

**TERMS OF REFERENCE FOR THE SCANNING, TESTING AND DEVELOPMENT OF A QUALITY ASSURANCE PROTOCOL FOR LOW FLUSH TOILET PEDSTAL**

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| **KEY STRATEGIC AREA** | **KSA 9: Business Development and Innovation** |
| **THRUST** | **3: Business Development** |
| **PROGRAMME** | **13: SASTEP** |
| **TITLE** | **SCANNING, TESTING AND DEVELOPMENT OF A QUALITY ASSURANCE PROTOCOL FOR LOW FLUSH TOILET PEDSTAL** |

**Objectives:**

* Scanning, identifying and compiling a compendium of commercially available and developmental stage low flush toilets available in South Africa
* Sub-categorization of available low flush toilet technologies such as water based, vacuum, low suction types etc.
* Development of general requirements, technical requirements, specifications, performance testing and other protocols that can form the basis for the standardization of low flush toilet technologies
* Application of the developed requirements, specification and testing protocol listed above on commercially and developmental available low flush toilets
* Determining the impact of low flush on water consumption at the household and municipal level
* Determine the impact of low flush toilet on piping and plumbing within the boundaries of the household and on the municipal reticulation system
* Provide, through a case study on a chosen area, the impact of low flush on household water use, sewage volumes and the downstream wastewater treatment plant

**Background:**

The recent drought in Cape Town served as a warning to not only south Africa but to other nations on the need to have a proactive and sustainable water resource management strategy. The Cape Town drought embodied the country’s vulnerability to climate change and dwindling water resources. This problem is however not unique to the Western Cape as drought conditions have been reported across the country in provinces such as the Eastern Cape, Free State and Limpopo. The impact of the drought, climate change and dwindling water resources in the country is further exacerbated by the excessive and unsustainable use by end-users, leaks and poor resource management. South Africa consumes up to 250 litres per capita per day compared to a world average of 180 litres per capita per day (Heeden & Cilliers, 2014). A move towards water sensitive cities and settlements is an imperative and water conservancy technology is therefore an important tool in the water management toolbox to minimize adverse impact on the economy and well-being of society.

The conveyance of human waste from homes through reticulation systems to wastewater treatment plants requires large volumes of valuable potable water and contributes to a large portion of water consumption. The reduction of flush water volumes as well as the volumes required for reticulation can assist in minimizing water use and reducing volumes sent to the wastewater treatment plants. Low flush toilets provide a means to better manage and assists in reducing the volume of water used in this service.

Low flush toilet technology promotes water conservancy through minimizing the amount of valuable potable water used for flushing. While dry toilets are more sustainable from a water-use standpoint, cleanliness and hygiene are closely associated with water-borne toilets and dry toilet have low acceptance amongst end-users. The current toilet-use paradigm is water intensive and, in a water-stressed country like South Africa, high volume flush toilets pose a threat to water security and sustainable use of water resources. The WRC has championed initiatives in the past to drive reduced water use for sanitation such as the pour flush and low flush toilets. The pour/low flush toilets provide a compromise between the water intensive conventional flush toilets and a dry toilet. Flush volume of between 2 to 5 liters is possible, minimizing water use and provides end users with a feeling of hygiene and cleanliness associated with a flush toilet. Subsequent to the WRC research into low/pour flush toilets, various brands of locally manufactured and imported pedestal that fit the category are now available in the market place, however, the number of low flush toilets installed in homes and other locations are still very low compared to conventional high volume flush toilets. Several anecdotal and unsubstantiated reasons have been mentioned for the low adoption such as perceived efficacy of the flush volume to adequately move the waste from the toilet to the back end or conveyance system and the coating of the conveyance piping with human waste resulting in odors and blockage are often stated as barriers to adoption.

These perceptions have stalled the realization of the benefits low flush can provide. Apart from the water conservancy benefits, low flush toilet offers economic benefits from the local manufacture of low flush toilets with a demand that can be driven by encouraging and incentivizing the installation of low flush toilets in new building construction projects as well as retrofitting existing toilets. The net water saving from a mass roll out of low flush toilet will conserve water use, reduce amount spent by government on importing water. The increase in demand for locally manufactured low flush toilets will create employment across the value-chain and contribute to the GDP. Standardization can unlock further potential such as an export market, designation by national sanitation regulator that will allow increased procurement by government entities.

To unlock these benefits, a cross-organizational intervention amongst relevant players in the sanitation value chain as well as a proper characterization and specification of a low flush toilet, and to develop a standardization protocol to ensure quality, flush volume assurance and user acceptance. As a minimum, the cross-organization committee should include: the department of water and sanitation (to drive policy and regulation), south African bureau of standards (SABS) (to drive testing and certification), department of trade, industry, trade and competition (DTIC) (to drive designation and industrialization policies to support local manufacturing and market access), various municipalities and water boards (to drive the development of tender specification to give guidance on municipal procurement), to name a few. To this end, a deeper understanding of the existing products, their limitations impact on existing systems and an outline of a testing and standardization protocol that will form a basis for driving the initiative.

**Requirements:**

* Scan and identify all commercially available and developmental stage low flush toilets available in South Africa and a generic overview of the most innovative ones from the global market
* Develop general and technical requirements, specifications, performance testing and other protocols that can form the basis for the standardization of low flush toilet technologies
* Develop a product and performance testing protocol for low flush toilet technologies
* Conduct product and performance testing on identified low flush toilet based on developed protocols
* Desk-stop evaluation of the impact of low flush on water consumption at the household and municipal level and potential impact on per capita water consumption
* Lab-based or field-testing evaluation of the impact of low flush on sewage plumbing and piping within the boundary of the household
* Evaluate the effect and impact of reduced sewage flows/volumes on reticulation pipes and on wastewater treatment plants.
* Highlight potential changes in engineering practices to support water efficient toilets in both greenfield and brownfield sites.
* Highlight further (new) research questions that needs to be investigated to foster the growth and adoption of water efficient toilets
* Compile a well-structured compendium of available low-flush technologies
* List of consideration for municipalities, policy makers, engineering bodies, regulators and standard bodies

Interested parties to submit a detailed proposal that contains the following, as a minimum

* Detailed framework on how the tests and investigations will be conducted
* Schedule, detail of costs and payment schedule **(Note: all costs and payment should include VAT)**
* Proof of experience with similar project

**Deliverables:**

1. Compendium of low flush toilets that includes detailed description, technical information, value proposition, limitations etc.
2. Compilation of general and technical requirements, and specifications that can guide the selection and categorization of a toilet as low flush toilet
3. Protocols for product and performance testing of low flush toilets based general and technical requirements and specifications
4. Final report – (summary of the study and to contain the impact of reduced sewage flow on household sewage pipes, municipal sewage pipes and headers, and downstream wastewater treatment plant)

**Time Frame:** 6 months (May - November 2019)

**Closing Date:** March 20, 2020