

Four decades of water recycling in Atlantis (Western Cape, South Africa): Past, present and future

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ABSTRACT

The primary aquifer at Atlantis (Western Cape, South Africa) is ideally suited for water supply and the indirect recycling of urban stormwater runoff and treated domestic wastewater for potable purposes. The relatively thin, sloping aquifer requires careful management of the artificial recharge and abstraction for balancing water levels. Water quality management is a further key issue at Atlantis for ensuring the highest quality potable water. Groundwater quality varies from point to point in the aquifer, while urban runoff and wastewater qualities vary greatly. The layout of the town allows for the separation of stormwater from the residential and industrial areas as well as separate treatment of domestic and industrial wastewater. This permits safe artificial recharge of the various water quality portions at different points in the aquifer, either for recycling or for preventing seawater intrusion. All of the management actions are dependent on detailed data collection and this paper describes the various parts of the system, describes the data collection activities, and provides results of the monitoring and aquifer responses over the past four decades. Challenges related to iron fouling of production boreholes are also described. The presence of emerging contaminants was studied in 2008 but requires follow-up research for establishing the extent of any possible threat to water recycling. In order to address the shortcomings of the system a risk management plan based on the Hazard Analysis and Critical Control Points approach was developed. Lessons learnt from the Atlantis experience can be transferred to other potential sites for establishment of similar systems in arid and semi-arid areas of South Africa and the African continent.