Assessing the Impact of Expansion of Bulk Infrastructure on the Capital Requirements of Water Boards

Report to the
Water Research Commission

prepared by

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Executive Summary

Water Boards were established under the Water Services Act of 1997 to provide bulk water to other water services institutions and to serve as water services providers when contracted by municipalities. A number of recent initiatives have been aimed at expanding the operations of Water Boards. Expanding the areas of activity of Water Boards will have an impact on their financial viability, most notably on capital expenditure requirements. As a result, the WRC has appointed PDG to conduct research on the impact of expansion of bulk infrastructure on the capital requirements of Water Boards.

The project involved two main streams of work. The first stream focussed on modelling the impact of expanding areas of activity on the financial viability of Water Boards; the second on identifying indicators for assessing the ability of Water Boards to access capital finance, particularly under expansion.

Modelling and case study applications

A key deliverable for this study was the development of a model able to assess the impact of expanding areas of activity on the financial viability of Water Boards. The model was then to be applied to several case studies, in order to determine its usefulness and applicability and make recommendations for possible improvements and extensions to the model in future.

An Excel based modelling tool, called the Regional Water Boards Model (RWBM) was developed, making use in some instances of the logic of a previous WRC model called the Regional Water Supply Services Model (RWSSM).

The application of the RWBM for DWA's IRR process

The Department of Water Affairs (DWA) initiated a process of Institutional Reform and Realignment (IRR) in 2007 in to ensure that the water sector effectively contributes to government's national development and transformation priorities through the development of effective, accountable and sustainable institutions. A new phase of the IRR process was initiated in 2011. Included in this phase was a review of the role of Water Boards.

This IRR review was taking place in parallel to this WRC study, described in this report. It became apparent that the modelling work conducted under this WRC study could provide insights into the impact of IRR proposals regarding realigning the footprints and functions of Water Boards on the financial sustainability of those Water Boards. The case studies presented in this report were thus applied as part of the analysis for the IRR process. In most respects, the expansion scenario considered in the case studies was defined by the IRR process.

Case study methodology

Eight case studies were conducted, aligned with possible regional Water Boards identified under the DWA IRR process. Each Regional Water Board is centred on an existing Water Board and with the incorporation of three smaller Water Boards into these regional entities.

Case study statistics related to size and expansion[1]

Water board name (existing core water board and 'place holder' name for new entity)	Bulk water sold (million m^3 pa)		Assets (R million)		Opex (Rmillion pa)		Capex (Rbillion)
	2011	2012	2011	2012	2011	2012	10 yrs
Rand (East Central)	1 344	1 897	70 810	88 984	5 627	8 978	28.3
Umgeni (Eastern)	423	586	13 344	24 361	1 140	1 952	8.0
Mhlatuze (North Eastern)	41	87	2 745	5 909	231	615	2.4
Sedibeng (Western)	86	130	8 100	10 641	455	621	3.0
Lepelle Northern (Northern)	70	255	1 904	51 098	302	1 771	11.5
Amatola (Southern)	28	124	778	5 746	260	988	2.5
Bloem (Central)	87	133	4 700	7 917	271	514	3.1
Magalies (North Western)	114	152	3 000	8 742	460	712	2.4

The case studies were conducted in a relatively 'hands off' manner. The data collection process was initiated at meetings with the Water Boards, with further communications regarding data conducted telephonically or via email. In some cases, very good data was provided by the Water Boards, with the data templates required for the model filled in, in other cases the Water Boards provided less data. Given the tight timeframes required by the DWA IRR project, it was not possible to engage with the Water Boards in any detail regarding the interpretation of the data that they provided.

The case study results should thus be treated with great caution and provide a rough and indicative first cut of results only. They should not be used as absolute indications of the likely performance of the Water Boards under an expansion scenario. For the purposes of this WRC study, which was to test the prototype RWBM and make recommendations for possible improvements and extensions, the data was considered adequate.

Expansion scenario considered

The expansion scenario considered in the modelling was defined largely by the IRR process. One of the option processes is considering a move towards Regional Water Boards, with a Regional Water Board being responsible for all regional infrastructure including regional water resource and water services infrastructure (potable and non-potable systems). This scenario has two key implications in terms of scenarios. The first key implication is an extension of the boundaries of the Water Boards. The second is the inclusion of the management of water resources as a Water Board function.

Summary of model results

The expansion scenario considered results in a significant increase in the **value of assets** managed by Water Boards, with Lepelle Northern and Amatola experiencing the most significant impact (approximately a 250% and a 50% increase in value of assets respectively).

There is a significant need for new **capital expenditure**, dominantly for bulk water schemes. Expenditure on water resources infrastructure is relatively small for all but Lepelle Northern Water where the scale of transfer of this infrastructure is projected to be relatively large. The expenditure in the case of water resources is largely related to rehabilitation of infrastructure.

[1] The figures in the table are based on the proposed level of expansion of Water Boards, as explained in later sections of this report, and include the incorporation of three smaller Water Boards into regional entities. The assets are based on expansion of bulk infrastructure and the transfer of water resources infrastructure to the Water Boards from DWA.

Summary of key model results per Water Board

	Demand (million m^3 p.a.)			Value of assets (R million)			Capital expenditure required	Capital funding gap as % of capital expenditure required	Real tariff increase required p.a. to maintain balanced operating account
	2011	**2021**	**% increase**	**2011**	**2021**	**% increase**	**2011 to 2021**	**2011 to 2021**	**2011 to 2021**
Bloem	91	138	52%	4 700	7 917	68%	3 113	61%	0.4%
Umgeni	437	601	44%	11 671	24 361	88%	8 050	0%	2.0%
Rand	1 476	2 046	39%	70 000	88 984	26%	28 288	12%	1.3%
Mhlathuze	74	131	77%	2 000	5 9090	134%	2 442	19%	4.5%
Magalies	119	158	33%	3 000	8 724	191%	2 392	0%	5.0%
Lepelle Northern	136	325	139%	1 844	47 911	2498%	10 920	42%	6.5%
Amatola	38	140	265%	778	5 746	499%	2 503	28%	1.2%
Sedibeng	88	135	53%	8 100	10 641	31%	2 952	45%	0.0%

Regarding **capital finance**, the modelling suggests that all Water Boards aside from Umgeni and Magalies water will face a capital financing gap. In terms of absolute size of funding gap, Lepelle North, Rand and Bloem face the largest gaps. However, Rand's gap is small as a percentage of total funding required. When percentage split is assessed, Bloem, Sedibeng and Lepelle North face the biggest challenges, with Amatola close behind.

On the **operating account**, significant tariff increases will be required to ensure that financial statements remain balanced over time. Whether or not tariff increases of this magnitude will be possible, both in terms of approval from DWA and in terms of affordability of the resultant tariff to consumers, was not considered in the modelling, but is a key area of concern.

Capital financing indicators for Water Boards

Assessing the ability of an entity such as a Water Board to borrow is a complex process, part art and part science.

Methodologies and tools for assessing ability to borrow

The **maximum borrowing capacity** of a Water Board can be estimated as the present value of the future Free Cash Flow. A projection of Free Cash Flow will need to include some assumptions about the likely performance of the Water Board in future. Ratios such as Debt Service Coverage Ratio should also be considered when assessing borrowing capacity, as financial institutions are likely to cap exposure based on the level of these indicators.

An assessment of **credit worthiness** is a more sophisticated process that examines the financial, economic, political and organisational risks faced by the Water Board. It results in a credit rating for the Water Board.

There are some **existing tools** that could potentially be adapted to assess Water Boards, namely the Water Utility Vulnerability Index (WUVI) developed by the Water Operators Partnership, and Water Credit Assessment tool (WaterCAT) developed for the Kenyan Water Services Regulatory Board and the WSP.

Rough assessment of the ability of the eight case study Water Boards to borrow

While a comprehensive assessment of capacity to borrow really requires a full shadow credit rating exercise, a fairly standard set of indicators can be used to obtain a first assessment. This set should include **financial indicators** with operating cost coverage, current ratio, operating surplus, debt coverage ratio and debtors days proposed. The financial indicators should be complemented by some **organisational indicators**, with vacancies, dismissals or suspensions in key management posts; length of time in key management posts; levels of absenteeism and audit opinions proposed. Together, these financial and organisational indicators provide a good first assessment of ability to borrow.

Data to calculate the organisational indicators was not available for the analysis here. Performance on the five financial indicators was used to develop a **composite score of financial performance** for the eight Water Boards included as case studies for this project. This score suggests that Rand, Umgeni and Mhlathuze would have relatively strong ability to borrow; Bloem and Sedibeng would have moderate ability; and Lepelle North, Amatola and Magalies would have little or no ability to borrow.

Performance of underlying municipal areas as a determinant of ability to borrow

Assessing the economic risks faced by a Water Board is a key element of a credit rating exercise. By their nature, Water Boards have narrow customer bases: they are each dependent on a handful of municipal customers for revenue. This means that they are very strongly exposed to risk related to municipal performance. For example, a municipality that struggles to collect revenue for the retail water

services that it provides is probably more likely to default on payment to the Water Board than one that has strong revenue collection systems in place.

A composite indicator assessing the performance of a group of municipalities underlying an individual Water Board was developed under this project, based on the recently completed DCOG Differentiation Barometer. A comparison of a composite financial performance scores for Water Boards with the composite performance in the underlying municipal areas shows a very strong correlation.

This provides strong support for the hypothesis that strongly performing Water Boards are those who serve strongly performing municipalities, and that an assessment of the ability of a Water Board to borrow requires an assessment of the vulnerability of the municipal areas underlying that Water Board.

The implication for expansion is that the performance and structure of the municipal areas into which Water Boards are being asked to expand should be assessed as an indicator of the likely impact of expansion on the financial viability of Water Boards.

Conclusions

The RWBM has been shown to be a useful tool but needs to be considered only as a prototype. More work is needed to use it more interactively with Water Boards, improve the model, refine the options to be investigated and improve the data.

The results of the case studies conducted should be treated with significant caution, due to limitations in the datasets used. However, they do highlight the fact that the expansions to Water Boards footprints and activities proposed under the IRR process pose considerable challenges. Expansion will require the Water Boards taking on significant new assets and incurring considerable capital expenditure over the next 20 years. This will place strain on operating accounts, and on the ability to raise capital.

While a comprehensive assessment of capacity to borrow really requires a full shadow credit rating exercise, a fairly standard set of indicators can be used to obtain a first assessment. Using the financial indicators for the eight Water Boards included as case studies for this project suggests that Rand, Umgeni and Mhlathuze would have relatively strong ability to borrow; Bloem and Sedibeng would have moderate ability; and Lepelle North, Amatola and Magalies would have little or no ability to borrow.

When considering the implications of expansion, an assessment of the performance and structure of the municipal areas into which the Water Boards are being asked to expand is vital.

Key issues to be addressed, should **horizontal expansion** be considered, relate to the implications for cross-subsidisation. In most cases, horizontal expansion implies expansion from urban areas into rural areas. The viability of many rural schemes is poor. The impact of this expansion on tariffs in the current Water Board footprint, and the limits to cross-subsidisation, must be carefully assessed. This requires a sound assessment of the affordability limits in both the existing and expanded Water Board footprints. The issue of access to grant funding by Water Boards is important in this regard.

The key issues to be addressed should **vertical expansion** be considered are two-fold.

Firstly, water resources assets should be transferred in a carefully managed manner. It is assumed that these resources will be transferred free of charge (in other words, that Water Boards do not have to purchase the assets from DWA). However, water resource schemes have differing viability, with most potable schemes having fairly strong viability but many non-potable schemes having

questionable viability. Asset transfer should be staggered, with the more viable potable water schemes transferred first.

Secondly, even should assets be transferred free of charge, transfer carries implications for capital expenditure on rehabilitation. A funding mechanism for rehabilitating these assets, particularly those in poor condition, should be established in order to prevent over-burdening the Water Boards.

Accessing the RWBM

The RWBM model is available freely for download at www.wrc.org.za/software/rwbm

Contents

1 Introduction

Water Boards were established under the Water Services Act of 1997 to provide bulk water to other water services institutions and to serve as water services providers when contracted by municipalities. A number of recent initiatives have been aimed at expanding the operations of Water Boards.

- The Department of Water Affairs (DWA) Institutional Realignment Project of 2008 raised the possibility of Regional Water Utilities with Provincial boundaries. DWA's Institutional Reform and Realignment (IRR) Project of 2011/12 has taken this idea further.
- The Department of Cooperative Governance and Traditional Affairs (COGTA) Municipal Infrastructure Support Agency (MISA) envisions Water Boards playing a key role in improving service provision in areas where municipalities have limited capacity.

Expanding the areas of activity of Water Boards will have an impact on their financial viability, most notably on capital expenditure requirements. As a result, the WRC has appointed PDG to conduct research on the impact of expansion of bulk infrastructure on the capital requirements of Water Boards.

Project code K5/2086/3 has involved a number of activities, including:

- A financial scan of Water Boards, based on information currently held by DWA and National Treasury;
- The development of a model to assess the impact of expansion on the financial viability of Water Boards;
- The testing of that model through its application to a number of case studies;
- A preliminary look at indicators that can be used to assess the ability of Water Boards to raise capital finance; and
- A workshop to disseminate and debate the project findings.

This report is the final report for the project. As such, it synthesises the results of these various streams of work. The structure of the report is as follows.

Section 2 provides some context on Water Boards in South Africa.

Section 3 provides an overview of the model used, the Regional Water Boards Model (RWBM) and highlights of the case studies conducted. Further detail on the case studies is available in the Appendices to the report. Comments on the model from the workshop are also included here.

Section 4 provides a discussion of capital financing indicators. Again, relevant comments from the workshop are included here.

Section 5 provides overall conclusions and suggestions regarding way forward.

Note that the attendance register and a summary of the programme of the workshop held for this project is included in Appendix A to this report.

2 Water Boards context

Water Boards originated with establishment of Rand Water in the early 1900s. Reasons for establishment vary from pragmatic need to serve large urban centres, mines and industries to more social and political objectives, as indicated in the table below.

Table 1: Reasons for establishment of Water Boards

Reason for establishment	Name of Water Board
To be a bulk water provider for a regional scale system	Rand, Lepelle Northern, Bloem and Overberg
To be a water provider to key industries and mines	Mhlatuze, Sedibeng, Magalies and Pelladrift
Conversion from former homeland government water utility	Botshelo, Amatola and Umgeni[2]
To serve poorly served areas	Bushbuckridge

There has been considerable activity with regard to Water Boards over past 15 years, with the establishment of some new Boards (Ekangala, Bushbuckridge) and the dis-establishment of some (Ekangala, Albany Coast, Namakwa).

There are currently[3] twelve Water Boards with a very large range in size.

[2] With Umgeni being an interesting case of political motivation: Durban Municipality previously ran its own bulk supply but with the promotion of the KwaZulu homeland the SA government of the time decided to form Umgeni Water Board to avoid a situation where a South African local government entity (Durban) sold water to an independent 'government' (the KwaZulu homeland).

[3] As of September 2011, when this project commenced.

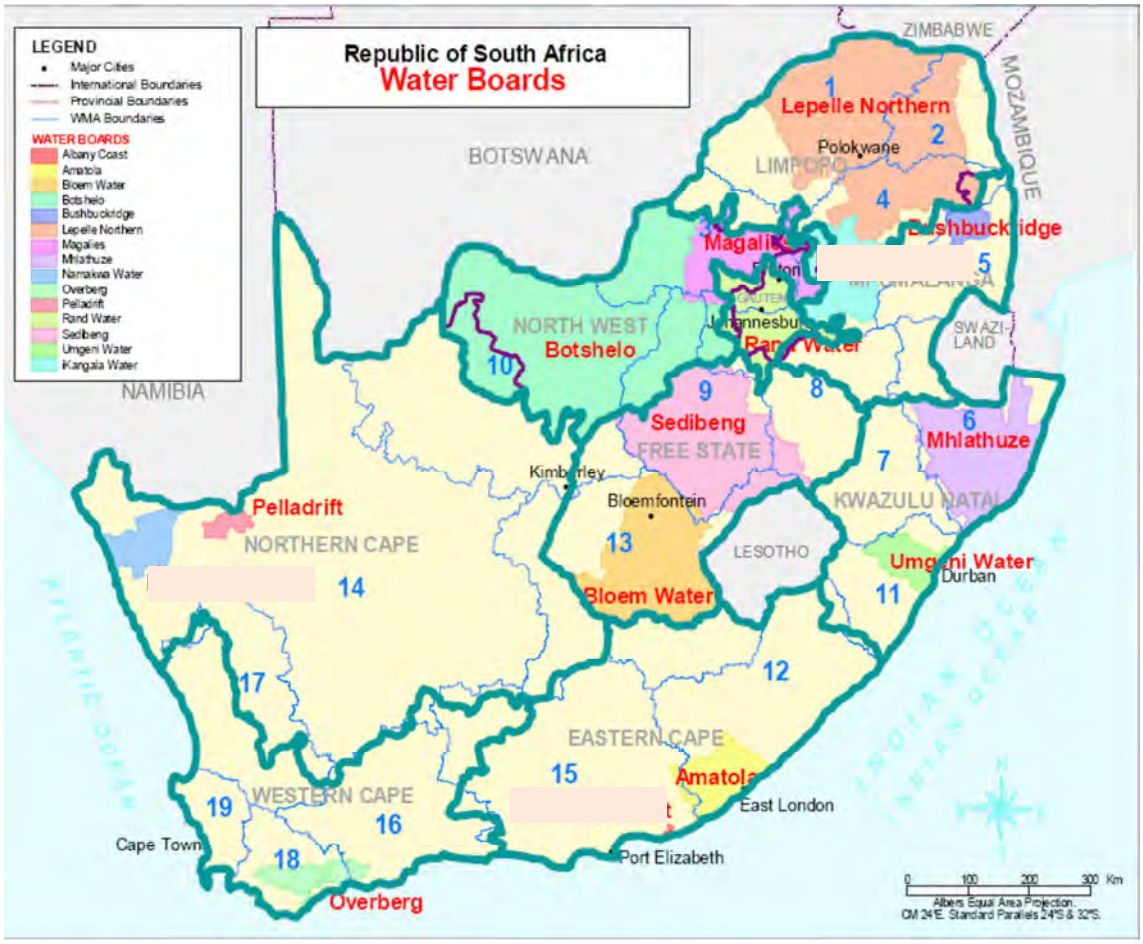

Figure 1: Geographic location of the 12 Water Boards

2.1 Size

There is a very large range in size between the Water Boards.

Table 2: Water Board statistics relating to size

Year 2010 data	Water sold (million cu m/yr)	Staff No.	Revenue (R m)	Capex (R m)	Average tariff (R/cu m)	% split based on revenue	% split based on capital
Rand	1,358	2,985	4,975	905	3.25	61%	59%
Umgeni	426	793	1,418	334	3.24	17%	22%
Sedibeng	78	443	403	14	5.53	5%	1%
Lepelle	91	294	250	21	2.60	3%	1%
Amatola	39	349	240	41	6.54	3%	3%
Bloem	87	237	226	15	3.59	3%	1%
Mhlathuze	92	181	215	178	1.90	3%	12%
Magalies	76	423	187	27	2.52	2%	2%
Botshelo	16	254	103	0.3	1.73	1%	0%
Bushbuckridge	26	241	79	0.4	3.07	1%	0%
Overberg	6	72	22	6.5	3.54	0%	0%
Pelladrift	4	10	13	0.8	2.98	0%	0%
Total	2,300	6,282	8,131	1,544		100%	100%

Source: DWA statistics

Rand and Umgeni are completely dominant in terms of size, together responsible for 78% of all water sold by WBs.

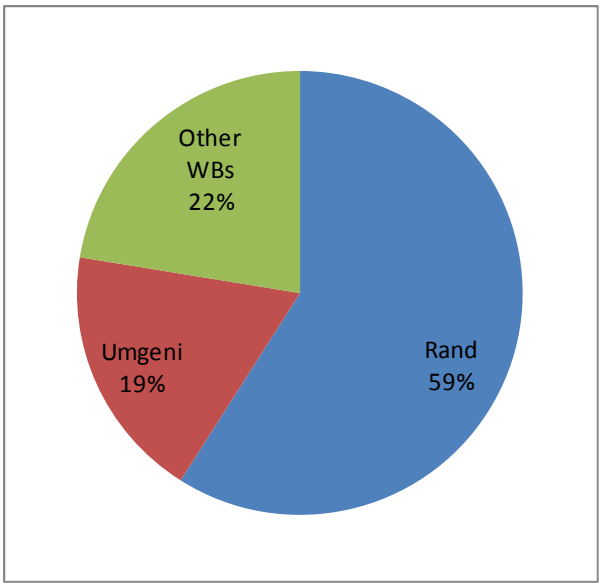

Figure 2: Share of total water sales by Rand, Umgeni and other Water Boards

Thereafter, the WBs can roughly be divided into two groups based on size:

- Sedibeng, Lepelle North, Amatola, Bloem, Mhlatuze and Magalies are all of moderate size.
- Botshelo, Bushbuckridge, Overberg and Pelladrift are small.

2.2 Economic activity in footprint

The WBs cover areas with varying levels of economic activity. The total estimated GVA in the footprints covered by the WBs is shown in the figure below (2007 estimates of GVA).

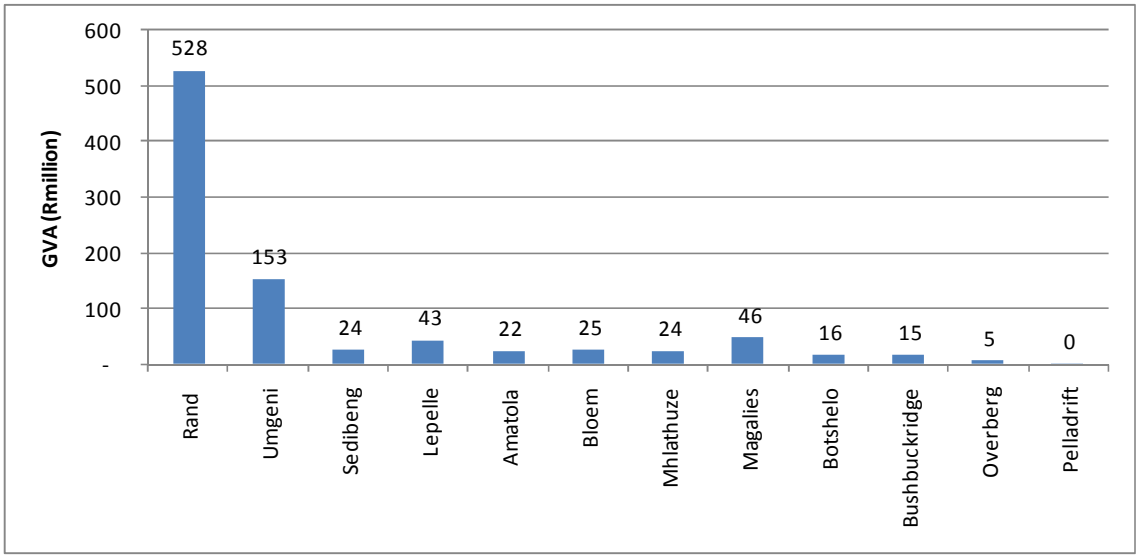

Figure 3: Estimated GVA (2007) in WB footprints

The economy of the area covered by Rand Water is completely dominant, with Umgeni also covering an area with significant economic activity.

Of course, the populations in the WB footprints also differ. GVA per capita gives an indication of the wealth of the footprint area covered by the WBs.

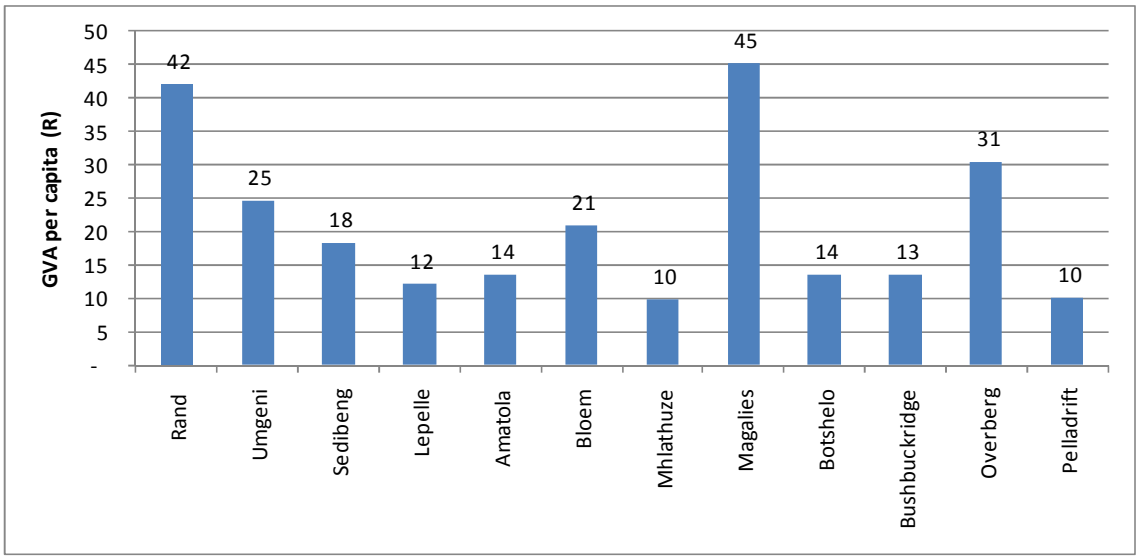

Figure 4: Estimated GVA per capita (2007) in WB footprints

Rand, Umgeni, Sedibeng, Bloem, Magalies and Overberg serve footprints with relatively high levels of economic activity as measured by GVA per capita.

2.3 Spatial form of footprint

Spatial form (i.e. urban/rural mix) can be quite a strong indicator of economic viability, particularly with regards to water services providers. Urban households are typically easier to provide with services, and it is easier to collect revenue from urban settlements.

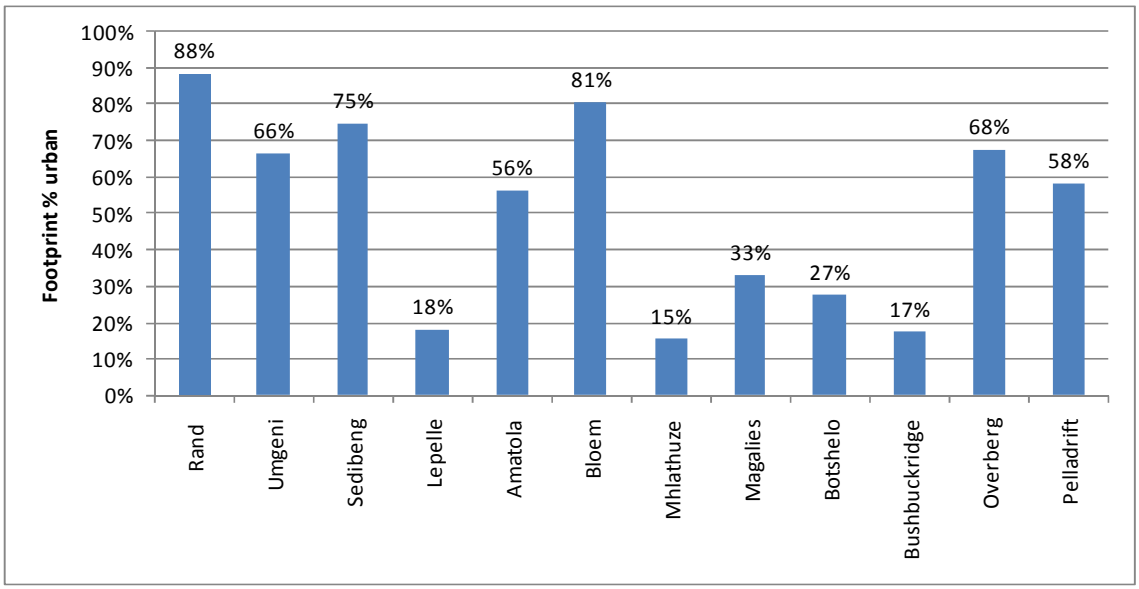

Figure 5: Urban share of households in WB footprints

Rand, Bloem, Sedibeng, Overberg and Umgeni serve areas that are largely urban (note that this is the urban share of the footprint area of the WB, not necessarily the population served by the WB). Pelladrift, Amatola, Magalies and Botshelo serve areas with significant urban populations. Lepelle North, Bushbuckridge and Mhlatuze serve areas with little urban presence.

3 Modelling and case study applications

A key deliverable for this study K5/2086/3 was the development of a model able to assess the impact of expanding areas of activity on the financial viability of Water Boards. The model was then to be applied to several case studies, in order to test it, determine its usefulness and applicability and make recommendations for possible improvements and extensions to the model in future.

This section provides an overview of the model developed (the Regional Water Boards Model, or RWBM) and a summary of the case study results.

3.1 Background on the RWBM and its application in the DWA IRR process of 2011/12

PDG had developed a model for Water Boards for previous work for the WRC, in 1999 (WRC project code K5/869). That model was called the Regional Water Supply Services Model, abbreviated as RWSSM. The RWSSM was aimed at assisting Regional Water Services Providers (such as Water Boards) to take on necessary investment planning and tariff analysis inherent in their business planning. Two case studies were conducted using the model (Bloem Water and Lepelle Northern

Water). The case studies were conducted in a fairly hands off manner, with little engagement with the Water Boards.

The Regional Water Boards Model (RWBM)

The original intention for the modelling component of this new Water Boards project was to adapt and update the RWSSM. However, the focus of this work is on the impacts of expansion on Water Board finances. This was not well handled in the RWSSM, which projected forward a 'business as usual' scenario[4]. As a result, an entirely new model was developed, making use of some of the logic of the RWSSM where this remained applicable. This new model has been called the Regional Water Boards Model (RWBM).

The application of the RWBM for DWA's IRR process

The Department of Water Affairs (DWA) initiated a process of Institutional Reform and Realignment (IRR) in 2007 in to ensure that the water sector effectively contributes to government's national development and transformation priorities through the development of effective, accountable and sustainable institutions. A new phase of the IRR process was initiated in 2011. Included in this phase was a review of the role of Water Boards.

This IRR review was taking place in parallel to the development of the RWBM for the WRC under this project. It became apparent that the RWBM could provide insights into the impact of IRR proposals regarding realigning the footprints and functions of Water Boards on the financial sustainability of those Water Boards.

The case studies presented in this report were thus applied as part of the analysis for the IRR process. In most respects, the expansion scenario considered in the case studies was defined by the IRR process.

3.2 Overview of the Regional Water Boards Model

The model was developed as a macro planning tool aimed at investigating long term viability of Water Boards is a situation where they will expand to supply new areas (new demand zones) and taken on new responsibilities, specifically water resources infrastructure provision. The model also provides for Water Boards to undertake sanitation activity, with a limited amount of expansion in this area provided for, and 'retail' water supply activity. In the latter case this will represent a major change for Water Boards but, while the model provides for this, it has received minimal attention in the case studies.

3.2.1 Model structure

The structure of the model, with the key factors influencing the future projections, is shown in the diagram below:

[4] The RWSSM considered growth in the demand for water due to household growth and to service provision or upgrading, but did not consider expansions to the area of supply or mix of activities undertaken by Regional Water Services Providers.

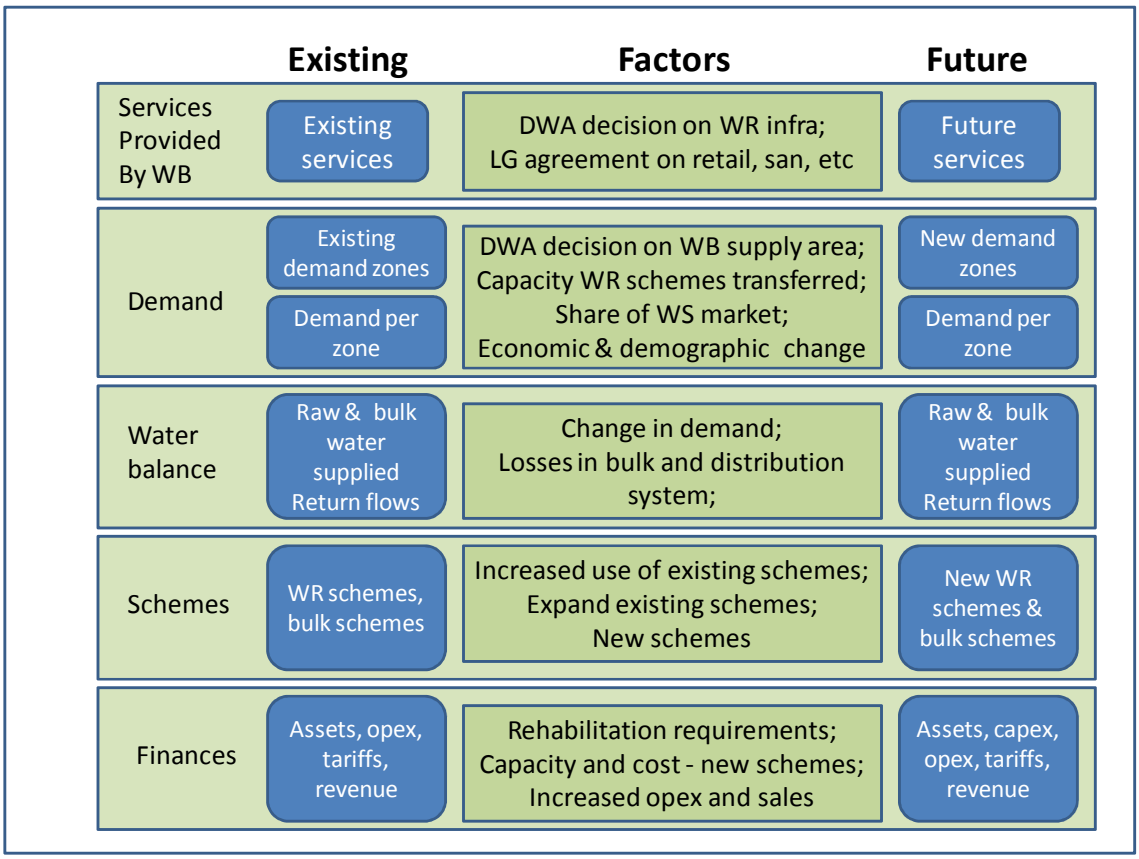

Figure 6: RWB Model structure showing key factors influencing projections

The model links existing demand for both potable and non-potable water to schemes (infrastructure), makes projections and then tests the future viability of the Water Board under future conditions. This is done by assessing tariffs and the ability of the Water Board to raise capital. The linkages are shown below:

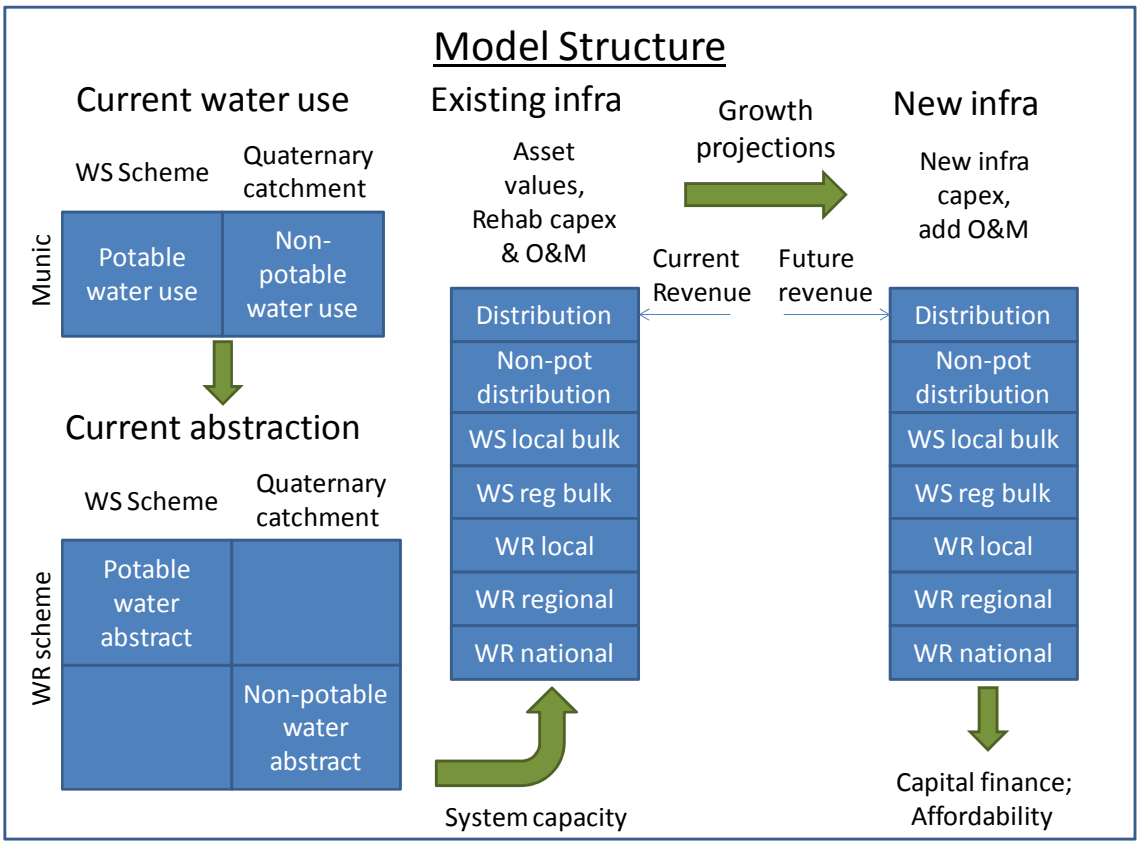

Figure 7: Model structure showing linkages between demand (water use), infrastructure and related financial aspects

A key feature of the model is the way it handles demand (water use). It includes a full database for all demand zones in the country, with the demand zones based on local municipality and metro boundaries. Within each demand zone the water demand for both potable and non-potable demand is estimated from first principles in a separate analysis undertaken for DWA with the RWB model drawing the figures for all demand zones into the country. The structure for doing this is shown in the figure below:

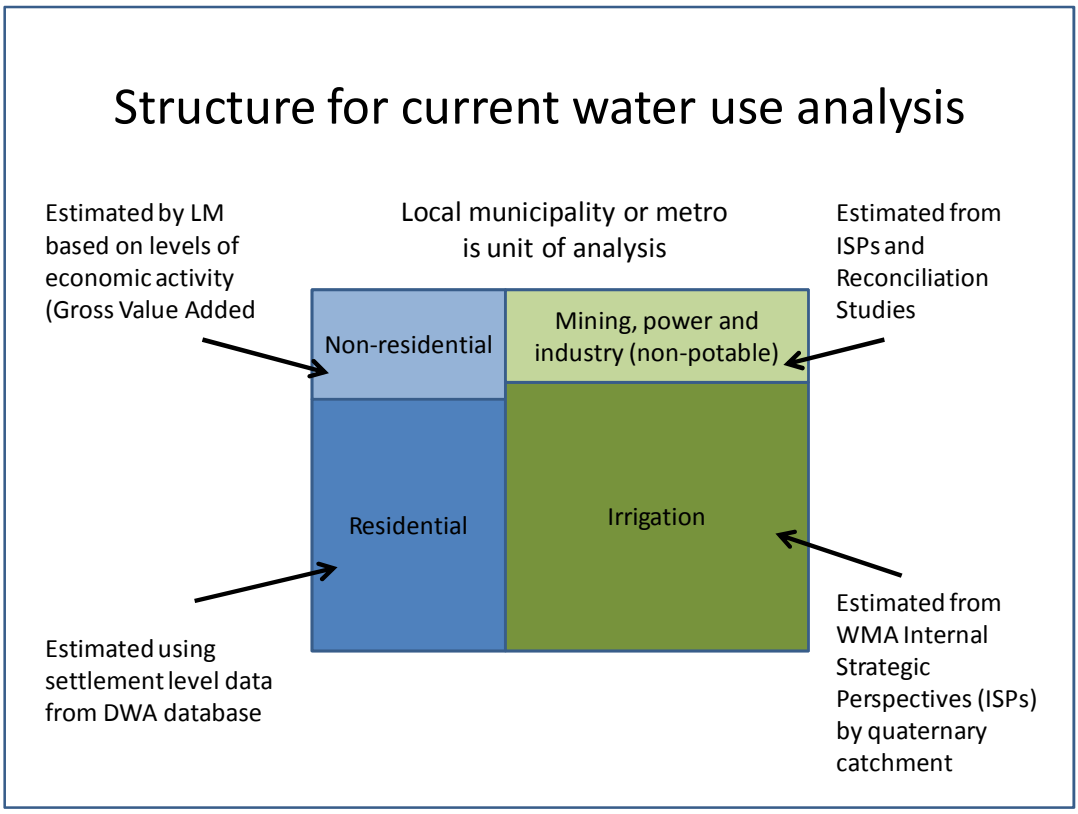

Figure 8: Structure for estimating demand (water use at point of consumption)

Having the figures for all demand zones the model allows for the demand zones to be applied for the specific Water Board to be selected and hence the RWB model has the underlying demand (or market) for the supply area included.

Another key feature of the model is the way it links demand zones to infrastructure. This is illustrated in the figure below:

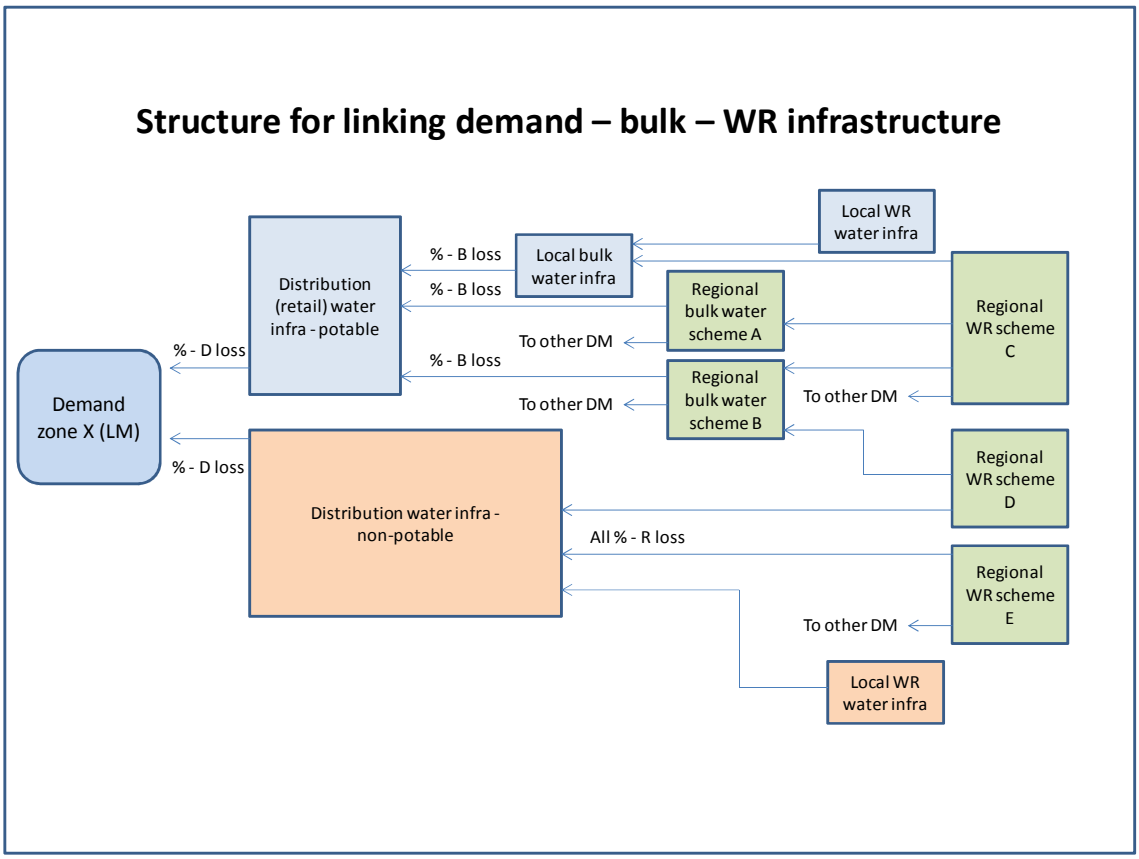

Figure 9: Model features for linking demand zones with schemes

Within the model this required each demand zone (and its associated distribution infrastructure) to be linked to a bulk supply scheme and then bulk supply schemes to be linked to water resource schemes. In the case of both bulk schemes and water resource schemes a differentiation is made between 'local' and 'regional' schemes. Local schemes are grouped together in the analysis and assumed to have common characteristics while regional schemes are identified in the model individually.

3.2.2 Model sections

The model is organised into five sections.

Section 1 is key user inputs regarding the current functioning of the Water Board. This includes:

- Demand Zones currently served and activities conducted in those zones (volumes of potable bulk water sold, volumes of non-potable bulk water sold, details of retail activities undertaken and volumes of bulk wastewater treated as well as tariffs charged per Demand Zone for these various activities)
- Bulk potable water schemes currently owned or operated (scheme capacities, operating costs, value of schemes and asset condition, as well as amount of demand from each Demand Zone that is met by this scheme).
- Water resource schemes currently owned or operated (scheme capacities, operating costs, tariffs, value of schemes and asset condition, as well as

amount of demand from each bulk potable or non-potable scheme that is met by this water resource scheme).

- Current financial statements
- Current loan book

Section 2 is key user inputs regarding the future functioning of the Water Board. This is the section where any expansion proposals are specified. It includes:

- Additional Demand Zones to be added to the Water Board footprint.
- Future retail activities (additional households to be served per Demand Zone).
- Future non-potable water supply (additional demand to be supplied, as well as tariffs).
- Future bulk sanitation (targeted percentage of return flow to be treated by the Water Board).
- Future bulk potable schemes to be owned or operated (including transfer of schemes to Water Board, expansion of schemes in order to allow for additional demand or new schemes to be constructed).
- Future water resource schemes to be owned or operated (including transfer of schemes to Water Board, expansion of schemes in order to allow for additional demand or new schemes to be constructed).
- Future capital financing sources available (parameters relating to availability of internal funding, term and interest rate for future loans, and estimation of grant funding available).

Section 3 is an extensive section that contains default parameters. The model is based on a large amount of default data as well as default parameters used to calculate results. The user can choose to leave these as is, or to over-write them. Default data includes:

- Data on household access to water supply and sanitation infrastructure per Demand Zone, drawn from DWA datasets.
- Data on non-residential demand for potable and non-potable water, drawn from estimates previously conducted for DWA.
- Data on current allocations of grant funding (Municipal Infrastructure Grant, Urban Settlements Development Grant and Regional Bulk Infrastructure Grant) to municipalities

Default parameters include:

- Unit water consumptions per household, based on access to infrastructure levels of service and income level.
- Household and economic growth rates.
- Parameters relating to the rate at which backlogs will be eradicated and what levels of infrastructure services will be provided to households.
- Parameters relating to the impact of assumed demand management interventions on water demand.
- Return flows.

- Distribution system losses, operating costs for distribution systems and capital costs for system expansion.
- Operating and capital costs for new bulk potable water schemes.
- Operating and capital costs for new water resource schemes.
- Operating and capital costs for bulk wastewater schemes.
- Assumptions relating to affordability and payment levels.
- Estimated useful lives of various infrastructure components, assumed asset conditions and years over which rehabilitation is to be conducted.

Section 4 contains model results.

Section 5 is model engines, where detailed calculations are conducted.

3.3 Case study methodology

The objective of the case studies was to test the RWB Model as a prototype with the intention that it can be refined and applied with improved data and more engagement with Water Boards and DWA in the future.

3.3.1 Identification of case studies

This study K5/2086/3 initially envisioned three case studies, with Lepelle Northern, Bloem and Amatola Water proposed. However, due to new priorities established by DWA, aligned with the IRR process, the WRC agreed to expand the number of case studies to eight. The logic in selecting these eight case studies is that they align with possible regional Water Boards with each of these centred on an existing Water Board and with the incorporation of three smaller Water Boards into these regional entities. The case studies are listed in the table below with the 'place holder' name for the regional Water Board, the existing Water Board which forms the core of the regional entity and some statistics abstracted from the models to give an indication of relative scale.

Table 3: Case study statistics relating to size and expansion

Water board name (existing core water board and 'place holder' name for new entity)	Bulk water sold (million m^3 pa)		Assets (R million)		Opex (Rmillion pa)		Capex (Rbillion)
	2011	2012	2011	2012	2011	2012	10 yrs
Rand (East Central)	1 344	1 897	70 810	88 984	5 627	8 978	28.3
Umgeni (Eastern)	423	586	13 344	24 361	1 140	1 952	8.0
Mhlatuze (North Eastern)	41	87	2 745	5 909	231	615	2.4
Sedibeng (Western)	86	130	8 100	10 641	455	621	3.0
Lepelle Northern (Northern)	70	255	1 904	51 098	302	1 771	11.5
Amatola (Southern)	28	124	778	5 746	260	988	2.5
Bloem (Central)	87	133	4 700	7 917	271	514	3.1
Magalies (North Western)	114	152	3 000	8 742	460	712	2.4

The figures in the table are based on the proposed level of expansion of Water Boards, as explained in later sections of this report, and include the incorporation of three smaller Water Boards into regional entities. The assets are based on expansion of bulk infrastructure and the transfer of water resources infrastructure to the Water Boards from DWA.

3.3.2 Process followed

The eight core Water Boards which are at the centre of the case studies were initially engaged, in June and July 2011, as part of the IRR project to inform them that an analysis was going to be undertaken based on a model which, at that stage, was not finally determined. Once it was agreed that the new WRC model would be applied to eight case studies, the Water Boards were engaged again, in early 2012, to inform them in more detail of the methodology to be applied and request data to be used in the model. The exception was Mhlathuze Water[5]. The work on the modelling then proceeded with whatever data was made available by the Water Boards which was variable in quality (see below). The initial model runs were completed in April 2012 with the results informing the IRR recommendations. At the same time the case studies allowed for the model to be tested as a 'prototype'. Feedback was given to the Water Boards on model results at a final set of meetings held in mid-2012[6].

3.3.3 Data used

As noted above, the case studies presented in this report were conducted in a relatively 'hands off' manner. The data collection process was initiated at meetings with further communications regarding data conducted telephonically or via email. In some cases, very good data was provided by the Water Boards, with the data templates required for the model filled in; in other cases the Water Boards provided less data.

The case studies were concluded within very tight timeframes due to the requirements of DWA's IRR project. While the results were presented to seven of the eight Water Boards, it was not possible to engage with the Water Boards in any detail regarding the interpretation of the data that they provided, within the timeframes and budget available. However, the main objective of the case studies was met in that the model, at prototype stage, has been tested, found to be generally useful and has served to provide 'business case' level information for the IRR initiative.

3.3.4 Expansion scenario considered

The expansion scenario considered in the modelling was defined largely by the IRR process. That process is considering a move towards Regional Water Boards, with a Regional Water Board being responsible for all regional infrastructure including regional water resource and water services infrastructure (potable and non-potable systems).

This scenario has two key implications in terms of scenarios. The first key implication is an extension of the boundaries of the Water Boards. The boundary scenario modelled in the case studies is shown in the figure below.

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[5] Mhlatuze Water was unwilling to meet with the project team without the involvement of DWA. It was not possible to obtain a meeting that included DWA in the timeframes of the work, and so modeling of Mhlatuze Water was conducted in a completely 'hands off' manner based purely on documents available.

[6] Here again there was an exception as it was not possible to visit Lepelle Northern Water due to time constraints

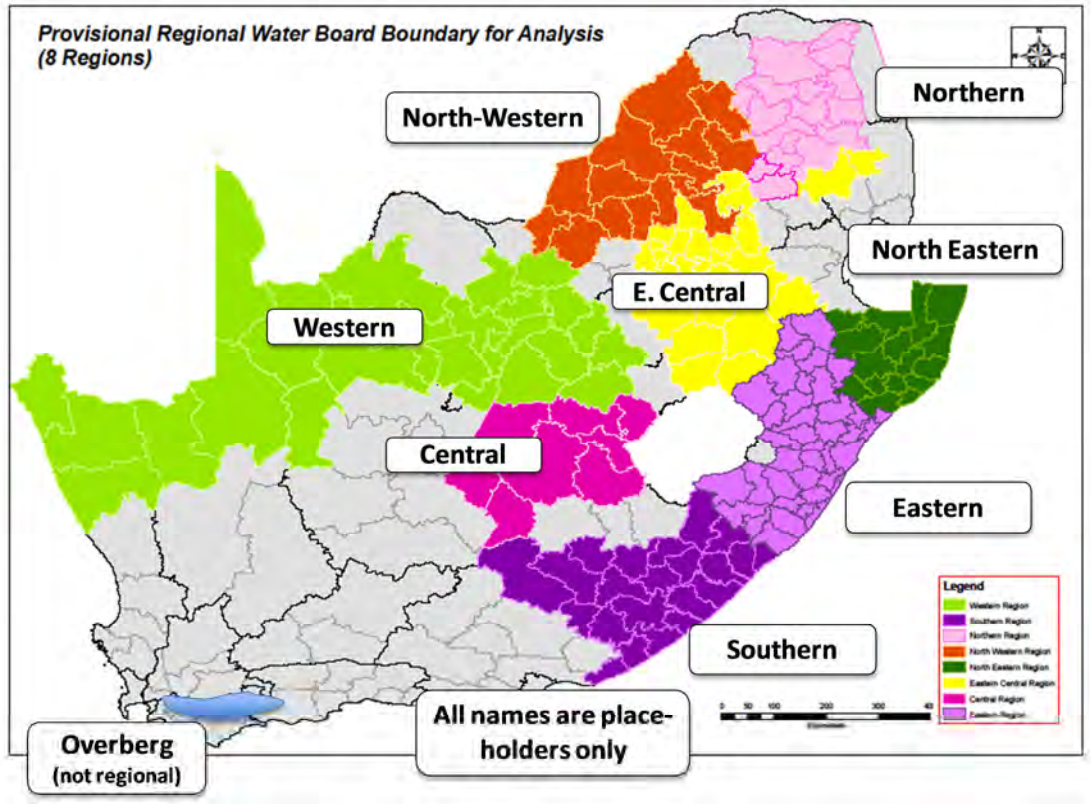

Figure 10: Expanded boundaries for Water Boards used in the case study models

A second key implication is the inclusion of the management of water resources as a Water Board function. This would involve the transfer of water resources infrastructure of regional or local[7] significance currently managed by DWA to the Water Boards.

In some cases, this regionalisation scenario would also include the Water Board taking over the management of regional water services infrastructure currently managed by municipalities.

3.4 Case study results

The full reports on each Water Board case study are included as an annexure to this document. This section includes a summary of results to illustrate comparative figures and trends.

3.4.1 Cautionary comment on interpreting the results

As noted in Section 3.3 above, the case studies presented here have been conducted with limited engagement with the Water Boards themselves. As a result, it is very important that the results presented here are regarded as indicative only. They are presented in order to demonstrate the use of the modelling tool, and

[7] The policy provide for water resources of local significance to ultimately be transferred to Water Service Authorities (WSAs) or Water User Associations (WUAs). However, where Water Boards have the capacity to manage this infrastructure and WSAs or WUAs do not, the option for transfer to Water Boards is provided for.

highlight the high level viability of a proposed expansion option. They should not be used as absolute indications of the likely performance of the Water Boards under an expansion scenario.

3.4.2 Impact of expansion

The various impacts of the expansion scenario considered are summarised below.

Demand for water resources due to Water Board operations

Water Boards abstract water from the resource for both potable and non-potable supplies, with the latter being a relatively small component. The projections from the models of the amount abstracted (essentially the 'demand' for raw water) is shown below.

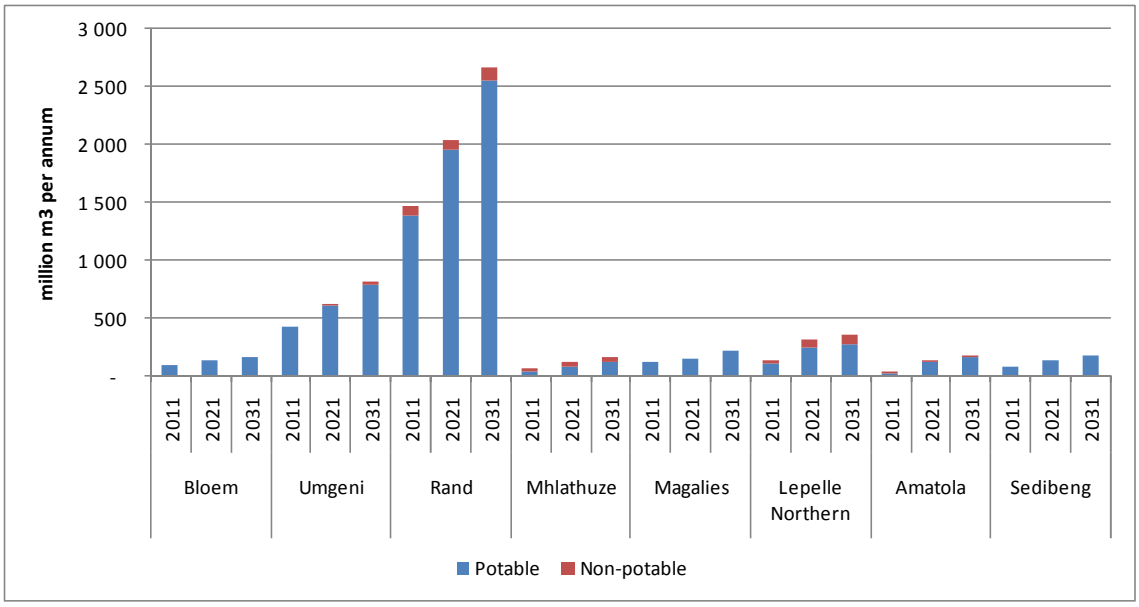

Figure 11: Water abstraction projections for each Water Board

Based on the above numbers, the figure below shows the change in demand for water resources due to Water Board activities between 2011 and 2021.

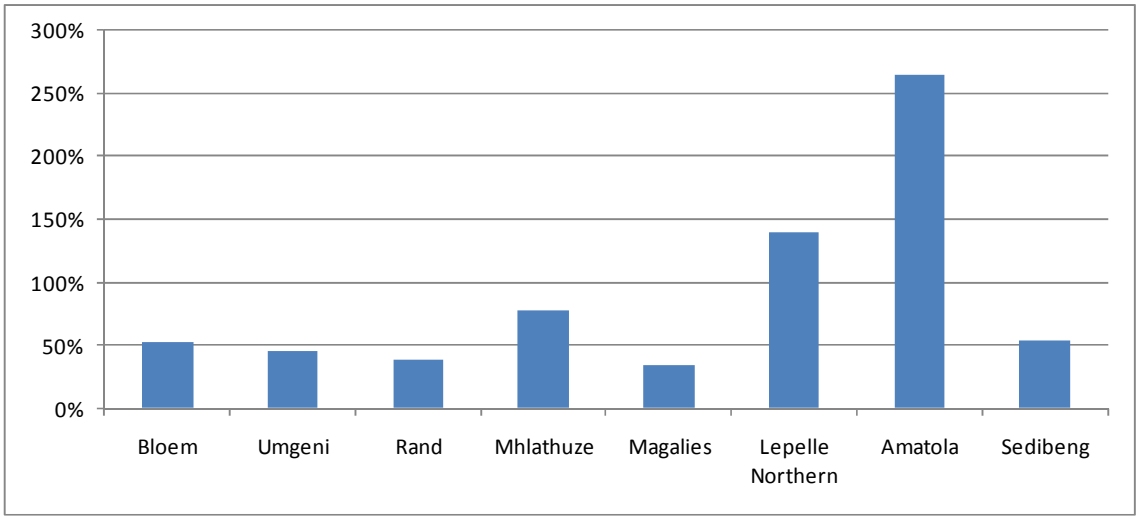

Figure 12: Change in demand for water resources due to Water Board activities between 2011 and 2021

The figure shows that the expansion scenarios all imply a significant increase in the volume of raw water abstracted by all of the Water Boards. The impact is notably large in Lepelle Northern and Amatola.

Value of assets managed by Water Boards

The models use the existing asset values provided by the Water Boards themselves, where this information is available, or taken from the DWA database. Based on the expansion options applied in the case studies, asset values increase, with the comparative results shown below.

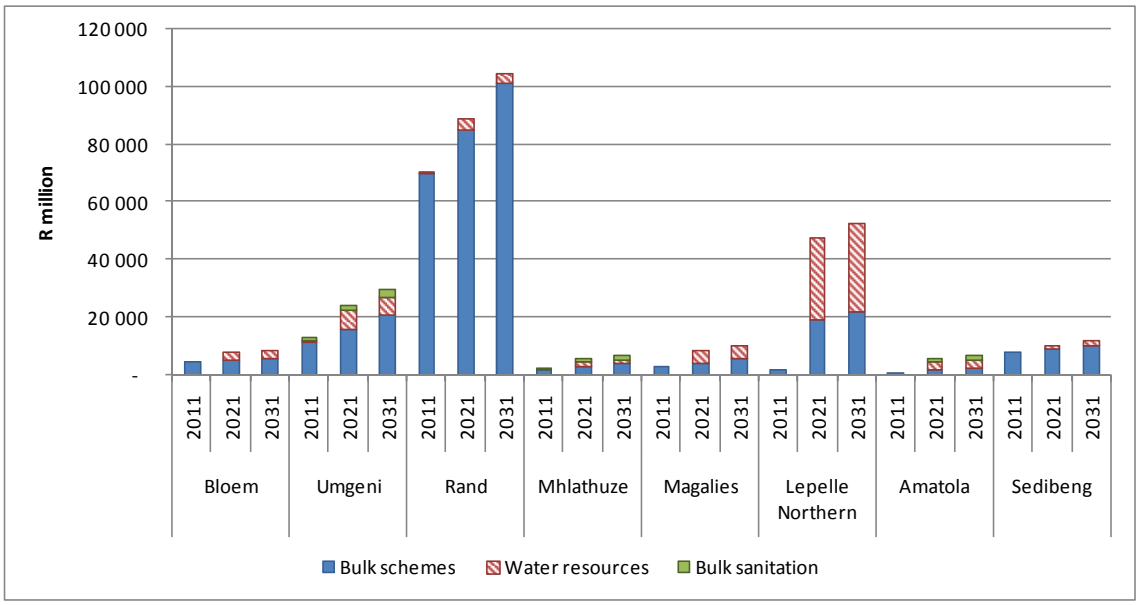

Figure 13: Projection of infrastructure asset values for each case study

It is notable that in some cases the transfer of water resources infrastructure is far more significant than in others. This is based largely on an assessment of what regional and local schemes are located in the Water Board area and are a priority for transfer.

The increase in assets as a percentage is shown below:

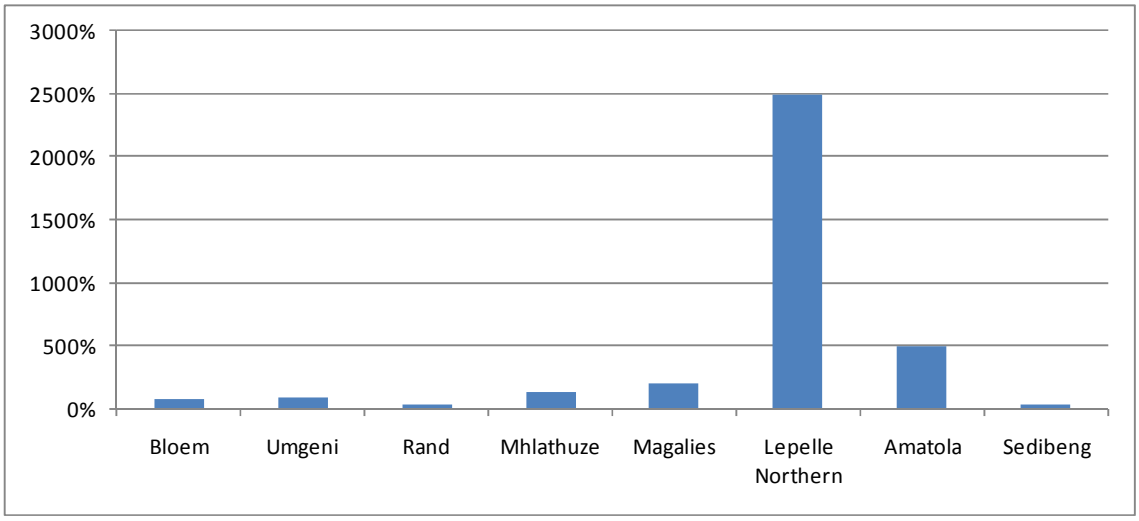

Figure 14: Change in value of assets managed by Water Boards between 2011 and 2021

The relative change is dominated by Lepelle Northern Water where there is the potential for large regional bulk water schemes to be transferred to the Water Board as well as a substantial number of water resources schemes. In the case of Amatola Water the expansion is dominated by the transfer of water resources schemes and an expanded role for the Water Board with respect to bulk sanitation.

3.4.3 Capital expenditure required

The model projects the required capital expenditure for each component of infrastructure: water resources, bulk water and bulk sanitation. The comparative results for capital expenditure for the 10 year period 2011 to 2021 are shown below (constant 2011 prices):

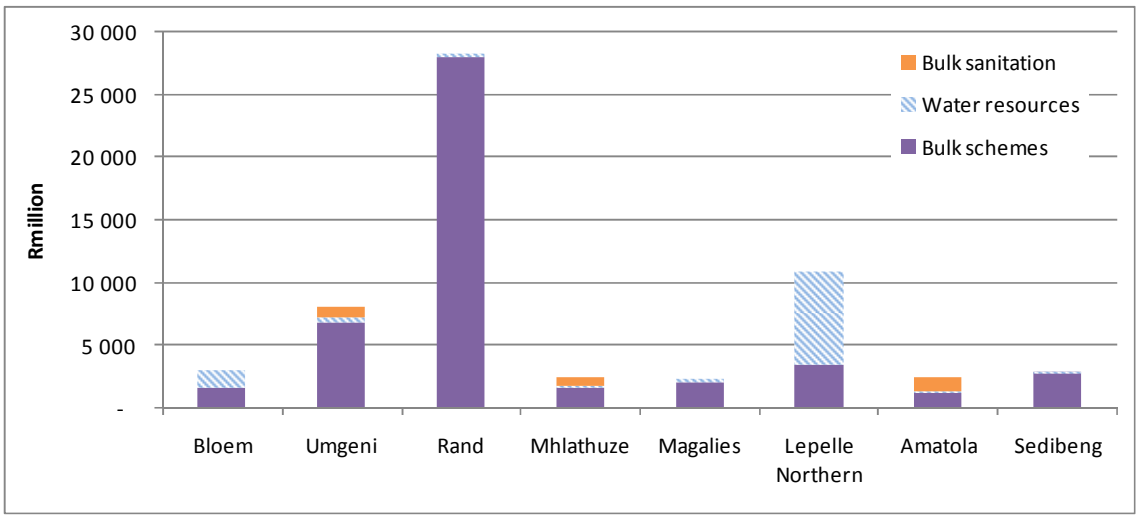

Figure 15: Capital expenditure projections for case study Water Boards – 2011-2021

For most Water Boards expenditure is dominantly for bulk water schemes, taking both the need for new infrastructure and rehabilitation into consideration.

Expenditure on water resources infrastructure is relatively small for all but Lepelle Northern Water where the scale of transfer of this infrastructure is projected to be relatively large. The expenditure in the case of water resources is largely related to rehabilitation of infrastructure.

3.4.4 Capital finance profiles

The model assesses access to capital financing in three broad categories: grant funding, equity (internal funding) and borrowing. Any difference between capital expenditure required and the sum of these three funding sources represents a capital financing gap.

The comparative results for capital finance available for the 10 year period 2011 to 2021 are shown below (constant 2011 prices):

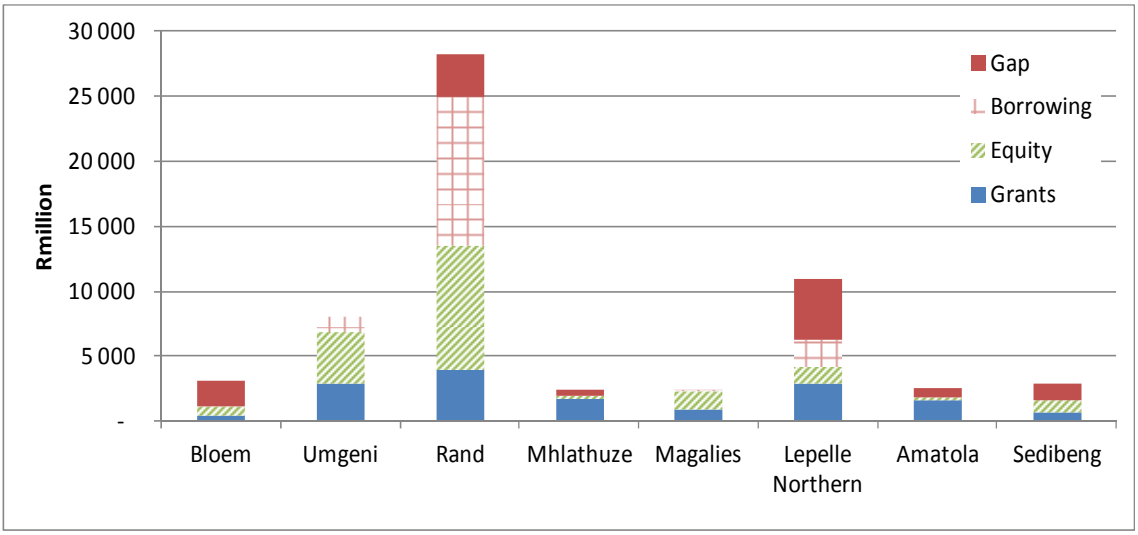

Figure 16: Capital finance projections for case study Water Boards – 2011-2021

The same numbers are shown as percentage splits in the figure below.

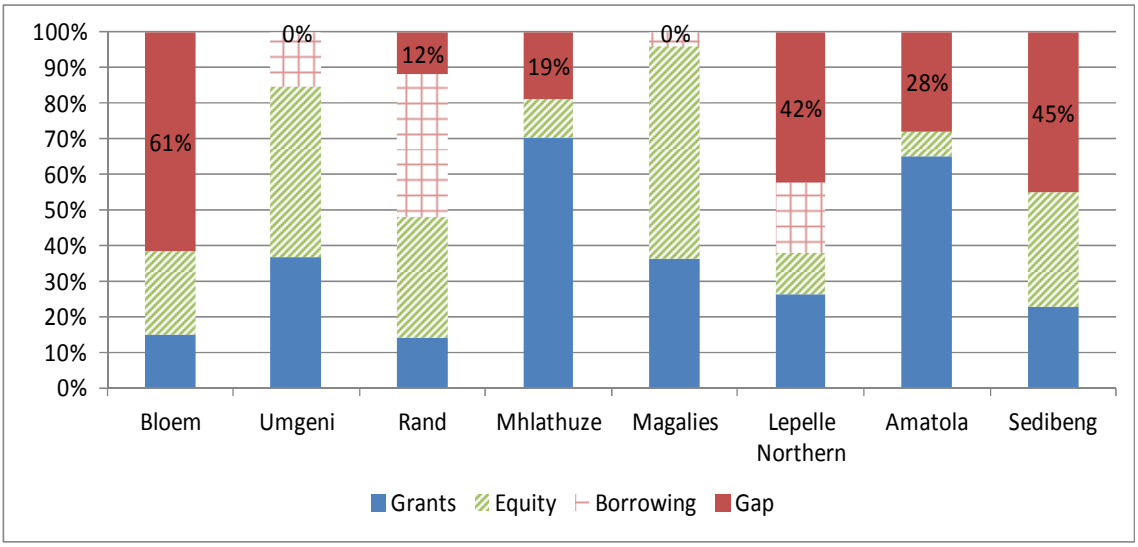

Figure 17: Capital finance percentage splits for case study Water Boards – 2011-2021

In terms of absolute size of funding gap, Lepelle North, Rand and Bloem face the largest gaps. However, Rand's gap is small as a percentage of total funding required. When percentage split is assessed, Bloem, Sedibeng and Lepelle North face the biggest challenges, with Amatola close behind.

3.4.5 Operating cost profiles

Operating costs across the entire value chain, from distribution to water resources, are shown in the figure below. The diamonds on the chart give a rough assessment of the tariff that would be paid by the end user.

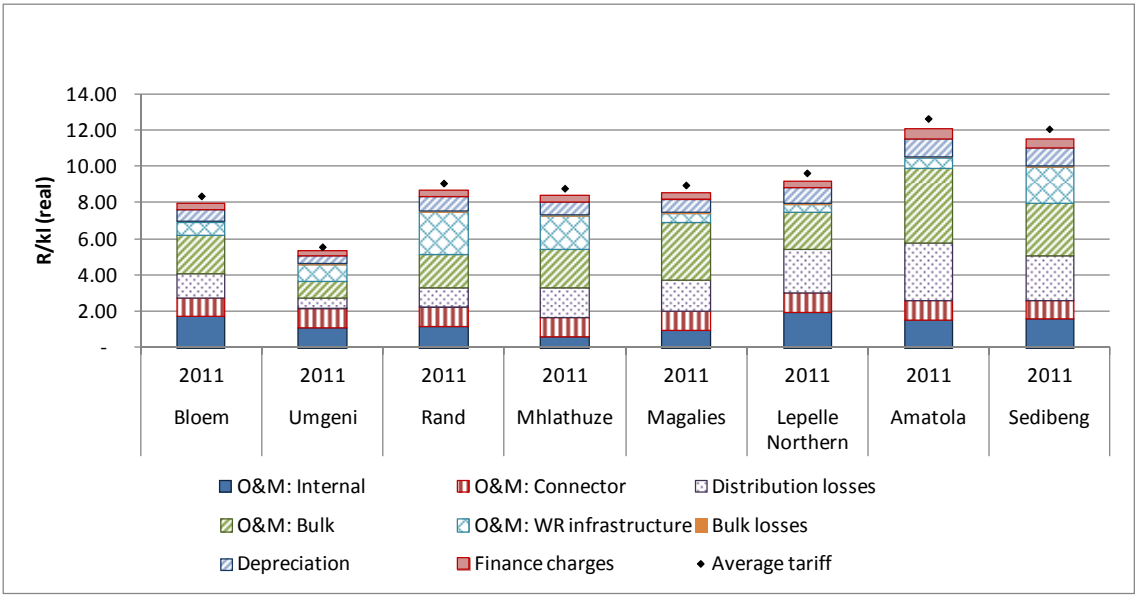

Figure 18: Average operating costs for case study Water Boards – 2011

Note that the average operating costs calculated above are heavily dependent on operating costs per bulk or water resource scheme inputted into the model. Cost data available was very poor, with data on water resources operating costs particularly poor.

That said, the figures indicate a range in costs of between around R5.00 and R12.00 in 2011. Note the significant impact of distribution losses on average cost.

The RWBM requires the user to enter the percentage real increase in bulk potable water tariffs per annum that will be allowed over time. In running the case studies, this was used as a key 'balancing' item; so tariff increases were entered to ensure that Water Board financial statements balanced over time. The tariff increases required are shown in the figure below.

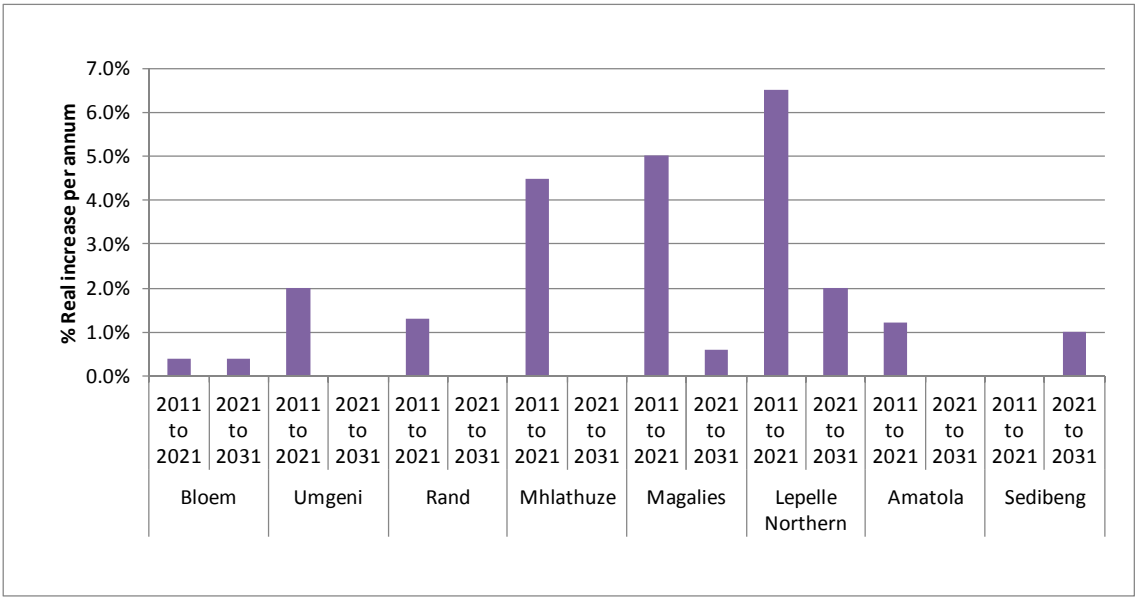

Figure 19: Real bulk potable tariff increases required for case study Water Boards

Whether or not tariff increases of this magnitude will be possible, both in terms of approval from DWA and in terms of affordability of the resultant tariff to consumers, was not considered in the modelling.

Certainly, increases of in excess of 4% p.a. in real terms (i.e. over and above inflation), as would be required in Mhlathuze, Magalies and Lepelle North between 2011 and 2021, do not seem reasonable.

3.5 Workshop comments on the modelling

The RWBM was broadly supported by attendants at the workshop, who felt that it is a useful tool. However, there were concerns about the data used to populate the models for the case study runs. For the purposes of case studies, to demonstrate application of the model under this WRC project, it was felt that the data was sufficient. However, if the model results are to be used to make decisions under the DWA IRR project, the Water Board delegates felt that more time should be spent on improving data and on running model scenarios. The Water Boards would like time to be able familiarise themselves with the model, run scenarios and assess implications. It was also noted that a model is useful only if it is kept updated and used to make decisions; if it is run once and then put aside, it is of no use.

3.6 Additional work required on the RWBM

The model version prepared and used for these case studies is a prototype only. Some elements of the model require refinement and improvement. This includes (although is not be limited to) the following:

- Further refinement to the affordability calculations in the model.
- Better handling of existing spare capacity in bulk potable and water resource schemes.
- Allowance for the fact that the capacity of some water resources is declining due to factors such as siltation.

- Ability for Water Boards to over-write demand projections and other key parameters currently calculated in the model.
- Incorporation revenue generated due to interest-bearing reserves.

In addition, there is currently no user guide for the RWBM. It has not been possible to prepare such a guide within the budget available for this project. At very least, a guideline on how to enter key data and interpret results would be useful.

4 Capital financing indicators for Water Boards

Capital financing indicators are used to assess the borrowing capacity or credit worthiness of an entity.

Definitions: 'Borrowing capacity' and 'credit worthiness'

'Borrowing capacity' is the amount of money that an entity can borrow, based on its current and projected financial health. There is a further factor here related to current market conditions. Even should an entity have strong capacity to borrow, market conditions may mean that its actual borrowing potential is limited due to willingness of banks to lend in general. Using this differentiation, 'borrowing capacity' is a function of internal factors within an organisation, while 'borrowing potential' is a function of internal factors as well as market conditions.

'Credit worthiness' is an assessment of the likelihood that a borrower will default on their current and/or future debt obligations.

4.1 Background on assessing credit worthiness and borrowing capacity

Assessing borrowing capacity is a relatively technical task, based largely on financial performance. However, the ability of an entity to borrow is a function of broader creditworthiness. Assessing credit worthiness is part art and part science, as discussed below.

4.1.1 Assessing credit worthiness

Credit worthiness looks at likelihood of default from both a quantitative and qualitative perspective and includes both internal criteria (within the entity's control) and external criteria (beyond the entity's control).

A credit rating will attempt to assess the economic, financial, political and organisational risks faced by an entity.

Economic risk	What are the economic events that might impair an entity's ability to repay debt? This is largely determined by the strength of the economic base. Factors considered here might include population size, unemployment rates, per capita income, local GVA growth and composition, types of industry, diversification.
Political risk	This is largely a judgement factor and relates to the political stability of the context in which the entity functions and political will to apply cost reflective tariffs.

Financial risk	Financial risk is assessed through the use of financial indicators or ratios that attempt to assess factors such as: • Revenue and expenditure structure and dynamics. • Net operating result. • Ongoing liquidity and cash flow management. • Financial flexibility – autonomy to raise taxes and fees. • Ability to balance financial operations over the economic cycle. • Willingness and ability to control expenses. • Indebtedness – both on and off-balance sheet debt[8].
Organisational risk	This is largely internal risk relating to the management and operations of the entity.

Some of the risk factors considered can be calculated, but some are a matter of judgement. In addition, assessing credit worthiness requires using historical data to predict future trends, and this process is always speculative.

4.1.2 Assessing borrowing capacity

Borrowing capacity is assessed based on a projection of future financial performance in order to determine whether an entity will be able to generate sufficient cash to service and repay debt.

Maximum borrowing capacity can be estimated as the:

Present value of future Free Cash Flow

Free Cash Flow is the projected cash flow after catering for normal operating expenditures, with adjustments made for:

- Servicing and repayment of existing debt;
- Retention of cash for expenditure on small capital works; and
- Retention of cash in a liquidity reserve.

Note that great care must be taken when projecting cash flow to realistically account for collection and billing efficiencies.

Borrowing capacity assessment is of course to some extent dependent on the same factors as a credit worthiness assessment, because the projections of financial performance (in other words, of Water Board expenditures and revenues) must take account of the economic, political and financial risks faced by the Water Board in question.

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[8] NALAS (Network of Associations of Local Authorities of South-East Europe) *Guidelines on Local Government Borrowing and Recent Developments in South East Europe* (http://www.nalas.eu/borrowing/4.html, accessed on 3 July 2012)

Borrowing capacity can only be properly assessed through the use of a model that projects expenditures and revenues and thus Free Cash Flow.

4.1.3 Some existing tools

There are some existing tools that can be used to assess credit worthiness or borrowing capacity. In all cases, the tools have been designed for a water utility or water services provider in situations where there is not a separation of bulk and retail service activities.

WaterCAT shadow credit ratings tool

The reliance of credit assessments on a range of criteria is well demonstrated by a recent piece of work by the Kenyan Water Services Regulatory Board (WASREB) and the WSP, developing 'shadow[9]' credit ratings for Kenyan water utilities. Shadow ratings were calculated using a tool (called the Water Credit Assessment Tool, or WaterCAT) that measured performance on a number of criteria, weighted them, came up with an overall score and then assigned a shadow rating based on that score.

The criteria groupings used, and their weights, are shown below.

Table 4: Criteria used in the WaterCAT credit analysis and shadow rating

Criteria	Comments	Weight applied
Internal		**73 in total**
Financial and Credit Management	Ability to meet expenditure obligations and service debt, includes collection and payment efficiency	25
Management Quality and Capacity	Organisational structure and compliance with regulations	19
Operational Performance	Includes Non-Revenue Water (NRW), water quality, maintenance quality and efficiency, and staff salaries as a percentage of operating expenditure.	15
Strategic Planning and Internal Transformation		5
Human Resources and Utilization of Private Sector		5
Customer Relations		4

[9] The ratings developed by WaterCAT are 'shadow' ratings in that they are not issued by ratings agencies, but are for diagnostic purposes, to test how financiers might evaluate a utility's credit standing.

External		**27 in total**
Support from Government	Degree and predictability of government support to WSPs, including during times of distress	10
Autonomy and Accountability	Independence of the utilities to make decisions without external intervention and the accounting controls employed	4
External Risks	Dependency of WSPs to irregular support, such as reliance on government and donor grants or subsidies, and assesses other external risks, such as the vulnerability to political interference that would force a utility to meet unfunded mandates	3
Economic Base	Average income of customers in the service area and the diversity of the customer base	10

The WaterCAT project also conducted statistical analysis to determine which indicators were closely correlated with the final shadow ratings. The following emerged:

- Service coverage
- Number of house connections
- Current ratio
- NRW
- Operational Cost Coverage Ratio (OCCR)
- Surplus
- Size of service area
- Volume of water produced

Interestingly, the study found no correlation between number of connections and shadow credit rating, and concluded that expanding water supply coverage does not necessarily lead to stronger credit ratings.

The study conclusions noted that the quality of management is highly correlated to the financial and operating results and that strong management teams and results-based performance monitoring mechanisms are important in improving credit ratings. The importance of sound capital investment planning was also noted.

Note that there is a MuniCAT tool, similar to WaterCAT, that is used in South Africa to determine shadow credit ratings for municipalities. This tool is the property of Afcap Consulting. Its adaptation and use for Water Boards would have to be negotiated through this company.

Water Utility Vulnerability Index

The WSP and Water Operators Partnership have developed two indices intended to assess the current status of a water utility and its vulnerability to future performance problems respectively.

The Water Utility Status Index 'APGAR[10]' is a composite indicator with a maximum score of 10. The APGAR is calculated using parameters measured by the Water Operators Partnership. The indicators used to calculate the APGAR are shown below.

Table 5: Indicators used in WUVI score

	Indicator	**Apgar score value**
1.1	Water coverage,%	0 if < 75% 1 if >= 75% and < 90% 2 if >= 90%
2.1	Sewerage coverage, %	0 if < 50% 1 if >= 50% and < 80% 2 if >= 80%
6.2	Non-revenue water, m3/km-day	0 if >= 100 1 if >= 40 and < 100 2 if < 40
23.1	Collection period, days	0 if >= 180 1 if >= 90 and <180 2 if < 90
19.1	Affordability, calculated as water revenue per capita divided by Gross National Income per capita	0 if >=2.5% 1 if >= 1.0% and <2.5% 2 if < 1%
24.1	Operating cost coverage	0 if < 1.0 1 if >= 1.0 and < 1.40 2 if >= 1.40

[10] An Apgar score is a simple and repeatable method to quickly and summarily assess the health of newborn children immediately after birth. It is determined by evaluating the newborn baby on five simple criteria on a scale from zero to two, then summing up the five values thus obtained.

	Overall APGAR Score	Critically low <3.6 Low 3.6-5 Fair 5-7 Normal >7

The APGAR is a measure of the current status of a water utility. It has been taken forward in the development of the Water Utility Vulnerability Index (WUVI), which is intended to measure the probability that a water utility will experience a **future** performance problem. The WUVI is intended to allow for some lead time to allow management (or policy responses) to prevent a crisis.

There are three versions of the WUVI formula, based on different APGAR thresholds. The version for the critically low threshold is:

$$\Pr[APGAR_{t+2} \leq 3.6] = \int_{-\infty}^{y} \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}x^2} dx$$

where $y = 1.10$
$- 0.031\ WaterCoverage_t$
$- 0.018\ SewerCoverage_t$
$+ 0.017\ NonRevenueWater_t$
$+ 0.284\ TotalRevenueServPopGNI_t$
$+ 0.002\ CollectionPeriod_t$

There is a spreadsheet used for calculating the WUVI. It is not clear how to get access to this spreadsheet, or whether it is available outside of the Water Operators Partnership.

The WUVI is very pertinent to credit assessments, given its intention to identify future risks of non-performance.

4.2 A comment on risk factors for Water Boards

The nature of the business model of Water Boards in South Africa is that they have a very small and un-diversified client base: Water Boards typically sell water directly to only a few municipalities and possibly industries. This means that the risk of a Water Board defaulting on a loan payment is heavily influenced by the risk of the Water Boards municipal customers defaulting on their payments to the Water Board.

As a result, it is proposed that when assessing the ability of a Water Board to borrow, it will in fact be necessary in many cases to assess the financial viability or vulnerability of the Water Board's municipal customers.

4.3 Indicators relating to Water Board performance

This section presents suggested indicators for assessing Water Board performance and ability to borrow. The number of indicators presented has been kept to a minimum. A full credit assessment would consider a far larger number of indicators.

The indicators presented are **financial** and **organisational**. The performance of the eight case study Water Boards considered as part of this project is assessed in terms of five key financial indicators. Performance with regard to the organisational indicators has not been assessed due to lack of data.

The **economic** risks faced by Water Boards are most appropriately assessed through an assessment of the underlying areas served by the Water Boards.

Political risk is largely a matter of judgement, and is not appropriately assessed through indicators.

4.3.1 Financial indicators

The data used is taken from a DWA database of WB financial statements between 2005/6 and 2009/10, drawn from Annual Reports. The data for the 2010/11 financial year was taken directly from the Water Board Annual Reports. It was not possible to access the Annual Report for Magalies Water and so no data on performance in 2010/11 was available for this Water Board.

In all cases, analysis was conducted only on the eight case study Water Boards included in the modelling work for this project.

Operating Cost Coverage

The Operating Cost Coverage Ratio (OCCR) is a key indicator of financial performance, and measures the extent to which revenues are sufficient to cover operating expenditure.

$$OCCR = \frac{Total\ revenue}{Operating\ expenditure}$$

A ratio of above 1.4 is considered to be strong, and a ratio of below 1.0 is considered unacceptable.

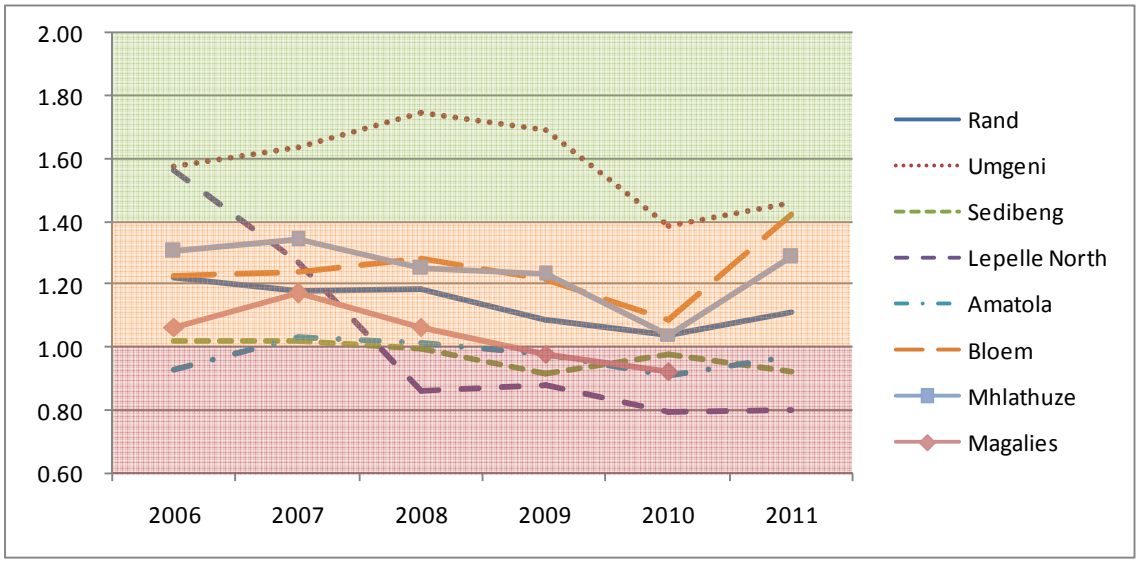

Figure 20: Trend in Operating Cost Coverage Ratio per Water Board

Of the Water Boards considered, only Umgeni Water has maintained an OCCR consistently above 1.40.

Sedibeng, Lepelle North, Amatola and Magalies have had OCCRs below 1.0 for the past three financial years.

Current ratio

Current ratio is a liquidity measure that assesses the ability of a firm to settle its current liabilities by liquidating its current assets.

$$Current\ ratio = \frac{Current\ assets}{Current\ liabilities}$$

A ratio of above 1.0 is considered to be necessary. Most analysts agree that a current ratio that is too high is not desirable as it may indicate that an entity is tying up money in current assets rather than using it for growth.

Note that current ratios can to some extent be 'manipulated' by an organisation by delaying the payment of liabilities that come due at year end. As is the case for many indicators, current ratio trends during the year should ideally be assessed, rather than just current ratios at year end.

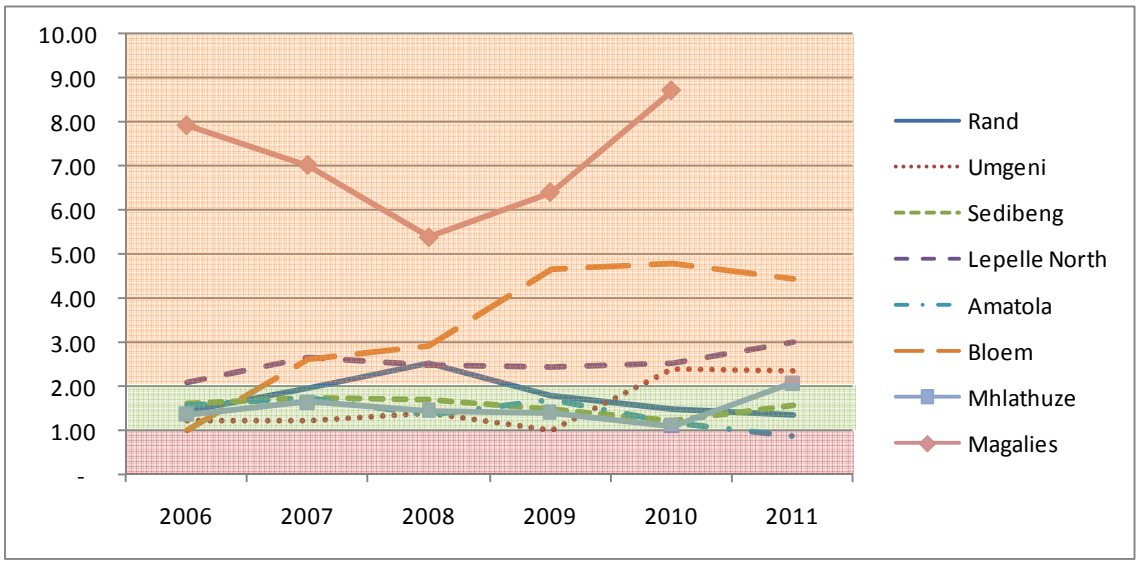

Figure 21: Trend in current ratio per Water Board

Rand, Umgeni, Sedibeng and Mhlathuze have current ratios in the desirable band of 1.0 to 2.0. Amatola has performed relatively well in terms of current ratio historically but slipped below 1.0 in 2010/11. Lepelle North, Bloem and Magalies have very high current ratios and are potentially not using their assets optimally.

% surplus

Percent surplus is calculated here as:

$$\%\ surplus = \frac{Net\ surplus}{Total\ revenue}$$

A positive surplus is of course desirable. A surplus of 5% or above is considered to be strong.

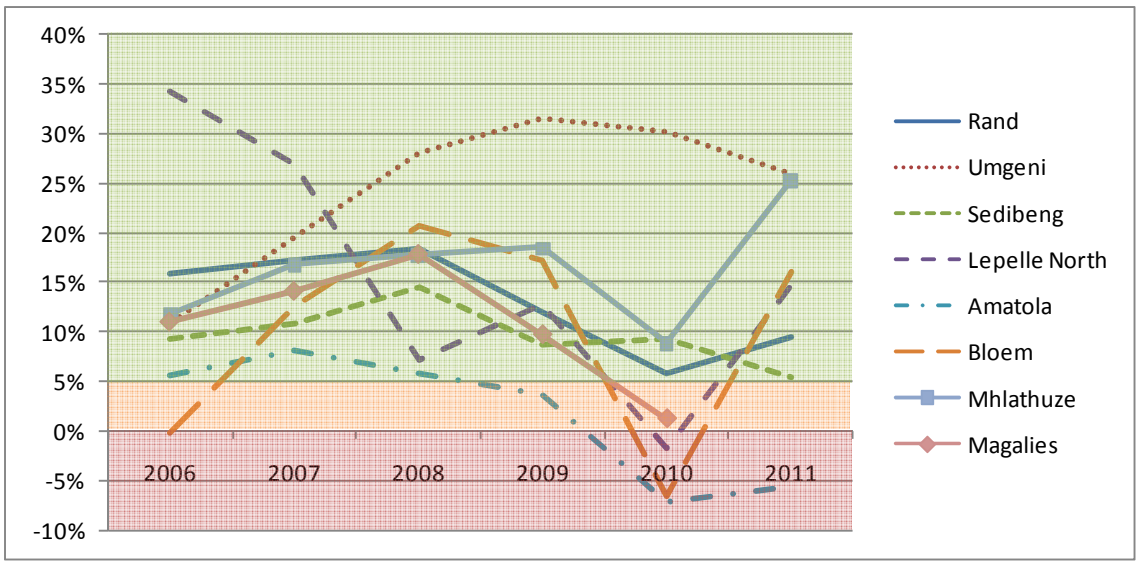

Figure 22: Trend in % surplus per Water Board

Rand, Umgeni, Sedibeng and Mhlathuze have all made strong surpluses historically. Lepelle North has been on a general declining trend, with a stronger year in 2010/11. Bloem has historically been fairly strong with a poor year in 2009/10. Magalies has been on a declining trend since 2007/8 with very narrow surplus margins in 2009/10. Amatola has been on a declining trend since 2006/7 with operating losses in the last two financial years.

Debt service coverage ratio

The Debt Service Coverage Ratio (DSCR) measures the ability of a Water Board to service its debt (both interest and principal payments) out of its operating surplus.

$$Debt\ Service\ Coverage\ Ratio = \frac{Net\ surplus\ before\ interest\ and\ depreciation}{Total\ debt\ service}$$

with debt service equal to the sum of interest payments and principal payments during the year.

Banks would typically insist on a DSCR of above 1.25.

The data for the calculation of the DSCR was available for only the 2010/11 financial year, as principal payments are not recorded in the DWA database of WB financial statements.

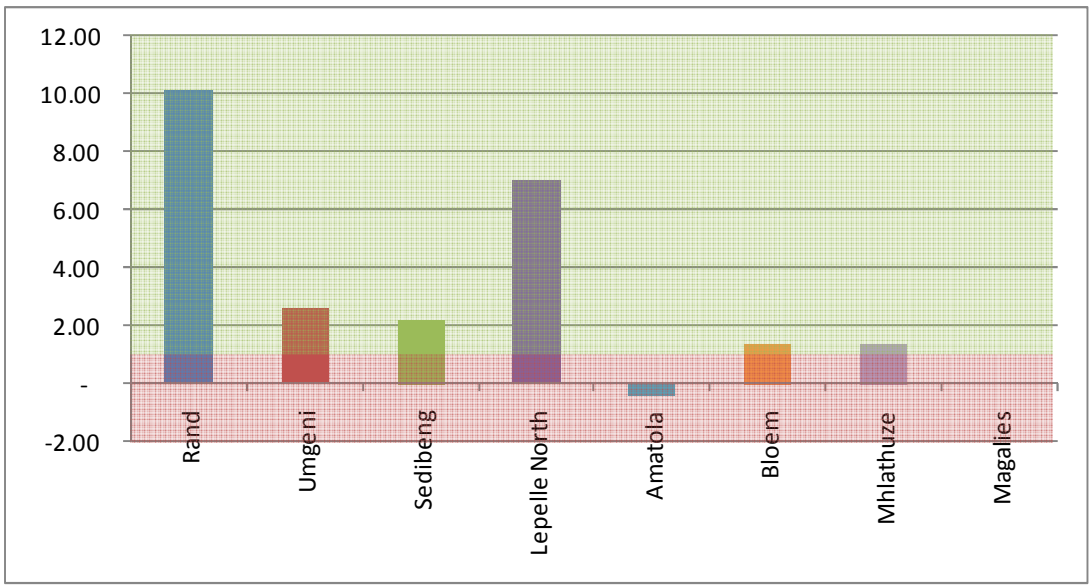

Figure 23: Debt service coverage per Water Board in 2010/11

Rand and Lepelle North showed very strong DSCRs. All of the Water Boards had DSCRs of above 1.25 with the exception of Amatola (which, of course, recorded an operating deficit in 2010/11 and thus had a negative DSCR) and Magalies for whom data was not available.

Collection period (debtor days)

Debtor days is a measure of debt collection efficiency and is the average number of days taken to collect debt.

$$Debtor\ days = \frac{Year\ end\ debtors \times 365}{Total\ revenue}$$

Note that a more reliable assessment of debtors days would be obtained by tracking this indicator through the year, rather than focussing only on the year end position. It is possible to improve the appearance of the debtor days indicator by having a strong push for debt collection at the end of the financial year.

The Department of Water Affairs Regulatory Performance Management System (RPMS) suggests 45 days as a target for debtors days in South African municipalities, with 80 or 90 days the current benchmark.

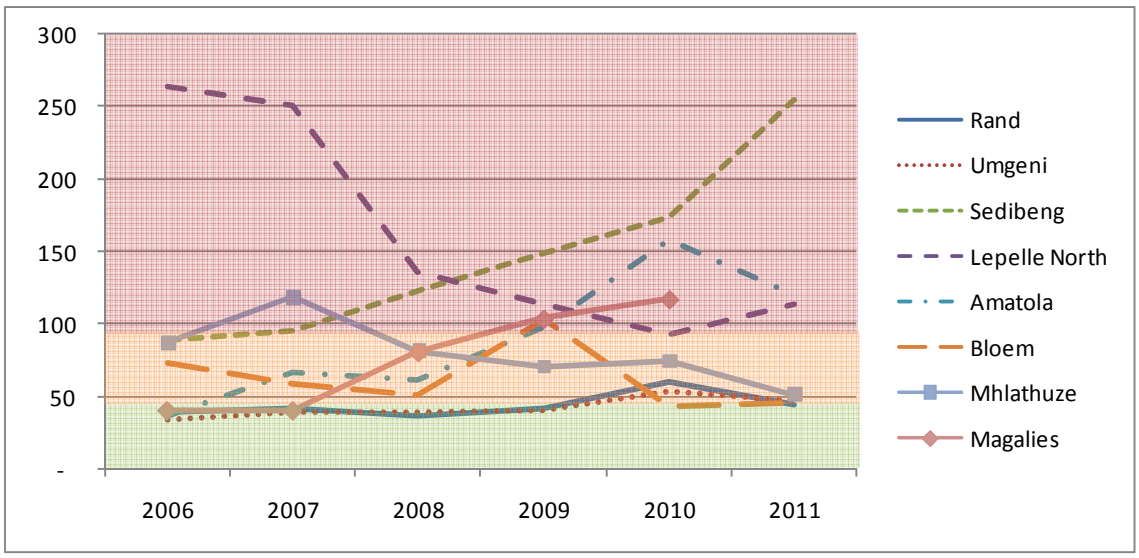

Figure 24: Trend in debtor days per Water Board

Rand, Umgeni, Bloem and Mhlathuze have maintained debtor days around the 45 day mark in recent years (with an outlier year in 2008/9 for Bloem). Sedibeng, Amatola, Lepelle North and Magalies perform less well on this indicator.

Summary of performance on financial indicators

In order to obtain an overall assessment of the performance of the case study Water Boards in terms of the financial indicators, a composite performance score was produced. The individual indicators were scored on a scale of 0 to 2 depending on how the Water Boards performed against the indicator targets. The overall trend was assessed. The scores for indicators were then summed in order to obtain a total performance score. The maximum score is 10.

Table 6: Summary of Water Board performance in terms of financial indicators

	OCCR	Current ratio	Surplus	Debtor days	Debt service coverage	Total score
Rand	1	2	2	2	2	9
Umgeni	2	2	2	2	2	10
Sedibeng	0	2	2	0	2	6
Lepelle North	0	1	1	0	2	4
Amatola	0	0	0	0	0	0
Bloem	1	1	1	2	2	7
Mhlathuze	1	2	2	2	2	9
Magalies	0	1	1	0		2

There are three bands of performance:

- Rand, Umgeni and Mhlathuze perform strongly.
- Sedibeng and Bloem perform adequately with OCCR and debtor days of concern for Sedibeng.
- Lepelle North, Amatola and Magalies perform poorly with Amatola particularly weak.

4.3.2 Organisational indicators

Sound management and strong organisational performance are in many respects as important as financial performance when assessing ability to borrow. In fact, the WaterCAT report noted that quality of management is highly correlated to financial and operating results. This is a critical subjective judgement exercised by financial institutions.

Data for the assessment of organisational performance in the case study Water Boards was collected as part of this project, but a set of possible indicators is proposed below.

Table 7: Proposed organisational indicators

Indicator	Definition	Comments
Length of time in senior management posts	Number of years in post	High turnover in key management posts poses significant risks in terms of loss of institutional memory and management direction.
Vacancies in senior management posts	Number of posts vacant at any point during the year Length of vacancy	Vacancies in key posts obviously leads to concern about overall management and strategic direction of a Water Board
Dismissals in senior management posts	Number of dismissals during the year	Dismissals and suspensions cast doubt on organisational soundness.
Suspensions in senior management posts	Number of suspensions during the year	
Absenteeism	Number of unplanned days of absence (absenteeism) for all staff during the year divided by total number of planned working days for all staff	Levels of absenteeism are a good indicator of overall organisational well-being. High rates of absenteeism may suggest low level of motivation and reflect poorly on the organisational culture.

Audit opinion	Audit outcome (Financially unqualified with no findings, Financially unqualified with findings, Qualified, Disclaimer)	The audit outcome provides a sense of the quality and transparency of the financial reporting.

It is recommended that the performance of the Water Boards be assessed in terms of these indicators, and combined with financial performance in order to obtain an overall sense of Water Board performance.

4.4 Indicators relating to context and performance in underlying areas

Given the heavy dependence of Water Boards on payment for services by their municipal customers, it is proposed here that understanding the performance and risk profile of those municipal customers is as important as the performance and risk profile of the Water Boards themselves when assessing ability to borrow.

The performance of the group of municipalities underlying an individual Water Board was assessed using a composite indicator based on data contained in the Department of Co-operative Governance's (DCOG) recently completed Differentiation Barometer (see Appendix J to this report for more detail on the Barometer and on how it was used to develop a composite score).

The composite scores were on a scale of 0 to 9, and are summarised below.

Table 8: Summary of performance of municipalities underlying Water Boards

	Municipal service (excluding Blue Drop)	Financial	Administrative	Total score
Rand	2	2	2	6
Umgeni	2	2	3	7
Sedibeng	1	1	1	3
Lepelle North	0	1	1	2
Amatola	2	2	2	6
Bloem	1	2	1	4
Mhlathuze	1	2	2	5
Magalies	1	2	2	5

The areas underlying Rand, Umgeni and Amatola are the strongest performers, with Mhlathuze and Magalies close behind. Sedibeng, Lepelle North and Bloem serve areas with poorer performance.

Note that the strong performance of the area served by Amatola is due almost entirely to the inclusion of Buffalo City in Amatola's supply area. If Buffalo City is removed from the weighting, the score for the area underlying Amatola Water drops to 3 (with scores of 0, 2 and 1 for the municipal service, financial and administrative areas respectively).

4.4.1 Workshop comments on the development of a score for municipal performance

There was significant debate and discussion at the workshop regarding the development of these composite scores. It was noted that there are many ways to measure municipal performance, and results may be strongly influenced by the measures and data used. The fact that the performance of the group of municipalities underlying a Water Board may be very strongly dominated by a single dominant municipality was also noted.

The key concern discussed was the weightings used to aggregate the performance of individual municipalities into a joint score. The volume of water sold to each municipality was used in the analysis. In some cases this is not appropriate: for example, in Magalies Water a large proportion of water sold is directly to industries, not to municipalities; and in Amatola Water a large amount of activities undertaken do not involve the sale of water to municipalities. This is noted, and should be borne in mind when interpreting the results presented below.

4.4.2 Comparing Water Board performance with performance in underlying areas

The figure below shows the composite financial performance scores for the Water Boards presented in Table 6 plotted against the composite performance in the underlying municipal areas presented in Table 8.

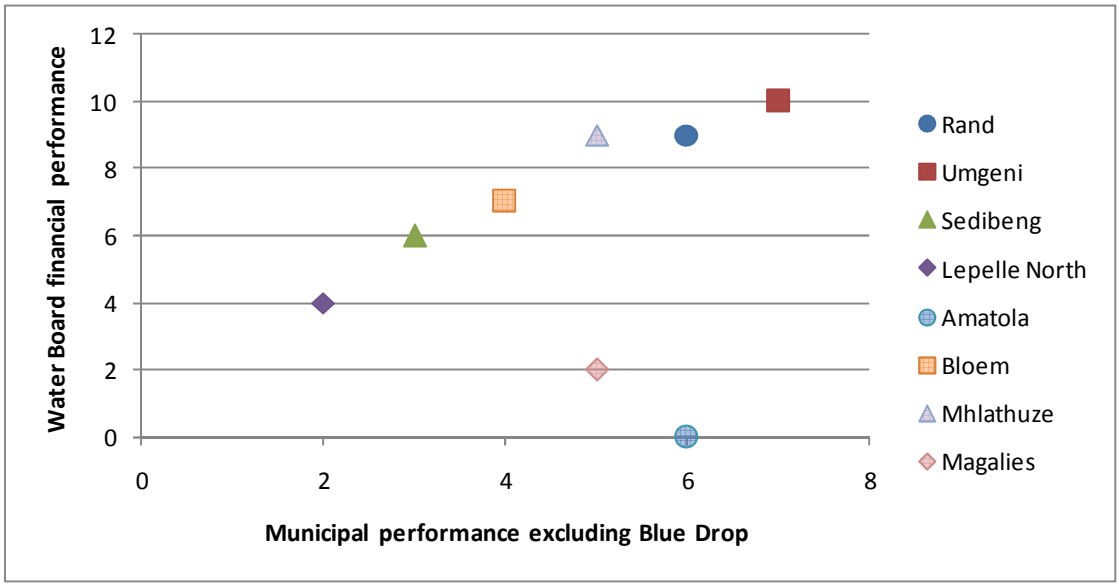

Figure 25: Water Board performance related to underlying municipal performance

A very strong linear relationship is apparent here, with two outliers. Magalies and Amatola both show poor Water Board performance despite moderately strong performance in the underlying municipalities. Note that this may be explained by the weights used in the development of the composite scores. See the workshop comments on this indicator in Section 4.4.1 above.

Figure 25 provides strong support for the hypothesis presented in Section 4.2 of this report: that the strongly performing Water Boards are those who serve strongly performing municipalities, and that an assessment of the ability of a Water Board to borrow requires an assessment of the vulnerability of the municipal areas underlying that Water Board.

4.4.3 The impact of expansion

The modelling work conducted for this project assessed the impact of the expansion of footprints on Water Board financial sustainability[11]. In many cases, Water Boards are likely to be expanded out of relatively strong urban municipal bases and into relatively weak rural municipalities.

The analysis presented in this report provides a methodology for assessing the impact of this expansion on the performance of the group of municipalities underlying a Water Board. Given the strong correlation between Water Board performance and municipal performance in the areas served by the Water Boards shown in Figure 25 of this report, the direction of the trend of municipal performance on expansion may have implications for Water Board performance.

The table below shows the composite performance score of between 0 and 9 for the group of municipalities underlying a Water Board under the expansion scenario modelled in this project. This can be compared with the scores in Table 8 in order to assess the impact of expansion on the composite performance scores.

Table 9: Summary of performance of municipalities underlying expanded Water Boards

	Municipal service (excluding Blue Drop)	Financial	Administrative	Total score after expansion	Total score before expansion
Rand	2	2	2	6	6
Umgeni	2	2	3	7	7
Sedibeng	0	1	1	2	3
Lepelle North	0	1	1	2	2
Amatola	1	2	2	5	6

[11] See the case study report produced as Deliverable 4 of the project for further detail.

Bloem	1	2	1	4	4
Mhlathuze	1	2	2	5	5
Magalies	1	2	2	5	5

Two of the areas underlying Water Boards drop a performance score point: Sedibeng drops from 3 to 2, and Amatola drops from 6 to 5. In both cases, the drop is in the score for municipal service.

5 Conclusions and possible ways forward

Water Boards operate in very different contexts and have a significant range in size, and economic activity and spatial form in the areas which they cover. They provide complex infrastructure and function in a complex institutional environment. There are many uncertainties regarding the future role of Water Boards and it is important for decisions on what this role can be to be backed up by sound analysis. The WRC initiative to develop a financial model and test it in eight case studies is an important step in understanding the impact of expansion decisions, with the results providing a useful first assessment of the financial implications, as recorded in this report.

5.1 The Regional Water Boards Model

The RWBM has been shown to be a useful tool but needs to be considered only as a prototype. More work is needed to use it more interactively with Water Boards, improve the model, refine the options to be investigated and improve the data.

5.2 Case study results

The results of the case studies conducted should be treated with significant caution, due to limitations in the datasets used. However, they do highlight the fact that the expansions to Water Boards footprints and activities proposed under the IRR process pose considerable challenges. Expansion will require the Water Boards taking on significant new assets and incurring considerable capital expenditure over the next 20 years. This will place strain on operating accounts, and on the ability to raise capital.

The modelling work conducted here has effectively considered expansion in two directions: 'horizontal' expansion of Water Board footprints, typically expanding from urban into more rural areas; and 'vertical' expansion of responsibilities, most notably Water Boards taking over water resources infrastructure.

Key issues to be addressed, should **horizontal expansion** be considered, relate to the implications for cross-subsidisation. In most cases, horizontal expansion implies expansion from urban areas into rural areas. The viability of many rural schemes is poor. The impact of this expansion on tariffs in the current Water Board footprint, and the limits to cross-subsidisation, must be carefully assessed. This requires a sound assessment of the affordability limits in both the existing and expanded Water Board footprints. The issue of access to grant funding by Water Boards is important in this regard.

The key issues to be addressed should **vertical expansion** be considered are two-fold.

Firstly, water resources assets should be transferred in a carefully managed manner. It is assumed that these resources will be transferred free of charge (in other words, that Water Boards do not have to purchase the assets from DWA). However, water resource schemes have differing viability, with most potable schemes having fairly strong viability but many non-potable schemes having questionable viability. Asset transfer should be staggered, with the more viable potable water schemes transferred first.

Secondly, even should assets be transferred free of charge, transfer carries implications for capital expenditure on rehabilitation. A funding mechanism for rehabilitating these assets, particularly those in poor condition, should be established in order to prevent over-burdening the Water Boards.

5.3 Capital financing indicators

Assessing the ability of an entity such as a Water Board to borrow is a complex process, part art and part science. There are some existing tools that could potentially be adapted to assess Water Boards.

While a comprehensive assessment of capacity to borrow really requires a full shadow credit rating exercise, a fairly standard set of indicators can be used to obtain a first assessment. This set should include financial indicators complemented by organisational indicators. Data to calculate the organisational indicators was not available for the analysis here. Using the financial indicators for the eight Water Boards included as case studies for this project suggests that Rand, Umgeni and Mhlathuze would have relatively strong ability to borrow; Bloem and Sedibeng would have moderate ability; and Lepelle North, Amatola and Magalies would have little or no ability to borrow.

When considering the implications of expansion, an assessment of the performance and structure of the municipal areas into which the Water Boards are being asked to expand is vital.

5.4 Possible ways forward

It is proposed that the most suitable option for taking this work forward would be for DWA to encourage use of the RWBM and for the Water Boards to fund updates and improvements to the model data themselves.

With regard to indicators for assessing the ability of Water Boards to access capital finance, the **development or adaptation of a shadow credit rating tool** would appear to be of significant interest. Some existing tools are already available (WaterCAT and MuniCAT) but further investigation should be undertaken into intellectual property rights issues regarding these tools, and options for adapting and applying them to Water Boards in South Africa. Such work is probably most appropriately undertaken by National Treasury or the Water Boards themselves.

References

DCOG (Department of Cooperative Governance) (2012) *A barometer to differentiate municipalities for support*, unpublished Draft Report 4.2

NALAS (Network of Associations of Local Authorities of South-East Europe) *Guidelines on Local Government Borrowing and Recent Developments in South East Europe* [on-line] available at http://www.nalas.eu/borrowing/4.html [accessed on 10 August 2012]

WASREB (Water Services Regulatory Board) and WSP (Water and Sanitation Programme) (2011) *Financing urban water services in Kenya: Utility shadow credit ratings*

WSP (Water and Sanitation Programme) (2008) *African Water Utilities Regional Comparative Utility Creditworthiness Assessment Report*.

WSP (Water and Sanitation Programme) and WOP (Water Operators Partnership) *Water Utility Vulnerability Index,* Presented at the Southern African Utility Benchmarking Workshop, 11 July 2011

Zirogiannis, N., Moffitt, L.J., Danilenko, A., Rop, R. and L. Otiego, *Consolidated Score of Water Utility Performance and Vulnerability: APGAR and WUVI*, Presented at the International Water Week, Amsterdam, The Netherlands, 3 November2011

Appendix A: Workshop attendance and programme

Workshop date: Tuesday 16 October 2012

Workshop venue: Leriba Lodge, 245 End Avenue, Clubview, Centurion

Attendance

Name	Organisation	Email address
Xola Bomela	Amatola Water	xbomela@amatolawater.co.za
Craig Thompson	Amatola Water	cthompson@amatolawater.co.za
Mokutu Kgwale	Bloem Water	mokutuk@bloemwater.co.za
Johann Killian	Lepelle Northern Water	jokank@lepelle.co.za
Aloious Chaminuka	Lepelle Northern Water	aloiousc@lepelle.co.za
Carel Schmahl	Lepelle Northern Water	carels@lepelle.co.za
Thoane S	Magalies Water	thoanes@magalieswater.co.za
Paul Pillay	Rand Water	ppillay@randwater.co.za
Shanita Budhoo	Rand Water	sbudhoo@randwater.co.za
Hendrick Nkosi	National Treasury	Hendrick.Nkosi@treasury.gov.za
Sizani Moshidi	DWA	MoshidiS@dwa.gov.za
G Ramorula	DWA	RamorulaG@dwa.gov.za
Peter Sekgothe	DWA	SekgotheP@dwa.gov.za
Rafat Khan	Midvaal Water	khan@midvaalwater.co.za
Jay Bhagwan	WRC	jayb@wrc.org.za
Ian Palmer	PDG	ian@pdg.co.za
Kim Walsh	PDG	kim@pdg.co.za
Johan Kruger	Afcap Consulting	johan@afcapconsult.co.za

Programme

10am to 10.30am	Introduction and background to project K5/2086/3	Jay Bhagwan
10.30am to 11.00am	Overview of findings of preliminary runs of the Regional Water Boards Model (RWBM)	Ian Palmer
11.00am to 11.30am	Discussion	All
11.30am to 1.00pm	Overview of the RWBM	Kim Walsh
1.00pm to 2.00pm	**Lunch**	
2.00pm to 2.30pm	An introduction to the theory of capital financing indicators: Borrowing ability, borrowing capacity and credit ratings	Johan Kruger
2.30pm to 3.00pm	Presentation of preliminary capital financing indicators	Kim Walsh
3.00pm to 3.30pm	**Tea**	
3.30pm to 4.30pm	Discussion of capital financing indicators for Water Boards	All
4.30pm to 5.00pm	Closure and way forward	Jay Bhagwan

Appendix B: Rand Water (East Central RWB) case study overview

Current situation

Current Water Board operations

The map below shows Rand Water's existing supply area.

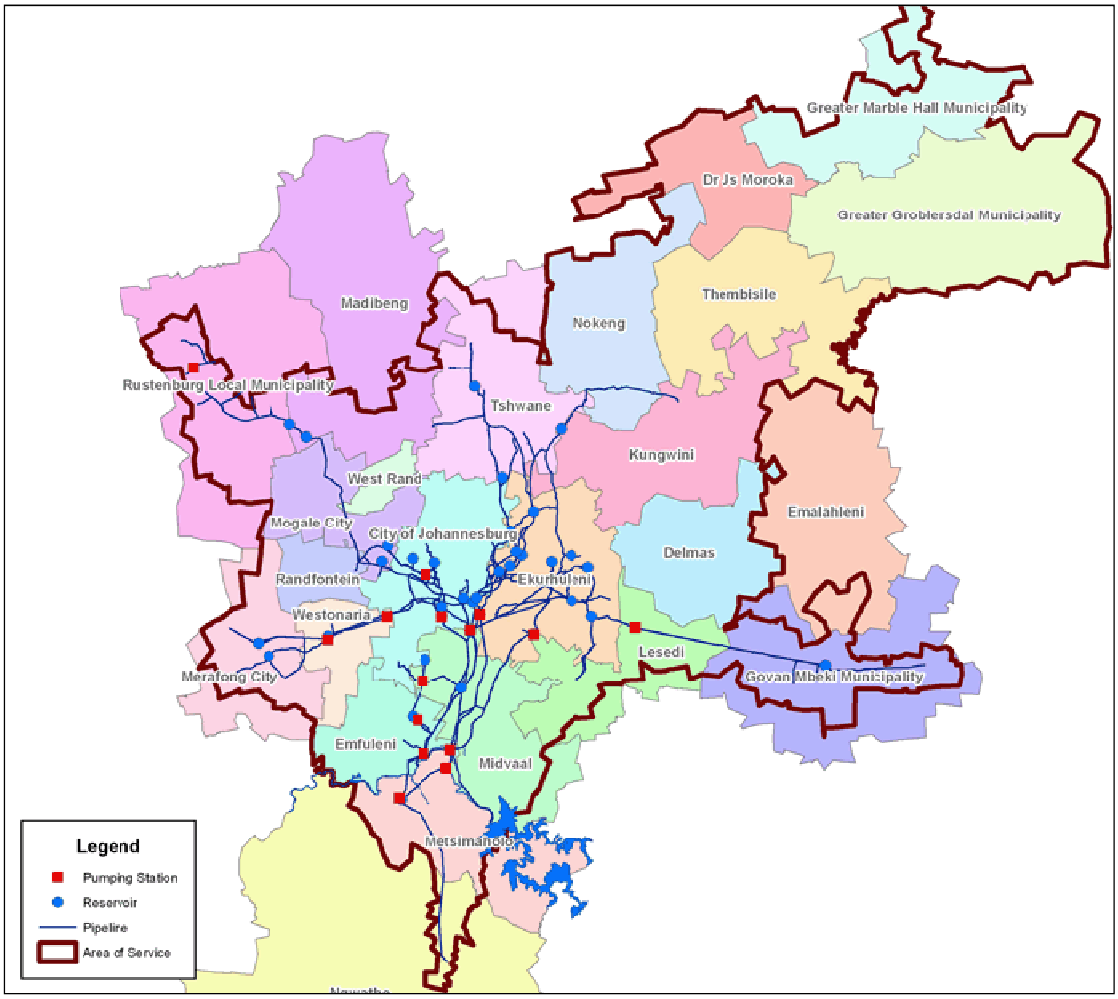

Figure 26: Map showing Rand Water's existing supply area

The water board has been in existence for a century serving the economic centre of the country and it remains by far the largest water board in South Africa. Figure 26 illustrates Rand Water's expansion over recent decades, which was driven primarily by the population and economic growth in its area of supply. The progression in supply areas include Govan Mbeki (supply to Secunda driven by industrial demand related to Sasol 2) and Rustenburg (driven by demand from the mining oriented economy of the area).

Table 10 depicts that 88% of the water supplied goes to the three Gauteng metros and Emfuleni Local Municipality.

Table 10: Volume of bulk potable water supplied, per municipality

Municipality	Volume supplied (Ml per annum)	% split of volume
City of Johannesburg	504 643	37.5%
Ekurhuleni	344 773	25.6%
City of Tshwane	250 066	18.6%
Emfuleni	84 270	6.3%
Rustenburg	35 675	2.7%
Mogale City	27 512	2.0%
Govan Mbeki	25 166	1.9%
Westonaria	17 337	1.3%
Metsimaholo	14 558	1.1%
Midvaal	11 118	0.8%
Merafong City	9 820	0.7%
Randfontein	8 917	0.7%
Lesedi	6 150	0.5%
Ngwathe	1 935	0.1%
Victor Khanye	1 486	0.1%
Madibeng	759	0.1%
Total	**1 344 185**	**100.0%**

In addition to supplying bulk potable water, Rand Water also supplies 87 000 Ml/yr of non-potable water and 27 000 Ml/yr of potable water direct to industries. Rand Water is involved in the retail of a small amount of water to other customers, excluding mines and industries. Rand Water also provides support to JS Moroka and Thembisile municipalities to run the Western Highveld scheme.

Current financial performance

According to the 2010/11 Financial Statement, Rand Water generated a revenue of R5 888 112 and a profit of R543 426 for the year. Rand Water's financials display a profit margin of 9% and a return on investments (ROA) of 6%.

Municipal water services in the region

With the exception of the Western Highveld and Bushbuckridge areas, all the other municipalities in the region are largely urban and have managed their own bulk supplies in the past (assuming Rand Water does not supply).

In the case of bulk supply of potable water the 'retailer' is the municipality in all of the area under consideration, although Rand Water does supply a few non-residential customers with water. With the exception of the very small parts of Limpopo province supplied from the West Highveld scheme, all of the metros and the local municipalities are Water Services Authorities (WSAs). Therefore district municipalities do not have a direct role to play unless contracted to do this by the LMs.

Existing water resources arrangements

The existing water resources infrastructure owned by DWA which is within the region (or at least in contact with it) is shown in the table below, categorised as national, regional and local.

Table 11: Water resources schemes located in the region

WR schemes in footprint	Type	CRC (R million)	O&M cost (Rm/pa)	Transfer priority
National				
Slang River GWS	National	686	16.82	
Usutu River GWS	National	3 091	33.03	
Usutu Vaal Phase 2 GWS	National	707	15.86	
Usutu-Vaal GWS	National	4 917	114.23	
Vaal Dam GWS	National	5 769	223.27	
Regional				
Crocodile River GWS (Kwena Dam)	Regional (Thaba Cheu)	1 476	4.91	3 (irrigation)

Pienaars R GWS (Roodeplaat Dam)	Regional (Tshwane)	966	20.62	Magalies system
Sabie River GWS (Inyaka Dam)	Regional (MP304)	688	1.95	1 (potable)
Rietspruit Dam	Regional (MP 312)	67	0.72	Check this
Local				
Acornhoek Dam	Local (MP 325)	13	0.39	1 (potable)
Bronkhorstspruit Dam	Local (Tshwane)	141	2.25	1 (potable)
Casteel Dam	Local (?)	22	0.49	1
Der Brochen Dam	Local (MP 321; LIM 475)	86	0.48	4 (edge of RWB)
Leeukraal Dam	Local (NW 371; Tshwane)	12	0.29	Magalies system
Loopspruit	Local (GT 484)	75	0.70	2
Mapochsgronden GWS	Local (LIM 472)	10	0.36	2
Ohrigstad GWS	Local (MP 321)	146	2.98	2
Rhenoster River	Local (FS 203)	772	4.98	2 (irrigation)
Rust De Winter GWS	Local (LIM 366)	131	6.00	Magalies system
Watervals River GWS	Local (MP 321)	194	1.17	2

Expansion considered

By far the most important activity of the EC RWB is the ongoing provision of bulk water through the Vaal metro bulk supply scheme. This is by far the biggest scheme in the country and is of the highest strategic importance. As noted above the other two bulk regional schemes, at much smaller scale, are the Bushbuckridge and Western Highveld schemes. In the case of Western Highveld this will mean that the RWB will have to take ownership of the scheme which has already been transferred by DWA to the municipalities. (This may be made possible through new legislation relating to regional schemes). Alternately this can be done through a 30 year concession contract.

With respect to water resources the *two regional schemes* which can be transferred are Sabie (centred in Inyaka Dam), primarily a potable water scheme[12], and the Crocodile River scheme (Kwena Dam) which is largely an irrigation scheme. In the latter case there will be a water user association[13] responsible for operating the distribution system. But the dam itself will require operation by the RWB. And the responsibility for rehabilitation of the distribution system assets will fall to the RWB, subject to a funding arrangement being agreed with DWA.

Local water resources schemes

The possible transfer of the 8 local water resources schemes is also considered feasible (combined asset value of about R2 billion).

Case study model results

Water demand

The projected profile of water demand growth into the future is shown below. Average growth in demand is estimated at 2.3% per annum.

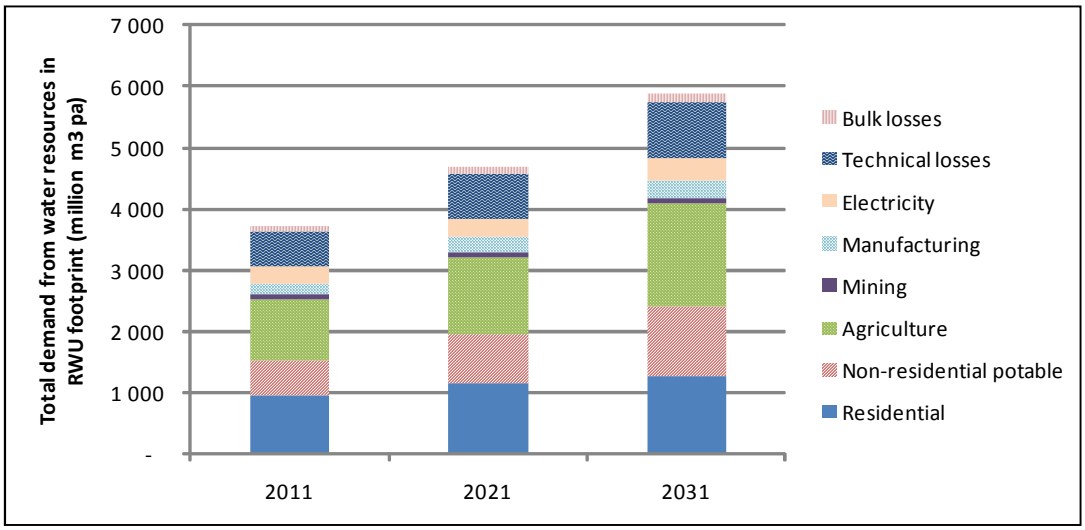

Figure 27: Water demand from water resources in RWB footprint

Projections estimate that non-residential water demand increases by the greatest proportion (99% from 2011 to 2031), followed by agriculture demand (71%), while mining demand decreases by 2% over this same period.

The demand from water resources due to RWB operations is shown in the table below.

[12] Still to be confirmed

[13] Functioning of Water User Association still to be checked.

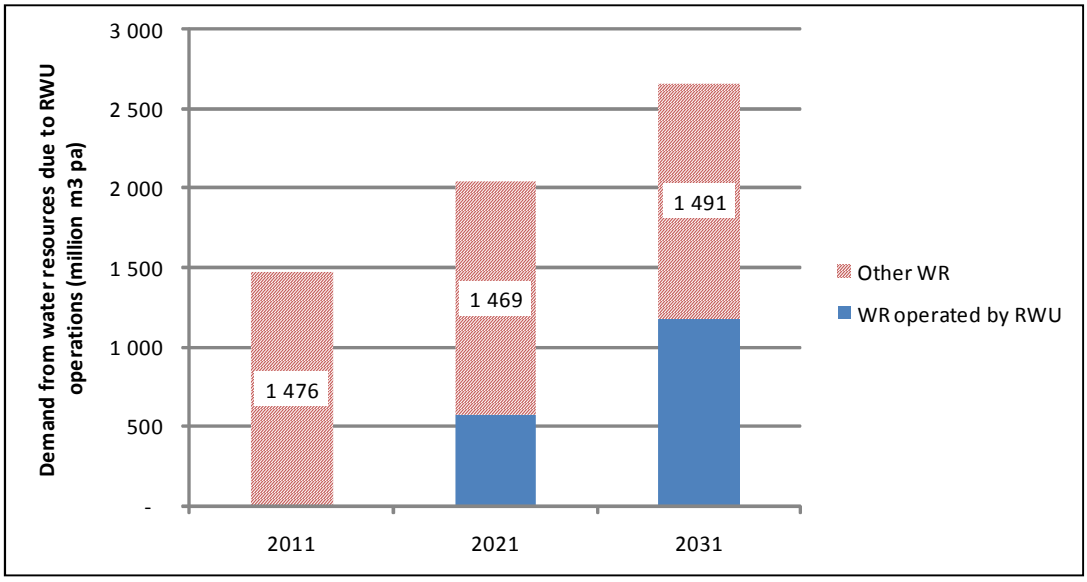

Figure 28: Water demand from water resources due to RWB operations

Asset values

The projected value of assets managed by the RWB is shown below.

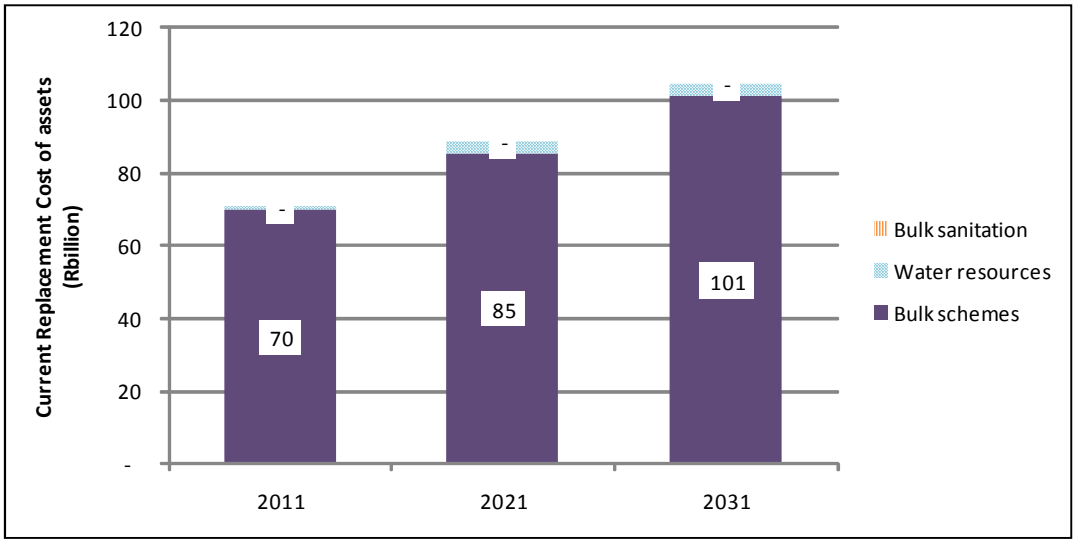

Figure 29: Current replacement cost of assets

Rand Water's existing assets are valued at R70 billion[14]. These are expected to increase to R101 billion in 2031.

The drivers for the increase in asset value are shown in the following table. The water resources assets proposed for transfer from DWA are valued at R4.3 billion.

[14] Based on benchmarks for the sector this is a high figure.

Table 12: Summary of asset value changes

	2011-2021	2021-2031
	R billion	R billion
Increase in CRC	**18.2**	**15.8**
Capex by RWB	13.8	15.8
Transfer of assets	4.3	

Operating expenditure

It is anticipated that the RWB will experience considerable growth in operating expenditure over the coming 10 years (4.8% in real terms) as it expands the existing operations of Rand Water and takes on new responsibilities.

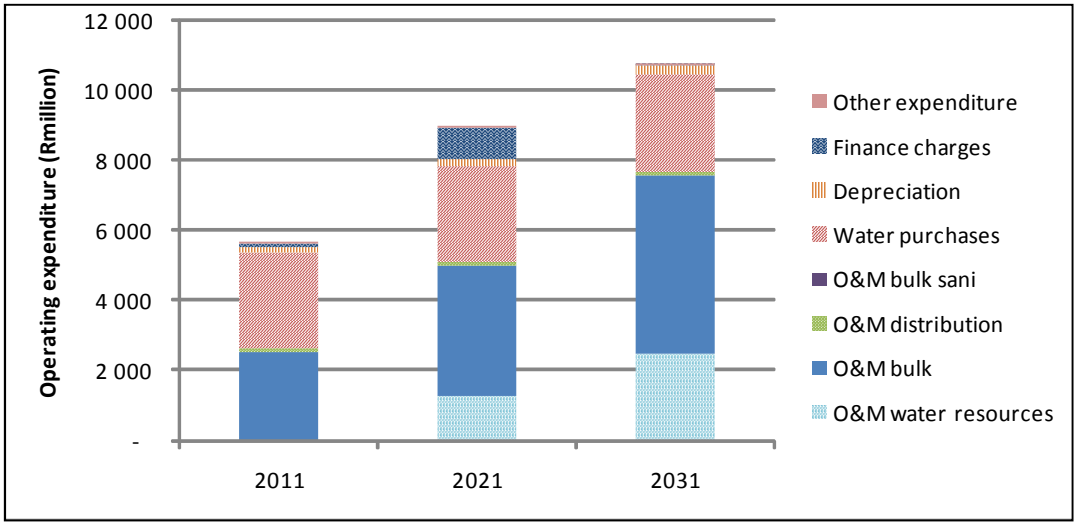

Figure 30: Operating expenditure

Operating profit per activity

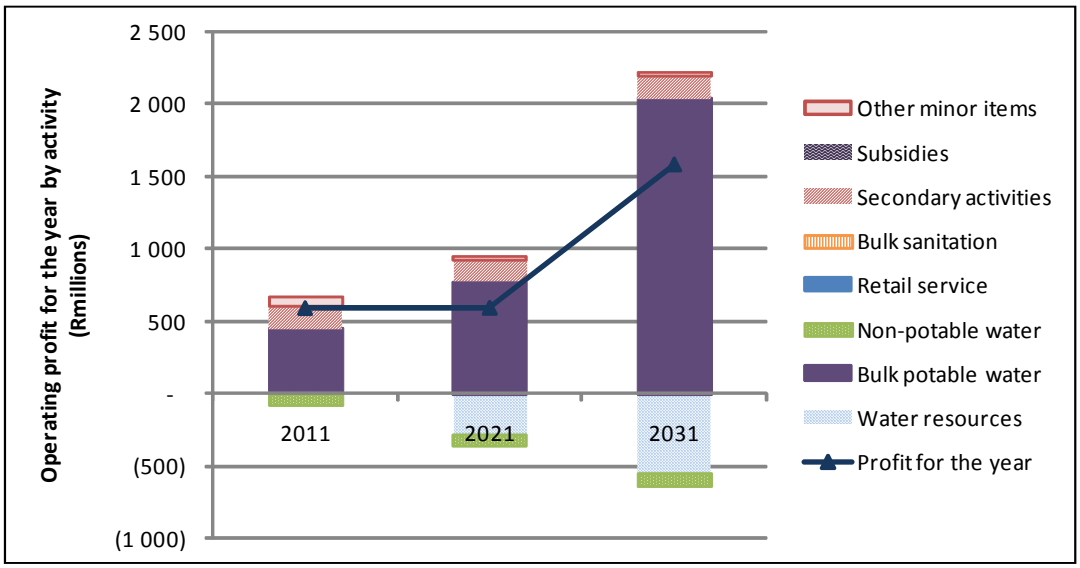

Figure 31: operating profit by activity

This projection is based on an assumed 1.3% p.a. real increase in bulk potable water tariffs between 2012 and 2021.

Capital expenditure

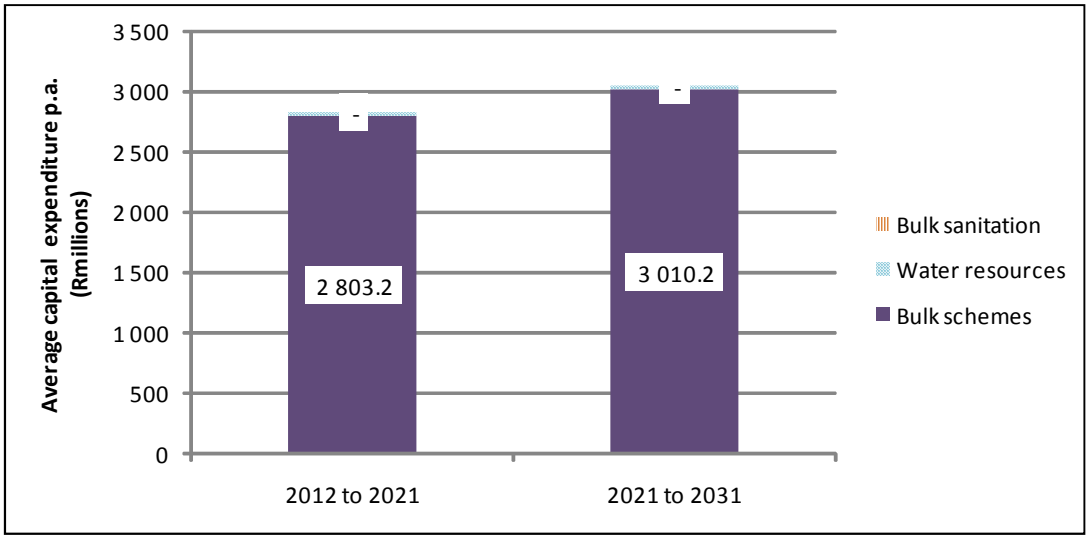

Figure 32: Average capital expenditure per annum

Capital expenditure of the order of R3 billion a year is anticipated, mostly for the expansion of the bulk water supply scheme and rehabilitation of existing bulk water assets.

Capital finance

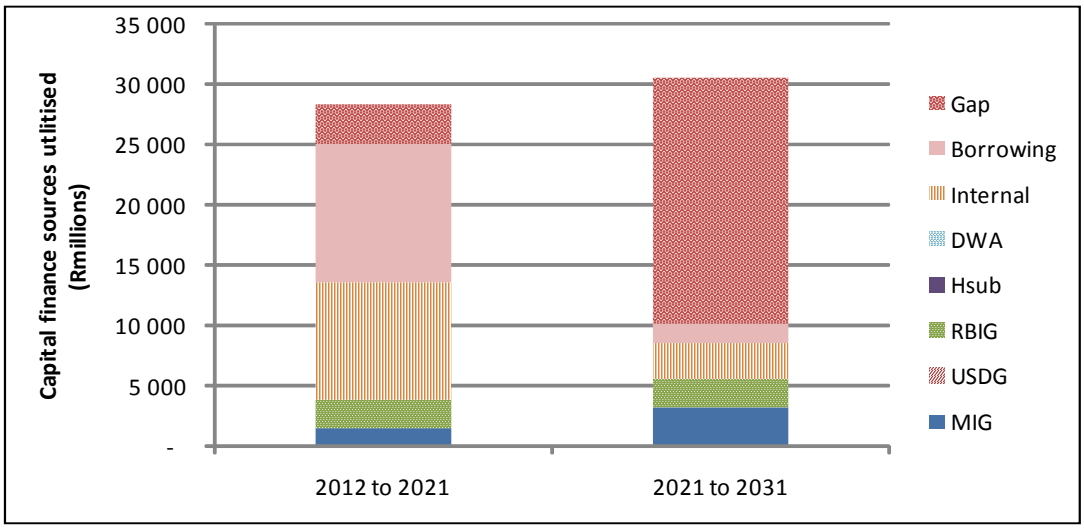

Figure 33: Capital finance sources utilised

At this stage the capital finance analysis is speculative. As can be seen from the graphs little provision is made for grant finance (MIG and RBIG funding) and no funding from DWA is included for rehabilitation of the water resources assets the RWB will take over. The analysis indicates a high level of reliance on internal reserves to fund the capital programme complemented with high levels of debt finance. The ability of the RWB to raise some R11 billion in debt finance over the coming 10 years may be just possible but will probably be very difficult.

Even with this high level of reliance on reserves and debt finance the analysis indicates that there is a gap in funding available. This will lead to a risk that assets are not properly rehabilitated.

Appendix C: Umgeni Water (Eastern RWB) case study overview

Current situation

Current Water Board operations

Umgeni Water was established in 1974, taking over assets previously owned by the City of Durban with the motivation that it could become a regional water supplier to what was then considered under Apartheid policies as an 'independent' country.

The continued expansion of demand for water has been driven primarily by the population and economic growth in its area of supply but Umgeni has expansion plans in the districts if Illembe, Sisonke, Ugu an Umgungundlovu. These are largely rural areas and schemes in these areas are expected to have low levels of water requirements for relatively costly schemes.

The current volume of bulk water is displayed in Table 13.

Table 13: Current Bulk Water Supply by Municipality

Current supply area	Municipality name	Bulk potable demand	Supplied by WB	Supplied by others
		2011	**2011**	**2011**
		Ml pd	**Ml pd**	**Ml pd**
Total		**1 750**	**1 159**	**591**
ETH	Ethekwini	945	900	45
KZN225	The Msunduzi	177	160	16
KZN291	Mandeni	28	11	16
KZN292	KwaDukuza	38	27	11
KZN293	Ndwedwe	7	3	4
KZN294	Maphumulo	4	2	3
KZN221	uMshwathi	10	8	2
KZN222	uMngeni	16	13	3
KZN227	Richmond	8	6	2

Current supply area	Municipality name	Bulk potable demand	Supplied by WB	Supplied by others
		2011	2011	2011
		Ml pd	Ml pd	Ml pd
KZN226	Mkhambathini	5	4	1
KZN211	Vulamehlo	3	2	0
KZN212	Umdoni	13	10	2
KZN213	Umzumbe	11	9	2
KZN434	Ubuhlebezwe	6	2	3

Umgeni Water currently operates four wastewater works: Darvill, Ixopo, Howick and Albert Falls South and audits their effluent compliance, as well as that of the small Albert Falls North Works. Umgeni Water also provides support (tertiary services) to a number of municipalities in its service area.

Current financial performance

Umgeni generated a revenue of R1 663 043 and a profit of R 540 672 for the 2010/11 year. Umgeni's financial statements reveal a 33% profit margin and a 13% return on investments.

Municipal water services in the region

Within the local municipalities, where Umgeni is currently supplying bulk water, it is estimated that they supply 90% of the bulk water with the remainder supplies from local sources (boreholes, etc.) or by municipalities. In the Ugu district to the south, Ugu runs its own bulk supplies but also gets water from Umgeni. In the Illembe inland (rural) areas and Sisonke the supply is mainly under the control of the district WSAs with Illembe DM having a substantial 'in house' service provider unit.

Existing water resources arrangements

The existing water resources infrastructure owned by DWA which is within the region is shown in the table below, categorised as national, regional and local.

Table 14: Water resources schemes located in the region

Scheme name	Significance	Asset value (R million)	Operating cost (Rm/yr)
Tugela-Vaal GWS	National	3 090	107.0

Scheme name	Significance	Asset value (R million)	Operating cost (Rm/yr)
Mooi Mgeni Rivers GWS	Regional	367	4.8
Tugela River GWS	Regional	668	3.0
Umgeni River GWS	Regional	3 120	12.1
Total regional (3 schemes)		**4 155**	**20**
Bizana Dam	Local	15	0.5
Bushmans River GWS	Local	485	3.4
Hammersdale Dam	Local	15	0.5
Mdloti River GWS	Local	558	0.4
Mnyamvubu River GWS	Local	163	2.5
Ngagane River GWS	Local	352	4.6
Qedusizi GWS	Local	488	0.4
Singisi Dam	Local	79	0.4
Total local (8 schemes)		**2 157**	**13**

Expansion considered

Water services

The area under consideration comprises the whole of southern KZN Province up to the Tugela River on the coast. It includes the eThekwini Metro and all the districts of KZN excluding uThungulu, Zululand and UMkhanyakude. It also includes the Alfred Nzo district in the Eastern Cape and one local municipality in OR Tambo district in the E Cape; Nqutu Hill. Expansion of water services activity is defined by the following logic:

- Building on Umgeni Water as the core water board for the coastal areas centred on eThekwini. Umgeni Water's current area of operation includes the supply to the metro complex of eThekwini and Msunduzi as well as the coastal strip down the South Coast (to Amanzimtoti) and up the North Coast to Dolphin Coast in Illembe district. It also serves part of the Sisonke district

and Umgungundlovu district. Umgeni currently supplies water to the Ugu district municipality which runs its own water services undertaking.

- Taking over responsibility for water services previously run by the uThukela Water Partnership which includes the districts of uThukela, Amjuba and Umzinyathi.
- Extending into the Eastern Cape, specifically Alfred Nzo district and Ngquzu Hill LM where Umgeni Water has current activities.

Water resources schemes

With respect to water resources the *two regional schemes* which can be transferred are the Umgeni and Mooi-Mgeni, both being large potable water schemes.

The possible transfer of the 8 local water resources schemes mentioned above is also considered feasible (combined asset value of about R2 billion).

Case study model results

Water demand

Average growth in demand between 2011 and 2021 is 3.1%, while growth slows to 2.5% between 2021 and 2031, as shown in Figure 34.

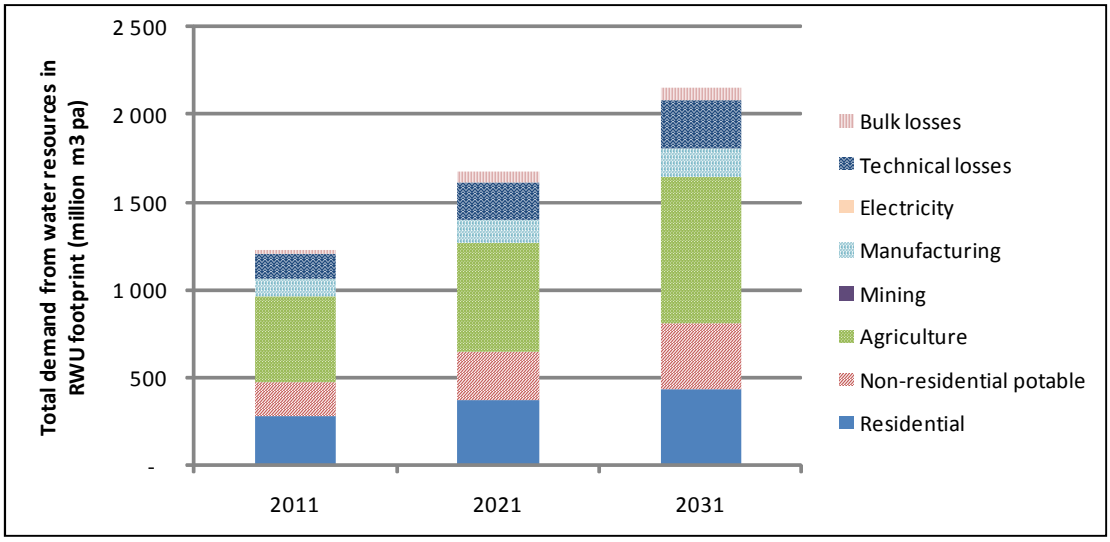

Figure 34: Total demand from water resources in RWB footprint

Projections show that bulk losses, experience the highest growth rate (193%) in the first decade, increasing from 22million m3 in 2011 to 65million m3 in 2021.

The demand from water resources due to RWB operations is shown in the table below.

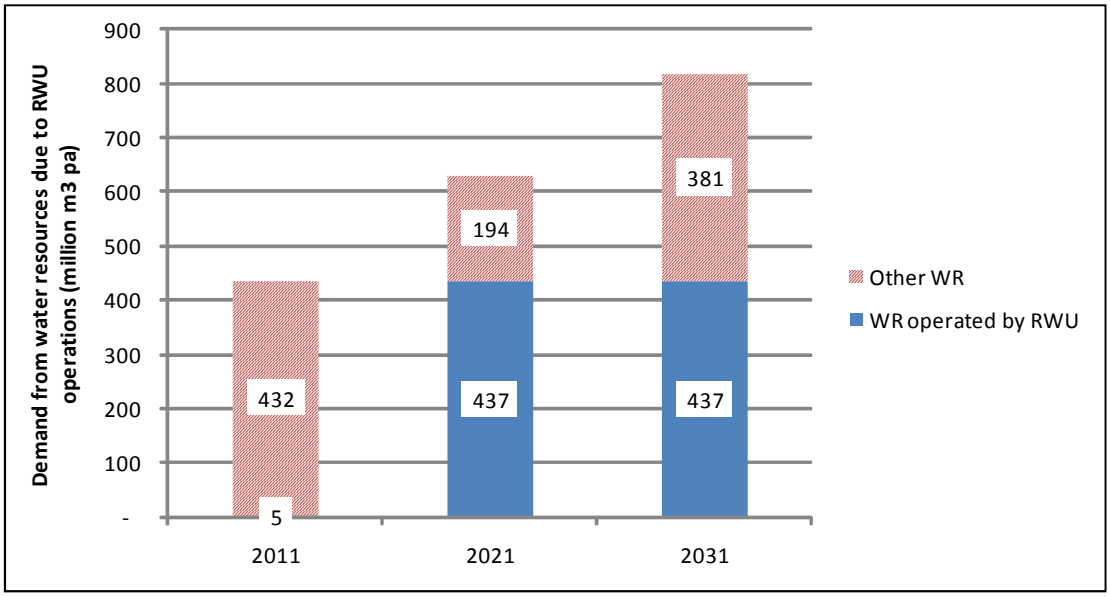

Figure 35: Demand from water resources due to RWB operations

Average growth in demand is 3.7% between 2011 and 2021 and 2.6% per annum from 2021 to 2031.

Asset values

The projected value of assets managed by the RWB is shown below.

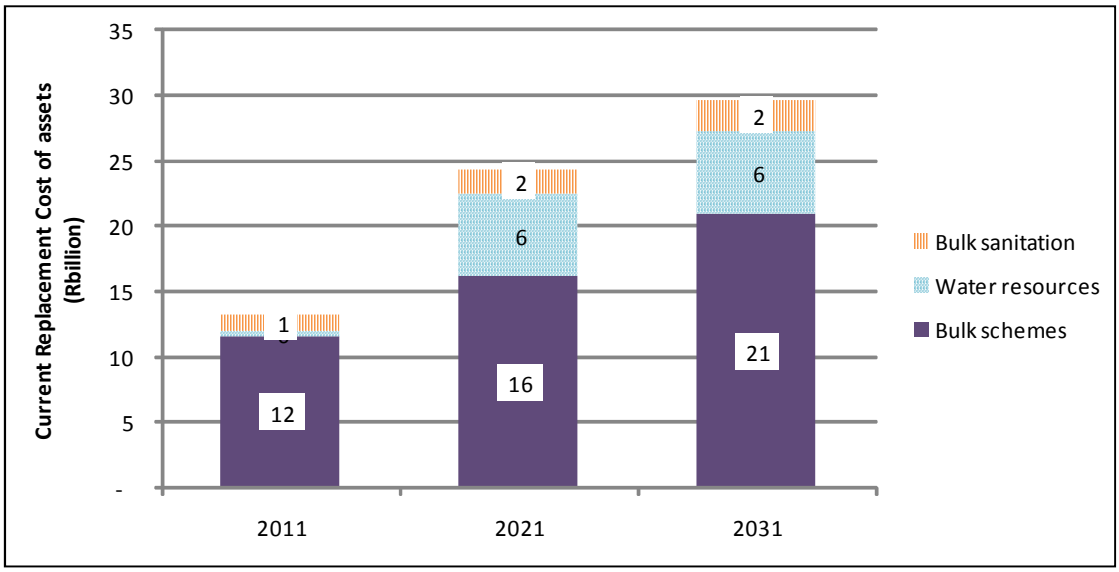

Figure 36: Current replacement costs of assets

It is projected that the current replacement costs of bulk schemes will increase 80% over the two decades, bulk sanitation replacement costs will increase by 73%. It is estimated that the value of water resources will increase from R0.35 billion in 2011 to R6.38billion in 2031.

The drivers for the increase in asset value are shown in the following table.

	2011-2021	2021-2031
	R billion	R billion
Increase in CRC	**11**	**5**
Capex by RWB	5	5
Transfer of assets	6	

Operating expenditure

Projected operating account trends are shown below:

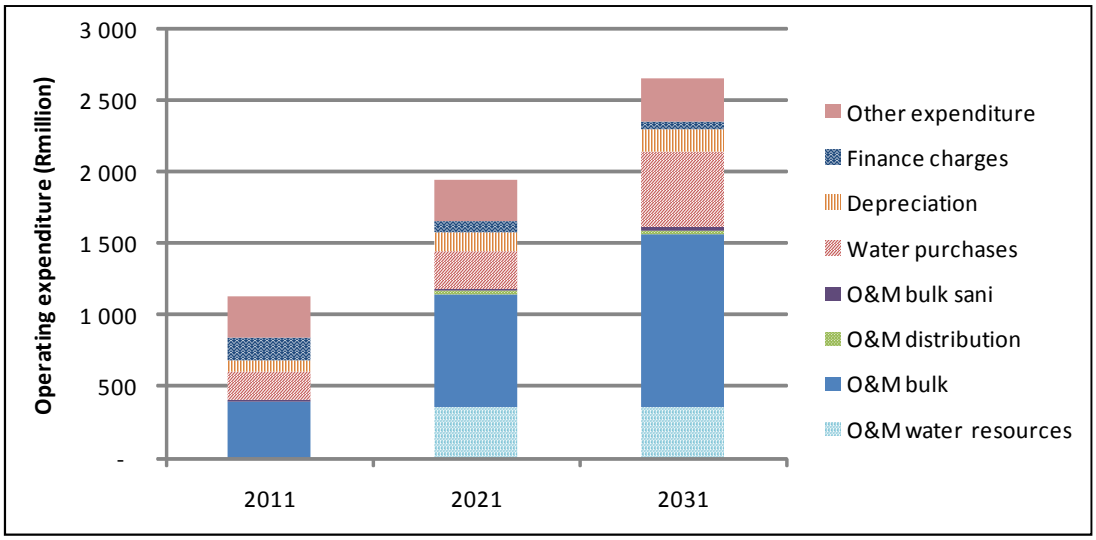

Figure 37: Operating expenditure trends

It is anticipated that the RWB will experience high growth over the coming 10 years (5.5% in real terms) as it expands the existing operations of Umgeni Water and takes on new responsibilities.

Operating surplus per activity

The model allows for each activity to be analysed separately with the results shown below (with the line showing the net position for all activities combined):

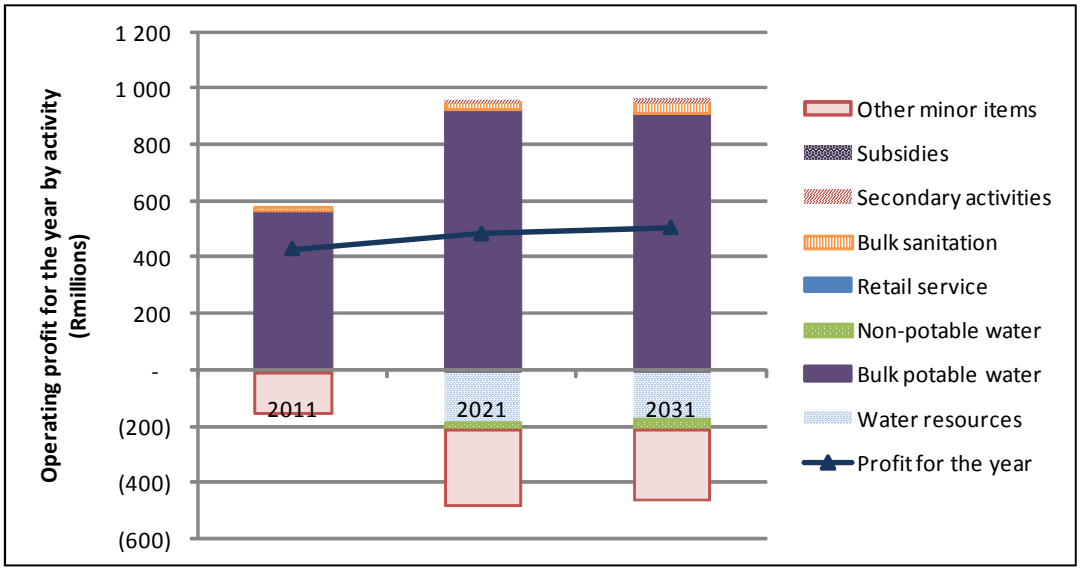

Figure 38: Operating surplus trends by activity

With regard to profitability, this will depend to a large extent on the ability to get real increase in bulk supply tariffs of 2.0%, in real terms, for which there may be resistance. At this stage it is indicated that the water resources infrastructure will be loss making in addition to the non-potable water component and other minor items.

Capital expenditure

Capital expenditure requirements are projected as follows:

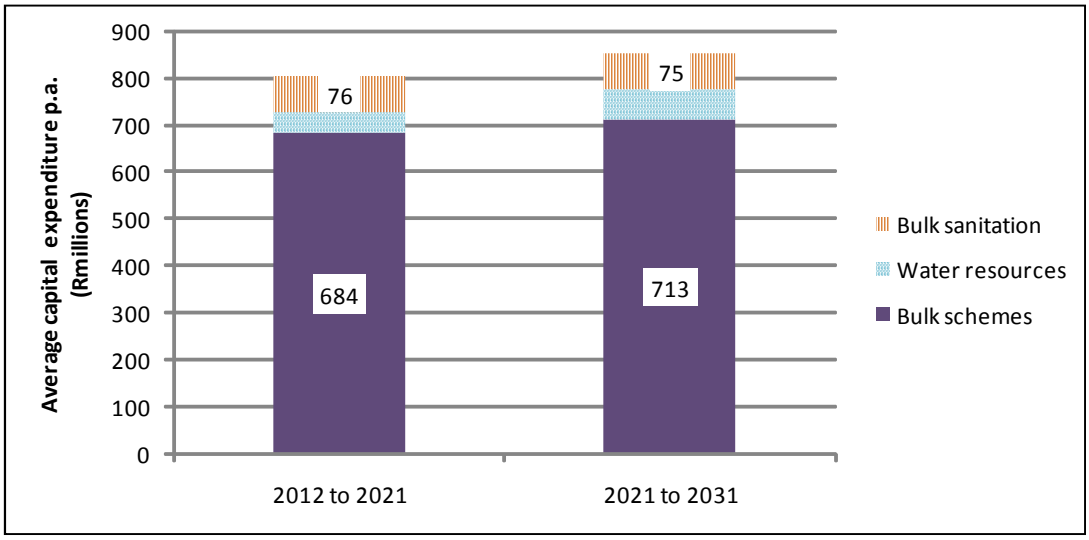

Figure 39: Average annual capital expenditure over 10 year periods

Capital expenditure of the order of R800 million a year is anticipated, mostly for the expansion of the bulk water supply scheme and rehabilitation of existing bulk water assets.

Capital finance

Capital finance projections are shown below:

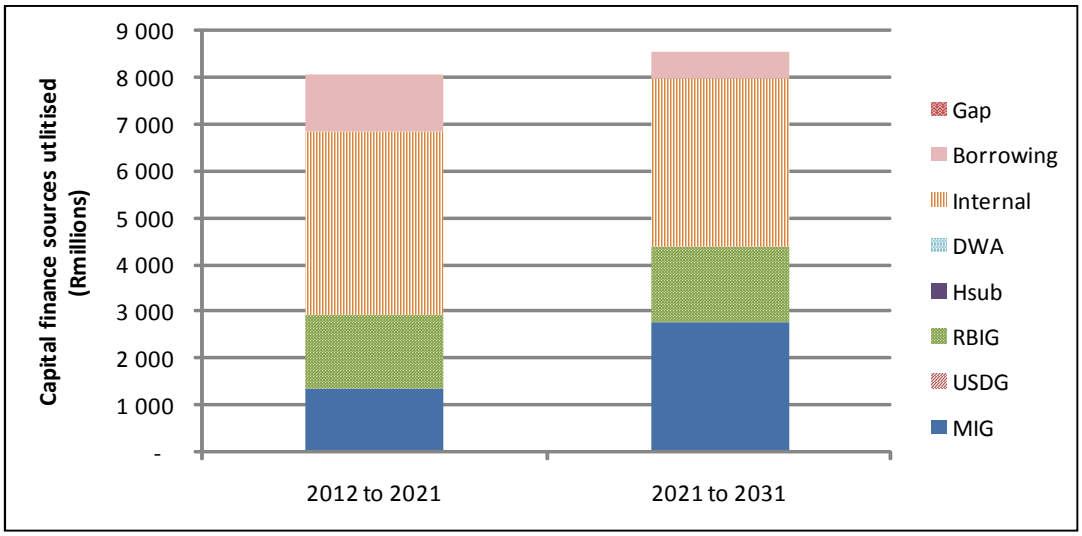

Figure 40: Capital finance sources utilised

At this stage the capital finance analysis is speculative. As can be seen from the graphs that substantial provision is made for grant finance (MIG and RBIG funding) but with no funding from DWA included for rehabilitation of the water resources assets the RWB will take over. The analysis indicates a high level of reliance on internal reserves to fund the capital programme complemented with substantial levels of debt finance. The ability of the RWB to raise some R1.2 billion in debt finance over the coming 10 years is probably achievable.

Appendix D: Sedibeng Water (Western RWB) case study overview

Current situation

Current Water Board operations

A map showing the Sedibeng supply area is shown below.

Figure 41: Current Sedibeng Water supply area

The supply area shown on the map does not include the full extent of the service area which extends to the Atlantic Ocean in the West. This incorporates the area formerly served by the Namaqua Water Board which has been disestablished.

Sedibeng Water owns and operates the following bulk water supply schemes.

Table 15: Current Sedibeng bulk water supply schemes

Scheme	Sales estimate (Ml/d)	Water source	Assumptions about areas served
Balkfontein	160	Vaal River (Balkfontein WTW) and Sand Vet scheme (Virginia WTW)	Mining supply is 29% of total. Scheme serves Free State goldfields in Matjabeng LM, parts of Nala LM in the Free State and parts of Maquassi Hills Lm in the North West.

Vaal Gamagara	39	Vaal River (62%) and groundwater sources.	Northern Cape municipalities: Francis Baard DM, John Taolo DM, Tsantsabane LM, Dikgatlong LM, Gamagara LM
Vaalharts grouping	67	Not clear. Presumably Harts R. Mostly surface water; some groundwater. Podimoe system in Naledi LM is dominant (46 Ml/d)	Greater Taung and environs.
Namakwa	10	Orange River	Namakwa coastal LMs

Sedibeng Water also operates three small wastewater treatment plants (largest 4Ml/d). It provides a retail service in Phokwane LM (26 000 people), Ga-Segonyana LM (70 000 people) and Greater Taung (310 000, mostly rural areas with communal standpipes).

Current financial performance

Sedibeng's financial statements for 2010/11 reveal a total revenue of R403 143 and an total profit of R44 265 for the year. This translates as a profit margin of 11% and a return on investment of 2%.

Municipal water services in the region

Sedibeng Water supplies 48% of the bulk water requirement in the region. Many of the smaller urban centres manage their own bulk systems and the majority of rural areas rely on boreholes for their supply.

Existing water resources arrangements

The existing water resources infrastructure owned by DWA which is within the region is shown in the table below, categorised as national, regional and local (see main report for definitions).

Table 16: Existing water resources infrastructure within the region to be served by Sedibeng

Scheme name	**Significance**	**Asset value (R million)**	**Operating cost (Rm/yr)**
Middle Vaal GWS	National	1 920	11.6
Sand – Vet GWS	Regional	3 453	1.1
Vaalharts	Regional	2 437	0.9

Scheme name	Significance	Asset value (R million)	Operating cost (Rm/yr)
Total regional (3 schemes)		**7 810**	
Bospoort Dam	Local	165	2.0
Disaneng Dam	Local	257	1.4
Loopspruit	Local	115	1.1
Lotlamoreng Dam	Local	50	0.5
Mankwe Dam	Local	125	0.5
Middelkraal Dam	Local	8	1.2
Nooitgedacht Dam	Local	10	0.3
Orange River – Kakamas	Local	828	0.2[15]
Orange River – Upington Islands	Local	465	0.2
Schoonspruit GWS	Local	39	6.2
Setumo Dam	Local	441	1.4
Sterkstroom GWS (Buffelspoort Dam)	Local	102	3.3
Total local (12 schemes)		**2 606**	

Expansion considered

By far the most important activity of the Western RWB is the ongoing provision of bulk water, primarily through the Balkfontein, Gamagara and Vaalharts grouping of

[15] The low costs associated with these large schemes are assumed to be associated with the fact that they do not include dams and the remainder of the infrastructure is managed by WUAs. This needs to be confirmed with DWA.

schemes. It is assumed that they will continue to own and operate these and the two smaller schemes (Namaqua and Pelladrift) and over the coming 20 years will expand in other areas as demand grows.

With regard to water resources infrastructure, no provision is made for transferring the two regional water resources schemes as these are considered to be adequately managed under existing arrangements. But the transfer of 10 local water resources schemes is provided for.

Case study model results

Water demand

Total water demand in the area covered by the proposed Western RWB is shown in the figure below.

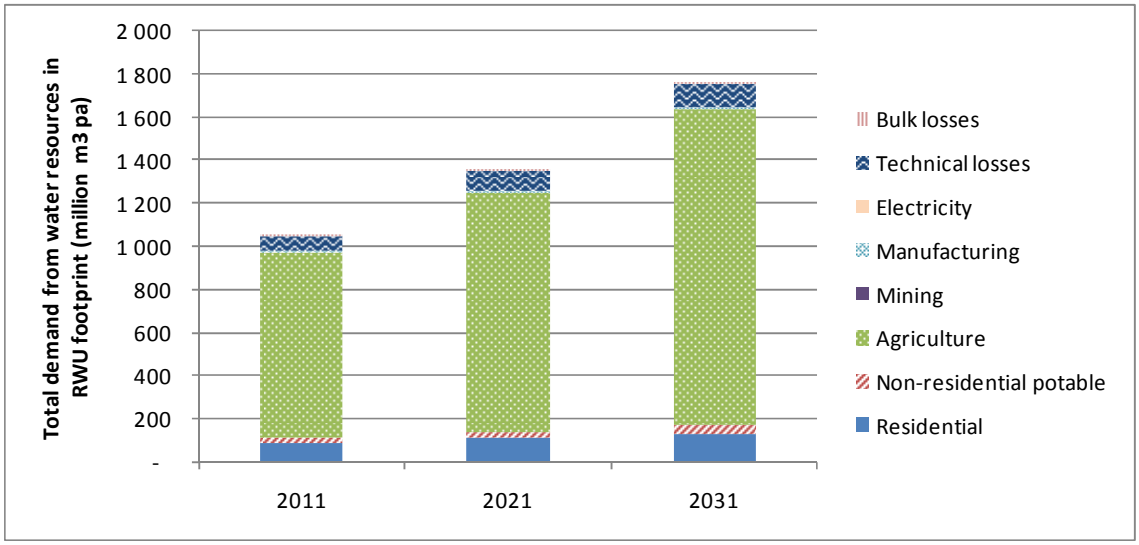

Figure 42: Demand for water within RWU footprint

Water demand grows by about 2.5% p.a.

The water board serves part of this market with the demand from water resources due to Water Board operations is shown in the figure below.

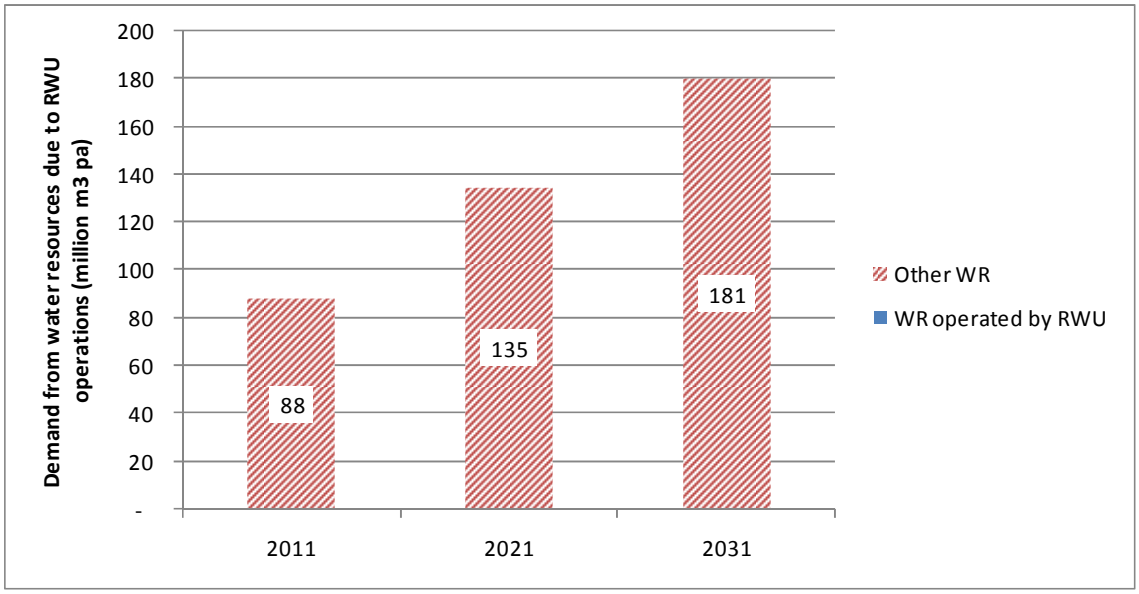

Figure 43: Projected abstraction of raw water (water resources demand)

Asset values

The projected value of assets managed by the RWB is shown below.

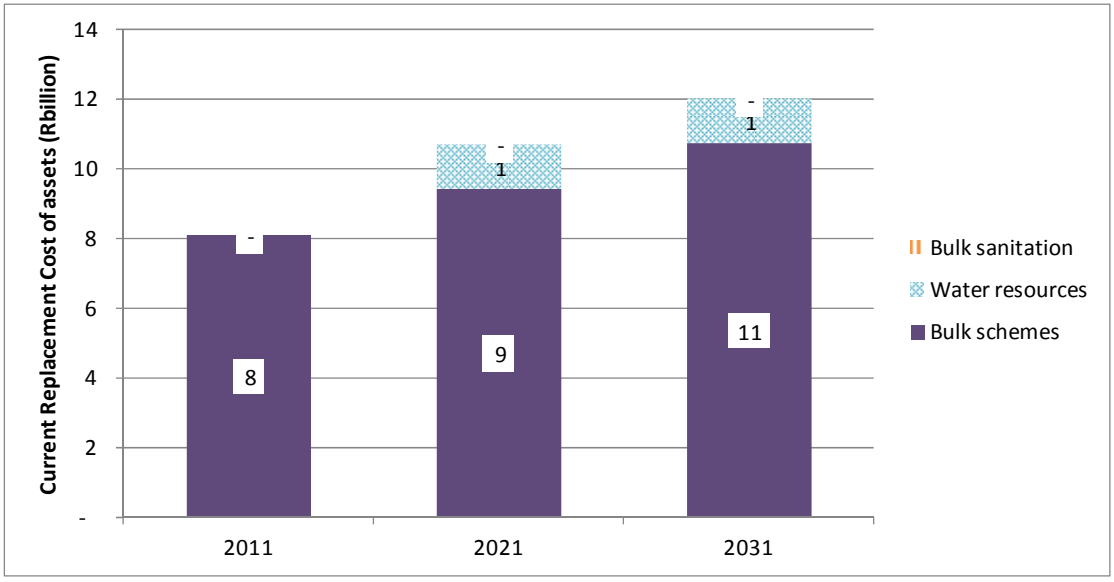

Figure 44: Projected asset values under RWU management

The drivers for the increase in asset value are shown in the following table.

Table 17: Asset value drivers

	2011-2021	2021-2031
	R billion	R billion
Total increase in CRC	**2 .6**	**1.3**
Capex by RWB	1.3	1.3
Transfer of assets	1.3	

The impact of taking over the assets of the specified water resources schemes is significant but not substantial.

Operating expenditure

Modelled operating expenditure results are shown below:

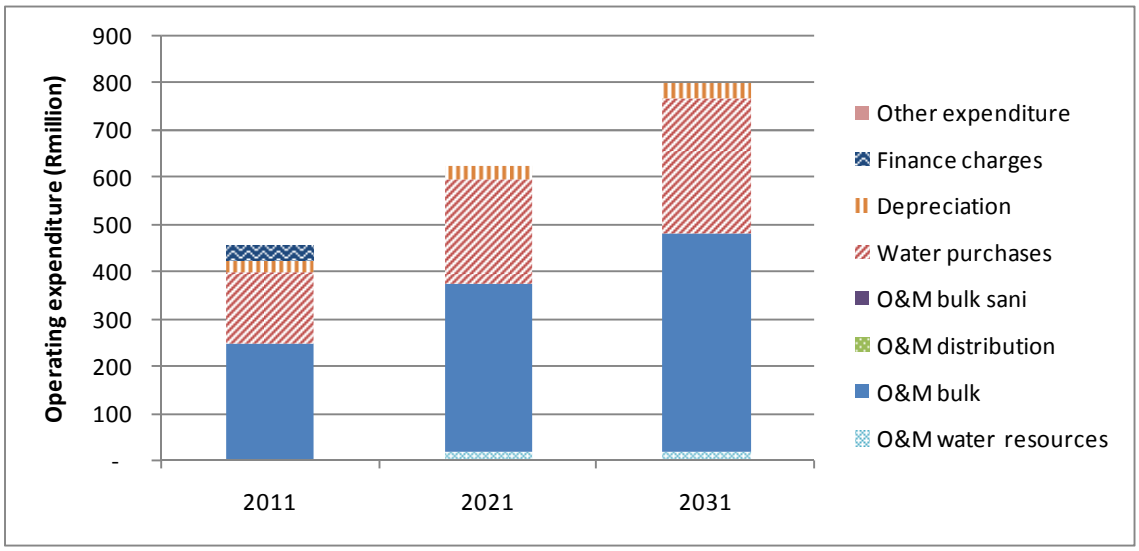

Figure 45: Projected operating expenditure figures

Expenditure is dominated by bulk water supply activities.

Operating surplus per activity

The model allows for each activity to be analysed separately with the results shown below (with the line showing the net position for all activities combined):

Figure 46: *Operating surplus trends by activity*

This projection is based on an assumed 1% p.a. real increase in bulk water tariffs after 2021.

Capital expenditure

Capital expenditure of the order of R300 million a year is anticipated, mostly for the expansion of the bulk water supply scheme and rehabilitation of existing bulk water assets. Some investment in rehabilitation of water resources infrastructure is also required.

Figure 47: *Average annual capital expenditure over 10 year periods*

Capital finance

A possible mix of capital finance is shown below.

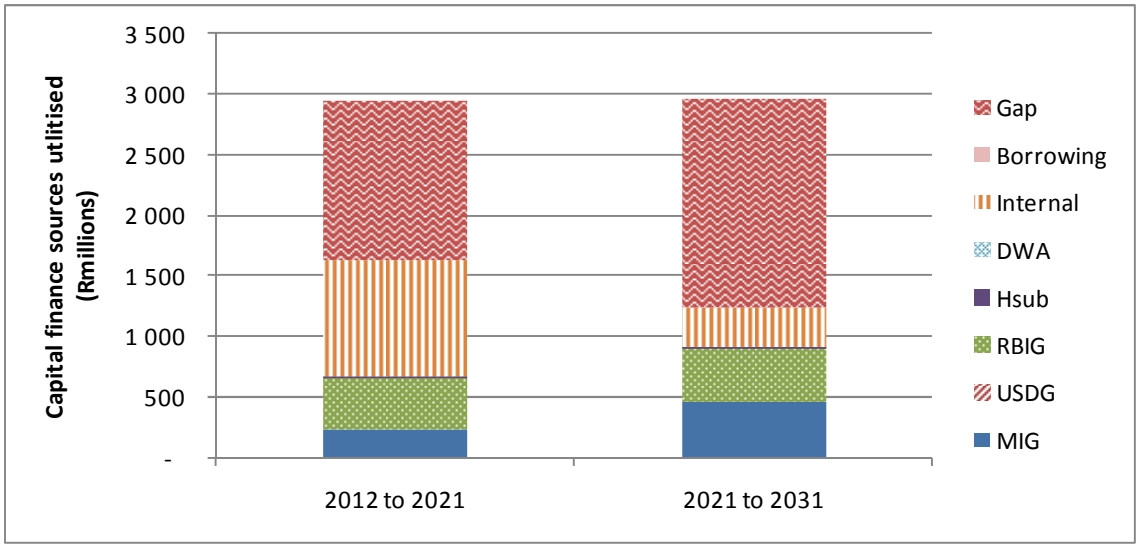

Figure 48: *Capital finance sources utilised*

At this stage the capital finance analysis is speculative. Significant provision is made for grant finance (MIG and RBIG funding) but no funding from DWA is included for rehabilitation of the water resources assets the RWB will take over.

The analysis indicates that Sedibeng will be able to generate some finance from internal reserves. However, a significant funding gap remains, a major concern for the water board and DWA in the future.

Appendix E: Lepelle Northern Water (Northern RWU) case study overview

Current situation

Current Water Board operations

Lepelle Northern Water's (LNW) service area extends to most of the Limpopo Province.

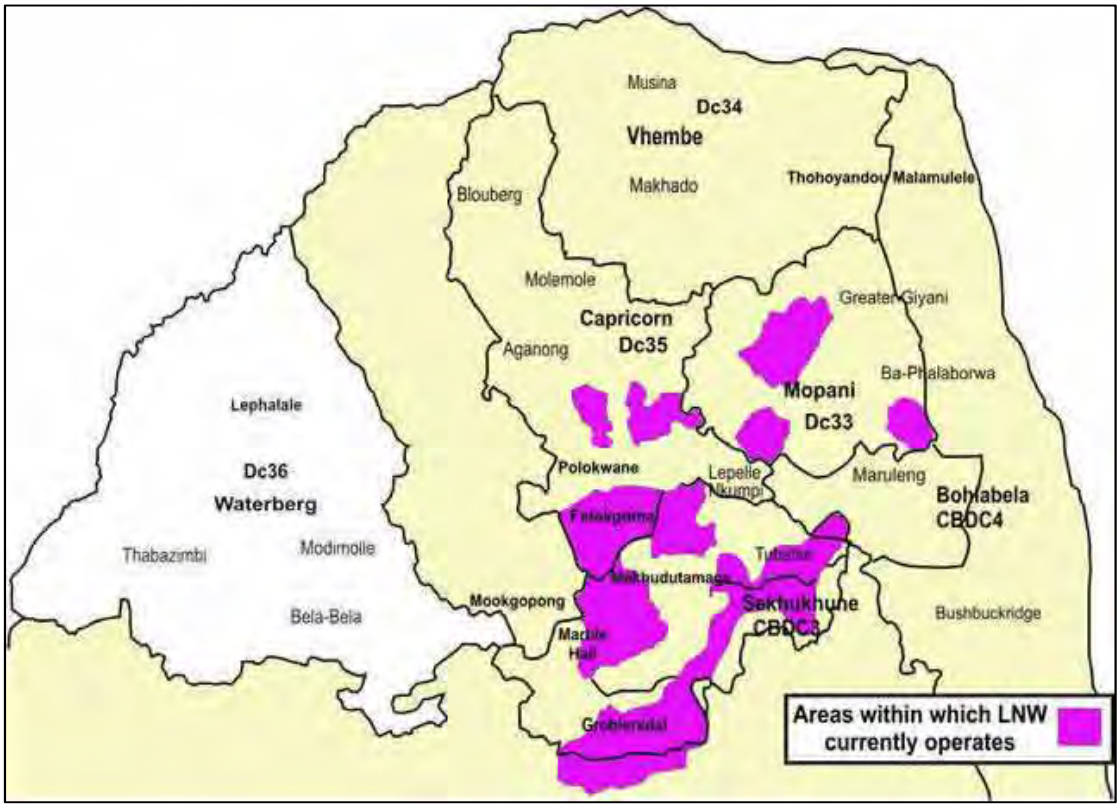

Figure 49: Lepelle Northern Water's current area of operation

It excludes three municipalities in the south west, Modimolle, Bela-Bela and Thabazimbi, which are served by Magalies Water. However, the actual settlements that are served with bulk water from LNW is restricted to the urban areas of Polokwane, Mankweng, Haenertsburg, Phalaborwa, Mokopane, Mahwereleng, Modjadjiskloof, Ga-Kgapane, Burgersfort and Steelpoort, as well as some rural areas along the pipeline routes and in the northern part of Sekhukhune District Municipality (see Figure 49 above).

Approximately 63% of all water supplied by LNW is consumed in Phalaborwa and Polokwane (domestic and industry). The Polokwane area is supplied via the Ebenezer transfer scheme from the Ebenezer Dam in the Letaba Catchment and via the Olifantspoort transfer scheme from the Olifants River in the Olifants catchment. In Polokwane, the water board supplies approximately 1/3 of the total municipal demand for bulk water. In terms of their customer spilt, LNW serves 50% mines and 50% domestic consumers in the Phalaborwa area. In the Waterberg DM, the water board only serves the town of Mokopane in the Mogalakwena LM and does not serve any areas in Vhembe District.

The water board operates 18 schemes, comprising:

- 10 Water Treatment Works (4 owned, 1 co-owned with DWA)
- 3 Wastewater Treatment Works (none owned)
- 5 Borehole schemes (none owned)

Continued expansion of demand for water has been driven primarily by the population and economic growth in its area of supply but LNW has expansion plans in the largely rural areas which exist within it supply area and schemes in these areas are expected to have low levels of water requirements for relatively costly schemes (this is covered in more detail below).

The current volume of bulk water supplied is shown below:

Table 18: Lepelle Northern Water sales

Code	Municipal name	Volume sold 2011 Ml pa
Total		**60 355**
LIM354	Polokwane	20 075
LIM367	Mogalakwena	4 080
LIM475	Greater Tubatse	
LIM471	Ephraim Mogale	
LIM332	Greater Letaba	
LIM333	Greater Tzaneen	3 017
LIM355	Lepele-Nkumpi	9 125
LIM334	Ba-Phalaborwa	22 963
LIM474	Fetakgomo	1 095
LIM473	Makhuduthamaga	

LNW used to be involved in retail services in the Greater Sekhukhune area, but since the Water Service Provider (WSP) function was taken back from the LMs to the DM in 2011, Lepelle Northern's involvement in retail has ceased. It is reported that this retail operation performed well and was able to achieve high levels of payment, but LNW is reluctant to become involved in other retail activities because of the risks involved.

LNW undertakes limited water resources management at present, but, subject to negotiations with DWA, is positioning itself to take over the operations and maintenance of certain schemes, with a much greater level of expansion also tested in the case study analysis as described below.

Current financial performance

The 2010/11 financial statements show that the Lepelle Northern Water generated R 287 994 revenue and R42 462 profit for the year. This translates as a profit margin of 15% and a 5% return on investment.

Municipal water services in the region

All Water Services Authorities (WSAs) in the Northern Region provide some portion of the bulk water supply themselves. Between 2003 and 2008 the DWA transferred a number of bulk water services assets, with a total asset value of R2.4 billion to the WSAs in the Province. Most of these bulk schemes are still being operated by the WSAs. However, there is concern around the continuing lack of capacity for management, operation and maintenance resulting in the decline of assets and associated services of schemes already transferred. This has prompted a cabinet memorandum to be prepared proposing that the high value bulk water services assets be transferred to the Northern RWB once established.

Polokwane is a Water Services Authority and has elected to provide the bulk and retail water services as an internal mechanism for the water supply schemes within their area of jurisdiction. These include the Chuene Maja, Olilfants-Sand and Seshego schemes, which form part of the Olifantspoort water supply scheme. It does, however, purchase water from LNW via the Ebenezer and Olifantspoort schemes.

Capricorn District Municipality is the WSA, but has appointed LNW as the external bulk WSP.

Greater Sekhukhune District Municipality is the WSA but resolved to appoint LNW remained a bulk WSP from the Flag Boshielo and Olifantspoort Schemes. LNW also manage the Burgersfort, Ohrigstad and Steelpoort WTW on behalf of the DM. Although the contracts with the DM have expired, LNW continues to perform this function on an 'interim' basis. The DM remains responsible for the smaller bulk schemes.

Vhembe District Municipality, the WSA, is currently responsible for a significant amount of large scale infrastructure that in the Luvhuvu area and part of the Middle Letaba area, but have very limited capacity to manage this. The schemes are performing very poorly.

Mopani District Municipality, the WSA, has elected to provide the bulk water services as an internal mechanism for water supply schemes which are within their area of jurisdiction, including most of the Middle Letaba area, with the exception of Nkowankowa (Thabina/Ritavi/Tours) and Modjadji (Modjadji), where the bulk water services are provided by Lepelle Northern Water Board on behalf of the DM.

Existing water resources arrangements

The existing water resources infrastructure owned by DWA which is within the region is shown in the table below, categorised as national, regional and local.

Table 19: DWA water resources infrastructure falling in the Northern Region

Scheme name	*Significance*	*Asset value (R million)*	*Operating cost (Rm/yr)*
Blyderivierpoort Dam	Regional	1,004	3.2
Groot Letaba River GWS	Regional	1,258	7.5
Loskop GWS	Regional	1,929	19.4
Luvuvhu River GWS(Nandoni Dam)	Regional	1,383	4.7
Middle Letaba System GWS	Regional	1,092	7.3
Olifants River GWS (Flag Boshielo)	Regional	338	2.8
Sterk River GWS (Doorndraai Dam)	Regional	616	7.8
Tours Dam	Regional	352	0.9
Vondo Dam	Regional	432	0.8
Sub-total regional (9 Schemes)		**8,404**	**55**
Chuniespoort Dam	Loc/reg	69	0.4
Damani Dam	Loc/reg	99	0.6
Luvuvhu River GWS (Malamulele Weir)	Loc/reg	2	0.4
Luvuvhu River GWS (Xikundu weir)	Loc/reg	9	0.4
Mahlangu Dam	Loc/reg	44	0.5
Mahonisi Dam	Loc/reg	12	0.5

Scheme name	*Significance*	*Asset value (R million)*	*Operating cost (Rm/yr)*
Makuleke Dam	Loc/reg	82	0.6
Modjadji Dam	Loc/reg	138	0.8
Mogalakwena River GWS (Glen Alpine Dam)	Loc/reg	335	2.2
Mutale Weir	Loc/reg	43	1.0
Mutshedzi Dam	Loc/reg	56	0.5
Phiphidi Dam	Loc/reg	17	0.7
Politsi GWS	Loc/reg	210	3.4
Seshego Dam	Loc/reg	81	0.7
Thabina Dam	Loc/reg	113	0.5
Thapani Dam	Loc/reg	79	0.6
Tshakhuma Dam	Loc/reg	211	1.6
Vergelegen Dam	Loc/reg	102	0.5
Albasini GWS	Local	373	8.4
Botlokwa Dam	Local	17	0.4
Buffelsdoorn GWS(Mokotswane Dam)	Local	32	0.6
Capes Thorne Dam	Local	27	0.5
Der Brochen Dam	Local	100	0.6
Dr. Eiselen Dam	Local	52	0.7
Duthuni Dam	Local	8	0.6

Scheme name	*Significance*	*Asset value (R million)*	*Operating cost (Rm/yr)*
Houtrivier Dam	Local	61	0.6
Klaserie Dam	Local	93	0.4
Lepellane Dam	Local	120	0.7
Lole Montes Dam	Local	72	0.4
Mapochsgronden GWS	Local	159	5.7
Mashashane Dam	Local	31	0.4
Mkhombo Dam	Local	24	0.2
Nkadimeng Dam	Local	134	0.5
Nwanedi/Luphephe GWS	Local	57	0.8
Nzhelele River GWS (Nzhelele Dam)	Local	51	1.0
Ohrigstad GWS	Local	96	1.9
Palala River GWS (Susandale and Visgat Weirs)	Local	4	0.2
Phiring Dam	Local	16	0.3
Piet Gouws Dam	Local	91	0.5
Rietfontein Dam I and II	Local	44	1.1
Rooikraal GWS	Local	55	2.1
Rust De Winter GWS	Local	8	0.3
Spitskop Dam	Local	13	0.5
Taung Dam	Local	-	0.0

Scheme name	*Significance*	*Asset value (R million)*	*Operating cost (Rm/yr)*
Turfloop Dam	Local	95	0.6
Vaalkop No 2 Dam	Local	74	0.5
Varswater Dam	Local	23	0.5
Watersvals River GWS	Local	23	0.1
Sub-total local (48 Schemes)		**3,656**	**47**

Expansion considered

Water services

By far the most important activity of the NRWB is the ongoing provision of bulk water through the existing and future bulk supply schemes in the area. There are several large regional water supply schemes which DWA is intending to hand over to the water board and there is also the possibility that large schemes previously transferred to WSAs in the area will be 're-transferred' to the water board as the WSAs have proven unable to manage them successfully.

Water resources

With respect to water resources the ***regional schemes*** which can be transferred are those in Table 19 that serve the regional bulk potable schemes.

Local water resources schemes

The possible transfer of the local water resources schemes mentioned above is also included (combined asset value of about R3.6 billion).

Case study model results

Water demand

The projected profile of water demand growth in the supply area into the future is shown below.

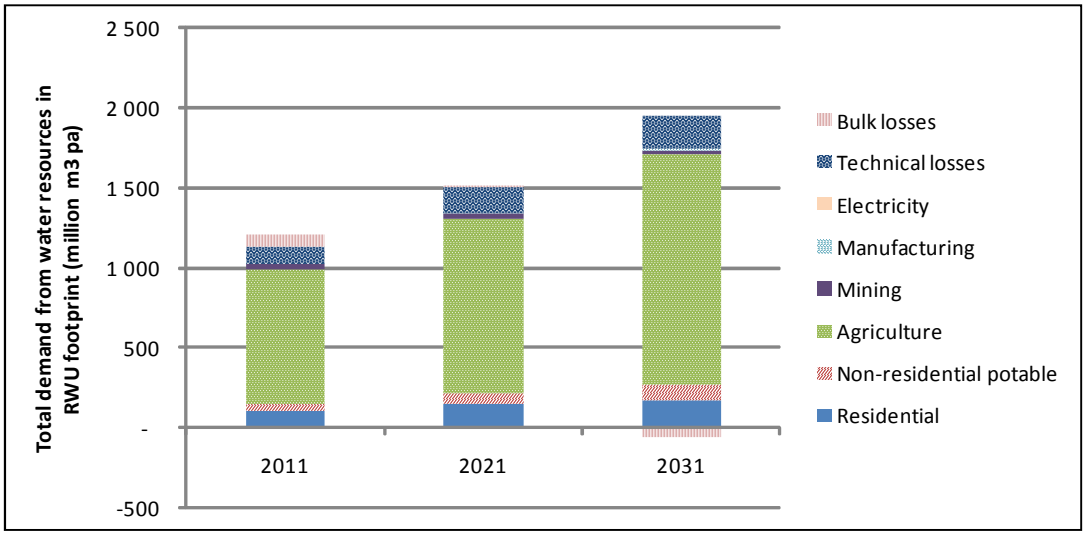

Figure 50: Total demand from water resources in RWB footprint

Average annual growth is projected as 2.3% per annum. In 2011 11% of demand is supplied by the RWB, however this increases to 21% in 2021, with the trend with respect to RWB abstractions shown below.

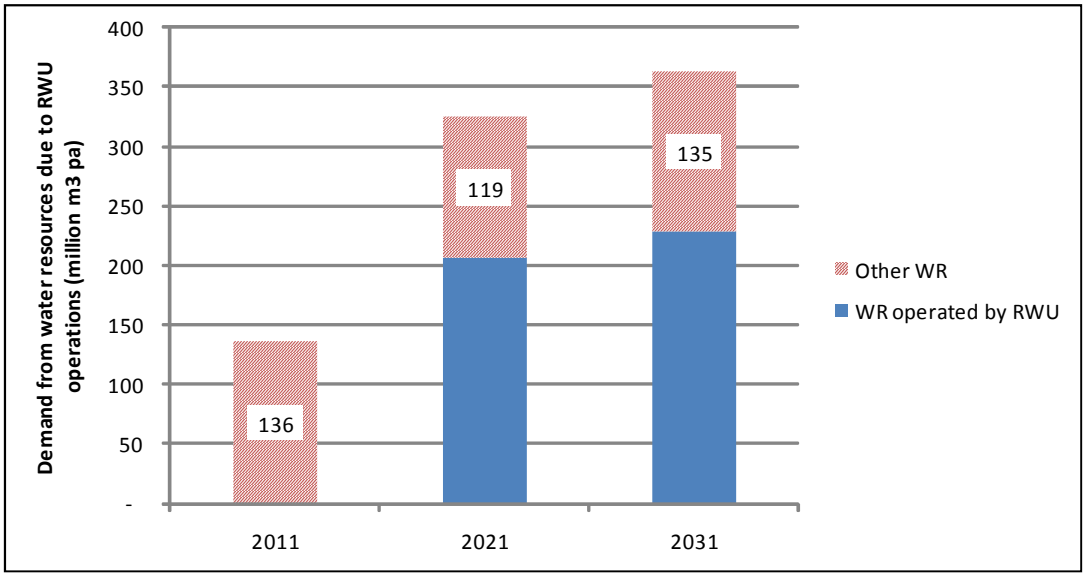

Figure 51: Demand from water resources due to RWB operations

The indication is that the water board may have control over a substantial proportion of its own water resources in the future.

Asset values

The projected value of assets managed by the RWB is shown below.

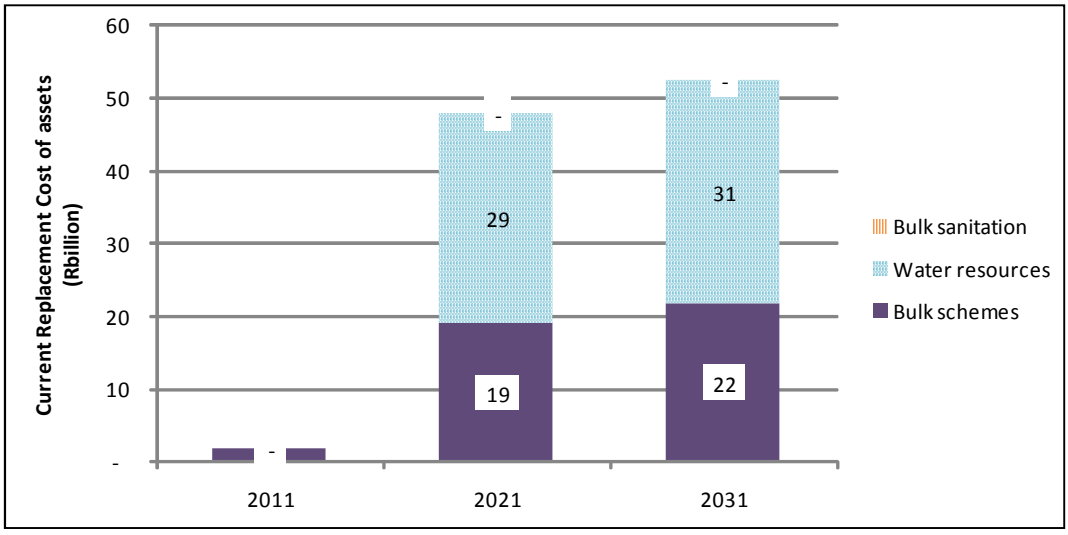

Figure 52: Projection of assets under RWB management

The increase in assets which the water board will potentially own and manage is extremely high. This relates to what is arguably the biggest issue in the water sector at the moment: how to effectively manage the large regional schemes and associated water retail activities in Limpopo Province. For this case study provision is made for a major role to be played by the water board and it is evident that it will need to become a completely different organisation in the transition to a regional entity.

The transition is driven primarily by transfer of assets but also through ongoing investment by the water board as shown below:

Table 20: Summary of asset value changes

	2011-2021	**2021-2031**
	R million	**R million**
Increase in CRC	**46 067**	**4 714**
Capex by RWB	10,025	12 088
Transfer of assets	39 108	

Operating expenditure

The projected operating expenditure results also show a very big step up in the coming 10 years:

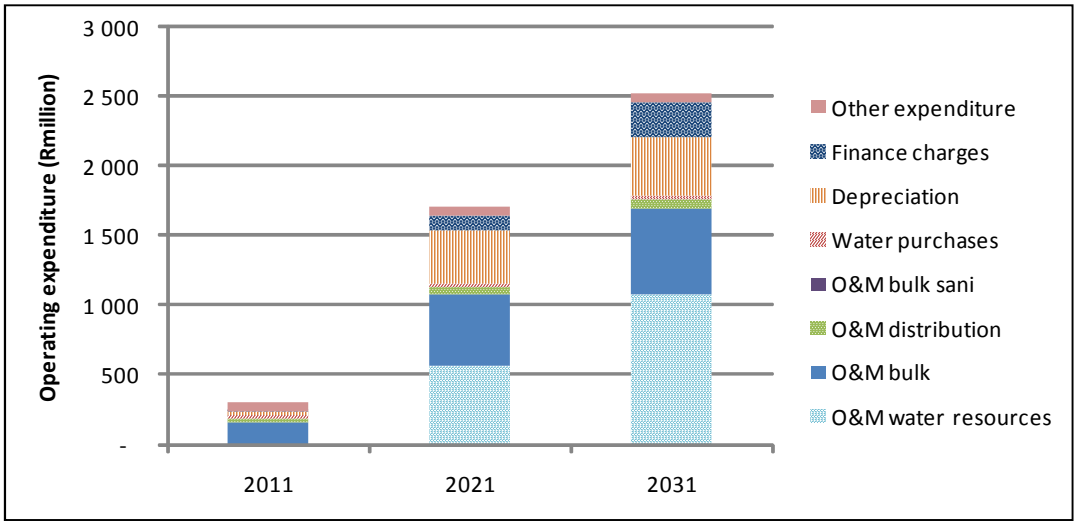

Figure 53: Projected operating expenditure figures for Northern RWB

It is anticipated that the RWB will experience exceptionally high growth over the coming 10 years (18.9% per annum in real terms) as it expands the existing operations of takes on significant new responsibilities.

Operating surplus per activity

The operating surplus per activity is shown in the figure below.

Figure 54: Projected operating surpluses

The results show the water resources account making a deficit which needs to be compensated for by surpluses on the bulk water supply account. To do this the projection is based on an assumed 6.5% p.a. real increase in bulk potable water tariffs between 2012 and 2021 and a 2% real increase between 2022 and 2031.

Capital expenditure

Capital expenditure trends are shown below.

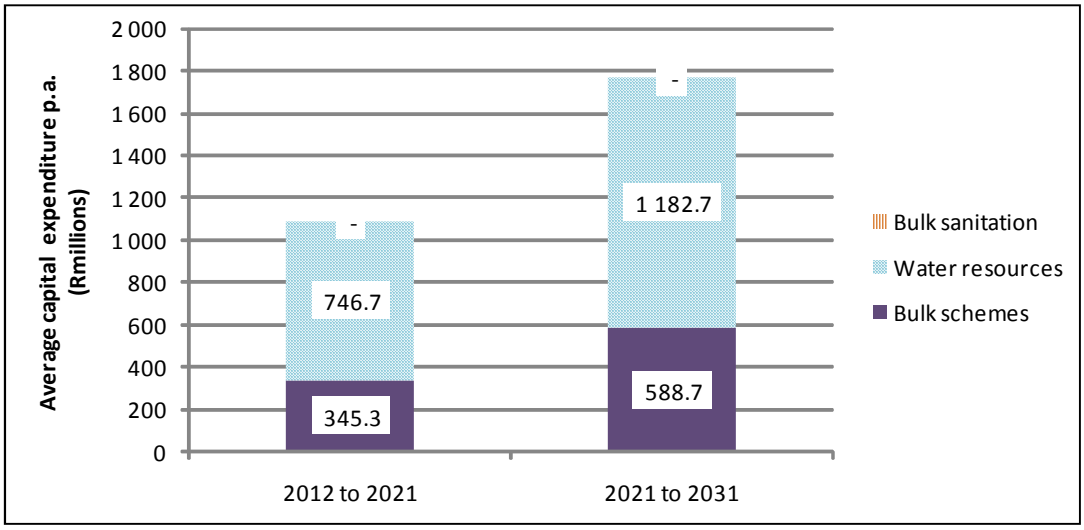

Figure 55: Average annual capital expenditure over 10 year periods

Capital expenditure of the order of R1.1 billion a year is anticipated for the first decade, mostly for the expansion of the water resource schemes and rehabilitation of existing water resources and bulk supply assets.

Capital finance

Capital finance projections are shown below:

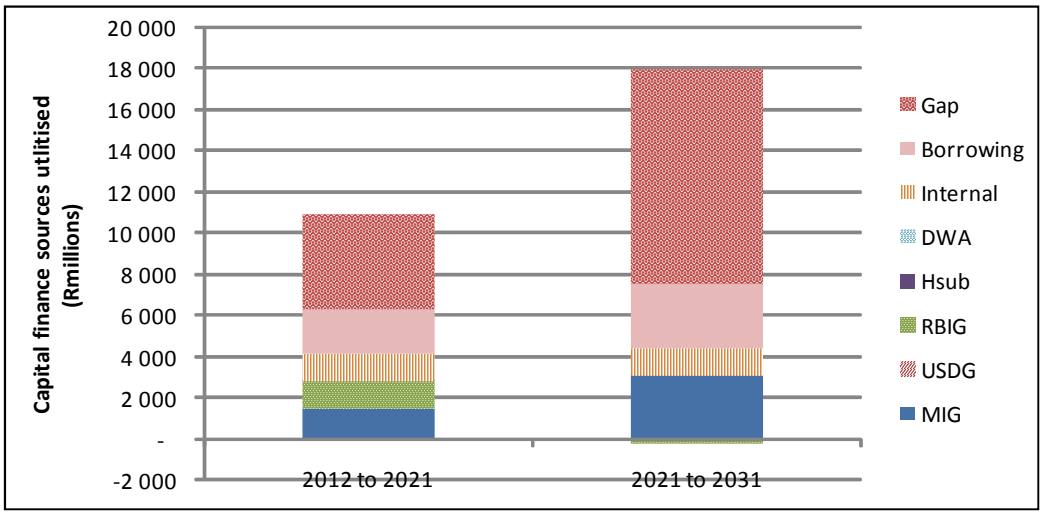

Figure 56: Capital finance sources utilised

At this stage the capital finance analysis is speculative. As can be seen from the graphs that some provision is made for grant finance (MIG and RBIG funding) but with no funding from DWA included for rehabilitation of the water resources assets the RWB will take over. The analysis indicates reliance on internal reserves to fund some of the capital programme, but with the major share being funded with debt finance. The model calculates a cap on the borrowing capacity of the RWB, which then results in a significant capital financing gap, which increases over time. The ability of the RWB to raise capital needs to be interrogated, but the initial analysis would indicate that it will not be able to raise the required capital finance and there are serious concerns about the way this infrastructure will be financed in the future.

Appendix F: Amatola Water (Southern RWB) case study overview

Current situation

Current Water Board operations

The current gazetted area and operational area of Amatola Water is shown in the figure below:

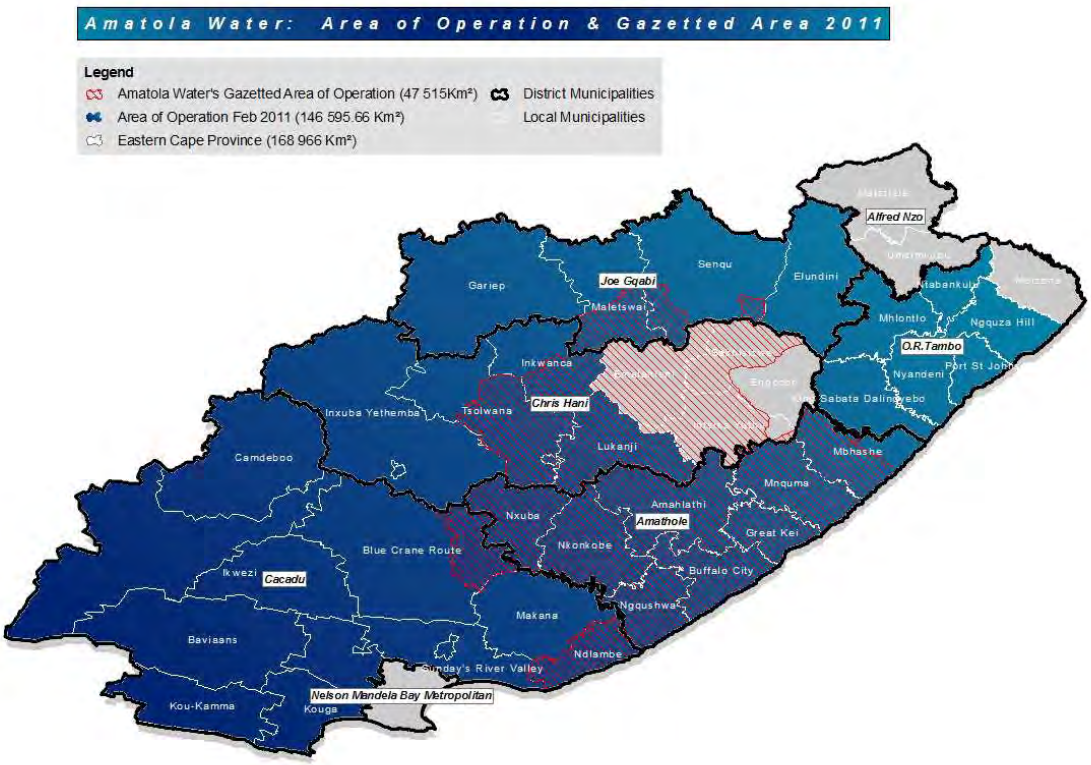

Figure 57: Map showing Amatola Water's existing operational and gazetted areas (Source: Amatola Water Business Plan 2011/15)

Despite a large area of operation, Amatola Water only owns infrastructure and provides (currently defined) primary services in Buffalo City, Amathole District Municipality and Ndlambe Local Municipality, as shown in the figure below. The difference between these two figures is dramatic, and indicates that AW currently undertakes a large amount of (currently defined) secondary activities.

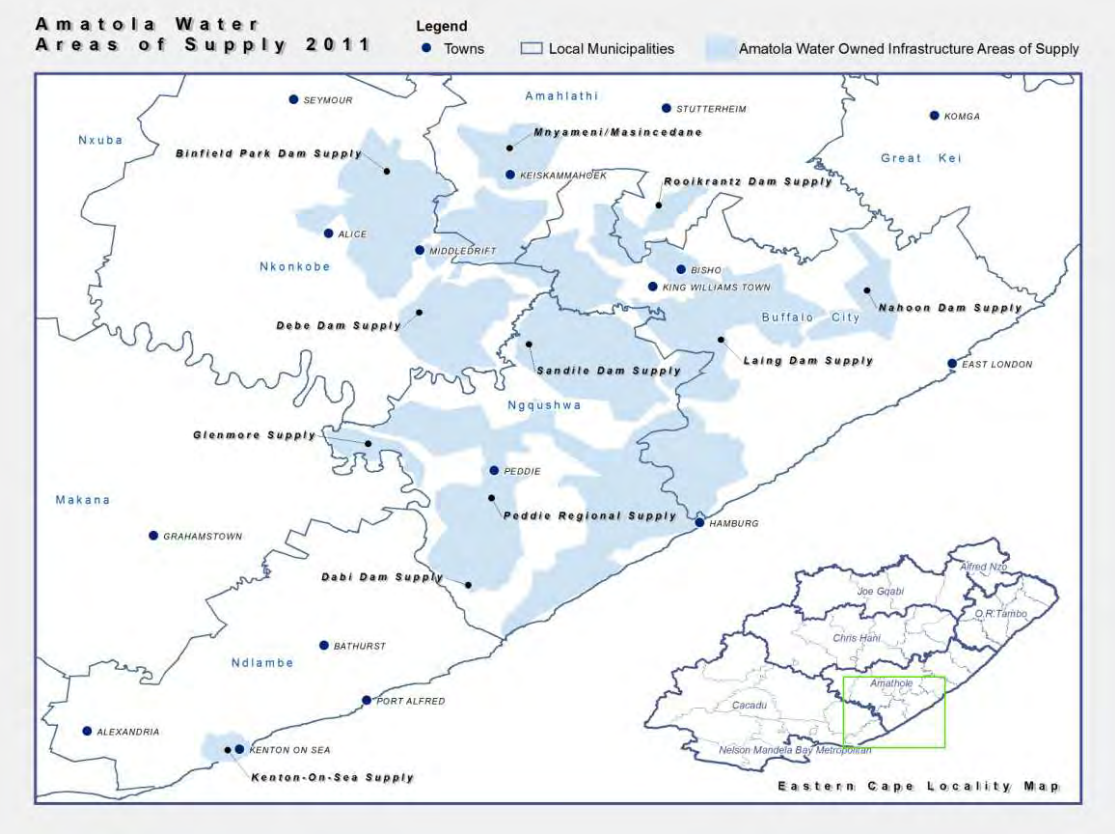

Figure 58: Amatola Water's existing area of primary activity (Source: Amatola Water Business Plan 2011/15)

Amatola Water's two core customers are BCM and ADM, with which it has bulk water supply contracts. AW also has a much smaller bulk water supply contract with Ndlambe municipality which was concluded when Amatola Water assumed the assets, liabilities and operations of the Albany Coast Water Board. The only significant individual consumer supplied by Amatola Water is Da Gama Textiles in East London.

The continued expansion of demand for water has been driven primarily by the population and economic growth in its area of supply rather than through expanding its area of supply. However, there has been some progression in the Peddie Regional Supply area where the regional scheme has been taking over the supply areas of smaller, non-viable local schemes.

The current volume of bulk water supplied, per municipality, is shown below:

Table 21: Volume of bulk potable water supplied, per municipality

Municipality	Volume supplied (Ml per annum)
Buffalo City	21 494
Ndlambe	642

Municipality	Volume supplied (Ml per annum)
Amahlathi	998
Ngqushwa	1 995
Nkonkobe	3 294

Other activities

Amatola Water currently manages 21 dams on behalf of DWA. In addition, Amatola Water has actively (and successfully) pursued 'other activities', which relate to infrastructure delivery, project management, and supporting of reticulation services for a range of clients including municipalities outside their gazetted area, DWA, other national departments and the private sector. These secondary activities make up approximately 50% of Amatola Water's revenue.

Current financial performance

The net operating profit for AW has been declined from 2008-2010 and in the last financial year the water board mad a net operating loss of R15 million (See figures below)

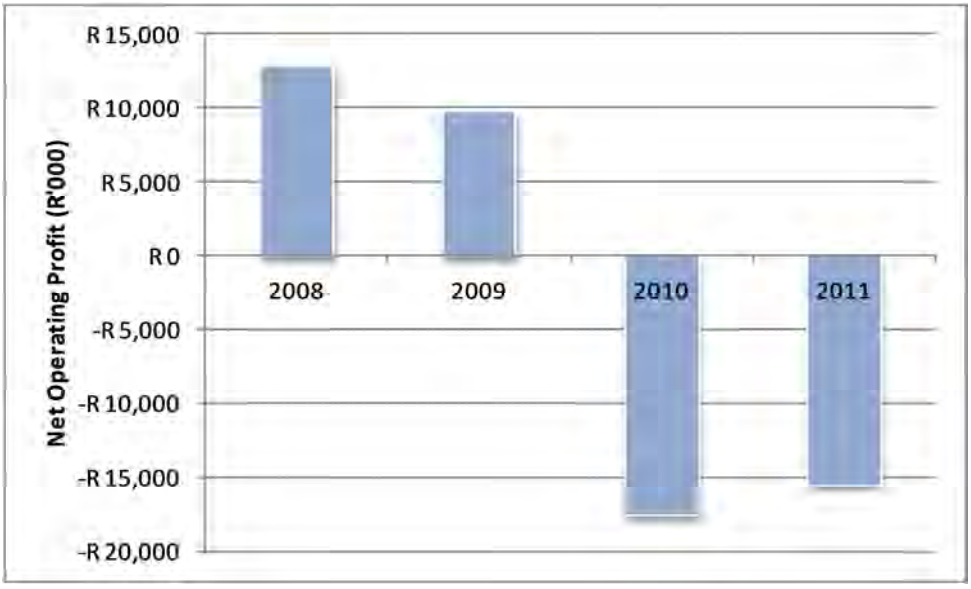

Figure 59: Amatola Water's net operating profit 2008-2011

A further compounding negative factor for AW is the large amount of outstanding debt, particularly for secondary activities, which is affecting AW's cash flow.

The adverse current financial position is partly related to the 'market' AW serves and this will need to be addressed in looking at future arrangements.

Municipal water services in the region

Buffalo City Metro Municipality manages 54% of its own bulk supply via the Umzoniana, King Williams Town and Needs Camp treatment works.

Nelson Mandela Bay Metro Municipality is entirely responsible for its bulk supply, but is reliant on Irrigation Boards and DWA Infrastructure branch for the supply of raw water to its treatment works.

Due to a shortage of capacity, Amathole DM has transferred the operation of all its WTWs and WWTWs to Amatola Water, but still provides staff on oversight of these operations. Amatola Water also operated the Sterkspruit WTW for Joe Gqabi DM. All other WTW in Joe Gqabi DM are operated by the DM.

The remaining bulk water supplies in the Eastern Cape are managed by the municipal WSPs (LMs in the Cacadu and Chris Hani DMs and DMs everywhere else).

Existing water resources arrangements

The existing water resources infrastructure owned by DWA which is within the region is shown in the table below, categorised as national, regional and local.

Scheme	Type	LM	CRC 2011 (Rm)	O&M (Rm pa)
Orange – Fish GWS	National		R 14,213	28.77
AMATOLA (WRIGGLESWADE DAM)	Regional		R 614	4.60
GAMTOOS RIVER (KOUGA AND LOERIE DAMS)	Regional		R 2,559	17.56
KLIPPLAAT RIVER (WATERDOWN DAM)	Regional		R 1,546	4.05
KROMME RIVER (IMPOFU DAM)	Regional		R 957	3.72
LAING DAM	Regional		R 400	2.66
Lower Fish Scheme	Regional		R 1,003	7.16
Lower Sundays scheme	Regional		R 1,036	8.79
NAHOON RIVER (NAHOON DAM)	Regional		R 450	4.07
ZANYOKWE (SANDILE DAM)	Regional		R 641	2.94

AMABELE GWS (AMATOLA)	Local	EC123; EC124	R 13	0.12
BALURA GWS (AMATOLA)	Local	BUF; EC128	R 42	0.09
BEKRUIPKOP CISKEI	Local	BUF; EC126	R 13	0.46
Binfield Park Dam	Local		R 710	2.44
Bizana Dam	Local	EC443	R 15	0.53
Blue Crane Dam	Local	BUF; EC124	R 13	0.33
BUSHMANSKRANTZ DAM	Local	EC124; EC127; EC134	R 272	1.32
Gxulu	Local		R 56	0.42
DABI DAM	Local	EC104; EC105; EC126	R 17	0.52
DEBE DAM	Local		R 120	0.88
Dimbaza – Ciskei	Local	BUF	R 7	0.45
DONNYBROOK 1	Local	EC132; EC134	R 7	0.60
DONNYBROOK 2	Local	EC132; EC134	R 5	0.44
DOORN RIVER (DOORN RIVER DAM)	Local	EC136; EC138; EC142; EC143	R 164	2.41
Elands River GWS (Elandskloof Dam)	Local		R 36	2.38
GCUWA WEIR	Local	EC121; EC122	R 35	0.75
GELUK GS	Local	EC132; EC134	R 7	0.32
GLENBROK	Local	EC132; EC134	R 65	0.46
GROOT RIVER (BEERVLEI DAM)	Local	EC107	R 134	2.24
GWABA	Local		R 4	0.44
GXETHU GWS (AMATOLA)	Local	BUF; EC126	R 20	0.39

Hartbeespoort GWS	Local		R 91	7.86
JAN TSHATSHU – CISKEI	Local	BUF; EC124	R 14	0.60
KAMASTONE	Local		R 3	0.44
KAT RIVER (KAT RIVER DAM)	Local	EC124; EC127	R 307	2.16
KEISKAMMAHOEK (CATA DAM)	Local	EC124; EC127	R 461	2.14
KEISKAMMAHOEK (MNYAMENI DAM)	Local	EC124; EC127	R 86	0.88
KUBUSI RIVER (GUBU DAM)	Local	BUF; EC124	R 124	1.74
KUZITUNGU	Local	EC132; EC134	R 5	0.44
KWABHACA (NTENETYANE DAM)	Local		R 102	0.44
Lanti (Qamata)	Local	EC134; EC135; EC136; EC138	R 194	4.08
LIBODE (MHLANGA DAM)	Local	EC155	R 143	0.47
MACUBENI DAM	Local	EC136	R 303	0.63
MAGWA – TS*	Local		R 73	0.72
MAIPASE – CISKEI	Local		R 4	0.44
MAITLAND – CISKEI	Local	EC126	R 3	0.49
MAJOLA – TS*	Local	EC154	R 24	0.40
MALUTI (BELFORT DAM)	Local		R 53	0.41
MANKAZANA GWS (AMATOLA)	Local	EC104; EC126; EC127	R 69	0.48
MASELA 1	Local		R 4	0.44
MASELA 2	Local		R 3	0.32

MDANTSANE 2	Local		R 7	1.06
MHLAHLANE (MABALENI DAM)	Local		R 118	0.45
Midfort	Local	EC132; EC134	R 47	0.53
MOUNT COKE	Local		R 7	0.45
MSENGENI	Local		R 55	0.41
NCORA (NCORA DAM)	Local	EC122; EC135; EC137; EC138	R 614	4.94
NGWEKAZI	Local	EC126	R 17	0.48
NONCAMPA	Local		R 9	0.61
NQADU – TS*	Local		R 50	0.67
NQWELO GWS (AMATOLA)	Local	EC104; EC126; EC127	R 33	0.84
NZIKIZINI GWS (AMATOLA)	Local		R 19	0.39
Olifants River (Stompdrift & Kamanassie Dams) GWS (Oudtshoorn)	Local	EC107	R 76	4.02
OUTSPAN DAM	Local	BUF	R 14	0.12
OXKRAAL – CISKEI	Local		R 613	1.32
PLEASANT VIEW DAM	Local		R 66	0.10
QAMATA (LUBISI DAM)	Local	EC135; EC136; EC138	R 301	2.38
QIBIRA	Local		R 1	0.38
REDHILL	Local	EC124; EC127	R 13	0.61
ROOIKRANTZ DAM	Local	BUF; EC124	R 242	1.71
ROXENI GWS (AMATOLA)	Local	EC127; EC128	R 90	0.27
RURA GWS (AMATOLA)	Local	EC104; EC126; EC127	R 15	0.48

Schoonspruit GWS	Local		R 39	6.24
Sheshegu Dam	Local	EC127; EC128	R 28	0.12
SHILOH – CS*	Local	EC124; EC127; EC134	R 101	0.84
SINQUMENI GWS (AMATOLA)	Local	EC104; EC126; EC127	R 30	0.12
Sterkspruit	Local	EC142	R 420	0.10
TARKA RIVER (KOMMANDODRIFT DAM)	Local	EC128; EC131; EC132	R 244	0.11
TENTERGATE – CS*	Local	EC132	R 21	0.35
TOLENI (TOLENI DAM)	Local	EC122; EC123	R 41	0.44
TSOJANA DAM	Local		R 67	0.66
TYHEFU (NDLAMBE DAM)	Local	EC104; EC126; EC127	R 18	0.39
TYUTYU	Local	BUF; EC124	R 2	0.32
UMTATA DAM	Local	EC157	R 501	2.61
WOBURN 2	Local		R 28	0.50
WOBURN 3	Local		R 16	0.47
XILINXA DAM	Local	EC121; EC122; EC135; EC137	R 56	0.86
XONXA DAM	Local	EC134; EC135; EC136;	R 711	2.17

It is evident that there are a large number of schemes in the area and the potential for some of the them to be transferred to the water board is significant.

Expansion considered

Bulk water infrastructure

There are three expansion options which are included:

1. Ongoing supply to Buffalo City Metro via existing and upgraded regional schemes (but with BCM continuing the be responsible for the schemes they own currently).

2. Bulk water supply to Amathole DM via the Sandile Dam and Peddie Regional Schemes.
3. Bulk water supply via any new schemes in the operation area classified as 'regional'.

Water resources infrastructure

The proposed policy is that these assets should be transferred to the RWB in the following order of priority:

1. Those regional schemes serving potable water supply systems being operated by the RWB
2. Those local schemes serving potable water supply systems being operated by the RWB
3. Other local schemes serving potable water supply systems
4. It is therefore not anticipated that water resources with an exclusively non-potable use would be transferred the RWB, as these are best managed by WUAs.
5. What these principles mean practically is that the RWB would take ownership of the regional schemes of the Wriggleswade Dam, Laing Dam, Nahoon Dam and Sandile Dam. In addition, local water resources that serve potable water supplies operated by the RWB, as well as any other local water resources that cannot be adequately managed at the local level, would be transferred to the RWB. Future regional water resource infrastructure, such as the proposed Umzimvubu Dam (unless classified as national), would be also the responsibility of the RWB.
6. The impact on the RWB's asset register is significant, as these transferred assets have an estimated CRC of R2.1 billion, with new water resources taking the total water resources asset value up to R2.85 billion by 2020, as shown in Figure 62.

Case study model results

Water demand

The projected water demand for the RWB area as a whole (all consumers, all demand zones) is shown in Figure 60, below. The total demand is dominated by the non-potable irrigation demand.

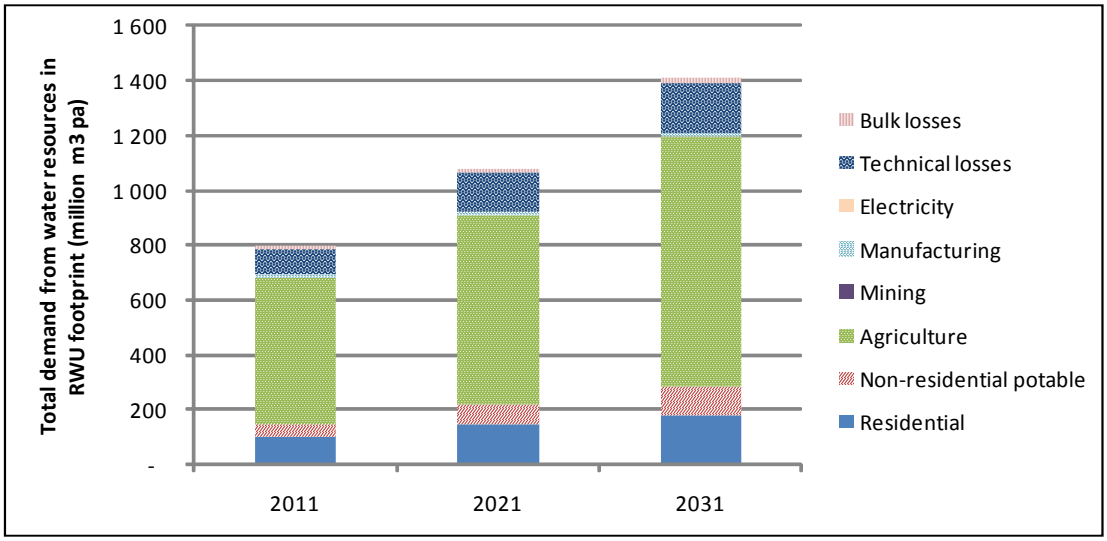

Figure 60: Total demand from water resources in RWB footprint

Average total demand is expected to increase by 3.1% in the initial decade and 2.7% per annum average growth thereafter.

Considering the bulk supply for the water board itself as a proportion of this overall total for the area, the percentage of demand is projected to increase from 5% in 2011 to 12% in 2031. This gives the following profile of abstractions by the water board:

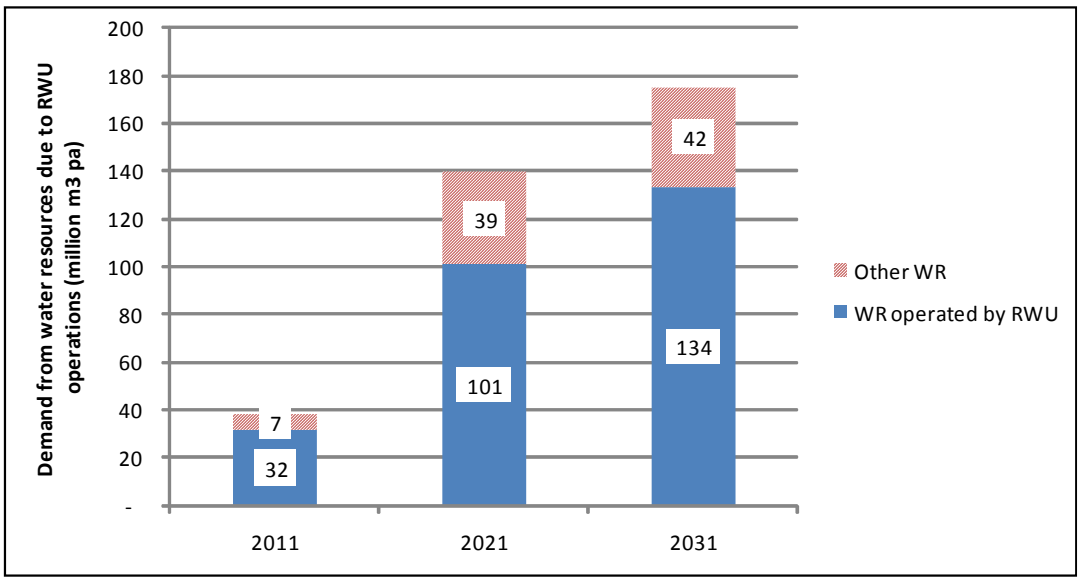

Figure 61: Demand from water resources due to RWB operations

An increase in average growth of 13.8% is predicted during the first 10 years.

Asset values

The projected value of assets managed by the RWB is shown below.

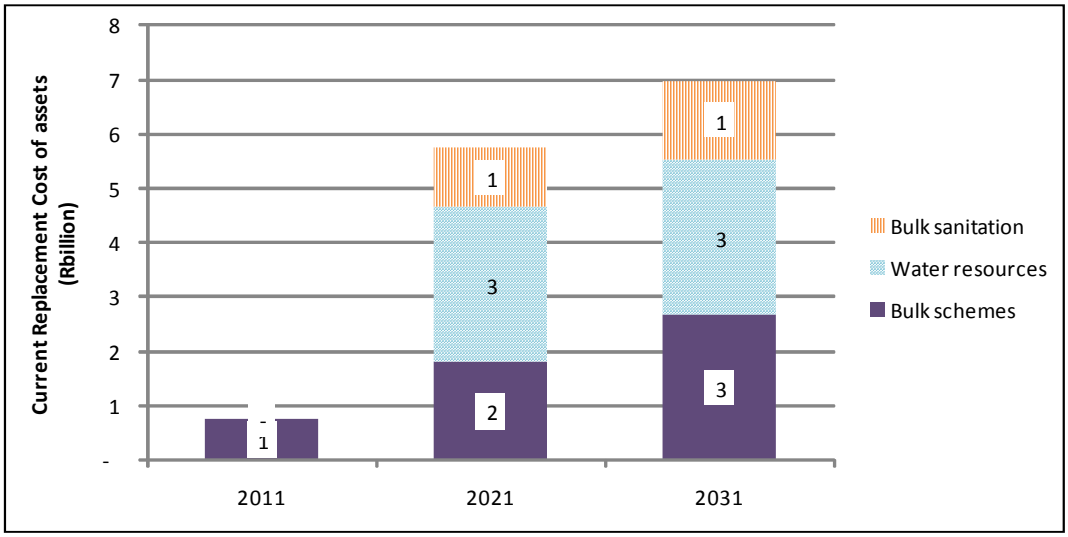

Figure 62: Current replacement cost of assets

The dominance of water resources infrastructure is evident, confirmed by the figures in the table below.

Table 22: Summary of asset value changes

	2011-2021	**2021-2031**
	R million	**R million**
Increase in CRC	**4 968**	**1 238**
Capex by RWB	2 119	1 238
Transfer of assets	2 849	

Operating expenditure

Projected operating account trends are shown below:

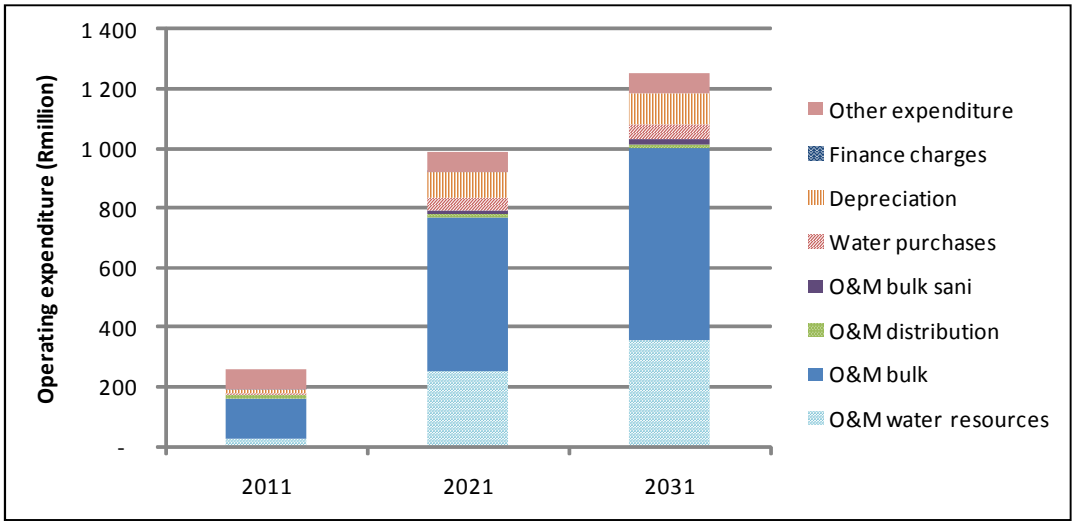

Figure 63: Operating expenditure trends

Figure 63 illustrates the very large (14.3% per annum) increase in operating expenditure that will be required due to the additional responsibilities for water resources and the increased water and sanitation responsibilities.

Operating profit per activity

The model allows for each activity to be analysed separately with the results shown below (with the line showing the net position for all activities combined):

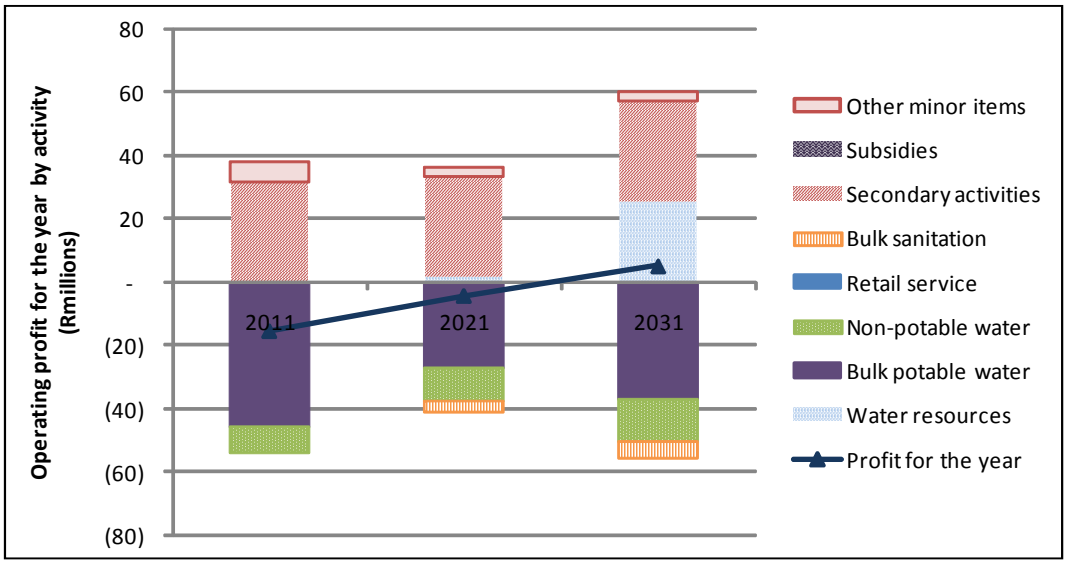

Figure 64: Operating profit for the year by activity

The net operating account shown in the lower graph in Figure 63 has been balanced using the water and sanitation tariff *increases. The table shows that a real tariff increase of 1.2% per annum is required* for the first ten years in order for the water board to break even. The surplus made on bulk water and sanitation and tertiary activities is required to balance the losses made on water resource operations and non-potable water sales. If the water board is intended to make a surplus, the annual tariff increases would have to be higher.

Capital expenditure

Capital expenditure requirements are projected as follows:

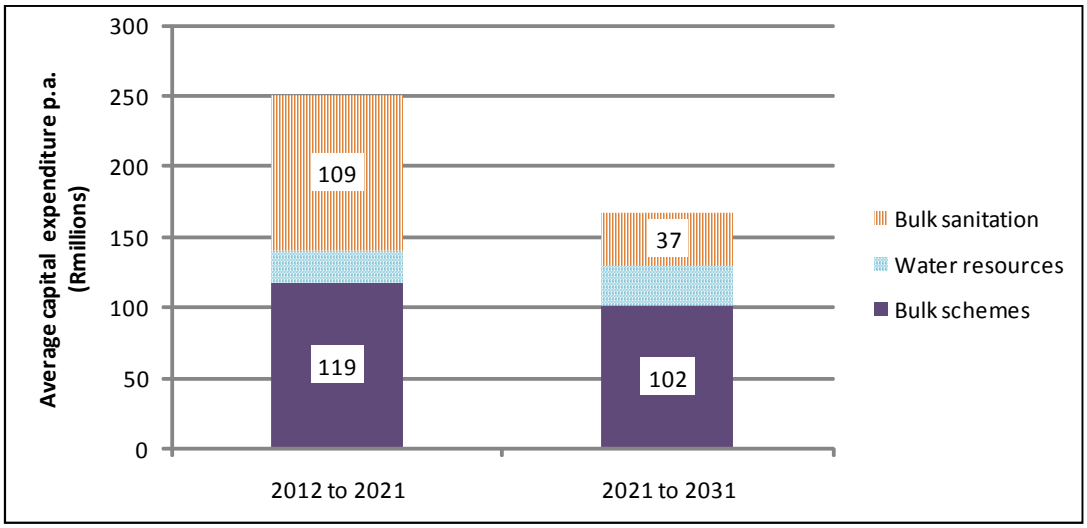

Figure 65: Average capital expenditure

Considerable expenditure on bulk sanitation infrastructure is provided for. This will need to be assessed further once greater clarity is available on the works to be taken over.

Capital finance

Capital finance projections are shown below:

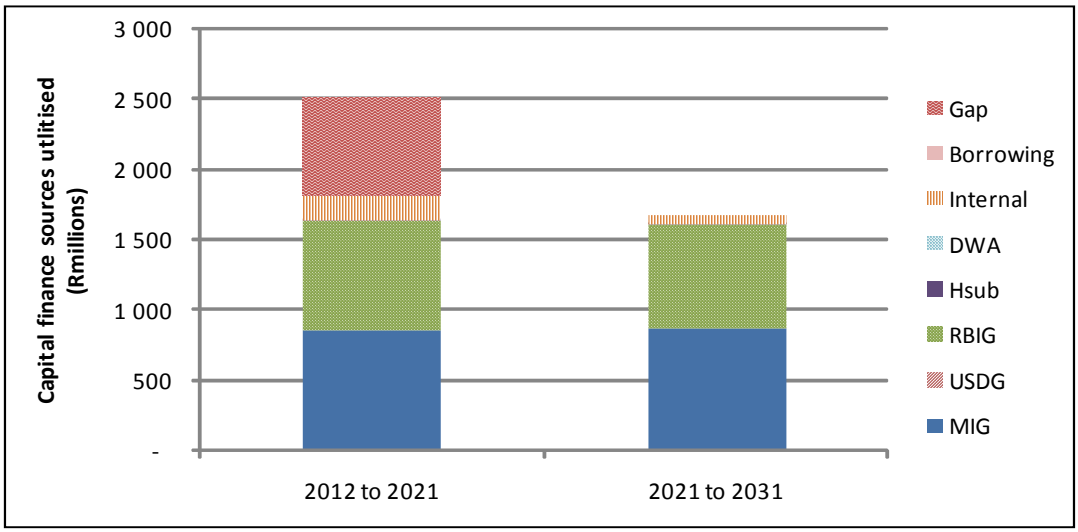

Figure 66: Capital finance sources utilised

The capital finance graph above shows that a significant amount of grant funding (MIG and RBIG) has been assumed for the bulk water services infrastructure, but no grant funding from DWA has been assumed for the rehabilitation of the assets that are transferred to the RWB. A small portion of the capital requirement can be funded out of internal reserves, but it does not appear that borrowing will be possible in the first 10 year period and a gap of approximately R700 million exists. Thereafter, the capital requirement reduces and should be affordable to the RWB.

Appendix G: Bloem Water (Central RWB) case study overview

Current situation

Current Water Board operations

As noted above the Bloem Water service area includes Mangaung metro and municipalities along the Orange River in the Free State and Northern Cape[16].

The bulk water supply system is dominated by the supply to Mangaung as illustrated in the following table:

Table 23: Bulk water supply

Scheme	Municipality served	Source of water	Demand from Scheme		Split
			m cu.m/yr	Ml/d	
Rustfontein	Mangaung	Modder River	19 600	54	29%
Groothoek	Mangaung	Groothoek dam	1 700	4.6	3%
Welbedacht	Mangaung	Caledon River (Welbedacht Dam)	44 000	120	65%
Bethuli	Kopanong	Orange River	1 300	3.6	1.9%
Gariep	Kopanong	Orange River	630	1.7	0.9%
Philippolis	Kopanong	Orange River	150	0.4	0.2%

Note: Mangaung system evidently includes supply to parts of Naledi Municipality

Bloem Water is concluding an agreement with Kopanong Municipality to operate wastewater treatment plants. Bloem Water does not undertake retail services and does not presently undertake significant secondary activities.

Current financial performance

The 2010/11 financial statements reveal that Bloem Water generated R226 488 revenue, but experienced a R16 619 net loss for the year.

Municipal water services in the region

The Mangaung municipality runs its own treatment works and bulk supply. There has been conflict between them and Bloem Water over the service provided by Bloem Water which, it is understood, is currently resolved. The other small towns in the region provide their own bulk supply, mostly from local sources.

[16] Map of water board area not available at time of writing

Existing water resources arrangements

The existing water resources infrastructure owned by DWA which is within the region is shown in the table below, categorised as national, regional and local

Scheme name	Significane	Asset value (R million)	Operating cost (Rm/yr)
Orange – Fish GWS	National	14 213	28.8
Orange River GWS	National	6 771	103.0
Van Der Kloof	National	1 969	16.4
Total national (3 schemes)		**22 953**	
Orange River – Boegoeberg GWS	Regional	1 229	6.2
Orange Riet Canal	Regional	2 716	1.7
Riet River	Regional	1 100	0.1
Caledon-Modder GWS	Regional	871	0.3
Total regional (4 schemes)		**5 915**	
Leeu River GWS (Armenia Dam)	Local	246	0.1
Modder River	Local	587	3.8
Moutloatsi Setlogelo Groothoek	Local	246	0.1
Sterkspruit	Local	420	0.1
ThabaN'chu	Local	149	2.1
Wittespruit-Egmont	Local	16	0.3
Total local (6 schemes)		**1 664**	

Expansion considered

Primary activities will remain the most important activity of the Central RWB, anchored by an increased role in supplying bulk water to the Mangaung metro,

assuming that the RWB continues to act as the primary provider of bulk water to the metro. It is assumed that there will be some expansion of activity to the smaller municipalities as well.

With regard to the transfer of water resources schemes, provision is made for the following:

- Caledon/Modder regional scheme (Asset value R0.9 billion).
- 6 local water resources schemes (combined asset value of R1.6 billion).

Although the latter schemes are considered 'local' they are included here under primary activity as the dams are intended to be owned and operated by the RWB, but with a water user association responsible for the operation of the distribution systems for the irrigation schemes.

Case study model results

Water demand

The projected profile of water demand growth into the future for all the demand zones and all consumers in the supply area is shown below.

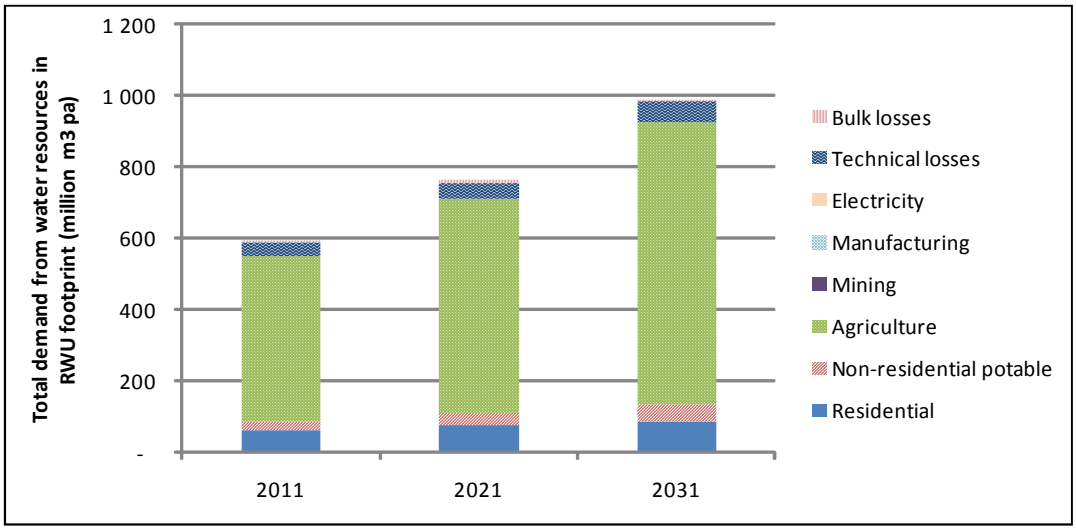

Figure 67: Total demand from water resources in RWB footprint

Average annual growth is 2.6% and agriculture demand is the largest.

Considering only water board responsibility, percentage of demand supplied by RWB increases from 15% in 2011 to 18% in 2021.

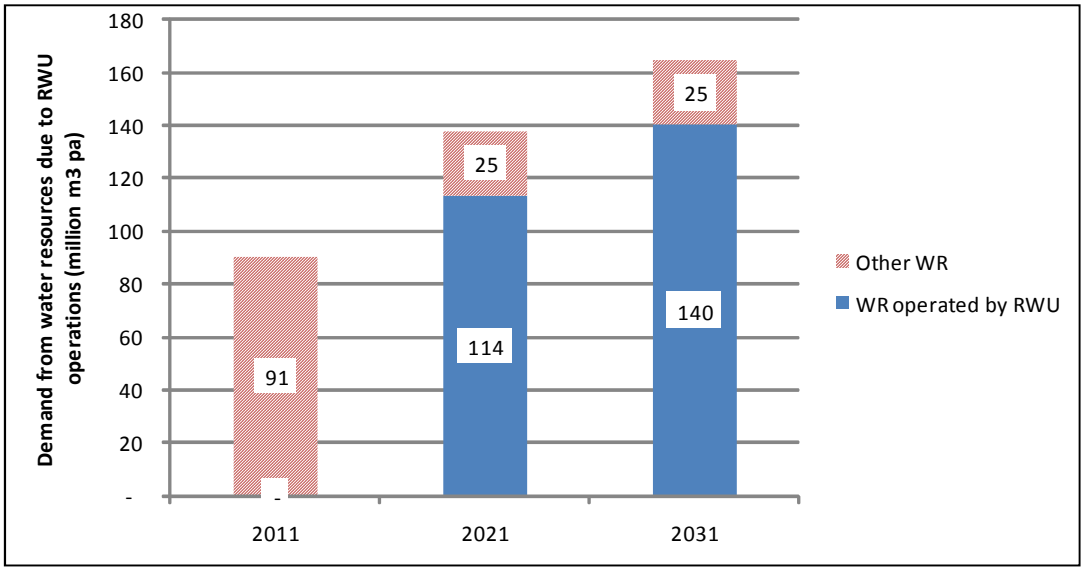

Figure 68: Water resources demand (abstractoin) from water resources due to RWB operations

Asset values

The projected value of assets managed by the RWB is shown below.

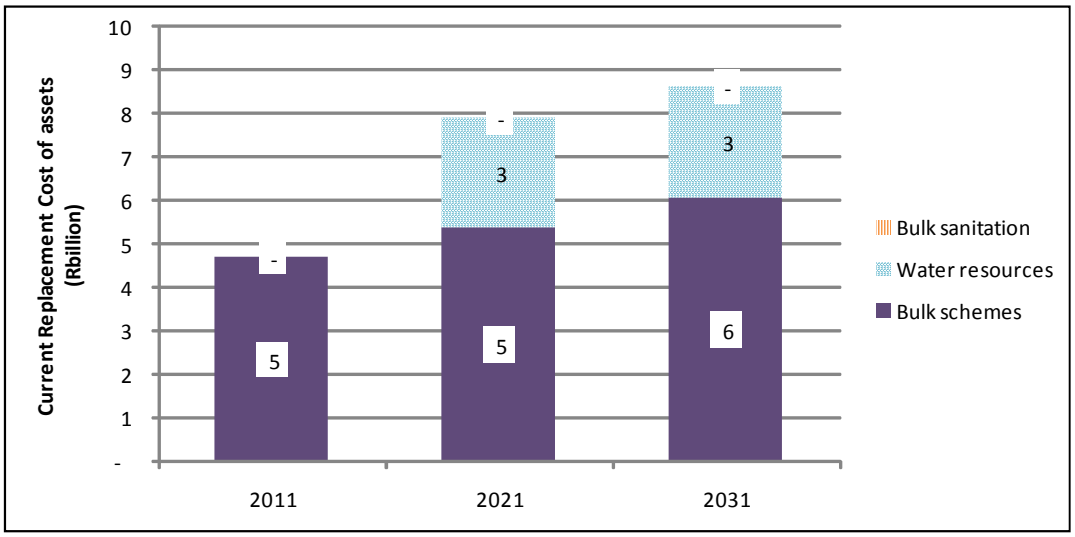

Figure 69: Current replacement cost of assets

A figure of R4.7 billion is used for the current replacement value of Bloem Water assets. This is much lower than the value on the DWA database of R7.4 billion but this latter value is so much higher in relation to other water boards, considering the relative scale of the systems that it is adjusted down for this round of the analysis.

Table 24: Summary of asset value changes

	2011-2021	2021-2031
	R billion	**R billion**
Increase in CRC	**3.2**	**0.7**
Capex by RWB	2.03	2.6
Transfer of assets	2.5	

Operating expenditure

It is anticipated that the RWB will experience high growth over the coming 10 years (6.6% in real terms) as it expands the existing operations, and takes on new activity.

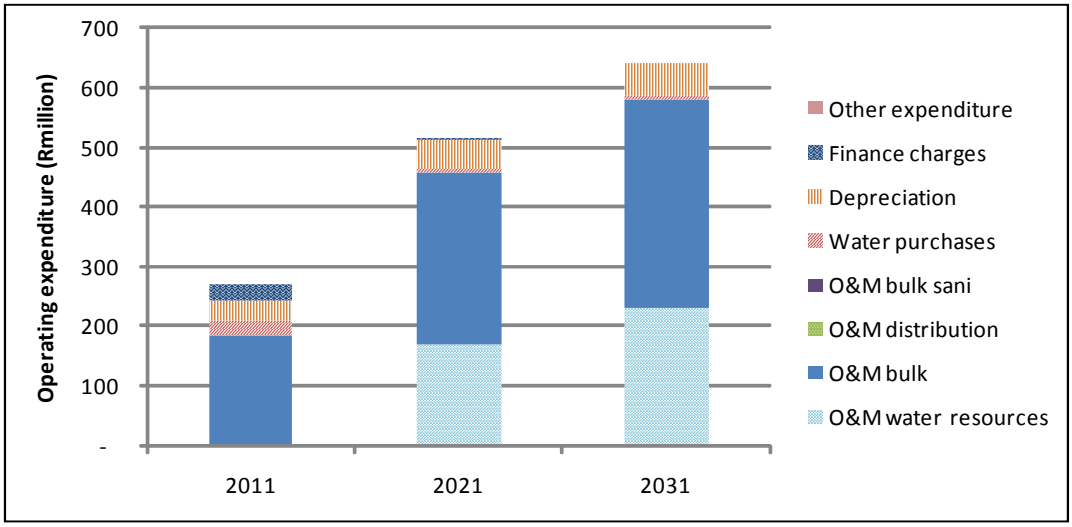

Figure 70: Operating expenditure

As illustrated, a substantial proportion of this growth will relate to water resources schemes.

Operating profit per activity

The model allows for each activity to be analysed separately with the results shown below (with the line showing the net position for all activities combined):

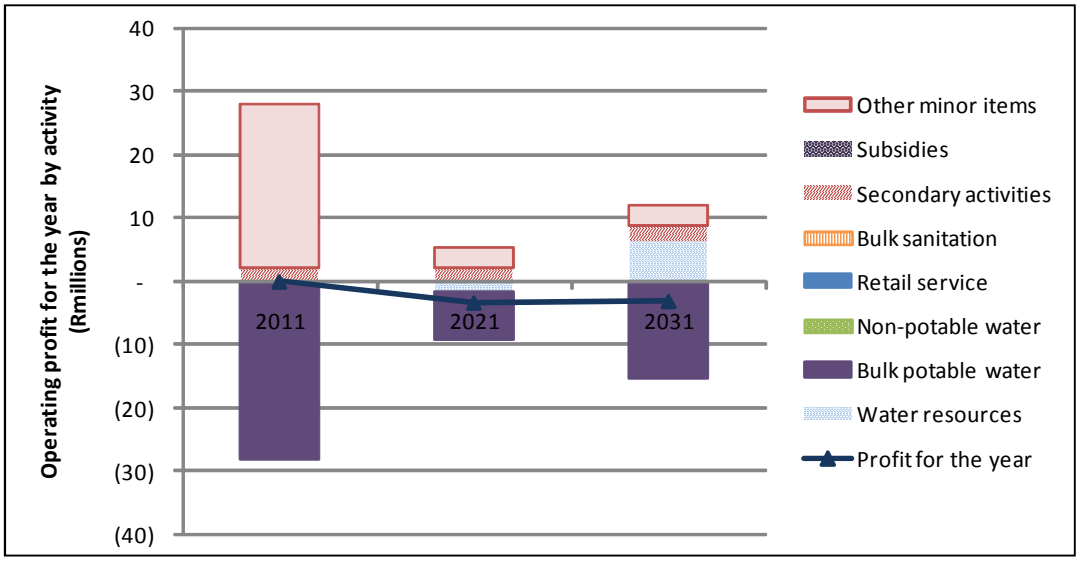

Figure 71: Operating profit for the year by activity

There is a concern over the deficit made on the bulk water account which needs to be considered further. With regard to profitability, the indication currently is that increases in tariffs at 0.4% above inflation are required to maintain this position.

Capital expenditure

The results from the analysis are shown below:

Figure 72: Average capital expenditure per annum

Capital expenditure of the order of R300 million a year is anticipated for the expansion of the bulk water supply scheme and rehabilitation of existing bulk water assets and also for investment in rehabilitation of water resources infrastructure.

Capital finance

At this stage the capital finance analysis is speculative. As can be seen from the graphs that some provision is made for grant finance (MIG and RBIG funding) but with no funding from DWA included for rehabilitation of the water resources assets the RWB will take over. The analysis indicates the use of internal reserves, but with

negligible borrowing possible. The implication is that the RWB cannot raise the required amount of funding in the early years with an increasing gap in later years. Refinement of the capital finance profile is required.

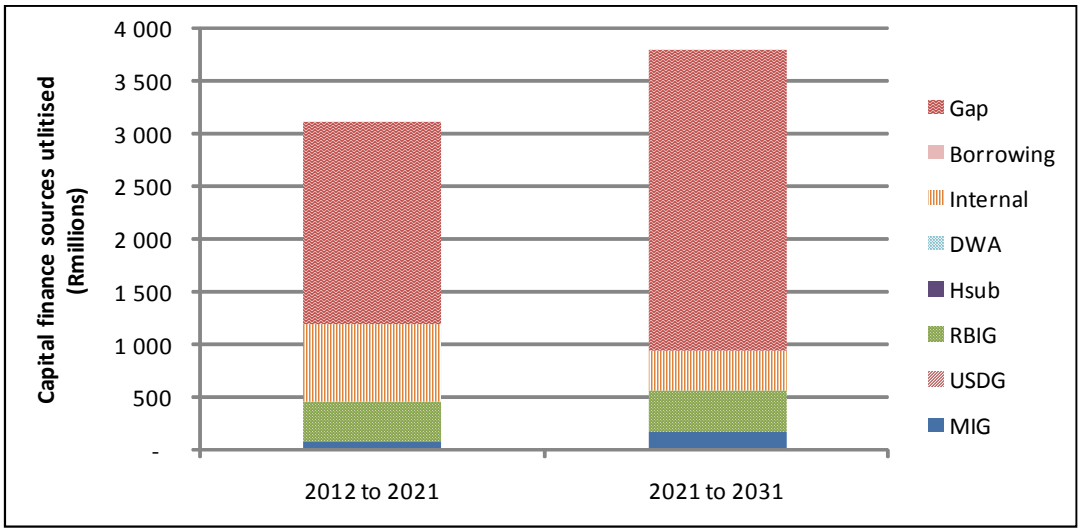

Figure 73: Capital finance sources utilised

Appendix H: Mhlathuze Water (North Eastern) case study overview

Current situation

Current Water Board operations

A map showing the Mhlathuze service area is shown below.

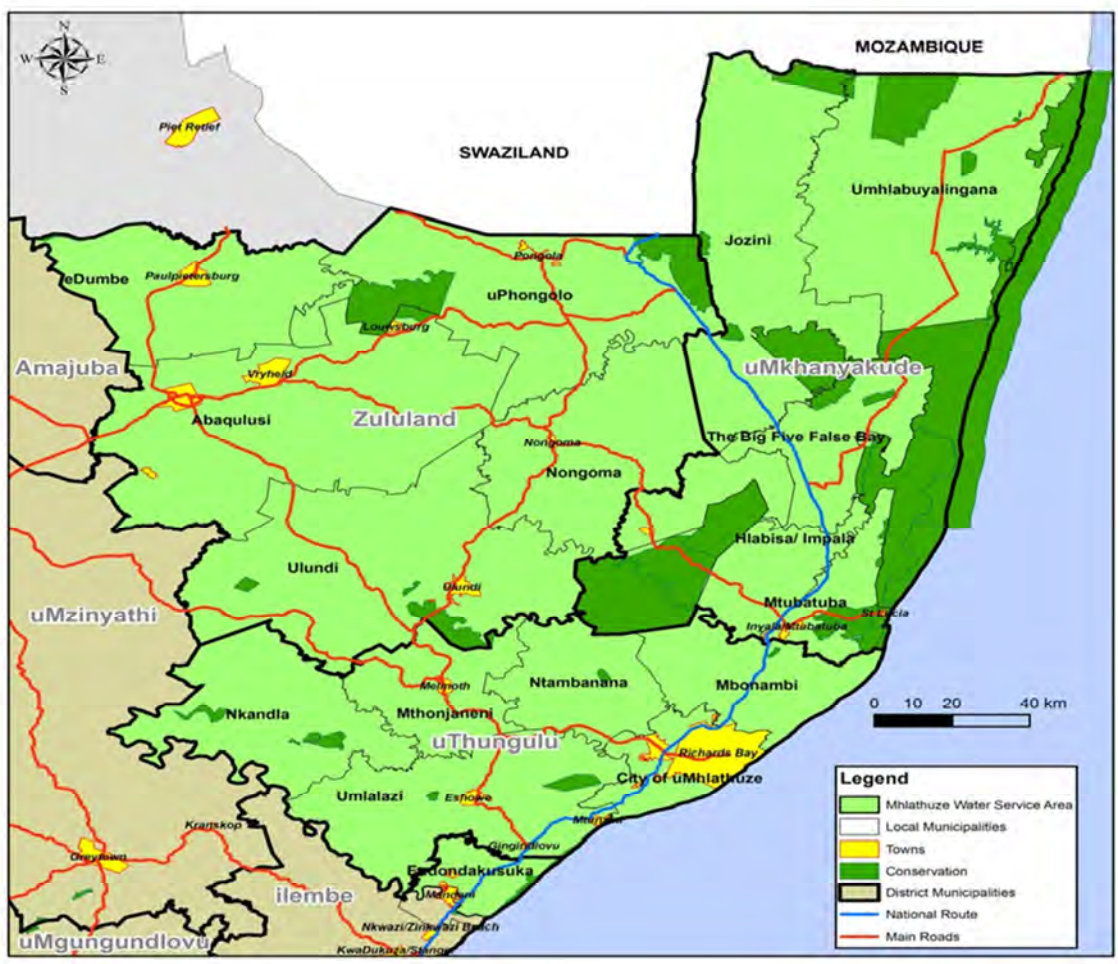

Figure 74: Map of Mhlatuze service area

Within this supply area the current activities of Mhlatuze Water are relatively limited, primarily to activities in the uMhlathuze municipal area. Mhlatuze Water owns and operates one major water treatment works, Nsezi, which supplies water to the Mhlatuze LM and industries:

Table 25: Estimated demand from the Nsezi WTW

Consumer	2011/12 demand (m cu.m/yr)[17]
Mondi Business Paper	36.5
uMhlathuze LM – Richards Bay	9.1
uMhlathuze LM –Empangeni	13.5
uMhlathuze LM – Foskor	5.5
Pulp United	-
Total	64.6

Mhlatuze Water owns and operates a sea outfall designed for industrial wastewater. It is assumed to treat and discharge 64 m cu.m/yr of wastewater from industries in the area.

The water board also provides water quality testing services to neighbouring districts. In the Mhlathuze business plan considerable emphasis is placed on water resources planning and operating transfer schemes in order to ensure that it has an adequate supply to the Nsezi WTW. The area has a valuable and vulnerable water environment and hence the emphasis on this aspect is justified.

MW does not undertake retail services.

Current financial performance

The 2010/11 financial statements display R214 547 in revenue and R21 160 profit for the year.

Municipal water services in the region

The Mhlathuze municipality runs its own treatment works and bulk supply. But according to the MW business plan this is becoming overloaded and increasing reliance will be made on the Nsezi plant which is going through major upgrades. For the areas other than Mhlathuze LM the WSA is at district level and each of the three districts are effectively the water service provider. However, two of them, uThungulu and uMkhanyakude contract out a large part of their operations to WSSA, a private sector organisation. Then operate the bulk supply systems in the

[17] Note: the MW business plan gives these figures as Ml/annum. But this is way too small. It is assumed that the figures are actually in millions of cu.m per annum.

rural areas. Zululand DM has recently also called for tenders for the operation of its bulk supply system (or at least part of it)[18].

Existing water resources arrangements

The existing water resources infrastructure owned by DWA which is within the region is shown in the table below, categorised as regional and local. There are no national schemes in the area.

Table 26: Water resources schemes located in the region

Scheme name	Significance	Asset value (R million)	Operating cost (Rm/yr)
Pongolapoort GWS	Regional	1 171	8.2
Pongola River GWS	Regional	1 055	10.9
Tugela-Mhlatuze Rivers GWS	Regional	918	11.3
Total regional (3 schemes)		**3 144**	**30**
Bevenson Dam	Local	17	0.4
Hluhluwe River GWS	Local	280	3.2
Lavumisa GWS	Local	4	0.0
White Mfolozi River GWS	Local	362	3.6
Total local (4 schemes)		**663**	**7**

Expansion considered

Primary activities will remain the most important activity of the North Eastern RWB, anchored by an increased role in supplying bulk water to the Mhlathuze LM and bulk wastewater services to industries in the area. There is also the potential for some expansion into Zululand and uMkhanyakude but at this stage this is most likely to be as a bulk supply service to WSAs (secondary activity)

Provision is included for the transfer of the following water resources schemes:

- Tugela-Mhlathuze regional scheme (Asset value R0.9 billion).
- 4 local water resources schemes, including the Hluhluwe River GWA and White Mfolozi River GWS (combined asset value of R0.6 billion).

[18] Results of tender process not known at this stage.

Although the latter schemes are considered 'local' they are included here under primary activity as the dams are intended to be owned and operated by the RWB, but with a water user association responsible for the operation of the distribution systems for the two irrigation schemes.

Case study model results

Water demand

The projected profile of water demand growth into the future for the supply areas as a whole (all demand zones and all consumers) is shown below.

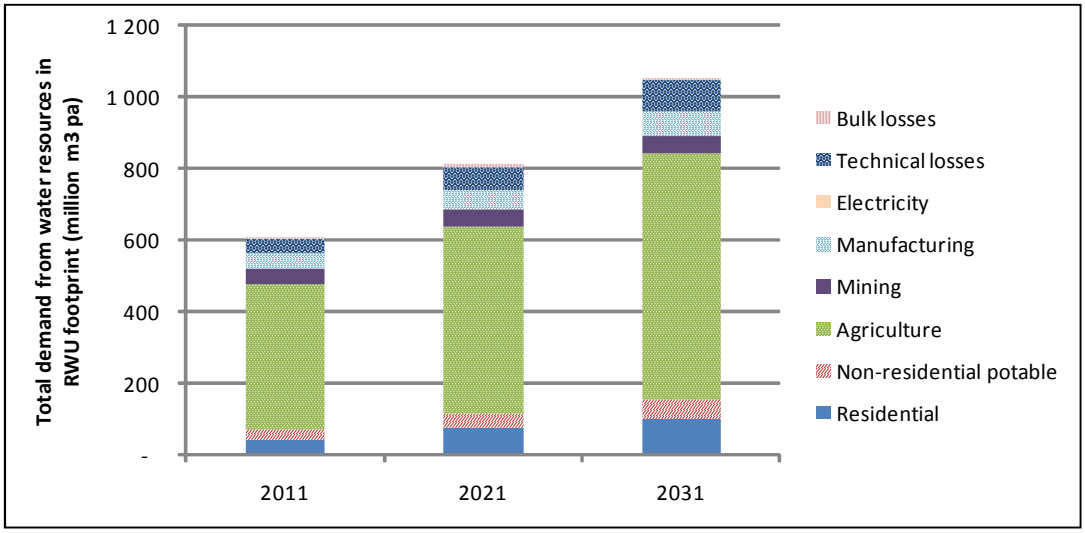

Figure 75: Total demand from water resources in RWB footprint

Within this supply areas the projection for demand for water resources (abstractions) relating to schemes owned by the water board itself are shown below.

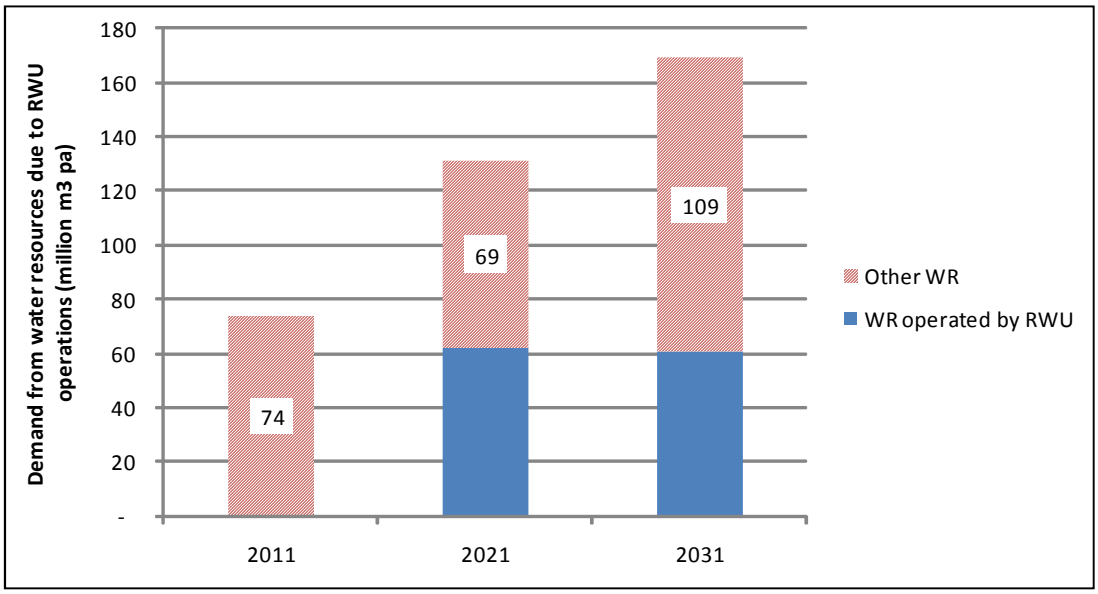

Figure 76: Demand from water resources (abstractions) due to RWB operations

Asset values

Allowing for growth in the bulk water supplied by the RWB and for the transfer of assets from DWA, the position with assets under management by the RWB looks as follows:

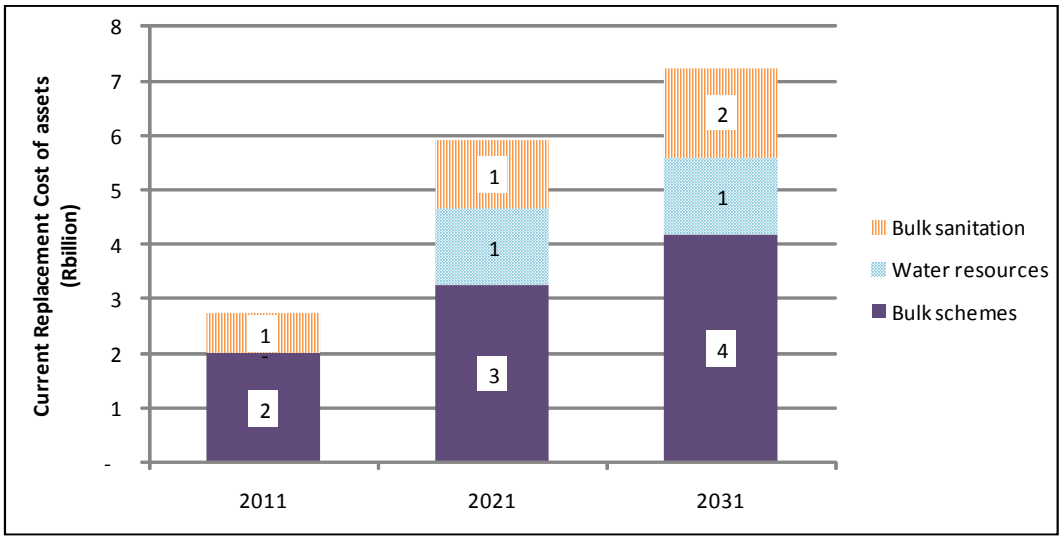

Figure 77: Current replacement cost of assets

As shown in the table below this is a mix of assets transferred and investments made by the water board.

Table 27: Split of assets

	2011-2021	**2021-2031**
	R billion	**R billion**
Increase in CRC	**3.2**	**1.3**
Capex by RWB	1.7	1.3
Transfer of assets	1.4	

Operating expenditure

Projected operating account trends are shown below:

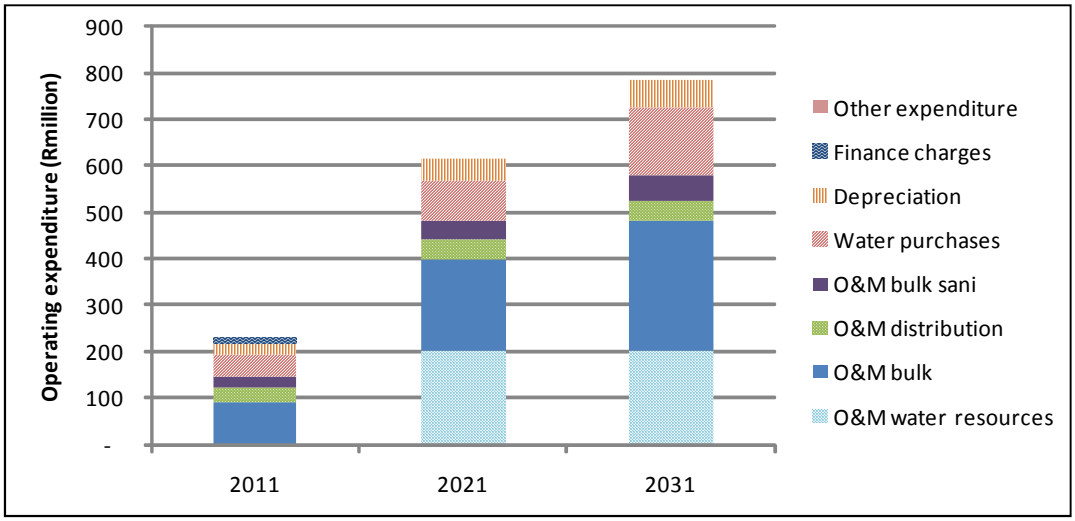

Figure 78: Operating expenditure

It is anticipated that the RWB will experience very high growth over the coming 10 years (10.3% in real terms) as it expands the existing operations, takes over water resources schemes and takes on new activity in rural areas.

Operating profit per activity

The model allows for each activity to be analysed separately with the results shown below (with the line showing the net position for all activities combined):

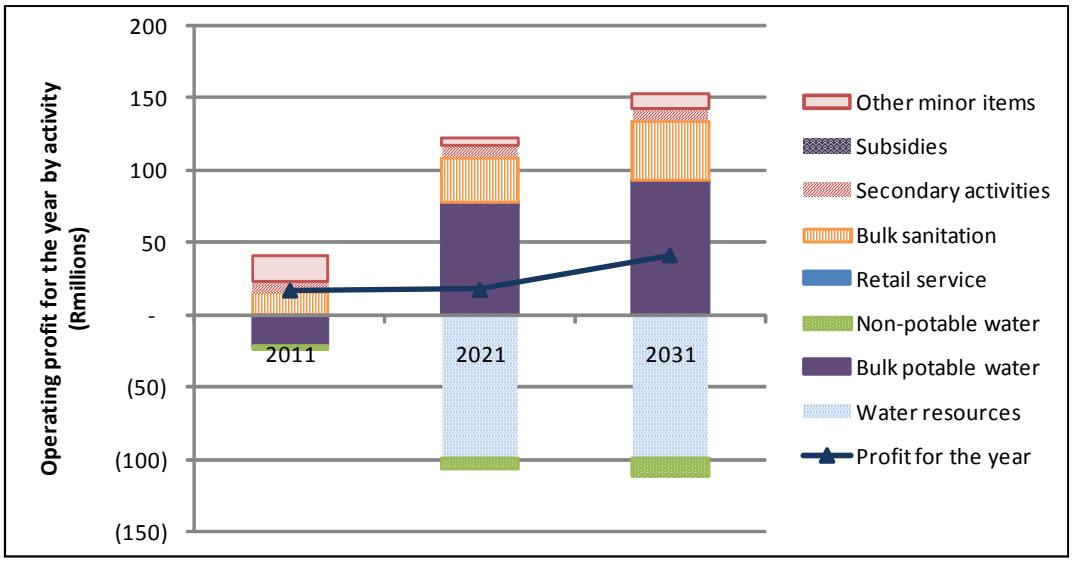

Figure 79: Operating profit for the year by activity

The fact that the water resources account shows a deficit is a concern and needs further investigation. With regard to profitability, the indication currently is that increases in tariffs at 4.5% above inflation are required. This is high with the probability that the overall tariff increases are driven by more activity in rural areas.

Capital expenditure

The results from the analysis are shown below:

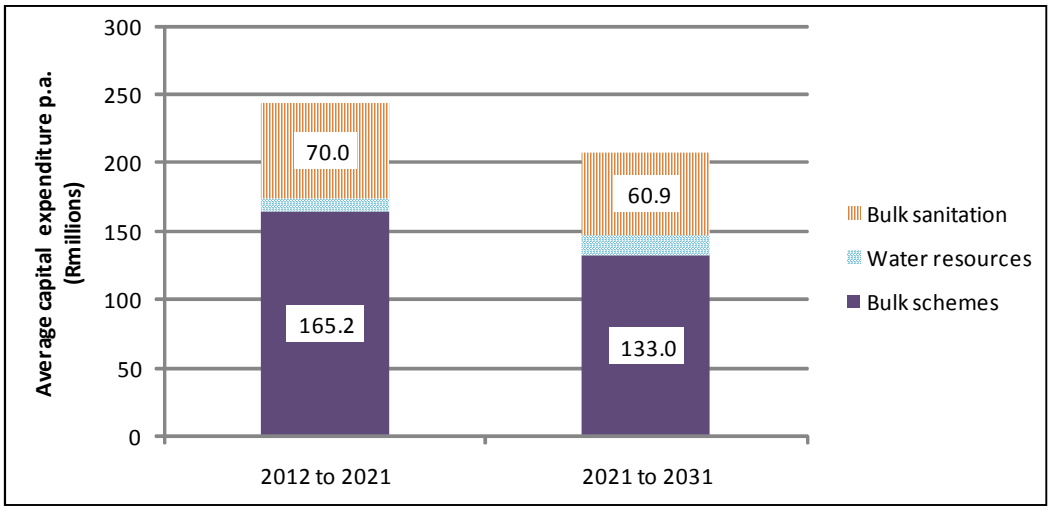

Figure 80: Average annual capital expenditure by decade

Capital expenditure of the order of R250 million a year is anticipated, mostly for the expansion of the bulk water supply scheme and rehabilitation of existing bulk water assets. Some investment in bulk sanitation is also required.

Capital finance

As can be seen from the graphs that significant provision is made for grant finance (MIG and RBIG funding) but with no funding from DWA included for rehabilitation of the water resources assets the RWB will take over. The analysis indicates the use of internal reserves is limited, with no borrowing possible based on the projected cash flow and balance sheet. The implication is that the RWB cannot raise the required amount of funding and a gap of around R450 million exists in the first 10 years.

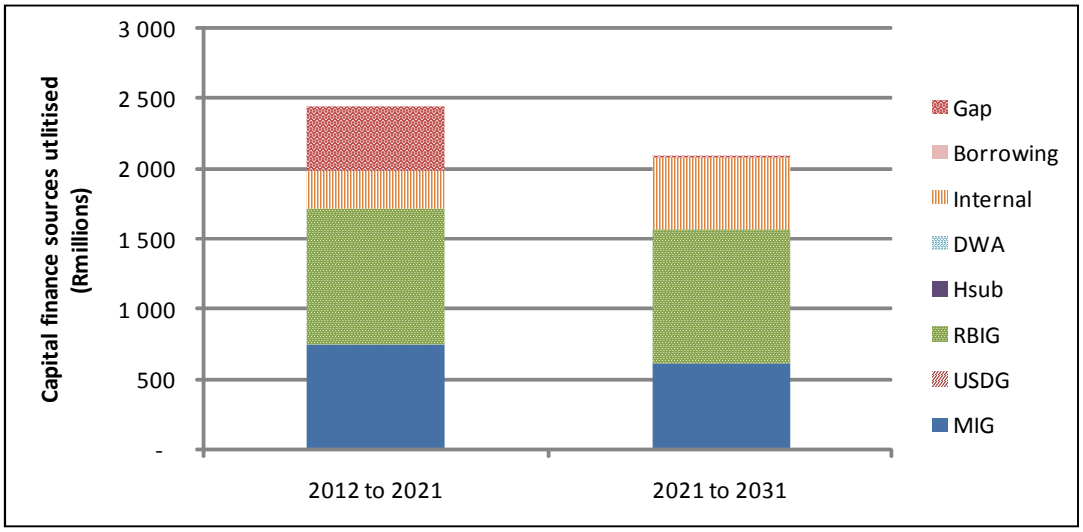

Figure 81: Capital finance sources utilised

Appendix I: Magalies Water (North Western RWU) case study overview

Current situation

Current Water Board operations

A map showing the Magalies supply area is shown below.

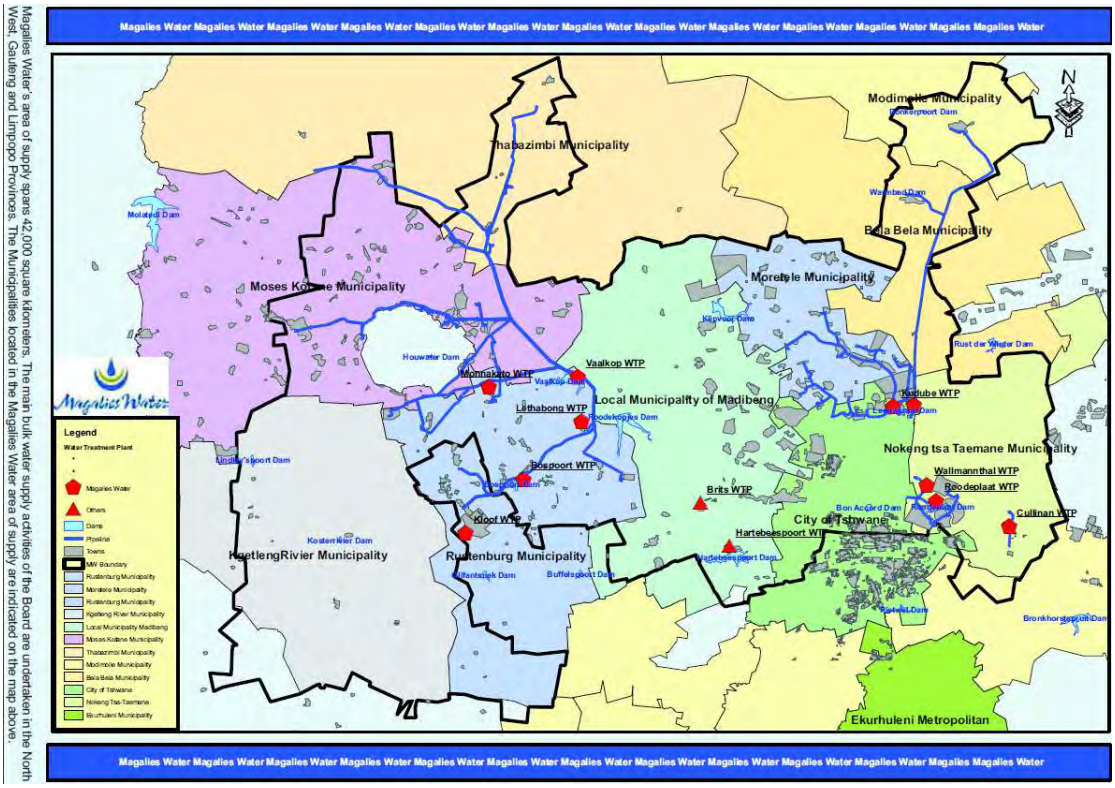

Figure 82: Magalies supply area

Magalies Water owns and operates 4 schemes and also operates two schemes for Tshwane:

Table 28: Magalies Bulk Water Supply

Scheme	Capacity (Ml/d)	Assumptions about areas served
Magalies Water owned schemes		
Vaalkop	210	North West province (Bojanala DM areas and Thabazimbi LM in Limpopo.
Klipdrift	16	Nothern areas of Tshwane (assumed)
Wallmansthal	12	Wallmanshal area, E Tshwane (former Nokeng)

Scheme	Capacity (Ml/d)	Assumptions about areas served
Cullinan	14	Cullinan, E Tshwane (former Nokeng)
Tshwane owned treatment works		
Temba	60	Northern parts of Tshwane and Moretele (assumed from map)
Roodeplaat	60	Modimolle and Bela Bela in Limpopo. Other areas in Tshwane (uncertain)

Vaalkop is a regional scheme and the Roodeplaat treatment works feeds a regional scheme which is operated by Magalies Water to serve the municipalities of Modimolle and Bela Bela in Limpopo.

Unusually, Magalies water buys treated bulk water from Rand Water to supply Rustenburg.

Magalies supplies water direct to mines, an important part of the their business. Altough not mentioned in their business plan they evidently run a retail service in Tshwane, Moretele and Madibeng under a management contract (R56 million a year recorded).

Current financial performance

Maglies generated R187 251 revenue in the 2010/11 financial year and experienced a net loss of R23 791 for the year.

Municipal water services in the region

Tshwane metro receives a large proportion of its water from the Vaal metro system own and operated by Rand Water. Aside from the Magalies bulk supply mentioned above, the metro also provides a small proportion of water itself[19]. Rustenburg is supplied from the Vaal metro system and from Vaalkop. Madibeng evidently provides a substantial proportion of its own bulk water. The smaller towns to the west of the region evidently have their own supplies.

Existing water resources arrangements

The existing water resources infrastructure owned by DWA which is within the region is shown in the table below, categorised as national, regional and local (see main report for definitions).

[19] Still to be checked.

Table 29: Water resources schemes located in the region

Scheme name	Significance	Asset value (R million)	Operating cost (Rm/yr)
Mogol River GWS (Mokolo Dam)	National	541	2.3
Crocodile River West GWS	Regional	1 945	6.4
Hartbeespoort GWS	Regional	1 500	7.9
Harts River GWS (Spitskop Dam)	Regional	332	0.1
Marico-Bosveld GWS (Kromellenboog Dam)	Regional	1 235	5.96
Mogalakwena River GWS (Glen Alpine Dam)	Regional	335	3.2
Mooi River GWS	Regional	1 028	17.0
Pienaars River GWS (Roodeplaat Dam)	Regional	1 141	12.2
Sterk River GWS (Doorndraai Dam)	Regional	644	8.2
Total regional (8 schemes)		**8 160**	**61**
Bo-Molopo GWS	Local	284	17.8
Bospoort Dam	Local	165	2.0
Disaneng Dam	Local	257	1.4
Harts River GWS (Wentzel Dam)	Local	37	0.1
Klein Maricopoort GWS	Local	175	3.2
Koster Dam	Local	104	1.9
Leeukraal Dam	Local	23	0.6
Lindleyspoort GWS	Local	216	4.2

Scheme name	Significance	Asset value (R million)	Operating cost (Rm/yr)
Loskop GWS	Local	6	7.1
Lotlamoreng Dam	Local	50	0.5
Madikwe Dam	Local	231	0.5
Mankwe Dam	Local	125	0.5
Middelkraal Dam	Local	8	1.2
Mkhombo Dam	Local	500	3.4
Molatedi Dam	Local	47	3.7
Ngotoane Dam	Local	115	0.7
Palala River GWS (Susandale and Visgat Weirs)	Local	14	0.6
Pella Dam	Local	46	0.5
Rust De Winter GWS	Local	34	6.2
Schoonspruit GWS	Local	39	6.2
Sehuwjane Dam	Local	68	0.4
Setumo Dam	Local	441	1.4
Sterkstroom GWS (Buffelspoort Dam)	Local	102	3.3
Total local (23 schemes)		**3 088**	**67**

Expansion considered

Water services

The most important activity of the NW RWB is the ongoing provision of bulk water, primarily through the Vaalkop scheme. It is assumed that they will continue to own and operate the three smaller schemes they have at the moment and will take over the new Pilanesberg scheme[20]. They will also operate the Mafikeng supply, taking this over from Botshelo water but this will remain under the ownership of the municipality.

Water resources schemes

With respect to water resources infrastructure, taking transfer of a large regional scheme such as Pienaars River – if indeed this has merit – is provided for at this stage.

With regard to local water resources, the transfer of the 23 local water resources schemes identified at this stage is provided for for this first run of the analysis. But this will have a big impact on the organisation and needs to be dealt with in a transitional way (combined asset value of about R8 billion).

Case study model results

Water demand

The projected profile of water demand growth into the future for the whole supply areas (all demand zones and all consumers) is shown below.

Figure 83: Total demand from water resources in RWB footprint

An average growth of 1.5% is predicted from 2011 to 2021.

Considering on only the water board operations, the percentage of demand supplied by the RWB in 2011 is 7% and this increases to 9% in year 2031.

[20] There is some room for rationalisation of the schemes serving Tshwane but this is not a high priority.

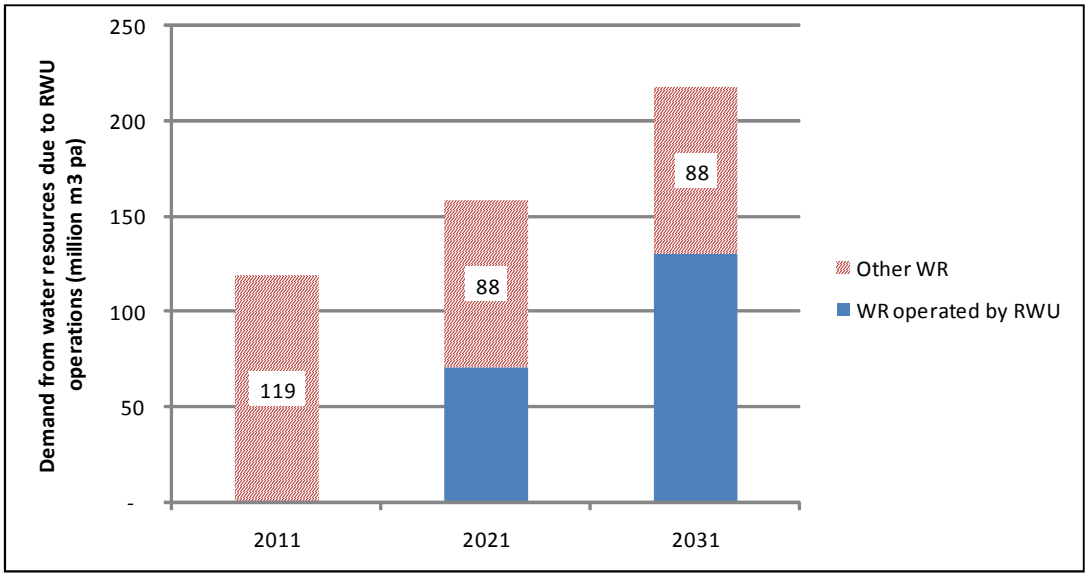

Figure 84: Demand from water resources due to RWB operations

Asset values

The current value of Magalies Water Assets is uncertain but is taken at R3 billion from the DWA data. While the RWB will take over Botshelo Water operations, Botshelo Water does not own any assets. Based on the assumption that the RWB will continue to expand the system currently managed by Magalies and Botshelo and that it will take over roughly R4 billion in water resources assets from DWA, the profile with regard to assets under the RWB ownership will look as follows:

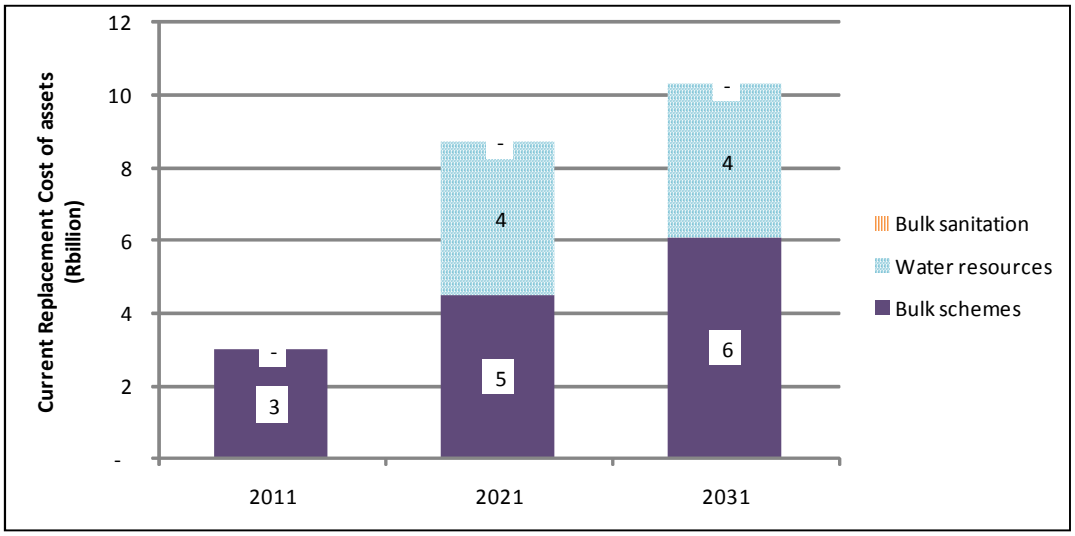

Figure 85: Current replacement cost of assets

The asset value changes are shown below.

Table 30: Summary of asset value changes

	2011-2021	2021-2031
	R billion	**R billion**
Increase in CRC	**5.7**	**1.6**
Capex by RWB	1.6	1.6
Transfer of assets	4.2	

Operating expenditure

Projected operating account trends are shown below:

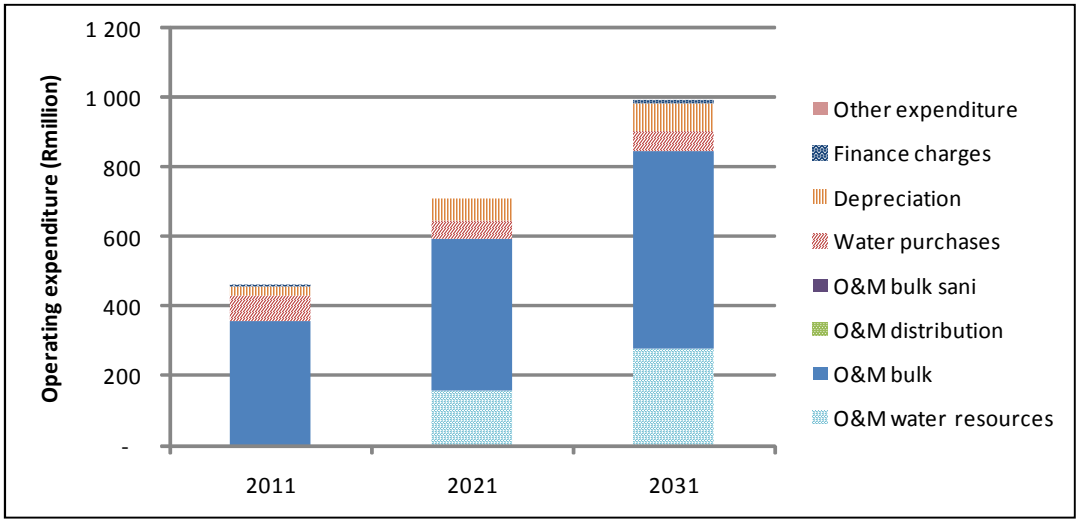

Figure 86: Operating expenditure

It is anticipated that the RWB will experience high growth over the coming 10 years (4.5% in real terms) as it expands the existing operations of the two water boards and takes over new water resource responsibilities.

Operating profit per activity

The model allows for each activity to be analysed separately with the results shown below (with the line showing the net position for all activities combined):

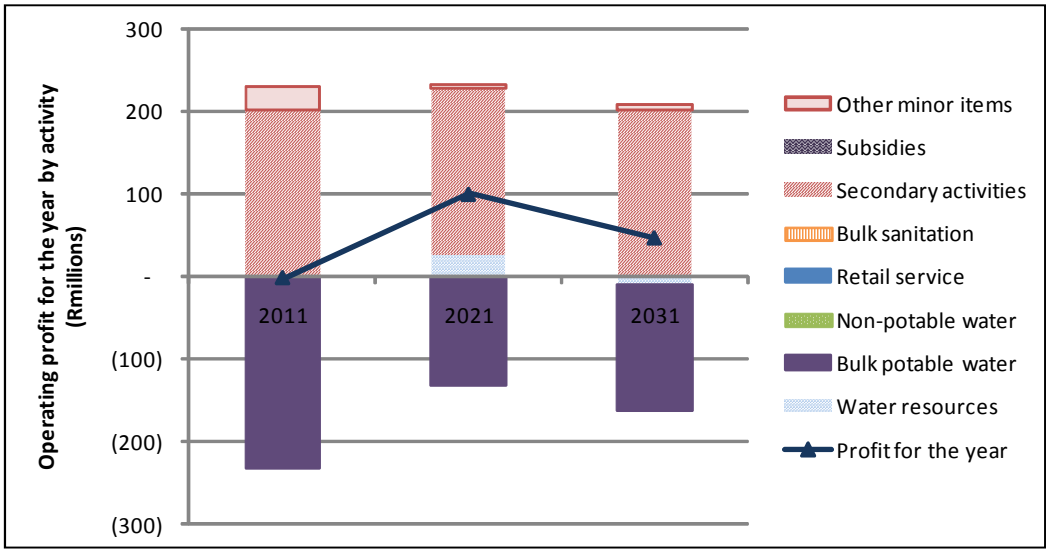

Figure 87: Operating profit for the year by activity

With regard to profitability, the current indications are that water resource schemes will run at a loss and this needs further consideration. Secondary activities are assumed to continue as they are. In order to maintain profitability, large increase in real terms in bulk supply tariff at 5.0% is required to which there may be resistance.

Capital expenditure

Capital expenditure requirements are projected as follows:

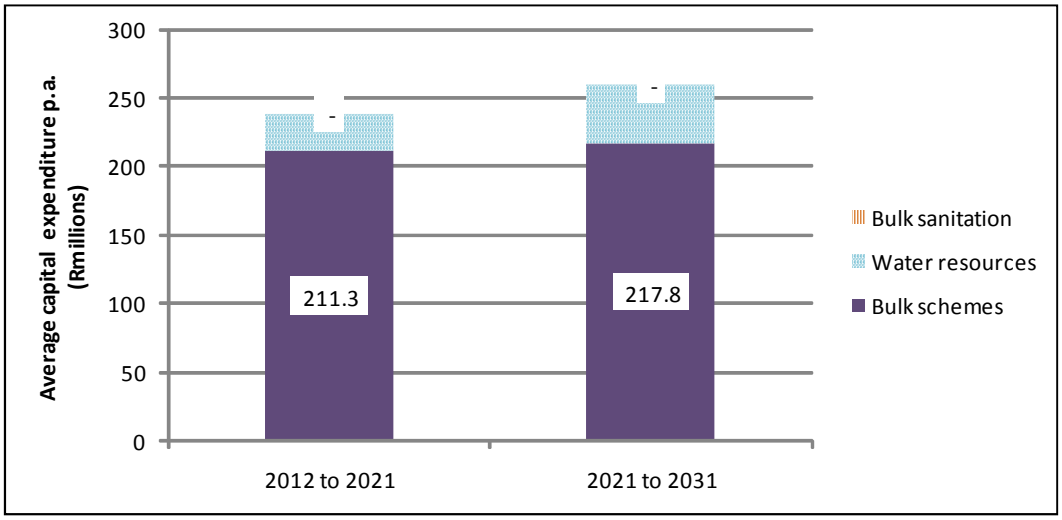

Figure 88: Average capital expenditure

Capital expenditure of the order of R250 million a year is anticipated, mostly for the expansion of the bulk water supply scheme and rehabilitation of existing bulk water assets.

Capital finance

Capital finance projections are shown below:

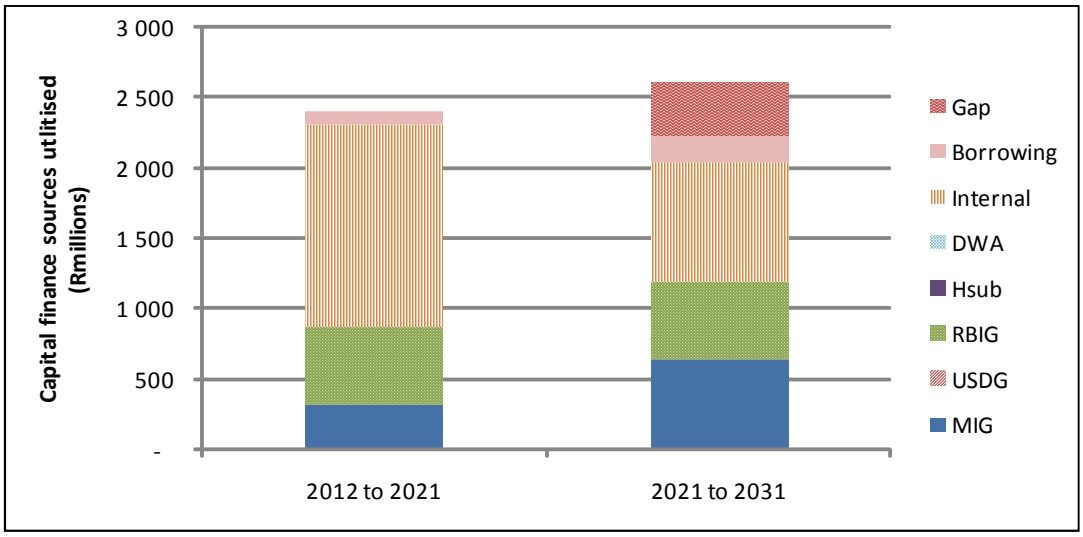

Figure 89: Capital finance sources utilised

As can be seen from the graphs that substantial provision is made for grant finance (MIG and RBIG funding) but with no funding from DWA included for rehabilitation of the water resources assets the RWB will take over. The analysis indicates the significant use of internal reserves in the early years but with increased reliance on debt finance in the future. The implication is that the RWB can raise the required amount of funding in the initial years, but not in the second 10 year period.

Appendix J: DCOG's Municipal Differentiation Barometer and the development of a composite indicator of municipal performance for use in this study

The Department of Co-operative Governance (DCOG) has recently done a piece of work on developing a barometer that can be used to differentiate municipalities and identify needs for support. The Barometer is a tool that assesses and analyses municipalities, based on a number of indicators, taking separate account of contextual factors and performance levels (DCOG, 2012).

The Barometer looks at Context and at three Key Performance Areas[21]. A summary of the indicators used to assess each area is presented in the table below. Weights are applied to the indicators and a score calculated for each municipality for Context and each of the Performance Areas.

Table 31: Indicators used to in DCOG Differentiation Barometer

Area	Indicators
Context	Percentage high income households
	Number of high income households
	Total service backlogs
	Percentage population in tribal settlements
	Percentage population in informal settlements
	Percentage increase in population
Municipal service provision performance	Blue Drop score 2011
	Blue Drop score 2012
	Non-Revenue Water
	MuSSA Water Vulnerability Score
	Green Drop score 2011
	Percentage of paved roads that are in good or very good condition as measured by VCI

[21] Note that it is significant that the Barometer treats context separately from performance. Part of the intention of the Barometer is to identify municipalities that are performing strongly in difficult contexts or poorly in strong contexts.

Financial performance	Revenue per high income household
	Two-year capital expenditure
	Audit outcome
	Fruitless and wasteful expenditure as percentage of operating budget
	Over/under expenditure as percentage of adjusted budget
	Closing cash balance
	Cash as percentage of three months operating expenditure
Administrative performance	Percentage of planned training conducted
	Compliance with skills development legislation
	Percentage of funded posts vacant
	Percentage of staff that left during the financial year
	Percentage of Section 57 posts filled
	Percentage of Section 57 posts vacant for more than 3 months
	Percentage of Section 57 managers that have signed performance agreements in place
	IDP compliance

Scores are out of 100%, and the Barometer places municipalities into one of four 'bands' of performance.

Table 32: Performance levels used in DCOG Differentiation Barometer

Band name	Score range	Descriptor
Level 1	75% to 100%	Strong performance or context
Level 2	50% to 75%	Adequate performance or context
Level 3	25% to 50%	Inadequate performance or context
Level 4	0% to 25%	Weak performance or context

The Differentiation Barometer provides a useful source of data on the relative contextual challenges and performance of municipalities.

Using the Differentiation Barometer to assess performance in areas underlying Water Boards

The results of the Differentiation Barometer were used to produce a composite assessment of the performance of the group of municipalities underlying each individual Water Board.

Excluding Blue Drop scores from Municipal Service Performance

Blue Drop scores for 2011 and 2012 were among the indicators used to calculate municipal performance in the Municipal Service Performance Area. In municipalities where a Water Board provides bulk services, performance in terms of these indicators is really a result of Water Board performance, not municipal performance.

The two Blue Drop indicators were thus removed from the calculation of municipal performance for the purposes of the analysis here.

Calculating scores for groups of municipalities underlying each Water Board for each Performance Area

An assessment of the performance of the group of municipalities underlying an individual Water Board was calculated as a weighted average of the individual municipal performances, with volume of water sold by the Water Board to the municipalities as the weighting. This gives a score for Context and for each Performance Area that is a percentage out of 100%.

Calculating a composite performance score

A composite performance score was then obtained by assigning a score from 0 to 3 for performance in each of the three Key Performance Areas. Scores were allocated based on the score ranges shown in Table 32 above. This gives a composite performance score of between 0 and 9 for the group of municipalities underlying a Water Board. These scores are shown in Table 8 in the body of this report.