
Hidden benefits of public private partnerships: the case of water pressure management in Sebokeng

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Abstract

Many water distribution systems in South Africa are deteriorating due to many years of neglect resulting in a serious maintenance backlog. Recent government legislation has introduced free basic water to all South Africans up to a limit of 6 Kl/month per property which in turn causes certain confusion regarding payment among many residents. These key issues and others have led to serious problems with service delivery specifically in the low income areas where the maintenance has been neglected for more than 30 years in some cases. The potential for support from the Private Sector has been highlighted at the highest levels within government as a possible solution to addressing the existing backlogs despite the fact that there are relatively few successful projects to support this view.

This paper presents the results after 30 months of operation of a small scale public private partnership in one of the largest low income areas in South Africa where the Sebokeng/Evaton Pressure Management Project was commissioned in July 2005. The savings both in terms of volume of water saved as well as financial savings to the municipality are impressive and exceed all initial expectations. The most interesting aspect of the project, however, is not the savings achieved from the installation, but the numerous other additional benefits that have materialised which were not originally anticipated when the project was commissioned. Such benefits, include the identification of many network problems that had been undetected for more than 9 years as well the sudden interest in helping the residents by several government and semi-government organisations. These organisations were unable or unwilling to provide any support to the area prior to the successful Public Private Partnership.

The project represents a significant advancement in Public-Private Partnerships (PPP's) and clearly demonstrates that small scale Public Private Partnerships can be viable despite the general view that this type of project is confined to large scale initiatives due to the effort and expense in developing the PPP type of contract. The paper provides details of the processes involved in setting up and implementing such a project and highlights that the model used by the Project Team to address leakage in Sebokeng and Evaton can be adapted for use in other areas and other applications to improve service delivery throughout South Africa as well as elsewhere in the world where conditions permit.

The paper presents the results from the project after the first 30 months of operation and summarises some of the many additional benefits that have arisen from the project.

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Keywords

Public private partnerships (PPP), water supply infrastructure, Sebokeng, Emfuleni Local Municipality, Rand Water, water supply, water pressure management.

Disciplines

Civil engineering, hydrology, Public management, Integrated Water Resource Management.

Introduction

Emfuleni Local Municipality is shown in **Figure 1** and is located to the south of Johannesburg in the industrial heartland of South Africa. A separate water utility called Metsi-a-Lekoa was established several years ago to manage the supply of potable water to approximately 1.2 million residents of the Municipality of which 450 000 are located in the Sebokeng and Evaton areas. Water is supplied to Metsi-a-Lekoa from the local bulk water provider which is one of the largest providers of potable bulk water in the world.

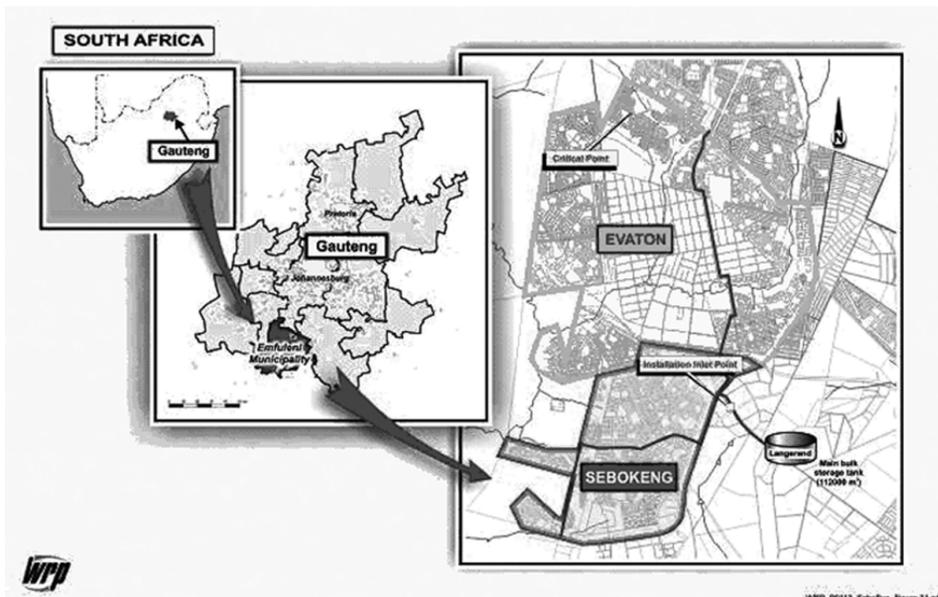


Figure 1: Location Plan

The areas are predominantly low-income residential areas with approximately 70 000 household connections, each of which is supplied with an individual water supply as well as water borne sewage. The combination of low income coupled with high unemployment has resulted in a general deterioration of the internal plumbing fittings over a period of many years causing high levels of leakage. The leakage at the start of the project was known to be extremely high as indicated by a Minimum Night Flow in the order of 2 800 m³/hr as shown in **Figure 2**. This is one of the highest Minimum Night Flows recorded anywhere in the world and represents almost two Olympic sized swimming pools of water every hour during a period when demand for water should be minimal. It should be noted that there is virtually no storage in the Sebokeng and Evaton areas, either at bulk reticulation level or domestic property level. The high Minimum Night Flow is therefore almost completely due to leakage, most of which occurs inside the properties and is therefore not evident from normal visual inspection. It should also be noted that since most of the leakage occurs inside the households, the leaking water returns to the sewage treatment plant through the sewer network which is often overloaded to such an extent that spillages of raw sewage into local river courses are a common occurrence in the area.

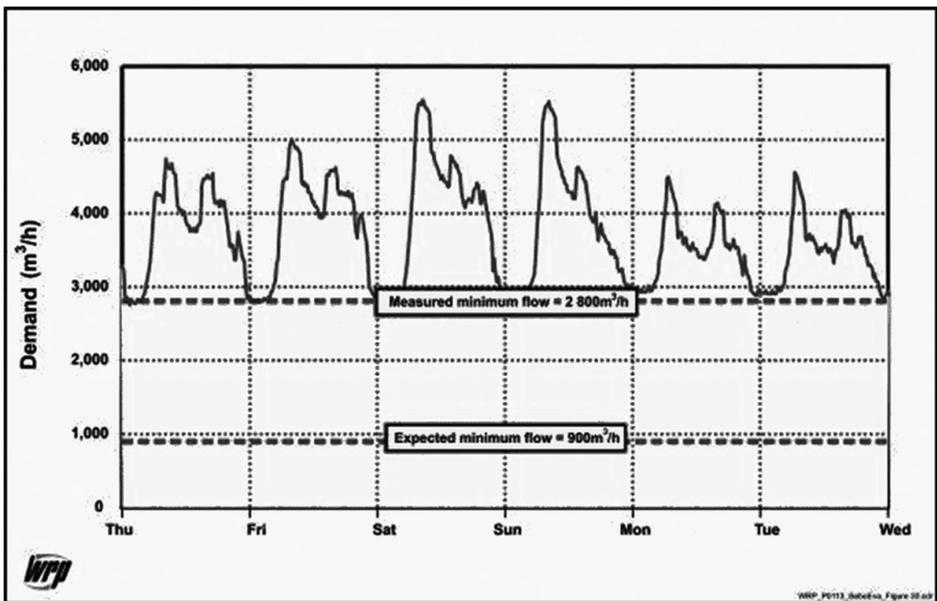


Figure 2: Initial water demands for a 6-day period entering Sebokeng and Evaton in July of 2003

It was estimated that the wastage in the area before the project was commissioned was in the order of 80% of the water supplied to the area which in turn represented an annual water bill of approximately R120 million per year (±\$20 million).

In 2004 the municipality appointed WRP Pty Ltd to design and commission what is understood to be one of the largest advanced pressure management installations in the world as the first phase of a long term strategy to reduce wastage in the area. The project involved no financial input from the municipality and even the initial capital costs were borne in total by the project team. The project was, effectively, a small scale Public Private Partnership (PPP) involving a simple risk-reward model and the original concept is discussed in detail by Mckenzie and Wegelin (2005). It basically reduces water pressure in the area during off-peak periods and in this manner reduces the water lost through leakage.

The concepts of using pressure management to reduce leakage from potable water distribution systems are not new and were first introduced to South Africa from the UK in the mid 1990s. Some details and background to the concepts are provided by Mckenzie (2001) and Mckenzie & Wegelin (2002). South Africa is now generally regarded as one of the world leaders in pressure management and the scope for large scale pressure management was first established through the commissioning of the Khayelitsha Pressure Management Project in 2000 which is described in detail in numerous national and international publications including Mckenzie (2002), Mckenzie, Mostert and Wegelin (2003) and Mckenzie (2005).

It should be noted that Pressure Management is only one of the many possible Water Demand Management interventions that can be considered when trying to reduce leakage and wastage from a water reticulation system. The leaks are not repaired and will continue to run, albeit at a much lower flow rate. After pressure management has been implemented, it is usually necessary to address the underlying problems using different techniques and in this regard the full range of Water Demand Management techniques should be considered. Details of the various interventions that can be considered are provided in the “Water Demand Management Cookbook” (Mckenzie et al, 2003) which was produced to help water suppliers understand their leakage problems and how to address them.

Benefits of the project

The most obvious benefits from the project are clearly the savings in water purchases by the municipality from the bulk water provider due to the reduced leakage in the Sebokeng and Evaton areas. The