Paper Number: 4605

Cape Flats Aquifer and False Bay – opportunities to change

Hay, E.R.[1], McGibbon, D.C.[2], Botha, F[3] and Riemann, K.[4]

[1]Umvoto Africa (Pty) Ltd, Muizenberg, Cape Town, e-mail: rowena@umvoto.com
[2]Umvoto Africa (Pty) Ltd, Muizenberg, Cape Town, e-mail: david.m@umvoto.com
[3]Umvoto Africa (Pty) Ltd, Muizenberg, Cape Town
[4]Umvoto Africa (Pty) Ltd, Muizenberg, Cape Town

The Cape Flats Aquifer (CFA), Western Cape, covers an area in excess of 400 km^2 and extends from False Bay in the south to Tygerberg Hills and Milnerton in the northeast and northwest, respectively. Geologically the Cape Flats is underlain by the fluvial, marine and aeolian Tertiary and Quaternary sedimentary deposits of the Sandveld Group, which unconformably overlie weathered Malmesbury Group and Cape Granite Suite basement rocks. The Elandsfontyn, Springfontyn and Witsand Formations form the major aquifers within the larger CFA. Basal fluvial-channel gravels located within bedrock palaeochannels have the highest groundwater yields.

A characteristic of the CFA is that it recharges quickly and has a relatively low residence time. The nature of urban expansion on top of this aquifer poses an ongoing pollution threat. This large resource of groundwater has deteriorated over the past decades and is now non-potable in certain areas, with varying levels of contamination. The deterioration is due to a combination of pesticides and fertilizers from agricultural practices, waste-water treatment plants, informal settlements, unlined or leaking canals, leaking sewerage pipes in some areas and, storm-water runoff. While not yet measured or modelled, it is likely that the amount of 'unnatural recharge' is greater than that of naturally infiltrated waters. The result is a mass-balance problem, whereby the input to the aquifer exceeds its current capacity, contributing to problems of winter flooding. This poses a health risk to communities, particularly those within informal settlements, and an environmental risk especially to False Bay. This research paper presents an innovative approach to urban aquifer management in South Africa that takes into account the realities of growing urbanisation, informal settlements, industrial development, urban agriculture and the potential for aquifer and environmental rehabilitation. It involves abstraction, treatment, storage and use from both surface- and groundwater and is based on proven technologies and various operating examples from around the world.