BITOU MUNICIPALITY

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PROJECT 301634 - BITOU MUNICIPALITY'S WSDP-IDP SECTOR INPUT REPORT FOR 2020/2021

REV	DESCRIPTION	ORIG	REVIEW	IX ENGINEERS APPROVAL	DATE	CLIENT APPROVAL	DATE
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BITOU MUNICIPALITY

WSDP – IDP WATER SECTOR INPUT REPORT (EXECUTIVE SUMMARY)

ITEM **DESCRIPTION** **PAGE**

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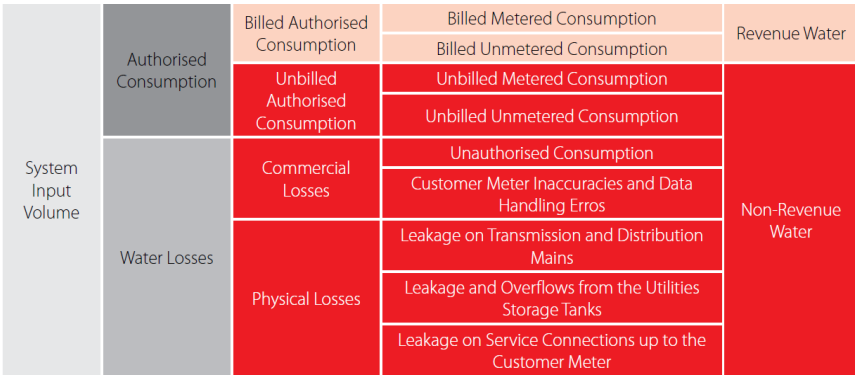
AADD	Average Annual Daily Demand
AC	Asbestos Cement
ADWF	Average Dry Weather Flow
AIDS	Acquired Immune Deficiency Syndrome
AMP	Asset Management Plan
AMR	Automatic Meter Reading
BGCMA	Breede-Gouritz Catchment Management Agency
BGWMA	Breede-Gouritz Water Management Area
BPT	Break Pressure Tank
BOCMA	Breede Overberg Catchment Management Agency
CMA	Catchment Management Agency
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
DMAF	Disaster Management Advisory Forum
DMC	Disaster Management Centre
DRC	Depreciated Replacement Cost
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
EHP	Emergency Housing Programme
EIA	Environmental Impact Assessment
FCV	Flow Control Valve
GAMAP	General Accepted Municipal Accounting Practice
HH	Households
HIV	Human Immunodeficiency Virus
IBT	Inclining Block Tariff
ICT	Information and Communications Technology
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
IMQS	Infrastructure Management Query System
IRDP	Integrated Rural Development Program
IRIS	Integrated Regulatory Information System
IWA	International Water Association
Kl	Kilo Litre
km^2	Square Kilometre
KPA	Key Performance Area
KPI	Key Performance Indicator
LGTAS	Local Government Turn Around Strategy
m	Metre
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agent
Ml	Mega Litre
Ml/a	Mega Litre per Annum
MuSSA	Municipal Strategic Self-Assessment
MTEF	Medium-Term Expenditure Framework
MTREF	Medium-Term Revenue Expenditure Framework
NGO	Non-Governmental Organization

NRW	Non-Revenue Water
NWRS	National Water Resource Strategy
PAT	Progress Assessment Tool
PDD	Peak Daily Demand
PHP	People's Housing Process
PPE	Personnel Protective Equipment
PRV	Pressure Reducing Valve
PS	Pump Station
RAS	Return Activated Sludge
RDP	Reconstruction and Development Programme
RM	Rand Million
RR	Risk Rating
RUL	Remaining Useful Life
SA	South Africa
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
SMS	Short Message Service
TB	Tuberculosis
TMG	Table Mountain Group
TWL	Top Water Level
UISP	Upgrading of Informal Settlements Programme
VAT	Value Added Tax
VIP	Ventilated Improved Pit
WARMS	Water Authorisation Registration and Management System
WC	Western Conservation
WDM	Water Demand Management
WMA	Water Management Area
W_2RAP	Wastewater Risk Abatement Plan
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSIG	Water Services Infrastructure Grant
WSMP	Water Services Master Plan
WSP	Water Services Provider
WTP	Water Treatment Plant
WTW	Water Treatment Works
WULA	Water Use License Application
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- • a national or provincial department, the year ending 31 March; or • a municipality, the year ending 30 June.
Global Warming	The increase in the average surface temperatures across the globe, usually measured over long periods of time; reported to have increased by 1ºC over the past hundred years.
Integrated Development Plan (IDP)	An IDP is a legislative requirement for municipalities, which identifies the municipality's key development priorities; formulates a clear vision, mission and values; formulates appropriate strategies; shows the appropriate organisational structure and systems to realise the vision and the mission and aligns resources with the development priorities.
National Water Resource Strategy 2	Sets out how we will achieve the following core objectives: • Water supports development and the elimination of poverty and inequality. • Water contributes to the economy and job creation, and • Water is protected, used, developed, conserved, managed and controlled sustainably and equitably.
International Water Association (IWA) Water Balance	
System Input Volume	The volume of treated water input to that part of the water supply system to which the water balance calculation relates.
Authorised Consumption	The volume of metered and/or un-metered water taken by registered customers, the water supplier and others who are implicitly or explicitly authorised to do so by the water supplier, for residential, commercial and industrial purposes. It also includes water exported across operational boundaries. Authorised consumption may include items such as fire-fighting and training, flushing of mains and sewers, street cleaning, watering of municipal gardens, public fountains, frost protection, building water, etc. These may be billed or unbilled, metered or unmetered.
Water Losses	The difference between System Input and Authorised Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission or distribution schemes, or individual zones. Water Losses consist of Physical Losses and Commercial Losses (also known as Real Losses and Apparent Losses).
Billed Authorised Consumption	Those components of Authorised Consumption which are billed and produce revenue (also known as Revenue Water). Equal to Billed Metered Consumption plus Billed Unmetered Consumption.
Unbilled Authorised Consumption	Those components of Authorised Consumption which are legitimate but not billed and therefore do not produce revenue. Equal to Unbilled Metered Consumption plus Unbilled Unmetered Consumption.
Commercial Losses	Includes all types of inaccuracies associated with customer metering as well as data handling errors (meter reading and billing), plus unauthorised consumption (theft or illegal use). Commercial losses are called "Apparent Losses" by the International Water Association and in some countries the misleading term "Non-Technical Losses" is used.

KEY TERMS AND INTERPRETATIONS

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

KEY TERMS AND INTERPRETATIONS

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

WSDP – IDP Water Sector Input Report (Executive Summary)

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 Bitou 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 Services

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 2017-2022 (2020/2021) WSDP for Bitou Municipality includes the following documents.

- WSDP-IDP Sector Input Report (Executive Summary Report that can be used for Council approval and the Public Participation Process).
- Water Services Development Plan: Administration, Information and Comprehensive Overview Report.
- Water Services Development Plan: Future Demand and Functionality Requirements Report.

The WSDP-IDP Sector Input Report must be submitted to the Council for their approval and issued to the public for their comment.

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

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

SECTION A: STATUS QUO OVERVIEW

Bitou Municipality is the gateway into the Western Cape from the Eastern part of South Africa. Bitou Municipality also falls within the Breede-Gouritz Water Management Area (BGWMA). The Municipality consists of seven individual wards and is the only WSA within this municipal area and is also the WSP. The Municipality is located within the Garden Route District of the Western Cape Province, in which the following local municipalities are also located:

- Hessequa Municipality;
- Mossel Bay Municipality;
- Oudtshoorn Municipality;
- Kannaland Municipality;
- George Municipality; and
- Knysna Municipality

Bitou Municipality's Management Area includes the following towns and urban areas (***Water Distribution Systems***):

- Plettenberg Bay, Kranshoek, Gansevallei, Wittedrift, Green Valley, Keurboomstrand, Kwanokuthula, New Horizons, Ladywood and Qolweni / Bossiesgif / Pine Trees – **Plettenberg Bay System**
- Kurland – **Kurland System**
- Natures Valley – **Natures Valley System**
- Harkerville, Covie and the farms in the rural areas.

WSA Perspective: The most significant challenges, from a Water Services perspective, are the augmentation of the existing water resources for Plettenberg Bay in order to meet the future water 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 (ensure adequate maintenance), 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.

The most critical development and internal transformation needs, as included in the 2020/2021 IDP, are as follows:

- Local economic development: Over-reliance on one economic driver; very limited industry or manufacturing base; lack of resort and hotel environment. Limited space for development.
- Unemployment: High unemployment and inequality, high levels of poverty.
- Water: No dams, limited water supply, lack of potable water.
- Infrastructure: Limited bulk infrastructure, landfill site needs, challenges with maintenance of infrastructure.
- Suitable staff: Challenges in filling critical positions, attraction of skilled labourers.
- Housing: Development of affordable (social and gap) housing.
- Alignment and integration: Poor internal communication, staff working in silos and no centralised municipal building.
- Public engagement: Limited public participation and communication with communities.

The 2018/2019 Annual Report list the following top ten risks of the Municipality:

- Inadequate budget to deliver on municipal objectives.
- Ineffective expenditure management.
- Political instability delays in governance (Management Committees and Council) approval process.
- Non-alignment of ICT with municipal business strategy.
- Ineffective response to severe storms and fire disasters.
- Inability of the Municipality to attract, build, nurture and retain scarce/critical skills.
- Failure to ensure effective execution of municipal projects within set targets.
- Strikes and riots due to failure to meet increase demands of human settlement housing.
- Inappropriate municipal infrastructure to meet expected community needs.
- Ineffective municipal-wide service delivery value chain.

Physical Perspective:

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

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

The Garden Route District Municipality and the Western Cape Government, Department of Environmental Affairs and Development Planning have undertaken comprehensive studies on the risk that the Western Cape and the District faces as a result of Climate Change and have developed numerous strategies and adaptation plans. The most recent being the Climate Change Adaptation Summary Report for the Garden Route District (March 2018). This report identifies the vulnerabilities, risks and threats that the District faces due to the effects of Climate Change. The key climate change hazards identified for the Garden Route District include the following:

- Decrease in rainfall.
- Higher average temperature (temperatures dependant vulnerability)
- Increase severity of drought (longer periods between rainfall events and more intense rainfall events).
- Increased fire risks.
- Increase in flooding.
- Increased intensity of storm and extreme events.
- Increase in coastal impacts (costal storm surges and sea-level rise).
- Alien vegetation reducing the viability of ecosystems.

The report suggested the following WATER adaptation strategies that are to be considered in order to reduce the effects felt by climate change as well as Bitou Municipality's risk to these threats.

- Prioritisation of invasive alien vegetation clearing.
- Prioritisation for restoration of ecological infrastructure in catchments.
- Effective utilisation of irrigation water.
- Resource nexus decision support.
- Develop ecosystem goods and services investment opportunities.
- Continued focus on the way in which we manage water systems and increased emphasis on Water Sensitive Urban Design.

It is therefore advisable for Bitou 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: Large parts of the Municipality (50 666ha) are formerly conserved. These areas consist of National Parks (45%). Provincial Nature Reserves (5%), Private Nature Reserves (1%) and Marine Protected Areas (0.05%).

The Garden Route National Park, located in the north and south east of the municipal area, covers large parts of the municipal area. The park encompasses four sections, the Wilderness Section, Knysna Lakes Section, Tsitsikamma Section and Nature's Valley Section. The park falls within the cape Floristic Region and is a biodiversity hotspot due to its high species diversity. The park protects large Southern Cape indigenous forests, fynbos areas, mountain catchments, rivers and lakes and is regarded as one of the most pristine national parks in South Africa.

Bitou Municipality includes the Keurbooms, Matjies, Piesang, Sout and Groot Estuaries. The Keurbooms River Estuary has been ranked as the 17th most important Estuary in South Africa. Bitou Municipality is home to the following parks and protected areas:

Table A.1: Parks and Protected Areas

Type	Name
National	Garden Route National Park
Provincial	Keurbooms River Nature Reserve
	EC Soetkraal Nature Reserve
	Robberg Nature Reserve
Private	Plettenberg Bay Country Club
	Wadrif Nature Reserve
	Bobbejaanskloof Private Nature Reserve
	Kiaruna Nature Reserve
	Hog Hollow Nature Reserve
	Olisshof Nature Reserve
	Backenburn Nature Reserve
	The Gums Nature Reserve
	Buitenverwachten Nature Reserve
	Annex Arch Rock Nature Reserve
	Forest Hall Nature Reserve
	Hebron Nature Reserve
Marine Protected Areas	Tsitsikamma National Park
	Robberg Nature Reserve

Demographic Perspective:

Economics: The local economy of the Bitou municipal area was dominated by the finance, insurance, real estate and business services (R799.7 million or 25.3 per cent) followed by the wholesale and retail trade, catering and accommodation (R604.7 million or 19.1 per cent) and construction (R394.0 million; 12.5 per cent). Combined, these top three sectors contributed R1.798 billion (or 56.8 per cent) to Bitou's economy, which was estimated be worth about R3 164.6 billion in 2017 (Bitou Municipality's Socio-Economic Profile, Western Cape Government, 2019).

Social: The table below gives an overview of the Socio-Economic Profile of Bitou Municipality (Bitou Municipality's Socio-Economic Profile, Western Cape Government, 2019).

Table A.2: 2019 Socio Economic Profile of Bitou Municipality			
Education (2018)		**Poverty (2018)**	
Matric Pass Rate	82.2%	Gini Coefficient	0.653
Learner-Teacher Ratio	30.6	Human Development Index	0.701
Retention Rate	56.8%		
Health (2018/2019)		**Safety and Security (Actual number of reported cases in 2018/2019)**	
Primary Health Care Facilities	7	Residential Burglaries	510
Immunisation Rate	48.0%	DUI	48
Maternal Mortality Ratio (per 100 000 live births)	0.0	Drug-related Crimes	316
Teenage Pregnancies – Delivery rate to women U18	0.0	Murder	20
		Sexual Offences	97
Access to Basic Service Delivery (Percentage of households with access to basic services, 2016)		**Road Safety (2018)**	
Water	94.5%	Road User Fatalities	12
Refuse Removal	88.6%		
Electricity	95.3%	**Labour (2018)**	
Sanitation	98.2%	Unemployment Rate	23%
Housing	76.6%		
Socio-economic Risks		**Largest Three Sectors (Contribution to GDP, 2017)**	
Increased income inequality	Risk 1	Finance, insurance, real estate and business sector	25.3%
High levels of unemployment	Risk 2	Wholesale and retail trade, catering and accommodation.	19.1%
High learner / teacher ratio	Risk 3	Construction	12.5%

TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

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

Table A.1.1: Settlement Summary		
Section	**Value**	**Assessment Score**
1.1 Total Population	68 966	80%
1.2 Total Number of Households (Permanent)	23 373	80%
1.3 Average Household Size	3.00	80%
1.4 Total Number of Settlements	19	80%

Table A.1.2 Summary by Settlement Group (Urban / Rural Split)				
Settlement Type	**Settlements**	**Population**	**Households**	**Assessment Score**
Rural	4	5 691	1 987	80%
Urban	14	63 306	21 386	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	5 153	1 855	2.8	80%
Rural	Scattered Rural Village	2	218	52	4.2	80%
Rural	Rural - Informal Settlements (Squatter Camp)	1	320	80	4.0	80%
Urban	Urban - Informal Settlements (Squatter Camp)	6	8 988	2 247	4.0	80%
Urban	Urban - Formal Town	9	54 318	19 139	2.8	80%

Table.A.1.4 Amenities Summary (Health & Educational facilities)		
Amenity Type	**Number of Amenities**	**Assessment Score**
Health Facilities	9	80%
Educational facilities	25	80%

The 2016 Community Survey from Statistics South Africa estimated the 2016 population for Bitou Municipality at 59 157 persons and the permanent households at 21 914, at an average household size of 2.7 persons per household.

Bitou Municipality's 2019 Socio Economic Profile of the Western Cape estimated the 2019 population for Bitou Municipality at 65 879 persons and that the population is estimated to increase to 73 334 persons by 2023, which equates to a 2.7% annual average growth rate. The 2018/2019 Annual Report indicate the population for 2018/19 as 60 686 persons and 28 232 households.

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 population of Bitou Municipality for 2018/2019 is currently estimated at approximately 68 966 persons. The 2018/2019 population was estimated by applying an annual growth rate of 5.0% to the 2011 Census population figure. The current population figures and the annual population growth percentages used in the WSDP are aligned with the figures used in DWS's GeoDatabase. The future estimated annual population growth percentages, as listed in the table below, were agreed with the Municipality during January 2014.

Table A.1.5: Estimated Future Annual Population Growth Percentages per Distribution System	
Town	**Estimated future annual Population Growth %**
Plettenberg Bay	5.4%
Kurland	4.0%
Natures Valley	4.0%
Farms	2.0%
Total	**5.0%**

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

Table A.1.6: Water Services Overview (Water and Sanitation)

Settlement Type	2011/2012 Households	2011/2012 Population	2018/2019 Households	2018/2019 Population	Water and Sanitation category: 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	
Sub-Total	**0**	**0**	**0**	**0**										
Formal Town					Adequate			Below RDP					None	
Plettenberg Bay	12,357	34,822	17,925	50,595	P		P							
Kurland	847	2,372	1,114	3,118	P		P							
Natures Valley	76	460	100	605	P		P							
Sub-Total	**13,280**	**37,654**	**19,139**	**54,318**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Townships					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Informal Settlements					Adequate			Below RDP					None	
Pinetrees	25	100	105	420		P								
Kwanokuthula			31	124		P								
Bossiesgif / Qolweni	1,185	4,740	1561	6,244		P								
Kranshoek	14	56	3	12		P								
Kurland	415	1,660	547	2,188		P								
Sub-Total	**1,639**	**6,556**	**2,247**	**8,988**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Working towns & service centres					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Sub-Total: (Urban)	**14,919**	**44,210**	**21,386**	**63,306**	**3**	**5**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
RURAL														
Rural / Farming					Adequate			Below RDP					None	
Farms	1,694	4,810	1,878	5,255	P		P							P
Sub-Total	**1,694**	**4,810**	**1,878**	**5,255**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Informal Settlements					Adequate			Below RDP					None	
Harkerville	36	144	80	320		P								
Covie	0	0	29	116		P								
Sub-Total	**36**	**144**	**109**	**436**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Sub-Total (Rural)	**1,730**	**4,954**	**1,987**	**5,691**	**1**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
TOTAL	**16,649**	**49,164**	**23,373**	**68,996**	**4**	**7**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**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		
Full level of service: People access and pay for more than 90 l/c/d at high pressure.	Interim **Full**	**Full provision**: People access a minimum of 50 l/c/d of SANS241 quality water on demand at the boundary of the yard, metered and tariffed.
Middle level of service: People access and pay for 51-90 l/c/d at medium pressure.	Interim **Upper**	**Upper provision**: People access a maximum of 90 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Intermediate**	Intermediate provision: People access more than 50 l/c/d but less than 90 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
Minimum level of service: People access 25-50 l/c/d at low to medium pressure, use of more than 25 l/c/d is paid for.	Interim **Basic Plus**	**Basic Plus provision**: People access more than 25 l/c/d but less than 50 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Basic**	**Basic provision**: People access a minimum of 25 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Free Basic**	**Free basic provision**: People access a minimum of 25 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered.
	Intermittent	**Intermittent provision**: People access a minimum of 1500 l/household/week of acceptable quality water on a weekly basis within 100m, which is metered.
Bulk service: Source of potable water to be provided to people, which is metered in all circumstances.		
No service / provision = backlog: People access water from insecure or unimproved sources, or sources that are too distant, too time consuming or are of poor quality.		

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

Proper disposal. clean platform. vector and rodent control.

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

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

All the formal households in the urban areas of Bitou Municipality's Management Area are provided with water and sewer connections inside the erven. Households in informal areas are provided with communal services as an intermediary measure. Bitou Municipality is committed to work with the private landowners to ensure that at least basic water and sanitation services are provided to those households in the rural areas with existing services still below RDP standard. The 2011 Census data indicated that there are still a small number of households on the farms in the rural areas without basic water and sanitation services.

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

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

Census Category	Description	Year 0 FY2018/19		Year - 1 FY2017/18		Year - 2 FY2016/17	
		Nr	%	Nr	%	Nr	%
	WATER (ABOVE MIN LEVEL)						
Piped (tap) water inside dwelling/institution	House connections	12 565	53%	11 998	53%	11 465	53%
Piped (tap) water inside yard	Yard connections	8 503	36%	8 120	36%	7 758	36%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	2 356	10%	2 198	10%	2 040	9%
	Sub-Total: Minimum Serivce Level and Above	**23 424**	**99%**	**22 316**	**99%**	**21 263**	**99%**
	WATER (BELOW MIN LEVEL)						
Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Standpipe connection: > 200 m < 500 m	31	0%	31	0%	31	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	Standpipe connection: > 500 m < 1 000 m	4	0%	4	0%	4	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	10	0%	10	0%	10	0%
No access to piped (tap) water	No services	184	1%	184	1%	184	1%
	Sub-Total: Below Minimum Service Level	**229**	**1%**	**229**	**1%**	**229**	**1%**
	Total number of households	**23 653**	**100%**	**22 545**	**100%**	**21 492**	**100%**

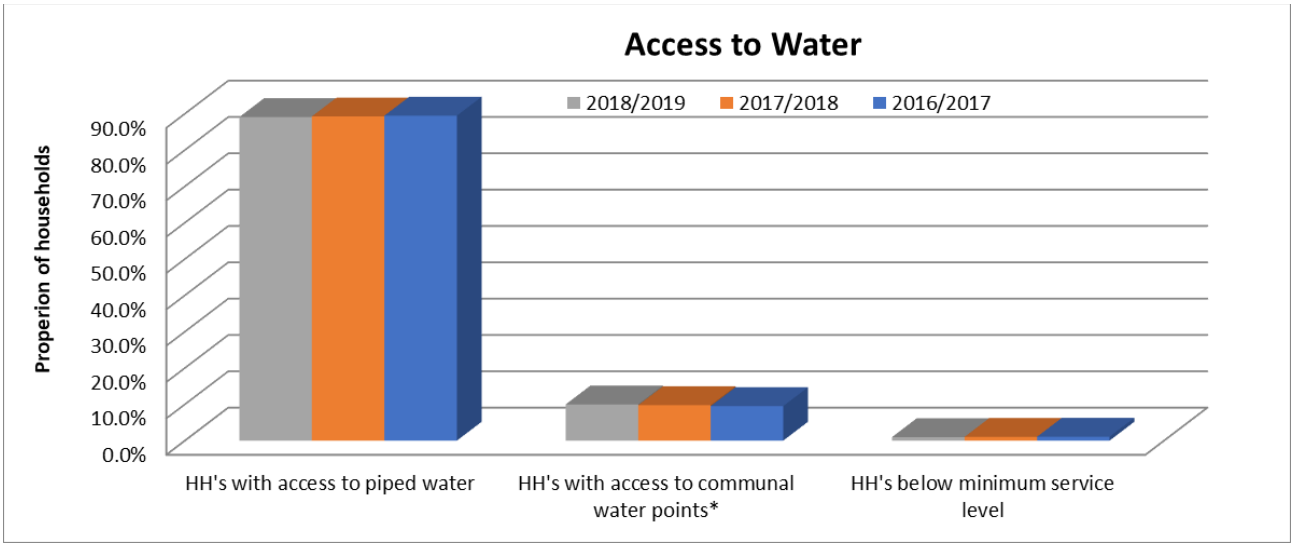


Figure A.2.1: Access to Water Services.

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

Table A.2.4: Residential water service levels					
Service Level	**Plettenberg Bay**	**Kurland**	**Natures Valley**	**Farms**	**Total**
No Water Services	0	0	0	184 [1)]	184
Below RDP: Infrastructure Upgrade	0	0	0	0	0
Below RDP: Infrastructure Extension	0	0	0	45 [2)]	45
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
Total Basic Need (RDP)	**0**	**0**	**0**	**229**	**229**
Below Housing Interim [3)]	0	0	0	0	0
Adequate Housing Permanent [4)]	1 700	547	0	109	2 356
Total Housing Need	**1 700**	**547**	**0**	**109**	**2 356**
Standpipes	0	0	0	0	0
Yard Connections [5)]	7 823	430	0	250	8 503
House Connections [6)]	10 102	684	380	1 399	12 565
Total Adequate	**17 925**	**1 114**	**380**	**1 649**	**21 068**
Total	**19 625**	**1 661**	**380**	**1 987**	**23 653**

Notes: 1) Census 2011: Number of households on the farms in the rural areas with no access.

2) Census 2011: Number of households on the farms in the rural areas with communal services (200m – 500m) 31, (500m – 1000m) 4 and (> 1000m) 10

3) Below Housing Interim in the above table is the number of households in informal areas without basic water services. There are no households in the urban areas with existing water service levels below RDP standard.

4) Adequate Housing Permanent in the above table is the number of households in informal areas with communal water services, as confirmed by the Municipality.

5) Estimated number of backyard dwellers: Projected number of households – Number of residential consumers as taken from the financial system – Number of households in informal areas.

6) Residential consumer units as taken from the financial system. The residential consumers include holiday houses.

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**
Plettenberg Bay	Urban	0	0	0	0
Kurland	Urban	0	0	0	0
Natures Valley	Urban	0	0	0	0
Farms	Rural	229	641	229	641
		229		**229**	

Table A.2.6: Water Supply Level Profile		
Water Profile (Households)	**Totals**	**Assessment Score**
Total Households with a water need (Irrelevant the type of need)	**229**	**60%**
Total Households below RDP	**229**	**60%**
Piped water inside the dwelling/house-	12 565	80%
Piped water inside yard	8 503	60%
Piped water distance <200m	2 356	80%
Piped water distance >200m	45	60%
Borehole in the yard	0	80%
Rain-water tank in yard	0	80%
Water vendor-carrier/tanker	0	80%
Stagnant water - dam/pool	0	80%
Flowing water/spring/ stream/river	0	80%
Water Other (Include no water)	184	60%

Table A.2.7: Water Reliability Profile		
Section: Water Reliability Profile	**Totals**	**Assessment Score**
Total Number of Households having Reliable Service	**23 424**	**80%**
Total Number of Households NOT having Reliable Service	**229**	**60%**

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

Table A.2.8: Residential Water Services Delivery Access Profile: Sanitation							
Census Category	**Description**	**Year 0 FY2018/19**		**Year - 1 FY2017/18**		**Year - 2 FY2016/17**	
		Nr	**%**	**Nr**	**%**	**Nr**	**%**
	SANITATION (ABOVE MIN LEVEL)						
Flush toilet (connected to sewerage system)	Waterborne	18 585	79%	17 742	79%	16 948	79%
	Waterborne: Low Flush	0	0%	0	0%	0	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	2 364	10%	2 257	10%	2 156	10%
Chemical toilet	Non-waterborne (above min. service level)	16	0%	16	0%	16	0%
Pit toilet with ventilation (VIP) and UDS		35	0%	35	0%	35	0%
Other / Communal Services		2 356	10%	2 198	10%	2 040	9%
	Sub-Total: Minimum Serivce Level and Above	**23 356**	**99%**	**22 248**	**99%**	**21 195**	**99%**
	SANITATION (BELOW MIN LEVEL)						
Pit toilet without ventilation	Pit toilet	168	1%	168	1%	168	1%
Bucket toilet	Bucket toilet	48	0%	48	0%	48	0%
Other toilet provision (below min. service level	Other	29	0%	29	0%	29	0%
No toilet provisions	No services	52	0%	52	0%	52	0%
	Sub-Total: Below Minimum Service Level	**297**	**1%**	**297**	**1%**	**297**	**1%**
	Total number of households	**23 653**	**100%**	**22 545**	**100%**	**21 492**	**100%**

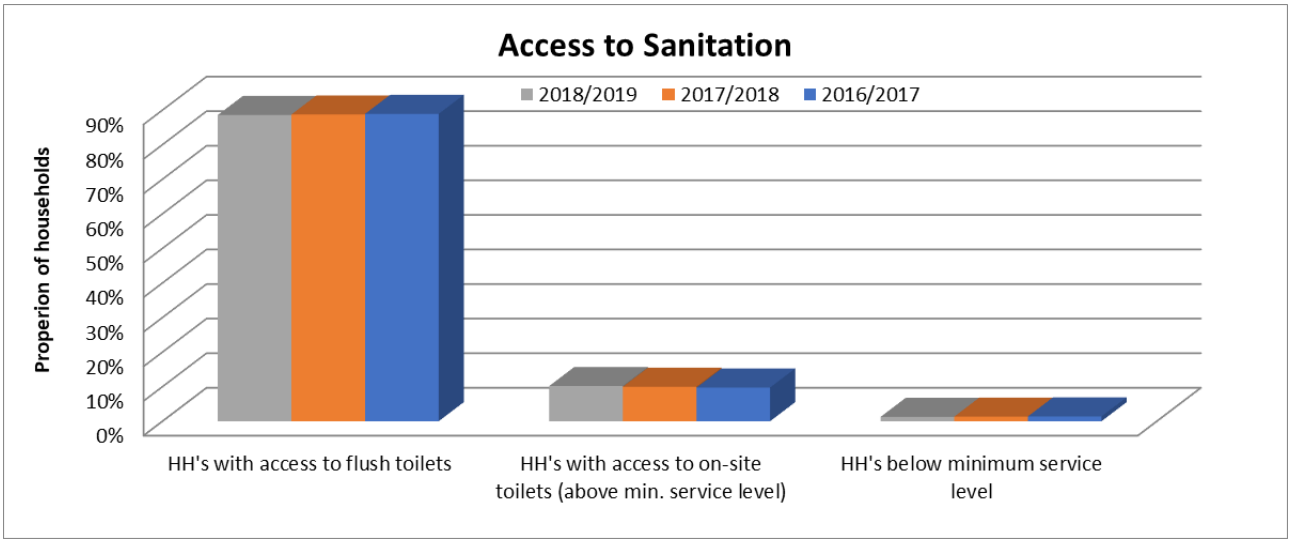


Figure A.2.2: Access to Sanitation Services.

The existing sanitation service levels in Bitou Municipality's Management Area are estimated as follows (June 2019):

Table A.2.9: Residential sanitation service levels

Service Levels	Plettenberg Bay	Kurland	Natures Valley	Farms	Total
No Sanitation Services	0	0	0	52 [1)]	52
Below RDP: Infrastructure Upgrade	0	0	0	261 [2)]	261
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
Total Basic Need (RDP)	**0**	**0**	**0**	**313**	**313**
Below Housing Interim [4)]	0	0	0	0	0
Adequate Housing Permanent [5)]	1 700	547	0	109	2 356
Total Housing Need	**1 700**	**547**	**0**	**109**	**2 356**
Non Waterborne	0	0	0	35 [3)]	35
Waterborne Low Flush	0	0	0	0	0
Septic Tanks [6)]	454	0	300	1 530	2 284
Conservancy	0	0	80	0	80
Waterborne WWTW [7)]	17 471	1 114	0	0	18 585
Total Adequate	**17 925**	**1 114**	**380**	**1 565**	**20 984**
Total	**19 625**	**1 661**	**380**	**1 987**	**23 653**

Notes: 1) Census 2011: Number of households on the farms in the rural areas with no toilet facility 52
2) Census 2011: Number of households on the farms in the rural areas with existing buckets 48, chemical toilets 16, pit toilets without ventilation 168 and "other" 29
3) Census 2011: Number of households on the farms in the rural areas with pit toilets with ventilation 35.
4) Below Housing Interim in the above table is the number of shacks in informal areas without basic sanitation services. There are no households in the urban areas with existing sanitation service levels below RDP standard.
5) Adequate Housing Permanent in the above table is the number of households in informal areas with communal sanitation services, as confirmed by the Municipality.
6) Plettenberg Bay Septic tanks as taken from the 2011 Census data.
7) Include backyard dwellers that use the services of the main house.

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
Plettenberg Bay	Urban	0	0	0	0
Kurland	Urban	0	0	0	0
Natures Valley	Urban	0	0	0	0
Farms	Rural	313	876	313	876
		313		**313**	

Table A.2.11: Sanitation Level Profile

Sanitation Profile (Households)	Totals	Assessment Score
Total Households with a sanitation need (Irrelevant the type of need)	**313**	**60%**
Total Households below RDP	**313**	**60%**
Flush toilet (connected to sewerage system)	20 832	80%
Flush toilet (with septic / conservancy tank)	2 473	80%
Chemical Toilet	16	60%
Pit toilet with ventilation (VIP)	35	60%
Pit without ventilation	168	60%
Bucket toilet	48	60%
None	81	60%

Table A.2.12: Sanitation Reliability Profile		
Section: Sanitation Reliability Profile	**Totals**	**Assessment Score**
Total number of households having reliable service	**23 340**	**80%**
Total number of households not having reliable service	**313**	**60%**
Infrastructure to be upgraded: None to VIP (HH)	81	60%
Infrastructure requirement: Bucket to VIP (HH)	48	60%
Infrastructure to be upgraded: Pit to VIP (HH)	168	60%
Number of households NOT having reliable service due to: Functionality	16	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)	229	60%
Direct settlement backlog water population. Total population of settlement with a water need (irrelevant the type of need)	641	60%
Direct settlement backlog sanitation households. Total household of settlement with a sanitation need (irrelevant the type of need)	313	60%
Direct settlement backlog sanitation population. Total population of settlement with a sanitation need (irrelevant the type of need)	876	60%

The current number of households in the informal areas, with access to communal basic services, is 2 356. These services consist of communal standpipes and communal ablution facilities. Bitou Municipality works towards a ratio of at least 1 tap per twenty-five households and 1 communal toilet per five households for their shared services. 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.2.14: 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**	
Kwanokuthula	8	3.88	8	3.88	31
Bossiesgif	307	5.08	165	9.46	1 561
Pinetrees	12	8.75	8	13.13	105
Kurland	86	6.36	150	3.65	547
Kranshoek	1	3.00	1	3.00	3
Harkerville	14	5.71	10	8.00	80
Covie	7	4.14	30	0.97	29
Total	**435**	**5.42**	**372**	**6.33**	**2 356**

The number of user connections in each user sector, for the various distribution systems in Bitou Municipality's Management Area, are summarised in the three tables below.

Table A.2.15: Number of User Connections in Each User Sector for the Plettenberg Bay distribution system						
Year	**No of Household Consumer Units**	**No of Commercial Consumer Units**	**No of Industrial Consumer Units**	**No. of Other Consumer Units**	**Total**	**Average Annual Growth**
2009/2010	7 347	316	33	14	**7 710**	
2010/2011	8 155	309	33	15	**8 512**	
2011/2012	8 343	323	33	15	**8 714**	
2012/2013	8 386	325	33	47	**8 791**	
2013/2014	8 607	271	32	92	**9 002**	3.50%
2014/2015	9 017	268	37	93	**9 415**	
2015/2016*	9 315	265	36	96	**9 712**	
2016/2017	9 606	265	36	101	**10 008**	
2017/2018	9 986	265	36	101	**10 388**	

Table A.2.15: Number of User Connections in Each User Sector for the Plettenberg Bay distribution system						
Year	**No of Household Consumer Units**	**No of Commercial Consumer Units**	**No of Industrial Consumer Units**	**No. of Other Consumer Units**	**Total**	**Average Annual Growth**
2018/2019	10 102	272	36	101	**10 512**	

Categories: * 2015/2016 figures were estimated

Table A.2.16: Number of User Connections in Each User Sector for the Kurland Distribution System					
Year	**No of Household Consumer Units**	**No of Commercial Consumer Units**	**No. of Other Consumer Units**	**Total**	**Average Annual Growth**
2009/2010 *	595	5	9	609	1.53%
2010/2011 *	607	5	9	621	
2011/2012 *	619	5	9	633	
2012/2013 *	632	5	9	646	
2013/2014 *	645	5	9	659	
2014/2015 *	658	5	9	672	
2015/2016 *	671	5	9	685	
2016/2017	685	5	9	699	
2017/2018	685	5	9	699	
2018/2019	684	5	9	698	

Note: * 2009/2010 to 2015/2016 figures were estimated

Table A.2.17: Number of User Connections in Each User Sector for the Natures Valley Distribution System					
Year	**No of Household Consumer Units**	**No of Commercial Consumer Units**	**No. of Other Consumer Units**	**Total**	**Average Annual Growth**
2009/2010	375	0	0	375	0.38%
2010/2011	376	0	0	376	
2011/2012	375	0	0	375	
2012/2013	374	0	0	374	
2013/2014	373	0	0	373	
2014/2015	381	0	0	381	
2015/2016 *	381	2	2	385	
2016/2017	381	4	4	389	
2017/2018	381	4	4	389	
2018/2019	380	4	4	388	

Note: * 2015/2016 figures were estimated

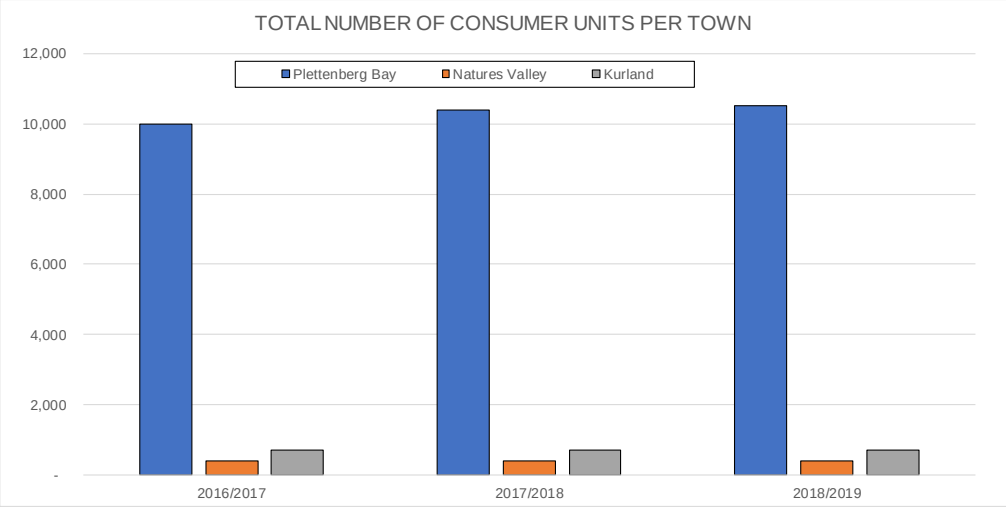


Figure A.2.3: Total number of Consumer Units per Town for the Last Three Financial Years

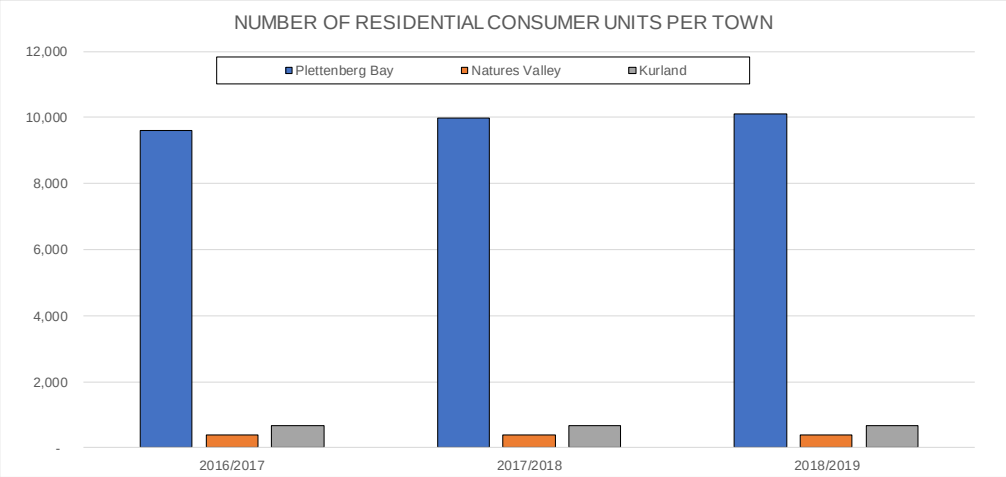


Figure A.2.4: Number of Residential Consumer Units per Town for the Last Three Financial Years

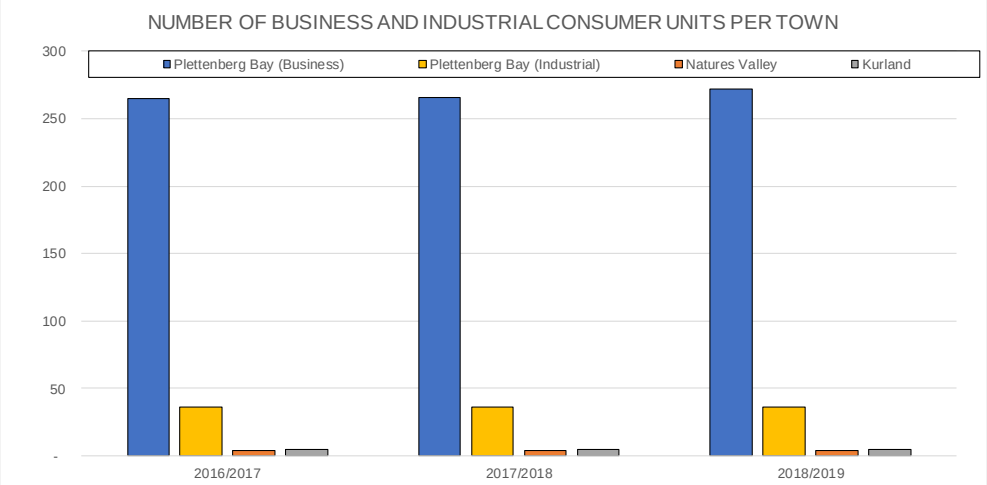


Figure A.2.5: Number of Business/Commercial Consumer Units per Town for the Last Three Financial Years

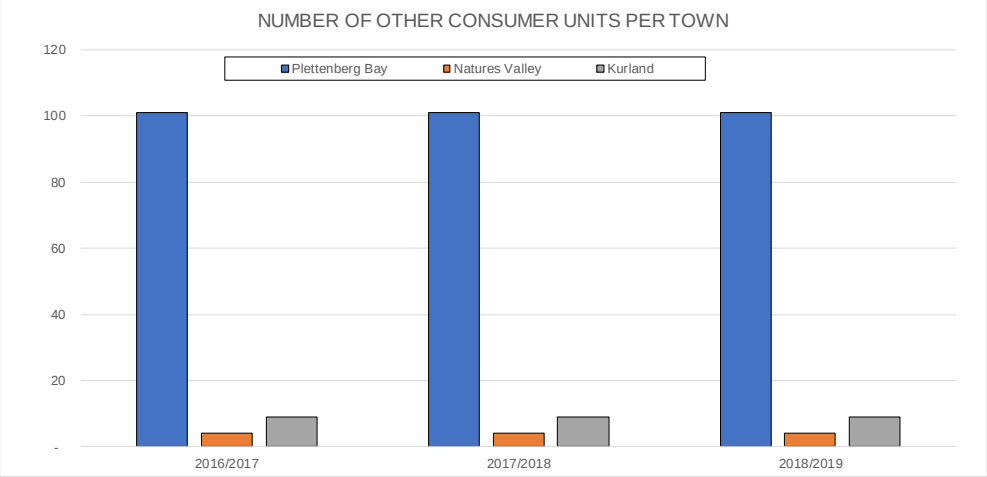


Figure A.2.6: Number of Other Consumer Units per Town for the Last Three Financial Years

Public Amenities

The water and sanitation service levels at the health and educational facilities in Bitou Municipality's Management Area are indicated in the two tables below.

Table A.2.18: 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)
Education Plan				
Primary school	10	-	-	-
Secondary school	2	-	-	-
Tertiary	-	-	-	-
Combined	3	-	-	-
Special needs	-	-	-	-
Other	10	-	-	-
Total	**25**	**-**	**-**	**-**
Health Plan				
Hospitals	1	-	-	-
Health Centers	1	-	-	-
Clinics	4	-	-	-
Mobile Clinics	3	-	-	-
Total	**9**	**-**	**-**	**-**

Table A.2.19: 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)
Education Plan				
Primary school	10	-	-	-
Secondary school	2	-	-	-
Tertiary	-	-	-	-
Combined	3	-	-	-
Special needs	-	-	-	-
Other	10	-	-	-
Total	**25**	**-**	**-**	**-**
Health Plan				
Hospitals	1	-	-	-
Health Centers	1	-	-	-
Clinics	4	-	-	-
Mobile Clinics	3	-	-	-
Total	**9**	**-**	**-**	

All schools, tertiary- and health facilities in Bitou Municipality's Management Area are supplied with adequate water and sanitation services.

TOPIC 3: WATER SERVICES ASSET MANAGEMENT

Table A.3.1: Infrastructure Components										
Assets	**Boreholes**	**Abstraction Points**	**WTW**	**Water Pump Stations**	**Sewer Pump Stations**	**Water Pipelines**	**Sewer Pipelines**	**Reservoirs**	**WWTW**	**Assessment Score**
Total number of components / km of pipeline / units	16	4	4	4 (RW) 25 (PW)	75	278.678km (Int) 104.215km (Bulk)	55.839km (Rising) 255.878km (Gravity)	31	2	80%

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

Table A.3.2: Summary of Existing Main Water Infrastructure					
Water Distribution System	**Bulk Supply**	**WTW**	**Water Reticulation (Internal/Bulk)**	**Number of Water PS**	**Number of Reservoirs**
	(Resources)	**(Capacity in Ml/d)**	**(km)**	**(RW/PW)**	**(Storage in Ml)**
Plettenberg Bay	Keurbooms River (Weir), Piesang River (Roodefontein Dam) and eleven production boreholes	Plettenberg Bay WTW (27.0 Ml/d)	259.226km (Int) 99.326km (Bulk)	2 (RW), 21 (PW) and 2 (PW Private)	22 Reservoirs (49.657); 5 Towers (2.808); 1 Reservoir Private (0.115); 2 Tanks (0.011)
	Desalination	Plettenberg Bay Desalination Plant (2.0 Ml/d)			
Harkerville	Three production boreholes	-	0.017km (Bulk)	1 (PW)	1 Reservoir (0.500) 2 Tanks (0.010)
Kurland	Wit River and two production boreholes	Kurland WTW (0.6 Ml/d)	8.462km (Int) 3.994km (Bulk)	1 (RW)	2 Reservoirs (2.000)
Natures Valley	Groot River	Natures Valley WTW (1.0 Ml/d)	10.990km (Int) 0.878km (Bulk)	1 (RW) and 1 (PW)	1 Reservoir (0.600)

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

Table 3.3: Summary of Existing Main Sewerage Infrastructure						
Sewer Drainage Systems	**Sewer Drainage Network**		**Number of Sewer PS**	**WWTW**		
	Rising	**Gravity**		**Name**	**Hydraulic Capacity**	**Organic Capacity**
	km	**km**			**Ml/d**	**Kg COD/d**
Plettenberg Bay	54.540	247.227	72	Plettenberg Bay (Gansevlei)	9.000	4 000
Kurland	1.299	8.651	3	Kurland	0.500	1 000

Table A.3.4: Refurbishment Need and O&M Occurrence												
Component	**Refurbishment Need**				**O&M Occurrence**				**Observation**			
	High	**Medium**	**Low**	**None**	**Regular**	**Periodic**	**Sporadic**	**None**	**Dysfunctional**	**Operational**	**Prime Condition**	**Vandalised**
Boreholes	0	0	6	10	0	0	16	0	0	6	10	0
Abstraction points	0	0	4	0	0	0	4	0	0	4	0	0
Bulk water pipelines	0	0	4	0	0	0	4	0	0	4	0	0
Reservoirs	3	4	18	13	0	0	38	0	1	29	8	0
Water pump stations	5	5	10	9	1	0	26	2	3	21	5	0

Table A.3.4: Refurbishment Need and O&M Occurrence												
Component	Refurbishment Need				O&M Occurrence				Observation			
	High	Medium	Low	None	Regular	Periodic	Sporadic	None	Dysfunctional	Operational	Prime Condition	Vandalised
WTW	0	0	3	1	1	0	3	0	0	3	1	0
Bulk sewer pipelines	0	0	2	0	0	0	2	0	0	2	0	0
Sewer pump stations	0	0	63	12	0	0	75	0	0	63	12	0
WWTW	0	0	2	0	0	0	2	0	0	2	0	0

Asset Management: The objectives of asset management within the Bitou Municipality are to assist officials in understanding their legal and managerial responsibilities with regard to assets and to ensure the effective and efficient control of the Municipality's assets through:

- Proper recording of assets from authorisation to acquisition and to subsequent disposal.
- Providing for safeguarding procedures.
- Setting proper guidelines as to authorised utilisation.
- Prescribing for proper maintenance.

The key elements of the Asset Management Policy represent:

- Statutory and regulatory framework / responsibilities and accountabilities.
- Financial management / internal controls / management of control items.
- Management and operation of assets / classification and components.
- Accounting for assets / financial disclosure.

The asset management section consists of three staff members and forms part of the Expenditure and Asset Management Division within the finance directorate. The costing module on the SAMRAS Management Information System is utilised to cost all new asset components up to completion there-of. This approach was deployed over the past year with great success.

Regular asset counts are conducted in accordance with the prescriptions of the Asset Management Policy. Information regarding asset register updates in respect of disposals, adjustments, review of useful life etc. is based on submissions by user departments in accordance with the procedures in place. The asset register is currently hosted on software specifically developed for this purpose.

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

Water Infrastructure: The opening costs and the carrying values of the water infrastructure of Bitou Municipality are summarised in the table below, as included in the June 2019 Asset Register.

Table A.3.6: Opening Cost and Book Value of the Water Infrastructure

Asset Type	Opening Cost (OC)	Carrying Value (CV)	% CV / OC
Boreholes	R11 933 930	R9 929 462	83.2%
Bulk Water Pipelines	R39 649 543	R36 441 075	91.9%
Reservoirs	R38 111 036	R20 402 583	53.5%
Water Pump Stations	R21 593 007	R14 767 830	68.4%
Water Pipelines	R62 311 321	R44 766 352	71.8%
Nature's Valley WTW	R1 385 705	R341 861	24.7%
Kurland WTW	R1 569 379	R861 807	54.9%
Harkerville WTW	R1 871 661	R1 807 965	96.6%
Plettenberg Bay WTW	R52 972 895	R36 314 260	68.6%
Totals	**R231 398 475**	**R165 633 194**	**71.6%**

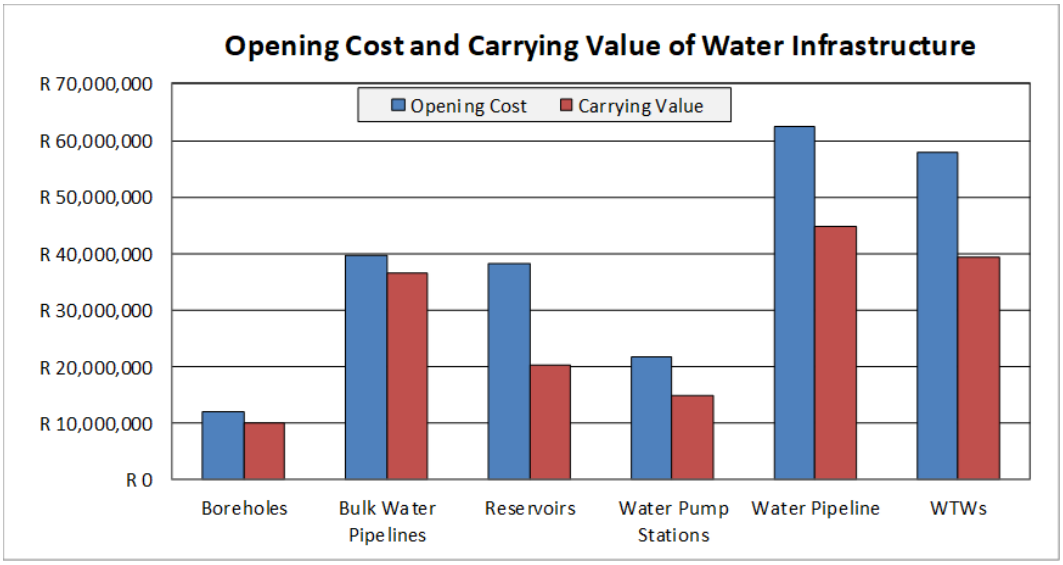


Figure A.3.1: Opening Cost and Carrying Value of the Water Infrastructure

The information in the previous table indicates that 28.4% of the value of the water supply infrastructure has been consumed.

The following tables and graphs give an overview of the remaining useful life by facility type for the water infrastructure, as included in the June 2019 Asset Register (Opening Costs):

Table A.3.7: Overview of the RUL by Facility Type for the Water Infrastructure (Opening Costs)

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Boreholes	R26 057	R931 417	R5 216 823	R2 821 497	R2 938 137
Bulk Water Pipelines	R0	R0	R632 461	R0	R39 017 081
Reservoirs	R4 364 598	R3 631 348	R4 007 623	R12 281 141	R13 826 326
Water Pump Stations	R2 974 249	R5 490 057	R2 843 889	R48 940	R10 235 872
Water Pipeline	R4 396 685	R3 199 415	R0	R805 119	R53 910 102
Nature's Valley WTW	R1 157 600	R36 092	R158 814	R4 446	R28 754
Kurland WTW	R186 503	R733 859	R68 394	R27 558	R553 065
Harkerville WTW	R0	R0	R7 898	R0	R1 863 763
Plettenberg Bay WTW	R2 675 628	R10 628 700	R15 554 382	R1 198 596	R22 915 590
Totals	**R15 781 319**	**R24 650 887**	**R28 490 284**	**R17 187 296**	**R145 288 689**

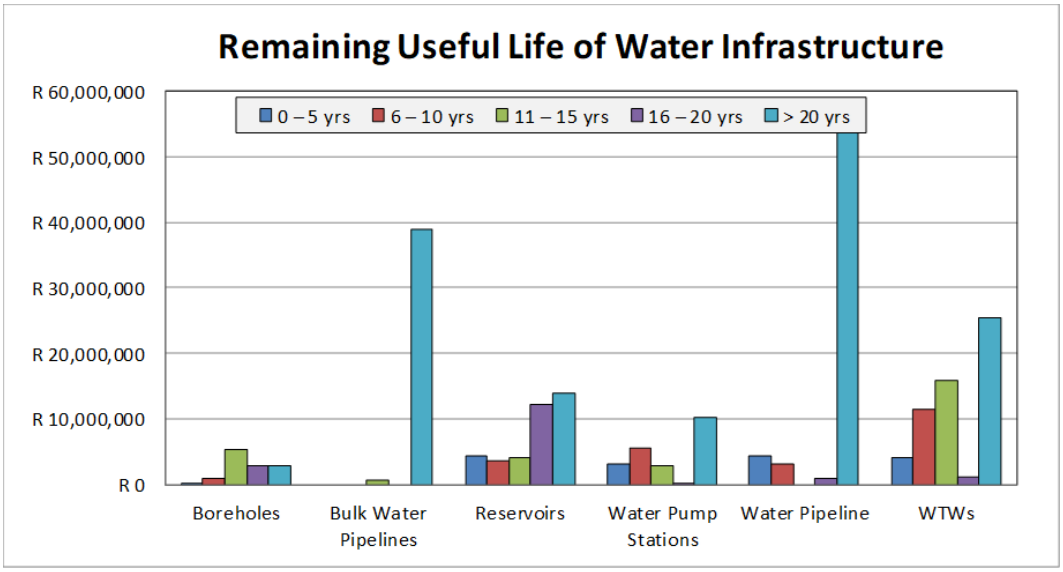


Figure A.3.2: Remaining Useful Life of the Water Infrastructure

The asset renewal needs for the water infrastructure assets over the next 10 years is R4.043 million per year. The reinvestment required is R15.781 million in the first 5 years and R24.651 million in the second 5-year period.

The following tables and graphs give an overview of the age distribution by facility type for the water infrastructure, as included in the June 2019 Asset Register (Opening Costs):

Table A3.8: Overview of Age Distribution by Facility Type for the Water Infrastructure (Opening Costs)

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Boreholes	R7 832 123	R4 020 245	R3 664	R6 876	R71 022
Bulk Water Pipelines	R12 211 665	R22 037 467	R2 044 193	R423 972	R2 932 246
Reservoirs	R5 212 354	R8 319 756	R1 779 031	R5 023 723	R17 776 171
Water Pump Stations	R16 116 787	R769 784	R1 848 805	R100 689	R2 756 943
Water Pipeline	R14 205 289	R13 955 338	R1 525 292	R5 051 790	R27 573 611
Nature's Valley WTW	R11 900	R195 423	R993 033	R0	R185 349
Kurland WTW	R395 871	R846 895	R43 507	R105 210	R177 896
Harkerville WTW	R1 871 661	R0	R0	R0	R0
Plettenberg Bay WTW	R16 773 144	R30 725 248	R1 103 392	R712 467	R3 658 645
Totals	**R74 630 794**	**R80 870 155**	**R9 340 917**	**R11 424 728**	**R55 131 882**

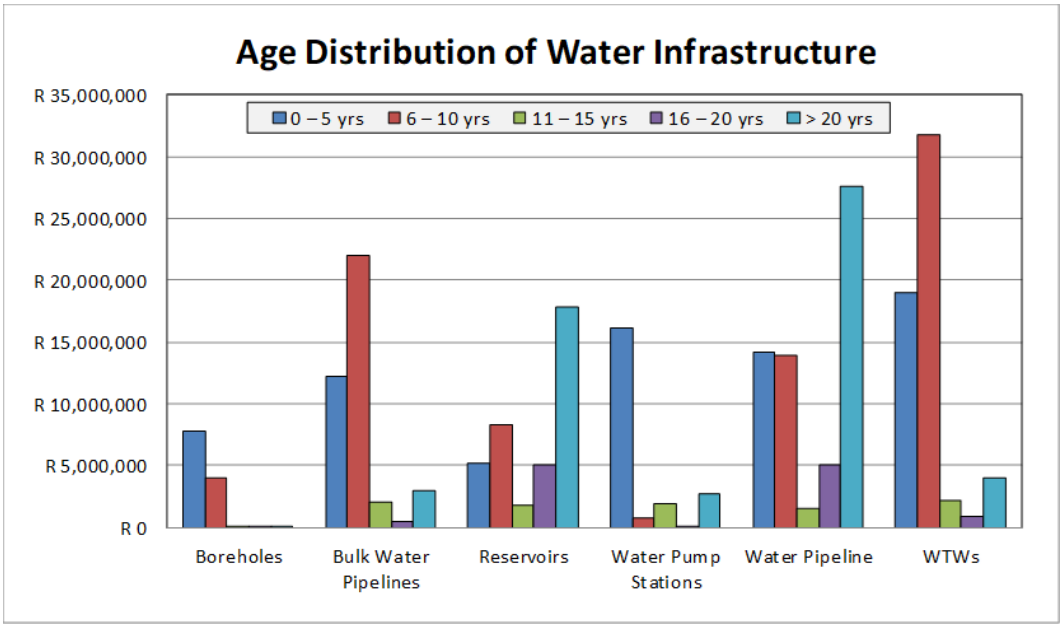


Figure A.3.3: Age Distribution of the Water Infrastructure

The age of 23.83% of the water infrastructure assets is greater than 20 years.

Sewerage Infrastructure: The opening costs and carrying values of the sewerage infrastructure of Bitou Municipality are summarised in the table below, as included in the June 2019 Asset Register:

Table A3.9 Opening Costs and Book Values of the Sewerage Infrastructure

Asset Type	Opening Cost (OC)	Carrying Value (CV)	% CV / OC
Bulk Sewer Pipelines	R24 509 485	R21 615 756	88.2%
Sewer Pipelines	R57 128 808	R44 031 888	77.1%
Sewer Pump Stations	R58 509 929	R41 298 108	70.6%
Kurland WWTW (WTW-001)	R1 651 844	R1 095 066	66.3%
Plettenberg Bay WWTW (WTW-002)	R7 046 759	R4 028 684	57.2%
Totals	**R148 846 825**	**R112 069 501**	**75.3%**

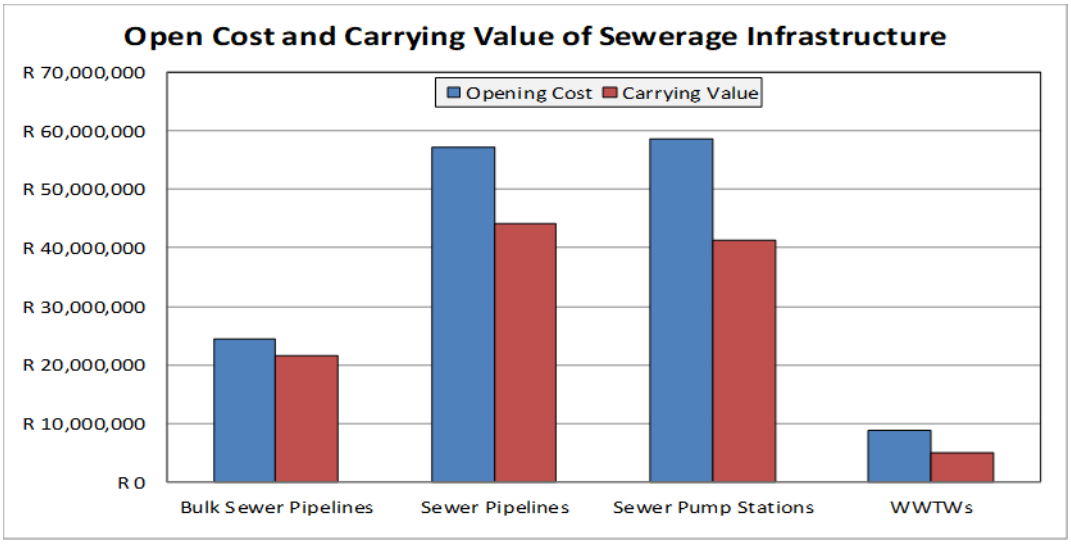


Figure A.3.4: Opening Costs and Carrying Value of the Sewerage Infrastructure

The information in the previous table indicates that 24.7 % of the value of the sewerage infrastructure has been consumed.

The following table and graph give an overview of the RUL by facility type for the sewerage infrastructure, as included in the June 2019 Asset Register (Opening Costs):

Table A.3.10: Overview of the RUL by Facility Type for the Sewerage Infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Bulk Sewer Pipelines	R0	R0	R818 574	R0	R23 690 911
Sewer Pipelines	R0	R5 355	R4 424 685	R519 943	R52 178 826
Sewer Pump Stations	R5 160 820	R7 940 297	R22 934 199	R2 705 716	R19 768 896
Kurland WWTW (WTW-001)	R80 506	R79 263	R581 094	R373 448	R537 533
Plettenberg Bay WWTW (WTW-002)	R940 358	R122 983	R1 893 372	R1 498 113	R2 591 934
Totals	**R6 181 684**	**R8 147 898**	**R30 651 924**	**R5 097 220**	**R98 768 099**

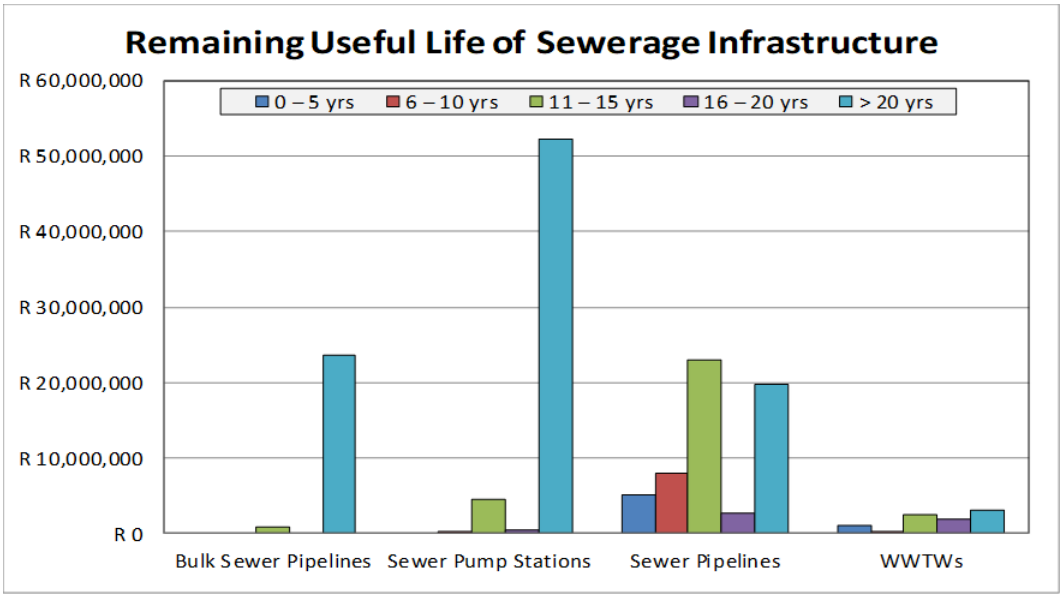


Figure A.3.5: Remaining Useful Life of the Sewerage Infrastructure

The asset renewal needs for the sewerage infrastructure assets over the next 10 years is R1.433 million per year. The reinvestment required is R6.182 million in the first 5 years and R8.148 million in the second 5-year period.

The following table and graph give an overview of the age distribution by facility type for the sewerage infrastructure, as included in the June 2019 Asset Register (Opening Costs):

Table A.3.11: Overview of the Age Distribution by Facility Type for the Sewerage Infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Bulk Sewer Pipelines	R13 261 406	R469 438	R2 584 152	R6 436 404	R1 758 086
Sewer Pipelines	R19 147 716	R16 128 749	R1 771 821	R4 487 186	R15 593 336
Sewer Pump Stations	R37 592 646	R14 352 291	R1 398 321	R948 903	R4 217 767
Kurland WWTW (WTW-001)	R535 071	R581 536	R38 813	R0	R496 423
Plettenberg Bay WWTW (WTW-002)	R2 516 201	R822 045	R1 355 371	R0	R2 353 143
Totals	**R73 053 040**	**R32 354 059**	**R7 148 477**	**R11 872 493**	**R24 418 755**

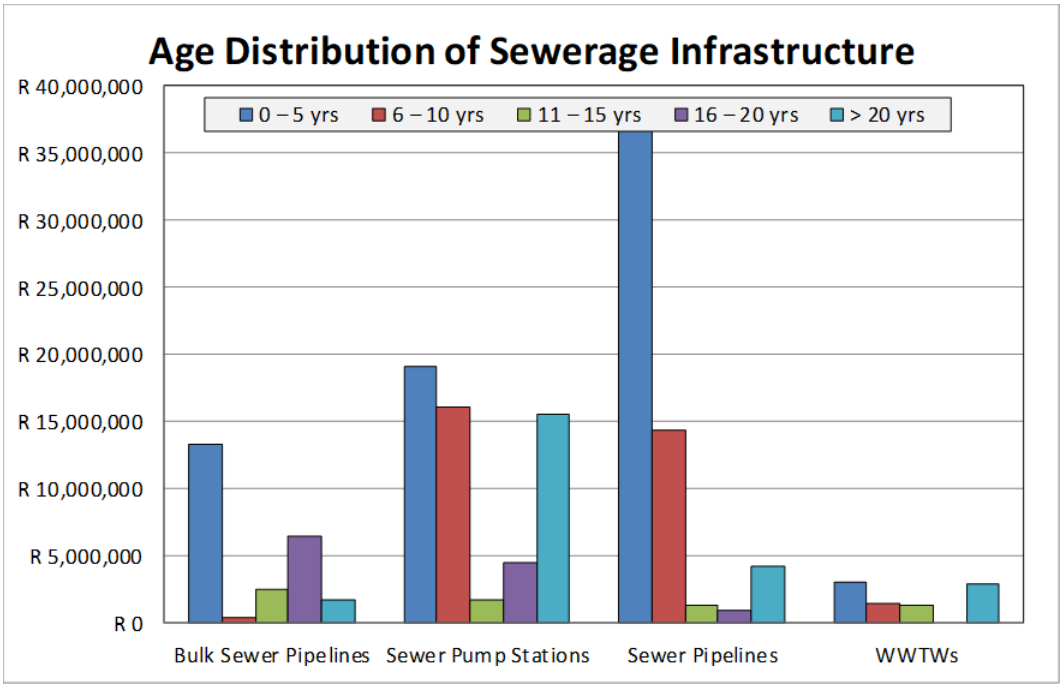


Figure A.3.6: Age Distribution of the Sewerage Infrastructure

The age of 16.41% of the sewerage infrastructure assets is greater than 20 years.

One of the key challenges of Bitou Municipality is to identify adequate funds for the rehabilitation and maintenance of the existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. Most of the maintenance work currently carried out on the water and sewerage infrastructure are re-active and it is critical for the Municipality to increase their maintenance budget for water and sewerage infrastructure in order to ensure that the required preventative maintenance work is also carried out. An Asset Management Plan needs to indicate the risks associated with the inadequate refurbishment and maintenance of the various water and sewerage infrastructure.

Disaster Management Plan: Bitou Municipality does not have its own municipal Disaster Management Centre (DMC) office. It is heavily dependent on the Garden Route DMC, which is located in one of its neighbouring municipalities, George. This DMC was established as a result of government's commitment to provide a comprehensive safety service to the community of the district. DMCs provide the physical environment where all disaster management activities can be managed in a coordinated and integrated approach. This DMC provides a 24-hour call taking and dispatch facility. An organisational facility is also available that is used as a Joint Operation Centre (JOC) during disasters and it hosts a venue for planning sessions outside disaster periods. A tactical facility is available as well as offices for various emergency services.

In terms of the Disaster Management Act of 2002 (as amended) section 51, each District and metropolitan may establish a Disaster Management Advisory Forum (DMAF). The Garden Route Disaster Management Centre has an active Advisory forum on which the Bitou Municipality participates. Bitou Municipality is not required by the Act to have its own DMAF.

The table below highlighted incidents experienced in the past (extract from Municipal Disaster Management Plan, 2018)

Table A.3.12: Disaster Incidents Experienced in Bitou Municipality

Year	Incidents
2007/2008	Snow, sleet, hail, floods
2009/2010	Floods, wild fires, plantation fires, vegetation fires, shack fires.
2011/2012	Aircraft incident, unrest, structural fires, flooding, shack fires.
2013/2014	Bush fires, heavy rainfall, drought, heat waves, coastal erosion, shack fires.
2015/16/17	Increase in statistics to vegetation fires, rural areas and plantations. Most recent disaster was fire storm of 7 June 2017.

Bitou Municipality's 2019 Disaster Risk Assessment is included under Section 3.1.2 of the Future Demand and Functionality Requirements Report. The top ten (10) risks for Bitou Municipality are as follows (In no particular order):

- Wildfires;
- Alien Invasive Species (Vegetative);
- Hazmat Incidents: Roads;
- Civil Unrest;
- Roads Incidents;
- Storm Surge / Coastal flooding;
- Floods (Stormwater/Riverine);
- Urban fires (Informal)
- Coastal Erosion;
- Disruption: Waste Removal / Management; and
- Critical infrastructure: Sanitation

Untreated Effluent Management Plan: All effluent discharged in the urban areas in Bitou Municipality are treated at the existing two WWTWs and there is no known untreated effluent discharged to the environment. A W_2RAP was prepared for the two WWTWs and the drainage networks.

TOPIC 4: WATER SERVICES OPERATION AND MAINTENANCE

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

Pipe bursts and other serious damage to pipes immediately interrupts services to the affected area and is rapidly addressed by Bitou Municipality. O&M is a continuous process for Bitou 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. Bitou 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.

Bitou Municipality also have standby teams available after hours and over weekends, besides the planned and scheduled O&M activities, in order to allow for unscheduled responses to service breakdowns due to mal-functioning equipment, vandalism, emergency situations, etc. This allows Bitou 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

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

TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

Bitou Municipality adopted a Drought Management Policy during the recent drought experienced in the Western Cape. Various water demand measures were also adopted as part of the Drought Management Policy. The levels of water restrictions, as included in the Drought Management Policy, are indicated in the table below:

Table A.5.1: Levels of Water Restrictions (Drought Management Policy)

Level of Water Restriction	Trigger Point	Percentage target reduction in potable water supply and demand	Target Consumption of Potable Water Demand (Ml/d)	Calculated number of remaining weeks of bulk raw water supply (Weeks)
Water Conservation Measures	Permanent 100% - 81%	Baseline	9.20	11.27
1: Moderate	80% - 66%	0% - 10%	8.28	9.68
2: High	65% - 51%	10% - 20%	8.16	6.93
3: Very High	50% - 36%	20% - 30%	6.44	5.12
4: Severe	35% - 21%	30% - 40%	5.52	5.69
5: Emergency	< 20%	40% - 50%	4.60	6.83

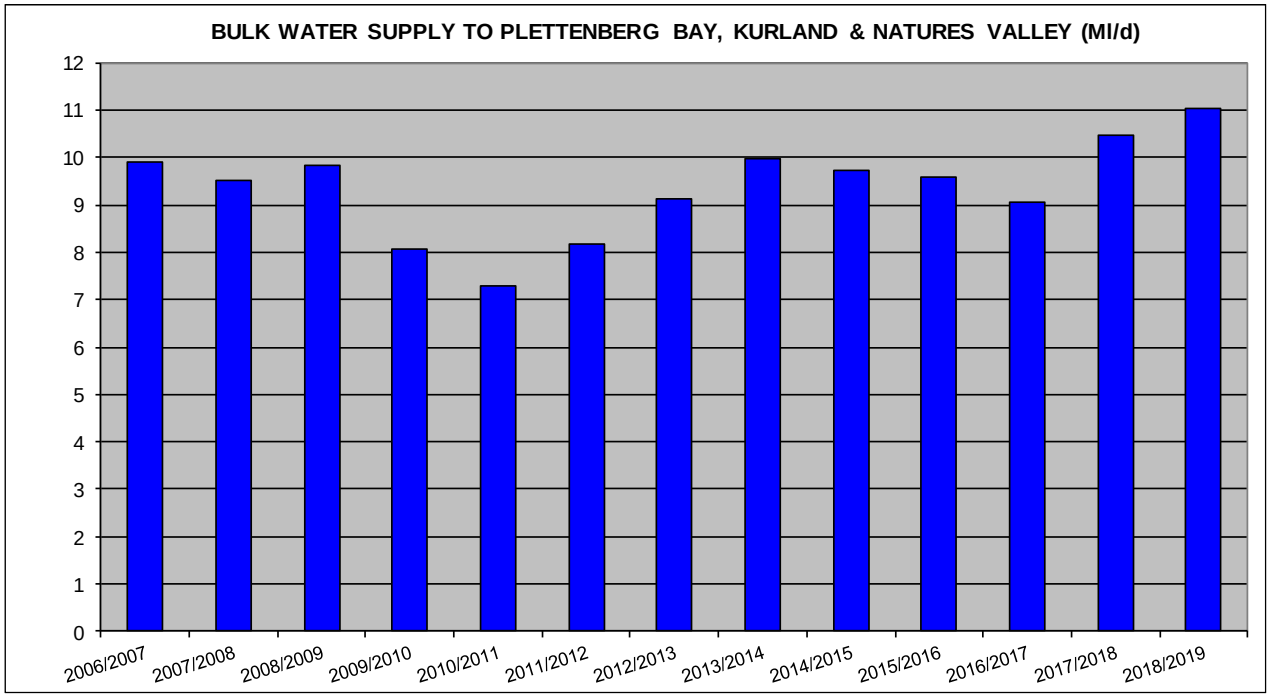


Figure A.5.1: Total Annual Bulk Raw Water Supply to Plettenberg Bay, Kurland and Natures Valley

The drought measures, water restrictions and other WC/WDM measures implemented by Bitou Municipality over the drought periods 2009/2010 to 2010/2011 and again over the period 2015/2016 to 2016/2017 resulted in a reduction of the overall water requirements for the towns, as can be noted from the above graph. There was however a steady increase in total water requirement experienced over the last two financial years.

A WC/WDM Strategy was also drafted for Bitou Municipality, as part of the WSDP process, which is included under Topic 5 of the Future Demand and Functionality Requirements Report. The main water demand management interventions implemented by Bitou Municipality over the last few years were as follows:

- The 2014/2015 Water Master Plans are currently being updated.
- Customer Services and Complaints System is implemented by the Municipality (Burst pipes, etc.). Standby teams are also available after hours and over weekends for immediate repairs of burst pipes and water leaks.
- Strict municipal service standards for the installation of new water reticulation networks for own and private developments. Reticulation material and quality standards checks.

- Meter and record all bulk water supply to the various distribution systems and improve the quality of data regarding the monthly consumer usage in order to carry out more detail water balances for the various systems.
- Implement a seven (7) block step water tariff structure that promotes the efficient use of water and discourage wastages.
- Pressure reduction (PRVs), re-zoning of network from various reservoirs (bulk meters for each zone) and automatic meter reading (Scada system).
- Implementation of pipeline and meter replacement programmes. Various bulk water meters were replaced during the last financial year. Pre-paid water meters were also installed.
- Assistance programmes in low income areas to reduce water leakages.
- Various Water Week and Water Conservation Awareness Campaigns.
- "War on Leaks" project

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

Table A.5.2: Treatment Losses, NRW and Water Losses for the various water distribution systems

Distribution System	Component	Unit	Record : Prior (Ml/a)				18/19
			14/15	15/16	16/17	17/18	
Plettenberg Bay	Treatment Losses	Volume	220.892	168.763	168.139	278.997	252.564
		Percentage	6.92%	5.47%	5.98%	8.28%	7.19%
	NRW	Volume	848.409	836.629	387.339	984.733	973.853
		Percentage	27.4%	27.0%	13.3%	29.9%	27.8%
	Water Losses	Volume	751.803	766.964	321.049	944.893	930.383
		Percentage	24.3%	24.8%	11.0%	28.7%	26.5%
	ILI		3.37				3.36
Kurland	Treatment Losses	Volume	5.349	11.144	16.107	12.436	2.917
		Percentage	3.0%	6.3%	9.4%	6.6%	1.5%
	NRW	Volume	7.955	43.027	29.327	40.584	79.841
		Percentage	4.7%	25.9%	18.8%	23.0%	41.4%
	Water Losses	Volume	5.178	39.185	26.054	27.134	54.159
		Percentage	3.0%	23.6%	16.7%	15.4%	28.1%
	ILI						3.32
Natures Valley	Treatment Losses	Volume	2.332	2.588	1.622	9.880	18.775
		Percentage	4.3%	4.9%	3.4%	17.4%	24.6%
	NRW	Volume	7.004	9.056	0.087	6.884	15.854
		Percentage	13.5%	18.0%	0.2%	14.7%	27.5%
	Water Losses	Volume	6.738	8.445	0	6.790	15.739
		Percentage	13.0%	16.8%	0.0%	14.5%	27.3%
	ILI		1.14				2.39
Total	**NRW**	**Volume**	**863.368**	**888.712**	**416.753**	**1 032.201**	**1 069.548**
		Percentage	**26.00%**	**26.84%**	**13.37%**	**29.37%**	**28.46%**
	Water Losses	**Volume**	**763.719**	**814.594**	**347.103**	**978.817**	**1 000.281**
		Percentage	**23.00%**	**24.60%**	**11.13%**	**27.86%**	**26.62%**

Notes: 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.5.3: Reducing Unaccounted Water		
Reducing unaccounted water and water inefficiencies		**Assessment Score**
Night flow metering	Partially	60%
Day flow metering	Yes	60%
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	Partially	40%
Retro-fitting of water inefficient toilets	Partially	40%
Meter repair programme	Partially	60%
Consumer/end-use demand management: Public Information & Education Programmes		
Schools targeted by education programmes	Partially	60%
Consumers targeted by public information programmes	Yes	80%

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 Bitou Municipality.

Table A.6.1: Current and Additional Water Sources and Volumes							
Current Water Sources							
Source Type	**Scheme**	**Number of Sources**	**Current 18/19 Abstraction or Returns (Mm³/a)**	**Permit / Licence Volumes (Mm³/a)**	**Community Water Supply**		**Assessment Score**
					Rural	**Urban**	
Conjunctive Use: Groundwater (GW) and Surface Water (SW)	Plettenberg Bay (GW)	14	0.228	Busy with WULAs	0%	100%	
	Kurland (GW)	2	0.188		0%	100%	
	Plettenberg Bay (SW)	2	3.284	3.454	0%	100%	
	Kurland (SW)	1	0.008	0.130	0%	100%	
Surface Water	Natures Valley	1	0.076	0.120	0%	100%	
Desalination	Plettenberg Bay	1	0.247	0.730	0%	100%	
External Sources (Bulk Purchase)	No bulk water is purchased from any external bulk service provider						
Water Returned to Source	Plettenberg Bay	1	1.145	3.865	N/A	N/A	80%
	Kurland	1	0.096	0.500	N/A	N/A	80%

Table A.6.2: Additional Resources				
Source Type	**Schemes**	**Number of Sources**	**Potential Volume (Mm³/a)**	**Licensed Abstraction (Mm³/a)**
Groundwater	GFE1 & GFE2	6	0.475 to 1.351	WULAs will be done when source is developed
Surface Water	3 Mm³ or 4.5 Mm³ Wadrif dam	1	5.09 to 6.55	
External Sources (Bulk Purchase)	Further 2 Ml/d RO plant	1	0.730	

Table A.6.3: Monitoring		
Monitoring	**Assessment Score**	
% of water abstracted monitored: Surface water	80%	
% of water abstracted monitored: Ground water	60%	
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)	Ad-hoc	40%
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)	Monthly	60%

The graph below provide an overview of the total bulk raw water supply from the various resources for Bitou Municipality's distribution systems.

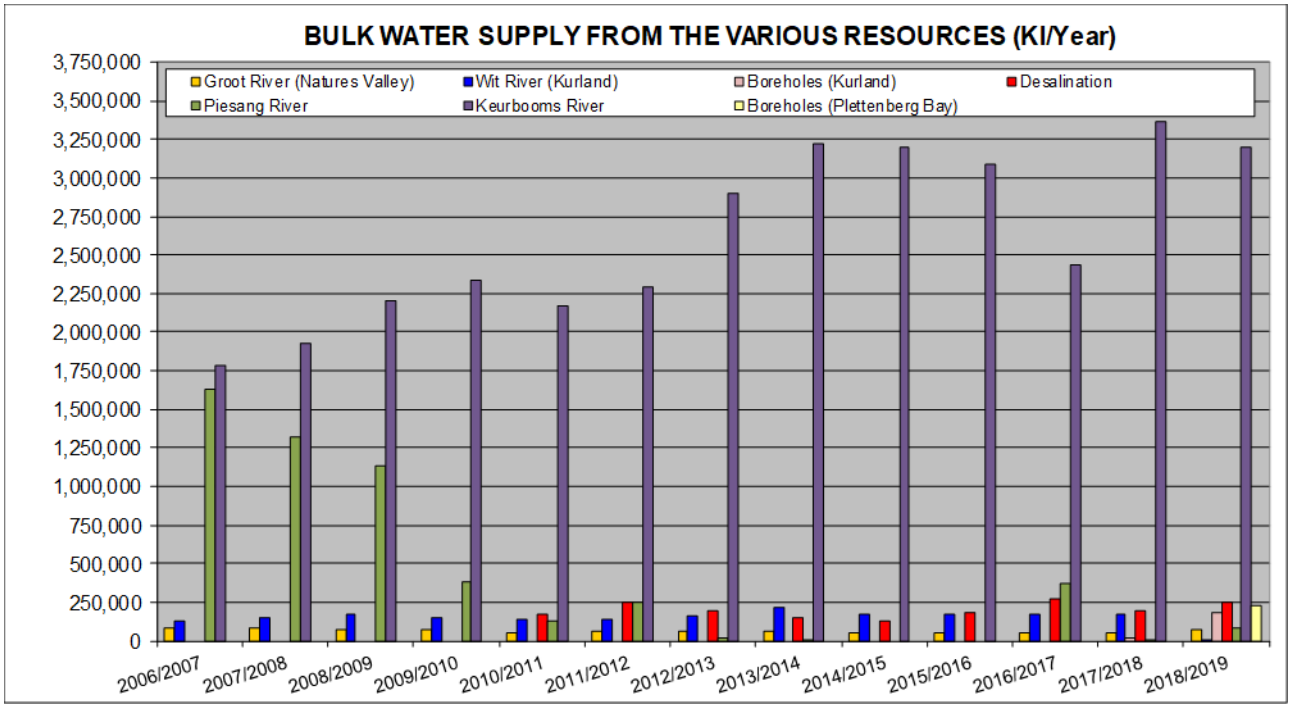


Figure A.6.1: Total Annual Raw Water Supply from the Various Resources

The table below summarise the bulk raw water supplied to the various distribution systems in Bitou Municipality's Management Area.

Table A.6.4: Annual Bulk Raw Water Supply to the Various Distribution Systems							
Distribution System	**Source**	**Record : Prior (Ml/a)**					**18/19**
		13/14	**14/15**	**15/16**	**16/17**	**17/18**	
Plettenberg Bay	Piesang River	0.007	0.000	0.000	374.851	12.292	89.435
	Keurbooms River	3 214.545	3 193.876	3 084.230	2 437.637	3 357.932	3 194.827
	Desalination	149.433	124.889	179.150	270.905	199.818	246.744
	Boreholes	0.000	0.000	0.000	0.000	0.000	228.474
Plettenberg Bay Sub Total		3 363.985	3 318.765	3 263.380	3 083.393	3 570.042	3 759.480
Natures Valley	Groot River	65.821	54.302	52.854	48.067	56.633	76.366
Kurland	Wit River	211.587	176.099	177.189	171.814	174.869	7.885
	Boreholes	0.000	0.000	0.000	0.000	13.741	188.110
Kurland Sub Total		211.587	176.099	177.189	171.814	188.610	195.995
Total		**3 641.393**	**3 549.166**	**3 493.423**	**3 303.274**	**3 815.285**	**4 031.841**

Water Quality: Operational and Compliance Water Quality Monitoring Programmes are implemented by Bitou Municipality. Water Quality sampling is done by Bitou Municipality's own laboratory at the Plettenberg Bay WTW. The water quality results are loaded onto DWS's IRIS via the internet. Once entered the data is automatically compared to SANS241. This real-time system allows for immediate intervention to rectify any problems.

The current Water Quality Operational and Compliance sampling programmes comply with SANS 241-2:2015 requirements with regard to the minimum monitoring frequency for process risk indicators and no additional sampling is proposed for any of the water distribution systems.

Table A.6.5: Water Quality			
Water Quality	**In place**	**Status Quo**	**Assessment Score**
Is there a Water Safety Plan in Place?	Yes	80%	80%
Reporting on quality of water taken from source: urban & rural	Yes	80%	80%
Quality of water returned to the resource: urban	Yes	80%	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	60%	60%
The abstraction IS NOT registered with DWS	-	-	-
The abstraction IS recorded	Yes	60%	60%
The abstraction IS NOT recorded	-	-	-

The additional monitoring required by Bitou Municipality for determinands identified during the risk assessment exceeding the numerical limits in SANS241:2015 are as follows (Water quality samples taken over the period July 2018 to June 2019).

Table A.6.6: Percentage Compliance of the Water Quality Samples for the Period July 2018 to June 2019			
Performance Indicator	**Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)**	**% Sample Compliance according to SANS 241-2015 Limits**	**Frequency of Additional Monitoring due to failure**
Plettenberg Bay			
Acute Health Microbiological	No (Excellent)	100.0%	-
Acute Health Chemical	No (Excellent)	100.0%	-
Chronic Health	No (Excellent)	99.9%	-
Aesthetic	No (Excellent)	100.0%	-
Operational Efficiency	No (Excellent)	99.9%	-
Kurland			
Acute Health Microbiological	No (Excellent)	100.0%	-
Acute Health Chemical	No (Excellent)	100.0%	-
Chronic Health	No (Excellent)	100.0%	-
Aesthetic	No (Excellent)	99.8%	-
Operational Efficiency	No (Excellent)	100.0%	-
Natures Valley			
Acute Health Microbiological	No (Excellent)	100.0%	-
Acute Health Chemical	No (Excellent)	100.0%	-
Chronic Health	No (Excellent)	100.0%	-
Aesthetic	No (Excellent)	100.0%	-
Operational Efficiency	No (Excellent)	99.8%	-

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

Table A.6.7: Four Categories under which the Risks Posed by Micro-organism, Physical or Aesthetic property or Chemical Substance of Potable Water is Normally Classified

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

The table below indicates the compliance of the E.Coli monitoring frequency in the water distributions systems of Bitou 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.

Table A.6.8: Bitou Municipality's compliance of the monthly E.Coli monitoring frequency in the water distributions systems in terms of the minimum requirements of SANS 241-2:2015 (Table 2).

Distribution System	Population served	Required number of monthly samples (SANS 241-2:2015: Table 2)	Number of monthly E.Coli samples taken by Municipality during 2018/2019
Plettenberg Bay	57 395	11.5	64.4
Kurland	5 306	2	9.4
Natures Valley	605	2	10.5

It can be noted from the above table that the number of monthly E.Coli samples taken by the Municipality during the 2018/2019 financial year was more than the required number of samples for all the systems.

Effluent quality: The current Operational and Compliance sampling programmes for the WWTWs are adequate, with no additional monitoring proposed. The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the period July 2018 to June 2019 at the Plettenberg Bay and Kurland WWTWs are summarised in the tables below.

Table A.6.9: Percentage Microbiological (E.Coli) Compliance of the Compliance Samples taken at the Various WWTWs

WWTW	Number of Samples Taken	Number of Samples Complying with General Standards	Percentage Compliance
Plettenberg Bay	122	122	100.0%
Kurland	41	41	100.0%
Total	**163**	**163**	**100.0%**

Table A.6.10: Percentage Chemical Compliance of the Compliance Samples taken at the Various WWTWs.

WWTW	Number of Compliance Samples Taken				Number of Samples Complying with General Standards				Percentage Compliance				
	Ammonia	Nitrites & Nitrates	COD	Ortho-Phosphate	Ammonia	Nitrites & Nitrates	COD	Ortho-Phosphate	Ammonia	Nitrites & Nitrates	COD	Ortho-Phosphate	Overall
Plettenberg Bay	138	153	153	148	138	150	153	146	100.0%	98.0%	100.0%	98.6%	**99.2%**
Kurland	51	51	52	51	50	46	52	51	98.0%	90.2%	100.0%	100.0%	**97.1%**
Total	**189**	**204**	**205**	**199**	**188**	**196**	**205**	**197**	**99.5%**	**96.1%**	**100.0%**	**99.0%**	**98.6%**

Table A.6.11: Percentage Physical Compliance of the Compliance Samples taken at the Various WWTWs.										
WWTW	Number of Compliance Samples Taken			Number of Samples Complying with General Standards			Percentage Compliance			
	pH	Electrical Conductivity	Suspended Solids	pH	Electrical Conductivity	Suspended Solids	pH	Electrical Conductivity	Suspended Solids	Overall
Plettenberg Bay	153	140	153	153	140	153	100.0%	100.0%	100.0%	**100.0%**
Kurland	53	50	50	52	50	49	98.1%	100.0%	98.0%	**98.7%**
Total	**206**	**190**	**203**	**205**	**190**	**202**	**99.5%**	**100.0%**	**99.5%**	**99.7%**

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	2011/2012 to 2012/2013			2012/2013 to 2014/2015			2014/2015 to 2018/2019		
	Micro.	Chemical	Physical	Micro.	Chemical	Physical	Micro.	Chemical	Physical
Plettenberg Bay	Same	Decrease	Increase	Same	Increase	Decrease	Same	Increase	Increase
Kurland	Same	Decrease	Decrease	Same	Decrease	Increase	Same	Increase	Decrease

TOPIC 7: FINANCIAL

Capital Budget: The table below gives an overview of Bitou Municipality's historical water and sewerage capital expenditure and the percentage of the total capital budget for the last five financial years.

Table A.7.1: Historical Capital Expenditure of the Water and Sewerage Infrastructure Budgets					
Financial Year	Total Capital Budget of Municipality	Water Expenditure		Sewerage Expenditure	
		Expenditure	% of Total Capital Budget	Expenditure	% of Total Capital Budget
2014/2015	R55 497 000	R6 614 870	11.92%	R7 439 460	13.41%
2015/2016	R96 762 000	R10 053 922	10.39%	R11 516 097	11.90%
2016/2017	R120 645 000	R12 117 001	10.04%	R13 331 865	11.05%
2017/2018	R121 998 000	R24 934 232	20.44%	R14 628 839	11.99%
2018/2019	R130 343 000	R15 151 728	11.62%	R16 344 300	12.54%

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: Total Operational Costs and Income for Water and Sanitation Services for the Last Six Financial Years						
Description	Record Prior					2018/2019
	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	
Water Services						
Expenditure	**R26 857 262**	**R40 591 381**	**R40 744 642**	**R43 494 451**	**R50 681 908**	**R65 003 271**
Income	**-R52 043 312**	**-R73 893 993**	**-R85 144 371**	**-R92 033 295**	**-R119 588 936**	**-R119 998 133**
Surplus / Deficit	**-R25 186 050**	**-R33 302 612**	**-R44 399 728**	**-R48 538 845**	**-R68 907 028**	**-R54 994 861**
Sanitation Services						
Expenditure	**R14 206 766**	**R45 528 252**	**R47 960 384**	**R49 242 350**	**R31 980 366**	**R49 153 274**
Income	**-R49 479 329**	**-R64 423 147**	**-R74 386 729**	**-R75 260 892**	**-R56 093 832**	**-R85 504 847**
Surplus / Deficit	**-R35 272 563**	**-R18 894 895**	**-R26 426 345**	**-R26 018 542**	**-R24 113 466**	**-R36 351 574**

Tariff and Charges: A detail seven (7) block step tariff system is implemented by Bitou Municipality. This tariff system discourages the wasteful or inefficient use of water. It is expected that this tariff structure will continue to be implemented in the future. The water usage block tariff has been structured for a basic affordable tariff for up to 30 kl per household per month. Punitive tariffs are in place for excessive water consumption and to equalise under recovery for the lower blocks. The sustainable supply of potable water is however becoming an ever increasing challenge.

The first twenty five (25) kl of water is provided free to all residential consumers. Bitou Municipality's tariffs support the viability and sustainability of water supply services to the poor through cross-subsidies (where feasible). Free basic water and sanitation services are linked to the Municipality's Indigent Policy and all indigent households therefore receive free basic water and sanitation services. This implies that either the equitable share is used to cover this cost, or higher consumption blocks are charged at a rate greater than the cost in order to generate a surplus to cross-subsidies consumers who use up to twenty five (25) kilolitres per month.

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

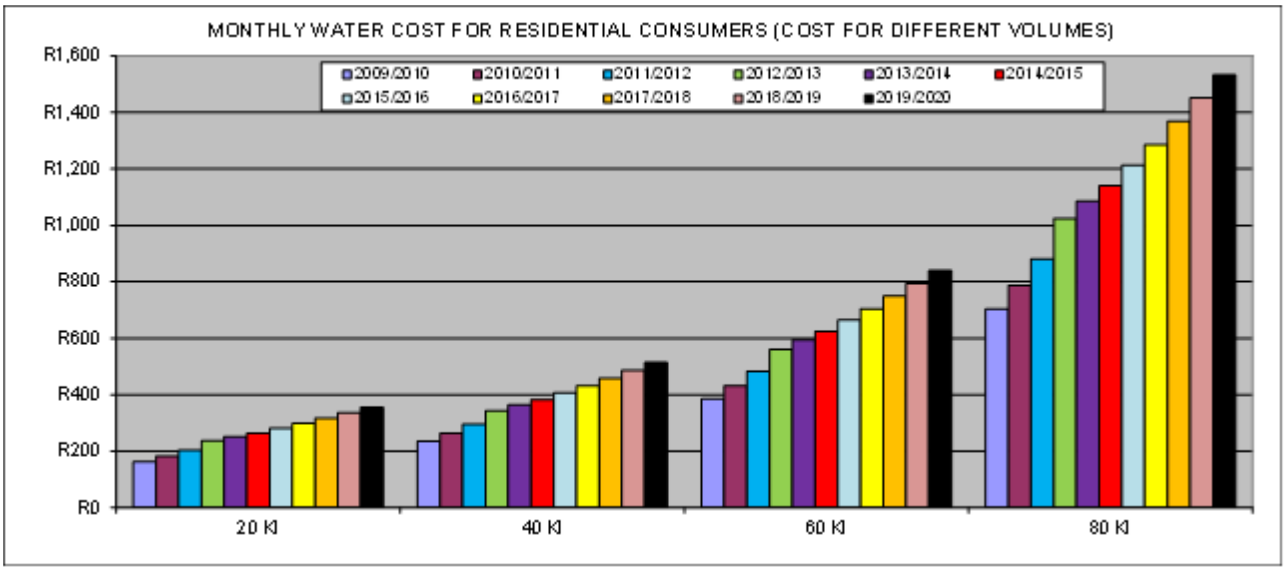


Figure A.7: Water Cost for Residential Consumers

The water tariff structures for Bitou Municipality for the 2019/2020 financial year and the previous eight financial years are summarised in the table below (Subject to VAT).

Table A.7.3: Basic Minimum Charges and Availability Charges for Water Services										
Description	**Conditions**	**Record Prior (Vat Excluded)**								**19/20**
		11/12	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	
Basic Minimum Charges										
Domestic and Churches: Per dwelling / Flat / Accommodation establishment with 3 or less bedrooms	All Areas	R204-47	R237-59	R251-85	R264-44	R281-36	R298-24	R317-33	-	-
Per Dwelling / Flat / Accommodation establishment	All Areas	-	-	-	-	-	-	R317-33	R336-37	R355-37
Domestic property valuation below R350 000 per Dwelling / Flat	Consump. 1 – 6 Kl / month	R0-00	R0-00	R0-00	R0-00	0-00	R0-00	R0-00	R0-00	R0-00
	Consump. 7 Kl or more / month	R51-12	R59-40	R62-96	R66-11	R70-34	-	-	-	-
	Rebate as % of residential on consump. of 7 Kl or more per month	-	-	-	-	0%	50%	30%	0%	0%
Shops / Offices / Accommodation establishment with 4 or more bedrooms	Per Unit	R265-81	R308-87	R327-40	R343-77	R365-77	R387-72	R412-53	R437-28	R461-99
Restaurants	Per Unit	R531-61	R67-74	R654-80	R687-54	R731-54	R775-43	R825-06	R874-56	R923-97
Industrial	Per unit	R531-61	R617-74	R654-80	R687-54	R731-54	R775-43	R825-06	R874-56	R923-97
Per Non-Profit Community Creche (On application only)	First 40 Kl water free	R212-65	R247-09	R261-92	R275-02	R292-62	R310-18	R330-03	R349-83	R369-60
Hotels / Boarding Houses	Per Unit	R265-81	R308-87	R327-40	R343-77	R365-77	R387-72	R412-53	R437-28	R461-99
Caravan Parks	Per Unit	R265-81	R308-87	R327-40	R343-77	R365-77	R387-72	R412-53	R437-28	R461-99
Schools	Per Unit	R531-61	R617-74	R654-80	R687-54	R731-54	R775-43	R825-06	R874-56	R923-97
PDI Areas	Per Unit	R212-65	R247-09	R261-92	R275-02	R292-62	R310-18	R330-03	-	-
Rural Areas	Per Unit	R265-81	R308-87	R327-40	R343-77	R365-77	R387-72	R412-53	R437-28	R461-99
Registered schools and crèches qualify for a rebate of	Rebate of	10%	10%	10%	10%	10%	10%	10%	10%	10%
Availability Charges Per Annum										
Domestic	On vacant properties	R2 453-61	R2 851-09	R3 022-00	R3 173-00	R3 376-00	R3 579-00	R3 808-00	R4 036-00	R4 264-00
Domestic: PDI Areas	On vacant properties	R613-40	R712-77	R756-00	-	-	-	-	-	-
Other Erven	On vacant properties	R6 379-38	R7 412-84	R7 858-00	R8 251-00	R8 779-00	R9 306-00	R9 902-00	R10 496-00	R11 089-00
Other PDI Areas	On vacant properties	R2 551-75	R2 965-13	R3 143-00	-	-	-	-	-	-

Table A.7.4: Volume charges for water services											
Description	**Block Definition**		**Record Prior (Vat Excluded)**								**19/20**
			11/12	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	
Domestic and Churches	0 – 25 Kl	R / Kl	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00
	26 – 30 Kl	R / Kl	R4-80	R5-58	R5-91	R6-21	R6-61	R7-01	R7-46	R7-91	R8-36
	31 – 40 Kl	R / Kl	R6-72	R7-81	R8-28	R8-69	R9-25	R9-81	R10-44	R11-07	R11-70
	41 – 50 Kl	R / Kl	R8-16	R9-48	R10-05	R10-55	R11-23	R11-90	R12-66	R13-42	R14-18
	51 – 60 Kl	R / Kl	R10-56	R12-27	R13-01	R13-66	R14-53	R15-40	R16-39	R17-37	R18-35
	61 – 70 Kl	R / Kl	R13-44	R15-62	R16-56	R17-39	R18-50	R19-61	R20-87	R22-12	R23-37
	> 70 Kl	R / Kl	R26-40	R30-68	R32-52	R34-15	R36-34	R38-52	R40-99	R43-45	R45-90
	Bulk Consumers	Rebate of	10%	10%	10%	10%	10%	10%	10%	-	-
Pre-Paid Water Meters	0 – 25 Kl	R / Kl	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00
	26 – 30 Kl	R / Kl	R4-80	R5-58	R5-91	R6-21	R6-61	R7-01	R7-46	R7-91	R8-36
	31 – 40 Kl	R / Kl	R6-72	R7-81	R8-28	R8-69	R9-25	R9-81	R10-44	R11-07	R11-70
	41 – 50 Kl	R / Kl	R8-16	R9-48	R10-05	R10-55	R11-23	R11-90	R12-66	R13-42	R14-18
	51 – 60 Kl	R / Kl	R10-56	R12-27	R13-01	R13-66	R14-53	R15-40	R16-39	R17-37	R18-35
	61 – 70 Kl	R / Kl	R13-44	R15-62	R16-56	R17-39	R18-50	R19-61	R20-87	R22-12	R23-37
	> 70 Kl	R / Kl	R26-40	R30-68	R32-52	R34-15	R36-34	R38-52	R40-99	R43-45	R45-90
Business / Commercial / Other	0 – 60 Kl	R / Kl	R6-63	R7-70	R8-16	R8-57	R9-12	R9-67	R10-29	R10-91	R11-53
	61 – 100 Kl	R / Kl	R15-01	R17-44	R18-49	R19-41	R20-65	R21-89	R23-29	R24-69	R26-08
	101 – 200 Kl	R / Kl	R17-15	R19-93	R21-13	R22-19	R23-61	R25-03	R26-63	R28-23	R29-82
	Above 200 Kl excl. Laundromats	R / Kl	R19-28	R22-40	R23-74	R24-93	R26-53	R28-12	R29-92	R31-72	R33-51
	Above 200 Kl Laundromats	R / Kl	R17-15	R19-93	R21-13	R22-19	R23-61	R25-03	R26-63	R28-23	R29-82
Rural (Without service agreement for development)	0 – 20 Kl	R / Kl	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00
	21 – 30 Kl	R / Kl	R4-80	R5-58	R5-91	R6-21	R6-61	R7-01	R7-46	R7-91	R8-36
	31 – 40 Kl	R / Kl	R8-16	R9-48	R10-05	R10-55	R11-23	R11-90	R12-66	R13-42	R14-18
	Above 40 Kl	R / Kl	R26-42	R30-70	R32-54	R34-17	R36-36	R38-54	R41-01	R43-47	R45-93
Raw Water from Municipal Boreholes	0 – 100 Kl	R / Kl	-	-	-	-	R1-00	R1-06	R1-13	R1-20	R1-27
	Above 100 Kl	R / Kl	-	-	-	-	R1-00	R1-06	R1-13	R1-20	R1-27
Beaches (Pre-paid)	Beaches	R / Kl	R8-59	R7-65	R8-11	R8-52	R9-07	R9-61	R10-23	R10-84	R11-45

Other water tariffs applicable for Bitou Municipality are summarised in the table below:

Table A.7.5: Other Water Tariffs for Bitou Municipality

Description	Conditions	Record Prior (Vat Excluded)								19/20
		11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	
Connection Fees										
Municipal Area 15 mm	Per Connection	R1 616-66	R1 697-49	R1 799-00	R1 889-00	R2 010-00	R2 131-00	R2 267-00	R2 403-00	R2 539-00
Municipal Area 20 mm	Per Connection	R1 939-99	R2 036-99	R2 159-00	R2 267-00	R2 412-00	R2 557-00	R2 721-00	R2 884-00	R3 047-00
Municipal Area 25 mm	Per Connection	R2 618-98	R2 749-93	R2 915-00	R3 061-00	R3 257-00	R3 452-00	R3 673-00	R3 893-00	R4 113-00
Municipal Area 40 mm	Per Connection	R7 856-95	R8 249-80	R8 745-00	R9 182-00	R9 770-00	R10 356-00	R11 019-00	R11 680-00	R12 340-00
Municipal Area 50 mm	Per Connection	R8 642-65	R9 074-78	R9 619-00	R10 100-00	R10 746-00	R11 391-00	R12 120-00	R12 847-00	R13 573-00
Municipal Area 80 mm	Per Connection	R9 506-91	R9 982-26	R10 581-00	R11 110-00	R11 821-00	R12 530-00	R13 332-00	R14 132-00	R14 930-00
Rural Area 20mm only	Per Connection	R2 521-99	R2 648-08	R2 807-00	R2 947-00	R3 136-00	R3 324-00	R3 537-00	R3 749-00	R3 961-00
Non Standard Connections		Cost plus 10%								
Minimum Charge	Per Connection	R3 666-58	R3 849-91	R4 081-00	R4 285-00	R4 559-00	R4 833-00	R5 142-00	R5 451-00	R5 759-00
Other Fees										
Dis and Reconnections due to non-payment – All Areas	Per Incident	R266-00	R279-30	R293-00	R308-00	R328-00	R348-00	R370-00	R392-00	R416-00
Special Readings – All Areas		R217-00	R227-85	R242-00	R254-00	R270-00	R286-00	R304-00	R322-00	R340-00
Sale of water by tanker – Collected at Depot	Per Kl	R4-00	R4-50	R7-60	R7-98	R8-49	R9-00	R9-58	R10-15	R10-72
Delivery of water by Tanker	Per Kl	R8-62	R17-00	R18-02	R18-92	R20-13	R21-34	R22-71	R24-07	R25-43
	Per Tanker of part thereof	R366-74	R382-00	R405-00	R425-00	R452-00	R479-00	R510-00	R541-00	R572-00
Filling of Swimming Pools from Hydrant	Per Kl	R8-62	Invoice / Quote							
	Per Tanker of part thereof	R366-74								
Service Calls – Normal Working Hours	Town	R217-00	R227-85	R242-00	R254-00	R270-00	R286-00	R304-00	R322-00	R340-00
	Rural	R294-00	R308-70	R327-00	R343-00	R365-00	R387-00	R412-00	R437-00	R462-00
Service Calls – Outside Normal Working Hours	Town	150% of Above	R341-78	R362-00	R381-00	R405-00	R429-00	R456-00	R483-00	R510-00
	Rural	150% of Above	R463-05	R491-00	R515-00	R548-00	R581-00	R618-00	R656-00	R693-00
Service Calls – Sundays and Public Holidays	Town	200% of Above	R455-70	R483-00	R508-00	R540-00	R572-00	R608-00	R644-00	R680-00
	Rural	200% of Above	R617-40	R654-00	R686-00	R730-00	R774-00	R824-00	R874-00	R924-00
Test of water meter		R176-18	R184-98	R196-00	R206-00	R219-00	R232-00	R247-00	Cost + 10%	Cost + 10%
Temporary dis / reconnection		R217-00	R227-85	R242-00	R254-00	R270-00	R286-00	R304-00	R322-00	R340-00

Table A.7.5: Other Water Tariffs for Bitou Municipality										
Description	**Conditions**	**Record Prior (Vat Excluded)**								**19/20**
		11/12	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	
Tampering with meter	Payable before replacement	R2 131-36	R2 237-93	R2 372-00	R2 491-00	R2 650-00	R2 809-00	R2 989-00	R3 168-00	R3 347-00
Surcharge inaccessible meter	Per incident	-	-	R285-00	R299-00	R318-00	R337-00	R359-00	R500-00	R500-00
Relocation of water meters		-	-	Cost + 10%						
Penalty for illegal water connection	Per Incident	-	-	R7 854-00	R8 247-00	R8 775-00	R9 302-00	R9 897-00	R10 491-00	R11 084-00
Water Tests Chemical analysis	Per Sample	R369-60	R388-08	R411-00	R432-00	R460-00	R488-00	R519-00	R550-00	R850-00
Water Tests Bacteriological, E.Coli, Coliforms	Per Sample	R98-56	R103-49	R110-00	R116-00	R123-00	R130-00	R138-00	R146-00	R200-00
Penalty for late payment		Prime + 1%								
Augmentation Fees		See Municipality's Tariffs Schedule								

The Drought Tariffs for the supply of water for the last seven financial years are as follows:

Table A.7.6: Tariffs for Drought Situations									
Block		**Conditions**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**
Drought Situation Stage 1: The Tariff will only be applied if the Roodefontein Dam is at volume 80%-60%. No penalty will be charged.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	R377-77	R396-66	R422-05	R298-24	R317-33	-	-
Consumption Charge (Domestic and Churches)	26 – 30 kl	R / kl	R8-87	R9-31	R9-91	R10-50	R11-17	-	-
	31 – 40 kl	R / kl	R12-41	R13-03	R13-86	R14-69	R15-63	-	-
	41 – 50 kl	R / kl	R15-07	R15-82	R16-83	R17-84	R18-98	-	-
	51 – 60 kl	R / kl	R19-51	R20-49	R21-80	R23-11	R24-59	-	-
	61 – 70 kl	R / kl	R24-84	R26-08	R27-75	R29-42	R31-30	-	-
	Above 70 kl	R / kl	R48-78	R51-22	R54-50	R57-77	R61-47	-	-
Rural (Without service agreement for development)	0 – 20 kl	R / kl	-	-	-	R0-00	R0-00	-	-
	21 – 30 kl	R / kl	-	-	-	R10-50	R11-17	-	-
	31 – 40 kl	R / kl	-	-	-	R17-84	R18-98	-	-
	Above 40 kl	R / kl	-	-	-	R57-77	R61-47	-	-
Drought Situation Stage 2: These tariffs would only be applied if either the Roodefontein Dam is at 40% or the flow of the Keurbooms River is at 400 l/s and when water consumption is more than 20 kl/month.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	R503-69	R528-87	R562-72	R298-24	R317-33	R336-37	R355-37
	Incentive Rebate	All Areas	-	-	-	R35-05	R37-29	R39-53	R41-76
Consumption Charge (Domestic and Churches)	21 – 30 KL	R / KL	-	-	-	R13-89	R14-78	R15-67	R16-56
	26 – 30 kl	R / kl	R11-84	R12-43	R13-23	-	-	-	-
	31 – 40 kl	R / kl	R16-57	R17-40	R18-51	R19-62	R20-88	R22-13	R23-38

Table A.7.6: Tariffs for Drought Situations									
Block		**Conditions**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**
	41 – 50 kl	R / kl	R20-12	R21-13	R22-48	R23-83	R25-36	R26-88	R28-40
	51 – 60 kl	R / kl	R26-04	R27-34	R29-09	R30-84	R32-81	R34-78	R36-75
	61 – 70 kl	R / kl	R33-15	R34-81	R37-04	R39-26	R41-77	R44-28	R46-78
	Above 70 kl	R / kl	R65-11	R68-37	R72-75	R77-12	R82-06	R86-98	R91-89
Rural (Without service agreement for development)	0 – 20 kl	R / kl	-	-	-	R0-00	R0-00	R0-00	R0-00
	21 – 30 kl	R / kl	-	-	-	R13-89	R14-78	R15-67	R16-56
	31 – 40 kl	R / kl	-	-	-	R23-83	R25-36	R26-88	R28-40
	Above 40 kl	R / kl	-	-	-	R77-12	R82-06	R86-98	R91-89
Drought Situation Stage 3: These tariffs would only be applied if either the Roodefontein Dam is at 25% or the flow of the Keurbooms River is at 300 l/s and when water consumption is more than 15 kl/month.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	R755-54	R793-32	R844-09	R298-24	R317-33	R336-37	R355-37
	Incentive Rebate	All Areas	-	-	-	-	R74-59	R79-07	R83-54
Consumption Charge (Domestic and Churches)	16 – 30 KL	R / KL	-	-	-	R20-81	R22-14	R23-47	R24-80
	26 – 30 kl	R / kl	R17-74	R18-63	R19-82	-	-	-	-
	31 – 40 kl	R / kl	R24-85	R26-09	R27-76	R29-43	R31-31	R33-19	R35-07
	41 – 50 kl	R / kl	R30-18	R31-69	R33-72	R35-74	R38-03	R40-31	R42-59
	51 – 60 kl	R / kl	R39-05	R41-00	R43-62	R46-24	R49-20	R52-15	R55-10
	61 – 70 kl	R / kl	R49-69	R52-17	R55-51	R58-84	R62-61	R66-37	R70-12
	Above 70 kl	R / kl	R97-62	R102-50	R109-06	R115-60	R123-00	R130-38	R137-75
Rural (Without service agreement for development)	0 – 15 kl	R / kl	-	-	-	R0-00	R0-00	R0-00	R0-00
	16 – 30 kl	R / kl	-	-	-	R20-81	R22-14	R23-47	R24-80
	31 – 40 kl	R / kl	-	-	-	R35-74	R38-03	R40-31	R42-59
	Above 40 kl	R / kl	-	-	-	R115-60	R123-00	R130-38	R137-75
Drought Situation Stage 4: These tariffs would only be applied if the Roodefontein Dam is at 35% - 21% on consumption greater than 15 kilolitre per month per household connection.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	-	-	-	-	-	R476-00	R502-89
	Incentive Rebate	All Areas	-	-	-	-	-	R111-89	R118-21
Consumption Charge (Domestic and Churches)	16 – 30 kl	R / KL	-	-	-	-	-	R33-21	R35-09
	31 – 40 kl	R / kl	-	-	-	-	-	R46-97	R49-62
	41 – 50 kl	R / kl	-	-	-	-	-	R57-05	R60-27
	51 – 60 kl	R / kl	-	-	-	-	-	R73-80	R77-97
	61 – 70 kl	R / kl	-	-	-	-	-	R93-92	R99-23
	Above 70 kl	R / kl	-	-	-	-	-	R184-50	R194-92
Rural (Without service agreement for development)	0 – 15 kl	R / kl	-	-	-	-	-	R0-00	R0-00
	16 – 30 kl	R / kl	-	-	-	-	-	R33-21	R35-09
	31 – 40 kl	R / kl	-	-	-	-	-	R57-05	R60-27
	Above 40 kl	R / kl	-	-	-	-	-	R184-50	R194-92

Table A.7.6: Tariffs for Drought Situations									
Block		**Conditions**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**
Drought Situation Stage 5: These tariffs would only be applied if the Roodefontein Dam is less than 20% on consumption greater than 15 kilolitre per month per household connection.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	-	-	-	-	-	R714-00	R754-34
	Incentive Rebate	All Areas	-	-	-	-	-	R167-84	R177-32
Consumption Charge (Domestic and Churches)	16 – 30 KL	R / KL	-	-	-	-	-	R49-82	R52-63
	31 – 40 kl	R / kl	-	-	-	-	-	R70-46	R74-44
	41 – 50 kl	R / kl	-	-	-	-	-	R85-58	R90-42
	51 – 60 kl	R / kl	-	-	-	-	-	R110-70	R116-95
	61 – 70 kl	R / kl	-	-	-	-	-	R140-85	R148-81
	Above 70 kl	R / kl	-	-	-	-	-	R276-75	R292-39
Rural (Without service agreement for development)	0 – 15 kl	R / kl	-	-	-	-	-	R0-00	R0-00
	16 – 30 kl	R / kl	-	-	-	-	-	R49-82	R52-63
	31 – 40 kl	R / kl	-	-	-	-	-	R85-58	R90-42
	Above 40 kl	R / kl	-	-	-	-	-	R276-76	R292-40

The sewerage tariff structures for Bitou Municipality for the 2019/2020 financial year and the previous eight financial years are summarised in the tables below (Subject to VAT).

Table A.7.7: Basic Minimum Charges and Availability Charges for Sanitation Services										
Description	**Conditions**	**Record Prior (Vat Excluded)**								**19/20**
		11/12	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	
Basic Minimum Charge										
Single residential erven and Churches	Per Annum / per Unit	R3 007-00	R3 494-00	R3 718-00	R3 904-00	R4 169-00	R4 419-00	R4 702-00	R4 984-00	R5 266-00
General Residential, Shops, Offices, Hotels, including accommodation establishments	Per Annum	R4 623-00	R5 372-00	R5 716-00	R6 002-00	R6 410-00	R6 795-00	R7 230-00	R7 664-00	R8 097-00
Single residential properties utilised for business purposes, etc.	Per Unit or Equivalent / Per Annum	R6 010-00	R6 984-00	R7 431-00	R7 803-00	R8 334-00	R8 834-00	R9 399-00	R9 963-00	R10 526-00
Residential property valuation below R350 000	Per Annum	R841-96	R978-36	R1 041-00	Rebate as % of residential (70%)	Rebate as % of residential (50%)	Rebate as % of residential (30%)	Rebate as % of residential (15%)	Rebate as % of residential (0.0%)	Rebate as % of residential (0.0%)
Restaurants	Per Unit or Equivalent / Per Annum	R6 010-00	R6 984-00	R7 431-00	R7 803-00	R8 334-00	R8 834-00	R9 399-00	R9 963-00	R10 526-00
Bulk Consumers	Rebate of	10%	10%	10%	10%	10%	10%	10%	0%	0%

Table A.7.7: Basic Minimum Charges and Availability Charges for Sanitation Services										
Description	Conditions	Record Prior (Vat Excluded)								19/20
		11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	
Schools (31 May each year)	Per learner per annum	R8-00	R9-30	R9-90	R10-40	R11-11	R11-78	R12-53	R13-28	R14-00
Hostels (31 May each year)	Per learner per annum	R8-00	R9-30	R9-90	R10-40	R11-11	R11-78	R12-53	R13-28	R14-00
Group Housing and Resort Zones	Per unit per annum	R3 007-00	R3 494-00	R3 718-00	R3 904-00	R4 169-00	R4 419-00	R4 702-00	R4 984-00	R5 266-00
Registered schools and crèches qualify for a rebate of:	Rebate of	10%	10%	10%	10%	10%	10%	10%	10%	10%
Sanitation Fee per Erf										
Improved properties not served by waterborne sewerage irrespective if service is utilised	Per Annum	R1 175-00	R1 365-00	R1 452-00	R1 525-00	R1 629-00	R1 727-00	R1 838-00	R1 948-00	R2 065-00
Availability Charge Per Annum										
Single residential erven	Vacant Properties	R3 007-00	R3 494-00	R3 718-00	R3 904-00	R4 169-00	R4 419-00	R4 702-00	R4 984-00	R5 266-00
Light industrial erven	Vacant Properties	R3 007-00	R3 494-00	R3 718-00	R3 904-00	R4 169-00	R4 419-00	R4 702-00	R4 984-00	R5 266-00
Other	Vacant Properties	R6 014-00	R6 988-00	R7 435-00	R7 807-00	R8 338-00	R8 838-00	R9 404-00	R9 968-00	R10 531-00

Table A.7.8: Volume Charges for Sanitation Services										
Description	Block Definition	Record Prior (Vat Excluded)								19/20
		11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	
Septic Tank Removals (Normal Working Hours)										
Tanker Removals	Per load or part thereof	R277-00	R322-00	R343-00	R360-00	R384-00	R407-00	R433-00	R459-00	R485-00
Tanker Removals per load or part thereof	Where no annual fee is paid	R695-00	R808-00	R860-00	R903-00	R964-00	R1 022-00	R1 087-00	R1 152-00	R1 217-00
Tanker Removals – Sub-economic	Per load or part thereof	R369-00	R429-00	R456-00	R479-00	R512-00	R543-00	R578-00	R613-00	R648-00
Septic Tank Removals (Outside Normal Working Hours)										
Tanker Removals	Per load or part thereof	150% Normal Rate	R483-00	R514-00	R540-00	R576-00	R611-00	R650-00	R689-00	R728-00
Tanker Removals per load or part thereof	Where no annual fee is paid		R1 212-00	R1 290-00	R1 355-00	R1 446-00	R1 533-00	R1 631-00	R1 728-00	R1 826-00
Tanker Removals – Sub-economic	Per load or part thereof		R643-50	R685-00	R719-00	R768-00	R815-00	R867-00	R920-00	R972-00
Septic Tank Removals (Sundays and Public Holidays)										
Tanker Removals	Per load or part thereof	200% Normal Rate	R644-00	R685-00	R720-00	R768-00	R814-00	R866-00	R918-00	R970-00
Tanker Removals per load or part thereof	Where no annual fee is paid		R1 616-00	R1 719-00	R1 806-00	R1 928-00	R2 044-00	R2 174-00	R2 304-00	R2 434-00

Table A.7.8: Volume Charges for Sanitation Services										
Description	**Block Definition**	**Record Prior (Vat Excluded)**								**19/20**
		11/12	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	
Tanker Removals – Sub-economic	Per load or part thereof		R858-00	R913-00	R958-00	R1 024-00	R1 086-00	R1 156-00	R1 226-00	R1 296-00
Night Soil (Per Bucket)										
Dwellings / Shops / Churches / Schools	Per month	R37-00	R43-00	R45-75	R48-04	R51-31	R54-39	R57-87	-	-

Other sanitation tariffs applicable for Bitou Municipality are summarised in the table below:

Table A.7.9: Other Sanitation Tariffs for Bitou Municipality										
Description	**Conditions**	**Record Prior (Vat Excluded)**								**19/20**
		11/12	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	
Dumping at WWTW										
Per load or part thereof or < 5000 litres	Per Month	R866-25	R909-56	R968-00	R1 016-00	R1 085-00	R1 150-00	R1 224-00	R1 297-00	R1 370-00
Per single load > 5000 litres	Per Load	R275-00	R288-75	R307-00	R322-00	R344-00	R365-00	R388-00	R411-00	R434-00
Connection Fees										
Connection at existing Municipal point	Single Residential	R1 868-00	R1 961-40	R2 087-00	R2 191-00	R2 340-00	R2 480-00	R2 639-00	R2 797-00	R2 955-00
	Other	R5 492-00	R5 766-60	R6 136-00	R6 443-00	R6 881-00	R7 294-00	R7 761-00	R8 227-00	R8 692-00
Connection at different or additional point	Single Residential	R1 868-00	R1 961-40	R2 087-00	R2 191-00	R2 340-00	R2 480-00	R2 639-00	R2 797-00	R2 955-00
	Other	R5 492-00	R5 766-60	R6 136-00	R6 443-00	R6 881-00	R7 294-00	R7 761-00	R8 227-00	R8 692-00
Other Sanitation Tariffs										
Payable on late payment of an account		Prime + 1%								
Augmentation Fees		See Municipality's Tariffs Schedule								

Metering, Billing and Income: Installing meters and implementing an adequate billing system is central to managing services effectively and building a relationship of understanding and trust between the provider and consumer. The information below provides an indication of the estimated number of erven and units in each area that is currently not metered, as calculated from the Swift data of November 2019.

Table A.7.10: Estimated Number of Unmetered Erven and Units (November 2019 data)

Area as per Treasury Data	Number of Erven	Number of Units	Estimated AADD (kl/d)
Green Valley	3	3	2.25
Keurboomstrand	69	69	68.7
Kranshoek	186	187	91.9
Kurland	77	77	41.0
Kwanokuthula	344	344	159.1
Natures Valley	2	2	1.6
New Horizon	139	139	60.8
Plettenberg Bay	447	496	481.7
No record in Treasury	31	31	0
Wittedrift	6	6	4.3
Total	**1 304**	**1 354**	**911.35**

TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

Bitou Municipality is the WSA and Water Services Provider for the various towns in Bitou Municipality's Management Area. A By-law relating to Water Supply, Sanitation Services and Industrial Effluent is in place and available on the municipality's website

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.

The Top Layer SDBIP is used as a scorecard to measure, monitor, evaluate and report on institutional performance (monthly, quarterly, bi-annual and annual basis). The Departmental SDBIP measures the performance of the departments and performance agreements and plans are used to measure the performance of employees. Performance is reported on a regular basis and it includes the evaluation of performance, the identification of poor performance and corrective actions to improve performance.

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.

The Municipality regularly review their Organogram in order to ensure that the number of Process Controllers per WTW and WWTW is in-line with DWS's requirements for Process Controllers per Class of plant. Submissions for the re-classification of Process Controllers, after specific training courses were completed, are also regularly loaded onto the IRIS.

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

The Municipality had 632 budgeted positions for the 2018/2019 financial year. 82 Budgeted posts were vacant at the end of 2018/2019, resulting in a vacancy rate of 13.0%. A total number of 550 positions are filled of which 546 are permanent and 4 positions temporarily (2018/2019 Annual Report).

Table A.8.1: Vacancies within the Municipality			
Post Level	**Per Post Level Filled**	**Vacant Number**	**Vacant %**
MM & MSA section 57 & 56	6	0	0%
Middle Management (T14-T19)	41	3	6.8%
Admin Officers (T4-T13)	390	43	9.9%
General Workers (T3)	113	36	24.2%
Total	**550**	**82**	**13.0%**
Functional Area	**Per Functional Level Filled**	**Vacant Number**	**Vacant %**
Municipal Manager	27	8	22.9%
Corporate Services	48	5	9.4%
Financial Services	62	10	13.9%
Community Services	245	31	11.2%
Municipal Services and Infrastructure Development	144	22	13.3%
Planning and Strategic Services	24	6	20.0%
Total	**550**	**82**	**13.0%**

Bitou Municipality is currently effectively managing their water and sanitation services. Special focus is however required to ensure adequate rehabilitation and maintenance of the existing water and sewerage infrastructure.

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

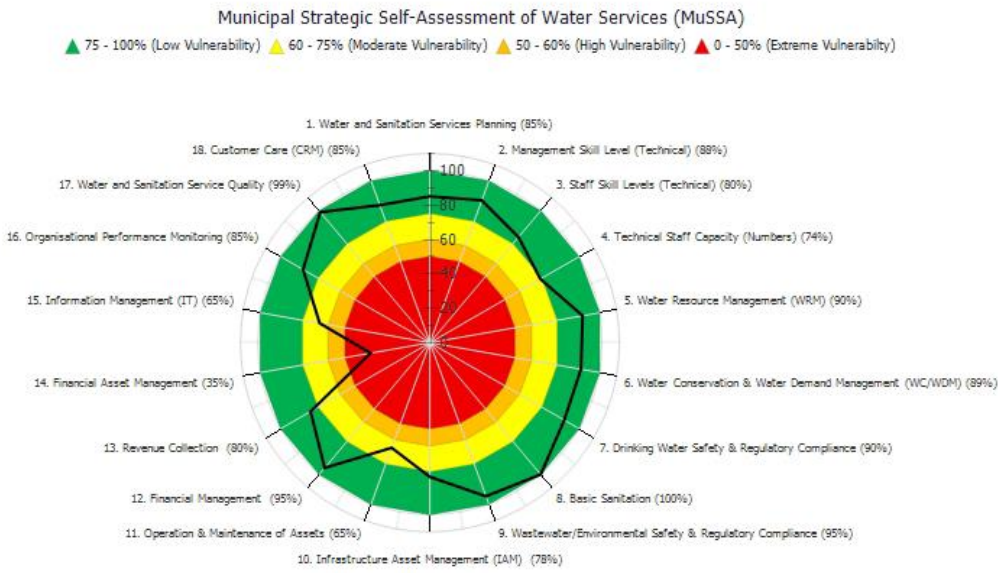


Figure A.8.1: Spider Diagram of the Vulnerability Levels of Bitou Municipality for 2019

Bitou Municipality's Vulnerability Index for 2019 was indicated as 0.27 "Moderate Vulnerability". The area of concern evident from the 2019 assessment is: Financial Asset Management (35.0%).

A comprehensive Customer Services and Complaints management system is in place at Bitou 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 Communication Strategy is also in place and the additional communication channels utilised by Bitou Municipality include Facebook, Twitter and SMS.

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 Bitou Municipality is summarised as follows in the DWS's 2014 Blue Drop Report (last assessment):

Table A.8.2: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)

Municipal Blue Drop Score	2011 – 96.12%, 2012 – 97.74%, 2014 – 90.44%

Regulatory Impression: The Bitou Local Municipality team was well prepared and demonstrated their commitment to the Blue Drop assessment and water quality excellence. A decreased Municipal Score was however achieved with lower scores for all systems. The reason for the observed decrease in compliance includes:

- Monitoring programmes uploaded to the BDS did not include a WTW final water sampling point as required to comply with the requirements of SANS 241.
- Compliance monitoring data uploaded to the BDS did not include results for both final water and the network for the Nature's Valley and Kurland systems, and chemical determinants were not monitored in the network in the Plettenberg Bay system. The limited number of chemical determinants being tested was highlighted as an issue of concern in the previous Blue Drop report.
- Municipal budgets and costs were available only at a municipal level and not system specific.
- Water balance data needs verification to enable the correct calculation of the water loss indicators for No Drop compliance.

It is anticipated that with the commitment to the Blue Drop programme that the municipal team will ensure that the identified gaps are addressed and that an upward trend towards compliance will once again be achieved.

Performance Area	Kurland	Natures Valley	Plettenberg Bay
Water Safety Planning	**33.43**	**33.43**	**33.43**
Treatment Process Management	**6.80**	**8.00**	**8.00**
DWQ Compliance	**15.00**	**15.00**	**23.25**
Management, Accountability	**8.50**	**8.50**	**8.50**
Asset Management	**11.48**	**12.74**	**12.74**
Use Efficiency, Loss Management	**2.18**	**2.18**	**2.18**
Bonus Scores	4.58	3.78	2.77
Penalties	0.00	0.00	0.00
Blue Drop Score (2014)	**81.96%**	**83.62%**	**90.86%**
Blue Drop Score (2012)	97.4%	97.8%	97.8%
Blue Drop Score (2011)	95.0%	95.0%	96.2%
System Design Capacity (Ml/d)	0.6	0.0	22.0
Operational Capacity (% i.t.o. Design)	75%	30%	41%
Average daily consumption (l/p/d)	180.0	2.0	252.8
Microbiological Compliance (%)	**99.9%**	**99.9%**	**99.9%**
Chemical Compliance (%)	**99.9%**	**99.9%**	**96.1%**

Table A.8.3: DWS's 2014 Blue Drop Risk Profile Progress Report results for Bitou Municipality			
Municipal Blue Drop Risk Rating			
The overall 2014 Risk Rating for Bitou is 16% which translates into the best performance in the Western Cape. Note that this value is based on the 3 specific areas indicated below and shows no concerns (medium to critical risks) for Process Control (which risks reflect compliance in terms of draft Regulation 813), Drinking Water Quality and Risk Management in any of the 3 systems.			
Assessment Area	**Kurland**	**Natures Valley**	**Plettenberg Bay**
2014			
Blue Drop Risk Rating (2014)	**21.7%**	**21.7%**	**15.8%**
Process Control RR	33.3%	33.3%	28.2%
Drinking Water Quality RR	40.7%	40.7%	40.7%
Risk Management RR	21.7%	21.7%	21.7%
2013			
Blue Drop Risk Rating (2013)	**29.9%**	**36.9%**	**19.1%**
Process Control RR	41.0%	48.7%	33.3%
Drinking Water Quality RR	18.5%	11.1%	11.1%
Risk Management RR	39.1%	39.1%	39.1%
2012			
Blue Drop Risk Rating (2012)	**72.1%**	**72.1%**	**72.1%**
Process Control RR	79.5%	79.5%	79.5%
Drinking Water Quality RR	11.1%	11.1%	11.1%
Risk Management RR	13.0%	13.0%	13.0%

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

Table A.8.4: Average Daily Consumption (l/p/d) for the Last Four Financial Years						
Distribution System	**2018/2019**			**2017/2018**		
	Estimated Permanent Population	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily consumption (l/p/d)**	**Estimated Permanent Population**	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily consumption (l/p/d)**
Plettenberg Bay	57 395	5 929	**103**	54 454	5 501	**101**
Kurland	5 306	300	**57**	5 102	358	**70**
Natures Valley	605	110	**182**	582	103	**177**
Distribution System	**2016/2017**			**2015/2016**		
	Estimated Permanent Population	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily consumption (l/p/d)**	**Estimated Permanent Population**	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily consumption (l/p/d)**
Plettenberg Bay	51 664	5 993	**116**	49 017	5 299	**108**
Kurland	4 906	335	**68**	4 717	337	**71**
Natures Valley	560	120	**214**	538	113	**210**

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 Bitou 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 – 78.00%, 2011 – 96.40%, 2013 – 98.82%**
Regulatory Impression: The Bitou Municipality is on peak form and once again did not fail to confirm their position as one of the top performers in the South African wastewater industry. To maintain a score of 96.4% is no small feat, yet the Bitou team managed to further improve to a municipal Green Drop score of 98.8%, supported by two Green Drop Certificates (>98%). The Regulator has appreciation for the WSA's consistency, the team's discipline, supported by first-rate preparations in having appropriate and high quality evidence in place for auditing. The presence of the Technical Director during the entire assessment represents the tenure in best management that sets a benchmark for managers across the country. Notably is the municipality's concerted effort to ensure that shortcomings had been addressed since 2011. The W_2RAP is a 'home-grown' process and the	

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

product of in-house preparation, drafting and implementation by the very team who earned this 2013 Green Drop Certification. The document displays the knowledge and practical application approach that is a trademark of this edge-cutting municipality.

The excellent Green Drop score is equally reflected in the low CRR risk rating of 22 and 35% for both systems. In addition, it is worth mention that both site inspections resulted in 99% and 100% scores. The Regulator acknowledges Bitou for its top performing team at the edge of their discipline, extremely proud of their work and truly making a difference in their town

Green Drop findings:

1. Fractional scores were lost as both systems do not have sufficient stormwater ingress management plans and proof of implementation.
2. Gansevlei lost fractional scores for enforcement of bylaws (presentation of package plants enforcement) and Regulation 17 (Class II instead of Class III compliance)
3. Fractional scores subtracted for ring-fenced budget expenditure not compared to best practice expenditure (5-8% of budget to repairs and maintenance).

Site Inspection Report:

Gansevlei (Plettenberg Bay) WWTW 99%

Kurland WWTW 100%

Two plants were inspected to verify the Green Drop findings:

- The inspectors commented as follow:
  - "we could not fault any of the two plants...";
  - "the wastewater treatment facilities of Bitou surpass any of the drinking water plants inspected recently...";
  - "the plants have not been cleaned in anticipation of the inspections, this is standard practice every day running the plant...".
- The Gansevlei WWTW received a partial score for one safety contravention, namely the guards on the wheels of one of the clarifiers had been removed for galvanising. No temporary additional sign was displayed to warn of the added danger. A piece of rectagrid over one of the screen channels had also been removed and no danger tape had been put between the handrails. The screenings conveyer belt rollers were not guarded.
- Apart from the above, the Gansevlei plant complied with all criteria of the inspection scorecard. The Kurland plant complied 100% with all criteria. The following highlights are reported:
  - Flow and electricity metering taken; all process control monitoring conducted.
  - Manual, drawings, flow diagrams, incident management protocols, etc. in place and plant and staff certificates displayed.
  - The plant and surroundings are impressive, neat and tidy and the staff is happy in their setting.
  - Screenings and grit removed and measures, covered with sand to control odours.
  - Pump stations have warning system for pump failures, all equipment calibrated.
  - The activated sludge plant is well maintained and operated; no fault could be found. Most impressive is the process knowledge and the cooperation between the laboratory and plant staff.
  - Residual chlorine measured to remain at 0.2 mg/l and increase to with 0.8 mg/l when rain events occur to counter for upstream pollution from informal settlements.

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

GREEN DROP REPORT CARD		
Key Performance Area	**Plettenberg Bay (Gansevlei)**	**Kurland**
Process Control, Maintenance and Management Skill	**96**	**100**
Monitoring Programme	**100**	**100**
Submission of Results	**100**	**100**
Effluent Quality Compliance	**100**	**100**
Risk Management	**100**	**100**
Local Regulation	**88**	**100**
Treatment Capacity	**100**	**100**
Asset Management	**95**	**95**
Bonus Scores	1.19	0.86
Penalties	0.00	0.00
Green Drop Score (2013)	**98.77%**	**99.45%**
Green Drop Score (2011)	**96.50%**	**96.10%**
Green Drop Score (2009)	**79.00%**	**77.50%**
System Design Capacity (Ml/d)	9.000	0.650
Capacity Utilisation (% ADWF i.t.o. Design Capacity)	46.10%	36.92%
Resource Discharged into	Bitou River into Keurbooms Estuary	Salt River
Microbiological Compliance	100.00%	100.00%
Chemical Compliance	99.19%	99.07%
Physical Compliance	98.12%	99.07%
Overall Compliance	98.81%	99.18%

Table A.8.5: Green Drop Performance of the Municipality (DWS's 2013 Green Drop Report)		
GREEN DROP REPORT CARD		
Key Performance Area	**Plettenberg Bay (Gansevlei)**	**Kurland**
Wastewater Risk Rating (2012)	**22.70%**	**17.60%**
Wastewater Risk Rating (2013)	**22.73%**	**35.29%**

The 2014 Green Drop 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 compared 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 Bitou 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 Bitou Municipality		
Technology Description	**Kurland**	**Plettenberg Bay (Gansevlei)**
Technology (Liquid)	Activated sludge	Activated sludge
Technology (Sludge)	Sludge lagoon/pond	Sludge lagoon/pond
Key Risk Areas		
ADWF Design Capacity (Ml/d)	0.65	9
Operational flow (% of Design Capacity)	26%	30%
Annual Average Effluent Quality Compliance (2012-2013)	**97.9%**	**99.0%**
Microbiological Compliance (%)	**100.0%**	**100.0%**
Physical Compliance (%)	**98.1%**	**99.8%**
Chemical Compliance (%)	**97.2%**	**98.1%**
Technical skills (Reg 813)	Yes	Yes
2014 Wastewater Risk Rating (%CRR/CRR$_{max}$)	**17.6%**	**22.7%**
2013 Wastewater Risk Rating (%CRR/CRR$_{max}$)	**35.3%**	**22.7%**
Risk Abatement Planning		
Highest Risk Areas based on the CRR	None	None
WW Risk Abatement Status	Final document plus implementation	Final document plus implementation
Capital & Refurbishment expenditure for Fin Year 2012-2013 (Rand)	None specified	R0,439m
Description of Projects' Expenditure 2012-2013	Replace floating Aerator, Install Kurland Sewer Pump station 3 services link to Housing	Platform 75 kW aerator, services link to housing, relocation of pump station 1,1A. The latter two projects are in the process
W$_2$RAP Abatement Document and Status Commentary	W2RAPs were provided for the 2 wastewater systems dated 2012/13, approved by Municipal Manager. No indication of multi-disciplinary team involved in development and implementation. Wastewater systems described, existing system assessed - general comments regarding systems stated. Specific hazard assessment done for catchment (Wit River catchment) and improvement plan provided for all priorities. Three high risks identified. General comments made on sewage pump stations and plants as well as control measures. Specific hazard assessment then done (with hazard risk matrix). >90 risks identified for Gansevlei plant and >80 for Kurland. Four high risks identified for Gansevlei before mitigation. All residual risks low. Risks are identified for screenings, degritting, inflow metering, anaerobic zone, disinfection, wastewater monitoring, human resources, management, etc. Six high risks identified for Kurland before mitigation. All residual risks low. Monitoring included in control measures. Measurement and evaluation of wastewater quality included in control measures. Appears as if W$_2$RAP is effective and meets health and environmental based targets. Management procedures and support programmes included. Sections included on incident alert levels and notifications as well as an emergency protocol . Commendable work by the municipality.	

Regulatory Impression

Bitou Municipality continues to perform excellently in managing their wastewater systems. During the Green Drop assessment (2013), both systems achieved well beyond the 90% benchmark and the Municipality is competing amongst the best performing municipalities in South Africa. This is a feat that requires great

competency, care and wilful planning and should be safeguarded at all cost in the future. The Municipality is congratulated for their accomplished contribution to wastewater management in South Africa.

It is often difficult to show further progress once a state of excellence has already been achieved. However, Bitou shows in the present 2014 Green Drop Performance Progress Assessment an even further reduction in the Wastewater Risk Rating for Kurland, whist Plettenberg Bay (Gansevlei) remained constant. The latter is mainly due to not all the required process controller competency being available at the plant during all the shifts worked. The Municipality should aim to improve the situation. Wastewater quality discharged at both works remains excellent, while sufficient wastewater treatment capacity is available.

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 23rd of October 2017. This WSDP is Bitou Municipality's new WSDP according to DWS's requirements.

Bitou 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 Bitou Municipality's Annual Report. The 2018/2019 WSDP Performance- and Water Services Audit Report was taken to Council as part of the Municipality's Annual Report.

Bitou Municipality's Water and Sewer Master Plan process entails the establishment of computer models for the water systems and the sewer systems in Bitou 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 Bitou Municipality's water distribution and sewer drainage systems. The existing Water and Sewer Master Plans of Bitou Municipality were updated during 2019/2020 and were incorporated into the WSDP. All forward planning for water and sanitation services and water and sewerage infrastructure is guided by the Water and Sewer Master Plans.

Water Safety Plans are in place for the various water distribution systems and a W_2RAP for the WWTWs and the sewer drainage areas.

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

The W_2RAP is an all-inclusive risk analysis tool by which risks associated with the management of collection, treatment and disposal of wastewater are identified and rated (quantified). The W_2RAP is used by Bitou Municipality to manage the identified risks according to its potential impacts on the receiving environment / community / resources.

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

- Water Master Plan, Bitou Municipality, June 2020, GLS Consulting
- Sewer Master Plan, Bitou Municipality, June 2020, GLS Consulting

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 Bitou Municipality are as follows:

Vision: "To be the best together "

Mission: "We partner with communities and stakeholders to sustainably deliver quality services so that everyone in Bitou can live and prosper together"

The **strategic priorities** of Bitou Municipality are as follows:

- Excellence in service delivery;
- Leveraging tourism development;
- Improvement of basic service delivery to informal settlements and the poor;
- Embracing technology to facilitate development and progress;
- Create and enabling environment where all people can be included;
- Effective and efficient utilization of resources;
- Improvement of safety for all communities; and
- Institutional and financial sustainability.

The seven **Key Performance Areas** of Bitou Municipality and the **Strategic Objectives** for each of the seven KPA's are as follows:

- (KPA 1) Strategic Planning for Transformation;
  - Spatially integrate areas separated by apartheid; promote access for poor to work, recreational and commercial opportunities.
- (KPA 2) Economic Development;
  - Grow the local economy, create jobs, empower previously disadvantaged, and transform ownership patterns. Economic development of local economy.
- (KPA 3) Community and Social Development;
  - Eradicate poverty and uplift previously disadvantaged communities, promote social cohesion.
- (KPA 4) Infrastructure Development;
  - Provision of basic services.
- (KPA 5) Institutional Development;
  - Build a capable, corruption-free administration that is able to deliver on developmental mandate.
- (KPA 6) Financial Sustainability;
  - Manage expenditure prudently, grow revenue base and build long-term financial sustainability to invest in social and economic development.
- (KPA 7) Public Participation.
  - An active and engaged citizenry, able to engage with and shape the municipality's programme.

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

TOPIC 1: SETTLEMENTS AND DEMOGRAPHICS

Topic C.1.1: Settlement Demographics and Public Amenities						
Section	**Intervention Required**	**%**	**Solution description as identified by Master Plan**	**%**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring %**
Settlements Summary	No	100	Implement recommendations around the Core Landscape areas and the Urban Restructuring for the different areas as included in the SDF.	100	Yes	92.9
	Yes	100	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. 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 WC/WDM measures and diversify water resources	100	Yes	92.9
	Yes	100	Continue with the implementation of the Housing Pipeline 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 new Water and Sewer Master Plans and that housing projects only continue once the required bulk water and sewerage infrastructure are in place.	100	Yes	92.9
Summary by Settlement Group	No	100				100
Assessment Score by Settlement Type	No	100				100
Amenities Summary	No	100				100

Detail Spatial Structure and Development proposals are included in Bitou Municipality's November 2019 SDF for each of the areas.

The low-cost housing developments and the rapid expansion of the areas put enormous pressure on the limited resources of the Municipality. As a result, effective and efficient service delivery is thus tremendously challenged. Bitou Municipality's housing pipeline (2018-2021) is summarised in the table below.

Table C.1.2: Three Year Housing Pipeline

Area	Units	Construction Readiness	Feasibility Applications	Land Acquisition
Kwanokuthula IRDP Phase 4: Top Structures Kwanokuthula IRDP/UISP Phase 5 and 6 (120 UISP)	441 1 562		Planning Fees (2018-2021)	
Ebenezer IRDP/UISP Qolweni: 735 informal, New Horizons: 735 backyard	1 469		Planning Fees (EIA)	Ebenezer Portions 3, 42,44 Portion 20 Farm Hillview
Qolweni Phase 3A: Top Structures Qolweni Phase 4A (UISP): Serviced Sites Qolweni Phase 4B (UISP): Serviced Sites Qolweni Phase 5 (UISP): Serviced Sites	169 382 303 99	(2018-2020) (2018-2020) (2020-2021) (2020-2021)	Planning Fees (2018-2021)	Erf 9834 Minnaar's Land (2018-2019)
Shell Ultra City (IRDP/FLISP): Serviced Sites	80	Serviced Sites (2019-2020)		
Green Valley Phase 2 (IRDP/UISP) (122 UISP)	730		Planning Fees (2018-2021)	Portion 28; Farm 306 Wittedrift (2018-2019)
Kurland UISP Phase 3 (UISP): Serviced Sites Kurland UISP Phase 4 (UISP): (500 Eventually)	74 270	(2019-2020)	Planning Fees (2018-2021)	Land transfer in progress (Farm 562)
Kranshoek IRDP Phase 3	1 457			Farm 432: Portions 7, 8, 9
Harkerville Housing Projects: Not to Proceed				
Total Units	**7 036**			

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

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	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	No	71.4
Direct Backlog Sanitation	Yes	100	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	No	71.4
Water Services Infrastructure Supply Level Profile	No	100				100
Water Reliability Profile	No	100				100
Sanitation Service Infrastructure Supply Level Profile	No	100				100
Sanitation Reliability Profile	No	100				100
Water Services: Education	No	100				100
Water Services: Health	No	100				100

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 Services: Education	No	100				100
Sanitation Services: Health	No	100				100
Health and Educational Facilities	No	100				100

A separate water and sanitation service level policy is not yet in place, but the water and sanitation service levels to be provided by the Municipality to the consumers in their Management Area are however addressed in the Water Supply, Sanitation Services and Industrial Effluent By-laws. All water services provided by Bitou 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 Bitou Municipality's Indigent Policy.

The large number of residents in the lowest income groups (living in informal areas) places a major challenge on Bitou Municipality to provide suitable housing. Bitou Municipality works towards providing all households in the towns with a water connection inside the erven and connecting all households to a waterborne sanitation system. It is however important to consider the Municipality's capacity (financial and institutional) to operate and maintain complex sewage systems if opting for higher service levels and in particular waterborne sanitation.

The National Norms and Standards for Domestic Water and Sanitation Services include the following interim water and sanitation services (Communal services for informal areas):

Table C.2.2: Interim Water and Sanitation Services (National Norms and Standards for Domestic Water and Sanitation Services)

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

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

Interim sanitation services (Communal and shared facilities)

- Users shall be consulted on the siting and design, and the responsible cleaning and maintenance of shared toilets. Clean toilets are more likely to be frequently used.
- Plumbing in and for communal and shared facilities needs to be more robust than that installed on private premises, and shall comply with the general principles of the National Building Regulations. Precautions need to be taken in the design against vandalism, theft and misuse.
- Efforts shall be made to provide people living with chronic illnesses, such as HIV and AIDS, with easy access to a toilet as they frequently suffer from chronic diarrhoea and reduced mobility.
- Where possible, communal and shared toilets must be provided with lighting, or users provided with torches. The input of the users must be sought with regard to ways of enhancing the safety of users.
- Efforts to build a sense of communal ownership and pride of possession shall be made so that cooperation is voluntarily given or assured by peer pressure.
- Sufficient sanitation facilities shall be provided for the number of users
  - Communal toilet: Toilet seats – 1 seat per 50 users; Urinal units – 1 unit per 100 users; Hand washing – 1 basin per 10 toilet seats.
  - Shared toilet mostly used all the time: Toilet seats – 1 seat per 20 users; Urinal units – 1 unit per 50 users; Hand washing – 1 basin per 4 toilet seats.

Table C.2.2: 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
• Shared and communal facilities shall have separate toilet blocks for men and women with separate entries; waste bins with lids in toilet block for women – emptied once a week and disposed of appropriately; urinal facilities for men; seats for children in the section for women; waiting / circulating area; separate washing cubicles for men and women; facility to store large volumes of water (water-borne sanitation); appropriate wastewater disposal system; and store room for keeping the cleaning material / equipment.

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

Communal standpipes represent probably the weakest part of a network's water supply services. 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. Poor people are the ones that suffer the most from water-related diseases due to:

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

Bitou 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. Water Service Levels in the WSDP for the farms are based on the 2011 Census data.

Bitou Municipality is faced with various challenges with regard to the provision of services on private owned land (Farms) 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 Bitou Municipality.
- Subsidising the operating and maintenance costs. If the basic service is to be provided free to the poor then Bitou Municipality must ensure that the costs of providing the service are covered by the local government equitable share and / or through cross-subsidies within Bitou Municipality's Management Area.

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

Public Amenities Education: All education facilities in Bitou Municipality's Management Area are provided with adequate and safe water and sanitation services and no specific strategies, with regard to the provision of water and sanitation services to these facilities, were therefore identified. Bitou Municipality is however committed to work with the Education Department to address any possible shortcomings with regard to the provision of water services that might still exist at any of the schools.

It is important for the schools to focus on Water Demand Management activities and for Bitou Municipality to support the schools with a WDM programme. This will not only aid in Bitou 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 the one hospital in Bitou Municipality's Management Area have adequate and safe water and sanitation services. Bitou Municipality will strive to continue to ensure that the minimum required SANS241:2015 water quality standards are met through the systematic upgrading of their WTWs. The monitoring of provision of basic minimum services to farm dwellers remains a challenge, in view of the limited funding and human resources.

The establishment and functioning of effective health systems and health care services is critical for not only the upliftment of communities but more so for the sustainability of communities. Health services are rendered throughout the area by a network of clinics. The environmental health function is currently with the 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 Bitou Municipality with regard to environmental health issues and that a good communication protocol is followed between the District Municipality and Bitou Municipality to report on health issues.

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

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

TOPIC 3: WATER SERVICES ASSET MANAGEMENT

Table 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	Include the CRC of the water and sewerage infrastructure in the Asset Register. The Condition of the assets can also be included. Ensure all the water and sewerage infrastructure are included in the Asset Register.	100	Yes	92.9
	Yes	100	Develop an Asset Management Plan	100	Partially	85.7
Operation	No	100	Implement recommendations from the Water Safety Plan. Improvement / Upgrade plans to be implemented.	100	Partially	78.6
	No	100	Detail WTW Process Audits to be done.	100	No	71.4
	No	100	Implement recommendations from the W_2RAP. Improvement / Upgrade plans to be implemented.	100	Partially	78.6
	No	100	Detail WWTW Process Audits to be done.	100	No	71.4
	No	100	Refurbish existing water and sewerage SCADA system.	100	Partially	71.4
Functionality Observation	Yes	100	Provide additional reservoir storage capacity for the towns with inadequate storage capacity. Upgrade existing water pump stations and provide new water pump stations for the identified areas. Upgrade existing WTWs and WWTWs as recommended. Upgrade existing sewer pump stations and provide new sewer pump stations for the identified areas.	100	Partially	85.7
Asset Assessment Spectrum	Yes	100	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 O&M 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	Partially	85.7
Water and Sanitation schemes	Yes	100	Upgrade sections of the water reticulation network and sewer drainage network as proposed in the Water and Sewer Master Plan	100	Partially	85.7

Asset Management Plan: Bitou Municipality will develop an infrastructure maintenance plan that is linked to an integrated asset management system to ensure preventative maintenance. Depreciation, repairs and maintenance as well as the acquisition of assets will all increase collectively to ensure efficient and effective budgeting. This will entail the review of the current budgeting strategy and process as well as expenditure and management systems to ensure efficient and effective service delivery in line with Bitou Municipality priorities. It will require the review of revenue management systems in order to maximise revenue generation possibilities and improve revenue performance. The cash and debt management strategies and practices will have to be reviewed and internal controls and delegations regarding financial management should be re-assessed. Asset management through an integrated infrastructure and asset management plan must also be implemented. The review of governance practices in the Supply Chain Management practices should be done and proper controls and risk management practices should be implemented.

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.

Bitou 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 Bitou 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 Bitou 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. Bitou 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: Detail Risk Reduction recommendations are included in Bitou Municipality's 2019 Disaster Risk Assessment.

Untreated Effluent Management Plan: There are no known untreated effluent discharged to the environment. The W_2RAP includes Management Procedures and Incident Response and Emergency Protocols.

Future Water and Sewerage Infrastructure Requirements: The Water and Sewer Master Plans (2020) for the various distribution and drainage systems in Bitou Municipality's Management Area recommends upgrades of the water and sewerage infrastructure to the values indicated in the tables below in the foreseeable future in order to accommodate development and population growth according to the SDF.

Table C.3.2: Summary of the Future Water and Sewerage Infrastructure Requirements for Bitou Municipality, as included in the 2020 Water and Sewer Master Plans

Scheme	Water Infrastructure [1)]	Sewerage Infrastructure [2)]	Total
Plettenberg Bay	R308 826 000	R222 115 000	**R530 941 000**
Kurland	R56 675 000	R5 492 000	**R62 167 000**
Natures Valley	R5 746 000	R0	**R5 746 000**
Harkerville	R100 000	R0	**R100 000**
Total	**R371 347 000**	**R227 607 000**	**R598 954 000**

Notes: 1) Include internal water reticulation networks, reservoirs, pump stations, bulk water pipelines and WDM items.
2) Include internal sewerage drainage networks, pump stations, rising mains and bulk sewer pipelines.
3) Costs include P&G's, Contingencies & Fees, but exclude EIA studies, registration of servitudes and/or land acquisition and VAT.

GROUNDWATER INFRASTRUCTURE

Bitou Municipality is responsible for the operation and maintenance of a number of production and monitoring boreholes in their Management Area. It is therefore critical for Bitou Municipality to monitor 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 and the volume of water abstracted. 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 Bitou Municipality to focus on aquifer protection, groundwater monitoring and wellfield management, in order to ensure the sustainable use of the groundwater resources. The table below gives an overview of the key groundwater management functions.

Table C.3.3: Key Groundwater Management Functions

Activity	Responsible Person	Skills and qualifications required	Resources, tools and equipment	Remarks
Measuring and recording of water levels.	Pump operator	Literacy, numeracy, trained in taking water levels	Dip meter, ruler, log book, pen.	Done as part of operators' regular O&M activities.
Measuring and recording abstraction	Pump operator	Literacy, numeracy, trained in reading water meters.	Log book, pen	Done as part of operators' regular O&M activities.
Providing data to the authority that is responsible for water supply on a regular basis.	Pump operator and pump operator supervisor	Literacy, numeracy, keeping records.	Postal service or public transport.	Including as part of the reporting requirements of the pump operator.

Table C.3.3: Key Groundwater Management Functions				
Activity	**Responsible Person**	**Skills and qualifications required**	**Resources, tools and equipment**	**Remarks**
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)

Detail information regarding the existing groundwater sources is available under Sections 3 of the Administration, Information and Comprehensive Overview Report. **The recommended daily, weekly, monthly and six monthly O&M activities, as included under Section 4.1.1 of the Future Demand and Functionality Requirements Report, are to be implemented by Bitou Municipality for their boreholes.**

SURFACE WATER INFRASTRUCTURE (ABSTRACTION POINTS)

Topic 6 gives an overview of the years in which the annual water requirement is likely to exceed the total registration volumes or yields from the various resources. The table below summarise the raw water storage capacity available, the current water requirements of the towns and the number of days for which storage is available.

Table C.3.4: Current Raw Water Storage Capacity Available, the Current Water Requirements of the Towns and Number of Days for which Storage is available.

Scheme	Raw water storage capacity available (Ml)	Water usage for the last three years (AADD, Ml/d)			Number of days for which storage capacity is available if full		
		16/17	17/18	18/19	16/17	17/18	18/19
Plettenberg Bay	2 060 x 55% = 1 133	8.448	9.781	10.300	134	116	110
Kurland	-	0.471	0.517	0.537	-	-	-
Natures Valley	-	0.132	0.155	0.209	-	-	-

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

BULK WATER INFRASTRUCTURE

Based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk water pipelines:

Table C.3.5: Future Bulk Water Pipelines Required

Scheme	Recommended bulk water pipelines
Plettenberg Bay	Feeder mains that require upgrading • It is proposed that the Archiewood and Brackenridge reservoirs are supplied in future with water only through the existing 200/250 mm Ø pipeline that currently supplies the Town Tower reservoir with water from the Plettenberg Bay WTP. This will alleviate pressure on the so-called "Kwanokuthula" pipeline and consequently improve bulk water supply to the Kwanokuthula East (Lower) reservoir. It is proposed that the 200 mm Ø section of this pipeline between the Plettenberg Bay WTP and the Town Tower reservoir is increased to a 315 mm Ø pipeline (item BPW.B1). • Upgrading of the 100 mm Ø feeder main between the Town Tower reservoir and the Town Lower & Upper towers (item BPW.B24). • The existing 200 mm Ø section of the so-called "Kwanokuthula" rising main (between the New Horizon reservoirs and the Kwanokuthula East (Lower) reservoirs) should be reinforced with a new 315 mm Ø rising main when supply from the Plettenberg Bay WTP pump station to Kwanokuthula reached capacity (item BPW.B27). • Upgrading of the feeder main to the Kwanokuthula West (Upper) tower(s) when the proposed second 500 Kl tower is constructed (part of item BPW.B63). • Upgrading of the feeder main to the Kwanokuthula East (Lower) pump station (item BPW.B29). • Upgrading of the 200 mm Ø bulk pipe from the WTP PS to the Town reservoir A (item BPW.B77). • Upgrading of the 90 mm Ø feeder main to Wittedrift reservoir (item BPW.B71). • Upgrading of the bulk system from the Town reservoirs A & C to the Matjiesfontein reservoir. This bulk system comprises of 4 discreet sections, i.e. section 1 (150 & 315 mm Ø pipelines from the Town reservoirs to opposite the Turtle Creek Golf Estate where the 315 mm Ø pipeline ends), section 2 (150 mm Ø pipeline from opposite the Turtle Creek Golf Estate to the draw-off to Wittedrift & Green Valley at the Rietvlei Road), section 3 (150 mm Ø pipeline along the N2 from the Rietvlei Road to before the bridge over the Keurbooms River) and section 4 (200 mm Ø pipeline from the bridge over the Keurbooms River to the Matjiesfontein reservoir). It is proposed that section 2 of this bulk system is reinforced with a new 355 mm Ø pipeline (item BPW.B39), section 3 with a new 355 mm Ø pipeline (item BPW.B67) and section 4 with a parallel 315 mm Ø pipeline (item BPW.B47). • The existing 250 & 300 mm Ø rising mains from the Plettenberg Bay WTP to the Brakkloof reservoir should be augmented when supply problems to the Brakkloof reservoir are experienced. It is proposed that the "old" 300 mm Ø AC pipe is replaced with a new 450/400 mm Ø pipeline (item BPWB17). The "old" 300 mm Ø should then be utilized as a dedicated supply pipe to transfer potable water from the desalination plant to the Brakkloof and Town reservoirs. • Upgrading of the 100 mm Ø feeder main between the Kranshoek reservoir and the Kranshoek towers (upgrading of this pipeline is currently in progress). • Upgrading of the 200 mm Ø bulk pipe from the Bitou desalination plant to the existing 300 mm Ø bulk pipeline between the Plettenberg Bay WTP and the Brakkloof reservoir (item BPW.B37). New feeder mains required • Commission the rising main from the so-called "New Horizon" pipeline towards the Kwanokuthula West (Upper) reservoir and tower (item BPW.B59).

Table C.3.5: Future Bulk Water Pipelines Required	
Scheme	**Recommended bulk water pipelines**
	• New 200 mm Ø feeder main from the Archiewood reservoir reticulation network to the proposed Ganse Valley Estate (item BPW13.3). • New 200 mm Ø feeder main from the Town PRV 4 reticulation network to the proposed Roodefontein Golf Estate (item BPW1.17). • New 160 mm Ø feeder main from the existing Green Valley bulk PS to the proposed higher lying Green Valley reservoir (item BPW.B73). • New feeder main to the proposed Green Valley booster pump station. • New 200 mm Ø feeder main from the bulk system between the Town reservoirs and Matjiesfontein to the proposed Hanglip Golf Estate (item BPW.B45). • New 110 mm Ø rising main from the Keurboomstrand Lower reservoir to the proposed Keurboomstrand Upper reservoir (item BPW.B50). • New feeder main to proposed Keurboomstrand Upper booster pump station. • New feeder main to the proposed Goose Valley booster pump station. • New 315 mm Ø rising main between Roodefontein Lower and Upper reservoirs (item BPW.B5). • New 200 mm Ø raw water pipeline from the Kwanokuthula East reservoir site to the Plettenberg Bay WTP (item BPW.B11). • New 200 mm Ø feeder main from the New Horizon PS to the proposed New Horizon Tower (item BPW10.3)
Kurland	• New 200 mm Ø feeder main from the Matjiesfontein reservoir to the proposed Matjiesfontein Upper reservoir (item BKW.B3.1). • New 160 mm Ø feeder main from the Matjiesfontein Upper reservoir to the existing Kurland bulk system (item BKW.B3.2). A 3.0 km 160 mm Ø section of the bulk system between Kurland and Plettenberg Bay has already been constructed (from Kurland along the N2 towards Plettenberg Bay). It is proposed that item BKW.B3.2 connect to this pipeline (on the southern side) and that the northern side of this pipeline is connected to the existing 200 mm Ø supply pipeline from the Kurland reservoirs to the Kurland reticulation network. The existing 200 mm Ø pipe (that is currently part of the reticulation network) should then be transferred to the bulk system (after item BKW1.3 is implemented).
Natures Valley	No feeder mains require upgrading in the future.

The estimated costs for the future bulk water supply pipelines required are indicated in the table below.

Table C.3.6: Cost of Future Bulk Water Supply Pipelines Required						
Scheme	**New feeder mains that are proposed or existing feeder mains that require upgrading in the future (Master Plan Item)**	**Project**	**Year**	**Diameter (mm)**	**Length (m)**	**Estimated Cost (VAT Excl.)**
Plettenberg Bay	35 l/s FCV to install (BPW.B2)	PRJ-BPW-002	2021	150	-	R233 000
	Dedicated bulk supply pipeline to Kwanokuthula Upper Reservoir (BPW.B59)	PRJ-BPW-002	2021	315	3	R62 000
	Pipeline when FDA P100 develops (BPW.B73)	PRJ-BPW-006	2021	160	766	R1 072 000
	Inter-connection pipe to improve bulk water supply to Keurboomstrand (BPW.B40)	PRJ-BPW-007	2021	160	31	R76 000
	Pipeline when existing bulk supply to Keurboomstrand reservoir nears capacity (BPW.B48.2)	PRJ-BPW-057	2023	200	10	R60 000
	Pipeline to reinstate New Horizon PS when FDA P35 develops (BPW10.2)	PRJ-BPW-008	2023	280	6	R72 000
	Pipeline when future New Horizon PS is constructed (BPW10.3)	PRJ-BPW-008	2023	280	26	R131 000
	Pipeline when New Horizons Tower is constructed (BPW10.5)	PRJ-BPW-008	2023	280	23	R120 000
	Pipeline when FDA P35 develops (BPW10.6)	PRJ-BPW-008	2023	250	44	R157 000
	Pipeline to rezone high lying areas of New Horizon reservoir to New Horizon Tower (BPW10.7)	PRJ-BPW-008	2023	200	13	R65 000
	Valve to insert and close to rezone high lying areas of New Horizon reservoir to New Horizon Tower (BPW10.8a)	PRJ-BPW-008	2023	200	-	R117 000
	Valve to insert and close to rezone high lying areas of New Horizon reservoir to New Horizon Tower (BPW10.8b)	PRJ-BPW-008	2023	160	-	R110 000
	Valve to insert and close to rezone high lying areas of New Horizon reservoir to New Horizon Tower (BPW10.9a)	PRJ-BPW-008	2023	160	-	R117 000
	Valve to insert and close to rezone high lying areas of New Horizon reservoir to New Horizon Tower (BPW10.9b)	PRJ-BPW-008	2023	200	-	R117 000
	Valve to insert and close to rezone high lying areas of New Horizon reservoir to New Horizon Tower (BPW10.10)	PRJ-BPW-008	2023	110	17	R42 000
	Pipeline to augment bulk water supply to Keurboomstrand (BPW.B39.1)	PRJ-BPW-009	2025	355	925	R3 725 000
	Pipeline to augment bulk water supply to Keurboomstrand (BPW.B39.2)	PRJ-BPW-009	2025	160	30	R75 000
	Pipeline to reduce demand on Kwanokuthula system (BPW.B21.1)	PRJ-BPW-011	2025	23	280	R128 000

Table C.3.6: Cost of Future Bulk Water Supply Pipelines Required						
Scheme	**New feeder mains that are proposed or existing feeder mains that require upgrading in the future (Master Plan Item)**	**Project**	**Year**	**Diameter (mm)**	**Length (m)**	**Estimated Cost (VAT Excl.)**
	Valve to insert and close to reduce demand on Kwanokuthula system (BPW.B21.2)	PRJ-BPW-011	2025	250	-	R138 000
	8 l/s FCV to install to reduce demand on Kwanokuthula system (BPW.B22)	PRJ-BPW-011	2025	80	-	R175 000
	New dedicated supply to Roodefonteon Upper reservoir (BPW.B5)	PRJ-BPW-013	2025	315	2 207	R7 095 000
	Inter-connection pipeline to utilise old 150 mm pipeline as supply to Kranshoek reservoir (BPW.B33)	PRJ-BPW-013	2025	160	14	R53 000
	New bulk pipeline when bulk supply to Wittedrift & Green Valley reaches capacity (BPW.B71)	PRJ-BPW-014	2025	200	5 261	R9 264 000
	New bulk pipeline when supply problems to towers are experienced (BPW.B24)	PRJ-BPW-024	2025	160	10	R47 000
	Valve to insert and close (Emergency connection between towers) (BPW.B19)	PRJ-BPW-026	2025	315	-	R156 000
	Bulk supply line to connect borehole to existing borehole network (BPW.B12.1)	PRJ-BPW-046	2025	110	849	R865 000
	Bulk pipeline to augment bulk water supply to Kwanokuthula (including N2-crossing) (BPW.B27.1)	PRJ-BPW-048	2025	315	1 079	R3 184 000
	Bulk pipeline to augment bulk water supply to Kwanokuthula (including N2-crossing) (BPW.B27.2)	PRJ-BPW-048	2025	400	52	R337 000
	Pipeline when existing bulk supply to Matjiesfontein reservoir nears capacity (BPW.B67)	PRJ-BPW-015	2030	355	2 670	R10 612 000
	Pipeline to reinforce bulk supply from desalination plant to the existing bulk system (BPW.B37)	PRJ-BPW-047	2030	315	732	R2 388 000
	New feeder main for Kwanokuthula West pump station (BPW.B29)	PRJ-BPW-019	2035	400	30	R252 000
	Connection pipeline to Kwanokuthula Upper bulk pipeline when item BPW.B31 is implemented (BPW.B64)	PRJ-BPW-019	2035	315	62	R251 000
	Connection pipeline to Kwanokuthula Upper bulk pipeline when item BPW.B31 is implemented (BPW.B66a)	PRJ-BPW-019	2035	315	10	R86 000
	Valve to insert and close when connection pipeline to Kwanokuthula Upper bulk pipeline is established (BPW.B66b)	PRJ-BPW-019	2035	315	-	R156 000
	New dedicated supply pipeline to new Keurboomstrand Upper Reservoir (BPW.B50)	PRJ-BPW-034	2035	110	943	R958 000
	New pipeline when FDAs P83 – P87 are developed (BPW.B97a)	PRJ-BPW-042	2035	160	2 133	R2 596 000
	Alternative supply pipeline to Keurboomstrand from the proposed Matjiesfontein Upper reservoir (BPW.B97b)	PRJ-BPW-042	2035	110	478	R498 000
	PRV to install to reduce high static pressures when FDAs P84 to P87 develop (BPW.B98)	PRJ-BPW-042	2035	80	-	R175 000
	6 l/s FCV to install to sustain pressure in upstream bulk system (BPW.B99)	PRJ-BPW-042	2035	80	-	R175 000
	Construct raw bulk line to Bitou WTP (BPW.B11)	PRJ-BPW-051	2035	200	4 927	R8 679 000
	Connect boreholes to raw water reservoir (BPW.B12.2)	PRJ-BPW-051	2035	250	103	R294 000
	New pipeline when existing bulk supply to Matjiesfontein reservoir nears capacity (BPW.B47)	PRJ-BPW-022	2040	315	2 792	R8 961 000
	New pipeline when supply problems to Brakkloof Reservoir occur (BPW.B17.1)	PRJ-BPW-025	2040	400	3 881	R15 389 000
	New pipeline when supply problems to Brakkloof Reservoir occur (BPW.B17.2)	PRJ-BPW-025	2040	450	1 328	R5 316 000
	20 l/s FCV to install to sustain pressure in network when Roodefontein Golf Estate sump is constructed (BPW1.18)	PRJ-BPW-056	2040	100	-	R205 000
	Upgrade existing bulk pipeline to meet ultimate demand (When FDA P059 develops) (BPW.B1)	PRJ-BPW-054	2045	315	814	R2 650 000
	33 l/s FCV to install when FDA P59 develops (BPW13.4)	PRJ-BPW-055	2045	150	-	R233 000
	Pipeline when FDA P70 develops (BPW.B45)	PRJ-BPW-041	2050	200	2 083	R3 693 000
	32 l//sFCV to install when FDA P70 develops (BPW.B92)	PRJ-BPW-041	2050	100	-	R205 000
	Pipeline when pumps are upgraded from 50 L/s to 100 L/s (BPW.B77)	PRJ-BPW-052	2050	315	105	R387 000
	Sub Total					**R91 952 000**
Kurland	New pipeline when WTW nears capacity (BKW.B4)	PRJ-BKW-004	2025	200	3 080	R8 332 000
	New pipeline when WTW nears capacity (BKW.B7)	PRJ-BKW-005	2030	160	5 977	R12 535 000
	Pipeline to utilise existing gravity feed as part of the bulk system (BKW.B8.1)	PRJ-BKW-005	2030	160	352	R771 000
	Valve to close / Pipe to disconnect	PRJ-BKW-005	2030	200	-	-
	Valve to close / Pipe to disconnect	PRJ-BKW-005	2030	200	-	-
	Pipeline to utilise existing gravity feed as part of the bulk system (BKW.B8.4)	PRJ-BKW-005	2030	160	12	R59 000

Table C.3.6: Cost of Future Bulk Water Supply Pipelines Required						
Scheme	**New feeder mains that are proposed or existing feeder mains that require upgrading in the future (Master Plan Item)**	**Project**	**Year**	**Diameter (mm)**	**Length (m)**	**Estimated Cost (VAT Excl.)**
	Sub Total					**R21 697 000**
Natures Valley	-	-	-	-	-	-
	Sub Total					-
Total						**R113 649 000**

The recommended maintenance activities for the bulk water pipelines, as included under Section 4.1.3 of the Future Demand and Functionality Requirements Report, to be implemented by Bitou Municipality.

WATER TREATMENT WORKS INFRASTRUCTURE

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

Table C.3.7: Existing Capacities and Flows at each of the WTWs (Ml/d)					
WTW	**Existing Hydraulic Capacity**	**Peak Month Average Daily Flow**	**Average Daily Flow 2018/2019**	**Required Treatment Capacity (1.5 x $AADD_{10yr}$)**	**2018/2019 Water Quality Failures (SANS0214:2015)**
Plettenberg Bay	27.000	10.997 (Dec)	9.624	18.658	-
Desalination	2.000	1.971 (Jan)	1.634 *	2.000	-
Kurland	0.600	0.573 (Nov)	0.537	0.935	-
Natures Valley	1.000	0.430 (Dec)	0.209	0.364	-

Note: * Calculated over period December 2018 to April 2019.

It can be noted from the above table that the existing hydraulic capacities of all the WTWs are adequate, except for the Kurland WTW. There were also no water quality failures during the last financial year and the current treatment processes and operational procedures at the WTWs are therefore adequate. Some of the equipment at the WTWs however require refurbishment as indicated in Table C.3.8.

The WTWs to be upgraded in Bitou Municipality are summarised in the table below:

Table C.3.8: WTWs to be Upgraded in the Future		
Scheme	**Short, Medium, Long Term**	**Estimated Cost (Vat Excluded)**
Upgrade capacity of Kurland WTW from 0.6 Ml/d to 1.2 Ml/d	Short	R9 317 000

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

- Plettenberg Bay WTW:
  - Lime dosing equipment needs refurbishment at both inlets. Pump control panel not working effectively (Wiring and speed control). Only one of the two lime cones are working, valve of the one is broken and therefore not in use. Lime feeder for the final water is not working.
  - Endress Hauser inline pH monitoring is not working.
  - Only one of the two coagulant dosing pumps at the second inlet is working, no standby.
  - Chlorine dosing building: No light fittings in the one room. Scales are not working. Chlorine gas detector is not working, which urgently needs to be repaired. Some lose wires in the control panel in the chlorine building.
  - DAF unit: Only one of the pumps can be used, because one of the check valves was removed for repairs.
  - Five large sand filters: The automatic vales do not always open and sometimes need to be operated manually.
  - Nine small sand filters: One of the filters is not working.

- Plettenberg Bay Desalination WTW: No items were identified.
- Kurland WTW: Capacity of plant is insufficient to meet future water treatment requirements. No other items were identified during the site inspection.
- Natures Valley WTW: Final water pump station at WTW needs refurbishment.

The table below gives an overview of the recommended improvements for the WTWs in Bitou Municipality's Management Area, as identified during the WSDP inspection.

Table C.3.9: Recommended Improvements for the WTWs as Identified during the WSDP Inspection.

Scheme	Recommendations	Estimated Cost (Vat Excluded)
Plettenberg Bay	Refurbish lime dosing equipment at both inlets.	R250 000
	Refurbish pH inline monitoring equipment.	R85 000
	Repair second coagulant dosing pump at the second inlet.	R25 000
	Refurbish chlorine dosing equipment (Leak gas detector, Scales, etc.)	R70 000
	Replace check valve for pump at DAF unit.	R10 000
	Refurbish filter units.	R80 000
Desalination Plant	-	-
Kurland	-	-
Natures Valley	Refurbish final water PS at WTW.	R1 200 000
Total		**R1 720 000**

The recommended O&M activities for the WTWs, as included under Section 4.1.4 of the Future Demand and Functionality Requirements Report, are to be implemented by Bitou Municipality.

WATER PUMP STATIONS

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

- Most of the water pump stations are operated manually, because of problems with the SCADA system.
- Weekly maintenance inspections are required for all the water PSs (Items to be checked indicated under Section 4.1.5 of the Future Demand and Functionality Requirements Report).
- Weekly and quarterly maintenance inspections are required of all the water PSs by an electrician (Items to be checked indicated under Section 4.1.5 of the Future Demand and Functionality Requirements Report).
- New Horizon Small PS: Pump is in for repairs.
- Town Tower High and Low reservoir PS: Only two of the four pumps are working.
- Kwanokuthula PS No.1: Two of the motors were removed and the PS is currently not in use.
- Roodefontein raw water PS: PS is not secure, because the door was broken off.

Based on the most likely land-use development scenario, it will be necessary for the following water pump stations:

Plettenberg Bay pump stations that require upgrade:

- A back-up pump is proposed for the existing High Lift pump at the Plettenberg WTW PS in order to improve the redundancy of the supply to New Horizon and Kwanokuthula West (Upper) reservoirs (item BPW.B58).
- Upgrading of the Kwanokuthula East (Lower) PS in order to improve supply to the Kwanokuthula East (Lower) tower (item BPW.B18) and to the Kwanokuthula West (Upper) reservoir (item BPW.B31).
- Upgrading of the Kwanokuthula West (Upper) PS in order to augment supply to the Kwanokuthula West (Upper) tower when the proposed second 500 kl Upper tower is constructed (item BPW.B60).

- Upgrading of the pumps at the Plettenberg WTP that pumps to the Town Tower and Brackenridge reservoirs is proposed if supply problems are experienced when FDA P59 develops (item BPW.B32).
- Upgrading of the pumps at the Town Tower reservoir pumping to the Town Lower & Upper towers is proposed if supply problems are experience (item BPW.B23).
- Upgrading of the pumps at the WTP PS that pump towards the Town reservoir A (item BPW.B76).
- Upgrading of the Green Valley pump station (item BPW.B72).
- Upgrading of the pumps at the Plettenberg WTP that pumps to the Brakkloof reservoir (item BPW.B16).
- Upgrading of the pumps at the Brakkloof PS that pumps to the Quarry reservoir (item BPW.B9).
- Upgrading of the Kranshoek reservoir to Kranshoek towers pump station (this project is currently in progress).
- Upgrading of the pumps at the Bitou desalination plant bulk PS (item BPW.B36).

Plettenberg Bay new pump stations required:

- New booster pump station to Wittedrift (item BPW.B41a).
- Upgrading of the booster pumps to Wittedrift when required (BPW.B41b)
- New Green Valley booster pump station (item BPW.B75).
- A new booster pump station to augment bulk water supply to Matjiesfontein reservoir (item BPW.B100). This pump station should only be constructed after sections 2, 3 & 4 of the bulk system from the Town reservoirs to the Matjiesfontein reservoir is implemented.
- Decommission the existing booster pumps (inside the pipeline) towards the Keurboomstrand reservoir (item BPW.B48.3) and replace with a new pump station (item BPW.B48.1).
- New pump station at Keurboomstrand reservoir to proposed Keurboomstrand Upper reservoir (item BPW.B49).
- New Keurboomstrand Upper booster pump station (item BPW.B52).
- New pump station at proposed Roodefontein Lower reservoir to proposed Roodefontein Upper reservoir (item BPW.B4).
- New Goose Valley booster pump station (item BPW.B35).
- New pump station on the New Horizon reservoir site for the proposed New Horizon tower (item BPW10.1)

Plettenberg Bay new pump stations required: Private Developers

- New pump station to supply bulk water from the Archiewood reservoir zone to the proposed Ganse Valley Estate reservoir (item BPW13.5). This is seen as private infrastructure for the cost of the developer of FDA P59.
- New pump station to supply bulk water from the Town PRV 4 zone to the proposed Roodefontein Golf Estate reservoir (item BPW1.19). This is seen as private infrastructure for the cost of the developer of FDA P11.
- New pump station to supply bulk water to the proposed Hanglip Golf Estate reservoir (item BPW.B93). This is seen as private infrastructure for the cost of the developer of FDA P70.

Kurland new pump stations required:

- New pump station to supply bulk water from the Matjiesfontein reservoir to the proposed Matjiesfontein Upper reservoir (item BKW.B3).
- New pump station to supply bulk water from the Matjiesfontein Upper reservoir to the Kurland reservoirs (item BKW.B6).

Natures Valley new pump stations required: No future pump stations are required.

Table C.3.10: Future Water Pump Stations Required						
Scheme	**Recommendations included in the Water Master Plan (Master Plan Item)**	**Project**	**Year**	**Capacity (l/s)**	**Head (m)**	**Estimated Cost (VAT Excl.)**
Plettenberg Bay	New PS to augment bulk water supply to Wittedrift & Green Valley (after item BPW.B40 is implemented)(BPW.B41a)	PRJ-BPW-006	2021	7	55	R2 023 000
	Upgrade Green Valley PS when FDA P100 develops (BPW.B72)	PRJ-BPW-006	2021	15	75	R1 886 000
	New Green Valley booster PS when FDA P100 develops (BPW.B75)	PRJ-BPW-012	2023	20	25	R1 879 000
	New PS when existing bulk supply to Keurboomstrand reservoir nears capacity (BPW.B48.1)	PRJ-BPW-057	2023	15	55	R1 851 000
	Decommission existing booster pumps (inside pipeline) when existing bulk supply to Keurboomstrand reservoir nears capacity (BPW.B48.3)	PRJ-BPW-057	2023	10	35	R216 000
	New PS when FDA P35 develops (BPW10.1)	PRJ-BPW-008	2023	80	25	R2 822 000
	New PS at proposed Roodefontein lower reservoir to proposed Roodefontein Upper reservoir (when Roodefontein Upper reservoir is constructed) (BPW.B4)	PRJ-BPW-013	2025	90	60	R3 342 000
	Upgrade PS at the Town Tower reservoir pumping to Town Lower and Upper Towers (Ultimate requirement 16 l/s, upgrade if required) (BPW.B23)	PRJ-BPW-024	2025	16	20	R239 000
	Upgrade Kwanokuthula East (Lower) PS (Reduce pumping requirements to higher tower) (BPW.B18)	PRJ-BPW-026	2025	60	15	R580 000
	Upgrade Kwanokuthula West (Upper) PS when supply to Upper tower reaches capacity (BPW.B60)	PRJ-BPW-018	2030	175	16.5	R922 000
	Upgrade existing Brakkloof PS when existing bulk supply to Quarry reservoir nears capacity (BPW.B9)	PRJ-BPW-037	2030	25	35	R575 000
	Upgrade existing PS at Desalination Plant (Upgrade pump capacity to 7 Ml/d) (BPW.B36)	PRJ-BPW-047	2030	85	130	R2 296 000
	Upgrade existing Kwanokuthula East (Lower) PS when supply problems to Upper reservoir occur (BPW.B31)	PRJ-BPW-019	2035	85	30	R865 000
	Install backup pump for Highlift PS at Plettenberg Bay WTW for supply to New Horison and Kwanokuthula (BPW.B58)	PRJ-BPW-019	2035	100	122	R1 658 000
	New PS at Keurboomstrand reservoir when new Keurboomstrand Upper reservoir is constructed (BPW.B49)	PRJ-BPW-034	2035	10	90	R1 795 000
	Upgrade PS at Plettenberg Bay WTW that pump to Brakkloof reservoir when supply problems to Brakkloof reservoir occur (BPW.B16)	PRJ-BPW-025	2040	165	50	R1 826 000
	New Goose Valley booster PS when higher lying erven of FDA P60 develops (BPW.B35)	PRJ-BPW-033	2040	17	45	R1 861 000
	New Keurboomstrand Upper booster PS when FDAs P83 & P84 develop (BPW.B52)	PRJ-BPW-034	2040	15	30	R1 808 000
	25m³ @ 33m TWL Pump Sump when FDA P11 develops (Cost to developer)	PRJ-BPW-056	2040	-	-	-
	25m³ @ 34m TWL Pump Sump to install when FDA P59 develops. New sump for Ganse Valley Estate (BPW13.5)	PRJ-BPW-055	2045	-	-	-
	Upgrade pump to augment bulk water supply to Wittedrift & Green Valley (After item BPW.B71 is implemented) (BPW.B41b)	PRJ-BPW-049	2045	20	25	R340 000
	Upgrade PS at Plettenberg Bay WTW that pump to the Town Tower and Brackenridge reservoirs (Ultimate requirement 95 l/s, upgrade if required) (BPW.B32)	PRJ-BPW-054	2045	95	65	R740 000
	New PS when existing bulk supply to Matjiesfontein reservoir nears capacity (BPW.B100)	PRJ-BPW-050	2050	95	25	R3 068 000
	Upgrade pumps at Plettenberg Bay WTW that pump to Reservoir A when supply problems to Town reservoirs are experienced (BPW.B76)	PRJ-BPW-052	2050	100	10	R797 000
	25m³ @ 6m TWL Pump Sump for Hangklip Estate (Cost to developer) (BPW.B93)	PRJ-BPW-050	2050	-	-	-
	Sub Total					**R33 389 000**
Kurland	New PS when existing bulk supply to Kurland WTP nears capacity (BKW.B3)	PRJ-BKW-004	2025	30	200	R2 630 000
	New PS when existing bulk supply to Kurland WTP nears capacity (BKW.B6)	PRJ-BKW-004	2030	20	200	R2 278 000
	Sub Total					**R4 908 000**
Natures Valley	-	-	-	-	-	-
	Sub Total					**-**
Total						**R38 297 000**

The recommended O&M activities for the water pump stations, as included under Section 4.1.5 of the Future Demand and Functionality Requirements Report, are to be implemented by Bitou Municipality.

RESERVOIR INFRASTRUCTURE

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

- The levels of most of the reservoirs are controlled through visual inspections, because of problems with the SCADA system. This result in additional operational costs and increase the workload of the operational personnel.
- The reservoir covers are not locked and adequately secured at most of the reservoirs.
- A large number of the reservoir valve chambers are without covers or the existing covers are broken. Some of the chambers are also under water and the chambers are not adequately maintained.
- There is a lack of maintenance done on the reservoir valves.
- The Kwanokuthula old tower is not in use, because it is leaking.
- The following reservoir sites are not yet adequately fenced and secured.
  - New Horizon reservoirs.
  - Goose Valley reservoir (Fence was stolen).
  - Wittedrift reservoir (Fence was vandalised).
  - Natures Valley reservoir.

The condition of most of the reservoirs in Bitou Municipality's Management Area is good. New security fences were also recently installed at some of the reservoirs to reduce possible vandalism. Bitou Municipality's overall storage factors of the reservoirs for the various systems for 2018/2019, based on 1 x PDD (24 hours storage capacity), are 3.18 for Plettenberg Bay, 2.60 for Kurland and 0.67 for Natures Valley. The Water Master Plan indicates the total reservoir storage capacity for Plettenberg Bay as 128 h x AADD, for Kurland as 156 h x AADD and for Nature's Valley as 84 h x AADD.

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 (2020) and indicated below.

Based on the most likely land-use development scenario, it will be necessary for the construction of the following new reservoirs.

Plettenberg Bay reservoirs required:

- Additional reservoir storage capacity of 3.500 Ml and additional capacity at the Upper tower of 0.500 Ml are proposed at the existing Kwanokuthula West (Upper) reservoir site to accommodate future developments (items BPW.B62 & BPW.B63). The reservoir and tower will be required when the water demand for the Kwanokuthula West (Upper) tower zone exceeds 2 000 Kl/d.
- It is proposed that a new 500 kl tower with a proposed TWL of 210 m a.s.l. (item BPW.10.4) is constructed in order to accommodate FDAs P35 & P91. This new tower will also be required to provide sufficient pressure to the higher lying erven in New Horizon.
- Additional reservoir storage capacity of 3.500 Ml is proposed at the existing Kwanokuthula East (Lower) reservoir site to accommodate future developments (item BPW.B28). The reservoir will be required when the water demand for the Kwanokuthula East (Lower) reservoir and tower zones exceeds 1 500 Kl/d.
- It is proposed that the existing Green Valley reservoirs and elevated tank are replaced with a new higher lying 1.250 Ml reservoir (item BPW.B74, TWL of 138 m a.s.l.). The existing reservoirs and elevated tank can be decommissioned.
- When additional storage capacity is required for the Matjiesfontein reservoir zone, a new 2.000 Ml reservoir should be constructed at the existing Matjiesfontein reservoir site (item BPW.B53).

- A new 0.600 Ml Keurboomstrand Upper reservoir (item BPW.B51) with a TWL of 160 m a.s.l. is proposed for the future Keurboomstrand Upper reservoir zone and the Keurboomstrand Upper booster zone.
- A new 3.500 Ml Roodefontein Lower reservoir with a TWL of 175 m a.s.l. is proposed for the future Roodefontein Lower zone (item BPW.B3).
- A new 7.000 Ml Roodefontein Upper reservoir with a TWL of 215 m a.s.l. is proposed for the future Roodefontein Upper zone (item BPW.B6). Construction of this reservoir can be phased.
- A new 1.000 Ml raw water reservoir (item BPW.B10) is proposed on the Kwanokuthula East reservoir site to collect raw water from the Kwanokuthula well field. The safe yield of the boreholes is ± 3.5 Ml/d (balancing volume of the reservoir is ± 7 hours x the safe yield of the boreholes). A more detailed study will however be required regarding the size (and requirement) of the raw water storage reservoir and if the quality of the raw water is such that it can be blend with the potable water from the Kwanokuthula East reservoir.

Plettenberg Bay reservoirs required: Private Developers

- A new 2.800 Ml reservoir (item BPW13.6) with a TWL of 140 m a.s.l. is proposed for the proposed Ganse Valley Golf Estate (future area P59). This reservoir should be filled through a pump station and accompanying rising main from a sump with a controlled inflow in order to sustain the pressure in the upstream reticulation network. This is seen as private infrastructure for the cost of the developer of future area P59.
- A new 1.600 Ml reservoir (item BPW1.23) with a TWL of 135 m a.s.l. is proposed for the proposed Roodefontein Golf Estate (FDA P11). This reservoir should be filled from a sump with a controlled inflow in order to sustain the pressure in the upstream reticulation network. This is seen as private infrastructure for the cost of the developer of FDA P11.
- A new 2.800 Ml reservoir (item BPW.B94) with a TWL of 185 m a.s.l. is proposed for the proposed Hanglip Golf Estate (future area P70). This reservoir should be filled through a pump station and accompanying rising main from a sump with a controlled inflow in order to sustain the pressure in the upstream bulk supply system. This is seen as private infrastructure for the cost of the developer of future area P70.

Kurland reservoir required:

- A new 1.500 Ml reservoir (item BKW.B9) is proposed at the existing Kurland reservoir site in order to augment reservoir storage capacity. This reservoir will be required when the AADD for Kurland exceeds 750 kl/d.
- A new 0.600 Ml balancing reservoir is however proposed on the bulk system from the Matjiesfontein reservoir to Kurland, i.e. the proposed Matjiesfontein Upper reservoir with a TWL of 217 m a.s.l. (item BKW.B5).

Natures Valley reservoir required:

- A new 1.000 Ml reservoir is proposed at the existing Nature's Valley reservoir site to replace the existing 0.600 Ml reservoir (item BNW.B1).

Table C.3.11: Future Reservoir Storage Capacities Required

Scheme	Recommendations included in the Water Master Plan (Master Plan Item)	Project	Year	Capacity (Ml)	Estimated Cost (VAT Excl.)
Plettenberg Bay	New reservoir for Roodefontein Lower zone (BPW.B3)	PRJ-BPW-001	2021	3.500	R11 920 000
	New reservoir storage capacity for Green Valley when FDA P100 develops (BPW.B74)	PRJ-BPW-006	2021	1.250	R5 921 000
	Construct water tower when FDA P35 develops (BPW10.4)	PRJ-BPW-008	2023	0.500	R7 980 000
	New reservoir for Roodefontein Upper zone (can be phased) (BPW.B6)	PRJ-BPW-013	2025	7.000	R19 502 000
	New Kwanokuthula West reservoir when existing reservoir storage volume nears capacity (BPW.B62)	PRJ-BPW-018	2030	3.500	R11 920 000
	New Kwanokuthula West water tower when existing tower storage volume nears capacity (BPW.B63)	PRJ-BPW-018	2030	0.500	R7 980 000

Table C.3.11: Future Reservoir Storage Capacities Required					
Scheme	**Recommendations included in the Water Master Plan (Master Plan Item)**	**Project**	**Year**	**Capacity (Ml)**	**Estimated Cost (VAT Excl.)**
	New reservoir required for Kwanokuthula East when existing storage nears capacity (BPW.B28)	PRJ-BPW-017	2035	3.500	R11 920 000
	New Keurboomstrand Upper reservoir when FDA P83 - P87 develop (BPW.B51)	PRJ-BPW-034	2035	0.600	R3 654 000
	Construct Kwanokuthula East raw water reservoir (BPW.B10)	PRJ-BPW-051	2035	1.000	R5 040 000
	New reservoir when FDA P11 develops (Cost to developer) (BPW1.23)	PRJ-BPW-056	2040	1.600	-
	New Matjiesfontein reservoir required when existing storage nears capacity (BPW.B53)	PRJ-BPW-023	2045	2.000	R8 008 000
	New reservoir for Ganse Valley Estate (Cost to developer) (BPW13.6)	PRJ-BPW-055	2045	2.800	-
	New reservoir for Hangklip Estate (Cost to developer) (BPW.B94)	PRJ-BPW-041	2050	2.800	-
	Sub Total				**R93 845 000**
Kurland	New reservoir when existing storage capacity nears capacity (BKW.B9)	PRJ-BKW-006	2025	1.500	R6 650 000
	New reservoir when Kurland WTP nears capacity (Reservoir to serve dual purpose, see PRJ-BPW-042) (BKW.B5)	PRJ-BKW-004	2025	0.600	R3 654 000
	Sub Total				**R10 304 000**
Natures Valley	Replace existing reservoir (PNW.B1)	PRJ-BNW-002	2022	1.000	R5 040 000
	Sub Total				**R5 040 000**
Total					**R109 189 000**

The recommended O&M activities for the reservoirs, as included under Section 4.1.6 of the Future Demand and Functionality Requirements Report, are to be implemented by Bitou Municipality.

WATER RETICULATION INFRASTRUCTURE

Based on the most likely land-use development scenario, it will be necessary for the following water reticulation infrastructure.

Table C.3.12: Future Water Reticulation Infrastructure Required					
Scheme	**Recommendations included in the Water Master Plan**	**Master Plan Items**	**Project**	**Year**	**Estimated Cost (VAT Excl.)**
Plettenberg Bay	Green Valley bulk supply upgrades - Phase 1	BPW21.1, BPW21.2, BPW21.3 & BPW21.4	PRJ-BPW-006	2021	R1 415 000
	Plettenberg Bay network upgrades - Priority	BPW1.22, BPW3.1, BPW3.2, BPW3.3, BPW3.4, BPW6.3, BPW19.1, BPW19.2	PRJ-BPW-007	2021	R1 127 000
	Development related infrastructure: Wittedrift (Priority)	BPW15.1, BPW15.1	PRJ-BPW-040	2021	R872 000
	Development related infrastructure: Kwanokuthula (Short term)	BPW8.8, BPW8.9, BPW8.13, BPW8.14, BPW8.15, BPW9.1, BPW9.7	PRJ-BPW-010	2022	R7 806 000
	Roodefontein Upper reservoir and bulk supply infrastructure	BPW5.1, BPW5.2, BPW5.6a, BPW5.6b, BPW5.6c, BPW5.6d, BPW5.6e, BPW5.7	PRJ-BPW-013	2025	R11 764 000
	Development related infrastructure: Goose Valley reservoir zone	BPW14.1	PRJ-BPW-033	2025	R725 000
	Kwanokuthula Upper storage capacity augmentation	BPW8.1	PRJ-BPW-018	2030	R2 264 000
	Development related infrastructure: Archiewood & Brackenridge reservoirs	BPW13.1, BPW13.2	PRJ-BPW-031	2030	R1 728 000
	Development related infrastructure: Kwanokuthula (Longer term)	BPW11.10	PRJ-BPW-035	2030	R975 000
	Development related infrastructure: Roodefontein reservoirs	BPW4.1, BPW5.8, BPW5.10	PRJ-BPW-038	2030	R12 550 000
	Development related infrastructure: Town PRV 4 zone	BPW1.10, BPW1.12, BPW1.14, BPW1.15, BPW1.16, BPW1.20, BPW1.21	PRJ-BPW-039	2030	R6 050 000
	Development related infrastructure: Kwanokuthula (Medium term)	BPW8.16, BPW9.2, BPW9.3	PRJ-BPW-020	2035	R2 505 000
	Plettenberg Bay network upgrades - Longer term	BPW1.13, BPW3.5, BPW3.6	PRJ-BPW-021	2035	R2 644 000

Table C.3.12: Future Water Reticulation Infrastructure Required					
Scheme	**Recommendations included in the Water Master Plan**	**Master Plan Items**	**Project**	**Year**	**Estimated Cost (VAT Excl.)**
	Development related infrastructure: Goose Valley reservoir zone	BPW14.4	PRJ-BPW-033	2035	R1 332 000
	Development related infrastructure: Kwanokuthula (Longer term)	BPW9.4, BPW9.5, BPW9.6	PRJ-BPW-035	2035	R6 583 000
	Development related infrastructure: Matjiesfontein reservoir zone	BPW16.1	PRJ-BPW-036	2035	R3 244 000
	Development related infrastructure: Quarry reservoir zone	BPW6.1	PRJ-BPW-037	2035	R379 000
	Development related infrastructure: Roodefontein reservoirs	BPW4.4, BPW5.11, BPW5.9	PRJ-BPW-038	2035	R10 080 000
	Development related infrastructure: Wittedrift (Longer term)	BPW15.3	PRJ-BPW-053	2035	R379 000
	Development related infrastructure: Archiewood & Brackenridge reservoirs	BPW7.1, BPW7.2, BPW13.3	PRJ-BPW-031	2040	R2 789 000
	Development related infrastructure: Brakkloof reservoir zone	BPW2.2, BPW2.3	PRJ-BPW-032	2040	R613 000
	Development related infrastructure: Goose Valley reservoir zone	BPW14.2	PRJ-BPW-033	2040	R403 000
	Development related infrastructure: Matjiesfontein reservoir zone	BPW16.2	PRJ-BPW-036	2040	R964 000
	Development related infrastructure: Quarry reservoir zone	BPW6.2	PRJ-BPW-037	2040	R926 000
	Development related infrastructure: Roodefontein reservoirs	BPW4.2a, BPW4.2b, BPW4.2c, BPW4.3, BPW4.5, BPW4.6	PRJ-BPW-038	2040	R4 318 000
	Development related infrastructure: Roodefontein Golf Estate	BPW1.17	PRJ-BPW-056	2040	R1 723 000
	Development related infrastructure: Keurboomstrand	BPW17.1	PRJ-BPW-034	2045	R279 000
	Development related infrastructure: Kwanokuthula (Longer term)	BPW8.17	PRJ-BPW-035	2045	R1 198 000
	Development related infrastructure: Matjiesfontein reservoir zone	BPW16.3	PRJ-BPW-036	2045	R302 000
	Development related infrastructure: Goose Valley reservoir zone	BPW14.3	PRJ-BPW-033	2050	R634 000
	Sub Total				**R88 571 000**
Kurland	Kurland network upgrade	BKW1.1, BKW1.2 & BKW1.3	PRJ-BKW-001	2021	R9 044 000
	Development related infrastructure: Kurland	BKW2.1	PRJ-BKW-003	2023	R1 405 000
	Sub Total				**R10 449 000**
Natures Valley	Natures Valley network upgrades	BNW1.1, BNW1.2	PRJ-BNW-001	2023	R706 000
	Sub Total				**R706 000**
Harkerville	Establish Harkerville & Forest View hydraulic water models	BHW.1.1	PRJ-BHW-001	2021	R100 000
	Sub Total				**R100 000**
Total					**R99 826 000**

The Water Master Plan indicated the following Water Demand Management infrastructure requirements.

Table C.3.13: Future Water Demand Management Infrastructure Required					
Scheme	**Recommendations included in the Water Master Plan**	**Master Plan Items**	**Project**	**Year**	**Estimated Cost (VAT Excl.)**
Plettenberg Bay	Town PRV 4 zone: Alteration of zone boundaries & improvement of network conveyance & redundancy	BPW1.1, BPW1.4, BPW1.5, BPW1.24 & BPW1.25	PRJ-BPW-003	2021	R367 000
	Brakkloof reservoir zone: Alteration of zone boundaries	BPW2.1, BPW2.4, BPW2.5, BPW2.6a, BPW2.6b, BPW2.7a, BPW2.7b, BPW2.8a, BPW2.8b, BPW2.8c, BPW2.8d, BPW2.8e, BPW2.8f & BPW2.9	PRJ-BPW-004	2021	R497 000
	Development related infrastructure: Archiewood & Brackenridge reservoirs	BPW20.1	PRJ-BPW-031	2045	R205 000
	Sub Total				**R1 069 000**
Kurland	-	-	-	-	-
	Sub Total				**-**

Table C.3.13: Future Water Demand Management Infrastructure Required					
Scheme	**Recommendations included in the Water Master Plan**	**Master Plan Items**	**Project**	**Year**	**Estimated Cost (VAT Excl.)**
Natures Valley	-	-	-	-	-
	Sub Total				**-**
Total					**R1 069 000**

The recommended maintenance activities for the water reticulation networks and fittings, as included under Section 4.1.3 of the Future Demand and Functionality Requirements Report, are to be implemented by Bitou Municipality.

BULK SEWER PIPELINE AND SEWER DRAINAGE NETWORK INFRASTRUCTURE

The 2018/2019 Annual Report indicated that the Municipality experienced a high number of sewer blockages. The actions of the Municipality to address these blockages include the following:

- Daily monitoring of “hotspots” for blockages is underway;
- Community awareness programmes; and
- Consideration of use of screens in sewer systems is being researched.

Based on the most likely land-use development scenario, it will be necessary for the following bulk sewer pipeline and sewer drainage network infrastructure.

Table C.3.14: Future Bulk Sewer Pipeline and Sewer Drainage Network Infrastructure Required					
Scheme	**Recommendations included in the Water Master Plan**	**Master Plan Items**	**Project**	**Year**	**Estimated Cost (VAT Excl.)**
Plettenberg Bay gravity mains	1 108m x 200mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS5.1	PRJ-BPS-013	2021	R3 671 000
	213m x 250mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS5.2	PRJ-BPS-013	2021	R887 000
	436m x 160mm dia. new gravity when FDAs P31d, P31e, P32 and P33 develop	BPS25.1	PRJ-BPS-010	2021	R752 000
	267m x 200mm dia. new gravity when FDAs P31c, P31d, P31e, P32, P33 and P34 develop	BPS25.2	PRJ-BPS-010	2021	R540 000
	667m x 250mm dia. new gravity when FDAs P31c, P31d, P31e, P32, P33 and P34 develop	BPS25.3	PRJ-BPS-010	2021	R1 472 000
	127m x 160mm dia. upgrade existing gravity when FDA P31b develops	BPS25.4	PRJ-BPS-010	2021	R471 000
	510m x 250mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS25.5	PRJ-BPS-022	2021	R1 965 000
	373m x 250mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS25.6	PRJ-BPS-022	2021	R1 468 000
	223m x 250mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS25.7	PRJ-BPS-022	2021	R926 000
	57m x 250mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS25.8	PRJ-BPS-022	2021	R323 000
	50m x 315mm dia. upgrade existing gravity when FDAs P31b and P90 develop	BPS25.9	PRJ-BPS-010	2021	R337 000
	3m x 400mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS25.10	PRJ-BPS-010	2021	R157 000
	666m x 355mm dia. upgrade existing gravity (Existing MIG application)	BPS27.4A	PRJ-BPS-010	2021	R2 450 000
	619m x 355mm dia. upgrade existing gravity (Existing MIG application)	BPS27.4B	PRJ-BPS-010	2021	R2 286 000
	640m x 355mm dia. upgrade existing gravity (Existing MIG application)	BPS27.4C	PRJ-BPS-010	2021	R2 362 000
	1970m x 250mm dia. new gravity when FDA P35 develops	BPS27.11	PRJ-BPS-023	2021	R4 238 000
	693m x 160mm dia. upgrade existing gravity when FDA P100 develops (Investigate first)	BPS32.2	PRJ-BPS-006	2021	R1 483 000
	523m x 160mm dia new gravity when FDA P100 develops	BPS32.3	PRJ-BPS-006	2021	R1 092 000
	873m x 200mm dia. upgrade existing gravity when FDA P100 develops (Investigate first)	BPS32.4	PRJ-BPS-006	2021	R2 077 000
	432m x 250mm dia. upgrade existing gravity when FDA P100 develops (Investigate first)	BPS32.5	PRJ-BPS-006	2021	R1 241 000
	864m x 160mm dia. new gravity when FDA P100 develops	BPS46.3	PRJ-BPS-016	2021	R1 772 000

Table C.3.14: Future Bulk Sewer Pipeline and Sewer Drainage Network Infrastructure Required					
Scheme	**Recommendations included in the Water Master Plan**	**Master Plan Items**	**Project**	**Year**	**Estimated Cost (VAT Excl.)**
	85m x 315mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS4.1	PRJ-BPS-008	2022	R484 000
	48m x 400mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS4.2	PRJ-BPS-008	2022	R390 000
	502m x 315mm dia. upgrade existing gravity when overflow problems occur	BPS12.5	PRJ-BPS-008	2022	R2 248 000
	50m x 200mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS12.6	PRJ-BPS-008	2022	R272 000
	344m x 355mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS12.7	PRJ-BPS-008	2022	R1 725 000
	360m x 525mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS12.8	PRJ-BPS-008	2022	R2 470 000
	114m x 525mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS12.9	PRJ-BPS-008	2022	R904 000
	142m x 675mm dia. upgrade existing gravity when overflow problems occur	BPS27.12	PRJ-BPS-020	2022	R1 521 000
	68m x 200mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS20.1	PRJ-BPS-009	2023	R329 000
	8m x 400mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS20.2	PRJ-BPS-009	2023	R185 000
	33m x 315mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS21.1	PRJ-BPS-009	2023	R265 000
	210m x 400mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS21.2	PRJ-BPS-009	2023	R1 226 000
	2 229m X 250mm dia. new gravity when future Wittedrift PS1 is constructed	BPS51.3	PRJ-BPS-058	2023	R5 870 000
	958m x 250mm dia. new gravity when future Wittedrift PS2 is constructed	BPS51.6	PRJ-BPS-058	2023	R2 556 000
	14m x 250mm dia. new gravity to divert flow from old Wittedrift PS when new Wittedrift PS and downstream infrastructure has been constructed	BPS51.7	PRJ-BPS-058	2023	R93 000
	27m x 160mm dia. new gravity to diververt flow and decommission pump station when Wittedrift PS and downstream infrastructure has been constructed	BPS51.8	PRJ-BPS-058	2023	R104 000
	1 333m x 160mm dia. new gravity when FDAs P5 and P7 develop	BPS11.1	PRJ-BPS-014	2025	R2 191 000
	918m x 160mm dia. new gravity when FDAs P5 and P7 develop	BPS11.2	PRJ-BPS-014	2025	R1 525 000
	422m x 200mm dia. new gravity when FDAs P5 and P7 develop	BPS11.3	PRJ-BPS-014	2025	R823 000
	1062m x 250mm dia. new gravity when FDAs P5 and P7 develop	BPS11.4	PRJ-BPS-014	2025	R2 310 000
	190m x 315mm dia. new gravity when FDAs P5 and P7 develop	BPS11.5	PRJ-BPS-014	2025	R550 000
	20m x 400mm dia. new gravity when FDAs P5, P7 and P8 develop	BPS11.7	PRJ-BPS-034	2025	R136 000
	270m x 160mm dia. new gravity when FDAs P27 and P30 develop	BPS26.1	PRJ-BPS-055	2025	R484 000
	357m x 200mm dia. new gravity when FDAs P27, P29 and P30 develop	BPS26.2	PRJ-BPS-055	2025	R705 000
	633m x 250mm dia. new gravity when FDAs P27, P29 and P30 develop	BPS26.3	PRJ-BPS-055	2025	R1 401 000
	950m x 160mm dia. new gravity when FDAs P27 and P30 develop	BPS26.4	PRJ-BPS-055	2025	R1 576 000
	336m x 200mm dia. new gravity when FDAs P27, P28 and P30 develop	BPS26.5	PRJ-BPS-055	2025	R667 000
	104m x 315mm dia. new gravity when FDAs P27, P28, P29 and P30 develop	BPS26.6	PRJ-BPS-055	2025	R328 000
	86m x 400mm dia. new gravity when FDAs P27, P28, P29 and P30 develop	BPS26.7	PRJ-BPS-055	2025	R350 000
	247m x 160mm dia. new gravity when FDA P27 develops	BPS26.13	PRJ-BPS-055	2025	R447 000
	194m x 160mm dia. new gravity when FDA P60 develops	BPS28.1	PRJ-BPS-025	2025	R362 000
	284m x 160mm dia. new gravity when FDA P104 develops	BPS37.7	PRJ-BPS-053	2025	R616 000
	60m x 200mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS2.1	PRJ-BPS-031	2030	R301 000
	130m x 160mm dia. new gravity when FDA P47 develops	BPS16.1	PRJ-BPS-040	2030	R259 000
	242m x 160mm dia. new gravity when FDA P45 develops	BPS17.1	PRJ-BPS-039	2030	R439 000
	289m x 200mm dia. new gravity when FDA P27 develops	BPS26.10	PRJ-BPS-056	2030	R581 000
	51m x 825mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS27.1	PRJ-BPS-003	2030	R894 000
	135m x 400mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS27.2	PRJ-BPS-003	2030	R839 000
	67m x 600mm dia. upgrade existing gravity when overflow problems occur (Investigate first)	BPS27.3	PRJ-BPS-003	2030	R692 000
	296m X 160mm dia. new gravity when FDAs P78 and P79 develop	BPS39.2	PRJ-BPS-015	2030	R526 000
	318m x 160mm dia. new gravity when FDAs P78, P79 and P80 develop	BPS39.3	PRJ-BPS-015	2030	R562 000
	1 860m x 250mm dia. new gravity to accommodate future areas in Kranshoek region (Implement when Kranshoek bulk outfall sewer reaches capacity)	BPS12.11	PRJ-BPS-033	2035	R4 005 000

Table C.3.14: Future Bulk Sewer Pipeline and Sewer Drainage Network Infrastructure Required					
Scheme	**Recommendations included in the Water Master Plan**	**Master Plan Items**	**Project**	**Year**	**Estimated Cost (VAT Excl.)**
	1 374m x 315mm dia. new gravity to accommodate future areas in Kranshoek region (Implement when Kranshoek bulk outfall sewer reaches capacity)	BPS12.12	PRJ-BPS-033	2035	R3 586 000
	1 289m x 400mm dia. new gravity to accommodate future areas in Kranshoek region (Implement when Kranshoek bulk outfall sewer reaches capacity)	BPS12.13	PRJ-BPS-033	2035	R4 288 000
	3 035m x 600mm dia. new gravity to accommodate future areas in Kranshoek region (Implement when Kranshoek bulk outfall sewer reaches capacity)	BPS12.14	PRJ-BPS-002	2035	R14 145 000
	1 244m x 400mm dia. new gravity when existing bulk sewer can no longer accommodate flow from future areas P5, P7 and P8	BPS12.17	PRJ-BPS-032	2035	R4 139 000
	446m X 160mm dia. new gravity when future areas P24 and P25 develops	BPS13.6	PRJ-BPS-042	2035	R767 000
	276m X 160mm dia. new gravity when FDA P78 develops	BPS39.1	PRJ-BPS-015	2035	R495 000
	1 037m X 160mm dia. new gravity. Option dependent on when PRJ-BPS-002 is implemented (Cost to developer)	BPS50.1	PRJ-BPS-018	2035	-
	92m x 160mm dia. new gravity. Option dependent on when PRJ-BPS-002 is implemented (Cost to developer)	BPS50.2	PRJ-BPS-018	2035	-
	521m x 250mm dia. new gravity to accommodate future areas in Kranshoek region (Implement when Kranshoek bulk outfall sewer reaches capacity)	BPS12.10	PRJ-BPS-036	2036	R1 163 000
	347m x 200mm dia. new gravity when FDA P8 develops	BPS11.6	PRJ-BPS-014	2040	R688 000
	499m x 250mm dia. new gravity when FDA P11 develops	BPS13.2	PRJ-BPS-042	2040	R1 115 000
	290m x 250mm dia. new gravity when FDAs P11 and P22 develop	BPS13.3	PRJ-BPS-042	2040	R672 000
	14m x 250mm dia. new gravity when FDAs P11, P22, P24 and P25 develop	BPS13.4	PRJ-BPS-042	2040	R87 000
	455m x 160mm dia. new gravity when FDA P25 develops	BPS13.5	PRJ-BPS-042	2040	R781 000
	71m x 160mm dia. new gravity when FDA P64 and P65 develop	BPS31.2	PRJ-BPS-030	2040	R164 000
	162m x 160mm dia. new gravity when FDAs P76 and P77 develop	BPS37.1	PRJ-BPS-053	2040	R311 000
	374m x 160mm dia. new gravity when FDAs P75, P76 and P77 develop	BPS37.2	PRJ-BPS-053	2040	R651 000
	248m x 200mm dia. new gravity when FDAs P71, P75, P76 and P77 develop	BPS37.3	PRJ-BPS-052	2040	R505 000
	6m x 160mm dia. new gravity to divert flow when future gravity sewer line is constructed. PS can be abandoned.	BPS37.8	PRJ-BPS-052	2040	R62 000
	146m x 160mm dia. new gravity when FDAs P83 and P84 develop	BPS39.5	PRJ-BPS-015	2040	R285 000
	93m x 200mm dia. upgrade existing gravity when overflow problems occur	BPS39.6	PRJ-BPS-015	2040	R404 000
	370m x 160mm dia. new gravity when FDA P83 develops	BPS39.4	PRJ-BPS-015	2045	R645 000
	371m x 160mm dia. new gravity when FDA P64 develops	BPS31.1	PRJ-BPS-030	2050	R647 000
	307m x 160mm dia. new gravity when FDA P73 develops	BPS37.4	PRJ-BPS-053	2050	R544 000
	Sub Total				**R112 325 000**
Plettenberg Bay rising mains	862m x 250mm dia. upgrade existing rising when Kwanokuthula PS1 is upgraded	BPS25.12	PRJ-BPS-010	2021	R2 955 000
	699m x 90mm dia. new rising when future PS 23 is constructed	BPS46.2	PRJ-BPS-016	2021	R654 000
	490m x 200mm dia. upgrade existing rising when PS 8 requires upgrading (Investigate first)	BPS4.4	PRJ-BPS-008	2022	R1 373 000
	5761m x 355mm dia. upgrade existing rising when Aventura PS overflows due to existing rising main capacity	BPS34.2	PRJ-BPS-020	2022	R22 822 000
	1502m x 200mm dia. new rising when future Wittedrift PS1 is constructed	BPS51.2	PRJ-BPS-058	2023	R2 654 000
	940m x 200mm dia. new rising when future Wittedrift PS 2 is constructed	BPS51.5	PRJ-BPS-058	2023	R1 669 000
	1230m x 250mm dia. new rising when future PS2 is constructed (Rising main can be linked to Kranshoek bulk as interim solution)	BPS11.9	PRJ-BPS-034	2025	R2 909 000
	1011m x 250mm dia. new rising when Ladywood PS1 is constructed (Includes N2 road crossing)	BPS26.9	PRJ-BPS-054	2025	R2 396 000
	1197m x 110mm dia. new rising when future PS9 is constructed	BPS28.3	PRJ-BPS-025	2025	R1 198 000
	315m x 90mm dia. new rising when future PS11 is constructed	BPS30.2	PRJ-BPS-029	2025	R302 000
	657m x 90mm dia. new rising when future PS 18 is constructed	BPS92.2	PRJ-BPS-024	2025	R615 000
	416m x 90mm dia. new rising when future PS 3 is constructed (Cost to developer)	BPS14.2	PRJ-BPS-047	2030	-
	468m x 600mm dia. upgrade existing rising main when pump upgrade is implemented (BPS17.2)	BPS17.3	PRJ-BPS-003	2030	R4 351 000
	842m x 90mm dia. new rising when future PS5 is constructed (Cost to developer)	BPS18.2	PRJ-BPS-048	2030	-
	106m x 90mm dia. new rising when future PS6 is constructed (Cost to developer)	BPS19.2	PRJ-BPS-049	2030	-
	213m x 160mm dia. new rising when Ladywood PS2 is constructed	BPS26.12	PRJ-BPS-056	2030	R308 000
	1124m x 90mm dia. new rising when Ladywood PS3 is constructed	BPS26.15	PRJ-BPS-057	2030	R1 043 000

Table C.3.14: Future Bulk Sewer Pipeline and Sewer Drainage Network Infrastructure Required					
Scheme	**Recommendations included in the Water Master Plan**	**Master Plan Items**	**Project**	**Year**	**Estimated Cost (VAT Excl.)**
	470m x 160mm dia. new rising when future PS12 is constructed. N2 crossing required.	BPS31.4	PRJ-BPS-028	2030	R656 000
	269m x 90mm dia. new rising when future PS20 is constructed (Cost to developer)	BPS43.2	PRJ-BPS-044	2030	-
	841m x 550mm dia. upgrading existing rising when pump upgrade is implemented (BPS12.15)	BPS12.16	PRJ-BPS-038	2035	R6 521 000
	859m x 550mm dia. upgrade existing rising main when pump upgrade is implemented (BPS13.7)	BPS13.8	PRJ-BPS-037	2035	R6 646 000
	561m x 600mm dia. upgrade existing rising main when pump upgrade is implemented (BPS16.2)	BPS16.3	PRJ-BPS-037	2035	R5 033 000
	927m x 90mm dia. new rising when future PS8 is constructed (Cost to developer)	BPS24.2	PRJ-BPS-046	2035	-
	949 x 90mm dia. new rising when future PS10 is constructed (Cost to developer)	BPS29.2	PRJ-BPS-027	2035	-
	598m x 200mm dia. new rising main from Kranshoek PS4 to new Kranshoek bulk sewer in order to created additional capacity in the existing downstream infrastructure.	BPS12.18	PRJ-BPS-036	2036	R1 070 000
	570m x 110mm dia. new rising when future PS4 is constructed (Cost to developer)	BPS15.2	PRJ-BPS-041	2040	-
	829m x 160mm dia. upgrade existing rising when Sanderlings PS is upgraded (Investigate first)	BPS35.2	PRJ-BPS-050	2040	R1 920 000
	503m x 90mm dia. new rising when future PS14 is constructed (Cost tot developer)	BPS36.2	PRJ-BPS-051	2040	-
	636m x 110mm dia. new rising when future PS15 is constructed	BPS37.6	PRJ-BPS-052	2040	R643 000
	1680m x 355mm dia. new rising including river-crossing (Existing 200mm dia. rising main is in a poor condition and should be replaced)	BPS38.2	PRJ-BPS-004	2040	R6 673 000
	1032m x 90mm dia. new rising when future PS17 is constructed (Cost to developer)	BPS42.2	PRJ-BPS-012	2040	-
	368m x 90mm dia. new rising when future PS21 is constructed (Cost to developer)	BPS44.2	PRJ-BPS-026	2040	-
	640mm x 90mm dia. new rising when future PS22 is constructed (Cost to developer)	BPS45.2	PRJ-BPS-026	2040	-
	1544m x 90mm dia. new rising when future PS7 is constructed (Cost to developer)	BPS23.2	PRJ-BPS-045	2045	-
	221m x 90mm dia. new rising when future PS 16 is constructed (Cost to developer)	BPS11.11	PRJ-BPS-035	2045	-
	2119m x 200mm dia. new rising when future PS13 is constructed (Cost to developer)	BPS33.2	PRJ-BPS019	2050	-
	804m x 110mm dia new rising when future PS1 is constructed (Cost to developer)	BPS7.2	PRJ-BPS-043	2050	-
	Sub Total				**R74 411 000**
Kurland gravity mains and network	606m x 250mm dia new gravity	BKS2.3	PRJ-BKS-003	2021	R1 636 000
	Sub Total				**R1 636 000**
Kurland rising mains	1084m x 160mm dia new rising	BKS2.2	PRJ-BKS-003	2021	R1 488 000
	Abandon existing rising main when future Kurland PS K1 is implemented	BKS.B3	PRJ-BKS-003	2021	-
	Sub Total				**R1 488 000**
Total					**R189 860 000**

The recommended O&M activities for the bulk and sewer drainage networks, as included under Section 4.1.9, to be implemented by Bitou Municipality.

SEWER PUMP STATIONS

Based on the most likely land-use development scenario, it will be necessary for the following new sewer pump stations, as well as upgrading of the existing sewer pump stations:

Table C.3.15: Future Sewer Pump Stations Required

Town	Recommendations included in the Sewer Master Plan	Year	Estimated Cost (VAT Excl.)
Plettenberg Bay	Upgrade Kranshoek PS 3 to 3.5 l/s (Investigate first) (BPS5.5)	2021	R24 000
	New 3.5 l/s PS when FDA-P100 develops (BPS46.1)	2021	R1 055 000
	Upgrade Kwanokuthula PS 1 to 62 l/s (Required to accommodate future developments) (BPS25.11)	2021	R820 000
	Upgrade existing PS to 12 l/s to accommodate future demand (Investigate first) (BPS25.13)	2021	R24 000
	Upgrade PS to 5 l/s if required (Investigate first) (BPS25.14)	2021	R24 000
	Upgrade Wittedrift PS to 12 l/s when FDA-P100 develops (BPS32.1)	2021	R442 000
	Upgrade PS8 to 35 l/s when PS overflows (Investigate first) (BPS4.3)	2022	R641 000
	Downgrade PS3 to 30 l/s when downstream PS2 or sewer overflows (BPS20.3)	2023	R217 000
	New 20 l/s future Wittedrift PS1 (Required to accommodate ultimate demand. Alternative to pumping to Aventura PS) (BPS51.1)	2023	R1 955 000
	New 25 l/s future Wittedrift PS2 (Required when future Wittedrift PS1 is constructed) (BPS51.4)	2023	R2 104 000
	New 10 l/s Future PS 9 (Required for FDA P58 and P60) (BPS28.2)	2025	R1 658 000
	New 5 l/s Future PS 11 (Required for FDA P67 and P68) (BPS30.1)	2025	R1 508 000
	New 3.5 l/s pump station when FDA-P91 & P92 develop (BPS92.1)	2025	R1 055 000
	New 40 l/s future PS 2 when FDA P5, P7, P8 develop (BPS11.8)	2025	R2 542 000
	New 55 l/s future Ladywood PS 1 when FDA P27, P28, P29 and P30 develop (BPS26.8)	2025	R2 974 000
	New 14 l/s future Ladywood PS 2 when FDA P27 develop (BPS26.11)	2030	R1 777 000
	New 4 l/s future Ladywood PS 3 when FDA P27 develop (BPS26.14)	2030	R1 206 000
	New 3.5 l/s PS when FDA-P51 develop (Cost to the developer) (BPS43.1)	2030	-
	New 3.5 l/s PS when FDA-P21 develop (Cost to the developer) (BPS14.1)	2030	-
	New 3.5 l/s PS when FDA-P20 develop (Cost to the developer) (BPS18.1)	2030	-
	New 3.5 l/s PS when FDA-P19 develop (Cost to the developer) (BPS19.1)	2030	-
	New 13 l/s future PS P12 when FDA P64, P65, P66, P67, P68 develop (BPS31.3)	2030	R1 748 000
	Downgrade PS10 to 7 l/s - Only required if downstream sewer overflows (Investigate first) (BPS3.1)	2030	R159 000
	Upgrade Piesang Valley PS 18 to 305 l/s (BPS17.2)	2030	R2 333 000
	Upgrade Piesang Valley PS 20 to 288 l/s (BPS13.7)	2035	R2 333 000
	Upgrade Piesang Valley PS 19 to 300 l/s (BPS16.2)	2035	R2 333 000
	Upgrade Piesang Valley PS 5 to 250 l/s (BPS12.15)	2035	R2 138 000
	New 3.5 l/s PS when FDA-P34 develop (Cost to the developer) (BPS24.1)	2035	-
	New 3.5 l/s PS when FDA-P68 develop (Cost to the developer) (BPS29.1)	2035	-
	New 3.5 l/s PS when FDA-P77 develop (Cost to the developer) (BPS36.1)	2040	-
	New 10 l/s future PS P15 when FDA P71, P73, P75, P76, P77 develop (BPS37.5)	2040	R1 658 000
	Upgrade Matjiesfontein PS to 70 l/s (BPS38.1)	2040	R880 000
	New 7 l/s PS when FDA-P46 develop (Cost to the developer) (BPS15.1)	2040	-
	New 4 l/s PS when FDA-P11 develop (Cost to the developer) (BPS42.1)	2040	-
	New 3.5 l/s PS when FDA-P60 develop (Cost to the developer) (BPS44.1)	2040	-
	New 4.5 l/s PS when FDA-P60 develop (Cost to the developer) (BPS45.1)	2040	-
	Upgrade Sanderlings PS to 14 l/s when FDA-P71 develop (Investigate first) (BPS35.1)	2040	R24 000
	New 3.5 l/s PS when FDA-P33 develop (Cost to the developer) (BPS23.1)	2045	-
	New 3.5 l/s PS when FDA-P10 develop (Cost to the developer) (BPS11.10)	2045	-
	Upgrade Aventura PS to 120 l/s (BPS34.1)	2050	R1 244 000
	New 25 l/s PS when FDA-P70 develop (Cost to the developer) (BPS33.1)	2050	-
	New 8.5 l/s PS when FDA-P15 develop (Cost to the developer) (BPS7.1)	2050	-
	Upgrade PS H3 to 20 l/s when FDA P15 develops (BPS8.1)	2050	R503 000
	Sub Total		**R35 379 000**
Kurland	New 25 l/s Kurland PS K1 when future area P96 develops. Existing Kurland PS1 can be abandoned and flow diverted to new PS (BKS.2.1).	2021	R2 104 000
	Decommission PS when future Kurland PS K1 is implemented (BKS.B2)	2025	R216 000
	Upgrade PS to 3.5 l/s if required. Verify existing PS capacity and dia. of rising main first (BKS.B4)	2025	R24 000
	Upgrade PS to 3.5 l/s if required. Verify existing PS capacity and dia. of rising main first (BKS.B5)	2025	R24 000
	Sub Total		**R2 368 000**
Total			**R37 747 000**

The recommended O&M activities for the sewer pump stations, as included under Section 4.1.8, to be implemented by Bitou Municipality.

WASTE WATER TREATMENT INFRASTRUCTURE

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

Table C.3.16: Existing Capacities, Flows and Required Future Flows for the two WWTWs (Ml/d)

WWTW	Existing Hydraulic Capacity	Peak Month Average Daily Flow	Average Daily Flow (2018 – 2019)	Required Treatment Capacity (10 Year projected flow)	Final Effluent Compliance for 2018/2019
Plettenberg Bay (Gansevlei)	9.000	4.387 (Sep)	3.690	7.328	Microbiological: 100.0% Chemical: 99.2% Physical: 100.0%
Kurland	0.500	0.321 (Jun)	0.309	0.461	Microbiological: 100.0% Chemical: 97.1% Physical: 98.7%

Bitou Municipality review on an annual basis the capacity and suitability of their 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 Plettenberg Bay (Gansevlei) WWTW: The WWTW has sufficient capacity to treat the existing and future short to medium term projected flow to the works. An upgrade will only be required within the next 10 – 15 years.

The Kurland WWTW: The WWTW has sufficient capacity to treat the existing and future short to medium term projected flow to the works. An upgrade will only be required within the next 10 – 15 years.

The WWTWs to be upgraded in Bitou Municipality are summarised in the table below:

Table C.3.17: WWTWs to be Upgraded in the Future

WWTW	Short, Medium, Long Term	Estimated Cost (Vat Excluded)
Plettenberg Bay	Long	R32 300 000
Kurland	Long	R17 251 000

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

- Plettenberg Bay (Gansevlei) WWTW:
  - Inlet works: Mechanical wash screen compactor is not working.
  - Anaerobic and Anoxic Reactors: Mixers are not working.
  - Aeration: Additional floating aerator for periods of high ammoniac trip the power.
  - RAS PS: Only two of the three pumps are working.
  - PS for the return of effluent from the emergency storage pond needs to be refurbished.
  - Disinfection: Chlorine scales are not working. Chlorine gas detector is not working.
  - Flow metering: Final effluent flow meter is not working.
- Kurland WWTW: Sump for the treated effluent is required for the re-use pump station (irrigation).

The table below gives an overview of the recommended improvements for the WWTWs in Bitou Municipality's Management Area, as taken from the W_2RAP and identified during the WSDP inspection:

Table C.3.18: Recommended Improvements for the Two WWTWs as Included in the W_2RAP and Identified During the WSDP Inspection.

Component	Improvement Plan	Estimated Cost (Vat Excluded)
Plettenberg Bay WWTW		
WWTW	New gensets are required for all electrical equipment.	R472 500
Inlet works	Mechanical wash screen compactor needs to be refurbished.	R200 000
Anaerobic and Anoxic Reactors	Mechanical mixers are not working and need to be refurbished.	R75 000
Aerobic Reactor	Refurbish additional floating aerator for periods of high ammoniac (Trip the power).	R30 000
Pump Stations	Refurbish one RAS pump currently not working.	R35000
	PS for the return of effluent from the emergency storage pond needs to be refurbished.	R500 000
Disinfection	Refurbish chlorine dosing equipment (Scales, Gas leak detector, etc.)	R70 000
Flow metering	Repair final effluent flow meter (Calibration)	R10 000
Sub Total		**R**
Kurland WWTW		
Final effluent	Install sump for the final treated effluent for the re-use pump station (irrigation)	R30 000
Sub Total		**R30 000**
Total		**R1 242 500**

The recommended O&M activities for the WWTWs, as included under Section 4.1.10 of the Future Demand and Functionality Requirements Report, are to be implemented by Bitou Municipality.

Water and Sanitation Schemes:

Water Schemes: Based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary:

Table C.3.19: Future Water Reticulation Infrastructure Required

Plettenberg Bay

Proposed distribution zones

- The boundaries between the existing Brakkloof reservoir zone and the Town PRV 4 zone are adjusted in order to improve network conveyance and redundancy.
- The Town PRV 4 zone, supplied with water from the Town Reservoirs, is increased to include future development areas P18 to P24.
- The boundaries between the existing Brakkloof reservoir zone and the Whale Rock reservoir zone are adjusted. It is proposed that the existing Whale Rock reservoir zone is augmented with water from the Quarry reservoir zone through a PRV (at the position of the old decommissioned Quarry BPT). Future development areas P16 & P17 are accommodated within the existing Whale Rock reservoir zone.
- The Brakkloof reservoir zone is increased to include the lower lying areas of future development area P14.
- The Quarry reservoir zone is increased to include future development areas P13 & P15 as well as the higher lying areas of future area P14.
- Two new zones are proposed for the future development areas between Kranshoek and the Quarry reservoir, viz. the new Roodefontein Upper and Lower reservoir zones. It is proposed that the Roodefontein Upper reservoir zone supplies the future development areas P4 - P6, P97, P98 and the higher lying areas of future area P7, while the Roodefontein Lower reservoir zone supplies the lower lying areas of future development area P7 as well as future areas P8, P10 and P12.
- The boundary of the Kranshoek tower zone is adjusted so that the higher lying area to the north of the zone is incorporated in the proposed Roodefontein Upper reservoir zone.
- The boundary of the Town Upper tower zone is increased to accommodate future development area P51.
- The boundary of the Archiewood and Brackenridge reservoir zone is increased to accommodate future development areas P25, P40, P52, P53, P101, P102 and the lower lying erven of area P94.
- A new Archiewood PRV 2 zone is proposed for when future development area P43 develops, supplied with water from the Archiewood reservoir through a new PRV.
- A new Piesang Valley PRV zone is proposed for when future development area P46 develops, supplied with water from the Archiewood reservoir through a new PRV.
- It is proposed that the existing Kwanokuthula tower zone (which is currently supplied with water only from the Upper tower because the Lower tower has a leak) is supplied in future from only the Upper tower. An emergency valve (to be closed) is proposed between the supply from the Lower tower and the existing Kwanokuthula network. The zone boundary of the Kwanokuthula Upper tower zone is increased to accommodate future areas P31 - P35 & P90.

Table C.3.19: Future Water Reticulation Infrastructure Required
• A new Kwanokuthula reservoir zone (supplied from the existing Kwanokuthula East (Lower) reservoirs) is proposed for the lower lying areas of future development areas P27 & P28 as well as future area P26. • A new Kwanokuthula Lower tower zone (supplied from the existing Kwanokuthula East (Lower) tower) is proposed for the higher lying areas of future development areas P27 & P28 as well as future areas P29 & P30. • A new tower (proposed New Horizon tower) is proposed next to the existing New Horizon reservoirs in order to accommodate future development areas P35 & P91. It is proposed that the higher lying erven in New Horizon (that is currently accommodated within the New Horizon reservoir zone) is incorporated in the proposed New Horizon tower zone. This will improve the low static pressure that exists currently within the higher lying erven in New Horizon. • The boundary of the New Horizon reservoir zone is increased to accommodate future development areas P36, P44, P45 and P47 - P50, P92 and the higher lying erven of area P94. • A new Goose Valley booster zone is proposed for the higher lying areas of future development area P60. • The boundary of the Goose Valley reservoir zone is increased to accommodate future development areas P56, P58, the lower lying areas of P60 as well as future areas P64 - P69. • The boundary of the Matjiesfontein reservoir zone is increased to accommodate future development areas P71 - P82 & P104. • A new Keurboomstrand Upper reservoir zone (supplied from the existing Keurboomstrand reservoir) is proposed for future development areas P85 - P87. • A new Keurboomstrand Upper booster zone (supplied from the proposed Keurboomstrand Upper reservoir) is proposed for future development areas P83 & P84. • Three new distribution zones are proposed for the Hanglip, Roodefontein and Ganse Valley Estates. • The boundary of the Wittedrift reservoir zone is increased to accommodate future development areas P61 - P63 & P99. • A new Green Valley booster zone is proposed for when the higher lying future area P100 develops in Green Valley. It is proposed that this booster zone is supplied with water from a new Green Valley reservoir. • It is proposed that the existing Green Valley reservoirs and elevated tank are decommissioned and that the existing Green Valley reservoir and tower zones are supplied from the new Green Valley reservoir when it is commissioned. Two new PRV's are proposed to reduce static pressures at the lower lying erven when these erven are incorporated within the proposed new Green Valley reservoir zone. • Future area P54 should be accommodated within the existing Town Reservoir zone and future area P55 within the existing Town PRV 1 zone.
Proposed future system and required works • The most significant upgrades of the existing distribution system is the alteration of the existing zone boundaries between the Town PRV 4, Brakkloof reservoir, Whale Rock reservoir, Kwanokuthula tower and New Horizon reservoir zones in order to improve operation of the existing system. • The alteration of the existing zone boundaries between the Town PRV 4, Brakkloof reservoir and Whale Rock reservoir zones will improve network conveyance and redundancy in the system. • The alteration of the zone boundary of the New Horizon reservoir zone together with the implementation of the New Horizon tower zone will improve the low static pressures that is currently experienced in the higher lying erven of the New Horizon reservoir zone. • A new PRV is proposed at the position of the existing Quarry BPT (that is decommissioned) in order to improve the capacity of the existing system to provide fire flow to Robberg Estate and Whale Rock Beach. • A number of distribution pipelines are also required to reinforce water supply within the Plettenberg Bay distribution network and supply future development areas when they develop.
Kurland
Proposed distribution zones • The only change to the existing distribution zone is that the existing boundary of the existing zone is increased to accommodate future development areas.
Proposed future system and required works • A new bulk supply pipeline from the Kurland reservoirs to the town is proposed in order to reinforce water supply to the Kurland network. The implementation of this project will improve low water pressures in Kurland that are currently experienced during periods of high demand. • Upgrading of the existing Kurland distribution network is proposed in order to accommodate housing developments on Erf 562.
Natures Valley
Proposed distribution zones • There are no changes to the existing distribution zones of Natures Valley.
Proposed future system and required works • Two reinforcement pipelines are proposed to improve the conveyance in the network.

Sanitation Schemes: Based on the most likely land-use development scenario, the following further sewer reticulation infrastructure components will be necessary:

Table C.3.20: Future Sewer Reticulation Infrastructure Required
Plettenberg Bay
• The boundaries of the existing drainage areas in Plettenberg Bay are increased to accommodate proposed future development areas that fall within these drainage areas. • The main outfall sewer that gravitates to Kranshoek PS 1 should be upgraded if overflow problems occur. • A new main outfall sewer (items BPS12.10 - BPS12.14) is proposed for future development areas P4, P6, the northern areas of P7, P10, P12, P13 & P14. This outfall sewer should gravitate to the existing Piesang Valley 5 PS. It is proposed that flow from the Kranshoek PS 4 is in future diverted to this new bulk sewer (through the implementation of master plan item BPS12.18) in order to create additional capacity in the existing bulk sewer between Kranshoek and the Piesang Valley PS 5. • A new internal pump station and rising main should be constructed for the southern portion of future area P10 that cannot gravitate to the proposed Kranshoek bulk sewer. • A new Future PS P2 drainage area is proposed for the future development areas P5, P8, P9 and the southern areas of P7. A new pump station and rising main should be constructed for this drainage area that discharges into the drainage area of the Piesang Valley 5 PS (discharges into the proposed new bulk sewer from Kranshoek through master plan items BPS11.9 & BPS12.17). • A new internal pump station (Future PS P17) and rising main should be constructed for the southern portion of future area P11 that cannot gravitate in a northern direction towards the Piesang Valley PS 20. • The option should be investigated to in future (after the new Kranshoek bulk sewer is constructed) abandon the proposed Future PS P17 and Brackenridge pump stations 1, 2 & 3 and divert flow from the upstream drainage areas to the proposed Kranshoek bulk sewer. • A new Future PS P1 drainage area is proposed for future development area P15. A new pump station and rising main should be constructed for this drainage area that discharges into PS H3. When overflow problems occur at PS H3, the pumps should be upgraded according to the sewer master plan. • The main outfall sewer that gravitates to PS 11 should be upgraded if overflow problems occur. • PS 10 should be downsized to a capacity of 7 l/s if overflow problems occur between PS 9 and PS 10. • If overflow problems occur at the main outfall sewer that drains towards PS 8, this outfall sewer should be upgraded. When overflow problems occur at PS 8, the pumps should be upgraded to a capacity of 35 l/s and the rising main upgraded to a diameter of 200 mm. If overflow problems occur in the main gravity outfall sewer into which the rising main of PS 8 discharges, this outfall sewer should be upgraded according to the master plan. • When the Piesang Valley 5 pumping station reaches capacity the pump station should be upgraded to a capacity of 250 l/s and the existing rising main replaced with a new dedicated 500 mm diameter rising main that discharges into the Piesang Valley 20 PS (alternatively the existing 350 mm rising main can be reinforced with a new 350 mm diameter parallel rising main). • A new Future PS P3 drainage area is proposed for future development area P21. A new pump station and rising main should be constructed for this drainage area that discharges into the drainage area of the Piesang Valley 20 PS. • New main outfall sewers are proposed for future development areas P11 & P22 - P25. These outfall sewers should gravitate to the existing Piesang Valley 20 PS. When the Piesang Valley 20 pumping station reaches capacity the pump station should be upgraded to a capacity of 290 l/s and the existing rising main replaced with a new 500 mm diameter rising main (alternatively the existing 350 mm rising main can be reinforced with a new 355 mm diameter parallel rising main). • A new Future PS P4 drainage area is proposed for future development area P46. A new pump station and rising main should be constructed for this drainage area that discharges into the Piesang Valley 19 PS. When the Piesang Valley 18 pumping station is upgraded, the Piesang Valley 19 and 20 pump stations should be upgraded to a capacity of 300 l/s and their existing rising mains replaced with new 600 mm diameter rising mains (alternatively the existing 350 mm diameter rising mains should be reinforced with new 400 mm diameter parallel rising mains. • New outfall sewers are proposed for future development areas P45 & P47 that gravitates to the Piesang Valley 18 & 19 pump stations. • A new Future PS P20 drainage area is proposed for future development area P51. A new pump station and rising main should be constructed for this drainage area that discharges into the drainage area of PS1a. • New Future PS P5 and P6 drainage areas are proposed for future development areas P19 & P20. New pump stations and rising mains should be constructed for these drainage areas that discharge into the drainage area of PS 4. • If overflow problems occur at the main outfall sewers that drain towards PS 2 & 3, these outfall sewers should be upgraded. • New Future PS P7 and P8 drainage areas are proposed for future development areas P33 & P34. New pump stations and rising mains should be constructed for these drainage areas that discharge into the drainage area of Kwanokuthula PS 1. New outfall sewers and pipe reinforcements are proposed for the Kwanokuthula PS 1 drainage area when future development areas P31 - P34 develops. When the Kwanokuthula PS 1 reaches capacity the pump station should be upgraded to a capacity of 62 l/s and the rising main upgraded to a diameter of 250 mm. • Upgrading is proposed of the existing bulk sewer downstream of the Kwanokuthula PS 1 (master plan items BPS27.4A, B & C). This will be required in order to accommodate additional housing projects in Kwanokuthula as well as the future Ladywood development. • A new Ladywood drainage area is proposed for future development areas P27 - P30. A new Ladywood PS 1 with a capacity of 55 l/s and rising main should be constructed for this drainage area that discharges into the Ganse Valley WWTW Gravity drainage area. • A new so-called “Ebenhaezer” bulk sewer is proposed in order to accommodate future development area P35. • A new Future PS P18 drainage area is proposed for future development areas P91 & P92. A new pump station and rising main should be constructed for this drainage area that discharges into the proposed Ebenhaezer bulk sewer. • A new Future PS P9 drainage area is proposed for future development areas P58 & P60. A new pump station and rising main should be constructed for this drainage area that discharges into the Gansevlei WWTW.

Table C.3.20: Future Sewer Reticulation Infrastructure Required
• New Future PS P10, P11 and P12 drainage areas are proposed for future development areas P64 - P68. Future PS P12 should pump to Future PS P11, Future PS P11 to Future PS P10 and Future PS P10 to the existing Goose Valley Main PS. • When the proposed housing development in Green Valley (future area P100) starts to develop it is proposed that the existing sewer infrastructure between the development and the Wittedrift PS is upgraded and that the Wittedrift PS is upgraded to a capacity of 12 l/s. • The proposed capacity of 12 l/s for the Wittedrift PS is at the upper limit of what can be pumped to the Aventura PS through the 7,0 km 125 mm diameter rising main between the Wittedrift and Aventura pump stations. • It is proposed that when the upgraded Wittedrift PS reaches capacity (as additional areas in Wittedrift and Green Valley develops) the rising main to Aventura is abandoned and new bulk infrastructure is constructed in order to pump directly from Wittedrift to the Gansevlei WWTW (see project BPS-058). • A new Future PS P13 with a capacity of 25 l/s and a rising main that discharges into the Aventura PS is proposed for future development area P70. • The capacity of the Aventura PS is currently limited to 32 l/s due to the capacity of the downstream 5,8 km rising main. It is proposed that the existing 200 mm diameter rising main is upgraded to a 355 mm diameter rising main. This will improve the capacity of the Aventura PS from 32 l/s to 78 l/s. • When the Aventura PS reaches capacity in future as development of upstream developments commence, it is proposed that the pumps in the pump station are upgraded to a capacity of 120 l/s. • When future development area P71 develops the Sanderlings PS and rising main should be upgraded to a capacity of 14 l/s and a diameter of 160 mm. • New Future PS P14 and P15 drainage areas are proposed for future development areas P71 - P77. Future PS P14 should pump to the drainage area of Future PS P15 and Future PS P15 to the existing Matjiesfontein PS. It is proposed that the existing Plettenberg Manor PS is decommission and sewage from the upstream drainage area is diverted to the proposed Future PS P15. • When the Matjiesfontein PS reaches capacity it should be upgraded to a capacity of 70 l/s. The existing 200 mm diameter rising main is in a bad state of repair and should be replaced with a new 315 mm diameter rising main. • New outfall sewers are proposed for future development areas P78 - P80, P83 & P84 in the Keurboomstrand Main drainage area.
Kurland
• The existing Kurland PS 1 drainage area is increased to accommodate future development area P95 to the north of Kurland that fall within this drainage area. • A new Future PS K1 drainage area is proposed for future development area P96 (± 1 500 erven on a portion of Erf 562 to the south of Kurland). A new pump station and rising main to the Kurland WWTW should be constructed for this purpose. • No layout information was available for future development area P96, but from the topographical information it seems that it will be possible to abandon the existing Kurland pump station 1 in future (after the proposed Future PS K1 is constructed) and re-direct flow from the upstream drainage area to the Future PS K1. • It is therefore proposed that when future area P96 develops Future PS K1 should be constructed on a site downstream of future area P96 and Kurland PS 1 so that the total flow from future area P96 and the existing Kurland PS 1 drainage area can gravitate towards the proposed PS (see project BKS-003). • The option should also be investigated to abandon the Kurland PS 2 and re-direct flow from the upstream drainage area towards the proposed Future PS K1.
Natures Valley
• There is currently no sewer network in Natures Valley and the existing erven are serviced through septic tanks. No provision is made in the sewer master plan to service these erven with a waterborne sanitation system in the future. This option should however be investigated.

TOPIC 4: WATER SERVICES OPERATION AND MAINTENANCE

Table 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 Is There an O&M Plan?	Yes	100	Operation and Maintenance tasks for the various water and sewerage infrastructure components, as indicated under Sections 4.1.1 to 4.1.10 of the "Future Demand and Functionality Requirements" WSDP Master Plan should be implemented. Ensure the required O&M schedules are in place and signed off.	100	Partially	85.7
Resources	Yes	100	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 O&M 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	Partially	85.7
Information	Yes	100	Ensure that the required O&M Manuals are in place for all the water and sewerage infrastructure.	100	Partially	85.7
			Ensure all the water and sewerage infrastructure are included in the Asset Register.	100	Yes	100
	Yes	100	Groundwater: Implement recommended daily, weekly, monthly and six monthly O&M activities for the boreholes.	100	Partially	85.7

Table 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 %**
Activity Control & Management	Yes	100	Surface water infrastructure: Implement preventative maintenance procedures.	100	Partially	85.7
	Yes	100	Bulk and water reticulation networks and fittings: Compile daily, weekly, monthly and annual maintenance checklists for the maintenance activities for the water reticulation networks and fittings.	100	Partially	85.7
	Yes	100	WTWs: Evaluate the existing O&M schedules for the WTWs against the recommended O&M tasks and ensure all required activities are adequately monitored and recorded.	100	Partially	85.7
	Yes	100	Water PSs: Compile weekly and monthly maintenance checklists for the recommended activities for all the water PSs and all PSs need to be inspected on at least a weekly basis.	100	Partially	85.7
	Yes	100	Reservoirs: Compile maintenance checklists for the recommended reservoir maintenance activities and document all inspections.	100	Partially	85.7
	Yes	100	Remote monitoring and Control Systems: Ensure adequate maintenance is carried out on the SCADA systems and compile maintenance checklists for the recommended activities.	100	Partially	85.7
	Yes	100	Sewer PSs: Compile weekly and quarterly maintenance checklists for the recommended activities for all the sewer PSs and all centrifugal pump stations need to be inspected on at least a weekly basis.	100	Partially	85.7
	Yes	100	Bulk and sewer drainage networks: Annual, monthly and weekly schedules for maintenance should be drawn up for the bulk and sewerage networks. Regular cleaning of sewer lines and all blockages and their precise locations should be recorded.	100	Partially	85.7
	Yes	100	WWTWs: Evaluate the existing O&M schedules for the WWTWs against the recommended O&M tasks and ensure all required activities are adequately monitored and recorded.	100	Partially	85.7

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 Bitou 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 Bitou Municipality.

TOPIC 5: CONSERVATION AND DEMAND MANAGEMENT

Table 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	Implement the proposed WC/WDM Strategy and the 25 WC/WDM items. Ensure adequate budget is allocated under the Capital and Operational budgets towards the implementation of the proposed WC/WDM initiatives.	100	Partially	85.7
	Yes	100	Set up meeting with the Large Water Users to discuss water consumption status, potential water saving volumes and to cultivate a water saving awareness within each large water user.	100	No	78.6
Leak and meter repair programmes.	Yes	100	A Leak Repair and Assistance Programme that investigates and repairs leaks at all domestic households in low cost housing developments and poor areas with consumption above 15 kl / month should be implemented.	100	No	71.4
	Yes	100	Continue with the current phased pipeline rehabilitation programme.	100	Partially	92.9
	No	100	Improve maintenance on bulk water meter chambers and ensure all bulk water meters are installed in lockable meter chambers. Chambers to be regularly cleaned.	100	Partially	85.7
	Yes	100	Install water meters at all the unmetered erven.	100	Partially	85.7
Consumer/end-use demand management: Public Information & Education Programmes	Yes	100	Support schools with WDM initiatives	100	Partially	85.7
	Yes	100	Bitou Municipality can consider adding helpful hints on effective water usage on the monthly bills. Community awareness programmes should be initiated to inform consumers of the importance of WC/WDM.	100	Partially	85.7
Conjunctive use of surface - and groundwater	No	100				100
Working for Water	No	100				100

Table C.5.2: Conservation and Demand Management - Water Balance						
Section	**Intervention Required?**	**%**	**Solution description as defined by topic situation assessment**	**%**	**Is there an Existing project/activity addressing this problem?**	**Current Demand Overall Scoring %**
Water Balance	Yes	100	Ensure that the volume of water supplied from all water resources are metered per individual source, 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	Yes	85.7

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 Bitou 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 Bitou Municipality is 74 out of 100 suggesting that there is some room for improvement in the implementation of WC/WDM.

The proposed WC/WDM Strategy for Bitou Municipality is listed in the table below, the Strategy is based on the 25 WC/WDM items of the Scorecard.

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

Item 1: Development of a Standard Water Balance

Recommendation and Strategy:

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

Funding and Budget Requirements:

No specific budget requirements. The IWA Water Balances for the systems are updated on a monthly basis by the municipality.

Item 2: Pressurised System at all times

Recommendation and Strategy:

- Adequate human resources, technical skills and O&M budgets need to be allocated towards the operation, maintenance and refurbishment of the existing infrastructure, in order to ensure that systems are always pressurised.
- Existing water pump stations that are in a poor condition needs to be refurbished.
- PRVs to be serviced regularly.

Funding and Budget Requirements:

Budgets as indicated under the individual items of the WC/WDM Strategy. Increase O&M budget allocations towards the refurbishment and replacement of old water infrastructure.

Items 3 and 4: Metering System

Recommendation and Strategy:

- All un-metered water connections, as identified through the WSMP 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.
- 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.
- 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;

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

- 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 R3 260 000.

Item 5: Effective and Informative Billing System

Recommendation and Strategy:

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

Funding and Budget Requirements:

Estimated cost to enhance the user friendliness of the municipal bill is R275 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 Consumer Services Charter should include the following information:

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

Funding and Budget Requirements:

Budget requirement for improved customer awareness raising with regard to the Municipality's Complaints System R130 000/annum.

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. The CRC of the infrastructure also needs to be indicated.

Funding and Budget Requirements:

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

Item 9: Asset Management Capital Works

Recommendation and Strategy:

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

Funding and Budget Requirements:

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.

Item 10: Asset Management Operation and Maintenance

Recommendation and Strategy:

The municipality needs to differentiate between budget allocated towards the operation and maintenance of the water infrastructure and the budget allocated towards the replacement of the water and sewerage infrastructure. A budget of approximately 1% to 2% of the

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

value of the system is typically required for the operations and maintenance of the system to ensure that the system remains in good condition.

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

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

An AMP normally includes the following:

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

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

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

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

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

Funding and Budget Requirements:

Additional budget should be allocated towards the repairs and maintenance of the existing water 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.

An estimated budget for the drafting of an AMP for all the water and sewerage infrastructure is R650 000.

Item 11: Dedicated WC/WDM Support

Recommendation and Strategy:

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

Funding and Budget Requirements:

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

Item 12: Active Leakage Control

Recommendation and Strategy:

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

Decide on how the work will be undertaken:

- The appointment and training of additional staff.
- The training of existing staff.
- 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.
- The above three options need to include the purchase or re-allocation of equipment.
- Complete outsourcing of the activity.

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

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

Funding and Budget Requirements:

Table C.5.3: Proposed WC/WDM Strategy Items for Bitou Municipality
R200 000 to undertake leak detection in zones with high excess night flows. In addition allocate approximately R125 000 per year for general visual leak inspections.
Item 13: Sectorization of Reticulation Systems
Recommendation and Strategy: The billed metered data, which is currently linked to the 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. Faulty bulk water meters need to be replaced and new meters need to be installed for the reservoirs and pump stations with no bulk water meters. The Financial Department needs to continue to provide the billed metered consumption data separately for each of the systems. Sectorization will assist with the following: • Clear indication of how much water is being used per area / zone. • Areas with high NRW and water losses can easily be identified. • Leakage and pressure control can be better managed. • Water demand per area / zone can be determined. Night flows need to be measured for zones with expected high water losses. It is recommended to re-log the night flows every few years to determine if there was an increase in leakage.
Funding and Budget Requirements: The estimated cost for the logging of flows and pressures for zones with expected high water losses is R300 000. The logging exercise should be repeated at least every three years. A budget should be allocated to investigate and resolve possible zone interconnections. It is however difficult to price such investigations at this stage.
Item 14: Effective Bulk Metering Management System
Recommendation and Strategy: • All bulk water meters at existing WTWs, reservoirs and pump stations need to be read and recorded on at least a weekly basis. • Broken bulk water meters need to be repaired or replaced. • All bulk water meters need to be installed in lockable meter chambers and reservoir sites and water pump stations need to be secured in order to prevent unauthorised access and possible damage to the water meters. • New bulk water meters need to be correctly installed. Ideally a straight pipe section upstream of the meter of at least 5x the meter dia. and 3x the meter dia. downstream of the meter. Strainers need to be installed to protect the meters. These strainer elements must be removable from the top, for ease of cleaning. Gate valves are required for maintenance before and after meters. • Every informal area with communal services to be supplied with a bulk water meter in order to determine the unbilled metered consumption. All discrete zones are to be supplied with a bulk water meter. The meter readings must be recorded on at least a weekly basis. The readings can be used to quantify both the water supplied and the leakage for a specific area.
Funding and Budget Requirements: Allow an annual budget of approximately 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.
Item 15: Effective Zone Meter Management and Assessment of Night Flows
Recommendation and Strategy: See recommendations under Item 14.
Funding and Budget Requirements: See funding and budget requirements included under Item 14.
Item 16: Pressure Management
Recommendation and Strategy: 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: • Undertake feasibility studies to determine the ranking of areas / projects (Desktop Study, Logging of pressures and flows, Analysis of data). • 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). • Impact assessment (Post pressure management logging to determine impact of new PRVs and / or installation of smart pressure controllers on existing PRVs). • The on-going operation, maintenance and optimisation of advanced pressure management installations.
Funding and Budget Requirements: 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).
Item 17: As-built Drawings of Bulk and Reticulation Infrastructure
Recommendation and Strategy: Continue with the regular updating of the Water and Sewer Master Plans.
Funding and Budget Requirements: Allow a budget of approximately R1.5 million for the updating of the Water and Sewer Master Plans every five years.
Item 18: Schematic Layouts of Water Reticulation Systems
Recommendation and Strategy:

Table C.5.3: Proposed WC/WDM Strategy Items for Bitou Municipality
Municipality needs to continue to update the schematic layouts on a regular basis, in order to ensure they remain accurate.
Funding and Budget Requirements: None
Item 19: Regulation and Bylaws
Recommendation and Strategy: The By-law needs to be enforced and adequate human resources need to be allocated for this purpose.
Funding and Budget Requirements: No additional budget or funding requirements. Enforcement of bylaw to be implemented through existing budgets.
Item 20: Tariffs
Recommendation and Strategy: See Section 7.3 under Topic 7 of the Future Demand and Functionality Requirements WSDP Report.
Funding and Budget Requirements: 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 R250 000.
Item 21: Technical Support to Customers
Recommendation and Strategy: The objective of a Technical Support programme is not limited to assisting consumers in reducing their water demand, but is also to look at wastewater, monitor compliance with by-laws and service conditions and offer general customer support. Once a dedicated person has been allocated to WC/WDM it is recommended to engage with large customers and to identify areas where the municipality can provide assistance. The proposed activities of this programme that can be budgeted for are as follows: • Train existing staff; • Identify and visit large consumers (Checking that large consumers are correctly metered and billed, providing tips on WC/WDM, test the accuracy of all large consumer meters, install data-loggers on all large consumer meters and informing consumers of any sudden change in consumption patterns). • Arrange leakage inspections in public building; • Provide assistance and technical know-how for large consumers; and • Introduce compulsory water management plan for large consumers.
Funding and Budget Requirements: No additional funding – pending the appointment of a dedicated person for WC/WDM.
Item 22: Removal of Un-authorised Connections
Recommendation and Strategy: Meters need to be installed at the estimated 1 304 unmetered erven (1 354 units), as identified through the Water Master Plan process. See Section 5.1.1.5. of the Future Demand and Functionality Requirements WSDP Report.
Funding and Budget Requirements: Estimated budget of R3.260 million is required to install water meters at the unmetered erven.
Item 23: Community Awareness on WDM
Recommendation and Strategy: See Section 5.1.3 of the Future Demand and Functionality Requirements WSDP Report.
Funding and Budget Requirements: It is estimated that R120 000 / year should be allocated for WC/WDM awareness campaigns and activities, material to be included with monthly water bills, placing notices in newspapers, billboards, competitions, etc.
Item 24: Schools Education on WDM
Recommendation and Strategy: See Section 5.1.3.1 of the Future Demand and Functionality Requirements WSDP Report.
Funding and Budget Requirements: It is estimated that a budget of R50 000 per year should be allocated for the establishment of a schools education programme in Bitou Municipality. The DWS can also assist the municipality with pamphlets and posters on WC/WDM initiatives.
Item 25: Retrofitting
Recommendation and Strategy: See Sections 5.1.2.1 and 5.1.2.2 of the Future Demand and Functionality Requirements WSDP Report.
Funding and Budget Requirements: Leak repair assistance programmes: R250 000 per annum for ongoing exercise to repair leakages at indigent properties using in excess of 20 kl/month. WSIG funding or "War on Leaks" funding from DWS can be requested in this regard. Retrofitting: R300 000 for a pilot project in one of the public buildings.

The way forward for Bitou 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.

Bitou Municipality needs to ensure that adequate funding is allocated under their Capital and Operational budgets towards the implementation of the WC/WDM Strategy. Key WDM projects to be taken into account during Bitou 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
- 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 Bitou 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. Bitou Municipality has responded to the need to address NRW and water losses within their jurisdiction by implementing various WC/WDM initiatives. The Municipality will also actively implement the proposed WC/WDM Strategy in order to reduce the percentage of NRW and water losses and improve water use efficiency within the various schemes as follows:

Table C.5.4: Commitment to Reduce NRW, Water Losses and Water Inefficiencies

Scheme	2018/2019 NRW (%/a)	2018/2019 Water Losses (%/a)	Committed Future Water Losses	
			2023 (%/a)	2043 (%/a)
Plettenberg Bay	27.8%	26.5%	20.0%	15.0%
Kurland	41.4%	28.1%	20.0%	15.0%
Natures Valley	27.5%	27.3%	20.0%	15.0%

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

Bitou Municipality is committed to continue to meter the influent at all their WWTWs, the quantity of treated effluent re-used and the quantity of treated effluent returned to the Water Resource System.

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

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

Bitou Municipality should conduct an assessment of strategic gaps in their IWA water balance data to record those flows, both water and sewerage, that are strategic in terms of medium to long term planning. A prioritisation of these locations should subsequently follow with budget allocated to improve the availability and accuracy of the flow and quality data.

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

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

The following areas need to be focused on for the IWA water balance for Plettenberg Bay.

- The unmetered erven, as identified through the Water Services Master Planning process, to be supplied with water meters.
- SCADA system to be refurbished in order to ensure that the water pump stations and the reservoir levels are controlled through the system.
- Abstraction per borehole to be recorded on at least a monthly basis.
- All bulk zone water meters to be recorded on at least a monthly basis.
- Raw water supply to the desalination plant to be recorded, as well as the treatment losses for the plant.
- "Unbilled metered" consumption to be phased out. All water usage to be metered and billed.
- Bulk water meters to be adequately protected in lockable meter chambers. Chambers to be cleaned regularly.

The following areas need to be focused on for the IWA water balance for Kurland.

- The unmetered erven, as identified through the Water Services Master Planning process, to be supplied with water meters.
- Abstraction per borehole to be recorded on at least a monthly basis.
- "Unbilled metered" consumption to be phased out. All water usage to be metered and billed.

The following areas need to be focused on for the IWA water balance for Natures Valley.

- The unmetered erven, as identified through the Water Services Master Planning process, to be supplied with water meters.
- High treatment losses of the last financial year to be reduced.
- Bulk water meters to be adequately protected in lockable meter chambers. Chambers to be cleaned regularly.

IWA water balance for Harkerville and Covie

- "Unbilled metered" consumption to be phased out. All water usage to be metered and billed.

Water Losses: The effective implementation of the proposed WC/WDM Strategy will enable Bitou Municipality to reduce their NRW and Water Losses for the various distribution systems even further 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	Ensure the required authorisations (licences) are in place for all the water resources, as well as the required registrations.	100	Partially	92.9
Additional Sources Available	Yes	100	Continue with the further augmentation of the Plettenberg Bay water resources in order to meet the future water requirements (WC/WDM, Additional Groundwater, Wadrif Off-channel dam, Additional Desalination, etc.)	100	Partially	85.7
Monitoring	Yes	100	Implement a Comprehensive Groundwater Monitoring Programme for all production boreholes (Monitor abstraction, water levels, water chemistry and install loggers. Electronic data must be downloaded quarterly by a geohydrologist and needs to be reviewed annually by a geohydrologist.	100	Partially	85.7
Water Quality	No	100	Continue with the current operational and compliance water quality and effluent quality sampling programmes.	100	Yes	100
Operation	No	100				100

The Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 and 2019 winter months. This drought reduced the safe yields of the Municipality's own existing surface water resources. The Municipality therefore continued with the implementation of specific WC/WDM measure to lower the current water requirements and the augmentation of the existing water sources of Plettenberg Bay and Kurland with groundwater.

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. Bitou 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.

Detail future water requirement projection models were developed for each of the schemes in Bitou Municipality's Management Area. These models include the future projections up to 2043 and were calibrated by using historic billed metered consumption data and bulk metered abstraction data. The NRW and Water Losses were 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 yields / registration volumes surplus or shortfalls are indicated in the table below for each of the schemes.

Table C.6.2: Projected Future Water Requirements and Yield / Registration Volumes surplus (+) / shortfall (-) Based on WSDP Model

Scheme	Projection	PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)				
		2023	2028	2033	2038	2043
Plettenberg Bay	3.5% Annual Growth	4 465.083	5 303.118	6 298.440	7 480.571	8 884.572
	5.5% Annual Growth	4 913.490	6 421.735	8 392.951	10 969.251	14 336.372
	WSDP Model	**4 284.016**	**5 244.408**	**6 448.099**	**7 960.808**	**9 866.584**
	Registration surplus (+) / shortfall (-)	**-159.016**	**-1 119.408**	**-2 323.099**	**-3 835.808**	**-5 741.584**
	Yield surplus (+) / shortfall (-)	**+4 494.789**	**+3 534.397**	**+2 330.706**	**+817.997**	**-1 087.779**
Kurland	1.5% Annual Growth	211.142	227.460	245.039	263.977	284.378
	3.5% Annual Growth	232.781	276.470	328.360	389.989	463.184
	WSDP Model	**210.024**	**247.706**	**292.605**	**346.148**	**410.044**
	Yield surplus (+) / shortfall (-)	**+140.728**	**+103.046**	**+58.147**	**+4.604**	**-59.292**
Natures Valley	1.5% Annual Growth	82.268	88.626	95.475	102.854	110.803
	3.5% Annual Growth	90.699	107.722	127.940	151.952	180.472
	WSDP Model	**80.736**	**92.753**	**106.982**	**123.856**	**143.894**
	Registration surplus (+) / shortfall (-)	**+39.264**	**+27.247**	**+13.018**	**-3.856**	**-23.894**

A number of boreholes were developed over the last two financial years to augment the water supply to Plettenberg Bay, Forest View, Harkerville and Kurland. The Municipality is currently busy with WULAs for these boreholes. The table below gives an overview of the years in which the annual water requirement is likely to exceed the sustainable yields / registration volumes from the various water resources.

Table C.6.3: Years in which the Annual Water Requirement will Exceed the Sustainable Yield / Registration Volumes from the Various Resources

Distribution System	Total sustainable Yield or Registration (x 10^6 m^3/a)	Annual Growth on 2018/2019 requirement (1.5% or 3.5%)	Annual Growth on 2018/2019 requirement (3.5% or 5.5%)	WSDP Projection Model
Plettenberg Bay	4.125 (Registration)	2020 (3.5%)	2019 (5.5%)	2021
	8 778.805 (Yield)	2042 (3.5%)	2033 (5.5%)	2040
Kurland	0.350 (Yield)	> 2043 (1.5%)	2034 (3.5%)	2038
Natures Valley	0.120 (Registration)	> 2043 (1.5%)	2030 (3.5%)	2036

Plettenberg Bay: The historical firm yield of all Bitou Municipality's supply systems was determined in 2014 to be 4.33 million m^3/a (Feasibility Study Phase of the Regional Integration of the Bulk Water Supply Systems of the Knysna and Bitou Municipalities, Phase 2A: Feasibility Option Analysis Report, 2014). With the 2018/2019 total water demand of 3.759 million m^3/a for Plettenberg Bay alone, there is currently surplus water supply available. Based on the current rapid increase in water demand as a result of the drought recovery period, the time period of surplus supply could be limited. The successful implementation of the proposed WC/WDM could however delay the need for the implementation of the next bulk water augmentation scheme.

The Feasibility Option Analysis Report short-listed the following stand-alone options for Plettenberg Bay.

Table C.6.4 Short-listed Bitou stand-alone options (Feasibility Option Analysis Report, 2014)

Scheme Elements	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Groundwater Wellfield	N/A	N/A	George Fault East	George Fault East	Plettenberg Bay Central	N/A
Storage Reservoir	Wadrif (3 Mm^3)	Wadrif (4.5 Mm^3)	Wadrif (3 Mm^3)	Wadrif (4.5 Mm^3)	Wadrif (3 Mm^3)	2.0 Ml/d Desalination Plant
Total Cost (R million)	65.7	80.25	73.8	86.52	102.0	24.0
Incremental Yield (Mm^3/a)	5.09	6.55	6.22	6.51	6.51	0.73
URV (R/m^3)	3.30	3.63	2.89	3.27	4.71	9.76*

The Feasibility Study Phase of the Regional Integration of the Bulk Water Supply Systems of the Knysna and Bitou Municipalities: Phase 2B: Preliminary Design Report, 2015 include the following future water demand-supply balance graph for Plettenberg Bay.

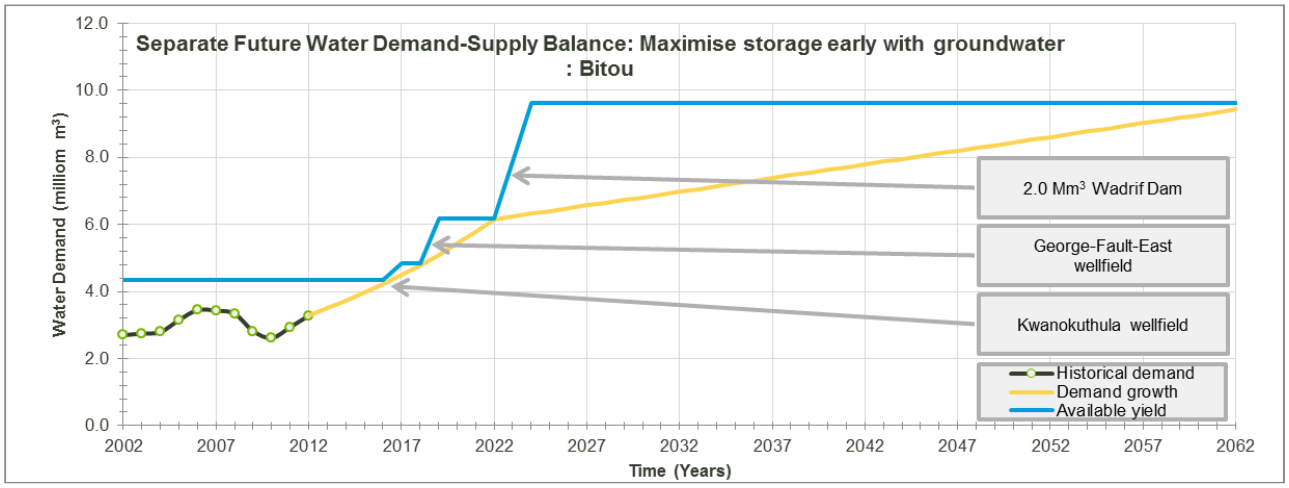


Figure C.6.1: Future Water Demand-Supply Balance Graph for Plettenberg Bay (Feasibility Study)

Two groundwater sites, GFE1 and GFE2, in the eastern end of the George Fault on the Plettenberg Bay Game Farm were explored during 2017 to assess their potential for municipal bulk water supplies. Seven deep boreholes (>60 m) and two shallow boreholes (<30 m) were drilled in total at the two sites. The groundwater quality is marginal with slightly elevated salinities and manganese concentrations. The combined electrical conductivities of the borehole waters are ~180 mS/m (the SANS-241 limit is 170 mS/m), but when blended with Keurbooms River water which has an EC of ~10 mS/m, the resulting water should be suitable for domestic consumption.

Sites GFE1 and GFE2, could supply 0.7 and 0.6 Ml/day respectively, or 1.3 Ml/day in total. The maximum potential for the area is estimated to be ~3.7 Ml/day. To achieve this yield, 6 production boreholes dispersed along a line on the southern side of the fault would probably be needed.

Groundwater abstraction from this area will affect the water table (or piezometric level) in the area, and this will predominantly be on the southern side of the fault line. In order to assess the possible effect on neighbouring boreholes, abstraction from a linear wellfield along the fault line was numerically simulated and the effect on water levels in neighbouring boreholes assessed. It was found that using the boreholes for periods of 30 days to cover peak-demand periods has a significantly less impact on neighbouring boreholes than continuous use for 300 days (which is also equivalent to 20 hrs/day for 365 days).

Should existing boreholes or a wellfield be developed in this area, it will be essential to install a water level monitoring system for three main reasons:

i. To optimise the abstraction rates from pumping boreholes.

ii. To establish the aquifer yield in the long term and to ensure it is not over-pumped and steadily dewatered.

iii. To ensure the effect of abstraction does not have a major impact on other groundwater users.

In order for the municipality to optimise the available groundwater resources in this area, it is recommended that a wellfield be developed in two stages:

1st: Equip sites GFE1 and GFE2 with pumps and monitor the pumping boreholes and nearby un-used boreholes. Analyse the data after a season of pumping and assess the optimum number of additional production boreholes that should be added to the wellfield. Borehole GFE1C can be used as is, but GFE2E should be replaced with a larger diameter borehole that is lined with uPVC casing.

2nd: If the results from the 1st stage indicate that additional boreholes could be put into production, then site, drill, test and equip them and expand the monitoring network and review the data after a season of pumping. Adjust the pumping rates based on the reviewed data.

Irrespective of whether the wellfield is expanded after the 1st stage, a robust monitoring system would have to be installed to ensure the aquifer is utilised optimally, and this would include ensuring no significant negative effects on neighbouring users.

Possible resource augmentation options for the Plettenberg Bay system include the following:

- Continue with the active implementation of the proposed WC/WDM Strategy.
- Expansion of the existing wellfield in the Kwanokathula Aquifer.
- Development of the George Fault East wellfield.
- Keurbooms River off-channel Wadrif dam to store surplus winter water and use in conjunction with groundwater.
- Additional desalination or indirect water re-use through pumping treated effluent into the Roodefontein Dam.

Kurland: Two new boreholes were drilled at the Kurland WTW and the current supply from the Wit River and the groundwater is adequate to meet the projected future water requirements for Kurland for the long term.

Natures Valley: The current supply from the Groot River is adequate to meet the projected future water requirements for Natures Valley for the long term.

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 Bitou Municipality:

Table C.6.5: Potential Future Water Resources for the Various Towns (DWS's All Towns Reconciliation Strategies)

Distribution System	Recommended Summary Options
Plettenberg Bay	**Plettenberg Bay has sufficient water to meet its current and near future water requirements. A shortfall in water supply can be expected after 2020, which would increase to 4.552 million m³/a by 2040 for the low-growth scenario and 10.344 million m³/a for the high-growth scenario. The following sources are identified as potential sources to augment the current water supply, in order of priority and implementation sequence:** • Implementation of the Water Conservation and Water Demand Management Strategy to reduce water losses and achieve savings in water consumption. • Expansion of the existing wellfield in the Kwanokathula Aquifer. • Artificial recharge of TMG aquifer with surplus water and abstraction during peak months. • Keurbooms River off-channel dam (Wadrif) to store surplus winter water and use in conjunction with groundwater. • Indirect water re-use through pumping treated effluent into the Roodefontein Dam.
Kurland	**The supply from the Wit River has been sufficient for the previous water requirements. Based on the preliminary water balance, a shortfall of 0.030 million m³/a in water supply is already experienced. The shortfall would increase to 0.274 million m³/a by 2040 for the medium-growth scenario and 0.393 million m³/a for the high-growth scenario. The following sources are identified as potential sources to augment the current water supply, in order of priority and implementation sequence:** • Groundwater development of the TMG Aquifer. • Rainwater harvesting as part of a Water Demand Management Strategy to reduce the requirement for potable water.
Natures Valley	**The supply from the Groot River seems to be sufficient for the current water requirements. A shortfall in water supply is expected in 2028 (i.e. high-growth scenario), which would increase to 0.229 million m³/a by 2040 for the high-growth scenario). The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Development and implementation of a Water Conservation and Water Demand Management Strategy to reduce water losses and achieve savings in water consumption. • Groundwater development of TMG Aquifer in close proximity to Natures Valley. • Desalination of seawater.

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

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

Metering of all water demand is one of the most significant steps in order to properly plan and manage water sources. Without metering no management is possible. Bitou Municipality needs to continue to ensure that all the bulk water meters are read on a monthly basis at least.

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

Water Quality: Operational and Compliance Water Quality Monitoring Programmes are implemented by Bitou Municipality. Water Quality sampling is done by Bitou Municipality's own laboratory at the Plettenberg Bay WTW. The table below gives an overview of the current water quality parameters sampled by Bitou Municipality.

Table C.6.6: Current Parameters Sampled by Bitou Municipality: Routine Monitoring of Process Indicators

Current / Proposed	Sampling point	Frequency of sampling	Samples taken by	Current Parameters Sampled
Plettenberg Bay				
Current	Intake	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity
		Daily	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness
		Monthly	Lab	E.Coli
	Flocculation Channel	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids
	Clarifier (Settling Tank or DAF)	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity
	Filtered Water	4 Times per Shift	Lab	Colour, Turbidity
	Final Water	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity, Free Chlorine
		Daily	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness
		Weekly	Lab	E.Coli, Aluminium
	Distribution System	Weekly	Lab	Alkalinity, Aluminium, Calcium, Colour, Conductivity, Copper, E.Coli, Free Chlorine, Iron, Magnesium, pH, Sulphate, Total Dissolved Solids, Total Hardness, Turbidity
Kurland				
Current	Intake	Daily	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity
		Monthly	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness, E.Coli

Table C.6.6: Current Parameters Sampled by Bitou Municipality: Routine Monitoring of Process Indicators				
Current / Proposed	**Sampling point**	**Frequency of sampling**	**Samples taken by**	**Current Parameters Sampled**
	Flocculation Channel	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids
	Clarifier (Settling Tank)	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Turbidity
	Filtered Water	4 Times per Shift	Lab	Colour, Turbidity
	Final Water	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity, Free Chlorine
		Weekly	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness, Aluminium, E.Coli
	Distribution System	Weekly	Lab	Alkalinity, Aluminium, Calcium, Colour, Conductivity, Copper, E.Coli, Free Chlorine, Iron, Magnesium, pH, Sulphate, Total Dissolved Solids, Total Hardness, Turbidity
Natures Valley				
Current	Intake	Daily	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity
		Monthly	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness, E.Coli
	Filtered Water	4 Times per Shift	Lab	Colour, Turbidity
	Final Water	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity, Free Chlorine
		Weekly	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness, Aluminium, E.Coli
	Distribution System	Weekly	Lab	Alkalinity, Aluminium, Calcium, Colour, Conductivity, Copper, E.Coli, Free Chlorine, Iron, Magnesium, pH, Sulphate, Total Dissolved Solids, Total Hardness, Turbidity

The operational water sampling programmes of Bitou Municipality needs to comply with the minimum monitoring requirements of the SANS 241-2:2015 (Table 1: Minimum monitoring for prescribed process risk indicators) for the various WTWs and distribution systems, as summarised below.

Table C.6.7: Minimum Monitoring Frequency for Process Risk Indicators (SANS241-2:2015: Table 1)			
Determinand	**Raw Water**	**Final Water**	**Distribution System**
Conductivity or total dissolved solids	Daily	Daily	Not applicable
pH value	Daily	Once per shift [a]	Fortnightly
Turbidity	Daily	Once per shift [a]	Fortnightly
Disinfectant residuals	Not applicable	Once per shift [a]	Fortnightly
E.Coli (or faecal coliforms) [b]	Not applicable	Weekly	Fortnightly but dependent on population served [d]
Heterotrophic plate count [c]	Not applicable	Weekly	Fortnightly
Treatment chemicals [d]	Not applicable	Monthly	Not applicable
a: A shift is defined as an eight-hour work period.			
b: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and immediate follow-up sampling at an increased sampling frequency.			
c: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and follow-up sampling. d: Includes all risk determinands that are added or formed as a result of the use of treatment chemicals (for example aluminium, iron and chlorine). If non-compliant with the numerical limits specified in SANS 241-1 in the final water, the distribution system monitoring frequencies of Table 3 in SANS241-2:2015 apply.			

The current Operational and Compliance sampling programmes comply with SANS 241-2:2015 requirements with regard to the minimum monitoring frequency for process risk indicators and no additional sampling is proposed for any of the water distribution systems.

Effluent Quality: Operational and Compliance sampling is done at both the Plettenberg Bay WWTW and the Kurland WWTW. The table below gives an overview of the sampling programmes.

Table C.6.8: Operational and Compliance Sampling Programme for the WWTWs

Determinand	Raw	Aeration Basin	Clarifier	Final	Upstream of Effluent Discharge	Downstream of Effluent Discharge
Plettenberg Bay WWTW (Gansevlei)						
Faecal Coliforms	Weekly	-	Weekly	Weekly	Weekly	Weekly
Chemical Oxygen Demand	Weekly	-	Weekly	Weekly	Weekly	Weekly
pH	Weekly	-	Weekly	Weekly	Weekly	Weekly
Ammonia as Nitrogen	Weekly	-	Weekly	Weekly	Weekly	Weekly
Nitrate/Nitrite as Nitrogen	Weekly	-	Weekly	Weekly	Weekly	Weekly
Chlorine as Free Chlorine	Weekly	-	Weekly	Weekly	Weekly	Weekly
Suspended Solids	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
Electrical Conductivity	Weekly	-	Weekly	Weekly	Weekly	Weekly
Ortho-Phosphate	Weekly	-	Weekly	Weekly	Weekly	Weekly
SSV	-	Weekly	-	-	-	-
Kurland WWTW						
Faecal Coliforms	Weekly	-	Weekly	Weekly	-	-
Chemical Oxygen Demand	Weekly	-	Weekly	Weekly	-	-
pH	Weekly	-	Weekly	Weekly	-	-
Ammonia as Nitrogen	Weekly	-	Weekly	Weekly	-	-
Nitrate/Nitrite as Nitrogen	Weekly	-	Weekly	Weekly	-	-
Chlorine as Free Chlorine	Weekly	-	Weekly	Weekly	-	-
Suspended Solids	Weekly	Weekly	Weekly	Weekly	-	-
Electrical Conductivity	Weekly	-	Weekly	Weekly	-	-
Ortho-Phosphate	Weekly	-	Weekly	Weekly	-	-
SSV	-	Weekly	-	-	-	-

The Municipality's existing Operational and Compliance Sampling Programmes for the wastewater are adequate and no additional sampling points are recommended. Operational Alert Levels are also in place to ensure that the various unit processes in the plant performs optimally.

Bitou Municipality actively implement their Operational and Compliance Water and Effluent Quality Sampling Programmes in order to promptly identify water and effluent quality failures and to react accordingly. The water quality compliance sample results and the effluent quality compliance sample results are loaded onto DWS's IRIS via the internet. Once entered the water quality data is automatically compared to SANS:241:2015 limits and the final effluent data to the authorisations for the WWTWs. These real-time systems allow for immediate intervention to rectify any problems.

Bitou Municipality's own laboratory will continue to participate in a proficiency testing scheme in the future. The Municipality will also continue and further improve the level and frequency of regular sampling (Operational and Compliance Monitoring) and reporting on water and wastewater quality.

TOPIC 7: FINANCIAL

Bitou Municipality's 2018/2019 Annual Report list the following financial viability challenges:

- Poor debt collection: The average debt collection for 2018/2019 financial year is 82%, which is way below the National Treasury norms. Relaxation of the policy resulted in reduced collection of cash, as result of this, debtors book and debt impairment increased.

- Increased cost: The Municipality is continuously increasing the operating cost and this has a direct bearing in the cash position of the municipality. The Municipality contributes substantially from its own coffers to finance the capital cost.

- Unpaid housing grants: The Housing grant that was gazette for the year under review was not 100% paid per DoRA. The Municipality utilized its own funding to pay for the Housing project.

For Bitou Municipality to continue improving the quality of life of its citizens through the delivery of high quality services, it is necessary to generate sufficient revenue from rates and service charges; considering the review of the infrastructure grant by National Treasury and changes to allocations to Municipalities. It is also important to ensure that all billable revenue is firstly, charged correctly and secondly, adequately collected. This would mean devising means to collect revenue in areas that are traditionally Eskom distribution areas and where the Municipality's collection efforts have had little to no effect. The prevailing economic circumstances are adding to the difficulties in collecting the revenue due to the Municipality.

The spending required to address the needs of the community will inevitably always exceed available funding; hence difficult choices have to be made in relation to tariff increases and balancing expenditure against realistically anticipated revenue.

The municipality's revenue strategy is built around the following key components:

- National Treasury's guidelines and macroeconomic policy;
- Revenue enhancement and maximizing the revenue base;
- Efficient revenue management, which aims to ensure a minimum 95% annual collection rate for property rates and other key service charges;
- Electricity tariff increases as to be approved by the National Electricity Regulator of South Africa (NERSA);
- Implementing cost reflective tariff increases for water, sanitation and refuse collection;
- Budgeting for a moderate surplus to ensure availability of cash reserves to back statutory funds and current provisions.
- Fully subsidizing all indigent households in terms of the relief offered by the municipality

Bitou Municipality considered the following for their 2020/2021 MTREF Budget.

- Affordable cost reflective tariffs;
- Cost containment as recommended by National Treasury;
- The current economic climate and its impact on the Community we serve;
- Provision for asset renewal and maintenance;
- Credibility and level of funding of the Budget; and
- Alignment of the Budgets to the Municipality's plans.

The council needs to ensure that the infrastructure department receive sufficient funds for investment in the replacement of assets. The water and wastewater department needs to improve the infrastructure to unlock housing development and replace some of the aged asbestos pipes that are leaking (Bitou Municipality's Multi-year Operating and Capital Budget for 2020-2023).

Expenditure:

Operational: The future planned operational expenditure by type for Bitou Municipality, as included in the Budget Tables, is as follows:

Table C.7.1: Expenditure Items by Type, as Included in the 2019/2020 Budget

Expenditure Items	% of total 18/19 Expenditure	2018/2019 Pre-audit Outcome	2019/2020	2020/2021	2021/2022
Employee related costs	34.64%	R208 591 000	R236 196 000	R256 270 000	R271 497 000
Remuneration of Councillors	1.14%	R6 849 000	R6 971 000	R7 269 000	R7 581 000
Debt Impairment	6.66%	R40 112 000	R107 439 000	R118 827 000	R126 099 000
Depreciation and Asset Impairment	5.30%	R31 914 000	R32 893 000	R34 486 000	R36 177 000
Finance Charges	2.81%	R16 945 000	R14 798 000	R13 949 000	R11 574 000
Bulk Purchases	18.60%	R112 024 000	R134 086 000	R155 014 000	R179 212 000
Other Materials	0.83%	R5 026 000	R7 372 000	R8 080 000	R8 577 000
Contracted Services	19.07%	R114 822 000	R112 595 000	R126 248 000	R148 997 000
Transfers and Grants	1.09%	R6 571 000	R6 750 000	R9 792 000	R9 836 000
Other Expenditure	9.86%	R59 411 000	R57 019 000	R60 228 000	R62 823 000
Loss on disposal of PPE	0.00%	R0	R0	R0	R0
Total	100.00%	**R602 265 000**	**R716 119 000**	**R790 163 000**	**R862 373 000**

Source: Medium Term Revenue and Expenditure Framework for Bitou Municipality: 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 Bitou 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 Bitou 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 insufficient budget allocated towards the rehabilitation and maintenance of the existing water and sewerage infrastructure, 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 Bitou 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.

- Bitou Municipality needs to ensure that the Credit Control and Debt Collection Policy and Customer Care and Revenue Management By-law are strictly enforced.

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

Table C.7.2: Estimated Capital Expenditure per Standard Classification of Bitou Municipality's Future Capital Budget

Capital Expenditure Standard	2018/2019 Pre-audit outcome	2019/2020	2020/2021	2021/2022
Executive and Council	R0	R0	R0	R0
Budget and Treasury Office	R1 510 000	R6 765 000	R8 832 000	R3 874 000
Corporate Services	R0	R0	R0	R0
Community and Social Services	R307 000	R920 000	R1 912 000	R1 300 000
Sport and recreation	R4 848 000	R5 021 000	R240 000	R1 255 000
Public Safety	R350 000	R0	R25 000	R950 000
Housing	R50 117 000	R0	R0	R0
Health	R0	R0	R0	R0
Planning and Development	R2 094 000	R0	R0	R0
Road Transport	R22 586 000	R5 300 000	R27 058 000	R25 777 000
Environmental Protection	R0	R0	R0	R0
Electricity	R13 198 000	R21 088 000	R13 145 000	R15 867 000
Water	R16 931 000	R21 017 000	R26 942 000	R22 113 000
Waste Water Management	R17 402 000	R14 525 000	R16 958 000	R15 355 000
Waste Management	R1 000 000	R10 130 000	R1 300 000	R1 300 000
Total Capital Expenditure	**R130 343 000**	**R84 766 000**	**R96 412 000**	**R87 791 000**

Source: Medium Term Revenue and Expenditure Framework for Bitou Municipality: Table A5 - Capital Expenditure by Vote, Standard Classification and Funding

The opening costs of the water infrastructure that is expected to come to the end of its useful life over the next 20 years is around R86.110 million (an average of R4.305 million per year) and for sewerage infrastructure the value is R50.079 million (an average of R2.504 million per year). The renewals burden is set to increase sharply over the next 20 years. Water and sewerage infrastructure assets with a total opening cost value of about R40.432 million and R14.330 million will be reaching the end of their useful lives over the first 10 years and will need to be replaced, rehabilitated or reconstructed. In the following 10 years the amounts are estimated to be R45.678 million and R35.749 million.

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

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 Bitou Municipality, with regard to their Capital Funding, are as follows:

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

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

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

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

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

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

- To focus strongly on revenue collection, in order to improve the Municipality's own funding sources. The Municipality also needs to actively implement 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 Bitou Municipality to address the bulk infrastructure backlogs that exist in the various towns as indicated in the tables under Topic 3 of the Future Demand and Functionality Requirements Report.

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

Income: The majority of Bitou Municipality's revenue is from internally generated funds. 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.

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

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

Revenue Item	% of total 18/19 Income	2018/2019 Pre-audit Outcome	2019/2020	2020/2021	2021/2022
Property Rates	20.18%	R137 947 000	R145 672 000	R153 830 000	R162 444 000
Service Charges - Electricity	24.06%	R164 465 000	R172 591 000	R195 149 000	R220 654 000
Service Charges - Water	10.57%	R72 275 000	R87 057 000	R91 933 000	R97 081 000
Service Charges - Sanitation	7.32%	R50 045 000	R85 498 000	R90 286 000	R95 342 000
Service Charges - Refuse	5.60%	R38 293 000	R49 790 000	R52 578 000	R55 522 000
Rental of facilities and equipment	0.23%	R1 560 000	R1 654 000	R1 743 000	R1 838 000
Interest earned - external investments	1.12%	R7 660 000	R8 089 000	R8 526 000	R8 986 000
Interest earned - outstanding debtors	0.83%	R5 654 000	R11 159 000	R11 867 000	R12 627 000
Dividends received	0.00%	R0	R0	R0	R0
Fines, penalties and forfeits	6.93%	R47 382 000	R61 513 000	R64 971 000	R68 624 000
Licences and permits	0.05%	R348 000	R683 000	R722 000	R762 000
Agency services	0.28%	R1 914 000	R1 995 000	R2 106 000	R2 224 000
Transfers and subsidies	21.22%	R145 075 000	R118 770 000	R143 634 000	R173 507 000
Other revenue	1.50%	R10 262 000	R9 067 000	R9 566 000	R10 102 000
Gains on disposal of PPE	0.11%	R782 000	R826 000	R870 000	R917 000
Total	100.00%	**R683 662 000**	**R754 364 000**	**R827 781 000**	**R910 630 000**

Source: Medium Term Revenue and Expenditure Framework for Bitou Municipality.: Table A4 – Budgeted Financial Performance (Revenue and Expenditure)

Capital: The Capital Budget of Bitou Municipality for the last five financial years were roughly between R85 million and R130 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 Bitou 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 Bitou 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 Bitou Municipality's total capital budget are summarised in the table below:

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

Capital Funding Source	2018/2019 Pre-audit Outcome	2019/2020	2020/2021	2021/2022
National Government	R30 123 000	R23 479 000	R23 338 000	R24 921 000
Provincial Government	R51 928 000	R9 520 000	R27 000 000	R20 300 000
District Municipality	R0	R0	R0	R0
Other transfers and grants	R0	R0	R0	R0
Public Contributions and Donations	R969 000	R0	R0	R0
Borrowing	R0	R11 640 000	R0	R0
Internally generated funds	R47 322 000	R40 127 000	R46 074 000	R42 570 000
Total Capital Funding	**R130 342 000**	**R84 766 000**	**R96 412 000**	**R87 791 000**

Source: Medium Term Revenue and Expenditure Framework for Bitou Municipality.: 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.

Bitou Municipality's current seven block step water tariff structure adequately promotes the efficient use of water by consumers and discourages the wastage of water. Higher tariffs are charge for the higher consumption blocks. The first 6 kl of water is provided free to residential consumers who qualify for indigent relief. It is expected that this tariff structure will continue to be implemented in the future. Special drought tariffs (Stages 1 – 5) are also in place.

The sustainable supply of potable water is becoming an ever increasing challenge. This scarce commodity has to be optimally managed. The increase in the price of electricity and chemicals for purification has contributed to the cost of delivering the service. The table below gives some comments on the specific blocks, with regard to Bitou Municipality's block step tariff structure, for residential consumers.

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

Block (kl/month)	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Comments
0 – 6 kl	R0-00	R0-00	R0-00	R0-00	R0-00	Free basic water
7 – 15 kl						Low volume use
16 – 25 kl						Typical use volume, including garden irrigation
26 – 30 kl	R6-61	R7-01	R7-46	R7-91	R8-36	
31 – 40 kl	R9-25	R9-81	R10-44	R11-07	R11-70	Above average use, including garden irrigation
41 – 50 kl	R11-23	R11-90	R12-66	R13-42	R14-18	
51 – 60 kl	R14-53	R15-40	R16-39	R17-37	R18-35	
61 – 70 kl	R18-50	R19-61	R20-87	R22-12	R23-37	Wasteful use and/or severe garden irrigation
71 – 100 kl	R36-34	R38-52	R40-99	R43-45	R45-90	
> 100 kl						Significant waste and/or unnecessary garden irrigation

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

- Maintain a rising block tariff structure.
- Keep number of blocks in the tariff to a minimum. One block to address free basic water (the first step) and another to address the "cut-off" volume where consumers are discouraged to use water above this monthly volume (highest block) are required. In addition another three blocks could be used to distinguish between low users, typical use of high water use. Six blocks in a tariff often make good sense, as indicated in Table C.7.5.
- The volumetric steps should be kept the same for all the areas within Bitou 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 Bitou Municipality are as follows:

- Bitou 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.
- Bitou Municipality will continue to re-evaluate the tariffs they charge for their water and sanitation services on an annual basis to continue to ensure that all the O&M expenditure for water and sanitation services are recovered through their water and sanitation services income, to ensure adequate funding to address the bulk infrastructure backlogs and the adequate rehabilitation and maintenance of all existing water and sewerage infrastructure within the various towns.
- Some of the large water users could lower their current water demand by means of improved practices or re-use of wastewater. Bitou Municipality should note that revenue could potentially decrease as a result of reuse practices.
- The current water tariff codes adequately differentiate between the different type of consumers and their water usage. The Municipality can investigate the possibility to uniquely describe the “Municipal” water usage with a distinction between the different user types, for example parks, office usage, fire-fighting, etc.

Metering, Billing and Income: It is important for Bitou Municipality to continue with the reading of all their bulk water meters. The bulk meters and meter chambers also need to be properly maintained and the meters need to be protected from vandalism. The distribution networks need to be divided into smaller zones with a bulk water meter for each zone. The zone bulk water meters need to be linked to the billed metered consumption data for the specific zones, in order to identify the NRW and Water Losses for each of the individual zones. Bitou Municipality is committed to ensure that all water used for irrigation purposes are metered.

The Technical Department needs to continue to work with the Financial Department in order to ensure that all water used is metered. All connections providing an uncontrolled volume of water supply need to be metered and tariffs need to be applied in proportion to water use.

It is recommended that Bitou Municipality compile a detail water meter audit of all their bulk and consumer water meters. All consumer water meters older than eight years need to be replaced if they are found to be inaccurate. New technology, including remote meter reading will most probably become more affordable and widely used in the future and Bitou Municipality can investigate the possibility to make use of these systems in the future.

Meters need to be installed at the estimated 1 304 unmetered erven, as identified through the Water Master Plan process.

TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER CARE

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 WSDP website to assist WSAs with the WSDP process and to provide a framework for the capturing of the data. The WSDP of Bitou Municipality needs to be updated regularly.

The Municipality needs to continue to draft a WSDP Performance and Water Services Audit Report annually, as required in terms of Section 18 of the Water Services Act, 1997 (Act No.108 of 1997), as well as the "Regulations relating to compulsory national standards and measures to conserve water", as issued in terms of Sections 9(1) and 73(1)(j) of the Water Services Act.

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

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

The required Director positions are filled and Performance Agreements are signed with these Directors annually. Bitou Municipality is committed to fill the vacant positions on the approved organogram as soon as possible.

Although Bitou Municipality's Water Services has some highly competent and extensively-experienced staff, the Municipality also struggles to source adequately trained and experienced technical staff to operate and maintain plant and machinery. Budgetary provision for recruitment of qualified staff and their ongoing training is provided, but limited.

A Work Place Skills Plan for Bitou Municipality is in place, which lists the training to be provided during the new financial year. The training of Bitou Municipality's personnel involved in the management of water and sanitation services are the most important factors that determine the ability of Bitou Municipality to deliver safe and reliable water and to treat the effluent at the WWTWs to an acceptable standard. Training of all staff involved in water supply and sanitation services on matters related to treatment processes and quality monitoring and control is essential because their actions (or failure to act) will have a major impact on the well-being of the communities and the environment.

It is important for Bitou Municipality to classify all WTWs and WWTWs and operators along the lines of the regulations by establishing a programme for certification of works, operators, technicians and managers. The process will include reviewing the skills needed and aligning resources to these needs as well as reviewing total staff numbers necessary to meet all the objectives in the National Water Act.

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

It is important for Bitou Municipality to regularly review the Organogram in order to ensure that the number of Process Controllers per WTW and WWTW is in-line with the legal required number of Process Controllers per Class of plant. Submissions for the re-classification of Process Controllers need to be made to the DWS once specific training courses were completed by the Process Controllers.

Bitou 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.

Potential exist for the improvement on the mechanisms that are in place in order to ensure compliance with the Municipality's Water Supply, Sanitation Services and Industrial Effluent By-law.

Access to safe drinking water is essential to health and is human right. Safe drinking water that complies with the SANS:241 Drinking Water specifications do not pose a significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages. Bitou Municipality is therefore committed to ensure that their water quality always complies with SANS241:2015 limits.

Water Safety Plans are in place for Plettenberg Bay, Kurland and Natures Valley, which include Improvement / Upgrade Plans. The purpose of the Improvement / Upgrade Plans is to address the existing significant risks where the existing controls were not effective or absent. Barriers implemented by Bitou 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).
- 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 Bitou 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.

A Customer Services Charter needs to be compiled for Bitou Municipality. The Customer Services Charter should include the following:

- 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.

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

SECTION D: WATER SERVICES OBJECTIVES AND STRATEGIES

The water services strategies presented below were derived from the 2019/2020 Top Layer SDBIP and the water services situational analysis as summarized in Section C: Water Services Existing Needs Perspective and presents the 5-year Water Services strategies as established in the WSA's WSDP:

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator (SDBIP KPI Number)	Baseline	WSDP FY2018/19 TARGET	WSDP FY2019/20 TARGET	WSDP FY2020/21 TARGET	WSDP FY2021/22 TARGET	WSDP FY2022/23 TARGET
Topic 1: Settlement Demographics & Public Amenities							
-	-	-	-	-	-	-	-
Topic 2: Service Levels							
Universal access to decent quality of services.	Provide piped water to properties which are connected to the municipal water infrastructure network and billed for the service as at 30 June (D199)	11 495	11 670	11 495	Targets still to be set.	Targets still to be set.	Targets still to be set.
Universal access to decent quality of services.	Provide sanitation services to properties which are connected to the municipal waste water (sanitation/sewerage) network and are billed for sewerage service irrespective of the number of water closets (toilets) as at 30 June (D201)	12 111	12 170	12 111	Targets still to be set.	Targets still to be set.	Targets still to be set.
Universal access to decent quality of services.	Support all applications received for basic water services on the farms (Subject to availability of financial resources and sustainability of type of service) (New).	-	-	-	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)
Universal access to decent quality of services.	Support all applications received for basic sanitation services on the farms (Subject to availability of financial resources and sustainability of type of service) (New).	-	-	-	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)
Topic 3: Water Services Asset Management							
Universal access to decent quality of services.	% of recommendations as included in the Improvement / Upgrade Plan of the Water Safety Plan and the detail WTW Process Audits implemented (New).	-	-	-	60% of recommendations implemented	75% of recommendations implemented	90% of recommendations implemented
Universal access to decent quality of services.	% of recommendations as included in the Improvement / Upgrade Plan of the W_2RAP and the detail WWTW Process Audits implemented (New).	-	-	-	60% of recommendations implemented	75% of recommendations implemented	90% of recommendations implemented
Universal access to decent quality of services.	Ensure adequate storage capacity for all towns (At least 48hrs AADD) (New).	-	-	-	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.
Universal access to decent quality of services.	Ensure adequate water pump station and water reticulation capacity (New).	-	-	-	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water	Upgrade existing water pump stations and provide new pump stations as identified in the Water Master Plan. Upgrade water reticulation

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator (SDBIP KPI Number)	Baseline	WSDP FY2018/19 TARGET	WSDP FY2019/20 TARGET	WSDP FY2020/21 TARGET	WSDP FY2021/22 TARGET	WSDP FY2022/23 TARGET
					reticulation networks as proposed in the Water Master Plan.	reticulation networks as proposed in the Water Master Plan.	networks as proposed in the Water Master Plan.
Universal access to decent quality of services.	Ensure adequate sewer pump station and drainage network capacity (New).	-	-	-	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.
Universal access to decent quality of services.	Ensure all water and sewerage infrastructure assets are included in the Asset Register, with accurate CRC, DRC, RUL and Age (New).	-	-	-	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL and Age in the Asset Register is not correct.	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL and Age in the Asset Register is not correct.	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register and assets for which the CRC, DRC, RUL and Age in the Asset Register is not correct.
Universal access to decent quality of 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 (New).	-	-	-	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							
Universal access to decent quality of services.	Spend 80% of the sewerage maintenance budget by the end of June (D195).	80%	-	80%	80%	80%	80%
Universal access to decent quality of services.	Spend 80% of the water maintenance budget by the end of June (D196).	80%	-	80%	80%	80%	80%
Universal access to decent quality of services.	Ensure a budget of at least 1% of the total value of the water and sewerage assets is allocated towards the annual O&M of the systems (New).	-	-	-	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.
Universal access to decent quality of services.	Report at least annually to the public on the percentage of water quality and final effluent quality compliance (New).	-	-	-	At least annual publication of water quality and wastewater	At least annual publication of water quality and wastewater	At least annual publication of water quality and

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator (SDBIP KPI Number)	Baseline	WSDP FY2018/19 TARGET	WSDP FY2019/20 TARGET	WSDP FY2020/21 TARGET	WSDP FY2021/22 TARGET	WSDP FY2022/23 TARGET
					quality compliance percentages.	quality compliance percentages.	wastewater quality compliance percentages.
Topic 5: Conservation and Demand Management (Topic 5.1: Water Resources)							
Universal access to decent quality of services.	Limit non-revenue water losses to less than 19% as at 30 June (D202).	19%	5.47%	19%	19%	19%	19%
Universal access to decent quality of services.	Complete the Water Balance audit by 30 June (D192).	1	1	1	1	1	1
Universal access to decent quality of services.	Repair breaks within 6 hours after break has been reported (D191).	95%	100%	95%	95%	95%	95%
Topic 5: Conservation and Demand Management (Topic 5.2: Water Balance)							
Universal access to decent quality of 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 (New).	-	-	-	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.	100% of all sources metered and bulk water meters read and recorded at least monthly.
Universal access to decent quality of services.	Ensure all incoming and outgoing flows at the WWTWs are metered, as well as final effluent re-used for irrigation purposes and that meters are read and recorded on at least a monthly basis (New).	-	-	-	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.	100% of all flows at WWTWs metered and meters read and recorded at least monthly.
Topic 6: Water Resources							
Universal access to decent quality of services.	95% of water samples comply with SANS241 Micro Biological indicators (D189)	95.00%	99.9%	95.00%	95.00%	95.00%	95.00%
Universal access to decent quality of services.	90% of test results of outflow water comply with permit values (D190)	90.00%	99.1%	90.00%	90.00%	90.00%	90.00%
Universal access to decent quality of services.	% Of abstraction from sources registered and authorized by the DWS (New).	-	-	-	80% Compliance	90% Compliance	95% Compliance
Topic 7: Financial							
Universal access to decent quality of services.	Spend 90% of approved capital budget for Water Services (D206).	90.00%	100.00%	90.00%	90.00%	90.00%	90.00%
Universal access to decent quality of services.	Spend 90% of approved capital budget for Waste Water Services (D208).	90.00%	-	90.00%	90.00%	90.00%	90.00%

Table D.1: Water Services Objectives and Strategies							
Objective / Strategy	Key Performance Indicator (SDBIP KPI Number)	Baseline	WSDP FY2018/19 TARGET	WSDP FY2019/20 TARGET	WSDP FY2020/21 TARGET	WSDP FY2021/22 TARGET	WSDP FY2022/23 TARGET
Universal access to decent quality of services.	Submit application for external funding by the end of September (D194).	1	-	1	1	1	1
Topic 8: Institutional Arrangements and Customer Care							
Universal access to decent quality of services.	Hold quarterly Health and Safety meetings to ensure a safe working environment (D193).	1	1	1	1	1	1
Universal access to decent quality of services.	Report on the implementation of the WSDP annually by the end of October. Report submitted to Council and DWS (New).	1	-	-	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 E2c 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 Bitou Municipality.

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

Table E.1: Summary of MTEF Projects

Project Main Category	FY2019/20		FY2020/21		FY2021/22		MTEF Total	
	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)
Water Projects	10	R21,017	12	R26,942	10	R22,113	**19**	**R70,072**
Sanitation Projects	16	R14,525	10	R16,958	6	R15,355	**25**	**R46,838**
Combined Water & Sanitation Projects	**26**	**R35,542**	**22**	**R43,900**	**16**	**R37,468**	**44**	**R116,910**

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

Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2018/19	FY2019/20 Budget	Own	MIG	RBIG	Loans	Housing	MWIG	Other	Total Cost	
1. Infrastructure Projects								**R0**	**R27,267**								**R27,267**	
1.1		Plettenberg Bay WTWs: New high lift pump	Increase pump capacity if High Lift PS at WTW	Services	Water	Internal Bulk	Pump Station		**R800**	R800							**R800**	Water Master Plan
1.2		Harkerville: Pressure pump and pipework	Provide adequate pressure in Harkerville	Services	Water	Water Network	Reticulation line		**R120**	R120							**R120**	O&M
1.3		Kwano: New water pipeline (Phase 2B: New pipeline from Kwano East to West res.) & upgrade tank	Installation of new bulk water pipeline	Services	Water	Internal Bulk	Bulk Pipeline		**R2,476**		R2,476						**R2,476**	Water Master Plan
1.4		Kranshoek: Upgrade bulk water (Completion of pipeline from Airport to Kranshoek and upgrading of Brakkloof PS)	Installation of new bulk water pipeline and upgrading of PS	Services	Water	Internal Bulk	Bulk Pipeline and Pump Station		**R12,521**	R600	R11,921						**R12,521**	Water Master Plan
1.5		Bossiesgif New water (TRA): UISP New water at Erf 9834 and 10358	Installation of water reticulation network	Services	Water	Water Network	Reticulation		**R500**					R500			**R500**	Housing
1.6		Kurland New water: UISP New water at opposite Community Hall / Erf 562	Installation of water reticulation network	Services	Water	Water Network	Reticulation		**R500**					R500			**R500**	Housing
1.7		Kurland: Upgrade PS No.4 (2 x new 6 kW motors with pumps)	Upgrade Kurland PS No.4	Services	Sewer	Sanitation Bulk	Pumpstation		**R500**	R500							**R500**	Sewer Master Plan & W_2RAP
1.8		Longships PS No.10 (New panel, pumps, refurbish pipework, new genset)	Refurbish Longships PS No.10	Refurbishment	Sewer	Sanitation Bulk	Pump Station		**R800**	R800							**R800**	Refurbishment & W_2RAP
1.9		Keurbooms: Upgrade PS No.1 (New panel, pumps, refurbish pipework, refurbish genset)	Upgrade Keurbooms PS No.1	Services	Sewer	Sanitation Bulk	Pump Station		**R500**	R500							**R500**	Sewer Master Plan & W_2RAP
1.10		Ebenezer new bulk sewerage infrastructure	Install bulk sewerage infrastructure for Ebenezer	Services	Sewer	Sanitation Bulk	Bulk Pipeline		**R4,000**	R4,000							**R4,000**	Sewer Master Plan
1.11		Gansevallei WWTW: New mechanical screen	Install new mechanical screen	Refurbishment	Sewer	Sanitation Bulk	WWTW		**R550**	R550							**R550**	O&M & W_2RAP
1.12		Kranshoek: Upgrade existing outfall sewer to 250mm dia.	Upgrade bulk sewer pipeline	Services	Sewer	Sanitation Bulk	Bulk Pipeline		**R1,000**	R1,000							**R1,000**	Sewer Master Plan
1.13		Hobie Beach: Upgrade PS No.3 (Refurbishment of existing panel, 2 x 15 kW submersible pumps)	Upgrade Hobie Beach PS No.3	Services	Sewer	Sanitation Bulk	Pump Station		**R500**	R500							**R500**	Sewer Master Plan & W_2RAP
1.14		Central Beach: Upgrade PS No.4 (New panel, 2 x 6 kW submersible pumps, lime feeder)	Upgrade Central Beach PS No.4	Services	Sewer	Sanitation Bulk	Pump Station		**R500**	R500							**R500**	Sewer Master Plan & W_2RAP
1.15		Bossiesgif new sewer (TRA): UISP new sewer at Erf 9834 and 10358	Install new sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R1,000**						R1,000		**R1,000**	Housing
1.16		Kurland new sewer: UISP new sewer opposite Community Hall / Erf 562	Install new sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R1,000**						R1,000		**R1,000**	Housing
2. Source Development Projects								**R0**	**R0**								**R0**	
									R0								**R0**	
3. Demand Management projects								**R0**	**R3,500**								**R3,500**	
3.1		Water Demand Management (Pressure Management)	Installation and maintenance of PRVs	WC/WDM	Water	Water Network	Reticulation		**R500**	R500							**R500**	WSDP & WC/WDM Strategy
3.2		Poortjies: Upgrade water pipeline (Replacement of old AC Pipes in Poortjies East)	Replacement of of old water reticulation network	WC/WDM	Water	Water Network	Reticulation		**R3,000**	R3,000							**R3,000**	WSDP & WC/WDM Strategy
4. O&M Commitments								**R696**	**R4,775**								**R5,471**	
Operations																		
4.1		Tools and equipment	Purchase required tools and equipment	O&M	Water	Tools & Equipment	Other	R89	**R100**	R100							**R189**	O&M
4.2		Pump station equipment	Purchase required pump station equipment	O&M	Water	Internal Bulk	Pump Stations	R323	**R500**	R500							**R823**	O&M & W_2RAP
4.3		Tools and equipment	Purchase required tools and equipment	O&M	Sewer	Tools & Equipment	Other	R34	**R100**	R100							**R134**	O&M
4.4		Replace LDV Water (Water works)	Purchase LDV	O&M	Sewer	Vehicle	Other		**R375**	R375							**R375**	O&M
4.5		New Digger Loader Water	Purchase Digger Loader	O&M	Sewer	Vehicle	Other		**R900**					R900			**R900**	O&M
4.6		New Crew cab jetting machine Water	Purchase Jetting machine	O&M	Sewer	Vehicle	Other		**R1,300**					R1,300			**R1,300**	O&M
4.7		Security for keys on sites (Security measures at PSs)	Improve security measures at PSs	Vandalism	Sewer	Tools & Equipment	Other	R250	**R1,000**	R1,000							**R1,250**	WSDP & W_2RAP
4.8		Pump station equipment	Purchase required tools and equipment	O&M	Sewer	Tools & Equipment	Other		**R500**	R500							**R500**	O&M
Maintenance																		
									R0								**R0**	
5. Institutional								**R0**	**R0**								**R0**	
									R0								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness Programs																		
									R0								**R0**	
WASH Programs																		
									R0								**R0**	
		Total						**R696**	**R35,542**								**R36,238**	

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	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2018/19	FY2020/21 Budget	Own	MIG	RBIG	Loans	Housing	MWIG	Other	Total Cost	
1. Infrastructure Projects								**R0**	**R41,900**								**R41,900**	
1.1		Kurland: Upgrade WTW from 0.6 Ml/d to 1.2 Ml/d	Increase capacity of Kurland WTW	Services	Water	Water Purification	WTW		**R5,000**	R5,000							**R5,000**	WSDP
1.2		Kurland: Upgrade water reticulation (Pipelines from WTW to town, Erf 562)	Increase capacity of bulk water pipeline	Services	Water	Internal Bulk	Bulk Pipeline		**R5,000**	R5,000							**R5,000**	Water Master Plan
1.3		Natures Valley: New reservoir (1.500 Ml)	Construct new 1.5 Ml reservoir for Natures Valley	Storage Capacity	Water	Internal Bulk	Reservoir		**R2,000**	R2,000							**R2,000**	Water Master Plan & WSDP
1.4		Kwano: New water pipeline (Phase 2B: New pipeline from Kwano East to West res.) & upgrade tank	Installation of new bulk water pipeline	Services	Water	Internal Bulk	Bulk Pipeline		**R8,342**	R2,100	R6,242						**R8,342**	Water Master Plan
1.5		Kranshoek: Upgrade bulk water (Completion of pipeline from Airport to Kranshoek and upgrading of Brakkloof PS)	Installation of new bulk water pipeline and upgrading of PS	Services	Water	Internal Bulk	Bulk Pipeline and Pump Station		**R500**	R500							**R500**	Water Master Plan
1.6		Bossiesgif: New water (PH4A): UISP New water at Qolweni and Bossiesgif	Installation of water reticulation network	Services	Water	Water Network	Reticulation		**R2,000**					R2,000			**R2,000**	Housing
1.7		Kurland New water: UISP New water at opposite Community Hall / Erf 562	Installation of water reticulation network	Services	Water	Water Network	Reticulation		**R500**					R500			**R500**	Housing
1.8		Ebenezer New water: UISP New water at Ebenezer for New Horizons	Installation of water reticulation network	Services	Water	Water Network	Reticulation		**R2,000**					R2,000			**R2,000**	Housing
1.9		Erf 4367 (Shell) New water: UISP New water at Erf 4367 opposite Shell Ultra City	Installation of water reticulation network	Services	Water	Water Network	Reticulation		**R500**					R500			**R500**	Housing
1.10		Keurbooms: Upgrade PS No.1 (New panel, pumps, refurbish pipework, refurbish genset)	Upgrade Keurbooms PS No.1	Services	Sewer	Sanitation Bulk	Pump Station		**R500**	R500							**R500**	Sewer Master Plan & W_2RAP
1.11		Ebenezer new bulk sewerage (New bulk outfall sewer from proposed Ebenezer housing development)	Install new bulk outfall sewer pipeline	Services	Sewer	Sanitation Bulk	Bulk Pipeline		**R3,558**		R3,558						**R3,558**	Sewer Master Plan
1.12		Gansevlei WWTW: Upgrade plant to 21 Ml/d (Upgrade of aeration basin, clarifiers, aerators, mixers, pumps and motors)	Upgrade WWTW	Treatment	Sewer	Sanitation Bulk	WWTW		**R1,000**	R1,000							**R1,000**	WSDP & W_2RAP
1.13		Kranshoek: Upgrade internal sewer reticulation	Upgrade internal sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R2,000**	R2,000							**R2,000**	Sewer Master Plan
1.14		Kranshoek: Reconstruct PS No.2 (Relocate existing PS on Erf 805 and reconstruct elsewhere)	Construct new Kranshoek PS No.2	Services	Sewer	Sanitation Bulk	Pump Station		**R500**	R500							**R500**	Sewer Master Plan & W_2RAP
1.15		Bossiesgif new sewer (PH4A): UISP new sewer at Qolweni and Bossiesgif	Install new sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R3,000**					R3,000			**R3,000**	Housing
1.16		Kurland new sewer: UISP new sewer opposite Community Hall / Erf 562	Install new sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R1,000**					R1,000			**R1,000**	Housing
1.17		Ebenezer new sewer: UISP new sewer at Ebenezer for New Horizons	Install new sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R3,000**					R3,000			**R3,000**	Housing
1.18		Erf 4367 (Shell) new sewer: UISP new sewer at Erf 4367 opposite Shell Ultra City	Install new sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R1,500**					R1,500			**R1,500**	Housing
2. Source Development Projects								**R0**	**R0**								**R0**	
									R0								**R0**	
3. Demand Management projects								**R0**	**R500**								**R500**	
3.1		Water Demand Management (Pressure Management)	Installation and maintenance of PRVs	WC/WDM	Water	Water Network	Reticulation		**R500**	R500							**R500**	WSDP & WC/WDM Strategy
4. O&M Commitments								**R412**	**R1,500**								**R1,912**	
Operations																		
4.1		Tools and equipment	Purchase required tools and equipment	O&M	Water	Tools & Equipment	Other	R89	**R100**	R100							**R189**	O&M
4.2		Pump station equipment	Purchase required pump station equipment	O&M	Water	Internal Bulk	Pump Stations	R323	**R500**	R500							**R823**	O&M & W_2RAP
4.3		Pump station equipment	Purchase required tools and equipment	O&M	Sewer	Tools & Equipment	Other		**R900**	R900							**R900**	O&M
Maintenance																		
									R0								**R0**	
5. Institutional								**R0**	**R0**								**R0**	
									R0								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness Programs																		
									R0								**R0**	
WASH Programs																		
									R0								**R0**	
		Total						**R412**	**R43,900**								**R44,313**	

Table E.2c: Water Services MTEF Projects - FY2021/22 (3rd year MTEF period)

Nr	Project Reference Number (Dept)	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources									MTEF Project Source
								Prev spent FY2018/19	FY2021/22 Budget	Own	MIG	RBIG	Loans	Housing	MWIG	Other	Total Cost	
1. Infrastructure Projects								**R0**	**R33,968**								**R33,968**	
1.1		Kurland: Upgrade WTW from 0.6 Ml/d to 1.2 Ml/d	Increase capacity of Kurland WTW	Services	Water	Water Purification	WTW		**R5,000**	R5,000							**R5,000**	WSDP
1.2		Natures Valley: New reservoir (1.500 Ml)	Construct new 1.5 Ml reservoir for Natures Valley	Storage Capacity	Water	Internal Bulk	Reservoir		**R3,000**	R3,000							**R3,000**	Water Master Plan & WSDP
1.3		Bossiesgif: New water (PH4A): UISP New water at Qolweni and Bossiesgif	Installation of water reticulation network	Services	Water	Water Network	Reticulation		**R2,000**					R2,000			**R2,000**	Housing
1.4		Ebenezer New water: UISP New water at Ebenezer for New Horizons	Installation of water reticulation network	Services	Water	Water Network	Reticulation		**R2,000**					R2,000			**R2,000**	Housing
1.5		Plettenberg Bay WTW: New PS (New clear water PS at Plett WTW)	New clear water PS at Plettenberg Bay WTW	Services	Water	Internal Bulk	Pumpstation		**R3,478**					R3,478			**R3,478**	Water Master Plan & WSDP
1.6		Green Valley: Upgrade water supply (New / upgrade bulk water pipeline from Goose Valley to Green Valley)	Installation of new bulk water pipeline	Services	Water	Internal Bulk	Bulk Pipeline		**R3,135**		R3,135						**R3,135**	Water Master Plan
1.7		Gansevlei WWTW: Upgrade plant to 21 Ml/d (Upgrade of aeration basin, clarifiers, aerators, mixers, pumps and motors)	Upgrade WWTW	Treatment	Sewer	Sanitation Bulk	WWTW		**R2,000**	R2,000							**R2,000**	WSDP & W_2RAP
1.8		Green Valley upgrade bulk sewer (Upgrade existing outfall sewer from Green Valley to Wittedrif)	Upgrade bulk sewer pipeline	Services	Sewer	Sanitation Bulk	Bulk Pipeline		**R3,855**	R500	R3,355						**R3,855**	Sewer Master Plan
1.9		Kranshoek: Upgrade internal sewer reticulation	Upgrade internal sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R2,000**	R2,000							**R2,000**	Sewer Master Plan
1.10		Kranshoek: Upgrade PS No.3 (New pumps, new panel, new valves, new 50 kVA Genset, Upgrade building)	Upgrade Kranshoek PS No.3	Services	Sewer	Sanitation Bulk	Pump Station		**R1,500**	R1,500							**R1,500**	Sewer Master Plan & W_2RAP
1.11		Bossiesgif new sewer (PH4A): UISP new sewer at Qolweni and Bossiesgif	Install new sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R3,000**					R3,000			**R3,000**	Housing
1.12		Ebenezer new sewer: UISP new sewer at Ebenezer for New Horizons	Install new sewer drainage network	Services	Sewer	Internal Sanitation	Waterborne Sanitation		**R3,000**					R3,000			**R3,000**	Housing
2. Source Development Projects								**R0**	**R0**								**R0**	
									R0								**R0**	
3. Demand Management projects								**R0**	**R2,500**								**R2,500**	
3.1		Water Demand Management (Pressure Management)	Installation and maintenance of PRVs	WC/WDM	Water	Water Network	Reticulation		**R500**	R500							**R500**	WSDP & WC/WDM Strategy
3.2		Dunes: Upgrading reticulation (Replacement of old AC Pipes)	Replacement of of old water reticulation network	WC/WDM	Water	Water Network	Reticulation		**R2,000**	R2,000							**R2,000**	WSDP & WC/WDM Strategy
									R0								**R0**	
4. O&M Commitments								**R412**	**R1,000**								**R1,412**	
Operations																		
4.1		Tools and equipment	Purchase required tools and equipment	O&M	Water	Tools & Equipment	Other	R89	**R500**	R500							**R589**	O&M
4.2		Pump station equipment	Purchase required pump station equipment	O&M	Water	Internal Bulk	Pump Stations	R323	**R500**	R500							**R823**	O&M & W_2RAP
Maintenance																		
									R0								**R0**	
5. Institutional								**R0**	**R0**								**R0**	
									R0								**R0**	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness Programs																		
									R0								**R0**	
WASH Programs																		
									R0								**R0**	
		Total						**R412**	**R37,468**								**R37,881**	

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 Bitou Master Plans were incorporated into the WSDP.

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

Recommended infrastructure projects for implementation in the future 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

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

- Upgrade capacity of Kurland WTW from 0.6 Ml/d to 1.2 Ml/d.
- Upgrade Kurland water reticulation pipelines (From WTW to Erf 562)
- New pump station at the Plettenberg Bay WTWs.
- New 1.500 ML reservoir at Natures Valley
- Upgrade Poortjies and Dunes water pipelines (Replacement of old AC pipes)
- New water pipeline in Kwanokuthula (Phase 2B: New pipeline from Kwanokuthula East to West Reservoir)
- Upgrade bulk water in Kranshoek (Completion of pipeline from Airport to Kranshoek and upgrading of Brakkloof PS).
- New water reticulation networks (UISP) for Qolweni, Bossiesgif, Kurland, Ebenezer and Erf 4367.
- Upgrade water supply in Green Valley (New bulk water pipeline from Goose Valley to Green Valley).
- Upgrade sewer pump stations for Keurbooms (PS No.1), Longships (PS No.10) and Kurland (PS No.4) and purchase additional pump station equipment.
- Improve security measures at sewer pump stations.
- New bulk sewerage infrastructure for Ebenezer.
- Upgrade Gansevlei WWTW: New mechanical screen and upgrade capacity of plant to 21 Ml/d (Upgrade aeration basin, clarifiers, aerators, mixers, pumps and motors).
- Upgrade bulk outfall sewer from Green Valley to Wittedrift.
- Upgrade existing outfall sewer and internal sewer drainage networks in Kranshoek.
- Upgrade sewer pump stations (Hobie Beach PS No.3 and Central Beach PS No.4).
- Upgrade PS No.3 and reconstruct PS No.2 in Kranshoek.
- New sewer drainage networks (UISP) for Qolweni, Bossiesgif, Kurland, Ebenezer and Erf 4367.

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 R132.636 million of which 88% are funded, as included in the three year MTEF project list. It should however be emphasised that additional funding will be required to address the full achievement of the water services strategies as outlined in Section D, but that the extent of such additional funding can only be determined, once initial investigations and activities have been concluded.

Table F.1: WSDP 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			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
CURRENT NEEDS										
Topic 1: Settlements and Demographics										
Topic 2: Service Levels										
2.1	Residential development to be provided with services	Installation of water reticulation network	MTEF	Yes	BM1920001	Bossiesgif: New water (PH4A): UISP New water at Qolweni and Bossiesgif	R4,000	Yes	Yes	Yes
2.2	Residential development to be provided with services	Installation of water reticulation network	MTEF	Yes	BM1920002	Bossiesgif New water (TRA): UISP New water at Erf 9834 and 10358	R500	Yes	Yes	Yes
2.3	Residential development to be provided with services	Installation of water reticulation network	MTEF	Yes	BM1920003	Kurland New water: UISP New water at opposite Community Hall / Erf 562	R1,000	Yes	Yes	Yes
2.4	Residential development to be provided with services	Installation of water reticulation network	MTEF	Yes	BM1920004	Ebenezer New water: UISP New water at Ebenezer for New Horizons	R4,000	Yes	Yes	Yes
2.5	Residential development to be provided with services	Installation of water reticulation network	MTEF	Yes	BM1920005	Erf 4367 (Shell) New water: UISP New water at Erf 4367 opposite Shell Ultra City	R500	Yes	Yes	Yes
2.6	Residential development to be provided with services	Installation of sewer drainage network	MTEF	Yes	BM1920006	Bossiesgif new sewer (PH4A): UISP new sewer at Qolweni and Bossiesgif	R6,000	Yes	Yes	Yes
2.7	Residential development to be provided with services	Installation of sewer drainage network	MTEF	Yes	BM1920007	Bossiesgif new sewer (TRA): UISP new sewer at Erf 9834 and 10358	R1,000	Yes	Yes	Yes
2.8	Residential development to be provided with services	Installation of sewer drainage network	MTEF	Yes	BM1920008	Kurland new sewer: UISP new sewer opposite Community Hall / Erf 562	R2,000	Yes	Yes	Yes
2.9	Residential development to be provided with services	Installation of sewer drainage network	MTEF	Yes	BM1920009	Ebenezer new sewer: UISP new sewer at Ebenezer for New Horizons	R6,000	Yes	Yes	Yes
2.10	Residential development to be provided with services	Installation of sewer drainage network	MTEF	Yes	BM1920010	Erf 4367 (Shell) new sewer: UISP new sewer at Erf 4367 opposite Shell Ultra City	R1,500	Yes	Yes	Yes
2.11	Some households on the farms without basic water services	Provide basic water services to the households on the farms without services	WSDP	No	BM1920011	Install basic water services to the households on the farms without basic services	R1,832	Yes	No	No
2.12	Some households on the farms without basic sanitation services	Provide basic sanitation services to the households on the farms without services	WSDP	No	BM1920012	Install basic sanitation services to the households on the farms without basic services	R2,504	Yes	No	No
Topic 3: Water Services Asset Management (Infrastructure)										
3.1	Existing WTW capacity is inadequate to meet future requirements	Increase capacity of WTW to meet treatment capacity	MTEF	Yes	BM1920013	Kurland: Upgrade WTW from 0.6 Ml/d to 1.2 Ml/d	R10,000	Yes	Yes	Yes
3.2	Capacity of existing bulk water pipeline is inadequate	Increase capacity of bulk water pipeline	MTEF	Yes	BM1920014	Kurland: Upgrade water reticulation (Pipelines from WTW to town, Erf 562)	R5,000	Yes	Yes	Yes
3.3	Capacity of existing water pump station is inadequate	Upgrade existing water pump station	MTEF	Yes	BM1920015	Plettenberg Bay WTWs: New high lift pump	R800	Yes	Yes	Yes
3.4	Existing pressure in Harkerville is inadequate	Install pressure pump to increase pressure in network	MTEF	Yes	BM1920016	Harkerville: Pressure pump and pipework	R120	Yes	Yes	Yes
3.5	Existing reservoir storage capacity is inadequate	Ensure adequate reservoir storage capacity	MTEF	Yes	BM1920017	Natures Valley: New reservoir (1.500 Ml)	R5,000	Yes	Yes	Yes
3.6	Capacity of existing bulk water pipeline is inadequate	Increase capacity of bulk water pipeline	MTEF	Yes	BM1920018	Kwano: New water pipeline (Phase 2B: New pipeline from Kwano East to West res.) & upgrade tank	R10,818	Yes	Yes	Yes
3.7	Capacity of existing bulk water pipeline and PS is inadequate	Increase capacity of bulk water pipeline and PS	MTEF	Yes	BM1920019	Kranshoek: Upgrade bulk water (Completion of pipeline from Airport to Kranshoek and upgrading of Brakkloof PS)	R13,021	Yes	Yes	Yes
3.8	Capacity of existing clear water PS at WTW is inadequate	Upgrade existing water pump station	MTEF	Yes	BM1920020	Plettenberg Bay WTW: New PS (New clear water PS at Plett WTW)	R3,478	Yes	Yes	Yes
3.9	Capacity of existing bulk water pipeline is inadequate	Increase capacity of bulk water pipeline	MTEF	Yes	BM1920021	Green Valley: Upgrade water supply (New / upgrade bulk water pipeline from Goose Valley to Green Valley)	R3,135	Yes	Yes	Yes
3.10	Capacity of existing sewer pump station is inadequate	Upgrade existing sewer pump station	MTEF	Yes	BM1920022	Kurland: Upgrade PS No.4 (2 x new 6 kW motors with pumps)	R500	Yes	Yes	Yes
3.11	Existing sewer PS needs to be refurbished	Refurbish existing sewer pump station	MTEF	Yes	BM1920023	Longships PS No.10 (New panel, pumps, refurbish pipework, new genset)	R800	Yes	Yes	Yes
3.12	Capacity of existing sewer pump station is inadequate	Upgrade existing sewer pump station	MTEF	Yes	BM1920024	Keurbooms: Upgrade PS No.1 (New panel, pumps, refurbish pipework, refurbish genset)	R1,000	Yes	Yes	Yes
3.13	Capacity of existing bulk sewer pipeline is inadequate	Ensure adequate bulk sewer drainage capacity	MTEF	Yes	BM1920025	Ebenezer new bulk sewerage infrastructure	R4,000	Yes	Yes	Yes
3.14	Capacity of existing bulk sewer pipeline is inadequate	Ensure adequate bulk sewer drainage capacity	MTEF	Yes	BM1920026	Ebenezer new bulk sewerage (New bulk outfall sewer from proposed Ebenezer housing development)	R3,558	Yes	Yes	Yes
3.15	Existing mechanical screen at WWTW is not working	Ensure adequate screening capacity at WWTW	MTEF	Yes	BM1920027	Gansevallei WWTW: New mechanical screen	R550	Yes	Yes	Yes
3.16	Existing WWTW capacity is inadequate to meet future requirements.	Increase capacity of WWTW to meet future treatment capacity	MTEF	Yes	BM1920028	Gansevlei WWTW: Upgrade plant to 21 Ml/d (Upgrade of aeration basin, clarifiers, aerators, mixers, pumps and motors)	R3,000	No	Yes	Yes
3.17	Capacity of existing bulk sewer pipeline is inadequate	Ensure adequate bulk sewer drainage capacity	MTEF	Yes	BM1920029	Green Valley upgrade bulk sewer (Upgrade existing outfall sewer from Green Valley to Wittedrif)	R3,855	Yes	Yes	Yes
3.18	Capacity of existing bulk sewer pipeline is inadequate	Ensure adequate bulk sewer drainage capacity	MTEF	Yes	BM1920030	Kranshoek: Upgrade existing outfall sewer to 250mm dia.	R1,000	Yes	Yes	Yes
3.19	Capacity of existing internal sewer drainage network is inadequate	Ensure adequate sewer drainage network capacity	MTEF	Yes	BM1920031	Kranshoek: Upgrade internal sewer reticulation	R4,000	Yes	Yes	Yes

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?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
CURRENT NEEDS										
3.20	Capacity of existing sewer pump station is inadequate	Upgrade existing sewer pump station	MTEF	Yes	BM1920032	Hobie Beach: Upgrade PS No.3 (Refurbishment of existing panel, 2 x 15 kW submersible pumps)	R500	Yes	Yes	Yes
3.21	Capacity of existing sewer pump station is inadequate	Upgrade existing sewer pump station	MTEF	Yes	BM1920033	Central Beach: Upgrade PS No.4 (New panel, 2 x 6 kW submersible pumps, lime feeder)	R500	Yes	Yes	Yes
3.22	Capacity of existing sewer pump station is inadequate	Upgrade existing sewer pump station	MTEF	Yes	BM1920034	Kranshoek: Upgrade PS No.3 (New pumps, new panel, new valves, new 50 kVA Genset, Upgrade building)	R1,500	Yes	Yes	Yes
3.23	Capacity of existing sewer pump station is inadequate	Upgrade existing sewer pump station	MTEF	Yes	BM1920035	Kranshoek: Reconstruct PS No.2 (Relocate existing PS on Erf 805 and reconstruct elsewhere)	R500	Yes	Yes	Yes
3.24	Asset Management Plan to ensure adequate refurbishment and replacement of existing water and sewerage infrastructure not yet in place.	Develop an Asset Management Plan to ensure adequate budget allocation towards the operation and maintenance of the existing water and sewerage infrastructure.	WSDP	No	BM1920036	Develop an Asset Management Plan	R650	Yes	No	No
Topic 4: Water Services Operation and Maintenance										
4.1	Tools and equipment need to be purchased for water services	Ensure adequate O&M	MTEF	Yes	BM1920037	Tools and equipment	R700	No	Yes	Yes
4.2	Pumps, motors and fittings needs to be purchased for water PSs	Ensure adequate O&M	MTEF	Yes	BM1920038	Pump station equipment	R1,500	No	Yes	Yes
4.3	Tools and equipment need to be purchased for sanitation services	Ensure adequate O&M	MTEF	Yes	BM1920039	Tools and equipment	R100	No	Yes	Yes
4.4	LDV needs to be replaced	Ensure adequate O&M	MTEF	Yes	BM1920040	Replace LDV Water (Water works)	R375	Yes	Yes	Yes
4.5	New Digger Loader is required for Water	Ensure adequate O&M	MTEF	Yes	BM1920041	New Digger Loader Water	R900	Yes	Yes	Yes
4.6	New Jetting machine is required for Water	Ensure adequate O&M	MTEF	Yes	BM1920042	New Crew cab jetting machine Water	R1,300	Yes	Yes	Yes
4.7	Security measures at sewer PSs need to be imcreased	Ensure adequate security at sewer PSs	MTEF	Yes	BM1920043	Security for keys on sites (Security measures at PSs)	R1,000	No	Yes	Yes
4.8	Pumps, motors and fittings needs to be purchased for sewer PSs	Ensure adequate O&M	MTEF	Yes	BM1920044	Pump station equipment	R1,400	No	Yes	Yes
4.9	Annual Process Audits are required for all WTWs	Detail Technical Process Audits for all WTWs	WSDP	No	BM1920045	Annual Process Audits for three WTWs	R120	Yes	No	No
4.10	Annual Process Audits are required for all WWTWs	Detail Technical Process Audits for all WWTWs	WSDP	No	BM1920046	Annual Process Audits for two WWTWs	R80	Yes	No	No
4.11	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	BM1920047	Draft required O&M Schedules for all water and sewerage infrastructure	R200	Yes	No	No
Topic 5: Conservation and Demand Management (Topic 5.1 Water Resources)										
5.1	Water losses and NRW to be reduced through pressure	Implement pressure reduction to reduce water losses and NRW	MTEF	Yes	BM1920048	Water Demand Management (Pressure Management)	R1,500	No	Yes	Yes
5.2	Sections of water network with regular pipe bursts need to be	Implementation of Pipeline Replacement Programme	MTEF	Yes	BM1920049	Poortjies: Upgrade water pipeline (Replacement of old AC Pipes in Poortjies East)	R3,000	No	Yes	Yes
5.3	Sections of water network with regular pipe bursts need to be	Implementation of Pipeline Replacement Programme	MTEF	Yes	BM1920050	Dunes: Upgrading reticulation (Replacement of old AC Pipes)	R2,000	No	Yes	Yes
5.4	2018/2019 NRW 28.46% and Water Losses 26.62%	25 WC/WDM measures were proposed in the WSDP (Strategy)	WSDP	Partially	BM1920051	Implement WC/WDM measures	R2,350	Yes	Partially	Partially
Topic 5: Conservation and Demand Management (Topic 5.2 Water Balance)										
5.5	Unmetered erven were identified as part of the Water Master Plan	Install water meters for all the unmetered erven	WSDP	Partially	BM1920052	Install water meters for all the unmetered erven	R3,260	Yes	Partially	Partially
5.6	Existing SCADA system for water and sewerage infrastructure not working effectively.	Ensure fully functional SCADA system	WSDP	No	BM1920053	Refurbish existing water and sewerage SCADA system	R4,230	Yes	No	No
Topic 6: Water Resources										
6.1	Groundwater Monitoring Programme can be improved	Implement Comprehensive Groundwater Monitoring Programme	WSDP	Partially	BM1920054	Implement a Comprehensive Groundwater Monitoring Programme	R500	Yes	Partially	Partially
Topic 7: Financial										
Topic 8: Institutional Arrangements and Customer Care										
TOTAL: CURRENT NEEDS							**R132,636**			
	Funded						**R116,910**			
	% Funded						**88%**			

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?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number (Dept)	Project Title	Project Cost R'000			
FUTURE NEEDS										
Infrastructure										
F.1	Inadequate capacity of existing bulk water pipelines to meet future requirements.	Ensure adequate bulk water pipeline capacity to meet future requirements.	Water Master Plan	No	BM1920055	Future bulk water pipelines required for Plettenberg Bay	R91,952	Yes	No	No
F.2			Water Master Plan	No	BM1920056	Future bulk water pipelines required for Kurland	R21,697	Yes	No	No
F.3	Inadequate capacity of existing WTW.	Upgrade WTW to meet future water treatment requirements and ensure water quality compliance.	WSDP	Yes	BM1920057	Upgrade Kurland WTW from 0.6 Ml/d to 1.2 Ml/d	R9,317	Yes	Yes	Yes
F.4	Existing WTWs to be refurbished.	Ensure adequate water quality treatment and water quality compliance.	WSDP	No	BM1920058	Refurbish Plettenberg Bay WTW	R520	Yes	No	No
F.5			WSDP	No	BM1920059	Refurbish final water PS at Natures Valley WTW	R1,200	Yes	No	No
F.6	Inadequate capacity of existing water pump stations to meet future requirements.	Ensure adequate water pump capacity to meet future requirements.	Water Master Plan	No	BM1920060	Future water pump stations required for Plettenberg Bay	R33,389	Yes	No	No
F.7			Water Master Plan	No	BM1920061	Future water pump stations required for Kurland	R4,908	Yes	No	No
F.8	Existing reservoir storage capacity is inadequate to meet future requirements.	Ensure adequate reservoir storage capacity to meet future requirements.	Water Master Plan	No	BM1920062	Future reservoirs required for Plettenberg Bay	R93,845	Yes	No	No
F.9			Water Master Plan	No	BM1920063	Future reservoirs required for Kuland	R10,304	Yes	No	No
F.10			Water Master Plan	No	BM1920064	Future reservoirs required for Natures Valley	R5,040	Yes	No	No
F.11	Inadequate capacity of existing water reticulation networks to meet future requirements.	Ensure adequate internal water reticulation capacity.	Water Master Plan	No	BM1920065	Upgrade existing water reticulation network for Plettenberg Bay	R88,571	Yes	No	No
F.12			Water Master Plan	No	BM1920066	Upgrade existing water reticulation network for Kurland	R10,449	Yes	No	No
F.13			Water Master Plan	No	BM1920067	Upgrade existing water reticulation network for Natures Valley	R706	Yes	No	No
F.14			Water Master Plan	No	BM1920068	Upgrade existing water reticulation network for Harkerville	R100	Yes	No	No
F.15	Some of the zone boundaries require alterations and improvement of network conveyance and redundancy.	Alteration of zone boundaries	Water Master Plan	No	BM1920069	Implement WDM items as proposed in the Water Master Plan	R1,069	Yes	No	No
F.16	Capacity of existing sewer pump stations is inadequate to meet future requirements.	Ensure adequate sewer pump station capacity.	Sewer Master Plan	No	BM1920070	Future sewer pump stations required for Plettenberg Bay	R35,379	Yes	No	No
F.17			Sewer Master Plan	No	BM1920071	Future sewer pump stations required for Kurland	R2,368	Yes	No	No
F.18	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	BM1920072	Future bulk sewer pipeline and drainage network required for Plettenberg Bay	R186,736	Yes	No	No
F.19			Sewer Master Plan	No	BM1920073	Future bulk sewer pipeline and drainage network required for Kurland	R3,124	Yes	No	No
F.20	Inadequate capacity of existing WWTW.	Upgrade WWTW to meet future treatment requirements and ensure final effluent quality compliance.	WSDP	No	BM1920074	Upgrade Plettenberg Bay (Gansevlei) WWTW	R32,300	Yes	No	No
F.21			WSDP	No	BM1920075	Upgrade Kurland WWTW	R17,251	Yes	No	No
F.22	Existing WWTW to be refurbished.	Ensure adequate wastewater treatment capacity and final effluent quality compliance.	WSDP	No	BM1920076	Refurbishment of Plettenberg Bay WWTW	R1,213	Yes	No	No
F.23			WSDP	No	BM1920077	Refurbishment of Kurland WWTW	R30	Yes	No	No
Resources										
F.24	Yield of existing water resources of Plettenberg Bay is inadequate to meet future long term water requirements.	Augmentation of existing water resources of Plettenberg Bay in order to meet future water requirements.	WSDP	No	BM1920078	Development of the George Faulty East wellfield and the construction of the Keurbooms River off-channel Wadrif dam.	R73,800	Yes	No	No
TOTAL: FUTURE NEEDS							**R725,268**			