water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Support on the Continuation of the Reconciliation Strategy of the KwaZulu-Natal Coastal Metropolitan Area: Phase 2

STATUS REPORT: SEPTEMBER 2015

Project Name:	***Support on the Continuation of the Reconciliation Strategy of the KwaZulu-Natal Coastal Metropolitan Area: Phase 2***
Report Title:	***Status Report: September 2015***
Authors:	***Study Team***
DWS Report No.:	***-***
DWS Contract No.:	***WP 10728***
AECOM Reference No.:	***60326618 (J02172)***
Status of Report:	***Draft***
First Issue:	***2015/10/09***
Final Issue:	

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LIST OF ABBREVIATIONS

BWSS	Bulk Water Supply Scheme
DM	District Municipality
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
KZN	KwaZulu-Natal (Province)
LTBWSS	Lower Thukela Bulk Water Supply Scheme
MM	Metropolitan Municipality
MMTS	Mooi-Mgeni Transfer Scheme
MMTS2a	Mooi-Mgeni Transfer Scheme Phase 2a (Spring Grove Dam)
NWRS2	National Water Resources Strategy 2
O&M	Operation and Maintenance
SANBI	South African National Biodiversity Institute
SCA	South Coast Augmentation
SOF	System Operations Forum
SSC	Strategy Steering Committee
TCTA	The Trans Caledon Tunnel Authority
TWP	Thukela Water Project
UEIP	uMngeni Ecological Infrastructure Partnership
uMWP-1	uMkhomazi Water Project Phase 1 (Smithfield Dam)
WC/WDM	Water Conservation and Water Demand Management
WSA	Water Services Authority
WSS	Water Supply System
WTW	Water Treatment Works

1 INTRODUCTION

1.1 BACKGROUND

In 2006 the Department of Water and Sanitation, DWS, (then Department of Water Affairs) developed the *Water Reconciliation Strategy Study for the KwaZulu-Natal Coastal Metropolitan Area*, a strategy to ensure adequate supply of water for the metropolitan areas in the central KwaZulu-Natal (KZN) region. The key objective of the Strategy is to identify, evaluate and prioritise the interventions that should be implemented to meet future water requirements. Within this context the Strategy is used as a decision support framework for making informed and timeous recommendations on interventions through a collaborative process involving stakeholders and institutions involved in the water supply cycle.

1.2 STUDY AREA

The study area of the Reconciliation Strategy extends from the Thukela River mouth on the KZN North Coast to the uMtwalume River on the South Coast and from Howick in the west to Durban in the east. It includes the eThekwini Metropolitan Municipality (MM), Msunduzi Local Municipality, as well as portions of uMgungundlovu, iLembe, and Ugu District Municipalities (DMs). The area consists of three main supply systems, namely the **Mgeni Water Supply System (WSS)**, the **South Coast WSS** and the combined **Mdloti-Mvoti WSS** (on the North Coast).

The location of the supply areas as well as the integrated nature and main sources of water are shown in **Figure 1.1**. This includes the Mooi-Mgeni Transfer Scheme (MMTS) with Mearns Weir (Phase 1) and the recently completed Spring Grove Dam (Phase 2), as well as linkages between the supply systems via the Northern and Western Aqueducts, as well as the South Coast Augmentation (SCA) and Lower Thukela Bulk Water Supply Scheme (LTBWSS) conveyance infrastructure. The figure also indicates the proposed transfer from the uMkhomazi catchment to the Mgeni catchment via the uMkhomazi Water Project Phase 1 (uMWP-1).

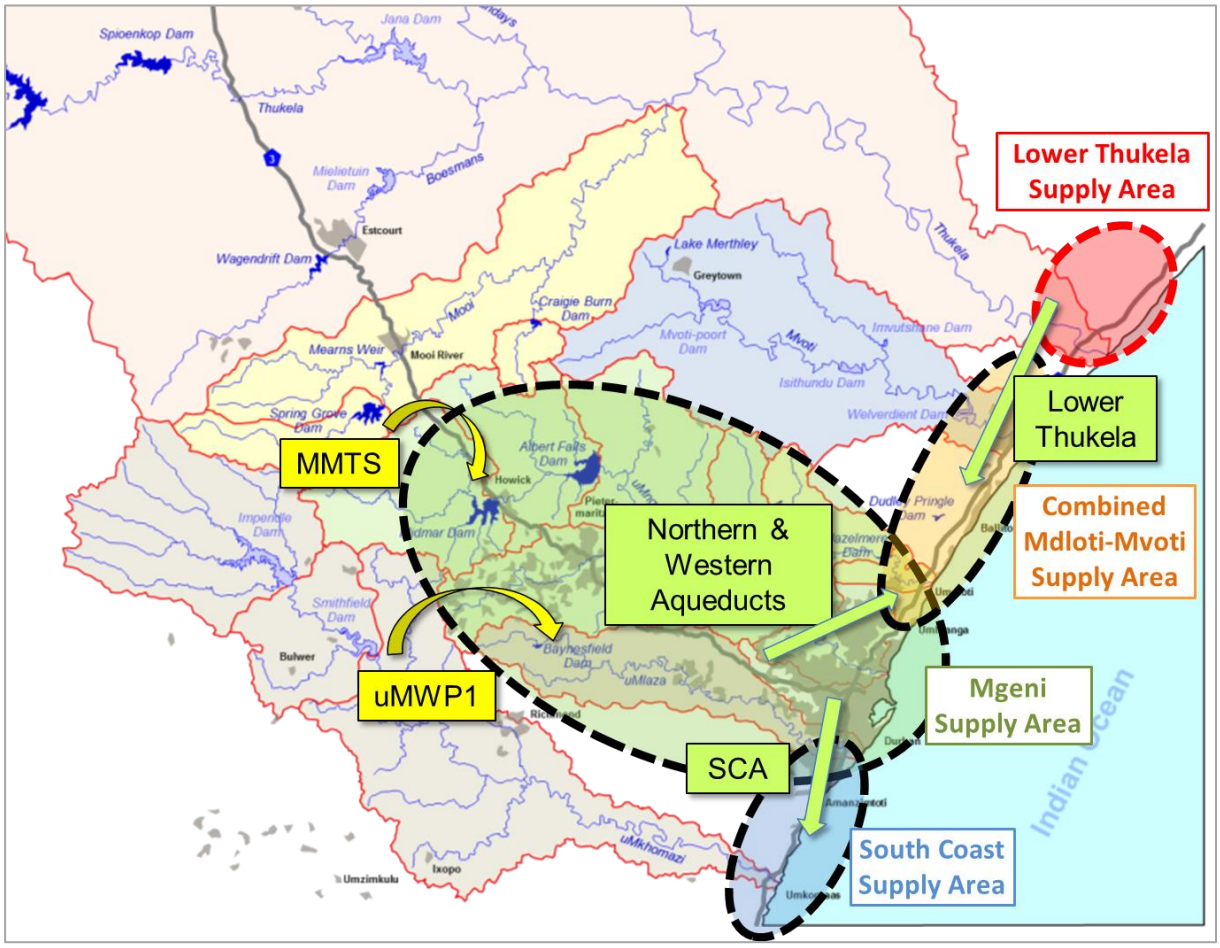

Figure 1.1: Study area of the Reconciliation Strategy

1.3 PURPOSE OF REPORT

The purpose of this document is to report on the current status of the Strategy as discussed and agreed upon at the 8th meeting of the *Strategy Steering Committee* (SSC) held on 09 September 2015. This included water supply challenges in the supply area, water requirement projections, water balances and the progress of a number of key short, medium, and long-term resource infrastructure projects required for the implementation of the Strategy.

A high level of emphasis was also placed on the cooperation with water services providers and authorities in the region to increase the efficiency of water use through ongoing water conservation and water demand management (WC/WDM) initiatives. Other initiatives such as the harvesting of rainwater could also play an important future role in supporting future water supply, particularly for new developments.

Finally, although the Strategy focuses on the planning of water resources over a planning horizon of 30 years, the short-term drought challenges currently being experienced in KZN were also discussed. To address the short-term drought

challenges in the province, emergency relief work is well advanced. Within the focus area of the Strategy this includes the emergency uThongathi River transfer scheme to support Hazelmere Dam, as well as a functioning scheme to transfer water from the Hlimbitwa River to Maphumulo on the North Coast. Furthermore, a functioning emergency scheme at uMzinto provides support to the South Coast by transferring water from the Mpambanyoni River to the catchment of EJ Smith Dam.

Further information and previous reports on the Strategy can be obtained from the DWS website at:

https://www.dws.gov.za/Projects/KZN%20Recon/

The DWS Project Manager for the Strategy is Mr Niel van Wyk and he can be contacted on:

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2 WATER REQUIREMENTS

A key component of the Reconciliation Strategy is realistic and up-to-date water requirement projections that guide the need for and timing of intervention options. Continuous updating and revision of water requirement projections ensures that the Strategy remains relevant by taking into account the various socio-economic and dynamic influencing factors that cannot be predicted with absolute certainty.

Water requirement projections are developed for three supply areas in the study area. These are:

- North Coast from La Mercy to Zinkwazi;
- South Coast from Amanzimtoti to Mtwalume; and
- The Mgeni WSS, which includes the main centers of Durban, Pietermartizburg and Howick, and the surrounding areas supplied from the uMngeni River.

Prior to SSC Meeting 8, water requirements projections were reviewed and updated where necessary, based on available water supply and sales figures and on data from other studies where confidence in the data was acceptable. Water requirements were projected to 2040 for the aforementioned systems, based on area specific growth rates. The main focus for SSC 8 was the incorporation of the effects of the aging and deterioration of existing infrastructure, termed system attrition, as well as the potential measures to combat this, termed WC/WDM. The details of these measures were obtained from the relevant Water Services Authorities' (WSAs) WC/WDM Master Plans. The water requirement projections with additional losses through system attrition at about 1% per annum formed the high road scenario for the future water requirements perspective. For the purposes of planning, the less aggressive WC/WDM savings targets from the Master Plans were adopted as the low road scenario. These updated water requirement projections are included in the water balances presented in **Section 3**.

More information on the WC/WDM measures and planned implementation by the WSAs is provided in **Section 4.1**.

3 WATER BALANCES

3.1 MDLOTI-MVOTI WSS

Due to the inter-connectedness of the Mdloti and Mvoti systems on the North Coast, the water balances of these systems have been integrated into a single water balance. For reconciliation planning purposes, two intervention scenarios have been identified as long term options for the North Coast. The first scenario involves the construction of Isithundu Dam (**Figure 3.1**), the second includes the recently identified indirect re-use of water via Hazelmere Dam from return flows generated in the oThongati and/or Mvoti catchments (**Figure 3.2**). This potential intervention has been formulated as part of Ethekwini's Total Outflow Strategy that is running in parallel to the Classification process.

The water balances in **Figure 3.1** and **Figure 3.2** clearly show – and this is currently being experienced – that the North Coast is in a short-term deficit situation (shown in red). For both scenarios, the rapid growth in water requirements that is anticipated on the North Coast will require the following actions to maintain a sustained positive water balance:

- LTBWSS1 is commissioned in 2016 (shown in a darker blue).
- The raising of Hazelmere Dam is completed by 2018 (shown in orange).
- LTBWSS2 be commissioned by 2021 (shown in light blue).

Thereafter, the two alternatives are:

- Isithundu Dam be implemented and would need to be commissioned by 2026 (shown in turquoise), **Figure 3.1**; or
- Indirect re-use of water is implemented to not only address effluent discharge constraints in the estuaries of the rivers, but also make additional raw water available at Hazelmere Dam (**Figure 3.2**). Based on the estimated growth in available return flows, the Proposed Isithundu Dam on the Mvoti River could be delayed beyond the planning horizon of 30 years.

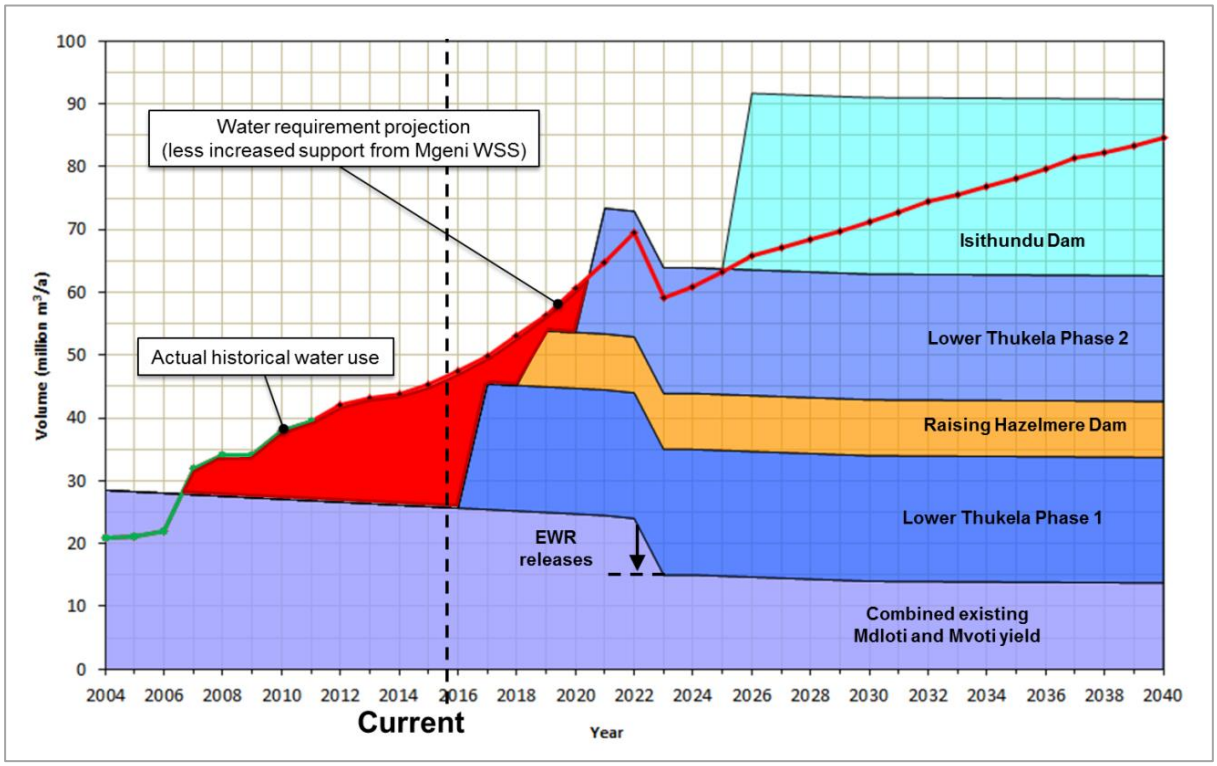

Figure 3.1: Mdloti-Mvoti water balance (incl. Isithundu Dam)

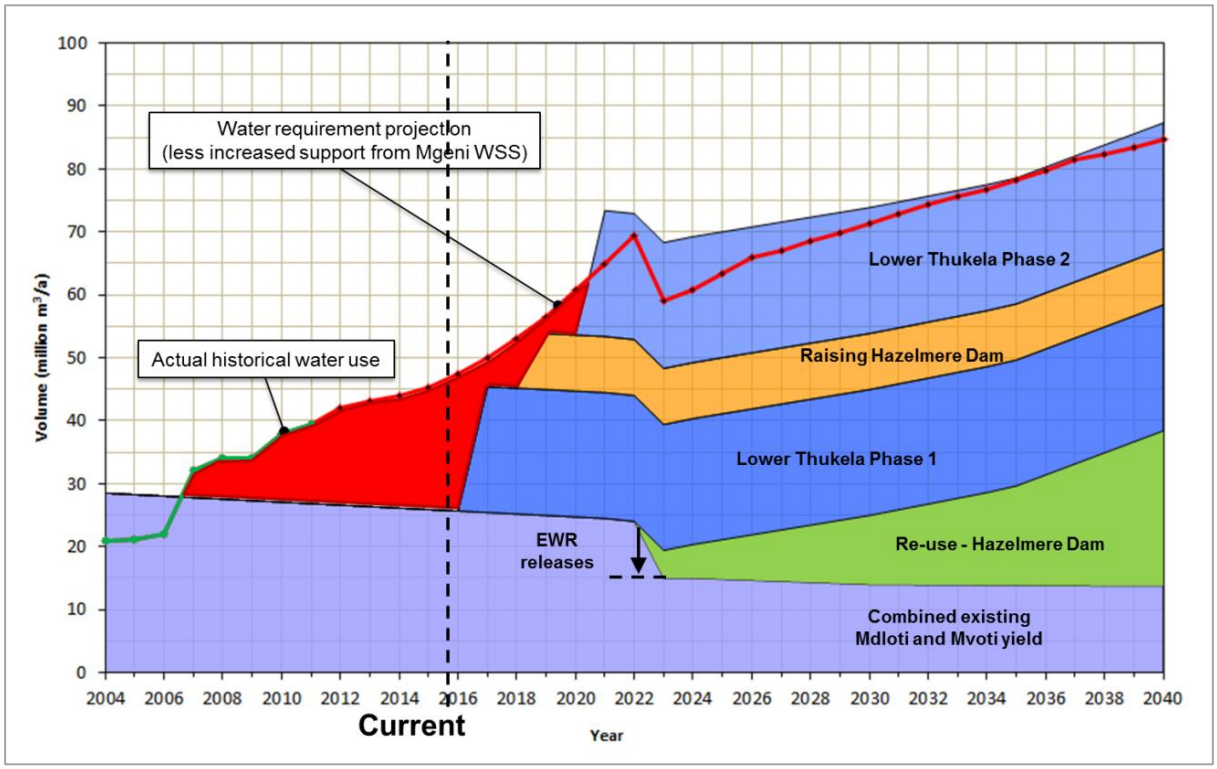

Figure 3.2: Mdloti-Mvoti water balance (including re-use from Hazelmere Dam)

Further points to note on the two figures with regards to water requirements and water availability are:

- The reduction in water requirements on the Mdloti-Mvoti WSS in 2023, represented by a decrease in the red water requirement projection line. This

results from moving a portion of the water supply from Hazelmere Dam onto the Mgeni WSS when the proposed uMWP-1 is commissioned. This water will be supplied via the Northern and Western Aqueducts. Note that this implies the need for commissioning uMWP-1 and the new Northern Aqueduct by 2023 (as discussed in later in **Section 3.3**).

- The implementation of the Reserve and associated Ecological Water Requirements (EWRs), which may require additional releases from Hazelmere Dam, is delayed until the implementation of the uMWP-1. The impact of the EWR on the yield of the system is a decrease of approximately 10 million m^3/a (shown as a decrease in the purple portion at the bottom of **Figure 3.1**). The potential to off-set the EWR through the return of treated effluent is still being established and will be dealt with in more detail at the next Technical Support Group meeting.

3.2 SOUTH COAST WSS

The water balance for the South Coast WSS is shown in **Figure 3.3**. The existing water availability represents both local resources (shown in light blue) as well the support from the Mgeni WSS through the South Coast Augmentation (SCA) pipeline (shown in dark blue). Projected water requirements are shown as red lines, with and without the planned implementation of WC/WDM initiatives.

Figure 3.3 also shows the augmentation of the South Coast by the implementation of either the proposed Lower uMkhomazi Bulk Water Supply Scheme (Ngwadini Dam, as discussed **Section 4.7**) or the desalination of seawater (both shown in green) with earliest implementation in 2019/2020. As such, a short-term shortfall is likely around 2018 to 2019. WC/WDM initiatives will be a key measure in minimising risk over this period, as well as for long term sustainable supply once the system is augmented.

The water balance in **Figure 3.4** illustrates that once the South Coast is augmented, the support that is currently provided from the Mgeni WSS through the SCA can be reduced, making additional water available for use as a short term reprieve for the Mgeni WSS.

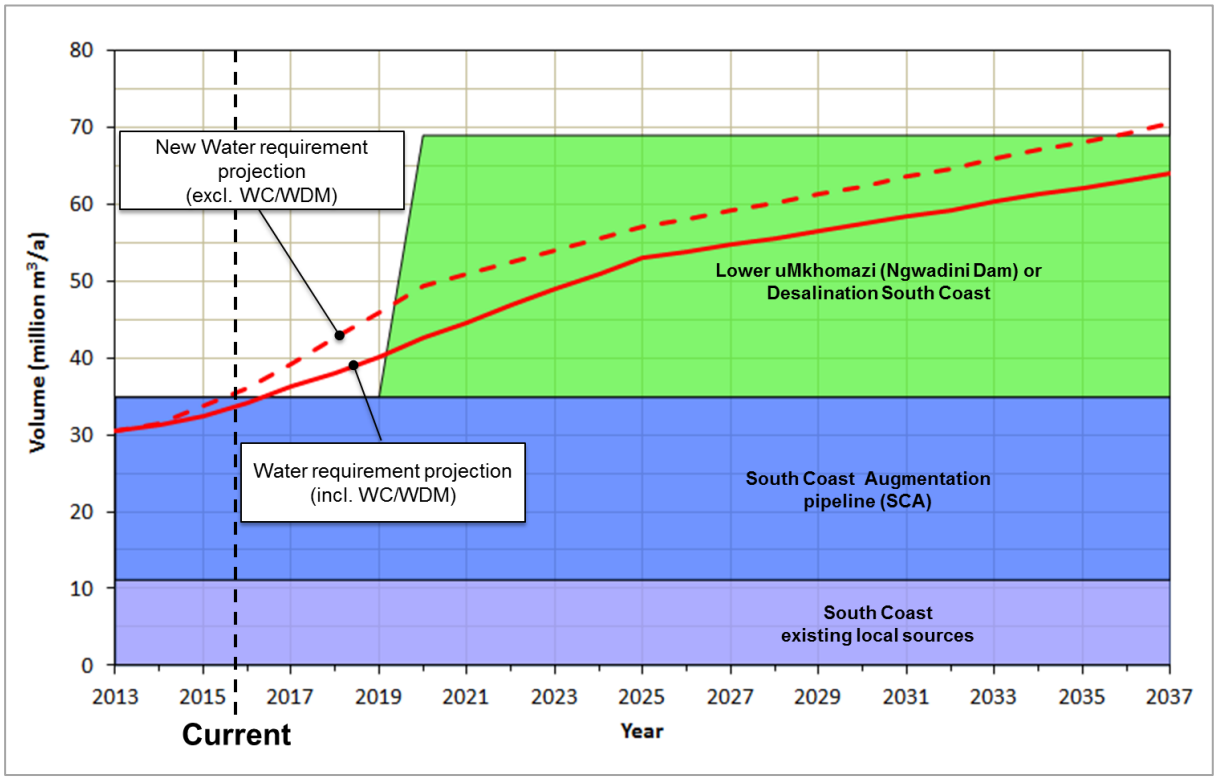

Figure 3.3: South Coast water balance with support from Mgeni WSS

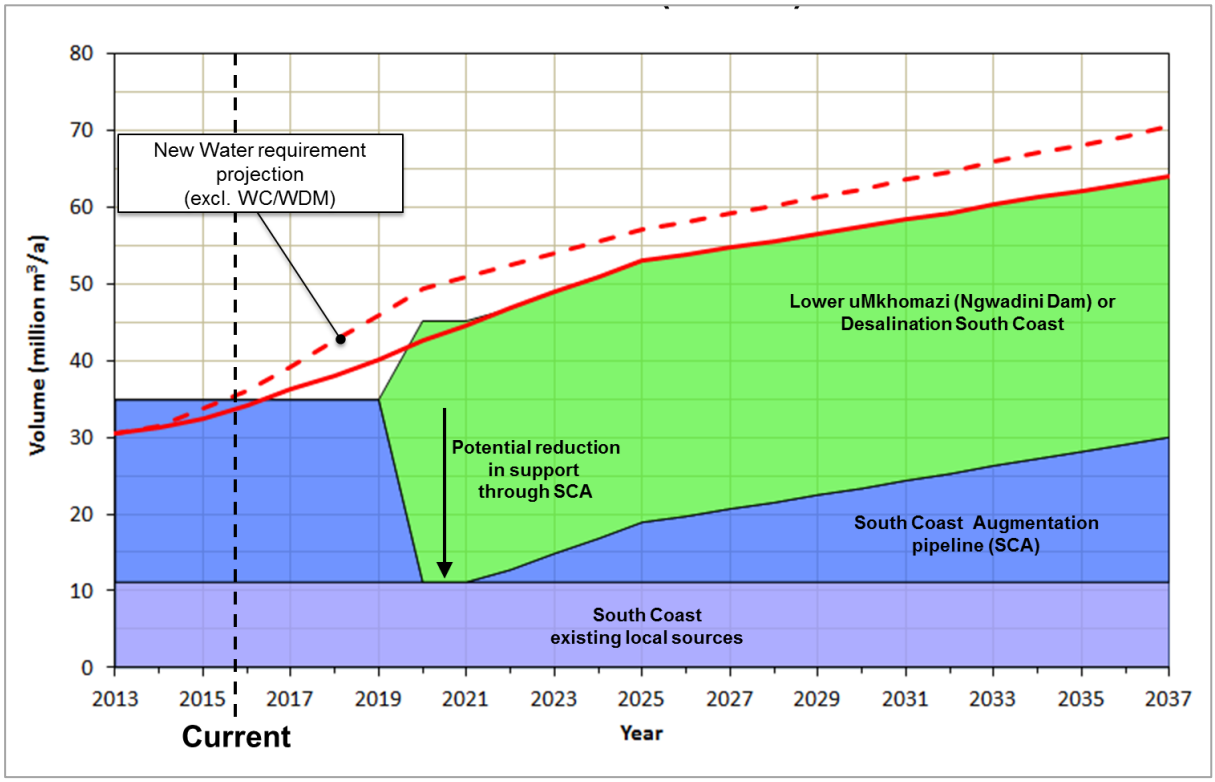

Figure 3.4: South Coast water balance with reduction in support from Mgeni WSS

3.3 MGENI WSS

As mentioned in Section 2, water requirements for the Mgeni WSS were updated to include possible system attrition due to the aging and deterioration of water

supply infrastructure (see Figure 3.5). This can however be addressed through the appropriate implementation of the correct WC/WDM initiatives (see Figure 3.6), which could mitigate the increasing system losses and also achieve some water demand management savings.

The new high and low growth scenarios for the Mgeni WSS are thus those including system attrition and WC/WDM.

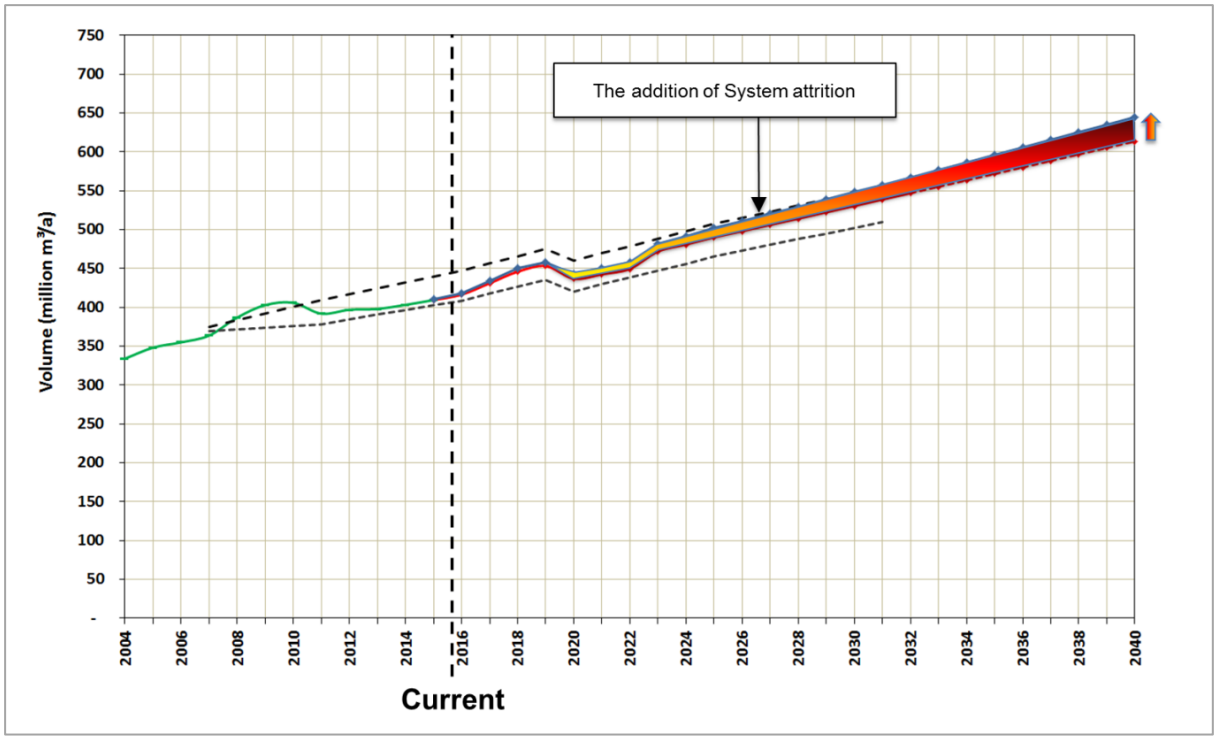

Figure 3.5: Addition of system attrition to Mgeni WSS water requirements

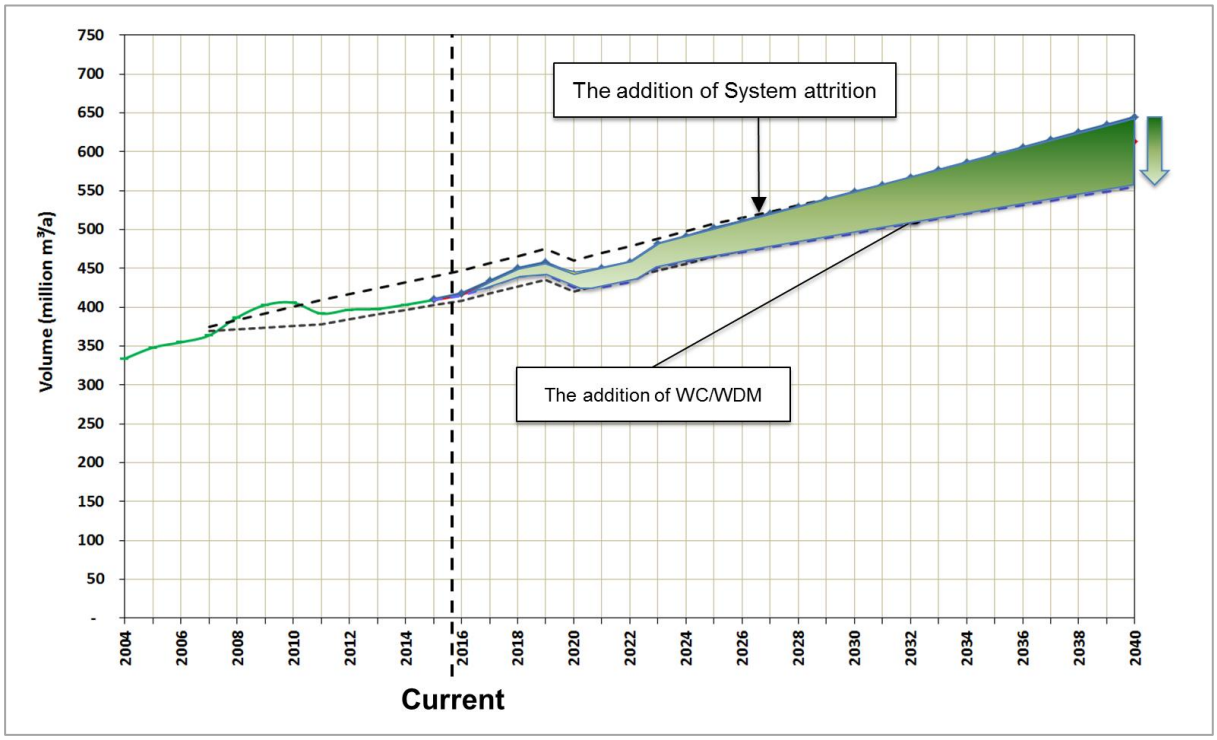

Figure 3.6: Addition of potential benefits from WC/WDM initiatives

As discussed in the *Status Report: February 2015* (DWS, 2015), there are several options for the augmentation of the Mgeni WSS and the reconciliation of water resources and projected water requirements. These options are summarised as follows:

- **Scenario 1**: Implementation of re-use of treated effluent or desalination of seawater on the North Coast, followed by the uMWP-1 (shown in Figure 3.7).
- **Scenario 2**: Implementation of both re-use and desalination on the North Coast, followed by a delayed uMWP-1 (shown in Figure 3.8).
- **Scenario 3**: Implementation of only uMWP-1 (shown in Figure 3.9).

The water requirement projection on all water balances account for the impacts of the following:

- The reduction in support from the Mgeni WSS to the South Coast after the implementation of either the proposed Lower uMkhomazi Bulk Water Supply Scheme (Ngwadini Dam) or the desalination of seawater (as discussed earlier in Section 3.2), resulting in a decrease in the red line in 2020.
- Moving a portion of the water supply from Hazelmere Dam onto the Mgeni WSS (as discussed earlier in Section 3.1), resulting in an increase in the red line in 2023.

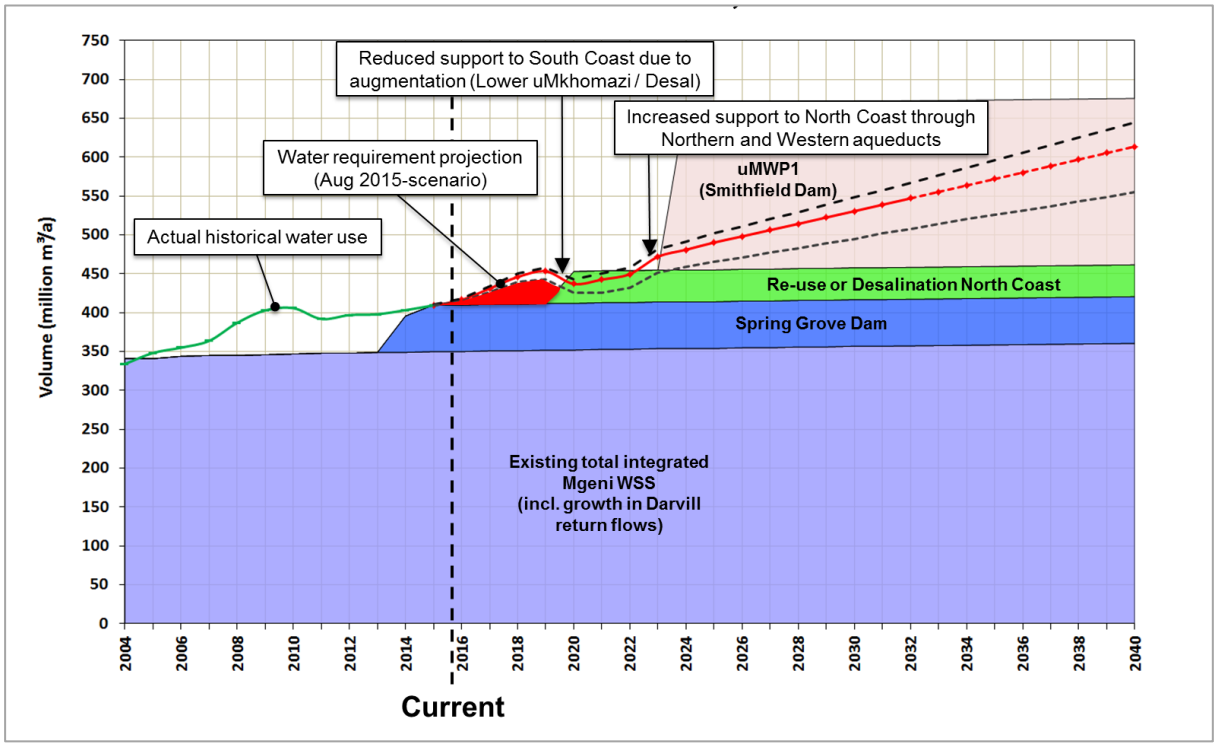

Figure 3.7: Mgeni water balance with re-use or desalination and then uMWP-1

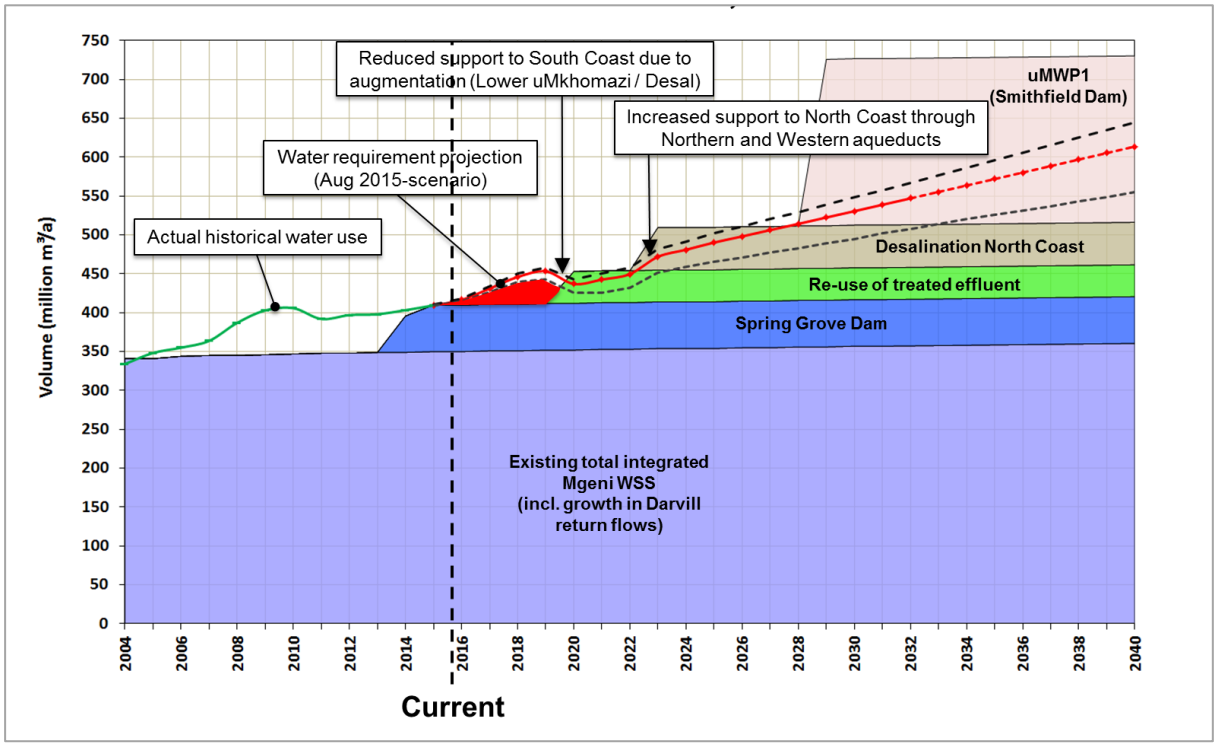

Figure 3.8: Mgeni water balance with both re-use and desalination and delayed uMWP-1

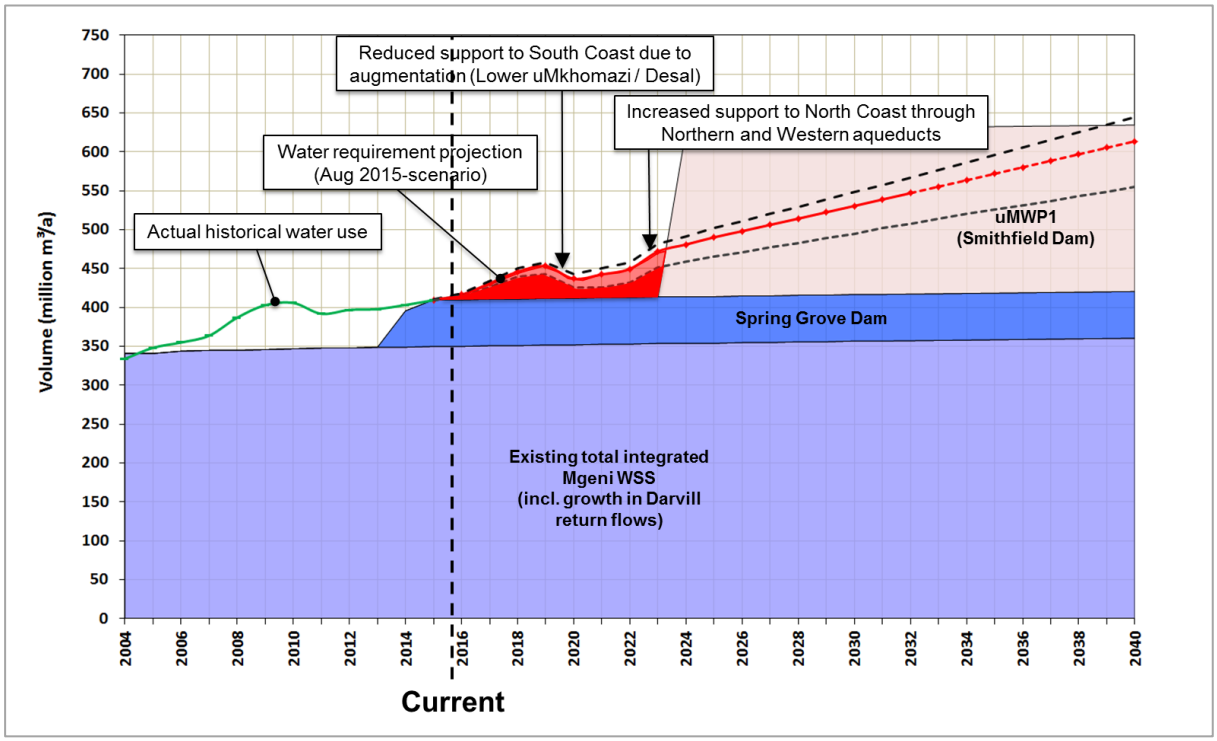

Figure 3.9: Mgeni water balance with uMWP-1 only

Based on the water balances for the reconciliation scenarios presented above the following is noted:

- Even with the recently commissioned MMTS2 (Spring Grove Dam) the Mgeni WSS remains in deficit after 2015. This deficit will increase until the Mgeni WSS can be further augmented.
- If the re-use of treated effluent or desalination is implemented, a positive water balance can be maintained from 2020. However, the uMWP-1 (Smithfield Dam) still needs to be commissioned by 2023.
- If both re-use and desalination are implemented, uMWP-1 can be delayed, although only for 5 years.
- Both re-use and desalination have high energy and O&M costs, which may result in these plants being mothballed when uMWP-1, a gravity scheme, comes on line (Figure 3.8).
- If uMWP-1 is implemented without re-use or desalination, a longer period of potential shortfall of about six years is projected, from 2017 to 2022.

3.4 RISK ASSESSMENT

The water balances discussed in Section 3.3 clearly illustrate the urgent need for augmenting the Mgeni WSS, and that uMWP-1 (Smithfield Dam) needs to be commissioned as soon as possible. Of interest is that the projected six-year shortfall period (2017 to 2022) will be similar in length and magnitude to that which was experienced in the Mgeni WSS prior to the commissioning of Spring Grove Dam (2006 to 2014). It was fortunate that during this period above average rainfall was experienced, thereby maintaining water balances at levels that were higher than those projected by earlier models. This may not be the case in the future projected shortfall period.

Within this context, an assessment was undertaken to quantify the possible implications for water users in the Mgeni WSS of the projected shortfall, based on the risks of non-supply during the shortfall period. The assessment involved a comparison of the following:

- **Projected water requirements** in the system;
- **Projected water supply**, based on both water volume and assurance of supply characteristics.

The approach and results of the assessment are discussed below.

a) Water user priority classification

The water user priority classification adopted for the Mgeni WSS is summarised in Table 3.1 and shows the distribution of the total system water use volume across four classes, namely “High”, “Medium-high”, “Medium-Low” and “Low”.

Table 3.1: Water user risk criteria for the Mgeni WSS

User priority classification		Annual assurance of supply	Annual risk of failure	RI(1) of failure (years)	Volume (as % of total)
L	Low	95%	5%	1:20	12%
ML	Medium-low	98%	2%	1:50	12%
MH	Medium-high	99%	1%	1:100	13%
H	High	99.5%	0.5%	1:200	63%
Total:					**100%**

Note: (1) Recurrence Interval

b) Projected water requirements

The total projected water requirements in the Mgeni WSS, disaggregated into the volume of water that would be required in each of the four water use priority classes is shown in Figure 3.10.

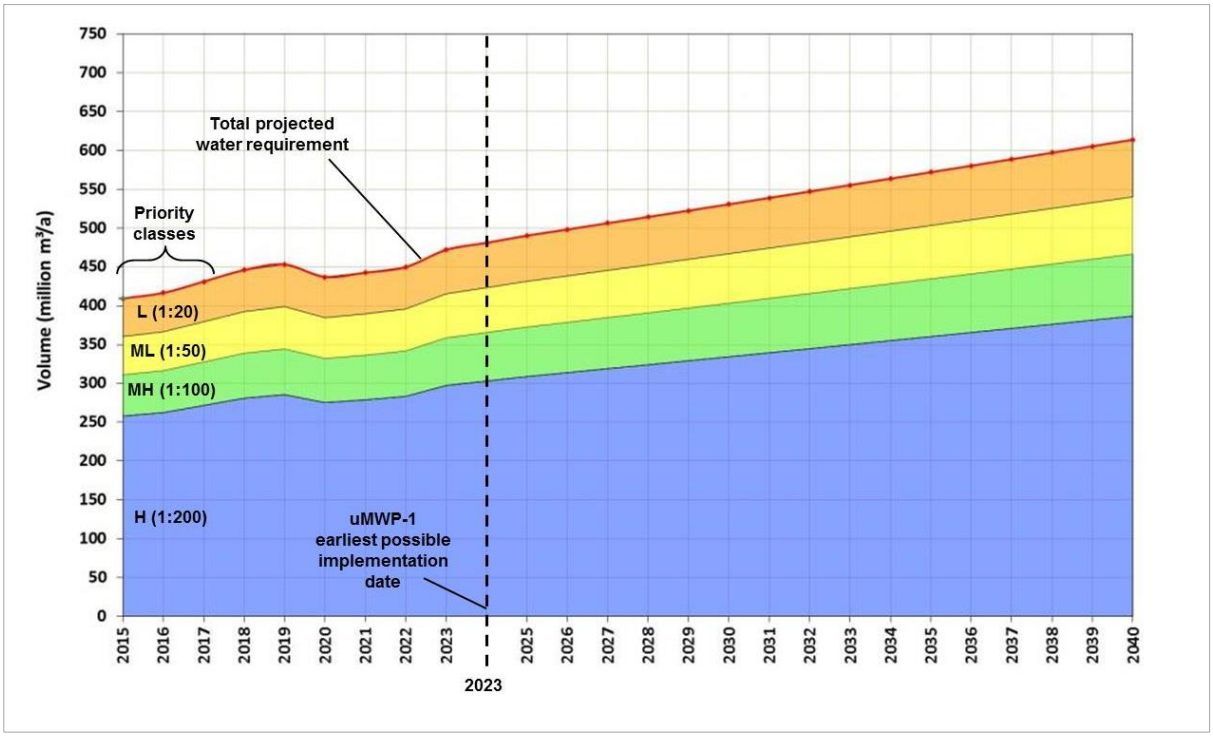

Figure 3.10: Projected water requirements according to water use priority classes

c) Projected water supply

The projected supply of water to users in the Mgeni WSS was modelled using the Water Resources Planning Model (WRPM) to analyse 2 scenarios as follows:

- **Scenario 1**: Full water supply is targeted. Under this scenario, projected water requirements (as shown earlier in Figure 3.10) are fully supplied when water is available in the system. The result is presented in Figure 3.11 and shows how achievable assurances of supply will decrease significantly over time.
- **Scenario 2**: Water supply is curtailed. For this scenario, water supply is curtailed based on a combination of (i) the current assurance of supply characteristics of the system; and (ii) the assumption that lower priority water use will be curtailed in order to protect the higher priority water user. The result is presented in Figure 3.12 and shows an increasing shortfall in water supply (in red), totalling almost 20% of the total water requirement in 2023 – the earliest possible implementation date of uMWP-1.

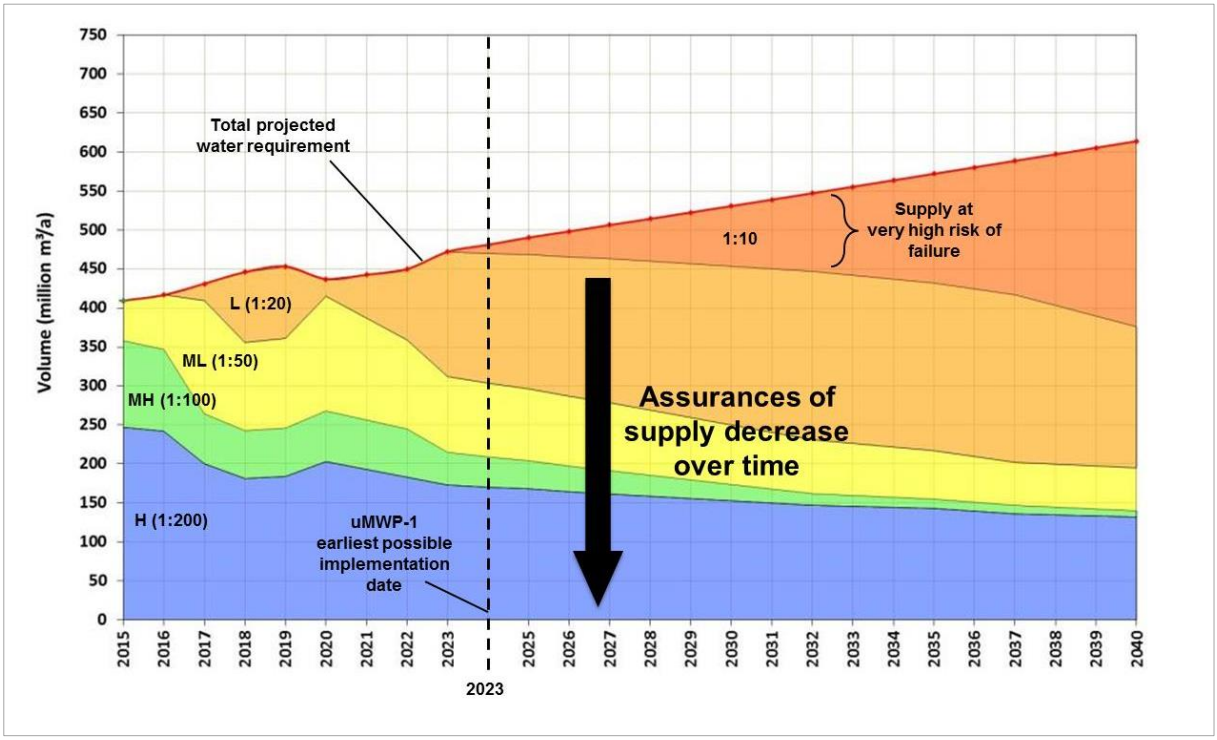

Figure 3.11: Projected water supply (full water supply is targeted)

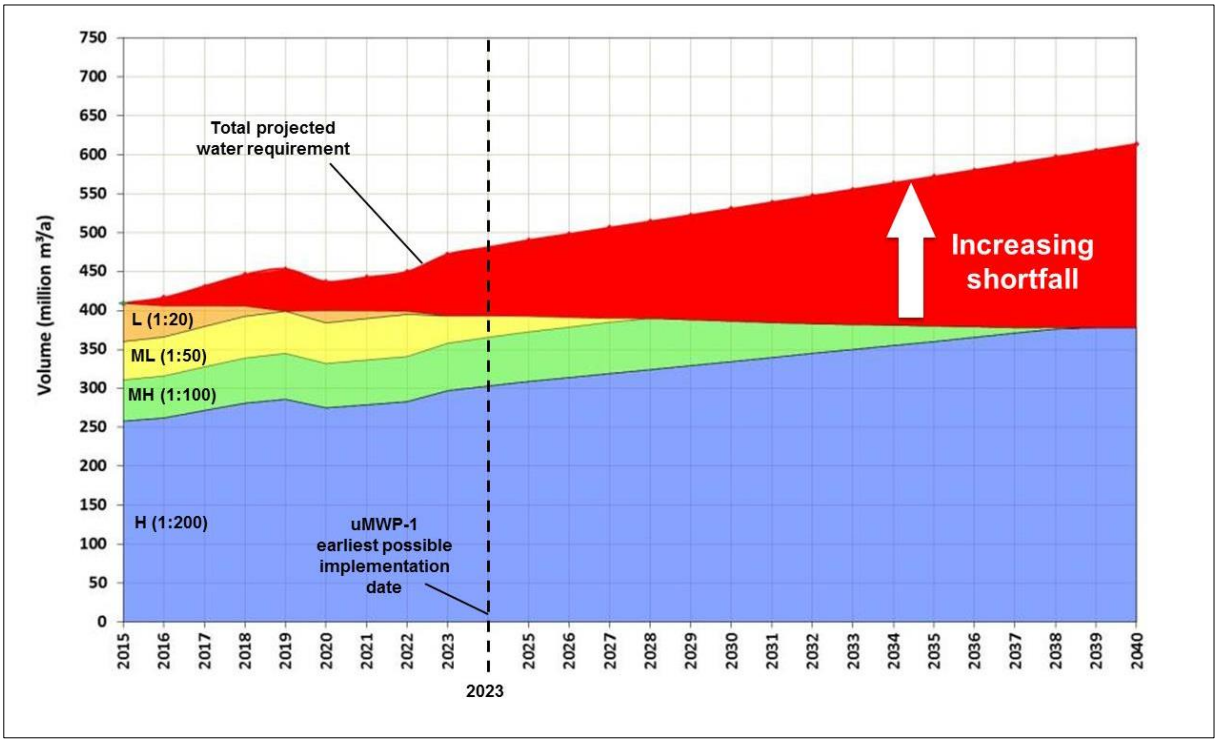

Figure 3.12: Projected water supply (water supply is curtailed)

These results confirm that water users in the Mgeni WSS are at significant risk of experiencing either of the following situations prior to the implementation of uMWP-1:

- Without curtailments, water supply at the required levels of assurance will continue to drop, and eventually reach an unacceptably high risk of failure

- Even with curtailments, an increasing shortfall in water supply if water use is curtailed based on available water resources.

Furthermore, it is also clear that the situation will increase in severity if the implementation of uMWP-1 is delayed. This will result in more regular water restrictions and possibly significant negative socio-economic impacts. The implementation of uMWP-1 must therefore be prioritised with focused decision making and adherence to the project programme.

Finally it should be noted that the perception of whether the projected risks are acceptable will most likely vary from institution to institution, as well as from individual to individual. However, the risk should be evaluated against the potential monetary savings associated with not implementing costly interim intervention options (i.e. re-use or desalination) prior to uMWP-1.

4 STATUS OF RECONCILIATION STRATEGY

An important aspect of updating the Strategy is the progress on the implementation and/or revision of target dates for the implementation of planned schemes and other intervention options, as well as the updating of water requirement projections (as described in **Section 2**). Target dates for intervention options were revised based on feedback from SSC members and discussions prior to SSC Meeting 8, and the updated list is provided in **Appendix A**. Key milestones and observations for each of the interventions are summarised below.

4.1 WC/WDM

Water conservation and water demand management (WC/WDM) is an important intervention for dealing with short- and medium-term water supply challenges. Due to the interconnectedness of the water supply systems in the Strategy area, a failure by any of the WSAs to implement and maintain appropriate WC/WDM initiatives will have a significant impact on all other users.

eThekwini MM, iLembe DM, Msunduzi LM and Ugu DM presented information at SSC Meeting 8 and summarised challenges and success with implementing WC/WDM. It was noted that:

- The municipalities have a focussed strategy with associated budgets to implement WC/WDM initiatives.
- To ensure its success, WC/WDM must be viewed as more than simply a series of technical interventions as it depends heavily on social perceptions and behaviours and strong public support.
- Ageing infrastructure is one of the main causes of leaks.

As mentioned in **Section 2**, the WC/WDM strategies and associated potential savings on water requirements by each of the responsible municipalities will be more revised and incorporated into the water balances and Reconciliation Strategy. Preliminary information from the 5-year WC/WDM Master Plans for five WSAs is presented in **Table 4.1**.

Table 4.1: Preliminary information from 5-year WC/WDM Master Plans

WSA(1)	Baseline (Mℓ/d)	5-year, no WC/WDM (Mℓ/d)	5-year, with WC/WDM (Mℓ/d)	Saving	
				(Mℓ/d)	(million m^3/a)
eThekwini	911	1014	943	71	25.9
Msunduzi	183	206	185	21	7.7
Ugu	111	113	102	11	4.0(2)
iLembe	63	79	74	5	1.8(2)
Umgungundlovu	61	75	62	13	4.7(2)
Total saving:	**Between 40 and 48 million m^3/a**				

Note: (1) Water Services Authorities
(2) Partially located within Reconciliation Strategy area

As decided at SSC Meeting 7, all the municipalities (that are WSAs) will continue to provide feedback at future meetings on WC/WDM implementation and progress.

4.2 MOOI-MGENI TRANSFER SCHEME

The Mooi-Mgeni Transfer Scheme (MMTS) was developed to augment water supply to the Mgeni WSS, and comprises the Mearns Weir, the recently commissioned Spring Grove Dam on the upper Mooi River and the associated conveyance infrastructure. Once commissioned in its entirety, MMTS (including Phase 2A and B) will increase the current yield of the Mgeni System by 60 million m^3/a (at Inanda Dam).

The Trans Caledon Tunnel Authority (TCTA) implemented Phase 2A on behalf of DWS and Spring Grove Dam was completed on 3 March 2014. Furthermore, the 14.9 km Phase 2B pipeline has been completed (apart from 0.1 km railway/R103 crossing), and commissioning is expected early in 2016.

4.3 NORTH COAST INFRASTRUCTURE

The North Coast has been experiencing rapid growth in recent years, increasing the water requirements above the available resources and infrastructure capacities.

4.3.1 Raising of Hazelmere Dam

The raising of Hazelmere Dam by 7 m with a piano key weir to increase the gross storage capacity from 23.9 to 43.7 million m^3 will augment the water supply to the

North Coast area (from the Mdloti to the Thukela River) and sustain irrigation downstream of the dam. Progress to date includes the following activities:

- People displaced are being consulted by Land Matters and professional evaluators.
- Demolition of existing buildings and minor civil works has been completed.
- 14 Valuation reports were approved by the Minister, 20 valuation reports are still outstanding.
- The resettlement is in process.
- Construction:
    - Civil Works contractor is appointed; site hand-over was done on 30 June 2015.
    - Commencement date for construction was on 01 July 2015.
    - Construction period is 24 months.
    - An estimated 300 jobs will be created over the construction period.

4.3.2 North Coast Pipeline and Hazelmere Supply Infrastructure

In line with the planned raising of Hazelmere Dam and anticipated increase in available water, Umgeni Water has proceeded with upgrading the water treatment and supply infrastructure linked to the dam. Progress is as follows:

- A new raw water pipeline from Hazelmere Dam to the Hazelmere water treatment works (WTW), upgrade of the Hazelmere WTW from 45 to 75 Mℓ/d and a pump station at the WTW. All have recently been completed.
- The WTW and new infrastructure can only be operated at the increased capacity on a sustained basis once the raising of Hazelmere Dam has been completed.

4.3.3 Lower Thukela Bulk Water Supply Scheme

The expected growth in the water requirements in the KwaDukuza area will be met from the LTBWSS. The scheme involves the abstraction of water from the lower Thukela River (near the SAPPI mill) and treatment at a regional WTW. Construction started in February 2014, comprising the abstraction works, pump stations, de-silting works, WTW and storage reservoirs. The construction of a gravity pipeline from the Mvoti reservoir to Darnall is also underway. It is anticipated that the scheme will be commissioned by mid-2016.

4.4 uMKHOMAZI WATER PROJECT

The first phase of the uMWP-1 comprises a new dam at Smithfield on the uMkhomazi River, water conveyance infrastructure (including a 32 km tunnel), a balancing dam and WTW in the uMlaza valley, as well as a gravity potable water pipeline connecting the uMWP to the Umgeni Water bulk distribution network. Although augmentation of the Mgeni WSS is required from 2017 onwards, the uMWP can only be implemented by 2023. Institutional arrangements to ensure the timely implementation of this scheme are therefore of critical importance.

Feasibility studies currently being finalised by DWS and Umgeni Water provide the project layout and size of infrastructure components, for both the raw water and potable water components of the scheme. The specialist Environmental Impact Assessment (EIA) is underway and the aim is to present submissions to the relevant authorities by November 2016.

4.5 DIRECT REUSE OF TREATED WASTEWATER

In 2009, eThekwini MM initiated a study to assess the viability of reuse as an option to augment water availability in their area of supply. It was proposed that treated effluent from the KwaMashu and Northern wastewater treatment works is reclaimed and treated to potable standard for reticulation. However, public concerns and negative sentiment has since halted the process. It is therefore unlikely that this option will be pursued to address short-term water supply issues in the area.

4.6 DESALINATION OF SEAWATER

Umgeni Water is investigating the option of desalinating seawater as an alternative water supply source. A feasibility study is currently being finalised to investigate two 150 Mℓ/d plants, located at Lovu on the South Coast and Tongaat on the North Coast, respectively. The size of these plants is based on the capacity of existing and proposed bulk water supply infrastructure in these areas, which can be utilised to convey the potable water from the plants to the various distribution points. Current estimates show that the total cost of the infrastructure will be approximately R3 400 million, bringing the cost of water to between R10/kℓ and R15/kℓ. The EIA is underway and the feasibility study will be completed in the near future. Implementation can potentially be achieved by 2019.

However, the Tongaat plant on the North Coast may not be required as the LTBWSS (discussed in **Section 4.3.3**) and raising of Hazelmere Dam (see

Section 4.3.1) will address the short-term needs, while the medium- to long-term needs will be addressed by the uMWP-1 (see Section 3.1). The feasibility of the Lovu plant depends on an economic comparison with the other proposed scheme for the South Coast, namely the Lower uMkhomazi BWSS (discussed below).

4.7 LOWER UMKHOMAZI BWSS

The Lower uMkhomazi Bulk Water Supply Scheme (BWSS) consists of an abstraction works on the uMkhomazi River, a 50 m high off-channel storage dam at Ngwadini (on a tributary of the lower uMkhomazi River), a 100 Mℓ/d WTW, pump station and pipeline to deliver water to the South Coast supply area. The scheme is an alternative to a desalination plant at Lovu on the South Coast (discussed above). Umgeni Water commenced with a detailed feasibility study on the scheme and this is expected to be completed by December 2015. The EIA is also currently underway. The estimated implementation date of the scheme is March 2022 at an estimate cost of R2 200 million.

4.8 MVOTI RIVER FEASIBILITY STUDY

The Mvoti River Feasibility Study involves assessing the development of a large dam on the Mvoti River, either at Isithundu or Welverdient, with a regional WTW and bulk distribution infrastructure. The proposed three-year study has been delayed, but DWS will continue with the study to ensure that the scheme can be implemented when required. If the scheme is found to be feasible, detailed design of the scheme may be undertaken from 2018 to 2020 and construction from 2020 to 2023. First water delivery is currently estimated at April 2024.

4.9 THUKELA WATER PROJECT DESKTOP STUDY

The Thukela Water Project (TWP) is a major proposed water resources development located in the upper Thukela River catchment. Although the TWP has been planned as an augmentation scheme for Vaal River System, the possibility has been proposed of fast-tracking a selected component of the project as a regional water supply option for KZN. In particular, the project could provide medium-term augmentation to the lower Thukela and, therefore, a portion of the Reconciliation Strategy area. However, no further work has been undertaken on this option since the previous SSC meetings and may only be considered at a later stage.

4.10 CATCHMENT CARE

The *uMngeni Ecological Infrastructure Partnership* (UEIP) is a committee dedicated to maintaining and investing in "ecological infrastructure" (i.e. naturally functioning ecosystems that deliver valuable services to people) as a means to contribute to water security and improve water quality. This partnership is headed by the South African National Biodiversity Institute (SANBI) and is supported by a number of the SSC member institutions. The SSC recognises the importance of maintaining ecological infrastructure within the Reconciliation Strategy area and, as such, indicated their continued commitment to collaboration between the Strategy and the UEIP. It is conceptually feasible that catchment care could result in improve water resources, however due to a lack of quantifiable data at this early stage of this project, this initiative has not been considered in the options assessed for this Strategy.

4.11 RAINWATER HARVESTING

At SSC Meeting 8 the potential benefits of rainwater harvesting and on-site water management solutions were discussed. It was requested by the SSC that the benefits of rainwater harvesting be further explored as a way of improving water use efficiency in the Reconciliation Strategy area. In particular, the potential for implementing such approaches and technologies at new developments should be encouraged. Rainwater harvesting can also be a tool to assist in improving water users understanding of water resources variability and the need for good water use practices.

4.12 MANAGEMENT OF SYSTEM OPERATION AND DROUGHT INTERVENTIONS

Further to the above interventions, the *Umgeni Water Supply System Operations Forum* (SOF) has been established to focus on improving system operation and the management of water restrictions in the event of a drought.

Information for the 2014 SOF was presented and discussed at SSC Meeting 6, but subsequently the situation deteriorated and rainfall during the wet season of 2014/2015 was below average. At SSC Meeting 7 the DWS KZN office reported back on the then current situation and interventions in the province.

At the 8th SSC meeting, the key discussion points and decisions from the 2015 SOF were presented, summarised as follows:

- Due to low storage levels, water restrictions needed to be urgently implemented at a number of schemes across the province, including with thin the study area. Water restrictions within the study area included the North and South Coast, for users supplied from Hazelmere and the Umzinto dams respectively.
- As short term emergency measures to maintain water supply for basic human needs and avoid the dams running empty, Umgeni Water had implemented emergency pumping schemes from neighbouring catchments. Emergency pumping from the oThongati River was augmenting the Hazelmere dam by up to 8 ML/d, and a scheme from the Mphambanyoni was augmenting the EJ Smith Dam in Umzinto.
- Further drought relief funds and interventions are being administered, following the declaration by the Premier of KZN of a *Provincial State of Disaster* due the continued drought conditions. It was noted that various activities and allocated budgets associated with the drought relief plans in iLembe, Umkhanyakude, Zululand, uThungulu and Ugu are currently being implemented.

It was agreed that while resolution of the drought situation in KZN required short-term actions, the ongoing **long-term planning and implementation of the Reconciliation Strategy** was critical to managing the possible impact of similar future water scarcity situations.

Furthermore, while water restrictions are not desirable and need to be carefully considered, water restrictions are sometimes unavoidable, and could be particularly prevalent over the next 8 years as part of the strategy to manage periods of compromised water availability. A key to managing the short term challenges is timeous and informed decision making.

5 REFERENCES

DWS, 2014. *Continuation of the Reconciliation Strategy of the KwaZulu-Natal Coast Metropolitan Area: Phase 2, Status Report: August 2014,* Pretoria, South Africa: DWS.

DWS, 2015. *Continuation of the Reconciliation Strategy of the KwaZulu-Natal Coast Metropolitan Area: Phase 2, Status Report: February 2015,* Pretoria, South Africa: DWS.

Appendix A

List of Intervention Options

Table A.1: Updated list of intervention options and target dates

Main scheme	Start date	End date	Comment/s
Mooi-Mgeni Transfer Scheme Phase 2A (DWS/TCTA)			
Spring Grove Dam	-	-	Completed
Water delivery via MMTS2	In progress	Oct 2015	Refurbishment of MMTS1 valves and manhole complete
Upgrade Mearns pump station and pipeline (3.2 m^3/s)	In progress	Dec 2015	-
Mooi-Mgeni Transfer Scheme Phase 2B (DWS/TCTA)			
Construction	Oct 2014	Apr 2015	-
Delivery via MMTS2B (1.8 m^3/s)	-	Dec 2015	-
Hazelmere Dam Raising (DWS)			
Preliminary design work and geotechnical investigation to confirm best option	Feb 2012	Oct 2014	Completed
Decision to continue with raising of dam as an option	-	Apr 2015	Completed
Finalise design/tenders	May 2015	Jun 2015	
Construction	Jul 2015	Jul 2017	
Delivery		2018/2019	DWS estimate (K Bester)
uMkhomazi Water Project Phase 1 (DWS)			
Feasibility Study (Raw Water)	Oct 2011	Nov 2015	
Feasibility Study (Potable Water)	Aug 2012	Jul 2014	-
Feasibility Study EIA	Nov 2012	Nov 2015	EIA scoping completed, proceed with EIA
Decision to proceed with uMWP-1 and offtake agreements	Dec 2016	Dec 2017	-
Detailed design	Jan 2017	Dec 2018	-
Construction	Jan 2019	Dec 2022	-
Delivery (220 million m^3/a, or 214 with release to Lower uMkhomazi)	-	Apr 2023	-
Mvoti River Scheme (DWS)			
Feasibility Study	Apr 2015	Apr 2018	Estimated start date (timeline moved)
EIA (including estuary)	Jun 2015	Apr 2018	-
Detailed design	Aug 2018	Jul 2020	-
Construction	Oct 2020	Oct 2023	-
Delivery	-	Apr 2024	-
Lower Thukela Bulk Water Supply Scheme (Umgeni Water)			
Construction Phase 1	Feb 2014	Jun 2016	Underway
Delivery Phase 1 (55 Mℓ/d)	-	Dec 2016	-
Construction Phase 2	Jul 2017	Dec 2018	Uncertain
Delivery Phase 2 (55 Mℓ/d, total 110 Mℓ/d)	-	Jan 2019	-

Main scheme	Start date	End date	Comment/s
North Coast Pipeline and Hazelmere Supply Infrastructure (Umgeni Water)			
Construction pipeline from Honolulu to Mvoti pump station	-	Jun 2014	Pump station to Ballito experienced delays
Upgrade Hazelmere WTW	-	Jun 2014	Completed
Desalination of seawater (Umgeni Water)			
Feasibility Study	Jan 2012	Mar 2015	Completed
Funding procurement, design and tender phase	Jan 2016	Jul 2017	1 year assumed starting 2016
Construction	Jul 2017	Jun 2019	2 years assumed
Delivery (150 Mℓ/d)	-	Jul 2019	Tongaat or Lovu options
Direct reuse of treated wastewater (eThekwini MM)			
Tender preparation and adjudication	Jan 2015	Jun 2015	-
Tender award, financing and site establishment	Jun 2015	Jun 2016	-
Construction and commissioning	Jul 2016	Jul 2018	-
Delivery (41 million m^3/a)	-	Jul 2018	-
Lower uMkhomazi Bulk Water Supply Scheme (Umgeni Water)			
Feasibility Study	Jul 2014	Dec 2015	
EIA (including estuary)	Aug 2014	Dec 2015	
Detailed design	Apr 2016	Apr 2017	
Construction	-	Mar 2022	
Delivery (100 Mℓ/d)	-	Mar 2022	Yield available before & after uMWP-1 with releases