	Haarlem	R20.137
<b>Total</b>		<b>R607.436</b>

## WASTE WATER TREATMENT INFRASTRUCTURE

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

**Table C.3.13: Existing Capacities and Flows at each of the WWTWs (MI/d)**

WWTW	Hydraulic Design Capacity (MI/d)	2018/2019 Average Daily Flow (MI/d)	2018/2019 Peak Month Average Daily Flow (MI/d)	Operational % i.t.o. Design Capacity
Outeniqua	15.000	9.534	11.533 (Sept)	65.6%
Gwaing	7.300	7.274	9.065 (May)	99.6%
Kleinkrantz	2.500	0.592	0.806 (Dec)	23.7%
Herolds Bay	0.300	0.162	0.287 (Apr)	54.0%
Uniondale	1.000	0.698	0.838 (Sept)	69.8%
Haarlem	0.100	0.074 (Estimated)	Unknown	74.0%

**Table C.3.14: Design Organic Load Capacities of WWTWs and Current Loads**

WWTW	Organic Design Capacity (kg COD / day)	2018/2019 Average Actual Organic Load (kg COD / day)	Operational % i.t.o. Design Capacity
Outeniqua	15 000	8 178	54.5%
Gwaing	6 935	3 930	56.7%
Kleinkrantz	2 208	362	16.4%
Herolds Bay	210	58	27.6%
Uniondale	640	536	83.8%
Haarlem	Unknown	20 (Estimated)	Unknown

George Municipality revises on an annual basis the capacity and suitability of the WWTWs to meet the requirements of the authorisations and downstream users for the quality of the final effluent being discharged to the receiving water bodies. When the water quality requirements for the final effluent becomes stricter and / or when the inflow to the WWTW has increased to such an extent that the capacity of the plant needs to be increase, then the Municipality appoints reputed consulting engineering firms to undertake feasibility studies to perform technical and economical evaluation of the different options available for upgrading or extending the capacity of the treatment works.

The Sewer Master plan (March 2019) has indicated that it will be necessary to upgrade the following WWTWs:

**Table C.3.15: Proposed WWTWs to be Upgraded as included in the Latest Sewer Master Plans**

Master Plan Item Reference	WWTW included in the Sewer Master Plan	Year	Cost (R Million)
GW 17.01c	Gwaing new 5.5 MI/d: Phase 1 of 4	2023	R106.282
GW 17.02b	Gwaing new 5.5 MI/d: Phase 2 of 4	2033	R106.282
GW 17.03b	Gwaing new 5.5 MI/d: Phase 3 of 4	2043	R106.282
GW 17.04b	Gwaing new 5.5 MI/d: Phase 4 of 4	2058	R106.282
OT 24.01c	Outeniqua new 10.0 MI/d: Phase 1 of 3	2018	R177.341
OT 24.02b	Outeniqua new 5.5 MI/d: Phase 2 of 3	2033	R106.282
OT 24.03b	Outeniqua new 5.5 MI/d: Phase 3 of 3	2053	R106.282
HB 05.01c	Herolds Bay new 0.5 MI/d: Phase 1 of 2	2018	R13.898
HB 05.01e	Abandon existing WWTW: Phase 1 of 2	2018	R2.141

Table C.3.15: Proposed WWTWs to be Upgraded as included in the Latest Sewer Master Plans

Master Plan Item Reference	WWTW included in the Sewer Master Plan	Year	Cost (R Million)
HB 05.01g	Herolds Bay new 0.5 MI/d: Phase 2 of 2	2033	R13.898
UD 09.02b	Uniondale new 0.600 MI/d	2033	R16.128
HL 02.01c	Haarlem new 0.344 MI/d: Phase 1 of 2	2023	R10.080
HL 02.02b	Haarlem new 0.300 MI/d: Phase 2 of 2	2033	R9.003
<b>Total</b>			<b>R880.181</b>

**Outeniqua WWTW:** George Municipality is currently busy with the upgrading of the Outeniqua WWTW. Both the hydraulic and organic treatment capacity of the WWTW will be increased as part of the upgrading. The hydraulic design capacity will be increased with an additional 10 MI/d in two modules of 5 MI/d each. These modules could be further upgraded in the future with the provision of Primary Sedimentation Tanks to increase the capacity of these modules from 5 MI/d to 8 MI/d. The full design capacity of the Outeniqua WWTW will be 25 MI/d. The dewatering capacity at the Gwaing WWTW and the sludge transfer capacity from the Outeniqua WWTW will require upgrading when the works reaches its ultimate capacity.

The current upgrading includes the following:

- Inlet works, odour control and main biological reactor flow division box.
- Biological reactor. A completely new reactor module with a volume of 5 900 m<sup>3</sup> is required for each reactor module. The Biological Nutrient Removal reactor will include Anaerobic, Primary Anoxic, Aerobic and Secondary Anoxic zones.
- Blower house and MCC building.
- Final Clarifier: New flat-bottomed clarifier with a diameter of 35m identical to the existing clarifiers. The existing final clarifiers are presently not equipped with scum removal facilities. The absence of a scum removal system on the final clarifiers impacts on the operation of the low-pressure ultra-filtration system installed to recycle effluent to the Garden Route Dam for indirect reuse. A scum removal system will be retrofitted to these clarifiers and the new clarifiers will also be provided with a scum removal system.
- Drying beds for scum removed from the final clarifiers. Scum removed from the surface of the clarifiers will not be pumped to Gwaing WWTW with the waste sludge and the scum would be handled on site at Outeniqua (Drying beds).
- Final effluent disinfection: The chlorine contact tank volume will be increased to cater for the ultimate flow of 25 MI/d.

**Gwaing WWTW:** The following items were noted not working at the WWTW during the WSDP site visit:

- Inlet works: Problems with shaft 3A of the screenings pump. The grit classifier does not work.
- BNR Plant: One of the surface mounted aerators is broken.
- BNR Plant: First secondary settling tank with scraper mechanism is not working.
- Final flow meter was vandalised.
- Biofilter Plant: Both humus tanks are not in use.
- Biofilter Plant: Anaerobic Digester not in use, even though it was recently refurbished.

A report was prepared in January 2014 on possible modifications to the trickling filters to bring these modules back into service. The following four upgrade options were considered to achieve similar effluent results to the existing activated sludge system with respect to phosphorus.

- **External nitrification system:** Use of the existing biological trickling filters in conjunction with activated sludge in an external nitrification system.
- **Modified external nitrification system:** Use the existing biological trickling filters in conjunction with activated sludge in a modified external nitrification system.

- **Refurbishment of the trickling filters with chemical phosphorus removal:** The refurbishment of the trickling filters for those to be used and the installation of chemical dosing to reduce the phosphorus concentration to comply with General Standards.
- **Construction of a new biological nutrient activated sludge module:** Under this option, the trickling filters will not be refurbished or used and a new BNR activated sludge reactor module needs to be provided.

Cost estimates were done for these options in a December 2016 Report "Upgrade of Biofilter Works at Gwaing WWTW". The recommendations from this Report are indicated below.

Although the construction of a new activated sludge module has a higher capital cost and since the Special Standard of 1 mgP/l is not required, chemical dosing of the trickling filter effluent is not required. This makes the refurbishment of the existing trickling filter works an attractive option. Although the effluent quality from the trickling filter is of a lower quality than the activated sludge works, it is recommended that this option be adopted as it has a lower capital and operating cost and consumes less energy.

The other advantage of re-commissioning the trickling filters is that these were hydraulically designed for 7 MI/d (but with very poor effluent quality) and can thus take higher peak-loads during wet periods which would otherwise have bypassed the plant. Under normal operations, most of the wastewater flow should be directed to the BNR with a minimum flow to the refurbished bio-filters. This is required to keep these active but due to poor effluent quality, should be kept to the lowest volume practical. With the BNR capacity reached at times, all additional flow should be directed to the bio-filters until their capacities is also reached, where after the peak flows need to be taken to the maturation ponds. The division box must be upgraded to accommodate the proposed flow regime.

The estimated capital and O&M cost for the two options are as follows:

- Refurbishment of existing 3.5 MI/d trickling filters. Capital R12.6M and O&M R1.49M.
- New 3.5 MI/d activated sludge module incorporating BNR. Capital R52.69M and O&M R2.04M.

Kleinkrantz WWTW: The capacity of the WWTW was upgraded in 2015 to 2.5 MI/day. No future upgrades are therefore planned for the works.

Herolds Bay WWTW: The sewer master plan includes the construction of a new 0.5MI/d WWTW for Herolds Bay.

Uniondale WWTW: The WWTW was upgraded to an activated sludge system during 2013. No future upgrades are therefore planned for the works for the short to medium term. The following items were noted during the WSDP site visit:

- Recycled water was used for the cleaning of the screens, but the water was too dirty blocking the nozzles.
- The final effluent ponds need to be cleaned.
- The current stockpile arrangement for the dried sludge is not adequate (Possible run-off during rainy periods).
- Final effluent flow meter is needed.
- DO meter is needed for the biological reactor.

Haarlem WWTW: The existing WWTW capacity of 0.1 MI/d will be increased in two phases of 0.344 MI/d and 0.300 MI/d respectively, as indicated in the Sewer Master Plan.

### Water and Sanitation Schemes:

**Water Schemes:** There will be no changes to the existing water schemes. The Water Master Plan (2019) indicates the proposed future water distribution zones for each of the schemes.

**Sanitation Schemes:** There will be no changes to the existing sanitation schemes. The Sewer Master Plan (2019) indicates the proposed future drainage zones for each of the schemes.

## TOPIC 4: WATER SERVICES INFRASTRUCTURE MANAGEMENT (O&amp;M)

Topic C.4.1: Water Services O&M						
Section	Intervention Required?	%	Solution description as defined by topic situation assessment	%	Is there an Existing project / activity addressing this problem?	Current Demand Overall Scoring %
O&M Plan	Yes	100.00	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" Water Services Master Plan should be implemented. Ensure the required O&M schedules are in place and signed off.	100.00	Yes	100.00
Is There an O&M Plan?						
Resources	Yes	100.00	A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of existing infrastructure. In the case of the operations and maintenance of the systems, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the systems remain in good condition.	100.00	Yes	92.86
Information	No	100.00	Ensure that the required O&M Manuals are in place for all the water and sewerage infrastructure.	100.00	Yes	100.00
			Ensure all the water and sewerage infrastructure are included in the Asset Register.	100.00	Yes	100.00
Activity Control & Management	Yes	100.00	Groundwater: Implement recommended daily, weekly, monthly and six monthly O&M activities for the boreholes.	100.00	Yes	100.00
			Surface water infrastructure: Implement preventative maintenance procedures.	100.00	Yes	100.00
			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.	100.00	Yes	100.00
			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.	100.00	Yes	100.00
			Water PSs: Compile weekly and monthly maintenance checklists for the recommended activities for all the water PSs and all PSs need to be inspected on at least a weekly basis.	100.00	Yes	100.00
			Reservoirs: Compile maintenance checklists for the recommended reservoir maintenance activities and document all inspections.	100.00	Yes	100.00
			Remote monitoring and Control Systems: Ensure adequate maintenance is carried out on the SCADA systems and compile maintenance checklists for the recommended activities.	100.00	Yes	100.00
			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.	100.00	Yes	100.00
			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.	100.00	Yes	100.00
			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.	100.00	Yes	100.00

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

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

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

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

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

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

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

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



- Troubleshooting entails minor preventative maintenance operations such as greasing or checking for proper functioning. Servicing of this type may be performed on site by an authorised technician. An authorised technician has received training that enables him/her to perform such maintenance work safely and is well aware of potential problems.
- Breakdowns require identification, diagnosis and repairs by replacing components or working parts. Servicing of this type must be carried out by trained persons, on site or in the maintenance shop, using the documentation (manuals, spare part lists, etc.) necessary for maintenance of equipment.
- Major maintenance work covers all major corrective or preventative work except modernization and rebuilding. Servicing of this type must be carried out by a team that comprises highly skilled technical specialists, using the relevant documentation.
- Modernising and rebuilding equipment or executing major repairs is usually done by the manufacturer or builder. Resources are specified and usually very similar to those used in the original manufacturing or construction.

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

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

Secondly technical managers must ensure that they 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. Sections 4.1.1 to 4.1.10 of the “Future Demand and Functionality Requirements” Water Services Master Plan include recommended O&M tasks for the various water and sewerage infrastructure components that should be implemented by George Municipality.

## TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

Topic C.5.1: Conservation and Demand Management - Water Resource Management						
Section	Intervention Required?	%	Solution description as defined by topic situation assessment	%	Is there an Existing project/activity addressing this problem?	Current Demand Overall Scoring %
Reducing unaccounted water and water inefficiencies	Yes	100.00	Implement the proposed WC/WDM Strategy and the 25 WC/WDM items.	100.00	Yes	78.58
			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.	100.00	No	85.71
Leak and meter repair programmes.	Yes	100.00	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.	100.00	No	64.29
			Continue with the phased pro-active replacement of all old water meters.	100.00	Yes	85.71
	Yes	100.00	Support schools with WDM initiatives	100.00	No	64.29



Topic C.5.1: Conservation and Demand Management - Water Resource Management						
Section	Intervention Required?	%	Solution description as defined by topic situation assessment	%	Is there an Existing project/activity addressing this problem?	Current Demand Overall Scoring %
Consumer/end-use demand management: Public Information & Education Programmes			George Municipality can consider adding helpful hints on effective water usage on the monthly bills. Continue with community awareness programmes to inform consumers of the importance of WC/WDM.	100.00	Yes	
Conjunctive use of surface - and groundwater	No	100.00				100.00
Working for Water	No	100.00				100.00

Topic 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	100.00	Ensure that the volume of water supplied from all water resources are metered, the raw water and final water at the WTWs and the volume of water supplied to the various zones (at Reservoirs). The influent at all 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.	100.00	Yes	92.86

**The vision of George Municipality's WDM Strategy is as follows:**

**“George Municipality commits itself, within reason and as far as practically possible, to uphold and continually impose the WDM measures currently in place and to impose new measures where WDM can be further improved.”**

The existing water demand management measures and the future water demand management measures planned by George Municipality are summarised in the table below:

Table C.5.3: Existing and Future WDM Measures included in George Municipality's WDM Strategy	
Existing WDM Measures	Future WDM Measures
<ul style="list-style-type: none"> <li>Water Master Plan updated quarterly</li> <li>Block Tariffs</li> <li>Pipe replacement and maintenance programme</li> <li>Complaints system</li> <li>Standby teams for immediate repair of burst pipes</li> <li>Pressure management</li> <li>Working for Water</li> <li>Promoting use of water efficient fittings.</li> <li>Public Awareness</li> <li>Zone metering</li> <li>Telemetry System</li> <li>Installation of bulk meters in existing areas for monitoring.</li> <li>Accurate records of water use and losses</li> <li>Promote rain water harvesting</li> </ul>	<ul style="list-style-type: none"> <li>Pressure Management Pressure management will be introduced, where required, by installing pressure reducing valves with constant downstream pressures. Pressure reduction will be implemented in order to lower pressures to the minimum required pressures during peak times. The number of pressure reducing valves to be installed will be determined on approval of civil engineering plans. This will have the effect of reducing the pressure of the water supply to the new residential erven created. The pressure reducing measures will result in fewer leaks and reduced water consumption due a reduction in wastage.</li> <li>Metering Individual water meters will be installed for each dwelling. The meters will be maintained by the Municipality and will be read monthly. The Municipality's block tariff system will be applicable to all developments.</li> <li>Residential measures – Water efficient fittings The following conditions will be included in the Deed of sales of erven:               <ul style="list-style-type: none"> <li>➢ Install low flow shower heads.</li> <li>➢ Install dual flush low flow toilet cisterns.</li> <li>➢ Any other measures specified by the George Municipality</li> </ul>               The following will be compulsory for erf owners for implementation during the planning and building of private residences:               <ul style="list-style-type: none"> <li>➢ Design a 5 000 l rainwater tank as part of the house layout and install a small automatic pressure pump, where necessary, for use for irrigation and other purposes.</li> </ul> </li> <li>Leakage Control</li> </ul>

Table C.5.3: Existing and Future WDM Measures included in George Municipality's WDM Strategy	
Existing WDM Measures	Future WDM Measures
<ul style="list-style-type: none"> <li>Promote indigenous gardens</li> <li>Water restrictions</li> <li>Strict municipal services standards for the installation of new water reticulation for own and private developments.</li> <li>Reticulation material and quality standards – Facilitate maintenance.</li> <li>Up to date WSDP</li> <li>All large development applications need to be supported with evidence of WDM interventions.</li> <li>All new medium and large developments to have detailed WDM Plan.</li> </ul>	<p>Combination bulk water meters will be installed, as required (one on each connector pipe to the residential development). The meters will be connected to the existing Municipal telemetry system for continuous monitoring.</p> <p>Night flows will thus be monitored so that pipe bursts and leaks can be identified immediately.</p> <p>During the construction process strict monitoring of construction methods and pipe laying will be maintained by the consultants to ensure that the quality of the pipe network system is of a high standard. The latter will reduce leakages and breakages which could occur in future if pipelines and fittings are incorrectly installed.</p> <ul style="list-style-type: none"> <li>User Education                     <p>The home owner's association/body corporate will educate the residents by placing notices at the entrance gate, administration office, or any other publicly accessible area which will include water saving recommendations (Bathrooms, Kitchens, Laundries and Outside areas).</p> </li> <li>Indigenous Gardens                     <p>Indigenous gardens and smaller planted areas that need irrigating will be promoted for all dwellings and will be implemented in the developments private/public open spaces.</p> </li> </ul> <p><u>Re-use of grey water</u></p> <p>In accordance with the George Municipality's approach, grey water re-use on site will not be promoted. The main reason being that it is envisaged to treat all waste water at a central treatment plant where the water will be treated to potable standards for re-use under controlled conditions.</p>

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 George 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. The status quo score for George Municipality is 80 out of 100 suggesting that there is limited room for improvement in the implementation of WC/WDM. The proposed WC/WDM Strategy for George Municipality is based on the 25 WC/WDM items listed in the table below:

Table C.5.4: Proposed WC/WDM Strategy Items for George Municipality
<b>Item 1: Development of a Standard Water Balance</b>
<b>Recommendation and Strategy:</b> <ul style="list-style-type: none"> <li>Continue with the monthly updating of the IWA Water Balances for the three systems and reporting on the Treatment Losses, NRW and Water Losses for each of the systems to management. A dedicated senior technician manage the NRW analysis of George Municipality.</li> <li>Continue with the drafting of an annual WSDP Performance and Water Services Audit Report, as required by the Water Services Act.</li> <li>Implement the recommended WC/WDM activities in order to reduce the NRW and Water Losses.</li> <li>Determine all unbilled authorized consumption by firstly identify all the relevant consumers, e.g. Municipal buildings, parks, fire services, sport fields, etc. Unbilled consumption do not generate income, but will enable the municipality to better quantify their NRW.</li> </ul>
<b>Funding and Budget Requirements:</b> <p>The IWA Water Balances for the three systems are updated on a monthly basis by the municipality.</p>
<b>Item 2: Pressurised System at all times</b>
<b>Recommendation and Strategy:</b> <ul style="list-style-type: none"> <li>Adequate human resources, technical skills and O&amp;M budgets need to be allocated towards the operation, maintenance and refurbishment of the existing infrastructure, in order to ensure that systems are always pressurised.</li> <li>Existing water pump stations that are in a poor condition needs to be refurbished.</li> </ul>
<b>Funding and Budget Requirements:</b> <p>Budgets as indicated under the individual items of the WC/WDM Strategy. Increase O&amp;M budget allocations towards the refurbishment and replacement of old water infrastructure.</p>
<b>Items 3 and 4: Metering System</b>
<b>Recommendation and Strategy:</b> <ul style="list-style-type: none"> <li>All un-metered water connections, as identified through the Swift analyses process, 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 Treasury data therefore needs to be cleaned and the municipality needs to identify and correct any inaccurate data in the system.</li> <li>Consumer consumption checks / investigations need to be carried out where water usage are very low, but there are households on the property. 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.</li> </ul>

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

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

**Funding and Budget Requirements:**

Install water meters for all un-metered water connections. Estimated budget requirement for the installation of individual water meters is R5 095 000.

**Item 5: Effective and Informative Billing System****Recommendation and Strategy:**

- Municipality needs to continue to ensure that all customer's meters are read on a monthly basis and that the customers are billed on a monthly basis according to the actual volume of water used for the specific month.
- Municipality needs to continue with the commercial data analysis done on the billed metered consumption data, which include the identification of un-metered even, 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 ensure that all consumers are familiar with the telephone numbers to lodge complaints and report leaks. Suggestions would be to include these numbers on the monthly water bills, on the Municipality's website, 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.
- Develop a Client Services Charter.

The Client 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. Budget requirements for Client Services Charter R100 000.

**Item 8: Asset Register for Water Infrastructure****Recommendation and Strategy:**

The municipality needs to ensure that all the existing water and sewerage infrastructure is 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:**

<b>Table C.5.4: Proposed WC/WDM Strategy Items for George Municipality</b>
<p>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.</p>
<p><b>Funding and Budget Requirements:</b></p> <p>Capital budget of at least 2% of the total water and sewerage asset value allocated towards the replacement of the existing water and sewerage infrastructure.</p>
<p><b>Item 10: Asset Management Operation and Maintenance</b></p>
<p><b>Recommendation and Strategy:</b></p> <p>The municipality needs to differentiate between budget allocated towards the operation and maintenance of the water infrastructure and the budget allocated towards the replacement of the water and sewerage infrastructure. A budget of approximately 1% to 2% of the value of the system is typically required for the operations and maintenance of the system to ensure that the system remains in good condition.</p> <p>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:</p> <ul style="list-style-type: none"> <li>➤ Ensure the operation and maintenance functions are well planned.</li> <li>➤ Demonstrate responsible management.</li> <li>➤ Justify and communicate funding requirements.</li> <li>➤ Service provisioning complies with regulatory requirements.</li> </ul> <p>An AMP normally includes the following:</p> <ul style="list-style-type: none"> <li>➤ documents the nature, extent, age, utilization, condition, performance and value of the infrastructure work;</li> <li>➤ identifies existing and target levels of service, as well as expected changes in demand;</li> <li>➤ identifies the life-cycle management needs of the infrastructure (development, renewal, operations and maintenance);</li> <li>➤ assesses capital and operational budget needs; and</li> <li>➤ identifies infrastructure asset management improvement needs.</li> </ul> <p>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.</p> <p>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.</p> <p>The O&amp;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:</p> <ul style="list-style-type: none"> <li>➤ Inspection of isolation valves and packing.</li> <li>➤ Control valve inspection and maintenance.</li> <li>➤ Inspection of cathodic protection of steel pipes.</li> </ul>
<p><b>Funding and Budget Requirements:</b></p> <p>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.</p> <p>An estimated budget for the drafting of an AMP for all the water and sewerage infrastructure is R750 000.</p>
<p><b>Item 11: Dedicated WC/WDM Support</b></p>
<p><b>Recommendation and Strategy:</b></p> <p>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.</p>
<p><b>Funding and Budget Requirements:</b></p> <p>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.</p>
<p><b>Item 12: Active Leakage Control</b></p>
<p><b>Recommendation and Strategy:</b></p> <p>The following process needs to be followed for active leakage control of the reticulation network:</p> <p><u>Decide on how the work will be undertaken:</u></p>

<b>Table C.5.4: Proposed WC/WDM Strategy Items for George Municipality</b> <ul style="list-style-type: none"> <li>The appointment and training of additional staff.</li> <li>The training of existing staff.</li> <li>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.</li> <li>The above three options need to include the purchase or re-allocation of equipment.</li> <li>Complete outsourcing of the activity.</li> </ul> <p><u>Leak detection:</u> Identify areas with highest leaks and send teams into the field to detect leaks.</p> <p><u>Repair of leaks once identified:</u> 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.</p>
<b>Funding and Budget Requirements:</b> 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.
<b>Item 13: Sectorization of Reticulation Systems</b>
<b>Recommendation and Strategy:</b> The billed metered data currently linked to the three 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. Faulty bulk water meters need to be replaced and new meters 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: <ul style="list-style-type: none"> <li>Clear indication of how much water is being used per area / zone.</li> <li>Areas with high NRW and water losses can easily be identified.</li> <li>Leakage and pressure control can be better managed.</li> <li>Water demand per area / zone can be determined.</li> </ul> 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.
<b>Funding and Budget Requirements:</b> 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.
<b>Item 14: Effective Bulk Metering Management System</b>
<b>Recommendation and Strategy:</b> <ul style="list-style-type: none"> <li>All bulk water meters at existing WTWs, reservoirs and pump stations need to be read and recorded on at least a weekly basis.</li> <li>Broken bulk water meters need to be repaired or replaced.</li> <li>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.</li> <li>New bulk water meters need to be correctly installed. Ideally a straight pipe section upstream of the meter of at least 5x the meter dia. and 3x the meter dia. downstream of the meter. Strainers need to be installed to protect the meters. These strainer elements must be removable from the top, for ease of cleaning. Gate valves are required for maintenance before and after meters.</li> <li>Every informal area with 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.</li> </ul>
<b>Funding and Budget Requirements:</b> Allow an annual budget of approximately R350 000 for the installation of new bulk water meters, the replacement of faulty bulk water meters and to adequately protect existing bulk water meters.
<b>Item 15: Effective Zone Meter Management and Assessment of Night Flows</b>
<b>Recommendation and Strategy:</b> See recommendations under Item 14.
<b>Funding and Budget Requirements:</b> See funding and budget requirements included under Item 14.
<b>Item 16: Pressure Management</b>
<b>Recommendation and Strategy:</b> The reticulation networks need to be divided into pressure zones, prior to implementing pressure management, and the pressures and flows need to be metered and logged. The activities of such a programme are as follows: <ul style="list-style-type: none"> <li>Undertake feasibility studies to determine the ranking of areas / projects (Desktop Study, Logging of pressures and flows, Analysis of data).</li> <li>Implement advanced pressure management in areas identified (Design PRV Chambers, Pressure management implementation of new PRVs, Supply and installation of smart electronic pressure controllers for existing PRVs).</li> <li>Impact assessment (Post pressure management logging to determine impact of new PRVs and / or installation of smart pressure controllers on existing PRVs).</li> <li>The on-going operation, maintenance and optimisation of advanced pressure management installations.</li> </ul>



<b>Table C.5.4: Proposed WC/WDM Strategy Items for George Municipality</b>
<b>Funding and Budget Requirements:</b> Funding and Budget requirements for pressure management to be determined once a decision is taken on the further areas prioritised for pressure management (From recommended flow and pressure logging exercise).
<b>Item 17: As-built Drawings of Bulk and Reticulation Infrastructure</b>
<b>Recommendation and Strategy:</b> 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.
<b>Funding and Budget Requirements:</b> The Municipality currently adequately budget for the updating of their Water and Sewer Master Plans with the most recent “As-built” drawings.
<b>Item 18: Schematic Layouts of Water Reticulation Systems</b>
<b>Recommendation and Strategy:</b> Municipality needs to continue to update the schematic layouts and the Aerial Maps on a regular basis, in order to ensure they remain accurate.
<b>Funding and Budget Requirements:</b> None
<b>Item 19: Regulation and Bylaws</b>
<b>Recommendation and Strategy:</b> The Water Services By-laws need to be reviewed and updated as necessary. The By-laws need to be enforced and adequate human resources need to be allocated for this purpose.
<b>Funding and Budget Requirements:</b> No additional budget or funding requirements. Enforcement to be implemented through existing budgets.
<b>Item 20: Tariffs</b>
<b>Recommendation and Strategy:</b> See Section 7.3 under Topic 7 of the Future Demand and Functionality Requirements Water Services Master Plan.
<b>Funding and Budget Requirements:</b> Financial study to determine the impact of changing the sanitation tariff structure from a fixed monthly amount, which is also not based on the number of toilet pans, to a stepped tariff based on water consumption in the future. Estimated cost R300 000.
<b>Item 21: Technical Support to Customers</b>
<b>Recommendation and Strategy:</b> 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: <ul style="list-style-type: none"> <li>• Train existing staff;</li> <li>• 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).</li> <li>• Arrange leakage inspections in public building;</li> <li>• Provide assistance and technical know-how for large consumers; and</li> <li>• Introduce compulsory water management plan for large consumers.</li> </ul>
<b>Funding and Budget Requirements:</b> No additional funding – pending the appointment of a dedicated person for WC/WDM.
<b>Item 22: Removal of Un-authorised Connections</b>
<b>Recommendation and Strategy:</b> Meters need to be installed at the estimated 2 038 unmetered erven, as identified through the Swift analyses. See Section 5.1.1.5. of the Future Demand and Functionality Requirements Water Services Master Plan
<b>Funding and Budget Requirements:</b> Estimated budget of R5.095 million is required to install water meters at the unmetered erven.
<b>Item 23: Community Awareness on WDM</b>
<b>Recommendation and Strategy:</b> See Section 5.1.3 of the Future Demand and Functionality Requirements Water Services Master Plan.
<b>Funding and Budget Requirements:</b> It is estimated that R250 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.
<b>Item 24: Schools Education on WDM</b>
<b>Recommendation and Strategy:</b> See Section 5.1.3.1 of the Future Demand and Functionality Requirements Water Services Master Plan.
<b>Funding and Budget Requirements:</b>

<b>Table C.5.4: Proposed WC/WDM Strategy Items for George Municipality</b>
It is estimated that a budget of R100 000 per year should be allocated for the establishment of a schools education programme in George Municipality. The DWS can also assist the municipality with pamphlets and posters on WC/WDM initiatives.
<b>Item 25: Retrofitting</b>
<b>Recommendation and Strategy:</b> See Sections 5.1.2.1 and 5.1.2.2 of the Future Demand and Functionality Requirements Water Services Master Plan.
<b>Funding and Budget Requirements:</b> Leak repair assistance programmes: R600 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: R400 000 for a pilot project in one of the public buildings.

The way forward for George 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.

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

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

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

Some WC/WDM measures are often enforced by local government through water restrictions during drought periods. Appropriate municipal water control (metering) and pricing structure (billing and revenue collection) could however ensure that these measures become routine. George Municipality has responded to the need to address NRW and water losses within their jurisdiction by implementing various WC/WDM initiatives. The Municipality will continue with the active implementation of their 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 Non-revenue Water and Water Inefficiencies

Scheme	2018/2019 NRW (%/a)	2018/2019 Water Losses (%/a)	2023 (%/a)	2043 (%/a)
George / Wilderness	29.50%	24.08%	20%	15%
Uniondale	38.66%	36.18%	25%	15%
Haarlem	58.91%	55.71%	40%	20%

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

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

The following areas need to be focused on for the water balance of the George/Wilderness system.

- The NRW and Water Losses need to be reduced. Continue with the installation of zone meters and the reading and recording of all zone water meters (also meters at PSs and reservoirs) in order to determine the NRW and Water Losses for specific zones in the future. Billed metered consumption data from the Financial Department to be linked to specific zones in the future, in order to accurately determine the NRW and Water Losses for specific zones.
- Stolen final effluent flow meter at the Gwaing WWTW needs to be replaced. Meter readings to be taken and recorded of the final effluent discharged from the Outeniqua-, Gwaing and Kleinkrantz WWTW.

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

- The NRW and Water Losses need to be reduced. The bulk water meters at the reservoirs need to be read and the readings need to be recorded in order to determine the NRW and Water Losses for specific zones in the future. Billed metered consumption data from the Financial Department to be linked to specific zones in the future, in order to accurately determine the NRW and Water Losses for the specific zones.
- Final effluent flow meter needs to be installed at the Uniondale WWTW.
- The raw water and final water flow meters at the Uniondale WTW need to be properly protected to prevent possible vandalism of the meters. The raw water meter is not in a chamber, but inside the WTW terrain, and there is no cover for the final water meter chamber that is located outside the WTW terrain.
- Raw water meters need to be installed at the two surface water sources to measure the separate supply from the Uniondale dam and from the Kammanassie River.

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

- The NRW and Water Losses need to be reduced.
- Flow meters need to be installed at the Uniondale WWTW (For both incoming flow to the plant and final effluent pumped from the WWTW).
- The flow meter for final water pumped from the WTW is in a meter chamber, but there is no cover. The chamber is located next to the WTW fence and the meter can be vandalized. Cover needs to be provided for the chamber.

**Water Losses:** The effective implementation of the developed WC/WDM Strategy will enable George Municipality to reduce their NRW and water losses for the various distribution systems drastically over the next five years.

**TOPIC 6: WATER RESOURCES**

Topic C.6.1: Water Resource						
Section	Intervention Required?	%	Solution description as defined by topic situation assessment	%	Is there an Existing project/activity addressing this problem?	Current Demand Overall Scoring %
Current Water Sources	No	100.00				100.00
Additional Sources Available	No	100.00	Continue with the further augmentation of George/Wilderness water resources in order to meet the future water requirements.	100.00	Yes	92.86
Monitoring	No	100.00	Continue with the current industrial effluent quality monitoring programme, where the quality and volume of industrial effluent discharged by industrial consumers are monitored.	100.00	Yes	100.00
Water Quality	No	100.00	Continue with the current operational and compliance water quality and effluent quality sampling programmes.	100.00	Yes	100.00
Operation	No	100.00				100.00

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. George Municipality needs to continue with the monthly reading of all their existing bulk water meters, which is a valuable source of information.

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

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

Detail future water requirement projection models were developed for each of the distribution systems and the future water requirements are indicated in the table below. These models include the future projections up to 2043 and were calibrated by using historic billed metered consumption data and bulk abstraction data. The percentage of water losses was determined for each of the distribution systems and growth in future water requirement was based on agreed population and growth figures. The projected future water requirements and the yield surplus or shortfalls are indicated in the table below for each of the systems.

Table C.6.2: Projected Future Water Requirements and Yields surplus (+) / shortfall (-) based on WSDP model						
Scheme	Model	PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)				
		2023	2028	2033	2038	2043
George and Wilderness	2.0% Annual Growth	13 880.770	15 325.492	16 920.581	18 681.689	20 626.094
	3.5% Annual Growth	14 931.878	17 734.388	21 062.889	25 016.105	29 711.285
	<b>WSDP Model</b>	<b>13 736.650</b>	<b>15 538.156</b>	<b>17 617.545</b>	<b>20 021.336</b>	<b>22 804.280</b>
	<b>Yield surplus (+) / shortfall (-)</b>	<b>+7 313.350</b>	<b>+5 511.844</b>	<b>+3 432.455</b>	<b>+1 028.664</b>	<b>-1 754.280</b>
Uniondale	1.5% Annual Growth	315.639	340.033	366.312	394.622	425.120
	3.0% Annual Growth	339.662	393.761	456.477	529.182	613.466
	<b>WSDP Model</b>	<b>276.890</b>	<b>295.913</b>	<b>316.873</b>	<b>339.966</b>	<b>365.405</b>
	<b>Yield surplus (+) / shortfall (-)</b>	<b>+420.110</b>	<b>+401.087</b>	<b>+380.127</b>	<b>+357.034</b>	<b>+331.595</b>
Haarlem	1.5% Annual Growth	209.912	226.135	243.611	262.439	282.721
	3.0% Annual Growth	225.888	261.866	303.575	351.926	407.979
	<b>WSDP Model</b>	<b>150.964</b>	<b>145.155</b>	<b>140.430</b>	<b>136.584</b>	<b>133.463</b>
	<b>Allocation surplus (+) / shortfall (-)</b>	<b>+79.036</b>	<b>+84.845</b>	<b>+89.570</b>	<b>+93.416</b>	<b>+96.537</b>

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

Table C.6.3: Potential Future Water Resources for the Various Towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	Option	Potential
George	Summary	<p><b>The water requirement projections indicate that there is currently no shortfall in water supply. Under the high-growth scenario shortfalls can be expected between 2030 and 2035, which would increase in 2040 to 6.802 million m<sup>3</sup>/a. George LM had to implement various augmentation options over the last number of years in order to prevent a water crises, as the current water sources did not had adequate supply to cater for the water requirements. The following sources have been included in the integrated licence.</b></p> <ul style="list-style-type: none"> <li>Re-use of water via the Garden Route Dam (further phases of 4 phase development).</li> <li>Raise Garden Route Dam Spillway.</li> <li>Supply from the Malgas Pump Scheme</li> </ul> <p>The following sources have been identified as potential sources to augment the future water supply.</p> <ul style="list-style-type: none"> <li>Groundwater development in the TMG Aquifer and conjunctive use with Garden Route Dam and / or any new dam.</li> <li>Local groundwater development to augment water supply to small coastal towns.</li> <li>Supply from one of the various possible dam schemes in the area, namely Malgas and Maalgate rivers.</li> <li>Desalination of sea water and groundwater from coastal boreholes.</li> </ul> <p><b>The Reconciliation Strategy recommends the following interventions for implementation in order of priority and sequence:</b></p> <ul style="list-style-type: none"> <li>Continue with the implementation of the WC/WDM Strategy.</li> <li>Water re-use via the Garden Route Dam (Second Phase) in conjunction with the integration of boreholes into the supply scheme.</li> <li>Raising of Garden Route Dam spillway.</li> <li>Construction of Malgas Dam.</li> <li>Water re-use via the Garden Route Dam (Third Phase).</li> <li>Desalination of seawater.</li> </ul>
Uniondale	Summary	<p><b>The current yield is adequate to cater for current and future water requirements. However the following interventions are required to increase water use efficiency:</b></p> <ul style="list-style-type: none"> <li>Continue with the implementation of the WC/WDM Strategy to reduce water losses in infrastructure and water consumption.</li> <li>Rainwater harvesting as part of the WDM Strategy to reduce consumption of potable water.</li> </ul> <p><b>The following sources have been identified as potential sources to augment the current water supply, if required:</b></p> <ul style="list-style-type: none"> <li>Increase abstraction from Kammanassie River and/or Holdrif River.</li> <li>Groundwater development of TMG Aquifer around Uniondale.</li> <li>Secure domestic use allocation from Haarlem Dam through trading of water rights with irrigators.</li> <li>Raising of Haarlem Dam to increase domestic allocation.</li> </ul> <p><b>The Reconciliation Strategy recommends the following interventions for implementation in order of priority and sequence:</b></p> <ul style="list-style-type: none"> <li>Continue with the implementation of the WC/WDM Strategy to reduce water losses and achieve savings in water consumption.</li> <li>Groundwater development of TMG Aquifer in close proximity to Uniondale to access storage for increasing assurance of supply.</li> <li>Increase abstraction from Kammanassie River and Holdrif River through water trading.</li> </ul>
Haarlem	Summary	<p><b>The current yield seems to be adequate for current supply, but is insufficient for future water requirements. The following sources have been identified to augment the current water supply:</b></p> <ul style="list-style-type: none"> <li>Continue with the implementation of the WC/WDM Strategy to reduce water losses and water consumption.</li> <li>Rainwater harvesting as part of the WDM Strategy to reduce consumption of potable water.</li> <li>Increase domestic allocation from Haarlem Dam through trading of water rights with irrigators.</li> <li>Groundwater development of TMG Aquifer south of Haarlem.</li> <li>Raising of Haarlem Dam to increase domestic allocation.</li> </ul>

Table C.6.3: Potential Future Water Resources for the Various Towns (DWS's All Towns Reconciliation Strategies)

Distribution System	Option	Potential
		<p><b>The Reconciliation Strategy recommends the following interventions for implementation in order of priority and sequence:</b></p> <ul style="list-style-type: none"> <li>Continue with the implementation of the WC/WDM Strategy to reduce water losses and achieve savings in water consumption.</li> <li>Groundwater development of TMG Aquifer in close proximity to the Haarlem Dam and implementing conjunctive use.</li> </ul>

The short, medium and long term options evaluated through the George Bulk Water Supply Study, to augment the supply to George, include the following:

Table C.6.4: Short-, Medium and Long Term Source Augmentation Options

Proposed Option	Comment
<b>Short to Medium Term Augmentation Options</b>	
Water Demand Management	Already implemented
Refurbishment of Kaaimans River Weir	Already implemented
Malgas River Pumping Scheme	Already implemented
First Phase of the Re-use of Treated Effluent	Already implemented
<b>Raising of GRD Spillway</b>	Busy with implementation
<p>The dam could be raised to increase its storage capacity by installing spillway gates or by raising the spillway crest and the dam embankment. Raising the spillway crest of the dam with fusegate systems appears to be the most simple and economical. Three options are under consideration i) 3.0m raising with TOPS gates (No EFR) ii) 3.0m raising with Hydroplus fusegates (No EFR) or iii) 3.0m raising with TOPS gates and implement a release for the Reserve, pump treated effluent to be released below the dam to meet the requirements of the Reserve.</p> <p>A possible Environmental Release Requirement (Currently not included in the Water License) may be required by DWS. Although the downstream ecology has already been sacrificed, it may be a requirement i.t.o. a new license, in which case the raising of the GRD spillway may no longer be considered a feasible option.</p> <p>The estimated cost for sub-option ii) is approximately R14.5 million (VAT Excluded)</p>	
<b>Medium to Longer Term Augmentation Options</b>	
<b>Second Phase of the Re-use of Treated Effluent</b>	Will be considered
<p>The proposal is to process and supply an additional 5 to 10 Ml/d after Phase 1. The effluent will be pumped from the Gwaing WWTW through a 4.5 km pipeline to the post treatment plant at Outeniqua WWTW. The main infrastructure required is as follows:</p> <ul style="list-style-type: none"> <li>A 5 – 10 Ml/d pump station at Gwaing WWTW;</li> <li>A 1.5km 400mm dia. rising main to a high point;</li> <li>A balancing tank situated at the high point;</li> <li>A 3 km gravity main from the high point to the Outeniqua WWTW;</li> <li>Upgrade the Ultra filtration plant at the Outeniqua WWTW to 15 – 20 Ml/d; and</li> <li>Upgrade the treated effluent pump station at Outeniqua WWTW to 15 – 20 Ml/d.</li> </ul> <p>The estimated cost for Phase 2 of the re-use of treated effluent is R75 million (VAT Excluded)</p>	
<b>Proposed Malgas Dam</b>	Being considered
<p>This options comprises a dam on the Malgas River with a storage capacity of 11 million m<sup>3</sup> and a firm yield of 5.2 million m<sup>3</sup>/a. A conventional earth dam would be most economical, assuming that a suitable core material source could be identified in close proximity to the dam site. The proposed dam wall would be 60m high. The approximately 7.3km of pipeline from the Malgas Pumping Scheme will be utilized to convey water from the dam to the balancing dams at the WTW.</p> <p>The estimated cost of constructing a dam is R130 million (VAT Excluded).</p>	
<b>Longer Term Augmentation Options</b>	
<b>Proposed Maalgate Dam</b>	Feasible, if land acquisition issues can be resolved
<p>The proposed Maalgate Dam would have a storage capacity of 10 million m<sup>3</sup> with a yield of approximately 5.8 million m<sup>3</sup>/a. The dam would have a wall approximately 29m high, with a maximum water depth of 25m and a surface area of approximately 100 ha at full supply.</p> <p>This scheme would also require the construction of a new pump station, to be situated below the dam wall, and a new 450mm dia. 18km pipeline, which would pump water from the dam to the George WTWs.</p> <p>The estimated cost of constructing the dam is R130 million and R45 million for the pumping scheme (VAT Excluded).</p>	
<b>Proposed Upper Kaaimans River Dam</b>	Not feasible due to potential excessive environmental impacts
<p>The proposed Upper Kaaimans Dam would be a 4 million m<sup>3</sup> dam, with a wall height of 43m and a surface area of approximately 28 ha at full supply level. The resulting additional yield from this dam is 2 million m<sup>3</sup>/a. Surplus water stored in the dam would be released to the river downstream during the dry months and pumped, by the pumps situated at the existing Kaaimans River Weir pump station to the GRD.</p>	
<b>Desalination</b>	Not yet cost effective

Table C.6.4: Short-, Medium and Long Term Source Augmentation Options	
Proposed Option	Comment
<p>Reverse Osmosis is recommended for the George Municipality, due to its flexibility, membrane technology and opportunities for energy recovery. A two phase scheme was assessed as part of the George Bulk Water Supply Study. The plant could start off as a 5 MI/d plant and then increase to a total of 10 MI/d over 5 years.</p> <p>Pre-treatment of the seawater, which includes disinfection and pH balancing, is required to reduce fouling and scaling of the membrane. The membranes will, however, require replacement every five years in any event. The resultant waste product referred to as brine would be pumped out to sea, where it would be discharged into the high-energy surf zone.</p> <p>The estimated cost of constructing a 10 MI/d desalination plant is R250 million (Vat Excluded).</p>	
<b>Groundwater</b>	Being considered but requires further investigation
<p>The groundwater option consists of drilling for water in the high-potential TMG aquifer. This includes various boreholes of varying depth (up to approximately 300m deep), equipped with pumps and gravity pipelines to the Old WTW or the existing balancing dams at the new George WTWs. The conservative yield from these boreholes was determined as 7 to 8 MI/d.</p> <p>Twenty (20) boreholes have been drilled as part of the emergency augmentation schemes implemented to manage the drought during 2009/2010 and three of these boreholes have been equipped in the short term to provide drought relief, with a combined yield capacity of 2.1 MI/d. Boreholes with significant yield will be used to monitor ground water. Licenses will be applied for to utilize these boreholes as a future source of potable water for George.</p>	

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

Table C.6.5: Years in which the Annual Water Requirement will Exceed the Sustainable Yields from the Various Resources				
Scheme	Total sustainable Yield or Allocation (x 10 <sup>6</sup> m <sup>3</sup> /a)	Annual Growth on 2018/2019 requirement (1.5% or 2.0%)	Annual Growth on 2018/2019 requirement (3.0% or 3.5%)	WSDP Projection Model
George / Wilderness	21.050 (Yield)*	2043 (2.0%)	2033 (3.5%)	2040
Uniondale	0.697 (Allocation)	> 2043 (1.5%)	> 2043 (3.0%)	> 2043
Haarlem	0.230 (Allocation)	2028 (1.5%)	2023 (3.0%)	> 2043

Note: \* Include Malgas Pumping Scheme. Yield from raising of Garden Route dam not yet included in figure.

**Water Quality:** George Municipality's existing operational and compliance water quality sampling programmes complies 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 <sup>a</sup>	Fortnightly
Turbidity	Daily	Once per shift <sup>a</sup>	Fortnightly
Disinfectant residuals	Not applicable	Once per shift <sup>a</sup>	Fortnightly
E.Coli (or faecal coliforms) <sup>b</sup>	Not applicable	Weekly	Fortnightly but dependent on population served <sup>d</sup>
Heterotrophic plate count <sup>c</sup>	Not applicable	Weekly	Fortnightly
Treatment chemicals <sup>d</sup>	Not applicable	Monthly	Not applicable

a: A shift is defined as an eight-hour work period.

b: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and immediate follow-up sampling at an increased sampling frequency.

c: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and follow-up sampling.

d: Includes all risk determinands that are added or formed as a result of the use of treatment chemicals (for example aluminium, iron and chlorine). If non-compliant with the numerical limits specified in SANS 241-1 in the final water, the distribution system monitoring frequencies of Table 3 in SANS241-2:2015 apply.

**Effluent Quality:** Sampling is done on a frequent basis by the Process Controllers at the various WWTWs and by George Municipality's own laboratory, according to a comprehensive operational monitoring programme, which meets the minimum sampling requirements. The Compliance Monitoring Programme consists of 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 George Municipality's own Laboratory for all the WWTWs. The Municipality takes immediate action to rectify problems and / or improve operational aspects as and when may be required. For serious failures an Incident Response Management Protocol is followed to ensure rapid remedying of the problems, which includes notification to the DWS as may be necessary.



**Industrial Consumers:** George Municipality will continue with the monitoring of the quality of effluent discharged into the Municipality's sewer system by all wet industrial consumers. George Municipality needs to meet regularly with the industrial consumers with regard to the quality of final effluent discharged by them.

George 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 George Municipality's sewer system in order to determine whether the quality comply with the standards and criteria.

### TOPIC 7: FINANCIAL

George Municipality listed the following **challenges** confronted by them during their 2019/2020 budget process (Final Budget 2019/20 to 2021/22, 29 May 2019).

- Although the global economic growth outlook has improved the local economy's GDP is forecasted to increase by 1.5% in 2019 with a moderate improvement over the medium term;
- The impact of the aforementioned on local governments' ability to markedly contribute to reducing unemployment and poverty;
- The pressures of the slow economy on collection rates and the ability of George Municipality's residents to pay their municipal bill;
- The addressing of service delivery shortcomings as identified in the adjustments budget in February 2019 and its effect on the available funding;
- The continued funding constraints with regards to the low available funding for the Capital Budget through the Capital Replacement Reserve and the ability to take up loans to meet the demand for upgrading and replacing of infrastructure; and
- The contribution by George Municipality to the establishment of the Regional Landfill Site.

A **continued strategy** was followed, as outlined within the Council's long term financial plan, with the compilation of the 2019/20 budget, whereby the following was done.

- The municipality needs to focus on its core functions. During the February 2018 adjustments budget the Budget Committee, Portfolio Councillors in conjunction with the Heads of Departments, scrutinised the budget to affect all possible savings;
- The need to maximise income through efficiencies and the way the municipality do business was investigated before a decision was taken to increase the rates, service charges and other tariffs;
- A revenue enhancement project is ongoing to ensure that all consumers are billed correctly and are contributing to the municipality's income as set out in the municipality's tariff policy;
- A provision of R71.3 million was made for debtor's impairment in the operating budget. The writing off, of irrecoverable debt will continue to be scrutinized through the business processes of the internal credit control unit. The unit is guided by an internal credit control committee to ensure that proper credit control measures are performed and to recommend to council the writing off, of debt;
- A provision for a contribution of R45.2 million to the capital replacement reserve (CRR) in the operating budget has been made to grow the municipality's reserve;
- The capital contributions policy was reviewed to ensure that the municipality receives fair compensation from bulk capacity sold to developers. The Budget Committee emphasized the principle that developers need to "pay-up-front" before any infrastructure development is carried out by Council;
- A greater emphasis will be placed on improving the municipality's cash management practices, within the legal prescripts, to improve the municipality's liquidity position;
- The Budget Committee has re-emphasised its wish that the capital budget, as with the previous budget be limited to the available cash funds at the municipality's disposal;
- All attempts need to be made to maximise available National and Provincial Government Grants to service part of the municipality's capital program; and

- The Budget Committee reconfirmed that specific strategic land be identified which may be sold or developed to effect growth in George and to build the CRR.

**National Treasury's observations** from the 2019 mid-year budget and performance visits, with regard to the Financial Health and Service Delivery of the municipality, are as follows:

- The municipality had a good cash position of R617.8 million by the end of 2017/18 to pay outstanding creditors of about R172 million;
- The municipality realised an operational deficit of R28.1 million, enough to worry that it would affect the municipality's contribution to the Cash Reserves, which are often used to finance capital budget;
- The municipality's current ratio is good at 2.1, while the norm is between 1.5 to 2.1;
- The municipality's water losses, although they are within the norm of 15-30 percent, it is worrying that it is at the upper end of the norm (27.3 percent);
- By mid-year water losses had reduced to 23 percent;
- The municipality had a very good consumer collection rate of 97 percent, while the norm is 95 percent;
- By mid-year the consumer collection rate had increased to 103 percent;
- Capital expenditure increased from 67 percent in 2016/17 to 76 percent in 2017/18. There were 75 percent of key performance indicators that were fully achieved; however, it is a concern that only 50 percent was achieved in terms of service delivery performance. It is therefore not clear how the overall 75 percent municipal performance affects service delivery.
- Slow start in Capital Expenditure (18.3 percent) by mid-year is a huge concern as the municipality deviated significantly from its SDBIP plans. This could impact service delivery badly if not addressed in the second half of 2018/19 financial year.

**The Auditor General's audit included a high-level overview of the financial viability of George Municipality, which indicate the overall financial viability as GOOD (30 June 2018).** The Auditor General looked at Expenditure Management, Revenue Management, Asset and Liability Management as well as Cash Management.

Given the financial constraints of municipalities, this is a commendable achievement. There are however some of the ratios that indicated that management and Council will have to implement measures to manage the financial viability even more vigorously.

George Municipality's Strategic Objective 5 is "Good Governance and Human Capital", with the following Challenges, Outcomes and Departmental Objectives that impact on financial services (2019/2020 4<sup>th</sup> Generation IDP).

### Challenges:

- Comprehensive audit of operations, processes, duties and service-delivery standards of Directorates;
- Realignment of organisational structure to be more responsive to community needs;
- Ensure viable financial management and control;
- Implement the Long-Term Financial Plan; and
- Functional structures and committees of Council.

### Outcomes:

- Administration is corruption free;
- The municipal environment is financially viable;
- Clean audit status is maintained; and
- Municipality is performance driven.



### Departmental Objectives:

- To develop mechanisms to ensure viable financial management and control;
- To maintain effective credit control in the Municipality and enhance and maximise revenue base through improved collection rate;
- To re-align expenditure on non-income producing and support services;
- To improve contracts management, specifically to address financial implications; and
- To manage the municipal finances according to the Municipal Finance Management Act in an effective and efficient manner.

### Expenditure:

**Operational:** The future planned expenditure by type for George Municipality, as included in the approved 2019/2020 Budget, is as follows:

Table C.7.1: Expenditure Items by Type, as included in the 2019/2020 Final Budget					
Expenditure Items	% of total 18/19 Expenditure	2018/2019 Pre-audit Outcome	2019/2020	2020/2021	2022/2023
Employee related costs	28.58%	R561 113 000	R597 372 000	R638 224 000	R682 657 000
Remuneration of Councillors	1.10%	R21 549 000	R23 943 000	R25 140 000	R26 397 000
Debt Impairment	3.46%	R67 987 000	R71 386 000	R74 956 000	R78 703 000
Depreciation and Asset Impairment	8.27%	R162 429 000	R162 817 000	R147 099 000	R141 130 000
Finance Charges	1.65%	R32 340 000	R36 144 000	R33 816 000	R34 260 000
Bulk Purchases	21.99%	R431 666 000	R498 975 000	R533 885 000	R571 239 000
Other Materials	1.97%	R38 728 000	R38 861 000	R41 814 000	R44 272 000
Contracted Services	24.76%	R486 006 000	R641 852 000	R672 423 000	R647 655 000
Transfers and Subsidies	3.26%	R63 914 000	R69 450 000	R91 968 000	R100 716 000
Other Expenditure	4.93%	R96 809 000	R128 533 000	R125 742 000	R138 434 000
Loss on disposal of PPE	0.03%	R636 000	R674 000	R715 000	R757 000
<b>Total</b>	<b>100.00%</b>	<b>R1 963 177 000</b>	<b>R2 270 007 000</b>	<b>R2 385 782 000</b>	<b>R2 466 220 000</b>

Source: Final 2019/2020 Medium Term Revenue and Expenditure Framework, 29 May 2019: 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 George 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. It is estimated that the budget requirements will double over this period.

The recommendations for George 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 George Municipality to ensure that sufficient funding is allocated towards an asset replacement fund, in order to ensure adequate rehabilitation and maintenance of the existing infrastructure. A financial sustainability strategy is necessary, which needs to include the implementation of an aggressive revenue management framework for ongoing revenue enhancement.
- Water services operational surpluses have to be allocated to essential water services requirements in the future.
- George Municipality needs to ensure that the Credit Control and Debt Collection By-laws are strictly enforced.

**Capital:** The future estimated capital expenditure per standard classification are summarised in the table below:

<b>Table C.7.2: Estimated Capital Expenditure per Standard Classification of George Municipality's Future Capital Budget</b>				
<b>Capital Expenditure Standard</b>	<b>2018/2019 Pre-audit Outcome</b>	<b>2019/2020</b>	<b>2020/2021</b>	<b>2021/2022</b>
Executive and Council	R979 000	R594 000	-	R600 000
Finance and administration	R10 523 000	R10 748 000	R6 048 000	R6 674 000
Internal audit	R100 000	R145 000	R97 000	R100 000
Community and social services	R6 267 000	R8 242 000	R7 467 000	R7 672 000
Sport and recreation	R16 033 000	R8 811 000	R12 942 000	R11 693 000
Public safety	R13 605 000	R8 582 000	R14 490 000	R11 350 000
Housing	R1 347 000	R1 766 000	R652 000	R1 071 000
Health	R350 000	R118 000	R145 000	R360 000
Planning and Development	R648 000	R2 560 000	R874 000	R1 399 000
Road transport	R109 387 000	R58 228 000	R69 779 000	R85 193 000
Environmental protection	-	-	-	-
Energy Sources	R52 863 000	R71 838 000	R73 411 000	R62 274 000
Water Management	R34 630 000	R77 894 000	R88 475 000	R117 900 000
Waste water management	R66 340 000	R84 553 000	R97 246 000	R36 620 000
Waste management	R20 669 000	R10 048 000	R10 828 000	R10 008 000
Other	R263 000	R645 000	R1 460 000	R126 000
<b>Total Capital Expenditure</b>	<b>R334 004 000</b>	<b>R344 772 000</b>	<b>R383 914 000</b>	<b>R353 040 000</b>

Source: Final 2019/2020 Medium Term Revenue and Expenditure Framework, 29 May 2019: Table A5 - Capital Expenditure by Vote, Standard Classification and Funding

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 recommendations for George 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 as regular as possible and use the Master Plans to list the desired infrastructure development requirements and reflect these in the IDP.

- Assign a high priority to the implementation of the approved 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, because most of the funds for the current water and sewerage capital projects come from the municipality's own funding sources. The Municipality also needs to continue with the active implementation of their Credit Control and Debt Collection measures in order to minimize the percentage of non-payment of municipal services.
- To identify all possible sources of external funding over the next three years to assist George Municipality to address the bulk infrastructure backlogs that exist in the various towns.
- 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 George Municipality to commit to a substantial and sustained programme of capital renewal works.

**Income:** George Municipality's revenue strategy is built around the following key components:

- National Treasury's guidelines, Circular No. 93 & 94;
- The municipality's Property Rates Policy;
- The municipality's Credit Control and Indigent Policy and rendering of free basic services;
- Tariff policy and structure;
- Electricity tariff increases as approved by the National Electricity Regulator of South Africa (NERSA); and
- Revenue enhancement plan.

**Operational:** The future planned revenue by source for George Municipality, as included in the approved 2019/2020 Budget, is as follows:

Revenue Item	% of total 18/19 Income	2018/2019 Pre-audit Outcome	2019/2020	2020/2021	2021/2022
Property Rates	13.52%	R260 104 000	R279 613 000	R300 583 000	R323 127 000
Service Charges - Electricity	33.39%	R642 101 000	R723 026 000	R765 868 000	R811 234 000
Service Charges - Water	6.81%	R130 898 000	R127 469 000	R135 117 000	R143 225 000
Service Charges - Sanitation	4.65%	R89 395 000	R101 020 000	R109 661 000	R118 982 000
Service Charges - Refuse	4.05%	R77 805 000	R85 163 000	R92 828 000	R101 183 000
Rental of facilities and equipment	0.31%	R5 896 000	R6 183 000	R6 480 000	R6 808 000
Interest earned – external investments	2.29%	R44 067 000	R43 180 000	R45 352 000	R47 648 000
Interest earned – outstanding debts	0.30%	R5 805 000	R6 096 000	R6 401 000	R6 721 000

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**Table C.7.3: Revenue Items by Source, as included in the 2019/2020 Final Budget**

Revenue Item	% of total 18/19 Income	2018/2019 Pre-audit Outcome	2019/2020	2020/2021	2021/2022
Fines, penalties and forfeits	3.77%	R72 569 000	R76 126 000	R80 182 000	R84 259 000
Licences and permits	0.17%	R3 345 000	R3 516 000	R3 695 000	R3 872 000
Agency Services	0.44%	R8 427 000	R8 848 000	R9 291 000	R9 755 000
Transfers and Subsidies	25.22%	R485 000 000	R605 092 000	R582 686 000	R565 615 000
Other Revenue	5.08%	R97 776 000	R151 618 000	R204 013 000	R219 040 000
Gains on disposal of PPE	0.00%	-	-	-	-
<b>Total</b>	<b>100.00%</b>	<b>R1 923 188 000</b>	<b>R2 216 950 000</b>	<b>R2 342 158 000</b>	<b>R2 441 469 000</b>

Source: Final 2019/2020 Medium Term Revenue and Expenditure Framework, 29 May 2019: Table A4 – Budgeted Financial Performance (Revenue and Expenditure)

**Capital:** The Capital Budget of George Municipality for the last five financial years were roughly between R200 million and R240 million per year. Capital funding will have to increase substantially if existing service levels are to be sustained, which has to be the goal. In this regard George Municipality's own funding, as well as the MIG funding must significantly exceed inflation. Other possible sources of funding and innovative funding mechanisms have to be explored.

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

**Table C.7.4: Sources of funding for the Future Capital Budgets of George Municipality**

Capital Funding Source	2018/2019 Pre-audit Outcome	2019/2020	2020/2021	2021/2022
National Government	R120 118 000	R54 342 000	R55 167 000	R61 424 000
Provincial Government	R15 948 000	R6 878 000	-	-
District Municipality	-	-	-	-
Other transfers and grants	-	-	-	-
Public contributions and donations	-	-	-	-
Borrowing	R25 008 000	R144 695 000	R126 635 000	R92 005 000
Internally generated funds	R172 930 000	R138 857 000	R202 112 000	R199 611 000
<b>Total Capital Funding</b>	<b>R334 004 000</b>	<b>R344 772 000</b>	<b>R383 914 000</b>	<b>R353 040 000</b>

Source: Final 2019/2020 Medium Term Revenue and Expenditure Framework, 29 May 2019: 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.

George Municipality's current six block step water tariff structure adequately promotes the efficient use of water by consumers and discourages the wastage of water. Higher tariffs are charge for the higher consumption blocks.

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

Table C.7.5: Comments on the Municipality's Block Step Water Tariff Structure						
Block (kl/month)	15/16	16/17	17/18	18/19	Comments	
0 – 6 Kl	R0-00	R0-00	R0-00	R0-00	Free Basic Water	
7 – 12 Kl	R11-89	R12-72	R13-74	R14-84	Low volume use	
12 – 15 Kl	R13-69	R14-65	R15-82		R17-09	Typical use volume, including garden irrigation
15 – 20 Kl						
20 – 30 Kl	R16-41	R17-56	R18-96	R20-48	Above average use, including garden irrigation	
30 – 50 Kl	R19-70	R21-08	R22-77	R24-59		
50 – 60 Kl	R22-47	R24-04	R25-96	R28-04		Wasteful use and/or severe garden irrigation
60 – 100 Kl						Significant waste and/or unnecessary garden irrigation
> 100 Kl						

Wasteful or inefficient use of water is discouraged through increased tariffs. It is suggested that the following tariff structure characteristics should remain in George 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.
- The volumetric steps should be kept the same for all the areas within George Municipality's Management Area.
- The cost of water in the maximum step should severely discourage use in this category. The volumetric use for the highest category could be 60 kl/month, above which residential water use could be considered to be wasteful or unnecessary. Garden use requiring in excess of this volume should be reduced in accordance with xeriscape practices.

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

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

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

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

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

- George Municipality can investigate the financial viability of changing the sanitation tariff structure from a fixed monthly amount, which is also not based on the number of toilet pans, to a stepped tariff based on water consumption in the future. Volumetric usage for sanitation services, whereby charges are determined according to water usage, with maximum ceilings and charged accordingly. This will need to include a free sanitation bracket, similar for free water. This will also further deter wasteful water use.
- George 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 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 waste water. George Municipality should note that revenue could potentially decrease as a result of reuse practices.
- George Municipality needs to continue 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 discharged into George Municipality's sewer system is in place and 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 George Municipality to recalculate their treatment costs annually, in order to ensure that there is no under or over recovery of costs from industrial consumers.

The municipality needs to continue with the regular sampling of the quality of all industrial effluent discharged into the sewer system and all industrial consumers need to be charged according to the quality of the effluent discharged into the sewer system.

- George Municipality's current water tariff codes adequately differentiate between the different type of consumers and their water usage. The Municipality can investigate the possibility to uniquely describe the "Municipal Dep." (1418) water usage with a distinction between the different user types, for example parks, office usage, fire-fighting, etc.
- The Municipality can investigate the possibility of adding a further block above 50 kl, for residential water usage, which should discourage consumers to use water above this monthly volume.

## **TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES**

George Municipality's Strategic Objective 5 is "Good Governance and Human Capital", with the following Challenges, Outcomes and Departmental Objectives for Effective Internal Service Delivery (2019/2020 4<sup>th</sup> Generation IDP).

### Challenges:

- Comprehensive audit of operations, processes, duties and service-delivery standards of Directorates;
- Realignment of organisational structure to be more responsive to community needs;
- Ensure viable financial management and control;
- Implement the Long-Term Financial Plan; and
- Functional structures and committees of Council.

### Outcomes:

- Administration is corruption free;
- The municipal environment is financially viable;
- Clean audit status is maintained; and



- Municipality is performance driven.

### Departmental Objectives:

- To ensure proper asset management by implementing standard asset management operating procedures;
- To realign the organisational structure to be more responsive to community needs, more service and efficiency orientated and to fulfil the goals identified in the 5-year plan.
- To maximise the use of technology to improve service delivery;
- To ensure that municipal staff are efficient, effective and responsive;
- To boost internal capacity by starting a graduates programme and employing students graduating from universities who are seeking first-time employment at a much lower remuneration cost for each department. Also, utilise interns in the different departments by requesting financial support from Eden District Municipality, which subsidises half of the interns' salaries.

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

The existing Water Safety Plans for the various WTWs and water distribution systems and the W2RAPs for the WWTWs and drainage networks need to be updated regularly.

The latest Water and Sewer Master Plans of George Municipality summarise the projects (Master Plan Items) necessary in order to cope with the increased future demands and developments within the George Municipality's systems. George Municipality needs to continue to regularly update their Water and Sewer Master Plans.

Critical vacant posts must be filled to preserve service levels and comply with legislation. The Department Civil Engineering Services has an approximate 50% vacancy rate. Scarce skills and inadequate annual prioritisation of technical positions are resulting in serious infrastructure service delivery management challenges. George Municipality is therefore committed to fill the vacant positions on the approved organogram as soon as possible.

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

George 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.

George 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.

The Water Safety Plans of George Municipality were recently updated and includes an Improvement / Upgrade Plan. The purpose of the Improvement / Upgrade Plan is to address the existing significant risks where the existing controls were not effective or absent. Barriers implemented by George Municipality against contamination and deteriorating water quality include the following:

- Participate in Catchment management and water resource protection initiatives.
- Protection at points of abstraction such as river intakes and dams (Abstraction Management).



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

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

- A well informed Council and municipal managers that understand the extreme importance of and are committed to providing adequate resources for continuous professional operation and maintenance of the water supply system.
- Competent managers and supervisors in the technical department who are responsible for water supply services lead by example and are passionate about monitoring and safeguarding drinking water quality.
- Well informed community members and other consumers of water supply services that have respect for water as a precious resource.

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

### SECTION D: WATER SERVICES OBJECTIVES AND STRATEGIES

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

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Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2017 status quo)	WSDP	WSDP	WSDP	WSDP	WSDP
			FY2018/19	FY2019/20	FY2020/21	FY2021/22	FY2022/23
			TARGET	TARGET	TARGET	TARGET	TARGET
Topic 1: Settlement Demographics & Public Amenities							
Affordable Quality Services	Review the Human Settlements Master Plan and submit to the Portfolio Committee by 30 June 2020	1		1	-	-	-
Topic 2: Service Levels							
Affordable Quality Services	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 (32)	34 300		34 300	34 800	35 300	35 800
Affordable Quality Services	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 (34)	36 000		36 000	36 500	37 000	37 500
Affordable Quality Services	Provide free basic water to indigent households (36)	13 145		13 145	13 145	13 145	13 145
Affordable Quality Services	Provide free basic sanitation to indigent households (38)	16 000		16 000	16 000	16 000	16 000
Ensure all households on the farms are provided with at least basic water services, subject to DWS guidance.	Support all applications received for basic water services on the farms (Subject to availability of financial resources and sustainability of type of service).	-			100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)
Ensure all households on the farms are provided with at least basic sanitation services, subject to DWS guidance.	Support all applications received for basic sanitation services on the farms (Subject to availability of financial resources and sustainability of type of service).	-			100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)
Provision of water to informal households based on the standard of 1 water point to 25 households.	Number of communal taps installed in relation to the number of informal households.	-			Provide at least 1 water point to every 25 households in informal areas	Provide at least 1 water point to every 25 households in informal areas	Provide at least 1 water point to every 25 households in informal areas
Provision of sanitation service to informal households based on the standard of 1 toilet to 5 households.	Number of toilet structures provided in relation to the number of informal households.	-			Provide at least 1 toilet to every 5 households in informal areas.	Provide at least 1 toilet to every 5 households in informal areas.	Provide at least 1 toilet to every 5 households in informal areas.
Topic 3: Water Services Asset Management							
Affordable Quality Services	85% spent by 30 June 2020 of the amount budgeted for the construction of the Garden Route Dam spill way (8)	85		85	-	-	-

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Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2017 status quo)	WSDP	WSDP	WSDP	WSDP	WSDP
			FY2018/19	FY2019/20	FY2020/21	FY2021/22	FY2022/23
			TARGET	TARGET	TARGET	TARGET	TARGET
Affordable Quality Services	Rehabilitate and upgrade Water - Networks in terms of the approved capital budget by 30 June (11)	85		85	85	85	85
Affordable Quality Services	Rehabilitate and upgrade Water - Purification in terms of the approved capital budget by 30 June (12)	85		85	85	85	85
Affordable Quality Services	Rehabilitate and upgrade Sewerage - Networks in terms of the approved capital budget by 30 June (13)	85		85	85	85	85
Affordable Quality Services	Rehabilitate and upgrade Sewerage Treatment Works in terms of the approved capital budget by 30 June (14)	85		85	85	85	85
Affordable Quality Services	Compile WTW Process Audits for each WTW and % of recommendations, as included in the WTW Process Audits, implemented.	-			Compile WTW Process Audits	60% of recommendations implemented	70% of recommendations implemented
Affordable Quality Services	Compile WWTW Process Audits for each WWTW and % of recommendations, as included in the WWTW Process Audits, implemented.	-			Compile WWTW Process Audits	60% of recommendations implemented	70% of recommendations implemented
Affordable Quality Services	% of recommendations as included in the Improvement / Upgrade Plan of the Water Safety Plan implemented.	-			60% of recommendations implemented	70% of recommendations implemented	80% of recommendations implemented
Affordable Quality Services	% of recommendations as included in the Improvement / Upgrade Plan of the W <sub>2</sub> RAPs implemented.	-			60% of recommendations implemented	70% of recommendations implemented	80% of recommendations implemented
Affordable Quality Services	Ensure adequate storage capacity for all towns (At least 48hrs AADD).	-			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.
Affordable Quality Services	Ensure adequate water pump station and water reticulation capacity.	-			Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation networks as proposed in the Water Master Plan.
Affordable Quality Services	Ensure adequate sewer pump station and drainage network capacity.	-			Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.	Upgrade existing sewer pump stations and provide new pump stations as identified in the Sewer Master Plan. Upgrade sewer drainage networks as proposed in the Sewer Master Plan.
Affordable Quality Services	Ensure all water and sewerage infrastructure assets are included in the Asset Register, with accurate CRC, DRC, RUL and Age.	-			Annual reporting to the Financial Department on water and sewerage assets	Annual reporting to the Financial Department on water and sewerage assets	Annual reporting to the Financial Department on water and sewerage assets

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2017 status quo)	WSDP	WSDP	WSDP	WSDP	WSDP
			FY2018/19	FY2019/20	FY2020/21	FY2021/22	FY2022/23
			TARGET	TARGET	TARGET	TARGET	TARGET
					not yet included in the Asset Register and assets for which the CRC, DRC, RUL and Age in the Asset Register is not correct.	not yet included in the Asset Register and assets for which the CRC, DRC, RUL and Age in the Asset Register is not correct.	not yet included in the Asset Register and assets for which the CRC, DRC, RUL and Age in the Asset Register is not correct.
Affordable Quality Services	Ensure a budget of at least 2% of the total value of the water and sewerage assets is allocated towards the replacement of existing infrastructure per annum.	-			A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.
Topic 4: Water Services Operation and Maintenance							
Affordable Quality Services	Ensure a budget of at least 1.5% of the total value of the water and sewerage assets is allocated towards the annual O&M of the systems.	-			A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1.5% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.
Affordable Quality Services	Report at least annually on the percentage of water quality and final effluent quality compliance.	-			At least annual publication of water quality and wastewater quality compliance percentages.	At least annual publication of water quality and wastewater quality compliance percentages.	At least annual publication of water quality and wastewater quality compliance percentages.
Topic 5: Conservation and Demand Management (Topic 5.1: Water Resources)							
Affordable Quality Services	Limit water network losses to less than 25% or less by 30 June (6)	25		25	25	25	25
Topic 5: Conservation and Demand Management (Topic 5.2: Water Balance)							
Affordable Quality Services	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.	-			85% of all sources metered and bulk water meters read and recorded at least monthly.	90% of all sources metered and bulk water meters read and recorded at least monthly.	95% of all sources metered and bulk water meters read and recorded at least monthly.
Affordable Quality Services	Ensure all incoming and outgoing flows at WWTWs are metered, as well as final effluent re-used for irrigation purposes and that meters are read and recorded on at least a monthly basis.	-			85% of all flows at WWTWs metered and meters read and recorded at least monthly.	90% of all flows at WWTWs metered and meters read and recorded at least monthly.	95% of all flows at WWTWs metered and meters read and recorded at least monthly.
Topic 6: Water Resources							
Affordable Quality Services	90% Compliance to general standards with regards to waste water outflow by 30 June (15)	90		90	90	90	90
Affordable Quality Services	95% water quality level obtained as per SANS 241 physical and micro parameters by 30 June (16)	95		95	95	95	95
Affordable Quality Services	% Of abstraction from sources registered and authorized by the DWS.	-			90% Compliance	95% Compliance	100% Compliance

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator	Baseline (FY2017 status quo)	WSDP	WSDP	WSDP	WSDP	WSDP
			FY2018/19	FY2019/20	FY2020/21	FY2021/22	FY2022/23
			TARGET	TARGET	TARGET	TARGET	TARGET
Affordable Quality Services	Ensure yields and allocations are adequate to meet at least the projected five year water requirements for all areas.	-			100% adequate supply to meet future water requirements for all areas.	100% adequate supply to meet future water requirements for all areas.	100% adequate supply to meet future water requirements for all areas.
Affordable Quality Services	% Monitoring of effluent discharged by industrial consumers (Quantity and Quality)	-			70% of all industrial consumers monitored wrt quality and quantity of effluent discharged by them.	80% of all industrial consumers monitored wrt quality and quantity of effluent discharged by them.	90% of all industrial consumers monitored wrt quality and quantity of effluent discharged by them.
<b>Topic 7: Financial</b>							
Good Governance and Human Capital	Financial viability measured in terms of the municipality's ability to meet its service debt obligations as at 30 June (40)	45		45	45	45	45
Good Governance and Human Capital	Financial viability measured in terms of the outstanding service debtors as at 30 June (41)	15.6		15.6	15.6	15.6	15.6
Good Governance and Human Capital	Financial viability measured in terms of the available cash to cover fixed operating expenditure as at 30 June (42)	2		2	2	2	2
Affordable Quality Services	The percentage of the municipal capital budget actually spent on capital projects by 30 June (43)	85		85	85	85	85
Good Governance and Human Capital	Achieve a payment percentage of 95% by 30 June (44)	95		95	95	95	95
<b>Topic 8: Institutional Arrangements and Customer Care</b>							
Good Governance and Human Capital	The percentage of the Municipality's personnel budget actually spent on implementing its workplace skills plan by 30 June (5)	0.5		0.5	0.5	0.5	0.5
Good Governance and Human Capital	Report on the implementation of the WSDP annually by the end of October. Report submitted to Council and DWS	-			1	1	1

## SECTION E: WATER SERVICES MTEF PROJECTS

The Water Services Medium-Term Expenditure Framework (MTEF) projects are presented below and outline the water services projects which are funded for implementation within the next three financial years. Table E.2a provides the projects identified for implementation in FY2019/20, Table E.2b provides the projects identified for implementation in FY2020/21 and Table E.2c provides the projects identified for implementation in FY2021/22.

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 George Municipality.

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

<b>Table E.1: Summary of MTEF Projects</b>								
<b>Project Main Category</b>	<b>FY2019/20</b>		<b>FY2020/21</b>		<b>FY2021/22</b>		<b>MTEF Total</b>	
	<b>Nr</b>	<b>Value (R'000)</b>	<b>Nr</b>	<b>Value (R'000)</b>	<b>Nr</b>	<b>Value (R'000)</b>	<b>Nr</b>	<b>Value (R'000)</b>
Water Projects	37	R77,894	31	R88,476	24	R117,900	92	R284,270
Sanitation Projects	47	R81,421	41	R92,744	31	R34,130	119	R208,295
<b>Combined Water &amp; Sanitation Projects</b>	<b>84</b>	<b>R159,315</b>	<b>72</b>	<b>R181,220</b>	<b>55</b>	<b>R152,030</b>	<b>211</b>	<b>R492,565</b>

## WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table E.2a: Water Services MTEF Projects - FY2019/20 (1<sup>st</sup> year MTEF period)

Table E.2a: Water Services MTEF Projects - FY2019/20 (1 <sup>st</sup> year MTEF period)																		
Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Prev spent FY2018/19	Project Budget / Funding Sources								Total Cost	MTEF Project Source
									Budget	Own	M/E	R/BG	ACP	DR	M/WG	Other		
1. Infrastructure Projects								R0	R98,701								R98,701	
1		Thembalethu UISP – Water (Housing Grant)	Installation of water reticulation network	Housing	Water	Water Network	Reticulation		R575							R575	Housing	
4		Provision of water tanks	Provide water tanks for hh without basic services	Basic Services	Water	Water Network	Basic Services		R80	R80						R80	WSDP	
9		Airport mainline upgrade	Increase capacity of airport mainline	Services	Water	Water Network	Reticulation		R500	R500						R500	Water Master Plan	
11		Kaaimans Transnet bridge upgrading	Refurbishment and increase capacity of pipeline across Kaaimans Transnet bridge	Services	Water	Water Network	Reticulation		R500	R500						R500	Refurbishment and Water Master Plan	
12		Property Development – Sweetpea street residential erven project	Installation of water reticulation network	Services	Water	Water Network	Reticulation		R140	R140						R140	Water Master Plan	
13		Property Development – Diamond road industrial erven project	Installation of water reticulation network	Services	Water	Water Network	Reticulation		R60	R60						R60	Water Master Plan	
16		N2 Thembalethu crossing upgrade	Upgrade of bulk water pipeline	Services	Water	Water Network	Reticulation		R500	R500						R500	Water Master Plan	
17		Upgrading of asbestos pipe – Greater George	Upgrade water reticulation network	Services	Water	Water Network	Reticulation		R1,500	R1,500						R1,500	Water Master Plan	
20		Wilderness Heights – Bulk water supply pipeline	Upgrade of bulk water pipeline	Services	Water	Water Network	Reticulation		R450	R450						R450	Water Master Plan	
21		Wilderness Heights – Upgrade existing water pump station	Refurbishment and upgrade of pump station	Services	Water	Water Network	Pump station		R780	R780						R780	Refurbishment & Water Master Plan	
25		WTW – 30 MI balancing dam	Increase raw water storage capacity	Storage capacity	Water	Water Purification	Raw water balance dam		R1,000	R1,000						R1,000	WSDP & Water Master Plan	
26		Extension of Waterworks 20 MI	Increase water treatment capacity	Services	Water	Water Purification	WTW		R34,721		R16,221				R18,500	R34,721	WSDP & WTW Technical Report	
31		Settling tanks (Uniondale and Wilderness) – Roofs	Install roofs for settling tanks in Uniondale and Wilderness	Water quality compliance	Water	Water Purification	WTW		R800	R800						R800	WSDP & Water Safety Plan	
35		Uniondale reservoir (500 KI) Lyonville	Construction of new 500 KI reservoir	Storage capacity	Water	Water Purification	Reservoir		R800	R800						R800	WSDP & Water Master Plan	
37		Wilderness Waterworks	Work at Wilderness WTW	O&M	Water	Water Purification	WTW		R45	R45						R45	O&M	
44		Thembalethu UISP – Sewerage	Installation of sewer drainage network	Housing	Sanitation	Sewerage Networks	Drainage network		R1,696						R1,696	R1,696	Housing	
45		Property Development – Sweetpea street residential erven project	Installation of sewer network	Services	Sanitation	Sewerage Networks	Drainage network		R420	R420						R420	Sewer Master Plan	
46		Property Development – Diamond road industrial erven project	Installation of sewer network	Services	Sanitation	Sewerage Networks	Drainage network		R180	R180						R180	Sewer Master Plan	
50		Wilderness Kleinkrantz main sewer line upgrade	Increase capacity of Kleinkrantz main sewer line	Services	Sanitation	Sewerage Networks	Drainage network		R3,250	R1,500					R1,750	R3,250	Sewer Master Plan	
58		Network rehabilitation / upgrade Thembalethu	Rehabilitation and upgrade of sections of sewer network	Rehabilitation	Sanitation	Pipe Network Upgrades	Drainage network		R250	R250						R250	Pipeline Replacement Programme	
59		Upgrading of Schaapkop pump station (mechanical)	Upgrade of sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000						R1,000	Sewer Master Plan	
60		Upgrading of Meul street pump station (mechanical)	Upgrade of sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000						R1,000	Sewer Master Plan	
62		Schaapkop pump station (Install inlet screens)	Install inlet screens at Schaapkop sewer pump station	O&M	Sanitation	Upgrading of Pumpstation	Pump stations		R650	R650						R650	O&M	
64		Upgrade Gwaing / Proefplaas pump station	Upgrade sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R500	R500						R500	Sewer Master Plan	
65		Schaapkop rising main to Tamsui upgrade	Upgrade rising main	Services	Sanitation	Upgrading of Pumpstation	Drainage network		R825	R825						R825	Sewer Master Plan	
66		Upgrading of pump stations	Upgrade sewer pump stations	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000						R1,000	Sewer Master Plan	
67		Upgrading: Electrical switchgear (pump stations)	Upgrade electrical switchgear at sewer pump stations	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R800	R800						R800	Sewer Master Plan	
70		Herolds Bay pump station	Upgrade Herolds Bay sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R400	R400						R400	Sewer Master Plan	
76		Europe bulk sewer rising main – Relocate	Relocate sewer rising main	Services	Sanitation	Sewerage Networks	Drainage network		R280	R280						R280	Sewer Master Plan	
77		Metrogrounds bulk sewer and water connections	Bulk sewer pipeline	Services	Sanitation	Sewerage Networks	Drainage network		R200	R200						R200	Sewer Master Plan	
78		Thembalethu N2 bulk sewer	Bulk sewer pipeline	Services	Sanitation	Sewerage Networks	Drainage network		R400	R400						R400	Sewer Master Plan	
82		Outeniqua WWTW 10MI/d addition	Increase capacity of Outeniqua WWTW	Services	Sanitation	Sewerage Treatment Plant	WWTW		R42,220		R12,220				R30,000	R42,220	WSDP & WWTW Technical Report	
92		Sludge dewatering plant	Install sludge dewatering plant	Treatment	Sanitation	Sewerage Treatment Plant	WWTW		R1,000	R1,000						R1,000	WSDP & WWTW Technical Report	
95		Upgrading of pump stations for plants – Herolds Bay store	Upgrading of pump stations for plants	Treatment	Sanitation	Sewerage Treatment Plant	WWTW		R180	R180						R180	Sewer Master Plan	
2. Source Development Projects								R0	R20,669								R20,669	
22		Raising Garden Route dam	Raising of wall of dam	Resources	Water	Water Purification	Storage dam		R20,669	R15,140			R5,529				R20,669	WSDP & Source Augmentation Studies
3. Demand Management projects								R0	R4,800								R4,800	
2		Installation of new meters	Installation of new water meters	WC/WD	Water	Water Network	Reticulation		R350	R350							R350	WSDP
3		Installation of Smart meters	Installation of Smart water meters	WC/WD	Water	Water Network	Reticulation		R1,500	R1,500							R1,500	WSDP
7		Water network rehabilitation	Rehabilitation of sections of the water network	WC/WD	Water	Water Network	Reticulation		R2,000	R2,000							R2,000	Pipeline Replacement Programme
36		PRVs	Install PRVs to reduce pressures	WC/WD	Water	Water Purification	Reticulation		R800	R800							R800	WSDP & Water Master Plan
98		Replace flow meter – Gwaing	Replace flow meter at WWTW	Monitoring	Sanitation	Sewerage Treatment Plant	WWTW		R150	R150							R150	O&M



# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table E.2a: Water Services MTEF Projects - FY2019/20 (1<sup>st</sup> year MTEF period)

								Project Budget / Funding Sources												
Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Prev spent FY2018/19	Budget	FY2019/20								Total Cost	MTEF Project Source	
										Own	MIG	RBG	ACP	DR	MWVG	Other				
4. O&M Commitments								R0	R35,145									R35,145		
Operations																				
6		Security wall	Install new security wall	Security	Water	Water Network	Security		R100	R100								R0	O&M	
8		Telemetry and Service Network System	Upgrading of the telemetry system for water network	WC/WDM	Water	Water Network	Other		R300	R300								R100	O&M	
18		Vehicles and Machinery (Total)	Purchase vehicles, water trucks, tipper truck, tools, equipment, etc.	O&M	Water	Vehicles and Machinery	Other		R1,100	R200						R900		R300	O&M	
28		H&S Extractor fans – Chlorine rooms (R956 200 was rolled over)	Installation of extractor fans in chlorine rooms	Health & Safety	Water	Water Purification	WTW		R1,500	R1,500								R1,100	O&M	
29		Instrumentation	Purchase required instrumentation for WTWs	Water quality compliance	Water	Water Purification	Other		R90	R90								R90	WSDP & Water Safety Plan	
30		Telemetry	Upgrade of telemetry system for WTWs	O&M	Water	Water Purification	Other		R90	R90								R90	WSDP & Water Safety Plan	
32		Tools and Equipment	Purchase tools and equipment for WTWs	O&M	Water	Water Purification	Other		R23	R23								R23	O&M	
33		Air conditioning pump stations	Installation of air conditioning units in pump stations	O&M	Water	Water Purification	Pump stations		R90	R90								R90	O&M	
34		Uniondale Waterworks office building (Process Controllers)	Construction of office building for Process Controllers	Working environment	Water	Water Purification	WTW		R500	R500								R500	WSDP & Water Safety Plan	
38		Replace fencing at infrastructure (Old WTW, Touwsrante- and Wilderness reservoirs)	Replace existing security fencing at WTW and reservoirs.	Security	Water	Water Purification	WTW and Reservoirs		R405	R405								R405	WSDP & Water Safety Plan	
39		Filter sand at Waterworks	Purchase filter sand for WTWs	Water quality compliance	Water	Water Purification	WTW		R900	R900								R900	O&M	
43		Haarlem Waterworks office building	Construction of office building for Process Controllers	Working environment	Water	Water Purification	WTW		R447	R447								R447	WSDP & Water Safety Plan	
49		Installation of syphon chambers	Installation of syphon chambers	O&M	Sanitation	Sewerage Networks	Drainage network		R80	R80								R80	O&M	
51		Tools and equipment	Purchase tools and equipment for drainage networks	O&M	Sanitation	Sewerage Networks	Other		R100	R100								R100	O&M	
52		Telemetry and service network system	Upgrading of the telemetry system for sewer network	O&M	Sanitation	Sewerage Networks	Drainage network		R300	R300								R300	O&M	
53		Two-way radio systems	Purchase two-way radio systems	O&M	Sanitation	Sewerage Networks	Other		R100	R100								R100	O&M	
54		Jetting machine	Jetting machine to clear blockages	O&M	Sanitation	Sewerage Networks	Other		R500							R500		R500	O&M	
55		Upgrading depot facilities	Upgrade facilities at depots	O&M	Sanitation	Sewerage Networks	Other		R100	R100								R100	O&M	
56		45m Security wall around perimeter	Install security wall	Security	Sanitation	Sewerage Networks	Security		R100	R100								R100	O&M	
69		Generator shelters and security booths at pump stations	Provide generator shelters and security booths	Security	Sanitation	Upgrading of Pumpstation	Pump stations		R300	R300								R300	WSDP and WJRAP	
72		Upgrading of access roads & fencing (pump stations)	Upgrade access roads and fencing at pump stations	Security	Sanitation	Upgrading of Pumpstation	Pump stations		R500	R500								R500	WSDP and WJRAP	
74		Vehicles and machinery (Total)	Purchase vehicles and machinery	O&M	Sanitation	Vehicles and Machinery	Other		R2,800							R2,800		R2,800	O&M	
81		Scientific services (Instrumentation, Vehicles, Office furniture)	Purchase instrumentation, vehicles and office furniture	O&M	Sanitation	Scientific Services	Other		R718	R118						R600		R718	O&M	
88		Boreholes at WWTWs plants	Monitoring boreholes at WWTWs	Environment	Sanitation	Sewerage Treatment Plant	WWTW		R1,200	R1,200								R1,200	WJRAP	
89		Tools and equipment	Purchase tools and equipment for WWTW	O&M	Sanitation	Sewerage Treatment Plant	Other		R20	R20								R20	O&M	
90		Generators	Provide generators as backup power supply for WWTW	Power failures	Sanitation	Sewerage Treatment Plant	WWTW		R800	R800								R800	WSDP and WJRAP	
93		Fencing of treatment plants (Gwaing, Outeniqua)	Install fencing at WWTW	Security	Sanitation	Sewerage Treatment Plant	WWTW		R1,100	R1,100								R1,100	WSDP and WJRAP	
94		Paving of gravel roads of plants (Kleinkrantz)	Paving of gravel roads at plants	O&M	Sanitation	Sewerage Treatment Plant	WWTW		R600	R600								R600	WJRAP	
96		Access control to plants	Improve access control at WWTW	Security	Sanitation	Sewerage Treatment Plant	WWTW		R94	R94								R94	O&M	
97		High mast lighting (Outeniqua)	Install high mast lighting to improve visibility	Safety	Sanitation	Sewerage Treatment Plant	WWTW		R640	R640								R640	O&M	
99		Furniture and fittings	Purchase furniture and fittings for WWTW	O&M	Sanitation	Sewerage Treatment Plant	Other		R18	R18								R18	O&M	
Maintenance																				
5		Upgrading depot facilities	Upgrade facilities at depots	O&M	Water	Water Network	Other		R100	R100								R100	O&M	
27		Rehabilitation of old WTW (6 MI Module)	Rehabilitation and increase capacity of WTW	Services	Water	Water Purification	WTW		R3,700	R1,500						R2,200		R3,700	WSDP & WTW Technical Report	
40		Malgas water pump station rehabilitation	Rehabilitation of existing Malgas water pump station	Rehabilitation	Water	Water Purification	Pump station		R280	R280								R280	O&M	
41		UF Plant - Rehabilitation	Rehabilitation of existing UF plant	Rehabilitation	Water	Water Purification	WTW		R200	R200								R200	O&M	
42		Kaaimans water pump station rehabilitation	Rehabilitation of existing Kaaimans water pump station	Rehabilitation	Water	Water Purification	Pump station		R300	R300								R300	O&M	
57		Network rehabilitation sewerage	Rehabilitation of sections of the sewer network	Rehabilitation	Sanitation	Pipe Network Upgrades	Drainage network		R250	R250								R250	Pipeline Replacement Programme	
63		Schaapkop rising main rehabilitation of bridge crossing river	Rehabilitation of Schaapkop rising main	Rehabilitation	Sanitation	Upgrading of Pumpstation	Drainage network		R450	R450								R450	O&M	
75		Sewer network rehabilitation	Rehabilitation of sections of the sewer network	Rehabilitation	Sanitation	Sewerage Networks	Drainage network		R1,500	R1,500								R1,500	Pipeline Replacement Programme	
83		Outeniqua WWTW – Rehabilitation of carousel	Rehabilitation of Carousel	Rehabilitation	Sanitation	Sewerage Treatment Plant	WWTW		R8,850							R8,850		R8,850	O&M	
84		Gwaing WWTW – Reinststate 3.5 M/d	Reinststate the 3.5 M/d plant at Gwaing WWTW	Services	Sanitation	Sewerage Treatment Plant	WWTW		R1,000	R1,000								R1,000	WSDP & WWTW Technical Report	
85		Refurbishment of belt presses at Gwaing WWTW	Refurbishment of the belt presses	Refurbishment	Sanitation	Sewerage Treatment Plant	WWTW		R200	R200								R200	WSDP & WWTW Technical Report	
86		Replacement of aerators and mixers	Replacement of aerators and mixers	Refurbishment	Sanitation	Sewerage Treatment Plant	WWTW		R1,900	R1,900								R1,900	WSDP & WWTW Technical Report	
87		Refurbishment of horizontal bridge for aerators – Outeniqua WWTW	Refurbishment of horizontal bridge for aerators	Refurbishment	Sanitation	Sewerage Treatment Plant	WWTW		R800	R800								R800	WSDP & WWTW Technical Report	
5. Institutional								R0	R0									R0		
6. Water Services Programmes								R0	R0										R0	
Awareness Programs																				
									R0									R0		
WASH Programs																				
									R0									R0		
Total								R0	R159,315										R159,315	

# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table E.2b: Water Services MTEF Projects - FY2020/21 (2nd year MTEF period)

Table E.2b: Water Services MTEF Projects - FY2020/21 (2nd year MTEF period)																			
Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Prev spent FY2018/19	Project Budget / Funding Sources								Total Cost	MTEF Project Source	
									FY2020/21										
									Budget	Own	M/G	R/BG	ACIP	DR	M/WIG	Other			
1. Infrastructure Projects									R0	R141,083								R141,083	
4		Provision of water tanks	Provide water tanks for hh without basic services	Basic Services	Water	Water Network	Basic Services		R80	R80							R80	WSDP	
9		Airport mainline upgrade	Increase capacity of airport mainline	Services	Water	Water Network	Reticulation		R1,000	R1,000							R1,000	Water Master Plan	
10		Transnet crossing Mitchell Street / Denneoord	Increase capacity of network	Services	Water	Water Network	Reticulation		R1,000	R1,000							R1,000	Water Master Plan	
11		Kaaimans Transnet bridge upgrading	Refurbishment and increase capacity of pipeline across Kaaimans Transnet bridge.	Services	Water	Water Network	Reticulation		R1,000	R1,000							R1,000	Refurbishment and Water Master Plan	
14		Property Development – Clay street industrial erven project	Installation of water reticulation network	Services	Water	Water Network	Reticulation		R90	R90							R90	Water Master Plan	
16		N2 Thembaletu crossing upgrade	Upgrade of bulk water pipeline	Services	Water	Water Network	Reticulation		R1,300	R1,300							R1,300	Water Master Plan	
17		Upgrading of asbestos pipe – Greater George	Upgrade water reticulation network	Services	Water	Water Network	Reticulation		R1,500	R1,500							R1,500	Water Master Plan	
19		Kraalbosch Reservoir 6 Ml	Construction of new 6 Ml reservoir for Kraalbosch	Storage capacity	Water	Water Network	Reservoir		R235	R235							R235	WSDP & Water Master Plan	
20		Wilderness Heights – Bulk water supply pipeline	Upgrade of bulk water pipeline	Services	Water	Water Network	Reticulation		R2,500	R2,500							R2,500	Water Master Plan	
25		WTW – 30 Ml balancing dam	Increase raw water storage capacity	Storage capacity	Water	Water Purification	Raw water balance dam		R12,000	R12,000							R12,000	WSDP & Water Master Plan	
26		Extension of Waterworks 20 Ml	Increase water treatment capacity	Services	Water	Water Purification	WTW		R47,648		R29,648					R18,000	R47,648	WSDP & WTW Technical Report	
35		Unionsdale reservoir (500 Kl) Lyonville	Construction of new 500 Kl reservoir	Storage capacity	Water	Water Purification	Reservoir		R1,000	R1,000							R1,000	WSDP & Water Master Plan	
48		Property Development – Clay street industrial erven project	Installation of sewer network	Services	Sanitation	Sewerage Networks	Drainage network		R270	R270							R270	Sewer Master Plan	
50		Wilderness Kleinkrantz main sewer line upgrade	Increase capacity of Kleinkrantz main sewer line	Services	Sanitation	Sewerage Networks	Drainage network		R3,750	R3,750							R3,750	Sewer Master Plan	
58		Network rehabilitation / upgrade Thembaletu	Rehabilitation and upgrade of sections of sewer network	Rehabilitation	Sanitation	Pipe Network Upgrades	Drainage network		R1,000	R1,000							R1,000	Pipeline Replacement Programme	
59		Upgrading of Schaapkop pump station (mechanical)	Upgrade of sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R3,000	R3,000							R3,000	Sewer Master Plan	
60		Upgrading of Meul street pump station (mechanical)	Upgrade of sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000							R1,000	Sewer Master Plan	
61		Upgrading of Eden pump station (mechanical)	Upgrade of sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R500	R500							R500	Sewer Master Plan	
62		Schaapkop pump station (Install inlet screens)	Install inlet screens at Schaapkop sewer pump station	O&M	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000							R1,000	O&M	
64		Upgrade Gwaing / Proefplaas pump station	Upgrade sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,500	R1,500							R1,500	Sewer Master Plan	
65		Schaapkop rising main to Tamsui upgrade	Upgrade rising main	Services	Sanitation	Upgrading of Pumpstation	Drainage network		R1,000	R1,000							R1,000	Sewer Master Plan	
66		Upgrading of pump stations	Upgrade sewer pump stations	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,500	R1,500							R1,500	Sewer Master Plan	
67		Upgrading: Electrical switchgear (pump stations)	Upgrade electrical switchgear at sewer pump stations	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R800	R800							R800	Sewer Master Plan	
70		Herolds Bay pump station	Upgrade Herolds Bay sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R2,500	R2,500							R2,500	Sewer Master Plan	
71		Wilderness Heights 6 1/2 sewer pump station	New sewer pump station for Wilderness Heights	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R270	R270							R270	Sewer Master Plan	
79		Wilderness Heights – 1.6km bulk sewer main	Upgrade bulk sewer pipeline	Services	Sanitation	Sewerage Networks	Drainage network		R1,250	R1,250							R1,250	Sewer Master Plan	
80		Wilderness Heights – 30m sewer pumping main	Upgrade sewer rising main	Services	Sanitation	Sewerage Networks	Drainage network		R450	R450							R450	Sewer Master Plan	
82		Outeniqua WWTW 10Ml/d addition	Increase capacity of Outeniqua WWTW	Services	Sanitation	Sewerage Treatment Plant	WWTW		R50,000							R50,000	R50,000	WSDP & WWTW Technical Report	
92		Sludge dewatering plant	Install sludge dewatering plant	Treatment	Sanitation	Sewerage Treatment Plant	WWTW		R1,940	R1,940							R1,940	WSDP & WWTW Technical Report	
2. Source Development Projects									R0	R0								R0	
									R0								R0		
									R0								R0		
3. Demand Management projects									R0	R5,000								R5,000	
2		Installation of new meters	Installation of new water meters	WC/WDM	Water	Water Network	Reticulation		R500	R500							R500	WSDP	
3		Installation of Smart meters	Installation of Smart water meters	WC/WDM	Water	Water Network	Reticulation		R1,500	R1,500							R1,500	WSDP	
7		Water network rehabilitation	Rehabilitation of sections of the water network	WC/WDM	Water	Water Network	Reticulation		R2,000	R2,000							R2,000	Pipeline Replacement Programme	
36		PRVs	Install PRVs to reduce pressures	WC/WDM	Water	Water Purification	Reticulation		R1,000	R1,000							R1,000	WSDP & Water Master Plan	

# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table E.2b: Water Services MTEF Projects - FY2020/21 (2nd year MTEF period)

Table E.2b: Water Services MTEF Projects - FY2020/21 (2nd year MTEF period)																				
Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Prev spent FY2018/19	Project Budget / Funding Sources										Total Cost	MTEF Project Source
									FY2020/21											
									Budget	Own	M/G	RBG	ACIP	DR	MWIG	Other				
4. O&M Commitments									R0	R35,137								R35,137		
Operations																				
6		Security wall	Install new security wall	Security	Water	Water Network	Security			R80	R80							R80	O&M	
8		Telemetry and Service Network System	Upgrading of the telemetry system for water network	WC/WDM	Water	Water Network	Other			R250	R250							R250	O&M	
18		Vehicles and Machinery (Total)	Purchase vehicles, water trucks, tipper truck, tools, equipment, etc.	O&M	Water	Vehicles and Machinery	Other			R947	R47						R900	R947	O&M	
23		Backup generator at Garden Route Dam	Generator for raw water pump station	Power failures	Water	Water Purification	Pump station			R4,500	R4,500							R4,500	WSDP & Water Safety Plan	
28		H&S Extractor fans – Chlorine rooms (R956 200 was rolled over)	Installation of extractor fans in chlorine rooms	Health & Safety	Water	Water Purification	WTW			R2,000	R2,000							R2,000	WSDP & Water Safety Plan	
29		Instrumentation	Purchase required instrumentation for WTWs	Water quality compliance	Water	Water Purification	WTW			R94	R94							R94	WSDP & Water Safety Plan	
30		Telemetry	Upgrade of telemetry system for WTWs	O&M	Water	Water Purification	Other			R94	R94							R94	WSDP & Water Safety Plan	
32		Tools and Equipment	Purchase tools and equipment for WTWs	O&M	Water	Water Purification	Other			R24	R24							R24	O&M	
33		Air conditioning pump stations	Installation of air conditioning units in pump stations	O&M	Water	Water Purification	Pump stations			R94	R94							R94	O&M	
38		Replace fencing at infrastructure (Old WTW, Touwsrante- and Wilderness reservoirs)	Replace existing security fencing at WTW and reservoirs.	Security	Water	Water Purification	WTW and Reservoirs			R400	R400							R400	WSDP & Water Safety Plan	
39		Filter sand at Waterworks	Purchase filter sand for WTWs	Water quality compliance	Water	Water Purification	WTW			R1,060	R1,060							R1,060	O&M	
51		Tools and equipment	Purchase tools and equipment for drainage networks	O&M	Sanitation	Sewerage Networks	Other			R80	R80							R80	O&M	
52		Telemetry and service network system	Upgrading of the telemetry system for sewer network	O&M	Sanitation	Sewerage Networks	Drainage network			R300	R300							R300	O&M	
53		Two-way radio systems	Purchase two-way radio systems	O&M	Sanitation	Sewerage Networks	Other			R80	R80							R80	O&M	
55		Upgrading depot facilities	Upgrade facilities at depots	O&M	Sanitation	Sewerage Networks	Other			R100	R100							R100	O&M	
68		Generators – Standby for Wilderness pump stations	Provide standby generators for Wilderness pump stations	Power failures	Sanitation	Upgrading of Pumpstation	Pump stations			R1,000	R1,000							R1,000	WSDP and W <sub>2</sub> RAP	
69		Generator shelters and security booths at pump stations	Provide generator shelters and security booths	Security	Sanitation	Upgrading of Pumpstation	Pump stations			R300	R300							R300	WSDP and W <sub>2</sub> RAP	
72		Upgrading of access roads & fencing (pump stations)	Upgrade access roads and fencing at pump stations	Security	Sanitation	Upgrading of Pumpstation	Pump stations			R700	R700							R700	WSDP and W <sub>2</sub> RAP	
74		Vehicles and machinery (Total)	Purchase vehicles and machinery	O&M	Sanitation	Vehicles and Machinery	Other			R1,350							R1,350	R1,350	O&M	
81		Scientific services (Instrumentation, Vehicles, Office furniture)	Purchase instrumentation, vehicles and office furniture	O&M	Sanitation	Scientific Services	Other			R465	R145						R320	R465	O&M	
88		Boreholes at WWTWs plants	Monitoring boreholes at WWTWs	Environment	Sanitation	Sewerage Treatment Plant	WWTW			R1,450	R1,450							R1,450	W <sub>2</sub> RAP	
89		Tools and equipment	Purchase tools and equipment for WWTW	O&M	Sanitation	Sewerage Treatment Plant	Other			R10	R10							R10	O&M	
90		Generators	Provide generators as backup power supply for WWTW	Power failures	Sanitation	Sewerage Treatment Plant	WWTW			R1,400	R1,400							R1,400	WSDP and W <sub>2</sub> RAP	
91		Vehicles	Purchase vehicles for WWTW	O&M	Sanitation	Sewerage Treatment Plant	Other			R640							R640	R640	O&M	
93		Fencing of treatment plants (Kleinkrantz)	Install fencing at WWTW	Security	Sanitation	Sewerage Treatment Plant	WWTW			R650	R650							R650	WSDP and W <sub>2</sub> RAP	
94		Paving of gravel roads of plants (Uniondale)	Paving of gravel roads at plants	O&M	Sanitation	Sewerage Treatment Plant	WWTW			R1,500	R1,500							R1,500	W <sub>2</sub> RAP	
97		High mast lighting (Kleinkrantz)	Install high mast lighting to improve visibility	Safety	Sanitation	Sewerage Treatment Plant	WWTW			R350	R350							R350	O&M	
99		Furniture and fittings	Purchase furniture and fittings for WWTW	O&M	Sanitation	Sewerage Treatment Plant	Other			R19	R19							R19	O&M	
Maintenance																				
5		Upgrading depot facilities	Upgrade facilities at depots	O&M	Water	Water Network	Other			R80	R80							R80	O&M	
27		Rehabilitation of old WTW (6 MI Module)	Rehabilitation and increase capacity of WTW	Services	Water	Water Purification	WTW			R2,500	R1,500						R1,000	R2,500	WSDP & WTW Technical Report	
41		UF Plant - Rehabilitation	Rehabilitation of existing UF plant	Rehabilitation	Water	Water Purification	WTW			R500	R500							R500	O&M	
42		Kaaimans water pump station rehabilitation	Rehabilitation of existing Kaaimans water pump station	Rehabilitation	Water	Water Purification	Pump station			R1,500	R1,500							R1,500	O&M	
57		Network rehabilitation sewerage	Rehabilitation of sections of the sewer network	Rehabilitation	Sanitation	Pipe Network Upgrades	Drainage network			R1,000	R1,000							R1,000	Pipeline Replacement Programme	
63		Schaapkop rising main rehabilitation of bridge crossing river	Rehabilitation of Schaapkop rising main	Rehabilitation	Sanitation	Upgrading of Pumpstation	Drainage network			R2,400	R2,400							R2,400	O&M	
75		Sewer network rehabilitation	Rehabilitation of sections of the sewer network	Rehabilitation	Sanitation	Sewerage Networks	Drainage network			R2,000	R2,000							R2,000	Pipeline Replacement Programme	
84		Gwaing WWTW – Reinstatate 3.5 MI/d	Reinstatate the 3.5 MI/d plant at Gwaing WWTW	Services	Sanitation	Sewerage Treatment Plant	WWTW			R2,000	R2,000							R2,000	WSDP & WWTW Technical Report	
85		Refurbishment of belt presses at Gwaing WWTW	Refurbishment of the belt presses	Refurbishment	Sanitation	Sewerage Treatment Plant	WWTW			R220	R220							R220	WSDP & WWTW Technical Report	
86		Replacement of aerators and mixers	Replacement of aerators and mixers	Refurbishment	Sanitation	Sewerage Treatment Plant	WWTW			R2,000	R2,000							R2,000	WSDP & WWTW Technical Report	
87		Refurbishment of horizontal bridge for aerators – Outeniqua	Refurbishment of horizontal bridge for aerators	Refurbishment	Sanitation	Sewerage Treatment Plant	WWTW			R1,000	R1,000							R1,000	WSDP & WWTW Technical Report	
5. Institutional									R0	R0								R0		
										R0								R0		
6. Water Services Programmes									R0	R0								R0		
Awareness Programs																				
										R0								R0		
WASH Programs																				
										R0								R0		
Total									R0	R181,220								R181,220		

# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table E.2c: Water Services MTEF Projects - FY2021/22 (3 <sup>rd</sup> year MTEF period)																			
Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Prev spent FY2018/19	Project Budget / Funding Sources								Total Cost	MTEF Project Source	
									FY2021/22										
									Budget	Own	MIG	RBG	ACP	DR	MW/M	Other			
1. Infrastructure Projects									R0	R124,770								R124,770	
4		Provision of water tanks	Provide water tanks for hh without basic services	Basic Services	Water	Water Network	Basic Services		R80	R80							R80	WSDP	
9		Airport mainline upgrade	Increase capacity of airport mainline	Services	Water	Water Network	Reticulation		R1,000	R1,000							R1,000	Water Master Plan	
10		Transnet crossing Mitchell Street / Denneoord	Increase capacity of network	Services	Water	Water Network	Reticulation		R1,000	R1,000							R1,000	Water Master Plan	
11		Kaaimans Transnet bridge upgrading	Refurbishment and increase capacity of pipeline across Kaaimans Transnet bridge.	Services	Water	Water Network	Reticulation		R1,000	R1,000							R1,000	Refurbishment and Water Master Plan	
15		Property Development – Ossie Urban street industrial even project	Installation of water reticulation network	Services	Water	Water Network	Reticulation		R200	R200							R200	Water Master Plan	
16		N2 Thembaletu crossing upgrade	Upgrade of bulk water pipeline	Services	Water	Water Network	Reticulation		R3,500	R3,500							R3,500	Water Master Plan	
17		Upgrading of asbestos pipe – Greater George	Upgrade water reticulation network	Services	Water	Water Network	Reticulation		R1,500	R1,500							R1,500	Water Master Plan	
19		Kraalbosch Reservoir 6 MI	Construction of new 6 MI reservoir for Kraalbosch	Storage capacity	Water	Water Network	Reservoir		R3,000	R3,000							R3,000	WSDP & Water Master Plan	
24		WTW – Reservoirs 12 MI	Construction of new 12 MI reservoir	Storage capacity	Water	Water Purification	Reservoir		R1,000	R1,000							R1,000	WSDP & Water Master Plan	
25		WTW – 30 MI balancing dam	Increase raw water storage capacity	Storage capacity	Water	Water Purification	Raw water balance dam		R15,000	R15,000							R15,000	WSDP & Water Master Plan	
26		Extension of Waterworks 20 MI	Increase water treatment capacity	Services	Water	Water Purification	WTW		R80,000		R31,788					R48,212	R80,000	WSDP & WTW Technical Report	
41		UF Plant - Rehabilitation	Rehabilitation of existing UF plant	Rehabilitation	Water	Water Purification	WTW		R1,500	R1,500							R1,500	O&M	
48		Property Development – Ossie Urban street industrial even project	Installation of sewer network	Services	Sanitation	Sewerage Networks	Drainage network		R600	R600							R600	Sewer Master Plan	
58		Network rehabilitation / upgrade Thembaletu	Rehabilitation and upgrade of sections of sewer network	Rehabilitation	Sanitation	Pipe Network Upgrades	Drainage network		R1,000	R1,000							R1,000	Pipeline Replacement Programme	
59		Upgrading of Schaapkop pump station (mechanical)	Upgrade of sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R3,000	R3,000							R3,000	Sewer Master Plan	
60		Upgrading of Meul street pump station (mechanical)	Upgrade of sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000							R1,000	Sewer Master Plan	
61		Upgrading of Eden pump station (mechanical)	Upgrade of sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R2,000	R2,000							R2,000	Sewer Master Plan	
64		Upgrade Gwaing / Proefplaas pump station	Upgrade sewer pump station	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R2,000	R2,000							R2,000	Sewer Master Plan	
66		Upgrading of pump stations	Upgrade sewer pump stations	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R2,000	R2,000							R2,000	Sewer Master Plan	
67		Upgrading: Electrical switchgear (pump stations)	Upgrade electrical switchgear at sewer pump stations	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000							R1,000	Sewer Master Plan	
71		Wilderness Heights 61/s sewer pump station	New sewer pump station for Wilderness Heights	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R390	R390							R390	Sewer Master Plan	
73		Thembaletu P/S 6	New sewer pump station for Thembaletu	Services	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000							R1,000	Sewer Master Plan	
92		Sludge dewatering plant	Install sludge dewatering plant	Treatment	Sanitation	Sewerage Treatment Plant	WWTW		R2,000	R2,000							R2,000	WSDP & WWTW Technical Report	
2. Source Development Projects									R0	R0								R0	
									R0	R0							R0		
3. Demand Management projects									R0	R4,000								R4,000	
2		Installation of new meters	Installation of new water meters	WC/WDM	Water	Water Network	Reticulation		R500	R500							R500	WSDP	
3		Installation of Smart meters	Installation of Smart water meters	WC/WDM	Water	Water Network	Reticulation		R1,500	R1,500							R1,500	WSDP	
7		Water network rehabilitation	Rehabilitation of sections of the water network	WC/WDM	Water	Water Network	Reticulation		R2,000	R2,000							R2,000	Pipeline Replacement Programme	
4. O&M Commitments									R0	R23,260								R23,260	
Operations																			
8		Telemetry and Service Network System	Upgrading of the telemetry system for water network	WC/WDM	Water	Water Network	Other		R200	R200							R200	O&M	
18		Vehicles and Machinery (Total)	Purchase vehicles, water trucks, tipper truck, tools, equipment, etc.	O&M	Water	Vehicles and Machinery	Other		R2,420	R100						R2,320	R2,420	O&M	
29		Instrumentation	Purchase required instrumentation for WTWs	Water quality compliance	Water	Water Purification	WTW		R200	R200							R200	WSDP & Water Safety Plan	
30		Telemetry	Upgrade of telemetry system for WTWs	O&M	Water	Water Purification	Other		R200	R200							R200	WSDP & Water Safety Plan	
32		Tools and Equipment	Purchase tools and equipment for WTWs	O&M	Water	Water Purification	Other		R50	R50							R50	O&M	
33		Air conditioning pump stations	Installation of air conditioning units in pump stations	O&M	Water	Water Purification	Pump stations		R200	R200							R200	O&M	
38		Replace fencing at infrastructure (Old WTW, Touwsrante- and Wilderness reservoirs)	Replace existing security fencing at WTW and reservoirs.	Security	Water	Water Purification	WTW and Reservoirs		R500	R500							R500	WSDP & Water Safety Plan	
39		Filter sand at Waterworks	Purchase filter sand for WTWs	Water quality compliance	Water	Water Purification	WTW		R1,300	R1,300							R1,300	O&M	
51		Tools and equipment	Purchase tools and equipment for drainage networks	O&M	Sanitation	Sewerage Networks	Other		R80	R80							R80	O&M	

# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table E.2a: Water Services MTEF Projects - FY2021/22 (3 <sup>rd</sup> year MTEF period)																				
Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Prev spent FY2018/19	Project Budget / Funding Sources								Total Cost	MTEF Project Source		
									FY2019/20											
									Budget	Own	MIG	RBG	ACP	DR	MWIG	Other				
52		Telemetry and service network system	Upgrading of the telemetry system for sewer network	O&M	Sanitation	Sewerage Networks	Drainage network		R200	R200								R200	O&M	
55		Upgrading depot facilities	Upgrade facilities at depots	O&M	Sanitation	Sewerage Networks	Other		R100	R100								R100	O&M	
68		Generators – Standby for Wilderness pump stations	Provide standby generators for Wilderness pump stations	Power failures	Sanitation	Upgrading of Pumpstation	Pump stations		R1,000	R1,000								R1,000	WSDP and W <sub>2</sub> RAP	
69		Generator shelters and security booths at pump stations	Provide generator shelters and security booths	Security	Sanitation	Upgrading of Pumpstation	Pump stations		R300	R300								R300	WSDP and W <sub>2</sub> RAP	
72		Upgrading of access roads & fencing (pump stations)	Upgrade access roads and fencing at pump stations	Security	Sanitation	Upgrading of Pumpstation	Pump stations		R700	R700								R700	WSDP and W <sub>2</sub> RAP	
81		Scientific services (Instrumentation, Vehicles, Office furniture)	Purchase instrumentation, vehicles and office furniture	O&M	Sanitation	Scientific Services	Other		R360	R360								R360	O&M	
88		Boreholes at WWTWs plants	Monitoring boreholes at WWTWs	Environment	Sanitation	Sewerage Treatment Plant	WWTW		R1,450	R1,450								R1,450	W <sub>2</sub> RAP	
89		Tools and equipment	Purchase tools and equipment for WWTW	O&M	Sanitation	Sewerage Treatment Plant	Other		R10	R10								R10	O&M	
90		Generators	Provide generators as backup power supply for WWTW	Power failures	Sanitation	Sewerage Treatment Plant	WWTW		R2,000	R2,000								R2,000	WSDP and W <sub>2</sub> RAP	
91		Vehicles	Purchase vehicles for WWTW	O&M	Sanitation	Sewerage Treatment Plant	Other		R700							R700		R700	O&M	
93		Fencing of treatment plants (Herolds Bay)	Install fencing at WWTW	Security	Sanitation	Sewerage Treatment Plant	WWTW		R1,100	R1,100								R1,100	WSDP and W <sub>2</sub> RAP	
94		Paving of gravel roads of plants (Gwaing)	Paving of gravel roads at plants	O&M	Sanitation	Sewerage Treatment Plant	WWTW		R1,500	R1,500								R1,500	W <sub>2</sub> RAP	
97		High mast lighting (Uniondale)	Install high mast lighting to improve visibility	Safety	Sanitation	Sewerage Treatment Plant	WWTW		R350	R350								R350	O&M	
99		Furniture and fittings	Purchase furniture and fittings for WWTW	O&M	Sanitation	Sewerage Treatment Plant	Other		R40	R40								R40	O&M	
Maintenance																				
5		Upgrading depot facilities	Upgrade facilities at depots	O&M	Water	Water Network	Other		R50	R50								R50	O&M	
57		Network rehabilitation sewerage	Rehabilitation of sections of the sewer network	Rehabilitation	Sanitation	Pipe Network Upgrades	Drainage network		R1,000	R1,000								R1,000	Pipeline Replacement Programme	
75		Sewer network rehabilitation	Rehabilitation of sections of the sewer network	Rehabilitation	Sanitation	Sewerage Networks	Drainage network		R2,000	R2,000								R2,000	Pipeline Replacement Programme	
84		Gwaing WWTW – Reinstatement 3.5 Ml/d	Reinstatement the 3.5 Ml/d plant at Gwaing WWTW	Services	Sanitation	Sewerage Treatment Plant	WWTW		R2,500	R2,500								R2,500	WSDP & WWTW Technical Report	
85		Refurbishment of belt presses at Gwaing WWTW	Refurbishment of the belt presses	Refurbishment	Sanitation	Sewerage Treatment Plant	WWTW		R250	R250								R250	WSDP & WWTW Technical Report	
86		Replacement of aerators and mixers	Replacement of aerators and mixers	Refurbishment	Sanitation	Sewerage Treatment Plant	WWTW		R2,500	R2,500								R2,500	WSDP & WWTW Technical Report	
5. Institutional								R0	R0									R0		
									R0									R0		
6. Water Services Programmes								R0	R0									R0		
Awareness Programs																				
									R0									R0		
WASH Programs																				
									R0									R0		
Total								R0	R152.030										R152.030	

## **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 2019 Master Plans were incorporated into the WSDP.

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

Recommended infrastructure projects for implementation in the future will be based on the following plans and processes:

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

George Municipality's approved 2019/2020 Capital Budget include the following major water infrastructure projects, which are planned for the short term (Next three years):

- Raising of the Garden Route Dam wall.
- Extension of the George WTW (New plant) with an additional 20 Ml/d.
- Rehabilitation of the 6 Ml/d Module of the George WTW (Old plant).
- Water network rehabilitation for various areas.
- Installation of Smart meters.

The following major sewerage infrastructure projects are planned for the short term.

- Upgrading of the Wilderness Kleinkrantz main sewer pipeline.
- Upgrading of the Schaapkop-, Meul Street- and Eden sewer pump stations (Mechanical).
- Rehabilitation of various sections of the sewer networks.
- Upgrading of the Outeniqua WWTW (Increase the capacity with an additional 10 Ml/d) and the rehabilitation of the carousel at the plant.
- Reinstate the 3.5 Ml/d module at the Gwaing WWTW.
- Replacement of a number of aerators and mixers at the WWTWs.
- Sludge dewatering plant.

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

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

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

The current needs projects are estimated at R522.308 million of which 94% are funded, as included in the MTEF project list. It should however be emphasised that additional funding will be required to address the full achievement of the water services strategies as outlined in Section D, but that the extent of such additional funding can only be determined, once initial investigations and activities have been concluded.



# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021

Table F.1: WSDP FY2019/20: LIST OF CONCEPTUAL PROJECTS

Table F.1: WSPD FY2019/20: 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				Project Cost R'000	Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title						
CURRENT NEEDS												
Topic 1: Settlements and Demographics												
Topic 2: Service Levels												
4	Some households on the farms without basic water services	Provide basic water services to the households on the farms without services.	MTEF Project	Yes	GE1920001	Provision of water tanks		R240	No	Yes	Yes	
2.1	Some households on the farms without basic water services	Provide basic water services to the households on the farms without services.	WSDP	Partially	GE1920002	Install basic water services to the households on the farms without basic services		R8,920	Yes	Partially	Partially	
2.2	Some households on the farms without basic sanitation services	Provide basic sanitation services to the households on the farms without services.	WSDP	No	GE1920003	Install basic sanitation services to the households on the farms without basic services		R11,488	Yes	No	No	
2.3	The existing service levels of the primary schools in the rural areas are not known	Confirm the service levels of the primary schools in the rural areas	WSDP	No	GE1920004	Service level survey of primary schools in the rural areas		R40	Yes	No	No	
Topic 3: Water Services Asset Management (Infrastructure)												
1	Housing developments to be provided with services	Installation of water reticulation network	MTEF Project	Yes	GE1920005	Thembalethu UISP – Water (Housing Grant)		R575	Yes	Yes	Yes	Yes
9	Capacity of existing bulk water pipeline is inadequate	Increase capacity of bulk water pipeline	MTEF Project	Yes	GE1920006	Airport mainline upgrade		R2,500	Yes	Yes	Yes	Yes
10	Capacity of existing bulk water pipeline is inadequate	Increase capacity of bulk water pipeline	MTEF Project	Yes	GE1920007	Transnet crossing Mitchell Street / Denneoord		R2,000	Yes	Yes	Yes	Yes
11	Capacity of existing bulk water pipeline is inadequate	Refurbishment and increase capacity of pipeline across Kaalmans Transnet bridge	MTEF Project	Yes	GE1920008	Kaalmans Transnet bridge upgrading		R2,500	Yes	Yes	Yes	Yes
12	Residential development to be provided with services	Installation of water reticulation network	MTEF Project	Yes	GE1920009	Property Development – Sweetpea street residential even project		R140	Yes	Yes	Yes	Yes
13	Industrial development to be provided with services	Installation of water reticulation network	MTEF Project	Yes	GE1920010	Property Development – Diamond road industrial even project		R60	Yes	Yes	Yes	Yes
14	Industrial development to be provided with services	Installation of water reticulation network	MTEF Project	Yes	GE1920011	Property Development – Clay street industrial even project		R90	Yes	Yes	Yes	Yes
15	Industrial development to be provided with services	Installation of water reticulation network	MTEF Project	Yes	GE1920012	Property Development – Ossie Urban street industrial even project		R200	Yes	Yes	Yes	Yes
16	Capacity of existing bulk water pipeline is inadequate	Upgrade of bulk water pipeline	MTEF Project	Yes	GE1920013	N2 Thembalethu crossing upgrade		R5,300	No	Yes	Yes	Yes
17	Capacity of existing water reticulation network is inadequate	Upgrade water reticulation network	MTEF Project	Yes	GE1920014	Upgrading of asbestos pipe – Greater George		R4,500	No	Yes	Yes	Yes
19	Existing reservoir storage capacity is inadequate	Ensure adequate reservoir storage capacity	MTEF Project	Yes	GE1920015	Kraalbosch Reservoir 6 MI		R3,235	Yes	Yes	Yes	Yes
20	Capacity of existing bulk water pipeline is inadequate	Increase capacity of bulk water pipeline	MTEF Project	Yes	GE1920016	Wilderness Heights – Bulk water supply pipeline		R2,950	Yes	Yes	Yes	Yes
21	Capacity of existing water pump station is inadequate	Upgrade existing water pump station	MTEF Project	Yes	GE1920017	Wilderness Heights – Upgrade existing water pump station		R780	Yes	Yes	Yes	Yes
24	Existing reservoir storage capacity is inadequate	Ensure adequate reservoir storage capacity	MTEF Project	Yes	GE1920018	WTW – Reservoirs 12 MI		R1,000	Yes	Yes	Yes	Yes
25	Existing raw water storage capacity is inadequate	Increase raw water storage capacity	MTEF Project	Yes	GE1920019	WTW – 30 MI balancing dam		R28,000	Yes	Yes	Yes	Yes
26	Existing WTW capacity for George is inadequate	Increase water treatment capacity	MTEF Project	Yes	GE1920020	Extension of Waterworks 20 MI		R162,369	Yes	Yes	Yes	Yes
31	No roofs over settling tanks at WTWs	Install roofs for settling tanks in Uniodale and Wilderness	MTEF Project	Yes	GE1920021	Settling tanks (Uniodale and Wilderness) – Roofs		R800	Yes	Yes	Yes	Yes
35	Existing reservoir storage capacity is inadequate	Ensure adequate reservoir storage capacity	MTEF Project	Yes	GE1920022	Uniodale reservoir (500 KI) Lyonville		R1,800	Yes	Yes	Yes	Yes
37	Work needs to be done at Wilderness WTW	Work at Wilderness WTW	MTEF Project	Yes	GE1920023	Wilderness Waterworks		R45	Yes	Yes	Yes	Yes
44	Housing developments to be provided with services	Installation of sewer drainage network	MTEF Project	Yes	GE1920024	Thembalethu UISP – Sewerage		R1,696	Yes	Yes	Yes	Yes
45	Industrial development to be provided with services	Installation of sewer drainage network	MTEF Project	Yes	GE1920025	Property Development – Sweetpea street residential even project		R420	Yes	Yes	Yes	Yes
46	Industrial development to be provided with services	Installation of sewer drainage network	MTEF Project	Yes	GE1920026	Property Development – Diamond road industrial even project		R180	Yes	Yes	Yes	Yes
47	Industrial development to be provided with services	Installation of sewer drainage network	MTEF Project	Yes	GE1920027	Property Development – Clay street industrial even project		R270	Yes	Yes	Yes	Yes
48	Industrial development to be provided with services	Installation of sewer drainage network	MTEF Project	Yes	GE1920028	Property Development – Ossie Urban street industrial even project		R600	Yes	Yes	Yes	Yes
50	Capacity of existing bulk sewer pipeline is inadequate	Increase capacity of bulk sewer pipeline	MTEF Project	Yes	GE1920029	Wilderness Kleinkrantz main sewer line upgrade		R7,000	Yes	Yes	Yes	Yes
58	Capacity of existing sewer drainage network is inadequate	Rehabilitation and upgrade of sections of the sewer network	MTEF Project	Yes	GE1920030	Network rehabilitation / upgrade Thembalethu		R2,350	Yes	Yes	Yes	Yes
59	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920031	Upgrading of Schaapkop pump station (mechanical)		R7,000	Yes	Yes	Yes	Yes
60	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920032	Upgrading of Meul street pump station (mechanical)		R3,000	Yes	Yes	Yes	Yes
61	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920033	Upgrading of Eden pump station (mechanical)		R2,500	Yes	Yes	Yes	Yes
62	Regular blockages require screens to be installed	Inlet screens to be installed at pump station to reduce blockages	MTEF Project	Yes	GE1920034	Schaapkop pump station (Install inlet screens)		R1,650	Yes	Yes	Yes	Yes
64	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920035	Upgrade Gwaling / Proefplaas pump station		R4,000	Yes	Yes	Yes	Yes
65	Capacity of existing sewer rising main is inadequate	Increase capacity of bulk sewer rising main	MTEF Project	Yes	GE1920036	Schaapkop rising main to Tamsui upgrade		R1,825	Yes	Yes	Yes	Yes
66	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920037	Upgrading of pump stations		R4,500	Yes	Yes	Yes	Yes
67	Electrical switchgear at sewer pump station to be upgraded	Upgrade of electrical switchgear at sewer pump station	MTEF Project	Yes	GE1920038	Upgrading: Electrical switchgear (pump stations)		R2,600	Yes	Yes	Yes	Yes
70	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920039	Herolds Bay pump station		R2,900	Yes	Yes	Yes	Yes
71	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920040	Wilderness Heights 61/s sewer pump station		R660	Yes	Yes	Yes	Yes
73	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920041	Thembalethu P/S 6		R1,000	Yes	Yes	Yes	Yes
76	Position of existing rising main not correct	Bulk sewer rising main to be relocated	MTEF Project	Yes	GE1920042	Europe bulk sewer rising main – Relocate		R280	Yes	Yes	Yes	Yes
77	Development to be provided with services	Installation of sewer drainage network	MTEF Project	Yes	GE1920043	Metropoulos bulk sewer and water connections		R200	Yes	Yes	Yes	Yes
78	Capacity of existing bulk sewer pipeline is inadequate	Increase capacity of bulk sewer pipeline	MTEF Project	Yes	GE1920044	Thembalethu N2 bulk sewer		R400	Yes	Yes	Yes	Yes
79	Capacity of existing bulk sewer pipeline is inadequate	Increase capacity of bulk sewer pipeline	MTEF Project	Yes	GE1920045	Wilderness Heights – 1.6km bulk sewer main		R1,250	Yes	Yes	Yes	Yes
80	Capacity of existing sewer rising main is inadequate	Increase capacity of bulk sewer rising main	MTEF Project	Yes	GE1920046	Wilderness Heights – 30m sewer pumping main		R450	Yes	Yes	Yes	Yes
82	Existing WWTW capacity is inadequate to meet future requirements	Increase capacity of WWTW to meet treatment capacity	MTEF Project	Yes	GE1920047	Outeniqua WWTW 10M/d addition		R92,220	Yes	Yes	Yes	Yes
92	Sludge dewatering plant is required	Ensure sludge are treated correctly	MTEF Project	Yes	GE1920048	Sludge dewatering plant		R4,940	Yes	Yes	Yes	Yes
95	Capacity of existing sewer pump station is inadequate	Upgrade of sewer pump station	MTEF Project	Yes	GE1920049	Upgrading of pump stations for plants (Herolds Bay store)		R180	Yes	Yes	Yes	Yes
Topic 4: Water Services Operation and Maintenance												
5	Existing depot facilities need to be upgraded	Upgrading of depot facilities	MTEF Project	Yes	GE1920050	Upgrading depot facilities		R230	Yes	Yes	Yes	Yes
27	Existing WWTW capacity is inadequate to meet future requirements	Increase capacity of WWTW to meet treatment capacity	MTEF Project	Yes	GE1920051	Rehabilitation of old WTW (6 MI Module)		R6,200	Yes	Yes	Yes	Yes
40	Existing pump station needs to be rehabilitated	Rehabilitation of existing Malgas water pump station	MTEF Project	Yes	GE1920052	Malgas water pump station rehabilitation		R280	Yes	Yes	Yes	Yes
41	Sections of the existing UF Plant need to be rehabilitated	Rehabilitation of existing UF Plant	MTEF Project	Yes	GE1920053	UF Plant – Rehabilitation		R2,200	Yes	Yes	Yes	Yes
42	The existing Kaalmans water pump station needs to be rehabilitated	Rehabilitation of existing Kaalmans water pump station	MTEF Project	Yes	GE1920054	Kaalmans water pump station rehabilitation		R1,800	Yes	Yes	Yes	Yes
57	Sections of the existing sewer drainage network to be rehabilitated	Rehabilitation of sections of the sewer network	MTEF Project	Yes	GE1920055	Network rehabilitation sewerage		R2,250	No	Yes	Yes	Yes
63	Sections of the existing rising main need to be rehabilitated	Rehabilitation of the rising main	MTEF Project	Yes	GE1920056	Schaapkop rising main rehabilitation of bridge crossing river		R2,050	Yes	Yes	Yes	Yes
75	Sections of the existing sewer drainage network to be rehabilitated	Rehabilitation of sections of the sewer network	MTEF Project	Yes	GE1920057	sewer network rehabilitation		R5,500	No	Yes	Yes	Yes
83	Existing carousel at the Outeniqua WWTW to be rehabilitated	Ensure adequate treatment capacity	MTEF Project	Yes	GE1920058	Outeniqua WWTW – Rehabilitation of carousel		R8,850	Yes	Yes	Yes	Yes
84	The 3.5 MI/d plant at the Gwaling WWTW to be reinstated	Ensure adequate treatment capacity	MTEF Project	Yes	GE1920059	Gwaling WWTW – Reinstated 3.5 MI/d		R5,500	Yes	Yes	Yes	Yes
85	Belt presses at Gwaling WWTW to be refurbished	Ensure adequate treatment capacity	MTEF Project	Yes	GE1920060	Refurbishment of belt presses at Gwaling WWTW		R670	Yes	Yes	Yes	Yes
86	Some of the existing aerators and mixers to be replaced	Ensure adequate treatment capacity	MTEF Project	Yes	GE1920061	Replacement of aerators and mixers		R6,400	Yes	Yes	Yes	Yes
87	Horizontal bridge for aerators to be refurbished at Outeniqua WWTW	Ensure adequate treatment capacity	MTEF Project	Yes	GE1920062	Refurbishment of horizontal bridge for aerators – Outeniqua WWTW		R1,800	Yes	Yes	Yes	Yes
6	Security wall needs to be installed	Ensure adequate security	MTEF Project	Yes	GE1920063	Security wall		R180	Yes	Yes	Yes	Yes
8	Existing telemetry system to be upgraded	Upgrading of the telemetry system for the water network	MTEF Project	Yes	GE1920064	Telemetry and Service Network System		R750	Yes	Yes	Yes	Yes
18	Vehicles, water trucks, tippertruck, tools and equipment to be purchased	Ensure adequate O&M of the water network	MTEF Project	Yes	GE1920065	Vehicles and Machinery (Total)		R4,467	Yes	Yes	Yes	Yes
23	Backup generator is required for raw water pump station	Ensure adequate pump capacity during power failures	MTEF Project	Yes	GE1920066	Backup generator at Garden Route Dam		R4,500	Yes	Yes	Yes	Yes
28	Extractor fans are required for chlorine rooms	Ensure compliance with H&S standards (Chlorine gas)	MTEF Project	Yes	GE1920067	H&S Extractor fans – Chlorine rooms (R956 200 was rolled over)		R3,500	Yes	Yes	Yes	Yes
29	Instrumentation is required for WTWs	Ensure water quality compliance	MTEF Project	Yes	GE1920068	Instrumentation		R384	Yes	Yes	Yes	Yes
30	Existing telemetry system for WTWs to be upgraded	Ensure adequate monitoring for WTWs	MTEF Project	Yes	GE1920069	Telemetry		R384	Yes	Yes	Yes	Yes
32	Tools and equipment need to be purchased for WTWs	Ensure adequate O&M of WTWs	MTEF Project	Yes	GE1920070	Tools and Equipment		R97	Yes	Yes	Yes	Yes
33	Air conditioning units need to be installed for water pump stations	Ensure adequate O&M of water pump stations	MTEF Project	Yes	GE1920071	Air conditioning pump stations		R384	Yes	Yes	Yes	Yes
34	Office building is required at Uniodale WTW for Process Controller	Improve working environment for Process Controller at WTW	MTEF Project	Yes	GE1920072	Uniodale Waterworks office building (Process Controllers)		R500	Yes	Yes	Yes	Yes
38	Existing fencing at water infrastructure needs to be replaced	Ensure adequate security	MTEF Project	Yes	GE1920073	Replace fencing at infrastructure (Old WTW, Towsrantsen reservoirs and Wilderness reservoirs)		R1,305	Yes	Yes	Yes	Yes

# WSDP-IDP WATER SECTOR INPUT REPORT FOR 2020/2021



Table F.1: WSDP FY2019/20: LIST OF CONCEPTUAL PROJECTS

Table F.1: WSDP FY2019/20: LIST OF CONCEPTUAL PROJECTS											
Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Project Number (Dept)	Existing Projects Information		Project Cost R'000	Does this current listed project address the problem?	Approved by Council, in project database and part of 5 year IDP work schedule?	Project listed in 3yr MTEF - cycle?
						Project Title					
CURRENT NEEDS											
39	Filters sand at WTWs needs to be replaced regularly	Ensure water quality compliance	MTEF Project	Yes	GE1920074	Filter sand at Waterworks		R3,260	Yes	Yes	Yes
43	Office building is required at Haarlem WTW for Process Controller	Improve working environment for Process Controller at WTW	MTEF Project	Yes	GE1920075	Haarlem Waterworks office building		R447	Yes	Yes	Yes
49	Syphon chambers need to be installed	Ensure adequate O&M	MTEF Project	Yes	GE1920076	Installation of syphon chambers		R80	Yes	Yes	Yes
51	Tools and equipment to be purchased for drainage networks	Ensure adequate O&M	MTEF Project	Yes	GE1920077	Tools and equipment		R260	Yes	Yes	Yes
52	Existing telemetry system to be upgraded	Upgrading of the telemetry system for the sewer network	MTEF Project	Yes	GE1920078	Telemetry and service network system		R800	Yes	Yes	Yes
53	Two-way radio systems are required	Ensure adequate O&M	MTEF Project	Yes	GE1920079	Two-way radio systems		R180	Yes	Yes	Yes
54	Jetting machine is required to clear blockages	Ensure adequate O&M	MTEF Project	Yes	GE1920080	Jetting machine		R500	Yes	Yes	Yes
55	Existing depot facilities need to be upgraded	Upgrading of depot facilities	MTEF Project	Yes	GE1920081	Upgrading depot facilities		R300	Yes	Yes	Yes
56	Security wall needs to be installed	Ensure adequate security	MTEF Project	Yes	GE1920082	45m Security wall around perimeter		R100	Yes	Yes	Yes
68	Backup generator is required for water pump stations	Ensure adequate pump capacity during power failures	MTEF Project	Yes	GE1920083	Generators – Standby for Wilderness pump stations		R2,000	Yes	Yes	Yes
69	Shelters and security booths are required for water pump stations	Ensure adequate security	MTEF Project	Yes	GE1920084	Generator shelters and security booths at pump stations		R900	Yes	Yes	Yes
72	Access roads and fencing at pump stations need to be upgraded	Ensure adequate security	MTEF Project	Yes	GE1920085	Upgrading of access roads & fencing (pump stations)		R1,900	Yes	Yes	Yes
74	Vehicles and machinery are required	Ensure adequate O&M	MTEF Project	Yes	GE1920086	Vehicles and machinery (Total)		R4,150	Yes	Yes	Yes
81	Instrumentation, vehicles and office furniture are required	Ensure adequate O&M	MTEF Project	Yes	GE1920087	Scientific services (Instrumentation, Vehicles, Office furniture)		R1,543	Yes	Yes	Yes
88	Monitoring boreholes are required at WWTWs	Prevent any potential environmental pollution	MTEF Project	Yes	GE1920088	Boreholes at WWTWs plants		R4,100	Yes	Yes	Yes
89	Tools and equipment are required	Ensure adequate O&M	MTEF Project	Yes	GE1920089	Tools and equipment		R40	Yes	Yes	Yes
90	Backup generators are required for power failure periods	Ensure back-up power supply during periods of power failures	MTEF Project	Yes	GE1920090	Generators		R4,200	Yes	Yes	Yes
91	Vehicles are required	Ensure adequate security	MTEF Project	Yes	GE1920091	Vehicles		R1,340	Yes	Yes	Yes
93	Fencing to be installed at WWTWs	Ensure adequate security	MTEF Project	Yes	GE1920092	Fencing of treatment plants (Gwaing, Outeniqua, Kleinkrantz, Uniondale)		R2,850	Yes	Yes	Yes
94	Existing gravel roads at plants to be paved	Ensure adequate O&M	MTEF Project	Yes	GE1920093	Paving of gravel roads of plants		R3,600	Yes	Yes	Yes
96	Existing access control at plants to be improved	Ensure adequate security	MTEF Project	Yes	GE1920094	Access control to plants (Gwaing, Outeniqua, Kleinkrantz, Uniondale)		R94	Yes	Yes	Yes
97	High mast lighting is required at plants to improve visibility	Ensure adequate safety	MTEF Project	Yes	GE1920095	High mast lighting (Outeniqua, Kleinkrantz, Uniondale)		R1,340	Yes	Yes	Yes
99	Furniture and fittings to be purchased	Ensure adequate O&M	MTEF Project	Yes	GE1920096	Furniture and fittings		R77	Yes	Yes	Yes
4.1	Annual Process Audits are required for all WTWs	Detail Technical Process Audits for all WTWs	WSDP	No	GE1920097	Annual Process Audits for all WTWs		R300	Yes	No	No
4.2	Annual Process Audits are required for all WWTWs	Detail Technical Process Audits for all WWTWs	WSDP	No	GE1920098	Annual Process Audits for all WWTWs		R300	Yes	No	No
4.3	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	GE1920099	Draft required O&M Schedules for all water and sewerage infrastructure		R300	Yes	No	No
Topic 5: Conservation and Demand Management (Topic 5.1 Water Resources)											
2	2018/2019 NRW 30.19% and Water losses 24.88%	Ensure all water connections are metered and replace faulty meters	MTEF Project	Yes	GE1920100	Installation of new meters		R1,350	No	Yes	Yes
3	2018/2019 NRW 30.19% and Water losses 24.88%	Ensure all water connections are metered and replace faulty meters	MTEF Project	Yes	GE1920101	Installation of Smart meters		R4,500	No	Yes	Yes
7	Sections of water networks with regular bursts need to be replaced	Implementation of Pipeline Replacement Programme	MTEF Project	Yes	GE1920102	Water network rehabilitation		R6,000	No	Yes	Yes
36	Existing pressures too high, which result in additional water losses	Implement pressure reduction to reduce water losses	MTEF Project	Yes	GE1920103	PRVs		R1,800	Yes	Yes	Yes
98	Final flow meter was vandalised.	Ensure adequate monitoring of effluent flows at WWTW	MTEF Project	Yes	GE1920104	Replace flow meter (Gwaing)		R150	Yes	Yes	Yes
5.1	2018/2019 NRW 30.19% and Water losses 24.88%	25 WC/WDM measures were proposed in the WSDP	WSDP	Partially	GE1920105	Implement WC/WDM measures		R3,300	No	No	No
Topic 5: Conservation and Demand Management (Topic 5.2 Water Balance)											
5.2	Unmetered even were identified as part of the Swift process	Install water meters for al the unmetered even	WSDP	Partially	GE1920106	Install water meters for all the unmetered even		R5,095	Yes	Partially	Partially
Topic 6: Water Resources											
22			MTEF Project	Yes	GE1920107	Raising Garden Route dam		R20,669	Yes	Yes	Yes
Topic 7: Financial											
Topic 8: Institutional Arrangements and Customer Care											
TOTAL: CURRENT NEEDS											
Funded								R522,308			
% Funded								R492,565			
								94%			
FUTURE NEEDS											
Infrastructure											
F.1			Water Master Plan	No	GE1920108	Future bulk water pipelines required for George		R373,285	Yes	No	No
F.2	Inadequate capacity of existing bulk water pipelines to meet future requirements.	Ensure adequate bulk water pipeline capacity to meet future requirements.	Water Master Plan	No	GE1920109	Future bulk water pipelines required for Wilderness		R80,603	Yes	No	No
F.3			Water Master Plan	No	GE1920110	Future bulk water pipelines required for Uniondale		R6,737	Yes	No	No
F.4			Water Master Plan	No	GE1920111	Future bulk water pipelines required for Haarlem		R1,502	Yes	No	No
F.5			Water Master Plan	No	GE1920112	Refurbish / Upgrade existing WTW for George and Wilderness		R1,044,264	Yes	No	No
F.6	Inadequate capacity of existing WTWs to meet future requirements.	Ensure adequate WTW capacity to meet future requirements.	Water Master Plan	No	GE1920113	Refurbish / Upgrade existing WTW for Uniondale		R19,761	Yes	No	No
F.7			Water Master Plan	No	GE1920114	Refurbish / Upgrade existing WTW for Haarlem		R6,357	Yes	No	No
F.8			Water Master Plan	No	GE1920115	Future water pump stations required for George / Wilderness		R73,215	Yes	No	No
F.9	Inadequate capacity of existing water pump stations to meet future requirements.	Ensure adequate water pump capacity to meet future requirements.	Water Master Plan	No	GE1920116	Future water pump stations required for Uniondale		R2,311	Yes	No	No
F.10			Water Master Plan	No	GE1920117	Future water pump stations required for Haarlem		R2,592	Yes	No	No
F.11	Existing reservoir storage capacity is inadequate to meet future requirements.	Ensure adequate reservoir storage capacity to meet future requirements.	Water Master Plan	No	GE1920118	Future reservoirs required for George / Wilderness		R294,237	Yes	No	No
F.12			Water Master Plan	No	GE1920119	Future reservoirs required for Uniondale		R6,436	Yes	No	No
F.13			Water Master Plan	No	GE1920120	Upgrade existing water reticulation network for George		R446,595	Yes	No	No
F.14	Inadequate capacity of existing water reticulation networks to meet future requirements.	Ensure adequate internal water reticulation capacity.	Water Master Plan	No	GE1920121	Upgrade existing water reticulation network for Wilderness		R34,695	Yes	No	No
F.15			Water Master Plan	No	GE1920122	Upgrade existing water reticulation network for Uniondale		R7,356	Yes	No	No
F.16			Water Master Plan	No	GE1920123	Upgrade existing water reticulation network for Haarlem		R654	Yes	No	No
F.17			Sewer Master Plan	No	GE1920124	Future bulk sewer pumpstations required for George / Wilderness		R246,910	Yes	No	No
F.18	Capacity of existing sewer pump stations is inadequate to meet future requirements	Ensure adequate sewer pump station capacity.	Sewer Master Plan	No	GE1920125	Future bulk sewer pumpstations required for Uniondale		R6,186	Yes	No	No
F.19			Sewer Master Plan	No	GE1920126	Future bulk sewer pumpstations required for Haarlem		R2,589	Yes	No	No
F.20			Sewer Master Plan	No	GE1920127	Future bulk sewer pipeline and sewer drainage network required for George / Wilderness		R567,601	Yes	No	No
F.21	Inadequate capacity of bulk sewer pipelines and sewer drainage network capacity to meet future requirements.	Ensure adequate bulk sewer pipeline and internal sewer drainage capacity.	Sewer Master Plan	No	GE1920128	Future bulk sewer pipeline and sewer drainage network required for Uniondale		R19,698	Yes	No	No
F.22			Sewer Master Plan	No	GE1920129	Future bulk sewer pipeline and sewer drainage network required for Haarlem		R20,137	Yes	No	No
F.23			Sewer Master Plan	No	GE1920130	Refurbish / Upgrade existing WWTW for George and Wilderness		R844,970	Yes	No	No
F.24	Inadequate capacity of existing WWTWs to meet future requirements.	Ensure adequate WWTW capacity to meet future requirements.	Sewer Master Plan	No	GE1920131	Refurbish / Upgrade existing WWTW for Uniondale		R16,128	Yes	No	No
F.25			Sewer Master Plan	No	GE1920132	Refurbish / Upgrade existing WWTW for Haarlem		R19,083	Yes	No	No
Resources											
F.26	Yield from existing resources inadequate to meet future water requirements	Augmentation of existing water resources: Re-use of treated effluent (Second Phase)	WSDP	No	GE1920133	4.5km pipeline to supply an additional 5 - 10 Ml/d of treated effluent from Gwaing to Outeniqua WWTW		R101,832	Yes	No	No
F.27	Yield from existing resources inadequate to meet future water	Augmentation of existing water resources: Proposed Malgas Dam	WSDP	No	GE1920134	Proposed 11 million m³ dam (Firm yield of 5.2 million m³/a)		R176,509	Yes	No	No
TOTAL: FUTURE NEEDS								R4,422,242			