



## TERMS OF REFERENCE FOR A DIRECTED WRC PROJECT

KEY STRATEGIC AREA	KSA 9: Business Development and Innovation
THRUST	3: Business Development
PROGRAMME	13/31: SASTEP
TITLE	Development of Next-Gen Sanitation Technology Toolbox for SA Schools

### Strategic Objectives:

- Develop a next generation sanitation technology toolbox to accelerate NGS adoption in South African schools.
- Demonstrate cost effective Capex and OPEX model for improved, sustainable, safe and dignified sanitation facilities in schools.

### Specific Aims:

1. Literature review on economies of scale of innovations: prototype vs production vs mass productions
2. Desktop technology assessment and evaluation of next generation sanitation technologies on the SASTEP SAFE Demo platform and other suitable NGS technologies to determine suitability for SA school context, considering different urban and rural settings.
3. Benchmark available next generation sanitation demonstration technologies against criteria such as cost (Capex and Opex), operability, maintainability, site specificity, user acceptance and other school sanitation requirements such as DBE, public Works, or DWS norms and standards, red book etc. (benchmark against common school sanitation technologies e.g., VIP)
4. Develop and document a process/framework for calculating lifecycle cost for school sanitation and perform a lifecycle cost analysis on identified school sanitation technologies, using developed framework.
5. Establish metric for benchmarking school sanitation capex cost. (Cost per seat is the generally accepted and most used metric but it does not accurately provide basis for comparison across sites e.g., greenfield site will have higher capex than brownfield).
6. Propose a more rigorous metric for comparing and benchmarking school sanitation technologies other than cost per seat.
7. Develop and coordinate a colloquium in partnership with SASTEP and WRC on sustainable school sanitation, addressing existing issues and challenges, identifying opportunities and engaging school sanitation stakeholder to formulate and recommend policies and strategies.
8. Define and segment key school sanitation stakeholders and develop engagement strategy for different stakeholder groups on current and emerging issues in school sanitation.
9. Research current systems of financing capex and opex with specific reference to systems, structures, and challenges to manage these functions

10. Investigate ways in which o/m of NGS in schools can be made central to the provision of new toilets e.g., design-build-operate contracts

**Rationale:**

Public schools across South Africa often lack requisite sanitation infrastructure that allow learners to perform basic bodily functions in privacy and dignity without fear or danger to their health, safety, and overall well-being. Toilet facilities in public rural schools are often either unimproved or dilapidated. Unsafe toilet infrastructure has resulted in pupil fatalities prompting outcry from civil society and the public at large. This prompted President, Cyril Ramaphosa, on August 14, 2018, to launch the Sanitation Appropriate for Education (SAFE) Initiative, with the mandate to “spare generations of young South Africans the indignity, discomfort and danger of using pit latrines and other unsafe facilities in our schools”. The Water Research Commission (WRC) and its partners, such as the DSI, and BMGF heeded the president’s clarion call, along with other key stakeholders in the sanitation sector to address the sanitation challenges in schools. Research conducted by the WRC indicate that inappropriate technologies and the lack of investment in infrastructure renewal, as well as little to no operations and maintenance (O&M budget perpetuates dilapidated facilities in school.

Public discourse on school sanitation quickly devolves into sanitation technology preferences e.g., waterborne vs. a hole in the ground (the ventilated pit latrine and its many variants). Proponents of the latter lauds its practicality – (low maintenance, no need for water), low-cost capital cost and ease of construction of pit vault-based sanitation systems, while those that oppose it argue that it perpetuates inequality, indignity and it is predominantly deployed in poor urban or rural areas while toilet facilities in more affluent private and independent schools are predominantly waterborne sanitation technology type, which is perceived as being more hygienic and aspirational. However, the choice of technology deployed in schools is usually determined by budget, geographical constraints and in many cases proximity to a sewer reticulation system and maintainability. For example, a school near a reticulation sewer is more likely to deploy a flushing toilet than one in a water stressed area with no wastewater treatment plant close by.

The emergence of new and innovative sanitation solution offers an opportunity to meet school sanitation challenges and alleviate concerns highlighted above. but the adoption this category of solutions is low, and the current school sanitation technology toolbox is grossly inadequate in meeting current and future challenges of school sanitation. Through SASTEP and other initiatives the WRC has been in the forefront of introducing, next generation sanitation technologies to schools. SASTEP is working closely with Presidency’s SAFE Initiative and the department of basic education (DBE) to promote the uptake of innovative sanitation technologies and solutions that can transform school sanitation, reduce the current excessive cost per toilet seat, increase safety and provide the next generation of learners with hygienic and dignified sanitation solutions.

SASTEP has ring fenced a portion of the technology demonstration budget to support the SAFE initiative as per the partnership among Office of the Presidency, Water Research Commission, DSI, and the Bill and Melinda Gates Foundation. Through this funding, the SASTEP programme plans to install innovative and appropriate sanitation technologies within its portfolio in schools, monitor the performance of these installation over a period to understand crucial information such as CAPEX, OPEX, operation and maintenance (O&M), user acceptance, trial different operation and maintenance service models etc. The intervention is envisioned to include schools of various sizes and different site conditions that is representative of schools within the country. The multiple sites will provide valuable data that can help validate and develop a comprehensive school sanitation technology toolbox for the department of basic education and other school sanitation stakeholders.

An independent evaluator/assessor is therefore required to gather and analyze different sites representative of all possible school sites around the country and match available technologies to each

site to create a comprehensive school sanitation toolbox for the country. The independent evaluator/assessor will also be required to gather and collate data and information from SASTEP/SAFE Demonstration sites and other representative sites to formulate a central strategy for addressing current school sanitation challenges.

Current means of benchmarking school sanitation technologies is based on the cost per seat. This metric mostly takes to account the construction and installation cost which can easily be skewed by inflated project mgt costs by consultants, demolishing of existing infrastructure, the state of the site, greenfield vs. brownfield, or other ancillary infrastructure needed other than the toilet system itself i.e., front end (toilet pedestal) and back-end (treatment unit). This metric also does not take to account other intangible aspects such social and user acceptability and aspiration and environmental aspects such as impact on potable water source, waste disposal consideration and energy requirements. As a water stressed country and the threat of climate change impact on our current sanitation paradigm, such considerations are germane to a robust school sanitation policy and plan.

Current infrastructure investment in school sanitation is concentrated on capital expenditure only with little or no consideration made for continuous operations, maintenance, and asset renewal expenses. This can be argued as the root cause of the derelict and dilapidated facilities found in many public schools. A small dip stick survey conducted by SASTEP to gauge the understanding of schools on operations and maintenance and budget allocation for this purpose confirmed this hypothesis, with many public schools underspending compared to their private or independent school counterparts. There is a need to understand in more details current policy and thinking around this area of school sanitation, engage with the various segment of the value chain and proffer strategies, model, and structure to engrain a maintenance and asset renewal mindset in school sanitation. This should include alternative and innovative means of funding O&M needs,

#### **Deliverables:**

1. Inception report *(to include detailed project plan, and clear methodology for data collection and synthesis of deliverables 4 and 5)*
2. Literature review on economies of scale of innovations: prototype vs production vs mass productions
3. School sanitation stakeholder map and segmentation.
4. Report on stakeholder demand analysis: Engage school sanitation stakeholder (including but not limited to DBE (National and provincial), SAFE Presidency, DBE School Sanitation implementing agents, Parents and learners, principals, and teachers, SGBs, Teacher Union, civil society organizations e.g., Section 27, NECT and other relevant, contractors, consultants) – *This should be aligned to the SASTEP marketing and communications strategy.*
5. Report on desktop analysis of NGS technologies for schools (this should include technologies on the SASTEP SAFE School demonstration platform and other available and school appropriate technologies. This should include
  - a. Technology Assessment and Evaluation
  - b. Cost benchmarking including life cycle costing
  - c. Cost benchmarking/comparison metrics.
  - d. Different Service models for O/M e.g., Social Franchising
  - e. User acceptance
  - f. Social and behavioral aspects
  - g. Gender intentionality
6. Proposal for sustainable school sanitation funding model (OPEX / CAPEX), including new contracting models.

7. School Sanitation Stakeholder Engagement Strategy
8. School sanitation colloquium support Plan and Budget (organize, moderate and compile feedback, recommendation, and way forward) – Budget for colloquium is excluded from the budget. – (design of the event is included in scope, this could be a single national event or series of regional one or combination of both).
9. Final Report – presenting project outcomes, technology toolbox and guides for technologies and O&M.
  - a. Policy Briefs on recommendations and findings on critical issues and technology toolbox. Three( 3) policy briefs for DBE, DWS AND DPW.

**Time Frame: 18 months**

**Budget: R 1 500 00 (VAT included)**

*Project team should include technical and financial experts and academics.*

**Approved**

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**On behalf of executive**

**Dr Jennifer Molwantwa– CEO**