Zululand

DISTRICT MUNICIPALITY
DISTRIK MUNISIPALITEIT
UMKHANDLU WESIFUNDA

# WATER SERVICES DEVELOPMENT PLAN

## 2017 - 2021
## 5-year Cycle

**REVISION 4: 2020/2021**
**JUNE 2020**

# INDEX

# A. EXECUTIVE SUMMARY

## A.1 Introduction

ZDM as the Water Service Authority 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 [Water Services Act of 1997 Section 11]. ZDM therefore has a legislative responsibility to Prepare a Water Services Development Plan (WSDP) for its area of jurisdiction [Water Service Act of 1997 Section 12]. Planning work related to various aspects of water services are being dealt with on a continuous basis through the year and the results of such work are then systematically fed into the WSDP.

**Name of WSA**

| | | |
|---|---|---|
| Name | Zululand District Municipality | |
| Address | Private Bag X76<br>ULUNDI<br>3838 | Lot B400, Gagane Street<br>ULUNDI<br>3838 |

**Status of WSDP**

The planned completion dates for the revision of the WSDP are as follows:

- WSDP Steering Committee approval (Draft version) – March 2020
- EXCO approval – May 2020
- Expected Council approval – June 2020
- Submission of final WSDP with amended comments & input - August 2020

**WSDP drafting team**

The contact persons within the municipality who are responsible for the functioning, planning and implementation of the WSDP are shown in Table A1.1 below:

**Table A1.1: Drafting team**

| Name | Position | Tel Number | Email |
|---|---|---|---|
| Mr Z.W Mcineka | Municipal Manager | 035 874 5500 | zmcineka@zululand.org.za |
| Mr X Buthelezi | Deputy Director: WSA | 035 874 5542 | xbuthelezi@zululand.org.za |
| Mr J.J Jordaan | HOD: Technical Services (Acting) | 035 874 5500 | jjordaan@zululand.org.za |
| Mr B Mnguni | HOD: Planning | 035 874 5617 | bmnguni@zululand.org.za |

**Process followed**

ZDM annually prepares a revised WSDP in time for the approval of the annual municipal budget. Planning work related to various aspects of water services are being dealt with on a continuous basis through the year and the results of such work are then systematically fed into the WSDP.

The WSDP Steering Committee has been established and meets at least four times per year. The steering committee comprises of the ZDM management team, officials from the Local Municipalities, Councillors and consultants involved with the technical work. The aim is to have a first draft of each year's revision ready by end of February. The following approvals are done:

**Table A1.2: WSDP Approval Process**

| Item | Date |
|---|---|
| WSDP Steering Committee Meetings | Quarterly |
| Submission of draft WSDP document to WSA for comments | End February |
| WSDP & IDP Steering Committee Approval | End March |
| Representative Forum approval – This forum comprises all Government Departments involved with the IDP process, all Councillors and role players from the private sector. | End April |
| EXCO approval | May |
| Advertise for public comment | End May |
| Council approval | June |
| Submit to DWA for final approval | August |

**Public comments**

The WSDP will be advertised during May 2020 for public comment.

**Adoption record**

The 2019/2020 revision of the WSDP has been approved by the ZDM Council during June 2019.

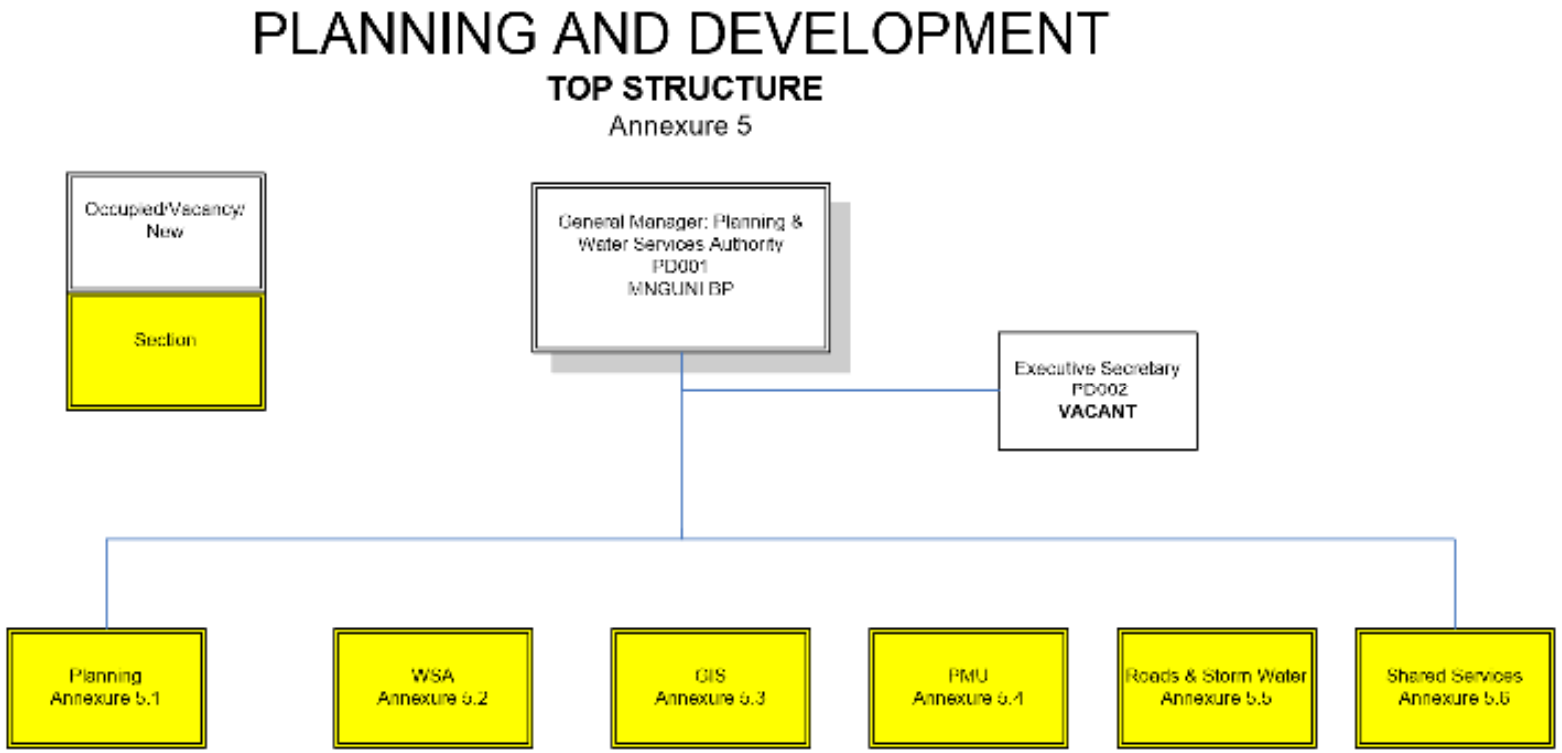
**WSDP co-ordinators**

The WSDP process is managed by the Deputy Director: Water Services Authority in association with the HOD: Planning & Community Development and the HOD: Technical Services and their staff.

**PMU**

The ZDM PMU has been established and is functioning well. The PMU unit comprises of a Deputy Director, two technical officers, project administrator and secretary. The PMU manager reports to the HOD: Technical Services and is responsible for the implementation of all projects scheduled by the WSA. The WSA unit is situated in the Planning Department and reports to the HOD: Planning. The organograms below indicates the split in functions related to water services:

**Table A1.3: Organogram**

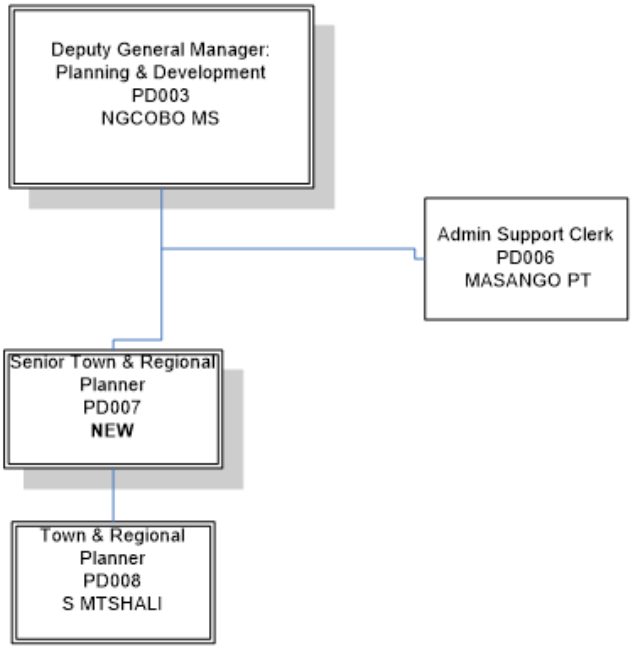



*See proceeding pages for each Annexure*

# PLANNING AND DEVELOPMENT

## Planning

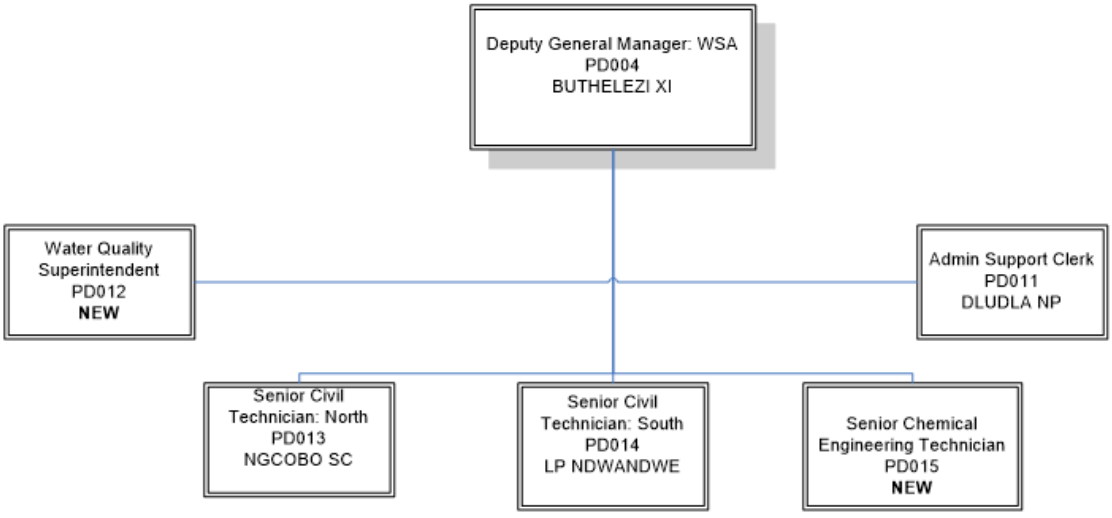
Annexure 5.1




# PLANNING AND DEVELOPMENT

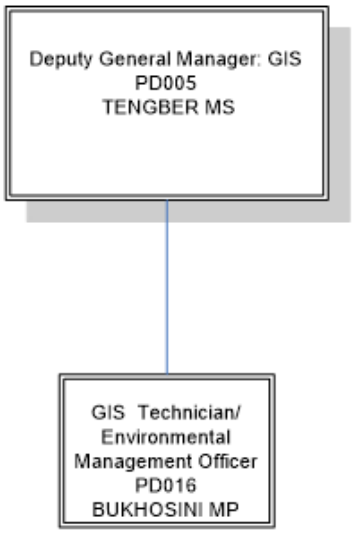
## Water Services Authority

Annexure 5.2



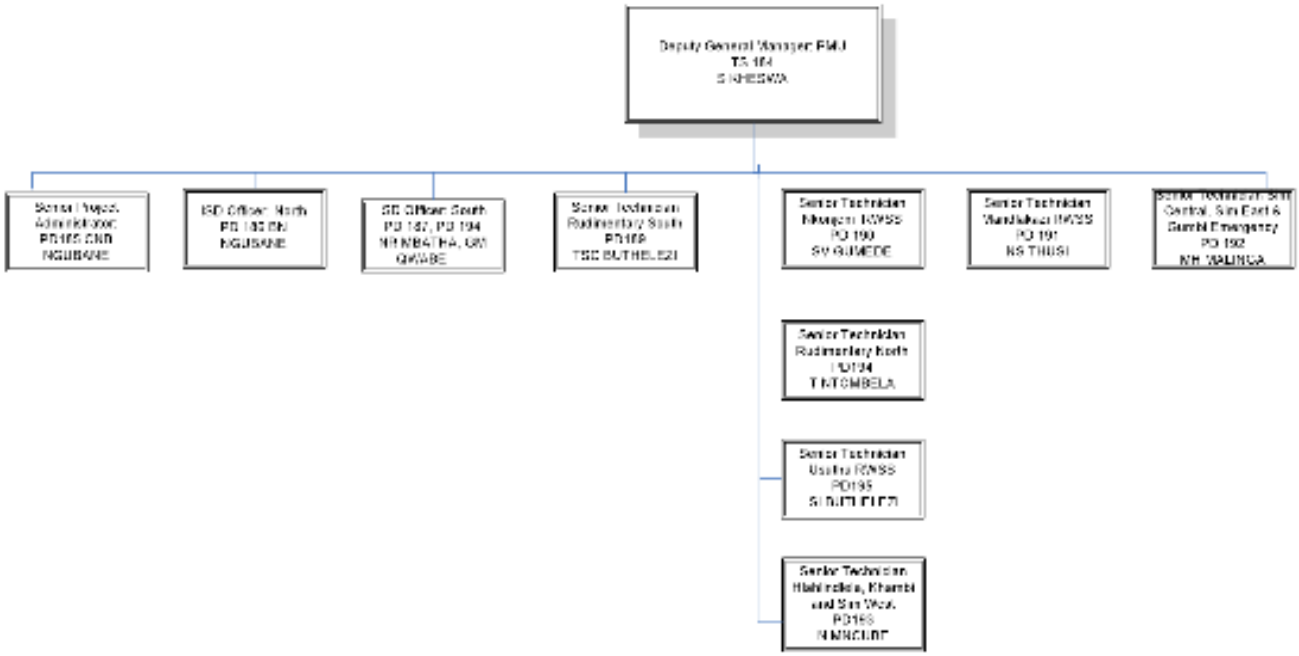
# PLANNING AND DEVELOPMENT

Geographic Information Systems
Annexure 5.3



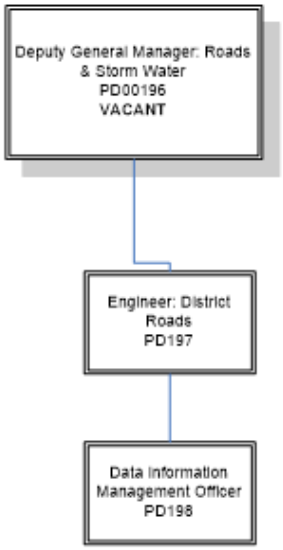

# PLANNING AND DEVELOPMENT

Project Management
Annexure 5.4



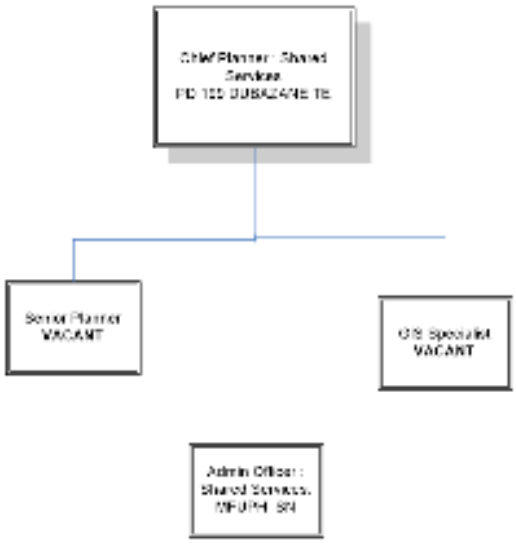
# PLANNING AND DEVELOPMENT

Planning
Annexure 5.5




# PLANNING AND DEVELOPMENT

Shared Services (Funded)
Annexure 5.6



**Water services level policy**

ZDM has compiled a Water Services Policy and this is available from the ZDM website at www.zululand.org.za. The following levels of service for water and sanitation are available from the municipality:

**Table A1.4: Service Levels**

| Domestic Water Supply | | | | |
|---|---|---|---|---|
| **Service Level Number** | **Level of Service** | **Definition** | **Applicable Tariff Structure** | **Norms and Standards** |
| DW1 | Full pressure conventional house connection | Full pressure unrestricted individual erf/yard connection | Stepped block tariff | Design specifications |
| DW2 | Yard tank (RDP standard) | Restricted (to 200l per day) individual erf connection with tank in yard | No charge | Design specifications |
| DW3 | Communal street taps (RDP standards) | Unrestricted full pressure standpipe not further than 200m from dwellings (shared by a number of consumers) | No charge | Design specifications |
| DW4 | Rudimentary | Formalised supply:<br>• Borehole equipped with hand pump<br>• Protected spring<br>• Communal standpipe within 800m from dwellings | No charge | Design specifications |

| Domestic Sanitation | | | | |
|---|---|---|---|---|
| **Service Level Number** | **Level of Service** | **Definition** | **Applicable Tariff Structure** | **Norms and Standards** |
| DS1 | Water borne | Unrestricted connection to municipal sewerage system | Water consumption based tariff structure included in water tariff | Design specifications |
| DS2 | Conservancy tank | Localised temporary sewage storage facility | Rate per load disposed by municipality | Design specifications |
| DS3 | Septic tanks | On-site disposal (self treatment) | No charge | Design specifications |
| DS4 | Ventilated improved pit (VIP) | Dry pit with sufficient capacity on-site disposal based on set standards | No charge | Design specifications |

## A.2 IDP and WSDP Goals

The Integrated Development Plan (IDP) for the ZDM has the following vision and mission statement for the region:

| **IDP vision and mission statement for the municipality** |
|---|
| **Vision**<br>"*We, the people of Zululand are proud communities that are committed to the development of Zululand through hard work, integrity and a common purpose."*<br><br>**Mission**<br>• **To develop an affluent district by:**<br>o *Optimal delivery of essential services*<br>o *Supporting sustainable local economic development*<br>o *Community participation in service delivery* |

Part of the development objectives for Zululand is facilitating the delivery of basic services that include water services (i.e. water and sanitation provision), strengthening the local economy with particular emphasis on tourism, agriculture and small business sectors, and the sustainable use of land and the natural environment.

The importance of the vision and objectives in terms of the WSDP is the development of Zululand through the provision of equitable and sustainable water services leading to an improvement in the quality of life. It therefore follows that planning in respect of water services must increase the current level of service throughout the region with an improvement experienced by all. Planning must therefore be sustainable in terms of water resources, material resources, contractor capacity, management capacity, as well as funding and maintenance cost.

The IDP has a number of key development strategies, namely:

- Delivery and coordination of basic services.
- Social issues of communities.
- Sustainability and environment.
- Economic development.
- Build capacity to lead and manage development in Zululand.

All these development strategies will ultimately link to the need and spatial requirement for water services provision. **Spatial development within the ZDM is directly related to the provision and availability of water services, therefore development tends to follow sustainable planning in the WSDP and not force water services provision into areas that are currently not economically viable or sustainable to supply.**

This support the water and sanitation infrastructure development focus of the KZN Provincial Growth and Development Strategy (PGDS) for 2035, which will be discussed in the next section.

## A.3 Strategic Objectives & Development Goals

The ZDM WSDP supports the KZN PGDS Strategic Framework. WSDP goals, objectives, interventions and projects are aligned to place ZDM in a position to fulfil its role as WSA in achieving the provincial PGDS for 2035.

While the focus has been predominantly on providing each person with sustainable infrastructure and eradicating backlogs, the status of existing and aging infrastructure, as well as the availability and sustainability of water resources has been neglected. An extract of the KZN PGDS can be reviewed below.

> *"The 2015/2016 drought experienced in the country and more so in the Province has had a severe impact on the citizens of the Province and their livelihoods. The most severe impact has been felt by the rural communities of KZN whose livelihoods depend on agriculture, including livestock. The Province, through various initiatives and programs, has attempted to ensure a reliable supply of water to its citizens. The continued low rainfall has made this task increasingly challenging. National and Provincial government have spent millions of rand to ensure citizens have access to water.*
>
> ***The discourse on reliable and affordable water supply has forced the water sector to re-look at several aspects of the water source management and water supply**. In terms of water source it is being argued that the Province requires a better understanding of groundwater and its catchment areas. This strategy argues that water planning and resource management should be done at a quaternary catchment level - the focus should not only be at regional level. Alternative water sources, like grey water and desalination must become viable options as sources of supply.*
>
> ***There is also a school of thought that the severity of the drought is a direct correlation to the poor maintenance programs of water services authorities**. These related to poor borehole upgrades and spring protection, high water losses due to leakages not been attended to urgently, water theft and lack of bulk and reticulation planning.*
>
> *Skills development and capacity building, in the water sector continues to be an area of investigation in this review. There is a school of thought that argues that the skills required are more at an artisan level rather than at engineering level. This relates to the **maintenance issue around boreholes and spring protection and attendance of water leaks**. There is, however, another school of thought that water services authorities have focused more on **water demand** rather than water source management and that shift must be emphasised. Further, there is increasing pressure being put on the water sector institution to begin to develop a **sustainable water sector capacity building model**. The water services boards, the water services departments and the water services authorities all have various levels and type of expertise within their institutions. Therefore, these institutions along with engineering councils and the private sector must begin to provide a holistic sustainable **capacity building model** that contributes to a new water sector investment strategy. In addition, there is a growing demand for **localized water skills** at all levels as well as employment and*

*business opportunities. The water sector through the vast capital spend have the potential to improve* ***employment opportunities and create entrepreneurs in decentralized local spaces****.*

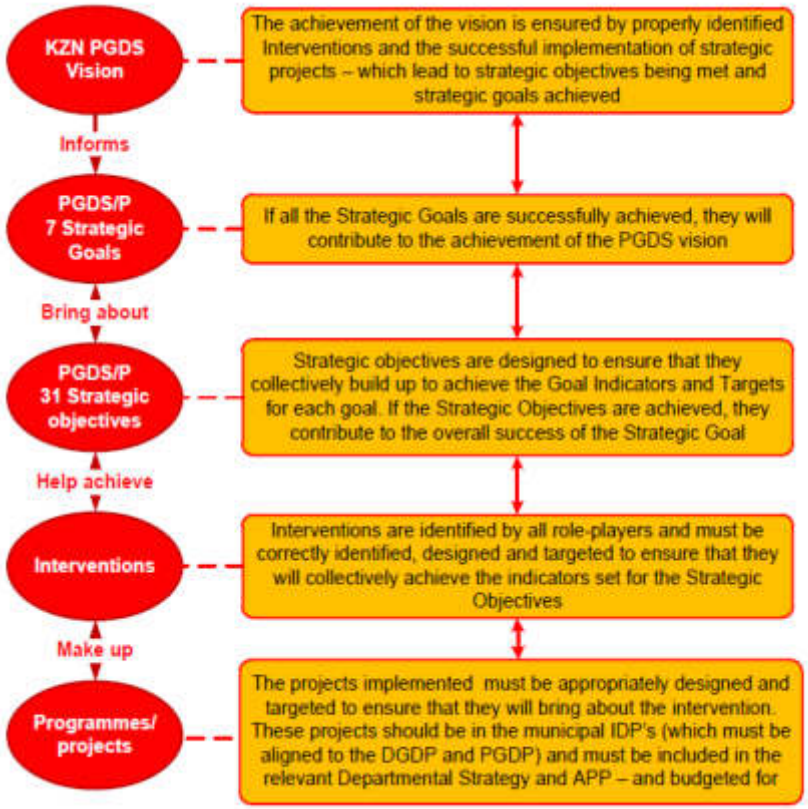
***The financial cost of water supply cannot be underestimated and the Province needs to have a funding model to address this****. Like energy, water costs will increase and become increasingly expensive for consumers and business, thus the importance of having a* ***reliable and affordable water supply****. The Department of Water and Sanitation in the Province have several key capital water projects that will ensure a relative supply of water in the province. The growing concerns will be the pace at which our province is urbanizing and the greater demand this will have on water provision in these urbanized areas as well as to ensure reliable access to water, in rural areas.*

*Given the above, the Province in the next five years must engage in the development of a new water sector investment strategy. This strategy must include* ***elements of water loss and maintenance, water availability, cost of water supply****. In addition, the strategy should include water source plans that consider ground water, desalination, grey-water. Further a discussion on localized skills and local business development. Greater emphasis on improving rural access to water and increasing mitigating measures to this section of our population."*

As water provision will increase, so will water resources needs, operation and maintenance of existing infrastructure, efficient institutional and financial capacity to manage infrastructure and revenue etc. The KZN PGDS Framework aims to achieve at least 90% reliable services by 2035.

An overview of the KZN PGDS framework with associated goals and objectives for water and sanitation services can be reviewed in the next figure.

**Figure A.3.1: KZN PGDS Framework**




**The 2016 Revised PGDS Strategic Framework**

Figure 10: PGDS Strategic Framework

**2016 PGDS STRATEGIC GOALS and OBJECTIVES**

| STRATEGIC GOAL | No | STRATEGIC OBJECTIVE 2016 |
|---|---|---|
| 1 INCLUSIVE ECONOMIC GROWTH | 1.1 | Develop and promote the agricultural potential of KZN |
| | 1.2 | Enhance sectoral development through trade investment and business retention |
| | 1.3 | Enhance spatial economic development |
| | 1.4 | Improve the efficiency, innovation and variety of government-led job creation programmes |
| | 1.5 | Promote SMME and entrepreneurial development |
| | 1.6 | Enhance the Knowledge Economy |
| 2 HUMAN RESOURCE DEVELOPMENT | 2.1 | Improve early childhood development, primary and secondary education |
| | 2.2 | Support skills development to economic growth |
| | 2.3 | Enhance youth and adult skills development and life-long learning |
| 3 HUMAN AND COMMUNITY DEVELOPMENT | 3.1 | Eradicate poverty and improve social welfare services |
| | 3.2 | Enhance health of communities and citizens |
| | 3.3 | Safeguard and enhance sustainable livelihoods and food security |
| | 3.4 | Promote sustainable human settlements |
| | 3.5 | Enhance safety and security |
| | 3.6 | Advance social cohesion and social capital |
| | 3.7 | Promote youth, gender and disability advocacy and the advancement of women |
| 4 INFRASTRUCTURE DEVELOPMENT | 4.1 | Development of seaports and airports |
| | 4.2 | Develop road and rail networks |
| | 4.3 | Develop ICT infrastructure |
| | 4.4 | Ensure availability and sustainable management of water and sanitation for all |
| | 4.5 | Ensure access to affordable, reliable, sustainable and modern energy for all |
| | 4.6 | Enhance KZN waste management capacity |
| 5 ENVIRONMENTAL SUSTAINABILITY | 5.1 | Enhance resilience of ecosystem services |
| | 5.2 | Expand the application of green technologies |
| | 5.3 | Adapt and respond climate change |
| 6 GOVERNANCE AND POLICY | 6.1 | Strengthen policy, strategy coordination and IGR |
| | 6.2 | Build government capacity |
| | 6.3 | Eradicate fraud and corruption |
| | 6.4 | Promote participative, facilitative and accountable governance |
| 7 SPATIAL EQUITY | 7.1 | Enhance the resilience of new and existing cities, towns and rural nodes, ensuring equitable access to resources, social and economic opportunities |
| | 7.2 | Ensure integrated land management use across the Province, ensuring equitable access to goods and services, attracting social and financial investment |

Strategic Objectives and Interventions for the KZN PGDS can be reviewed below.

**Figure A.3.2: KZN PGDS Strategic Objectives and Interventions**

**Strategic Objective 4.4 Indicators:**

4.4.1 Percentage mean annual runoff water stored in each district.
4.4.2 Quantity of water abstracted per annum in each district.
4.4.3 Number of households receiving minimum standards of sanitation.
4.4.4 Percentage households with access to safe drinking water
4.4.5 Cubic meters of water available.
4.4.6 Surface Water storage as a percentage of surface mean annual runoff per district.
4.4.7 Non-Revenue Water loss – (physical and non-physical water loss).
4.4.8 Number of projects not approved due to bulk Water and Sanitation Infrastructure constraint.
4.4.9 Number of MIG and WSIG projects meeting 75 litres of water per person per day.

**Strategic Objective 4.4 Interventions:**

4.4(a) Review and implement the Provincial Water Sector Investment Strategy.
4.4(b) Policy and guidelines on the inclusion of quaternary catchment for groundwater, grey water and desalination.
4.4(c) Develop and implement water sector capacity building programme with all water institutions.
4.4(d) Develop new water and sanitation tariff policy.
4.4(e) Expedite the approval of Water Use Licences.
4.4(f) Programme for development of water sources (desalination, rainwater, recycling, groundwater).
4.4(g) Expedite the planning and implementation of sub-transmission networks in the Province.

The ZDM WSDP support the above framework, and will elaborate on each aspect in more details throughout the document under each relevant chapter. The following provides a framework for these topics under 11 categories as depicted in the KZN PGDS document.

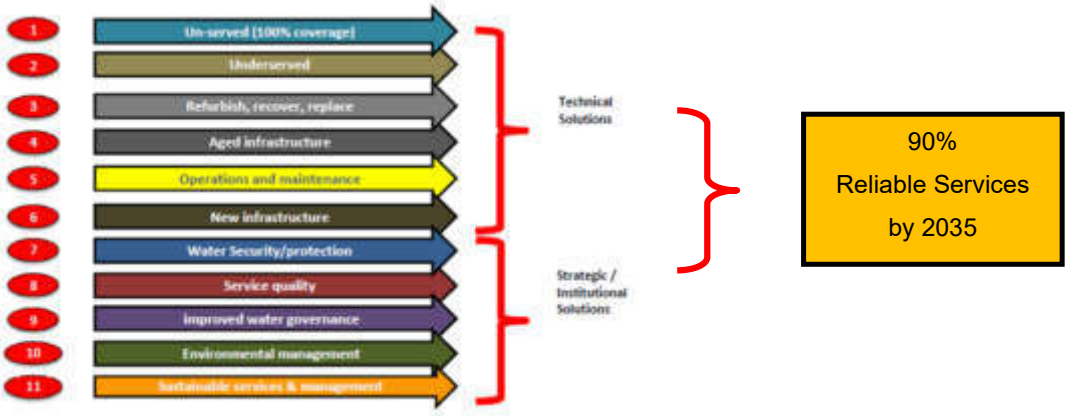



**Figure A.3.3: KZN PGDS Strategic Framework**

These 11 categories are consolidated in the WSDP under the following chapters as required by the web-based WSDP template of DWS:

- CHAPTER 1: Socio-Economic Profile
- CHAPTER 2: Service Level Profiles
- CHAPTER 3: Water Resources Profile
- CHAPTER 4: Operation and Maintenance
- CHAPTER 5: Water Conservation & Demand Management
- CHAPTER 6: Water & Sanitation Services Profile
- CHAPTER 7: Water Balance
- CHAPTER 8: Institutional Profile
- CHAPTER 9: Customer Service
- CHAPTER 10: Financial Profile
- CHAPTER 11: Project Rollouts
- CHAPTER 12: Strategic Goals

Items related to the Strategic Objectives and Development Framework will be discussed throughout this WSDP and reference will be made to the 2035 targets.

## A.4 Background to the area

The ZDM is situated in northern KwaZulu-Natal (KZN). It covers an area of 14,808 km$^2$ and is divided into five local municipalities (LMs), namely eDumbe (KZ261), uPhongolo (KZ262), Abaqulusi (KZ263), Nongoma (KZ265), and Ulundi (KZ266) (Figure A4.1a). There is only one change in the local municipal boundaries from 2011 to 2016. This area is located west of Louwsburg, where a portion of uPhongolo LM has been incorporated into AbaQulusi LM. This change can be reviewed under Figure A 4.1a on the proceeding page.

The district is predominantly rural with commercial farmland interspersed by protected areas, towns, and dense to scattered rural settlements within traditional authority areas. The majority of these rural settlements are small, making service delivery to these remote areas extremely costly. Settlements are located as follows:

**Table A 4.1: Settlement location**

| Settlement Location | Nr of Settlements |
|---|---|
| Urban Towns | 27 |
| Communal Property | 27 |
| Land Reform Areas | 75 |
| State-owned | 26 |
| Tribal Areas | 857 |
| Private Land | 257 |
| **TOTAL** | **1 269** |

A revised update of settlements has been done to update settlement boundaries and include new land reform areas as settlements. Household clusters on private farms have also been identified, and will be addressed based on ZDM's policy regarding rural residents on privately owned farm lands. A map showing the existing settlements against the revised settlement database can be reviewed under Figure A4.1b. The major changes and updates can be seen in AbaQulusi and eDumbe LM's, with minor updates and additions in the uPhongolo LM. The new settlement areas are included as part of this 5-year review of the WSDP.

A comparison table showing the new revised settlement types can be reviewed in Table A4.1b below.

**Table A 4.2: Settlement Types**

| Class | Settlement Type | Nr of Settlements | Total households |
|---|---|---|---|
| URBAN | Urban - Formal Town | 4 | 6 425 |
| | Urban - For hip | 5 | 14 675 |
| | Urban - Ex Town | 13 | 10 233 |
| | Urban - Working Town | 6 | 1 335 |
| | Urban - Service Centre | 8 | 1 549 |
| | Urban - Squatter Camp | 1 | 115 |
| RURAL | Urban Fringe - Informal Settlement | 19 | 8 906 |
| | Peri-Urban - Squatter Camp | 1 | 284 |
| | Rural - Formal Dense >5000 | 2 | 3 046 |
| | Rural - Formal Dense <5000 | 35 | 10 310 |
| | Rural - Scattered Dense | 5 | 2 612 |
| | Rural - Scattered Medium Density | 5 | 223 |
| | Rural - Scattered Low Density | 59 | 10 732 |
| | Rural - Scattered Very Low Density | 1 106 | 107 422 |
| | Rural - Scattered households | N/A | 5 775 |
| | **TOTAL** | **1 269** | **183 642** |

The following provides details of the areas within ZDM defined under urban:

| LM | CLASSIFICATION | Z-NR | AREA |
|---|---|---|---|
| AbaQulusi | Urban - Formal Town | Town9 | Louwsburg |
| | | Town27a | Vryheid Town |
| | Urban - Former Township | Town27b | Bhekuzulu |
| | | Town16a | Emondlo town |
| | | Town27c | Lakeside |
| | Urban - Service Centre | ZNew180 | Kandaspunt |
| | | Z846 | Mountain view |
| | | ZPM12 | Rietvlei |
| | Urban - Squatter Camp | ZMAP122 | Vryheid Dump Site |
| | Urban - Working Town | ZHC5 | Boomlaer |
| | | Z932 | Coronation |
| | | Z934 | Enyathi |
| | | Z938 | Hlobane |
| | | ZHC4 | Thutukani |
| | | ZHC8 | Vaalbank |
| eDumbe | Urban - Ex Homeland Town | Z937 | Frischgewaagd |
| | Urban - Formal Town | Town8a | Paulpietersburg Town |
| | Urban - Former Township | Town8b | Edumbe Township |
| | Urban - Service Centre | Z928 | Luneburg |
| Nongoma | Urban - Ex Homeland Town | Town22 | Nongoma Town |
| | | ZMAP26 | White City |
| Ulundi | Urban - Ex Homeland Town | Z741 | Kwazondela |
| | | Z931 | Mahlabathini |
| | | Town18-A | Ulundi Unit A |
| | | Town18-B | Ulundi Unit B |
| | | Town18 | Ulundi Unit B1 |
| | | Town18-BA | Ulundi Unit BA |
| | | Town18-C | Ulundi Unit C |
| | | Town18-D | Ulundi Unit D |
| | | Town18-L | Ulundi Unit L |
| | Urban - Service Centre | Z940 | Babanango |
| uPhongolo | Urban - Ex Homeland Town | Z459 | Belgrade |
| | Urban - Formal Town | Town15a | Pongola Town |
| | Urban - Former Township | Town15b | Ncotshane Township |
| | Urban - Service Centre | ZMAP124 | Golela Border Post |
| | | Z936 | Magudu |
| | | Town15c | Pongola Town (Sugar Refinery) |

Land use in the ZDM is linked primarily to tenure and the land with the highest agricultural potential is in private ownership and is mostly used for commercial farming or conservation, with low settlement densities. Private farmlands constitute a large portion of the ZDM's land area. The land use potential varies throughout the district, but are predominantly varieties of grassveld and thornveld. Agricultural activities are mainly forestry (eDumbe, Abaqulusi and around Babanango), sugar cane (uPhongolo), livestock (throughout the district), maize, soya beans, wheat, groundnuts, sorghum, vegetables and sub-tropical fruit. These commercial farms mostly have well developed infrastructure and farming systems. The difficulties they experience relate more to broader economic factors than spatial factors and linkages in the ZDM. In recent years, a number of cattle farms throughout the ZDM have been converted into game farms. These may be linked to tourism and conservation in the district.

In contrast, the non-arable land and land with severe limitations to agriculture, fall into the traditional authority areas and are densely settled. These Ingonyama Trust areas support settlement and subsistence agriculture (there is moderate to restricted agricultural potential), with the Traditional Authorities (TAs) for each LM being divided as follows:

- eDumbe LM: Dlamini TA and Mtetwa TA.
- uPhongolo LM: Masidla TA, Msibi TA, Ntshangase TA and Simelane TA.
- Abaqulusi LM: Hlahlindhlela TA and Kambi TA.
- Nongoma LM: Mandhlakazi TA, Matheni TA and Usuthu TA.
- Ulundi LM: Empetempithini TA, Mbata TA, Mpungose TA, Ndebele TA, Nobamba TA, Ximba TA and Zungu TA.

A map showing land distribution can be reviewed under Figure A4.1c. Tribal Authority areas, Land Reform Areas, privately owned farms and urban areas can be seen.

**Figure A 4.1: Locality map of Zululand District Municipality.**

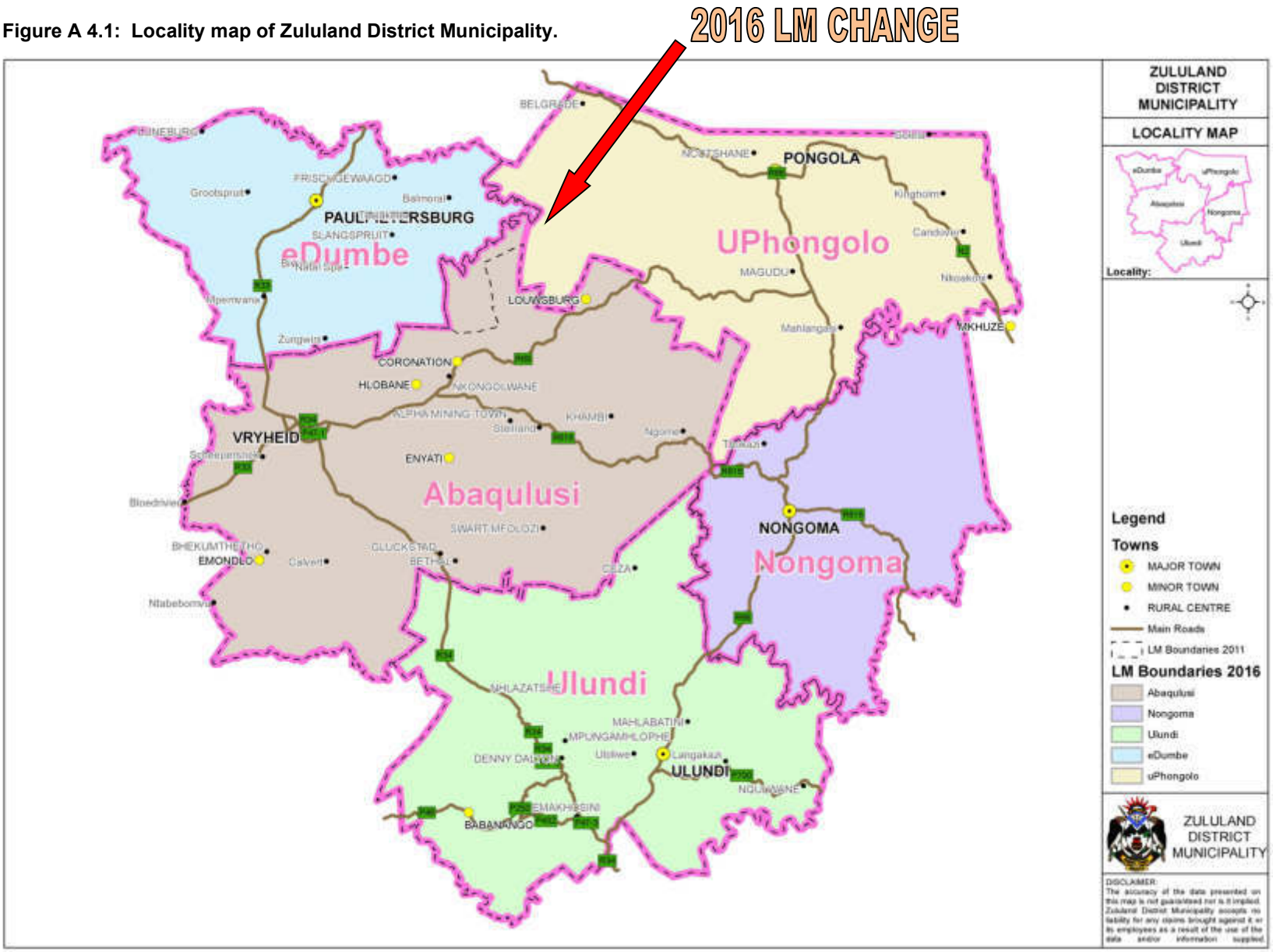


**Figure A 4.2: Demographics of Zululand District Municipality.**

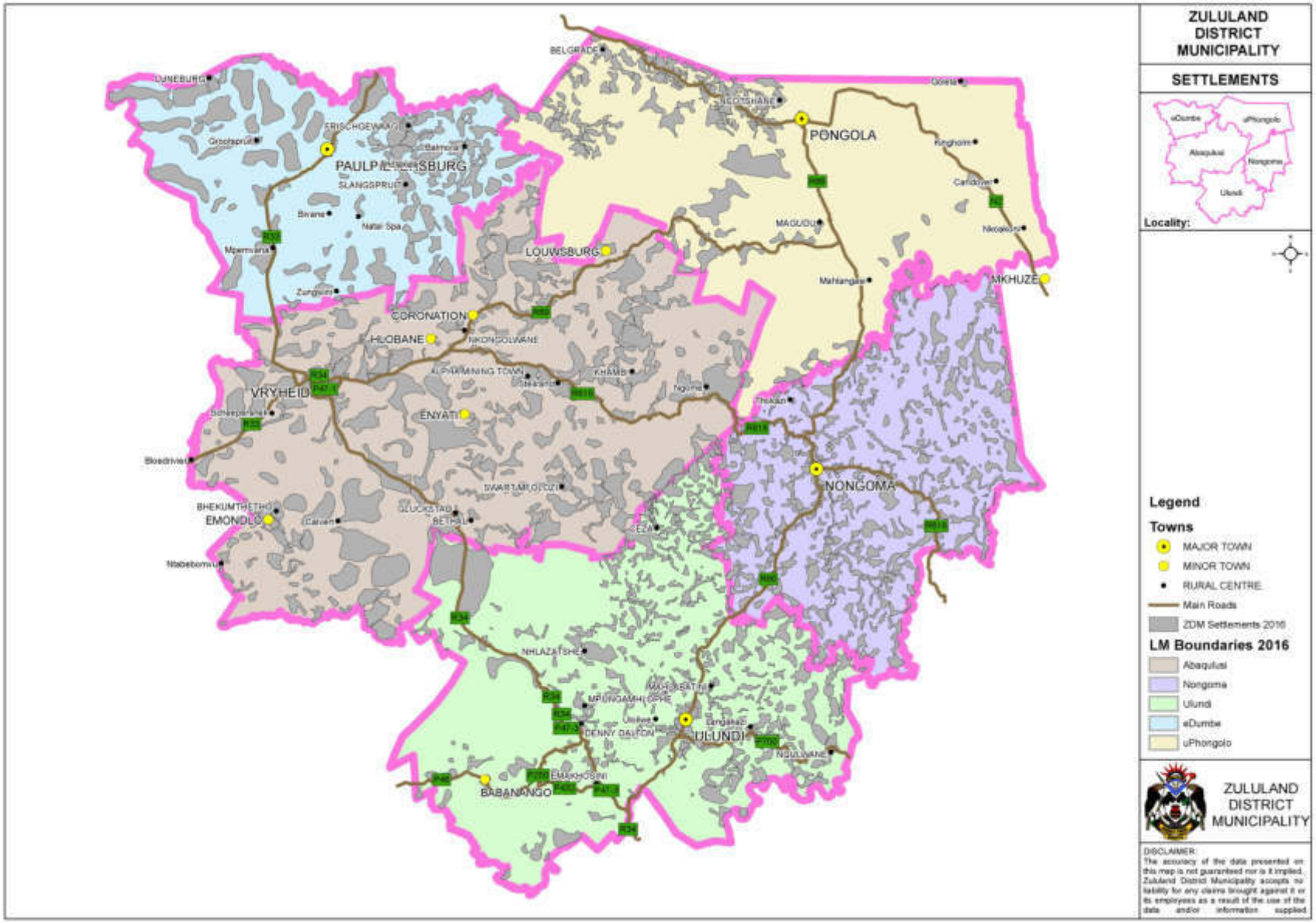
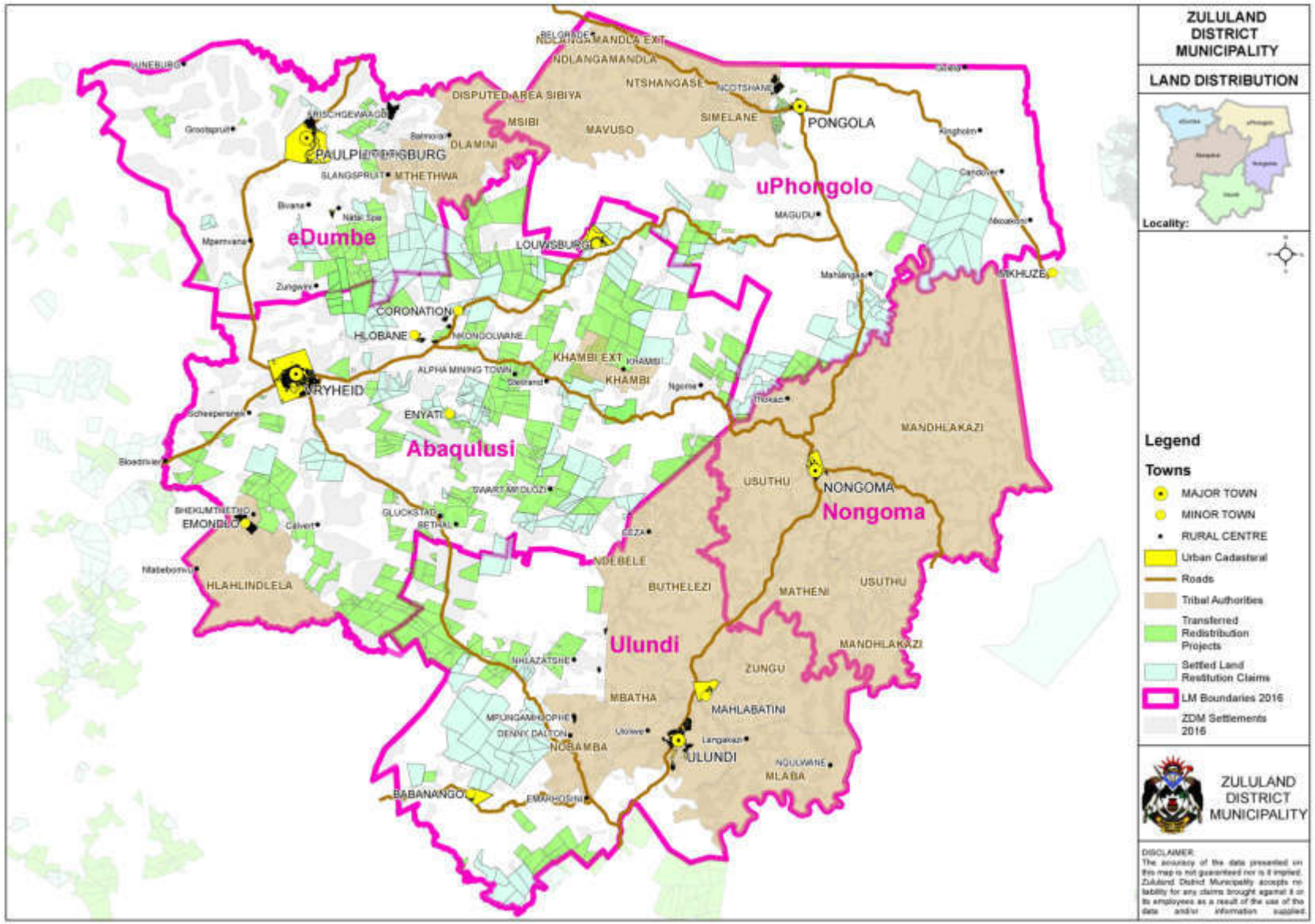


**Figure A 4.3: Land distribution in Zululand District Municipality.**



The area forms part of the Pongola, Mkuze and Mfolozi River Catchments of the Usuthu/Mhlathuze Water Management Area that extends from the high lying areas in the north and west to the Indian Ocean in the east. The northern and western edges of the ZDM are characterised by steep terrain. The Skurweberg and Elandsberg Mountains on the Western side of the ZDM are approximately 1,700 m above sea level. In the northeast there are the Lebombo Mountains. In general the topography slopes and gets less steep from west to east, as well as from north to south, consequently all the main rivers flow in this direction. There are some large relatively flat areas between 200 m and 300 m around the town of Pongola, as well as on the lower reaches of the Mfolozi River (Figure A4.2).

Climatic conditions vary significantly from the northern highlands to the eastern low-lying areas around the town of Pongola. Rainfall is strongly seasonal with more than 80% occurring as thunderstorms between October and March, with the peak months being December to February in the inland areas. Rainfall varies from over 1,000 mm in the north and west, dropping to below 600 mm in the central area around Pongola. The resultant Mean Annual Runoff (MAR) ranges from above 200 mm in the north and west, to below 100 mm in the central areas. Overall the Mean Annual Precipitation (MAP) is 840 mm, and the corresponding MAR 102 mm (12 % of MAP) (Figure A4.3). Annual variability of rainfall is indicated by the historic coefficient of variation of the rainfall record, which ranges from (20 % to 25 %) in the west to greater than 35 % in the Pongola area. In accordance with the rainfall pattern the relative humidity is higher in summer than in winter. Potential mean annual gross evaporation ranges from 1400mm in the west to 1600 mm in the lowveld. The highest mean monthly evaporation is in December and the lowest mean monthly evaporation in June. One strategic dam, namely Pongolapoort/Jozini, has been developed. There is a vast amount of water in the area with both surface resources, as well as good ground water potential.

| **Topography type** | **Percentage of total municipal area** |
|---|---|
| Mountainous | 30% |
| Rolling | 70% |
| Flat | 0% |
| Coastal | 0% |

**Figure A 4.4: Terrain map of Zululand District Municipality.**

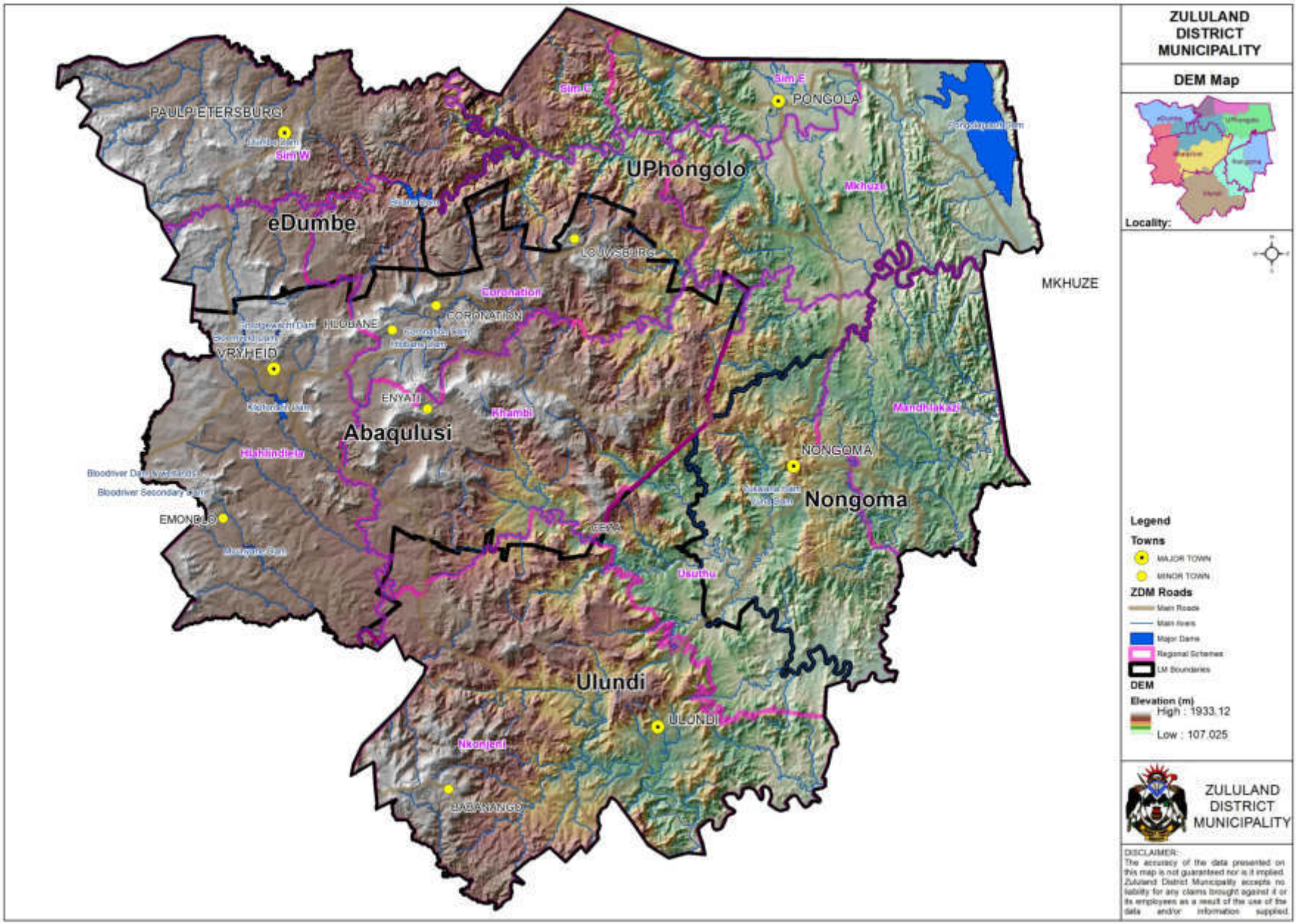
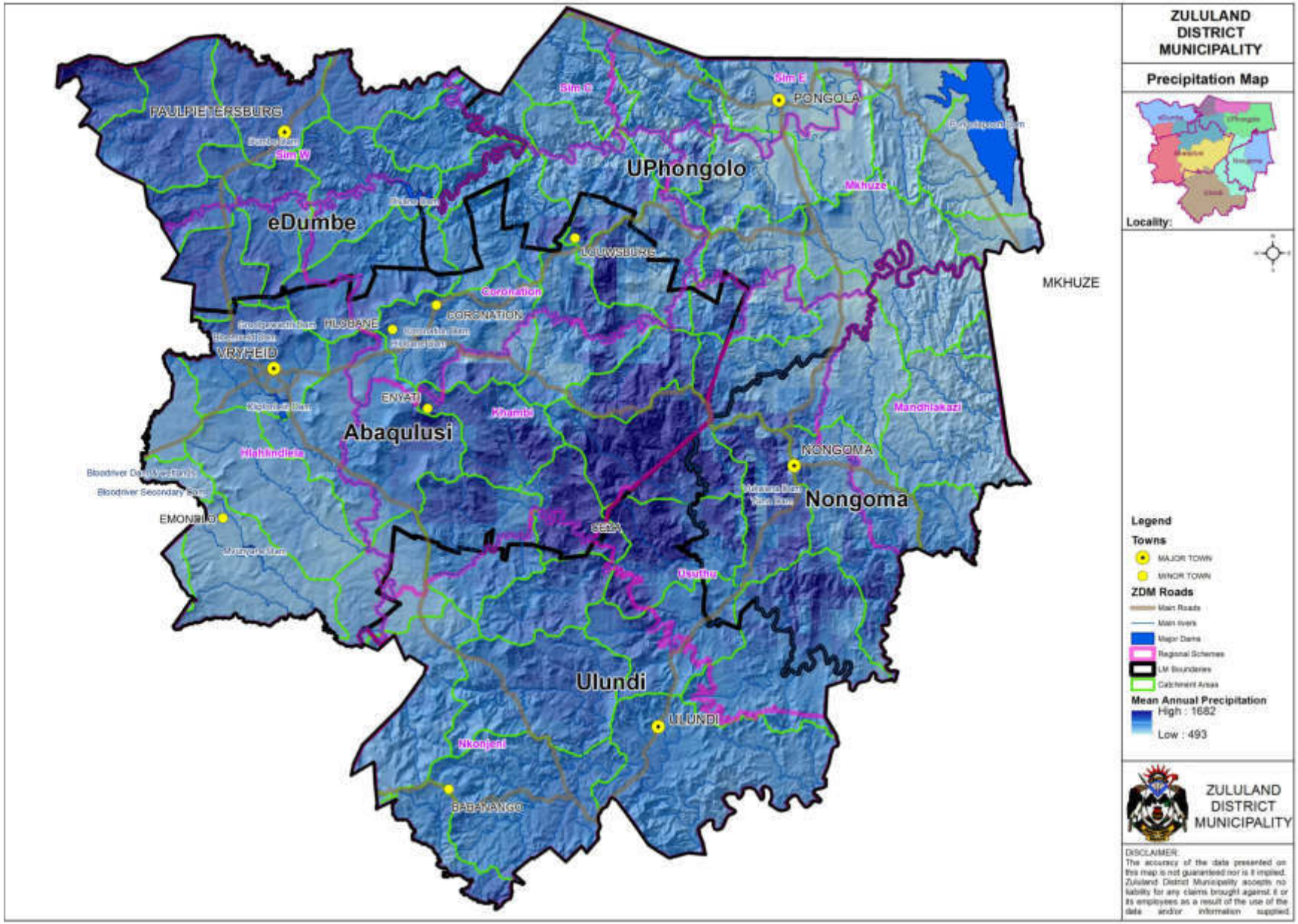


**Figure A 4.5: Precipitation map of Zululand District Municipality.**



# A.5 Backlogs

Tables A.2 (a) & (b) below indicate the status in ZDM with regards to water services backlogs in the district. Baclogs, progress and funding allocations are to be finalised during the final review of the WSDP in May.

**Table A.5.1: Access to water (households)**

| Water | None or Inadequate | Rudimentary <RDP | Communal standpipes RDP | Yard/House connections >RDP | TOTALS |
|---|---|---|---|---|---|
| AbaQulusi LM | 0 | 0 | 0 | 16 000 | 16 000 |
| eDumbe LM | 0 | 0 | 0 | 5 458 | 5 458 |
| Nongoma LM | 0 | 0 | 0 | 632 | 632 |
| Ulundi LM | 0 | 0 | 0 | 5 912 | 5 912 |
| uPhongolo LM | 0 | 0 | 0 | 4 009 | 4 009 |
| **Total (urban)** | **0** | **0** | **0** | **32 011** | **32 011** |
| AbaQulusi LM | 6 768 | 3 886 | 10401 | 9 749 | 31 119 |
| eDumbe LM | 2 775 | 726 | 1628 | 6 940 | 12 183 |
| Nongoma LM | 6 547 | 10 626 | 10 969 | 15 601 | 43 744 |
| Ulundi LM | 3 143 | 2 256 | 14 333 | 19 208 | 39 075 |
| uPhongolo LM | 1 307 | 1111 | 2570 | 16 478 | 25 510 |
| **Total (rural)** | **20 540** | **18 605** | **39 901** | **67 976** | **151 631** |
| **Total (households)** | **20 540** | **18 605** | **39 901** | **99 987** | **183 642** |

The following figure depicts the estimated time it will take to eradicate all water backlogs below RDP standard if current MIG funding allocations remains constant. RBIG and WSIG funding allocations fluctuate based on approved funding applications, and future projections have not been included in this review. These funding allocations will however be added as funding is confirmed.

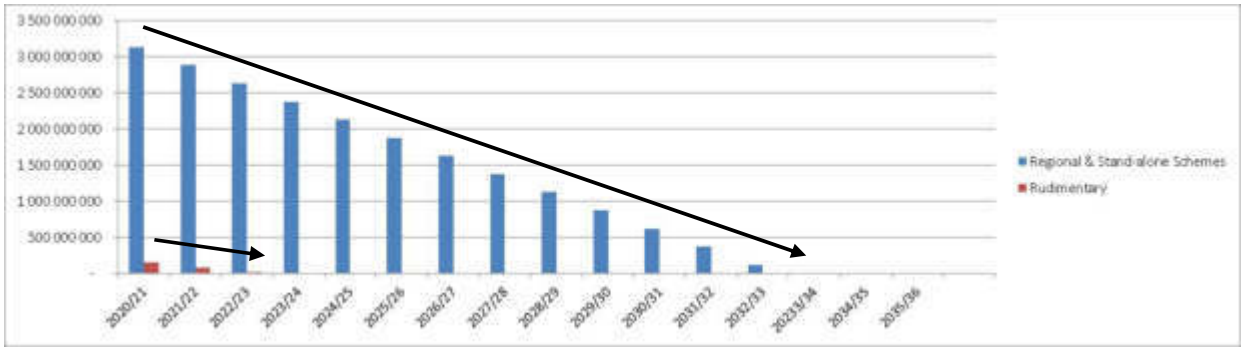



**Figure A 5.1: Water Backlog eradication (2035 goals)**

**Table A.5.2: Access to sanitation**

| | None or Inadequate (Excl. Infills/Replacemen | VIP | Septic tank | Waterborne | |
|---|---|---|---|---|---|
| | | RDP | RDP | >RDP | TOTALS |
| AbaQulusi LM | 0 | 0 | 1035 | 14 965 | 16 000 |
| eDumbe LM | 0 | 2981 | 498 | 1 979 | 5 458 |
| Nongoma LM | 0 | 283 | 0 | 349 | 632 |
| Ulundi LM | 0 | 635 | 0 | 5 277 | 5 912 |
| uPhongolo LM | 0 | 698 | 0 | 3 311 | 4 009 |
| **Total (urban)** | **-** | **4 597** | **1 533** | **25 881** | **32 011** |
| AbaQulusi LM | 8 098 | 22 597 | 424 | 0 | 31 119 |
| eDumbe LM | 1 288 | 10 629 | 266 | 0 | 12 183 |
| Nongoma LM | 9 854 | 33 890 | 0 | 0 | 43 744 |
| Ulundi LM | 2 123 | 36 900 | 52 | 0 | 39 075 |
| uPhongolo LM | 7 223 | 17 951 | 336 | 0 | 25 510 |
| **Total (rural)** | **28 586** | **121 967** | **1 078** | **0** | **151 631** |
| | | | | | |
| **Total (households)** | **28 586** | **126 564** | **2 611** | **25 881** | **183 642** |

The following figure depicts the estimated time it will take to eradicate all sanitation backlogs below RDP standard if current MIG funding allocations remains constant.

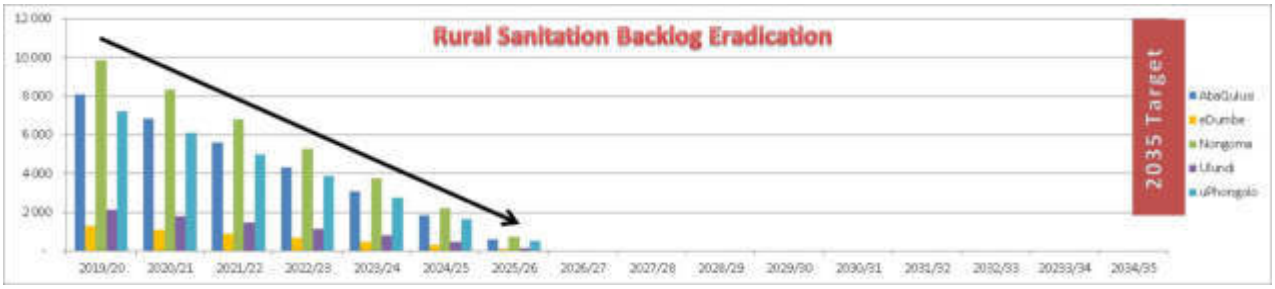



**Figure A 5.2: Sanitation Backlog eradication (2035 goals)**

With the 2035 goals in mind, the backlogs in rural sanitation should be eradicated by 2026. However, settlements are continuously expanding, and household growth will maintain an increase in the future.

**Table A.5.3: Percentage backlogs (water & sanitation)**

| WATER | TOTAL HOUSEHOLDS | BACKLOGS | % BACKLOGS | % OF TOTAL BACKLOGS |
|---|---|---|---|---|
| AbaQulusi LM | 47 119 | 10 654 | 22,61% | 27,22% |
| eDumbe LM | 17 641 | 3 501 | 19,85% | 8,94% |
| Nongoma LM | 44 376 | 17 173 | 38,70% | 43,87% |
| Ulundi LM | 44 987 | 5 399 | 12,00% | 13,79% |
| uPhongolo LM | 29 519 | 2 418 | 8,19% | 6,18% |
| **Total** | **183 642** | **39 145** | **21,32%** | **100,00%** |
| | | | | |
| **SANITATION** | **TOTAL HOUSEHOLDS** | **BACKLOGS** | **% BACKLOGS in LM** | **% OF TOTAL BACKLOGS** |
| AbaQulusi LM | 47 119 | 8 098 | 17,19% | 28,33% |
| eDumbe LM | 17 641 | 1 288 | 7,30% | 4,51% |
| Nongoma LM | 44 376 | 9 854 | 22,21% | 34,47% |
| Ulundi LM | 44 987 | 2 123 | 4,72% | 7,43% |
| uPhongolo LM | 29 519 | 7 223 | 24,47% | 25,27% |
| **Total** | **183 642** | **28 586** | **15,57%** | **100,00%** |

**Table A.5.4: Existing backlogs against funding allocations**

| YEAR | BACKLOGS (Households) | | ALLOCATIONS | | Household count |
|---|---|---|---|---|---|
| | Water | Sanitation | Water | Sanitation | |
| 2013-2014 | 56 559 | 56 757 | R 288 499 750 | R 65 386 250 | 2010 household count |
| 2014-2015 | 50 653 | 46 027 | R 300 616 500 | R 55 405 500 | |
| 2015-2016 | 47 934 | 37 650 | R 440 019 250 | R 55 339 750 | |
| 2016-2017 | 45 545 | 31 071 | R 281 021 250 | R 61 973 750 | |
| 2017-2018 | 57 358 | 38 007 | R 172 855 075 | R 45 120 650 | 2013 Households |
| 2018-2019 | 50 882 | 34 973 | R 456 344 175 | R 51 310 825 | |
| 2019-2020 | 42 711 | 30 586 | 383 328 220 | 51 310 825 | **2016 Households** |
| **2020-2021** | **39 145** | **28 586** | **394 165 250** | **59 721 750** | |

| YEAR | BACKLOGS REMAINING (%) | |
|---|---|---|
| | Water | Sanitation |
| 2017-2018 | 31.31 | 20.75 |
| 2018-2019 | 27.78 | 19.09 |
| 2019-2020 | 23.26 | 16.66 |
| **2020-2021** | **21.32** | **15.57** |

**PLEASE NOTE THAT BACKLOGS ARE ESTIMATES BASED ON PROJECTED COMPLETION DATES OF PROJECTS AT THE END OF JUNE, AND MAY VARY ON FINAL FINANCIAL YEAR END.**

**ACTUAL FIGURES WILL BE UPDATED AFTER FINANCIAL YEAR END**.

# A.6 Summary of content

The key information contained in the WSDP is listed below for ease of reference. More detail can be obtained by referring to the respective chapters in the document:

## Chapter 1: Socio Economic Profile

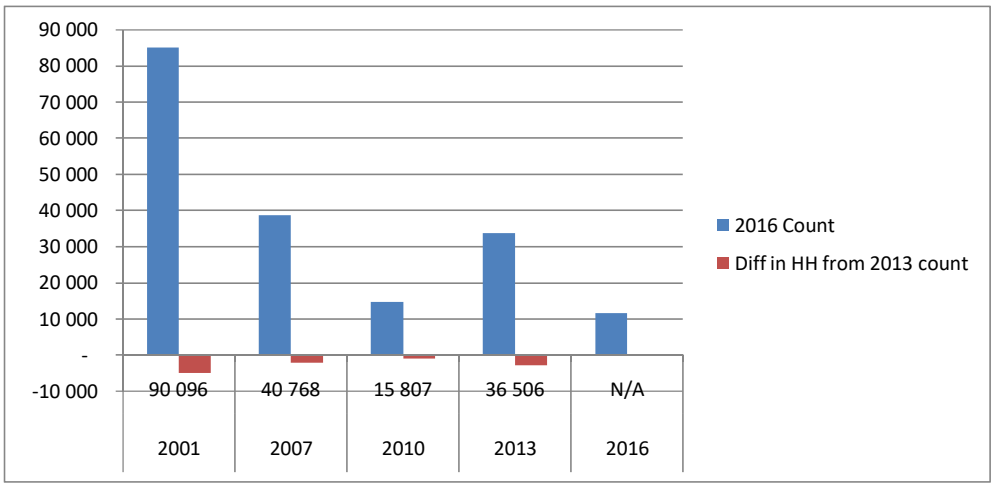
The current consumer profile of the district reflect an updated household count which was done by ZDM from aerial photography taken in 2016 by National Geo-spatial Information (NGI). A total of **182 585 households** and **1 057 farm houses** were captured, bringing the total dwellings in ZDM to **183 642.** Although this is only 465 households more than what the total household count was for 2013, there were many household ruins in the rural areas where dwellings were either abandoned or people have relocated. A comparison between the various households counts since 2001 is shown in the table below. This indicates the reduction in households over the past 17 years.

**Table A 6.1: Household Count Analysis Table (2001-2016)**

| YEAR FLOWN | 2013 Count | 2016 Count | Diff in HH from 2013 count |
|---|---|---|---|
| 2001 | 90 096 | 85 091 | -5 005 |
| 2007 | 40 768 | 38 607 | -2 161 |
| 2010 | 15 807 | 14 717 | -1 090 |
| 2013 | 36 506 | 33 666 | -2 840 |
| 2016 | N/A | 11 561 | - |
| **Overall increase in HH from 2013 count** | | | **465** |

The above table can be reviewed in graph format in the following chart.

**Figure A.6.1: Household Count Analysis Graph (2001-2016)**



From a spatial perspective, the following map indicates the number of households per square kilometer for 2016 compared with the number of households from 2013. The yellow and light green areas shows a strong decline in dwellings, whereas blue indicates a strong increase in households.

**Figure A.6.2: Dwelling Growth Pattern per Square Kilometer (2013-2016)**


Growth trends per local municipality can be summarised as follows:

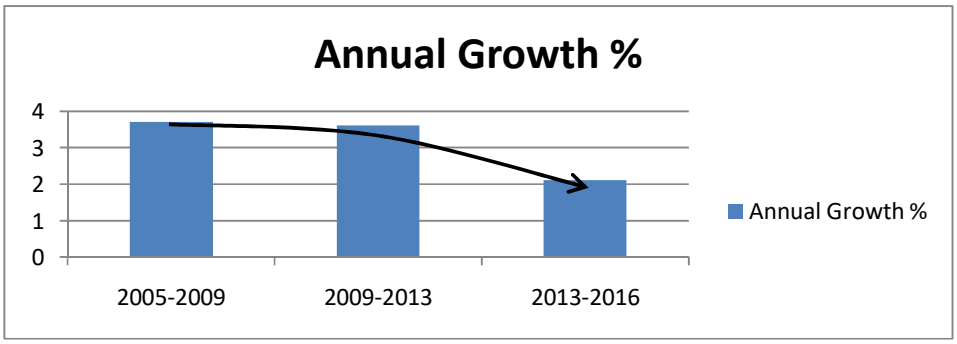
- **AbaQulusi**
  High growth in the surrounding eMondlo town areas as well as in Nkongolwane. There is a substantial growth in the Kwa Shoba & Tinta's Drift areas, with a high decrease in rural households surrounding Vryheid town.
- **eDumbe**
  Strong positive growth in eDumbe, Frischgewaagd & Bilanyoni.
- **uPhongolo**
  High growth in Ncotshane as well as settlements all along the N2 going west towards Belgrade.
- **Nongoma**
  Positive growth along the Nongoma/Hlabisa road, with an overall slight negative growth in most of the rural areas.

- **Ulundi**

  Positive growth surrounding Ulundi town areas, with an overall slight negative growth in most of the rural areas between Ulundi and Nongoma.

When the new household count of 11 561 from 2013 to 2016 is considered, it represents an increase in the number of households of 6.31% over 3 years. An **annual average household growth of 2.1%** is therefore evident over the period from 2013 to 2016, which is less than the 3.6% increase from the period 2009-2013. The period from 2005/2006 to 2009 shows an average annual household growth of 3.7%. There is therefore a slight decreasing trend in the household growth over the past 10 years in ZDM.

**Figure A.6.3: Household Count Analysis Graph (2001-2016)**




Due to the spatial analysis requirements for water and sanitation provision at household level, ZDM uses its own household data set which contains actual household positions as opposed to numerical values provided by STATSSA per enumeration area. Households and defined by and projects are implement per local settlement areas as defined by the ward councillors, and these settlements areas don't always coincide with the enumeration area boundaries of STATSSA. It is therefore impossible to correlate the enumeration areas with settlement areas and derive household statistics between the two data sets.

STATSSA has released the interim 2016 Community Survey statistics per local municipality, and the estimated number of households for the 2016 community survey is slightly higher than the spatial household count for ZDM. A comparison table between the 2011 census data and the 2016 community survey details can be seen in Table A.6.2 below.

**Table A.6.2: STATSSA 2016 Community Survey**

| | HOUSEHOLDS | | POPULATION | | Ave Households Size | |
|---|---|---|---|---|---|---|
| **Local Municipality** | **2011** | **2016** | **2011** | **2016** | **2011** | **2016** |
| AbaQulusi | 43 299 | 51 472 | 224 998 | 241 196 | 4.90 | 4.70 |
| eDumbe | 16 138 | 17 415 | 85 022 | 89 614 | 5.10 | 5.10 |
| Nongoma | 34 341 | 36 409 | 200 948 | 211 892 | 5.70 | 5.80 |
| Ulundi | 35 198 | 38 553 | 264 765 | 205 762 | 5.40 | 5.30 |
| uPongolo | 28 772 | 34 667 | 153 727 | 143 845 | 4.40 | 4.10 |
| **Total** | **157 748** | **178 516** | **929 461** | **892 310** | **5.10** | **5.00** |

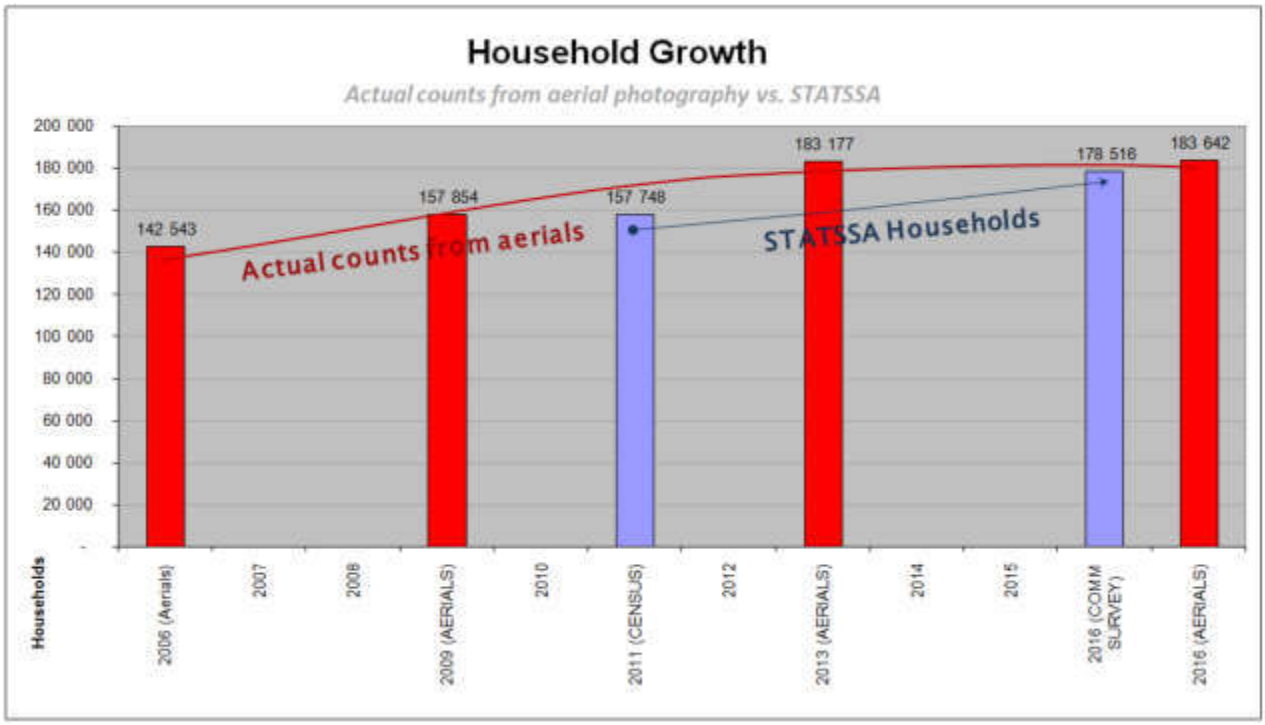
For population analysis, the 2011 Census figures will however be applied to the ZDM household count as per local municipality. A comparison table can be reviewed under Table A.6.3. below, showing household growth and population figures per local municipality.

**Table A.6.3: ZDM and STATSSA Census 2011 household growth analysis (2005 - 2017)**

| | Actual Household Statistics (Captured from aerial photography over 4 consequtive periods) vs CENSUS Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Local Municipality** | **2006** | **2009 (AERIALS)** | **2010** | **2011 (CENSUS)** | **2012** | **2013 (AERIALS)** | **2014** | **2015** | **2016 (COMM SURVEY)** | **2016 (AERIALS)** | **Annual household growth rate** | **Average Population per household** | **Total Population (ZDM)** |
| AbaQulusi | 36 069 | 40 302 | | | | 45 918 | | | | 47 119 | 0.9% | 4.90 | 230 883 |
| eDumbe | 15 011 | 16 880 | | | | 16 671 | | | | 17 641 | 1.9% | 5.10 | 89 969 |
| Nongoma | 34 056 | 38 171 | | | | 45 670 | | | | 44 376 | -0.9% | 4.40 | 195 254 |
| Ulundi | 35 309 | 37 365 | | | | 46 450 | | | | 44 987 | -1.1% | 5.70 | 256 426 |
| uPongolo | 22 098 | 25 136 | | | | 28 468 | | | | 29 519 | 1.2% | 5.40 | 159 403 |
| **Total** | **142 543** | **157 854** | | **157 748** | | **183 177** | | | **178 516** | **183 642** | **0.41%** | **5.10** | **931 935** |

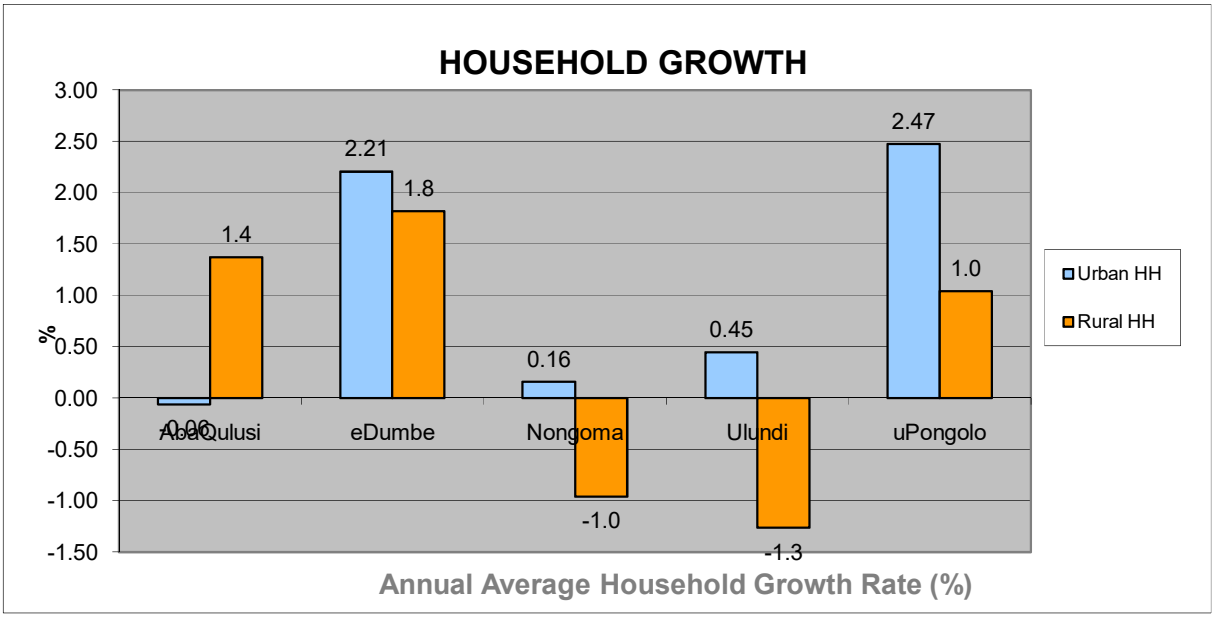
**To summarise the above outcomes, the current household count for ZDM taken from the 2016 household count, is 183 642, with a total population count of 931 935 when STATSSA population per household is applied.**

**Figure A.6.4: ZDM household growth analysis (2005 - 2017)**



In the following graph the household growth per local municipality can be compared between urban and rural growth over the past 3 years. eDumbe and uPhongolo shows the highest urban growth. Rural growth is negative in Ulundi and Nongoma, with a slight positive growth in AbaQulusi, eDumbe and uPhongolo.

**Figure A.6.5: Annual Urban and Rural Household Growth per Local Municipality**




*Data derived from 2013 and 2016 Aerial Photography (NGI)*

In Table A.3(d) the domestic dwellings and farm houses per local municipality can be reviewed. Industrial and business properties were only captured in urban areas since it is not always possible to distinguish businesses and commercial buildings in rural areas from aerial photography.

**Table A.6.3: Current consumer profile (units)**

| LOCAL MUNICIPALITIES | DOMESTIC | INDUSTRIAL / BUSINESSES | FARM HOUSES | TOTAL |
|---|---|---|---|---|
| AbaQulusi | 16 031 | 1 947 | - | 17 978 |
| eDumbe | 5 119 | 336 | - | 5 455 |
| Nongoma | 629 | 483 | - | 1 112 |
| Ulundi | 5 834 | 638 | - | 6 472 |
| uPhongolo | 3 732 | 576 | - | 4 308 |
| **Total (urban)** | **31 345** | **3 980** | **-** | **35 325** |
| AbaQulusi | 29 463 | - | 424 | 29 887 |
| eDumbe | 11 286 | - | 266 | 11 552 |
| Nongoma | 45 041 | - | - | 45 041 |
| Ulundi | 40 564 | - | 52 | 40 616 |
| uPhongolo | 24 400 | - | 336 | 24 736 |
| **Total (rural)** | **150 754** | **-** | **1 078** | **151 832** |
| **Total** | **182 099** | **3 980** | **1 078** | **187 157** |

## Chapter 2: Service Level & Associated Services Profile

The current levels of access to water services in the district are indicated below:

**Table A.6.4: Residential consumers: access to water**

| Water | None or Inadequate | Rudimentary <RDP | Communal standpipes RDP | Yard/House connections >RDP | TOTALS |
|---|---|---|---|---|---|
| AbaQulusi LM | 0 | 0 | 0 | 16 000 | 16 000 |
| eDumbe LM | 0 | 0 | 0 | 5 458 | 5 458 |
| Nongoma LM | 0 | 0 | 0 | 632 | 632 |
| Ulundi LM | 0 | 0 | 0 | 5 912 | 5 912 |
| uPhongolo LM | 0 | 0 | 0 | 4 009 | 4 009 |
| **Total (urban)** | **0** | **0** | **0** | **32 011** | **32 011** |
| AbaQulusi LM | 6 768 | 3 886 | 10401 | 9 749 | 31 119 |
| eDumbe LM | 2 775 | 726 | 1628 | 6 940 | 12 183 |
| Nongoma LM | 6 547 | 10 626 | 10 969 | 15 601 | 43 744 |
| Ulundi LM | 3 143 | 2 256 | 14 333 | 19 208 | 39 075 |
| uPhongolo LM | 1 307 | 1111 | 2570 | 16 478 | 25 510 |
| **Total (rural)** | **20 540** | **18 605** | **39 901** | **67 976** | **151 631** |
| **Total (households)** | **20 540** | **18 605** | **39 901** | **99 987** | **183 642** |

**Table A.6.5: Residential consumers: access to sanitation**

| WATER | TOTAL HOUSEHOLDS | BACKLOGS | % BACKLOGS | % OF TOTAL BACKLOGS |
|---|---|---|---|---|
| AbaQulusi LM | 47 119 | 10 654 | 22,61% | 27,22% |
| eDumbe LM | 17 641 | 3 501 | 19,85% | 8,94% |
| Nongoma LM | 44 376 | 17 173 | 38,70% | 43,87% |
| Ulundi LM | 44 987 | 5 399 | 12,00% | 13,79% |
| uPhongolo LM | 29 519 | 2 418 | 8,19% | 6,18% |
| **Total** | **183 642** | **39 145** | **21,32%** | **100,00%** |

| SANITATION | TOTAL HOUSEHOLDS | BACKLOGS | % BACKLOGS in LM | % OF TOTAL BACKLOGS |
|---|---|---|---|---|
| AbaQulusi LM | 47 119 | 8 098 | 17,19% | 28,33% |
| eDumbe LM | 17 641 | 1 288 | 7,30% | 4,51% |
| Nongoma LM | 44 376 | 9 854 | 22,21% | 34,47% |
| Ulundi LM | 44 987 | 2 123 | 4,72% | 7,43% |
| uPhongolo LM | 29 519 | 7 223 | 24,47% | 25,27% |
| **Total** | **183 642** | **28 586** | **15,57%** | **100,00%** |

**Table A.6.6: Backlog Figures**

| YEAR | BACKLOGS (Households) | | ALLOCATIONS | | Household count |
|---|---|---|---|---|---|
| | Water | Sanitation | Water | Sanitation | |
| 2013-2014 | 56 559 | 56 757 | R 288 499 750 | R 65 386 250 | 2010 household count |
| 2014-2015 | 50 653 | 46 027 | R 300 616 500 | R 55 405 500 | |
| 2015-2016 | 47 934 | 37 650 | R 440 019 250 | R 55 339 750 | |
| 2016-2017 | 45 545 | 31 071 | R 281 021 250 | R 61 973 750 | |
| 2017-2018 | 57 358 | 38 007 | R 172 855 075 | R 45 120 650 | 2013 Households |
| 2018-2019 | 50 882 | 34 973 | R 456 344 175 | R 51 310 825 | |
| 2019-2020 | 42 711 | 30 586 | 383 328 220 | 51 310 825 | **2016 Households** |
| **2020-2021** | **39 145** | **28 586** | **394 165 250** | **59 721 750** | |

**Table A.6.7: Backlog Eradication Progress**

| YEAR | BACKLOGS REMAINING (%) | |
|---|---|---|
| | Water | Sanitation |
| 2017-2018 | 31.31 | 20.75 |
| 2018-2019 | 27.78 | 19.09 |
| 2019-2020 | 23.26 | 16.66 |
| **2020-2021** | **21.32** | **15.57** |

**Table A.6.8: Public institutions and 'dry' industries: access to water**

| Institution | No off | WATER | | |
|---|---|---|---|---|
| | | None or inadequate | Communal standpipe | Yard connection |
| Businesses | 3 980 | | | |
| Clinics | 68 | 5 | 48 | |
| Creches | 7 | 2 | | |
| "Dry" Industries | | | | |
| Hospitals | 13 | | | 13 |
| Magistrate offices | 7 | | | 7 |
| Police Stations | 15 | 4 | | 11 |
| Prisons | 3 | | | 3 |
| Schools | 789 | 360 | 329 | 100 |
| Community Halls | 39 | 27 | | 12 |
| **Total** | **4 921** | **398** | **377** | **1 124** |

**Table A.6.9: Public institutions and 'dry' industries: access to sanitation**

| Institution | No off | SANITATION | | |
|---|---|---|---|---|
| | | None or inadequate | Dry pit / Septic tanks | Waterborne |
| Businesses | 3 980 | | | |
| Clinics | 68 | | 1 | |
| Creches | 7 | 2 | | |
| "Dry" Industries | | | | |
| Hospitals | 13 | | | 13 |
| Magistrate offices | 7 | | | 7 |
| Police Stations | 15 | 4 | | 11 |
| Prisons | 3 | | | 3 |
| Schools | 789 | 24 | 637 | 128 |
| Community Halls | 39 | 27 | | 12 |
| **Total** | **4 921** | **57** | **638** | **4 226** |

## Chapter 3: Water Resource Profile

The ZDM falls within the Mfolozi (W2), Mkuze (W3) and Pongola (W4) secondary catchments of the Usuthu/Mhlathuze Water Management Area (WMA)[1]. The aerial extent of the ZDM occupies approximately 22% of this WMA. . The total available water and requirements as at year 2000, based on a 98% assurance

[1] *The Usuthu/Mhlathuze WMA is one of 19 areas defined across South Africa in terms of the National Water Act, 1998 (Act 36 of 1998). These WMAs have been defined to improve water resource management within South Africa. With time, each of the WMAs will establish a catchment management agency (CMA) for the regulation and control of water use in the WMA.*

of supply within these sub-areas, is summarised in Table A.3 (d). It is evident that apart from the Pongola catchments, water from these sub-areas is currently over-utilised and a deficit is created. However, according to Basson and Rossouw[2], this deficit is a result of the provision made for future implementation of the Reserve. The Reserve is a legislated requirement of the amount of water required to satisfy the ecological needs of a river system (provisionally estimated at 20%) as well as the basic human needs (that have been established as 25 litres per person per day).

**Table A.6.6: Water balance - summary of the water available and required within Zululand District Municipality for the year 2000 (Million $m^3$ (kℓ) per annum).**

| | | | Mfolozi | Mkuze | Pongola | Total |
|---|---|---|---|---|---|---|
| Available water | Natural resource | surface water | 36 | 15 | 616 | 667 |
| | | groundwater | 5 | 12 | 8 | 25 |
| | Usable return flow | Irrigation | 5 | 6 | 21 | 32 |
| | | Urban | 4 | 0 | 0 | 4 |
| | | Mining & bulk | 1 | 0 | 0 | 1 |
| | Total local yield* | | **51** | **33** | **645** | **729** |
| | Transfers in | | 0 | 30 | 0 | 30 |
| | **Total available** | | **51** | **63** | **645** | **759** |
| Water requirements | Consumer groups | Irrigation | 51 | 61 | 213 | 325 |
| | | Urban** | 12 | 1 | 1 | 14 |
| | | Rural** | 11 | 10 | 6 | 27 |
| | | Mining & bulk industrial*** | 4 | 0 | 1 | 5 |
| | | Afforestation**** | 2 | 6 | 34 | 42 |
| | Total local requirements | | **80** | **78** | **255** | **413** |
| | Transfers out | | 18 | 0 | 30 | **48** |
| | **Total used** | | **98** | **78** | **285** | **461** |
| **Balance** | | | **-47** | **-15** | **360** | **298** |

*Source: Basson and Rossouw (2003).*
**Includes allowance for impacts of the ecological component of the Reserve, river losses, alien vegetation, rain-fed agriculture and urban run-off on yield.*
***Includes allowance for basic human needs component of the Reserve (25 ℓ/c/d).*
****Mining and bulk industrial water uses that are not part of the urban system.*

*****Afforestation quantities refer to the impact on yield only.*

[2] *Op cit 2 at 23.*

## CHAPTER 4: Operation & Maintenance

Operation and Maintenance management is split up as follows:

- **Bulk Water and Wastewater Management:**
  The core function for Water Services Provision Bulk is to ensure that water and wastewater infrastructure is managed properly in order to produce a cost effective and SANS 241 acquiescent quality of water. It is also to Operate and Maintain the Bulk Infrastructure in order to minimize down time).
- **Rural and Urban Reticulation:**
  The main function of the "Urban and Rural Reticulation Section" division is to operate and maintain the water and sanitation networks in both urban and rural areas within the Local Municipalities.

Of critical importance is the funding of Operations and Maintenance of existing and future schemes as they are being commissioned. Correct O&M of physical infrastructure is arguably more important than infrastructure construction because unless successful preventative maintenance procedures are instituted schemes will become inoperative. As a large proportion of expenditure relates to staff, competent personnel are required to ensure that the large investments in water services are not negated through dysfunction or dereliction.

This section looks at existing infrastructure which have reached its end of lifespan, and whether refurbishment, O&M or replacement is necessary for sustainable service delivery. This is applicable for water and sanitation components such as WTW's or Pump Stations, but also for scheme networks where infrastructure has deteriorated or reached the end of its lifespan. It furthermore entails O&M for all borehole and spring protection services where O&M plays a significant role.

Other factors influencing proper O&M include Staff capacity, external resources, equipment and budget requirements.

Table A.6.7 below shows the operational costs associated with the provision of water services in the district against the total income. At present a significant deficit exists for O&M, and ZDM is addressing these issues through various means.

**Table A.6.7: Operational costs and income**

| Operating costs and income | Total 5yr projected | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 |
|---|---|---|---|---|---|---|
| Operational costs | R 2 584 611 744 | R 431 009 527 | R 470 231 394 | R 513 022 451 | R 559 707 494 | R 610 640 876 |
| Personnel costs | R 915 267 755 | R 152 629 935 | R 166 519 259 | R 181 672 512 | R 198 204 710 | R 216 241 339 |
| **Total O&M costs** | **R 3 499 879 499** | **R 583 639 462** | **R 636 750 654** | **R 694 694 963** | **R 757 912 205** | **R 826 882 215** |
| Equitable share: FBS | R 2 328 387 910 | R 388 281 673 | R 423 615 306 | R 462 164 298 | R 504 221 250 | R 550 105 383 |
| Income: sales (actual payment) | R 133 386 724 | R 22 243 553 | R 24 267 717 | R 26 476 079 | R 28 885 402 | R 31 513 974 |
| **Total income** | **R 2 461 774 634** | **R 410 525 227** | **R 447 883 022** | **R 488 640 377** | **R 533 106 652** | **R 581 619 357** |
| **Deficit/surplus** | **R -1 038 104 865** | **R -173 114 236** | **R -188 867 631** | **R -206 054 586** | **R -224 805 553** | **R -245 262 859** |

KPI's include maintaining proper O&M on relevant assets, as well as keeping staff and budget requirements in place.

## Chapter 5: Water Conservation/ Demand Management

ZDM has embarked on an extensive Unaccounted for Water programme (UAW), aimed at understanding the usage of water in the district and to provide guidance to future demand management and waterloss interventions. Specific interventions will be launched at individual schemes to address water losses through:

- Pressure management
- Leak repair programmes
- Meter repair & replacement programmes
- Internal plumbing leaks
- Consumer end-use demand management initiatives

The water demand strategy will focus on a number of ways to ensure the reduction of water demand by consumers, for example:

- Influencing the behaviour of consumers
    - School and public educational and awareness programmes aimed at promoting effective usage of water (brochures, advertising, newsletters, demonstrations, exhibits, informative billing, etc)
    - Water services tariff that promotes efficient water usage
    - Any other “win-win” initiatives that could influence consumers positively
- Specific targeted projects like;
    - Repair plumbing leaks inside properties
    - Installation of water flow control devices, etc.

## Chapter 6: Water and Sanitation Services Infrastructure Profile

ZDM has done extensive work on the development of a database that will serve as an asset register, but also to be used as the basis for the development of an asset management system and to capture asset related information electronically for ongoing use. The system has been named ‘MANZI’ and access can be gained on the ZDM website at www.zululand.org.za once the user has been issued with a username and password.
Table A.3 (h) below provides a brief overview of the schemes in the district that have been captured on the MANZI system and a summary of the infrastructure under consideration, as well as a rough estimate of the value of assets. These figures will be refined over time once the asset management system has been rolled out.

**Table A.6.7: Summary of schemes in the district**

| Summary Data | LOS | Total |
|---|---|---|
| Number of Schemes | Above RDP - Urban | 13 |
| | Above RDP - Rural | 25 |
| | RDP | 105 |
| | Rudimentary | 173 |
| | **TOTAL SCHEMES** | **316** |

Table A.3 (i) below shows examples of infrastructure data that is currently available on the GIS system and MANZI. Some gaps still exist in the infrastructure information, ZDM has been systematically updating its infrastructure details and eliminating data gaps where possible within its capability and resources. This process involves both feature as well as attribute data, and will support the asset management system initiative of ZDM which is currently in development

**Table A.6.8: Summary of infrastructure components available the ZDM GIS**

| Summary Data | Description | Total |
|---|---|---|
| **Pipelines** | Bulk | 1 264 km |
| | Reticulation | 6 144 km |
| **Installations** | Yard Connection | 27 831 |
| | StandPipe - Barrel | 305 |
| | StandPipe - Communal | 5 792 |
| | Electrical Point | 72 |
| | Valve | 14 837 |
| | Meter | 1 274 |
| | Bulk Metering Points | 253 |
| | Handpump | 486 |
| | Pump | 25 |
| | Pump Station | 119 |
| | Source / Abstraction | 521 |
| | Break-pressure Tank | 499 |
| | Storage - Jojo | 228 |
| | Storage - Reservoir | 748 |
| | Treatment (Sand filters etc) | 12 |
| | Water Treatment Works | 39 |
| **Replacement Value** | Civil | R 2 187 465 532,77 |
| | Mechanical | R 638 857 590,23 |
| | Electrical | R 252 906 251,28 |
| | Telemetry | R 13 480 747,91 |

## Chapter 7: Water Balance

A first order water balance is presented in Chapter 7 from available data at the time.

## Chapter 8: Water Services Institutional Arrangements

The ZDM Section 78 investigation process was completed in 2007 and the conclusion was that a single Water Services Provider for the entire district (internal department within ZDM) is the preferred water services provision arrangement for the future and that this be implemented progressively. Certain specialised functions were also listed that should rather be contracted out to private business, although still being part of the overall WSP structure. These are services that require skilled personnel that are expensive and difficult to source and that are more cost effective to contract in rather than source in-house, for example electrical/mechanical artisans, certain maintenance functions, etc. The detailed outcome of the Section 78 investigation process is captured in Chapter 7 herewith.

## Chapter 9: Customer Services Profile

The provision of high quality water services to consumers involves good water quality and the reliability of water services. This chapter covers interventions implemented or planned by ZDM to address the above mentioned issues. A customer care charter is being drafted that will be the “contract” with the consumer and will also list the consumer’s responsibilities in this regard. Work has been done on the drafting of a customer care strategy and the following key focus areas have been identified:

- To know your customers (complete customer database)
- To develop proper mechanisms for effective two way communication with customers
- To provide affordable, high quality services that are accessible to all
- To empower your consumers through education
- To develop a customer focused organisation
- To develop a customer charter and honour the agreement with the customer
- To accelerate the implementation of appropriate service provision structures

## Chapter 10: Financial Profile

This chapter deals with two financial issues related to water services infrastructure, namely:

- New capital projects
- Operations and maintenance (O&M) of existing infrastructure

The details are contained in Chapter 9 but can be summarised in the tables below:

**Table A.6.9: Capital requirements: water**

| WATER | Capital requirements | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 |
|---|---|---|---|---|---|---|---|
| Regional bulk | R 2 204 249 853 | | | R - | R 294 572 595 | R 313 011 521 | R 1 596 665 737 |
| Secondary bulk | R 1 036 030 068 | | | R - | R 33 478 526 | R 35 896 523 | R 966 655 019 |
| Reticulation | R 361 760 667 | | | R - | R 11 452 635 | R 14 758 965 | R 335 549 067 |
| **Total capital (new)** | **R 3 602 040 588** | **R -** | **R -** | **R -** | **R 339 503 756** | **R 363 667 009** | **R 2 898 869 823** |
| Regional bulk (WTW) | R 599 570 000 | | | | | | |
| Secondary bulk | TBA | | | | | | |
| Reticulation | TBA | | | | | | |
| **Total capital (refurbishment)** | **R 599 570 000** | | | **R -** | | | |
| **Total capital** | **R 4 201 610 588** | **R -** | **R -** | **R -** | **R 339 503 756** | **R 363 667 009** | **R 2 898 869 823** |

**Table A.6.10: Capital requirements: sanitation**

| SANITATION | Capital requirements | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 |
|---|---|---|---|---|---|---|---|
| Bulk infrastructure | R - | | | | | | |
| Reticulation | R - | | | | | | |
| VIP toilets | R 385 911 000 | | | | 59 721 750 | 59 721 750 | 59 721 750 |
| **Total capital (new)** | **R 385 911 000** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |
| Bulk infrastructure (WWTW) | 322 510 000 | | | | - | - | - |
| Reticulation | TBA | | | | - | - | - |
| VIP toilets (Replacement Prgrm) | 551 988 000 | | | | - | - | - |
| **Total capital (refurbishment)** | **R 874 498 000** | **R -** | | **R -** | **R -** | **R -** | **R -** |
| **Total capital** | **R 1 260 409 000** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |

**Table A.6.11: Sources of Capital Income: Water**

| WATER | Expected Funding | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 (Est.) | 2022/2023 (Est.) |
|---|---|---|---|---|---|---|---|
| MIG | R 537 495 750,00 | | | | R 179 165 250,00 | R 179 165 250,00 | R 179 165 250,00 |
| DWA (RBIG) | R 300 000 000,00 | | | | R 100 000 000,00 | R 100 000 000,00 | R 100 000 000,00 |
| Housing | | | | | | | |
| WSIG | R 345 000 000,00 | | | | R 115 000 000,00 | R 115 000 000,00 | R 115 000 000,00 |
| Loans | | | | | | | |
| **TOTAL** | **R 1 182 495 750** | **R -** | **R -** | **R -** | **R 394 165 250** | **R 394 165 250** | **R 394 165 250** |
| Capital requirements | R 4 201 610 588 | | | | | | |
| **Shortfall up to 2022** | **R -3 019 114 838** | | | | | | |

**Table A.6.12: Sources of Capital Income: Sanitation**

| SANITATION | Expected Funding | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 (Est.) | 2022/2023 (Est.) |
|---|---|---|---|---|---|---|---|
| MIG | R 179 165 250,00 | | | | R 59 721 750,00 | R 59 721 750,00 | R 59 721 750,00 |
| DWA | | | | | | | |
| Housing | R - | | | | R - | R - | R - |
| Other grant funding | | | | | | | |
| Loans | | | | | | | |
| **TOTAL** | **R 179 165 250** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |
| Capital requirements | R 1 260 409 000 | | | | | | |
| **Shortfall up to 2022** | **R -1 081 243 750** | | | | | | |

**Table A.6.13: Operational costs and income**

| Operating costs and income | Total 5yr projected | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 |
|---|---|---|---|---|---|---|
| Operational costs | R 2 584 611 744 | R 431 009 527 | R 470 231 394 | R 513 022 451 | R 559 707 494 | R 610 640 876 |
| Personnel costs | R 915 267 755 | R 152 629 935 | R 166 519 259 | R 181 672 512 | R 198 204 710 | R 216 241 339 |
| **Total O&M costs** | **R 3 499 879 499** | **R 583 639 462** | **R 636 750 654** | **R 694 694 963** | **R 757 912 205** | **R 826 882 215** |
| Equitable share: FBS | R 2 328 387 910 | R 388 281 673 | R 423 615 306 | R 462 164 298 | R 504 221 250 | R 550 105 383 |
| Income: sales (actual payment) | R 133 386 724 | R 22 243 553 | R 24 267 717 | R 26 476 079 | R 28 885 402 | R 31 513 974 |
| **Total income** | **R 2 461 774 634** | **R 410 525 227** | **R 447 883 022** | **R 488 640 377** | **R 533 106 652** | **R 581 619 357** |
| **Deficit/surplus** | **R -1 038 104 865** | **R -173 114 236** | **R -188 867 631** | **R -206 054 586** | **R -224 805 553** | **R -245 262 859** |

## Chapter 11: List of Projects

The ZDM Water Master Plan comprises of ten back-to-back regional water schemes. The detailed project list included under Chapter 10 herewith lists sub-projects or phases associated with each regional scheme according to the approved progressive roll-out of the scheme.

The WSDP further allows for intermediate stand-alone schemes for areas falling within the regional scheme context which will take a long time to be implemented due to costly bulks. These intermediate stand-alone schemes are designed with a sustainable intermediate source which will all be integrated into the regional scheme once the regional scheme bulks reaches the area.

For remote communities where no bulk services are feasible or possible, a rudimentary water level of service is implemented in the form of boreholes with handpumps, or spring protections. In some areas a small reticulation scheme with RDP level of services will be constructed where possible.

Sanitation is being rolled out progressively based on prioritised zones or clusters to make implementation more cost-effective and practical. There is also a future sanitation rollout planned to replace the old Archloo, Zinc and block-type VIP's.

The water and sanitation projects to be implemented over the next 5 years and beyond are listed in detail in Chapter 10 of the document. Rollout maps can be reviewed under Figure A 5.1 - 5.5, and include the following rollouts:

- Regional Water Supply Schemes
- Intermediate Stand-alone Water Supply Schemes
- Rudimentary Water Supply
- Rural Sanitation
    - New infrastructure
    - Future Rural Sanitation Replacement Programme

**Figure A.6.6: Regional Water Supply Schemes**

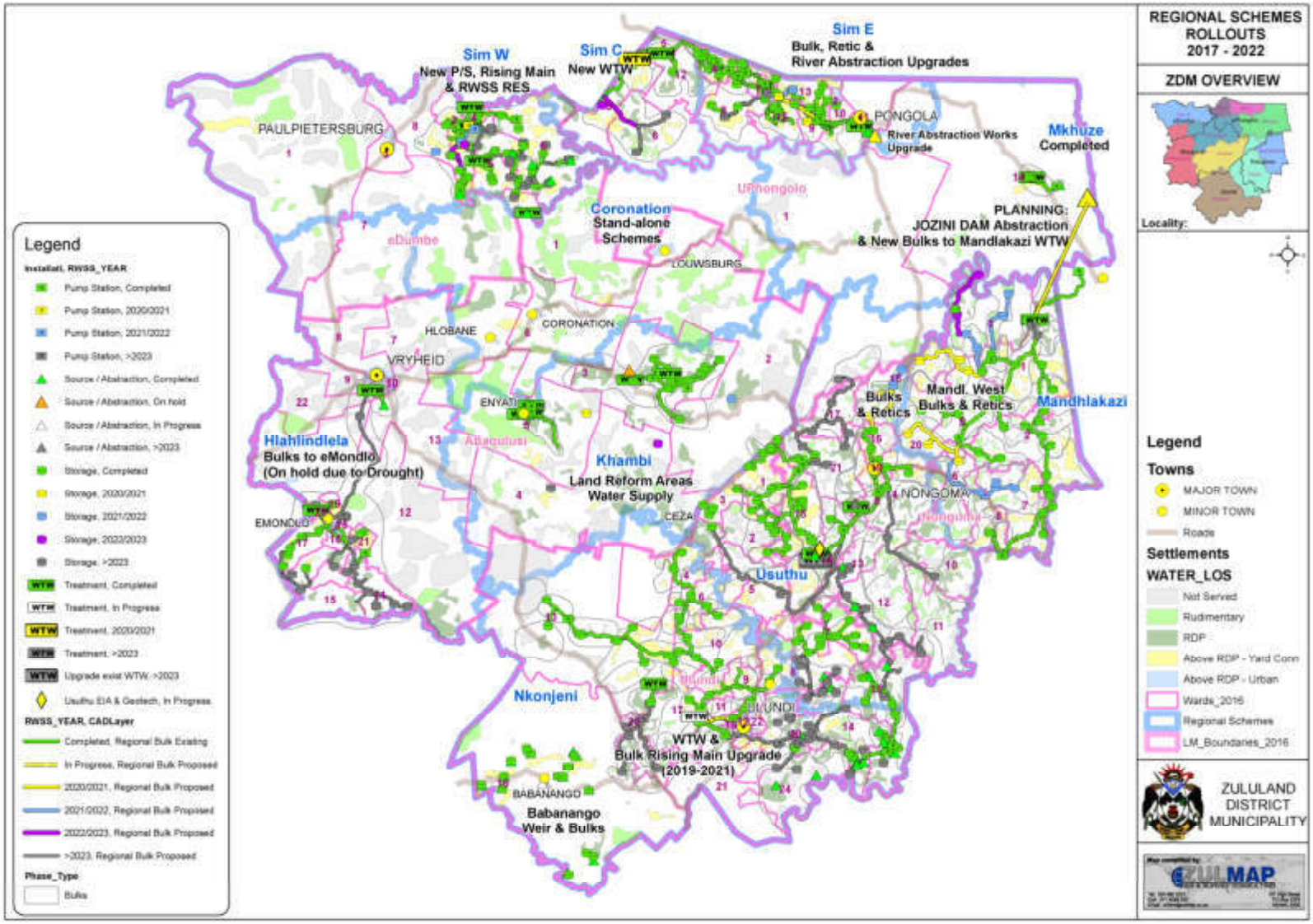


**Figure A.6.7: Intermediate Stand-alone Water Supply Schemes**

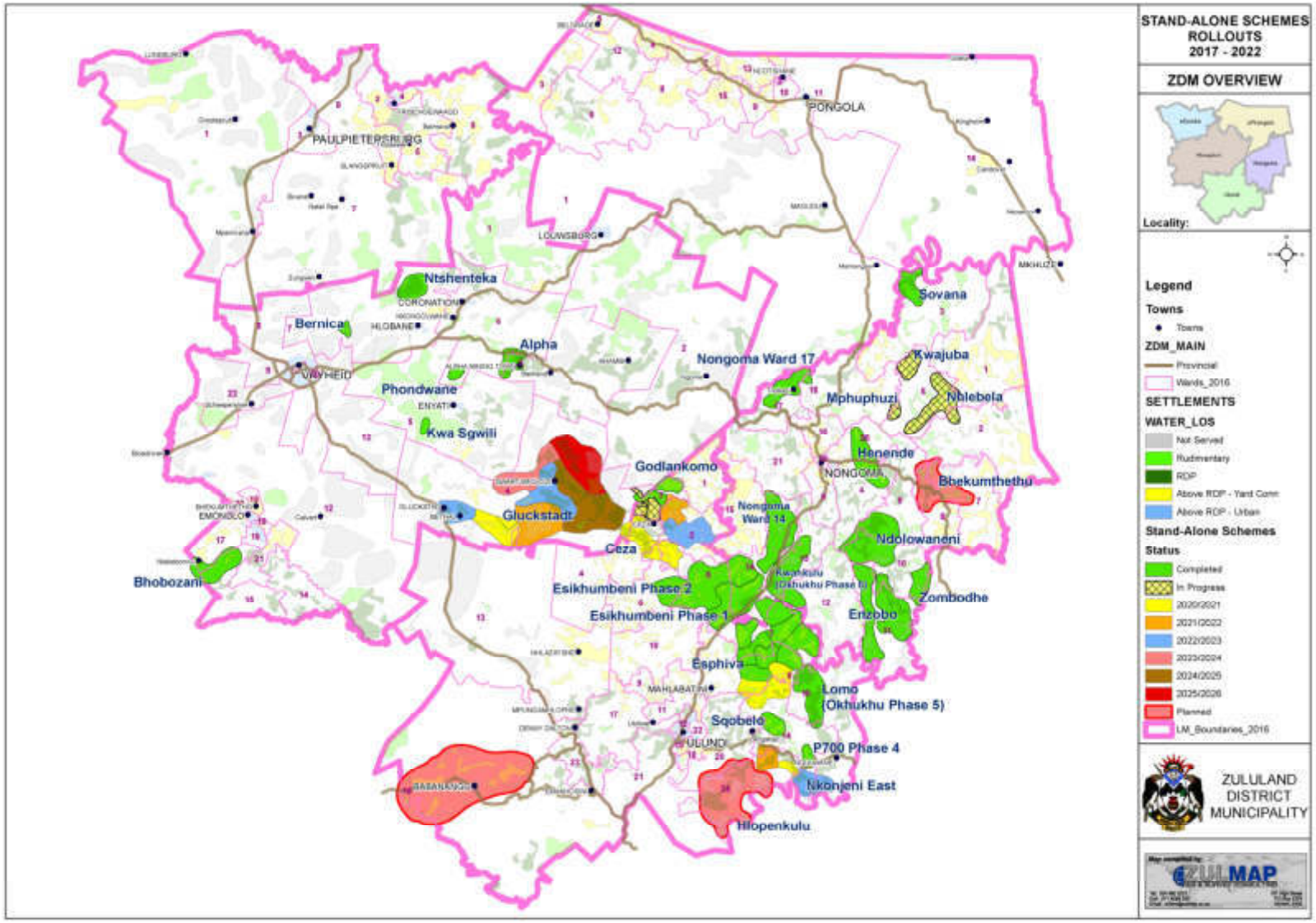


**Figure A.6.8: Rudimentary Water Supply**

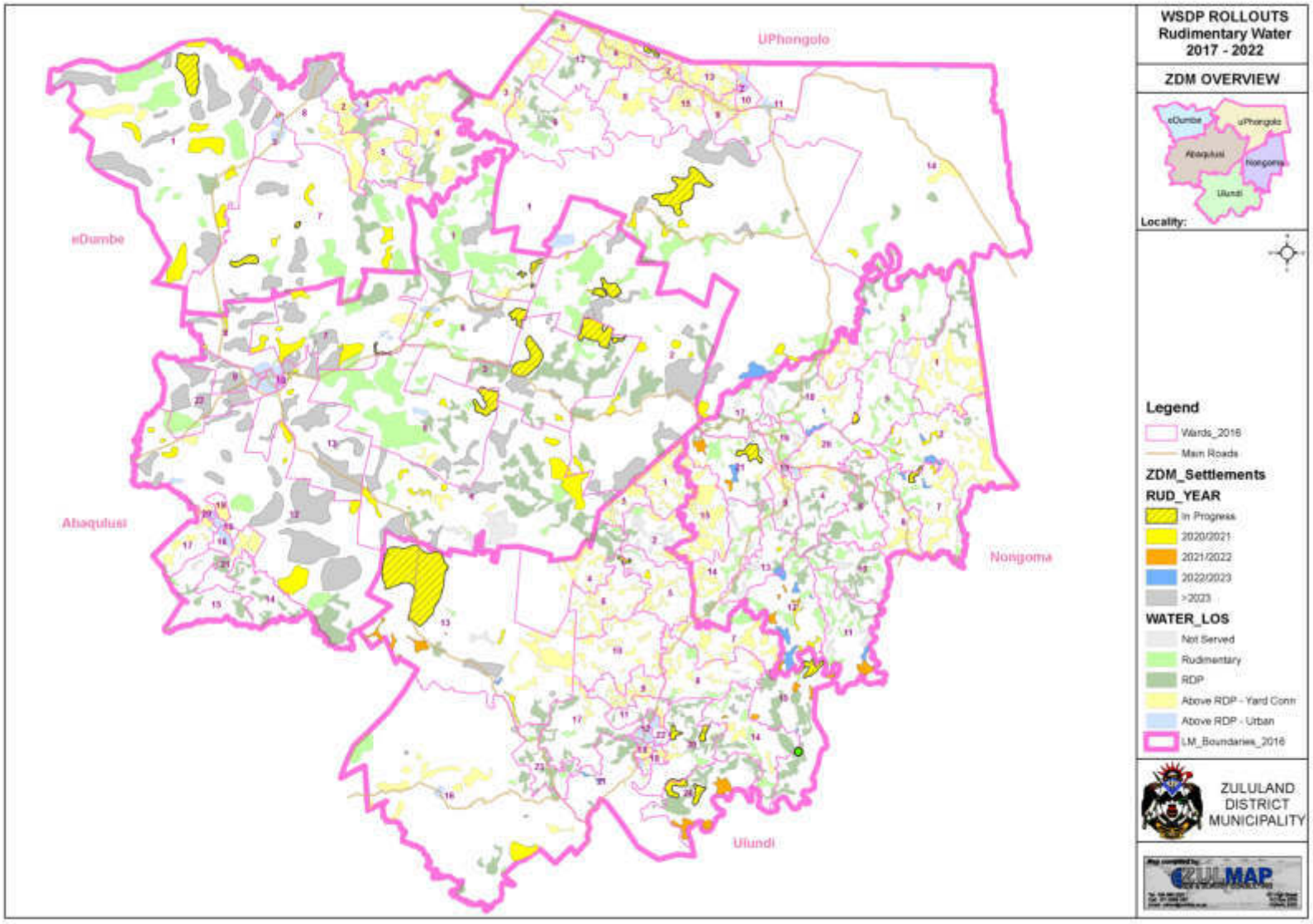


**Figure A.6.9: Rural Sanitation (New infrastructure)**

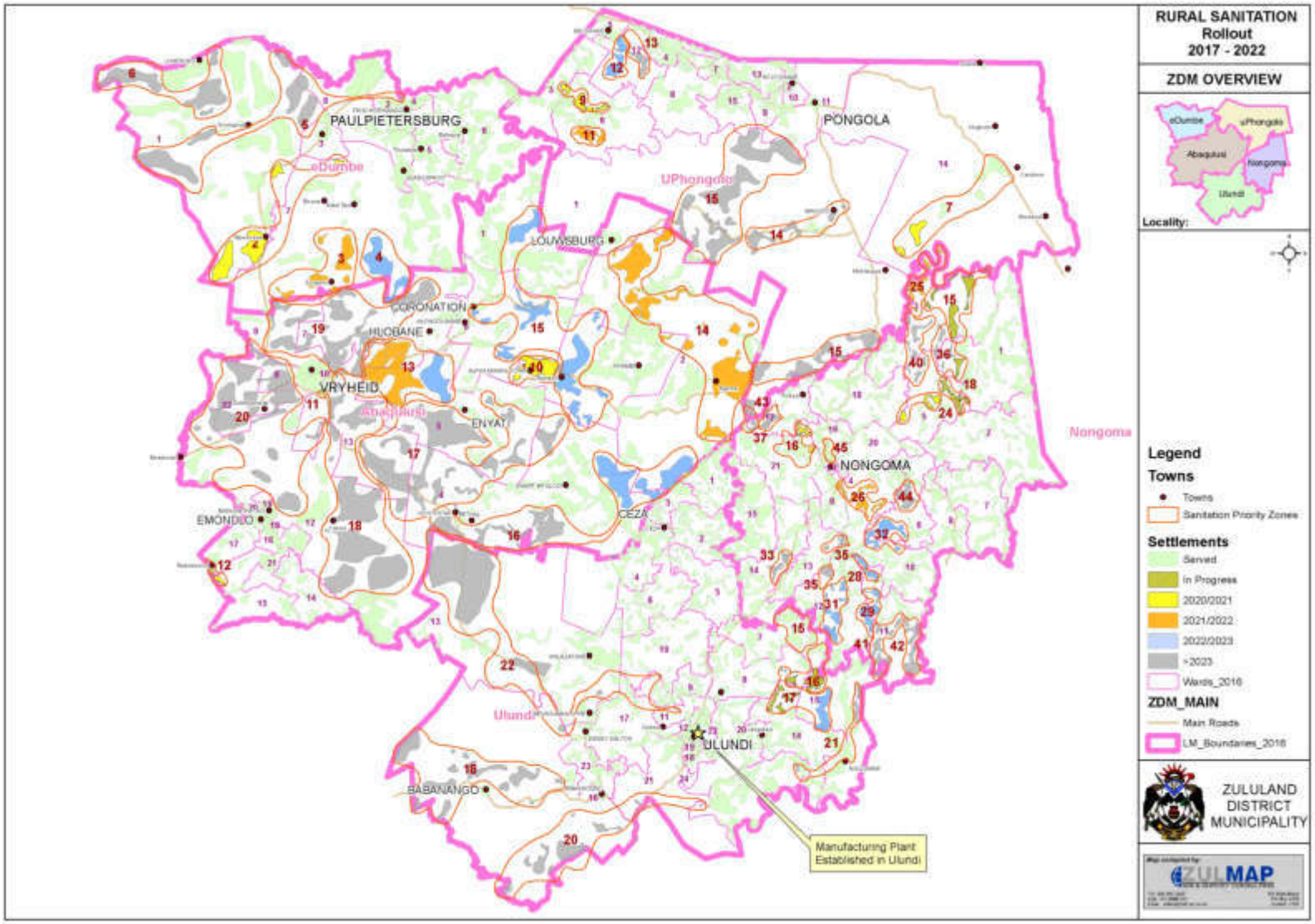
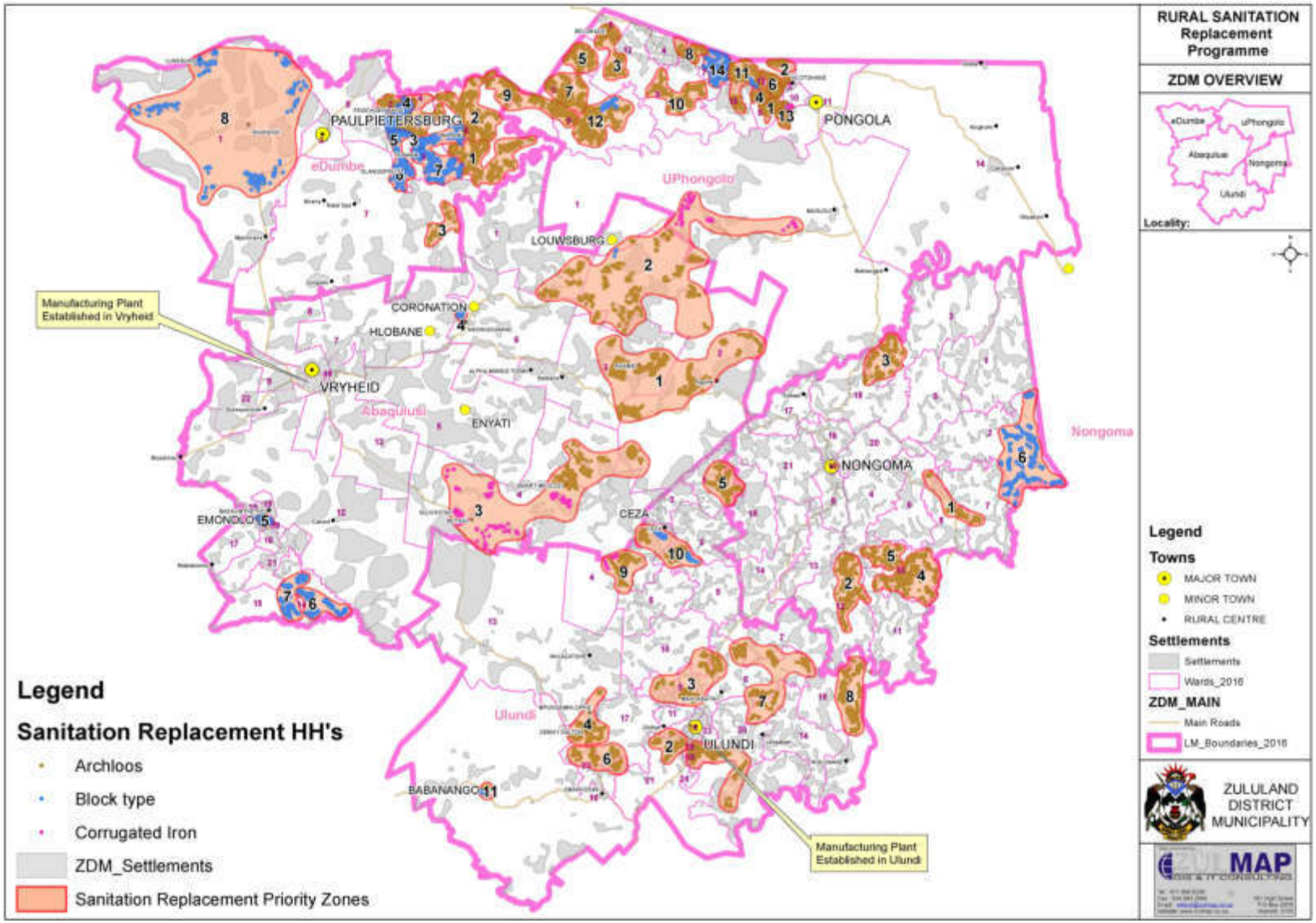


**Figure A.6.10: Rural Sanitation (Replacement Programme)**



## Chapter 12: Strategic Objectives & Development Strategies

The ZDM WSDP supports the KZN PGDS Strategic Framework. WSDP goals, objectives, interventions and projects are aligned to place ZDM in a position to fulfil its role as WSA in achieving the provincial PGDS for 2035.

While the focus has been predominantly on providing each person with sustainable infrastructure and eradicating backlogs, the status of existing and aging infrastructure, as well as the availability and sustainability of water resources has been neglected.

As water provision will increase, so will water resources needs, operation and maintenance of existing infrastructure, efficient institutional and financial capacity to manage infrastructure and revenue etc. The KZN PGDS Framework aims to achieve at least 90% reliable services by 2035.

An overview of the KZN PGDS framework with associated goals and objectives for water and sanitation services can be reviewed in the next figure.

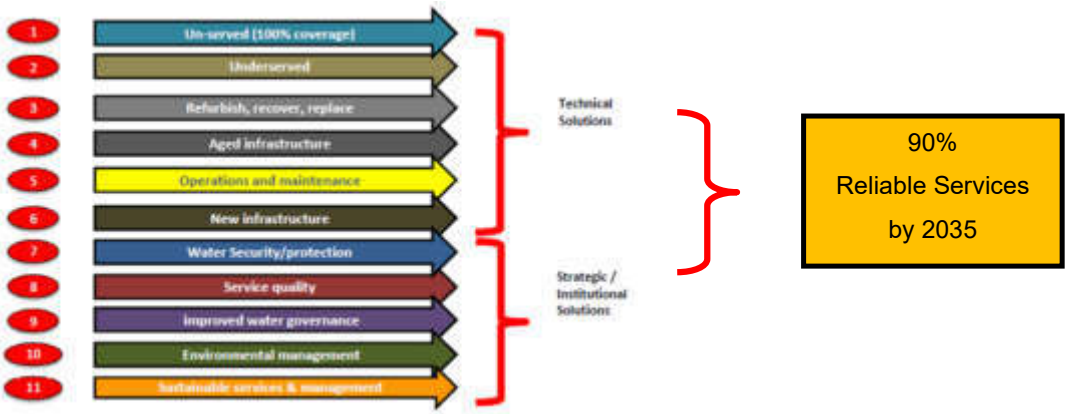



**Figure A.3.3: KZN PGDS Strategic Framework**

These 11 categories are consolidated in the WSDP under the following chapters as required by the web-based WSDP template of DWS:

- CHAPTER 1: Socio-Economic Profile
- CHAPTER 2: Service Level Profiles
- CHAPTER 3: Water Resources Profile
- CHAPTER 4: Operation and Maintenance
- CHAPTER 5: Water Conservation & Demand Management
- CHAPTER 6: Water & Sanitation Services Profile
- CHAPTER 7: Water Balance
- CHAPTER 8: Institutional Profile

- CHAPTER 9: Customer Service
- CHAPTER 10: Financial Profile
- CHAPTER 11: Project Rollouts
- CHAPTER 12: Strategic Goals

The Strategic Objectives and Development Framework with associated targets and KPI's will be provided in this chapter.

# 1. SOCIO-ECONOMIC PROFILE

The ZDM is the Water Services Authority (WSA) and Water Services Provider (WSP) for the entire district in terms of Section 1 of the Water Services Act, 1997[1]. The only exclusion is the urban areas within AbaQulusi LM for which AbaQulusi LM is currently the WSP.

In order to efficiently plan the development of water services in the DM's jurisdictional area it is necessary to determine the existing or current situation with respect to water and sanitation supply. This Section presents and identifies, both visually and statistically, the physical and consumer profile within the DM.

## 1.1 Demographics

The current consumer profile of the district is indicated in Table 1.1 (a) below:

**Table 1.1 (a): Current consumer profile (units)**

| LOCAL MUNICIPALITIES | DOMESTIC | INDUSTRIAL / BUSINESSES | FARM HOUSES | TOTAL |
|---|---|---|---|---|
| AbaQulusi | 16 000 | 1 794 | - | 17 794 |
| eDumbe | 5 458 | 218 | - | 5 676 |
| Nongoma | 632 | 321 | - | 953 |
| Ulundi | 5 912 | 533 | - | 6 445 |
| uPhongolo | 4 009 | 456 | - | 4 465 |
| **Total (urban)** | **32 011** | **3 322** | **-** | **35 333** |
| AbaQulusi | 30 702 | 390 | 417 | 31 509 |
| eDumbe | 11 926 | 113 | 257 | 12 296 |
| Nongoma | 43 743 | 79 | 1 | 43 823 |
| Ulundi | 39 030 | 209 | 45 | 39 284 |
| uPhongolo | 25 173 | 333 | 337 | 25 843 |
| **Total (rural)** | **150 574** | **1 124** | **1 057** | **152 755** |
| **Total** | **182 585** | **4 446** | **1 057** | **188 088** |

**Present population and projected population growth rates:**

Population and economic growth rates are used to determine future developmental requirements within the ZDM. This determines the required increase or decrease in water services. Non-domestic consumer unit growth, particularly commercial, industrial and agricultural growth, also gives an indication of the expected increase in water demand and associated wastewater flow discharges. Factors that affect population growth rate include:

- Immigration due to displaced farm labour, land restitution and declining job opportunities in neighbouring provinces;
- Emigration to urban centres or outward migration from the region in search of job opportunities; and
- The HIV/AIDS epidemic that is predicted to seriously affect economically active persons (18-45 years). Full-blown AIDS sufferers who are unable to continue working may return home to the rural areas. This

[1] Act 108 of 1997 as amended.

may be an internal urban/rural shift, or migration from urban areas outside the DM. With the prevalence of HIV/AIDS, especially in KZN, it is important to ensure adequate water services provision in the rural areas.

The current consumer profile of the district reflect an updated household count which was done by ZDM from aerial photography taken in 2016 by National Geo-spatial Information (NGI). A total of **182 585 households** and **1 057 farm houses** were captured, bringing the total dwellings in ZDM to **183 642.**

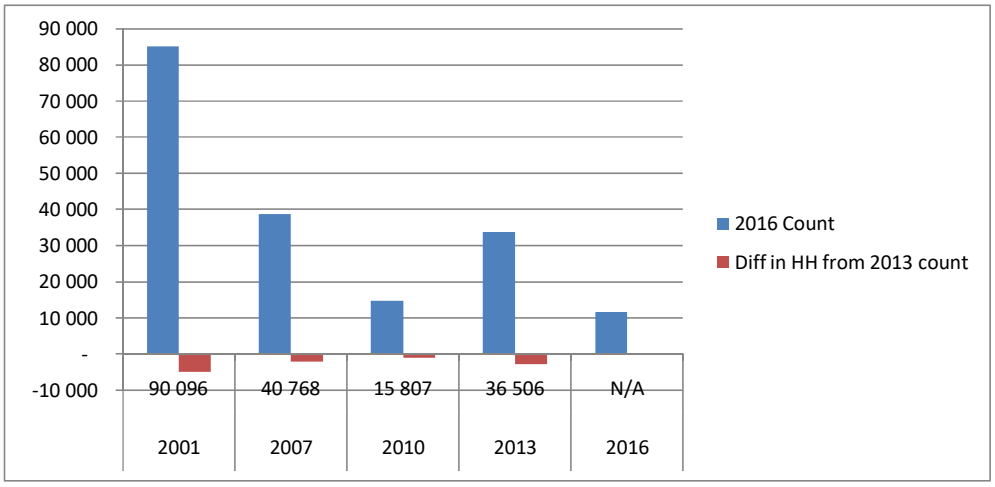
Although this is only 465 households more than what the total household count was for 2013, there were many household ruins in the rural areas where dwellings were either abandoned or people have relocated. A comparison between the various households counts since 2001 is shown in the table below. This indicates the reduction in households over the past 17 years.

**Table 1.1 (b): Household Count Analysis Table (2001-2016)**

| YEAR FLOWN | 2013 Count | 2016 Count | Diff in HH from 2013 count |
|---|---|---|---|
| 2001 | 90 096 | 85 091 | -5 005 |
| 2007 | 40 768 | 38 607 | -2 161 |
| 2010 | 15 807 | 14 717 | -1 090 |
| 2013 | 36 506 | 33 666 | -2 840 |
| 2016 | N/A | 11 561 | - |
| **Overall increase in HH from 2013 count** | | | **465** |

The above table can be reviewed in graph format in the following chart.

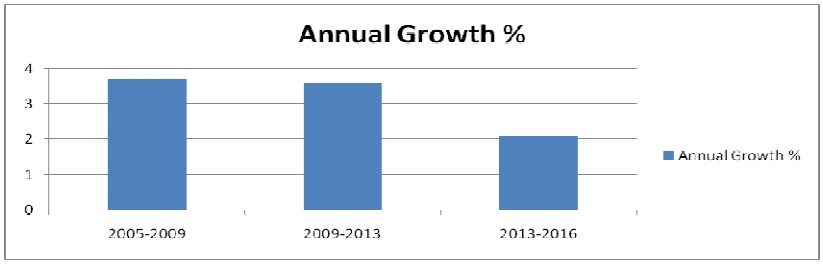
**Figure 1.1: Household Count Analysis Graph (2001-2016)**




From a spatial perspective, the following map indicates the number of households per square kilometer for 2016 compared with the number of households from 2013. The yellow and light green areas shows a strong decline in dwellings, whereas blue indicates a strong increase in households.

When the new household count of 11 561 from 2013 to 2016 is considered, it represents an increase in the number of households of 6.31% over 3 years. An **annual average household growth of 2.1%** is therefore evident over the period from 2013 to 2016, which is less than the 3.6% increase from the period 2009-2013. The period from 2005/2006 to 2009 shows an average annual household growth of 3.7%. There is therefore a slight decreasing trend in the household growth over the past 10 years in ZDM.

**Table 1.1 (c): Current consumer profile (units)**




Due to the spatial analysis requirements for water and sanitation provision at household level, ZDM uses its own household data set which contains actual household positions as opposed to numerical values provided by STATSSA per enumeration area. Households and defined by and projects are implement per local settlement areas as defined by the ward councillors, and these settlements areas don't always coincide with the enumeration area boundaries of STATSSA. It is therefore impossible to correlate the enumeration areas with settlement areas and derive household statistics between the two data sets.

STATSSA has released the interim 2016 Community Survey statistics per local municipality, and the estimated number of households for the 2016 community survey is slightly higher than the spatial household count for ZDM. A comparison table between the 2011 census data and the 2016 community survey details can be seen in Table 1.1 (a) below.

**Table 1.1 (d): STATSSA 2016 Community Survey**

| | HOUSEHOLDS | | POPULATION | | Ave Households Size | |
|---|---|---|---|---|---|---|
| **Local Municipality** | **2011** | **2016** | **2011** | **2016** | **2011** | **2016** |
| AbaQulusi | 43 299 | 51 472 | 224 998 | 241 196 | 4.90 | 4.70 |
| eDumbe | 16 138 | 17 415 | 85 022 | 89 614 | 5.10 | 5.10 |
| Nongoma | 34 341 | 36 409 | 200 948 | 211 892 | 5.70 | 5.80 |
| Ulundi | 35 198 | 38 553 | 264 765 | 205 762 | 5.40 | 5.30 |
| uPongolo | 28 772 | 34 667 | 153 727 | 143 845 | 4.40 | 4.10 |
| **Total** | **157 748** | **178 516** | **929 461** | **892 310** | **5.10** | **5.00** |

For population analysis, the 2011 Census figures will however be applied to the ZDM household count as per local municipality.

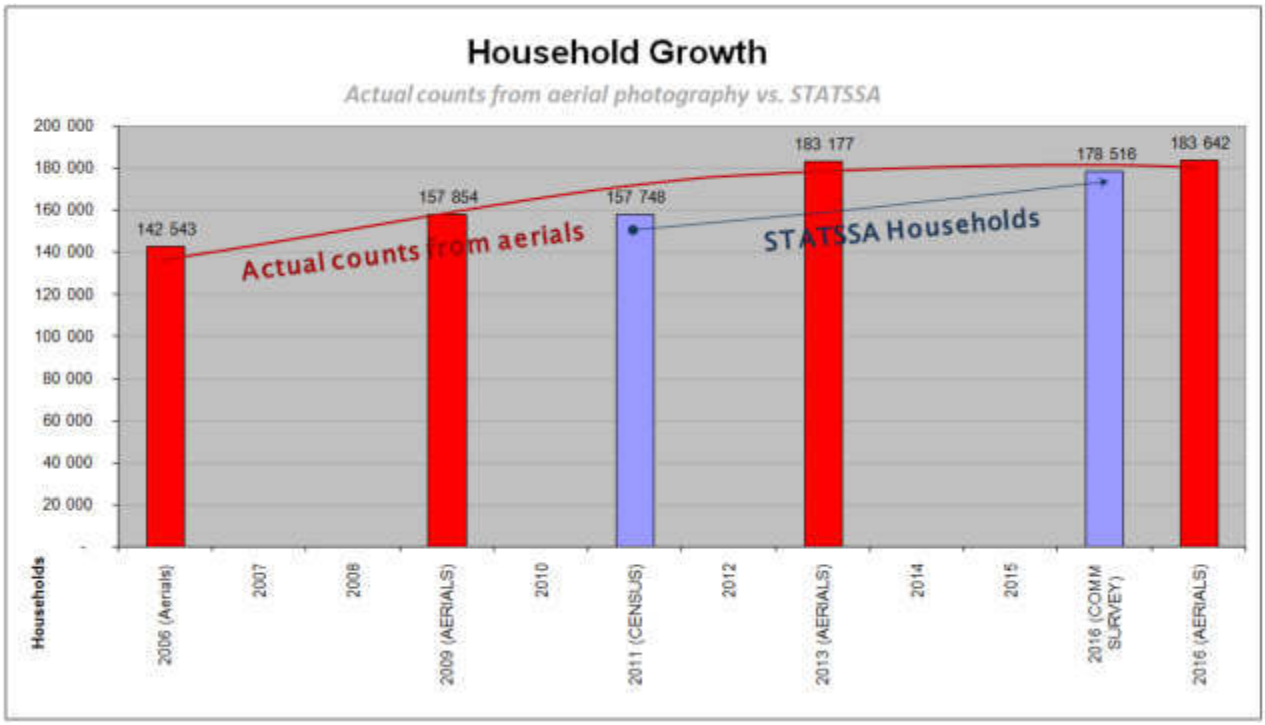
A comparison table between households captured from 2009, 2013 and the 2016 aerial photography can be reviewed in Table 1.1(b) and Figure 1.1 (a):

**Table 1.1 (e): Household and Population Figures**

| | Actual Household Statistics (Captured from aerial photography over 4 consequtive periods) vs CENSUS Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Local Municipality | 2006 | 2009 (AERIALS) | 2010 | 2011 (CENSUS) | 2012 | 2013 (AERIALS) | 2014 | 2015 | 2016 (COMM SURVEY) | 2016 (AERIALS) | Annual household growth rate | Average Population per household | Total Population (ZDM) |
| AbaQulusi | 36 069 | 40 302 | | | | 45 918 | | | | 47 119 | 0.9% | 4.90 | 230 883 |
| eDumbe | 15 011 | 16 880 | | | | 16 671 | | | | 17 641 | 1.9% | 5.10 | 89 969 |
| Nongoma | 34 056 | 38 171 | | | | 45 670 | | | | 44 376 | -0.9% | 4.40 | 195 254 |
| Ulundi | 35 309 | 37 365 | | | | 46 450 | | | | 44 987 | -1.1% | 5.70 | 256 426 |
| uPongolo | 22 098 | 25 136 | | | | 28 468 | | | | 29 519 | 1.2% | 5.40 | 159 403 |
| **Total** | **142 543** | **157 854** | | **157 748** | | **183 177** | | | **178 516** | **183 642** | **0.41%** | **5.10** | **931 935** |

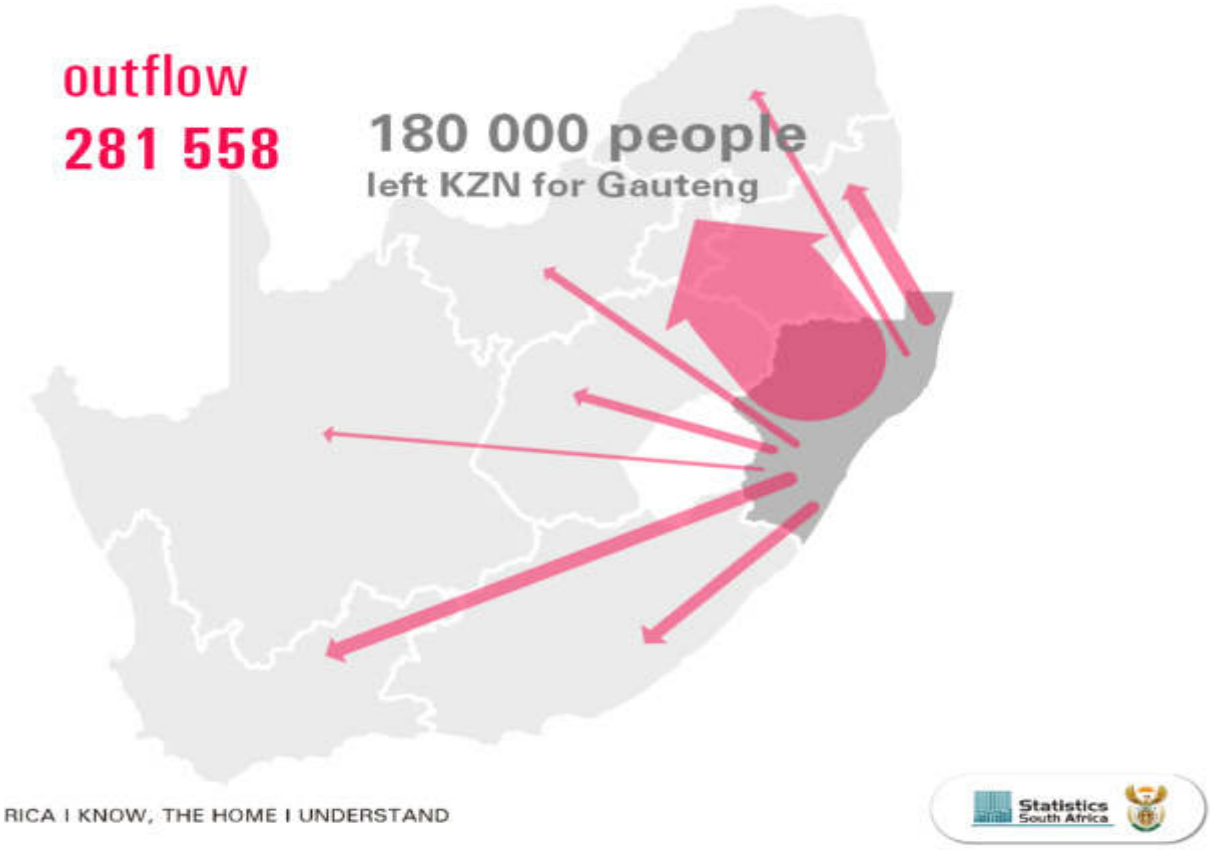
**To summarise the above outcomes, the current household count for ZDM taken from the 2016 household count, is 183 642, with a total population count of 931 935 when STATSSA population per household is applied.**

**Figure 1.1 (f): Household growth (2013 - 2016)**




According to Census 2011, the population growth rate for ZDM from 2001 to 2011 is only 0.3%. This may either be contributed to the negative influence that illnesses such as HIV/AIDS has, or it may be the result of migration where younger persons are leaving rural homes and living on their own in cities where they study, or in more urbanised areas away from their rural homes where job opportunities are more readily available. The migration factor can be seen in the STATSSA's statistical release document, where a strong tendency exist specifically towards migrating from KZN to Gauteng:

**Figure 1.1 (g): Migration trends for KZN (Source: STATSSA)**



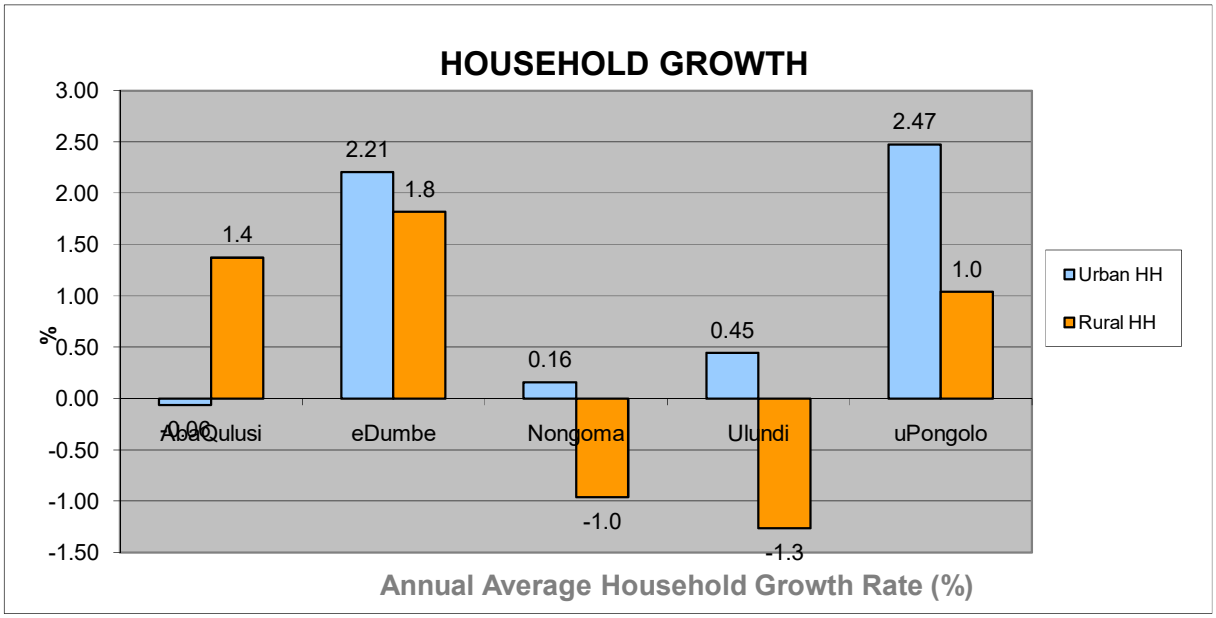

**Demographic trends and migration patterns:**

Demographic trends and migration patterns are difficult to predict, but when comparing household data from 2013 to 2016, there appears to be some migration from rural areas to the various urban centers in the district, as well as areas where infrastructure is provided. This is consistent with the reality that can be seen in the field, where in some rural areas up to 30% of traditional dwellings are abandoned and people have moved to areas where services are provided.

The following graph show urban and rural percentage household growth per LM in the district over a 3 year period between 2013 to 2016.

Very little growth has taken place in the urban areas, with most of the growth taken place in the rural areas.

**Figure 1.1 (h): Annual Urban and Rural Household Growth per Local Municipality**




*Data derived from 2013 and 2016 Aerial Photography (NGI)*

The 2011 Enumerated Area (EA) Census details allows the ZDM to compare its demographic analysis with that of the 2011 Census, especially in terms of actual population trends, which cannot be obtained from aerial photography. According to an overview on KZN done by STATSSA, rural-urban migration remains a "**growing phenomena**".

In Figure 1.1(h) the 2013 household count per square kilometer was compared with the latest 2016 household count. This clearly confirms the above statement from STATSSA that there is a strong migration from rural areas to urban areas (especially former township areas), or areas where infrastructure are available.

Growth trends per local municipality can be summarised as follows:

- **AbaQulusi**
  High growth in the surrounding eMondlo town areas as well as in Nkongolwane. There is a substantial growth in the Kwa Shoba & Tinta's Drift areas, with a high decrease in rural households surrounding Vryheid town.
- **eDumbe**
  Strong positive growth in eDumbe, Frischgewaagd & Bilanyoni.
- **uPhongolo**
  High growth in Ncotshane as well as settlements all along the N2 going west towards Belgrade.
- **Nongoma**
  Positive growth along the Nongoma/Hlabisa road, with an overall slight negative growth in most of the rural areas.

- **Ulundi**

  Positive growth surrounding Ulundi town areas, with an overall slight negative growth in most of the rural areas between Ulundi and Nongoma.

**Figure 1.1 (i): Demographic trends in household growth between 2013 and 2016**

**Figure 1.1 (i): Household growth percentage per settlement between 2013 and 2016**

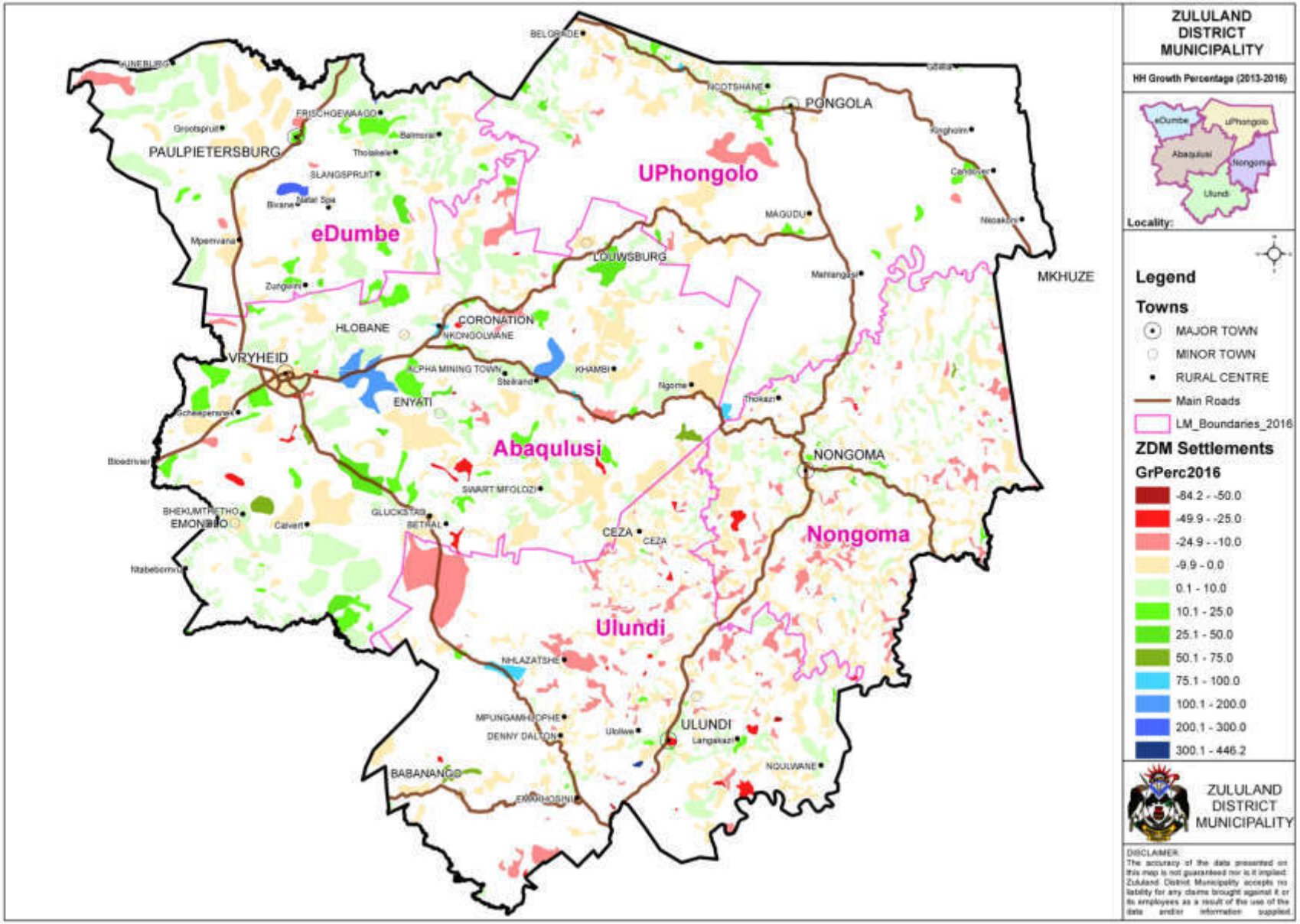
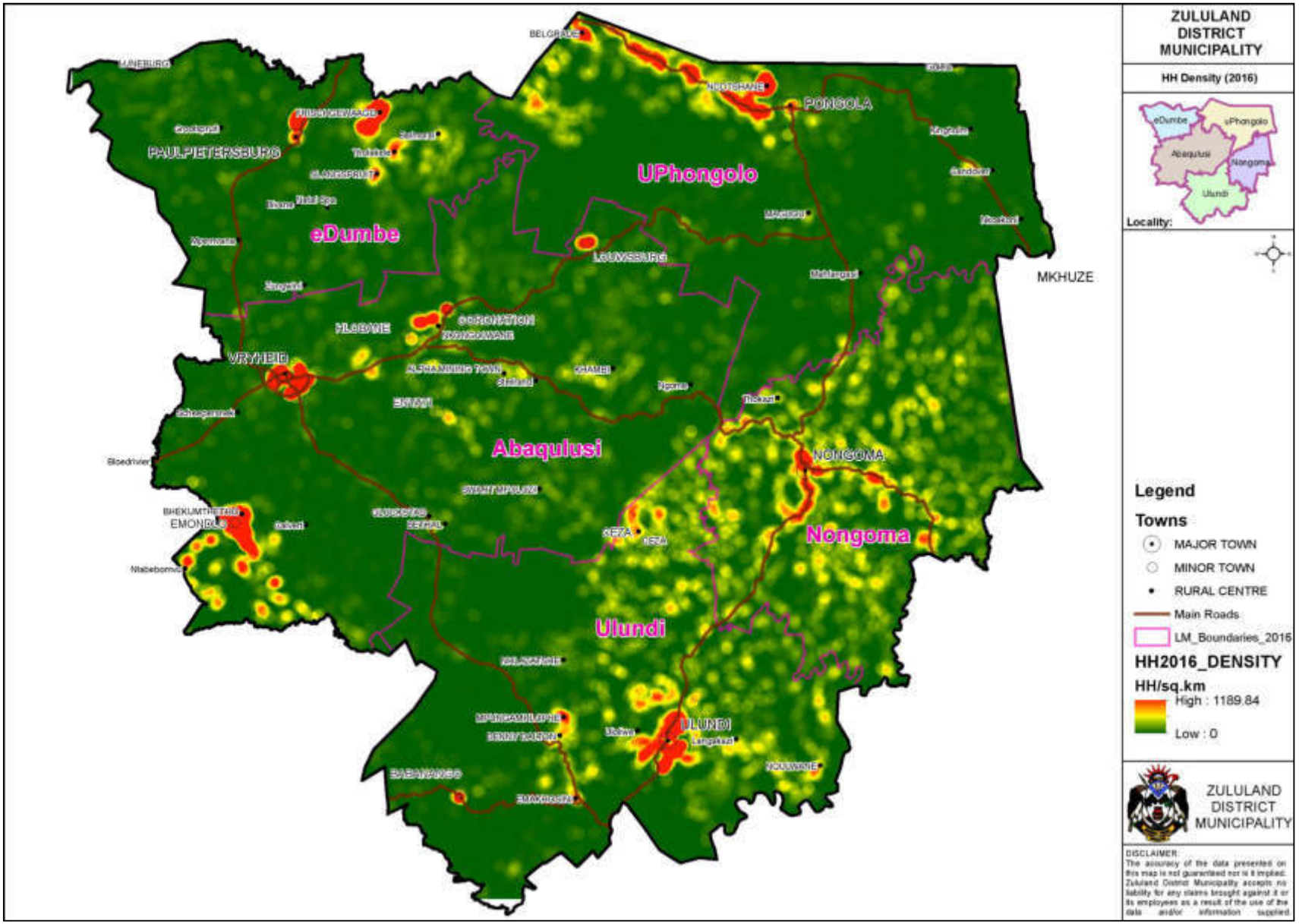


**Figure 1.1 (j): Household density map for households per square km**



**Settlement types:**

Existing settlement types as indicated in the provincial WSDP guidelines is summarised in the table below.

**Table 1.1 (j): Settlement Types for ZDM**

| Class | Settlement Type | Nr of Settlements | Total households |
|---|---|---|---|
| URBAN | Urban - Formal Town | 4 | 6 425 |
| | Urban - For hip | 5 | 14 675 |
| | Urban - Ex own | 13 | 10 233 |
| | Urban - Working Town | 6 | 1 335 |
| | Urban - Service Centre | 8 | 1 549 |
| | Urban - Squatter Camp | 1 | 115 |
| RURAL | Urban Fringe - Informal Settlement | 19 | 8 906 |
| | Peri-Urban - Squatter Camp | 1 | 284 |
| | Rural - Formal Dense >5000 | 2 | 3 046 |
| | Rural - Formal Dense <5000 | 35 | 10 310 |
| | Rural - Scattered Dense | 5 | 2 612 |
| | Rural - Scattered Medium Density | 5 | 223 |
| | Rural - Scattered Low Density | 59 | 10 732 |
| | Rural - Scattered Very Low Density | 1 106 | 107 422 |
| | Rural - Scattered households | N/A | 5 775 |
| | **TOTAL** | **1 269** | **183 642** |

The following provides details of the urban areas situated within ZDM:

| LM | CLASSIFICATION | Z-NR | AREA |
|---|---|---|---|
| AbaQulusi | Urban - Formal Town | Town9 | Louwsburg |
| | | Town27a | Vryheid Town |
| | Urban - Former Township | Town27b | Bhekuzulu |
| | | Town16a | Emondlo town |
| | | Town27c | Lakeside |
| | Urban - Service Centre | ZNew180 | Kandaspunt |
| | | Z846 | Mountain view |
| | | ZPM12 | Rietvlei |
| | Urban - Squatter Camp | ZMAP122 | Vryheid Dump Site |
| | Urban - Working Town | ZHC5 | Boomlaer |
| | | Z932 | Coronation |
| | | Z934 | Enyathi |
| | | Z938 | Hlobane |
| | | ZHC4 | Thutukani |
| | | ZHC8 | Vaalbank |
| eDumbe | Urban - Ex Homeland Town | Z937 | Frischgewaagd |
| | Urban - Formal Town | Town8a | Paulpietersburg Town |
| | Urban - Former Township | Town8b | Edumbe Township |
| | Urban - Service Centre | Z928 | Luneburg |
| Nongoma | Urban - Ex Homeland Town | Town22 | Nongoma Town |
| | | ZMAP26 | White City |
| Ulundi | Urban - Ex Homeland Town | Z741 | Kwazondela |
| | | Z931 | Mahlabathini |
| | | Town18-A | Ulundi Unit A |
| | | Town18-B | Ulundi Unit B |
| | | Town18 | Ulundi Unit B1 |
| | | Town18-BA | Ulundi Unit BA |
| | | Town18-C | Ulundi Unit C |
| | | Town18-D | Ulundi Unit D |
| | | Town18-L | Ulundi Unit L |
| | Urban - Service Centre | Z940 | Babanango |
| uPhongolo | Urban - Ex Homeland Town | Z459 | Belgrade |
| | Urban - Formal Town | Town15a | Pongola Town |
| | Urban - Former Township | Town15b | Ncotshane Township |
| | Urban - Service Centre | ZMAP124 | Golela Border Post |
| | | Z936 | Magudu |
| | | Town15c | Pongola Town (Sugar Refinery) |

ZDM has undertaken a settlement verification process to verify settlement names, boundaries settlement extensions as well as water and sanitation level of service on household level. This process was completed in April 2013, and details were incorporated in this WSDP 5-year review. Table 1.1k summarises the location of all settlements:

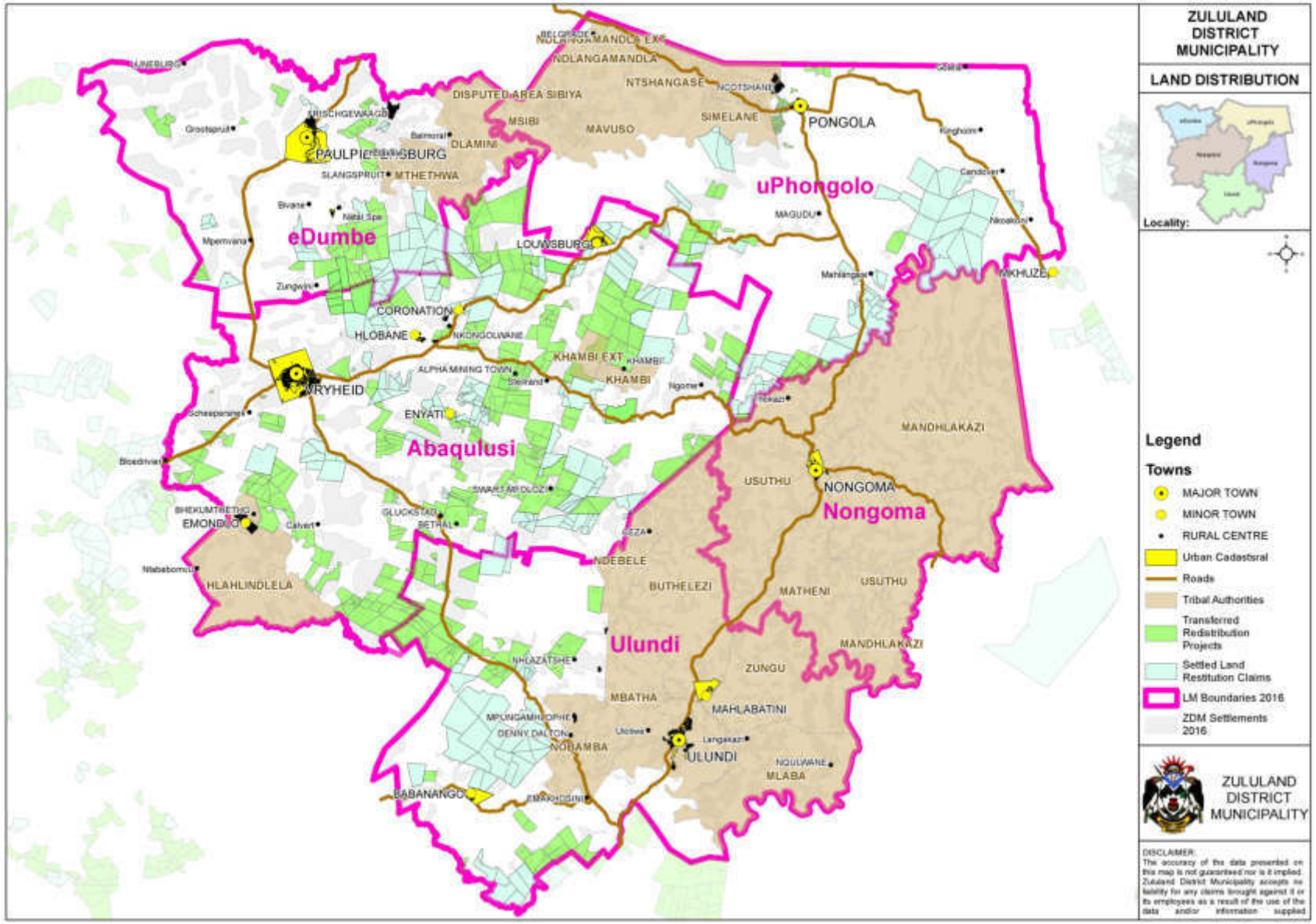
**Table 1.1 (k): Settlement Types for ZDM**

| Settlement Location | Nr of Settlements |
|---|---|
| Urban Towns | 27 |
| Communal Property | 27 |
| Land Reform Areas | 75 |
| State-owned | 26 |
| Tribal Areas | 857 |
| Private Land | 257 |
| **TOTAL** | **1 269** |

A comparison map showing settlement areas in relation to land ownership can be reviewed in Figure 1.1i. A total of 170 new settlements were incorporated and prioritised into the WSDP details for rollout purposes. These include:

- **Expansion of existing settlements**
- **New settlements**
- **Additional Land Reform areas not previously catered for in the rollout programmes**.

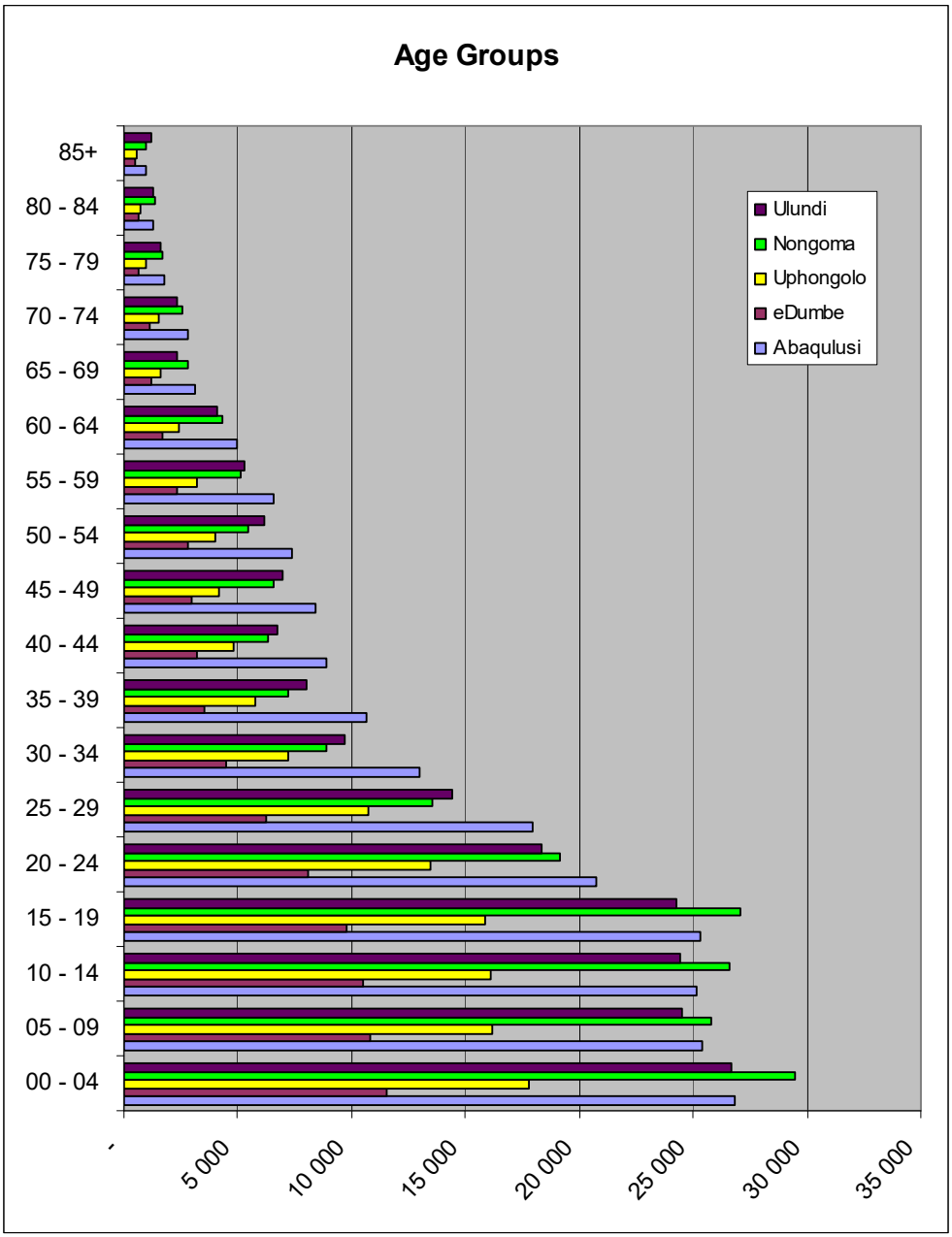
**Figure 1.1(k) Settlement Map**



**Age and gender profile:**

The age characteristics of the District's population are shown in the table hereunder (STATSSA 2011):

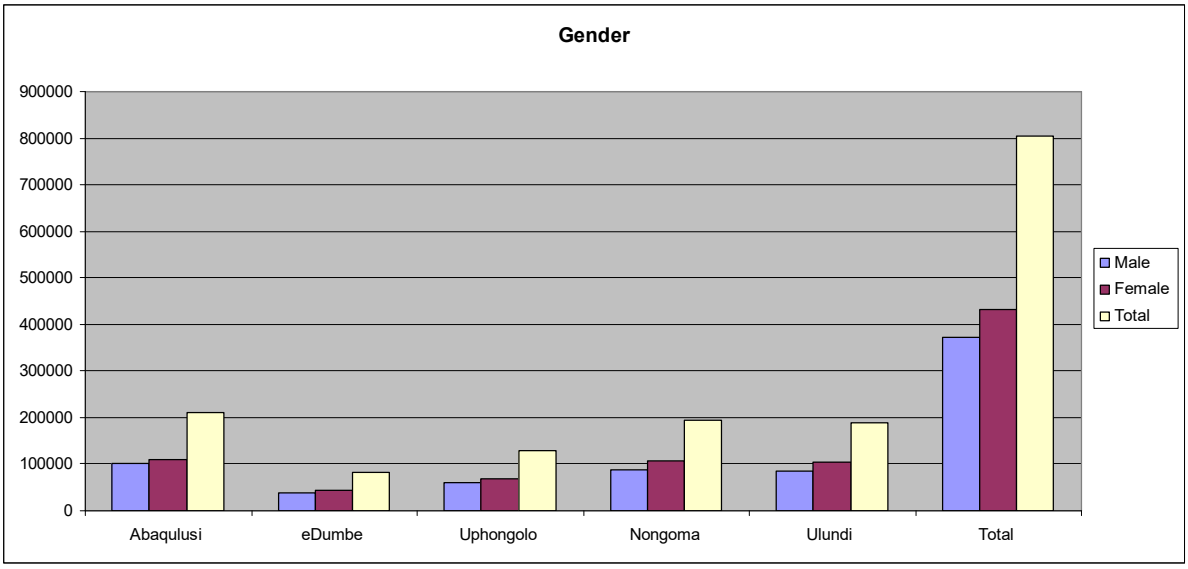
**Figure 1.1 (I): Age Groups Breakdown**




*Source: Census 2011*

It is evitable that the majority of population is between the age of 0 to 19. This may be contributed to school students leaving their homes to study or look for work opportunities.

**Figure 1.1 (m): Gender Breakdown**




*Source: Census 2011*

The male and female population is very close to one another, with the biggest difference in Nongoma and Ulundi.

## 1.2 Health

Water is the essence of life. A person requires a sufficient quantity of good quality water to maintain a state of good health; therefore the provision and quality of water services is required to ensure a sufficient standard of health and hygiene. The quality of water supplied must be sufficient to maintain good health, and sanitation services must provide households with hygienic conditions that will not harbour disease.

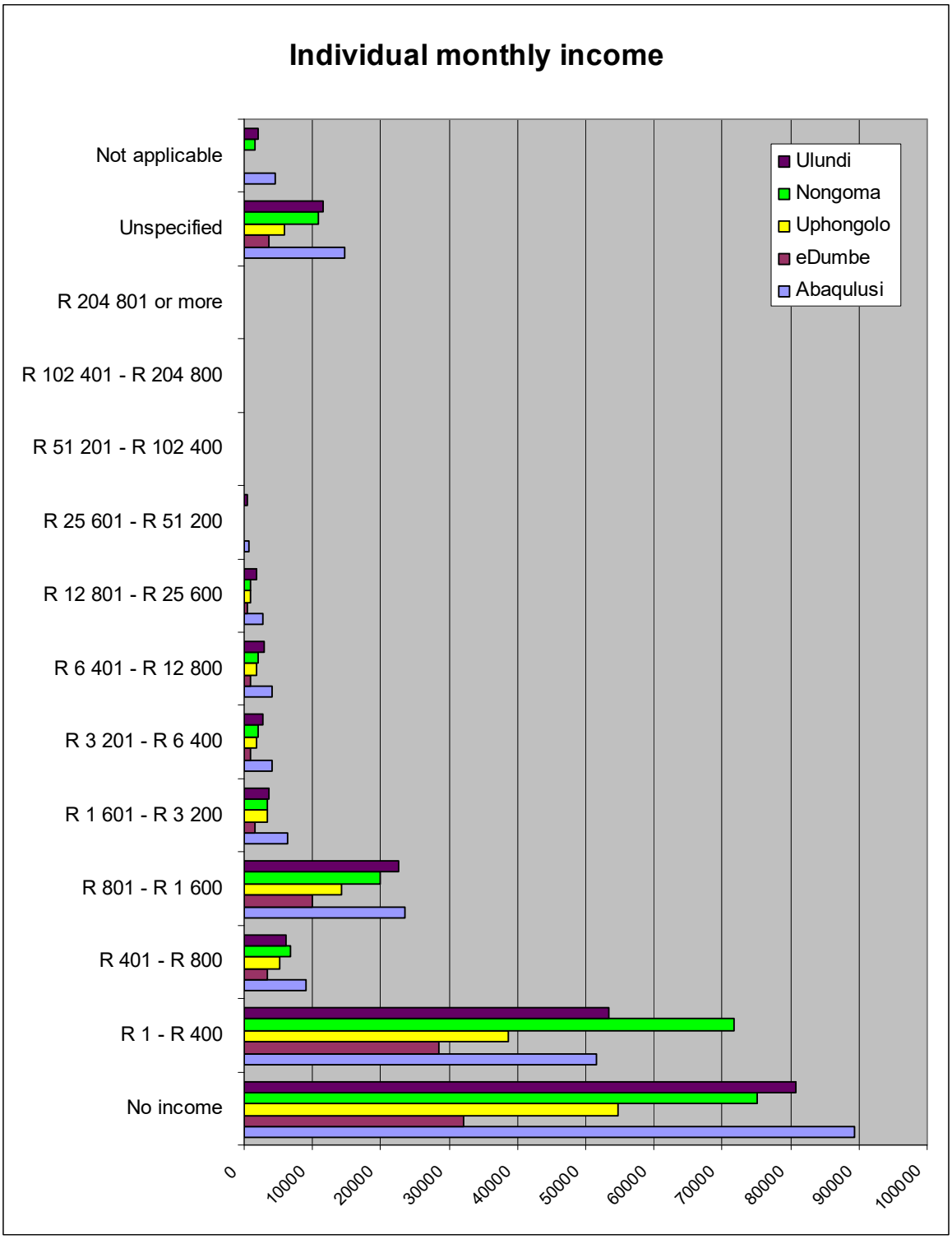
It is very important to consider the prevalence of **HIV/Aids** and the impact it has on the socio-economic conditions of the District. HIV/Aids will have a significant negative impact on the whole South African society and with Zululand being no exception. The implications are as follows:

- KwaZulu-Natal's present share of the South African population is about 21%. This is expected to remain constant over the next 20 years under a "low impact" HIV/AIDS scenario, according to the DBSA.
- However, KZN had the highest recorded HIV-positive rate in the country between 1997 and 1999, indicating that the impact is likely to be more severe than in the rest of South Africa, rather than less so. The Department of Health national statistics estimated KZN's HIV prevalence rate at 32,5% in 1999.
- The KZN's Office of the Premier reports that 'the prevalence appears to be higher among women than among men. Women are infected considerably earlier than men. Among women, prevalence rises sharply from about 15 years, reaches a peak at 25-30 years then begins to taper off. Among men, it rises sharply from about 20 years then peaks from about 35-40.
- This suggests that older boys and men are infecting large numbers of young women and girls. There is also survey evidence that, for a significant percentage of youth, sexual activity commences at very young ages.' In geographic terms, the highest prevalence rates in KZN were found in Pietermaritzburg (35%), Durban (34,8%), Jozini (32,7%), Ulundi (32,3) and Ladysmith (31,8%).

## 1.3 Employment and income

The following table and figure provides a comparative breakdown of the annual household income in the Zululand District Municipality. From the chart it is clear that the majority of people earn less than R400 per month, with a small percentage earning up to R1600.

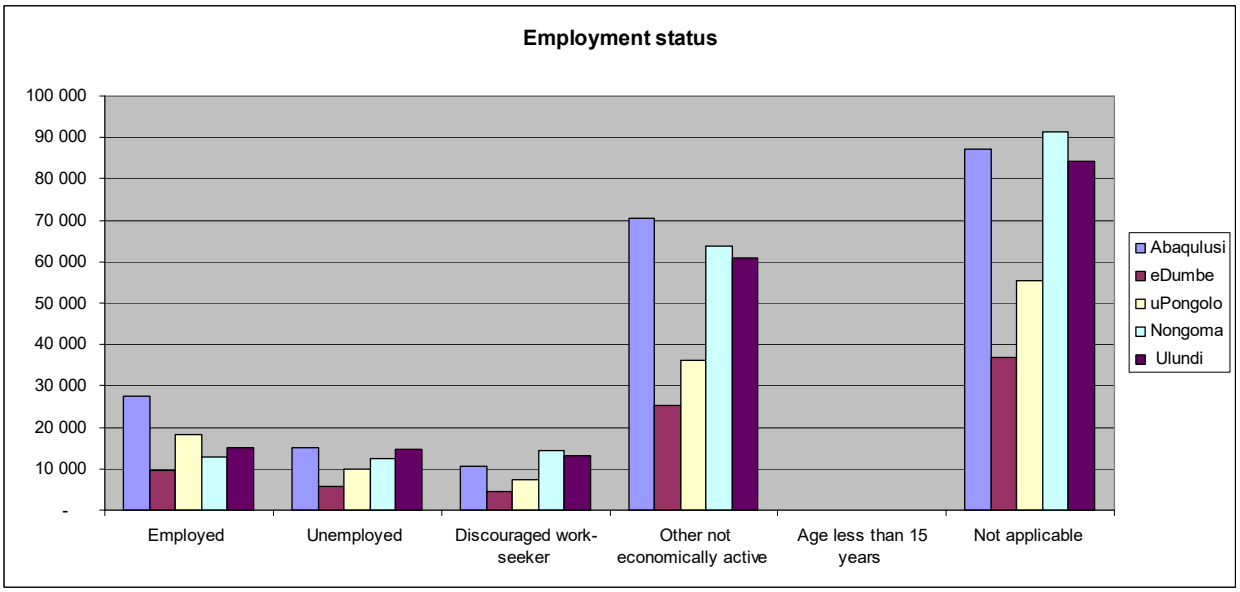
**Figure 1.3 (a): Household Income Breakdown for the ZDM**




*Source: Census 2011*

Employment levels are shown in the following table. A high percentage of population has no schooling.

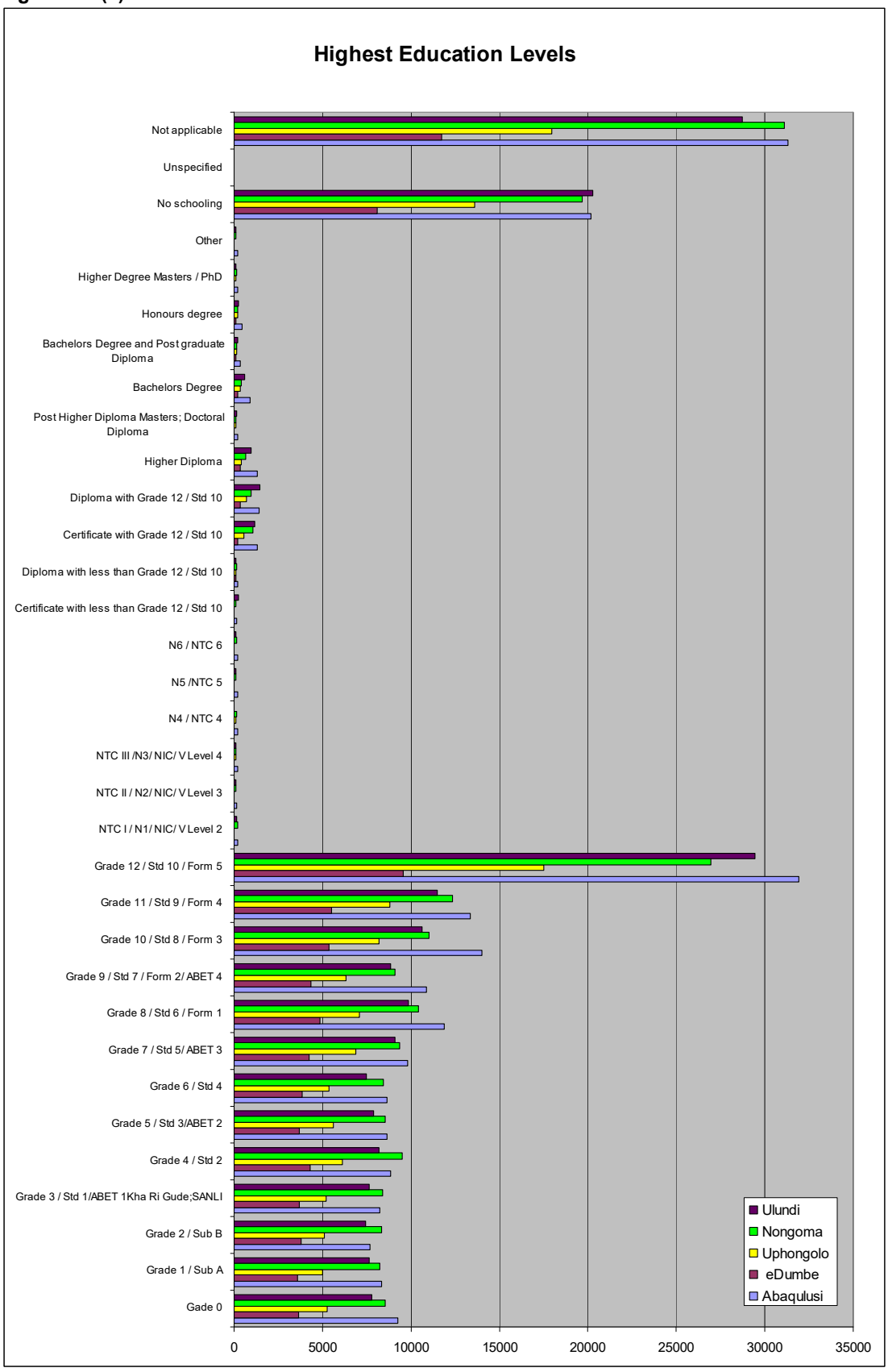
**Figure 1.3 (b): Levels of Employment**




*Source: Census 2011*

A very small percentage of the total population has full-time employment. This, together with very low income per person, as well as a high percentage of people with their highest level of education below Grade 12, contribute to a poor socio-economic standing for the ZDM area.

**Figure 1.3 (c): Levels of education**




*Source: Census 2011*

**Definition of a poor (indigent) household**

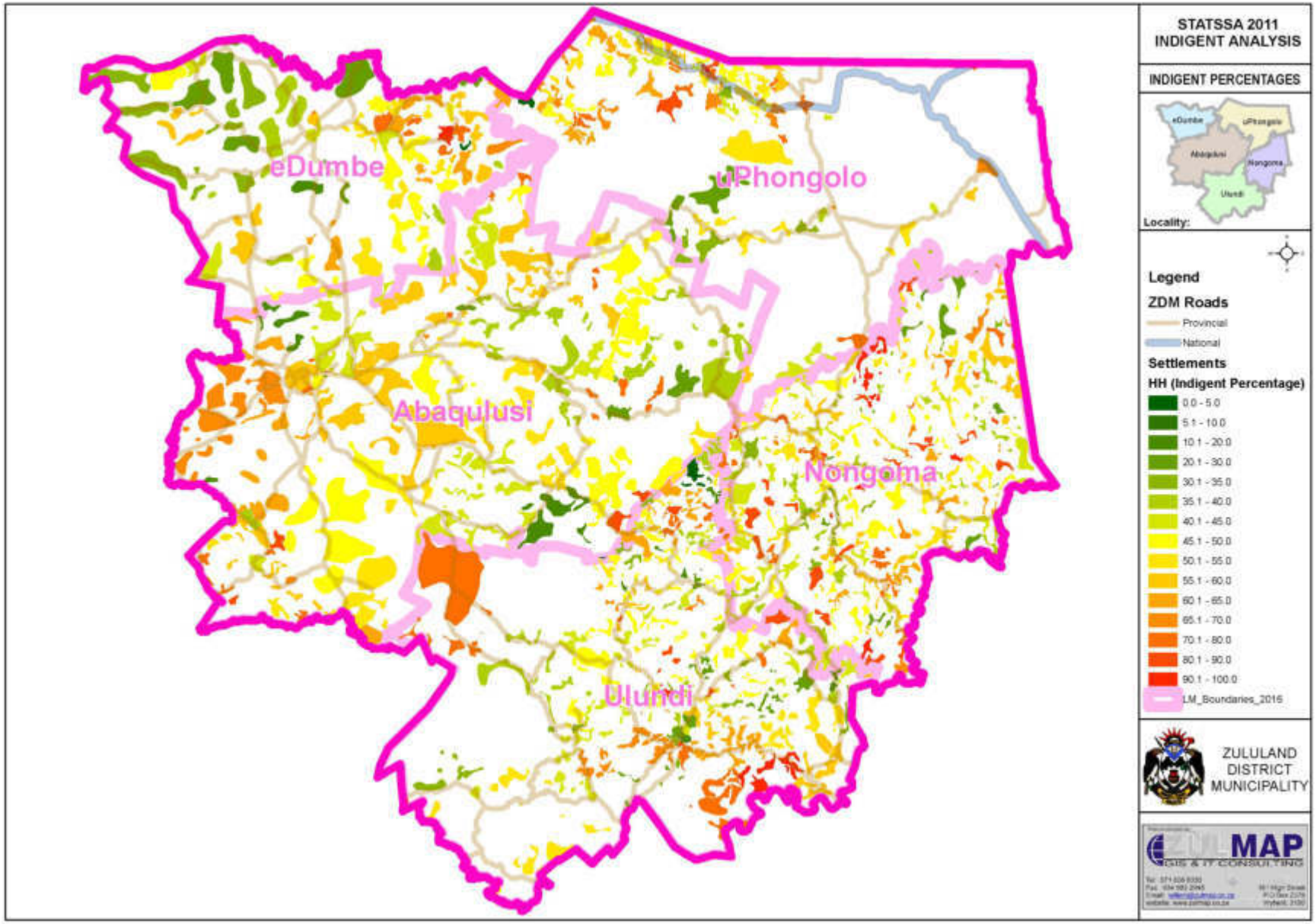
The definition of a poor household in terms of water services is required to assist the ZDM in the implementation of free basic water and sanitation, and the efficient, effective and sustainable use of the equitable share. The poor household definition relates to income poverty, or the lack of sufficient income to satisfy basic and essential needs such as food, clothing, energy and shelter. This definition therefore should be in line with the ZDM's Indigent Policy that is used for all free basic services, and usually relates to the total monthly household income.

In terms of a National Government policy, free basic water relates to a level of water supply derived from the World Health Organisation standard (25 litres per person per day) that is sufficient to promote a healthy living. Based on an average household of 8 persons, this amounts to 6,000 litres (or 6 kl) per household per month. As part of free basic sanitation, the National policy deals with level of service only. However, the long-term O&M component still requires clarification. Although a broad national policy commitment exists to extend free basic services to all households, poor households, for whom free basic services represent a significant poverty alleviation measure, are the primary targets. In addition, the ZDM must ensure long-term sustainability in the implementation of these policies. Taking into account the socio-economic standing of persons living within the ZDM area of jurisdiction, the potential income and expenditure for water services, and the contribution of equitable share, the ZDM poor household definition is set out below.

| **Proposed definition of poor household (indigent) by the municipality:** |
| --- |
| **All households earning a combined income of less than R 1 600 per month.** |

The following map depicts an overview of the approximate percentage indigent households per community within ZDM. The 2011 STATSSA Census income statistics were used to derive a percentage indigent households per Small Area (SAL). These figures were interpolated over to the local communities within each SAL. Shortcomings with this methodology include community boundaries expanding across more than one SAL area and also more than one SAL area within a single community. The outcomes therefore do not always represent a 100% reflection of the desired outcome, but is mostly prevalent within the urban town areas. Areas in question have been adapted as far as possible to compensate for this shortcoming.

Figure 1.3 (c): Percentage Indigent Households per Community



## 1.4 Economic sectors, GGP contribution and employment

The ZDM constitutes 16% of the area and ±8.5% of the population of KZN. The contribution to the Gross Geographic Product (GGP) of the province and that of individual sectors to the current local GGP still needs to be assessed. The relative contribution of each sector during the 1990s, highlight the dominance of mining and quarrying. However, owing to the effects of open market policy on coal mining and agriculture the ZDM experienced an economic decline in these sectors during the late 1990s. Nevertheless, over this period agriculture, social services and trade have increased their contribution to employment, whereas manufacturing has decrease its contribution and mining has remained the same.

**Table 1.4 (a): Economic sector contribution to GGP.**

| Economic sector | Total no. of employees | No. of local employees |
|---|---|---|
| Government | Unknown | Unknown |
| Manufacturing | 3 223 | 3 223 |
| Retail/Trade (incl. Tourism) | 7 539 | 7 539 |
| Farming/Agriculture | 11 276 | 11 276 |
| Utilities (power & water supply) | 391 | 391 |
| Mining | 1 673 | 1 673 |
| Social services | 18 211 | 18 211 |
| Finance | 3 292 | 3 292 |
| Transport & communications | 2 838 | 2 838 |
| Construction | 2 727 | 2 727 |
| **Total*** | **51 170** | **51 170** |

**These values do not include the person employed within private households or undetermined categories – Census 2001.*

**Table 1.4 (b): GGP and employment by type of economic activity (1994 and 1996).**

| | | % of GGP 1994 | % of Employment 1996 | % of Employment 2001 |
|---|---|---|---|---|
| Primary Sector | Agriculture, forestry, fishing | 12,4 | 12.1 | 16.9 |
| | Mining & quarrying | 31,8 | 2.5 | 2.5 |
| Secondary Sector | Manufacturing | 4,2 | 17.1 | 4.8 |
| | Utilities (power & water supply) | 0,2 | 0.7 | 0.6 |
| | Construction | 2,0 | 4.2 | 4.1 |
| Tertiary Sector | Retail/Trade | 12,9 | 9.7 | 11.3 |
| | Transport & communications | 13,9 | 5.5 | 4.2 |
| | Finance | 7,0 | 4.8 | 4.9 |
| | Government & social services | 15,6 | 17.1 | 27.2 |
| | Private households | N.A | 8.8 | 9.7 |
| | Unspecified/unknown | N.A | 17.5 | 13.8 |
| **TOTAL** | | **100,0** | **100,0** | **100,0** |

## 1.5 Economic trends

Up to the early 1990s, the ZDM's economic base depended heavily on coal mining, supported by agriculture, transport trade and government services. Formal economic activity was strongly concentrated in the then Vryheid magisterial district, from which no less that 73% of GGP was generated. Administrative and government services were concentrated in Ulundi and Vryheid. A significant weakness was, and remains, the reliance on the primary sector (44,4% of GGP), and the underdeveloped secondary sector which contributed only 6,4% of GGP.

By the late 1990s the ZDM had experienced an economic decline owing to the effects of open market policy on coal mining and agriculture. By 2000 all but one of the large-scale mining operations (Zululand Anthracite Colliery) had closed. Although tourism has started to play a larger role, this by no means fills the gap caused

by the closing of the mines that had a knock-on impact for all economic sectors and has been felt particularly in Vryheid and surrounding areas.

A number of recent economic studies and reports from the business sector suggest that the contribution of mining and quarrying have fallen to a low level, with little contribution from manufacturing activities, and that some increase is evident in transport (in support of forestry activities), trade and catering (on account of tourism). The informal sector, mainly petty commodity trading, has grown considerably over the last decade, but is constrained by the slump in primary and secondary sectors of the formal economy. The potential for economic growth in Zululand lies in tourism and agriculture.

# 2. SERVICE LEVEL & ASSOCIATED SERVICES PROFILE

Service levels currently differ across the ZDM, predominantly based on a rural/urban split. In general urban areas have water services equal to or higher than, and many rural areas have either no water services or these services do not meet, the compulsory national standards determined by the Minister of Water Affairs and Forestry in terms of Section 9(1)(a) of the Water Services Act, 1997 (Table 4a). The potential service levels for water include:

- Communal supply at the minimum prescribed levels listed – this service level is the 'basic' supply.
- Controlled volume supply – this would include yard tanks that are filled daily or low pressure connections either as yard or house connections.
- Uncontrolled volume supply – these are usually high-pressure connections either as yard taps or house connections.

The potential sanitation service levels include:

- Dry installations at the minimum prescribed levels listed – this usually comprises a ventilated improved pit (VIP) latrine that is the 'basic' supply.
- Wet installations – these are onsite waste "treatment" and would include septic tanks.
- Waterborne installations – these are connected to a wastewater treatment works (WWTW) either for digester effluent only (intermediate) or for the entire wastewater flow (full).

Zululand District Municipality has adopted a Free Basic Water Services policy as follows:

- All households will receive six kilolitres of potable water free of charge for domestic use.
- Industrial, commercial and institutional consumers do not qualify for free basic services.
- All water supplied from communal standpipes and rudimentary systems will be free.

**Table 2(a): Free Basic Water Policy**

| Service Level Number | Level of Water Service | Definition | Free Basic Water Policy |
|---|---|---|---|
| DW1 | Full pressure conventional house connection | Direct unrestricted full pressure (24m) connection to the reticulation system, metered and billed | Stepped block tariff (with first block at zero charge free to all households) |
| DW2 | Yard tank (RDP standard) | Restricted (to 200l per day) individual erf connection with tank in yard | All water at no charge |
| DW3 | Communal street tap (RDP standard) | Unrestricted full pressure standpipe not further than 200m from dwellings (shared by a number of consumers) | All water at no charge |
| DW4 | Rudimentary system | Formalised supply:<br>• Borehole equipped with hand pump<br>• Protected spring<br>• Communal standpipe further than 200m from dwellings | All water at no charge |

**Table 2(b): Free Basic Sanitation Policy**

| Service Level Number | Level of Sanitation Service | Definition | Free Basic Sanitation Policy |
|---|---|---|---|
| DS1 | Water borne sewage | Unrestricted connection to municipal sewerage system | Included in free basic water allocation |
| DS2 | Septic tank or similar facility | On-site disposal (self treatment) | No charge |
| DS3 | Conservancy tank | Localised sewage temporary storage facility | No charge to selected households in specific areas as determined by the municipality, aligned to free basic water policy for service level DW4 |
| DS4 | Ventilated improved pit (VIP) latrine | Dry pit with sufficient capacity on-site disposal based on set standards | No charge |

## 2.1 Residential consumer units

The level of access of residential consumers to basic water services are shown in the tables below:

**Table 2.1 (a): Residential consumers: access to water**

| Water | None or Inadequate | Rudimentary <RDP | Communal standpipes RDP | Yard/House connections >RDP | TOTALS |
|---|---|---|---|---|---|
| AbaQulusi LM | 0 | 0 | 0 | 16 000 | 16 000 |
| eDumbe LM | 0 | 0 | 0 | 5 458 | 5 458 |
| Nongoma LM | 0 | 0 | 0 | 632 | 632 |
| Ulundi LM | 0 | 0 | 0 | 5 912 | 5 912 |
| uPhongolo LM | 0 | 0 | 0 | 4 009 | 4 009 |
| **Total (urban)** | **0** | **0** | **0** | **32 011** | **32 011** |
| AbaQulusi LM | 6 768 | 3 886 | 10401 | 9 749 | 31 119 |
| eDumbe LM | 2 775 | 726 | 1628 | 6 940 | 12 183 |
| Nongoma LM | 6 547 | 10 626 | 10 969 | 15 601 | 43 744 |
| Ulundi LM | 3 143 | 2 256 | 14 333 | 19 208 | 39 075 |
| uPhongolo LM | 1 307 | 1111 | 2570 | 16 478 | 25 510 |
| **Total (rural)** | **20 540** | **18 605** | **39 901** | **67 976** | **151 631** |
| **Total (households)** | **20 540** | **18 605** | **39 901** | **99 987** | **183 642** |

**Table 2.1 (b): Residential consumers: access to sanitation**

| | None or Inadequate (Excl. Infills/Replacemen | VIP RDP | Septic tank RDP | Waterborne >RDP | TOTALS |
|---|---|---|---|---|---|
| AbaQulusi LM | 0 | 0 | 1035 | 14 965 | 16 000 |
| eDumbe LM | 0 | 2981 | 498 | 1 979 | 5 458 |
| Nongoma LM | 0 | 283 | 0 | 349 | 632 |
| Ulundi LM | 0 | 635 | 0 | 5 277 | 5 912 |
| uPhongolo LM | 0 | 698 | 0 | 3 311 | 4 009 |
| **Total (urban)** | **-** | **4 597** | **1 533** | **25 881** | **32 011** |
| AbaQulusi LM | 8 098 | 22 597 | 424 | 0 | 31 119 |
| eDumbe LM | 1 288 | 10 629 | 266 | 0 | 12 183 |
| Nongoma LM | 9 854 | 33 890 | 0 | 0 | 43 744 |
| Ulundi LM | 2 123 | 36 900 | 52 | 0 | 39 075 |
| uPhongolo LM | 7 223 | 17 951 | 336 | 0 | 25 510 |
| **Total (rural)** | **28 586** | **121 967** | **1 078** | **0** | **151 631** |
| **Total (households)** | **28 586** | **126 564** | **2 611** | **25 881** | **183 642** |

**Table 2.1 (c): Backlog Percentages per LM**

| WATER | TOTAL HOUSEHOLDS | BACKLOGS | % BACKLOGS | % OF TOTAL BACKLOGS |
|---|---|---|---|---|
| AbaQulusi LM | 47 119 | 10 654 | 22,61% | 27,22% |
| eDumbe LM | 17 641 | 3 501 | 19,85% | 8,94% |
| Nongoma LM | 44 376 | 17 173 | 38,70% | 43,87% |
| Ulundi LM | 44 987 | 5 399 | 12,00% | 13,79% |
| uPhongolo LM | 29 519 | 2 418 | 8,19% | 6,18% |
| **Total** | **183 642** | **39 145** | **21,32%** | **100,00%** |

| SANITATION | TOTAL HOUSEHOLDS | BACKLOGS | % BACKLOGS in LM | % OF TOTAL BACKLOGS |
|---|---|---|---|---|
| AbaQulusi LM | 47 119 | 8 098 | 17,19% | 28,33% |
| eDumbe LM | 17 641 | 1 288 | 7,30% | 4,51% |
| Nongoma LM | 44 376 | 9 854 | 22,21% | 34,47% |
| Ulundi LM | 44 987 | 2 123 | 4,72% | 7,43% |
| uPhongolo LM | 29 519 | 7 223 | 24,47% | 25,27% |
| **Total** | **183 642** | **28 586** | **15,57%** | **100,00%** |

**Table 2.1 (d): Backlog Progress**

| YEAR | BACKLOGS (Households) | | ALLOCATIONS | | Household count |
|---|---|---|---|---|---|
| | Water | Sanitation | Water | Sanitation | |
| 2013-2014 | 56 559 | 56 757 | R 288 499 750 | R 65 386 250 | 2010 household count |
| 2014-2015 | 50 653 | 46 027 | R 300 616 500 | R 55 405 500 | |
| 2015-2016 | 47 934 | 37 650 | R 440 019 250 | R 55 339 750 | |
| 2016-2017 | 45 545 | 31 071 | R 281 021 250 | R 61 973 750 | |
| 2017-2018 | 57 358 | 38 007 | R 172 855 075 | R 45 120 650 | 2013 Households |
| 2018-2019 | 50 882 | 34 973 | R 456 344 175 | R 51 310 825 | |
| 2019-2020 | 42 711 | 30 586 | 383 328 220 | 51 310 825 | **2016 Households** |
| **2020-2021** | **39 145** | **28 586** | **394 165 250** | **59 721 750** | |

| YEAR | BACKLOGS REMAINING (%) | |
|---|---|---|
| | Water | Sanitation |
| 2017-2018 | 31.31 | 20.75 |
| 2018-2019 | 27.78 | 19.09 |
| 2019-2020 | 23.26 | 16.66 |
| **2020-2021** | **21.32** | **15.57** |

**PLEASE NOTE THAT BACKLOGS ARE ESTIMATES BASED ON PROJECTED COMPLETION DATES OF PROJECTS AT THE END OF JUNE, AND MAY VARY ON FINAL FINANCIAL YEAR END.**

**ACTUAL FIGURES WILL BE UPDATED AFTER FINANCIAL YEAR END.**

## 2.2 Public institutions and 'dry' industries

Tables 2.2 (a) & (b) below shows the no off and type of institutions in the district as well as the status of water and sanitation facilities at these institutions. Figures 2.2 (a) shows the location of these facilities relative to water infrastructure.

**Table 2.2 (a): Public institutions and 'dry' industries: access to water**

| Institution | No off | WATER | | |
|---|---|---|---|---|
| | | None or inadequate | Communal standpipe | Yard connection |
| Businesses | 3 980 | | | |
| Clinics | 68 | 5 | 48 | |
| Creches | 7 | 2 | | |
| "Dry" Industries | | | | |
| Hospitals | 13 | | | 13 |
| Magistrate offices | 7 | | | 7 |
| Police Stations | 15 | 4 | | 11 |
| Prisons | 3 | | | 3 |
| Schools | 789 | 360 | 329 | 100 |
| Community Halls | 39 | 27 | | 12 |
| **Total** | **4 921** | **398** | **377** | **1 124** |

**Table 2.2 (b): Public institutions and 'dry' industries: access to sanitation**

| Institution | No off | SANITATION | | |
|---|---|---|---|---|
| | | None or inadequate | Dry pit / Septic tanks | Waterborne |
| Businesses | 3 980 | | | |
| Clinics | 68 | | 1 | |
| Creches | 7 | 2 | | 5 |
| "Dry" Industries | | | | |
| Hospitals | 13 | | | 13 |
| Magistrate offices | 7 | | | 7 |
| Police Stations | 15 | 4 | | 11 |
| Prisons | 3 | | | 3 |
| Schools | 789 | 24 | 637 | 128 |
| Community Halls | 39 | 27 | | 12 |
| **Total** | **4 921** | **57** | **638** | **4 226** |

ZDM has furthermore embarked on an extensive field surveys to determine the status of water and sanitation services at health institutes and schools in the district. The outcome of this survey is indicated in Figures 2.1 a,b,c and d below.

**Figure 2.1 (a): Current status of water services at clinics and hospitals in the district**

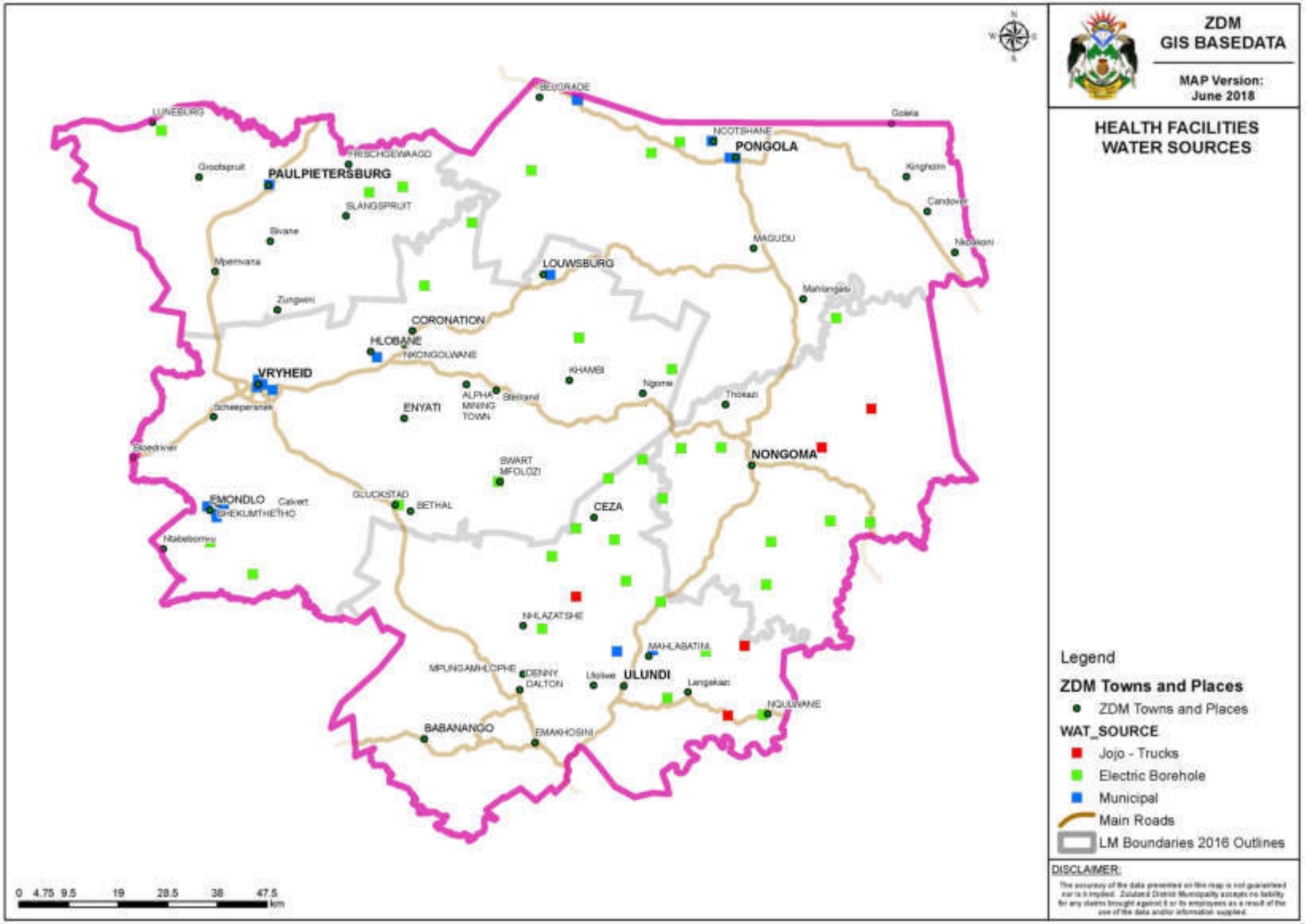


**Figure 2.1 (b): Current status of sanitation services at clinics and hospitals in the district**

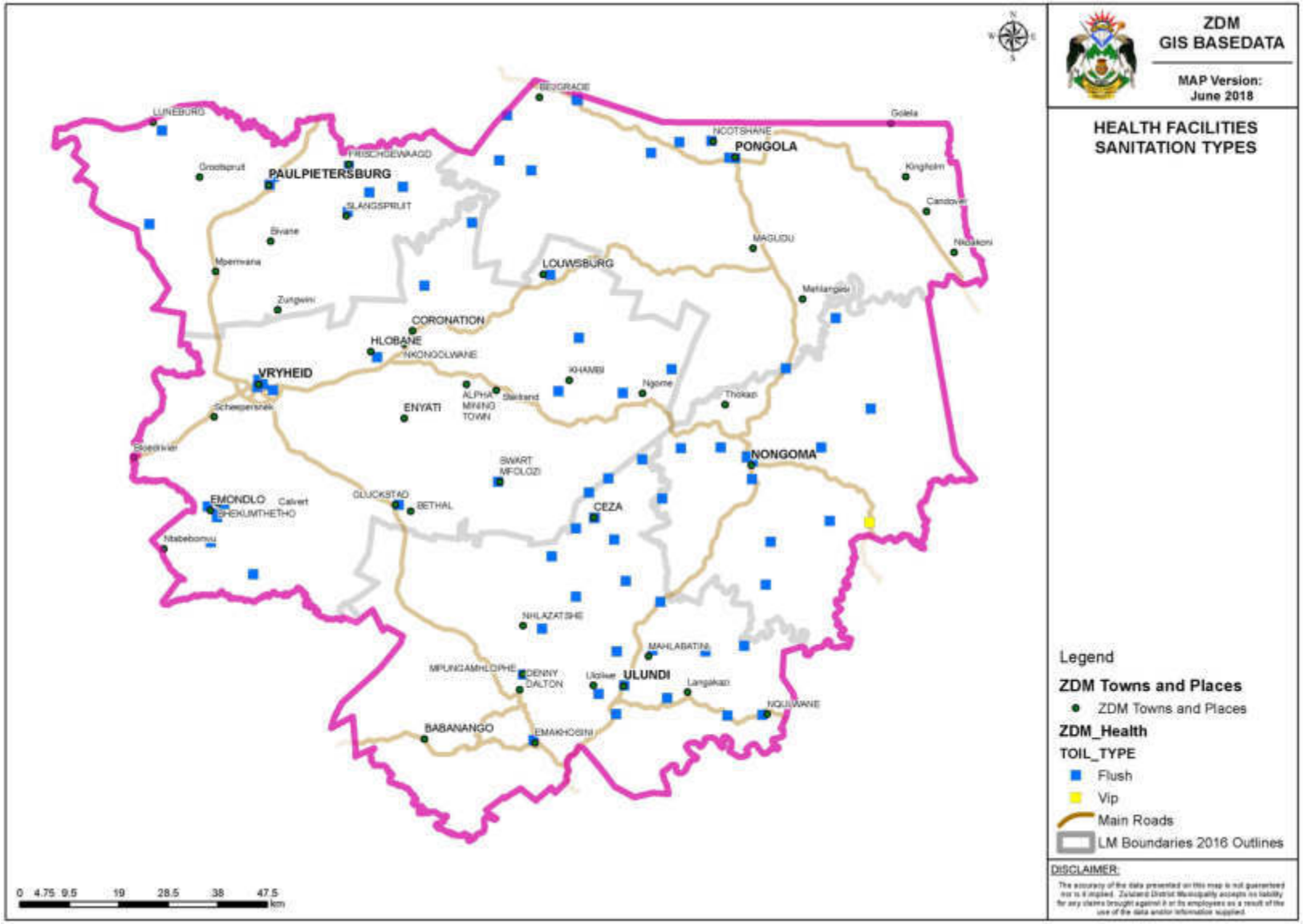


**Figure 2.1 (c): Current status of water services at schools**

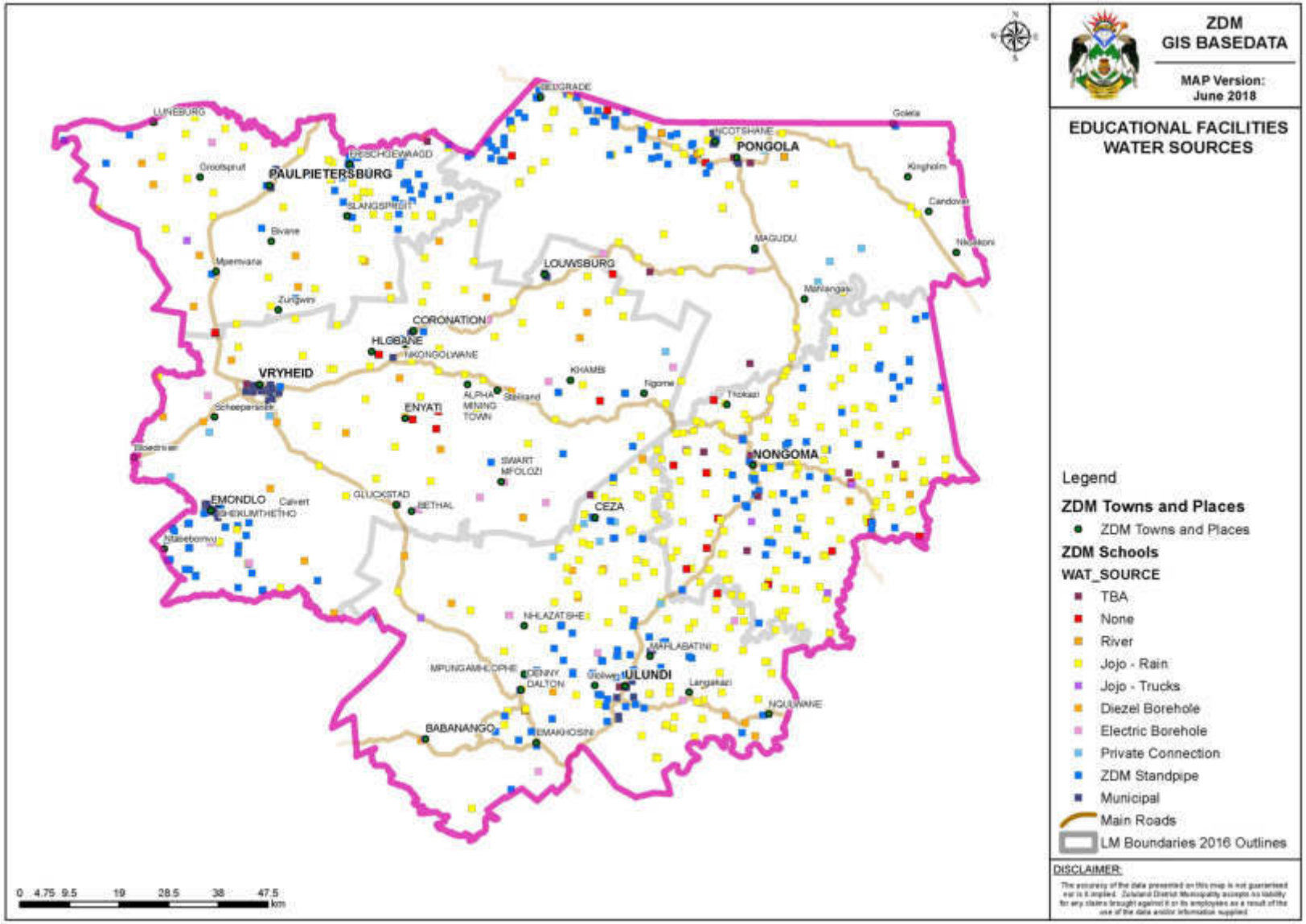
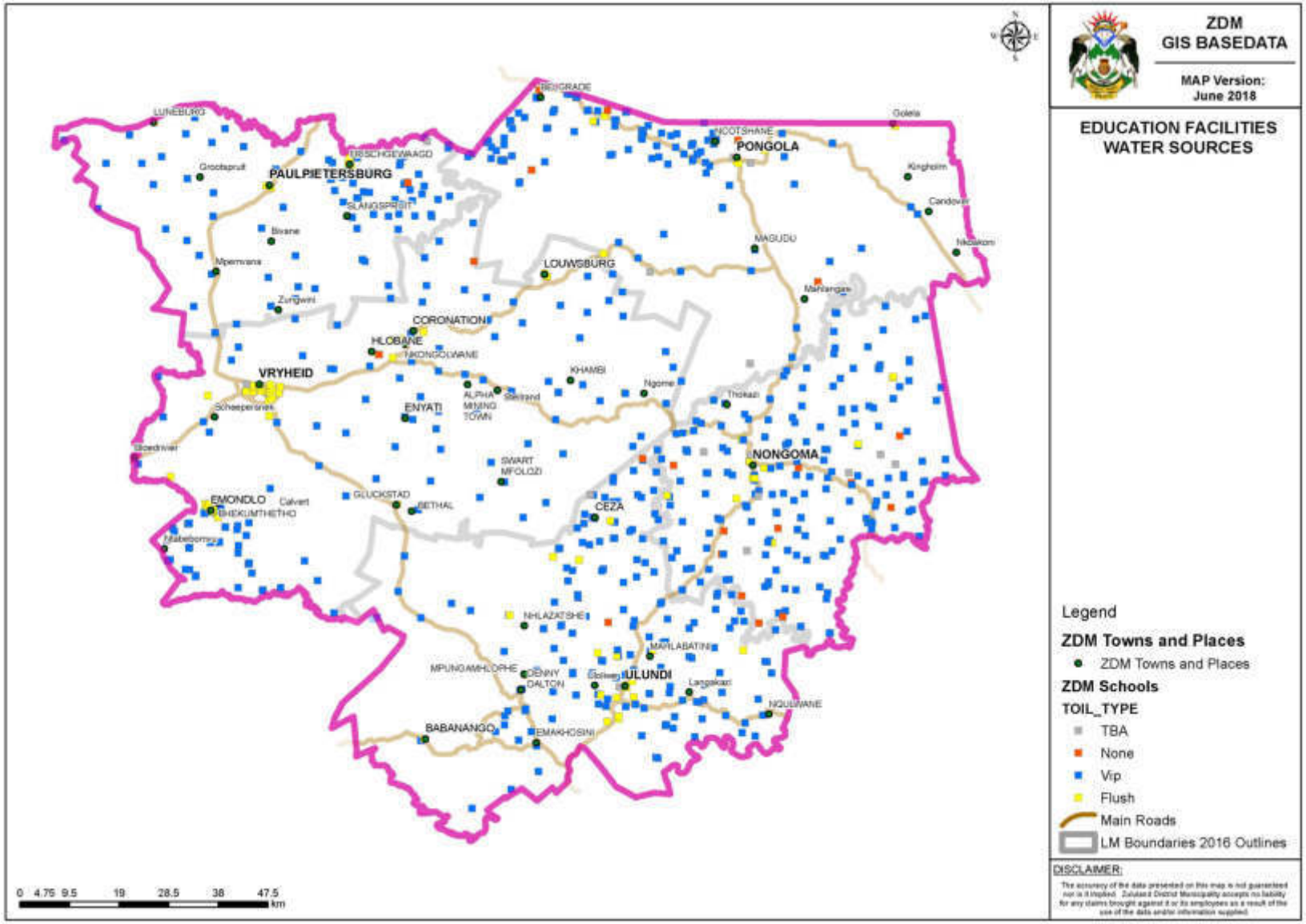


**Figure 2.1 (d): Current status of sanitation services at schools**



## 2.3 Wet Industries

There is a weak industrial base within the region and therefore industrial water use has not received high focus to date. Further detail will be obtained in future reviews of the WSDP.

## 2.4 'Raw' water consumers

There do not appear to be any raw water consumers in the ZDM, other than those not supplied with adequate water services i.e. the backlog. All water supplied is passed through a treatment facility.

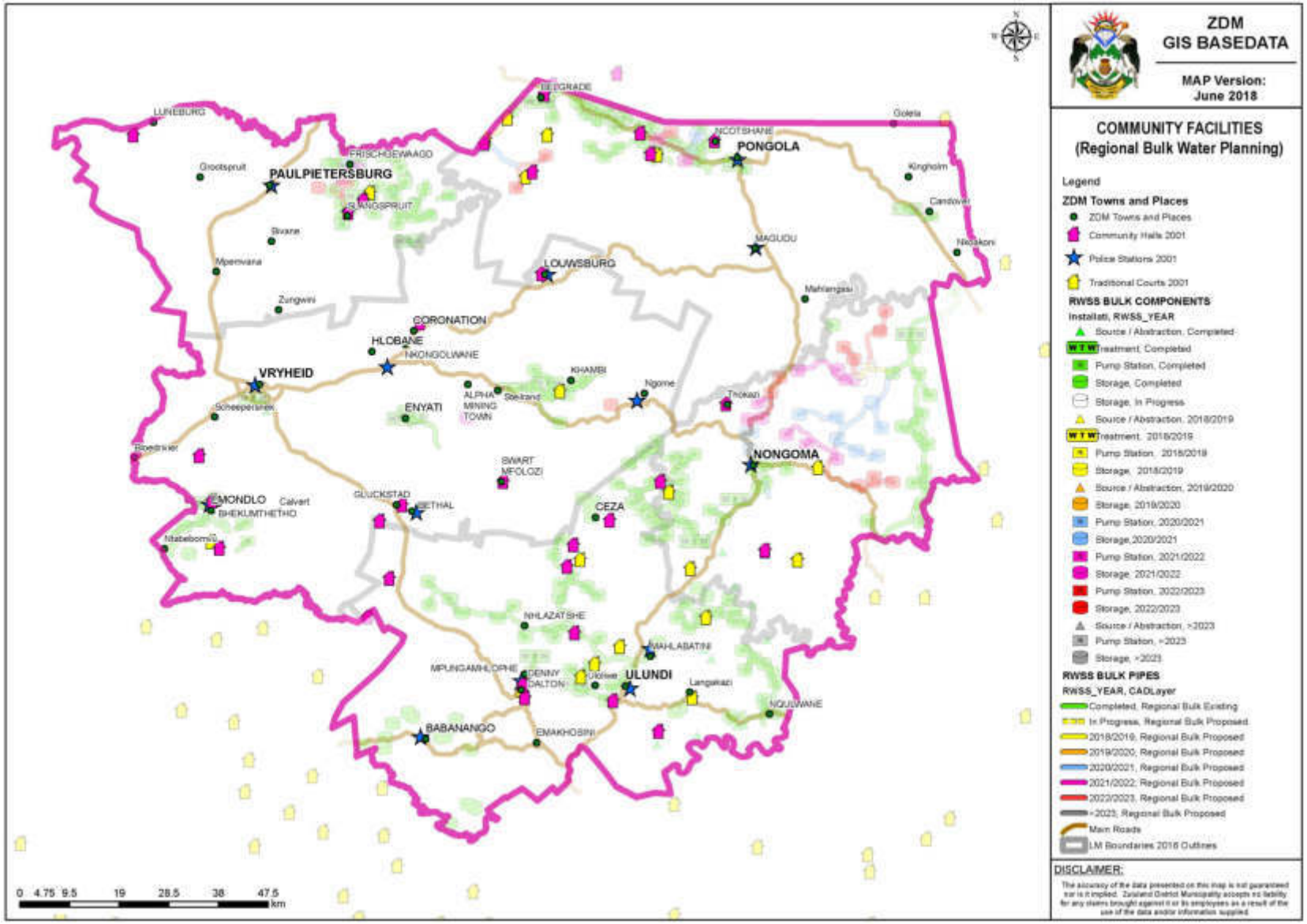
## 2.5 Industrial consumer units: sanitation

No industry discharges wastewater directly into the river system. All wastewater passes through the WWTWs prior to discharge at the requisite standards. However, detailed data on the effluent received from industrial consumers still needs to be obtained.

## 2.6 Industries and their permitted effluent releases

No industry discharges wastewater directly into the river system. All wastewater passes through the WWTWs, however details of the effluent are still required.

**Figure 2.1 (e): Location of institutional facilities relative to water infrastructure**



# 3. WATER RESOURCE PROFILE

## 3.1 Water sources

All water supplied by the ZDM to the community is from sources within the DM's area of jurisdiction, except for the Mandhlakazi Regional Scheme where water is obtained from the Pongolapoort dam via a private farmer. With a population count of approximately 805 055, ZDM requires at least 2 108 Mℓ of water per month or 25 295 Mℓ per year to supply the population with basic water services. This does not account for commercial or industrial requirements.

The ZDM falls within the Mfolozi (W2), Mkuze (W3) and Pongola (W4) secondary catchments of the Usuthu/Mhlathuze Water Management Area (WMA)[1]. The aerial extent of the ZDM occupies approximately 22% of this WMA. The total available water and requirements as at year 2000, based on a 98% assurance of supply within these sub-areas, is summarised in Table 3.1[2]. It is evident that apart from the Pongola catchments, water from these sub-areas is currently over-utilised and a deficit is created. However, according to Basson and Rossouw[3], this deficit is a result of the provision made for future implementation of the Reserve. The Reserve is a legislated requirement of the amount of water required to satisfy the ecological needs of a river system (provisionally estimated at 20%), as well as the basic human needs (that have been established as 25 litres per person per day).

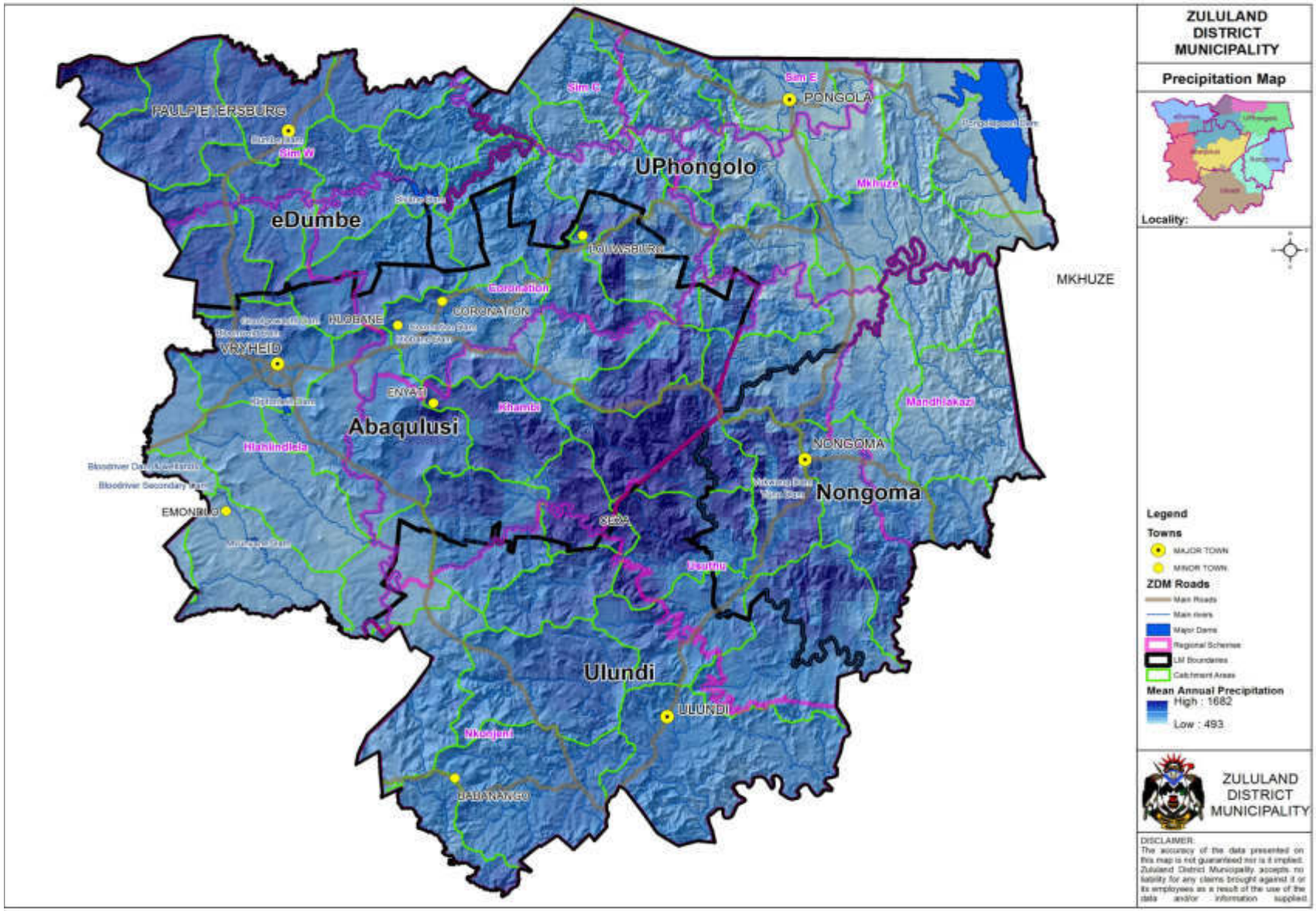
**Table 3.1: Water balance - summary of the water available and required within Zululand District Municipality for the year 2000 (Million m³ (kℓ) per annum).**

| | | | Mfolozi | Mkuze | Pongola | Total |
|---|---|---|---|---|---|---|
| Available water | Natural resource | surface water | 36 | 15 | 616 | 667 |
| | | groundwater | 5 | 12 | 8 | 25 |
| | Usable return flow | Irrigation | 5 | 6 | 21 | 32 |
| | | Urban | 4 | 0 | 0 | 4 |
| | | Mining & bulk | 1 | 0 | 0 | 1 |
| | Total local yield* | | **51** | **33** | **645** | **729** |
| | Transfers in | | 0 | 30 | 0 | 30 |
| | **Total available** | | **51** | **63** | **645** | **759** |
| Water requirements | Consumer groups | Irrigation | 51 | 61 | 213 | 325 |
| | | Urban** | 12 | 1 | 1 | 14 |
| | | Rural** | 11 | 10 | 6 | 27 |
| | | Mining & bulk industrial*** | 4 | 0 | 1 | 5 |
| | | Afforestation**** | 2 | 6 | 34 | 42 |
| | Total local requirements | | **80** | **78** | **255** | **413** |
| | Transfers out | | 18 | 0 | 30 | **48** |
| | **Total used** | | **98** | **78** | **285** | **461** |
| **Balance** | | | **-47** | **-15** | **360** | **298** |

*Source: Basson and Rossouw (2003).*
**Includes allowance for impacts of the ecological component of the Reserve, river losses, alien vegetation, rain-fed agriculture and urban run-off on yield.*
***Includes allowance for basic human needs component of the Reserve (25 ℓ/c/d).*
****Mining and bulk industrial water uses that are not part of the urban system.****Afforestation quantities refer to the impact on yield only.*

[1] The Usuthu/Mhlathuze WMA is one of 19 areas defined across South Africa in terms of the National Water Act, 1998 (Act 36 of 1998). These WMAs have been defined to improve water resource management within South Africa. With time, each of the WMAs will establish a catchment management agency (CMA) for the regulation and control of water use in the WMA.
[2] Data for this table have been extracted from Basson and Rossouw (2003). *Usuthu to Mhlathuze Water Management Area: Overview of water resources availability and utilisation, September 2003*. DWAF: BKS. Report no. P WMA 06/000/00/0203. 31pp. At 13 & 21.
[3] Op cit 2 at 23.

**Figure 3.1 Precipitation & Catchment Areas within ZDM**



### 3.1.1 White Umfolozi Catchment (Hlahlindlela Regional Water Supply and Nkonjeni Regional Water supply Area)

A detailed catchment study for the Mfolozi River has not been undertaken before. The catchment has however been included in national water resource studies such as the Surface Water Resources of South Africa 1990 (WR90) and the Water Resources of South Africa 2005 (WR2005) studies of the Water Research Commission. Although the Usuthu to Mhlathuze Water Management Area (WMA6) is not considered by the Department of Water Affairs (DWA) to be a water stressed area as a whole, the Mfolozi River catchment is considered to have a net deficit in the water balance for the catchment according to the National Water Resource Strategy (September 2004 edition). The National Water Resource Strategy also indicates that there will be no net increase in water requirements within the catchment from 2000 to 2025. However there has been growing water demand over the past decade mainly due to an increase in the provision of water services to the large rural population within the catchment.

A reconnaissance level water resource catchment study for the White Mfolozi River was undertaken in 2009/2010. The yield analyses indicate that there is **insufficient** water to currently meet the requirements of eMondlo at 98% assurance and by 2030 there will be significant shortfalls in the water availability to meet the requirements of all the main towns, especially if the Reserve are released from the main dams. One of the recommendations of the study was that the Water Resource Planning Model (WRPM) be used to determine the scheduling requirements for new infrastructure and to recommend operating rules for the system.

ZDM undertook a Water Resource Modelling of **the upper White uMfolozi River System** during 2011/2012. Areas served by this System are Vryheid Town and surrounding suburbs, Bhekuzulu, Lakeside, eMondlo Town and surrounding areas (Hlahlindlela Regional Water Supply Scheme), Mpumanhlope, Ulundi, Babanango (Nkonjeni Regional Water supply Scheme) and Nondweni (Umzimyathi District Municipality).

The Water Resource Planning Model (WRPM) will be utilized to incorporate the water requirement projection (growth) and the current system storage states as at the beginning of January 2012 into the systems model, for the following benefits;

1. To determine the resource capability of the various sub-systems at different storage states.
2. To determine the required water resource augmentation dates to ensure that planning and implementation of new schemes are done timeously to avoid water restrictions at unacceptable levels.

The WRPM system's main focus it implementation scheduling and planning as well as operating analysis, as it takes into account the current status of the system, the growing water requirements, changing return flows and the scheduling of new infrastructure. The WRPM is ideally suited to analysing a multi-catchment system and has been used successfully on many of the complex water resource system in South Africa, such as the Vaal River System, the Orange River System, the Berg River System and the Umgeni System. This is the first time it will be applied to the White Mfolozi System.

The Planning Model has been setup for the White Mfolozi system and analyses done for three water demand scenarios.

**Table 3.2: Low, Medium and High Growth Scenarios**

| Growth Scenario | Vryheid Area (%) | eMondlo Area (%) | Ulundi Area (%) |
|---|---|---|---|
| **Low** | 1.4 | 1.2 | 2 |
| **Median** | 2.3 | 2.4 | 3.2 |
| **High** | 3.2 | 3.7 | 4.5 |

The model indicates that the yield from Mvunyane dam **is insufficient** to meet the water requirements at the desired levels of assurance and should be augmented very soon, to avoid the risk of restrictions occurring. The operating rules for Mvunyane should be implemented to protect higher assurance users.

For the **low growth scenario**, the yield from Klipfontein combined with the other existing dams is sufficient to meet the water requirements of Vryheid and Ulundi as well as the link to eMondlo until at least 2030.

For the **median growth scenario**, the yield from Klipfontein combined with the other existing dams is sufficient to meet the water requirements of Vryheid, Ulundi and eMondlo until 2024. After 2024, the existing water resource infrastructure of the White Mfolozi will need augmentation to meet the projected water requirements.

For the **high growth scenario**, the yield from Klipfontein combined with the other existing dams is sufficient to meet the water requirements of Vryheid, Ulundi and eMondlo until 2021. After 2021 the existing water resource infrastructure of the White Mfolozi will need augmentation to meet the projected water requirements.

It is therefore important that the required work to plan for the next water resource augmentation be undertaken, due to the long lead times required to implement a water resource development projects.

In applying the Planning Model approach to the development planning of water resource systems it is important that analyses are regularly updated to account for changes in storage and any revised projections of demands. These analyses should be undertaken annually around the decision month of May. The updated analyses should include any proposed new resource development or change in reuse strategy.

The following recommendations are proposed:

- **Take immediate action to augment the water supply to eMondlo.**
- **Start the necessary pre-feasibility and /or feasibility studies to be prepared for the next Water Resource Augmentation project.**
- **Implement the proposed operating rules for Mvunyane, Bloemveld and Grootgewacht Dams**

- **Make a decision on a restriction strategy for eMondlo. Implement restrictions to eMondlo based on the short term yield curves and the water requirement projections.**
- **Continue to track the actual water usage in the system and update the water demand projections regularly.**
- **Monitor all dam levels on a daily basis, including the rainfall and evaporation.**
- **Monitor water abstractions and return flows on a daily basis.**
- **Rerun the WRPM every year in May with the updated system storage information and the updated water projections to revise the projected implementation date for the next water resource augmentation project.**
- **Review the recommendations made in the First Order Reconciliation strategies done during Small Town Studies, particular attention should be paid to Water Conservation and Demand Management Strategies in the ZDM supply areas.**
- **Review the option of raising Klipfontein dam as proposed in the First Order Reconciliation strategies with other water resource development alternatives to improve the system yield. The raising of Klipfontein Dam is likely to be expensive due to the potential impact on the road and railway line.**

**During 2016 ZDM was declared a drought-restricted region, which led to emergency interventions. The town of Vryheid was forced to rely on water tankers and water points at designated borehole and water tank points. Since then dam levels have normalised again but it is clear that the greater Vryheid region is in urgent need for major interventions in terms of sustainable water during dry winter months.**

### 3.1.2 Black Umfolozi Catchment (Usuthu Regional Water Supply)

ZDM investigated the available water resources in the upper Black Mfolozi River during 2011.

The purpose of the investigation was twofold:

- An assessment was undertaken to determine the available water resources of the upper Black Mfolozi River which involved quantifying the divertable flows at the existing weir on the river near Nongma upstream of the Kwa Nkweme River confluence. This represents the situation prior to construction of the off-channel storage dam on the Kwa Nkweme River. Analyses were performed for 18.6 Ml/day (2025 demand) and 25 Ml/day (2035 demand).

- Detailed yield analyses were undertaken to determine the water resources capability of a proposed system on the upper Black Mfolozi River, which consists of a new off-channel storage dam on the Kwa Nkweme River. Water for this off-channel storage dam will be supplied by diverting available flows from the existing weir on the Black Mfolozi River. The performance of the system was evaluated for a variety of possible configurations including a range of dam (storage) sizes, flow diversion capacities and downstream environmental flow requirements (EFR's).

Based on the results of the water resource assessment it is concluded that:

> *Prior to the construction of the proposed off-channel storage dam on the Kwa Nkweme River, a run-of-river scheme on the upper Black Mfolozi River could supply a target abstraction of 18.6Ml/day (or 6.8 million m³/a, the projected water requirement for the proposed scheme in 2025) with an annual risk of failure of 64% (recurrence interval of 1:1.6 years). This risk is well above accepted levels for schemes of this increase the supply capability (assurance of supply) of the system.*

A storage capacity of 7.9 million m³ (30% of the maximum capacity) is adequate to meet the target abstraction of 6.8 million m³/a. This, however, requires a fairly large diversion works capacity of 0.6m³/s. For a larger dam of 10.6 million m³ (40% of the maximum capacity) diversion works with a capacity of only 0.4m³/s would be adequate to meet the target abstraction.

The option recommended was the construction of a 75m high earthfill dam at estimated construction cost of R370m, but due to the limited geotechnical information available, the level of the dam options investigation (layouts and design) and related cost estimates can be classified as pre-feasibility.

A detailed survey of the dam basin is required, prior to any further designs and cost estimates. The survey information will be used on the area capacity calculations of the dam, as well as the design of the dam wall (length, height, spillway type, etc.) and other structures.

A detailed geotechnical investigation is also required, prior to any further designs and cost estimates.

### 3.1.3 Pongola Catchment (Mandhlakazi, Mkuze and Simdlangentsha Regional Water supply Area)

The Pongola catchment is currently under-utilised and the only catchment area not under stress. This catchment area supplies the Mandhlakazi Regional Water Supply Scheme from Senekal Boerdery via the Jozini Dam.

Due to the high cost involved for the construction of an off-storage Facility for the Usuthu Regional Scheme, the augmentation of the Mandhlakazi and Usuthu Regional Water Supply Schemes is currently investigated. The following items should be considered:

- Alternative sites for the off-channel storage facility should be investigated.
- The possibility to reduce the capacity of the off-channel storage dam on the Kwa Nkweme River should be investigated. The associated risk should be taken into account.
- The Operational cost should also be taken into account (including levies payable to Mr Senekal.)
- ZDM will have to assess their agreement with Senekal and negotiate upgrading and extensions of the existing agreement if necessary for the Usuthu supply.
- Additional and future DWA water allocations and licences from Jozini Dam.
- The existing abstraction works at Jozini Dam needs to be investigated.

### 3.1.4 Groundwater sources

**Groundwater sources – aquifer characteristics**

Groundwater is a useful water resource with potential quality and quantity being controlled by the geology of an area (see Figure 3.1 below). The Zululand district is underlain predominantly by Karoo Sequence basalts, shales, siltstones, sandstones and conglomerates that have been intruded by dolerite dykes, sills and plugs of Jurassic age (i.e. post Karoo; see Appendix 6 for geological maps). The formations making up the Karoo Supergroup sediments are often relatively massive such that primary storage and permeability is negligible. Groundwater storage and movement is confined to joints and bedding planes within the rock mass that yield between 0.5 and 2 ℓ/s. In the absence of faulting or dolerite intrusions, the groundwater potential of these sediments is marginal to poor (i.e. 0 to 0.5 ℓ/s (0 to 1,800 ℓ/h)). In addition, water quality is generally poor (Class 2) and some boreholes produce high concentrations of dissolved salts (Nyoka Formation), with high NaCl and $SO_4$ concentrations (Vryheid and Dwyka Formations) or high Iron and/or Manganese (Pietermaritzburg Formation). The indurated contact zones in the sediments adjacent to the intrusive Jurassic age dolerite intrusions are often highly fractured and these discrete zones enhance groundwater storage and rockmass permeability. As a result, boreholes drilled to intersect these structures usually produce higher yields and superior quality groundwater than that of the surrounding host rock. These contact zones usually produce yields ranging from 0.1 – 10 l/s and groundwater quality range from Class 0 to Class 3 depending on the composition of the sedimentary host rock.

The groundwater development potential of each of the quaternary catchments have been characterized using the criteria outlined as follows:

- The geological information underlying each quaternary and associated median yields for the geological formations.
- The ambient groundwater quality each of the geological formations.
- The renewable resource derived from rainfall recharge as a percentage of MAP over the effective surface area of the quaternary (base flow included in the estimates).
- Current utilization was calculated using the following assumptions
    - Handpumps - 250 l/hr for 12 hours = 3 kl/day
    - Motorized systems - 1000 l/hr for 10 hours = 10 kl/day

The potential extractable volume was derived from the difference between renewable groundwater resource (recharge) and current utilization (groundwater abstraction).

In general the overall groundwater quality in the ZDM is good in the northern parts (see Appendix 6), with the water quality in eDumbe, uPhongola and Abaqulusi LMs falling within Class 0 and 1 (Kempster Classification). In the southern parts the water quality is generally poor however, with most boreholes falling in Class 3. It is pertinent to note that a large number of the Traditional Authority areas are situated within these areas of poorer groundwater quality. The deterioration of groundwater quality from west to east, can be ascribed to:

- Declining rainfall from west to east.
- Concentration of dissolved solids from through flow below the Dwyka Formation and coal seams in the Vryheid Formation in the central and eastern regions of the catchments.

The sedimentary rocks that underlie the study area represent a secondary or fractured rock aquifer with negligible primary porosity or permeability. Groundwater storage and movement is therefore mainly confined to fractures and joints that occur within the rock mass, and is therefore structurally controlled.

The groundwater development potential within each of the quaternary catchments is adequate to meet the basic water demand of rural communities either through:

- Stand-alone basic levels of water supply by boreholes equipped with hand pumps; or
- Limited reticulation schemes through production boreholes that target structural features offering high groundwater development potential.

**Groundwater monitoring**

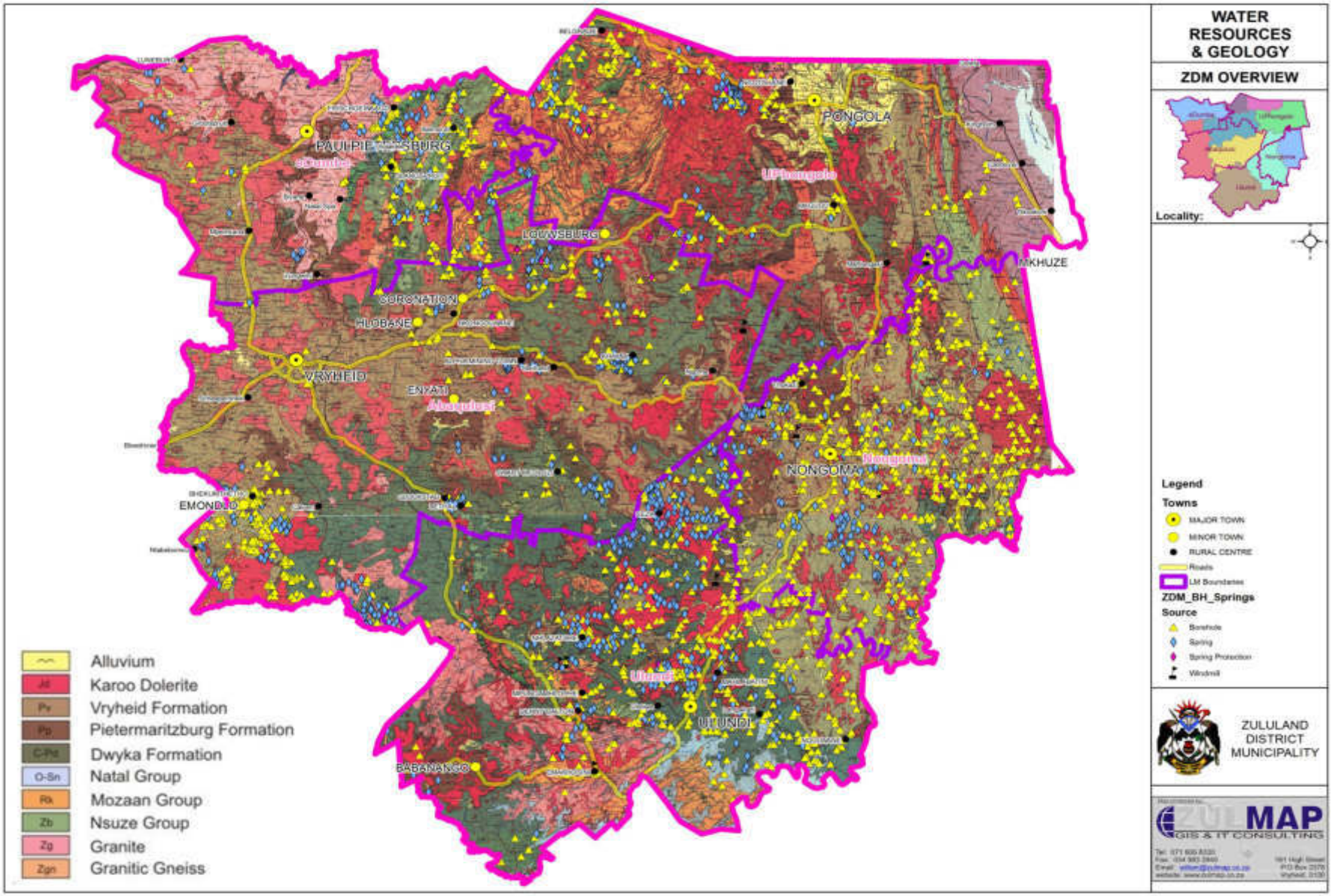
Owing to the fact that groundwater is utilised extensively in the supply of water services to the rural communities of the ZDM, it is important that groundwater levels and quality are monitored to ensure sustainability and SABS drinking water standards. The outbreak of cholera in KZN in 2000 resulted in extensive emergency work into the protection of surface water resources and sanitation supply. However groundwater quality is only occasionally monitored.

**External sources (where the WSA purchases water from others)**

All water currently supplied by the ZDM to the communities is from water resources within the DM's area of jurisdiction. However, as part of the regional scheme planning to alleviate the water services backlogs, the ZDM is approaching the surrounding WSAs to determine whether water can either be purchased from or supplied to others more cost effectively.

**Water returned to resources**

Water is returned through discharge from Wastewater Treatment Works (WWTW) in the urban areas into the Pongola and White Mfolozi River systems. However, the quantities of water returned to resources still needs to be obtained from the WWTWs and the current ZDM reporting systems will be extended to start monitoring the volumes discharged.


WATER RESOURCES & GEOLOGY
ZDM OVERVIEW
Locality:
PAULPIETERSBURG
PONGOLA
LOUWSBURG
MKHUZE
CORONATION
HLOBANE
VRYHEID
ENTATI
NONGOMA
EMONDLO
ULUNDI
BABANANGO
Legend
Towns
MAJOR TOWN
MINOR TOWN
RURAL CENTRE
Roads
LM Boundaries
ZDM_BH_Springs
Source
Borehole
Spring
Spring Protection
Windmill
ZULULAND DISTRICT MUNICIPALITY
ZULMAP
GIS & IT CONSULTING
Alluvium
Karoo Dolerite
Vryheid Formation
Pietermaritzburg Formation
Dwyka Formation
Natal Group
Mozaan Group
Nsuze Group
Granite
Granitic Gneiss

### 3.1.5 Drought Relief

Emergency drought relief funding was provided to ZDM in 2016 during the national state of emergency due to drought. An amount of R37 493 000 was made available in 2016 for drought relief interventions, and a planned 7 880 households were to benefit from this funding allocation. More details can be reviewed under Chapter 10. Projects.

## 3.2 Water quality

The quality of bulk water taken from the resource is measured at the source; water treatment works (WTW) and the reservoir (Table 3.4). More detailed information on water quality and monitoring frequency per WTW and WWTW is given in Section 7 of this document.

**Table 3.4 (a): Water quality monitoring.**

| | At source | At treatment plant | At reservoir | At tap |
|---|---|---|---|---|
| Is water quality measured? | Yes | Yes | Yes | Yes |
| Do you monitor it yourself? | Yes | Yes | Yes | Yes |
| If no, who does? | n/a | n/a | n/a | n/a |
| Monitoring intervals | Daily | Daily | Daily | Monthly |
| Are these results available in electronic format? | Yes | Yes | Yes | Yes |
| % time (days) within SABS 241 standards per year | 100 | 100 | 100 | unknown |

Monitoring of water quality within the rural areas is dependent upon the water source. Water supplied through boreholes and protected springs are not monitored for quality. In these instances the boreholes are not equipped, nor the springs protected if the water quality does not satisfy the SABS drinking water specifications. Water abstracted from surface water or supplied from urban areas is usually treated at a WTW and will have undergone the necessary quality monitoring and testing.

**Reporting on quality of water:**

ZDM has developed a water quality reporting system where all water quality test results are captured and management reports drawn for immediate interventions where needed. ZDM also reports monthly to DWA on water quality results, as part of the DWA regulation process. Schemes that indicate inferior water quality results are then immediately acted upon to resolve such issues. The actual report for each month is available from the ZDM MANZI system on request.

The Blue Drop Assessment also serves to evaluate different aspects of water provision and quality within ZDM. The latest results can be reviewed further-on in this report.

**Quality of water returned to the resource**

The water returned to the resources in the urban areas is from the WWTW and storm water systems. Monitoring of stormwater quality does not occur. The WWTW treat domestic wastewater and wet industrial effluent, and once treated the return effluent is sampled. The effluent produced by "wet" industries needs to be monitored and sampled to ensure compliance with the municipal by-laws in terms of discharge into the WWTW.

There is no formal wastewater treatment process in the rural areas as the rural areas are supplied through dry-pit VIPs and not waterborne sewerage systems. The quality of sewage returned to the water sources must also be monitored and reported to DWA on a monthly basis but at this stage limited information is available and useful reports do not yet exist.

**Pollution contingency measures**

The ZDM forms part of the Usuthu/Mhlathuze WMA and as such will form part of the CMA for this region. A proposal for the establishment of the Usuthu/Mhlathuze CMA has been put forward to national government. Once established the ZDM and all other water users within the Usuthu/Mhlathuze WMA will have input into, and have to comply with, the Usuthu/Mhlathuze catchment management strategy (CMS). This strategy should include pollution contingency measure/s that may be required to maintain the desired river reach classes. However, although groundwater forms part of holistic water resource management it is likely that this aspect may be treated as secondary by the CMA and it will therefore fall on the ZDM to ensure that they put suitable contingency measures in place.

## 3.3 Abstraction licenses and effluent permits

ZDM is in the process of registering all water and sewage works in the district with DWA. Shown below in Table 3.5 (a) is a list of the water and sewage works in the district and the status of the license registration processes.

**Table 3.5 (a): List of water permits**

| WTW Name | Latitude | Longitude | Registration Status |
|---|---|---|---|
| Babanango Town | -28.398321 | 31.071465 | Forms Submitted - Pending |
| Belgrade Township | -27.280166 | 31.279082 | Forms Submitted - Pending |
| Ceza WTW | -27.995517 | 31.375931 | Forms Submitted - Pending |
| eDumbe | -27.439965 | 30.820735 | Forms Submitted - Pending |
| Makhosini | -28.356472 | 31.272092 | Forms Submitted - Pending |
| Enyokeni Royal Palace | -27.959809 | 31.521190 | Forms Submitted - Pending |
| Frischgewaagd Town/Blinkwater | -27.389440 | 30.954311 | Forms Submitted - Pending |
| Itshelejuba | -27.276854 | 31.346154 | Forms Submitted - Pending |
| Khangela Royal Palace | -27.738193 | 31.705480 | Forms Submitted - Pending |
| Khiphunyawo | -27.311995 | 31.209771 | Forms Submitted - Pending |
| Khombuzi WTW | -27.730019 | 31.727438 | Forms Submitted - Pending |
| Mandlakazi RWSS | -27.680543 | 31.916534 | Forms Submitted - Pending |
| Mountain View | -27.784817 | 31.427912 | Forms Submitted - Pending |
| Mpungamhlope | -28.234665 | 31.271593 | Forms Submitted - Pending |
| Msibi | -27.351458 | 31.206944 | Forms Submitted - Pending |
| Mvuzini | -28.004120 | 30.679364 | Forms Submitted - Pending |
| Nkonjeni | -28.228463 | 31.423898 | Forms Submitted - Pending |
| Nkosentsha | -27.390240 | 31.254435 | Forms Submitted - Pending |
| Ophuzane | -27.491598 | 30.939828 | Forms Submitted - Pending |
| Osingisingini | -27.997320 | 31.685002 | Forms Submitted - Pending |
| Pongola/Ncotshane Town | -27.389033 | 31.617976 | Forms Submitted - Pending |
| Sidinsi | -27.955112 | 31.773067 | Forms Submitted - Pending |
| SpekBoom | -27.304730 | 31.395382 | Forms Submitted - Pending |
| Tholakela | -27.442931 | 30.970889 | Forms Submitted - Pending |
| Thulasizwe | -27.951000 | 31.366717 | Forms Submitted - Pending |
| Ulundi Town | -28.281655 | 31.340042 | Forms Submitted - Pending |
| Nongoma Town | -27.962509 | 31.613695 | Forms Submitted - Pending |
| Ncome | -27.944885 | 30.659276 | Forms Submitted - Pending |
| Coronation RWSS | -27.677210 | 31.052570 | Forms Submitted - Pending |
| Klipfontein | -27.791003 | 30.786818 | Forms Submitted - Pending |
| Bloemveldt | -27.727868 | 30.746585 | Forms Submitted - Pending |
| eMondlo Township | -27.971017 | 30.691998 | Forms Submitted - Pending |
| Hlobane Region | -27.717325 | 31.031722 | Forms Submitted - Pending |
| Louwsburg Town | -27.580634 | 31.271741 | Forms Submitted - Pending |
| Enyathi Town | -27.813338 | 31.060888 | Forms Submitted - Pending |
| Khambi RWSS | -27.773071 | 31.227059 | Forms Submitted - Pending |
| Purim WTW | -28.016124 | 30.758741 | Forms Submitted - Pending |
| Masokaneni WTW | -28.187636 | 31.738694 | Forms Submitted - Pending |

**Table 3.5 (b): List of sewage effluent permits**

| WWTW Name | Latitude | Longitude | Registration Status |
|---|---|---|---|
| Pongolo WWTW | -27.38861111 | 31.61805556 | Forms Submitted - Pending |
| Itshelejuba WWTW | -27.27341506 | 31.35323088 | Forms Submitted - Pending |
| Dumbe WWTW | -27.40916667 | 30.81444444 | Forms Submitted - Pending |
| Ulundi WWTW | -28.34812720 | 31.42949714 | Forms Submitted - Pending |
| James Nxumalo WWTW | -28.33960865 | 31.39827575 | Forms Submitted - Pending |
| St Francis WWTW | -28.22511079 | 31.47935490 | Forms Submitted - Pending |
| Nkonjeni WWTW | -28.22638889 | 31.41916667 | Forms Submitted - Pending |
| Ceza WWTW | -27.99833333 | 31.37777778 | Forms Submitted - Pending |
| Thulasizwe WWTW | -27.95194444 | 31.36777778 | Forms Submitted - Pending |
| Coronation WWTW | -27.66906843 | 31.06491781 | Forms Submitted - Pending |
| Hlobane WWTW | -27.71695336 | 31.00818335 | Forms Submitted - Pending |
| Vryheid WWTW | -27.79237777 | 30.78693412 | Forms Submitted - Pending |

# 4. OPERATION & MAINTENANCE

## 4.1 O&M Management

Operation and Maintenance management is split up as follows:

- **Bulk Water and Wastewater Management:**
  The core function for Water Services Provision Bulk is to ensure that water and wastewater infrastructure is managed properly in order to produce a cost effective and SANS 241 acquiescent quality of water. It is also to Operate and Maintain the Bulk Infrastructure in order to minimize down time).
- **Rural and Urban Reticulation:**
  The main function of the "Urban and Rural Reticulation Section" division is to operate and maintain the water and sanitation networks in both urban and rural areas within the Local Municipalities.

The following figure depicts the organogram related to the above functions:

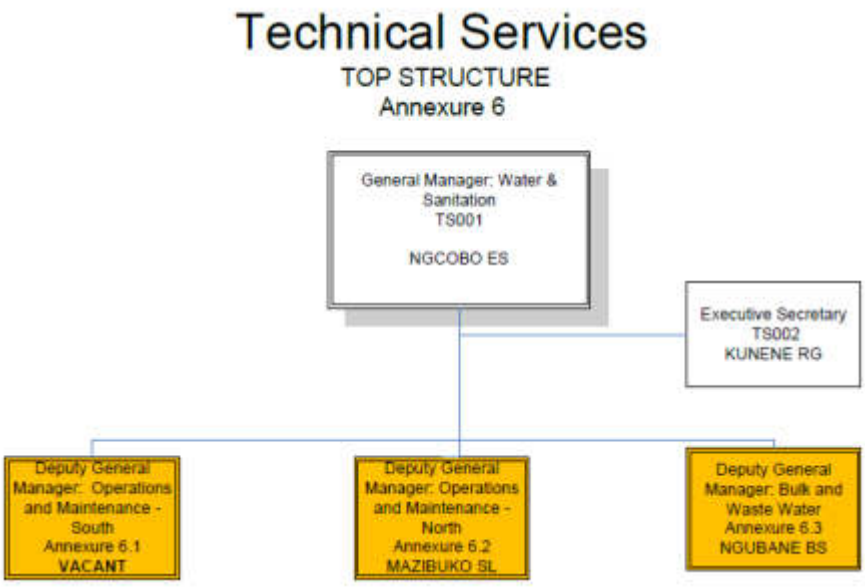



**Figure 4.1: Organogram**

An Asset Management Plan was compiled in 2016 for ZDM which outlines the following key aspects for O&M:

- Maintenance Strategy
- Compilation of Asset Register
- Budget Analysis
- Skills Assessment, Mentorship & Capacitating

The life cycle for O&M as depicted in the Asset Management Plan can be reviewed below:

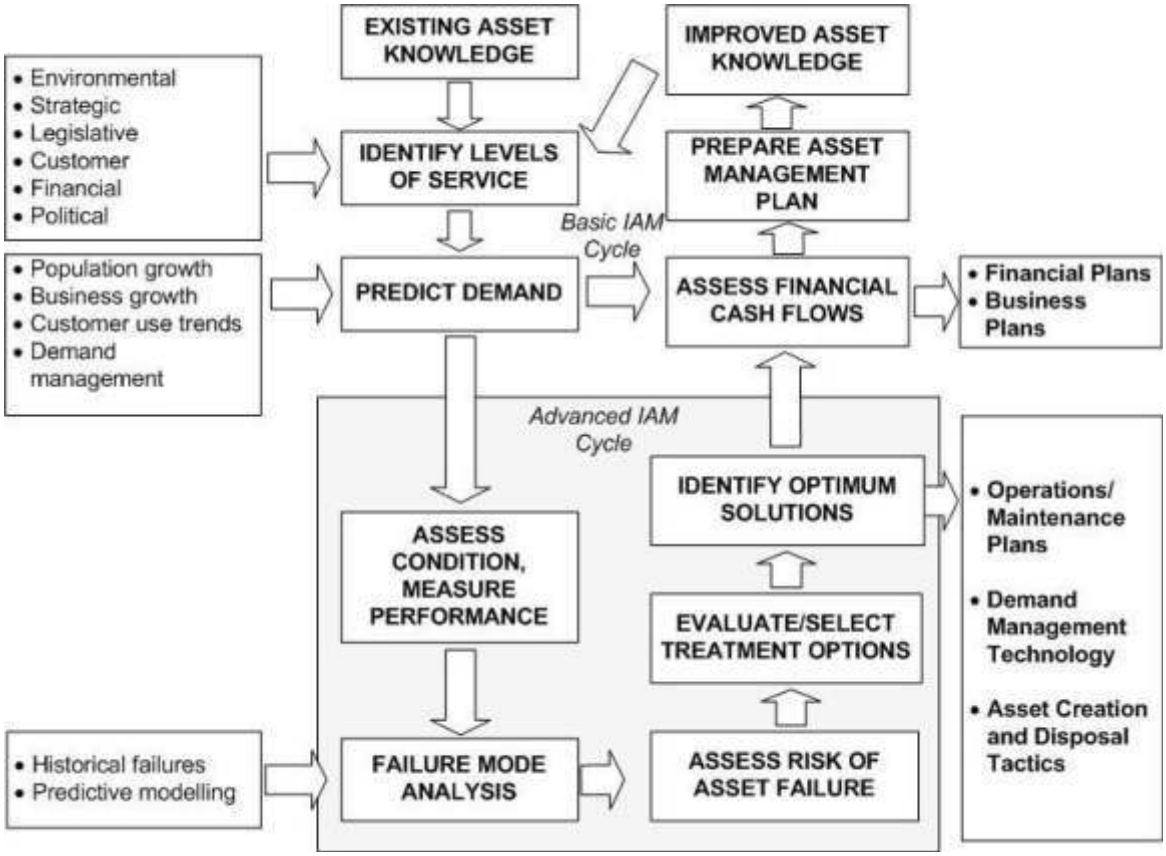



**Figure 4.2: Asset Management Life Cycle**

An Infrastructure Management Plan, Infrastructure Programme Management Plan, and Operations Management Plans are in place, and reporting is done on a monthly basis.

## 4.2 O&M Budget Requirements

Of critical importance is the funding of Operations and Maintenance of existing and future schemes as they are being commissioned. Correct O&M of physical infrastructure is arguably more important than infrastructure construction because unless successful preventative maintenance procedures are instituted schemes will become inoperative. As a large proportion of expenditure relates to staff, competent personnel are required to ensure that the large investments in water services are not negated through dysfunction or dereliction.

Table 4.1 below shows the operational costs associated with the provision of water services in the district against the total income. At present a significant deficit exists for O&M, and ZDM is addressing these issues

through various means. The NRW programme will assist in aligning O&M interventions where most needed and thereby improve the efficiency of scarce resources.

**Table 4.1: Operational costs and income**

| Operating costs and income | Total 5yr projected | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 |
|---|---|---|---|---|---|---|
| Operational costs | R 2 584 611 744 | R 431 009 527 | R 470 231 394 | R 513 022 451 | R 559 707 494 | R 610 640 876 |
| Personnel costs | R 915 267 755 | R 152 629 935 | R 166 519 259 | R 181 672 512 | R 198 204 710 | R 216 241 339 |
| **Total O&M costs** | **R 3 499 879 499** | **R 583 639 462** | **R 636 750 654** | **R 694 694 963** | **R 757 912 205** | **R 826 882 215** |
| Equitable share: FBS | R 2 328 387 910 | R 388 281 673 | R 423 615 306 | R 462 164 298 | R 504 221 250 | R 550 105 383 |
| Income: sales (actual payment) | R 133 386 724 | R 22 243 553 | R 24 267 717 | R 26 476 079 | R 28 885 402 | R 31 513 974 |
| **Total income** | **R 2 461 774 634** | **R 410 525 227** | **R 447 883 022** | **R 488 640 377** | **R 533 106 652** | **R 581 619 357** |
| **Deficit/surplus** | **R -1 038 104 865** | **R -173 114 236** | **R -188 867 631** | **R -206 054 586** | **R -224 805 553** | **R -245 262 859** |

KPI's include maintaining proper O&M on relevant assets, as well as keeping staff and budget requirements in place.

# 5. WATER CONSERVATION / DEMAND MANAGEMENT

Water conservation and demand management is related to the wise use of water, such that the inefficiencies within the bulk and reticulation system that result in water losses are minimised and controlled, and that the wastage of treated water either within the network or by the consumer is reduced. Through education and appropriate tariff structures the ZDM may reduce the water services demand and provide effective water conservation.

## 5.1 Water Resource Management Interventions

The ZDM liaised closely with the DWA Water Resources Department in the province when the back-to-back, regional, water master planning exercise was done. Water resources that were known to be under stress were avoided and the more sustainable water resources were targeted for long-term future supply. Chapter 3 of this report provides an overview of which resources are under stress.

The ZDM participates in DWA and other initiatives aimed at protecting the water resources in the district, e.g. the Working for Water Programme and is also an active member of the various Catchment Management Agencies within which the water resources of the District are located as well as the various Water User Associations that have been established in the District.

The quantum of water available for use within the District is both stressed and finite such that the only way of ensuring an adequate and sustainable supply in the long terms is to manage wasteful practices. In this regard the ZDM has recognised the need and embarked on a plan of action to address non-revenue water (NRW).

This programme is intended to quantify the usage of water within the district by way of a water balance, compare this with the design norms and standards set by the ZDM and to identify specific interventions to manage the demand within acceptable limits and to reduce waterlosses.

The information gathered from the NRW programme will be incorporated into MANZI, be aligned with the ZDM WSP reporting system and used to develop a water balance for individual schemes and eventually a water balance for the entire District as required by the WSDP.

The NRW programme will assist in aligning O&M interventions where most needed and thereby improve the efficiency of scarce resources.

The following specific interventions will address water losses through:

- Pressure management;
- Leak repair programmes;
- Meter repair & replacement programmes;
- Internal plumbing leaks; and
- Consumer end-use demand management initiatives.

The NRW strategy that the ZDM has adopted may be summarised as follows:

**NEED FOR AN NRW PROGRAMME**

The municipality has identified the need to embark on a Non Revenue Water (NRW) programme for the District not only to save water but also to benefit from the many added advantages that can be linked to such a programme such as:

- Reduced water consumption and water wastage;
- Improved quality of service provided with more consumers receiving water consistently (the need for example to close reservoirs at night will be substantially reduced or even completely eliminated);
- Improved coverage with billing and improved income stream for the municipality;
- Reduced costs to provide water services (less chemicals used, less maintenance required, etc);
- More efficient use of limited financial and human resources by focusing resources where most needed;
- Increased lifespan of infrastructure assets and postponing huge capital investments required to upgrade infrastructure in order to meet excessive growth in consumer consumption.

**PRINCIPLES**

Before embarking on any new initiative it is best to first clarify the principles that must guide the programme and thereby set the framework within which to operate, as follows:

- The approach should be holistic and should deal with the complete solution from design issues, through to operational challenges and included metering and billing shortcomings. All role-players within the organisation must be brought on board and ownership of the programme established in-house.
- Remedial actions identified through the programme must involve the relevant staff of the municipality and thereby work towards permanent change for the long term. The programme should influence daily operations in such a manner that it becomes a “way of life” within the organisation and leads to ongoing sustainability.
- Remedial actions that are decided upon have to be reviewed or at least judged economically by comparing the investment required versus the anticipated “win” that will be achieved. The 80/20 principle should apply whereby the effort is firstly focused where the major challenges occur. Schemes need to be prioritised for intervention and one possible method could be to prioritise

schemes in terms of their estimated contribution to the total estimated NRW in the District (see Table 1 below).

- Pressure Management activities should aim at achieving static pressures in the reticulation networks of urban areas of between 2,5 – 6 bar and in rural areas of between 1- 6 bar. Proper network modelling should however dictate the final solution for each individual scheme.
- Measurement devices installed through this programme must be compatible with the telemetry and SCADA systems that will be installed by the ZDM through a parallel processes.
- All field information must be captured electronically on the existing central database called MANZI (Infrastructure Management System) and thereby linked to the GIS.
- The IWA method is recommended to be used to categorize water usage and to compile a water balance for each scheme, as shown in the figure below:

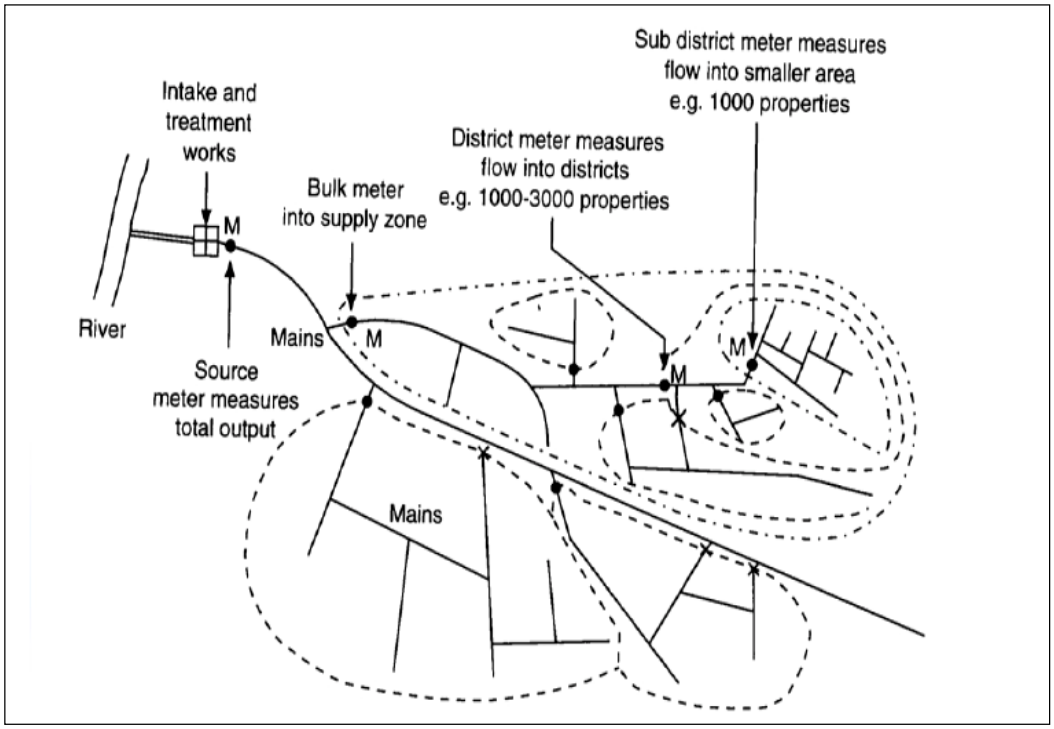
**Figure 4.1: IWA Method of categorizing water use**

<table>
<tr><td rowspan="8">System Input Volume</td><td rowspan="3">Authorized Consumption</td><td rowspan="2">Billed Authorized Consumption</td><td>Billed Metered Consumption</td><td>Revenue Water</td></tr>
<tr><td>Billed Unmetered Consumption</td><td rowspan="6">Non Revenue Water</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption</td><td>Unbilled Metered Consumption</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="5">Water Losses</td><td rowspan="2">Apparent Losses</td><td>Unauthorized Consumption</td></tr>
<tr><td>Customer Meter Inaccuracies and Data Handling Errors</td></tr>
<tr><td rowspan="3">Real Losses</td><td>Leakage on Transmission and Distribution Mains</td></tr>
<tr><td>Leakage and Overflows at Storage Tanks</td></tr>
<tr><td>Leakage on Service Connections up to point of Customer Meter</td></tr>
</table>

**METHODOLOGY**

The methodology to be used with the implementation of the NRW programme is summarised below:

- Understanding the functioning of the scheme from source to end user with the scheme information available;
- Managing scheme operations to achieve as closely as possible a situation where all consumers can receive water all day round and reservoirs do not have to be closed down at night (this allows for more accurate measurement);
- Identify water demand zones for each scheme and metering and logging points (temporary and permanent) and initiate implementation of the measurement devices as well as measures required to make zones discreet (see illustration below).




- The accurate recording and regular review of flow profiles and water supply volumes into each discrete zone, i.e. the metering infrastructure and data logging systems, including the compilation of system water balances.
- The accurate recording and regular review of consumer demand and the sustained implementation of specific tasks (e.g. leak detection surveys, step testing, pressure management reviews, prompt burst repairs, etc.) and sustained overall maintenance of all system components.
- The roll out of a meter testing and meter replacement programme.
    - Consumer metering and billing
    - Identify unmetered consumers and systematically install meters at all consumer connections.
    - Accurate and consistent billing of consumers as per the tariff policy.
    - Deal with non-payment in accordance with the ZDM by-laws and debt collection policy.

**PRIORITY SCHEMES**

It is difficult to determine accurately the extent of NRW in the district at this point in time and the pilot investigations that were discussed earlier indicated variances in NRW of between 41% and 68% between different schemes.

Table 4.1 (a) below lists the schemes in the district and the known System Input Volumes (SIV). Although the state of NRW in each individual scheme is unknown it could be safely assumed, based upon the previously mentioned pilot investigations, that at least a 40% NRW scenario prevails throughout. When 40% NRW is applied and the NRW contribution from each scheme is calculated as a percentage of the total NRW for the district, the schemes can be prioritised as indicated in Table 4.1 (a) overleaf.

**Table 4.1 (a): List of schemes with total monthly production and estimated UAW**

| Plant Name | Production (Ml/month) | Estimated NRW | % of Total District NRW |
|---|---|---|---|
| Vryheid Klipfontein / Bloemveld | 373.0 | 71% | 20.1% |
| Coronation | 39.1 | 47% | 2.1% |
| Hlobane | 12.2 | 59% | 0.7% |
| Paulpietersburg – eDumbe | 82.5 | 63% | 4.5% |
| Louwsburg | 12.3 | 11% | 0.7% |
| Mpungamhlope | 39.5 | 78% | 2.1% |
| eMakhosini | 8.5 | 43% | 0.5% |
| Babanango | 13.6 | 53% | 0.7% |
| Mandlakazi | 29.5 | 94% | 1.6% |
| Enyokeni Royal Palace | 0.9 | 65% | 0.1% |
| Kombuzi | 1.9 | 0% | 0% |
| Nongoma | 156.4 | 78% | 8.4% |
| Ophuzane | 13.1 | 57% | 0.7% |
| Tholakela | 8.5 | 38% | 0.5% |
| Mangosuthu | 32.3 | 10% | 1.7% |
| eMondlo | 39.0 | 12% | 2.1% |
| Msibi | 10.1 | 23% | 0.5% |
| Nkonsentsha | 1.2 | 50% | 0.1% |
| Belgrade | 23.8 | 67% | 1.3% |
| Khiphunyawo | 12.0 | 66% | 0.6% |
| Khambi Village | 8.6 | 80% | 0.5% |
| Mountain View | 2.5 | 98% | 0.1% |
| Osingisingini | 1.7 | 50% | 0.1% |
| Ceza | 3.4 | 50% | 0.1% |
| Sidinsi | 6.0 | 11% | 0.3% |
| Ulundi – Nkonjeni | 623.0 | 79% | 33.6% |
| Pongola Town/ Simdlangentsha East | 228.8 | 59% | 12.4% |
| Spekboom | 30.3 | 44% | 1.6% |
| Khangela Royal Palace | 0.3 | 29% | 0.1% |
| Mvuzini | 15.3 | 54% | 0.8% |
| Nkonjeni Hospital | 4.6 | 47% | 0.2% |
| Itshelejuba Hospital | 5.1 | 53% | 0.3% |
| Thulasizwe Hospital | 2.6 | 9% | 0.1% |
| Masokaneni | 0.0 | 0% | 0.0% |
| Purim | 10.4 | 22% | 0.6% |
| | **1 852** | **43%** | **100%** |

## 5.2 Status of the ZDM NRW programme

To date the ZDM has established a dedicated NRW team for North and South comprising the following:

**North**

- DD WSP (North)

**South**

- DD WSP (South)
- 1 x NRW technician
- 1 x Water inspector
- Reaction Team: 1 x plumber + 1 handyman + 1 labourer

The programme is focused on a number of key interventions as follows:

- Ensuring that adequate measures are implemented at a planning stage to facilitate the ongoing management of NRW including zone determination, meter sizing / specification and positioning etc;
- Compiling a comprehensive infrastructure database to facilitate NRW management;
- Datalogging of flow profiles;
- Meter zone identification;
- Pressure management;
- NRW management training;
- Installation of GSM dataloggers at key locations;
- Leak detection and repair – linked to customer service centre; and
- Establishment of a web based management system linked to Siza/Manzi.

The ZDM has also procured the services of a specialist NRW service provider to assist in capacitating the ZDM NRW team and to establish a NRW management system.

Progress to date may be summarised as follows:

**Nkonjeni RWSS/Ulundi**

- Survey of metering and pressure control infrastructure;
- Logging water meters within rural and urban areas and identification of areas of high night flows;
- Identify metering zones/districts;
- Set up NRW management systems;
- Procure additional loggers;
- Implement NRW training; and
- Compile infrastructure records.

**Frischgewaagd**

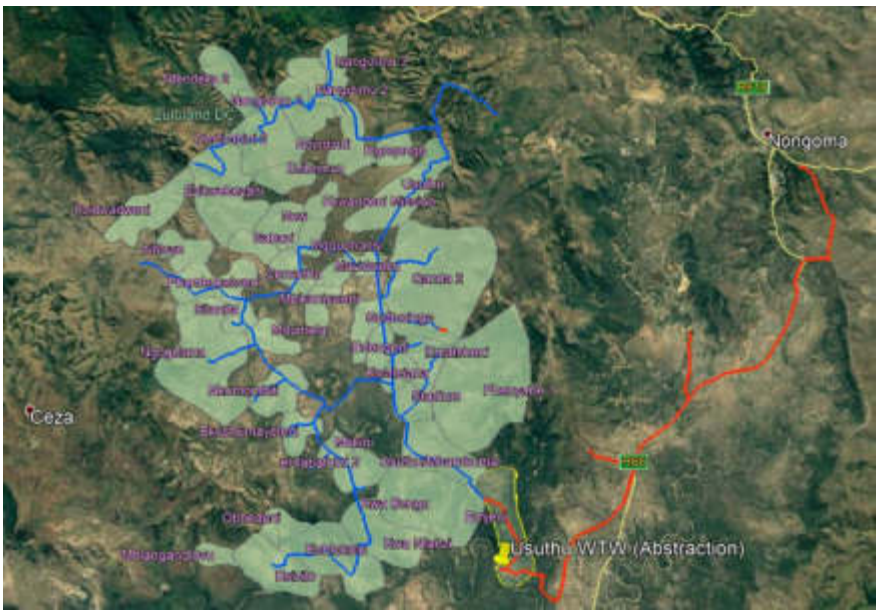
The networks at the township of Frischgewaagd were refurbished during 2007 to manage water losses, but no funding was available to install individual household connections. The township was devided into six supply zones and water is restricted per zone. This creates social problems as the usage per household cannot be controlled and if individuals waste water the entire zone is penalized. Water consumption per zone was measured during this period (2007/2008), just after the reticulation networks were refurbished. The initial daily consumption was between 650 and 750 kl/day for a period of 24 hours. Due to financial constraints at the time, it was decided to install **unmetered** yard connections at Frischgewaagd Township. Over time the home owners connected the new yard connection to their old internal plumbing systems without disconnecting their internal system from the old network, causing water losses.

During February 2012 loggers were re-installed and measurements taken. Early indications are that water is released to the township for 12 hours per day at a consumption of 780 kl/day (12 hours). This indicates that severe losses were present.

It is suggested that unmetered yard connections should be upgraded to metered yard connections to determine accurate water usage per reticulation zone. The home owners should be made aware of losses and loss management and should be restricted to free basic water, with an option to apply for a larger allocation of water (and be billed for it). Metered yard connections are being installed at Mangosuthu and were programmed to supply 200l/hh/day without any social issues.

**USUTHU REGIONAL SCHEME WATERLOSS PROGRAMME**

From the knowledge and outcomes gained from the above pilot projects, ZDM has recently embarked on the first full-scale Waterloss Management Programme on the Usuthu Regional Water Supply Scheme.



The goals of this programme will be to:

1. Establish and maintain the integrity of water zones and districts for the entire water supply system.
2. Monitor the level of NRW continuously for each district and zone.
3. Reduce and maintain the level of NRW to acceptable standards and benchmarks using best management practices.
4. Implement a consumer meter management programme.
5. Implement a pressure management programme.
6. Implement a pipeline maintenance and replacement programme.
7. Implement efficient water effluent management systems.
8. Install meters to all existing consumer connections.

The programme is currently being implemented and the expected deliverables are as follows:

| DELIVERABLE | CAPACITY BUILDING APPROACH |
|---|---|
| 1. WLM Action Plan | The WLM Action Plan will contain activities that will be prioritised for a period of 5 years. ZDM staff can use the plan to budget and execute prioritised WLM projects systematically |
| 2. Signed Funding Agreement | ZDM staff will be exposed to the extracting of data, analysing data and preparing a financial model and business plan to apply for funding. This can be used as template for additional funding applications. |
| 3. 10% NRW reduction by 30 June 2020 | ZDM staff will be closely involved with the implementation of the first WLM project so that a similar approach can be followed with subsequent projects. |
| 4. Trained O&M teams with adequate budget, staff, resources and systems | The capacity building approach will be to achieve the objective of this phase namely to ensure that the staff in the department responsible for operations and maintenance of the water services system are adequately trained and the department has the required budget, staff, resources and systems in place in order to deliver an efficient service to the community. |

The outcomes and lessons learnt from this programme will be used to lead the way in rolling out the ZDM Waterloss Management Programme to all the other regional water supply schemes.

## 5.3 Water Demand Management Interventions

ZDM is in the process of finalising a Water Demand Management Strategy (WDMS), in conjunction with the NRW programme.

Excessive water usage in many areas is putting the bulk infrastructure under immense pressure and upgrading will soon become necessary unless this can be postponed through effective demand management interventions.

The roll-out of new infrastructure to communities without services is of highest priority and leaves the ZDM with very little available capital for upgrading of existing services. Promoting more efficient usage of water can therefore have a significant impact in relieving this pressure with relatively low capital input.

The water demand strategy will focus on a number of ways to ensure the reduction of water demand by consumers, for example:

- **Influencing the behaviour of consumers**
    - School and public educational and awareness programmes aimed at promoting effective usage of water (brochures, advertising, newsletters, demonstrations, exhibits, informative billing, etc)
    - Water services tariff that promotes efficient water usage
    - Any other “win-win” initiatives that could influence consumers positively

- **Specific targeted projects like;**
    - Repair plumbing leaks inside properties
    - Installation of water flow control devices, etc.

ZDM by-laws have also been promulgated in 2008 and these assist the municipality to effectively regulate water usage in the district.

To date the WDMS has largely been driven at project level by the ISD service providers and at a political level by councillors. Part of the Usuthu Regional Scheme Waterloss Management Programme will be to lead the way in establishing effective water demand management.

# 6. WATER & SANITATION SERVICES INFRASTRUCTURE PROFILE

## 6.1 Existing water services infrastructure

ZDM has done extensive work on the development of a database that will serve as an asset register, but also to be used as the basis for the development of an asset management system and to capture asset related information electronically for ongoing use. The system has been named 'MANZI' and access can be gained on the ZDM website at www.zululand.org.za once the user has been issued with a username and password.

Table 5.1(a) below provides a brief overview of the schemes in the district that have been captured on the MANZI system and a summary of the infrastructure under consideration, as well as a rough estimate of the value of assets. These figures will be refined over time once the asset management system has been rolled out.

**Table 6.1(a): Summary of schemes in the district**

| Summary Data | LOS | Total |
|---|---|---|
| Number of Schemes | Above RDP - Urban | 13 |
| | Above RDP - Rural | 25 |
| | RDP | 105 |
| | Rudimentary | 173 |
| | **TOTAL SCHEMES** | **316** |

Figures 6.1 (a), (b) and (c) and Table 6.1 (b) below show examples of infrastructure data that is currently available on the GIS system and also on MANZI. Although some gaps still exist in the infrastructure information ZDM is working on getting all information gaps systematically updated.

**Table 6.1 (b): Summary of infrastructure components available on the ZDM GIS system**

| Summary Data | Description | Total |
|---|---|---|
| **Pipelines** | Bulk | 1 264 km |
| | Reticulation | 6 144 km |
| **Installations** | Yard Connection | 27 831 |
| | StandPipe - Barrel | 305 |
| | StandPipe - Communal | 5 792 |
| | Electrical Point | 72 |
| | Valve | 14 837 |
| | Meter | 1 274 |
| | Bulk Metering Points | 253 |
| | Handpump | 486 |
| | Pump | 25 |
| | Pump Station | 119 |
| | Source / Abstraction | 521 |
| | Break-pressure Tank | 499 |
| | Storage - Jojo | 228 |
| | Storage - Reservoir | 748 |
| | Treatment (Sand filters etc) | 12 |
| | Water Treatment Works | 39 |
| **Replacement Value** | Civil | R 2 187 465 532,77 |
| | Mechanical | R 638 857 590,23 |
| | Electrical | R 252 906 251,28 |
| | Telemetry | R 13 480 747,91 |

**Figure 6.1 (a): Existing water infrastructure in the district**

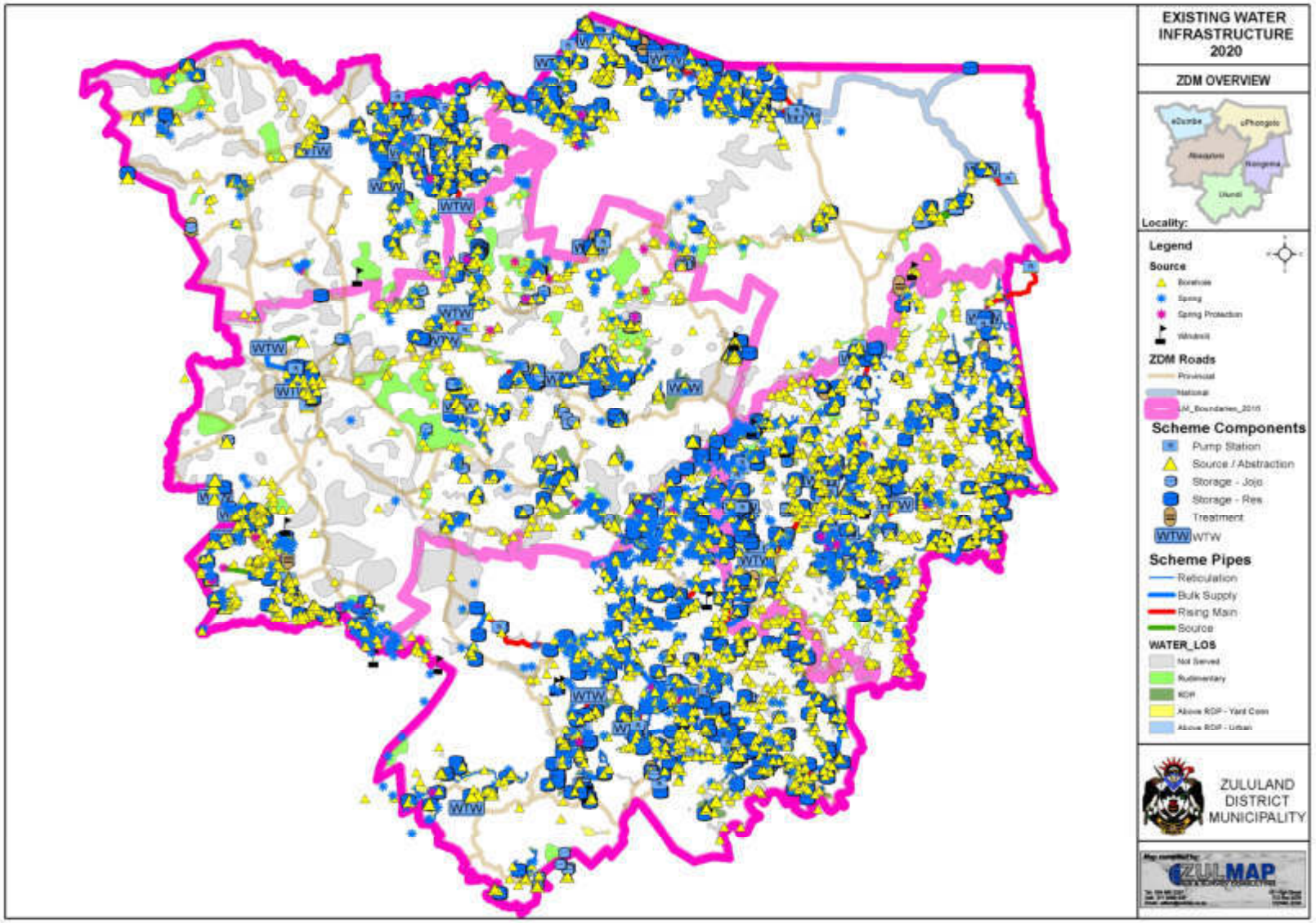


**Figure 6.1 (b): Typical Bulk Water Scheme details available on the ZDM GIS database (Ulundi Area)**

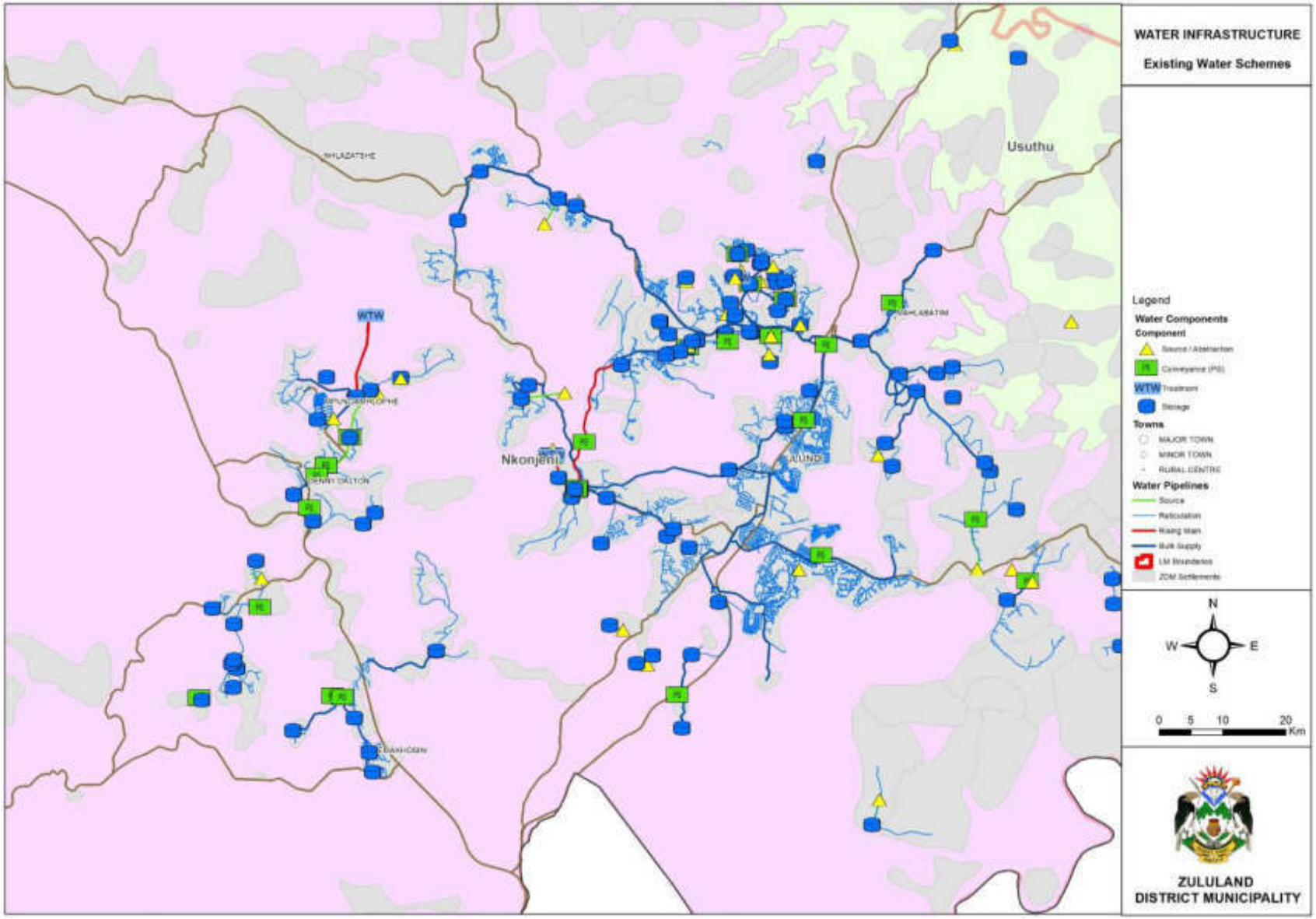
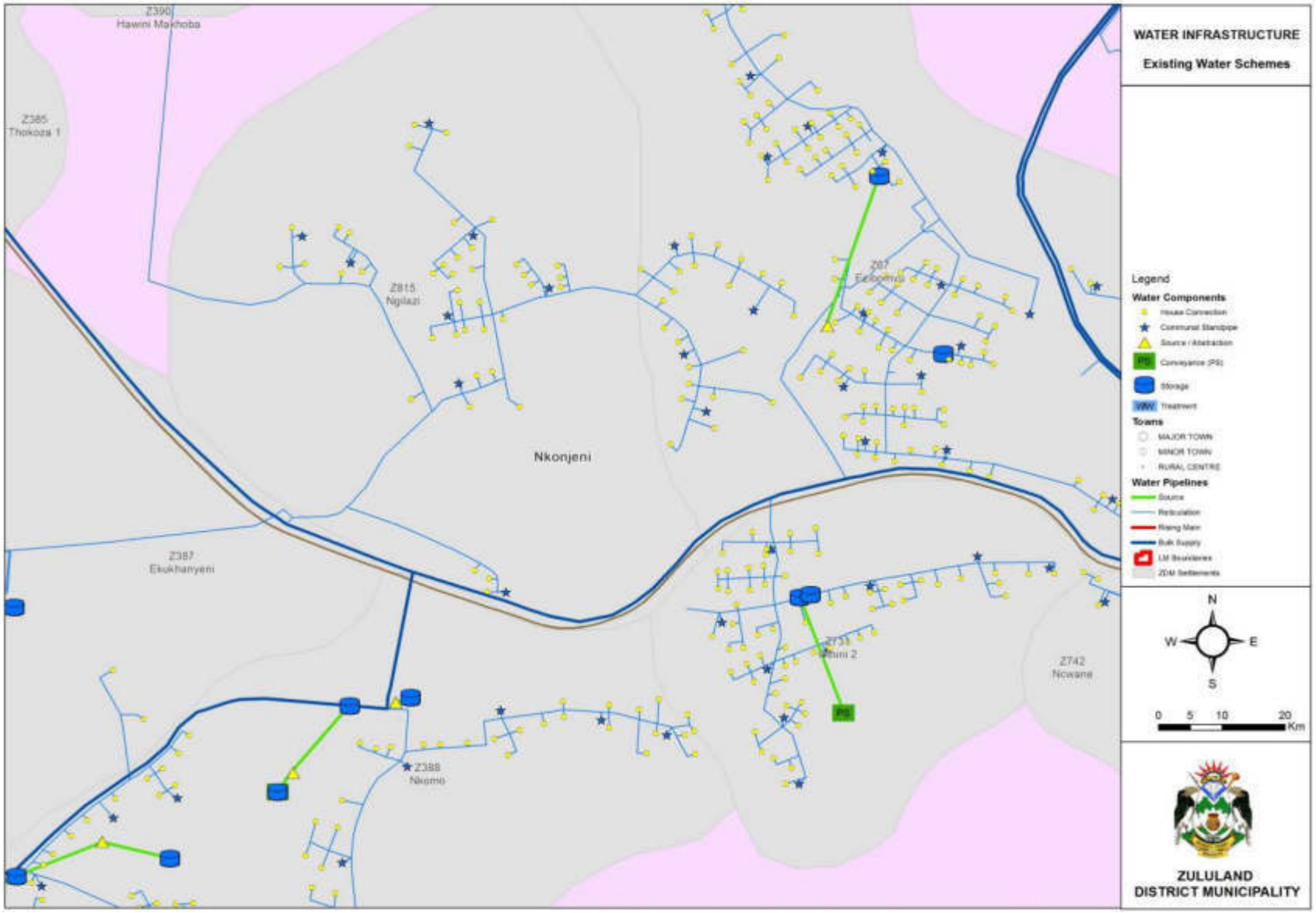
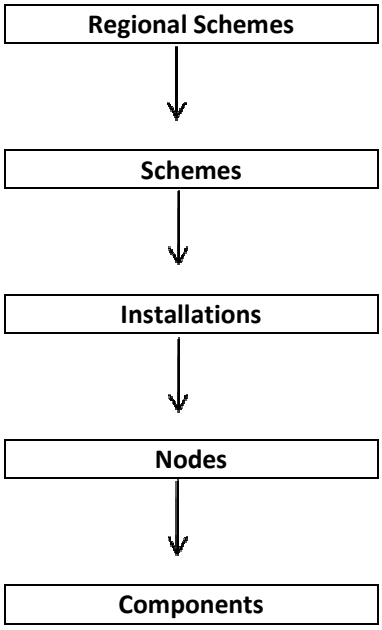


**Figure 6.1 (c): Typical Water Reticulation details available on the ZDM GIS database (Nkonjeni Regional Scheme Area)**



The asset data in the MANZI system has been structured in a specific data hierarchy as indicated below:

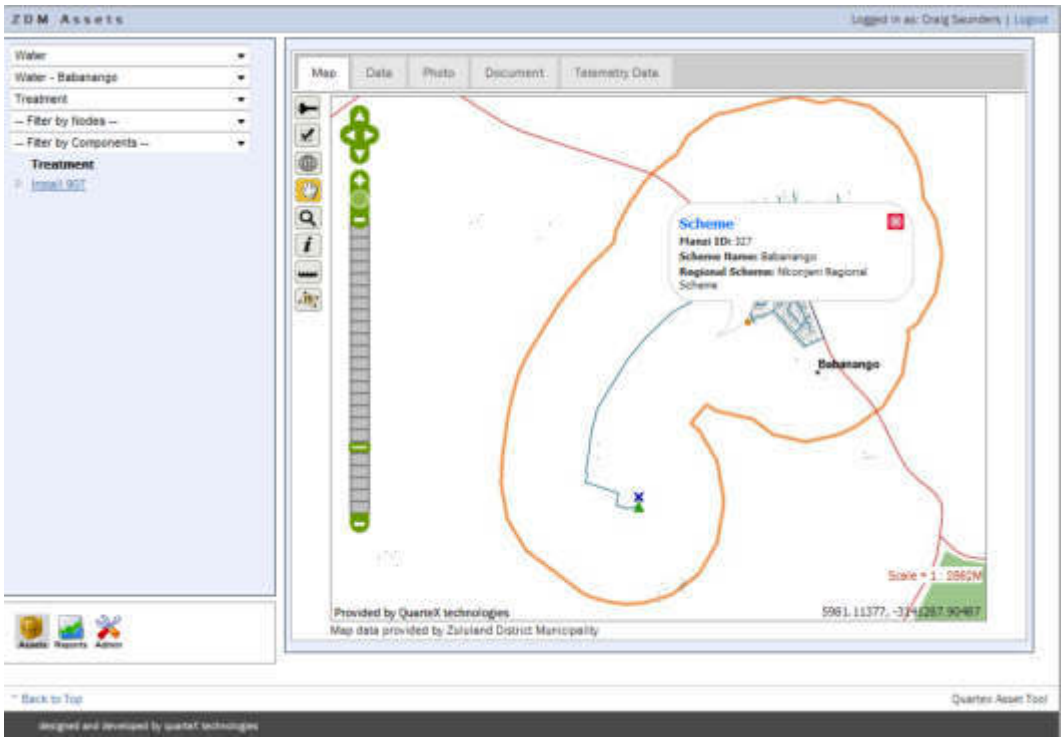



Different asset groups have been identified for water and sanitation infrastructure and these could be either listed as installations, nodes or components. Asset data forms have been developed for each asset group and this is used to capture asset information in the database. The asset data forms provide an overview of the type of information that is available on each asset group. Examples of such asset groups are:

- Water treatment works
- Sewage works
- Pump stations
- Pipelines
- Reservoirs
- Meters
- Valves
- Electrical equipment, etc

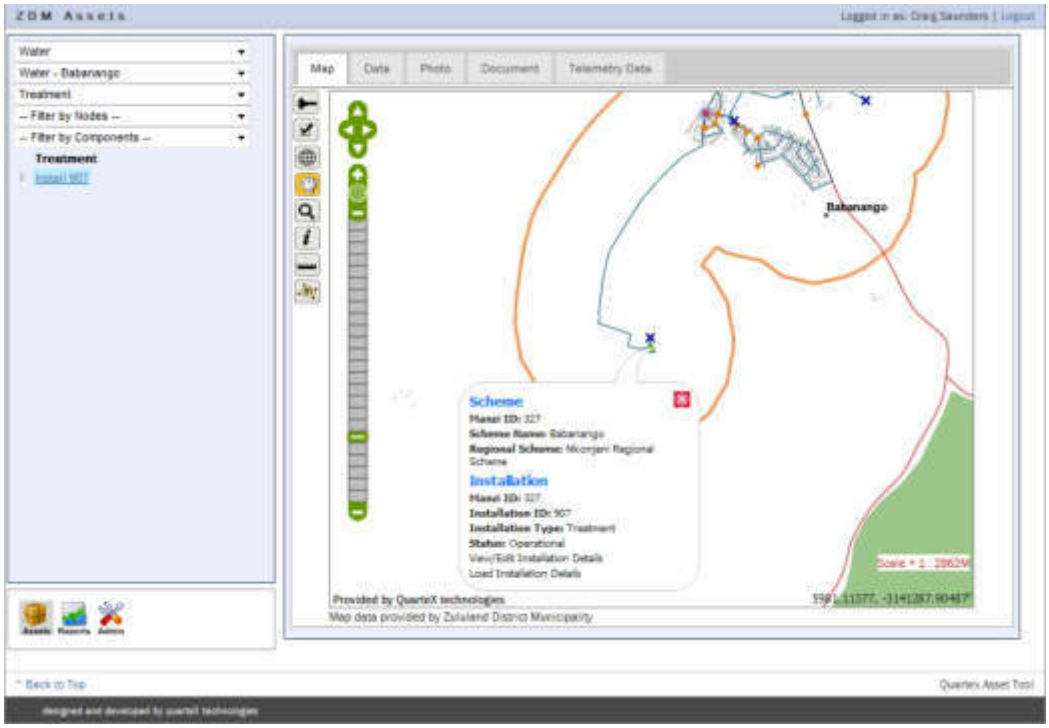
The Nkonjeni Regional scheme is again used as an example to illustrate the data hierarchy that has been used. Inside the Nkonjeni Regional scheme footprint there currently exists a number of schemes, varying from RDP to rudimentary schemes. Each of the schemes are allocated a scheme ID number by the system that is used to identify the scheme in all reporting that is used and to link different assets to the scheme. One of the schemes within this footprint is the Babanango scheme and the information captured at “scheme” level is shown in Figure 6.1 (d) below:

**Figure 6.1 (d): Babanango scheme: Map interface showing scheme detail**



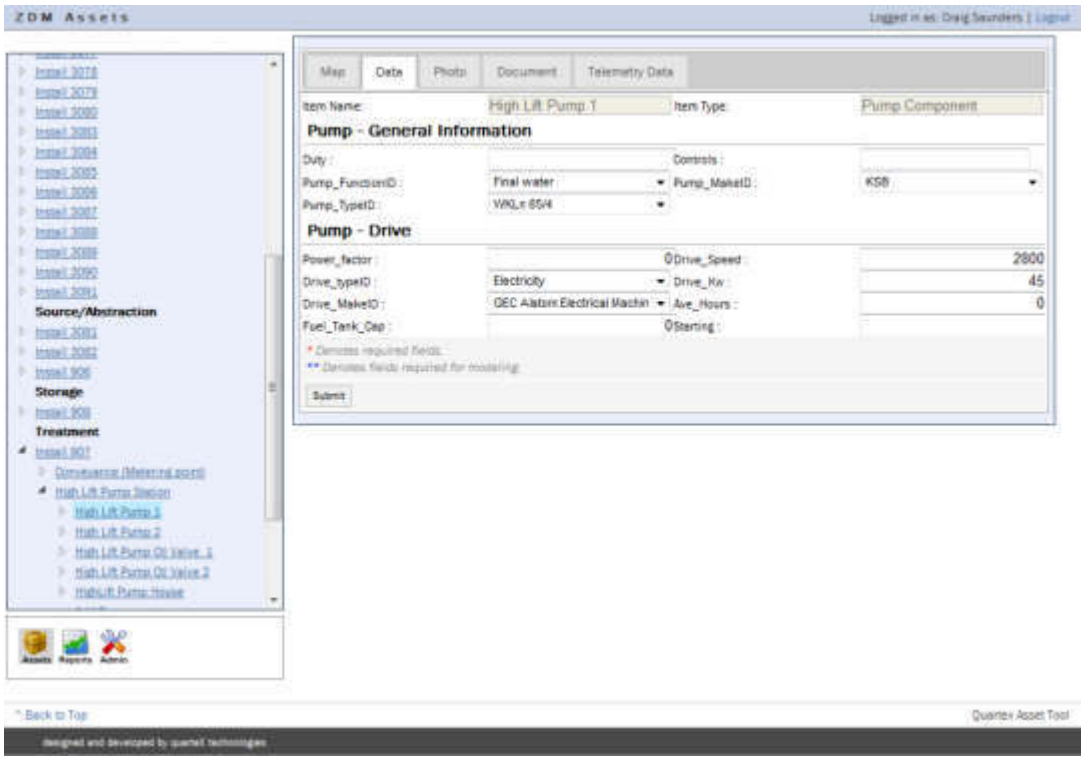

The Babanango water treatment works is one of the installations on this particular scheme and the asset data form captured at “installation” level is shown below in Figure 6.1 (e):

**Figure 6.1 (e): Babanango water treatment works: Map interface showing “installation” location**



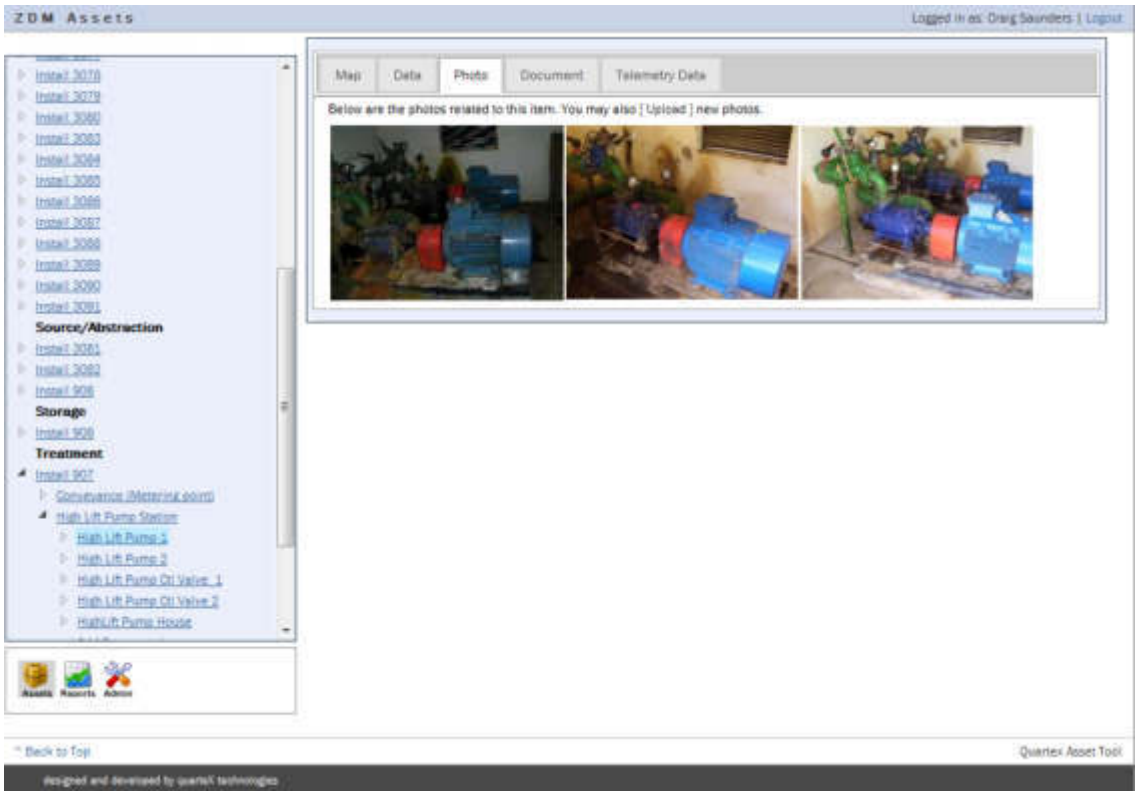
Within the Babanango water treatment works a number of nodes are listed, for example the raw water storage, sedimentation tanks, clarification process, sand filters, etc. The high lift pumping process is used as an example in this case and the asset data form captured at "component" level is shown in Figure 6.1 (f) below:

**Figure 6.1 (f): Babanango water treatment works: High lift pumping process: information captured at "component" level – Component details**



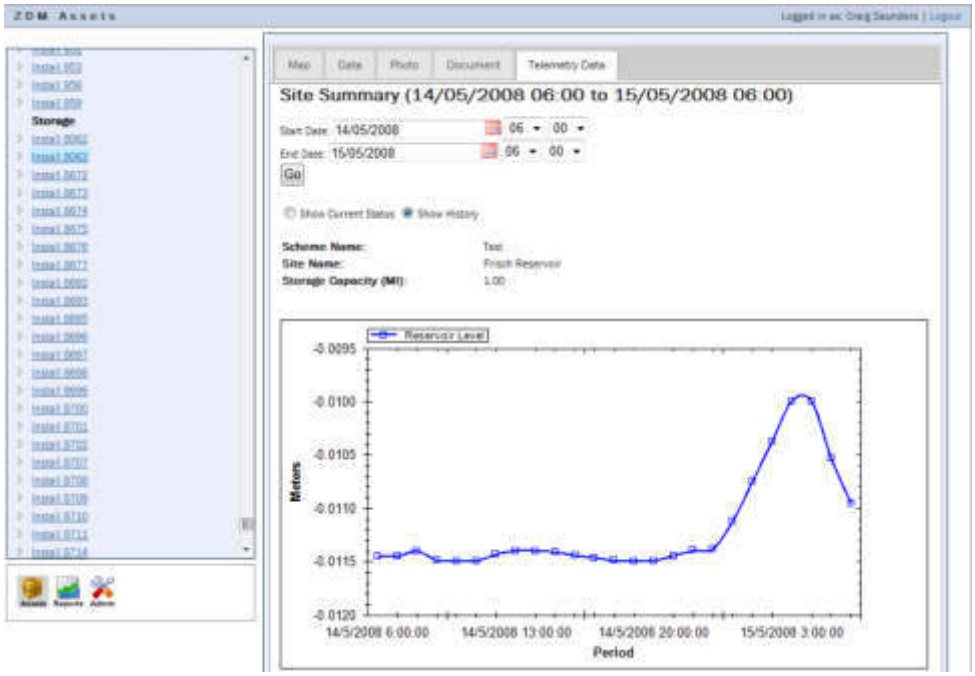

The different nodes within the Babanango water treatment works comprise of a number of components. The clear water pump station is such a node that comprises of various components such as the high lift pumps, electrical equipment, etc. The asset data form captured for the clear water pump station at "component" level is shown in Figure 6.1 (g) below:

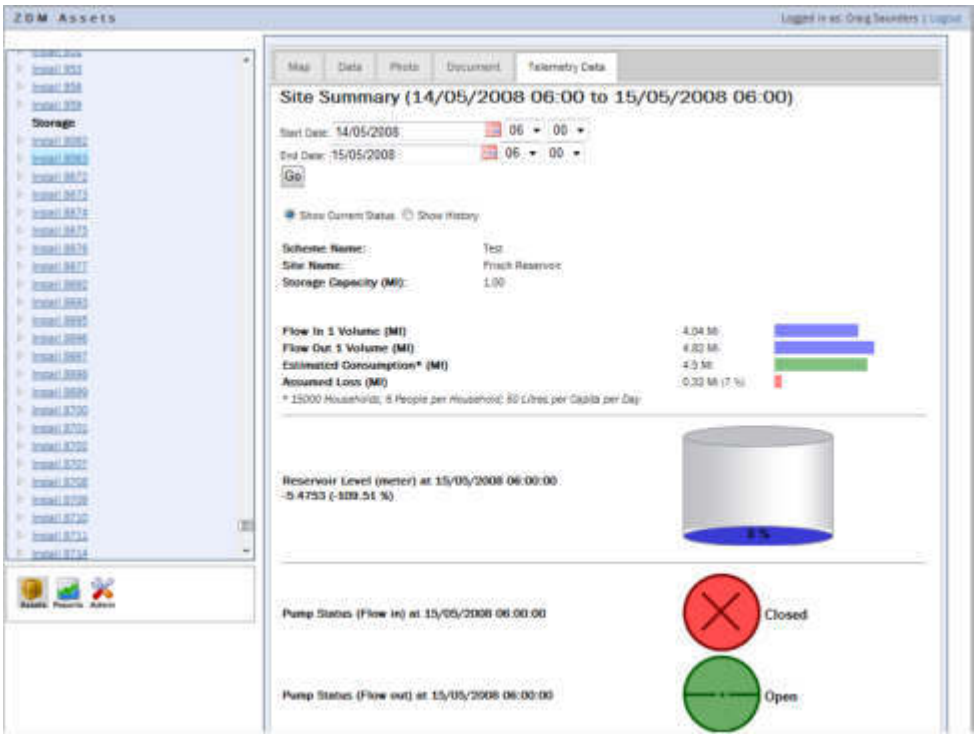
**Figure 6.1 (g): Babanango water treatment works: High lift pumping process: information captured at "component" level - Photographs**




In the same way documents specific to any level of the scheme map be uploaded to the system.

Telemetry has also been linked to the system and where data logging devices are installed, the outputs are presented, an example of the outputs for the telemetry at the Frischgewaagd Plant is shown in the figure below:

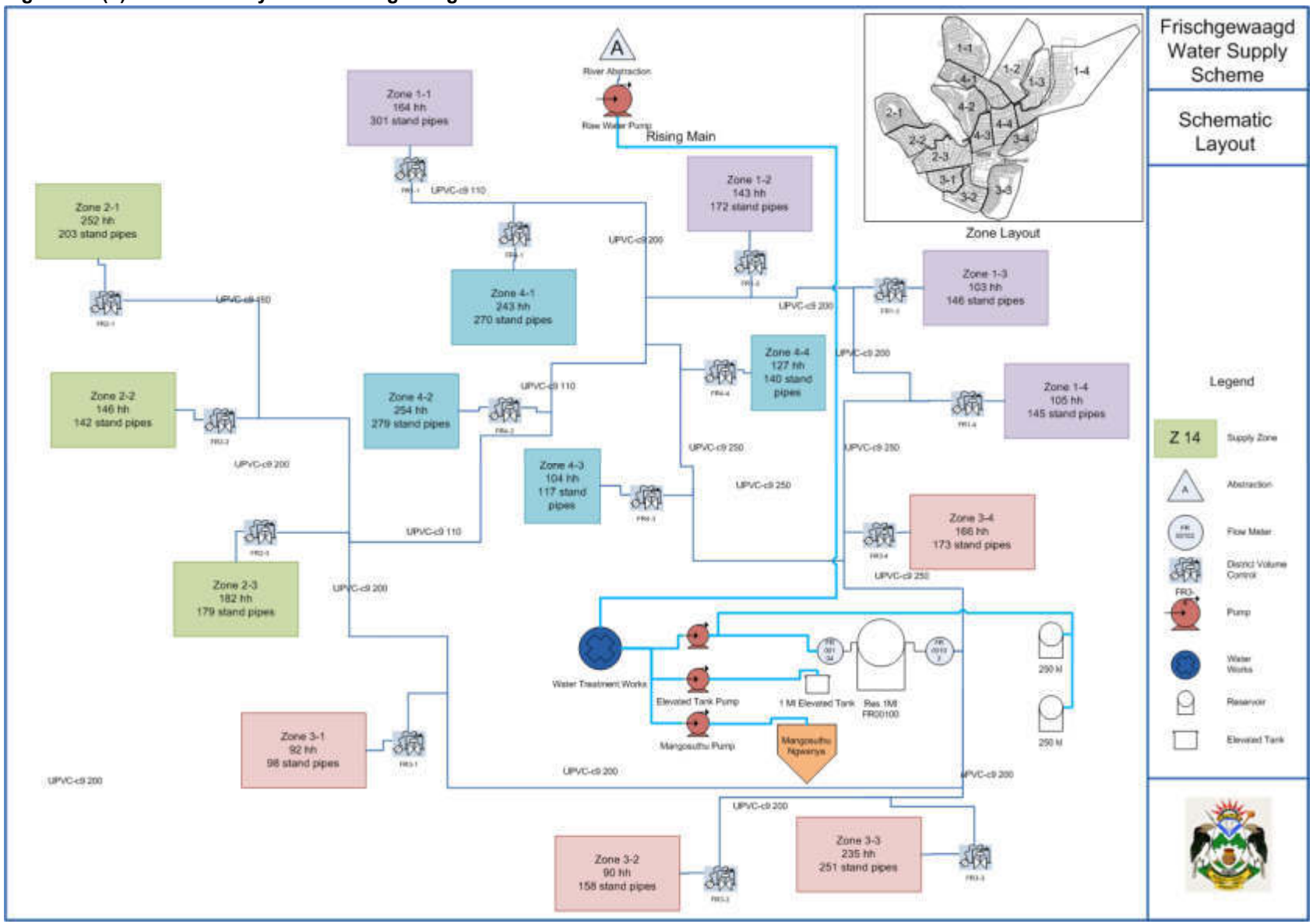





Schematic diagrams are also compiled for each scheme and basically summarises the main installations and nodes that make up the scheme. The diagram also shows how the installations and nodes are connected to make up the scheme and the direction of flow of the water or sewage.

The schematic diagram also forms the basis for the development of a water balance and telemetry installation for the scheme. The Frischgewaagd scheme is used as an example and the schematic diagram is attached herewith in Figure 6.1 (h) below:

**Figure 6.1 (h): Schematic layout of Frischgewaagd water scheme**



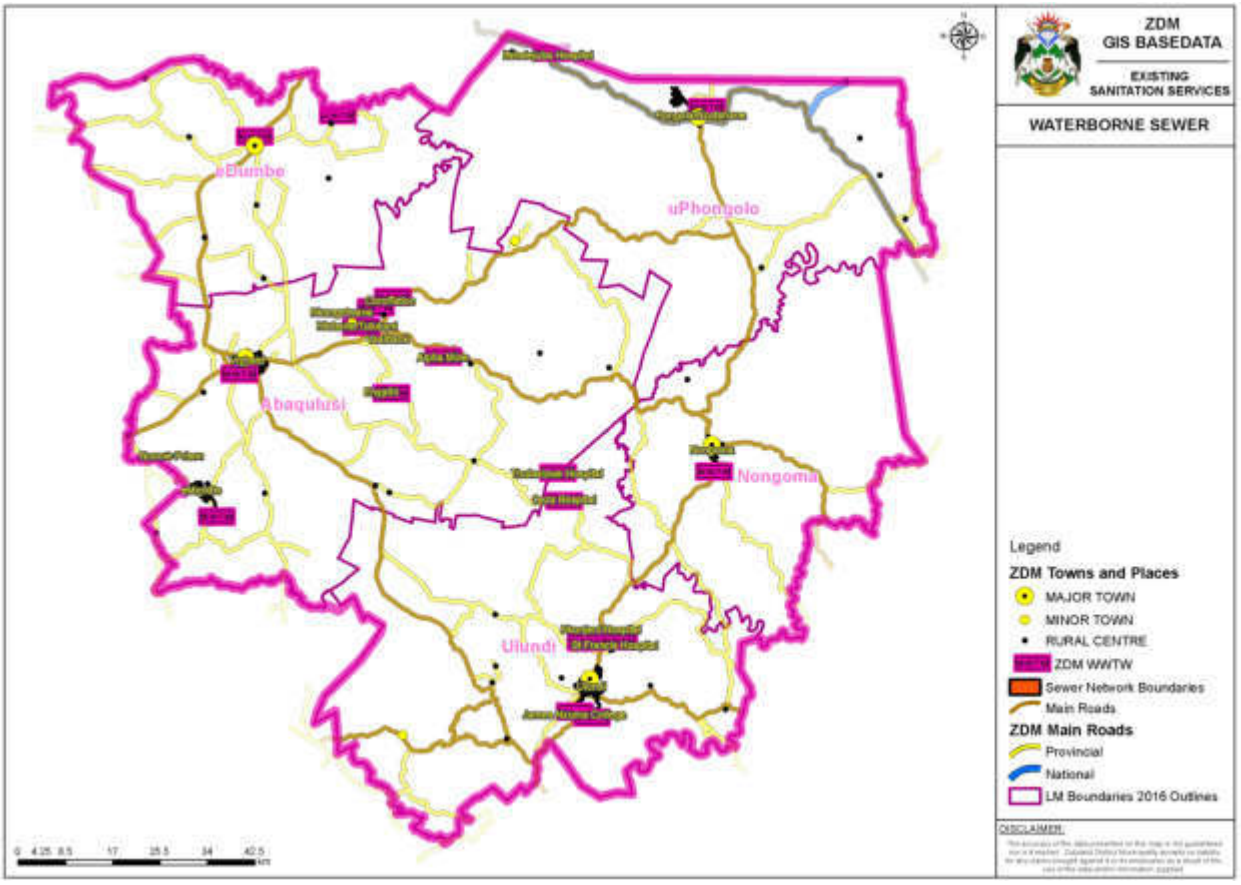
## 6.2 Existing sanitation services infrastructure

Sanitation services are divided up between formal waterborne sewer services, as well as basic RDP-level services in the form of VIP-type sanitation facilities for households.

There are 18 formal waterborne sewer networks in ZDM. Louwsburg and Paulpietersburg towns only have soak-away drain pits, while Frischgewaagd only has VIP-type sanitation.

A map showing these network locations can be seen in the next map.

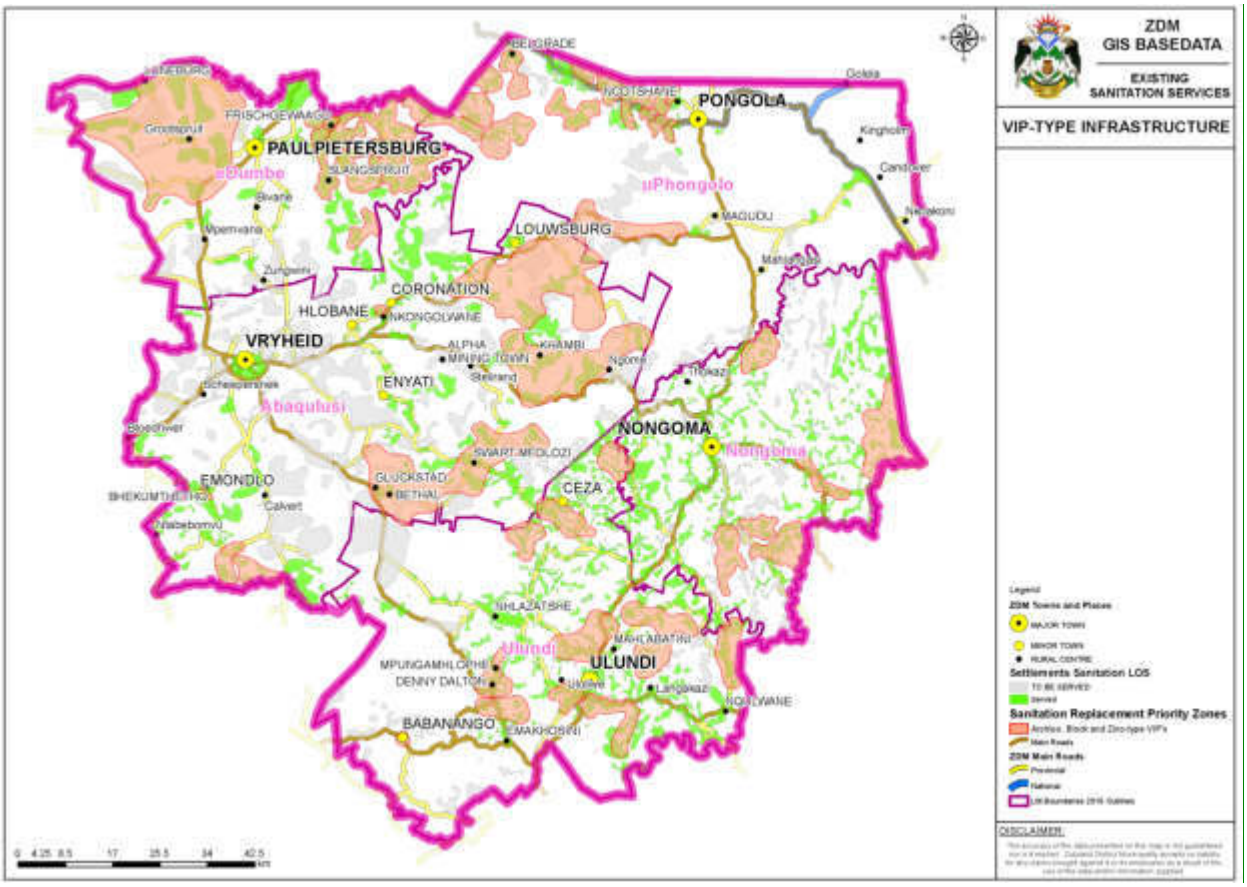
**Figure 6.2 Waterborne Sanitation**




VIP-type sanitation are mostly found in the more rural communities, and provide a basic sanitation facility for households. Previous programmes were implemented using Archloo, block or Zinc-type VIP's. These VIP's cannot be moved or relocated when the pit is full, and a replacement programme has been identified to replace these units with the current pre-cast type VIP's which can be disassembled and moved should the pit be full.

A map indicating existing settlements served with VIP-type units can be seen in the next map, as well as the areas earmarked for the replacement programme.

**Figure 6.3 VIP-type Sanitation**



## 6.2 Asset Management Assessment

As mentioned above ZDM is well advanced with the development of MANZI, the ZDM asset management system. The system currently comprises mostly asset data and work is being done to develop operational and maintenance procedures for the assets, which will guide the activities for the ongoing upkeep of asset conditions. Assessments have already been done on certain issues related to asset management and further work needs to be done on other issues, as summarised below:

- **Human resources** - The ZDM Section 78 investigation was finalised in 2007 and identified the most appropriate water services provider arrangement for the ongoing O&M of water services infrastructure in the district. Current staff organograms were compiled and compared with the minimum required staff resources needed to perform the O&M duties adequately. Shortages in staff numbers were identified and are being addressed over time within the ZDM financial means. Training of existing staff was also identified as a crucial element to ensure highly efficient personnel and this is being addressed annually as part of the ZDM Skills Development Plan. Certain functions have also been indentified that cannot cost effectively be developed in-house and will rather be contracted in externally.
- **Materials, tools & equipment, transport** – The Section 78 investigation has also identified shortcomings in this regard and has listed vehicles and equipment to be purchased in order to have fully functional O&M teams. The need for additional stores has also been identified throughout the district and these are progressively being addressed with the available funding.
- **Budget** – The Section 78 investigation has identified the funding requirements at present and in the future to adequately operate and maintain existing assets and new assets to be added over time. This information guides the preparation of the annual O&M budget, although available financial resources are not sufficient.
- **Asset information** – The locality information on assets is very good and particularly the water assets are viewed to be more than 80% covered. Sewerage information is still lacking but is being addressed. Asset information that also still needs further work includes as-built information, design reports, operating manuals, safety plans, etc. Assessments were also done on asset conditions to determine a brief overview of the status of assets and start identifying where urgent work needs to be done. Photographs were taken of each asset visited and have been included into the MANZI system.
- **Risk management** – ZDM realises that available resources will never really be sufficient to address all needs at once and therefore work has started on the development of a risk based approach to asset management. This model will consider the risk of failure of an asset, the consequence of such a failure and the probability of a failure occurring. This will all be compared to ensure that resources are applied where really needed most.
- **Reporting** – The ZDM WSP reporting system will feed back valuable information to management regarding O&M activities and asset performance. This information will be used to adjust asset management priorities if needed and also track the efficiency of asset management projects that are being implemented.

## 6.3 Schemes to be transferred

All schemes and related staff that were identified to be transferred from DWA and Department of Works to ZDM have been concluded. There are other schemes in the district still being operated by National Department of Works, e.g water services at prisons, but no formal or informal request have yet been entered into for the transfer of these schemes.

## 6.4 Schemes to be rehabilitated

There are currently a number of investigations underway to determine the refurbishment requirements of water services infrastructure in the district. The refurbishment requirements at bulk plants are receiving first priority since it is perceived that the most urgent interventions are required at these assets. Investigations are also being commissioned to determine the condition of urban infrastructure and the refurbishment needs in the towns. Whilst new infrastructure has been rolled out in the rural areas to previously neglected communities, the infrastructure in towns have received very little attention and funding since 1994 and it can be expected that most of the refurbishment requirements will be in these areas. The above mentioned investigations have not yet been fully completed and the results will be included once available.

**Assessment of the bulk water and sewage works:**

ZDM is currently updating its assessments on all water and waste water treatment works. The assessments included recommendations and cost estimates to refurbish and/or upgrade these works in the short term and medium to long term. These assessments also recommended emergency interventions.

The outcomes can be used to secure funding for the emergency interventions, short term refurbishment and medium to long term upgrading.

Emergency interventions are needed where work is needed to attend to fatal problem areas, such as settlements consuming raw untreated water, sewer water spilling directly into rivers and structures that is almost collapsing. Short term refurbishment (not critical work) is needed to refurbish and upgrade the existing works in order to meet the current demands and also to enable the works to function at its design capacity. These short term refurbishments were prioritised using criteria such as cost per capita and current demand versus current capacity.

Medium to long term upgrading (not critical work) is needed to upgrade the existing works in order to meet the future demands. These long term refurbishments were prioritised using criteria such as cost per capita and future demand versus the capacity after short term refurbishment. Some of these works will become redundant in future (As they will be incorporated into larger regional schemes). This was also taken into account.

**Table 6.4 (a): The list of Waste Water Treatment works that were assessed**

| Waste Water Treatment Works | | Current Delivery | Regional Area | Local Municipality |
|---|---|---|---|---|
| | | ML/d | | |
| 1 | Frischgewaagd WWTW | 0.08 | Sim West | eDumbe |
| 2 | Paulpieterburg WWTW | 0.30 | Sim West | eDumbe |
| 3 | Vryheid Town WWTW | 9.00 | Hlahlindlela | Abaqulusi |
| 4 | eMondlo WWTW | 2.40 | Hlahlindlela | Abaqulusi |
| 5 | Nkongolwane WWTW | 0.25 | Coronation | Abaqulusi |
| 6 | Alpha Mine WWTW | 0.00 | Khambi | Abaqulusi |
| 7 | Hlobane WWTW | 0.35 | Coronation | Abaqulusi |
| 8 | Coronation WWTW | 1.00 | Coronation | Abaqulusi |
| 9 | Itshelejuba Hospital WWTW | 0.09 | Sim Central | uPongola |
| 10 | Pongola Town WWTW | 2.50 | Sim East | uPongola |
| 11 | Thulasizwe Hospital WWTW | 0.03 | Usuthu | Nongoma |
| 12 | Holinyoka/Nongoma WWTW | 1.80 | Usuthu | Nongoma |
| 13 | Ceza WWTW | 0.14 | Usuthu | Nongoma |
| 14 | James Nxumalo WWTW | 0.08 | Nkonjeni | Ulundi |
| 15 | Nkonjeni Hospital WWTW | 0.20 | Nkonjeni | Ulundi |
| 16 | St Francis Hospital WWTW | 0.06 | Nkonjeni | Ulundi |
| 17 | Ulundi Town WWTW | 2.60 | Nkonjeni | Ulundi |
| 18 | Enyathi WWTW | 0.00 | Coronation | Abaqulusi |

**Table 6.4 (b): The list of Water Treatment works that were assessed**

| Water Treatment Works | | Current Delivery | Regional Area | Local Municipality |
|---|---|---|---|---|
| | | ML/d | | |
| 1 | Frischgewaagd WTW | 1.93 | Sim West | eDumbe |
| 2 | eDumbe WTW (Paulpietersburg) | 2.21 | Sim West | eDumbe |
| 3 | Ophuzane WTW | 0.41 | Sim West | eDumbe |
| 4 | Tholakele WTW | 0.7 | Sim West | eDumbe |
| 5 | Klipfontein WTW | 10 | Hlahlindlela | Abaqulusi |
| 6 | Bloemveld WTW | 5 | Hlahlindlela | Abaqulusi |
| 7 | Mondlo WTW | 9 | Hlahlindlela | Abaqulusi |
| 8 | Mvuzini WTW | 0.62 | Hlahlindlela | Abaqulusi |
| 9 | Purim WTW | 0.45 | Hlahlindlela | Abaqulusi |
| 10 | Hlobane WTW | 2 | Coronation | Abaqulusi |
| 11 | Louwsburg WTW | 0.72 | Coronation | Abaqulusi |

**Table 6.4 (b): The list of Water Treatment works that were assessed (continued)**

| Water Treatment Works | | Current Delivery | Regional Area | Local Municipality |
|---|---|---|---|---|
| | | ML/d | | |
| 12 | Coronation WTW | 0.4 | Coronation | Abaqulusi |
| 13 | Khambi WTW | 0.15 | Khambi | Abaqulusi |
| 14 | Mountain View WTW | 0.1 | Khambi | Abaqulusi |
| 15 | Belgrade WTW | 0.74 | Sim Central | uPongola |
| 16 | Msibi WTW | 0.42 | Sim Central | uPongola |
| 17 | Khiphunyawo WTW | 0.53 | Sim Central | uPongola |
| 18 | Nkosentsha WTW | 0.03 | Sim Central | uPongola |
| 19 | Spekboom WTW | 1.28 | Sim East | uPongola |
| 20 | Pongola WTW | 9.06 | Sim East | uPongola |
| 21 | Osingisingini WTW | 0.04 | Usuthu | Nongoma |
| 22 | Thulasizwe Hospital WTW | 0.16 | Usuthu | Nongoma |
| 23 | Vuna WTW | 1.52 | Usuthu | Nongoma |
| 24 | Ceza WTW | 0.26 | Usuthu | Nongoma |
| 25 | Khangela Palace WTW | 0.03 | Usuthu | Nongoma |
| 26 | Enyokeni Palace WTW | 0.04 | Usuthu | Nongoma |
| 27 | Ulundi WTW | 18.78 | Nkonjeni | Ulundi |
| 28 | Mpungamhlope WTW | 0.82 | Nkonjeni | Ulundi |
| 29 | Babanango WTW | 0.36 | Nkonjeni | Ulundi |
| 30 | Enyathi WTW | 0.09 | Coronation | Abaqulusi |
| 31 | Mandlakazi WTW | 1.77 | Mandlakazi | Nongoma |
| 32 | Sidinsi WTW | 0.11 | Mandlakazi | Nongoma |
| 33 | Kombusi WTW | 0.07 | Mandlakazi | Nongoma |
| 34 | Embile WTW | 0.08 | Usuthu | Nongoma |
| 35 | Masokaneni WTW | 0.01 | Nkonjeni | Ulundi |
| 36 | Nkonjeni Hospital WTW | 0.12 | Nkonjeni | Ulundi |
| 37 | Itshelejuba Hospital WTW | 0.13 | Sim Central | uPongola |
| 38 | Usuthu WTW | 0.09 | Usuthu | Nongoma |

The results of the assessments are shown in Tables 5.4 (c) & (d) below:

**Table 6.4 (c): Assessment of Water Treatment Works**

| Water Treatment Works | | Current Delivery | Cost Estimate Emergency Work | Cost Estimate Short Term | Cost Estimate Long Term (Excludes short term) |
|---|---|---|---|---|---|
| | | ML/d | ex VAT and Prof fees | ex VAT and Prof fees | ex VAT and Prof fees |
| 1 | Frischgewaagd WTW | 0.4 | R - | R 1 040 000 | R 45 000 000 |
| 2 | eDumbe WTW (Paulpietersburg) | 0.15 | R - | R 2 490 000 | R 20 000 000 |
| 3 | Ophuzane WTW | 0.1 | R - | R 540 000 | R - |
| 4 | Tholakele WTW | 0.74 | R - | R - | R - |
| 5 | Klipfontein WTW | 0.42 | R - | R 8 870 000 | R 4 415 000 |
| 6 | Bloemveld WTW | 0.53 | R - | R 3 640 000 | R 5 200 000 |
| 7 | Mondlo WTW | 0.03 | R 480 000 | R 180 000 | R 2 400 000 |
| 8 | Mvuzini WTW | 1.28 | R - | R - | R - |
| 9 | Purim WTW | 9.06 | R - | R - | R 250 000 |
| 10 | Hlobane WTW | 0.04 | R 450 000 | R 1 590 000 | R - |
| 11 | Louwsburg WTW | 0.16 | R 320 000 | R 2 500 000 | R - |
| 12 | Coronation WTW | 1.52 | R 850 000 | R 1 140 000 | R 22 000 000 |
| 13 | Khambi WTW | 0.26 | R - | R - | R 150 000 |
| 14 | Mountain View WTW | 0.03 | R - | R - | R 265 000 |
| 15 | Belgrade WTW | 0.04 | R 226 000 | R 95 300 | R 12 500 000 |
| 16 | Msibi WTW | 18.78 | R 74 000 | R 2 055 000 | |
| 17 | Khiphunyawo WTW | 0.82 | R 18 000 | R 4 140 000 | |
| 18 | Nkosentsha WTW | 0.36 | R 77 000 | R 1 680 000 | |
| 19 | Spekboom WTW | 0.4 | R 334 500 | R 1 607 200 | |
| 20 | Pongola WTW | 0.15 | R 215 000 | R 110 200 | R 20 000 000 |
| 21 | Osingisingini WTW | 0.1 | R 14 000 | R 672 000 | |
| 22 | Thulasizwe Hospital WTW | 0.74 | R 16 100 | R 42 000 | R 800 000 |
| 23 | Vuna WTW | 0.42 | | R 323 500 | |
| 24 | Ceza WTW | 0.53 | R 2 000 | R 2 030 000 | |
| 25 | Khangela Palace WTW | 0.03 | R 800 | R 1 335 000 | |
| 26 | Enyokeni Palace WTW | 1.28 | R 36 700 | R 28 000 | |
| 27 | Ulundi WTW | 9.06 | | R 530 000 | |
| 28 | Mpungamhlope WTW | 0.04 | R 17 600 | R 35 000 | R 20 000 000 |
| 29 | Babanango WTW | 0.16 | R 3 400 | R 2 335 000 | R - |
| 30 | Enyathi WTW | No assessments scheduled | | | |
| 31 | Mandlakazi WTW | Assessment outstanding | | | |
| 32 | Sidinsi WTW | Assessment outstanding | | | |
| 33 | Kombusi WTW | Assessment outstanding | | | |
| 34 | Embile WTW | No assessments scheduled | | | |
| 35 | Masokaneni WTW | No assessments scheduled | | | |
| 36 | Nkonjeni Hospital WTW | No assessments scheduled | | | |
| 37 | Usuthu WTW | 0.00 | | | R 100 000 000 |
| | | | **R 3 135 100** | **R 39 008 200** | **R 252 980 000** |

**Table 6.4 (d): Assessment of Waste Water Treatment Works**

| Waste Water Treatment Works | | Current Delivery | Cost Estimate Emergency Work | Cost Estimate Short Term | Cost Estimate Long Term (Excludes short term) |
|---|---|---|---|---|---|
| | | ML/d | ex VAT and Prof fees | ex VAT and Prof fees | ex VAT and Prof fees |
| 1 | Frischgewaagd WWTW | 0.08 | R 0 | R 300 000 | R 40 000 000 |
| 2 | Paulpieterburg WWTW | 0.30 | R 550 000 | R 1 800 000 | R 0 |
| 3 | Vryheid Town WWTW | 9.00 | R 0 | R 0 | R 0 |
| 4 | eMondlo WWTW | 2.40 | R 725 000 | R 3 630 000 | R 5 500 000 |
| 5 | Nkongolwane WWTW | 0.25 | R 0 | R 0 | R 990 000 |
| 6 | Alpha Mine WWTW | 0.00 | R 0 | R 300 000 | R 0 |
| 7 | Hlobane WWTW | 0.35 | R 900 000 | R 3 150 000 | R 450 000 |
| 8 | Coronation WWTW | 1.00 | R 850 000 | R 3 980 000 | R 6 000 000 |
| 9 | Itshelejuba Hospital WWTW | 0.09 | | R 70 000 | R 800 000 |
| 10 | Pongola Town WWTW* | 2.50 | R 13 000 | R 363 500 | R 1 390 000 |
| 11 | Thulasizwe Hospital WWTW | 0.03 | | R 220 000 | R 50 000 |
| 12 | Holinyoka/Nongoma WWTW** | 1.80 | | R 1 719 753 | R 4 310 000 |
| 13 | Ceza WWTW | 0.14 | | R 660 000 | R 2 000 000 |
| 14 | James Nxumalo WWTW | 0.08 | | R 270 000 | R 890 000 |
| 15 | Nkonjeni Hospital WWTW | 0.20 | | R 70 000 | R 1 770 000 |
| 16 | St Francis Hospital WWTW | 0.06 | | R 75 000 | R 840 000 |
| 17 | Ulundi Town WWTW** | 2.70 | | R 600 000 | R 2 900 000 |
| 18 | Enyathi WWTW | 0.00 | No assessments Scheduled | | |
| | | | | | |
| | **Total** | | **R 3 038 000** | **R 17 208 253** | **R 67 890 000** |

The above assessments are currently in the process of being reviewed and updated for further interventions.

**Figure 6.4 (a): Locality map of the Water Treatment Works**

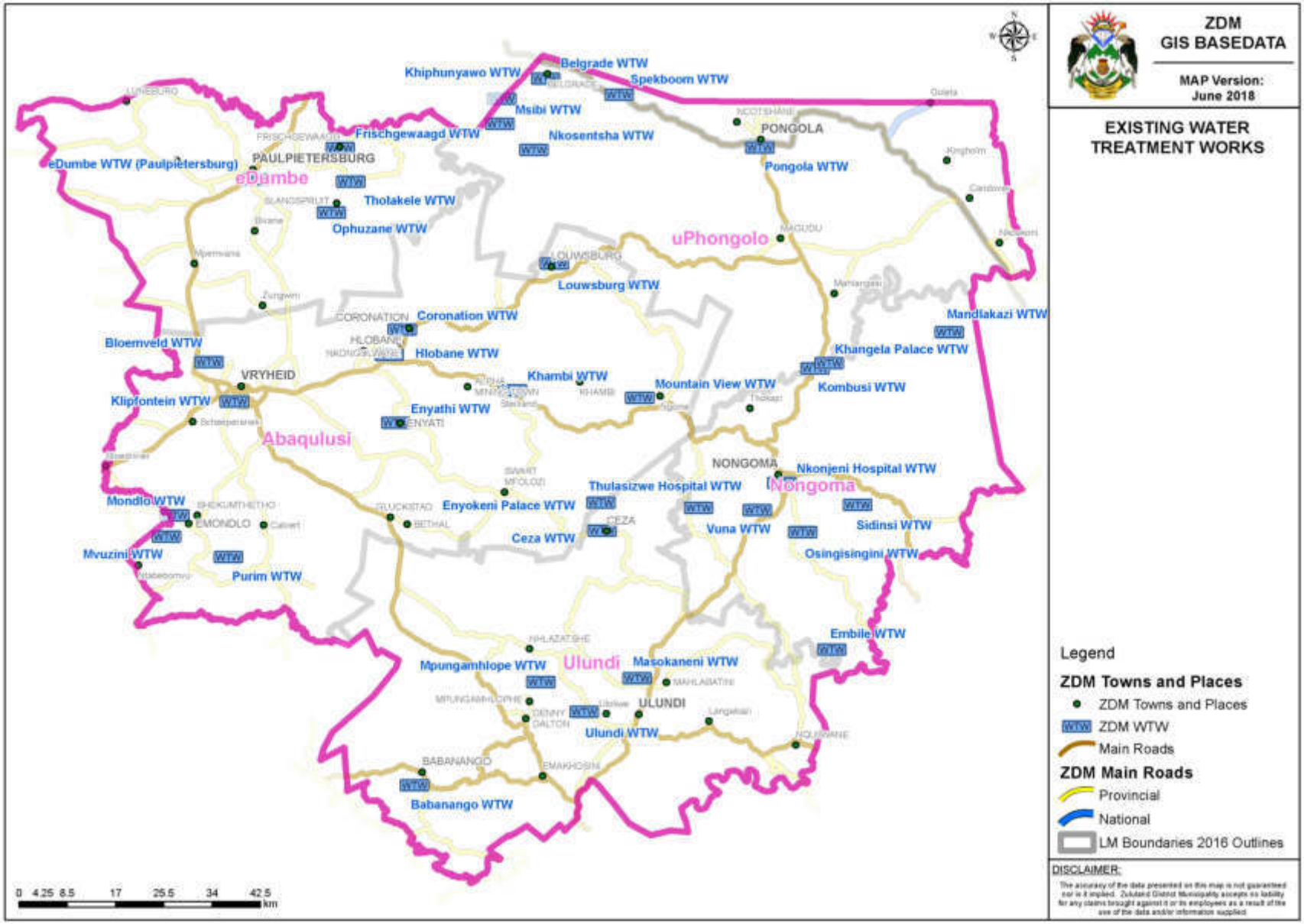
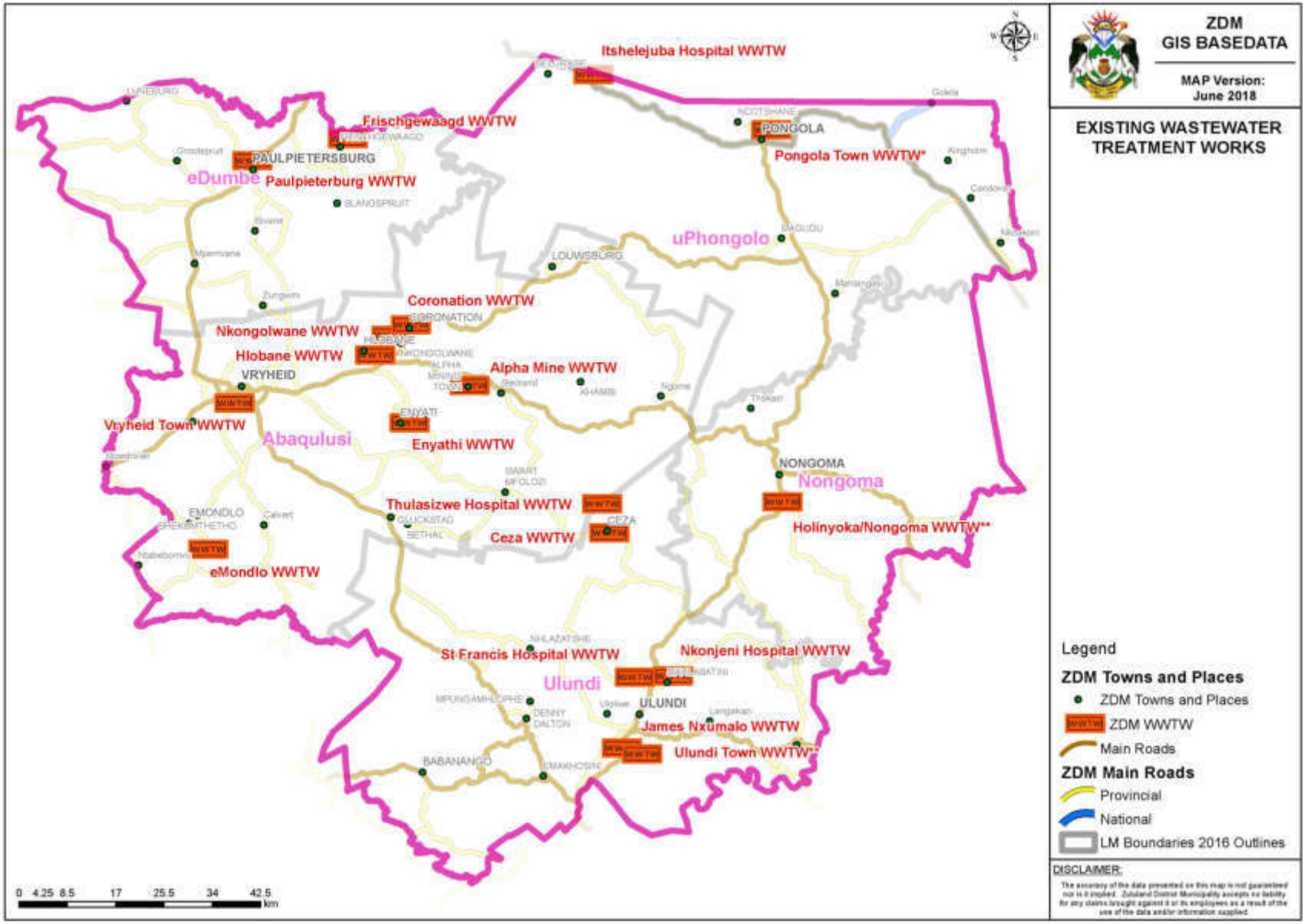


**Figure 6.4 (b): Locality map of the Sewage Works**



## 6.5 Blue Drop / Green Drop Assessments

### The Blue Drop Report Card and Scoring Criteria

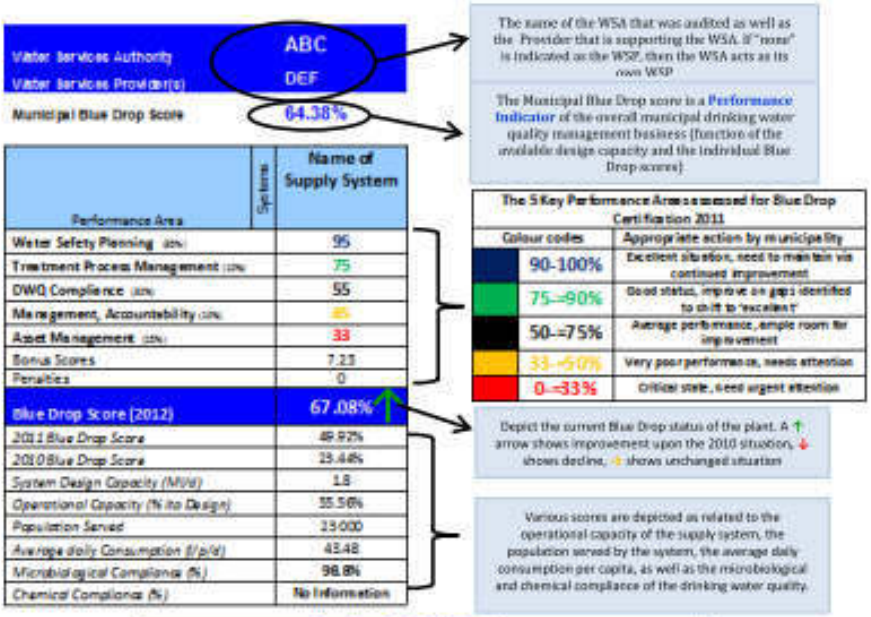
Assessments are conducted by a panel consisting of a qualified drinking water quality professional as Lead Inspector, 2-4 Inspectors (Assessors) and a Learner Assessor who also coordinates the logistical arrangements of the assessments.

The team selection is done based on the outcomes of a Blue Drop Examination which tests the assessor's knowledge and competence in the subject field. Virtual assessments were done in cases where municipalities uploaded their Portfolio of Evidence (or parts of) onto the Blue Drop System. The scorecards outlines the key requirements of the Blue and Green Drop Assessments and indicate the Portfolio of Evidence that was required by each municipality to calculate a Blue and Green Drop score per water supply system.

The latest Blue and Green Drop Assessment outcomes can be requested from the Planning Department of ZDM.

## How to read the Report Card

The following is an example of a typical municipal Blue Drop report card. Results are provided in colour-coded format – each colour has a specific meaning and performance reference.




| Quality of Drinking Water | |
|---|---|
| **Colour Drop** | **Indication of Drop** |
| | **Blue Drop Certified, water safe to drink; complied excellently with national standards throughout the reporting period; Must have scored 95% on adherence to Blue Drop Requirements; Water must comply excellently with SABS 241; Water safe to drink.** |
| | **Water complied excellently with standard; safe to drink**<br>**Micro > 97%**<br>**Chemical > 95%** |
| | **Water safe to drink but some chemical parameter compliance requires improvement**<br>**Micro > 97%**<br>**Chemical < 95% (or no information)** |
| | **Water generally safe to drink but with recorded some microbiological failures**<br>**Micro < 97%**<br>**Chemical > 95%** |
| | **Water did not comply according to expected standard targets**<br>**Micro > 90% < 95%**<br>**Chemical > 90% < 95%** |
| | **Compliance levels too low; there were extended periods when the water did not comply with standard / or no monitoring to confirm actual quality of tap water**<br>**Micro < 90%**<br>**Chemical < 90%** |

## The Green Drop Report Card

### How to Read the Report Card

The following is an example of a typical municipal report card that appears in the Green Drop Report 2013.
Results are provided in colour coded format – each colour has a specific meaning and performance reference.

| Water Services Authority | ABC Local Municipality |
|---|---|
| Water Services Provider(s) | ABC WSP |

| | |
|---|---|
| 2013 Municipal Green Drop Score | 81.63% |
| 2011 Municipal Green Drop Score | 63.80% |
| 2009 Municipal Green Drop Score | 75.00% |

The Municipal Green Drop score is a Performance Indicator of the overall municipal wastewater business (function of the available design capacity and the individual Green Drop scores).
Arrows: Depict the current Green Drop status of the plant. A ↑ arrow shows improvement upon the 2009situation, ↓ shows digress, → shows unchanged situation

| Key Performance Area | Weight | System X |
|---|---|---|
| Process Control & Maintenance Skills | 10% | 67 |
| Monitoring Programme | 15% | 95 |
| Submission of Results | 5% | 100 |
| Effluent Quality Compliance | 30% | 16 |
| Risk Management | 15% | 90 |
| Local Regulation | 5% | 100 |
| Treatment Capacity | 5% | 100 |
| Asset Management | 15% | 94 |
| Bonus Scores | | 8.48 |
| Penalties | | 1.90 |
| Green Drop Score (2013) | | 74.88% |
| 2011 Green Drop Score | | 47.00% |
| 2009 Green Drop Score | | 66.00% |
| System Design Capacity | Ml/d | 2.3 |
| Capacity Utilisation (% ADWF ito Design Capacity) | | 112.0% |
| Resource Discharged into | | Pienaars River (sensitive, special standard apply) |
| Microbiological Compliance | % | 12.95% |
| Chemical Compliance | % | 24.35% |
| Physical Compliance | % | 20.69% |
| Overall Compliance | % | 20.90% |
| Wastewater Risk Rating (2012) | | 76.50% |
| Wastewater Risk Rating (2013) | | 76.47% |

| Colour codes | Appropriate action by institution |
|---|---|
| 90-100% | Excellent situation, need to maintain via continued improvement |
| 80-<90% | Good status, improve where gaps identified to shift to 'excellent' |
| 50-<80% | Fair performance, ample room for improvement |
| 31-<50% | Very poor performance, need targeted intervention towards gradual sustainable improvement |
| 0-<31% | Critical state, need urgent intervention for all aspects of the wastewater services business |

≥90% = Green Drop Certification
<30% = Purple Drop Status

Plant is receiving 12% more wastewater compared to its original design capacity (ADWF)

Effluent quality compliance to legislative standards carries a high (30%) weight in the GDC score

The CRR% Deviation (CRR/ CRRmax) score is specific to the wastewater "treatment" function of the service. This score indicates the actual risk as a % of the maximum risk that the plant potentially can reach. An orange and redblock indicate that the plant is in high- or critical risk that warrants urgent attention. A higher value reflects a high risk state (undesirable). A lower value reflects a lower risk state.

*Note: volumetric capacity refers to Average Dry Weather Flow*

| CRR% Deviation | |
|---|---|
| | 90 – 100% Critical risk WWTP |
| | 70 - <90% High Risk WWTP |
| | 50-<70% Medium risk WWTP |
| | <50% Low Risk WWTP |

## 6.6 New infrastructure to be built

**Water infrastructure:**

During 2004 the ZDM started a comprehensive water master planning exercise to determine the most appropriate methods of providing previously neglected communities with water services. In all cases the main drivers were to obtain the technical solution that will not necessarily be the lowest in terms of capital requirements to implement, but rather that will provide a sustainable service throughout the year (sustainable water source) at the lowest possible water tariff (R/kl). The first step was to identify sustainable water sources in the district that could be used to provide water supply even during extreme drought situations and then to determine the most cost efficient way of supplying communities from these sources. The planning methodology that was used can be summarised as follows:

- Identify logical supply footprints
- Identify all possible options for supplying water to supply footprints
- Determine the capital and operational costs associated with each option
- Evaluate each option
- Decide on most appropriate solution

From the above planning process the entire district was covered with 10 back-to-back Regional Schemes, which are listed below and indicated on Figure 6.5 (a) attached herewith:

- Nkonjeni Regional Scheme
- Usuthu Regional Scheme
- Mandlakazi Regional Scheme
- Mkhuze Regional Scheme
- Simdlangentsha East Regional Scheme
- Simdlangentsha West Regional Scheme
- Simdlangentsha Central Regional Scheme
- Coronation Regional Scheme
- Khambi Regional Scheme
- Hlahlindlela Regional Scheme

Also indicated herewith on Figure 6.5 (b) is the planned future bulk infrastructure that was identified from the above planning process.

**Sanitation infrastructure:**

Further planning work is still required in the urban areas to confirm the suitability of the bulk infrastructure, especially with regards to increased pressures on this infrastructure due to an increasing urbanisation trend that has been occurring and also to allow for future growth in population.

Sanitation infrastructure being provided in rural areas (previously unserved communities) is limited to household VIP toilets. The units are being implemented as per sanitation prioritisation model.

**Pre-cast Manufacturing Plants**

As part of the Rural Sanitation Programme rollout, a Local Economic Development initiative was envisaged by ZDM, to establish a local manufacturing plant producing the pre-cast material for the rural sanitation units. Two locations were initially proposed for manufacturing plants, namely Ulundi and Vryheid.

The manufacturing plant in Ulundi was erected and established in 2008 via the Rural Sanitation Project funding, with a second plant completed in Vryheid during 2013. The objective is that the manufacturing plant will be handed over to local business partners, and in doing so promote local economic development.

## Estimated costs:

Table 6.6 (a) and (b) below summarises the estimated costs to provide sufficient water and sanitation services infrastructure to all households in future:

### Table 6.6 (a): Cost of infrastructure to be built

| WATER | Capital requirements | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 |
|---|---|---|---|---|---|---|---|
| Regional bulk | R 2 204 249 853 | | | R - | R 294 572 595 | R 313 011 521 | R 1 596 665 737 |
| Secondary bulk | R 1 036 030 068 | | | R - | R 33 478 526 | R 35 896 523 | R 966 655 019 |
| Reticulation | R 361 760 667 | | | R - | R 11 452 635 | R 14 758 965 | R 335 549 067 |
| **Total capital (new)** | **R 3 602 040 588** | **R -** | **R -** | **R -** | **R 339 503 756** | **R 363 667 009** | **R 2 898 869 823** |
| Regional bulk (WTW) | R 599 570 000 | | | | | | |
| Secondary bulk | TBA | | | | | | |
| Reticulation | TBA | | | | | | |
| **Total capital (refurbishment)** | **R 599 570 000** | | | **R -** | | | |
| **Total capital** | **R 4 201 610 588** | **R -** | **R -** | **R -** | **R 339 503 756** | **R 363 667 009** | **R 2 898 869 823** |

### Table 5.6 (b): Cost of infrastructure to be built

| SANITATION | Capital requirements | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 |
|---|---|---|---|---|---|---|---|
| Bulk infrastructure | R - | | | | | | |
| Reticulation | R - | | | | | | |
| VIP toilets | R 385 911 000 | | | | 59 721 750 | 59 721 750 | 59 721 750 |
| **Total capital (new)** | **R 385 911 000** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |
| Bulk infrastructure (WWTW) | 322 510 000 | | | | - | - | - |
| Reticulation | TBA | | | | - | - | - |
| VIP toilets (Replacement Prgrm) | 551 988 000 | | | | - | - | - |
| **Total capital (refurbishment)** | **R 874 498 000** | **R -** | | **R -** | **R -** | **R -** | **R -** |
| **Total capital** | **R 1 260 409 000** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |

## Funding sources and budget allocations:

Table 6.6 (c) and (d) below summarises the funding sources, implementation programmes and budget allocations for each programme:

### Table 6.6 (c): Sources of capital income: water

| WATER | Expected Funding | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 (Est.) | 2022/2023 (Est.) |
|---|---|---|---|---|---|---|---|
| MIG | R 537 495 750,00 | | | | R 179 165 250,00 | R 179 165 250,00 | R 179 165 250,00 |
| DWA (RBIG) | R 300 000 000,00 | | | | R 100 000 000,00 | R 100 000 000,00 | R 100 000 000,00 |
| Housing | | | | | | | |
| WSIG | R 345 000 000,00 | | | | R 115 000 000,00 | R 115 000 000,00 | R 115 000 000,00 |
| Loans | | | | | | | |
| **TOTAL** | **R 1 182 495 750** | **R -** | **R -** | **R -** | **R 394 165 250** | **R 394 165 250** | **R 394 165 250** |
| Capital requirements | R 4 201 610 588 | | | | | | |
| **Shortfall up to 2022** | **R -3 019 114 838** | | | | | | |

### Table 6.6 (d): Sources of capital income: sanitation

| SANITATION | Expected Funding | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 (Est.) | 2022/2023 (Est.) |
|---|---|---|---|---|---|---|---|
| MIG | R 179 165 250,00 | | | | R 59 721 750,00 | R 59 721 750,00 | R 59 721 750,00 |
| DWA | | | | | | | |
| Housing | R - | | | | R - | R - | R - |
| Other grant funding | | | | | | | |
| Loans | | | | | | | |
| **TOTAL** | **R 179 165 250** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |
| Capital requirements | R 1 260 409 000 | | | | | | |
| **Shortfall up to 2022** | **R -1 081 243 750** | | | | | | |

**Table 6.6 (e): Operational income and expenses**

| Operating costs and income | Total 5yr projected | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 |
|---|---|---|---|---|---|---|
| Operational costs | R 2 584 611 744 | R 431 009 527 | R 470 231 394 | R 513 022 451 | R 559 707 494 | R 610 640 876 |
| Personnel costs | R 915 267 755 | R 152 629 935 | R 166 519 259 | R 181 672 512 | R 198 204 710 | R 216 241 339 |
| **Total O&M costs** | **R 3 499 879 499** | **R 583 639 462** | **R 636 750 654** | **R 694 694 963** | **R 757 912 205** | **R 826 882 215** |
| Equitable share: FBS | R 2 328 387 910 | R 388 281 673 | R 423 615 306 | R 462 164 298 | R 504 221 250 | R 550 105 383 |
| Income: sales (actual payment) | R 133 386 724 | R 22 243 553 | R 24 267 717 | R 26 476 079 | R 28 885 402 | R 31 513 974 |
| **Total income** | **R 2 461 774 634** | **R 410 525 227** | **R 447 883 022** | **R 488 640 377** | **R 533 106 652** | **R 581 619 357** |
| **Deficit/surplus** | **R -1 038 104 865** | **R -173 114 236** | **R -188 867 631** | **R -206 054 586** | **R -224 805 553** | **R -245 262 859** |

**Implementation rollouts:**

Figures 6.6 (a) to (f) below provide an overview on each of the implementation programmes. Detailed maps and project rollout lists can also be reviewed in Section 10.

**Figure 6.6 (a): Locality Map**

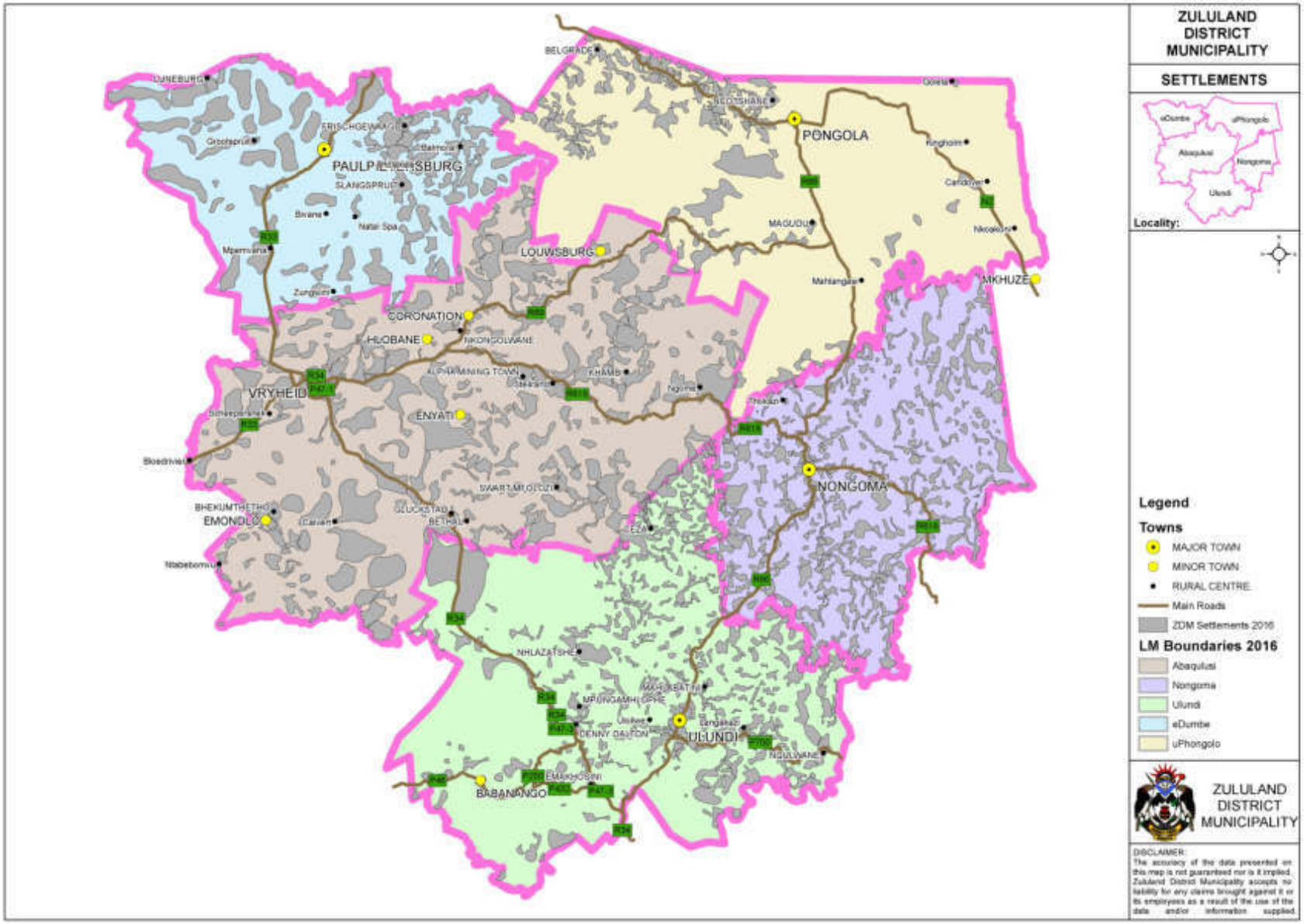


**Figure 6.6 (b): Planned future Bulk Infrastructure**

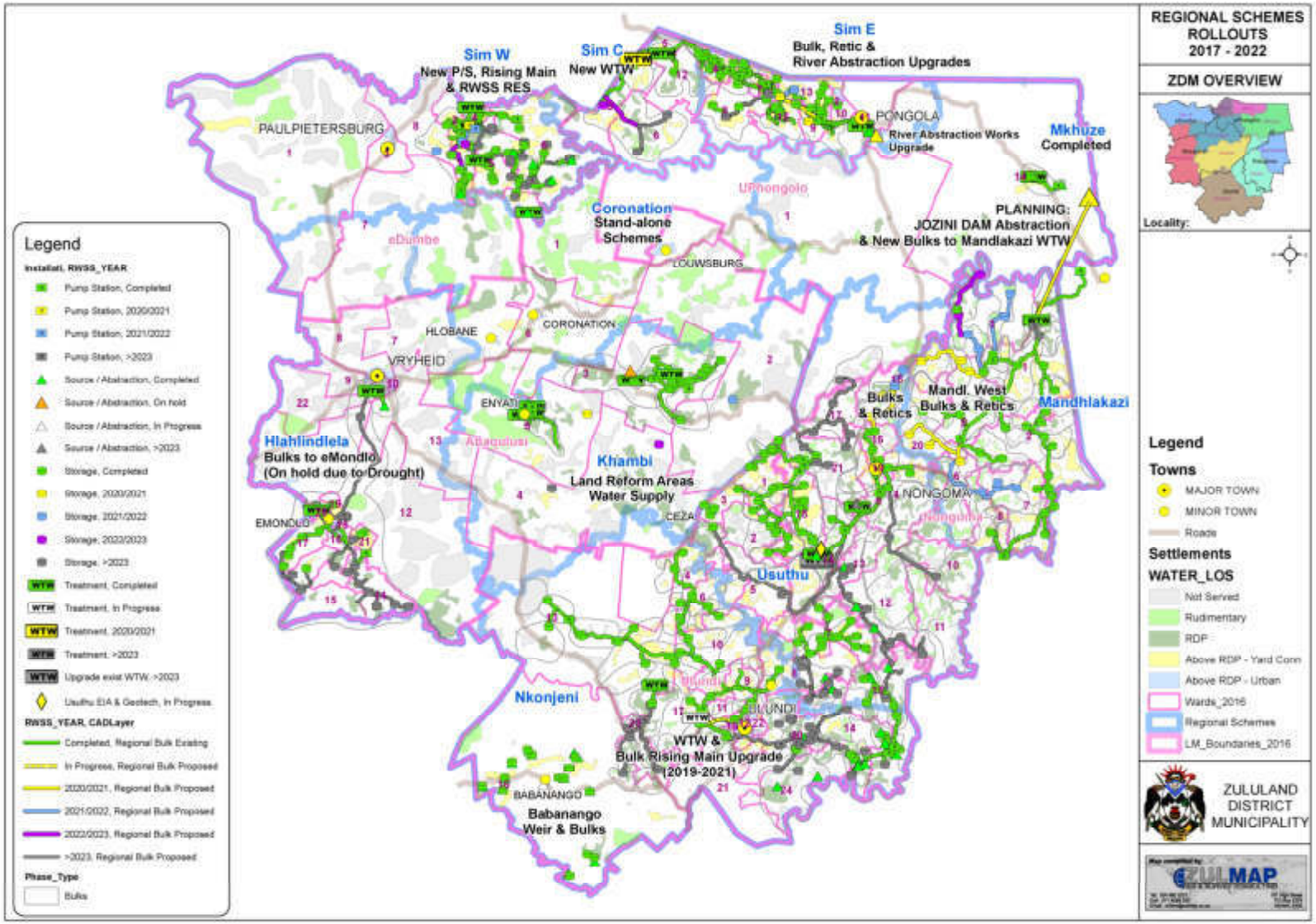


**Figure 6.6 (c): Planned future Stand-Alone Schemes to be implemented**

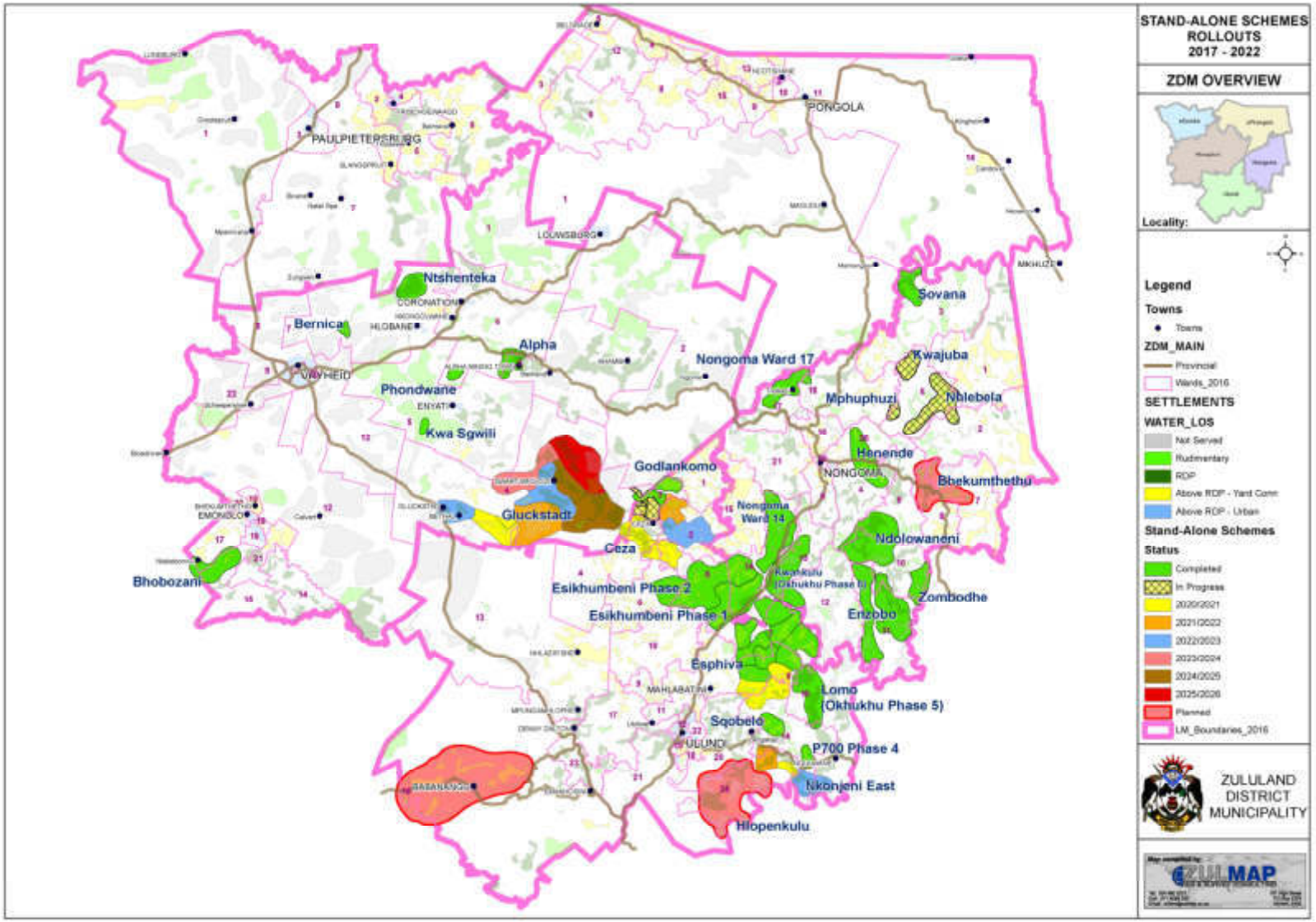


**Figure 6.6 (d): Planned rudimentary infrastructure rollouts.**

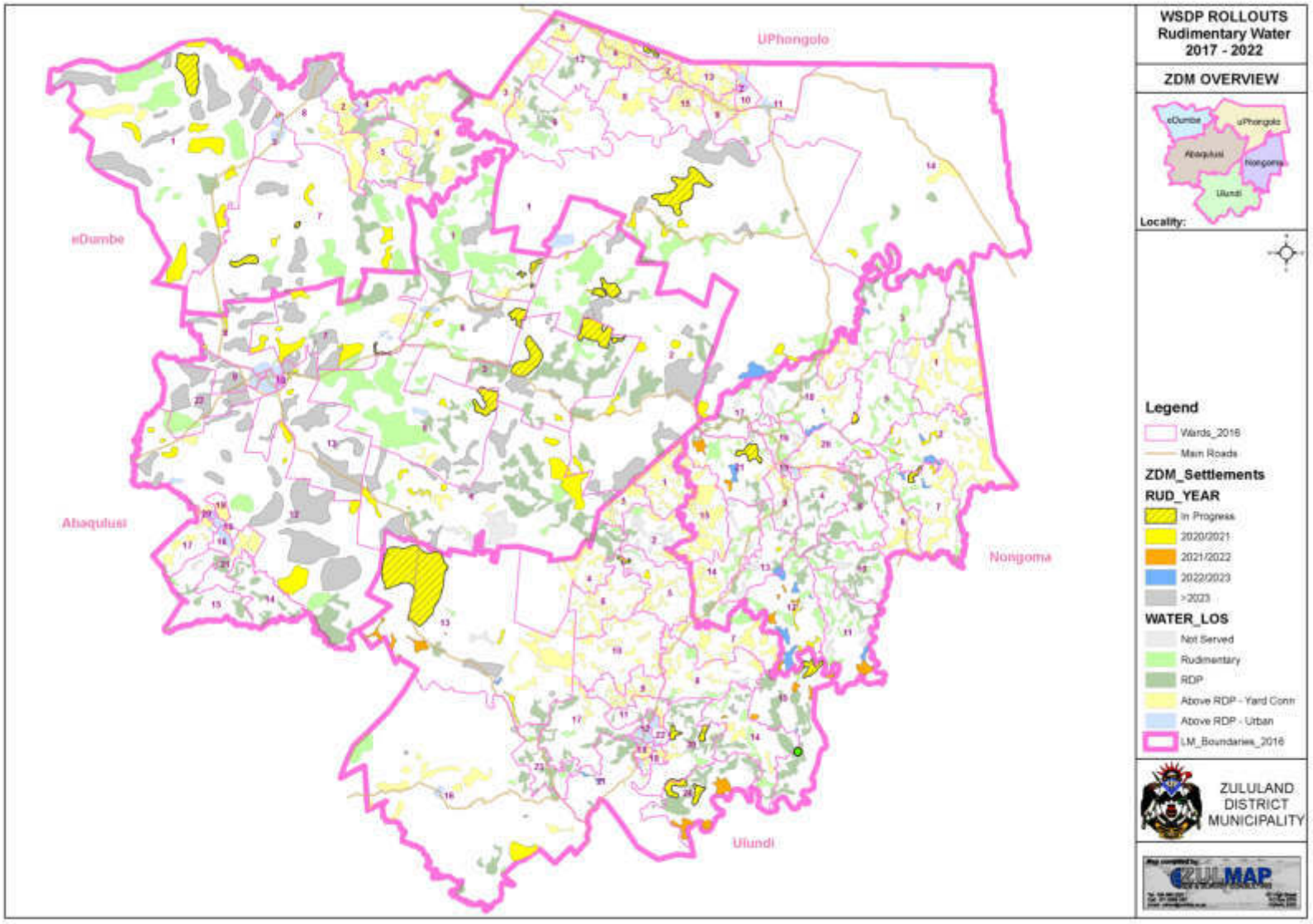


**Figure 6.6 (e): Planned rural sanitation infrastructure rollouts.**

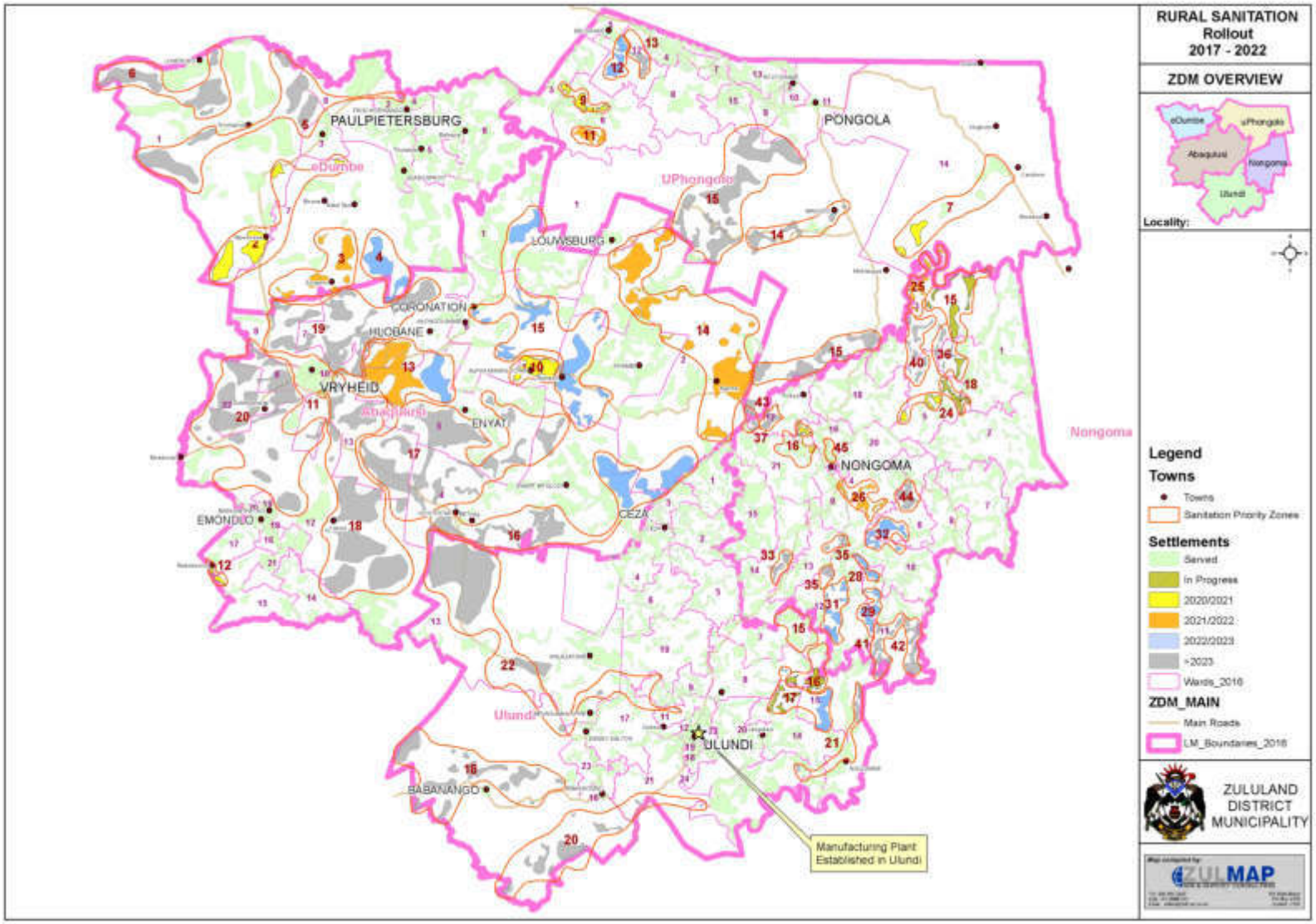
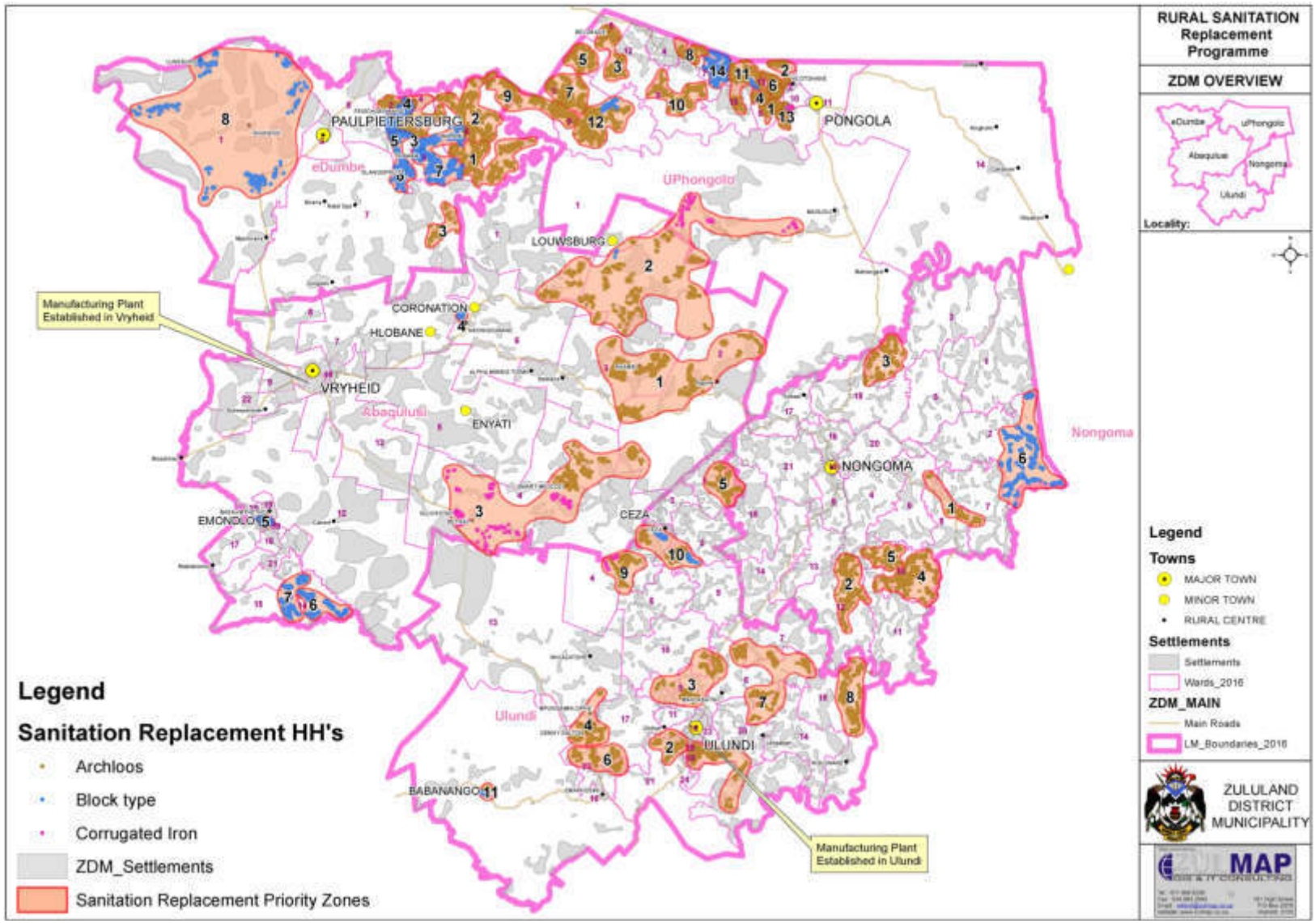


**Figure 6.6 (f): Planned rural sanitation replacement programme rollouts.**



# 7. Water Balance

This section views water services holistically taking account of the amount of water abstracted, supplied to consumers, lost in processing and returned to the resource in order to understand the functioning of the water supply system and ensure a balanced cycle for future sustainability. The overall idea is that what is taken out of the system must be returned to the system.

ZDM has initiated a reporting system whereby all Water Services Providers (WSP's) in the district have to provide certain prescribed operational information to the municipality on a monthly basis. Included in the information is water abstraction volumes, treatment volumes, consumer metered and billed volumes and effluent volumes at the sewage works. This information will eventually be used to compile a more comprehensive and accurate water balance for the district.

Unfortunately there is currently insufficient information related to internal losses and inflows into the sewage works to complete a comprehensive water balance. However, an attempt was made to produce a first order water balance with figures from data that was available at the time, as indicated below:

**Table 7.1 (a): First order water balance for district**

| DESCRIPTION | % LOSSES | Ml/d | Ml/year |
|---|---|---|---|
| Estimated bulk water abstracted | | 77.99 | 28 446 |
| Estimated bulk water purchased from others | | - | - |
| **Estimated bulk water treated** | | **77.99** | **28 446** |
| Estimated losses during treatment | 10% | 7.8 | 2 844.6 |
| Estimated physical water losses during distribution | 15% | 11.69 | 4 266.9 |
| **Estimated volume of water supplied to consumers** | **75%** | **58.49** | **21 334.5** |
| Estimated influent at wastewater works | 60% | 27.9 | 10 184 |
| Estimated losses during treatment | 10% | 4.7 | 1 697 |
| **Estimated effluent discharged to source** | | **14.0** | **5 092** |
| | | | |
| **Balance (discharge - abstraction)** | | **-48.1** | **-17 538** |

# 8. WATER SERVICES INSTITUTIONAL ARRANGEMENTS PROFILE

## 8.1 Water Services Authority assessment

The WSA has a number of functions and outputs that are mainly associated with governance and regulation. The situation within the ZDM is given in Table 8.1 (a) below.

**Table 8.1 (a): WSA functions and outputs within the ZDM**

| WSA functions / outputs | In place? (yes/ no) | If no, when will it be in place? | Support required (yes/no) |
|---|---|---|---|
| **Policy development** | | | |
| Indigent policy | Yes | N/A | No |
| Free basic water policy (including equitable share) | Yes | N/A | No |
| Free basic sanitation policy (including equitable share) | Yes | N/A | No |
| Procurement policy | Yes | N/A | No |
| **Regulation and tariffs** | | | |
| Water services bylaws with conditions as required by the Water Services Act | Yes | N/A | No |
| Mechanisms to ensure compliance with bylaws | Yes | N/A | No |
| Tariff structure | Yes | N/A | No |
| Tariffs promulgated | Yes | N/A | No |
| **Infrastructure development (projects)** | | | |
| Mechanisms to undertake project feasibility studies | Yes | N/A | No |
| Criteria for prioritising projects | Yes | N/A | No |
| Mechanisms to assess and approve project business plans | Yes | N/A | No |
| Mechanisms for selecting, contracting, managing and monitoring implementing agents | Yes | N/A | No |
| Mechanisms to monitor project implementation | Yes | N/A | No |
| **Water conservation and demand management** | | | |
| Water conservation and demand management strategy | In progress | TBA | No |
| **Performance management and monitoring** | | | |
| Performance management system | Yes | N/A | No |
| Water service monitoring and evaluation (M&E) system | Yes | N/A | No |
| **WSDP** | | | |
| WSDP information system | Yes | N/A | No |
| Mechanisms for stakeholder participation | Yes | N/A | No |
| Mechanisms to monitor and report on WSDP implementation | Yes | N/A | No |

**Table 8.1 (b): WSA functions and outputs within the ZDM**

| WSA functions / outputs | In place? (yes/ no) | If no, when will it be in place? | Support required (yes/no) |
|---|---|---|---|
| **WSP institutional arrangements** | | | |
| Criteria to select appropriate WSPs | Yes | N/A | No |
| Mechanisms to contract, manage and monitor WSPs | Yes | N/A | No |
| Mechanisms to approve WSP business plans | Yes | N/A | No |
| **WSA overall capacity** | | | |
| Sufficient staff and systems to fulfil all WSA functions | Yes | N/A | No |
| Other (state) | | | |

## 8.2 By-laws affecting water services

ZDM has worked extensively on the development of a water services policy and by-laws for the district. The documents were finalised by June 2008 and approved by Council. The by-laws have since been promulgated and are being enforced throughout. The documents are available on the ZDM website at www.zululand.org.za for information.

## 8.3 Water services providers' institutional arrangements

ZDM was awarded the Water Services Authority function in 2003 as part of the division of powers and functions amongst municipalities. The allocation of the water services function then resulted in a Section 78 investigation to be done to determine the most appropriate water services provider arrangements to provide water services in the district at the time and in future.

The investigation started off by determining the status quo with water services provision in the district at the time. A survey was done of all infrastructure assets, all costs related to water services were compiled and ring fenced, and staff organograms with vacant positions were drafted. It was known that the status quo situation was below the ideal and therefore and exercise was done to assess the current gaps and compile a model based on the existing WSP arrangements at the time, but only operating at the ideal level of service provision. This model was then compared with different scenarios of possible restructuring to determine the most appropriate long term WSP arrangement. The following WSP options were considered at the time:

- Option 1 (Internal WSP) – ZDM creates an internal department that is responsible for water services provision throughout the entire district
- Options 2 (Partly internal and partly external) – At the time two of the municipalities, namely Ulundi and Nongoma Municipalities, had insufficient capacity to perform the water provision function in their respective areas and it was clear that ZDM would have to take over the service in these areas in any event. The remaining three municipalities, namely uPhongolo, eDumbe and Abaqulusi did however pose potential to provide the service themselves and act in combination as an external WSP to ZDM. This option was therefore also considered and costed.

- Option 3 (Partly internal and partly external) – The option was also considered whereby the bulk services were separated out and the scenario considered where ZDM provides the bulk services throughout the district. The reticulation service would then be provided also by ZDM in the Ulundi and Nongoma municipal areas and again by the uPhongolo, eDumbe and Abaqulusi municipalities in their respective areas.

A number of key issues were identified during the assessment that had a significant influence on the eventual decision making process, as follows:

- Contracting the provision function out to an external provider (private sector or water board) was viewed as a potential risk in that such an institution would be focused on profit making rather than the long term preservation of the WSA assets. Such contracts are typically between 20 and 30 years and the risk is that assets are maintained only to the minimum level required during this time and that only the minimum required effort and money is spend on O&M activities and thereby maximising profits. This can be managed by the WSA to a large extend but only if the WSA have the systems in place to perform proper monitoring and evaluation of the provider. It was agreed at the time that ZDM would not be in an immediate position to do that.
- Due to the huge backlogs in the district ZDM is still in the middle of a massive infrastructure roll-out process and will be for the next 15 years still. During this time many old plants and schemes will be de-commissioned and taken over by new infrastructure from the regional schemes. This will therefore have a constant impact on staff and lead to regular restructuring taking place. The constant changing situation will therefore make it difficult to enter into long-term contracts for external service providers and it was felt that this transformation process could be more easily managed internally.
- Skilled senior management is needed at various levels in the organograms irrespective of which service provision options are being considered. These skilled personnel can only be attracted with the appropriate salary levels and due to the costs involved and the shortage of skills should be utilised as effectively as possible. There was a definite benefit in scale identified in applying costly resources over the biggest possible area. Therefore the ability of certain institutions, for instance a rural local municipality, to attract these skills were questioned and taken into consideration during the final decision making process.
- During the assessment it also became clear that certain specialised skills and functions should rather be outsourced than developed in-house. One example is mechanical and electrical expertise, which are needed on an ad-hoc basis and makes sense to contract in when needed.
- From the start there was a distinction made between bulk and reticulation infrastructure. In the case of water supply the bulk infrastructure was considered to be the abstraction, treatment and conveyance up to the main storage reservoirs. In the case of sewerage that bulk was considered to be mainly the sewage works. A split in the bulk and reticulation service provision was considered throughout and even with the internal option it made sense to keep the functions separate up to a certain management level.

- This district also poses physical constraints in terms of access routes from various places, travel times and other logistical considerations that had to be taken into account for all options that were considered.

Each of the options was costed and the results are shown in Table 7.3 (a) below. The table summarises the costs associated with each option that was considered and the estimates were done not only for the current year but forecasts were done up to year 5 and year x, where all consumers will have access to services.

**Table 8.3 (a): Summary of Costs**

| | | Ops Costs | Pers Costs | Total Costs |
|---|---|---|---|---|
| **YEAR 1** | Status Quo | R 44,304,250 | R 28,611,470 | R 72,915,720 |
| | Comparator | R 52,294,431 | R 49,781,179 | R 102,075,610 |
| | Option 1 | R 80,923,910 | R 15,388,264 | R 96,312,174 |
| | Option 2 | R 52,168,593 | R 51,058,679 | R 103,227,272 |
| | Option 3 | R 85,530,263 | R 16,228,825 | R 101,759,088 |
| **YEAR 5** | Option 1 | R 84,298,424 | R 16,960,203 | R 101,258,627 |
| | Option 2 | R 52,163,074 | R 50,882,541 | R 103,045,615 |
| | Option 3 | R 83,991,628 | R 17,684,455 | R 101,676,083 |
| **YEAR N** | Option 1 | R 79,343,627 | R 22,920,648 | R 102,264,275 |
| | Option 2 | R 52,178,163 | R 52,270,810 | R 104,448,959 |
| | Option 3 | R 79,856,990 | R 23,544,969 | R 103,401,959 |

The different options were also rated in terms of the following selected criteria:

- Environmental sustainability
- Financial sustainability
- Efficiency of management proposed structure
- Efficiency of customer care
- Efficiency to perform maintenance of assets

On the basis of the above criteria it appeared that Option 1 was likely to achieve the best overall performance in terms of services delivery in the district. Option 3 followed with Option 2 being the least sustainable. As may also be noted one of the key determinants in this rating system related to personnel and institutional arrangements. Structural arrangements, staff numbers and staff levels proved to be more efficient in Option 1 due to it being a single entity. This results in minimisation of duplication which is not the case in Options 2 and 3 owing to the inherent geographical and institutional split in the services provisioning function.

On the basis of the above findings the following recommendations were accepted by Council:

- In terms of the findings of the Section 78 assessment all indications showed that the internal option (1) should be adopted by Council since it clearly provides the best option for services provision in the Zululand District;
- The implementation of Option 1 should be accompanied by the identification of aspects of the water business for possible outsourcing.
- An implementation strategy should follow from the Section 78 Assessment to enable implementation of the internal option

All Water Services Provider functions were taken over by ZDM in 2003 from the Local Municipalities, except for the urban reticulation services within the AbaQulusi Local Municipality. An agreement between ZDM and AbaQulusi LM (better known as the Natal Spa Agreement) was reached in 2003 where AbaQulusi LM would serve as the WSP for an interim period, ending in June 2006. The purpose of this agreement was for AbaQulusi LM to assist ZDM in the WSP function for an interim period up until ZDM could function as the WSP. This agreement has however been extended on an annual basis since June 2006, but is currently under review by ZDM.

The complete Section 78 Assessment Report is available on the ZDM website at www.zuluand.org.za for information.

# 9. CUSTOMER SERVICES PROFILE

ZDM views the provision of a high quality service to customers as one of the highest priorities of the organisation. This can be seen in the fact that most of the KPI's in the organisation's Performance Management System relates to the provision of quality services to customers. ZDM realises that the organisation's core function is service delivery and this is also evident in the vision and mission statement of the municipality.

| **IDP vision and mission statement for the municipality** |
|---|
| **Vision**<br>"*We, the people of Zululand are proud communities that are committed to the development of Zululand through hard work, integrity and a common purpose.*"<br><br>**Mission**<br>• **To develop an affluent district by:**<br>  ○ **Optimal delivery of essential services**<br>  ○ **Supporting sustainable local economic development**<br>  ○ **Community participation in service delivery** |

ZDM has also developed a Customer Care strategy and certain strategic issues have been identified that needs urgent focus and immediate implementation. The key focus areas that were identified are the following:

- To know your customers (complete customer database)
- To develop proper mechanisms for effective two way communication with customers
- To provide affordable, high quality services that are accessible to all
- To empower your consumers through education
- To develop a customer focused organisation
- To develop a customer charter and honour the agreement with the customer
- To accelerate the implementation of appropriate service provision structures

## 9.1 Quality of service

The majority of the urban households are served with full pressure house connections or yard taps. More than half of the consumers within the rural areas are currently served, mostly through communal standpipes. In all cases where surface water is abstracted to supply communities there exists some form of treatment process that ensures that an acceptable quality of service is being provided. Many communities that are not served with formal water supply schemes are served through the ZDM rudimentary water supply programme utilising groundwater resources (i.e. boreholes with hand pumps or protected springs. The water being supplied through the rudimentary water supply programme is tested beforehand to ensure compliance with SABS standards and if need be disinfection is added where biological contamination exists. Groundwater sources that do not comply with the minimum water quality standards are not equipped for domestic use.

Water quality is monitored by the WSA on an ongoing basis and it is expected of the water service providers to report on the water quality status of each scheme at least once a month. This reporting is part of the MANZI reporting system and the information is linked to specific schemes. Monthly reporting is also being done to DWAF and captured on the eWQMS system. Indicated in Table 9.1 (a) is a monthly water quality report that was produced through the system.

## 9.2 Consumer complaints

ZDM has developed a system for the capturing and tracking of customer complaints, from the point where the complaint is recorded by the Customer Care centre, referred to specific individuals to deal with and closed out when finally dealt with. The system is called SIZA and records the time from when the complaint was lodged until the issue has been successfully completed. Response time to consumer complaints and the time it takes to deal with issues are therefore measured and can be reported on. Figures 9.2 a,b,c provide a view of system functionality.

**Figure 9.2 (a): Siza Dashboard**

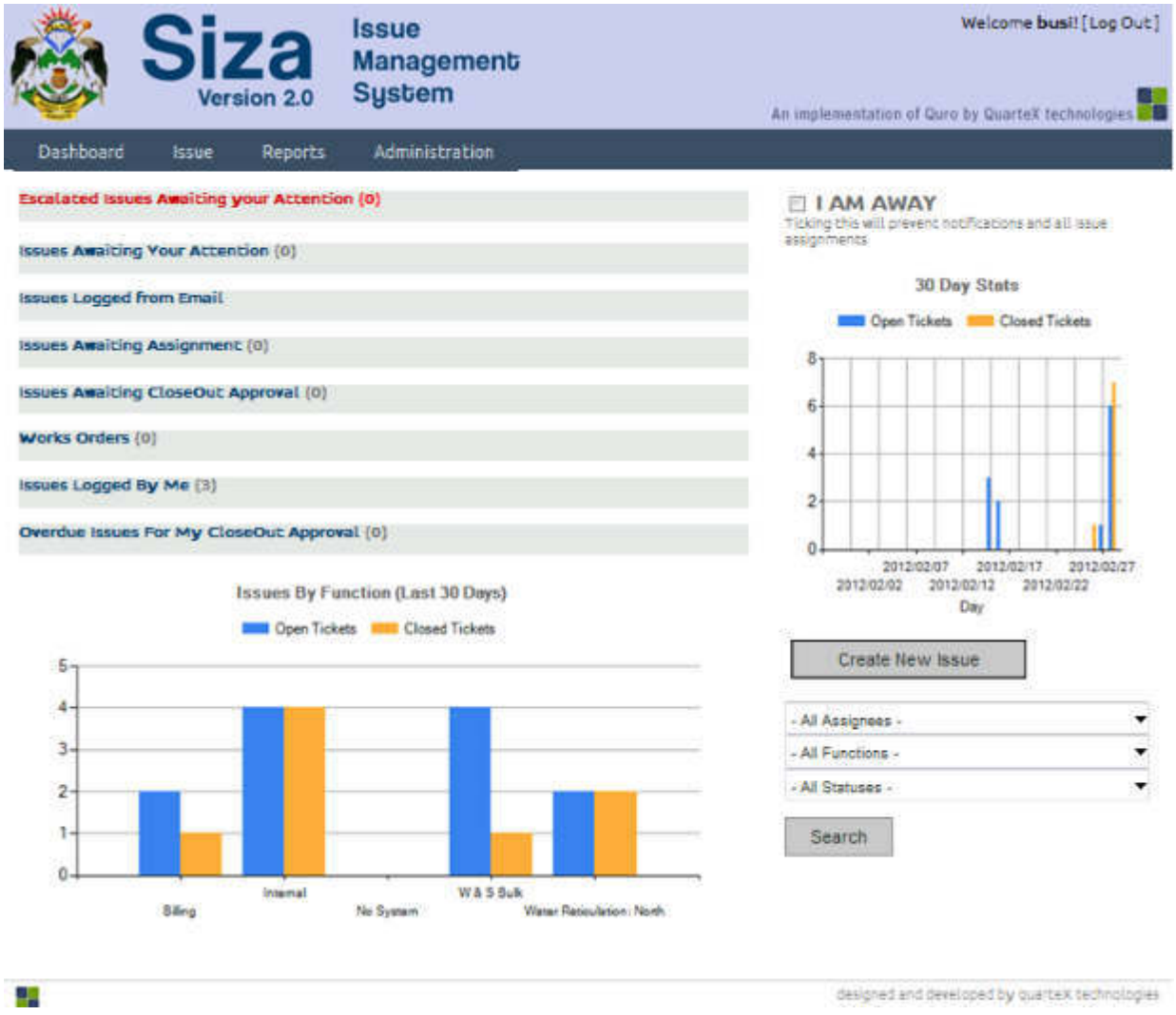


**Figure 9.2 (b): Capture new issue / Complaint**

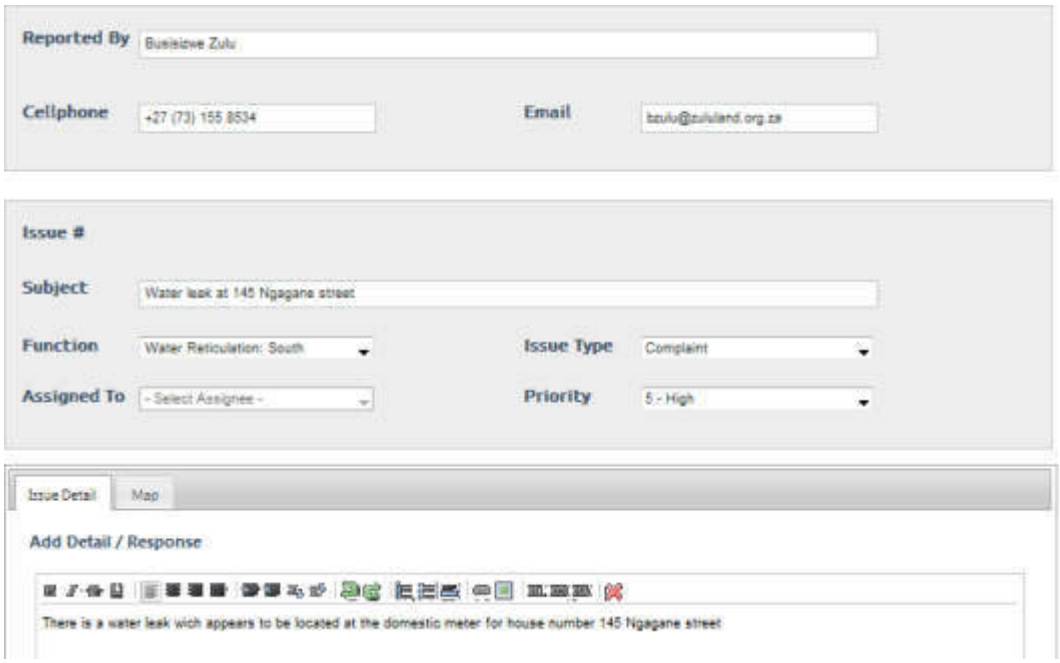
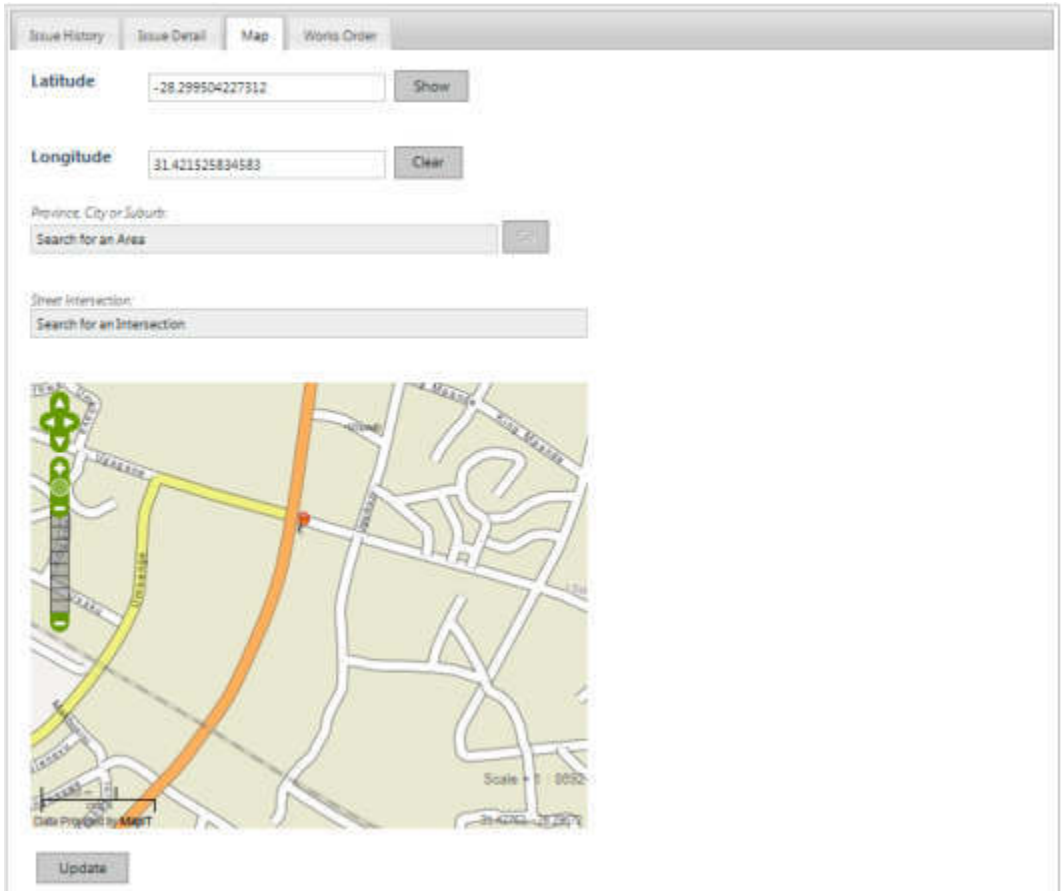



**Figure 9.2 (c): Issue Location**



# 10. Financial profile

The financials of water services are divided into two aspects namely, new capital projects and operations and maintenance (O&M) of existing infrastructure. The financial budgets of the ZDM are divided between income and expenditure for each of these aspects, and are further separated between water and sanitation.

## 10.1 Capital funds

Indicated below in Tables 10.1 (a) & (b) is the capital required to meet the national objectives of eradicating backlogs for water and sanitation by providing at least the RDP level of service to all households. The costs indicated have been calculated at present value and therefore excludes an allowance for future escalation. Tables 10.1 (c) & (d) indicate available funding up to 2022 and the shortfall in funding in order to eradicate backlogs by not later than 2022.

Current and future bulk refurbishment requirements have been included and short-, medium- and longterm interventions are being addressed. A Rural Sanitation Replacement Programme has been estimated at a cost of approximately R408m. The purpose of this programme will be to replace the old Archloo-, Block- and Zink-type VIP's. The Archloo-type VIP is not sustainable for longer than 3-5years, after which the structure starts to collapse. This causes a serious risk to people using the unit. Furthermore, these units are immovable, and most of the pits are full or nearly full. The purpose of the replacement programme is to replace all these units with movable pre-cast units. These structures have a long lifespan and can be moved in the case where pits get filled up.

**Table 10.1 (a): Capital requirements: water**

| WATER | Capital requirements | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 |
|---|---|---|---|---|---|---|---|
| Regional bulk | R 2 204 249 853 | | | R - | R 294 572 595 | R 313 011 521 | R 1 596 665 737 |
| Secondary bulk | R 1 036 030 068 | | | R - | R 33 478 526 | R 35 896 523 | R 966 655 019 |
| Reticulation | R 361 760 667 | | | R - | R 11 452 635 | R 14 758 965 | R 335 549 067 |
| **Total capital (new)** | **R 3 602 040 588** | **R -** | **R -** | **R -** | **R 339 503 756** | **R 363 667 009** | **R 2 898 869 823** |
| Regional bulk (WTW) | R 599 570 000 | | | | | | |
| Secondary bulk | TBA | | | | | | |
| Reticulation | TBA | | | | | | |
| **Total capital (refurbishment)** | **R 599 570 000** | | | **R -** | | | |
| **Total capital** | **R 4 201 610 588** | **R -** | **R -** | **R -** | **R 339 503 756** | **R 363 667 009** | **R 2 898 869 823** |

**Table 10.1 (b): Capital requirements: sanitation**

| SANITATION | Capital requirements | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 |
|---|---|---|---|---|---|---|---|
| Bulk infrastructure | R - | | | | | | |
| Reticulation | R - | | | | | | |
| VIP toilets | R 385 911 000 | | | | 59 721 750 | 59 721 750 | 59 721 750 |
| **Total capital (new)** | **R 385 911 000** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |
| Bulk infrastructure (WWTW) | 322 510 000 | | | | - | - | - |
| Reticulation | TBA | | | | - | - | - |
| VIP toilets (Replacement Prgrm) | 551 988 000 | | | | - | - | - |
| **Total capital (refurbishment)** | **R 874 498 000** | **R -** | | **R -** | **R -** | **R -** | **R -** |
| **Total capital** | **R 1 260 409 000** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |

**Table 10.1 (c): Source of capital income: water**

| WATER | Expected Funding | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 (Est.) | 2022/2023 (Est.) |
|---|---|---|---|---|---|---|---|
| MIG | R 537 495 750,00 | | | | R 179 165 250,00 | R 179 165 250,00 | R 179 165 250,00 |
| DWA (RBIG) | R 300 000 000,00 | | | | R 100 000 000,00 | R 100 000 000,00 | R 100 000 000,00 |
| Housing | | | | | | | |
| WSIG | R 345 000 000,00 | | | | R 115 000 000,00 | R 115 000 000,00 | R 115 000 000,00 |
| Loans | | | | | | | |
| **TOTAL** | **R 1 182 495 750** | **R -** | **R -** | **R -** | **R 394 165 250** | **R 394 165 250** | **R 394 165 250** |
| Capital requirements | R 4 201 610 588 | | | | | | |
| **Shortfall up to 2022** | **R -3 019 114 838** | | | | | | |

**Table 10.1 (d): Source of capital income: sanitation**

| SANITATION | Expected Funding | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 (Est.) | 2022/2023 (Est.) |
|---|---|---|---|---|---|---|---|
| MIG | R 179 165 250,00 | | | | R 59 721 750,00 | R 59 721 750,00 | R 59 721 750,00 |
| DWA | | | | | | | |
| Housing | R - | | | | R - | R - | R - |
| Other grant funding | | | | | | | |
| Loans | | | | | | | |
| **TOTAL** | **R 179 165 250** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |
| Capital requirements | R 1 260 409 000 | | | | | | |
| **Shortfall up to 2022** | **R -1 081 243 750** | | | | | | |

## 10.2 Operating costs and income (water & sanitation)

Of critical importance is the funding of Operations and Maintenance of existing and future schemes as they are being commissioned. Correct O&M of physical infrastructure is arguably more important than infrastructure construction because unless successful preventative maintenance procedures are instituted schemes will become inoperative. As a large proportion of expenditure relates to staff, competent personnel are required to ensure that the large investments in water services are not negated through dysfunction or dereliction.

Table 10.2 (a) on the proceeding page shows the operational costs associated with the provision of water services in the district.

## 10.3 Tariffs and charges

The ZDM tariff structure for various levels of water and sanitation services, including the Free Basic Services (FBS) allowance to households, are indicated in Table 10.3 (a) below. The demographics of the ZDM indicate that the level of poverty in the ZDM is high (Section 1). The ZDM cannot afford the expenses of maintaining an indigent roster and therefore provides all households in the district with FBS. Only institutions (schools, clinics, etc.) are not provided with FBS. ZDM might in future refine the above approach to a more targeted approach based on different residential areas.

**Table 10.2 (a): Operational costs and income**

| Operating costs and income | Total 5yr projected | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 |
|---|---|---|---|---|---|---|
| Operational costs | R 2 584 611 744 | R 431 009 527 | R 470 231 394 | R 513 022 451 | R 559 707 494 | R 610 640 876 |
| Personnel costs | R 915 267 755 | R 152 629 935 | R 166 519 259 | R 181 672 512 | R 198 204 710 | R 216 241 339 |
| **Total O&M costs** | **R 3 499 879 499** | **R 583 639 462** | **R 636 750 654** | **R 694 694 963** | **R 757 912 205** | **R 826 882 215** |
| Equitable share: FBS | R 2 328 387 910 | R 388 281 673 | R 423 615 306 | R 462 164 298 | R 504 221 250 | R 550 105 383 |
| Income: sales (actual payment) | R 133 386 724 | R 22 243 553 | R 24 267 717 | R 26 476 079 | R 28 885 402 | R 31 513 974 |
| **Total income** | **R 2 461 774 634** | **R 410 525 227** | **R 447 883 022** | **R 488 640 377** | **R 533 106 652** | **R 581 619 357** |
| **Deficit/surplus** | **R -1 038 104 865** | **R -173 114 236** | **R -188 867 631** | **R -206 054 586** | **R -224 805 553** | **R -245 262 859** |

## Table 10.3 (a): ZDM Water Services Tariffs

| DETAILS | NONGOMA | VAT | AMOUNT | % CHANGE | 2018/2019 CHANGE | ULUNDI | VAT | AMOUNT | % CHANGE | 2018/2019 CHANGE | EDUMBE | VAT | AMOUNT | % CHANGE | 2018/2019 CHANGE | PONGOLA | VAT | AMOUNT | CHANGE | 2018/2019 CHANGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WATER TARIFFS** | | | | | | | | | | | | | | | | | | | | |
| **DOMESTIC** | | | | | | | | | | | | | | | | | | | | |
| CURRENT 0-6kl | 0,00 | - | | | | 0,00 | 0,00 | | | | 0,00 | 0,00 | | | | 0,00 | 0,00 | | | - |
| PROPOSED | 0,00 | - | | 0% | 0,00 | 0,00 | 0,00 | | 0% | 0,00 | 0,00 | 0,00 | | 0% | 0,00 | 0,00 | 0,00 | | 0% | - |
| | | | | | 0,00 | | 0,00 | | | 0,00 | | 0,00 | | | 0,00 | | 0,00 | | | - |
| CURRENT 7-30kl | 6,30 | 0,88 | 7,18 | | | 6,30 | 0,88 | 6,52 | | | 6,30 | 0,88 | 6,52 | | | 5,32 | 0,75 | 6,07 | | |
| PROPOSED | 6,93 | 1,04 | 7,96 | 10% | 0,79 | 6,93 | 1,04 | 7,96 | 10% | 0,59 | 6,93 | 1,04 | 7,96 | 10% | 0,59 | 5,85 | 0,88 | 6,73 | 10% | 0,67 |
| | | | | | | | | | | | | | | | | | | | | |
| CURRENT 30-40 | 8,43 | 1,18 | 9,61 | | | 8,43 | 1,18 | 9,61 | | | 8,43 | 1,18 | 9,61 | | | 8,43 | 1,18 | 9,61 | | |
| PROPOSED | 9,69 | 1,45 | 11,15 | 15% | 1,54 | 9,69 | 1,45 | 11,15 | 10% | 1,54 | 9,69 | 1,45 | 11,15 | 10% | 1,54 | 9,69 | 1,45 | 11,15 | 10% | 1,54 |
| | | | | | | | 0,00 | - | | 0,00 | | 0,00 | - | | 0,00 | | 0,00 | - | | - |
| CURRENT > 40 | 11,37 | 1,59 | 12,97 | | | 11,37 | 1,59 | 12,97 | | | 11,37 | 1,59 | 12,97 | | | 11,37 | 1,59 | 12,97 | | |
| PROPOSED | 13,65 | 2,05 | 15,70 | 20% | 2,73 | 13,65 | 2,05 | 15,70 | 10% | 2,73 | 13,65 | 2,05 | 15,70 | 10% | 2,73 | 13,65 | 2,05 | 15,70 | 10% | 2,73 |
| | | | | | | | 0,00 | - | | 0,00 | | 0,00 | - | | 0,00 | | 0,00 | - | | - |
| **BUSINESS** | | | | | | | 0,00 | - | | 0,00 | | 0,00 | - | | 0,00 | | 0,00 | - | | - |
| CURRENT | 8,84 | 1,24 | 10,08 | | | 8,84 | 1,24 | 10,08 | | | 8,84 | 1,24 | 10,08 | | | 8,84 | 1,24 | 10,08 | | |
| PROPOSED | 9,73 | 1,46 | 11,19 | 10% | 1,11 | 9,73 | 1,46 | 11,19 | 10% | 1,11 | 9,73 | 1,46 | 11,19 | 10% | 1,11 | 9,73 | 1,46 | 11,19 | 10% | 1,11 |
| | | | | | | | | | | | | | | | | | | | | |
| **WATER CONNECTIONS:** | | | | | | | | | | | | | | | | | | | | |
| CURRENT | 2 833,03 | 396,62 | 3 229,66 | | | 2 833,03 | 396,62 | 3 229,66 | | | 2 833,03 | 396,62 | 3 229,66 | | | 2 833,03 | 396,62 | 3 229,66 | | |
| Proposed Residential | 3 116,34 | 467,45 | 3 583,79 | 10% | 354,13 | 3 116,34 | 467,45 | 3 583,79 | 10% | 354,13 | 3 116,34 | 467,45 | 3 583,79 | 10% | 354,13 | 3 116,34 | 467,45 | 3 583,79 | 10% | 354,13 |
| Proposed Businesses | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| **NEW SEWER CONNECTIONS:** | | | | | | | | | | | | | | | | | | | | |
| CURRENT | | | | | | | | | | | | | | | | | | | | |
| Proposed Residential | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | |
| Proposed Businesses | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| **METER TEMPERING:** | | | | | | | | | | | | | | | | | | | | |
| CURR - First Offence/ILLEGAL FEE | 1 661,19 | 232,57 | 1 893,75 | | | 1 661,19 | 232,57 | 1 893,75 | | | 1 661,19 | 232,57 | 1 893,75 | | | 1 661,19 | 232,57 | 1 893,75 | | |
| PROP - First Offence/ILLEGAL FEE | 1 827,31 | 274,10 | 2 101,40 | 10% | 207,65 | 1 827,31 | 274,10 | 2 101,40 | 10% | 207,65 | 1 827,31 | 274,10 | 2 101,40 | 10% | 207,65 | 1 827,31 | 274,10 | 2 101,40 | 10% | 207,65 |
| CURR-Second Offence/ILLEGAL FEE | 3 322,38 | 465,13 | 3 787,51 | | | 3 322,38 | 465,13 | 3 787,51 | | | 3 322,38 | 465,13 | 3 787,51 | | | 3 322,38 | 465,13 | 3 787,51 | | |
| PROP-Second Offence/ILLEGAL FEE | 3 654,61 | 548,19 | 4 202,81 | 10% | 415,30 | 3 654,61 | 548,19 | 4 202,81 | 10% | 415,30 | 3 654,61 | 548,19 | 4 202,81 | 10% | 415,30 | 3 654,61 | 548,19 | 4 202,81 | 10% | 415,30 |
| Third Offence | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| **WATER RECONNECTION FEE:** | 167,41 | 23,44 | 190,84 | | | 167,41 | 23,44 | 190,84 | | | 167,41 | 23,44 | 190,84 | | | 167,41 | 23,44 | 190,84 | | |
| **PROPOSED** | 184,15 | 27,62 | 211,77 | 10% | 20,93 | 184,15 | 27,62 | 211,77 | 10% | 20,93 | 184,15 | 27,62 | 211,77 | 10% | 20,93 | 184,15 | 27,62 | 211,77 | 10% | 20,93 |
| | | | | | | | | | | | | | | | | | | | | |
| **WATER TANKERS: loads** | | | | | | | | | | | | | | | | | | | | |
| Rate per kiloliter (Portable Water) | 10,02 | 1,40 | 11,42 | | | 10,02 | 1,40 | 11,42 | | | 10,02 | 1,40 | 11,42 | | | 10,02 | 1,40 | 11,42 | | |
| PROPOSED | 11,02 | 1,65 | 12,67 | 10% | 1,25 | 11,02 | 1,65 | 12,67 | 10% | 1,25 | 11,02 | 1,65 | 12,67 | 10% | 1,25 | 11,02 | 1,65 | 12,67 | 10% | 1,25 |
| | | | | | | | | | | | | | | | | | | | | |
| **Other Consumables** | | | | | | | | | | | | | | | | | | | | |
| Where no working water meter is installed on which the property is occupied | 164,54 | 23,04 | 187,58 | | | 164,54 | 23,04 | 187,58 | | | 164,54 | 23,04 | 187,58 | | | 164,54 | 23,04 | 187,58 | | |
| PROPOSED | 181,00 | 27,15 | 208,15 | 10% | 20,57 | 181,00 | 27,15 | 208,15 | 10% | 20,57 | 181,00 | 27,15 | 208,15 | 10% | 20,57 | 181,00 | 27,15 | 208,15 | 10% | 20,57 |
| Businesses | 543,71 | 76,12 | 619,83 | | | 543,71 | 76,11989 | 619,83 | | | 543,71 | 76,11989 | 619,83 | | | 543,71 | 76,11989 | 619,83 | | |
| PROPOSED | 598,08 | 89,71 | 687,80 | 10% | 67,96 | 598,08 | 89,71273 | 687,80 | 10% | 67,96 | 598,08 | 89,71273 | 687,80 | 10% | 67,96 | 598,08 | 89,71273 | 687,80 | 10% | 67,96 |
| **STAND ALONE/ DEDICATED SCHEMES** | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | |
| | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEWERAGE CHARGES** | | | | | | | | | | | | | | | | | | | | | |
| CURRENT | | 85.85 | 12.02 | 97.87 | | | 85.85 | 12.02 | 97.87 | | | 0.00 | 0.00 | - | | 0 | 85.85 | 12.02 | 97.87 | | |
| PROPOSED | | 94.43 | 14.17 | 108.60 | 10% | 10.73 | 94.43 | 14.17 | 108.60 | 10% | 10.73 | 0.00 | 0.00 | - | | 0 | 94.43 | 14.17 | 108.60 | 10% | 10.73 |
| | | | | | | | | | | | | | | | | | | | | | |
| **SEWER EXCESS** | | | | | | | | | | | | | | | | | | | | | |
| CURRENT | | 3.94 | 0.55 | 4.49 | | | 3.94 | 0.55 | 4.49 | | | 0.00 | 0.00 | - | | 0 | 3.94 | 0.55 | 4.49 | | |
| PROPOSED | | 4.34 | 0.65 | 4.99 | 10% | 0.49 | 4.34 | 0.65 | 4.99 | 10% | 0.49 | 0.00 | 0.00 | - | | 0 | 4.34 | 0.65 | 4.99 | 10% | 0.49 |
| | | | | | | | | | | | | | | | | | | | | | |
| **VACUUM TANK SERVICE per 5kl OR PART THEREOF** | | | | | | | | | | | | | | | | | | | | | |
| Normal week days | | 151.67 | 21.23 | 172.90 | | | 151.67 | 21.23 | 172.90 | | | 151.67 | 21.23 | 172.90 | | | 151.67 | 21.23 | 172.90 | | |
| PROPOSED | | 166.83 | 25.03 | 191.86 | 10% | 18.96 | 166.83 | 25.03 | 191.86 | 10% | 18.96 | 166.83 | 25.03 | 191.86 | 10% | 18.96 | 166.83 | 25.03 | 191.86 | 10% | 18.96 |
| Weekends and Public Holidays | | 482.58 | 67.56 | 550.14 | | | 530.84 | 74.32 | 605.15 | | | 530.84 | 74.32 | 605.15 | | | 530.84 | 74.32 | 605.15 | | |
| PROPOSED | | 530.84 | 79.63 | 610.46 | 10% | 60.32 | 583.92 | 87.59 | 671.51 | 10% | 66.35 | 583.92 | 87.59 | 671.51 | 10% | 66.35 | 583.92 | 87.59 | 671.51 | 10% | 66.35 |
| Rate per km | | 7.15 | 1.00 | 8.16 | | | 7.15 | 1.00 | 8.16 | | | 7.15 | 1.00 | 8.16 | | | 7.15 | 1.00 | 8.16 | | |
| PROPOSED | | 7.87 | 1.18 | 9.05 | 10% | 0.89 | 7.87 | 1.18 | 9.05 | 10% | 0.89 | 7.87 | 1.18 | 9.05 | 10% | 0.89 | 7.87 | 1.18 | 9.05 | 10% | 0.89 |
| | | | | | | | | | | | | | | | | | | | | | |
| **STAND ALONE/ DEDICATED SCHEMES** | | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| **WATER DEPOSIT** | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| **DOMESTIC** | | ESTIMATED TARRIF OF R250 FIXED | | | | | ESTIMATED TARRIF OF R250 FIXED | | | | | ESTIMATED TARRIF OF R250 FIXED | | | | | ESTIMATED TARRIF OF R250 FIXED | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| **NON DOMESTIC** | | AVERAGE MONTH WATER SERVICES | | | | | AVERAGE MONTH WATER SERVICES | | | | | AVERAGE MONTH WATER SERVICES | | | | | AVERAGE MONTH WATER SERVICES | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| **GENERAL TARRIFS:** | | | | | | | | | | | | | | | | | | | | | |
| METER TESTING | | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | | cost +10% | | | | |
| INDONSA HALL HIRE | | 758.34 | 106.17 | 864.50 | | | 758.34 | 106.17 | 864.50 | | | 758.34 | 106.17 | 864.50 | | | 758.34 | 106.17 | 864.50 | | |
| PROPOSED | | 834.17 | 125.13 | 959.30 | 10% | 94.79 | 834.17 | 125.13 | 959.30 | 10% | 94.79 | 834.17 | 125.13 | 959.30 | 10% | 94.79 | 834.17 | 125.13 | 959.30 | 10% | 94.79 |
| INDONSA DEPOSIT REFUNDABLE | | 303.33 | 42.47 | 345.80 | | | 303.33 | 42.47 | 345.80 | | | 303.33 | 42.47 | 345.80 | | | 303.33 | 42.47 | 345.80 | | |
| PROPOSED | | 333.67 | 50.05 | 383.72 | 10% | 37.92 | 333.67 | 50.05 | 383.72 | 10% | 37.92 | 333.67 | 50.05 | 383.72 | 10% | 37.92 | 333.67 | 50.05 | 383.72 | 10% | 37.92 |
| R/D CHEQUE | | 121.62 | 17.03 | 138.65 | | | 121.62 | 17.03 | 138.65 | | | 121.62 | 17.03 | 138.65 | | | 121.62 | 17.03 | 138.65 | | |
| PROPOSED | | 133.78 | 20.07 | 153.85 | 10% | 15.20 | 133.78 | 20.07 | 153.85 | 10% | 15.20 | 133.78 | 20.07 | 153.85 | 10% | 15.20 | 133.78 | 20.07 | 153.85 | 10% | 15.20 |
| NEW - SEWER SLUDGE PER 5000 LITRES | | 2345.07 | 328.31 | 2 673.38 | | | 2345.07 | 328.31 | 2 673.38 | | | 2345.07 | 328.31 | 2 673.38 | | | 2345.07 | 328.31 | 2 673.38 | | |
| PROPOSED | | 2579.58 | 386.94 | 2 966.51 | | 293.13 | 2579.58 | 386.94 | 2 966.51 | 10% | 293.13 | 2579.58 | 386.94 | 2 966.51 | 10% | 293.13 | 2579.58 | 386.94 | 2 966.51 | 10% | 293.13 |
| FAX | | 2.86 | 0.40 | 3.26 | | | 2.86 | 0.40 | 3.26 | | | 2.86 | 0.40 | 3.26 | | | 2.86 | 0.40 | 3.26 | | |
| PROPOSED | | 3.15 | 0.47 | 3.62 | 10% | 0.36 | 3.15 | 0.47 | 3.62 | 10% | 0.36 | 3.15 | 0.47 | 3.62 | 10% | 0.36 | 3.15 | 0.47 | 3.62 | 10% | 0.36 |
| CLEARANCE CERTIFICATE | | 14.31 | 2.00 | 16.31 | | | 14.31 | 2.00 | 16.31 | | | 14.31 | 2.00 | 16.31 | | | 14.31 | 2.00 | 16.31 | | |
| PROPOSED | | 15.74 | 2.36 | 18.10 | 10% | 1.79 | 15.74 | 2.36 | 18.10 | 10% | 1.79 | 15.74 | 2.36 | 18.10 | 10% | 1.79 | 15.74 | 2.36 | 18.10 | 10% | 1.79 |

**Sewer dump fee is R 91.34 per 25 Litre up to a maximum of R2500 per dump**
**Tender Fees:The minimum tender fee is R250.00 for amounts up to 2 million. And R100.00 for every 1 million or part thereof thereafter up to a maximum of R2500.00**

**The minimunimum deposit be R250.00, subject to the accounting officer review on a case by case basis.**

## 10.4 Income and sales

ZDM has developed a WSP reporting system, which is in the process of being rolled out, where actual income from water sales will be monitored on a monthly basis. Data from this system will be included in future revisions of the WSDP.

## 10.5 Metering and billing

The WSP reporting system referred to above will also report on metered and unmetered supply points and strategies being implemented to improve the situation. Data from this system will be included in future revisions of the WSDP.

# 11. List of projects

## 11.1 Introduction

ZDM has the following implementation programmes in terms of water and sanitation provision:

- **WATER**
  - **Regional Water Supply Schemes**

    There were originally 10 back to back Regional Water Supply Schemes. Coronation is however currenlty under review to rather implement stand-alone schemes:

| NAME | STATUS QUO |
|---|---|
| Coronation | Masterplan under review to implement stand-alone schemes instead of regional scheme |
| Khambi | Completed |
| Hlahlindlela | On hold due to water shortage |
| Mandhlakazi | In progress |
| Mkhuze | Completed |
| Nkonjeni | In progress |
| Simdlangentsha East | Upgrades to cater for increased water demands |
| Simdlangentsha Central | In progress |
| Simdlangentsha West | In progress |
| Usuthu | In progress |

    Each regional scheme footprint has a sustainable water source from where infrastructure is progressively being rolled out to all households within the supply area. The supply footprints have been identified in such a way that water can be provided to all households within the area in a sustainable manner and at the lowest possible cost (R/kl).

  - **Intermediate Stand-alone Schemes**

    Due to time and budget constraints with implementation of costly bulk infrastructure, ZDM has initiated an intervention to alleviate the severe water shortage in areas where a sustainable local source can be developed. These water sources will supply several settlements in the surrounding area, and will become part of the Regional Scheme infrastructure in future. Implementation will be done according to the ZDM Prioritisation Model for water services within each Regional Scheme.

  - **Rudimentary Water Supply**

    In areas where settlements cannot be served in the near future by the Regional Schemes or Intermediate Schemes, local water sources will be used to provide a survival level of water on

a rudimentary level. Implementation is done according to the ZDM Prioritisation Model for water services.

- **RURAL SANITATION**

  Sanitation in the rural areas is being provided in the form of dry-pit VIP toilets. Implementation is done according to the ZDM Prioritisation Model for rural sanitation services.

  A Rural Sanitation Replacement Programme has also been deemed neccessary in 2013 to replace the old Archloo-, Block- and Zink-type VIP's. This programme's implementation will be included in the next 5-year review of the WSDP.

- **SPECIAL PROJECTS**

  Special projects are individual infrastructure requirements on a Local Municipal level which are addressed and budgetted for on a needs basis.

- **EMERGENCY INTERVENTION PROJECTS**

  Emergency Intervention Projects are projects which require immediate intervention, such as during disaster management. Two such projects have been implemented over the past few years in ZDM, namely:

  - **Drought Relief**

    Emergency drought relief funding was provided to ZDM in 2016. An amount of R37 493 000 was made available in 2016 for drought relief interventions, and a planned 7 880 households were to benefit from this funding allocation. More details can be reviewed at the end of this section.

  - **COVID-19**

    South Africa is currently in lock-down due to the COVID-19 epidemic. Emergency interventions were immendiately put in place in ZDM, with 2 task teams deployed to plan, manage and oversee emergency interventions. More details can be reviewed at the end of this section.

Rollout programmes for each of the above can be reviewed at the end of this section.

## 11.2 ZDM Prioritisation Models

### 11.2.1 Introduction to Prioritisation Models in Service Delivery

The first Water Supply and Sanitation Policy White Paper was published in 1994 and enacted as the Water Services Act, Act 108 of 1997 (dwa.gov.za, 1994). The Department of Water Affairs (DWA)

had the responsibility of providing these services. A few guidelines were provided on how to implement these services, and **the primary principle is that development should be demand-driven.** The Apartheid era has left a legacy of prejudice, and it is important that the new water supply policies ensure that their implementation does not become subjective to political influence. The Water for Growth and Development Framework, published by DWA, stipulates that proper planning and resources need to be used to supply water through various programmes, such as bulk water schemes, intermediate stand-alone schemes, and survival-level of water where water scarcity is prevalent (dwa.gov.za, 2011). The water policies, however, provide little guidance about how these services should be prioritised.

The Water and Sanitation White Paper was revised in 2002 and adopted by Parliament on 17 September 2003 as the Strategic Framework for Water Services (dwa.gov.za, 2003). Some major amendments were made to the roles of the DWA and local government. DWA's function changed from being a direct delivery function to being a sector leader, supporter and regulator. The responsibility of service delivery was handed over to the local government, and each district and local municipality have to implement their own policies to manage service delivery. This includes their approach to prioritise service delivery. The prioritisation of these service deliveries has created an immense challenge to local government. The most basic of these services is water and sanitation supply. Due to the vastness and remote characteristics of the rural areas, it is one of the most difficult aspects of service delivery that local government faces. Additional to the spatial characteristics of these areas, political influence often dictates the outcomes of service delivery planning instead of focusing on the actual water needs of rural communities.

Most District Municipalities, in the more rural areas, are the WSP's for their respective area of jurisdiction. This includes the Local Municipal areas within the District Municipal area. In the Water Services Act of 1997, it stipulates that an Integrated Development Plan (IDP) for each District Municipality should provide details on all Sector Plans required on a National level (Government Gazette, 1997). The purpose of Sector Plans is to provide details on certain aspects or roles that the District Municipalities have to adhere to, explaining their plan of action for each aspect. The Water Services Development Plan (WSDP) is the Sector Plan detailing the approach that the municipality follows for water services, and how they intend to provide water services to its users. This is part of the planning purposes of the Municipality; therefore, the responsibility for compiling the WSDP usually lies with the Planning Department.

The WSDP should, therefore, detail the approach that the municipality follows for water services delivery, and the process followed to prioritise and implement these services. It is this process that

should include the consultative process with all relevant stakeholders to take their views into consideration (dwa.gov.za, 2004).

This consultative process is, in many cases driven by political influence, and is prone to result in argumentative situations between ward councillors to motivate projects within their own wards.

The ward councillors fulfil the role of acting on behalf of the local people in their respective wards with their focus on a consultative and participatory process for service delivery needs. A ward councillor, therefore, has the responsibility of being a spokesperson for the ward, which entails the successful voicing of community needs to the entities providing service delivery. Due to this responsibility, it is important that the councillor ensures that community needs are being addressed. Councillors for these wards may affiliate to different political parties.

Ward councillors are, therefore, in a predicament because they compete with the other ward councillors for budget allocations. The Water Services Provider (WSA), in return, faces the following challenges:

- If ten communities from different wards do not have water services, how should the budget allocations be done and which settlement will get water services first?
- Whose viewpoint acts as the decisive when deciding where water services should be implemented?

The community with the lowest level of services in one ward may, for example, be in a better position compared to communities in other wards because it is close to a perennial river. The question remains what objective measurement can determine which community is worse-off?
Figure 1 represents a typical workflow process to approve a WSDP review:

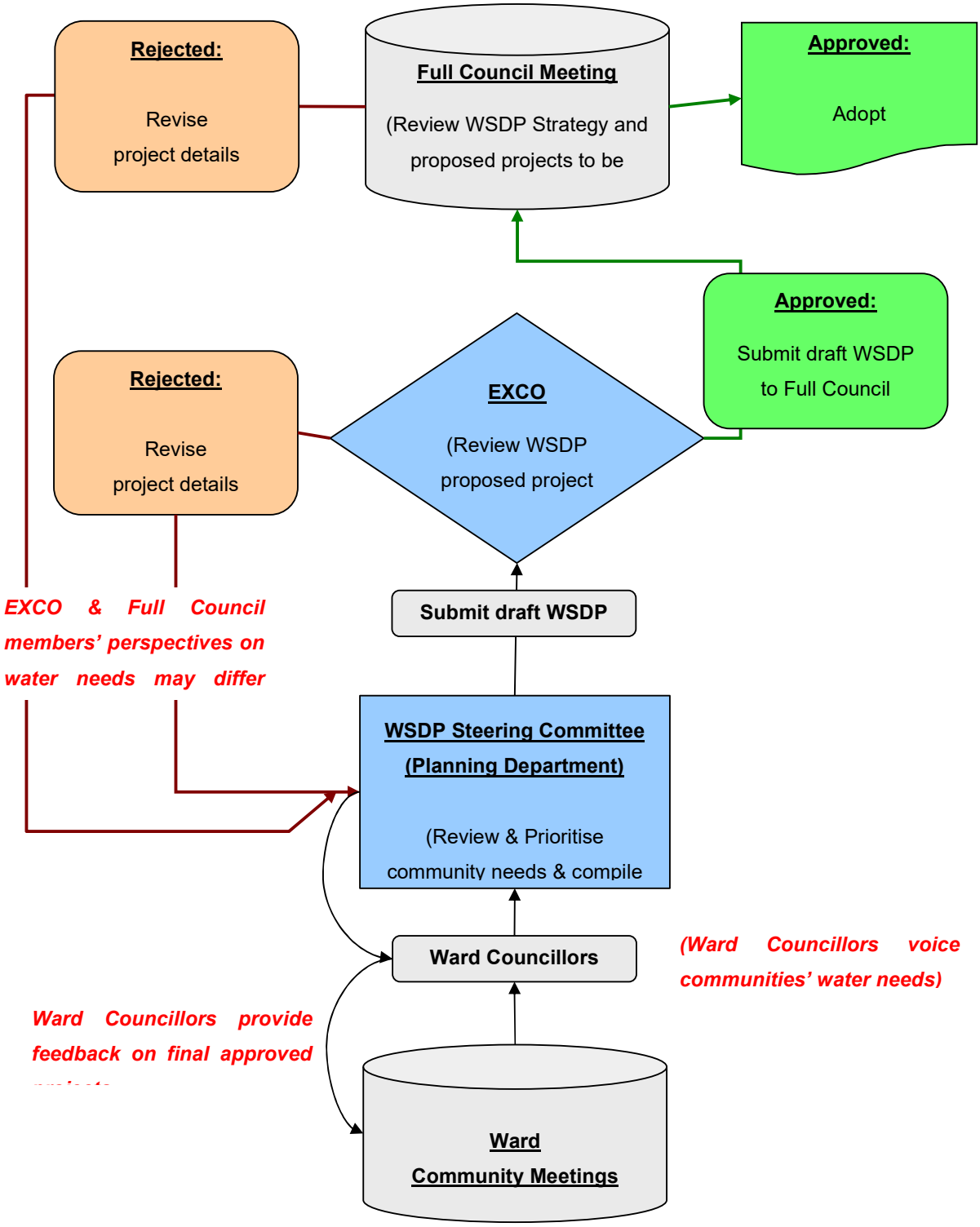



*Figure 11.2.1: Typical WSDP Approval Process of a District Municipality*

Figure 1 clearly demonstrates that an endless cycle of resubmissions may occur if the perspectives of the Executive Council (EXCO) and the councillors on water needs differ from what the WSDP Steering Committee view as priorities for water services implementation. Three factors play a dominant role in the above situation:

- **Individual perceptions of their own needs**
  People in one location may feel that they have an urgent need for water services since they have to walk down to the river to fetch water, but another community may not even have surface water within walking distance.

- **Community expectations of ward councillors**
  Ward councillors are voted for mainly on the expectation from the ward communities about what the councillor can do for them. This includes service delivery on various levels. Councillors, therefore, need to ensure that service delivery is taking place in their respective wards else they will lose their position as ward councillor.

- **Political pressure**
  Since multiple political parties are presented in a given municipality, it may become a tug-of-war to see which political party can do the most for their wards. This mainly consists of provision for basic services in the rural areas. Prioritisation for service delivery may, therefore, become biased to maintain favour with the ward communities.

**A Prioritisation Model for water and sanitation needs resolves the above conflict situations where projects are prioritised in an objective, unbiased approach based on their most urgent need for water and sanitation services.**

### 11.2.2 Prioritisation Methods

Several prioritisation methods exist that can be used, depending on the scenario and what the desired outcomes should be. A few of these typical methods are discussed in this section.

The National Association of County and City Health Officials (NACCHO), Washington DC, has developed the Assessment Protocol for Excellence in Public Health (APEX*PH*) planning tool (NACCHO, 2012). This is a flexible planning tool for health officials to address health-related issues in communities. A critical component of the Part I and Part II APEX*PH* processes occurs at the point where the identified issues are prioritised. Prioritising issues allows the health department and community to direct resources, time, and energy to those issues that are deemed most critical and practical to address.

The APEX*PH* workbook briefly mentions some of the most popular prioritisation methods, which are further described in the NACCHO document (cdc.gov, 2012). A brief summary of these methods is described next:

**1 Simplex Method**

The Simplex Method obtains group perceptions by the use of questionnaires. The answers to the questionnaires are scored and ranked and the issues with the highest scores are given the highest priority.

**2 Nominal Group Planning Method**

Nominal Group Planning was developed for situations where individual judgments must be obtained and combined to arrive at decisions which cannot be determined by one person. This strategy is best for problem exploration, knowledge exploration, priority development, program development, and program evaluation.

**3 Criteria Weighting Method**

The criteria weighting method is a mathematical process whereby participants establish a relevant set of criteria and assign a priority ranking to issues based on how they measure against the criteria. **The calculated values do not necessarily dictate the final policy decision, but offer a means by which choices can be ordered.**

**4 A "Quick and Colorful" Method**

This technique uses a means whereby individual group members vote to prioritise each health problem. A ballot or open method can be used.

The document further provides a summary of the positive and negative aspects of each method in Table 11.2.1.

*Table 11.2.1: Prioritisation Methods*

| PRIORITIZATION TECHNIQUES | Strengths | Weaknesses | Optimal size of group |
|---|---|---|---|
| **Simplex** | Efficient and quick to use, once questionnaire is constructed. Can be used with any size group. Allows for weighting of problems. | Requires the development of a questionnaire. Relies heavily on how questions are asked. | Any size. |
| **Nominal Group Planning** | Motivates and gets all participants involved. Can be used to identify areas for further discussion and can be used as part of other techniques (e.g., to help develop a Simplex questionnaire.) Allows for many ideas in a short period of time Stimulates creative thinking and dialogue. Uses a democratic process. | Vocal and persuasive group members can affect others. A biased or strong-minded facilitator can affect the process. Can be difficult with larger groups (more than 20-25) May be overlap of ideas due to unclear wording or inadequate discussion. | 10-15 (larger groups can be broken down into subgroups.) Not <6. |
| **Criteria Weighting** | Offers numerical criteria with which to prioritize. Mathematical process (this is a weakness for some.) Objective; may be best in situations where this is competition among the issues. Allows group to weight criteria differently. | Can become complicated. Requires predetermining criteria. | Any size. |
| **Hanlon (described in the APEX*PH* Workbook, pp 23 24 and Appendix E)** | PEARL component can be a useful feature. Offers relatively quantitative answers that are appealing for many. Baseline data for issues can be used for parts; this can be appealing due to the objectivity of the data. | The process offers the lowest priorities for those issues where solution requires additional resources or legal changes which may be problematic. Very complicated. | Any size. |
| **A "Quick and Colorful" Approach** | Simple. Well-suited to customizing. Blinded responses prevent individuals influencing others. Less time intensive. | Less sophisticated (may be a benefit for some groups). Doesn't offer the ability to eliminate options that may be difficult to address given current laws and resources. If open voting is used, participants may be influenced by others' votes. | Any size. |

The document concludes with the following statement:

> *"By using formalized techniques, such as those described here, groups have a structured mechanism that can facilitate an orderly process. Such a process also offers a common starting point that groups can alter to suit their own specific needs. Whatever technique is used, it is important to keep in mind that the reason prioritization is undertaken is to include input from all interest groups. Therefore, it is vitally important to include the community when defining criteria."*

**The theoretical foundation of the expected outcomes and results of a prioritisation model is that the level of urgency or the need for water ans sanitation supply to rural communities can be determined by establishing the existing form of water access.**

It should be possible to assign a "water and sanitation needs" value to the various aspects and characteristics of each settlement related to water and sanitation access. A total score can then be assigned to each settlement, which represents their urgency or need for water and sanitation services. **The higher the score, the higher the priority of the project for implementation.**

The most appropriate prioritisation technique for water and sanitation services in the South African rural context proves to be the Criteria Weighting method, and has been used successfully in various local government institutions to prioritise service delivery.

### 11.2.3 ZDM Prioritisation Models for Service Delivery

ZDM has initiated prioritisation models for water and sanitation implementation since 2002. The purpose of the prioritisation models are to priortise settlements and project implementation in an un-biased, objective way. Current Prioritisation Models include:

1 Regional Scheme Rollouts
2 Intermediate Stand-Alone Schemes
3 Rudimentary Water Supply Rollouts
4 Rural Sanitation Rollouts
  4.1 New Infrastructure
  4.2 Phase 3 Replacement Programme (TBA)
5 Budget Allocation Model

The Prioritisation Models are based on a weighted criteria method, whereby criteria for each model is given a weight, which counts up to a total score of 100. The highest score implies the highest priority for implementation.

### 11.2.4 Water Implementation Model

For water implementation on a rudimentary as well as regional level, the weighted criteria is based on specific characteristics of each settlement within ZDM. Where water needs to be provided to individual settlements, the settlements' individual prioritisation score is used to prioritise implementation.

Where larger areas are involved with several settlements grouped together, eg. within regional bulk reservoir zones, the average score of all settlements within each zone is calculated. This is then used as a zoning score to prioritise zones. The scoring criteria can be seen below:

Table 11.2.2: Scoring criteria for water implementation

| FACTOR | CRITERION | VALUE | WGHT |
|---|---|---|---|
| Existing Primary Water Source | Urban & RWSS (with Bulk, Secondary Bulk, Retic)<br>RWSS (with Bulk, Secondary Bulk)<br>RWSS (only Retic)<br>CWSS/Stand alone<br>Potable BH/Spring/H.Pump<br>Unprotected Surface Water (River/Dam etc) | 0<br>0.25<br>0.5<br>0.5<br>0.75<br>1 | 30 |
| Project Cost / Capita<br>Project Cost / HH | > R 40,000<br>R30,000 - R40,000<br>R20,000 - R30,000<br>R10,000 - R20,000<br>< R10,000 | 0.2<br>0.4<br>0.6<br>0.8<br>1 | 15 |
| Walking Distance to Water | < 1 km<br>1 – 3 km<br>> 3 km | 0<br>0.7<br>1 | 20 |
| Within 4 km of a Dev. Corridor/RSC | Primary / Service Centre<br>Secondary<br>Tertiary<br>None | 1<br>0.75<br>0.5<br>0 | 5 |
| Existing Sanitation | Less than 5%<br>25%<br>75%<br>More than 95% | 1<br>0.75<br>0.25<br>0 | 5 |
| Existing Use / Level of Service | Nothing (> 3km walking)<br>Survival (< 3km walking)<br>Rudimentary<br>≥ RDP | 1<br>0.75<br>0.5<br>0 | 15 |
| Linkages to other projects< (supplyable)<br>All settlements within 5km of existing Regional Scheme Layouts | Yes<br>No | 1<br>0 | 5 |
| History of Water Borne Disease | Yes<br>No | 1<br>0 | 5 |
| | | **Total** | **100** |

## 11.2.5 Rural Sanitation Implementation Model

Rural sanitation implementation is based on the same principle as with water, however different criteria and weights are used to address specific rural sanitation needs. Two prioritisation models are used for sanitation implementation:

- **Phase 1 & 2 (New projects)**
  These phases provide sanitation to settlements having not received any form of sanitation from previous sanitation projects.

- **Phase 3 (Replacement Programme)**
  Phase 3 will be initiated towards 2017 to replace old VIP-type structures, especially the Archloo-type structures which have proofed to have a very short lifespan. Old VIP-types such as block- and zink-type where pits are full and the top structure cannot be moved to a new location will also be replaced.

The scoring criteria for both these two programmes can be seen below:

Table 11.2.3: Phase 1 and 2 scoring criteria for rural sanitation implementation

| FACTOR | CRITERION | VALUE | WEIGHT |
|---|---|---|---|
| **Water Implementation** | Catch-up<br>Current Water Implementation (2008-2014)<br>Future Water Projects | 1<br>0.5<br><br>0 | 40 |
| **Distance to downstream open groundwater** (Pollution potential) | <50m<br>100m<br>250m<br>500m<br>>500m | 1<br>0.6<br>0.4<br>0.2<br>0 | 25 |
| **Settlement density in relation to HH count.** (Susceptability to diseases) | > 10<br>5 - 9.99<br>2 - 4.99<br>1 - 1.99<br><1 | 1<br>0.6<br>0.4<br>0.2<br>0.1 | 15 |
| **Settlement type** (Susceptability for diseases to surrounding urbanised area) | Urban Fringe<br>Peri-urban<br>Rural | 1<br>0.5<br>0.1 | 10 |
| **Rural Development Nodes Development Corridors Service Centres** | Yes<br>No | 1<br>0 | 10 |
| | | **Total** | **100** |

Table 11.2.4: Phase 3 scoring criteria for rural sanitation implementation

| FACTOR | CRITERION | VALUE | WEIGHT |
|---|---|---|---|
| **Existing households not covered by previous project** | 76-100%<br>51-75%<br>26-50%<br>0-25% | 1<br>0.67<br>0.33<br>0.01 | 35 |
| **Sanitation Top Structure Type** | Archloo<br>Zink<br>Block<br>Pre-cast | 1<br>0.67<br>0.33<br>0.01 | 25 |
| **Condition** | Need replacement<br>Need repairs<br>New | 1<br>0.5<br>0.01 | 20 |
| **Year built** | <2000<br>2001-2006<br>>2007 | 1<br>0.5<br>0.01 | 5 |
| **Settlement density** | High<br>Medium<br>Low<br>Very low | 1<br>0.6<br>0.3<br>0.01 | 15 |
| | | **Total** | **100** |

## 11.2.6 Budget Allocation Model

The annual funding allocations are split proportionally between the various implementation programmes for ZDM. Each implementation programme area is allocated a percentage in proportion to the overall budget requirement for eradicating the total backlog in that particular category of infrastructure projects.

Due to backlogs being eradicated continuously, these percentages are revised on an annual basis to ensure that the allocations reflect the revised backlogs for a particular programme and area.

## 11.3 Project Details

### 11.3.1 Regional Schemes

The ten Regional Water Supply Schemes require the largest portion of external funding due to costly bulk infrastructure. Due to this, ZDM augment the bulk reservoir zones with intermediate stand-alone schemes as well as survivial-level rudimentary water supply. Each rollout is prioritised as described above.

Since the master planning was done for the regional schemes, ZDM has experienced some unique challenges concerning the sustainability of the water sources to be used for the regional schemes. Land reform areas have seen an unexpected high household growth in certain areas, which increased the water demand for regional schemes drastically. Critical issues related to the above have been identified for each regional scheme, and project progress and interventions to these issues are discussed in more detail below.

#### 11.3.1.1 Nkonjeni

- **Background**
  The Nkonjeni regional scheme is in the privileged position of having a well-developed and sustainable water source. Therefore the bulk of the available funding can be applied towards the progressive roll-out of water services to the respective communities.

- **Key Issues and Interventions**
  The sustainability of the scheme is threatened by water losses in existing networks and excessive water usage from unmetered consumers. A water audit was done in 2006 (Ulundi Water Audit – October 2006) that indicated the inefficiency of water usage in Ulundi town to be 68% of the volume of water put into the system. ZDM has initiated a waterloss management programme where these waterlosses are systematically been addressed.

  Due to limited spatial information that was available for planning purposes at the start of the Regional Schemes, the area around Babanango was not covered initially under Nkonjeni Regional Scheme. During 2008 a demographic verification process was done which allowed ZDM to identify existing settlements footprints in the Babanango area. A business plan was submitted to DWA and MIG in 2009 which included these settlements under MIG funding, and implementation of water supply is completed.

- **External Support**
  Funding for Nkonjeni Regional Scheme is provided through MIG.

### 11.3.1.2 Usuthu

- **Background**

  The Usuthu Regional Scheme is the largest water supply scheme in the district and also represents the biggest portion of the total backlogs. The scheme required the development of a new water source from the Black Mfolozi river and expensive bulk infrastructure to be rolled out over vast distances to scattered rural communities.

- **Key Issues and Interventions**

  The biggest challenge with this scheme is the funding of the enormous capital investment of more than R500m that is required to provide the required infrastructure. ZDM has aquired additional DWA funding to fast-track the implementation of bulk services for this scheme.

  The huge capital investment required eradicating the backlogs through the regional scheme infrastructure and the resulting slow progress with the roll-out of services requires an intermediate solution to be developed to alleviate immediate water supply needs. The existing rudimentary supply programme, whereby local groundwater sources are developed within 800m walking distance from households, was hampered in Usuthu area due to difficulty in finding reliable and good quality water sources close to communities. ZDM has initiated intermediate, stand-alone water schemes to address the delay in providing reticulation to communities. These intermediate schemes are developed from production boreholes where available, and are designed in such a way that they can easily be integrated into the bulk services network in future.

  The sustainability of the main water source of Nongoma town is under severe strain and no longer sustainable during drought periods. The installation of a bulk pipeline from the Black Mfolozi river to Nongoma is currently in progress to address this issue. The internal bulks for Nongoma town will also be upgraded to augment the existing water supply.

  Nongoma town frequently experiences intermittent water supply to consumers and businesses, even outside of drought periods. Excessive water usage by unmetered consumers and high water losses contribute to the problem. A water loss study conducted in 2003 indicated that unaccounted water supply in Nongoma was in excess of 41%. A waterloss and water demand strategy is in progress as part of the Usuthu Regional Scheme planning.

- **External Support**

  Funding is provided by MIG as well as RBIG (Bulks).

### 11.3.1.3 Mandlakazi

- **Background**

  The Mandlakhazi Regional Scheme represents the second largest supply area in the district and also the second biggest portion of the total backlogs of the municipality. There are no towns in the supply area and the communities are sparsely scattered and vast distances apart. The provision of water services to all communities are therefore extremely expensive and will take a long time to conclude.

  Water supply problems in the neighbouring Hlabisa area has resulted in a change of priorities and the construction of a bulk supply pipeline to supply the eastern side of Mandlakazi and eventually reach the Hlabisa communities.

  The scheme is supplied with raw water from a privately-owned dam outside of the Zululand municipal area. The dam is supplied by the owner from the Pongolapoort Dam, which is a very reliable water source. Bulk water supply agreements are in place with the owner and the supply is secured. ZDM is however investigating the possibilities for an individual allocation and raw water abstraction permit from DWA for abstraction from the Pongolapoort Dam for long-term sustainability.

- **Key Issues and Interventions**

  The Mandlakazi area is also in need of an intermediate solution to accelerate the provision of services to households until the regional scheme bulk infrastructure can eventually reach all the communities. Drought problems are frequent in the area and the rudimentary programme has limited success in finding sustainable and potable local sources. However, success has been achieved in some areas for good production boreholes and this will be developed as intermediate stand-alone schemes which will be integrated into the regional scheme in future.

- **External Support**

  The regional scheme is funded by MIG as well as an allocation from RBIG to accellerate the implementation of the bulk services.

### 11.3.1.4 Mkhuze

- **Background**
  The Mkhuze Regional Scheme area comprises of mostly formal farm areas and a small number of sparsely scattered rural communities. The construction of a single regional scheme to supply the entire footprint is not feasible, but rather individual schemes from local sources.

- **Key Issues and Interventions**
  An existing land reform project at the Gumbi settlement has resulted in a dramatic influx of families that settled without any water or sanitation infrastructure being in place. This resulted in the construction of an emergency supply from the neighbouring Pongolapoort Dam. This project is completed. The abstraction point at the dam is however not ideal and in future a second abstraction point from a more ideal position should be investigated.

  There is huge potential for economic development on the western side of the Pongolapoort Dam but abstraction on that side of the dam is unfortunately very difficult. Groundwater sources in the area are also of poor quality and insufficient yield to sustain large scale development.

- **External Support**
  Funding is provided by MIG.

### 11.3.1.5 Simdlangentsha East

- **Background**
  The Simdlangentsha East Regional Scheme is a well-served area and consist of the lowest backlogs in the district. The scheme supplies Pongola town as well as a vast rural area. Water is abstracted from irrigation channels next to the Pongola river and with an emergency supply that is available further down at the Pongola river. The irrigation channels are managed by DWA and the supply is mostly reliable, except when the channels are closed for maintenance. ZDM also pays DWA a raw water charge for water abstracted from the channels.

- **Key Issues and Interventions**
  Water supply in the rural areas is under severe pressure with frequent interruptions to the supply. Excessive water usage and high waterlosses due to illegal and unmetered connections are the main contributors to the problem. Apart from the above problems the bulk infrastructure is also in need of upgrade as a result of population growth since the inception of the scheme. The challenges on the

scheme therefore require a combination of water demand management interventions and the upgrade of bulk infrastructure to address the long-term sustainability of the scheme. The waterloss managagement programme initiated by ZDM is addressing this at present, and the upgrading of the existing bulk infrastructure for the southern part of the scheme is in progress.

Pongola town has experienced significant development over the recent years and this was hampered by especially the absence of waterborne sanitation throughout the town. There is a need to compile a sewerage master plan for the area and plan upgrade requirements systematically.

- **External Support**
  Funding is provided by MIG.

### 11.3.1.6 Simdlangentsha Central

- **Background**
  The planning of the Simdlangentsha Central scheme is complete and the first phases of the bulk infrastructure have been completed. The project also requires a substantial investment in bulk infrastructure before communities will be reached with water supply. The area is however quite well served with localised schemes from local sources. The challenge is to keep these schemes operational until the bulk scheme can reach all the areas.

- **Key Issues and Interventions**
  The Simdhlangentsha East Regional Scheme experienced water pressure problems, and the Simdhlangentsha Central Regional Scheme is used to augment water supply to these settlements.

  The Simdlangentsha Central scheme contributes a small portion to the total backlogs of the ZDM and therefore also receives a small portion of the available capital funds, although a substantial capital investment is still required to provide the necessary infrastructure.

  Although the area is generally well-served, all schemes are old and the regional scheme planning will include infills to provide water to additional households.

- **External Support**
  Funding is provided by MIG.

### 11.3.1.7 Simdlangentsha West

- **Background**
  Simdhlangentsha West Regional Scheme mainly consists of rural areas to the east of Paulpietersburg town. The area is generally well-served although existing networks are old and infills and waterloss management is required.

  The current capacity of the rising main line from the existing weir in the Pongola River to the existing Water Treatment Works at Frischgewaagd Township is 2ML/day (Supplies Frischgewaagd and Mangosuthu with raw water), and the current capacity of the existing Water Treatment Works at Frischgewaagd town is 3Ml/day. New networks were installed at Frischgewaagd during 2007/2008. and the water demand was reduced from the maximum possible supply of 2ML/day to 0.7Ml/day. The balance of the water (1.3ML/day) is consumed by Mangosuthu (with only 20% of the population of Frischgewaagd). A new rising main line from the Pongola weir to Frischgewaagd will be constructed. The Frischgewaagd Water Treatment Works will be relocated to the Pongola River Weir, and will provide treated water to Ezimbomvu, Tholakela, Mangosuthu and Opuzane.

- **Key Issues and Interventions**
  High waterlosses are evident, especially in the Mangosuthu area. ZDM has addressed this issue and the construction of new networks at Mangosuthu is completed. Construction includes metered yard connections and consumers will be restricted to 200 litres per household. Consumers will be able to register for a higher level of service, but will be billed for the balance.

  In the near future Frischgewaagd will also be restricted to 200 litres per day, with the option to register and pay for a higher level of service.

  The biggest challenge is to obtain funding for the proposed bulk infrastructure. Funding of more than R120M will be needed just to supply Frischgewaagd and Mangosuthu with treated water.

- **External Support**
  Existing funding is provided by MIG.

### 11.3.1.8 Khambi

- **Background**
  The Khambi Tribal Authority area is well-served with several small stand alone schemes. (Esihlengeni, Kwamakweshe, Ngenetsheni, Cibilili and Ntumbane Community Water Supply

schemes). Not all of these schemes however have had a sustainable water source. The clinic at Ntumbane is often without water during the dry winter periods.

A weir was constructed in the KwaMthazi River and a new water treatment works was constructed. This supplies water to the Khambi Tribal Authority and the integration of all the stand-alone schemes to this bulk service is completed.

- **Key Issues and Interventions**
  The long-term planning was to supply water from the Coronation Dam to the Khambi area, but an in-depth study by ZDM concluded that the Coronation Dam will not be a sustainable solution for the long-term additional demand, and the cost per capita would be too high. ZDM is currently equipping sustainable local sources closer to Khambi area, which will result in a substantial saving in bulk infrastructure.

- **External Support**
  Funding is provided by MIG.

### 11.3.1.9 eMondlo/Hlahlindlela

- **Background**
  The eMondlo area is well-served with existing stand-alone schemes. eMondlo town receives water from the Mvunyane dam. These existing sources are however not sustainable for future use, and will receive water in future from the Klipfontein dam situated next to Vryheid town. Mvunyane dam is silted up to such an extent that it is no longer a sustainable source for eMondlo town.

- **Key Issues and Interventions**
  During 2000 a new water reticulation network at eMondlo A and B was installed in order to lessen the water demand from 12 Ml/day to 4 Ml/day. The eMondlo water treatment works can supply 8 Ml/day. This meant that 4 Ml/day would have been available towards the settlements surrounding eMondlo A and B after the installation of the new networks. Networks were installed at these settlements and connected to eMondlo A and B. The old network at Emondlo A and B was never decommissioned and expected savings of 4Ml/day never realised. The residents of eMondlo also connected the new network to the old network with pipes in their yards.

  The eMondlo water treatment works has been refurbished and upgraded to supply 12Ml/day, but the water demand has grown from 8Ml/day in 2000 to 16 Ml/day currently. With the refurbishment completed there is still a shortfall of 4 Ml/day. The existing rising main line from Mvunyane Dam to eMondlo Water Treatment works can furthermore only supply 12 Ml/day.

The above issues will all be addressed with the bulk services implementation through the Hlahlindlela Regional Scheme. In future water will be supplied from Klipfontein Dam to Vryheid Water Treatment works. Water will then be pumped from the Vryheid Water Treatment works to Hlahlindlela (including eMondlo Township). A regional water supply assessment will however first be done during 2015 before water can be supplied to eMondlo area.

The funding available to implement the Hlahlindlela Regional water supply is not adequate, but ZDM is reviewing the annual budget allocation for this scheme to fast-track the implementation of bulk services. The estimated cost to implement the water supply from Klipfontein Dam to eMondlo is well over the R200M.

AbaQulusi as the WSP for urban areas has initiated a waterloss programme at eMondlo B. This is crucial towards the sustainability of water supply to the area. All connections will be inspected for water leaks and repaired where neccessary. IN additiona to this, ZDM has allocated funding for the remaining Emondlo B as well as eMondlo A to resolve the excessive waterlosses experienced in these two areas.

- **External Support**
  Funding is provided by MIG.

### 11.3.1.10 Coronation

- **Background**
  The Coronation Regional Scheme consists of a few small and isolated towns and a number of scattered and very isolated rural settlements within formalised farm areas.

- **Key Issues and Interventions**
  The towns have a high level of service but the infrastructure is very old and urgent refurbishment is required in most cases. The Coronation scheme however is a small contributor to the total backlogs of the district and receives a small portion of the total capital funds. Refurbishment needs are competing with new infrastructure requirements for limited available funds. There is a need for refurbishment funding over and above funding for the eradication of backlogs.

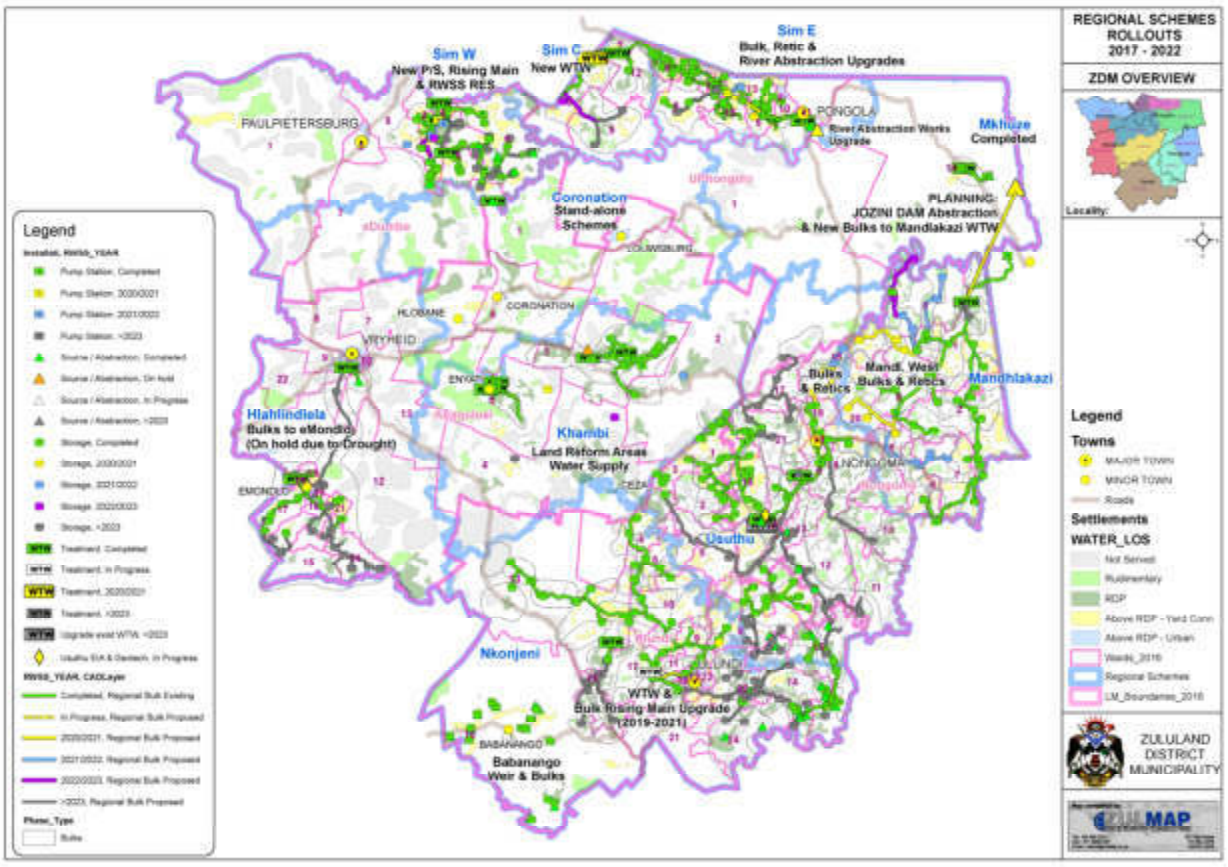
  The original planned regional scheme is currently under revision. The Coronation dam is not sustainable to supply Khambi Regional Scheme with additional water, and bulk services to the rural scattered settlements of Coronation area will be too costly to supply from a bulk infrastructure network. A revised Master Plan is currently in progress whereby stand-alone schemes from local sustainable sources will be developed to cover as many settlements as possible. Khambi Regional Scheme will also receive additional water needed from local sustainable sources.

The town of Louwsburg within the Coronation regional scheme area have a water resource challenge that will not be easy to solve. The existing dam has a limited catchment and groundwater is difficult to find due to the locality of the town. Any possible solutions will be very costly and there is insufficient funding at this stage to address the issue. The town is also in need of waterborne sewage, but the water problems receives a higher priority at present.

A revised Master Plan for Coronation is in progress to assess local water sources for stand-alone schemes in areas where no sustainable water is present.

- **External Support**
  Funding is provided by MIG.

**The following map depicts the rollouts of the regional schemes:**




## 11.3.2 Intermediate Stand-alone Schemes

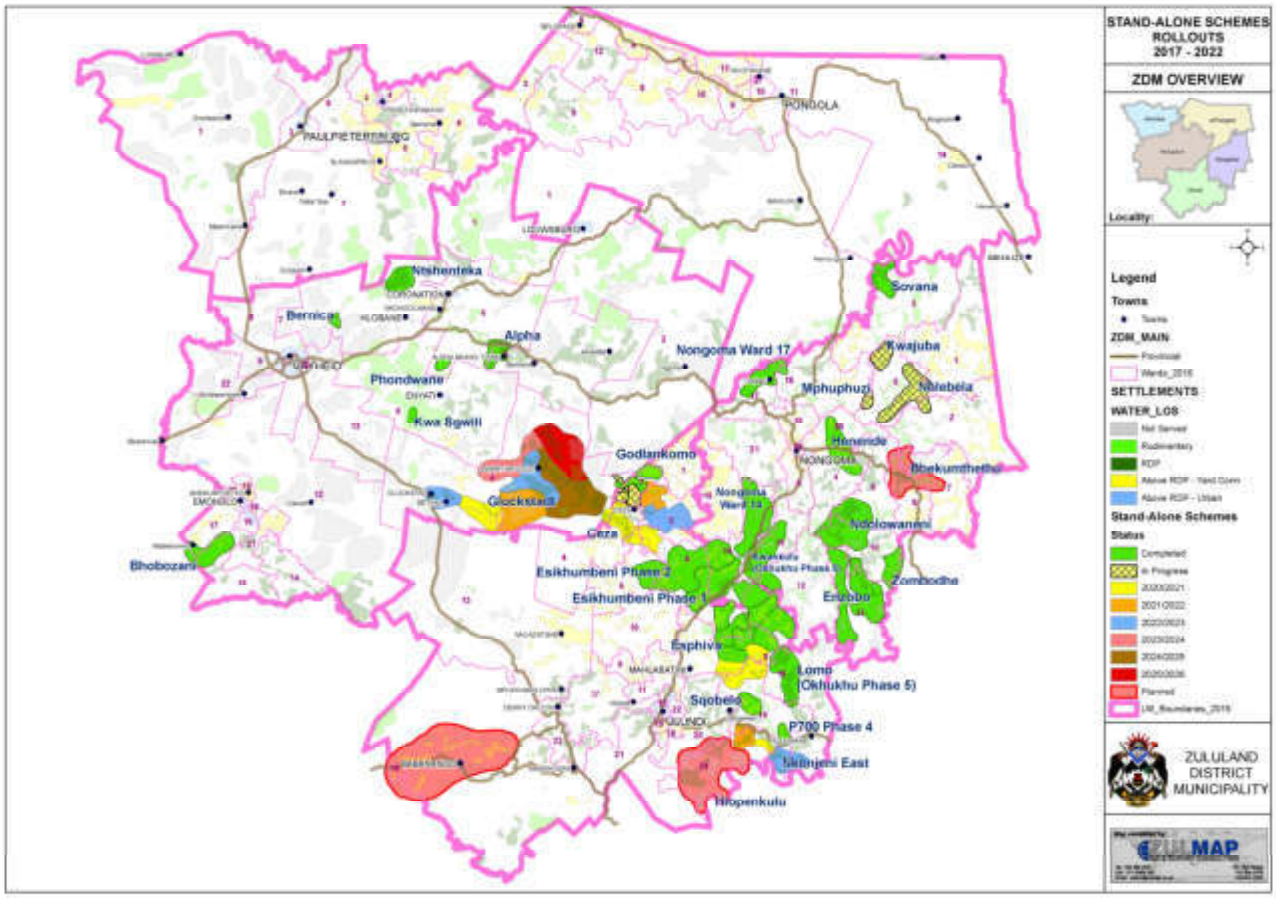
Due to time and budget constraints with implementation of costly bulk infrastructure, ZDM has initiated an intervention to alleviate the severe water shortage in areas where a sustainable local source can be

developed. These water sources will supply several settlements in the surrounding area, and will become part of the Regional Scheme infrastructure in future.

New production boreholes are continuously been identified under the Rudimentary Programme, and if suitable, an intermediate stand-alone scheme will be designed around these production boreholes.

Implementation are done according to the ZDM Prioritisation Model for water services within each Regional Scheme.

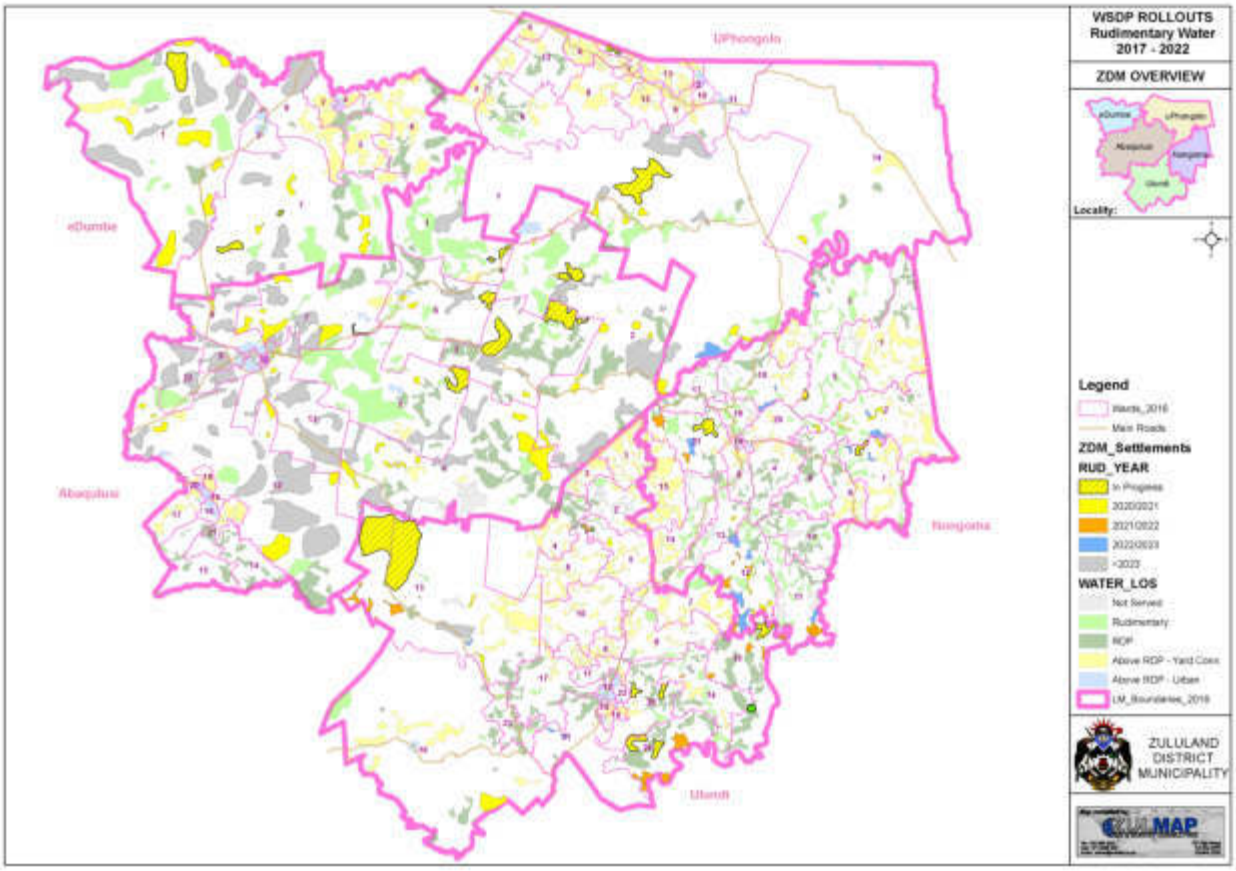
**The following map depicts the rollouts of the current intermediate stand-alone schemes:**




## 11.3.3 Rudimentary Water Supply

In areas where settlements cannot be served in the near future by the Regional Schemes or Intermediate Schemes, local water sources will be used to provide a survival level of water on a rudimentary level. Implementation is done according to the ZDM Prioritisation Model for water services. Through the rudimentary programme production boreholes are also identified for possible implementation of stand-alone schemes.

**The following map depicts the rollouts of the rudimentary programme:**

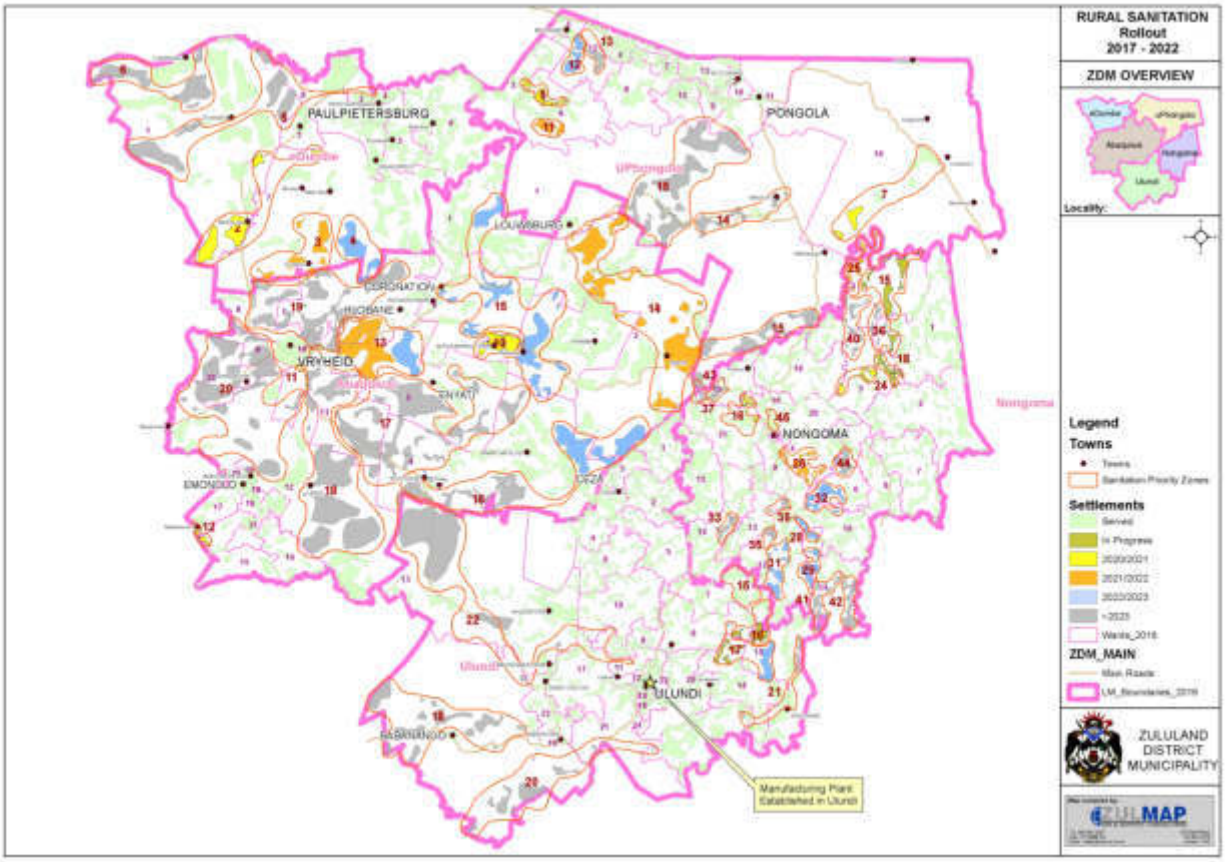



## 11.3.4 Sanitation Services

Sanitation in the rural areas is being provided in the form of dry-pit VIP toilets. Implementation is done according to the ZDM Prioritisation Model for rural sanitation services.

A Rural Sanitation Replacement Programme has also been deemed neccessary in 2013 to replace the old Archloo-, Block- and Zink-type VIP's. This programme's implementation will be included in the next 5-year review of the WSDP.

**The following map depicts the rollouts of the sanitation programme:**




## 11.3.4 Emergency Intervention Projects

Emergency Intervention Projects are projects which require immediate intervention, such as during disaster management. Two such projects have been implemented over the past few years in ZDM, namely:

- **Drought Relief**

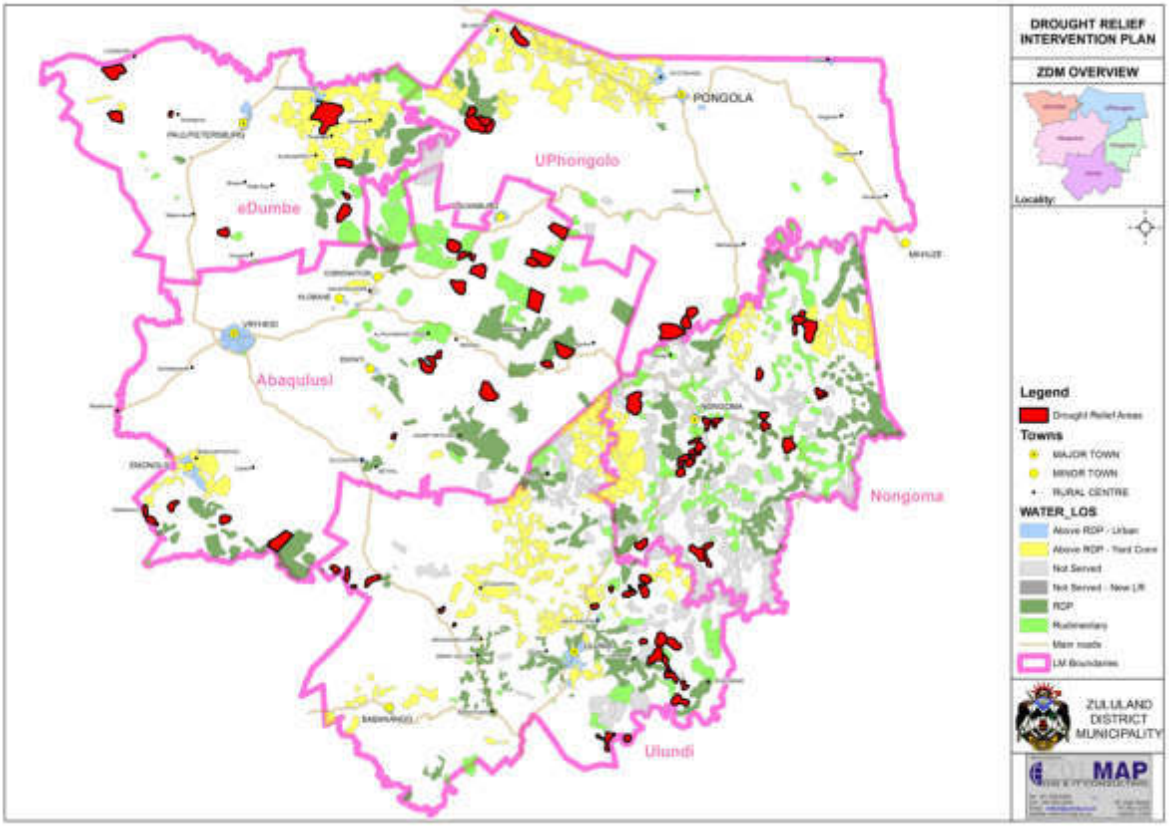
  Emergency drought relief funding was provided to ZDM in 2016. An amount of R37 493 000 was made available in 2016 for drought relief interventions, and a planned 7 880 households were to benefit from this funding allocation.

  A summary of the interventions can be seen in the next table.

| Municipal Name | Spring Protection | Water Tankers rental (6 months' period) | Boreholes Drilling and equipping | Refurbish Non-functioning Schemes |
|---|---|---|---|---|
| | Qty | Qty | Qty | Qty |
| **Abaqulusi LM** | 4 | | | |
| | | 1 | | |
| | | | 14 | |
| | | | | 1 |
| **Nongoma LM** | 2 | | | |
| | | 2 | | |
| | | | 27 | |
| | | | | 3 |
| **uLundi LM** | 2 | | | |
| | | 2 | | |
| | | | 18 | |
| | | | | 2 |
| **eDumbe LM** | 6 | | | |
| | | 1 | | |
| | | | 8 | |
| **uPhongolo LM** | 4 | | | |
| | | 1 | | |
| | | | 10 | |

**The town of Vryheid was forced to rely on water tankers and water points at designated borehole and water tank points. Since then dam levels have normalised again but it is clear that the greater Vryheid region is in urgent need for major interventions in terms of sustainable water during dry winter months.**

The present status of ZDM is satisfactory, but water use and dam levels are closely monitored.




❖ **COVID-19**

South Africa is currently in lock-down due to the COVID-19 epidemic. Emergency interventions were immendiately put in place in ZDM, with 2 task teams deployed to plan, manage and oversee emergency interventions.

Two task teams, namely the ZDM Techincal Task Team and the ZDM Command Council was established, which are represented by ZDM and it's local municipalities' management delegates, MEC, the SADF, SAPS and Dept. of Health. These task teams meet bi-weekly where feedback and planning are discussed.

The COVID-19 pandemic accelerated the need for emergency interventions and as a result the municipality was required to expand the programme to include additional vulnerable communities.

The emergency water supply interventions include water provision through static tanks and water tankers. These interventions are implemented throughout the district, in each of the five Local Municipalities. Water tankers operate on fixed routes and pre-approved water supply rosters, which determine when each community will receive water. The aim is to supply each community at least once a week.

The table below shows the full contingent of water tankers operating in the district and the distribution per LM's:

| *Local Municipality* | *Total* | *Hired* | *ZDM* | *Rand Water* | *COGTA* | *LM's* |
|---|---|---|---|---|---|---|
| ***Ulundi*** | **22** | 18 | 3 | 1 | | |
| ***Nongoma*** | **11** | 10 | | 1 | | |
| ***eDumbe*** | **9** | 7 | 1 | | 1 | |
| ***Abaqulusi*** | **15** | 12 | | 1 | 1 | 1 |
| ***uPhongolo*** | **10** | 8 | | 2 | | |
| | **67** | **55** | **4** | **5** | **2** | **1** |

The majority of the water tankers are hired and operated by external Service Providers, under the supervision of ZDM technical personnel. ZDM water tanker supervisors accompany the water tanker drivers to ensure that the supply routes are adhered to and water is delivered where intended, in accordance with the water supply roster. ZDM also contributed four water tankers from our own fleet towards the programme.

The Department of Water and Sanitation, through Rand Water, recently contributed an additional five water tankers to the district for the duration of the pandemic. COGTA also contributed two water tankers, albeit directly to the eDumbe and Abaqulusi LM's. These water tankers are being controlled by the respective LM's. Abaqulusi LM also contributed a water tanker from their own fleet.

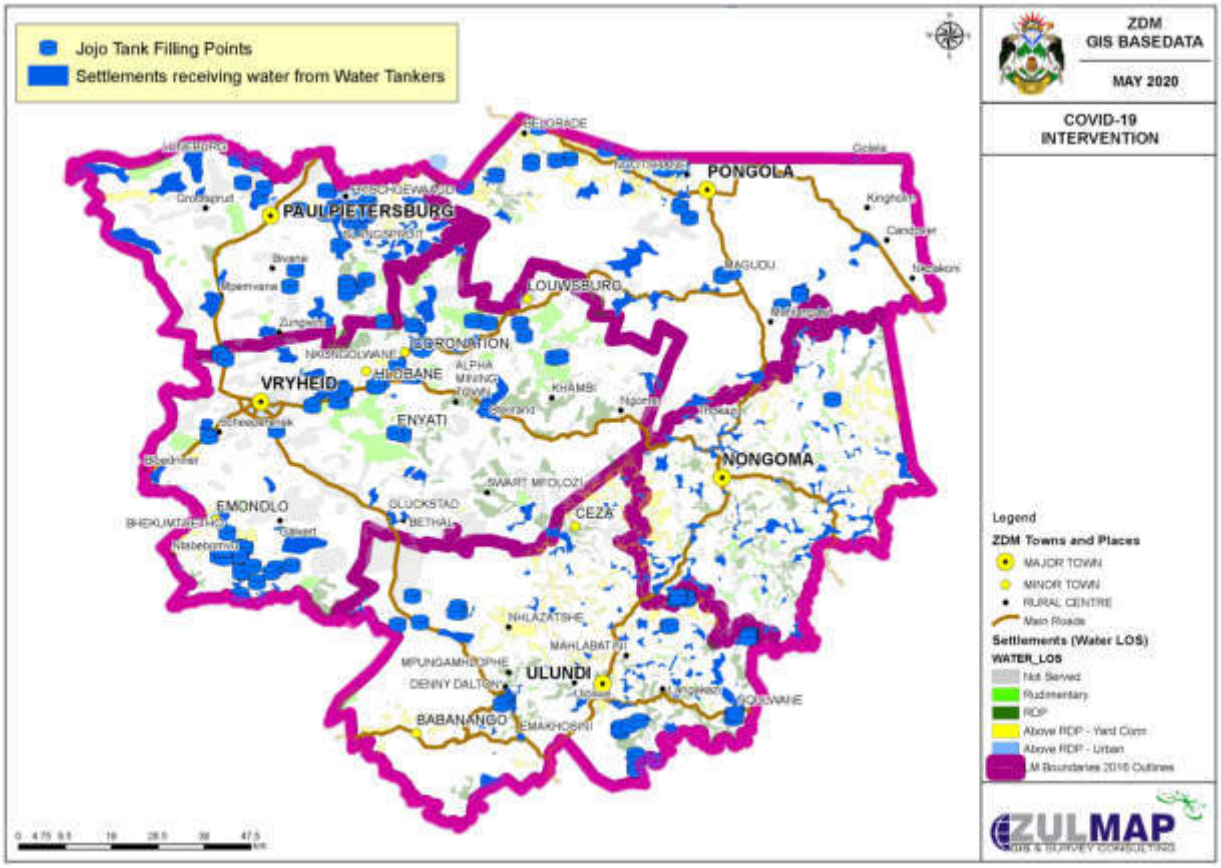
COGTA made available 50 x 2 700L static tanks during April 2020. The bulk of the tanks have been distributed and installed.

COGTA also distributed static tanks directly to certain Local Municipalities. ZDM is in the process of confirming the quantities that have been distributed to the respective LM's and the status of the installation of these tanks.

The distribution of static tanks throughout the district is shown in the table below:

| *Local Municipality* | *ZDM* | *LM's* |
|---|---|---|
| ***Abaqulusi LM*** | *83* | *31* |
| ***eDumbe LM*** | *44* | *TBC* |
| ***Nongoma LM*** | *93* | *TBC* |
| ***Ulundi LM*** | *83* | *TBC* |
| ***uPhongolo LM*** | *29* | *TBC* |
| | ***332*** | ***31*** |

A map depicting settlements benifitting from the water tanker water supply as well as positions of current Jojo tanks can be reviewed in the map sbelow. Distribution of tanks is however still in progress and more locations will be added.




ZDM has also assisted with the provision of emergency sanitation facilities in some areas, as part of the COVID-19 intervention programme. Temporary sanitation facilities have been provided at the following places, to assist with the COVID-19 prevention measures:

- uPhongolo taxi rank (2 units)
- Mavalane road block (4 units)

ZDM has, in response to Circular 11 of 2020, issued by the Department of Cooperative and Traditional Affairs on 1 April 2020, reprioritised the MIG and WSIG capital programmes to make funding available for covid-19 interventions. ZDM reprioritised R15m from the WSIG and R20m from the MIG allocations towards this programme. A Technical Report, detailing the intervention programme, was submitted and approved by *Department: Water and Sanitation* last week. The WSIG Business Plan for the approval and re-prioritisation of R15m funding was also approved.

The aim of this programme is to refurbish existing non-functioning water schemes and provide additional handpumps as an emergency intervention for water supply to communities. The first 40 water schemes and 90 handpumps have been prioritised for work to start urgently. Contractors and professional service providers have been appointed and work is in progress.

# PROJECT ROLLOUT MAPS

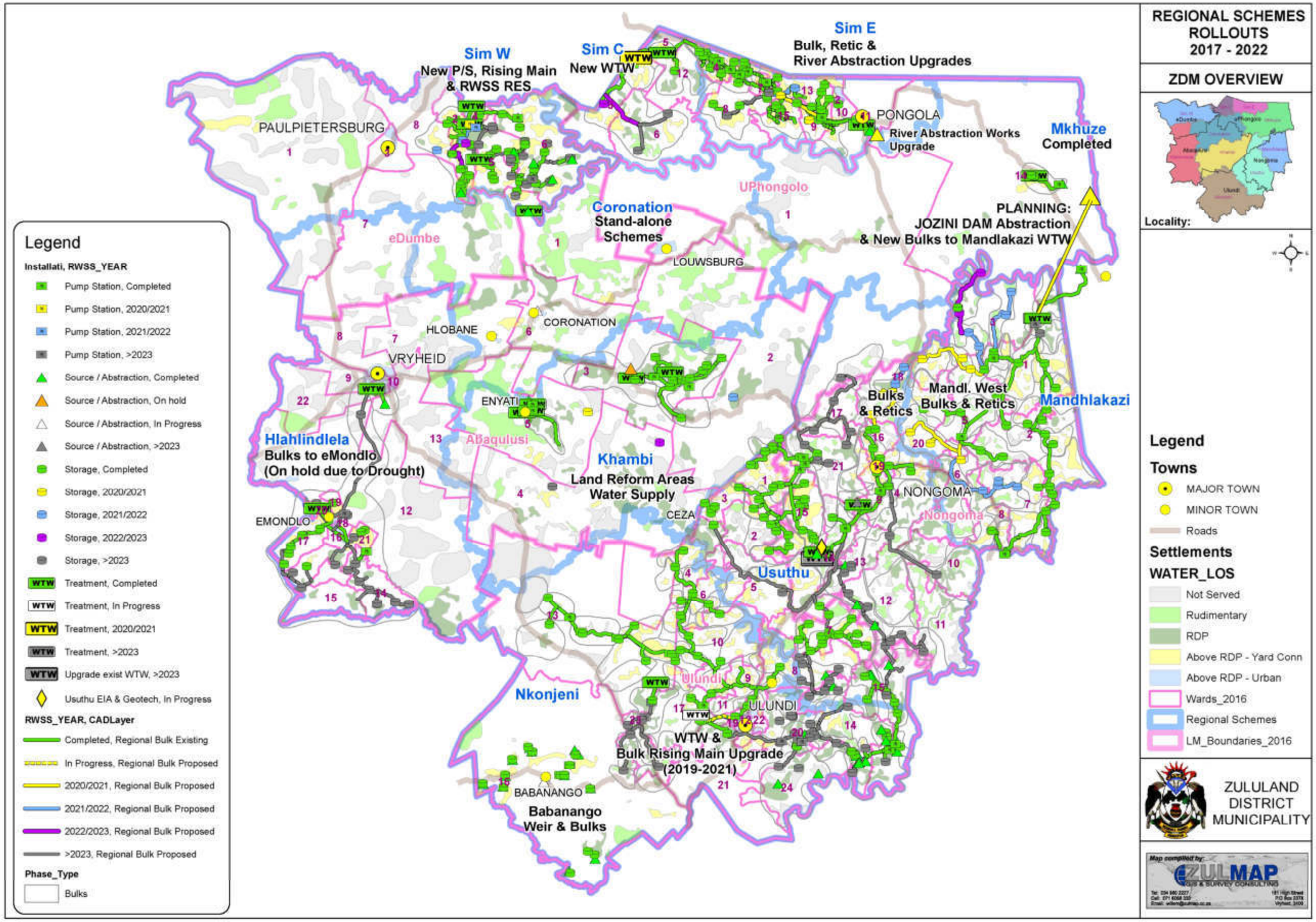
11.1 Regional Water Supply Schemes

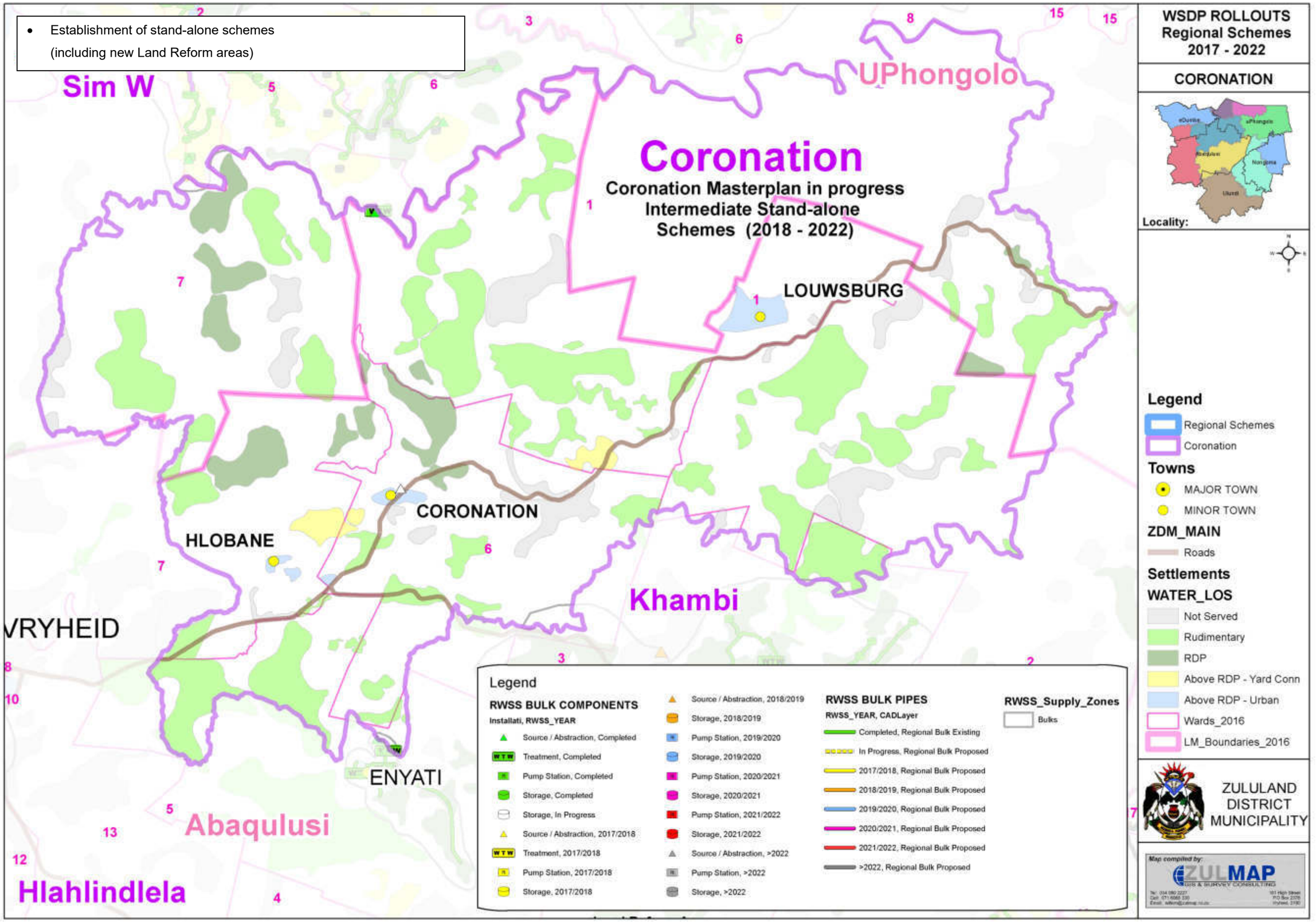
11.2 Intermediate Stand-alone Schemes

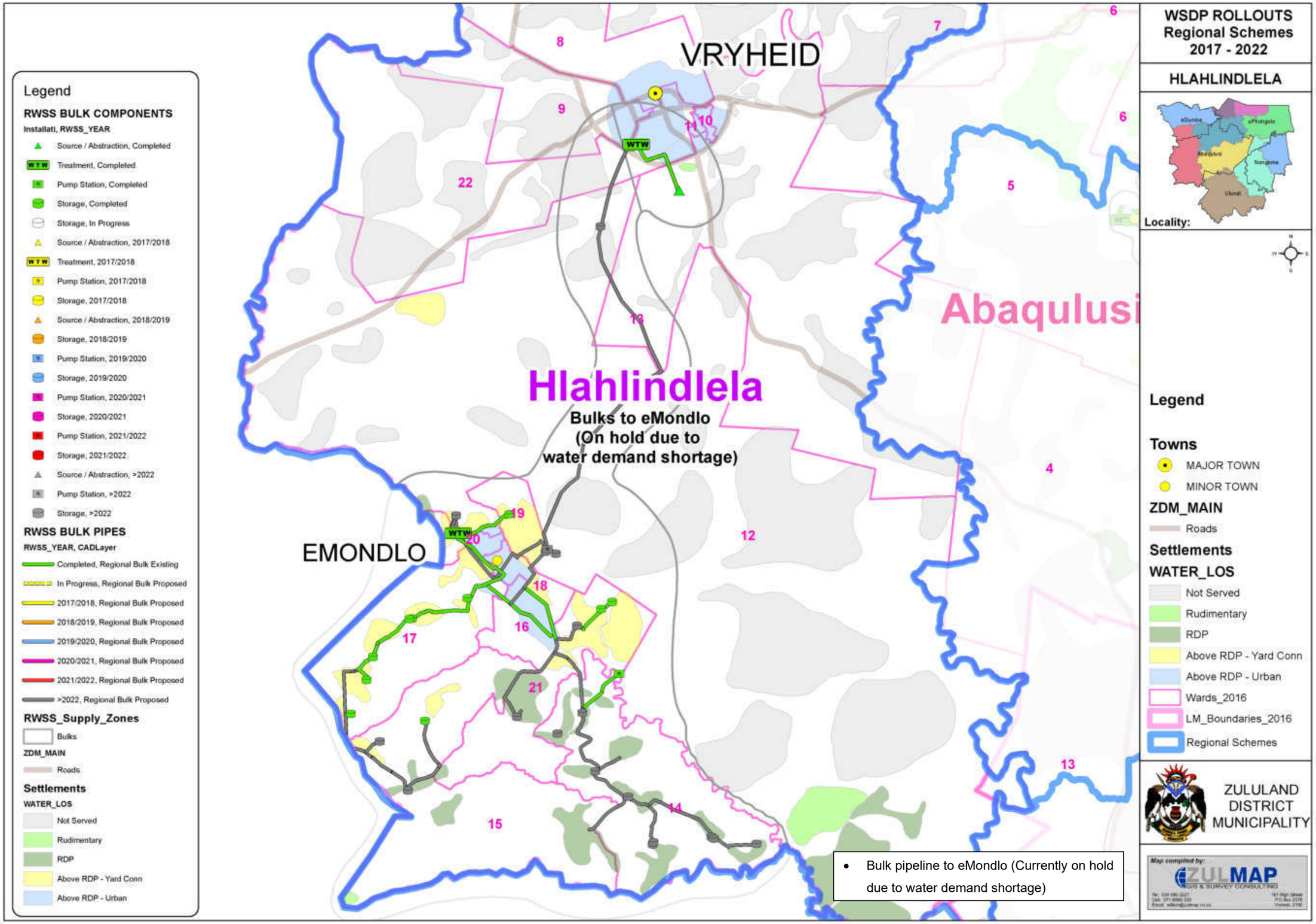
11.3 Rudimentary Water Supply

11.4 Sanitation Rollouts

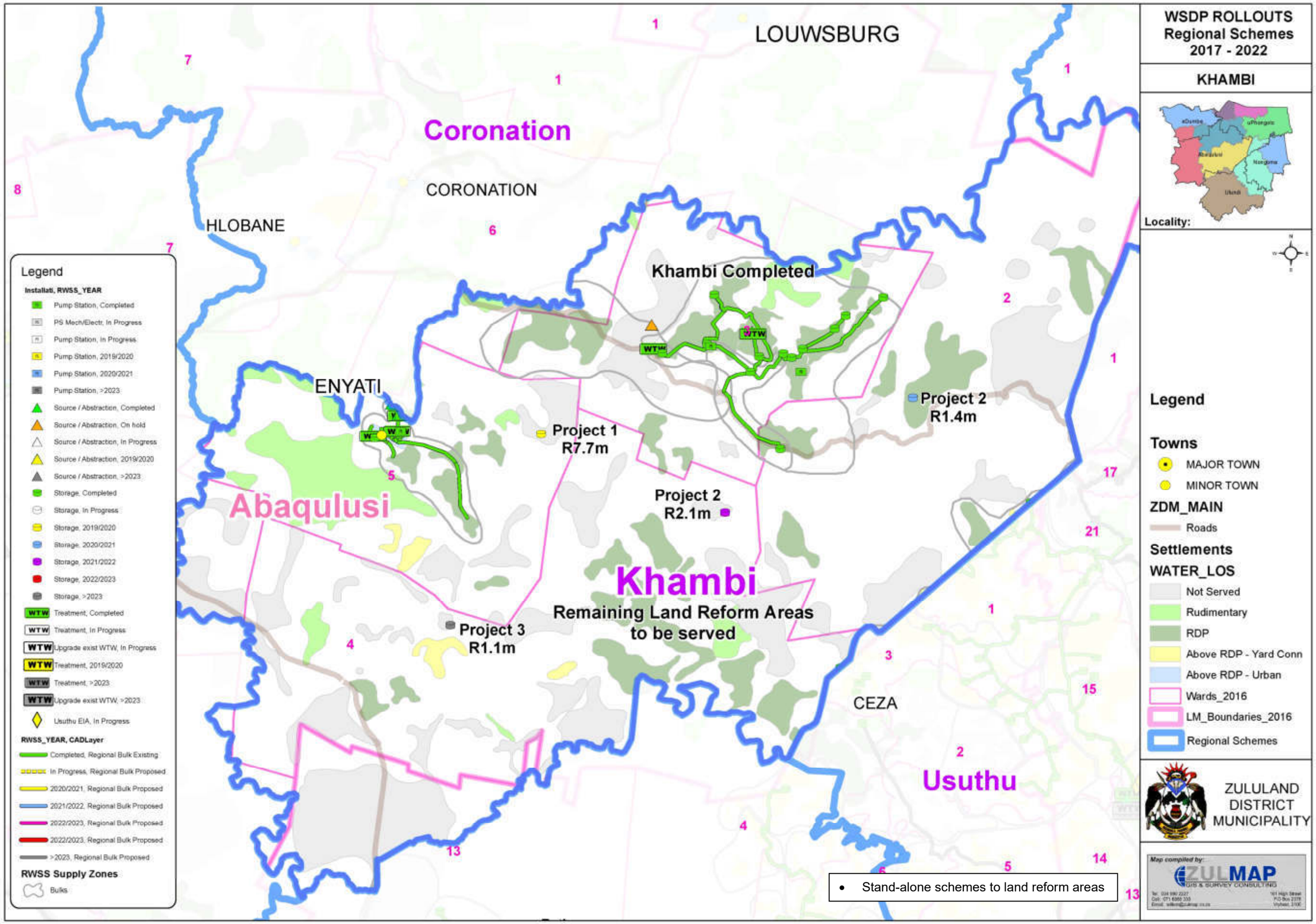
**Map 11.1: Roll-out of regional water services in the district over the next 5 years**

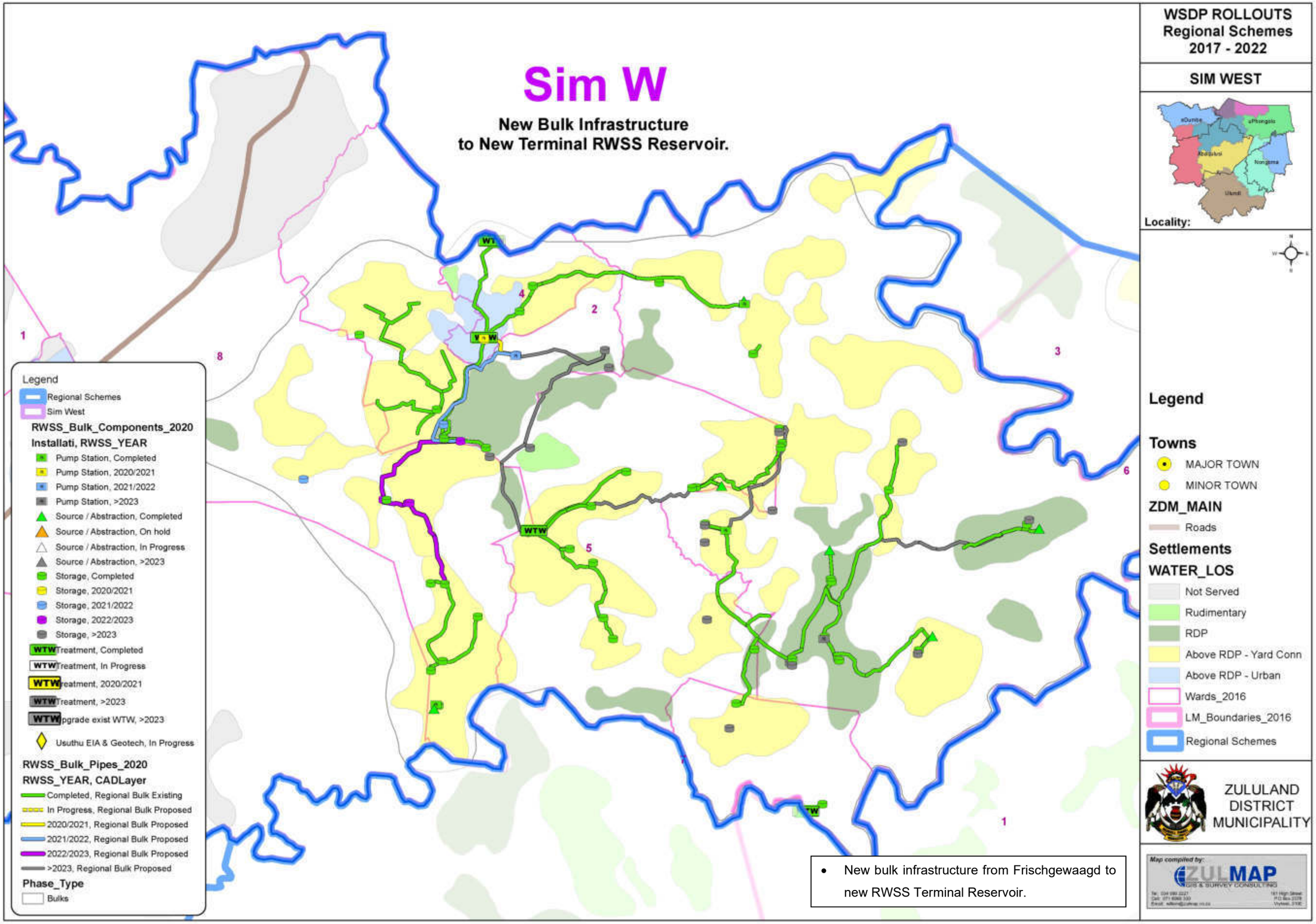


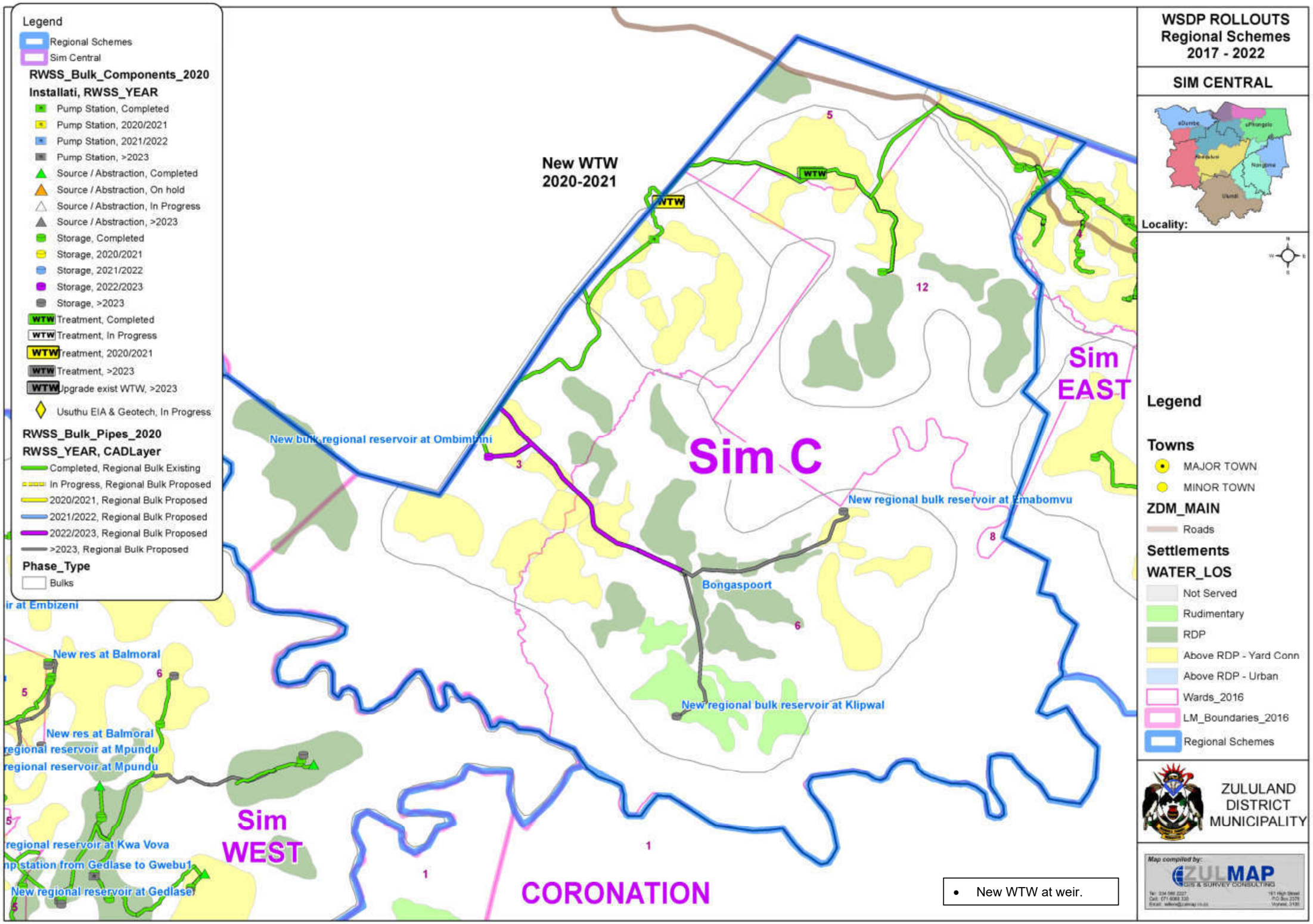

• Establishment of stand-alone schemes
(including new Land Reform areas)
Sim W
UPhongolo
Coronation
Coronation Masterplan in progress
Intermediate Stand-alone
Schemes (2018 - 2022)
LOUWSBURG
CORONATION
HLOBANE
Khambi
VRYHEID
ENYATI
Abaqulusi
Hlahlindlela
Legend
RWSS BULK COMPONENTS
Installati, RWSS_YEAR
Source / Abstraction, Completed
Treatment, Completed
Pump Station, Completed
Storage, Completed
Storage, In Progress
Source / Abstraction, 2017/2018
Treatment, 2017/2018
Pump Station, 2017/2018
Storage, 2017/2018
Source / Abstraction, 2018/2019
Storage, 2018/2019
Pump Station, 2019/2020
Storage, 2019/2020
Pump Station, 2020/2021
Storage, 2020/2021
Pump Station, 2021/2022
Storage, 2021/2022
Source / Abstraction, >2022
Pump Station, >2022
Storage, >2022
RWSS BULK PIPES
RWSS_YEAR, CADLayer
Completed, Regional Bulk Existing
In Progress, Regional Bulk Proposed
2017/2018, Regional Bulk Proposed
2018/2019, Regional Bulk Proposed
2019/2020, Regional Bulk Proposed
2020/2021, Regional Bulk Proposed
2021/2022, Regional Bulk Proposed
>2022, Regional Bulk Proposed
RWSS_Supply_Zones
Bulks
WSDP ROLLOUTS
Regional Schemes
2017 - 2022
CORONATION
Locality:
Legend
Regional Schemes
Coronation
Towns
MAJOR TOWN
MINOR TOWN
ZDM_MAIN
Roads
Settlements
WATER_LOS
Not Served
Rudimentary
RDP
Above RDP - Yard Conn
Above RDP - Urban
Wards_2016
LM_Boundaries_2016
ZULULAND
DISTRICT
MUNICIPALITY
Map compiled by:
ZULMAP

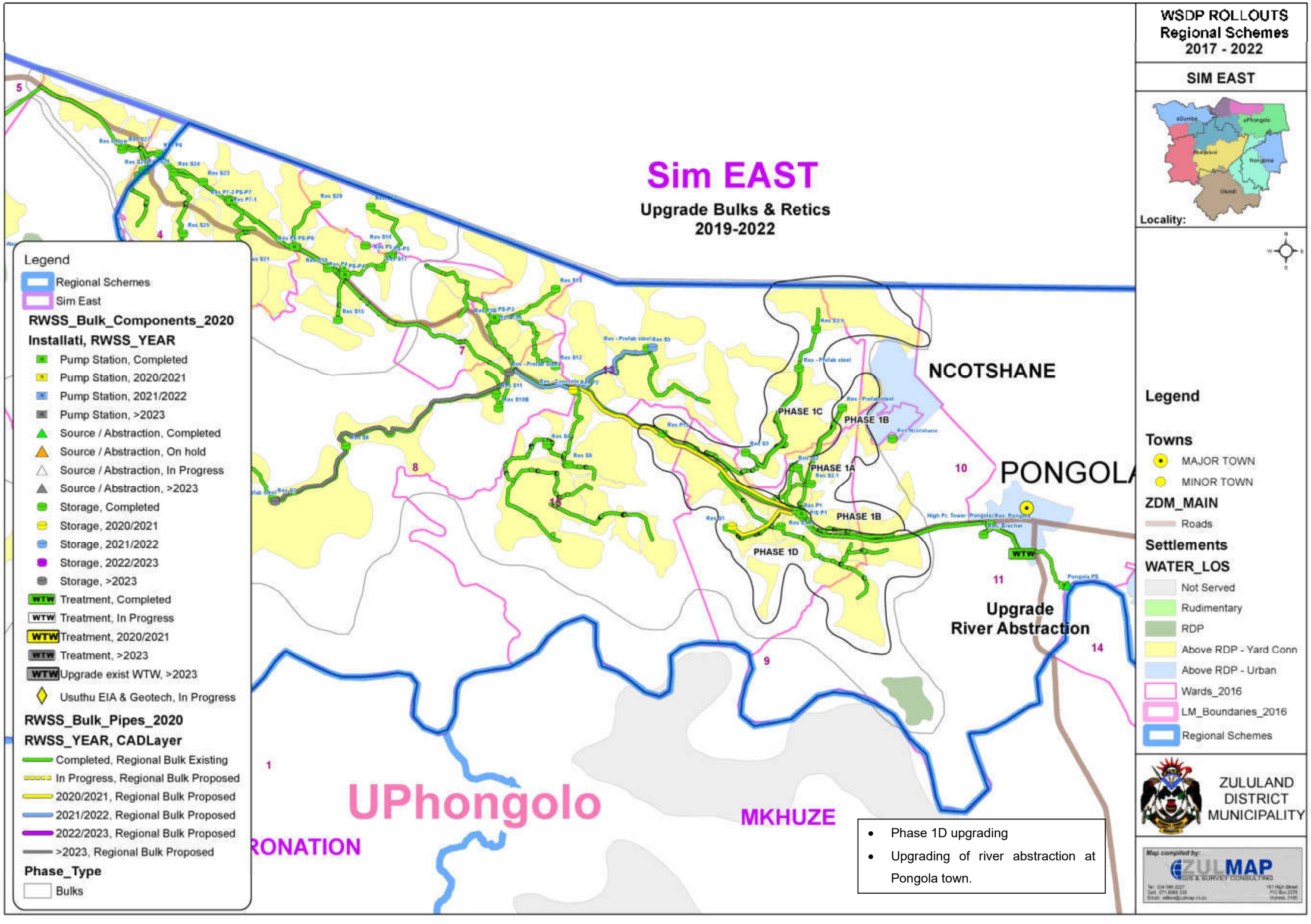



- Bulk pipeline to eMondlo (Currently on hold due to water demand shortage)


WSDP ROLLOUTS
Regional Schemes
2017 - 2022
KHAMBI
Locality:
LOUWSBURG
Coronation
CORONATION
HLOBANE
ENYATI
Khambi Completed
Project 1
R7.7m
Project 2
R1.4m
Project 2
R2.1m
Project 3
R1.1m
Abaqulusi
Khambi
Remaining Land Reform Areas
to be served
CEZA
Usuthu
Stand-alone schemes to land reform areas
Legend
Installati, RWSS_YEAR
Pump Station, Completed
PS Mech/Electr, In Progress
Pump Station, In Progress
Pump Station, 2019/2020
Pump Station, 2020/2021
Pump Station, >2023
Source / Abstraction, Completed
Source / Abstraction, On hold
Source / Abstraction, In Progress
Source / Abstraction, 2019/2020
Source / Abstraction, >2023
Storage, Completed
Storage, In Progress
Storage, 2019/2020
Storage, 2020/2021
Storage, 2021/2022
Storage, 2022/2023
Storage, >2023
Treatment, Completed
Treatment, In Progress
Upgrade exist WTW, In Progress
Treatment, 2019/2020
Treatment, >2023
Upgrade exist WTW, >2023
Usuthu EIA, In Progress
RWSS_YEAR, CADLayer
Completed, Regional Bulk Existing
In Progress, Regional Bulk Proposed
2020/2021, Regional Bulk Proposed
2021/2022, Regional Bulk Proposed
2022/2023, Regional Bulk Proposed
2022/2023, Regional Bulk Proposed
>2023, Regional Bulk Proposed
RWSS Supply Zones
Bulks
Legend
Towns
MAJOR TOWN
MINOR TOWN
ZDM_MAIN
Roads
Settlements
WATER_LOS
Not Served
Rudimentary
RDP
Above RDP - Yard Conn
Above RDP - Urban
Wards_2016
LM_Boundaries_2016
Regional Schemes
ZULULAND
DISTRICT
MUNICIPALITY
Map compiled by:
ZULMAP
GIS & SURVEY CONSULTING


Sim W
New Bulk Infrastructure
to New Terminal RWSS Reservoir.
WSDP ROLLOUTS
Regional Schemes
2017 - 2022
SIM WEST
Locality:
Legend
Regional Schemes
Sim West
RWSS_Bulk_Components_2020
Installati, RWSS_YEAR
Pump Station, Completed
Pump Station, 2020/2021
Pump Station, 2021/2022
Pump Station, >2023
Source / Abstraction, Completed
Source / Abstraction, On hold
Source / Abstraction, In Progress
Source / Abstraction, >2023
Storage, Completed
Storage, 2020/2021
Storage, 2021/2022
Storage, 2022/2023
Storage, >2023
WTW Treatment, Completed
WTW Treatment, In Progress
WTW Treatment, 2020/2021
WTW Treatment, >2023
WTW Upgrade exist WTW, >2023
Usuthu EIA & Geotech, In Progress
RWSS_Bulk_Pipes_2020
RWSS_YEAR, CADLayer
Completed, Regional Bulk Existing
In Progress, Regional Bulk Proposed
2020/2021, Regional Bulk Proposed
2021/2022, Regional Bulk Proposed
2022/2023, Regional Bulk Proposed
>2023, Regional Bulk Proposed
Phase_Type
Bulks
Legend
Towns
MAJOR TOWN
MINOR TOWN
ZDM_MAIN
Roads
Settlements
WATER_LOS
Not Served
Rudimentary
RDP
Above RDP - Yard Conn
Above RDP - Urban
Wards_2016
LM_Boundaries_2016
Regional Schemes
ZULULAND
DISTRICT
MUNICIPALITY
Map compiled by:
ZULMAP
GIS & SURVEY CONSULTING
WTW
1
2
3
4
5
6
7
8
New bulk infrastructure from Frischgewaagd to new RWSS Terminal Reservoir.


Legend
Regional Schemes
Sim Central
RWSS_Bulk_Components_2020
Installati, RWSS_YEAR
Pump Station, Completed
Pump Station, 2020/2021
Pump Station, 2021/2022
Pump Station, >2023
Source / Abstraction, Completed
Source / Abstraction, On hold
Source / Abstraction, In Progress
Source / Abstraction, >2023
Storage, Completed
Storage, 2020/2021
Storage, 2021/2022
Storage, 2022/2023
Storage, >2023
WTW Treatment, Completed
WTW Treatment, In Progress
WTW Treatment, 2020/2021
WTW Treatment, >2023
WTW Upgrade exist WTW, >2023
Usuthu EIA & Geotech, In Progress
RWSS_Bulk_Pipes_2020
RWSS_YEAR, CADLayer
Completed, Regional Bulk Existing
In Progress, Regional Bulk Proposed
2020/2021, Regional Bulk Proposed
2021/2022, Regional Bulk Proposed
2022/2023, Regional Bulk Proposed
>2023, Regional Bulk Proposed
Phase_Type
Bulks
New WTW
2020-2021
WTW
WTW
5
12
3
8
6
1
New bulk regional reservoir at Ombimbini
New regional bulk reservoir at Emabomvu
Bongaspoort
New regional bulk reservoir at Klipwal
ir at Embizeni
New res at Balmoral
New res at Balmoral
regional reservoir at Mpundu
regional reservoir at Mpundu
regional reservoir at Kwa Vova
np station from Gedlase to Gwebu1
New regional reservoir at Gedlase
Sim
WEST
Sim C
Sim
EAST
CORONATION
• New WTW at weir.
WSDP ROLLOUTS
Regional Schemes
2017 - 2022
SIM CENTRAL
Locality:
Legend
Towns
MAJOR TOWN
MINOR TOWN
ZDM_MAIN
Roads
Settlements
WATER_LOS
Not Served
Rudimentary
RDP
Above RDP - Yard Conn
Above RDP - Urban
Wards_2016
LM_Boundaries_2016
Regional Schemes
ZULULAND
DISTRICT
MUNICIPALITY
Map compiled by:
ZULMAP
GIS & SURVEY CONSULTING




- Phase 1D upgrading
- Upgrading of river abstraction at Pongola town.


NCOTSHANE
PONGOLA
10
11
14
1
3
COMPLETED
Mkhuze
Legend
RWSS BULK COMPONENTS
Installati, RWSS_YEAR
Source / Abstraction, Completed
Treatment, Completed
Pump Station, Completed
Storage, Completed
Storage, In Progress
Source / Abstraction, 2017/2018
Treatment, 2017/2018
Pump Station, 2017/2018
Storage, 2017/2018
Source / Abstraction, 2018/2019
Storage, 2018/2019
Pump Station, 2019/2020
Storage, 2019/2020
Pump Station, 2020/2021
Storage, 2020/2021
Pump Station, 2021/2022
Storage, 2021/2022
Source / Abstraction, >2022
Pump Station, >2022
Storage, >2022
RWSS BULK PIPES
RWSS_YEAR, CADLayer
Completed, Regional Bulk Existing
In Progress, Regional Bulk Proposed
2017/2018, Regional Bulk Proposed
2018/2019, Regional Bulk Proposed
2019/2020, Regional Bulk Proposed
2020/2021, Regional Bulk Proposed
2021/2022, Regional Bulk Proposed
>2022, Regional Bulk Proposed
RWSS_Supply_Zones
Bulks
ZDM_MAIN
Roads
Settlements
WATER_LOS
Not Served
Rudimentary
RDP
Above RDP - Yard Conn
Above RDP - Urban
WSDP ROLLOUTS
Regional Schemes
2018 - 2022
MKHUZE
Locality:
Legend
Towns
MAJOR TOWN
MINOR TOWN
ZDM_MAIN
Roads
Settlements
WATER_LOS
Not Served
Rudimentary
RDP
Above RDP - Yard Conn
Above RDP - Urban
Wards_2016
LM_Boundaries_2016
Regional Schemes
ZULULAND
DISTRICT
MUNICIPALITY
DISCLAIMER:
The accuracy of the data presented on this map is not guaranteed nor is it implied. Zululand District Municipality accepts no liability for any claims brought against it or its employees as a result of the use of the data and/or information supplied.
• Gumbi Scheme completed.

- Bulk supply to Zone 5.2 & 5.6
- Planning for new abstraction for Mandlakazi from Jozini dam to WTW.

**PLANNING:**
**New Abstraction & Bulks from Jozini Dam**

Zone 5.3
Zone 5.4
Zone 5.2
Zone 5.1
Zone 5.5
Zone 5.6
WTW

**Mandl. West**
**Zone 5.2 Bulks**
**2019-2020**

**Mandl. Central**
**Zone 5.6 Bulks**
**2019-2020**

Nongoma
NONGOMA

**Legend**

Installati, RWSS_YEAR
- Pump Station, Completed
- PS Mech/Electr, In Progress
- Pump Station, In Progress
- Pump Station, 2019/2020
- Pump Station, 2020/2021
- Pump Station, >2023
- Source / Abstraction, Completed
- Source / Abstraction, On hold
- Source / Abstraction, In Progress
- Source / Abstraction, 2019/2020
- Source / Abstraction, >2023
- Storage, Completed
- Storage, In Progress
- Storage, 2019/2020
- Storage, 2020/2021
- Storage, 2021/2022
- Storage, 2022/2023
- Storage, >2023
- WTW Treatment, Completed
- WTW Treatment, In Progress
- WTW Upgrade exist WTW, In Progress
- WTW Treatment, 2019/2020
- WTW Treatment, >2023
- WTW Upgrade exist WTW, >2023
- Usuthu EIA, In Progress

RWSS_YEAR, CADLayer
- Completed, Regional Bulk Existing
- In Progress, Regional Bulk Proposed
- 2020/2021, Regional Bulk Proposed
- 2021/2022, Regional Bulk Proposed
- 2022/2023, Regional Bulk Proposed
- 2022/2023, Regional Bulk Proposed
- >2023, Regional Bulk Proposed

**RWSS Supply Zones**
- Bulks

**WSDP ROLLOUTS**
**Regional Schemes**
**2017 - 2022**

**MANDHLAKAZI**

Locality:

**Legend**
- Regional Schemes
- Coronation

**Towns**
- MAJOR TOWN
- MINOR TOWN

**ZDM_MAIN**
- Roads

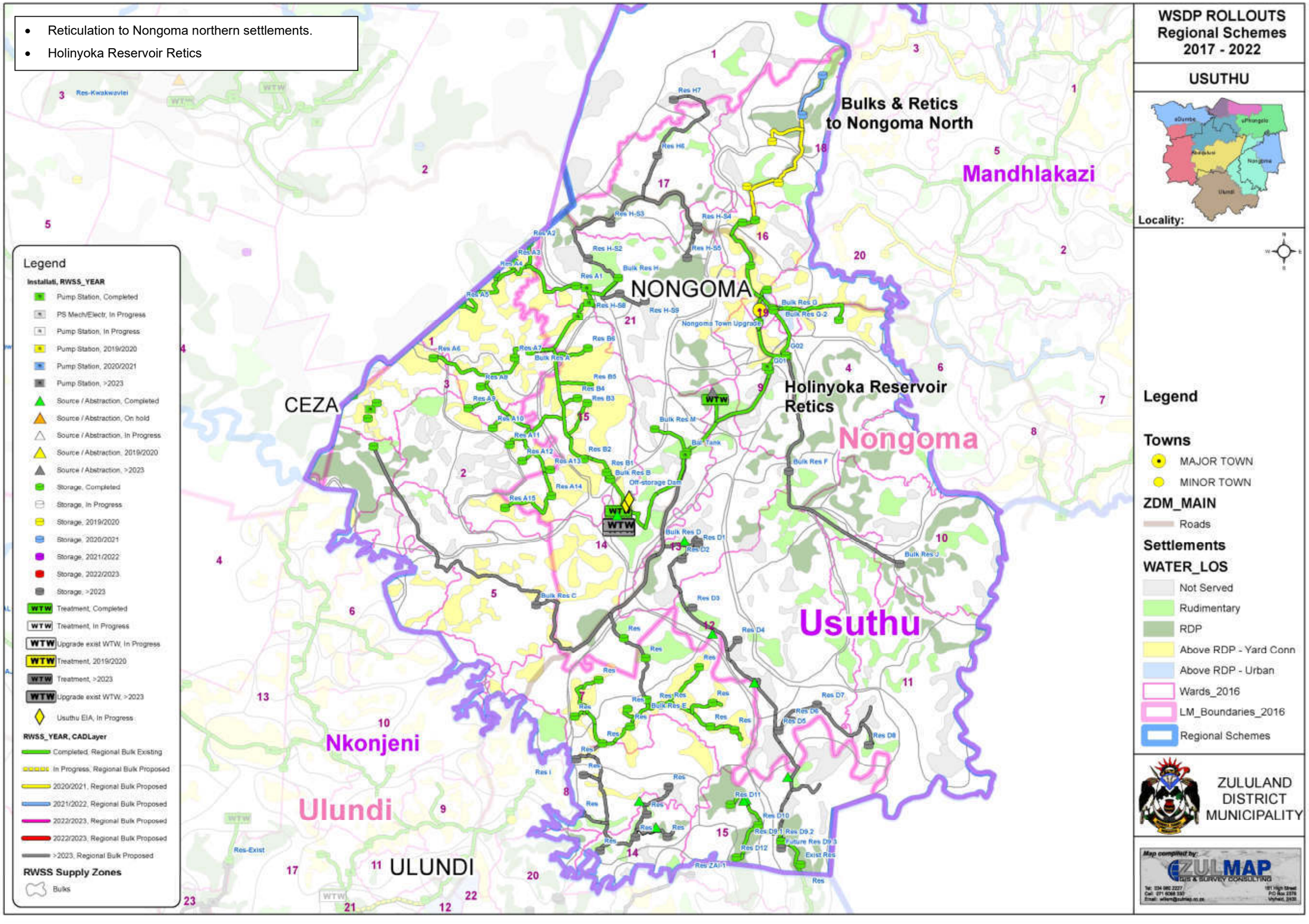
**Settlements**

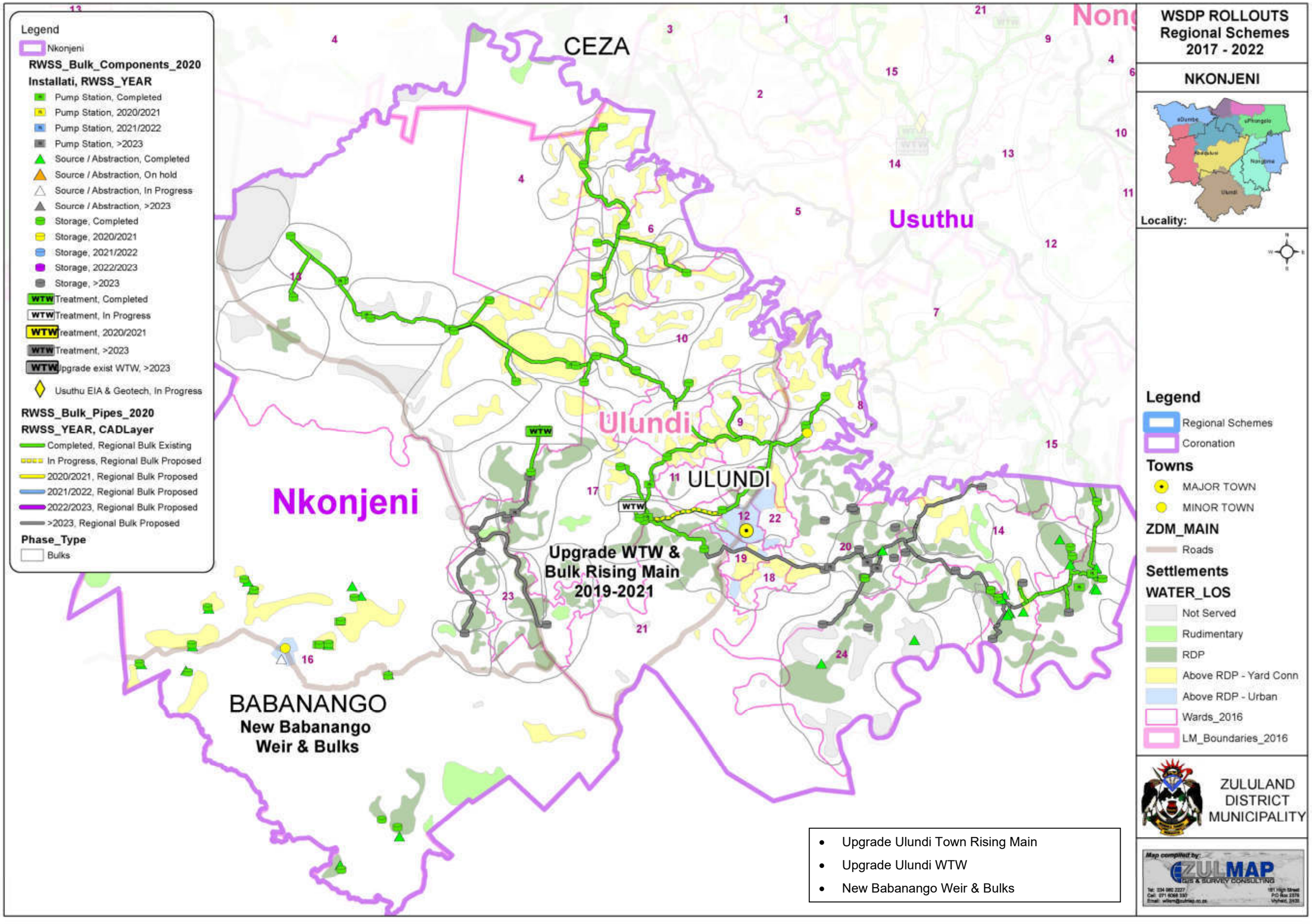
**WATER_LOS**
- Not Served
- Rudimentary
- RDP
- Above RDP - Yard Conn
- Above RDP - Urban
- Wards_2016
- LM_Boundaries_2016

ZULULAND DISTRICT MUNICIPALITY

Map compiled by: ZULMAP GIS & SURVEY CONSULTING

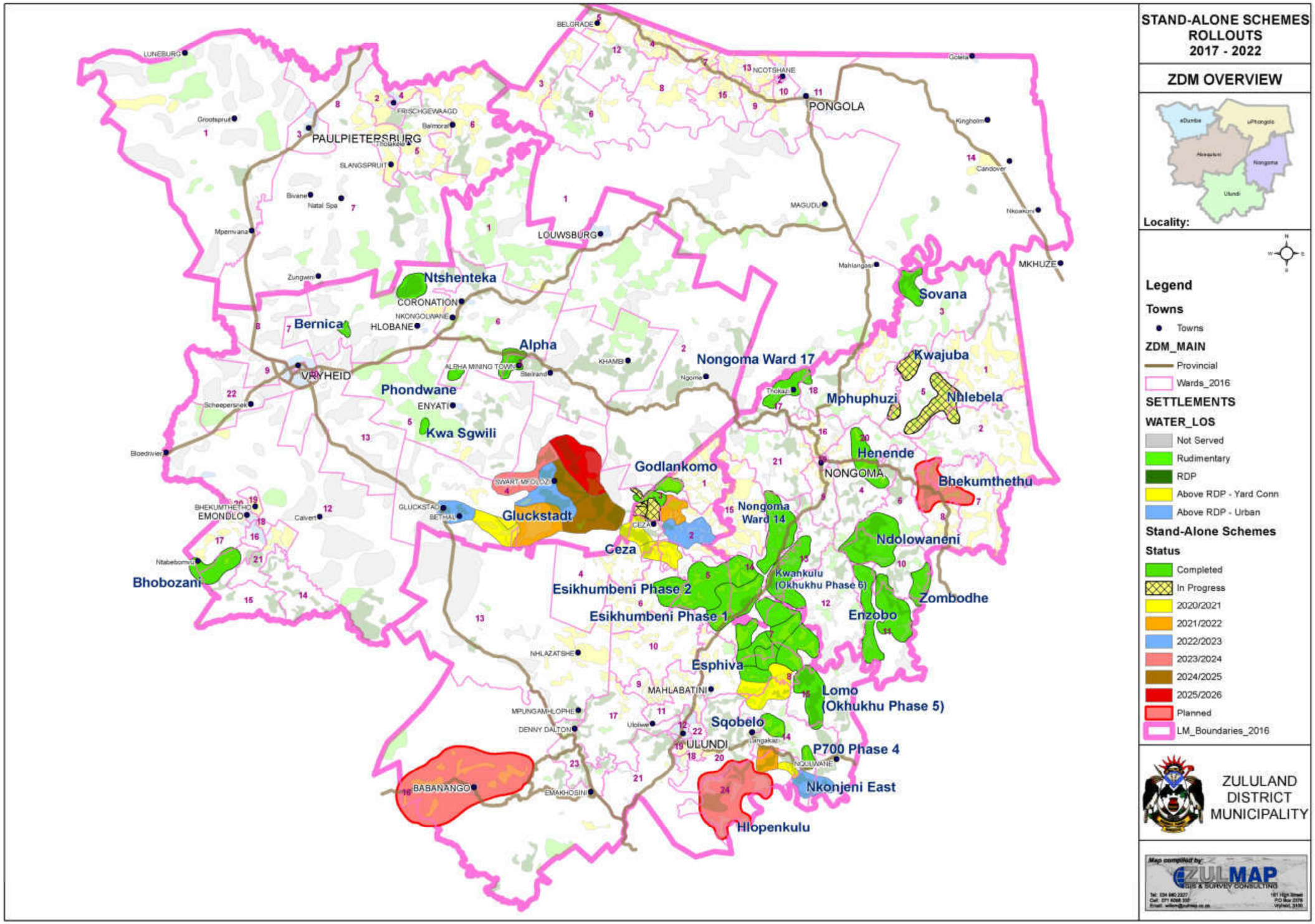
- Reticulation to Nongoma northern settlements.
- Holinyoka Reservoir Retics



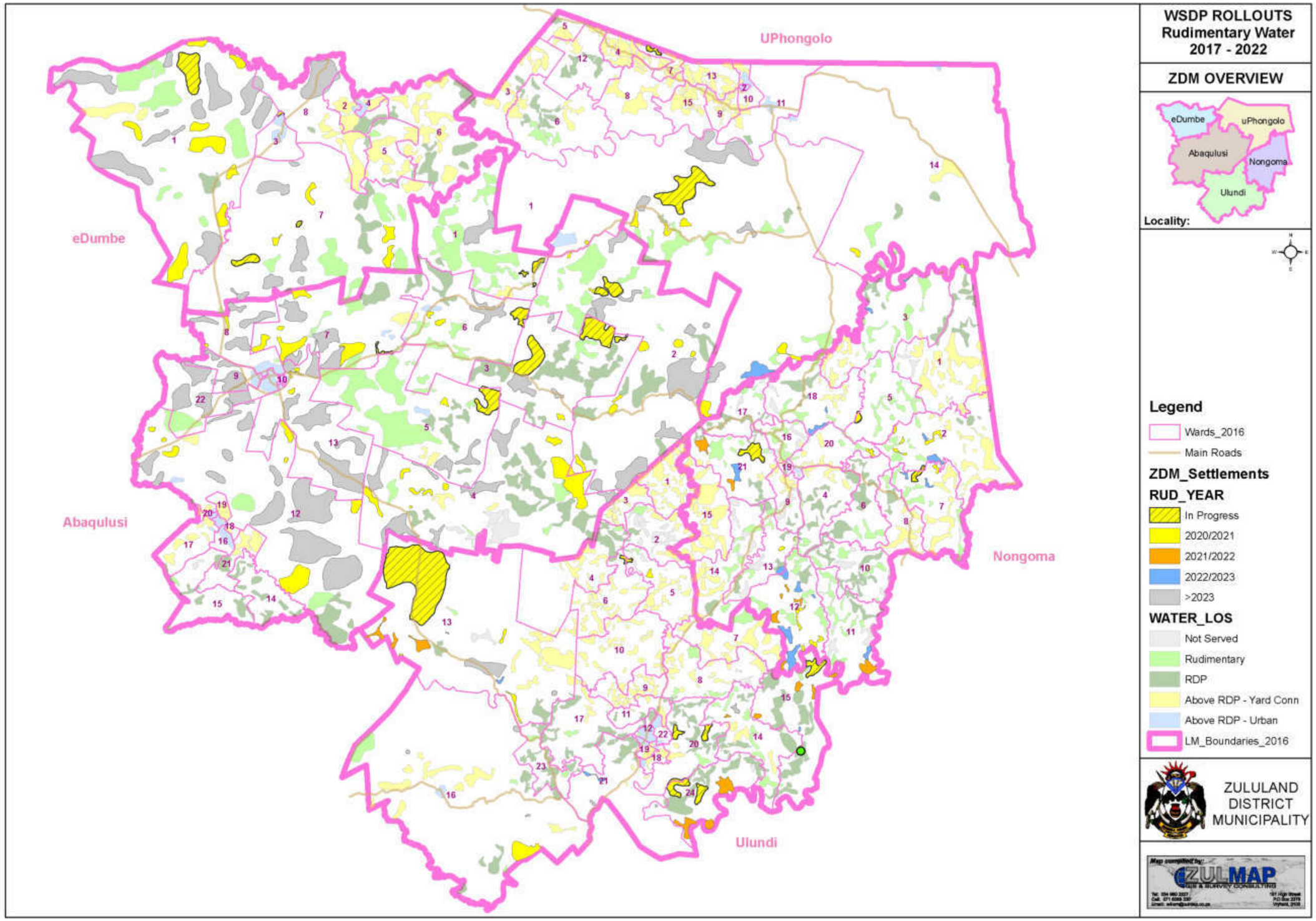



- Upgrade Ulundi Town Rising Main
- Upgrade Ulundi WTW
- New Babanango Weir & Bulks

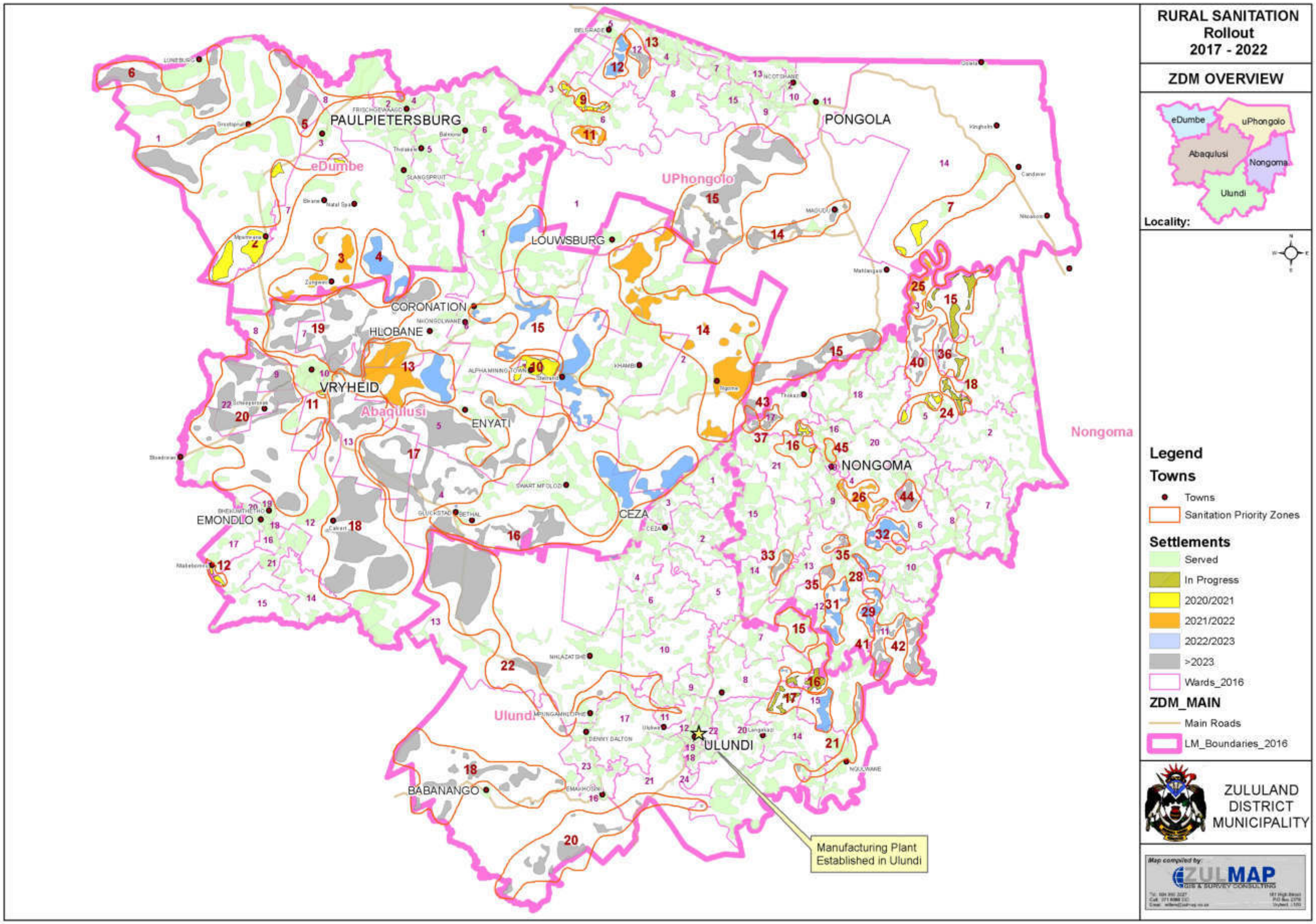
**Map 11.2: Identified Stand-alone Schemes**



**Map 11.3: Rudimentary water supply rollouts**



**Map 11.4: Roll-out of rural sanitation services in the district over the next 5 years**



# Table 11.1: Roll-out of Regional Water Infrastructure

# Table 11.2: Roll-out of Stand-alone Schemes

# Table 11.3: Roll-out of Rudimentary Water Services

# Table 11.4: Roll-out of New Rural Sanitation Services

## RUDIMENTARY ROLLOUTS

| Local Municipality | Regional Scheme | Ward 2016 | Rudimentary Implementation Year | Z-Nr | Settlement Name | Cost Estimate | Households Served | Comment |
|---|---|---|---|---|---|---|---|---|
| AbaQulusi | Coronation | 1 | Served | ZNew63 | Kwanogalaja | - | 3 | Functional solar pump |
| | | 5 | Served | ZNew25 | Malangweni | - | 72 | Functional handpump |
| | | 1 | In Progress | ZNew45 | Madanyini | 400 000 | 29 | Spring protections |
| | | 1 | In Progress | ZPM17a | Enhlangweni | 350 000 | 73 | Additional BH required |
| | | 1 | In Progress | ZPM11 | Ezakhiweni 1 | 60 000 | 17 | Resolve solar pump problem |
| | | 1 | In Progress | ZPM17b | Mbizo | 90 000 | 23 | Repair HPs |
| | | 2 | In Progress | ZNew46 | Emarondweni | 420 000 | 13 | Hydrocensus in progress |
| | | 2 | In Progress | ZNew48 | Empumazi | 450 000 | 14 | Hydrocensus in progress |
| | | 2 | In Progress | ZBUK61 | Endinsi | 350 000 | 46 | Hydrocensus in progress |
| | | 2 | In Progress | ZBUK60 | Kwafakazi | 120 000 | 85 | Hydrocensus in progress |
| | | 3 | In Progress | ZHR26 | Sgubudu | 120 000 | 170 | Hydrocensus in progress |
| | | 6 | In Progress | ZNew104 | Enkwaleni | 350 000 | 18 | Additional BH required |
| | | 6 | In Progress | ZNew103 | Uitzicht | 750 000 | 29 | Hydrocensus in progress |
| | | 6 | In Progress | ZPM6 | Mkhuze 2 | 700 000 | 78 | New sources |
| | | 7 | In Progress | ZHC5 | Boomlaer | 350 000 | 40 | Hydrocensus in progress |
| | | 1 | 2021/2022 | ZNew50 | Kwantebe | 870 000 | 51 | |
| | | 2 | 2021/2022 | ZNew22 | Kwabudula | 580 000 | 29 | |
| | | 2 | 2021/2022 | ZNew20 | Kwanmnunse | 850 000 | 51 | |
| | | 2 | 2021/2022 | ZNew40 | Kwasithole | 1 040 000 | 77 | |
| | | 2 | 2021/2022 | ZNew21 | Makhwela | 1 040 000 | 73 | |
| | | 3 | 2022/2023 | ZNew32 | Mfabantu | 520 000 | 20 | |
| | | 6 | 2022/2023 | ZNew34 | Gobeni | 460 000 | 17 | |
| | | 6 | 2022/2023 | ZNew33 | Mciyo | 660 000 | 29 | |
| | Hlahlindlela | 8 | Served | ZMAP122 | Vryheid Dump Site | - | 115 | Functional Handpump |
| | | 7 | In Progress | ZNew108 | Shoba 2 | 2 790 000 | 272 | Additional BHs |
| | | 7 | In Progress | ZNew95 | Voorkeur | 350 000 | 63 | New source required |
| | | 8 | In Progress | ZNew128 | KwaNgethe | 740 000 | 45 | Hydrocensus in progress |
| | | 8 | In Progress | ZNew153 | Kwatwo | 590 000 | 29 | Hydrocensus in progress |
| | | 7 | 2020/2021 | ZNew111 | Emakwateni | 940 000 | 68 | |
| | | 7 | 2020/2021 | ZNew112 | Geluk 1 | 390 000 | 9 | |
| | | 7 | 2020/2021 | ZNew113 | Kwalancast | 480 000 | 18 | |
| | | 7 | 2021/2022 | ZNew90 | Ntendeka 2 | 1 140 000 | 91 | |
| | | 7 | 2021/2022 | ZNew107 | Shoba 1 | 1 330 000 | 266 | |
| | | 7 | 2021/2022 | ZNew94 | Zungweni | 810 000 | 48 | |
| | | 8 | 2021/2022 | ZNew130 | Hellberg farms | 950 000 | 67 | |
| | | 8 | 2021/2022 | ZNew127 | KwaBeshu | 670 000 | 32 | |
| | | 8 | 2021/2022 | ZNew129 | KwaBevu | 490 000 | 23 | |
| | | 8 | 2021/2022 | ZNew126 | Magot | 680 000 | 41 | |
| | | 9 | 2022/2023 | ZNew154 | KwaMatiela | 510 000 | 21 | |
| | | 9 | 2022/2023 | ZNew125 | KwaSavells | 530 000 | 25 | |
| | | 9 | 2022/2023 | ZNew119 | Stillwater | 1 130 000 | 90 | |

## RUDIMENTARY ROLLOUTS

| Local Municipality | Regional Scheme | Ward 2016 | Rudimentary Implementation Year | Z-Nr | Settlement Name | Cost Estimate | Households Served | Comment |
|---|---|---|---|---|---|---|---|---|
| AbaQulusi | Hlahlindlela | 12 | In Progress | ZNew177 | Brakfontein 2 | 420 000 | 12 | Hydrocensus in progress |
| | | 12 | In Progress | ZNew168 | Mabunya | 420 000 | 13 | Hydrocensus in progress |
| | | 12 | In Progress | ZNew169 | Tintas Drift | 830 000 | 84 | Additional source, possible reticulation |
| | | 13 | In Progress | ZNew96 | Banga | 350 000 | 10 | Drill 1x BH |
| | | 13 | In Progress | ZMAP123 | Ema300 | 350 000 | 284 | Drill 1x BH |
| | | 13 | In Progress | ZNew93 | Eskame | 350 000 | 52 | Drill 1x BH |
| | | 13 | In Progress | ZNew109 | Hluma | 350 000 | 45 | Drill 1x BH |
| | | 13 | In Progress | ZNew76 | Mpofini | 890 000 | 53 | Hydrocensus in progress |
| | | 12 | 2020/2021 | ZNew175 | Aardappel | 540 000 | 26 | |
| | | 12 | 2020/2021 | ZNew163 | Brakfontein | 520 000 | 24 | |
| | | 12 | 2020/2021 | ZNew176 | Dubbelrecht | 440 000 | 14 | |
| | | 12 | 2020/2021 | ZNew161 | Emooi | 1 040 000 | 80 | |
| | | 12 | 2021/2022 | ZNew160 | Enyanyeni | 510 000 | 22 | |
| | | 12 | 2021/2022 | ZNew178 | Fairplay | 470 000 | 19 | |
| | | 12 | 2021/2022 | ZNew173 | Geluk 3 | 410 000 | 8 | |
| | | 12 | 2021/2022 | ZNew171 | Grootfontein | 660 000 | 40 | |
| | | 12 | 2021/2022 | ZNew170 | KwaMshomoloza | 580 000 | 28 | |
| | | 12 | 2021/2022 | ZNew164 | Langverwacht | 660 000 | 34 | |
| | | 12 | 2021/2022 | ZNew165 | Mawelawela | 580 000 | 28 | |
| | | 12 | 2021/2022 | ZNew179 | Mdlenevini | 620 000 | 34 | |
| | | 12 | 2021/2022 | ZNew172 | Middelpunt | 380 000 | 8 | |
| | | 12 | 2021/2022 | ZNew167 | Nsengeni | 470 000 | 20 | |
| | | 12 | 2021/2022 | ZNew162 | Vamba | 600 000 | 33 | |
| | | 13 | 2021/2022 | ZNew75 | Beafort | 890 000 | 64 | |
| | | 13 | 2021/2022 | ZNew74 | Golden Valley | 870 000 | 60 | |
| | | 13 | 2021/2022 | ZNew77 | Klipfontein | 570 000 | 20 | |
| | | 13 | 2021/2022 | ZNew110 | Kwabanga 1 | 960 000 | 68 | |
| | | 13 | 2022/2023 | ZNew92 | Kwabanga 2 | 780 000 | 51 | |
| | | 22 | 2022/2023 | ZNew124 | Betel | 490 000 | 22 | |
| | | 22 | 2022/2023 | ZNew106 | Eensgevonden plotte | 1 130 000 | 96 | |
| | | 22 | 2022/2023 | ZNew122 | Fearmdale | 980 000 | 66 | |
| | | 22 | 2022/2023 | ZNew123 | KwaLubeck | 490 000 | 23 | |
| | | 22 | 2022/2023 | ZNew120 | Scheepersnek | 640 000 | 34 | |
| | | 22 | 2022/2023 | ZNew121 | Zaaifontein | 510 000 | 22 | |
| | Khambi | 2 | In Progress | ZNew18 | Kwazondo | 400 000 | 21 | Test 2 springs |
| | | 3 | In Progress | ZMAP127 | Bhukubhu | 400 000 | 29 | Test 2 springs |
| | | 3 | In Progress | ZNew29 | Mabova | 350 000 | 32 | Drill 1x BH |
| | | 3 | In Progress | ZNew31 | Ndulinde | 350 000 | 54 | Drill 1x BH |
| | | 2 | 2020/2021 | ZMAP62 | Ketango | 440 000 | 17 | |
| | | 2 | 2020/2021 | ZMAP63a | Nsonyane | 870 000 | 29 | |
| | | 2 | 2020/2021 | ZMC13 | Ntabazelanga | 660 000 | 27 | |
| | | 2 | 2020/2021 | ZNew15 | Dlomodlomo | 520 000 | 25 | |
| | | 2 | 2020/2021 | ZNew16 | Kwakopie | 420 000 | 13 | |
| | | 2 | 2021/2022 | ZNew19 | Kwathemba | 590 000 | 30 | |
| | | 2 | 2021/2022 | ZNew12 | Mphitiphtini | 1 640 000 | 134 | |
| | | 2 | 2021/2022 | ZNew17 | Ndulo | 390 000 | 9 | |
| | | 2 | 2021/2022 | ZNew14 | Ngongomane | 2 140 000 | 177 | |
| | | 2 | 2022/2023 | ZNew13 | Ongcwezeni | 1 370 000 | 185 | |
| | | 2 | 2022/2023 | ZNew11 | Thuthukani | 450 000 | 14 | |
| | | 3 | 2022/2023 | ZNew181 | Hlanganani CPA | 370 000 | 6 | |
| | | 3 | 2022/2023 | ZNew30 | Kewulane | 1 070 000 | 81 | |
| | | 3 | 2022/2023 | ZNew28 | Mthumeni | 380 000 | 15 | |

## RUDIMENTARY ROLLOUTS

| Local Municipality | Regional Scheme | Ward 2016 | Rudimentary Implementation Year | Z-Nr | Settlement Name | Cost Estimate | Households Served | Comment |
|---|---|---|---|---|---|---|---|---|
| AbaQulusi | Khambi | 4 | In Progress | ZMAP55 | Weltevreden 2 | 60 000 | 55 | Equip existing BH |
| | | 4 | In Progress | ZNew66 | KwaPaul | 350 000 | 6 | Drill 1x BH |
| | | 4 | In Progress | ZNew67 | Thabankulu | 350 000 | 32 | Drill 1x BH |
| | | 5 | In Progress | ZNew82 | KwaJohn 2 | 350 000 | 21 | Drill 1x BH |
| | | 5 | In Progress | ZMAP75 | Mbogozi | 900 000 | 131 | Investigate 3x springs |
| | | 4 | 2020/2021 | ZNN21 | eMkhweleni | 800 000 | 53 | |
| | | 4 | 2020/2021 | ZNew70 | Berlin | 380 000 | 8 | |
| | | 4 | 2020/2021 | ZNew60 | Dagane | 660 000 | 39 | |
| | | 4 | 2020/2021 | ZNew68 | Elim | 460 000 | 15 | |
| | | 4 | 2020/2021 | ZNew64 | Emgageni | 1 900 000 | 146 | |
| | | 4 | 2021/2022 | ZNew62 | Enqothweni | 980 000 | 78 | |
| | | 4 | 2021/2022 | ZNew69 | Entabeni 1 | 410 000 | 8 | |
| | | 4 | 2021/2022 | ZNew53 | Kwamahashi | 590 000 | 30 | |
| | | 4 | 2021/2022 | ZNew65 | Kwaschoeman | 490 000 | 11 | |
| | | 4 | 2021/2022 | ZNew61 | Leeunek 1 | 510 000 | 24 | |
| | | 4 | 2021/2022 | ZMAP126 | Mangoe | 1 250 000 | 103 | |
| | | 4 | 2022/2023 | ZNew59 | Siyaphambile | 650 000 | 33 | |
| | | 5 | 2022/2023 | ZNew81 | Ekamvu | 560 000 | 26 | |
| | | 5 | 2022/2023 | ZNew131 | Lenjane 2 | 730 000 | 26 | |
| | | 13 | 2022/2023 | ZNew72 | Ishoba 1 | 1 310 000 | 131 | |
| | | 13 | 2022/2023 | ZNew73 | Leeunek 2 | 420 000 | 12 | |
| eDumbe | Coronation | 7 | 2020/2021 | ZPM35 | Baqulusini 5 | 450 000 | 15 | |
| | | 7 | 2020/2021 | ZTAS56 | Palmietfontein (Rondspring 137, Kwambhedleni) | 550 000 | 24 | |
| | | 7 | 2021/2022 | ZNew149 | Gweje | 1 170 000 | 87 | |
| | | 7 | 2022/2023 | ZNew146 | Makhwabe | 370 000 | 9 | |
| | Hlahlindlela | 7 | In Progress | ZNew150 | Mqwabe | 350 000 | 28 | Drill 1x BH |
| | | 7 | In Progress | ZNew6 | KwaManzi | 300 000 | 26 | Investigate spring |
| | | 7 | In Progress | ZMAP4 | Mthashana | 350 000 | 44 | Additional BH required |
| | | 1 | 2020/2021 | ZNew4 | Bivanyana | 710 000 | 38 | |
| | | 1 | 2020/2021 | ZNew132 | Khambula mission | 890 000 | 60 | |
| | | 1 | 2021/2022 | ZNew133 | Penvaan | 1 300 000 | 100 | |
| | | 7 | 2022/2023 | ZNew152 | Sefamanzi | 790 000 | 47 | |
| | | 7 | 2022/2023 | ZNew148 | Zungwini | 490 000 | 23 | |
| | Sim West | 1 | In Progress | ZNew141 | Bazangoma | 1 500 000 | 107 | Drill 4x BHs, test existing |
| | | 3 | In Progress | ZNew3 | Mandakane | 700 000 | 403 | Drill 2x BHs |
| | | 1 | 2020/2021 | ZMAP71 | Bella Vista | 830 000 | 53 | |
| | | 1 | 2020/2021 | ZMAP1 | Rooipoort | 850 000 | 57 | |
| | | 7 | 2020/2021 | ZMAP6 | Koudbad / Welverdiend | 670 000 | 36 | |
| | | 1 | 2020/2021 | ZNew143 | Brecher | 730 000 | 43 | |
| | | 1 | 2020/2021 | ZNew135 | Eloyi | 790 000 | 49 | |
| | | 1 | 2020/2021 | ZNew155 | Ematafuleni | 530 000 | 22 | |
| | | 1 | 2020/2021 | ZNew9 | Esitikini | 560 000 | 26 | |
| | | 1 | 2021/2022 | ZNew139 | Hloko | 1 100 000 | 67 | |
| | | 1 | 2021/2022 | ZNew10 | Knoopaan | 1 680 000 | 128 | |
| | | 1 | 2021/2022 | ZNew140 | KwaBhema | 850 000 | 57 | |
| | | 1 | 2021/2022 | ZNew134 | Kwalembe | 900 000 | 61 | |
| | | 1 | 2021/2022 | ZNew142 | Loti | 660 000 | 36 | |
| | | 1 | 2021/2022 | ZNew136 | Mkhupane | 540 000 | 26 | |
| | | 1 | 2021/2022 | ZNew137 | Ntshakwe | 550 000 | 25 | |
| | | 1 | 2021/2022 | ZMAP120 | Schikhoek (Land Reform) | 870 000 | 62 | |
| | | 1 | 2022/2023 | ZMAP121 | Tholwethu (Land Reform) | 1 070 000 | 73 | |
| | | 1 | 2022/2023 | ZNew144 | Titane | 690 000 | 36 | |
| | | 7 | 2022/2023 | ZNew151 | Ndabezitha | 460 000 | 13 | |
| | | 7 | 2022/2023 | ZNew5 | Nzenze | 550 000 | 80 | |
| | | 8 | 2022/2023 | ZNew8 | Nhlungwane | 1 450 000 | 116 | |

## RUDIMENTARY ROLLOUTS

| Local Municipality | Regional Scheme | Ward 2016 | Rudimentary Implementation Year | Z-Nr | Settlement Name | Cost Estimate | Households Served | Comment |
|---|---|---|---|---|---|---|---|---|
| Nongoma | Mandhlakazi | 2 | In Progress | ZMAP39 | Dungamanzi 1 | 350 000 | 62 | Drill 1x BH |
| | | 2 | In Progress | ZBUK21 | Enkanyezini | 1 050 000 | 57 | Drill 3x BHs |
| | | 2 | In Progress | ZMAP38 | Ntenjane | 710 000 | 41 | Drill 1x BH |
| | | 5 | In Progress | Z247 | Mpuphusi | 60 000 | 137 | Equip existing BH |
| | | 7 | In Progress | Z954 | Bhidi | 350 000 | 74 | Drill 1x BH |
| | | 7 | In Progress | Z204 | Sibanyaneni | 1 050 111 | 129 | Drill 3x BHs |
| | | 20 | In Progress | Z227 | Manqashaneni | 1 050 000 | 116 | Drill 3x BHs |
| | | 1 | 2020/2021 | ZMAP20 | Mhlanjeni | 510 000 | 16 | |
| | | 2 | 2020/2021 | Z234 | Kwankweme | 860 000 | 58 | |
| | | 3 | 2021/2022 | ZMAP22 | Mkhuze 1 | 320 000 | 1 | |
| | | 2 | 2021/2022 | Z236 | Esixeni | 530 000 | 22 | |
| | | 2 | 2021/2022 | ZBUK11 | Vusu Musi | 1 090 000 | 70 | |
| | | 3 | 2021/2022 | Z333 | Esqelwini | 340 000 | 3 | |
| | | 3 | 2021/2022 | ZBUK25 | Magendene | 550 000 | 25 | |
| | | 7 | 2022/2023 | Z198b | Dongothule | 2 070 000 | 69 | |
| | | 7 | 2022/2023 | ZBUK23 | Mgolokotho | 610 000 | 27 | |
| | | 18 | 2022/2023 | ZBUK24 | Meyame | 440 000 | 15 | |
| | | 18 | 2022/2023 | Z243 | Zibusele | 1 710 000 | 145 | |
| | Usuthu | 13 | Served | ZMAP28 | Mahayoyo | - | 228 | Regional scheme water supply |
| | | 4 | In Progress | Z362 | Emaqeleni 3 | 350 000 | 23 | Drill 1x BH |
| | | 12 | In Progress | Z338 | Esigoqobeni | 980 000 | 63 | Drill 1x BH |
| | | 12 | In Progress | ZKAY4 | Emayeni 1 | 350 000 | 50 | Drill 1x BH |
| | | 12 | In Progress | Z342 | Emayeni 2 | 350 000 | 83 | Drill 1x BH |
| | | 12 | In Progress | Z340 | Esidakeni 1 | 350 000 | 58 | Drill 1x BH |
| | | 12 | In Progress | Z339 | Ngwabe | 700 000 | 78 | Drill 2x BHs |
| | | 13 | In Progress | Z359 | Embokodweni | 1 120 000 | 75 | Protect spring & refurbish reticulation |
| | | 21 | In Progress | Z607 | Mangomhlophe | 700 000 | 300 | Hydrocensus in progress |
| | | 11 | 2021/2022 | Z147 | Ngolotshe | 3 710 000 | 316 | |
| | | 12 | 2021/2022 | ZMAP15 | Dum-Dum | 680 000 | 35 | |
| | | 12 | 2021/2022 | Z349 | Isizinda A | 410 000 | 9 | |
| | | 12 | 2021/2022 | Z341 | Isizinda B | 1 620 000 | 117 | |
| | | 12 | 2021/2022 | Z373 | Nhloyane | 410 000 | 10 | |
| | | 12 | 2021/2022 | ZMAP13 | Nqalu | 780 000 | 46 | |
| | | 21 | 2021/2022 | Z614 | Mayini / Ntonga | 2 380 000 | 205 | |
| | | 21 | 2021/2022 | Z597 | Semangadini | 1 250 000 | 87 | |
| | | 12 | 2021/2022 | ZAM12 | Ezingolaneni | 610 000 | 26 | |
| | | 12 | 2022/2023 | ZMAP16 | KwaLuphonjwana | 1 650 000 | 124 | |
| | | 12 | 2022/2023 | Z346 | KwaQuqu | 350 000 | 10 | |
| | | 12 | 2022/2023 | Z374 | Ngalonde | 1 350 000 | 94 | |
| | | 12 | 2022/2023 | ZAM11 | Nzama | 1 300 000 | 96 | |
| | | 21 | 2022/2023 | Z598 | Mpunzana | 2 190 000 | 194 | |
| | | 4 | 2022/2023 | Z362 | Emaqeleni 2 | 370 000 | 10 | |
| | | 11 | 2022/2023 | ZMAP9 | Doncaneni | 950 000 | 56 | |

## RUDIMENTARY ROLLOUTS

| Local Municipality | Regional Scheme | Ward 2016 | Rudimentary Implementation Year | Z-Nr | Settlement Name | Cost Estimate | Households Served | Comment |
|---|---|---|---|---|---|---|---|---|
| Ulundi | Nkonjeni | 8 | Served | Z931 | Mahlabathini | - | 210 | |
| | | 14 | Served | Z413 | Njomelwane | - | 318 | |
| | | 20 | Served | Z795 | KwaMvula | - | 141 | |
| | | 9 | In Progress | ZNew79 | Manaba | 1 400 000 | 10 | Drill 4x BHs |
| | | 13 | In Progress | ZNew115 | KwaHenie | 1 750 000 | 178 | Drill 5x BHs |
| | | 20 | In Progress | Z745 | Kwagqikazi | 1 750 000 | 326 | Drill 5x BHs |
| | | 20 | In Progress | Z402a | Kwavilakazi 2 | 1 050 000 | 122 | Drill 3x BHs |
| | | 24 | In Progress | Z813 | Enguqe | 5 340 000 | 178 | Hydrocensus in progress |
| | | 24 | In Progress | ZTAS18 | Ezimfeneni | 2 010 000 | 67 | Hydrocensus in progress |
| | | 13 | 2020/2021 | Z927 | Kwabombo | 330 000 | 3 | |
| | | 13 | 2020/2021 | ZTAS10 | Mandeva | 490 000 | 20 | |
| | | 13 | 2020/2021 | ZMAP96 | Mbombo | 650 000 | 34 | |
| | | 16 | 2020/2021 | ZMAP90 | Nzololo | 1 200 000 | 62 | Equip BH & rising main |
| | | 13 | 2021/2022 | ZMAP95 | Mzingathi | 550 000 | 25 | |
| | | 13 | 2021/2022 | ZAM9a | Thkelana 1 | 580 000 | 27 | |
| | | 13 | 2021/2022 | ZAM9b | Tukelana 2 | 330 000 | 1 | |
| | | 13 | 2021/2022 | ZHC3 | Witpoort | 480 000 | 17 | |
| | | 15 | 2021/2022 | Z707 | Ntabankulu | 430 000 | 4 | |
| | | 24 | 2021/2022 | ZMAP108 | Basamlilo | 1 980 000 | 66 | |
| | | 24 | 2021/2022 | ZTAS19 | Ezikhumbeni | 2 970 000 | 99 | |
| | | 24 | 2021/2022 | ZMAP109 | Ezisasaneni | 780 000 | 26 | |
| | | 13 | 2021/2022 | ZAM5 | Ensileni | 400 000 | 9 | |
| | | 15 | 2021/2022 | ZMAP92 | Nsingizane 2 | 420 000 | 11 | |
| | | 21 | 2021/2022 | ZMAP102 | Kwamadumela | 540 000 | 19 | |
| | | 13 | 2022/2023 | ZNew87 | Maduna | 460 000 | 16 | |
| | | 13 | 2022/2023 | ZNew114 | Nhlazatshe | 550 000 | 48 | |
| | | 16 | 2022/2023 | ZNew80 | Mandevu 1 | 340 000 | 4 | |
| | | 16 | 2022/2023 | ZNew24 | Nyashana | 350 000 | 5 | |
| | | 16 | 2022/2023 | ZNew23 | Qanuatho | 400 000 | 9 | |
| | | 21 | 2022/2023 | ZNew101 | Dorsfontein | 350 000 | 2 | |
| | | 24 | 2022/2023 | ZNew99 | Isandlwana | 380 000 | 5 | |
| | Usuthu | 14 | Served | Z706 | Mbanda | - | 37 | Served by Esphiva scheme |
| | | 5 | 2020/2021 | ZMAP111 | Hluthy | 700 000 | 30 | Drill 2x BHs |
| | | 6 | 2020/2021 | Z32 | Mashiyane | 700 000 | 162 | Drill 2x BHs |
| | | 15 | In Progress | Z688 | Makhalathini | 2 480 000 | 218 | Hydrocensus in progress |
| | | 14 | 2021/2022 | Z705 | Mshayazafe | 500 000 | 21 | |
| | | 15 | 2021/2022 | ZMAP110 | Mgubameni | 520 000 | 25 | |
| | | 15 | 2021/2022 | Z689 | Obinda | 590 000 | 15 | |
| | | 15 | 2021/2022 | Z698 | Pholela | 1 580 000 | 130 | |
| | | 14 | 2022/2023 | ZNew102 | Kwamswane | 590 000 | 23 | |
| uPhongolo | Coronation | 1 | In Progress | ZNew37 | Kwaslevu | 710 000 | 37 | Drill 2x BHs |
| | | 1 | 2020/2021 | ZNew41 | Kwamshikashika | 620 000 | 32 | |
| | | 1 | 2021/2022 | ZNew42 | Kwaphatha | 600 000 | 28 | |
| | Mkhuze | 1 | In Progress | ZNew43 | Morreson | 1 190 000 | 85 | |
| | | 1 | 2020/2021 | ZMAP52 | Hhinihhini | 490 000 | 18 | |
| | | 1 | 2021/2022 | ZNew36 | Emganwini | 600 000 | 28 | |
| | | 1 | 2021/2022 | ZNew44 | Emkhayeni | 1 420 000 | 100 | |
| | Mkhuze | 14 | 2020/2021 | ZNew157 | Ngulwane | 600 000 | 35 | |
| | Sim Central | 6 | Served | ZBUK63 | Dlomodlomo 1 | - | 95 | |
| | Sim East | 7 | In Progress | Z496 | Sivule | 350 000 | 195 | Drill BH |
| | Usuthu | 1 | In Progress | ZNew118 | Eskhaleni | 350 000 | 69 | Drill BH |
| | | 1 | 2020/2021 | ZMAP32 | Kwampondo | 920 000 | 61 | |
| | | 1 | 2021/2022 | ZHC25 | Mpalaza | 1 180 000 | 93 | |
| | | 1 | 2022/2023 | ZNew35 | Embangeni | 770 000 | 49 | |

# 12. Strategic Objectives and Development Goals

## 12.1 KZN PGDS Strategic Framework

The ZDM WSDP supports the KZN PGDS Strategic Framework. WSDP goals, objectives, interventions and projects are aligned to place ZDM in a position to fulfil its role as WSA in achieving the provincial PGDS for 2035.

While the focus has been predominantly on providing each person with sustainable infrastructure and eradicating backlogs, the status of existing and aging infrastructure, as well as the availability and sustainability of water resources has been neglected. An extract of the KZN PGDS can be reviewed below.

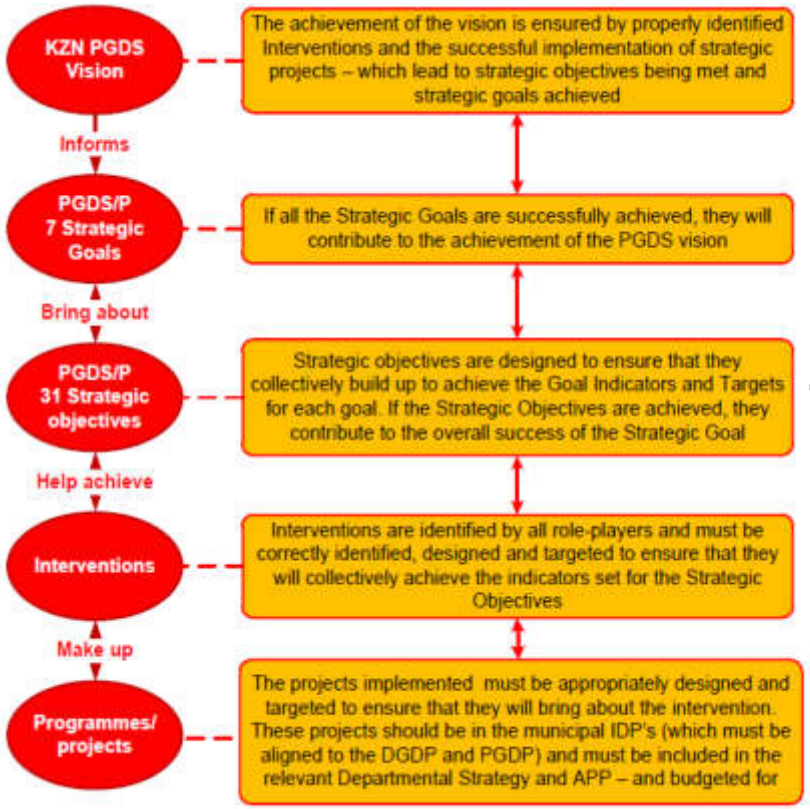
> *"The 2015/2016 drought experienced in the country and more so in the Province has had a severe impact on the citizens of the Province and their livelihoods. The most severe impact has been felt by the rural communities of KZN whose livelihoods depend on agriculture, including livestock. The Province, through various initiatives and programs, has attempted to ensure a reliable supply of water to its citizens. The continued low rainfall has made this task increasingly challenging. National and Provincial government have spent millions of rand to ensure citizens have access to water.*
>
> ***The discourse on reliable and affordable water supply has forced the water sector to re-look at several aspects of the water source management and water supply**. In terms of water source it is being argued that the Province requires a better understanding of groundwater and its catchment areas. This strategy argues that water planning and resource management should be done at a quaternary catchment level - the focus should not only be at regional level. Alternative water sources, like grey water and desalination must become viable options as sources of supply.*
>
> ***There is also a school of thought that the severity of the drought is a direct correlation to the poor maintenance programs of water services authorities**. These related to poor borehole upgrades and spring protection, high water losses due to leakages not been attended to urgently, water theft and lack of bulk and reticulation planning.*
>
> *Skills development and capacity building, in the water sector continues to be an area of investigation in this review. There is a school of thought that argues that the skills required are more at an artisan level rather than at engineering level. This relates to the **maintenance issue around boreholes and spring protection and attendance of water leaks**. There is, however, another school of thought that water services authorities have focused more on **water demand** rather than water source management and that shift must be emphasised. Further, there is increasing pressure being put on the water sector institution to begin to develop a **sustainable water sector capacity building model**. The water services boards, the water services departments and the water services authorities all have various levels and type of expertise within their institutions. Therefore, these institutions along with engineering councils and the private sector must begin to provide a holistic sustainable **capacity***

> ***building model*** *that contributes to a new water sector investment strategy. In addition, there is a growing demand for* ***localized water skills*** *at all levels as well as employment and business opportunities. The water sector through the vast capital spend have the potential to improve* ***employment opportunities and create entrepreneurs in decentralized local spaces****.*
>
> ***The financial cost of water supply cannot be underestimated and the Province needs to have a funding model to address this****. Like energy, water costs will increase and become increasingly expensive for consumers and business, thus the importance of having a* ***reliable and affordable water supply****. The Department of Water and Sanitation in the Province have several key capital water projects that will ensure a relative supply of water in the province. The growing concerns will be the pace at which our province is urbanizing and the greater demand this will have on water provision in these urbanized areas as well as to ensure reliable access to water, in rural areas.*
>
> *Given the above, the Province in the next five years must engage in the development of a new water sector investment strategy. This strategy must include* ***elements of water loss and maintenance, water availability, cost of water supply****. In addition, the strategy should include water source plans that consider ground water, desalination, grey-water. Further a discussion on localized skills and local business development. Greater emphasis on improving rural access to water and increasing mitigating measures to this section of our population."*

As water provision will increase, so will water resources needs, operation and maintenance of existing infrastructure, efficient institutional and financial capacity to manage infrastructure and revenue etc. The KZN PGDS Framework aims to achieve at least 90% reliable services by 2035.

An overview of the KZN PGDS framework with associated goals and objectives for water and sanitation services can be reviewed in the next figure.

**Figure 12.1: KZN PGDS Framework**




**The 2016 Revised PGDS Strategic Framework**

Figure 10: PGDS Strategic Framework

**2016 PGDS STRATEGIC GOALS and OBJECTIVES**

| STRATEGIC GOAL | No | STRATEGIC OBJECTIVE 2016 |
|---|---|---|
| 1 INCLUSIVE ECONOMIC GROWTH | 1.1 | Develop and promote the agricultural potential of KZN |
| | 1.2 | Enhance sectoral development through trade investment and business retention |
| | 1.3 | Enhance spatial economic development |
| | 1.4 | Improve the efficiency, innovation and variety of government-led job creation programmes |
| | 1.5 | Promote SMME and entrepreneurial development |
| | 1.6 | Enhance the Knowledge Economy |
| 2 HUMAN RESOURCE DEVELOPMENT | 2.1 | Improve early childhood development, primary and secondary education |
| | 2.2 | Support skills development to economic growth |
| | 2.3 | Enhance youth and adult skills development and life-long learning |
| 3 HUMAN AND COMMUNITY DEVELOPMENT | 3.1 | Eradicate poverty and improve social welfare services |
| | 3.2 | Enhance health of communities and citizens |
| | 3.3 | Safeguard and enhance sustainable livelihoods and food security |
| | 3.4 | Promote sustainable human settlements |
| | 3.5 | Enhance safety and security |
| | 3.6 | Advance social cohesion and social capital |
| | 3.7 | Promote youth, gender and disability advocacy and the advancement of women |
| 4 INFRASTRUCTURE DEVELOPMENT | 4.1 | Development of seaports and airports |
| | 4.2 | Develop road and rail networks |
| | 4.3 | Develop ICT infrastructure |
| | 4.4 | Ensure availability and sustainable management of water and sanitation for all |
| | 4.5 | Ensure access to affordable, reliable, sustainable and modern energy for all |
| | 4.6 | Enhance KZN waste management capacity |
| 5 ENVIRONMENTAL SUSTAINABILITY | 5.1 | Enhance resilience of ecosystem services |
| | 5.2 | Expand the application of green technologies |
| | 5.3 | Adapt and respond climate change |
| 6 GOVERNANCE AND POLICY | 6.1 | Strengthen policy, strategy coordination and IGR |
| | 6.2 | Build government capacity |
| | 6.3 | Eradicate fraud and corruption |
| | 6.4 | Promote participative, facilitative and accountable governance |
| 7 SPATIAL EQUITY | 7.1 | Enhance the resilience of new and existing cities, towns and rural nodes, ensuring equitable access to resources, social and economic opportunities |
| | 7.2 | Ensure integrated land management use across the Province, ensuring equitable access to goods and services, attracting social and financial investment |

Strategic Objectives and Interventions for the KZN PGDS can be reviewed below.

**Figure 12.2: KZN PGDS Strategic Objectives and Interventions**

**Strategic Objective 4.4 Indicators:**

4.4.1 Percentage mean annual runoff water stored in each district.
4.4.2 Quantity of water abstracted per annum in each district.
4.4.3 Number of households receiving minimum standards of sanitation.
4.4.4 Percentage households with access to safe drinking water
4.4.5 Cubic meters of water available.
4.4.6 Surface Water storage as a percentage of surface mean annual runoff per district.
4.4.7 Non-Revenue Water loss – (physical and non-physical water loss).
4.4.8 Number of projects not approved due to bulk Water and Sanitation Infrastructure constraint.
4.4.9 Number of MIG and WSIG projects meeting 75 litres of water per person per day.

**Strategic Objective 4.4 Interventions:**

4.4(a) Review and implement the Provincial Water Sector Investment Strategy.
4.4(b) Policy and guidelines on the inclusion of quaternary catchment for groundwater, grey water and desalination.
4.4(c) Develop and implement water sector capacity building programme with all water institutions.
4.4(d) Develop new water and sanitation tariff policy.
4.4(e) Expedite the approval of Water Use Licences.
4.4(f) Programme for development of water sources (desalination, rainwater, recycling, groundwater).
4.4(g) Expedite the planning and implementation of sub-transmission networks in the Province.

The ZDM WSDP support the above framework, and will elaborate on each aspect in more details throughout the document under each relevant chapter. The following provides a framework for these topics under 11 categories as depicted in the KZN PGDS document.

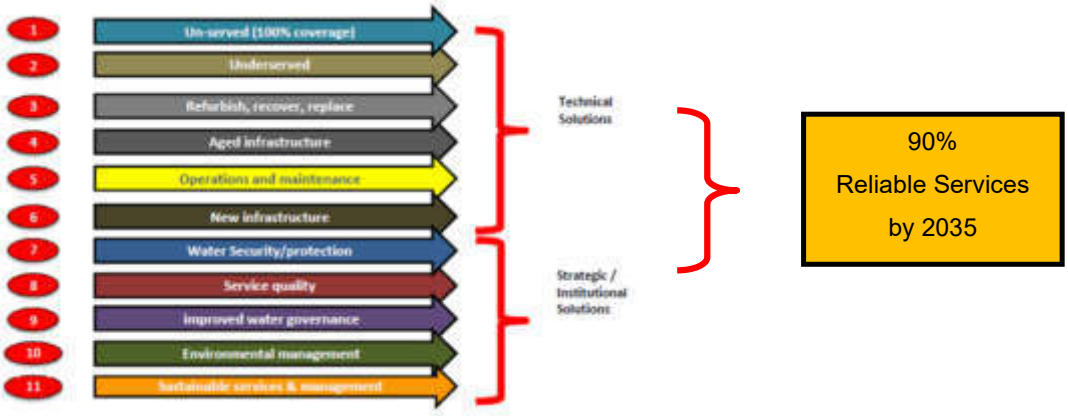



**Figure 12.3: KZN PGDS Strategic Framework**

These 11 categories are consolidated in the WSDP under the following topics as required by the web-based WSDP template of DWS:

- CHAPTER 1: Socio-Economic Profile
- CHAPTER 2: Service Level & Associated Services Profiles
- CHAPTER 3: Water Resources Profile
- CHAPTER 4: Operation and Maintenance
- CHAPTER 5: Water Conservation & Demand Management
- CHAPTER 6: Water & Sanitation Services Profile
- CHAPTER 7: Water Balance
- CHAPTER 8: Institutional Profile
- CHAPTER 9: Customer Service
- CHAPTER 10: Financial Profile
- CHAPTER 11: Project Rollouts
- CHAPTER 12: Strategic Goals

This section will therefore elaborate on strategic objectives, goals and mitigation interventions in the light of the 2035 KZN PGDS. Associated KPI's for each KPA will be summarised and monitored.

# CHAPTER 1. Demographic Profile

ZDM aims to maintain an accurate up-to-date demographic profile of the entire district. Household counts are spatially updated when new aerial imagery is available from NGI. This allows for spatial analysis on actual water and sanitation access points on the ground and not merely figures per ward. Settlements types, densities and population figures are updated with each household review.

Demographics are also compared against the 2011 Census figures.

**Table 12.4: ZDM and STATSSA Census 2011 household growth analysis (2005 - 2017)**

| | Actual Household Statistics (Captured from aerial photography over 4 consequtive periods) vs CENSUS Data | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Local Municipality** | **2006** | **2009 (AERIALS)** | **2010** | **2011 (CENSUS)** | **2012** | **2013 (AERIALS)** | **2014** | **2015** | **2016 (COMM SURVEY)** | **2016 (AERIALS)** | **Annual household growth rate** | **Average Population per household** | **Total Population (ZDM)** |
| AbaQulusi | 36 069 | 40 302 | | | | 45 918 | | | | 47 119 | 0.9% | 4.90 | 230 883 |
| eDumbe | 15 011 | 16 880 | | | | 16 671 | | | | 17 641 | 1.9% | 5.10 | 89 969 |
| Nongoma | 34 056 | 38 171 | | | | 45 670 | | | | 44 376 | -0.9% | 4.40 | 195 254 |
| Ulundi | 35 309 | 37 365 | | | | 46 450 | | | | 44 987 | -1.1% | 5.70 | 256 426 |
| uPongolo | 22 098 | 25 136 | | | | 28 468 | | | | 29 519 | 1.2% | 5.40 | 159 403 |
| **Total** | **142 543** | **157 854** | | **157 748** | | **183 177** | | | **178 516** | **183 642** | **0.41%** | **5.10** | **931 935** |

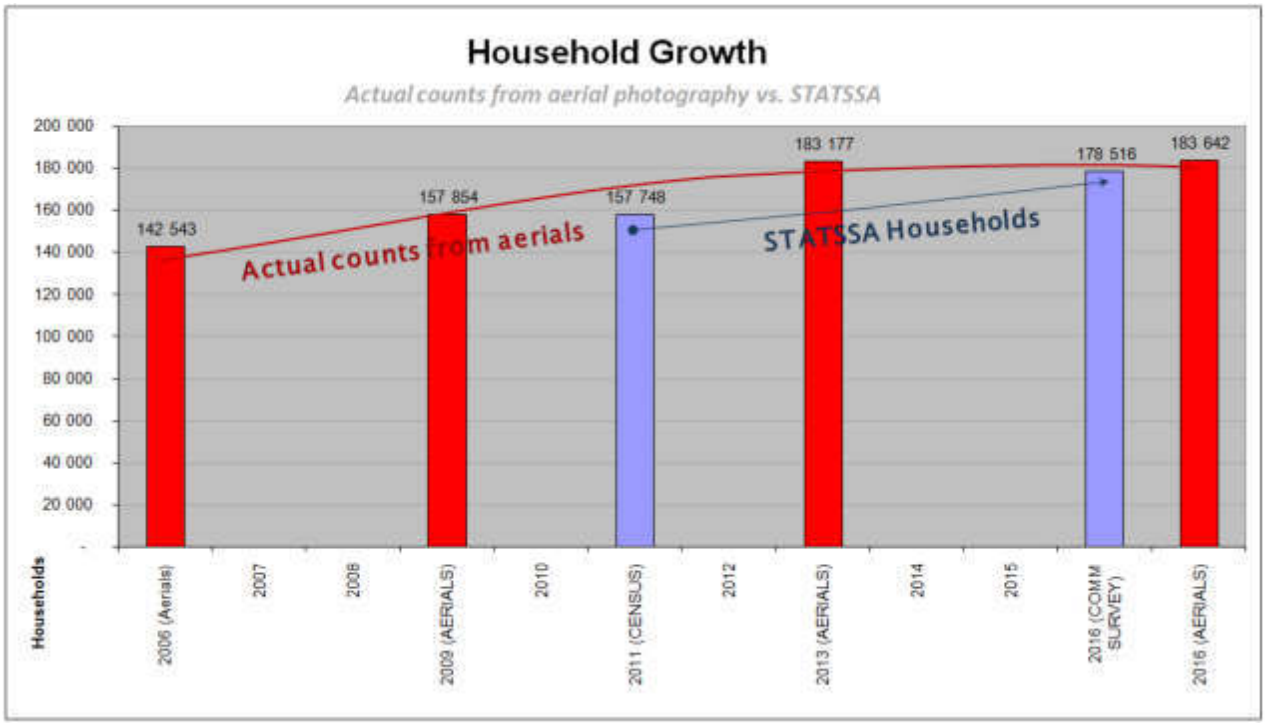



**Figure 12.5: ZDM household growth analysis (2005 - 2017)**

KPI's for this topic include updating and maintaining the household and settlement data set.

## CHAPTER 2. Service Level & Associated Services Profile

ZDM maintain its service level profile throughout the year, ensuring that all service level data is relevant and up-to-date as projects are completed. There is however limited data available on Public Institutions and Industries, and will need to be addressed in future.

Backlogs are systematically and progressively eradicated based on prioritisation models for each type of project. Rollout projects are listed per financial year based on each prioritisation model and available funding for each year.

**Table 12.1: Settlement Types for ZDM**

| Class | Settlement Type | Nr of Settlements | Total households |
|---|---|---|---|
| URBAN | Urban - Formal Town | 4 | 6 425 |
| | Urban - For hip | 5 | 14 675 |
| | Urban - Ex own | 13 | 10 233 |
| | Urban - Working Town | 6 | 1 335 |
| | Urban - Service Centre | 8 | 1 549 |
| | Urban - Squatter Camp | 1 | 115 |
| RURAL | Urban Fringe - Informal Settlement | 19 | 8 906 |
| | Peri-Urban - Squatter Camp | 1 | 284 |
| | Rural - Formal Dense >5000 | 2 | 3 046 |
| | Rural - Formal Dense <5000 | 35 | 10 310 |
| | Rural - Scattered Dense | 5 | 2 612 |
| | Rural - Scattered Medium Density | 5 | 223 |
| | Rural - Scattered Low Density | 59 | 10 732 |
| | Rural - Scattered Very Low Density | 1 106 | 107 422 |
| | Rural - Scattered households | N/A | 5 775 |
| | **TOTAL** | **1 269** | **183 642** |

## CHAPTER 2A. Un-served (Backlogs)

ZDM aims to eradicate all water and sanitation backlogs through various programmes. All settlements have been prioritised per individual programme, and implementation will continue as funding allocations allow it.

**WATER**

At present there are approximately 21 540 households regarded as backlogs for water (no formal water services). The total outstanding planned budget for regional and stand-alone schemes at present is R4 247 313 477, with a MIG funding allocation of R251 033 350 for the previous financial year. This results in ZDM being able to eradicate all existing backlogs with regional and stand-alone schemes by 2034/2035.

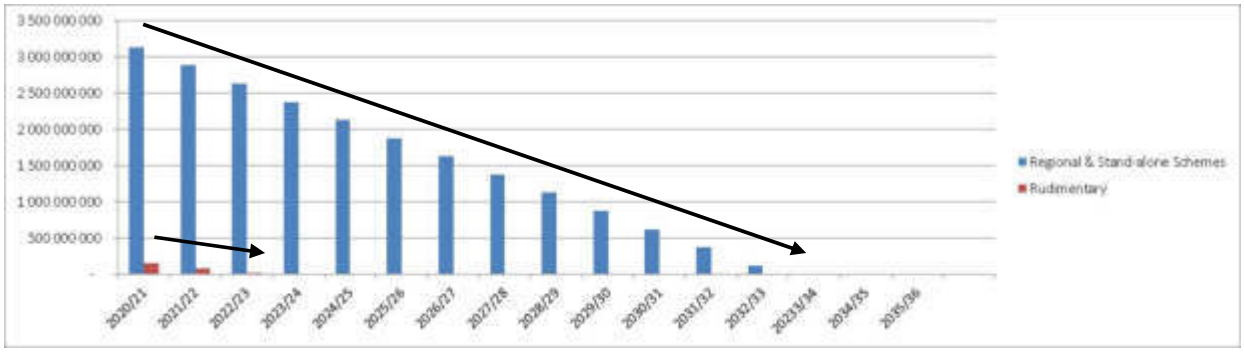



**Figure 12.6: Water Backlog Eradication Goals**

**SANITATION**

Sanitation backlogs in terms of rural RDP standards comprises of a total of 30 586 households. With a total cost of R380 070 000 and an annual budget allocation of R51 312 000, it will take approximately 7 years to eradicate all rural sanitation backlogs. This is well within the reach of the 2035 goals.

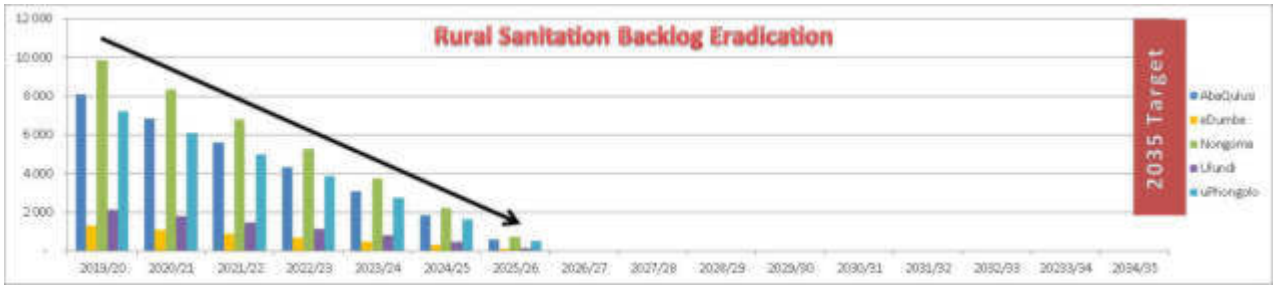



**Figure 12.7: Sanitation Backlog Eradication Goals**

## CHAPTER 2B. Under-served (Below RDP)

ZDM aims to provide all households with RDP level services. However, due to the difficult topology of ZDM and water scarcity in various places, water services in the form of sustainable schemes up to RDP level are not possible. In these cases ZDM aims to provide at least a rudimentary level of service in the form of rudimentary boreholes equipped with 800m communal standpipes, handpumps, or protected springs with standpipes where possible. At present approximately 21 171 households fall in this category, at a cost of R328 378 000. The funding allocation for rudimentary projects at present is R 39 378 000. ZDM aims to provide rudimentary services to these settlements by 2026/2027. Should alternative options such as a new production borehole allow for more sustainable water supply, settlements will be upgraded from rudimentary to RDP level of services.

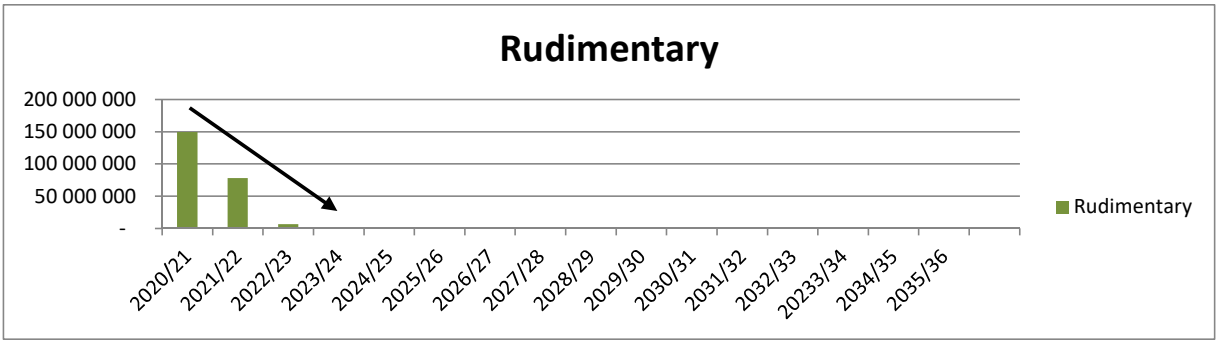



**Figure 12.8: Under-served Water Provision Goals**

KPI's include reaching the planned backlogs indicated on the rollout projects per financial year.

## CHAPTER 3. Water Resource Profile

The ZDM falls within the Mfolozi (W2), Mkuze (W3) and Pongola (W4) secondary catchments of the Usuthu/Mhlathuze Water Management Area (WMA)[1]. The aerial extent of the ZDM occupies approximately 22% of this WMA. . The total available water and requirements as at year 2000, based on a 98% assurance of supply within these sub-areas, is summarised in Table 12.3. It is evident that apart from the Pongola catchments, water from these sub-areas is currently over-utilised and a deficit is created. However, according to Basson and Rossouw[2], this deficit is a result of the provision made for future implementation of the Reserve. The Reserve is a legislated requirement of the amount of water required to satisfy the ecological needs of a river system (provisionally estimated at 20%) as well as the basic human needs (that have been established as 25 litres per person per day).

**Table 12.3: Water balance - summary of the water available and required within Zululand District Municipality for the year 2000 (Million $m^3$ (kℓ) per annum).**

| | | | Mfolozi | Mkuze | Pongola | Total |
|---|---|---|---|---|---|---|
| Available water | Natural resource | surface water | 36 | 15 | 616 | 667 |
| | | groundwater | 5 | 12 | 8 | 25 |
| | Usable return flow | Irrigation | 5 | 6 | 21 | 32 |
| | | Urban | 4 | 0 | 0 | 4 |
| | | Mining & bulk | 1 | 0 | 0 | 1 |
| | Total local yield* | | **51** | **33** | **645** | **729** |
| | Transfers in | | 0 | 30 | 0 | 30 |
| | **Total available** | | **51** | **63** | **645** | **759** |
| Water requirements | Consumer groups | Irrigation | 51 | 61 | 213 | 325 |
| | | Urban** | 12 | 1 | 1 | 14 |
| | | Rural** | 11 | 10 | 6 | 27 |
| | | Mining & bulk industrial*** | 4 | 0 | 1 | 5 |
| | | Afforestation**** | 2 | 6 | 34 | 42 |
| | Total local requirements | | **80** | **78** | **255** | **413** |
| | Transfers out | | 18 | 0 | 30 | **48** |
| | **Total used** | | **98** | **78** | **285** | **461** |
| **Balance** | | | **-47** | **-15** | **360** | **298** |

*[1] The Usuthu/Mhlathuze WMA is one of 19 areas defined across South Africa in terms of the National Water Act, 1998 (Act 36 of 1998). These WMAs have been defined to improve water resource management within South Africa. With time, each of the WMAs will establish a catchment management agency (CMA) for the regulation and control of water use in the WMA.*
*[2] Op cit 2 at 23.*

*Source: Basson and Rossouw (2003).*
**Includes allowance for impacts of the ecological component of the Reserve, river losses, alien vegetation, rain-fed agriculture and urban run-off on yield.*
***Includes allowance for basic human needs component of the Reserve (25 ℓ/c/d).*
****Mining and bulk industrial water uses that are not part of the urban system.*
*****Afforestation quantities refer to the impact on yield only.*

## CHAPTER 4: Operation & Maintenance

Of critical importance is the funding of Operations and Maintenance of existing and future schemes as they are being commissioned. Correct O&M of physical infrastructure is arguably more important than infrastructure construction because unless successful preventative maintenance procedures are instituted schemes will become inoperative. As a large proportion of expenditure relates to staff, competent personnel are required to ensure that the large investments in water services are not negated through dysfunction or dereliction.

This section looks at existing infrastructure which have reached its end of lifespan, and whether refurbishment, O&M or replacement is necessary for sustainable service delivery. This is applicable for water and sanitation components such as WTW's or Pump Stations, but also for scheme networks where infrastructure has deteriorated or reached the end of its lifespan. It furthermore entails O&M for all borehole and spring protection services where O&M plays a significant role.

Other factors influencing proper O&M include Staff capacity, external resources, equipment and budget requirements.

Table 12.4 below shows the operational costs associated with the provision of water services in the district against the total income. At present a significant deficit exists for O&M, and ZDM is addressing these issues through various means.

**Table 12.4: Operational costs and income**

| Operating costs and income | Total 5yr projected | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 |
|---|---|---|---|---|---|---|
| Operational costs | R 2 584 611 744 | R 431 009 527 | R 470 231 394 | R 513 022 451 | R 559 707 494 | R 610 640 876 |
| Personnel costs | R 915 267 755 | R 152 629 935 | R 166 519 259 | R 181 672 512 | R 198 204 710 | R 216 241 339 |
| **Total O&M costs** | **R 3 499 879 499** | **R 583 639 462** | **R 636 750 654** | **R 694 694 963** | **R 757 912 205** | **R 826 882 215** |
| Equitable share: FBS | R 2 328 387 910 | R 388 281 673 | R 423 615 306 | R 462 164 298 | R 504 221 250 | R 550 105 383 |
| Income: sales (actual payment) | R 133 386 724 | R 22 243 553 | R 24 267 717 | R 26 476 079 | R 28 885 402 | R 31 513 974 |
| **Total income** | **R 2 461 774 634** | **R 410 525 227** | **R 447 883 022** | **R 488 640 377** | **R 533 106 652** | **R 581 619 357** |
| **Deficit/surplus** | **R -1 038 104 865** | **R -173 114 236** | **R -188 867 631** | **R -206 054 586** | **R -224 805 553** | **R -245 262 859** |

KPI's include maintaining proper O&M on relevant assets, as well as keeping staff and budget requirements in place.

## CHAPTER 5. Water Conservation & Demand Management

This section looks at water conservation such as waterlosses due to leaks and illegal connections, and preventative measures to reduce waterlosses.

At present ZDM suffers significant waterlosses in some areas due to old leaking infrastructure as well as illegal connections. A waterloss programme was initiated but will need to be expanded to all water schemes.

<table>
<tr><td rowspan="8">System Input Volume</td><td rowspan="3">Authorized Consumption</td><td rowspan="2">Billed Authorized Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption</td><td>Unbilled Metered Consumption</td><td rowspan="6">Non Revenue Water</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="5">Water Losses</td><td rowspan="2">Apparent Losses</td><td>Unauthorized Consumption</td></tr>
<tr><td>Customer Meter Inaccuracies and Data Handling Errors</td></tr>
<tr><td rowspan="3">Real Losses</td><td>Leakage on Transmission and Distribution Mains</td></tr>
<tr><td>Leakage and Overflows at Storage Tanks</td></tr>
<tr><td>Leakage on Service Connections up to point of Customer Meter</td></tr>
</table>

**Figure 12.9: IWA Method of categorizing water use**

KPI's include reducing unaccounted water and water inefficiencies identified by a waterloss programme.

## CHAPTER 6. Water and Sanitation Services Profile

Water and sanitation level of services and classifications as per web-based WSDP requirements are maintained throughout the year as projects are completed.

**Table 12.3: Access to water (households)**

| Water | None or Inadequate | Rudimentary <RDP | Communal standpipes RDP | Yard/House connections >RDP | TOTALS |
|---|---|---|---|---|---|
| AbaQulusi LM | 0 | 0 | 0 | 16 000 | 16 000 |
| eDumbe LM | 0 | 0 | 0 | 5 458 | 5 458 |
| Nongoma LM | 0 | 0 | 0 | 632 | 632 |
| Ulundi LM | 0 | 0 | 0 | 5 912 | 5 912 |
| uPhongolo LM | 0 | 0 | 0 | 4 009 | 4 009 |
| **Total (urban)** | **0** | **0** | **0** | **32 011** | **32 011** |
| AbaQulusi LM | 6 768 | 3 886 | 10401 | 9 749 | 31 119 |
| eDumbe LM | 2 775 | 726 | 1628 | 6 940 | 12 183 |
| Nongoma LM | 6 547 | 10 626 | 10 969 | 15 601 | 43 744 |
| Ulundi LM | 3 143 | 2 256 | 14 333 | 19 208 | 39 075 |
| uPhongolo LM | 1 307 | 1111 | 2570 | 16 478 | 25 510 |
| **Total (rural)** | **20 540** | **18 605** | **39 901** | **67 976** | **151 631** |
| **Total (households)** | **20 540** | **18 605** | **39 901** | **99 987** | **183 642** |

**Table 12.4: Access to sanitation**

| | None or Inadequate (Excl. Infills/Replacemen | VIP RDP | Septic tank RDP | Waterborne >RDP | TOTALS |
|---|---|---|---|---|---|
| AbaQulusi LM | 0 | 0 | 1035 | 14 965 | 16 000 |
| eDumbe LM | 0 | 2981 | 498 | 1 979 | 5 458 |
| Nongoma LM | 0 | 283 | 0 | 349 | 632 |
| Ulundi LM | 0 | 635 | 0 | 5 277 | 5 912 |
| uPhongolo LM | 0 | 698 | 0 | 3 311 | 4 009 |
| **Total (urban)** | **-** | **4 597** | **1 533** | **25 881** | **32 011** |
| AbaQulusi LM | 8 098 | 22 597 | 424 | 0 | 31 119 |
| eDumbe LM | 1 288 | 10 629 | 266 | 0 | 12 183 |
| Nongoma LM | 9 854 | 33 890 | 0 | 0 | 43 744 |
| Ulundi LM | 2 123 | 36 900 | 52 | 0 | 39 075 |
| uPhongolo LM | 7 223 | 17 951 | 336 | 0 | 25 510 |
| **Total (rural)** | **28 586** | **121 967** | **1 078** | **0** | **151 631** |
| **Total (households)** | **28 586** | **126 564** | **2 611** | **25 881** | **183 642** |

KPI's include reaching the planned backlogs indicated on the rollout projects per financial year.

KPI's for this topic include updating and maintaining the household and settlement data set with regards to level of services.

## CHAPTER 7. Water Balance

Water resources looks at availability and sustainability of groundwater, surface water, bulk raw water purchases, rain water harvesting and the sustainability and cost-effectiveness of obtaining water from the various resources.

Water balance for ZDM was done in 2000 but will need a complete update.

**Table 12.8: Water balance - summary of the water available and required within Zululand District Municipality for the year 2000 (Million $m^3$ (kℓ) per annum).**

| | | | Mfolozi | Mkuze | Pongola | Total |
|---|---|---|---|---|---|---|
| Available water | Natural resource | surface water | 36 | 15 | 616 | 667 |
| | | groundwater | 5 | 12 | 8 | 25 |
| | Usable return flow | Irrigation | 5 | 6 | 21 | 32 |
| | | Urban | 4 | 0 | 0 | 4 |
| | | Mining & bulk | 1 | 0 | 0 | 1 |
| | Total local yield* | | **51** | **33** | **645** | **729** |
| | Transfers in | | 0 | 30 | 0 | 30 |
| | **Total available** | | **51** | **63** | **645** | **759** |
| Water requirements | Consumer groups | Irrigation | 51 | 61 | 213 | 325 |
| | | Urban** | 12 | 1 | 1 | 14 |
| | | Rural** | 11 | 10 | 6 | 27 |
| | | Mining & bulk industrial*** | 4 | 0 | 1 | 5 |
| | | Afforestation**** | 2 | 6 | 34 | 42 |
| | Total local requirements | | **80** | **78** | **255** | **413** |
| | Transfers out | | 18 | 0 | 30 | **48** |
| | **Total used** | | **98** | **78** | **285** | **461** |
| **Balance** | | | **-47** | **-15** | **360** | **298** |

KPI's include maintaining updated information on all water resources, and monitoring their sustainability.

## Chapter 8. Institutional Profile

This section looks at the functioning of ZDM itself in terms of personnel efficiency, management capacity, Customer Care and PMU-related responsibilities. It also looks at the WSDP function and its efficiency to assist ZDM in reaching its water and sanitation services goals and targets.

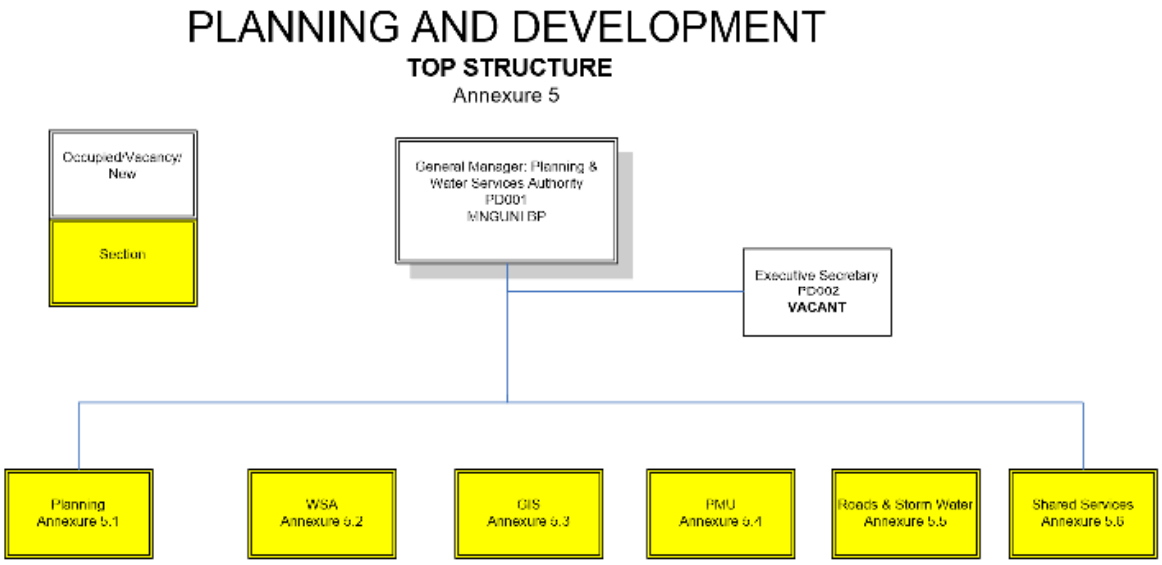



**Figure 12.10: Organogram**

KPI's include reducing bottlenecks in staff shortages and inefficiencies in the WSDP process.

## Chapter 9. Customer Services

ZDM views the provision of a high quality service to customers as one of the highest priorities of the organisation. This can be seen in the fact that most of the KPI's in the organisation's Performance Management System relates to the provision of quality services to customers.

ZDM has developed a system for the capturing and tracking of customer complaints, from the point where the complaint is recorded by the Customer Care centre, referred to specific individuals to deal with and closed out when finally dealt with. The system is called SIZA and records the time from when the complaint was lodged until the issue has been successfully completed. Response time to consumer complaints and the time it takes to deal with issues are therefore measured and can be reported on. Figures 12.11 provide a view of system functionality.


**Figure 12.11: Siza Dashboard**

## CHAPTER 10. Financial Profile

The financial profile looks at the ability of ZDM to spend its funding allocations, the sustainability of income versus expenses, and measures to reduce a possible deficit such as decreasing non-revenue water or obtain additional funding sources. Due to a large percentage indigent people within ZDM receiving free basic water, revenue from these large water schemes is not possible. ZDM however has to pay for raw water provision for

these large water schemes, and relies mostly on external funding such as MIG and RBIG to implement water and sanitation provision.

**Table 12.9: Capital requirements: water**

| WATER | Capital requirements | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 |
|---|---|---|---|---|---|---|---|
| Regional bulk | R 2 204 249 853 | | | R - | R 294 572 595 | R 313 011 521 | R 1 596 665 737 |
| Secondary bulk | R 1 036 030 068 | | | R - | R 33 478 526 | R 35 896 523 | R 966 655 019 |
| Reticulation | R 361 760 667 | | | R - | R 11 452 635 | R 14 758 965 | R 335 549 067 |
| **Total capital (new)** | **R 3 602 040 588** | **R -** | **R -** | **R -** | **R 339 503 756** | **R 363 667 009** | **R 2 898 869 823** |
| Regional bulk (WTW) | R 599 570 000 | | | | | | |
| Secondary bulk | TBA | | | | | | |
| Reticulation | TBA | | | | | | |
| **Total capital (refurbishment)** | **R 599 570 000** | | | **R -** | | | |
| **Total capital** | **R 4 201 610 588** | **R -** | **R -** | **R -** | **R 339 503 756** | **R 363 667 009** | **R 2 898 869 823** |

**Table 12.10: Capital requirements: sanitation**

| SANITATION | Capital requirements | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 |
|---|---|---|---|---|---|---|---|
| Bulk infrastructure | R - | | | | | | |
| Reticulation | R - | | | | | | |
| VIP toilets | R 385 911 000 | | | | 59 721 750 | 59 721 750 | 59 721 750 |
| **Total capital (new)** | **R 385 911 000** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |
| Bulk infrastructure (WWTW) | 322 510 000 | | | | - | - | - |
| Reticulation | TBA | | | | - | - | - |
| VIP toilets (Replacement Prgrm) | 551 988 000 | | | | - | - | - |
| **Total capital (refurbishment)** | **R 874 498 000** | **R -** | | **R -** | **R -** | **R -** | **R -** |
| **Total capital** | **R 1 260 409 000** | **R -** | **R -** | **R -** | **R 59 721 750** | **R 59 721 750** | **R 59 721 750** |

KPI's include tracking expenditure progress against planned expenditure and reducing financial deficits.

## 12.2 KPA's and KPI's

The following section details KPA's and KPI's as per above-mentioned topics.

The web-based WSDP allows for a DM to perform a self-assessment on each topic discussed. Topics are rated in terms of 90% reliable services by 2035 according to the KZN PGDS, and associated KPI's track progress on each topic. Mitigation measures are put in place with each annual review should a KPI not reach its desired progress.

The outcome for the 2019 self-assessment can be reviewed in the next two graphs. KPI's can be reviewed in the next table to track progress on each topic in the above graph. Topic 1 and Topic 3 are reliant on Census data and will be updated with every new Census done (2021 & 2031) after which data becomes progressively outdated.

| TOPIC | Assessment Quality | Assessment Quantity | Future Planning Assessment | Strategy Assessment | 2019 | KPI Targets 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOPIC 1: Demographic Profile** | 93% | 93% | 0% | 0% | **93.0%** | 92.0% | 100.0% | 99.0% | 98.0% | 97.0% | 96.0% | 95.0% | 94.0% | 93.0% | 92.0% | 91.0% | 100.0% | 99.0% | 98.0% | 97.0% | 96.0% |
| **TOPIC 2: Service Level Profiles** | 77% | 77% | 77% | 71% | **75.5%** | 80.0% | 85.0% | 90.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% |
| **TOPIC 3: Socio-Economic Background** | 59% | 59% | 0% | 0% | **59.0%** | 58.0% | 100.0% | 99.0% | 98.0% | 97.0% | 96.0% | 95.0% | 94.0% | 93.0% | 92.0% | 91.0% | 100.0% | 99.0% | 98.0% | 97.0% | 96.0% |
| **TOPIC 4: Water & Sanitation Services Profile** | 51% | 51% | 53% | 55% | **52.5%** | 60.0% | 65.0% | 70.0% | 75.0% | 80.0% | 85.0% | 90.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% |
| **TOPIC 5: Operation & Maintenance** | 59% | 59% | 61% | 61% | **60.0%** | 62.5% | 65.0% | 67.5% | 70.0% | 72.5% | 75.0% | 77.5% | 80.0% | 82.5% | 85.0% | 87.5% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% |
| **TOPIC 6: Associated Services** | 90% | 90% | 80% | 80% | **85.0%** | 86.0% | 87.0% | 88.0% | 89.0% | 90.0% | 91.0% | 92.0% | 93.0% | 94.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% |
| **TOPIC 7: Conservation & Demand Management** | 43% | 43% | 45% | 45% | **44.0%** | 50.0% | 55.0% | 60.0% | 65.0% | 70.0% | 75.0% | 80.0% | 85.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% |
| **TOPIC 8: Water Resources** | 44% | 44% | 40% | 40% | **42.0%** | 45.0% | 50.0% | 55.0% | 60.0% | 65.0% | 70.0% | 75.0% | 80.0% | 85.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% |
| **TOPIC 9: Financial Profile** | 74% | 74% | 65% | 66% | **69.8%** | 72.5% | 75.0% | 77.5% | 80.0% | 82.5% | 85.0% | 87.5% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% |
| **TOPIC 10: Institutional Profile** | 90% | 90% | 52% | 52% | **71.0%** | 75.0% | 80.0% | 85.0% | 90.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% | 95.0% |
| **TOPIC 11: Customer Services** | 90% | 90% | 90% | 90% | **90.0%** | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% | 90.0% |

**Figure 11.12: Self-assessment improvement scores for 2019**

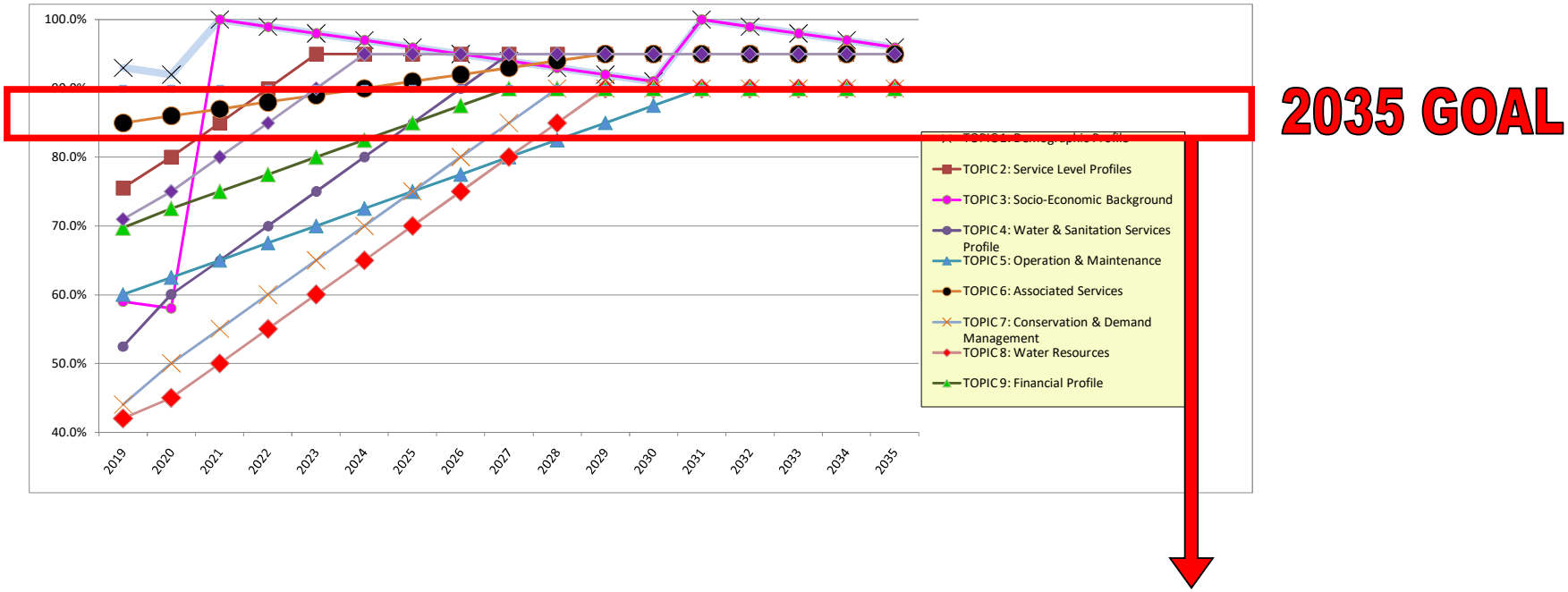



**Figure 11.12: Self-assessment improvement goals for 2035**

**Table 12.2: Performance Management KPI's for the provision of water and sanitation services**

Annual Target Score Indicator:

1. Meet KPI Objective (75-100%)
2. Not Fully Effective (50-75%)
3. Poor (25-50%)
4. Unacceptable (0-25%)

| Program driver | KPI for 2019 | Quarter 1 | | Quarter 2 | | Quarter 3 | | Quarter 4 | | Annual Target Score | Evidence reference | Comments & mitigations for non-performance (Scoring below 1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Target | Actual | Target | Actual | Target | Actual | Target | Actual | 1-5 Rating | | |
| **TOPIC 1: Demographic Profile** | Demographic data sets updated with Census reviews. | 2021/2031 Census Review | | N/A | N/A | N/A | N/A | N/A | N/A | | Updated Settlement dataset on GIS | |
| | Household & settlement spatial data sets updated with new aerial imagery | Expected 2020 | | N/A | N/A | N/A | N/A | N/A | N/A | | Updated Settlement & household datasets on GIS | |
| **TOPIC 2: Service Level Profile** | Maintain updated settlement data set on GIS with regards to water and sanitation services | Submission of data set with draft WSDP | | N/A | N/A | Submission of data set after final WSDP | | N/A | N/A | | Settlement data set submitted to GIS office | |
| **TOPIC 3: Socio-economic Profile** | WSDP updated with Census stats. | 2021/2031 Census Review | | N/A | N/A | N/A | N/A | N/A | N/A | | Updated Settlement dataset on GIS | |
| | Update STATSSA spatial data sets on GIS | Expected 2020 | | Expected 2020 | | Expected 2020 | | Expected 2020 | | | Updated STATSSA related spatial data sets on GIS | |

| Program driver | KPI for 2019 | Quarter 1 | | Quarter 2 | | Quarter 3 | | Quarter 4 | | Annual Target Score | Evidence reference | Comments & mitigations for non-performance (Scoring below 1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Target | Actual | Target | Actual | Target | Actual | Target | Actual | 1-5 Rating | | |
| **TOPIC 4: Water & Sanitation Services Profile** | Number of households served with rudimentary water supply<br>a. Number of households | TBA | | TBA | | TBA | | TBA | | | Completion reports | |
| | b. % of total households in DM | TBA | | TBA | | TBA | | TBA | | | | |
| | c. Number of total households in DM | TBA | | TBA | | TBA | | TBA | | | | |
| | Number of households served with RDP water level of services<br>a. Number of households | TBA | | TBA | | TBA | | TBA | | | Completion reports | |
| | b. % of total households in DM | TBA | | TBA | | TBA | | TBA | | | | |
| | c. Number of total households in DM | TBA | | TBA | | TBA | | TBA | | | | |
| | Number of households served with RDP sanitation level of services<br>a. Number of households | TBA | | TBA | | TBA | | TBA | | | Completion reports | |
| | b. % of total households in DM | TBA | | TBA | | TBA | | TBA | | | | |
| | c. Number of total households in DM | TBA | | TBA | | TBA | | TBA | | | | |
| **TOPIC 5: Operation & Maintenance** | Number of water quality tests | | | | | | | | | | Lab results | |
| | % planned O&M completed | 25% | | 50% | | 75% | | 100% | | | O&M progress report | |
| **TOPIC 6: Associated Services** | Reliable water access to educational & health facilities<br>a. % issues resolved | 0.25% | | 0.25% | | 0.25% | | 0.25% | | | Completion reports | |
| | b. % of total DM issues resolved | 85.25% | | 85.5% | | 85.75% | | 86% | | | | |
| **TOPIC 7: Conservation & Demand Management** | Resolve 5% of the total Conservation & Demand issues<br>a. % issues resolved | 1% | | 1% | | 1% | | 2% | | | Water Demand Management Report Progress | |
| | b. % of total DM issues resolved | 45% | | 46% | | 47% | | 49% | | | | |
| **TOPIC 8: Water Resources** | Resolve 3% of the total Water Resources issues<br>a. % issues resolved | N/A | N/A | 1% | | 1% | | 1% | | | Water Demand Management Report Progress | |
| | b. % of total DM issues resolved | N/A | N/A | 1% | | 1% | | 1% | | | | |
| | Water quality monitoring: Nr. of monthly reports submitted? | 3 | | 3 | | 3 | | 3 | | | | |
| | Water quality % within acceptable standards | 90% | | 90% | | 90% | | 90% | | | | |

| Program driver | KPI for 2019 | Quarter 1 | | Quarter 2 | | Quarter 3 | | Quarter 4 | | Annual Target Score | Evidence reference | Comments & mitigations for non-performance (Scoring below 1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Target | Actual | Target | Actual | Target | Actual | Target | Actual | 1-5 Rating | | |
| **TOPIC 9: Financial Profile** | Improved revenue to reduce financial deficit | TBA | | TBA | | TBA | | TBA | | | Quarterly Financial Statements | |
| | Spend planned funding to reach full expenditure at financial year end. | 25% | | 50% | | 75% | | 100% | | | PMU Progress Report | |
| **TOPIC 10: Institutional Profile** | Fill vacant posts | TBA | | TBA | | TBA | | TBA | | | Approved organogram | |
| | Create and fill additional recommended posts | TBA | | TBA | | TBA | | TBA | | | Approved organogram | |
| | Training & skills development for existing personnel | TBA | | TBA | | TBA | | TBA | | | Training schedule | |
| | Quarterly WSDP meetings | 1 meeting | | 1 meeting | | 1 meeting | | 1 meeting | | | Minutes & Attendance Registers | |
| | Submit WSDP review in time | Draft Review in March | | Final Review in June | | N/A | N/A | N/A | N/A | | WSDP document | |
| | Updated GIS data sets submitted with WSDP reviews | Submission of data sets with draft WSDP | | N/A | N/A | Submission of data sets after final WSDP | N/A | N/A | N/A | | ArcReader project file with all updated GIS data sets submitted to GIS office. | |
| **TOPIC 11: Customer Services** | % responses to SIZA customer complaint within 24H | | | | | | | | | | SIZA report | |
| | Notify community of planned or anticipated water supply interruptions 48H ahead of time | 100% | | 100% | | 100% | | 100% | | | Memo's / notifications | |