

EXECUTIVE SUMMARY

Introduction

South Africa is a water-scarce country and has to constantly strive to apply its available water resources in the most efficient manner. Different users, including industry, domestic consumers, agriculture and the environment, vie for the available resources and have to be awarded an equitable and adequate share to ensure sustainability in the long term.

Domestic water consumption is a function of various factors, including stand size, income, household size, climate, pressure and water price. Although a number of studies have been done on various aspects of domestic water demand, we still have an inadequate understanding of how much water is consumed and how consumption is affected by the various influencing factors. South African design guidelines still use the same water demand estimates as originally developed in the early 1980s.

Some studies have indicated that the national guidelines overestimate average water demand for large stands, which translate into overly expensive networks and inefficient use of infrastructure. While certain municipalities have their own water demand guidelines, there is a strong need for a comprehensive database of consumption on a national level.

The overriding problem with studying water consumption is that quality data is difficult to get hold of. Municipal water meter readings are an ideal source of water demand information since they are taken on a regular basis by virtually all municipalities in the country. However, this information is generally difficult to access and are typically discarded (and thus lost) after a short period of time.

In recent years, GLS Consulting Civil Engineers developed a software product called Swift. This product allows access municipal treasury databases to obtain demographic and water consumption information of large numbers of users. Swift has been implemented at many local authorities throughout South Africa, covering different economic, socio-economic, climatic and other areas. It was seen as an imperative that action is taken to ensure that this data is not lost.

Objectives

The main objective of the project was to develop a methodology for the archiving of water demand data, and to write an archive for the data currently available. This objective was achieved in full. The project also developed procedures for continuous expansion of the archive as new data becomes available.

Methodology and Results

The study was lead by the Water Research Group at the University of Johannesburg in consultation and collaboration with GLS Consulting Engineers. It consists mainly of the collection, verification, cleaning and archiving of data on water demand and other user parameters. Software code and/or macros were developed to use on the existing and future databases. A non-propriety text storage format was selected and standardised. The procedures described above were then applied to the data in the existing Swift databases to archive the data.

Forty-eight municipal treasury databases were archived in this study. This includes four metros (Johannesburg, Tshwane, Ekurhuleni and Cape Town) and 151 cities or towns. The total number of stands in the databases exceeds 2.5 million, of which 1.5 million are non-vacant stands. The number of records (water meter records) in the databases exceed 2.7 million. In

most cases, the data for each non-vacant record includes actual water meter readings, reading dates and estimated monthly consumption figures for more than two years. Data for all types of users with metered consumption are included in the database, including domestic, commercial, industrial and educational users.

A method was developed and documented for the sustained archiving of future Swift databases. This will allow continued expansion of the water consumption archive with minimum effort after the completion of this project.

Finally, methods for making the data accessible to researchers and other interested parties in South Africa were investigated. Based on legal advice received, request for, and permission for the use of data by other interested parties for the sole purposes of research, shall be at the sole discretion of the WRC, subject to a written motivation and acceptance of an indemnity declaration (example in Appendix A).

Conclusions

A methodology to archive water demand data was developed, and the currently available data was written to the archive (approximately 1.5 million users). The parties involved in this project will continue to expand the archive as new demand data become available, although this falls outside the scope of this project.

The data archive will form a rich source for future research on water demand behaviours and trends. Aspects that can be studied include consumption of different user categories, variation of demand with geographical location and time, and the effect of changes in water price and pressure on demands.

ACKNOWLEDGEMENTS

The research in this report emanated from a project funded by the Water Research Commission entitled *Development of a National Water Consumption Archive* (WRC Project K5/1605)

This project would not have been possible without financial support by the Water Research Commission. The authors would like to extend a word of appreciation for this opportunity. Mr JN Bhagwan, in particular, played a strong supporting and advisory role, which the authors gratefully acknowledge.

The authors would also like to acknowledge Kerry Fair, who assisted greatly with defining the archive structure and coding it.