Water, Sanitation, and Hygiene Upgrading Programme in Informal Settlements

An Interactive Qualifying Project submitted to the faculty of Worcester Polytechnic Institute in partial fulfillment of the requirements for the Degree of Bachelor Science

Abstract

South African citizens living in informal settlements often suffer from a lack of water supply and basic sanitation. Langrug, located in the Municipality of Stellenbosch, is an informal settlement representative of the water and sanitation crisis in the nation. As a result, the WPI Cape Town Project Centre (CTPC), Langrug residents, the Community Organisation Resource Centre (CORC), and the Municipality have been developing an innovative "Water, Sanitation, and Hygiene Upgrading Programme" (WaSH-UP) since 2011. Our 2013 WaSH-UP team's broad goal was to assess the Mandela Park WaSH-UP facility that emerged from the CTPC's 2012 WaSH team, and to use that knowledge to further improve water and sanitation provisions in the area. First, we assessed the Mandela Park WaSH-UP facility. We then identified a location in Langrug that would be best served by a new facility. At the community's request and with a co-researcher team, we designed and planned a facility in Zwelitsha, an area of about 600 people without electricity, toilets, or a sewer system. Our methodology and plans were largely centred on sustainability-related WaSH-UP principles that emerged from our assessment and that were deemed essential for successful facility replication.

This project summary is part of an ongoing research programme by students and faculty of the WPI Cape Town Project Centre to explore and develop with local partners options for sustainable community development in South Africa.

For our full project report: http://wp.wpi.edu/capetown/projects/p2013/wash/

For more about the Cape Town Project Centre: http://wp.wpi.edu/capetown/

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Problem Statement:

Water and Sanitation: An Ongoing Crisis in South Africa

Globally, two billion people live in slums, shantytowns, and informal settlements near major cities. These living areas often lack basic infrastructure, including proper streets, storm water systems, clean water, and safe sanitation. Cape Town shares these challenges. Home to an estimated 3.75 million people, Cape Town has over two hundred informal settlements containing 194,000 households (Gontsana, 2013).

Before 1994, about half of the people living in South Africa lacked proper health and sanitation facilities. During the apartheid era, there had been neglect of infrastructure that served non-white populations.

Toilet in Nkanini, a region in Langrug

When the African National Congress (ANC) took control in 1994, the new government passed laws and created new policies to reduce the inequities in infrastructure. Beginning with the new constitution, which states that access to basic water and sanitation is a human right, legislation began regulating the requirements for basic water and sanitation (Tissington, 2011). Local governments and municipalities have been working hard in the last years to effect change in communities.

The current conditions in Langrug, an informal settlement in the municipality of Stellenbosch, are an indication of the long process required to meet these basic needs. The 2012 WPI WaSH Team worked with the community to design and begin construction on a facility in Mandela Park, which was completed in April 2013 (CTPC 2012). This facility serves many in Langrug, but fails to serve the community of Zwelitsha, one of three sub-regions of Langrug. Zwelitsha is home to about 600 people without electricity, toilets, or a sewer system.

Background

WaSH-UP Core Principles

Past CTPC projects, helped us identify commonalities in WaSH projects. As we discovered the successful components and areas of improvement in the assessment of the Mandela Park WaSH facility, we elaborated further on the key elements of a successful WaSH facility. These principles make up the Water Sanitation and Hygiene Upgrading Programme, and were used in the planning of the Zwelitsha facility.

The WaSH-UP Programme is based on 6 core principles:

1. Community Has Responsibility and Ownership

Community-Driven Solutions: When designing a public toilet facility, community involvement is essential. Top-down government implemented approaches to water and sanitation have proven unsuccessful because the facility must fit the specific needs of a community. As one size does not fit all, it is best for the community to have a say in the design and implementation of its own facility.

Community-Driven Operation: The community is responsible for the operations and maintenance of the facility. The people hired as caretakers come from the community but the entire community is responsible for maintaining and expanding services of the facility.

Key WaSH-UP Principles

Creation of Livelihoods: The community's involvement in the operation of the facility allows for job creation as community members are hired as caretakers and security guards.

2. Full-Service Facility Meets WaSH Needs

It is important that the facility is not simply an ablution block, but a centre that addresses diverse water, sanitation, and other health and well-being needs of the community. Where there are toilets, there should also be water taps, hand washing sinks, and laundry basins.

3. Public Health Programme

A WaSH facility can be used as a centre for public health education as it pertains so heavily to water, sanitation and hygiene. Caretakers can facilitate the spread of public health knowledge through workshops and daily conversations with residents.

4. Multi-purpose Facility Increases Usability

Multi-purpose use of the facility is an element that increases usability of the centre. WaSH services give people a reason to come to the facility, and community members are able to become comfortable with it and can embrace it as part of their community. This allows the centre to become a social space where community members can receive mail, as well as a monitored space for early childhood development.

5. Multi-partner Involvement

Multi-partner involvement is an important element to the design, construction, and operation of a new WaSH facility. The commitment of several parties will help to see the construction to completion, and check in on the operations of the facility once construction is complete. Involvement must be consistent with all partners' core values and commitments.

6. Management Facilitates Maintenance and Fosters Program Development

To support caretakers hired from the community to clean and maintain the facility it is important to have a WaSH-UP Coordinator to make decisions when needed, report to CORC any issues, and to strategize the best operational budget. This WaSH-UP Coordinator would support caretakers in their professional development as health and hygiene ambassadors to the community.

Project Objectives

This project assessed the Mandela Park WaSH-UP facility and developed strategies to improve and implement WaSH-UP facilities as sustainable centrepieces in community upgrading. To achieve this goal, we pursued objectives pertaining to two separate sub-projects, the Mandela Park Facility Assessment and the Zwelitsha Facility Plan. The remainder of this summary is divided among those two domains, and the objectives are as follows:

Mandela Park Assessment

1. Assessed the Mandela Park facility along four domains of sustainability (social, environmental, economic, and institutional), and identified improvements that could be made.
2. Evaluated the costs and benefits of the Mandela Park WaSH-UP facility from construction to daily maintenance.

3. Explored how to expand the caretaker's role to more effectively advance the facility's health, hygiene and support community well-being.

4. Developed and implemented prototypes of social programmes and technical improvements.
5. Identified key WaSH-UP principles that are essential for facility planning and replication.

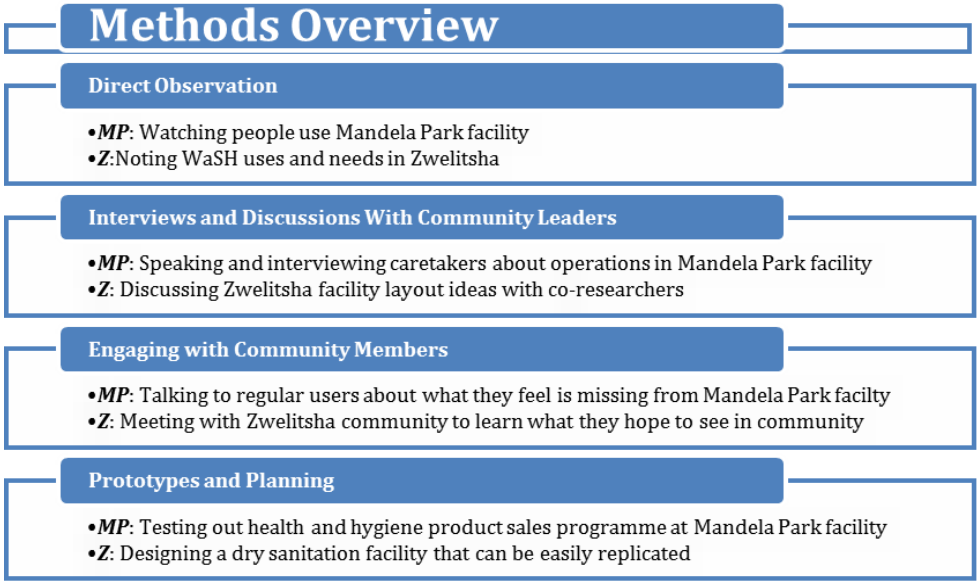
These objectives resulted in a Mandela Park Facility Assessment and an Operations and Management Plan.

Zwelitsha Plan

1. Engaged with community to determine what location would be best served by a new WaSH-UP facility.

2. Collaborated with co-researchers to design a preliminary layout and develop a plan for a new WaSH-UP facility.

3. Developed partnerships and plans for in moving the project forward when the team leaves.



Methods Overview: MP refers to methods in the Mandela Park Facility Assessment and Z refers to methods in the Zwelitsha Facility Plan.

These objectives resulted in a Mandela Park Facility Assessment and an Operations and Management Guide.

Methods

Facility Assessment and Shared Action Learning Help New Facility Design

Shared Action Learning is community driven conceptual approach, with mutual learning between both parties (Jiusto, Hersh, Taylor, 2012). Through observation, connection, and a community design process with co-researchers and caretakers, decisions and ideas on the project came from the community.

Mandela Park Assessment

Caretakers, the women who are paid to clean and maintain the facility, collected data in July 2013 soon after the facility opened. We asked them to collect data again during our time in the facility, and then we analysed usage by gender, time of day, type of usage and distance to

residence of user. We also looked for usage patterns that cannot be easily seen from the data. We were able sit on a bench in the facility and watch people come and go. Through our observations, we discovered additional usage trends and operational procedures. It was also an opportunity to test the effectiveness of the caretakers' collection of data. Usage data was determined not to be entirely reliable; our observations suggested usage was slightly underreported.

We learned about operating procedures by forming close relationships with caretakers, and learning more about them and their role. We spoke to them about opening, closing, and cleaning procedures, how money is handled, and how decisions are made. The caretakers worked with us to brainstorm ideas for facility improvements, including operational as well as structural suggestions. This information was used to create an Operations and Management Guide. We then analysed the construction process of the facility by interviewing those involved in its implementation.

Zwelitsha Plan

Community members approached the team with the need for a WaSH facility in Zwelitsha. The community indicated that there were no toilets in the area, and as a result they either travel far to use a toilet or use the bush. We were also shown the only tap in the area, which is partially broken and leaking.

Because there are no sewer lines in the area, a facility in Zwelitsha must use dry sanitation. Enviro Loo approached CORC about using their dry sanitation technology in informal settlements, and we brought Zwelitsha community members to their facility on Signal Hill in Cape Town, to gauge their acceptance of that type of sanitation.

Co-researchers were chosen from the Zwelitsha community to provide input on the planning for the new facility. After brainstorming and weighing pros and cons of different sites, we chose a site and designed a facility layout.

We knew our team would not be able to construct the new facility in the short time we were in Cape Town. We therefore explored new partnerships and outlined roles and responsibilities for the organisations that will participate in the next phase of planning.

Outcomes

Assessment Sheds Light On Key WaSH-UP Concepts, Allows For Replication

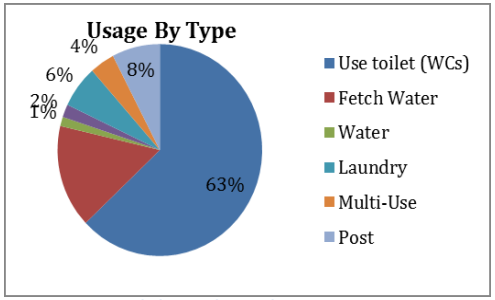
Our assessment first reports on existing WaSH features. The facility contains two urinals, eight toilets, three hand-washing sinks, four laundry basins, and two showers, for which users are charged R5 per shower. The structure also includes a hair salon, caretaker office, and large open space for social gatherings. We found that the majority of users are from the nearby shacks, and that toilets are the most common feature used. The showers are not used as frequently as expected.

Our assessment also reports on operational procedures that caretakers follow.

Our assessment also describes the construction process. In the haste to provide sanitation to the community, the process was rushed and became costly. This conclusion was further supported by a cost-benefit analysis we conducted.

This analysis showed that the Mandela Park WaSH facility is not economically sustainable. However, the high cost funds a facility that provides more than basic ablution. The facility has become a socially sustainable community centre of which the community takes ownership. It also has some environmentally sustainable components, such as a solar geyser that heats the water for showers using solar energy.

The final part of our assessment identified ways in which the facility could be improved and recommended for future WaSH facilities. For example, to become more environmentally sustainable, the facility could incorporate a rainwater collection barrel to recycle water. Additionally, two sides of the building are open, exposing the facility to the elements. The addition of window coverings that could be lowered during inclement weather would improve the environment within the facility.



Mandela Park Facility Usage Data

We established that construction of future facilities should only begin once a detailed plan is in place. Additionally, more precise record keeping of the facility's income would improve its economic sustainability. To improve the social sustainability of the facility, we identified several social and aesthetic improvements that would enhance the atmosphere. These included a children's playing area, the decoration of the children toilet stalls, and the addition of aesthetic features such as mirrors and a towel bar.

Based on the current operations and the improvements to the operating procedures that we identified in the assessment, we drafted an Operation and Management Guide of a WaSH Facility as an instruction manual for future caretakers. Based on the current operations and the improvements to the operating procedures that we identified in the assessment, we drafted an Operation and Management Guide of a WaSH Facility as an instruction manual for future caretakers of how to operate a WaSH facility.

Implementing Improvements at the Mandela Facility

Our next step was to implement some of the basic improvements to the facility. With the caretakers, we installed mirrors to the showers and sinks, as well as a towel bar and towel for hand drying. We also helped caretakers to purchase a new rubbish bin, dustpan and brush to make their cleaning more efficient, and the WPI Early Childhood Development Connection team that joined us in Langrug implemented child development improvements.

Moving Forward with a New Facility in Zwetlisha

The Langrug community hoped to implement more WaSH facilities in the settlement, especially in the neighbourhood of Zwelitsha. Together we decided that the focus of our project would be to develop a plan for a WaSH facility in that area.

The community leaders showed us two concrete platforms in Zwelitsha where the Municipality had put chemical toilets in an attempt to meet needed sanitation. The toilets were vandalized due to lack of community acceptance and to improper maintenance. Community members of Zwelitsha elected project leadership and co-researchers to form the "Z-Team." The Z-Team would provide community input to our planning and would share our ideas with the community for their approval. The community determined they preferred the most central location. With that in mind,

The Zwelitsha Z-Team (Community Representatives):	• Oversee participation of community • Engage with partners • Improve community facility continuously
Community Organization Resource Centre (CORC):	• Technical Director and WaSH-UP Coordinator (WUC) to oversee project development, finances, and facilitate communication among stakeholders.
Touching the Earth Lightly (TTEL):	• Facilitate community-based design process • Serve as Construction Manager with Local Project Manager (*below*) • Partial Project funding
Local Project Manager (Community Member):	• A community member to collaborate with TTEL and WUC on design and construction
Construction Laborers (community members):	• Meet tasks efficiently, and report to Project Manager
Caretakers:	• Maintain a clean and welcoming facility. • Report any issues to WUC
Enviro Loo:	• Provides the sanitation system • Helps install system components under agreed upon conditions. • Helps with education about dry sanitation • Conduct monthly check-ins to dispose the waste.
Worcester Polytechnic Institute:	• Help envision and build the long-term CORC-WPI WaSH Innovation Program with operational management plans. • Partially fund the project and contribute to all phases of project development except construction.
Municipality of Stellenbosch:	• Approval, financial support for operations

Key players in the planning of the Zwelitsha WaSH facility.
Partnership roles are still to be fully finalised.

we began to work with Olwethu, an architect from CORC, on drafting layouts. Throughout the design process, we showed drawings to the co-researchers, who provided further input.

New Partnerships Committed to Implementation

With limited time in Cape Town, we knew that we would be unable to see the project through to implementation. Therefore, we formed partnerships with organisations who could continue work after we left.

One of the companies we had been in contact with, Enviro Loo, approached CORC about using their dry technology. Enviro Loo makes dry sanitation toilets that separate liquid and solid waste so that it might be used for composting. Since Zwelitsha has no sewer lines and little access to water, dry sanitation would be a key feature of our facility plans. We also negotiated with Touching the Earth Lightly (TTEL), about their potential involvement in designing,

funding and managing of the facility's construction.

Multiple partners in the implementation of this facility would encourage a balanced division of responsibility and execution of the project. Langrug will be responsible for reporting any issues to CORC and the municipality, and for upholding the physical and social environment of the facility. CORC will assist in the communication between the Zwelitsha facility and the Municipality and overall project insight. TTEL will work with all parties to reach consensus on major decisions, and improve the design. Enviro Loo will be responsible for design, construction, and periodic checks on the toilets to make sure the dry sanitation technology is operating properly. Together, stakeholders will support the facility's operation and sustainability.

Shaun Andreasen , Enviro Loo Representative, at Potential Site

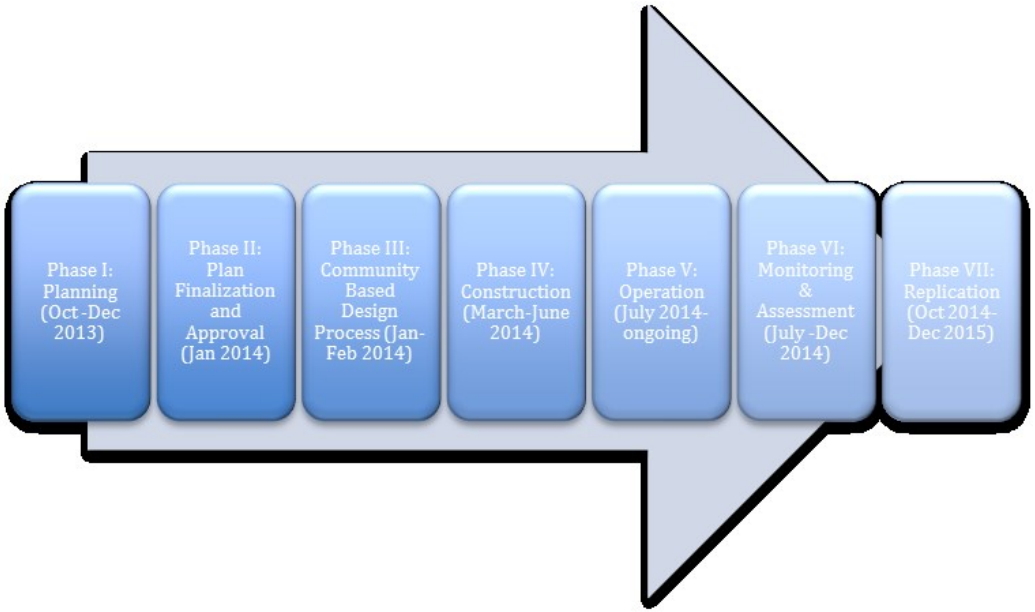
Moving Forward with a Dry Sanitation Facility

With the knowledge gathered from the assessment, we created a proposal for the Zwelitsha facility. This proposal outlines a construction plan, budget, operational plan, implementation timeline, and roles and responsibilities of partners.

Conclusion

Two months ago our team arrived in Cape Town not knowing how much work we would be able to do in Langrug. Our advisors quickly told us that Langrug would be the focus of our project, and we jumped right in. We knew that we would have to meet high standards. The community enthusiastically greeted us on our first day, and assisting them became our priority. The two portions of our project helped us do that. The community and caretakers helped prioritize and implement improvements on the Mandela Park Facility, and what we learned from them we took to the Z-team.

Working with the Z-team was an eye-opening experience. Our project ended in December, but members of the Z-team live with the reality of not having toilets. Their sense of urgency to make things happen gave us a sense of urgency. They pushed for new partnerships, and we did all we could in the rapid planning that developed to lay the foundation for implementation, with the next phase beginning in January.



Proposed timeline for implementation of Zwelitsha Facility. This detailed plan for the construction and operation will help partners continue the planning and implementation process next year.

Bringing our partners together was a rewarding challenge. The fear that the project might not succeed inspired us to be assertive in getting answers and making plans. Adding Enviro Loo and Touching the Earth Lightly to the partnership has given CORC, Langrug, and us confidence that the Zwelitsha Facility will be a reality.

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