SWARTLAND MUNICIPALITY

EXECUTIVE SUMMARY

WATER SERVICES DEVELOPMENT PLAN FOR

2014/2015

DESCRIPTION **PAGE**

List of Tables iii

Abbreviations and Definitions v

Key Terms vii

1. Critical developments and associated factors that impacts our area for the immediate future .. 2

1.1 Urban versus Rural Backlogs 2

1.2 Reliance on Water Resources Available and Bulk Infrastructure 2

1.3 Links between Water Supply and Sanitation 3

1.4 Limited Implementation and Operating Capacity in Some Municipalities 3

1.5 Available funding 3

1.6 Affordability of Service Levels (Operation and Maintenance Costs) 4

1.7 Growing Backlog in Refurbishment of Existing Infrastructure 4

1.8 Major Economic Development 4

1.9 Associated Population Growth and Water Demand 4

2. Administration 5

3. Demographics 5

3.1 Status Quo 5

3.2 Gaps and Strategies 7

4. Service Levels 8

4.1 Status Quo 8

4.2 Gaps and Strategies 9

5. Socio-Economic Background 10

5.1 Status Quo 10

5.2 Gaps and Strategies 12

6. Infrastructure 14

6.1 Status Quo 14

6.2 Gaps and Strategies 17

TABLE OF CONTENTS

7. Operation and Maintenance 26

7.1 Status Quo 26

7.2 Gaps and Strategies 30

8. Associated Services 31

8.1 Status Quo 31

8.2 Gaps and Strategies 31

9. Conservation and Demand Management 32

9.1 Status Quo 32

9.2 Gaps and Strategies 34

10. Water Resources 36

10.1 Status Quo 36

10.2 Gaps and Strategies 39

11. Financial 46

11.1 Status Quo 46

11.2 Gaps and Strategies 47

12. Water Services Institutional Arrangements 49

12.1 Status Quo 49

12.2 Gaps and Strategies 50

13. Social and Customer Service Requirements 51

131 Status Quo 51

13.2 Gaps and Strategies 53

14. Needs Development Plan 53

14.1 Status Quo 53

14.2 Gaps and Strategies 57

LIST OF TABLES

Table 2.1: Vision and Mission Statement of Swartland Municipality 5
Table 3.1.1: Growth Potential and Socio-Economic Needs of the towns in Swartland Municipality's Management Area (Growth Potential Study, November 2013) 6
Table 4.1.1: Number of user connections in each user sector for the last four financial years 8
Table 4.1.2: Total number of consumer units per town and percentage growth from 2009/2010 to 2012/2013 8
Table 4.1.3: Residential water and sanitation service levels (Based on projected population figures) 9
Table 5.1.1: Estimated current population and population growth rates 11
Table 6.1.1: Water and Sewerage infrastructure for which Swartland Municipality is responsible 14
Table 6.1.2: Water and Sewerage infrastructure challenges highlighted by the Municipality in their latest IDP 14
Table 6.1.3: Current and depreciated replacement costs of the water and sewerage infrastructure 15
Table 6.1.4: Overview of the RUL by facility type for water and sewerage infrastructure (CRC) 16
Table 6.1.5: Overview of the age distribution by facility type for water and sewerage infrastructure (CRC) 16
Table 6.2.1: Future pump stations requirements for Swartland Municipality's distribution systems 17
Table 6.2.2: Future reservoir capacity requirements for the Swartland Municipality's distribution systems 17
Table 6.2.3: Proposed upgradings for the various distribution systems (Water Master Plan) 18
Table 6.2.4: Future sewer reticulation infrastructure required 20
Table 6.2.5: Future sewer pump stations required 21
Table 6.2.6: Existing capacities and flows at each of the WWTWs (Ml/d) 21
Table 6.2.7: Recommendations from Malmesbury WWTW Process Audit (2012) 21
Table 6.2.8 Recommendations from Moorreesburg WWTW Process Audit (2012) 22
Table 6.2.9: Recommendations from Darling WWTW Process Audit (2012) 22
Table 6.2.10: Recommendations from Riebeek Wes and Riebeek Kasteel WWTW Process Audits (2012) 23
Table 6.2.11: Recommendations from Koringberg WWTW Process Audit (2012) 24
Table 6.2.12: Recommendations from Kalbaskraal WWTW Process Audit (2012) 24
Table 6.2.13: Recommendations from Chatsworth / Riverlands WWTW Process Audit (2012) 25
Table 7.1.1: Blue Drop Performance of the Municipality (DWA's 2012 Blue Drop Report) 26
Table 7.1.2: Green Drop Performance of the Municipality (DWA's 2011 Green Drop Report) 28
Table 7.1.3: DWA's 2012 Green Drop Risk Profile Progress Report results for Swartland Municipality 29
Table 9.1.1: Non revenue water for the various distribution systems 33
Table 9.2.1: Committed reduction in Non-Revenue Water 34
Table 10.1.1: Percentage compliance of the water quality samples for the period July 2012 to June 2013 37
Table 10.1.2: Five categories under which the risks posed by micro-organism, physical or aesthetic property or chemical substance of potable water is normally classified 39
Table 10.1.3: Microbiological, chemical and physical compliance percentages of the final effluent taken at the various WWTW over the period July 2012 to June 2013 39
Table 10.2.1: Potential future water resources for the various towns (DWA's Reconciliation Strategy) 41
Table 10.2.2: Current parameters sampled by the West Coast District Municipality and Swartland Municipality: Routine monitoring of Process Indicators 44
Table 10.2.3: Current and required sampling for E.Coli (or faecal coliforms) in the distribution systems 45
Table 11.1.1: Historical expenditure of the water and sewerage infrastructure budgets 46

LIST OF TABLES / Continue

Table 11.1.2: Summary of Operational and Maintenance expenditure and income budgets for water and sanitation services 46
Table 11.2.1: Comments on Swartland Municipality's step block water tariff structure 48
Table 13.1.1: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work 52
Table 13.1.2: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work 52
Table 14.1.1: Needs identified through the WSDP process and possible improvements / projects 54
Table 14.2.1: Water and sewerage capital projects, as included in the proposed Five Year Capital Budget for 2014/2015 57

ABBREVIATIONS AND DEFINITIONS

AADD	Average Annual Daily Demand
ACIP	Accelerated Community Infrastructure Programme
BDS	Blue Drop System
CBO	Community Based Organisation
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
DMODRC	Depreciated Replacement Cost
DO	Dissolved Oxygen
DWA	Department of Water Affairs
EC	Electrical Conductivity
EDP	Economic Development Partnership
EHP	Environmental Health Practitioners
EPWP	Expanded Public Works Programme
FDA	Future Development Area
GAMAP	General Accepted Municipal Accounting Practices
GIS	Geographic Information System
GRAP	Generally Recognised Accounting Practice
HL	Higher Level
IAMP	Infrastructure Asset Management Plan
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
KPI	Key Performance Indicator
l/s	Litres per second
LED	Local Economic Development
LL	Lower Level
m^3/a	Cubic metre per year
MAP	Mean Annual Precipitation
Ml	Mega litre
Ml/d	Mega litre per day
MNF	Minimum Night Flow
MTREF	Medium Term Revenue Expenditure Framework
NGO	Non-Governmental Organisations
O&M	Operation and Maintenance
PAT	Progress Assessment Tool
PRV	Pressure Reducing Valve
PS	Pump Station
RBIG	Regional Bulk Infrastructure Grant
RDP	Reconstruction and Development Programme
REDS	Regional Economic Development Strategy
RPMS	Regulatory Performance Management System

ABBREVIATIONS AND DEFINITIONS / Continue

RUL	Remaining Useful Life
SANS	South African National Standards
SDBIP	Service Delivery Budget Implementation Plan
SDF	Spatial Development Framework
SFWS	Strategic Framework for Water Services
SMAF	Swartland Municipality Advisory Forum
SMME	Small Medium Micro Enterprise
SWRO	Sea Water Reverse Osmosis
TMG	Table Mountain Group
UAW	Unaccounted for Water
WC/WDM	Water Conservation / Water Demand Management
WCNCB	Western Cape Nature Conservation Board
WDM	Water Demand Management
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider
WTW	Water Treatment Works
W_2RAP	Wastewater Risk Abatement Plan
WWTW	Waste Water Treatment Works

KEY TERMS

TERM	INTERPRETATION
Basic Water Supply Facility	The infrastructure necessary to supply 25 litres of potable water per person per day supplied within 200 metres of a household and with a minimum flow of 10 litres per minute (in the case of communal water points) or 6 000 litres of potable water supplied per formal connection per month (in the case of yard or house connections).
Basic Water Supply Service	The provision of a basic water supply facility, the sustainable operation of the facility (available for at least 350 days per year and not interrupted for more than 48 consecutive hours per incident) and the communication of good water-use, hygiene and related practices.
Basic Sanitation Facility	The infrastructure necessary to provide a sanitation facility which is safe, reliable, private, protected from the weather and ventilated, keeps smells to the minimum, is easy to keep clean, minimises the risk of the spread of sanitation-related diseases by facilitating the appropriate control of disease carrying flies and pests, and enables safe and appropriate treatment and/or removal of human waste and wastewater in an environmentally sound manner.
Basic Sanitation Service	The provision of a basic sanitation facility which is easily accessible to a household, the sustainable operation of the facility, including the safe removal of human waste and wastewater from the premises where this is appropriate and necessary, and the communication of good sanitation, hygiene and related practices.
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.
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.
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.
Effluent	The liquid discharged from a processing step, usually from an industry, from a water purification works or from a waste water treatment plant.
Global Warming	The increase in the average surface temperatures across the globe, usually measured over long periods of time; reported to have increased by $1^{o}C$ over the past hundred years.
IDP	A municipal plan as defined in the Municipal Systems Act.
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.
Potable	Water intended to be used for drinking or domestic purposes.
Re-use	Utilisation of treated or untreated wastewater for a process other than the one that generated it, i.e. it involves a change of user. 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.
RUL	The time remaining over which an asset is expected to be used.
Sewage	Liquid waste, with some suspended material, mainly human excrement.
Sewerage	Infrastructure for the collection, treatment, and disposal of liquid waste (sewage).
Surface Water	Runoff that occurs in streams and rivers, also in natural lakes and reservoirs; a major resource for water supplies.

KEY TERMS

TERM	INTERPRETATION
Water Balance	The regulation or rationalisation of human activity to match the sustainable local water supply, rather than base, or a process of balancing water supply and demand to ensure that water use does not exceed supply.
Wastewater Treatment	This includes any process which may be used to favourably modify the characteristics of the wastewater.
Water Balance	The regulation or rationalisation of human activity to match the sustainable local water supply, rather than base, or a process of balancing water supply and demand to ensure that water use does not exceed supply.
Water Resource	Water that can be used to contribute to economic activity, including a water course, surface water, estuary and ground water in an aquifer.
Water Services	Water supply services and/or sanitation services, or any part thereof.
Water Supply Services	The abstraction from a water resource, conveyance, treatment, storage and distribution of potable water, water intended to be converted to potable water and water for industrial or other use, to consumers or other water services providers. This includes all the organisational arrangements necessary to ensure the provision of water supply services including, amongst others, appropriate health, hygiene and water-related awareness, the measurement of consumption and the associated billing, collection of revenue and consumer care. Water services authorities have a right but not an obligation to provide industrial water to industries within their area of jurisdiction.
WSA	A WSA is any municipality that has the executive authority to provide water services within its area of jurisdiction in terms of the Municipal Structures Act 118 of 1998 or the ministerial authorisations made in terms of this Act. 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.
WSDP	A plan for water and sanitation services in terms of the Water Services Act.
WSP	A Water services provider is • Any person who has a contract with a WSA or another WSP to sell water to, and/or accept wastewater for the purpose of treatment from that Authority or Provider, who is usually a bulk water services provider); or • Any person who has a contract with a WSA to take responsibility for providing retail water services to one or more consumers within a specific geographic area; or • A WSA that provides either or both of the above services itself.
WC	The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.
WDM	The adaptation and implementation of a strategy or a programme 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.

EXECUTIVE SUMMARY

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

Sections 12 and 13 of the Water Services Act (Act No 108 of 1997) place a duty on WSAs to prepare and maintain a WSDP. The business elements included in the guidelines and addressed in detail in the three Modules of Swartland Municipality's WSDP are as follows:

- Administration
- Demographics Profile
- Service Levels Profile
- Socio Economic Background Profile
- Water Services Infrastructure Profile
- Operation and Maintenance Profile
- Associated Services Profile
- Water Resources Profile
- Conservation and Demand Management Profile
- Financial Profile
- Institutional Arrangements Profile
- Social and Customer Service Requirements Profile
- Needs Development Plan

The 2014/2015 WSDP of Swartland Municipality consists of the following documents.

- Executive Summary document (For Council approval and Public Participation Process)
- Module1: Overview and assessment of the status of information and strategies on a WSA level.
- Module 2: Detailed information: Enabling factors compliancy supportive information.
- Module 3: Future plans and strategic supportive information.

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 DWA.

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

1. CRITICAL DEVELOPMENTS AND ASSOCIATED FACTORS THAT IMPACTS OUR AREA FOR THE IMMEDIATE FUTURE

1.1 Urban versus Rural Backlogs

There is no basic water and sanitation services backlog in the urban areas of Swartland Municipality's Management Area. The 2011 Census data however indicated that there are still some households on the farms in the rural areas with existing service levels below RDP standard. Swartland Municipality is however committed to work with the private landowners in order to ensure that basic services are provided to these households by the private landowners.

The Municipality's biggest challenge is to address the housing backlog in the urban areas and to ensure that the necessary bulk infrastructure is in place in order to meet the future demands. Various bulk infrastructure capital projects were completed over the last number of years in order to ensure that the bulk water infrastructure can meet the future demands for the various towns.

Adequate funds also need to be allocated to essential rehabilitation and maintenance of the existing infrastructure in addition to the need to extend services to poor communities as both are priorities which need to be addressed. The existing infrastructure is in a relative good state and therefore it is important for the Municipality to maintain the existing public investment. Swartland Municipality is committed to allocate adequate funds for the rehabilitation and maintenance of their existing infrastructure. Such maintenance is however in competition with the need to extend services to the poor communities. The Municipality realises that the lack of adequate maintenance of existing assets could result in the total collapse of such service, with enormous economic consequences.

1.2 Reliance on Water Resources Available and Bulk Infrastructure

The towns within Swartland Municipality's Management Area receive their potable water from the West Coast District Municipality, who act as bulk WSP to the Municipality. The West Coast District Municipality already started in 2007 with a comprehensive study to identify a sustainable long term alternative water source for the region. Various alternative sources and combinations thereof were evaluated and eventually a 25.5 Ml/day sea water desalination plant in the Saldanha Bay area was identified as the most cost beneficial alternative.

The West Coast District Municipality is currently operating a pilot desalination plant for the summer period in order to get all the necessary data for their feasibility study and for the preliminary design of the desalination plant.

An increased allocation from the Berg River is however still an option and the West Coast District Municipality is also re-investigating the other alternatives that were previously investigated in the feasibility reports.

The upgrading of the Malmesbury WWTW was completed and the new WWTW was put into operation during March 2013. The Municipality is also currently busy with the construction of the new combined WWTW for Riebeek Wes, Riebeek Kasteel and Ongegund. The Municipality further continued with the replacement and upgrading of various sections of the water reticulation and sewer drainage networks within the various towns.

1.3 Links between Water Supply and Sanitation

The Water and Sewer Master Plans of Swartland Municipality are linked to their SDF. The future development areas were identified as part of the SDF. Bulk water and sewerage infrastructure and water and sanitation services are balanced with land usage and development planning. All service delivery is done in accordance with the availability of water and the capacities of the WWTWs that are in place or that will be implemented.

1.4 Limited Implementation and Operating Capacity in Some Municipalities

The financial statements of the Municipality were audited by the Office of the Auditor-General and found to be unqualified with no other matters (2012/2013). The Municipality is busy redeveloping an Asset Register which integrates with the financial system and which will provide much more up to date information on maintenance and renewal requirements.

Expenditure on repairs and maintenance however does not keep track with the increase in asset values as well as the ageing of the infrastructure. The MTREF further indicates a decline in the amounts spend on repairs and maintenance as a percentage of total operating expenditure. The main reason for these trends is that the municipality is only allowed to budget for increases in line with inflation targets, and other expenditure items over which the municipality has no control, such a collective agreements with unions, are well above the targets, thereby naturally leaving no space for increased expenditure on maintenance. This is an unacceptable situation which the municipality is trying to address by way of a reduction in other “nice to have” expenditure items.

The Municipality is however in a financially healthy position. The Council and Management are well aware of the dangers of lacklustre financial management practices and proactively participate in programmes to ensure a financially sustainable municipality.

The municipal staff is however at a technical, operations and management level continuously exposed to training opportunities, skills development and capacity building in an effort to create a more efficient overall service to the users. Swartland Municipality will also continue with their mentoring role for operators, ensuring 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.

1.5 Available funding

The estimated Capital Budget for Water and Sewerage Infrastructure are R45.5million for 2014/2015, R14.8 million for 2015/2016 and R13.6 million for 2016/2017. The municipality utilises a CRR to fund as much of the capital expenditure as possible. The CRR is being funded by surplus cash which is mainly derived from a recovery from tariffs for depreciation charges. Swartland Municipality will further continue with the sourcing of all possible external sources of funding for their capital projects.

The new Asset Register, which is currently being developed, will provide more accurate information on the real replacement values and service lives of the assets and the funds required to provide for adequate asset replacement.

1.6 Affordability of Service Levels (Operation and Maintenance Costs)

Both Water and Sanitation Services are currently managed by Swartland Municipality in a financial sustainable manner. The Municipality operates a step water tariff system with drought tariffs that can also be implemented. The sewer tariffs are not yet linked to the water consumption.

1.7 Growing Backlog in Refurbishment of Existing Infrastructure

Asset management is guided by the Asset Management Policy of the municipality. The policy is reviewed on an annual basis as part of the budget policies review process to ensure it complies with the latest requirements of GRAP, audit- and treasury directives. An Infrastructure Asset Register is in place for all water and sewerage infrastructure. The depreciated replacement costs were calculated for the water and sewerage infrastructure, which indicated that 55% of the value of the water infrastructure and 28% of the value of the sewerage infrastructure has been consumed.

The new Asset Register will integrate with the financial system and will provide much more up to date information on maintenance and renewal requirements. The new Asset Register is 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. Assets must be rehabilitated and / or replaced before the end of their economic life and the necessary operation and maintenance and capital funds must be allocated for this purpose.

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. A regime of planned preventative maintenance should be established for all infrastructure assets classified as critical and important in the Asset Register.

1.8 Major Economic Development

Investing in infrastructure creates an enabling environment for economic growth and is an important precondition for sustainable growth. Although Swartland Municipality has a potential for growth at much higher rates, failure to ensure adequate rehabilitation and maintenance of the existing infrastructure poses a serious threat to the local economy. The deterioration of water and sewerage infrastructure and rapid development, which is not always matched by growing capital expenditure, can further exacerbate the situation. Swartland Municipality therefore needs to continue with the rehabilitation and maintenance of their existing infrastructure in order to ensure the medium to long term sustainability of the existing infrastructure.

1.9 Associated Population Growth and Water Demand

Swartland Municipality's population growth over the period 2001 to 2011 was 4.66%. The detail future water demand projection models for each of the distribution systems were updated as part of the WSDP process. The Municipality also actively implements their WDM Strategy and various WDM activities in order to reduce their current percentage of non-revenue water even further and to keep the future water demand as low as possible.

The West Coast District Municipality is currently busy with various investigations for the augmentation of their existing water resources in order to ensure that the future bulk water demands of Swartland-, Saldanha- and Berg Rivier Municipality can be met.

2. ADMINISTRATION

Section 14 of the Water Services Act requires that the WSA must take reasonable steps to bring its draft WSDP to the notice of a number of different stakeholders so that they have the opportunity to comment on it.

The 2014/2015 WSDP will be distributed to the public as part of the IDP public participation process. The draft WSDP will also be distributed to all the neighbouring WSAs for their comments. All relevant comments received on the draft WSDP will be included in the final WSDP.

Swartland Municipality is currently working on an External Communication Policy / Plan. The Municipality has two distinct structures through which formalised public participation with its communities takes place i.e.

- Ward Committees; and
- Swartland Municipal Advisory Forum (SMAF)

The SMAF functions as the IDP Representative Forum and comprises of two members from each ward committee as well as any other role players or stakeholders the Executive Mayor wishes to co-opt onto the Forum for one or more meetings or for a specific purpose. Although the Ward Committees provide for representation of communities on a geographical basis, there are also a number of sector interests not covered by ward committees that play a major role within the municipal area, such as education, business and agriculture. Liaison with and involvement of such sector groups is therefore also crucial in order to get a full picture of the current reality in the Municipality's area. Liaison with sector groups is done mainly through the SMAF and workshops.

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

Table 2.1: Vision and Mission Statement of Swartland Municipality
VISION STATEMENT
"Swartland Municipality is a frontline organisation which promotes sustainable development and delivers services effectively and efficiently to all its people by building partnerships with all stakeholders."
MISSION STATEMENT
"At Swartland Municipality it is our mission to promote social and economic stability and growth through the sustainable delivery of services in terms of our legal powers and functions to all our interested parties."

3. DEMOGRAPHICS

3.1 Status Quo

Swartland Municipality falls within the Berg-Olifants Management Area and include the towns of Malmesbury, Moorreesburg, Koringberg, Darling, Yzerfontein, Riebeek Wes, Riebeek Kasteel, Ongegund, Kalbaskraal, Abbotsdale, Chatsworth and Riverlands and the farms in the rural areas.

The most significant challenges, from a Water Services perspective are the replacement and upgrading of the old water and sewerage infrastructure to accommodate future development and to ensure the sustainability of the existing services, the operation and maintenance of the WWTWs in a sustainable manner end ensuring the quality of final effluent discharged from the WWTWs complies with the legal requirements and to ensure the provision of basic services to households located on private 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.

Physical Perspective:

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

By protecting water resources, a system that is more resilient to the impact of climate change, such as floods and droughts will be ensured. In addition, a healthy functioning ecosystem can assist in mitigating some of the impacts of climate change on society. For example, well-functioning wetlands can minimise the impacts of floods and ensuring good riparian habitat can provide shading and minimise evaporation from the water resources. Groundwater aquifers can provide safe storage of water for use, if they are protected and not over-abstracted or polluted, for example, by untreated effluent.

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:

The ecological sensitive areas in and around the urban areas were identified, as part of Swartland Municipality's SDF. All sensitive areas were taken into account when the urban edges were determined in 2009. The biggest environmental challenges for Swartland Municipality's Management Area are the protection of the existing critical endangered plant species. Rivers and wetlands need to be protected with adequate buffer zones. The most important rivers are the Berg River and Diep River. The Berg River flows into the Berg River Estuary, which is of high conservation value. Die Diep River flows through Malmesbury, Abbotsdale and Kalbaskraal. Alien vegetation needs to be removed and need to be controlled in rivers, wetlands and identified conservation areas. The most important environmental assets of the Swartland Municipality's Management Area are as follows:

- The Wilderness areas with surrounding mountains: Kasteelberg, Paardeberg and Dassenberg;
- The crop farms, wine lands and vineyards;
- The slopes with remaining "fynbos" and "renosterveld";
- The Diep River that runs from its origin in "Kasteelberg" to form a natural link between Malmesbury, Abbotsdale, Kalbaskraal and much further, the Atlantic Ocean;
- The landscape with historical and cultural buildings, places, parks, landmarks, views as well as the network of roads that link the region and social structures; and
- The town boundary that limits expansion.

Demographic Perspective:

The growth potential of towns Study (November 2013) determined the growth potential and socio-economic needs of settlements in the Western Cape outside of the Cape Town metropolitan areas using quantitative data. The growth potential and socio-economic needs of the towns in Swartland Municpality's Management Area were indicated as follows in the Study.

Table 3.1.1: Growth Potential and Socio-Economic Needs of the towns in Swartland Municipality's Management Area (Growth Potential Study, November 2013)

Town / Settlement	Growth Potential	Socio-Economic Needs
Koringberg	Medium	Very Low
Moorreesburg	High	Medium
Riebeek Kasteel / Riebeek Wes	High	Medium
Malmesbury	Very High	High

Table 3.1.1: Growth Potential and Socio-Economic Needs of the towns in Swartland Municipality's Management Area (Growth Potential Study, November 2013)		
Town / Settlement	**Growth Potential**	**Socio-Economic Needs**
Kalbaskraal	High	Low
Darling	Medium	Low
Yzerfontein	Medium	Very Low

The key human development issues facing the Municipality include poverty and unemployment. People migrating to the Swartland have far reaching implications for the Municipality as it has a major effect on the economy. In-migration of people has an impact on the provision of housing and services, unemployment, poverty and the economy in general.

3.2 Gaps and Strategies

Swartland Municipality's new SDF was approved on 31 May 2012, which will assist the Municipality with all spatially related decision making. All future developments need to be aligned with the approved SDF.

It is advisable for Swartland Municipality that a conservative approach be followed regarding the management of water sources, due to the potential impact of climate change. It is proposed that the following approach be adopted to mitigate and adapt to the possible 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.

The Performance Objectives of Swartland Municipality, with regard to Environmental Protection, are as follows:

- Pollution Control
  - Monitor environmental health.
  - Keep the water quality on an acceptable level.
  - Properly address all health compaints
  - Ensure that all identified erven in urban areas are compliant with standards.
  - Monitor air pollution in the area.
  - Provide an effective pest control service.
- Bio-Diversity; Landscape and Other
  - Climate change awareness / strategy / initiatives for Swartland.
  - Effectively manage scarce natural resources.
- Occupational and Environmental Health and Non Related Environmental Health
  - Ensure that all the required safety representatives are in place.

- Reduce injuries on duty.
- Ensure the effective administration of claims.
- Ensure that health and safety committees are functional.
- Effective manage all injuries.
- Ensure that all capital projects comply with safety regulations.

4. SERVICE LEVELS

4.1 Status Quo

The number of user connections in each user sector, for the consumers provided with water services by Swartland Municipality, are summarised in the table below for the last four financial years.

Table 4.1.1: Number of user connections in each user sector for the last four financial years

Distribution System	12/13			11/12			10/11			09/10		
	Res	Bus	Other	Res	Bus	Other	Res	Bus	Other	Res	Bus	Other
Koringberg	329	9	8	372	10	8	376	15	3	355	11	0
PPC	79	3	17	79	3	14	80	2	12	89	1	5
Riebeek Wes	689	44	28	684	43	30	688	50	8	688	49	5
Riebeek Kasteel	1 069	32	24	1 056	33	24	1 047	42	11	1 047	36	6
Yzerfontein	1 166	21	24	1 140	21	24	1 118	23	20	1 280	24	16
Darling	2 442	105	51	2 434	100	55	2 411	119	30	2 307	97	14
Moorreesburg	2 776	195	46	2 777	192	45	2 779	190	39	2 784	186	33
Malmesbury	6 595	377	364	6 583	366	171	6 566	452	69	6 905	329	55
Abbotsdale	643	4	9	639	4	9	634	10	3	627	6	2
Kalbaskraal	405	6	10	400	4	11	397	10	4	402	5	2
Riverlands	312	1	8	312	1	9	312	3	7	320	4	0
Chatsworth	686	0	28	660	0	29	333	11	25	290	4	19
TOTALS	**17 191**	**797**	**617**	**17 136**	**777**	**429**	**16 741**	**927**	**231**	**17 094**	**752**	**157**

The growth in the total number of consumers per town for the period 2009/2010 to 2012/2013 is indicated in the table below.

Table 4.1.2: Total number of consumer units per town and percentage growth from 2009/2010 to 2012/2013

Distribution System	Growth % 09/10 – 12/13	12/13	11/12	10/11	09/10
Koringberg	-5.46%	346	390	394	366
PPC	4.21%	99	96	94	95
Riebeek Wes	2.56%	761	757	746	742
Riebeek Kasteel	3.31%	1 125	1 113	1 100	1 089
Yzerfontein	-8.26%	1 211	1 185	1 161	1 320
Darling	7.44%	2 598	2 589	2 560	2 418
Moorreesburg	0.47%	3 017	3 014	3 008	3 003
Malmesbury	0.64%	7 336	7 120	7 087	7 289
Abbotsdale	3.31%	656	652	647	635
Kalbaskraal	2.93%	421	415	411	409
Riverlands	-0.93%	321	322	322	324
Chatsworth	128.12%	714	689	369	313
TOTALS	**3.34%**	**18 605**	**18 342**	**17 899**	**18 003**

The current (2012/2013) residential water and sanitation service levels in Swartland Municipality's Management Area are therefore estimated as follows:

Table 4.1.3: Residential water and sanitation service levels (Based on projected population figures)

Service Level	Malmesbury	Abbotsdale	Riverlands	Chatsworth	Kalbaskraal	Riebeek Kasteel	Riebeek Wes	Darling	Moorreesburg	Koringberg	Yzerfontein	Farms	Total
WATER SERVICE LEVELS													
Basic Need (RDP)	0	0	0	0	0	0	0	0	0	0	0	157	157
Housing Need (No Services) (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Housing Need (Communal Services) (2)	0	0	0	89	0	0	0	0	0	0	0	0	89
Adequate (3)	10 146	962	471	673	726	1 511	1 272	2 914	3 926	343	1 166	7 732	31 842
Total	**10 146**	**962**	**471**	**762**	**726**	**1 511**	**1 272**	**2 914**	**3 926**	**343**	**1 166**	**7 889**	**32 088**
SANITATION SERVICE LEVELS													
Basic Need (RDP)	0	0	0	0	0	0	0	0	0	0	0	1 645	1 645
Housing Need (No Services) (1)	0	0	0	89	0	0	0	0	0	0	0	0	89
Housing Need (Communal Services) (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
Adequate (3)	10 146	962	471	673	726	1 511	1 272	2 914	3 926	343	1 166	6 244	30 354
Total	**10 146**	**962**	**471**	**762**	**726**	**1 511**	**1 272**	**2 914**	**3 926**	**343**	**1 166**	**7 889**	**32 088**

Notes: (1) Informal areas with no services

(2) Informal areas with existing communal services

(3) Adequate: Based on low estimated future population growth (Table 5.1.1) and include formal residential consumer units from the financial system and the estimated existing backyard dwellers on formal erven.

4.2 Gaps and Strategies

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

Water and Sanitation Service Level Policies for Swartland Municipality are not yet in place, but the service levels to be provided by the Municipality to the consumers in their Management Area are however addressed in the Municipality's draft Water Services By-laws. All water and sanitation services provided by Swartland 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 Swartland Municipality's Indigent Policy.

The number of persons on Swartland Municipality's housing waiting list in January 2014 was 12 912. The large number of residents in the lowest income groups places a major challenge on Swartland Municipality to provide suitable housing. Swartland Municipality works towards providing all households in the towns with a water connection inside the house and connecting all households to a waterborne sanitation system.

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

Swartland 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. Swartland Municipality is however faced with various challenges with regard to the provision of services on private owned land in a financial sustainable manner (enabling the ongoing 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 appropriate sanitation facility to the poor household.
- Health and hygiene promotion must be provided in a co-ordinated manner and must be properly managed and adequately funded if free basic sanitation is to become a reality. This requires close collaboration between the EHPs of the West Coast District Municipality responsible for environmental health and Swartland Municipality.
- Subsidising the operating and maintenance costs. If the basic service is to be provided free to the poor then Swartland Municipality must ensure that the costs of providing the service are covered by the local government equitable share and / or through cross-subsidies within Swartland 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.

The clinics and hospitals in Swartland Municipality's Management Area have adequate and safe water supply and sanitation services. All the schools in Swartland Municipality's Management Area also have adequate and safe water supply and sanitation services. It is important for the schools in Swartland Municipality's Management Area to focus on Water Demand Management activities and for Swartland Municipality to support the schools with a WDM activities as far as possible.

5. SOCIO ECONOMIC BACKGROUND

5.1 Status Quo

The 2001 Census recorded the population in the Swartland Municipality's Management Area at 72 109 (18 675 Households) and the 2007 Community Survey recorded the 2007 population at 77 520 (19 939 Households). According to the 2011 Census Community Profiles, the current population is 113 763 (29 325 Households).

Due to the high levels of uncertainty projecting the current and future population of Swartland Municipality it was decided to include a **high** and **low** estimate in the WSDP. The high growth percentages were however used in the future water demand projection models for each of the water distribution systems. The estimated current population and the population growth rates for the various distribution systems are summarised in the table below.

Table 5.1.1: Estimated current population and population growth rates

Distribution System	Historical Population Growth per year (2001 – 2011)	Census 2011			Future Population Growth per year (2011 Onwards)	Projections for 2012/2013		Number of Residential Consumer Units for 2012/2013
		Popula-tion	Number of Households	Persons / Household		Popula-tion	Number of Households (Permanent)	
Malmesbury	4.58%	35 897	9 474	3.79	4.50%	39 200	10 343	6 595
					3.50%	38 454	10 146	
Abbotsdale	3.18%	3 762	924	4.07	3.00%	3 991	981	643
					2.00%	3 914	962	
Riverlands	5.29%	1 726	427	4.04	6.00%	1 939	480	312
					5.00%	1 903	471	
Chatsworth	9.25%	2 326	679	3.43	7.50%	2 688	784	686
					6.00%	2 613	762	
Kalbaskraal	6.36%	2 411	659	3.66	6.50%	2 735	747	405
					5.00%	2 658	726	
Riebeek Kasteel	6.58%	4 761	1 345	3.54	7.50%	5 502	1 554	1 069
					6.00%	5 349	1 511	
Riebeek Wes	5.64%	4 605	1 143	4.03	6.50%	5 223	1 296	689
					5.50%	5 125	1 272	
Darling	3.29%	10 420	2 800	3.72	3.50%	11 162	3 001	2 442
					2.00%	10 841	2 914	
Moorreesburg	4.15%	12 877	3 698	3.48	4.00%	13 928	4 002	2 776
					3.00%	13 661	3 926	
Koringberg	13.02%	1 214	317	3.83	5.00%	1 338	349	329
					4.00%	1 313	343	
Yzerfontein	8.25%	1 140	490	2.33	6.00%	1 281	550	1 166
					4.00%	1 233	529	
Farms	7.01%	32 624	7 369	4.43	4.50%	35 626	8 042	*7 889*
					3.50%	34 948	7 889	
TOTALS	**4.65%**	**113 763**	**29 324**	**3.87**	**4.66%**	**124 613**	**32 129**	**25 001**
					3.56%	**122 012**	**31 451**	

The number of indigent households in Swartland Municipality's Management Area was 5 103 in June 2013 and 4 897 in January 2014. The unemployment rate in Swartland Municipality was 12.7% in 2011, which was the second lowest in the West Coast District (Bergrivier Municipality at 6.8%). The household income of the individual municipalities in the West Coast District is not too dissimilar to the overall economic trend prevailing in the West Coast District economy when compared to the GDP-R trends for the last decade or so. Household income peaks around the R19 201 – R38 400 per annum level with Swartland (6351 households) and Saldanha Bay (5 008 households) leading the way. The trajectory of the graphs for Swartland and Saldanha Bay municipalities for this category is considerably flatter than the surrounding municipalities indicating a more even spread of household income for these particular musicality whereas the lesser performing economies of Cederberg and Matzikama produce far more distinct peaks and troughs indicating higher levels of inequality.

A Housing Strategy is in place for Swartland Municipality, with an estimated number of 1 045 housing units planned for the next three years (2014/2015 onwards). The purpose of the Strategy is not only eradicate the current housing backlog, but to develop and plan for future integrated communities and settlements that would be able to sustain the growing needs for housing in such a way that all people will benefit from the housing developments.

The fastest growing sector in the West Coast District was finance and business services (growing 10.6% per annum, 2000-2011), followed by the construction sector (6.6% per annum). The West Coast hosted the fastest growing finance and business services sector across all district economies. While the construction sector boomed during the expansion phase of the business cycle, growth has collapsed following the impact of the recession in 2008-2009. The district economy witnessed significant job losses throughout the period 2000-2011, at a net rate of 36 500 per annum.

5.2 Gaps and Strategies

Social: A Social Development Policy and Strategy is in place (April 2013). The Municipality's Social Development Mission is *"We initiate, build and promote social development opportunities with the focus on sustainability, which specifically refers to financial viability in the long term, forming partnerships with the community and service providers, not harming the environment operating, within legal powers, functions and requirements"*. The focus areas that were identified for the social development strategy were as follows:

- Establish child facilities / promote child development.
- Facilitate youth development.
- Promote co-ordination / collaboration
- Promote access to the economy
- Lobbying for the vulnerable

Economic: Local economic development is creating a platform and environment to engage stakeholders in implementing strategies and programmes. The Framework emphasizes that municipalities have a key role in creating an environment conducive for investment through the provision of infrastructure and quality services, rather than by developing programmes and attempting to create jobs directly.

A LED Strategy is in place of which the purpose is to develop the local economy and to meet the national objectives of halving poverty and unemployment by 2014. The LED Strategy focuses on growing key sectors of the economy and this is linked to strategies for education, skills development and training, business development and support, spatial planning and township development as well as poverty reduction.

Swartland Municipality is committed to maximise its contribution to LED and job creation by:

- fully participating in the expanded public works programme (EPWP)
- using labour intensive methods wherever possible
- putting an obligation on service providers to use labour intensive approaches
- supporting labour intensive LED projects
- supporting the interns programme (this has already led to a number of permanent appointments)
- creating an enabling environment for investments and other activities that will lead to job creation
- timely delivery in spending on our capital programme
- effective revenue management
- sufficient provision for repairs and maintenance
- having more supply chain open days with a focus on small, medium and micro enterprises (SMME's)
- monitoring red tape issues through the Municipality's performance management system

- a bigger focus on the informal economy, the social economy and a decent work
- facilitating the use of the Jobs Fund
- interacting with the Provincial Government regarding new scheme regulations that will reduce red tape
- evaluating the appropriateness of our current approach to LED versus the establishment of a more focussed LED unit (affordability / financing?)
- fully supporting the Western Cape as well as the West Coast Economic Development Partnership (EDP)
- shifting paradigms with respect to -
    - economy and tourism boundaries
    - optimum IT efficiency (telecoms)
    - green economy / renewable energy
- looking at possible benefits from the Atlantis corridor.

The West Coast Regional Economic Development Strategy (REDS) is also in place, which has the following four main aims:

- Get the basics right and retain existing jobs.
- Grow competitive businesses
- Attract new investments and funding
- Share the benefits of growth

The following specific objectives have been identified:

- To reduce by 48% the number of households living below the poverty line by 2014.
- To achieve an economic growth to an annual average of 4.5% - 6 % per annum by 2014.
- For 40% of all visitors to the Western Cape to visit the West Coast by 2014.

Swartland Municipality's Performance Objectives for Local Economic Development are as follows:

- Assist new businesses to establish in the area.
- Facilitate new income generating developments.
- Complete LED Strategy and action plan and align to the District wide competitiveness project.
- Focussed marketing of Swartland to optimise the potential of existing infrastructure.
- Promote local economic development through liaison with business role-players.
- Promote and facilitate the creation of jobs.
- Facilitate the creation of jobs through the municipality's LED initiatives.

6. INFRASTRUCTURE

6.1 Status Quo

Swartland Municipality is responsible for the operation and maintenance of all the water and sewerage infrastructure summarised in the table below.

Table 6.1.1: Water and Sewerage infrastructure for which Swartland Municipality is responsible

Component	Description of the main functional tasks
Boreholes (3)	Bulk supply
Water Reticulation (465 km)	Distribution
Water Pump Stations (6)	Ensure adequate pressure and supply to certain areas
Reservoirs (30)	Balancing peak demands and providing some emergency storage.
Sewer Reticulation (230 km)	Collecting sewerage
Sewer Pump Stations (7)	Pumping sewerage to WWTWs
Waste Water Treatment Works (9)	WWTWs (Activated Sludge) and WWTWs (Oxidation dams).

The current water and sewerage challenges highlighted by the Municipality in their latest IDP for the various towns are as follows:

Table 6.1.2: Water and Sewerage infrastructure challenges highlighted by the Municipality in their latest IDP

Town	Water	Sewerage
Koringberg	• Poorly developed network, small diameter pipes, low pressure and flow condition and open ring mains. • Sections of the water reticulation network are obsolete and must be upgraded. • Secondary Chlorination at reservoirs must be implemented.	• Sewer reticulation network poorly developed and must be extended. • WWTW is overloaded and must be upgraded.
Riebeek West, Riebeek Kasteel and Ongegund	• Poorly developed network, small diameter pipes, low pressure and flow condition and open ring mains. • Sections of the water reticulation network are obsolete and must be upgraded. • Secondary Chlorination at reservoirs must be implemented. • Poor condition of Ongegund reservoir and pump station – must be upgraded.	• Actual capacity is unknown. • Maintenance on embankment, overloaded. • Extension of a flush toilet system.
Yzerfontein	• Secondary Chlorination at reservoirs must be implemented.	• Yzerfontein has no formal WWTW, with no waterborne sewer system.
Darling	• Poorly developed network, small diameter pipes, low pressure and flow condition and open ring mains. • Sections of the water reticulation network are obsolete and must be upgraded. • Reservoir capacity must be increased for further developments. • Secondary Chlorination at reservoirs must be implemented.	• Regular blockages in Darling North. • WWTW is overloaded and must be upgraded.
Moorreesburg	• Obsolete infrastructure pipe breakages, leaking valves and leaking hydrants. • Poorly developed network, shortage in cut-off valves. • Secondary Chlorination at reservoirs must be implemented.	• Electrical switch-gear which is obsolete and need to be replaced. • Capacity of sewerage works not sufficient.
Malmesbury	• Sections of the water reticulation network are obsolete and must be upgraded. • Storage capacity must be increased for further developments. • Secondary Chlorination at reservoirs must be implemented.	• Sewerage connector in Wesbank in the area of Wistaria Street is under pressure and must be upgraded for further developments. • A detailed survey must be done to determine the actual capacity of the sewer mains. • Obsolete infrastructure causing regular blockages.

Table 6.1.2: Water and Sewerage infrastructure challenges highlighted by the Municipality in their latest IDP		
Town	**Water**	**Sewerage**
		• Upgrading of the distribution network is needed. • Upgrading of the main connectors in Voortrekker Street from swimming pool to Bokomo Road.
Kalbaskraal and Abbotsdale	• Reservoir capacity must be increased for new developments. • Secondary Chlorination at reservoirs must be implemented.	• Maintenance on embankment and inlet works is needed.
Riverlands and Chatsworth	• Secondary Chlorination at reservoirs must be implemented.	• Actual capacity is unknown. • Maintenance on dam embankment and inlet works is needed. • Final effluent does not comply with standards. • Upgrading of WWTW. • Extension of distribution network.

The current and depreciated replacement costs of the water and sewerage infrastructure of Swartland Municipality is summarised in the table below (June 2013):

Table 6.1.3: Current and depreciated replacement costs of the water and sewerage infrastructure				
Asset Type	**GIS ID**	**CRC [1]**	**DRC [2]**	**% DRC / CRC**
WATER INFRASTRUCTURE				
Borehole	BH	R355 643	R275 211	77%
Pump Station	WPS	R13 198 484	R6 571 101	50%
Reservoir	RES	R85 628 543	R36 903 421	43%
Reticulation Pipeline	WRP	R219 681 838	R111 380 185	51%
Bulk Water Pipeline	BWP	R126 905 377	R67 274 526	53%
Dam	DAM	R30 043 750	R3 169 812	11%
Water Consumer Connections	WCC	R148 476 673	R50 529 738	34%
Other Assets	OTH	R10 987 480	R10 517 092	96%
Totals		**R635 277 788**	**R286 621 086**	**45%**
SEWERAGE INFRASTRUCTURE				
Sewer Pump Station	SPS	R14 095 898	R9 237 031	66%
Sewage Treatment Works	STW	R79 550 798	R74 918 428	94%
Sewer Reticulation Pipeline	SRP	R247 920 338	R207 407 303	84%
Bulk Sewer Pipeline	BSP	R44 444 553	R25 628 560	58%
Sewer Consumer Connections	SCC	R106 390 949	R35 529 875	33%
Other Assets	OTH	R5 867 022	R4 662 224	79%
Totals		**R498 269 558**	**R357 383 423**	**72%**

Notes: 1) CRC, as included in the June 2013 Asset Register
2) 2013 Book Value, as included in the June 2013 Asset Register

The above implies that about 55% of the water infrastructure and 28% of the sewerage infrastructure has been consumed.

The table below give's an overview of the RUL per facility type for the water and sewerage infrastructure of Swartland Municipality (June 2013):

Table 6.1.4: Overview of the RUL by facility type for water and sewerage infrastructure (CRC)						
Asset Type	**GIS ID**	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
WATER INFRASTRUCTURE						
Borehole	BH	R0	R0	R91 536	R114 107	R150 000
Pump Station	WPS	R433 695	R745 275	R328 167	R0	R11 691 347
Reservoir	RES	R0	R0	R0	R0	R85 628 543
Reticulation Pipeline	WRP	R0	R0	R427 902	R10 308 769	R208 945 167
Bulk Water Pipeline	BWP	R0	R0	R0	R0	R126 905 377
Dam	DAM	R0	R0	R0	R0	R30 043 750
Water Consumer Connections	WCC	R0	R0	R0	R0	R148 476 673
Other Assets	OTH	R1 284 210	R1 664 654	R3 633 346	R351 486	R4 053 784
TOTALS		**R1 717 905**	**R2 409 929**	**R4 480 951**	**R10 774 362**	**R615 894 641**
SEWERAGE INFRASTRUCTURE						
Sewer Pump Station	SPS	R80 747	R888 728	R61 006	R1 917 503	R11 147 914
Sewage Treatment Works	STW	R695 974	R0	R244 610	R9 327 507	R69 282 707
Sewer Reticulation Pipeline	SRP	R20 581	R0	R0	R13 019 068	R234 880 689
Bulk Sewer Pipeline	BSP	R0	R0	R0	R0	R44 444 553
Sewer Consumer Connections	SCC	R0	R158 000	R0	R422 949	R105 810 000
Other Assets	OTH	R415 381	R3 597 247	R58 388	R569 542	R1 226 464
TOTALS		**R1 212 683**	**R4 643 975**	**R364 004**	**R25 256 569**	**R466 792 327**

The average water asset renewal needs over the next 10 years is R0.413 million per year and the reinvestment required is R1.718 million in the first 5 years and R2.410 million in the second 5 year period. The asset renewal needs for sanitation assets over the next 10 years is R0.586 million per year. The reinvestment required is R1.213 million in the first 5 years and R4.644 million in the second 5 year period.

The table below give's an overview of the age distribution per facility for the water and sewerage infrastructure of Swartland Municipality (June 2012):

Table 6.1.5: Overview of the age distribution by facility type for water and sewerage infrastructure (CRC)						
Asset Type	**GIS ID**	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
WATER INFRASTRUCTURE						
Borehole	BH	R205 643	R0	R0	R140 000	R10 000
Pump Station	WPS	R1 911 360	R5 581 253	R1 872 029	R1 783 955	R2 049 887
Reservoir	RES	R3 164 630	R13 589 157	R8 456 855	R6 862 146	R53 555 755
Reticulation Pipeline	WRP	R14 681 850	R21 688 716	R6 908 177	R32 625 757	R143 777 338
Bulk Water Pipeline	BWP	R7 281 401	R18 511 898	R5 172 626	R25 118 355	R70 821 098
Dam	DAM	R0	R0	R0	R43 750	R30 000 000
Water Consumer Connections	WCC	R27 842	R888 831	R0	R18 550 000	R129 010 000
Other Assets	OTH	R6 400 628	R1 044 356	R1 483 182	R1 278 719	R780 596
TOTALS		**R33 673 354**	**R61 304 211**	**R23 892 869**	**R86 402 682**	**R430 004 674**
SEWERAGE INFRASTRUCTURE						
Sewer Pump Station	SPS	R4 040 839	R4 751 157	R3 963 046	R1 085 634	R255 221
Sewage Treatment Works	STW	R34 767 956	R1 384 905	R4 886 309	R5 830 515	R32 681 113
Sewer Reticulation Pipeline	SRP	R20 573 555	R31 461 899	R15 874 394	R22 130 325	R157 880 165
Bulk Sewer Pipeline	BSP	R0	R8 934 640	R2 787 777	R10 402 113	R22 320 023
Sewer Consumer Connections	SCC	R580 949	R410 000	R13 250 000	R0	R92 150 000
Other Assets	OTH	R3 073 229	R939 399	R328 348	R299 582	R1 226 464
TOTALS		**R63 036 528**	**R47 882 000**	**R41 089 874**	**R39 748 169**	**R306 512 986**

Most of the water and sewerage infrastructure age are greater than 20 years.

6.2 Gaps and Strategies

Various items listed in the Water and Sewer Master Plans of July 2008 were implemented by the Municipality over the last number of years. The sections below give an overview of the future water and sewerage infrastructure required by Swartland Municipality.

WATER PUMP STATIONS

The Water Master Plan (July 2008) and the updated Water Master Plan for Riebeek Vallei (March 2011) has indicated that based on the most likely land-use development scenario, it will be necessary for the following water pump stations:

Table 6.2.1: Future pump stations requirements for Swartland Municipality's distribution systems		
Pumps	**Future Capacity (l/s)**	**Head (m)**
Abbotsdale, Kalbaskraal, Riverlands and Chatsworth		
Proposed Abbotsdale Booster *(Was implemented)*	6.5	25
PPC (Ongegund)		
New PS when existing PS reaches capacity	20	35
New PS when upper reservoir is constructed	10	50
Riebeek Wes		
New PS when existing PS reaches capacity *(Was implemented)*	20	45
Malmesbury		
Proposed Wesbank Tower PS	25	20
Proposed Glen Lily Reservoir Booster PS	27	25

RESERVOIR INFRASTRUCTURE

The future reservoirs, as identified through the Water Master Plan (July 2008) and the updated Water Master Plan for Riebeek Vallei (March 2011), are indicated in the table below (New reservoirs already constructed by the Municipality were incorporated into the table):

Table 6.2.2: Future reservoir capacity requirements for the Swartland Municipality's distribution systems								
Water District (Reservoir zone)	**AADD, incl. UAW (kl/d)**		**Reservoir Capacity (kl)**					**Size of new recom-mended reservoir**
	Fully Occupied Existing	**Future**	**Present Capacity (1)**	**Storage required for**		**Shortage (1) (Minus is a shortage)**		
				Fully Occupied Existing	**Future**	**Fully Occupied Existing**	**Future**	
Abbotsdale	273	457	1 760	410	686	1 350	1 074	-
Chatsworth	558	802	540	837	1 203	-297	-663	1 500
Kalbaskraal	264	264	580	396	396	184	184	-
Darling	1 655	1 655	3 420	2 483	2 483	937	937	-
Koringberg (2)	227	269	500	341	404	159	96	
Kleindam	1 032	1 152	2 870	1 548	1 728	1 322	1 142	-
Old Golf Course	634	1 429	5 370	950	2 144	4 420	3 226	-
Panorama	2 892	2 108	5 300	4 338	3 162	962	2 138	1 000
Prison	1 076	1 076	2 120	1 614	1 615	506	505	
Wesbank	1 639	8 049	9 440	2 459	12 074	6 981	-2 634	4.000
Wesbank Tower	324	495	220	81	124	139	96	-
Proposed Glen Lily		1 990			2 985	-	-2 985	3.000
Proposed Wesbank HL		1 137			1 706	-	-1 706	2.000
Moorreesburg	2 780	3 065	8 160	4 170	4 598	3 990	3 562	-
Riebeek Kasteel	990	1 122	1 860	1 485	1 683	375	177	-
Riebeek Wes LL	510	732	1 500	765	1 098	735	402	-

Table 6.2.2: Future reservoir capacity requirements for the Swartland Municipality's distribution systems								
Water District (Reservoir zone)	AADD, incl. UAW (kl/d)		Reservoir Capacity (kl)					Size of new recom-mended reservoir
	Fully Occupied Existing	Future	Present Capacity (1)	Storage required for		Shortage (1) (Minus is a shortage)		
				Fully Occupied Existing	Future	Fully Occupied Existing	Future	
Riebeek Wes HL	190	190	1 190	285	285	905	905	-
PPC (Ongegund)	160	160	2 393	240	240	2 153	2 153	-
Yzerfontein	1 298	1 887	4 370	1 948	2 831	2 422	1 539	-

Notes: 1) The present reservoir capacities were confirmed with the Municipality and updated in the above table. The present and future shortages were also recalculated, based on the confirmed present capacities.

2) 0.230 Ml of the West Coast District Municipality included.

WATER AND SEWER RETICULATION INFRASTRUCTURE

The Water Master Plan (2008) has indicated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary (Items already implemented by the Municipality were taken out of the table).

Table 6.2.3: Proposed upgradings for the various distribution systems (Water Master Plan)
Moorreesburg
Proposed distribution districts: No changes. **Reservoirs:** No additional capacity is required. **Proposed future system and required works:** The existing water distribution system has sufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas, therefore no additional required works are proposed.
Koringberg
Proposed distribution districts: No changes. **Reservoirs:** No additional capacity is required. **Proposed future system and required works:** The existing water distribution system has sufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas, therefore no additional required works are proposed.
Malmesbury
Proposed distribution districts: The Wesbank reservoir site and district will become the main source of supply for the potential future developments. The augmentation of existing reservoirs or the implementing of reservoirs at new locations was investigated as part of the Master Plans, and with the exception of the proposed Glen Lily and Wesbank HL reservoirs, it was decided that the preferred scenario would be to augment the supply to the Wesbank Reservoirs and feed from there. **Reservoirs:** Various additional reservoirs were proposed, as included in Table 6.2.2 **Proposed future system and required works:** 1) Project MAW1: A new 3Ml reservoir at the existing Glen Lily reservoir, which belongs to the West Coast DM, is proposed to supply the developments. A booster pump station with a separate booster sub-district is also proposed to supply the higher lying areas. 2) Project MAW2 includes the items to accommodate for the large amount of potential future developments in the Wesbank Reservoir District. A new 400mm dia supply and a new 4Ml reservoir is proposed to augment the supply to this district. There are also a few PRVs proposed to control high static pressures in certain developments. A new booster pump station is proposed to supply the higher lying areas in potential future development No.7. One of the major changes proposed to the existing operation of the system is to implement items MAW 2.12 and MAW 2.13 which will result in the Abbotsdale, Kalbaskraal, Riverlands and Chatsworth areas to be fed from the Wesbank Reservoir and not from the Kleindam Reservoir as is the case presently. 3) Project MAW3 is proposed to rezone the existing Panorama District boundaries and augment the supply to the Panorama reservoir when capacity problems occur. It is proposed that the southern part of the Panorama Reservoir District, which includes the industrial area, be incorporated into the Kleindam Reservoir District. Although a PRV is currently controlling the high pressures it was decided to incorporate this area into the Kleindam Reservoir District, also because of the new 2Ml reservoir that

Table 6.2.3: Proposed upgradings for the various distribution systems (Water Master Plan)
was constructed at the Kleindam Reservoir. This will result in lower water demands on the Panorama Reservoir District which might currently experience capacity problems. 4) Project MAW4 includes the items to accommodate for potential future developments 34, 35, 36 and 37. A new 200mm dia supply and a new 2Ml reservoir is proposed to supply this proposed reservoir district directly from the West Coast DM bulk supply pipes. It is also recommended that a small area of Wesbank, currently experiencing low residual pressures, be incorporated into this district. 5) Project MAW5 is recommended to alleviate existing low residual problems in the Wesbank area. This area is currently being fed from the Wesbank reservoirs and it is proposed to incorporate this area into the Wesbank Tower District to alleviate these low pressure problems. 6) Project MAW6 which includes only Item MAW6.1 is proposed to accommodate for potential future development 6.
Abbotsdale, Chatsworth, Kalbaskraal and Riverlands
Proposed distribution districts: No changes. **Reservoirs:** *The reservoir capacity will not be sufficient to accommodate for the potential future developments in Chatsworth, therefore an additional 1.5 Ml reservoir is proposed (Updated by WorleyParsons).* **Proposed future system and required works:** The existing water distribution system for Abbotsdale, Kalbaskraal, Riverlands and Chatsworth has sufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas, therefore no additional required works are proposed.
Riebeek Wes
Proposed distribution districts: No changes **Reservoirs:** The reservoir capacity in Riebeek Wes is sufficient, therefore no additional capacity is required. **Proposed future system and required works:** A new 160mm dia parallel reinforcement pipe is proposed in Hof Street to augment the supply to accommodate for the potential future developments.
PPC (Ongegund)
Proposed distribution districts: No changes **Reservoirs:** The reservoir capacity in PPC is sufficient, therefore no additional capacity is required. **Proposed future system and required works:** The existing water distribution system has sufficient capacity to supply the future water demands for the fully occupied scenario, therefore no additional required works are proposed.
Riebeek Kasteel
Proposed distribution districts: No changes **Reservoirs:** The reservoir capacity in Riebeek Kasteel is sufficient, therefore no additional capacity is required. **Proposed future system and required works:** The existing water distribution system has sufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas, therefore no additional required works are proposed.
Yzerfontein
Proposed distribution districts: No changes **Reservoirs:** The reservoir capacity in Yzerfontein is sufficient, therefore no additional capacity is required. **Proposed future system and required works:** The existing Yzerfontein water distribution system doesn't have sufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas, therefore a 200mm dia parallel reinforcement pipe is proposed to accommodate for the potential future developments.
Darling
Proposed distribution districts: No changes **Reservoirs:** The reservoir capacity in Darling is sufficient, therefore no additional capacity is required.

Table 6.2.3: Proposed upgradings for the various distribution systems (Water Master Plan)
Proposed future system and required works:
The existing distribution system does not have sufficient capacity to supply the future water demands for the fully occupied scenario, therefore a 160mm dia parallel reinforcement pipe is proposed.

The Sewer Master Plan (July 2008) has indicated that based on the most likely land-use development scenario, the following future sewer reticulation infrastructure components will be necessary.

Table 6.2.4: Future sewer reticulation infrastructure required
Moorreesburg
• A new gravity main is needed in order to incorporate the existing stands into the sewer system. • The diameters of the main outfall sewers need to be investigated.
Koringberg
• A new gravity pipeline is needed in order to incorporate the existing stands into the sewer system.
Malmesbury
• There are currently no significant problems within the Malmesbury sewer system, therefore all the proposed upgrades were proposed to accommodate the potential future developments.
Abbotsdale, Chatsworth, Kalbaskraal and Riverlands
• Abbotsdale: A new sewer pump station and rising main are proposed to incorporate the existing stands currently being serviced by septic tanks into the formal sewer system. • Kalbaskraal: Two sewer pump stations are proposed and some rising mains and gravity mains to incorporate the existing stands currently being serviced by septic tanks into the formal sewer system. • Riverlands: The sewer system in Riverlands has sufficient capacity to accommodate the potential future development.
Riebeek Wes
• A new sewer pump station is proposed when FDA RWV10 develops. • Various sections of the existing drainage networks need to be upgraded and new gravity mains need to be constructed to accommodate the potential FDAs.
PPC (Ongegund)
• A new sewer pump station is proposed when FDA Exp02 develops. • The diameter of the main outfall sewer needs to be investigated. • New rising and gravity mains are needed to incorporate the FDAs.
Riebeek Kasteel
• A new sewer pump station is proposed when FDA ExpRK2 develops. • Various sections of the existing drainage networks need to be upgraded and new gravity mains need to be constructed to accommodate the potential future developments. • Some of the existing sewer PS can also be decommissioned.
Darling
• A new gravity main is needed in order to incorporate the existing stands into the sewer system. • The diameter of the main outfall sewer needs to be investigated.

SEWER PUMP STATIONS

The Sewer Master Plan (July 2008) and the updated Sewer Master Plan for Riebeek Vallei (March 2011) has indicated that based on the most likely land-use development scenario, it will be necessary for the following sewer pump stations:

Table 6.2.5: Future sewer pump stations required

Drainage System	Recommendations included in the Sewer Master Plan	Capacity (l/s)
Malmesbury	New sewer PS when future developments occur	110.0
Abbotsdale, Chatsworth, Kalbaskraal and Riverlands	Abbotsdale: New sewer PS to incorporate the existing stands into the sewer system	1.0
	Kalbaskraal: New sewer PS to incorporate the existing stands into the sewer system	1.5
	Kalbaskraal: New sewer PS to incorporate the existing stands into the sewer system	3.0
Riebeek Wes	New sewer PS when FDA RWV10 develops	See Sewer Master Plans
PPC (Ongegund)	New sewer PS when FDA Exp02 develops	
Riebeek Kasteel	New sewer PS when FDA ExpRK2 develops	

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 6.2.6: Existing capacities and flows at each of the WWTWs (Ml/d)

WWTW	Existing Hydraulic Capacity	Peak Month Average Daily Flow (July 2012 – June 2013)	Average Daily Flow (July 2012 – June 2013)	Average Wet Weather Flow (Jun, Jul, Aug)
Malmesbury	20.000	4.775 (Oct 2012)	4.417	4.468
Moorreesburg	1.500	1.249 (Jun 2013)	0.886	0.940
Darling	1.500	1.276 (Sept 2012)	1.037	1.234
Riebeek Wes	0.300	Unknown, average effluent flows were calculated from the Water Sales data.	0.310 (69% of Water Sales)	Unknown, average effluent flows were calculated from the Water Sales data.
Riebeek Kasteel	0.200		0.303 (48% of Water Sales)	
PPC (Ongegund)	0.150		0.071 (60% of Water Sales)	
Koringberg	0.030		0.088 (70% of Water Sales)	
Kalbaskraal	0.157		0.071 (40% of Water Sales)	
Chatsworth / Riverlands	0.118		0.141 (40% of Water Sales)	

Detail Process Audits were completed during 2012 for all the WWTWs in Swartland Municipality's Management Area and the recommendations from these Process Audits are summarised under each of the WWTWs below:

Malmesbury WWTW: The upgrading of the new WWTW was completed. The upgraded WWTW is a hybrid Membrane Bioreactor nutrient removal system. The system was designed to accommodate seasonal flow variation and provide operational flexibility and energy saving. The upgrade increased the plant hydraulic capacity to a peak wet weather flow of 30 Ml/d and peak dry weather flow of 20 Ml/d, while achieving the most restrictive effluent requirements. The Malmesbury WWTW has been operating successfully for over eleven months and has consistently met stringent effluent quality standard requirements, with excellent removal of COD, Nitrogen, TP, TSS and faecal coliforms. The new WWTW was put into operation during March 2013.

Table 6.2.7: Recommendations from Malmesbury WWTW Process Audit (2012)

Design Aspects
• The Municipality made specific inputs on practical matters relating to the operation and maintenance of the new WWTW. The new Laboratory will also ensure vast improvement on process control monitoring and compliance monitoring.
Operational Aspects
• There was room for improvement of the old WWTW's day to day operations (as reported by personnel), and this is in the process of being reviewed and improved.
• Specific training will be provided to the plant supervisor and process controllers during the commissioning of the new works.

Table 6.2.7: Recommendations from Malmesbury WWTW Process Audit (2012)
Overall Conclusions
• The extended and upgraded new MBR plant will be able to accommodate the high hydraulic and organic loadings, and should produce a high quality final effluent.

Moorreesburg WWTW: The WWTW was designed to conform to the old General Standards and the removal of nitrate / nitrite and orthophosphate was not a requirement. The new General Limits however requires the removal of nitrate / nitrite and orthophosphate. No upgrades to the works were done since the implementation of the new General Limits and conformance to the nitrate / nitrite and orthophosphate requirements cannot constantly be achieved. No upgrading is planned at present.

Table 6.2.8: Recommendations from Moorreesburg WWTW Process Audit (2012)
Design Aspects
• The inlet works is difficult to access, but it is understood that a new inlet works will be provided in due course.
• The poor nitrification in both the biofilter-system and the activated sludge system should be investigated and modifications made to the recycle streams and aeration to improve the efficiency of the biological oxidation processes.
Operational Aspects
• The operational monitoring program should be extended to ensure better control of the activated sludge process. Also monitor Settleable solids, EC, COD, Ammonia of Raw Water, DO at Aeration Tank and DO, EC, COD, Ammonia and Faecal Coliforms or E.Coli of final effluent.
• The instruments currently used for the operational monitoring is inadequate and should be replaced / supplemented by Hand-held pH meter with good quality electrode, EC meter and DO meter. Weekly samples for COD and Ammonia should be sent to the new Malmesbury WWTW Laboratory.
• The Team Leader and three General Workers should receive training in basic wastewater treatment processes, sampling, basic tests and interpretation of the results thereof, and how to do basic trouble shooting. This can be done through on-site intervention training.
Overall Conclusions
• The supervisor at the WWTW is committed to improving the O&M of the plant, but requires management tools and measuring equipment to be able to do this. The proposed operational monitoring programme should be implemented, for which purchase of the portable instruments are required. The personnel should receive training in how to use, calibrate and maintain the instruments.
• The operational information spreadsheets that were supplied together with the O&M Manual of the WWTW should be used to record all measurements, observations and events on the works, which should be submitted to the Superintendent: Wastewater for entering on the laboratory computer for compliance purposes and to monitor trends.

Darling WWTW: The WWTW was upgraded in 2008 from an oxidation pond system to an activated sludge process. The works has a hydraulic treatment capacity of 1.5 Ml/d. The Municipality plan to upgrade the hydraulic capacity of the plant by 2017/2018.

Table 6.2.9: Recommendations from Darling WWTW Process Audit (2012)
Design Aspects
• Storm water drainage should be improved to prevent ponding.
• Access to the inlet works should be improved to make it easier for the process controllers to clean the screens and grit channels.
• Storage space should be provided for chemicals and tools in the administrative building.
Operational Aspects
• The operational monitoring program should be extended to also monitor Settleable solids, EC, COD, Ammonia of Raw Water and DO, EC, COD, Ammonia and Faecal Coliforms or E.Coli of final effluent.
• An EC meter should be purchased.
• The existing DO meter should be repaired and calibrated.
• All measurements (existing and proposed new) should be recorded in the operational tool spreadsheets that were provided together with the O&M Manual of the works.
• Clear instructions should be given to the process controllers on what levels the MLSS (as indicated by the volumetric sludge concentration) and DO should be maintained for optimal plant performance.
• The assistant process controllers should be sent on formal training to obtain the necessary skills for operating the WWTW and to take samples, do basic measurements and tests, and to record and interpret the data.

Table 6.2.9: Recommendations from Darling WWTW Process Audit (2012)
• All tanker discharge volumes and contents should be recorded.
Overall Conclusions
• The WWTW is maintained in a good and neat condition with generally good housekeeping and application of best practices. Safety measures are complied with. • During the past year, all the quality parameters complied with the General Standard, which is commendable. • The operational monitoring programme should be extended to perform more measurements for optimizing the treatment processes, and the results of the measurements and test should be recorded in the operational spreadsheets that were developed for this purpose. This can then be handed to Mr Malan on a weekly basis for capturing on the central wastewater management computer at the Malmesbury WWTW.

Riebeek Wes-, PPC-, Riebeek Kasteel WWTW:

The Riebeek Wes WWTW is an oxidation pond system with a treatment capacity of 0.3 Ml/d

The PPC (Ongegund) WWTW is a small size package type treatment plant with an activated sludge treatment process. The treatment capacity of the works is 0.15 M/d. The WWTW was designed to conform to the old General Standards and the removal of nitrate / nitrite and orthophosphate was not a requirement. The new General Limits however requires the removal of nitrate / nitrite and orthophosphate. No upgrades to the works were done since the implementation of the new General Limits and conformance to the nitrate / nitrite and orthophosphate requirements cannot constantly be achieved.

The Riebeek Kasteel WWTW is an oxidation pond system with a treatment capacity of 0.2 Ml/d.

The Municipality is busy with the construction of a single new Activated Sludge WWTW with biological nutrient removal for Riebeek Wes, Riebeek Kasteel and Ongegund. The new WWTW will replace the existing WWTWs at these three towns, which will be decommissioned. Locating the consolidated works at Riebeek Kasteel has the advantage that the flow from Riebeek Wes can gravitate to the new WWTW. The new WWTW site is also further away from the residential areas, which have encroached to within about 50 metres of the old WWTW.

Table 6.2.10: Recommendations from Riebeek Wes and Riebeek Kasteel WWTW Process Audits (2012)
Design Aspects
• Riebeek Wes: Hydraulic loading on the ponds are already over the design capacity, but has produced acceptable results during the assessment period. Planning for upgrading and extension of the ponds should however continue. • Riebeek Kasteel: The plant is overloaded, but planning for a new regional activated sludge plant is in process.
Operational Aspects
• Riebeek Wes: Regular operational tasks at the plant can be improved (as is the case with all the other ponds systems). • Riebeek Kasteel: The plant should be kept in a satisfactory condition even though a new plant will shortly make these ponds redundant.
Overall Conclusions
• Riebeek Wes: Even though the oxidation ponds are currently overloaded at times, it has produced a satisfactory final effluent quality that is suitable for irrigation and that complies with the General Authorisation. Improved maintenance will help to ensure that the pond embankments are kept in a good condition and that no nuisances (e.g. mosquito breeding) can develop. • Riebeek Kasteel: The plant is not in a good condition, especially the anaerobic ponds. The security fencing is also ineffective. The plant should be kept clean and in a satisfactory condition even though the new plant will soon be built.

Koringberg WWTW: The WWTW is an oxidation pond system with a treatment capacity of 0.03 Ml/d. The Municipality plans to upgrade the oxidation dams so that it complies with DWA's new standards. Most of the capital work for the upgrading is planned for 2016/2017 and 2017/2018. The quantity of treated effluent expected from the Koringberg WWTW is so little that it does not justify constructing an activated sludge works. It was recommended that the wastewater be treated in a pond system and the effluent be irrigated. The estimated area required for irrigation is 0.77 ha.

Table 6.2.11: Recommendations from Koringberg WWTW Process Audit (2012)
Design Aspects
• Hydraulic loading on the ponds are three times the design capacity, and results in poor COD reduction to within the standards for disposal by irrigation. For this reason, planning for upgrading of the ponds should be expedited.
Operational Aspects
• Due to the high TDS of the final effluent, the SAR should be determined to ensure that the soil where the water is irrigated is not adversely affected. • The following routine tasks are recommended: ➢ Removing of grass and vegetation that grows on the embankment to prevent it from falling into the pond and generating the formation of mosquito breeding habitats. ➢ Removal of floating scum and macrophytes to prevent fly and mosquito breeding. ➢ Removal of any accumulated solids in the ponds' inlets and outlets. ➢ Repair of any damage to the embankments caused by rodents or other animals. ➢ Repair of any damage to external fences and gates or points of access to the plant. The operator responsible should register these activities in a pond maintenance record sheet. Regular servicing and maintenance of the mechanical and electrical equipment and instrumentation is of paramount importance and must be carried out in accordance with manuals supplied by the equipment suppliers. All damaged or defective equipment must be reported to the Senior Process Controller immediately and must be repaired or replaced as soon as possible. • Hand tools are required for maintaining the pond embankments, overflows and the site in general. • Embankments should be inspected regularly for erosion due to wind, wave action, surface run-off, or burrowing animals. Any necessary repairs to the embankments must be made immediately after the damage occurs. • Operators on the works must know what is expected of them in terms of performance and related tasks.
Overall Conclusions
• Koringberg is a small treatment system, but the flow is already exceeding the design capacity by about three times. Extensions and upgrading is already in planning and will provide more retention in the ponds for the biological oxidation processes.

Kalbaskraal WWTW: The WWTW is an oxidation pond system with a treatment capacity of 0.157 Ml/d. No upgrading is planned at present.

Table 6.2.12: Recommendations from Kalbaskraal WWTW Process Audit (2012)
Design Aspects
• Hydraulic loading on the ponds are nearing the design capacity, and are thereby reducing the capacity for COD reduction to within the standards for disposal by irrigation. It is recommended that slow-growing grass or vegetation is planted to minimise the frequency of removing the grass on the embankments when the plant is upgraded.
Operational Aspects
• Control of vegetation should receive high priority at Kalbaskraal. • The same routine tasks as listed under Table 6.2.11 for Koringberg WWTW is recommended. • Hand tools are required for maintaining the pond embankments, overflows and the site in general. • Embankments should be inspected regularly for erosion due to wind, wave action, surface run-off, or burrowing animals. Any necessary repairs to the embankments must be made immediately after the damage occurs. • Operators on the works must know what is expected of them in terms of performance and related tasks.
Overall Conclusions
• Kalbaskraal ponds system is maintained satisfactorily, but the safety and security requirements should be improved, as well as control of vegetation. • COD removal was not satisfactory at all times, with high COD concentrations in the final effluent at times. There appears to be organic overloading or high sludge levels in the ponds or both, which should receive attention. If necessary, the ponds should be cleaned and the sludge removed from the bottom.

Chatsworth / Riverlands WWTW: The WWTW is an oxidation pond system with a treatment capacity of 0.118 Ml/d. The Municipality plans to upgrade the oxidation dams so that it complies with DWA's new standards. The upgrading is planned for 2016/2017.

Table 6.2.13: Recommendations from Chatsworth / Riverlands WWTW Process Audit (2012)
Design Aspects
• Hydraulic loading on the ponds are nearing the design capacity, and are thereby reducing the capacity for COD reduction to within the standards for disposal by irrigation. For this reason, planning for upgrading of the ponds is currently in progress. • For the upgrading, it is recommended that slow-growing grass or vegetation is planted to minimise the frequency or removing the grass on the embankments.
Operational Aspects
• Regular operational tasks at the plant can be improved. • The same routine tasks as listed under Table 6.2.11 for Koringberg WWTW is recommended. • Hand tools are required for maintaining the pond embankments, overflows and the site in general. • Embankments should be inspected regularly for erosion due to wind, wave action, surface run-off, or burrowing animals. Any necessary repairs to the embankments must be made immediately after the damage occurs. • Operators on the works must know what is expected of them in terms of performance and related tasks.
Overall Conclusions
• Overall, the ponds system is maintained satisfactorily and the safety and security requirements are complied with. • Routine maintenance tasks can be improved on to ensure that the pond embankments are kept in an immaculate condition and that no nuisances can develop. • The ponds system will be upgraded shortly to improve the treatment performance and ensure that the organic content is reduced to levels complying with the irrigation quality requirements at all times.

Swartland Municipality revises on an annual basis the capacity and suitability of the WWTWs to meet the requirements of DWA 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, 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.

ASSET MANAGEMENT ASSESSMENT

The new Asset Register will integrate with the financial system and will provide much more up to date information on maintenance and renewal requirements. The objective of the new Asset Register 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.

The Asset Register is 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. Swartland 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 water and sewerage infrastructure will be identified from the Asset Register. All assets with a condition grading of "poor" and "very poor" will be prioritised.

7. OPERATION AND MAINTENANCE

7.1 Status Quo

A Water Safety Plan was drafted during 2013 for all the water distribution systems and treatment facilities. A detailed risk assessment was executed as part of the process and the existing control measures implemented by Swartland Municipality were evaluated. An Improvement / Upgrade Plan is also in place with relevant Water and Safety Management Procedures for any type of incident.

A W_2RAP for the various WWTWs is also in place. The W_2RAP is an all-inclusive risk analysis tool by which risks associated with the management of collection, treatment and disposal of wastewater, are identified and rated (quantified). The identified risks can then be managed according to its potential impacts on the receiving environment / community / resource.

The comprehensive O&M Manuals, which were developed for each of the WWTWs, will further assist the Municipality to ensure that the necessary control measures for the effective operation of the WWTWs are in place.

An Incident Response Management Protocol is in place and forms part of Swartland Municipality's Water Safety Plan and W_2RAP. The Incident Response Management Protocol entails that certain reactive procedures are followed when an incident occurs, such as when a malfunction of the treatment processes occurs due to power failures, faulty equipment, adverse weather conditions or human error.

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

The blue drop performance of Swartland Municipality is summarised as follows in the DWA's 2012 Blue Drop Report (May 2012):

Table 7.1.1: Blue Drop Performance of the Municipality (DWA's 2012 Blue Drop Report)

Municipal Blue Drop Score	95.24%

Regulatory Impression: The West Coast District Municipality and Swartland Municipality are congratulated on a fine performance that sees another two new systems obtain Blue Drop certification. However it should be noted that these certifications are deserved mostly because of the excellent work done by the water service provider.

1. The inspectors found that the lack of embracing the risk management (Water safety planning) concept and the thorough implementation thereof within the Swartland Municipality to immediately pose a threat to retain this Blue Drop status (especially in Malmesbury). The Authority and Provider are hereby encouraged to commence joint efforts to ensure that the drinking water quality is effectively managed within the context of water safety planning. It is however noted that the Municipality made provision to commence water safety planning processes later this year. It would be most valuable if these processes could link in with the bulk risk management plans and cover the potential risk gaps in the reticulation network. Swartland Municipality is commended for taking this progressive step since this is the essential missing part in their valiant efforts to consistently supply safe drinking water to their constituencies.
2. The inspectors noted the following on the performance of the West Coast District Municipality: *"The West Coast District Municipality was represented by a small but dynamic drinking water quality team despite the numerous uncertainties under which they are compelled to function they have performed well in terms of the Blue Water Services Certification Programme."*

Performance Area	Malmesbury	Moorreesburg / Koringberg
Water Safety Planning	**88**	**88**
Treatment Process Management	**100**	**100**
DWQ Compliance	**96**	**96**
Management, Accountability	**91**	**91**
Asset Management	**98**	**98**
Bonus Scores	2.04	2.04
Penalties	0	0

Performance Area	Malmesbury	Moorreesburg / Koringberg
Blue Drop Score (2012)	**95.24%**	**95.24%**
Blue Drop Score (2011)	92.88%	92.90%
Blue Drop Score (2010)	71.94%	71.94%
System Design Capacity (Ml/d)	29	73.3
Operational Capacity (% ito Design)	62.07	62.62
Population Served	23 762	4 950
Average daily consumption (l/p/d)	Not applicable	Not applicable
Microbiological Compliance (%)	**97.0%**	**99.9%**
Chemical Compliance (%)	**>99.9%**	**>99.9%**

The DWA also completed their Second Order Assessment of Municipal Waste Water Treatment Plants, DWA's Green Drop Report for 2011, which provides a scientific and verifiable status of municipal waste water treatment. Green drop status is awarded to those WWTWs that comply with 90% criteria on wastewater quality management.

The Green Drop performance of Swartland Municipality for the previous assessment cycle (2011) is summarised as follows in the DWA's 2011 Green Drop Report.

Table 7.1.2: Green Drop Performance of the Municipality (DWA's 2011 Green Drop Report)	
Average Green Drop Score	**72.7%**

Regulatory Impression: Even though the performance of Malmesbury, Darling and Moorreesburg remained more or less the same, the overall performance of the Swartland Municipality portrayed a huge improvement. There still remains much to do to improve the compliance of the majority of wastewater systems but great encouragement can be taken out of the performance of the Ongegund and Moorreesburg works where compliance levels came close to the Green Drop expectations. Swartland Municipality is also participating in the pioneering Berg River Wastewater Risk Reduction project where great advance is evident to meet with the targets set and the pre-directive" that was issued by the Western Cape Regional Office. The municipal team's dedication is much appreciated since that is the fundamental requirement for sustainable improvement.

Green Drop Findings:

1. There is reasonable concern over the high loading rates all of the works are subjected to. Riebeek Kasteel and Koringberg wastewater treatment works are being operated at double that of its design capacity. The planning of upgrades is under way with commissioning expected by 2013. In the Interim, special attention must be given to the process control.
2. Site inspection scores: Riebeek Kasteel 33%, PPC (Ongegund) 63%, Malmesbury 80% and Moorreesburg 64%

Criteria	Malmesbury	Darling	Moorreesburg	Ongegund	Koringberg	Riebeek Wes	Riebeek Kasteel	Kalbaskraal	Chatsworth
Process Control, Maintenance and Management Skill	72.5	67.5	52.5	37.5	37.5	37.5	52.5	52.5	52.5
Monitoring Programme	100	100	100	100	30	60	60	60	60
Credibility of Sample Analysis	100	100	100	100	100	100	100	100	100
Submission of results	0	0	0	0	0	0	0	0	0
Wastewater Quality Compliance	20	20	20	48	20	20	20	48	20
Failure Response Management	88.75	88.5	88.75	88.75	88.75	88.75	88.75	88.75	88.75
Bylaws	80	80	80	80	80	80	80	80	80
Treatment and Collector Capacity	85	85	85	85	70	70	70	30	70
Asset Management	75	75	75	75	75	75	75	65	65
Bonus Scores	10	10	10	10	10	10	10	10	10
Penalties	0	0	0	0	0	0	0	0	0
Green Drop Score (2011)	**73.9%**	**72.9%**	**71.4%**	**78.3%**	**66.4%**	**64.4%**	**65.9%**	**68.8%**	**61.9%**
Green Drop Score (2009)	77%	75%	73%	NA-0%	NA-0%	NA-0%	NA-0%	NA-0%	10%
Treatment Capacity (Ml/d)	5.500	1.500	1.500	0.150	0.030	0.300	0.200	0.157	0.120
Operational % i.t.o. Capacity	90.9%	83.3%	83.3%	100%	243%	120%	206%	89.1%	65%
Cumulative Risk Rating (CRR)	15	14	11	8	10	12	13	13	13
% i.t.o. Maximum Risk Rating	83.3%	77.8%	61.1%	44.4%	55.6%	66.7%	72.2%	72.2%	72.2%

The 2012 Green Drop Risk Profile Progress Report of the DWA is further the product of a "gap" year, whereby progress is reported in terms of the improvement or decline in the risk position of the particular WWTW, as compare to the previous year's risks profile. This tool to collect, assess and report the risk profile is called the Green Drop Progress Assessment Tool (PAT). The PAT progress assessment period was done on compliance data and actions during July 2010 to June 2011, which represents the year immediately following the Green Drop 2011 assessment period. The results for Swartland Municipality were summarised as follow in DWA's 2012 Green Drop Risk Profile Progress Report.

Table 7.1.3: DWA's 2012 Green Drop Risk Profile Progress Report results for Swartland Municipality

Assessment Area	Malmesbury	Darling	Chatsworth	Kalbaskraal	Riebeek Kasteel	Riebeek Wes	Moorreesburg	Koringberg	PPC - Ongegund
Technology	Activated Sludge Belt press dewatering	Anaerobic ponds / Facultative ponds Belt press dewatering	Aerated lagoons / Oxidation ponds	Oxidation pond Note: No effluent discharge	Aerated lagoons / Oxidation ponds Note: No effluent discharge	Anaerobic ponds / Facultative ponds. Note: No effluent discharge	Activated sludge lagoons	Anaerobic ponds / Facultative ponds. Note: No effluent discharge	Activated Sludge
Design Capacity (Ml/d)	5.500	1.500	0.120	0.157	0.200	0.300	1.500	0.030	0.150
Operational % i.t.o. Design Capacity	81.8%	80.0%	NM	NMR	205.0%	120.0%	49.3%	243.3%	100.0%
Microbiological Compliance	80.0%	77.8%	NM	NMR	NMR	NMR	92.9%	NMR	82.7%
Chemical Compliance	80.0%	73.6%	NM	NMR	NMR	NMR	87.5%	NMR	82.7%
Physical Compliance	93.3%	88.9%	NM	NMR	NMR	NMR	73.8%	NMR	82.7%
Annual Average Effluent Quality Compliance	**84.4%**	**80.0%**	**NM**	**NMR**	**NMR**	**NMR**	**84.7%**	**NMR**	**82.7%**
Wastewater Risk Rating (% CRR / CRR_{max})	**54.5%**	**58.8%**	**41.2%**	**41.2%**	**41.2%**	**58.8%**	**47.1%**	**41.2%**	**52.9%**
Highest Risk Area	Effluent Quality	Effluent Quality	No monitoring of flow or volume	Pond desludging, monitoring of flow	Flow exceed design capacity, no monitoring	Flow exceed design capacity, no monitoring	Effluent quality	Flow exceed design capacity, no monitoring	Flow equals design capacity, effluent quality
Risk Abatement Process	Final W_2RAP	Final W_2RAP	Final W_2RAP	Final W_2RAP	Final W_2RAP	Final W_2RAP	Final W_2RAP	Final W_2RAP	Final W_2RAP
Capital & Refurbishment expenditure in 2010/2011	R27.43 million	R0	R0	R0	R220 000	R220 000	R0	R220 000	R220 000
Description of Projects' Expenditure	Upgrading of WWTW. New inlet, refurbishment of passveer ditch, construction of membrane structure	None. This plant will not receive any capital funding due to developments at Riebeek WWTW	N/A	N/A	Construction of activated sludge plant	Construction of activated sludge plant	N/A	Upgrading of oxidation pond system	Construction of activated sludge plant

7.2 Gaps and Strategies

The Water Safety Plan and W_2RAP Teams of Swartland Municipality are committed to meet regularly to review the implementation of all the aspects of the Water Safety Plan and W_2RAP to ensure that they are still accurate and to determine whether the field assessments need updates or modifications and whether the Incident Response Management Protocol is still adequate. In addition to the regular three year review, the Water Safety Plan and W_2RAP will also be reviewed when, for example, a new water source is developed, major treatment improvements are planned and brought into use, or after a major incident.

It is important for Swartland Municipality to classify all treatment works 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.

Establish a mentoring role for operators ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operators. Establish budgets 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.

The Occupational Health and Safety Act contain provisions directing employers to maintain a safe workplace and to minimize the exposure of employees and the public to workplace hazards. It is therefore important for Swartland Municipality to compile a Legal Compliance Audit of their WWTW, which will provide the management of Swartland Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.

Swartland Municipality is committed to work with the DWA and the other role-players in order to further improve on their 2012 Blue Drop Score for the various distribution systems. The Water Safety Plan will be used to improve the Municipality's performance. The Improvement / Upgrade Plan of the Water Safety Plan will also be implemented by the Municipality in order to address the potential risks identified through the Water Safety Plan process.

It is also important for Swartland Municipality to continue with the upgrading of WWTWs when necessary, in order to reduce the risk of source contamination. WWTWs will be managed and operated by Swartland Municipality to comply with the permitted standards and in so doing intends to work towards green drop status for their WWTWs as well. The W_2RAP for the WWTWs will assist in reducing the current CRRs for the various WWTWs. The following will also further assist in the process of reducing the CRRs.

- Forward planning and upgrading / refurbishment of treatment plants to ensure adequate capacity for the flows received;
- Operate and maintain the WWTWs within design- and equipment specifications;
- Have trained, qualified and registered staff in place;
- Get mentoring / coaching contracts in place where there is a great demand for adequately skilled process controllers and supervision;
- Monitoring of flow to- and from the plants;
- Operational and Compliance sampling and monitoring of effluent quality;
- Appropriate authorisation in accordance with the National Water Act (36 of 1998); and / or
- Where plant is overloaded, introduce innovative methods to ensure enhancement of effluent quality.

8. ASSOCIATED SERVICES

8.1 Status Quo

All the schools, hospitals and clinics in Swartland Municipality's Management Area are supplied with a higher level of water and sanitation services.

8.2 Gaps and Strategies

The environmental health function is currently with the West Coast District Municipality. Typical functions of the West Coast District Municipality, with regard to health services, include the following:

- Households to meet the minimal health safety requirements
- Monitoring water quality (Including recreational waters)
- Waste management
- Food control
- Schools to meet health requirements
- Contagious disease control
- Community development: Making communities aware of environmental health issues and communicates with farm workers regarding sanitation services.

The Municipal Health Services of the West Coast District Municipality also report monthly to the Department of Environmental 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 West Coast District Municipality and Swartland Municipality with regard to environmental health issues and that that a good communication protocol is followed between the District Municipality and Swartland Municipality.

The health profile in relation to treated water is good. Within the urban context, drinking water throughout the municipal area is considered to be of a high quality.

The supply of basic sanitation services on the farms needs to be linked to the provision of health and hygiene education. Improved health requires behaviour change, which also cannot be achieved with a single health education talk given by an outside expert. Behaviour change requires sustained monitoring and promotion within the community. This is the key-function of the community health workers employed on sanitation projects.

Swartland 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.

Swartland Municipality will therefore endeavour to improve their efforts to foster partnership-driven development in planning and implementation where partnerships include community members, CBOs, NGOs, the private sector and other spheres of government. In this regard the Department of Health is considered a particularly important partner whose collaboration is much needed.

9. CONSERVATION AND DEMAND MANAGEMENT

9.1 Status Quo

The implementation of a Water Demand Management Strategy by Swartland Municipality has been extremely successful and has reduced the water demand of the towns significantly over the last four years. The overall percentage of non-revenue water was 17.73% for 2012/2013. The main water demand management interventions undertaken by Swartland Municipality over the last few years are as follows:

- Increasing Block Tariff Structure. The Municipality's tariff structure discourages inefficient and excessive use of water;
- Pipe replacement and maintenance programme for the priority areas with old reticulation networks and frequent pipe failures. All pipe bursts are logged and the Municipality compiled a pipe replacement programme during 2012/2013; The total length of Swartland Municipality's water supply network is approximately 418 km with an estimated replacement value of R543 400 000. The average condition of the water network can be rated as fair to poor. The pipe replacement requirement amounts to R59 434 766 over the next three (3) years and 30.84 km of pipeline.
- Central Customer services and complaints system (Reporting of burst pipes, complaints, etc.). Standby teams are also in place for immediate repairs of burst pipes. Burst pipes are repaired within 3 hours;
- Pressure Reduction at high pressure zones in Malmesbury and Riebeek Kasteel and the installation of additional flow meters at the various reservoirs (ACIP Funding) for the more accurate monitoring of flows and non-revenue water for the various zones;
- Promote the use of water efficient fittings (Building regulations);
- Watering of municipal parks during cooler early morning hours;
- Bulk metering and telemetry system, which act as an early warning system for e.g. pipe failures and reservoir overflows. Zones meters are also in place;
- Accurate records of water usage, water losses and non-revenue water. Water balance models for each of the distribution systems are kept up to date;
- Water restrictions (5%, 10%, 15%, 20%, 25%, 30% and 35% increase);
- Strict municipal services standards for the installation of new water reticulation for own and private developments;
- Annual fire hydrant inspection for leaks and functioning;
- Reticulation material and quality standards – Facilitate maintenance;
- Metering of all water usage (Households, standpipes, municipal parks, industrial, commercial and institutional) and monthly reading and billing of all meters;
- Annual audit of all meters larger than 50mm and replacement of the meters where necessary;
- Monthly monitoring of all wet industries and large volume water users for deviations together with appropriate actions in the event of a deviation;
- Leak repairs at indigent households;
- Monthly monitoring and inspection of zero usage consumers;

- Inspection for illegal connections on an ongoing basis; and
- Re-use of treated effluent for irrigation of sport fields in Moorreesburg, Darling and Malmesbury.

The table below gives a summary of the non-revenue water for the various distribution systems in Swartland Municipality's Management Area.

Table 9.1.1: Non revenue water for the various distribution systems

Description	Unit	12/13	Record : Prior (Ml/a)				
			11/12	10/11	09/10	08/09	07/08
Koringberg	Volume	16.710	0.802	13.358	40.201	7.722	15.575
	Percentage	26.62%	1.67%	22.28%	46.87%	12.29%	26.93%
	ILI	**1.60**	**0.07**	**1.24**	**3.74**	-	-
PPC	Volume	15.737	25.236	23.476	22.318	20.130	20.116
	Percentage	26.74%	39.68%	36.43%	35.70%	34.90%	36.66%
Riebeek Wes	Volume	22.376	18.768	52.437	38.774	19.055	9.959
	Percentage	11.98%	9.96%	24.48%	20.80%	11.43%	6.33%
	ILI	**1.39**	**1.15**	**3.38**	**2.50**	-	-
Riebeek Kasteel	Volume	52.455	19.488	23.597	5.624	29.497	29.056
	Percentage	18.43%	7.68%	8.96%	2.53%	11.45%	12.01%
	ILI	**1.93**	**0.70**	**0.65**	**0.15**	-	-
Yzerfontein	Volume	22.302	43.611	50.227	40.776	53.048	34.650
	Percentage	7.12%	13.78%	15.68%	13.44%	17.59%	12.57%
	ILI	**0.66**	**1.27**	**1.44**	**1.16**	-	-
Darling	Volume	20.477	45.687	47.637	55.715	108.917	0
	Percentage	3.03%	6.33%	6.81%	8.96%	20.41%	0.00%
	ILI	**0.32**	**0.74**	**0.82**	**0.96**	-	-
Moorreesburg	Volume	86.457	131.849	93.032	131.529	109.572	138.609
	Percentage	11.01%	15.93%	12.21%	16.49%	13.63%	16.84%
	ILI	**1.09**	**1.55**	**1.18**	**1.67**	-	-
Malmesbury	Volume	741.701	559.375	595.113	359.994	449.909	534.757
	Percentage	23.55%	17.97%	18.92%	12.45%	14.48%	17.85%
	ILI	**3.88**	**2.82**	**3.35**	**2.01**	-	-
TOTAL	**Volume**	**978.215**	**844.816**	**898.877**	**694.931**	**797.850**	**782.722**
	Percentage	**17.73%**	**15.27%**	**16.26%**	**13.44%**	**15.08%**	**15.57%**
	ILI	**2.56**	**2.17**	**2.56**	**1.82**	**-**	**-**

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

Category A = No specific intervention required (All towns, except Malmesbury).

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

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.

9.2 Gaps and Strategies

The annual water demand has increased since 2000 up to the end of 2013 with an average of 1.65% per annum. This is considered acceptable and the target is to maintain the average increase in water demand below 1.65% per annum. Swartland Municipality is committed to continue with the active implementation of their newly developed WDM Strategy in order to reduce the water losses within the various distribution systems as follows:

Table 9.2.1: Committed reduction in Non-Revenue Water

Distribution System	12/13 (%/a)	2017 (%/a)	2037 (%/a)
Koringberg	26.62%	15%	12.5%
PPC (Ongegund)	26.74%	15%	12.5%
Riebeek Wes	11.98%	15%	12.5%
Riebeek Kasteel	18.43%	15%	12.5%
Yzerfontein	7.12%	15%	12.5%
Darling	3.03%	15%	12.5%
Moorreesburg	11.01%	15%	12.5%
Malmesbury	23.55%	15%	12.5%

The most significant challenges is to secure sufficient resources for the further implementation of WDM actions. Certain actions can be introduced as part of the existing operational activities of the Municipality, but others would require additional capital and / or operational resources. The Municipality is increasingly financially strained due to escalating operational costs, costs associated with legal compliance and reporting matters, non-payment and limitations on the annual increasing of tariffs. The Municipality is not in a position at present to implement measures that would require additional capital or operational resources. Only actions that can be accommodated as part of the existing operational activities can be considered.

The future WDM activities identified as part of Swartland Municipality's new WDM Strategy (February 2014) are as follows:

- Pressure Management: Koringberg and Yzerfontein were also identified in the CES WDM Strategy as towns with a high priority for the implementation of pressure management.

- Leak Repair and Assistance Programme: Leak repair assistance is presently provided only to households registered as indigent households with the municipality in terms of the Indigent Policy. However 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. Leak programmes should include the following tasks:
  - Visit households on a prioritized basis, highest consumption first;
  - Educate the customer about the project and water saving measures;
  - Audit of properties for plumbing leaks and repair the leaks.
  - Charge the owner for the plumbing repairs through the municipal account. If the consumption is maintained at a reasonable level for a period of 6 months and the current account is paid monthly and on time, the water arrears can be negotiated with the owner.
  - Meters found to be faulty should be replaced;
  - Identify where water is used inefficiently and wastefully and take appropriate action;
  - Identify the number of people living at the property so as to determine a reasonable water usage.
  - Determine an affordable consumption.

Mechanisms for ensuring the customer repairs new water leaks, maintains an affordable consumption and does not build up arrears need to be addressed in the early stages of such a project, in order to ensure a sustainable solution (on-going water and cost savings) is achieved. The consumptions of the repaired properties need to be monitored so that rapid action can be taken should leaks re-occur. Further efforts should be made to ensure that those who qualify as "Indigent" on an income basis will also qualify on a water consumption basis.

- Residential measures: The use of water efficient fittings should be promoted, either as retrofitting to existing installations or as new installations. The fittings include low flow shower heads, dual flush toilet cisterns; aerated taps; automated irrigations systems, etc. The use and installation of these fittings should be included as a condition for the approval of building plans as well as provided for in the Water Services By-laws.

- Re-use of treated effluent: Treated effluent is already used for the irrigation of sport fields in Malmesbury, Darling and Moorreesburg. Further opportunities exist in Moorreesburg at the Rosenhof Sport Fields as well as Riebeek Kasteel and Riebeek Wes. Significant savings in the order of 110 000m³ per annum can be achieved should these sport fields be irrigated with treated effluent opposed to potable water.

- Meter Replacement: Meters should be replaced through a targeted approach. In order to achieve this, a meter management and replacement programme should be developed and implemented.

  It is further recommended that Swartland Municipality compile a detail water meter audit of all their water consumer meters, in order to identify the age of the meters and to any potential un-metered connections. All un-metered connections need to be provided with meters as soon as they are noticed by the Municipality. All consumer water meters that are not working, leaking or older than 8 years should be replaced. As it is estimated that the majority of the water meters are above the age of 8 years, it is suggested that the water meters above the age of 20 years be replaced first (Phase 1) followed by the meters between the ages of 8 and 20 years at a later stage (Phase 2) when further funds become available.

- Night flow analyses: Ongoing night flow analyses should be implemented as part of the normal operational activities of the Municipality. This will provide information on system performance and give direction for interventions.

- Leakage detection: Leak detection should be conducted by means of a specialised leak detection service provider in areas with high MNFs. The activity can be performed after the MNFs were calculated and the specific areas with high MNFs were determined. The MNF / average daily demand ratio needs to be used to prioritize leak detection for cost effectiveness (Note: 80% of losses come from 20% of leaks).

- Zone metering: District zones metering enable the identification of poor performing and leaking distribution infrastructure. At present each town in Swartland Municipality's Management Area comprises a district zone. This is not considered to be sufficient for Malmesbury, Moorreesburg and Darling. A further break down into smaller district zones should be implemented. The district zones should also be provided with equipment that enables remote flow and pressure logging via the scada system.

- Reduction in Municipal Water Demand: Existing parks should be re-landscaped to water wise gardens through a phased approach.

The leakage management programme can also focus on system operations by considering each of the following:

- **Raw water supply and treatment.** The focus should fall on bulk water metering, reduced filtration loss at the WTWs and staff training.

- **Distribution system:** The focus should fall on pressure management, leak repair, consumer metering and billing and staff training.

- **End-users.** The focus should fall on awareness campaigns (to encourage high-income users to reduce on-property leaks) and on water audits and leak repair at individual properties (for low-income users in the free-basic water category).

An extensive schools programme, which might also include annual competitions between schools (say with a prize for the lowest consumption, the lowest per capita consumption and for the best WDM-strategy poster design, etc.) needs to be implemented. Water saving by schools often forms the basis of WDM programmes elsewhere, because it also involves learners who experience implementation of WDM measures first hand. Schools should be encouraged to make WDM programmes part of a long term project, where learners should be actively involved. A schools WDM programme should receive a high priority.

Swartland Municipality needs to ensure that adequate funding is allocated under their Capital and Operational budgets towards the implementation of the WC/WDM initiatives. All external funding that could be utilised by Swartland Municipality for this purpose should be sourced.

The current water information database appears adequate from a water services management perspective. Swartland Municipality is committed to keep record of all bulk meter readings, flows at WWTWs and to update the water balance models on a monthly basis in order to determine locations of wastage and to enable the Municipality to actively implement their WDM Strategy in order to reduce their current non-revenue water even further. The water balance will not directly lead to the reduction of the demand, but is an imperative management tool that will inform the implementation of demand- side management initiatives.

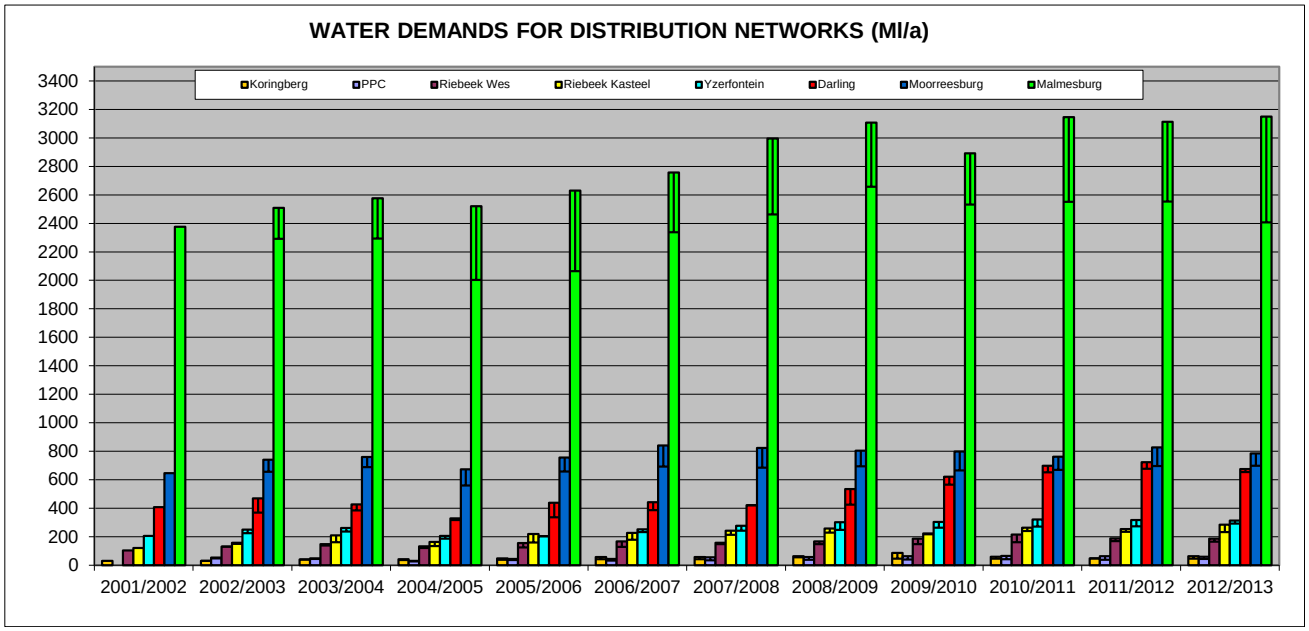
10. WATER RESOURCES

10.1 Status Quo

Sources: Swartland Municipality receives bulk potable water from the West Coast District Municipality. The District Municipality operates the Withoogte and Swartland bulk schemes, which is served by the Berg River as main raw water source. The bulk supply of Withoogte is augmented by abstraction of groundwater from the Langebaan Road Groundwater Aquifer System. Both these bulk distribution schemes are cross-border schemes and supply water to Swartland Municipality, Bergrivier Municipality and Saldanha Bay Municipality. Malmesbury (Abbotsdale, Riverlands, Chatsworth and Kalbaskraal), Moorreesburg, Yzerfontein, Darling, Riebeek Kasteel, Riebeek Wes, Koringberg and PPC are supplied with bulk potable water by the West Coast District Municipality.

Swartland Municipality supplements the water received from West Coast District Municipality in the Malmesbury distribution system with water from the Perdeberg Dam, which is treated by an automatic backwash rapid gravity sand filter, before it is distributed to Abbotsdale, Kalbaskraal, Riverlands and Chatsworth. A further three boreholes in Riverlands are also used as additional supply for Riverlands and Kalbaskraal. The groundwater is disinfected, before it is blended with the other potable water and distributed to the consumers in Riverlands and Kalbaskraal respectively.

The graph below gives a summary of the total bulk water supply to the various towns within Swartland Municipality's Management Area for the last twelve years.



Water Quality: Operational and Compliance samples are taken at various locations in each of the distribution systems and analysed to evaluate the compliance. The West Coast District Municipality monitors the water quality of the bulk potable water supplied to Swartland Municpality through their bulk distribution systems and Swartland Municipality further takes Microbiological samples at various points on their internal distribution systems. The water quality compliance results are loaded onto DWA's BDS 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 percentage compliance and the additional monitoring required by the West Coast District Municipality and Swartland Municipality for determinands identified during the risk assessment exceeding the numerical limits in SANS 241-1:2011 are as follows (Water quality samples taken over the period July 2012 to June 2013).

Table 10.1.1: Percentage compliance of the water quality samples for the period July 2012 to June 2013

Performance Indicator	Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2011)	% Sample Compliance according to DWA's 2014 Blue Drop Limits	Number of Samples taken into account	Frequency of Additional Monitoring due to failure
Withoogte Final				
Acute Health – 1 Chemical	No (Excellent)	100%	3	-
Acute Health – 1 Microbiological	No (Excellent)	100%	23	-
Chronic Health	No (Excellent)	100%	36	-
Aesthetic	No (Excellent)	100%	70	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	100%	64	-
Operational Efficiency	No (Excellent)	98.6%	73	-
Moorreesburg				
Acute Health – 1 Microbiological	Yes (Unacceptable)	93.8%	16	Weekly
Risk assessment defined Health (Acute or Chronic)	No (Good)	93.8%	16	-
Operational Efficiency	No (Excellent)	100%	16	-
Koringberg				
Acute Health – 1 Microbiological	No (Excellent)	100%	24	-
Chronic Health	No (Excellent)	95.7%	23	-

Table 10.1.1: Percentage compliance of the water quality samples for the period July 2012 to June 2013				
Performance Indicator	**Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2011)**	**% Sample Compliance according to DWA's 2014 Blue Drop Limits**	**Number of Samples taken into account**	**Frequency of Additional Monitoring due to failure**
Aesthetic	No (Excellent)	100%	48	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	97.9%	47	-
Operational Efficiency	Yes (Unacceptable)	88.9%	72	Weekly
Swartland Final				
Acute Health – 1 Chemical	No (Excellent)	100%	3	-
Acute Health – 1 Microbiological	No (Excellent)	100%	24	-
Chronic Health	No (Excellent)	100%	37	-
Aesthetic	No (Excellent)	100%	69	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	100%	66	-
Operational Efficiency	No (Good)	92.1%	76	-
Malmesbury				
Acute Health – 1 Microbiological	No (Excellent)	100%	36	-
Chronic Health	No (Excellent)	100%	24	-
Aesthetic	No (Excellent)	100%	48	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	100%	60	-
Operational Efficiency	No (Excellent)	95.2%	84	-
Darling				
Acute Health – 1 Microbiological	No (Excellent)	97.1%	35	-
Chronic Health	No (Excellent)	100%	24	-
Aesthetic	No (Excellent)	100%	48	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	98.3%	59	-
Operational Efficiency	Yes (Unacceptable)	85.5%	83	Weekly
Riebeek Kasteel				
Acute Health – 1 Microbiological	No (Excellent)	100%	8	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	100%	8	-
Operational Efficiency	Yes (Unacceptable)	87.5%	8	Weekly
Riebeek Wes				
Acute Health – 1 Microbiological	No (Excellent)	100%	4	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	100%	4	-
Operational Efficiency	No (Excellent)	100%	4	-
Yzerfontein				
Acute Health – 1 Microbiological	No (Excellent)	100%	24	-
Chronic Health	No (Excellent)	100%	24	-
Aesthetic	No (Excellent)	100%	48	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	100%	48	-
Operational Efficiency	Yes (Unacceptable)	69.4%	72	Weekly
Riverlands				
Acute Health – 1 Microbiological	No (Excellent)	100%	4	-
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	100%	4	-
Operational Efficiency	Yes (Unacceptable)	75%	4	Weekly
Abbotsdale				
Acute Health – 1 Microbiological	Yes (Unacceptable)	80%	5	-
Risk assessment defined Health (Acute or Chronic)	Yes (Unacceptable)	80%	5	-
Operational Efficiency	Yes (Unacceptable)	80%	5	-
Chatsworth				
Acute Health – 1 Microbiological	Yes (Unacceptable)	75%	4	-
Risk assessment defined Health (Acute or Chronic)	Yes (Unacceptable)	75%	4	-
Operational Efficiency	Yes (Unacceptable)	75%	4	-

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

Table 10.1.2: Five 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 - 1	Routinely quantifiable determinand that poses an immediate unacceptable health risk if consumed with water at concentration values exceeding the numerical limits specified in SANS 241.
Acute Health - 2	Determinand that is presently not easily quantifiable and lacks information pertaining to viability and human infectivity which, however, does pose immediate unacceptable health risks if consumed with water at concentration values exceeding the numerical limits specified in 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

Effluent quality: The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the period July 2012 to June 2013, for the various WWTWs, are as follows:

Table 10.1.3: Microbiological, chemical and physical compliance percentages of the final effluent taken at the various WWTW over the period July 2012 to June 2013

WWTW	Micro-biological	Chemical					Physical			
	Faecal Coliforms	Ammonia	Nitrates & Nitrites	COD	Ortho-Phosphates	Overall	pH	EC	SS	Overall
Malmesbury	58.3%	58.3%	91.7%	83.3%	90.9%	78.7%	100%	90.9%	83.3%	91.2%
Darling	91.7%	91.7%	100%	100%	100%	97.9%	100%	100%	100%	100%
Moorreesburg	91.7%	25.0%	75.0%	91.7%	75.0%	66.7%	100%	58.3%	91.7%	83.3%
PPC	83.3%	91.7%	66.7%	91.7%	100%	87.5%	83.3%	100%	91.7%	91.7%
Chatsworth	100%	NA	NA	100%	NA	100%	100%	100%	NA	100%
Kalbaskraal	100%	NA	NA	50.0%	NA	50.0%	100%	91.7%	NA	95.8%
Koringberg	100%	NA	NA	0.0%	NA	0.0%	100%	33.3%	NA	66.7%
Riebeek Kasteel	100%	NA	NA	100%	NA	100%	100%	100%	NA	100%
Riebeek Wes	100%	NA	NA	100%	NA	100%	100%	100%	NA	100%
Total	**93.6%**	**66.7%**	**83.3%**	**78.5%**	**91.5%**	**79.6%**	**98.1%**	**86.0%**	**91.7%**	**92.0%**

Industrial Consumers: The volumes and nutrient loads of effluent discharged by industrial consumers into the Municipality's sewer system are monitored by the Municipality.

10.2 Gaps and Strategies

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

In order to ensure sustainable economic development in the West Coast region the West Coast District Municipality started with a comprehensive study in 2007 to identify a sustainable long term alternative water source for the region. Various alternative sources and combinations thereof were evaluated and eventually a 25.5 Ml/day sea water desalination plant in the Saldanha Bay area was identified as the most cost beneficial alternative and partial funding for the project was obtained from the Regional Bulk infrastructure Grant (RBIG) programme from the DWA.

The West Coast District Municipality is therefore proposing to construct and operate a sea water desalination plant in the Saldanha Bay area using sea water reverse osmosis (SWRO) technology. The intake capacity of the plant will be approximately 60 Ml/d (21.9 million Ml/a) producing 25.5Ml/d (9.3 million Ml/a) at final capacity. Approximately 36 Ml/d (13 million Ml/a) brine will be discharged into the sea. It will have a lifespan of 25 years with the potential of an extended lifespan.

The plant will be constructed in three phases of 8.5 Ml/d to reach the full capacity by 2026. All infrastructure however will be constructed for the full capacity in the first construction phase. The proposed project consists of the following components:

- Sea water abstraction infrastructure consisting of an intake structure and pipe connected to either an intake sump and pump station at the coast with a pump line to the SWRO plant or connected directly to the sump and pump station situated at the plant.

- The SWRO desalination plant located on land at the sites selected for the study. The size of the site needed is approximately 4-5 Ha and the plant will consist of pre-treatment, RO treatment, electrical and mechanical equipment in a building, reservoir, and other site related infrastructure.

- Treated water reservoir and pump station at the SWRO plant pumping the potable water to the existing Besaansklip reservoirs of the West Coast District Municipality.

- Brine disposal infrastructure from the plant to the sea.

- Access roads to the plant.

- Site works at the plant.

- Electrical substation and connections

From the ten possible sites that was initially identified, the environmental screening and technical evaluation reduced the sites to two proposed sites to be evaluated i.e. the site at ArcelorMittal in the IDZ of Saldanha Bay and a site in Danger Bay. The alternative pipeline routes for these sites are as follows:

Site 1- ArcelorMittal site

- Inlet infrastructure in Saldanha Bay harbour with disposal infrastructure also in the harbour

- Inlet infrastructure in Saldanha Bay harbour with disposal infrastructure in Danger Bay

- Water supply pipeline along the route to the Besaansklip reservoir following roads and cadastral boundaries.

Site 2 – Danger Bay area

- Inlet infrastructure in Danger Bay with disposal infrastructure also in Danger Bay

- Inlet infrastructure in Danger Bay with disposal infrastructure also in the adjacent bay area

- Water supply pipeline along the route to the Besaansklip reservoir following an existing servitude corridor and from there following existing water pipeline servitudes along roads and cadastral boundaries.

The site identification, screening of sites and concept designs have been completed and two preferred sites were proposed, which were included in the environmental process.

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

Although the modelling results from the 'Analysis of Management Options at Misverstand Weir to mitigate the potential impact on salinity of the Berg Water Project and Voëlvlei Augmentation Scheme (DWA, 2006) Study indicated that the incremental impact of the Berg Water Project and the Voëlvlei Augmentation Scheme could be mitigated through the provision of an additional 250 000 m³ of off-channel storage capacity, this re-analysis shows that the desired 98% level of assurance would not be achievable. To obtain a 98% level of assurance an additional 0.7 million m³ of storage would be required over and above the readily available 0.5 million m³ at Withoogte.

The DWA further also completed their Reconciliation Strategy during 2010/2011 and the table below gives an overview of the recommended potential future water resources as included in the Strategies:

Table 10.2.1: Potential future water resources for the various towns (DWA's Reconciliation Strategy)

Distribution System	Option	Potential
Koringberg	Re-use of water	• Re-use of treated effluent is not a feasible option for Koringberg, as the current treatment process at the Koringberg WWTW is not considered adequate to deliver treated effluent of an acceptable quality.
	Groundwater	• The viability of groundwater abstraction in the Malmesbury Group of the direct surrounding area to Koringberg is very low. • Groundwater potential for the quaternary catchment G10K is highest for the TMG that is present in the Piketberg Mountains to the north. The fractured sandstone rocks of the Peninsula Formation in many cases have shown to be a successful option for groundwater abstraction. • Another option is the area of faulting of the Malmesbury Group about 4 km south of the town. Faults intersecting the usually little permeable Malmesbury rocks are likely to cause increased fracturing giving space for enhanced groundwater occurrence. Prior to any groundwater development further hydrogeological investigation is required.
	Surface Water	• There is no surface water resources located in close proximity to Koringberg. The most likely potential sources are augmented supply from the Misverstand Dam and groundwater development.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Koringberg considering the low Mean Annual Precipitation.
	Summary	**The current water sources do not have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the water supply:** • WC/WDM measures to reduce water losses. • Increase the allocation from the Withoogte Regional Scheme. • Groundwater development
Riebeek Wes	Re-use of water	• The re-use of treated effluent is not a feasible option for Riebeek Wes, as the current treatment process at the Riebeek Wes WWTW is not considered to be adequate to deliver effluent of an acceptable quality for re-use.
	Groundwater	• Groundwater potential is the highest for the TMG. Groundwater development along the outcrop of the Peninsula sandstone, favourable along the fault, might be a future option, though the recharge area in the Kasteelberg Mountains is very limited. This unit in general presents a good aquifer system with typical yields of 10 l/s – 20 l/s and a good water quality. • Another viable option is the intergranular deposits. In general there is very little hydrogeological information available and further exploration is recommended.
	Surface Water	• There is no surface water resources located in close proximity to Riebeek Wes. The most likely potential sources are thus an augmented supply from the Voëlvlei Dam and groundwater development.
	Other Sources	• Rainwater harvesting is not a feasible option for Riebeek Wes considering the big storage needed to carry over winter rain to summer use.
	Summary	**The current water sources do not have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential**

Table 10.2.1: Potential future water resources for the various towns (DWA's Reconciliation Strategy)		
Distribution System	**Option**	**Potential**
		sources to augment the water supply: • WC/WDM measures to reduce water losses. • Increase the allocation from the Swartland Regional Water Supply Scheme. • Groundwater development
Riebeek Kasteel	Re-use of water	• The re-use of treated effluent is not a feasible option for Riebeek Kasteel, as the current treatment process at the Riebeek Kasteel WWTW is not considered adequate to deliver treated effluent of an acceptable quality for re-use.
	Groundwater	• Groundwater potential is the highest for the TMG. Groundwater development along the outcrop of the Peninsula sandstone might be a future option although the recharge area in the Kasteelberg Mountains is very limited. This unit, in general, presents a good aquifer system with typical yields of 10 l/s – 20 l/s and a good water quality. A drilling exploration along the western foot of the Kasteelberg is recommended to find the best access. • Another viable option in the near surrounding is the intergranular deposits. In general there is very little hydrogeological information available and further exploration is recommended.
	Surface Water	• There is no surface water resources located in close proximity to Riebeek Kasteel. The most likely potential sources are thus an augmented supply from the Voëlvlei Dam and groundwater development.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Riebeek Kasteel considering the low MAP which occurs mainly in winter.
	Summary	**The current water sources do not have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Augment inflow to Voëlvlei Dam and increase allocation to Riebeek Kasteel. • Groundwater development
Yzerfontein	Re-use of water	• The re-use of treated effluent is not a feasible option for Yzerfontein as there is currently no waterborne sanitation system in place.
	Groundwater	• Yzerfontein is situated on quaternary limestone, calcrete and sand of the Bredasdorp Group, which presents the only target option. These units are part of the Grootwater Aquifer System with available yields of 2 – 5 l/s, but sensitive to abstraction and periods of low rainfall and susceptible to contamination. The advantages of use of this system are ease of access and development. Due to the danger of saltwater intrusion a 2.5 km "buffer zone" was declared along the coastline where no abstraction of groundwater is permitted, in order to protect the water quality of the aquifer further inland.
	Surface Water	• There is no surface water resources located in close proximity to Yzerfontein.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Yzerfontein considering the low Mean Annual Precipitation. • Yzerfontein is situated on the coast and therefore desalination may be a potential source of water. This option should be investigated further. Due to the integrated nature of the water supply operated by the WCDM, it is possible to build a single desalination plant at Saldanha, which will result in more water becoming available in Voëlvlei Dam for increasing the supply to Yzerfontein.
	Summary	**The current water sources do not have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the water supply:** • WC/WDM measures to reduce water losses. • Augment the inflow to the Voëlvlei Dam. • Desalination for Saldanha and environs to make more water available for Yzerfontein from Voëlvlei Dam.
Darling	Re-use of water	The re-use of treated effluent is a feasible option for Darling, considering that re-use of treated effluent for irrigation is currently taking place. The Municipality must be able to provide 95% assurance of supply in terms of quality requirements. If such an assurance of supply in terms of quality can be supplied, various re-use options could be considered in addition to those already in use. These include the following: • Dual reticulation systems for new developments, where re-use of water could be considered for irrigation purposes. • The direct use for non-potable consumption, namely for irrigation and industrial end-users specifically. • The option of indirect use. • The option of direct use (potable consumption) should be seen as a long-term intervention.

Table 10.2.1: Potential future water resources for the various towns (DWA's Reconciliation Strategy)		
Distribution System	**Option**	**Potential**
	Groundwater	• The first target option is zones of fracturing and faulting of the granite. Although these units are usually classified as minor aquifer systems with typical yields of 0.5 – 2 l/s and a moderate water quality, in contacts to other fractured zones they can present better aquifers. • The second target option is the quaternary units. This primary aquifer has available yields of 2 – 5 l/s, but is sensitive to abstraction and periods of low rainfall and susceptible to contamination. The advantages of use of this system are ease of access and development.
	Surface Water	• There is no surface water resources located in close proximity to Darling.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Darling considering the low rain which mainly falls during winter.
	Summary	**The current water sources do not have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Increased allocation form the Swartland Regional Water Supply Scheme. • Consider re-use of water. • Groundwater development.
Moorreesburg	Re-use of water	The existing WWTW is currently utilising 0.042 Mm³/a of treated effluent for irrigation which has an 82.2% compliance with the general requirements. Further re-use of water from the WWTW can only be allowed if the existing works can provide a 95% assurance of supply in terms of quality requirements. Some of the following interventions can be considered. • The direct use for non-potable consumption, namely for irrigation end-users specifically. • Dual reticulation systems for new developments, where re-use of water could be considered for irrigation purposes. • The option of indirect use. • The option of direct use (potable consumption) should be seen as a long-term intervention.
	Groundwater	• Moorreesburg is located in surface water catchment G10J, but near the boundary to G10L. The potential for the quaternary aquifers in high for both catchments. The quaternary in this area on average shows yields of 2 – 5 l/s, but is sensitive to abstraction and periods of low rainfall and susceptible to contamination. The advantages of using this source are ease of access and development. However, near Moorreesburg the presence of this Berg River Formation is limited and further hydrogeological exploration is recommended to assess the viability of groundwater development for municipal supply from this source. • Another potential option might be the area of faulting in the Malmesbury rocks. Faulting of sedimentary rocks frequently supports groundwater occurrence but there is no detailed information on the fault system in the area so far. Although these units are usually classified as minor aquifer systems with typical yields of 0.5 – 2 l/s and a moderate water quality, in contacts or other fractured zones they can present better aquifers.
	Surface Water	• Future supply will come from Misverstand Dam, when the West District Municipality augment their bulk water resources.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Moorreesburg considering the low Mean Annual Precipitation which occur in winter.
	Summary	**The current water sources do not have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the water supply:** • WC/WDM measures to reduce water losses. • An increased allocation from the Western Cape Water Supply Scheme. • Groundwater development.
Malmesbury and Abbotsdale	Re-use of water	The existing WWTW is currently supplying 1.229 Mm³/a of treated effluent for irrigation, which has a 48.4% compliance with the general requirements. Further re-use of water from the WWTW can be considered as the works is being upgraded to a Membrane Biological Plant, which can provide a 95% assurance of supply in terms of quality requirements. The following interventions can be considered: • The direct use for non-potable consumption, namely for irrigation end-users specifically. • Dual reticulation systems for new developments, where re-use of water could be considered for irrigation purposes. • The option of indirect use. • Recharging of the aquifers. • The option of direct use (potable consumption) should be seen as a long-term intervention.
	Groundwater	• The first target option is the contact between the Malmesbury Group and the Cape Granite

Table 10.2.1: Potential future water resources for the various towns (DWA's Reconciliation Strategy)		
Distribution System	**Option**	**Potential**
		Suite or other fractured zones. Although these units usually are classified as minor aquifer systems with typical yields of 0.5 – 2 l/s and a moderate water quality, in contacts to other fractured zones they can present better aquifers. • The second target option is the Alluvium. Boreholes in this primary aquifer can yield 2 – 5 l/s, but is sensitive to abstraction and periods of low rainfall and susceptible to contamination. The advantages of use of this system are ease of access and development. • The chance of high yielding boreholes in the Malmesbury shale and Cape Suite Granite seems to be low. The quaternary deposits exhibit an even higher groundwater potential and high yielding boreholes in the intergranular aquifer are a lot more likely. This source is however much further away and groundwater is most likely already being used to a high degree by farmers in the area.
	Surface Water	• There are no surface water resources located in close proximity to Malmesbury and Abbotsdale.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Malmesbury considering the low MAP occurring mainly in winter.
	Summary	**The current water sources do not have adequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Augment the inflow into the Voëlvlei Dam and increase the allocation to WCDM. • Water re-use • Groundwater development for smaller communities.

Water Quality: The current samples taken by the West Coast District Municipality and Swartland Municipality, over and above the existing Operational Sampling programme at the bulk WTWs, and the additional proposed parameters to be sampled are summarised in the table below (Taken from the recently completed Water Safety Plan).

Table 10.2.2: Current parameters sampled by the West Coast District Municipality and Swartland Municipality: Routine monitoring of Process Indicators			
System	**Sampling Point**	**Current Parameters Sampled (Number of samples and frequency)**	**Additional Proposed Parameters, (Number of samples and frequency)**
Abbotsdale, Kalbaskraal, Riverlands, Chatsworth	Intake Paardenberg	-	pH Daily
		-	Conductivity Daily
		-	Turbidity Daily
	Final Water Paardenberg	-	pH Daily
		-	Conductivity Morning and Afternoon
		-	Turbidity Morning and Afternoon
		-	E.Coli Weekly
	Distribution Systems	E.Coli and Total Coliform Count (3 Sample points, Three Monthly)	pH, Turbidity, Free Chlorine, Total Coliform Count and E.Coli (4 Samples, Monthly). 2 Sample points in Abbotsdale / Kalbaskraal and 2 sample points for Riverlands / Chatsworth
Moorreesburg	Distribution System	E.Coli and Total Coliform Count (2 Sample points, Monthly)	*Adequately covered by the sampling done at the Withoogte WTW (West Coast District Municipality)*
Koringberg	Distribution System	pH, Turbidity, Conductivity, Free Chlorine, Total Coliform Count and E.Coli (1 Sample point, Fortnightly)	-
Malmesbury	Distribution System	pH, Turbidity, Conductivity, Free Chlorine, Total Coliform Count and E.Coli (1 Sample point, Fortnightly)	pH, Turbidity, Conductivity, Free Chlorine, Total Coliform Count and E.Coli (Further 3 Samples, Monthly)
Riebeek Wes	Distribution System	E.Coli and Total Coliform Count (1 Sample point, Monthly)	*Adequately covered by the sampling done at the Swartland WTW (West Coast District Municipality)*
Riebeek Kasteel	Distribution System	E.Coli and Total Coliform Count (1	*Adequately covered by the sampling done at the Swartland WTW (West Coast*

Table 10.2.2: Current parameters sampled by the West Coast District Municipality and Swartland Municipality: Routine monitoring of Process Indicators			
System	**Sampling Point**	**Current Parameters Sampled (Number of samples and frequency)**	**Additional Proposed Parameters, (Number of samples and frequency)**
		Sample point, Monthly)	*District Municipality)*
Yzerfontein	Distribution System	pH, Turbidity, Conductivity, Free Chlorine, Total Coliform Count and E.Coli (1 Sample point, Fortnightly)	-
Darling	Distribution System	pH, Turbidity, Conductivity, Free Chlorine, Total Coliform Count and E.Coli (1 Sample point, Fortnightly)	-

The number of current and required sampling for E.Coli (or faecal coliforms) in the distribution systems of Swartland Municipality are summarised in the table below:

Table 10.2.3: Current and required sampling for E.Coli (or faecal coliforms) in the distribution systems			
Distribution System	**Population served**	**Required number of monthly samples (SANS 241-2:2011: Table 2)**	**Current microbiological samples taken by Swartland Municipality (SM) and the West Coast District Municipality (WC DM)**
Withoogte Bulk System			
Moorreesburg	12 877	2.6	2 Sampling points, monthly (SM) and 1 Sampling point monthly at Withoogte WTW (WC DM)
Koringberg	1 214	2	1 Sampling point fortnightly (WC DM)
Swartland Bulk System			
Malmesbury	35 897	7	1 Sampling point, monthly (SM) and 1 Sampling point fortnightly (WC DM)
Riebeek Wes	4 605	2	1 Sampling point, monthly (SM) and 1 sampling point monthly at Swartland WTW (WC DM)
Riebeek Kasteel	4 761	2	1 Sampling point, monthly (SM) and 1 sampling point monthly at Swartland WTW (WC DM)
Yzerfontein	1 140	2	1 Sampling point fortnightly (WC DM)
Darling	10 420	2.1	1 Sampling point, monthly (SM) and 1 Sampling point fortnightly (WC DM)
Swartland Bulk System, Perdeberg Dam and Three Riverlands Boreholes			
Abbotsdale	3 762	2	1 Sampling point, three monthly (SM)
Kalbaskraal	2 411	2	-
Riverlands	1 726	2	1 Sampling point, three monthly (SM)
Chatsworth	2 326	2	1 Sampling point, three monthly (SM)

Industrial Consumers: All industries formally apply for the discharge of industrial effluent into the Municipality's sewer system. The quality and volume of industrial effluent discharged into the sewer system are monitored by the Municipality, in order to determine whether the quality comply with the standards and criteria. The Municipality is committed to implement the set of By-laws with regard to the discharge of industrial effluent once promulgated. It is also necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place. The Municipality needs to continue to ensure that all industrial consumers apply for discharge permits and they must supply and maintain a flow meter measuring the volume of water that is discharged into the sewer system. It is also recommended that the accounts generated by the Municipality include for each cycle a summary of the COD and flow results to enable industries to keep a record and look at ways of improving where possible.

11. FINANCIAL

11.1 Status Quo

Capital Budget: Swartland Municipality's proposed Water and Sewerage Capital Budget for 2014/2015 is R2.952 million and R42.580 million respectively. The biggest portion of Swartland Municipality water capital budget for the next five years will be for the replacement of the old water reticulation networks, as identified through the Pipe Replacement Study, and to provide additional reservoir storage capacity. The biggest portion of the sewerage capital budget will be for the upgrading of the existing WWTWs, in order to meet the final effluent quality standards.

The table below gives an overview of Swartland Municipality's historical water and sewerage capital expenditure over the last three financial years.

Table 11.1.1: Historical expenditure of the water and sewerage infrastructure budgets

Financial Year	Water Infrastructure			Sewerage Infrastructure		
	Budget	Expenditure	% Spend	Budget	Expenditure	% Spend
2010/2011	R12 599 219-00	R12 805 050-67	101.63%	R28 226 194-00	R29 337 599-44	103.95%
2011/2012	R2 224 000-00	R2 740 644-14	123.23%	R55 837 013-00	R54 719 937-68	98.00%
2012/2013	R9 887 510-00	R9 787 510-00	98.99%	R29 333 679-00	R29 154 219-00	99.39%

Operational Budget: The table below gives a summary of the total Operational and Maintenance budgets for water and sanitation services for the last six financial years (Actual costs and income).

Table 11.1.2: Summary of Operational and Maintenance expenditure and income budgets for water and sanitation services

Description	Actual	Record Prior				
	12/13	11/12	10/11	09/10	08/09	07/08
Total operating expenditure for Water	R42 118 578	R29 681 838	R28 128 643	R23 694 891	R20 472 590	R18 610 155
Total operating income for Water	-R37 287 493	-R30 607 892	-R27 231 393	-R24 820 317	-R21 240 912	-R16 596 859
Nett Surplus / Deficit	**R4 831 085**	**-R926 054**	**R897 250**	**-R1 125 426**	**-R768 322**	**R2 013 296**
Total operating expenditure for Sanitation	R29 200 700	R24 269 287	R9 708 230	R12 771 542	R14 233 945	R12 252 463
Total operating income for Sanitation	-R34 775 432	-R24 318 404	-R21 796 567	-R22 047 507	-R15 896 551	-R14 622 508
Nett Surplus / Deficit	**-R5 574 732**	**-R49 117**	**-R12 088 337**	**-R9 275 965**	**-R1 662 606**	**-R2 370 045**

Tariff and Charges: The first six (6) kl of water is provided free to all consumers. Swartland Municipality's tariffs support the viability and sustainability of water supply services to the poor through cross-subsidies (where feasible). Free basic water and sanitation services are linked to Swartland 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 six (6) kilolitres per month.

Swartland Municipality's current four (4) block step 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 sustainable supply of potable water is becoming an ever increasing challenge. This scarce commodity has to be optimally managed. The continued increase in the price of electricity and chemicals for purification has contributed to the cost of delivering the service. The water usage block tariff has been structured for a basic affordable tariff for up to 30 kl per household per month. Punitive tariffs are in place for excessive water consumption.

11.2 Gaps and Strategies

Capital Budget: The water supply systems in most of the Municipalities are under increasing threat of widespread failure, due to inadequate rehabilitation and maintenance of the networks. This is also the case in Swartland Municipality's Management Area with 55% of the water infrastructure and 28% of the sewerage infrastructure which has been consumed. This is placing considerable strain on Swartland Municipality's maintenance operations. The real solution is for the Municipality to continue with their current commitment towards a substantial and sustained programme of capital renewal works (Rehabilitation and Maintenance of the existing infrastructure).

The replacement value of the water infrastructure that is expected to come to the end of its useful life over the next 20 years is around R19.4 million (an average of R0.97 million per year) and for sewerage infrastructure the value is R31.5 million (an average of R1.57 million per year). Water and sewerage infrastructure assets with a total current replacement value of about R4.1 million and R5.9 million will be reaching the end of their useful life over the next 10 years and will need to be replaced, rehabilitated or reconstructed.

It is therefore important for the Council to continue with their current committed capital renewal programme and to increase the budgets allocated towards the maintenance and rehabilitation of the existing infrastructure. The new Asset Register will also assist this process. The extent to which each type of water and sewerage infrastructure asset has been consumed was previously summarised. The Municipality's dedicated renewal programmes need to target the poor and very poor assets. If this is not done, there is a risk that the ongoing deterioration will escalate to uncontrollable proportions, with considerable impact on customers, the economy of the area and the image of Swartland Municipality.

Swartland Municipality's implementation strategies with regard to capital funds are as follows:

- To focus strongly on revenue collection, because most of the funds for the water and sewerage capital projects are form Swartland Municipality's own funding sources. Actively implement the Credit Control and Debt Collection Policy in order to minimize the percentage of non-payment of municipal services.

- To identify all possible sources of external funding over the next number of years to assist Swartland Municipality to address the bulk infrastructure backlogs that exist in the various towns and to ensure adequate rehabilitation and maintenance of the existing infrastructure.

- 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.

One of Swartland Municipality's Strategic Outcomes is "A Financially Sustainable Municipality with Well-Maintained Assets". The actions included under this strategic outcome are as follows:

- Review tariffs for water, sewerage and refuse;
- Maintain and improve on debt collection;
- Secure new sources of revenue;
- Monitor the financial health of the Municipality against financial standards;
- Streamlining of municipal organisation; and
- Maintain and utilise assets effectively and efficiently.

Operational Budget: 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.

An IAMP 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. The new Asset Register will enable Swartland 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 over the next twenty years in real terms, in line with the envisaged pace of development and the upgrading of the bulk infrastructure. It is estimated that the budget requirements will double over this period.

Swartland Municipality's implementation strategies with regard to operational budgets are as follows:

- Develop an IAMP, 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.

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

One of Swartland Municipality's Strategic Outcomes is "Access to Affordable and Reliable Municipal Infrastructure". The actions included under this strategic outcome are as follows:

- Ensure that there is always sufficient infrastructure capacity to accommodate demand;

- Minimise distribution losses and departmental operating costs;

- Ensure that the annual budget makes adequate provision for maintenance, renewal, upgrading and refurbishment of existing obsolete networks and equipment.

Tariff and Charges: The table below gives an overview of the block step water tariffs of Swartland Municipality (Vat Excluded), with some comments on the specific blocks.

Table 11.2.1: Comments on Swartland Municipality's step block water tariff structure

Block (Kl / month)	12/13	11/12	10/11	Comments
0 - 6	R0-00	R0-00	R0-00	Free Basic Water
7 - 20	R8-19	R7-28	R6-56	Low volume use
21 - 30				Typical use volume, including garden irrigation
31 - 60	R11-27	R10-02	R9-03	Above average use, including garden irrigation
61 - 100	R17-45	R15-51	R13-97	Wasteful use and / or severe garden irrigation
> 100				Significant waste and / or unnecessary garden irrigation

Swartland Municipality will continue with the implementation of their step block tariff structure for water services. Wasteful or inefficient use of water is discouraged through increased tariffs. Swartland Municipality can also investigate the possibility of volumetric sewerage tariffs, whereby the sewerage tariffs are linked to the volume of water usage. The quantity of wastewater discharged from the industrial consumers into Swartland Municipality's sewer system is metered and the quality is also monitored on a monthly basis.

It is suggested that the following tariff structure characteristics should remain in Swartland Municipality's Structure in order to ensure efficient water use.

- Maintain a rising block tariff structure.

- Keep number of blocks in the tariff to a minimum. One block to address free basic water (the first step) and another to address the "cut-off" volume where consumers are discouraged to use water above this monthly volume (highest block) are required. In addition another three blocks could be used to distinguish between low users, typical use or high water use.

- The volumetric steps should be kept the same for all the areas within Swartland 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.

Separate Tariff Codes are in place for the different type of consumers in Swartland Municipality's Management Area. These codes can be further reviewed so that distinction can also be made between user types for Municipal Usage (e.g. parks, sports, fire-fighting, etc.). A code should also be used to uniquely describe the water usage by schools.

12. WATER SERVICES INSTITUTIONAL ARRANGEMENTS

12.1 Status Quo

Swartland Municipality is the WSA for the entire Municipal Management Area. A Service Level Agreement is in place with the West Coast District Municipality for the provision of bulk water to most of the towns in Swartland Municipality's Management Area.

The 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.

At a technical, operations and management level, municipal staff is continuously exposed to training opportunities, skills development and capacity building in an effort to create a more efficient overall service to the users. Submissions were also made to the DWA for the classification and registration of the Process Controllers and Supervisors at the various WWTWs. A skills audit is conducted during each year, which leads to various training programmes in order to wipe out skills shortages and to provide employees with the necessary capacity. A Workplace Skills Plan for 2013/2014 is in place.
The Municipality is currently busy with the finalisation of their draft set of Water Services By-laws, which will be promulgated once finalised.

12.2 Gaps and Strategies

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

It is important for Swartland Municipality to report annually on the KPIs as listed in the SFWS, included in DWA's Water Services Regulation Strategy and required by DWA's RPMS. The RPMS is one of the programmes under DWA's Directorate Water Services Regulation. The DWA is changing the manner in which they regulate WSAs by becoming more proactive in their processes. A new risk- and incentive based process will be followed, which will focus on the four strategic areas of financially viable business, Customer Satisfaction, Effective Institution and Technical Efficiency.

The Occupational Health and Safety Act contain provisions directing employers to maintain a safe workplace and to minimize the exposure of employees and the public to workplace hazards. It is therefore important for Swartland Municipality to compile a Legal Compliance Audit of the WWTWs in Swartland Municipality's Management Area, which will provide the management of Swartland Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.

It is important for Swartland Municipality to allocate adequate funding for the rehabilitation and maintenance of the existing infrastructure and all forward planning for new infrastructure should be guided by the Water and Sewer Master Plans.

Swartland Municipality will continue with their mentoring role for operational personnel ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operational personnel. Budgets need to be established to address the shortfall of skilled personnel, 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 operational personnel, technicians and managers will be established.

The training of Swartland Municipality's personnel involved in the management of water and sanitation services is the most important factor that determines the ability of Swartland 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.

Swartland Municipality can also continue to actively focus on in-house training, which requires the identification of trainers (from senior operators / officers / professional ranks) for the development and facilitation of courses which relate to specific organizational knowledge and systems requirements. Swartland Municipality's internal reports such as the Water Safety Plan, Wastewater Risk Abatement Plan, Operation and Maintenance Manuals and this WSDP have the necessary information on which the in-house courses can be based. This will assist Swartland Municipality's Human Resource Department in general and the skills development facilitator in particular to develop and implement effective workplace skills plans relevant to Human Capacity Development requirements.

13. SOCIAL AND CUSTOMER SERVICE REQUIREMENTS

13.1 Status Quo

A comprehensive Customer Services and Complaints system is in place at Swartland Municipality and the Municipality has maintained a high and a very consistent level of service to its urban water consumers. After hour emergency requests are being dealt with by the control room on a twenty four hour basis. All water and sanitation related complaints are logged through the system in order to ensure quick response to complaints.

The Municipality completed a detail Client Service Survey during 2011. A public perception survey was also done under the guidance of Prof De Wet Schutte from UniSearch Research Consultants during October and November 2013. The next phase of the exercise will now be to interpret the results of the survey and to integrate the information into the IDP and Area Plan process.

The table below gives a summary of the records that are kept by Swartland Municipality with regard to customer services and maintenance work.

Table 13.1.1: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work

Service	Indicator	Abbotsdale	Chatsworth	Darling	Kalbaskraal	Koringberg	Malmesbury	Morreesburg	Farms	PPC Riebeek Wes	Riebeek Kasteel	Riebeek Wes	Riverlands	Yzerfontein	Total
Repair pipe bursts	Repair of burst water pipelines	7	6	28	11	5	149	46	1	14	20	30	30	10	**357**
Dams	Inspect / Repair faults at dams	-	-	1	-	-	3	5	-	-	-	-	-	-	**9**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	-	4	1	1	10	5	-	1	-	-	-	1	**23**
Other	Other water complaints (Not specified)	7	10	136	10	39	243	422	7	-	4	9	12	6	**905**
Pipelines water	Inspect / repair of faulty water pipelines	21	23	63	23	16	414	118	1	-	12	6	29	15	**741**
Reservoirs	Inspection of reservoirs and work carried out at reservoirs	1	-	2	-	-	3	1	-	1	-	1	-	-	**9**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	1	-	4	3	12	-	-	-	-	-	1	**21**
Tap Leak	Inspect / Repair leaking taps	-	1	1	-	-	11	4	-	-	-	1		1	**19**
Water Connections	New / Inspections and work carried out at water connections	8	10	5	6	1	28	7	1	-	8	6	4	26	**110**
Water Pump Stations	Inspections and work carried out at water pump stations.	-	-	-	-	-	-	-	-	-	-	-	1	-	**1**
Water Supply	Faulty water supply	8	1	3	4	5	76	11	3	5	9	9	3	1	**138**
Watermeters	Inspect / Test / Repair / Install	36	24	258	43	31	445	252	5	6	94	66	33	57	**1 350**
Total		**88**	**75**	**502**	**98**	**102**	**1 385**	**883**	**18**	**27**	**147**	**128**	**112**	**118**	**3 683**

Table 13.1.2: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work

Service	Indicator	Abbotsdale	Chatsworth	Darling	Kalbaskraal	Koringberg	Malmesbury	Morreesburg	Farms	PPC Riebeek Wes	Riebeek Kasteel	Riebeek Wes	Riverlands	Yzerfontein	Total
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	32	11	425	19	24	469	554	4	29	69	57	19	3	**1 715**
Septic tanks	Empty septic tanks	10	246	160	328	279	100	219	390	-	150	550	-	1 834	**4 266**
Investigate sewer reticulation network	Investigate and clear blockages in network	14	11	117	10	2	391	94	9	7	30	30	5	11	**731**
Other	Other sewer complaints (Not specified)	4	2	4	9	-	23	5	1	1	4	2	1	1	**57**
Sewer spillage	Investigate and clean sewer spillages	-	-	4	-	1	3	2	-	-	2	1	-	-	**13**
Pipeline sewer	Installation of sewer pipelines or repair of pipelines	4	-	3	-	-	8	4	-	-	4	1	1	-	**25**
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	1	-	-	-	1	-	-	-	-	-	-	**2**
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	4	-	-	3	-	6	2	-	-	3	1	-	-	**19**
Total		**68**	**270**	**714**	**369**	**306**	**1 000**	**881**	**404**	**37**	**262**	**642**	**26**	**1 849**	**6 828**

13.2 Gaps and Strategies

The existing Customer Services and Complaints system of Swartland Municipality is adequate for the management of water and sanitation complaints and for the recording of maintenance work carried out by the Municipality. The system also allows for the time to be recorded when the complaint was addressed and therefore ensures that complaints are addressed on time.

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. Swartland Municipality is therefore committed to ensure that their water quality always complies with national safety standards.

The Water Safety Plan of Swartland Municipality was finalised during 2013 and includes an Improvement / Upgrade Plan. The purpose of the Improvement / Upgrade Plan is to address the existing significant risks where the existing controls were not effective or absent. Barriers implemented by the Swartland Municipality against contamination and deteriorating quality include:

- Participate in catchment management and water source protection issues with the West Coast District Municipality.
- Correct operation and maintenance of the filtration and disinfection plants.
- Protection and maintenance of the distribution system. 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.

Four other important barriers against poor quality drinking water that are a prerequisite to those listed above are:

- 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.
- A Service Delivery Agreement with the West Coast District Municipality is in place for the provision of bulk water.
- Competent managers and supervisors in the technical department who are responsible for water supply services lead by example and are passionate about monitoring and safeguarding drinking water quality.
- Well informed community members and other consumers of water supply services that know how to protect the water from becoming contaminated once it has been delivered, that have respect for water as a precious resource and that adhere to safe hygiene and sanitation practices.

14. NEEDS DEVELOPMENT PLAN

14.1 Status Quo

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, in consultation with the Municipality's town planning consultants. 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 existing Water and Sewer Master Plans of Swartland Municipality are as follows:

- Water and Sewer Master Plans for all towns: July 2008
- Updating Water and Sewer Models and list of projects for Riebeek Kasteel, Riebeek Wes and Ongegund: March 2011
- Water Distribution System Pipe Replacement Study: April 2013

The recommended projects from these Master Plans were incorporated into the WSDP.

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

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

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

The needs identified through the WSDP process, which needs to be addressed in the future, are summarised in the table below for the different Topics:

Table 14.1.1: Needs identified through the WSDP process and possible improvements / projects

Topic	Short Coming	Possible Improvements / Projects
Administration	Key issues raised in the WSDP need to be taken to the IDP	Ensure Executive Summary of WSDP is included in the IDP.
Demographics	Only approve new developments if it is aligned with the new approved SDF.	Ensure all new developments are aligned with the new SDF and comply with the proposed strategies.
	Climate change: 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.	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
Service Levels	Ensure that all households on the farms in the rural areas with existing services below RDP standard are provided with at least basic water and sanitation services	Assist private landowners as far as possible with the provision of basic water and sanitation services to all the households in the Municipality's Management Area with existing service levels below RDP standard.
Socio Economic	-	-
Water Services Infrastructure	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.

Table 14.1.1: Needs identified through the WSDP process and possible improvements / projects		
Topic	**Short Coming**	**Possible Improvements / Projects**
	Ensure that an appropriate maintenance and rehabilitation plan (IAMP) is developed and implemented.	Develop an Infrastructure Asset Management Plan (IAMP). 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 new Asset Register will largely assist with this process.
	Records need to be kept of the number of breakages / failures per infrastructure type in order to assist the Municipality with their refurbishment and maintenance planning.	Keep record of all breakages / failures per infrastructure type.
	Ensure that all the assets, as listed under the various tables in this chapter, are included in the Asset Register.	Update the Asset Register to include all the assets.
	The Water and Sewer Master Plans were last updated in 2008 and in 2011 for Riebeek Vallei.	Update the Water and Sewer Master Plans
Operation and Maintenance	It is important for Swartland Municipality to classify all treatment works 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.	Establish a mentoring role for operators ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operators. Establish budgets 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.
	The Occupational Health and Safety Act contain provisions directing employers to maintain a safe workplace and to minimize the exposure of employees and the public to workplace hazards. It is therefore important for Swartland Municipality to compile a Legal Compliance Audit of their WWTWs, which will provide the management of Swartland Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.	Compile an Occupational Health and Safety Audit at all the WWTWs.
	Shortcomings were identified as part of the Water Safety Plan and W_2RAP.	Implement Improvement / Upgrade Plans of Water Safety Plan and W_2RAP.
	Shortcomings were identified as part of the WWTW Process Audits.	Implement recommendations from the detail WWTW Process Audits.
Associated Services	-	-
Conservation and Demand Management	Keep the percentage of non-revenue water as low as possible.	Continue with the implementation of the newly developed WDM Strategy and Action Plans.
	The WDM Strategy of Swartland Municipality and the comprehensive list of WDM activities included in the WSDP needs to be used by Swartland Municipality to prioritise those activities that can be implemented within the available funding and personnel resources of the Municipality.	Prioritise from the list of WDM activities those activities that can be implemented with the available budget and personnel and the activities which will have the biggest impact.
	Determine MNFs of the various distribution systems.	Ongoing night flow analyses should be implemented as part of the normal operational activities of the Municipality. This will provide information on system performance and give direction for interventions.
	It is recommended that Swartland Municipality compile a detail water meter audit of all their water consumer meters, in order to identify the age of the meters. Ensure all un-metered connections are metered and all irrigation water used on parks are also metered.	Compile a detail water meter audit of all residential and non-residential water meters. Implement a Meter Maintenance and Management Strategy, whereby a phased process is followed for the replacement of all water meters older than eight years.
	Implement an extensive schools WDM programme, which might also include annual competitions between schools (say with a prize for the lowest consumption, the lowest per capita consumption and for the best WDM-strategy poster design, etc.) Schools should be encouraged to make WDM	Support schools with WDM initiatives (Especially during Water Week)

Table 14.1.1: Needs identified through the WSDP process and possible improvements / projects		
Topic	**Short Coming**	**Possible Improvements / Projects**
	programmes part of a long term project, where learners should be actively involved. A schools WDM programme should receive a high priority.	
	Continue with the repairing of leaks at all the indigent households.	Repair leaks at all the indigent households
	Create more district zones within the various distribution systems. At present each town in Swartland Municipality's Management Area comprises a district zone. This is not considered to be sufficient for Malmesbury, Moorreesburg and Darling.	District zones metering enable the identification of poor performing and leaking distribution infrastructure. The distribution systems of Malmesbury, Moorreesburg and Darling should be break down into smaller district zones. The district zones should also be provided with equipment that enables remote flow and pressure logging via the scada system.
	Swartland Municipality needs to continue to focus on the installation of water saving devices (specific water efficient toilets). The Municipality also needs to focus on raising awareness regarding conservation projects and the installation of water efficient devices in order to reduce the water demand and their percentage of non-revenue water.	Raise awareness under the public of water efficient devices and water conservation projects.
Water Resource	Ensure adequate sources in order to meet the future projected demands.	Continue to engage with the West Coast District Municipality wrt their augmentation options for two bulk distribution systems.
	Ensure operation and management of the Municipality's own water resources in a sustainable manner.	Implement a groundwater management programme for the boreholes in Riverlands (Abstraction and quality).
Financial Profile	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.	Develop an IAMP. The new Asset Register, with which the Municipality is currently busy, will assist with the process.
	Sewer tariffs not yet linked to the volume of water usage by consumers.	Investigate the financial implication if the sewerage tariffs are linked to the volume of water usage.
Institutional Arrangements	All critical vacant water and sanitation positions as indicated on the approved Organogram needs to be filled as soon as possible. Swartland Municipality needs to review the skills needed at each of the WWTWs according to the classification of the WWTWs and need to align resources to these needs as well as reviewing the total staff numbers necessary to meet all the objectives in the National Water Act.	Aligning the career paths to the occupational categories will assist the personnel to understand levels within across teams. Simplification of job titles to conform to respective occupational categories will assist in developing compatible and comparable career paths within the different Departments. Occupational categories will provide differentiation between levels. This approach will allow for more specific job designations in organograms with explicit career path connotations.
	Continue with the mentoring role for operational personnel ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operational personnel. Budgets need to be established to address the shortfall of skilled personnel, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff.	Ensure all required water and sanitation training is included in the Municipality's Workplace Skills Plan. Establish budgets to address the shortfall of skilled personnel, rethink methods to retain qualified personnel and plan for clear career paths.
	Swartland Municipality can also continue to actively focus on in-house training, which requires the identification of trainers (from senior operators / officers / professional ranks) for the development and facilitation of courses which relate to specific organizational knowledge and systems requirements.	Swartland Municipality's internal reports such as the Water Safety Plan, W_2RAP, Operation and Maintenance Manuals and this WSDP have the necessary information on which the in-house courses can be based. This will assist Swartland Municipality's Human Resource Department in general and the skills development facilitator in particular to develop and implement effective workplace skills plans relevant to Human Capacity Development requirements.
Social and Customer Service Requirements	All critical water and sanitation stats need to be kept up to date and monitored on a monthly basis (Number of complaints; pipe breakages; sewer blockages; meters tested, replaced and repaired; septic tanks pumped, etc.)	Ensure all water and sanitation stats are kept up to date and included in the Monthly Reports.

14.2 Gaps and Strategies

Swartland Municipality's proposed key capital infrastructure projects for the next three years are as follows:

- Upgrade various sections of the internal water reticulation networks, as identified through the Pipeline Replacement Study.
- Construction of additional reservoirs in Koringberg, Riebeek Kasteel, Chatsworth and Darling, in order to ensure adequate storage capacity.
- Installation of additional secondary chlorination facilities, in order to ensure compliance with SANS:241:2011 water requirements.
- Refurbishment of the Wesbank Water Tower pump station.
- Upgrade and extension of various sections of the bulk sewer pipelines and internal drainage networks, as recommended by the Sewer Master Plans.
- Upgrading of the Riebeek Wes, Riebeek Kasteel and Ongegund combined WWTW, the Koringberg WWTW, the Chatsworth WWTW and the Darling WWTW.

The table below gives more detail of the individual projects, as included in the proposed Five Year Capital Budget for 2014/2015.

Table 14.2.1: Water and sewerage capital projects, as included in the proposed Five Year Capital Budget for 2014/2015

Project name	Local Area	Project type (e.g. bulk, reticulation, etc.)	Schedule Date and Estimated Cost				
			14/15	15/16	16/17	17/18	18/19
FUTURE WATER INFRASTRUCTURE							
Vehicles	Swartland	Other	R460 000	-	R180 000	R1 231 200	R538 750
New 0.250 Ml Reservoir	Koringberg	Reservoir	-	R3 074 000	-	-	-
New 0.500 Ml Reservoir	Riebeek Kasteel	Reservoir	R100 000	-	R3 200 000	-	-
Secondary Chlorination	Swartland	Disinfection	R260 000	R270 000	R300 000	-	-
New reservoir	Chatsworth	Reservoir	-	R3 180 000	-	-	-
Replacement of water reticulation network	Swartland	Reticulation Network	R1 811 492	R2 562 000	R2 900 000	R3 000 000	R3 500 000
Refurbish Wesbank water tower pump station	Malmesbury	Pump Station	R180 000	-	R1 350 000	-	-
New Reservoir	Darling	Reservoir	R100 000	-	-	-	-
Equipment	Swartland	Other	R40 800	R56 400	R77 880	R81 774	R85 863
Total			R2 952 292	R9 142 400	R8 007 880	R4 312 974	R4 124 613
FUTURE SEWERAGE INFRASTRUCTURE							
Vehicles	Swartland	Other	R1 562 500	R1 650 000	-	R258 000	R2 627 500
Upgrading of WWTW	Riebeek Wes and Riebeek Kasteel	WWTW	R40 940 508	R3 660 000	-	-	-
Sewerage	Koringberg	WWTW	-	-	R2 245 263	R2 863 454	R235 956
Sewerage	Darling	WWTW	-	R250 000	R800 000	R7 000 000	-
Upgrading of bulk collectors	Darling	Bulk Pipelines	-	-	-	-	R2 500 000
Sewerage	Chatsworth	WWTW	-	-	R2 500 000	-	-
Equipment: Telemetry	Swartland	Telemetry	R47 190	R51 909	R54 505	R57 230	R60 091
Equipment	Swartland	Other	R29 610	R31 091	R32 645	R34 277	R35 991
Total			R42 579 808	R5 643 000	R5 632 413	R10 212 961	R5 459 538

Swartland Municipality's implementation strategies, with regard to new water and sewerage infrastructure, 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.

- To update the existing Water Master Plans and to undertake revised master planning at least every two to three years and to use the Master Plans to list the desired infrastructure development requirements and reflect these in the IDP.

- Ensure adequate funds are allocated on an annual basis towards the rehabilitation and maintenance of the existing water and sewerage infrastructure. Continue with the replacement of the of old reticulation networks with regular pipe bursts, as prioritized through the Pipeline Replacement Study.

- Assign a high priority to the provision of basic water and sanitation services in the rural areas.

- Assign a high priority to the implementation of Swartland Municipality's WDM Strategy (Demand Management) 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.

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