

## Sustainability Handbook. Volume 1

An alternative rainwater harvesting system design methodology

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### **Abstract**

Climate change and rapid urbanisation have meant there is increasing pressure on water supplies in human settlements in South Africa. This has led to unreliable water supplies and outages. It is therefore important to understand whether there are alternative sources of water which can be used to improve the resilience of supply. One solution is to develop onsite rainwater harvesting systems. These capture rainwater from roofs and other surfaces and store this. Stored water can then be used instead of municipal water supplies for drinking, cleaning, irrigation and flushing toilets. While these systems can be highly effective and significantly reduce mains water consumption, they are not widely used in South Africa. This situation has been compounded by a lack of guidance on the calculation and sizing of rainwater harvesting systems. To address this gap this study presents, and critically evaluates, an alternative rainwater harvesting design methodology based on the Rainwater Use Model (RUM). The RUM methodology is compared to conventional methodologies by applying this to a case study building to carry out rainwater harvesting calculations for a range of scenarios. These results suggest that the RUM methodology may be more accurate than conventional methods. By enabling different aspects of the systems to be tested rapidly, the RUM methodology also provides useful guidance on where investment should be focused in the design of a rainwater harvesting system. The study will be of interest to Architects, Engineers and Planners who need to develop more resilient and sustainable water resources in human settlements in dry areas.