**TERMS OF REFERENCE FOR A SOLICITED WRC PROJECT**

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| **KEY STRATEGIC AREA**  | **KSA 49** |
| **STRATEGIC AREA:**  | **Water Use & Waste Management**  |
| **BUSINESS UNIT**  | **Water Use, Wastewater Resources & Sanitation Future** |
| **TITLE** | **EXCRETA FLOW DIAGRAM (SFD) CAPACITY BUILDING PROGRAMME FOR DWS AND WSAs TO IMPROVE SAFE MANAGEMENT OF HUMAN EXCRETA IN THE SANITATION VALUE CHAIN** |

**1.1 BACKGROUND**

Sanitation and the management of human excreta are critical aspects of public health, environmental sustainability, and social well-being. In South Africa, as in many other countries, the effective management of human waste remains a significant challenge. To address this issue, the concept of *Excreta* (or *Shit*) *Flow Diagrams* (SFDs) has emerged as a valuable tool to understand, visualise, and improve the sanitation situation in a given area. SFDs are a comprehensive and graphic representation of how excreta is generated, collected, treated, and disposed of in a specific location, providing essential insights into the entire sanitation service chain. SFDs have been undertaken in batches across the country and there is a need to coordinate and to extend SFDs nationally through all provinces, local governments, and municipalities. Through this project, *Department of Water & Sanitation* (DWS) and *Water Service Authorit*y (WSA) officials will be trained to prepare and thereafter periodically update SFDs. There are future plans to have SFDs included into Green Drop reporting.

Based on this background, we have also identified a need to modify the global SFD methodology to match the existing context in South Africa. South Africa has a different set of minimum norms and standards for sanitation and our terminology is not in sync with global definitions for sanitation. The global SFD methodology is therefore not directly transferable to the South African context with modification. This layer of complexity has been built into this project by including a local standardisation for SFDs in South Africa with one of the major outputs being a SFD South Africa Training Manual.

**1.2 PURPOSE**

This *Terms of Reference* (ToR) outlines the scope, objectives, methodology, and responsibilities for a directed project aimed at creating capacity for developing SFDs for South Africa. The project's primary goal is to develop the capacity for DWS and WSAs to develop SFDs that ultimately ends with a comprehensive understanding of the sanitation situation in different regions of South Africa, identifies areas that require improvement, and facilitate informed decision-making for sanitation infrastructure development and investment.

**2. EXCRETA FLOW DIAGRAMS (SFD) - OVERVIEW AND SIGNIFICANCE**

**2.1 What are Excreta Flow Di**agr**ams (SFDs)?**

SFDs are visual representations that depict the flow of human excreta (faeces and urine) throughout the entire sanitation service chain in a given area. They typically include key elements such as:

Generation: Sources of human excreta, including households, public toilets, and healthcare facilities.

Collection: The collection methods and infrastructure used to transport excreta to treatment facilities.

Treatment: Facilities and processes for treating excreta, including wastewater treatment plants or on-site sanitation solutions.

Disposal/Reuse: How treated or untreated excreta is ultimately disposed of or reused in the environment.

SFDs help stakeholders, policymakers, and sanitation experts visualise and understand the strengths and weaknesses of the sanitation system, enabling data-driven decision-making and resource allocation.

**2.2 Why are Excreta Flow Diagrams (SFDs) Useful?**

Excreta Flow Diagrams (SFDs) offer several key benefits:

1. Data-Driven Decision-Making: SFDs provide a data-driven basis for understanding the sanitation situation, which allows for evidence-based decision-making.
2. Identification of Gaps: SFDs highlight gaps and inefficiencies in the sanitation system, enabling targeted interventions and improvements.
3. Policy Development: SFDs support the development of policies and strategies that can lead to more efficient and sustainable sanitation services.
4. Awareness and Advocacy: SFDs can be used to raise public awareness and advocate for better sanitation practices.
5. Resource Allocation and Remedial Action Plans: Government agencies can use SFDs to allocate resources effectively for sanitation infrastructure development and identify priority areas for development or investment.
6. **PROJECT SCOPE**

The project will encompass the following key elements:

**3.1 Geographic Focus**

The project will focus on creating 36 SFDs for selected regions (WSAs) within South Africa. These regions will be selected by DWS.

**3.2 Develop a SFD Training Manual Tailored to South Africa**

One of the first steps before the SFD South Africa training with DWS and WSA officials is to host a national SFD benchmark workshop between SFD experts and possibly other interested stakeholders.

The experts shall reach a consensus on the following:

* Inclusion / exclusion of certain variables from the SFD South Africa manual.
* Standardise the names for specific variables in line with national standards and norms.
* Adapt methodology for data collection and stakeholder engagement.
* SFD calculation tool.
* Glossary of terms and variables relevant to the South African sector.
* Setting minimum requirements for SFD South Africa quality.
* A SFD training manual that is tailored to South African norms and standards, and understanding of sanitation concepts.

The training manual should be well-organised, visually appealing, and easy to navigate. Use headings, subheadings, numbering, and formatting techniques to enhance readability. Additionally, the manual should consider the target audience's learning preferences, local examples and case studies, and adapt the content and format accordingly.

A skills transfer plan should be included.

At the end of the SFD training, the SFD South Africa Manual should be updated based on the learnings (see **Figure 1**).



**3.2 Assist WSAs and DWS with SFD Development**

Work with WSAs and DWS to develop SFDs on relevant data on sanitation infrastructure, practices, and policies in the selected DWS regions.

Analyse the collected data to create detailed SFDs for each WSA, visualising the sanitation service chain, highlighting gaps and assist the WSA to provide an Action (Remedial) Plan for the WSA.

The role of the contractor is to assist the WSAs and DWS in the development of the SFDs and Action Plans. Due to the different strengths and competencies of individuals, “handholding” – which may include teaching of certain aspects around sanitation - may be required for certain individuals to bring them up to a level required to produce a SFD. There is an understanding that assistance will be offered but the service should be utilised in a thoughtful and appropriate manner, without taking advantage of it. Pre- and post-training surveys should be undertaken to measure the impact of the training on officials.

**3.3 Stakeholder Engagement**

Engage with DWS and WSA representatives to ensure accurate data collection and validate SFDs and training methods.

A stakeholder strategy and plan is required for this project. It will require the contractor to actively liaise with the DWS and coordinate planning, logistics and data management.

An Online Orientation Workshop will be required to introduce the SFD concept to officials. The orientation workshop serves the purpose of facilitating a smooth transition for individuals into a new skills development, and connections and training workshop prerequisites they need to succeed and contribute effectively.

After the development of the SFD South Africa Training Manual, **nine (9)** provincial training workshops are required. Booking of venues and catering, minutes and attendance registers are required. The contractor needs to be coordinate with DWS to block diaries for officials. DWS officials will be required to make their own provisions for travel. Based on previous SFD trainings in South Africa, this could be between 3-5 days in length for each training session. The contractor is responsible for hosting and organising the workshops. Scheduled off-line assistance for officials may be required and need to be accommodated for.

After the training, a benchmark workshop should be hosted by the contractor. The workshop should also be used as a platform for dissemination.

**3.4 Recommendations and Reporting**

Develop actionable recommendations and strategies for improving sanitation services based on the SFDs and prepare comprehensive reports for each region.

List of proposed priority projects that can be incorporated into WSDPs and IDPs per WSA to improve safe management of human excreta in the sanitation services value chain.

* 1. **Digitisation Strategy for SFDs**

Provide a framework for the digitisation of SFD reporting into national system for the DWS.

Structuring data before web hosting is crucial for presenting it effectively and efficiently on a web platform. There are several key important factors to consider to ensure that the web platform is effective, usable, scalable, and secure. The framework will evaluate these factors to ensure that DWS can integrate the SFDs within their webpages.

Some of the important factors to consider during the design process:

Data Capture:

* Data Cleanup: Remove any duplicates, inconsistencies, or irrelevant data from the dataset. This helps ensure that the data that is presented is accurate and meaningful.
* Data Transformation: If the data is in different formats or units, consider transforming it into a standardised format. For example, convert dates to a consistent format, normalise numerical values, and ensure consistent naming conventions. The workshops should cover these aspects.
* Data Aggregation: Depending on the data, there may be a need to aggregate it to present summary information. This could involve calculating averages, totals, or other relevant metrics. **The SFD South Africa Training Manual workshop should cover these aspects**.
* Data Formatting: Format the data for easy readability. Use appropriate data types for different fields (e.g., dates as dates, numbers as numbers), and ensure that data is properly aligned and labelled.
* Categorisation and Labelling: Categorise the data into relevant groups or categories if applicable. This makes it easier for users to navigate and understand the data. Use clear and descriptive labels for each category. **The categories need to be workshopped**.
* Data Relationships: If the data includes relationships between different entities, consider how you will represent these relationships on your web platform. This might involve using tables, charts, graphs, or other visualizations.

Data Storage & Use:

* User-Centred Design: Prioritise the needs and preferences of the users. Understand their goals, roles, and expectations to create an interface that is intuitive, user-friendly, and meets their requirements.
* Data Visualization and Interaction: Choose appropriate data visualization techniques (tables, charts, graphs) that effectively communicate insights from the data. Enable users to interact with and manipulate the data, providing options to filter, sort, and drill down into details.
* Responsive Design: Ensure that the platform is responsive and works well on various devices and screen sizes, including desktops, tablets, and smartphones. This enhances accessibility and user experience.
* Scalability and Performance: Design your platform to handle growing amounts of data and increasing user traffic. Optimise queries, implement caching strategies, and choose scalable technologies to maintain performance as your platform scales.
* Data Security and Privacy: Implement robust security measures to protect sensitive data. Use encryption for data transmission (HTTPS), ensure proper authentication and authorisation, and follow best practices for securing databases and user information.
* Data Integrity and Validation: Validate user inputs to prevent data corruption, injection attacks, and other security vulnerabilities. Implement mechanisms to ensure data integrity and consistency.
* Search and Navigation: Provide effective search functionality that helps users quickly locate and retrieve relevant data. Use clear navigation menus and labels to guide users through the platform.
* Accessibility: Ensure that the platform meets accessibility standards to accommodate users with disabilities. This includes providing alt text for images, ensuring proper colour contrast, and using semantic HTML.
* Performance Monitoring and Analytics: Implement monitoring tools to track platform performance, user interactions, and usage patterns. Analyse these insights to identify areas for improvement and to make informed decisions.
* APIs and Integration: Design the platform with the ability to integrate with other systems and services. Provide well-documented APIs (Application Programming Interfaces) to enable data exchange and functionality sharing.
* Data Backup and Disaster Recovery: Implement regular data backups and disaster recovery procedures to ensure that data can be restored in case of any unexpected incidents.
* Version Control: Apply version control to track changes to your platform's codebase and design. This helps manage updates and rollbacks effectively.
* Collaboration and Sharing: If the platform supports collaboration, design features that enable users to share, collaborate, and discuss data and insights within the platform.
* Legal and Compliance Considerations: Ensure that your platform complies with relevant legal regulations (such as data protection laws) and industry standards.
* Documentation: Provide thorough documentation for users, developers, and administrators. This includes user guides, API documentation, and system architecture documentation.
* User Feedback and Iteration: Collect user feedback and iterate on the design based on user experiences. Continuously improve the platform to meet changing user needs.
1. **OBJECTIVES (AND SCOPE):**

The objectives of the project are to:

1. To develop DWS national capacity for producing SFDs to guide the sanitation management. SFD Reports will be developed by DWS and WSA officials to improve planning, implementation and monitoring of sanitation delivery. The expected number of SFDs to be developed by officials is 36.
2. To support SFD skills transfer plan to DWS officials.
3. List of priority projects to improve sanitation situation to support planning per WSA.
4. Stakeholder engagement and dissemination.
5. Provide a framework for the digitisation of SFD reporting into national system for the DWS.
6. **DEFINED ROLES & RESPONSIBILITIES**
* WRC: provide assistance to the contractor where necessary in technical aspects and manage delivery of project outcomes.
* DWS: ensure that officials attend training events, develop the SFDs and provide the data packaged for future web-hosting platform. DWS will ensure that officials cooperate and participate.
* Contractor: To engage with DWS in coordination, develop the material for training, facilitate training for 36 SFDs and Action Plans, undertake consultation and record for improvement of future training.

***Specific:***

The project requires experience in SFD development and training.

The scope of the study will be undertaken to cover the **five** (**5**) **phases**. Due to complexity of the project and involvement of numerous parties to achieve the desired outcome, phases have been developed to mitigate risk between parties. For instance, should one party not fulfil its duties, and the issue cannot be resolved, then the reminder of phases will not be delivered (or paid for). Further, we shall keep an active contract will remain open until 31 March 2026 to mitigate for risk or unexpected delays.

Claims are made per deliverable and the work packages can be divided into deliverables:

Planning of events needs to be coordinated with the DWS.

**TOTAL BUDGET = R5.7m (VAT Inclusive) with specific timelines and a phased approach**

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**PHASE 1: Planning Phase**

1. **Inception Report** that provides the plan to develop SFD training manuals, experience with SFDs, and training workshops, skills transfer plan, dissemination and the evaluation of training outcomes. The Inception Report must contain the list of 36 WSAs (to be provided by DWS), Letters of Project Details sent to WSAs, possible MoUs and confirmation of participation of WSAs, an orientation session for trainees, Project Gannt chart approved by DWS, Schedule of workshops (including online) and approved by DWS, skills transfer plan, data and webportal plan on SFDs, as well as online / off-line support offered.
2. Host **SFD Benchmark Workshop** (for the SFD South Africa Training Manual). International SFD training aids may be used; however, it is vital that the content is tailored to South Africa and consensus may be required for standards and terminology. Experience in developing SFDs would be highly beneficial for this aspect.

**Target Date: 20 Feb 2024**

**Amount = R800,000.00 (VAT inclusive)**

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**PHASE 2: SFD Training Manual & Online-Orientation Workshop**

1. Develop a SFD Training Manual tailored to South African sector. Workshop(s) will be required to reach consensus for the South African SFD manual contents.
2. Online Orientation workshop to inform trainees of requirements and of the training itself. This workshop aims to prepare trainees for the upcoming workshops. Pre-training materials should be provided and prerequisites for training will need to communicated with trainees. It is advisable that a pre-training survey be undertaken in advance of physical training events to gain an understanding of individual and the collective skills.
3. Training Plan (skills transfer).

**Target Date: 15 June 2024**

**Amount = R800,000.00 (VAT Inclusive)**

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**PHASE 3: Provincial Workshops & Draft SFDs**

1. Nine (9) x Provincial SFD Training Workshops with attendance registers and minutes. Venues including catering will be required to be booked for training purposes.
2. Pre-training survey and post-training survey undertaken to understand areas of improvement for trainers and trainees.
3. Develop 36 Draft SFD Reports with WSAs/DWS officials.
4. Develop 36 Draft priority response strategy and plans for each case study WSA.
5. Feedback to WSAs to finalise SFDs – keep records of interaction. Should WSAs require assistance, off-line and on-line assistance should be provided and logged.

**Target Date: 30 Oct 2024**

**Amount = R2,300,000.00 (VAT inclusive)**

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**PHASE 4: Final SFDs with Closure Report**

1. 36 x Final SFDs. Edited and then endorsed by DWS.
2. Closing workshop (including dissemination).
3. Dissemination (including conferences, on-line engagements).
4. Update of SFD training manual based on training feedback.
5. Data sets are cleaned, standardised, updated and are provided to both the DWS & WRC.
6. Close-out Report on Training

**Target Date: 30 Jan 2025**

**Amount = R1,100,000.00 (VAT inclusive)**

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**PHASE 5**: **SFD Digitisation**

1. Framework for SFD digitisation report. Structuring data before web hosting is crucial for presenting it effectively and efficiently on a web platform. This phase will require that the contractor clean / transform data and that it is aligned to the DWS Digitalisation Strategy. This would require that contractor actively engage with DWS on data structuring and hosting.

**Target Date: 15 Jan 2025**

**Amount = R700,000.00 (VAT Inclusive)**

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**Deliverables:**

The first year deliverables may NOT include an advance – An Inception Report detailing the Project Plan and Management will be accepted.

WRC has the right to manage and terminate the different phases.

**Time Frame: 01 December 2024 – 31 March 2026**

**Further reading:**

<https://sfd.susana.org/knowledge/the-sfd-manual>

[https://sfd.susana.org/news-events/news/96-sfd-manual-volume-1-and-2-version-2-0#](https://sfd.susana.org/news-events/news/96-sfd-manual-volume-1-and-2-version-2-0)

<https://cdn.cseindia.org/userfiles/sfd_what-is-sfd.pdf>

<https://cdn.cseindia.org/userfiles/sfd_tools_presentation_barbara.pdf>