TERMS OF REFERENCE FOR A DIRECTED WRC PROJECT

THEMATIC AREA	**Water Use**
TITLE	**Towards Safe and Regulated Municipal Back-Up Water Supply Systems in South Africa**

Background and Rationale

In South Africa, the increasing unreliability of municipal water supply due to infrastructure challenges, climate variability, and service delivery constraints has led to the growing use of municipal back-up water supply systems by households, businesses, and institutions. Many of the municipal back up water supply systems use municipal piped water as source. When supply is available, water storage tanks fill up to create a reserve supply and are often reconnected to the building pipes. Pump systems and filtration units are often installed with the storage tanks. Without standardised guidelines or regulatory oversight, this raises questions about water quality, public health, system safety and maintenance, and integration with municipal infrastructure. Currently, there is a lack of clear regulations, safety testing under varying supply conditions, and technical guidance for design, installation, operation, and maintenance of these back-up solutions. This study is therefore essential to assess the performance and risks associated with these systems, identify best practices, and provide some technical guidance to those that implement such systems. This study is not aimed at eliminating a market need; rather it will help ensure that municipal water back-up systems support water security without compromising safety, quality, or the integrity of public water services.

Objectives

General:

The overarching objective of this research is to provide technical guidance and regulatory oversight for municipal back up water supply systems:

- Comprehensive desktop review that maps the current regulatory landscape, identify gaps in standards and oversight, and examine risks associated with unregulated installations. Further, provide a database for municipal back up suppliers and gain insight into market need.
- Provide insight as to whether household back up water systems that rely on municipal piped water supply have had any effects on the piped water distribution system during planned or unplanned water shortages using historical data for selected sites.
- To evaluate the safety and health risks associated with municipal back-up water supply systems, a structured water quality testing programme should be implemented. This programme must assess the quality of water at key points in different systems and under various operational conditions (different buildings and systems, planned versus unplanned maintenance, seasonal variation, etc.). Priority should be given to systems that store municipal piped water and return it back into the building for consumption, including drinking.

Specific:

The specific objectives of the project are to:

1. To document the types and configurations of back-up water supply systems in use, including associated treatment technologies, maintenance practices, market cost and

drivers, and user behaviours. Some preliminary insight into the effect of these systems on the water distribution network should be elucidated.
2. To evaluate the design, operation, and performance of municipal back-up water supply systems across different settings (residential, commercial, and institutional) in South Africa. Priority should be given to residential systems.
3. To assess the microbiological, chemical, and physical quality of water stored and used within these back-up systems, benchmarking against national drinking water standards.
4. To identify the key risks to public health and infrastructure safety associated with poorly managed or unregulated back-up systems.
5. To investigate the current regulatory environment and institutional roles, highlighting gaps and inconsistencies in by-laws, standards, oversight, and enforcement.
6. To develop evidence-based recommendations for technical guidelines, regulatory frameworks, and public awareness strategies aimed at improving the safety and integration of municipal water back-up systems.

Scope of Work
The scope of work follows the objectives with additional aspects of knowledge dissemination, including peer reviewed journals and public awareness materials (e.g. video), and an edited Final Report (20% of the total project budget). The research team should have access to sites, have flexibility to sample during water supply interruptions as needed and facilitate buy-in from back up suppliers.

4. Deliverables
Deliverables should match the objectives of the study.
Not more than three deliverables per financial year.
The first-year deliverables may NOT include an advance.
The final deliverable of the print-ready final report, valued at 20% of the Budget is required.

Total Funds Available:
R2.2 million over 3 years.

Year 1: R400,000.00
Year 2: R800 000.00
Year 3: R600 000.00
Year 4: R400,000.00 (Final Report)

Key Background Sources:
1. Microbial deterioration of stored water for users supplied by standpipes and groundwater tanks: https://journals.co.za/doi/pdf/10.10520/EJC116376
2. WRC Project C2023-2024-01394 by Stellenbosch University
3. https://www.investec.com/en_za/focus/financial-wellness/time-to-consider-a-backup-water-system.html
4. https://www.news24.com/business/economy/how-to-bypass-municipal-water-and-what-it-will-cost-you-20240312
5. https://www.nicd.ac.za/water-cuts-in-south-africa-are-hurting-hospitals-and-clinics-theres-an-increased-risk-of-infections/

6. https://www.wrc.org.za/wp-content/uploads/mdocs/WaterWheel_2004_06_purifiers%20p30-32.pdf