

# Framework for assessing the viability of implementing dual water reticulation systems in South Africa

AA Ilemobade<sup>1\*</sup>, JR Adewumi<sup>1</sup> and JE van Zyl<sup>2</sup>

<sup>1</sup>*School of Civil and Environmental Engineering, University of the Witwatersrand, South Africa*

<sup>2</sup>*Department of Civil Engineering Science, University of Johannesburg, South Africa*

## Abstract

In many settlements across the world (e.g. Pimpama Coomera and Mawson Lakes – Australia, Hong Kong – China, Majuro – Marshall Islands, Tarawa – Kiribati, and Windhoek – Namibia), dual water reticulation systems have been implemented in response to increasing water demands and decreasing freshwater availability. A dual water reticulation system comprises separate pipes that supply different water qualities to the end consumer. A set of pipes supply potable water while another set of pipes supply non-potable water. The non-potable water is targeted at meeting water requirements traditionally met using potable water (e.g. toilet and urinal flushing, landscaping irrigation, and industrial cooling). This therefore frees potable water to be used for previously unmet or increasing potable water requirements. For several reasons including the dearth of relevant national regulatory and guideline documents, consumer and decision-maker perceptions, ignorance, and appropriate decision-making tools, the use of dual water reticulation systems in South Africa has been limited. The aim of this study was therefore to develop a decision-making framework, using robust criteria, for assessing the viability of implementing dual systems in South Africa. This aim was achieved through undertaking literature reviews on the subject, an investigation of non-potable water consumers' and decision-makers' perceptions using questionnaires, and the actual development of a framework using data obtained from the literature review and questionnaires. The questionnaires were developed using seven key issues i.e. public health and safety, economics, technical feasibility, legislation/regulations and guidelines, organisational capacity, social acceptance, and public education. The various aspects of the Triple Bottom Line of sustainability (i.e. economic, environmental and social) provided structure to the framework while the Triple Bottom Line approach was utilised in the assessment of the different criteria.

**Keywords:** dual water reticulation systems, non-potable water recycling