Ensuring water supply for all towns and villages in the

Eastern Cape and Western Cape Provinces of South Africa

# All towns reconciliation strategies study

**History**

In 2008 the Department of Water Affairs (DWA) commenced with a nationwide programme to develop water reconciliation strategies for all towns, villages and clusters of villages across the country, following on the good progress with the reconciliation strategies for the metropolitan areas. The overall objective of the studies was to provide first-order water availability and water requirement reconciliation strategies for all towns and villages in South Africa (Citation). The large numbers of rural villages that occur in the eastern regions of the Eastern Cape Province part of the study area were grouped as clusters to facilitate integrated water resource management rather than the development of a huge numbers of stand-alone schemes. Towns and clusters of villages were studied in order of priority in terms of their currently perceived water resource problems.

The main objectives of the study were to:

Identify towns with an immediate need for high-intensity reconciliation studies in South Africa and the high cost of water transfer. Therefore each strategy was developed in a template that provides an overview of the current situation, the current water resources, the existing bulk and reticulation infrastructure, the percentage of non-revenue water it produces and the scoring in terms of DWA’s Blue and Green Drop certification process in order to identify whether a town, village or cluster of villages has a water-resource or a water-service problem. The recommendations provide a list of the suitable interventions to address any current or future water supply shortfalls. In most instances water conservation and water demand management and the development of local surface and groundwater resources were the most feasible options to meet any current or projected future water supply shortfalls.

It was not considered feasible or necessary to develop an individual reconciliation strategy for each individual town or settlement, but all towns and villages were addressed in the study. Towns, villages and settlements were grouped together into logical clusters based on their current or proposed future shared water resources for which a single reconciliation strategy could be developed.

# Current situation of water supply at local municipal level

There has been a major emphasis in the past decade in addressing the backlogs in water-supply infrastructure in the informal suburbs of urban towns, and in rural areas, with many rural water-supply schemes having been commissioned. These schemes include both surface-water and groundwater supplies throughout the rural areas. The overall impression of the current situation of water supply at local municipal level while doing the study is discussed below in terms of several relevant aspects.

## Water requirements

The water requirements of communities and towns vary significantly throughout the study area, depending upon factors such as the climatic conditions, level of service, socio-economic situation, wet industries, institutional capacity and consumer behaviour. However, there are several guidelines on what constitutes an acceptable level of water consumption. The basic water services are defined in South Africa as 25 ℓ/d per person (RSA, 2001), which equals the accepted norm for free basic water of 6 kℓ/month for a household of 8 persons. The DWA recommendations for low-income housing are 60 ℓ/d per person for planning purposes, while the water requirements in more affluent, developed towns can easily increase up to 250 ℓ/d per person. The dynamics of water use for each town may differ, but for the purposes of this study the towns have been categorised with respect to size and locality. This categorisation is considered adequate to cover the majority of the towns in the Eastern and Western Cape. Table 1 presents the categorisation of per capita water requirements for each type of town (DWA, 2009b).

It appears from the analysis of the information gathered during the All Towns Reconciliation Strategy Study that at least 34 x 106 m3 of water is lost in the Western Cape alone (excluding Cape Town and surrounds) each year between the water resource and the end-user, of which more than 10 x 106 m3/a could easily be saved through the implementation of effective water conservation and water demand management measures (DWA, 2011e). This would be sufficient to meet the annual water requirements of a town such as George or Stellenbosch. The situation in the Eastern Cape is worse with several examples of towns where 50% and more of the water abstracted does not reach the end-users (see Table 2). In cases without measured abstraction and consumption data, acceptable water losses of 15% to 20% have been assumed. This stresses the need for a good metering programme to better manage water and finances in every municipality.

The examples of high water losses in Table 2 are calculated water losses (or unaccounted for water, UAW) for selected towns in the Eastern and Western Cape, based on measured data and or observations. These are always non-revenue water and a loss of income to the municipality due to the cost of purification, reticulation and operation that was spent and a loss in revenue that was not collected from the ers.

## Water quality

Water quality of the resource and the drinking water is of concern throughout the study area with many communities relying on untreated raw water from rivers, springs or boreholes. Many of these sources, especially in the vast rural areas of the Eastern Cape, are contaminated due to a lack of proper land management and source protection.

The Blue Drop Report (DWA, 2011a) provides details of the drinking-water quality situation for towns and supply areas that are served from a water treatment works (WTWs). The smaller stand-alone water-supply and treatment schemes may achieve the required drinking water quality standard but often lack the required water-quality management to ensure continuously good drinking water quality (see Table 3). This is partly due to a lack of water-quality monitoring at the source to identify water contamination. Most of the small stand-alone schemes supply water without any treatment, and without water-quality monitoring. Hence, it is to be expected that the situation is worse than indicated in Table 1.

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| ***Figure 1***  *Map of towns in the Western Cape, indicating their water-supply source; (a) groundwater as sole source of supply; (b) groundwater and surface water; (c) surface water and/or other* |

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# Refurbishment or upgrade of existing infrastructure

The All Towns Reconciliation Strategy Study has shown that most of the current water-supply problems are not due to a lack of water resources, but rather a result of deteriorated infrastructure or poor O&M. Often, the best and most cost-effective solution lies in the refurbishment and proper maintenance of existing infrastructure. This was mainly found with groundwater schemes, where boreholes were dismantled or pumps broken, and the municipalities then complained about the ‘unreliability’ of groundwater.

# Groundwater development

In cases where the above measures are not sufficient to cater for the expected shortfall in water supply, exploration and development of known and new groundwater target areas will have to play an important role. Since there are only a few rivers left that can be further developed with surface water schemes of sufficient size to warrant the huge capital investment, groundwater development is recommended as one of the future options in most of the strategies.

During the recent droughts in the Eastern and Southern Cape many municipalities invested in the development of groundwater emergency schemes and established a number of boreholes for emergency supply. Most of these investments in establishing emergency groundwater supplies have been successful. However, the municipalities are still reluctant to incorporate this groundwater-fed emergency supply into their regular water-supply system, despite its reliability and worth in times of drought being proven. Groundwater supply is still seen as inferior and unreliable, an aspect that the Groundwater Strategy 2010 (DWA, 2010) addresses through awareness campaigns and training of municipal officials.

The information and recommendations from the All Towns Reconciliation Strategies are already utilised for follow-up studies and the potential for groundwater development has already been proven in several cases, e.g.:

* Drilling of exploration and production boreholes has commenced in Middelburg in the Chris Hani District Municipality (DM) and individual yields of up to 12 ℓ/s have been achieved, which is sufficient to meet the current shortfall and possibly cater for future growth.
* Recently, several high-yielding boreholes of up to 50 ℓ/s have been drilled in Matatiele in the Alfred Nzo DM, which, if confirmed by further borehole testing, could provide a feasible alternative to the proposed dam on the Kinira River.

The DWA has recently embarked on an exploration drilling programme for towns in the Karoo, mainly within the Cacadu DM. Towns that are in urgent need of additional water supplies were identified in the All Towns Reconciliation Strategies Study and, *inter alia*, include Jansenville, Rietbron, Steytlerville, Pearston and Paterson. All of these towns are solely relying on local groundwater sources, as the climatic conditions are not favourable for the development of surface water sources.

# Conclusions and recommendations

The All Towns Reconciliation Strategies Study has shown that most of the current water-supply problems and restrictions experienced in many towns and villages could be avoided by proper management of the existing schemes. This must include:

Effective implementation of water conservation and water demand management measures to reduce losses and wastage

Proper O&M, including making provision for an adequate budget for O&M

Asset management, to prolong the life of the infrastructure

Refurbishment of existing infrastructure to reduce losses and wastage