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**DELIVERING WATER, SANITATION AND HYGIENE SERVICES
IN AN UNCERTAIN ENVIRONMENT**

**Can shared facilities be sustainable? Experience from
communal ablution blocks in eThekweni, South Africa**

P.A. Crous, J. Haarhoff & C.A. Buckley, South Africa

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The provision of water and sanitation services to informal settlements is a challenge globally, and is evident throughout the cities of South Africa. The South African government has mandated the upgrading of informal settlements through the implementation of shared water and sanitation services as interim measure to meet the immediate needs of the communities. The eThekweni municipality has realised this mandate through the rollout of communal ablution blocks. This paper presents the success factors in the sustained use of these facilities throughout the eThekweni municipal area. The key findings indicate that apart from the maintenance of the sanitary fittings, the ablution facilities require strong institutional capacity and require not only the operation and also the maintenance of the physical ablution facility structure.

Introduction

The growth of informal settlements affects the majority of cities throughout the developing world, where the lack of basic services have detrimental effects on both environmental and public health (Huchzermeyer & Karam 2006). These development challenges are realities for most South African cities. It is especially evident in the eThekweni municipal area where 12 per cent of the households are housed informally, which is higher than the national average of nine per cent informal households in South Africa. There are approximately 420 informal settlements scattered within the urban and peri-urban areas of eThekweni, housing approximately a million people – almost a quarter of the total municipal population (StatsSA 2012). The informal population of eThekweni was estimated between 800 000 to 1 400 000 residents, which accounts for a quarter to a third of the municipal population (EH 2012; EM 2012). In 2007, the majority of informal settlement residents indicated that they had been living there for an extended period of time, with 73% of the respondents remaining in the same settlement for over six years (HDA 2012). The population densities in four eThekweni informal settlements vary from 35 – 130 dwellings per hectare.

By and large, informal settlements are seen as a failure of the public sector, legislative framework and the economy to adequately provide housing in the urban environment (Huchzermeyer & Karam 2006). Although informal settlements can either be associated with free-standing settlements or backyard shacks, this paper only investigates the provision of water and sanitation services to free-standing informal settlement areas which lack, *inter alia*, improved water and sanitation services.

Background

Informal settlement upgrading policy in South Africa

Addressing the needs of informal settlements has become a major development focus of the South African national government (DHS 2009). There was a major shift in the upgrading programme. Post-Apartheid, the government aimed to first and foremost provide housing to the informal residents. In 2009, this shifted to the provision of basic, interim services to meet the immediate needs of the communities and to improve their livelihoods. These services include shared water and sanitation facilities, roads, stormwater, and electrification. These basic, interim services form part of the incremental upgrading of the settlements such that the services dovetail with the long-term upgrading strategy for the settlement (DHS 2009). Addressing the needs of the 7.3 million informal settlement residents around South Africa will not only require urgent but sustained attention.

Water and sanitation framework in South Africa

As a member state of the United Nations, South Africa has the responsibility of providing improved water and sanitation services in line with the MDGs (WHO & JMP 2008). Constitutionally, the right to sanitation falls within the right to a safe environment (Section 24 a), human dignity (Section 10) and the right to adequate housing (Section 26). Sanitation provision is the responsibility of the local government (RSA 1996; DWAF 1994). Yet, South Africa is far from ensuring this right (Sali 2012).

The policy guidelines for implementing sanitation provision strategies are broadly defined in South Africa. The minimum standard for water supply is a standpipe, at a maximum distance of 200 m from the household providing a reliable water supply of 25 litres per person per day at a minimum flow of 10 litres per minute. In addition, the water must be available for at least 350 days per year and not be interrupted for more than 48 consecutive hours. The minimum standard for sanitation provision is a ventilated improved pit (VIP) or equivalent dry sanitation service (DWAF 2003). Yet, the legacy of Apartheid has created an expectation that conventional waterborne sanitation should be extended to informal settlements, despite its cost and the resulting pressure on water supplies (Paterson et al. 2007). Waterborne sanitation is the gold standard for informal settlement dwellers, and dry sanitation is perceived as an inferior technology.

Communal, or shared, water and sanitation facilities are not a new phenomenon but have been a part of civilization for centuries, with the most notable example dating back to the ancient Roman Empire's public wash baths and toilets (George 2008). Shared sanitation has been acknowledged as an appropriate sanitation solution for dense, unplanned informal settlement areas where land is not available and residents do not have tenure rights (Schouten & Mathenge 2010; Lüthi et al. 2011; Eales 2008; Bond et al. 2013). One of the main success factors to communal sanitation is a clear definition of who the users will be (Cotton et al. 1995). Although communal facilities are not a panacea, they are incremental improvements which could have long lasting benefits as they centralise the sewer and water connections at strategic locations within the settlements (Eales 2008; Lüthi et al. 2011).

Community ablution blocks in eThekweni

Communal ablution blocks (CABs) have been rolled out throughout the eThekweni municipal area. National government has made funding for capital expenditure available for the incremental upgrading of services in informal settlements through grants, such as the Urban Settlements Development Grant (USDG) – which have extensively been used for the capital costs of the CABs in eThekweni. The communities do not pay a monthly tariff to use the facilities. The operation and maintenance (O&M) costs are to be covered by a combination of the municipal revenue, cross-subsidisation and the Equitable Share grant, although the latter is often used for capital expenses or salaries (Still et al. 2009).

The CABs are designed to serve a population within 200 m radius from the CABs or a maximum of 75 households per facility. The CABs consist of separate male and female facilities which are each constructed out of retro-fit shipping containers. They have windows to provide natural lighting, and whirly birds and air vents to provide natural ventilation. There are no electrical lights within the CABs for nocturnal lighting. Each container is fitted with showers, toilets and urinals, and wash hand basins internally and laundry facilities connected externally.

As of December 2012, a total of 290 CAB facilities were operational throughout the municipal area. The CABs are supply driven as part of the national agenda to provide basic services to all. Thus, the community does not pay per use to use the facilities. The community is seen as the user and is not responsible for the facilities' operation or maintenance. However, this means that there is very little incentive for the community to assist in ensuring the sustainability of the facilities. To this extent, the municipality has employed a caretaker at each facility to minimise vandalism and misuse, and to ensure the facilities are operational at all times. The caretakers are paid through the Extended Public Works Programme Incentives Grant. The caretakers' responsibilities include (Roma et al 2010).

- Cleaning of the facility;
- Ensuring there is sufficient toilet paper and sanitary consumables;
- Reporting leaks, blockages, or broken fittings to the supervisor and the repair team;
- Ensuring the community has access to the facility while on duty.

The municipality is also responsible for providing the caretakers are also provided with sanitary consumables to adequately maintain these facilities. The sanitary consumables include PPE (personal protective equipment such as overalls, boots, gloves, and masks), buckets, mops, and brooms, disinfectants, and toilet paper.

Methodology

Municipal records

The municipal records were acquired in order to determine the number of toilet paper rolls and detergent bottles used at the CABs. The data was obtained for the period from June 2010 to June 2012. The maintenance records were also obtained to determine the repair time from the fault being reported to the plumbers making the repairs. This was obtained for the period from January 2011 to July 2012 for all of the CABs.

Four CAB surveys were used in this study. The first survey of 47 CABs was conducted in August 2011 as part of the Unilever funded project (Roma & Buckley 2011). Three more site visits were conducted in February, March and August 2012, whereby 50 CABs were visited and 36 caretakers were interviewed. The CAB site visits conducted in 2012 were preselected before going out to site from a dataset based on a representative sample from the North, South and Central areas in eThekweni. The site visits were conducted with a representative environmental health practitioner from the municipality. The aim of the site visits was to investigate the state of the fittings and any structural defects at each of the CABs. The data was captured and analysed in MS Excel. The 97 surveyed CAB sites surveyed in 2011 and 2012 provided sufficient data to develop a general condition of the CABs in eThekweni and to determine their success factors.

Results

Maintenance

The results from the maintenance records indicate that the average time for the plumbers to make a repair was around 11 days. The caretaker interviews indicated that the caretakers believed that the repair time was approximately twice as long as the official maintenance records, 23 days. However, the official municipal repair time is 48 hours (2 days). This target is currently not being met.

Accessibility

It was found from the survey in August 2012 that 27 of the caretakers (82%) lock the CAB facilities at night. The remaining caretakers prefer to lock the facilities to prevent vandalism but are unable to do so, as the keys have either been lost (67%) or the locks are broken (33%). The average reported open hours of the CABs is 05:57 – 19:15 (13.3 hours), with the longest reported period being from 04:00 – 21:30 (17.5 hours) and the shortest from 07:30 - 16:00 (8.5 hours). This means that the community has to use alternative toilet facilities at night, as the majority of CABs are not used at night. Furthermore, some of the caretakers lock the facilities when they are not present during the day in order to prevent misuse and vandalism. In such cases, the users have to go to the caretaker's house, which is typically located near the CAB facilities, to either get the key for the CAB or to get the caretaker to open the facility. This practice is perpetuated by the fact that the caretakers are paid to work 4-hours per day and that CAB facility does not provide a place where the caretakers can watchover the facilities while on duty.

Water leaks and disposal

From the study in August 2012, it was found that 20 of the CABs (80%) had greywater around the exterior CAB platform and surrounding environment. The reason for the poor drainage of CABs is caused by (i) leaking laundry wastewater pipes and (ii) laundry washing practices of the community. When the laundry basins are in use, other community members typically wash laundry in buckets next to the basins and then empty these into the surrounding environment.

Internally, poor drainage is problematic as the CAB facilities did not allow for drainage from the CAB floor, only from the discharge pipes of the fittings. The only method of removing water from the inside of the CAB is through the CAB door. The main reasons for poor internal discharge are blocked shower drain pipes and toilet drainage pipes leaking. The studies in March and August 2012 revealed that that the majority (75%) of the 33 visited CAB facilities had more than one leaking toilet drainage pipe. These leaks are caused during (i) transportation onto site, where the drainage pipes attached to the toilets disconnect from the toilet bowl structure, and from (ii) daily use, the movement caused by users sitting down and getting up from the toilet pedestal. The toilet leaks are the most critical drainage problem, as this poses a significant health risk to the users, especially vulnerable residents.

Sanitary consumables

The major monthly sanitary consumable is associated with the toilet paper and disinfectants. On average, over the period from October 2010 to June 2012, each CAB facility used 4.9 packs of toilet paper (containing 48 toilet paper rolls per packet) per month and one bottle of disinfectant (5ℓ). At these

quantities, the consumables account for approximately 20% of the annual operational cost of the CABs. The caretaker salary accounts for 45%, and the cost of water is 35% of the monthly operational cost.

CAB structure

The evidence of vandalism was seen with the presence of broken windows. On average, approximately 46% of the 35 CAB sites visited had at least one broken window on either the male or female containers. There was no significant difference for broken windows in either the male or female containers. However, 41% of the CABs that were locked when the site visit was conducted had broken windows, while 29% of those that were unlocked had broken windows.

The majority (87%) of the 38 CABs had malfunctioning whirly birds. The malfunctioning whirly birds refers to the whirly birds being present but not turning to create the natural draft.

The internal cubicle doors are used for privacy in the showers and the toilets. However, 44% of 136 male and female facilities had at least one missing cubicle door. The main reason for these doors being broken is due to poor hinge materials and misuse, not due to theft as the broken cubicle doors were either stored in the caretakers' house, or within the CAB itself.

Sanitary fittings

The showers and the toilets will only be discussed in this section for brevity. The synthesis of the surveys indicated that the shower taps are more commonly broken or missing (29%) than the shower heads (22%). However, there was no correlation between the shower head and the shower taps being broken simultaneously. It is noted that the missing shower head does not prevent users from bathing; however a missing shower tap means that the user cannot use the shower.

The toilets can malfunction in two ways, either with (i) leaking fresh water or wastewater, or (ii) breaking of the flush mechanism or the toilet seats. From 391 toilets in 70 male and female facilities it was found that the majority (51%) of the discharge pipes leak internally in the CABs, while 27% of the toilets continuously leaked water into the toilet bowl. The flush mechanism was broken and missing 17% and 20% of the time. It was further found that 32% of the toilet seats were missing. Although the lack of a toilet seat does not have a catastrophic effect on the use of the toilet, the seat provides both comfort and dignity to the users.

Lessons learnt

Based on the findings, the following lessons have been identified in order to ensure the sustainability of the shared water and sanitation facilities.

- **Funding.** Financial planning of the shared ablution facilities has to account not only for the capital expenses but also the operation and maintenance expenses. In South Africa, funding is made available through government grants, the users do not pay for the services. Although grant funding in South Africa secures funding for the installation of such services, it does not adequately account for the O&M costs. This is mainly due to the focus on eradicating the sanitation backlog in South Africa.
- **Caretakers.** There should be a full-time municipal presence at the CAB facilities, i.e. a caretaker. This will reduce vandalism and misuse and will enable legal recourse to be taken where required. This will also ensure that the facility is accessible to the community at all times. A caretaker room is required to enable the caretaker to permanently be on site.
- **Maintenance.** The maintenance of the ablution facilities is not only related to plumbing issues, such as pipe repairs, but also includes the repair of windows, doors, sanitary fittings and other structural components. These skills and the required supply chain for the procurement of such materials have to be developed, as these are not typical duties of municipal water and sanitation departments.
- **Responsiveness.** The main factor to sustained operation of the facilities is that maintenance is responsive and swift. This is achieved through open communication between the caretakers, who are responsible for the operation of the CABs, and the plumbers, who are responsible for the maintenance of the CABs, i.e. attending to blockages, replace fittings, etc.
- **Accountability.** There are currently no incentives in place to promote the sustainability of the CABs. For example, the caretakers are paid monthly, whether the CABs are operational or not. Incentives should be considered not only between the stakeholders within the municipality, i.e. the caretakers, the supervisors, the maintenance teams, etc.; but also between the municipality and the local community.
- **Standards.** It is important that the facility and the sanitary fittings are of a high quality, as the facilities are used by a large number of people on a daily basis. Standards should be in place to ensure that no inferior products are used in the ablution facilities.

Conclusions

The provision of interim shared water and sanitation facilities is an important policy shift in South Africa in order to meet the immediate needs of the communities. However, this is not a quick fix solution. Based on the rollout of communal ablution facilities in eThekweni, for example, it is estimated that all of the municipal areas in South Africa will require around 28 years to address the current sanitation backlog.

The experience from eThekweni highlighted a number of areas that need to be addressed in order to ensure that shared ablution facilities can be reliable and operational for the users. The results indicate that the sustained use of the CAB facilities does not only require conventional operation and maintenance of the sanitary fittings and pipelines, but also requires the maintenance of the physical CAB, the cubicle doors, windows, whirly birds and locks. This requires significant institutional capacity along with adequate funding to address faults and to perform the necessary repair works.

The main issues associated with the sustained use of the CAB facilities were prioritised in Table 1 based on the occurrence of malfunction of the different sanitary fittings and CAB components in the study. These parameters are equally weighted and shown as the “percentage of occurrence.” The ranked parameters are each identified based on the origin of the maintenance, whether due to the fitting, CAB structure, or drainage. This indicates the responsibilities that have to be performed by the maintenance teams.

Rank	Fittings	Type of problem	Affects health	Affects use	Affects dignity	Affects comfort	Promote misuse	Σ
1	Laundry	F D	75%	29%	17%	75%		196%
2	Toilets	F S D	44%	20%	28%	32%	33%	157%
3	Windows	S			47%	47%	47%	140%
4	Basins	F D	36%	36%		30%	30%	132%
5	Cubicle Doors	S			42%	42%	42%	125%
6	Showers	F S D	6%	14%	27%	27%	26%	99%
7	Paint	S				46%	46%	92%
8	CAB Doors	S	15%		21%	29%	21%	86%
9	Air Vents	S			27%	27%	27%	82%
10	Whirly Birds	S				34%		34%

F = Maintenance required due to the CAB sanitary fittings
 S = Maintenance required due to the CAB structure
 D = Maintenance required due to the water supply and sewerage (drainage)

The provision of communal ablution facilities, although interim, will require a dedicated funding stream for the operation and maintenance of these facilities, without which these facilities will become health risks to the communities who were meant to benefit from them.

In the eThekweni municipal area there will be a large number of sanitary fittings and other structural components that need to be maintained on a regular basis once all informal settlements have been provided with interim water and sanitation services. This is estimated to include approximately 2 916 CABs.

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References

- Bond, T., Roma, E., Foxon, K.M., Templeton, M.R. and Buckley, C.A. (2013) *Ancient water and sanitation systems – applicability for the contemporary urban developing world*. Water Science and Technology Vol. 67. No 3, pp.935-941.
- Cotton, A., Franceys, R., Pickford, J. and Saywell, D. (1995) *On-plot sanitation in low-income urban communities - A review of literature*, Loughborough University of Technology: Loughborough.
- DHS - Department of Human Settlements (2009) *National Housing Code - 5 Volume 4 Part 3 - Upgrading Informal Settlement*. Department of Human Settlements: Pretoria
- DWAF – Department of Water Affairs and Forestry (1994) *White Paper on Water Supply and Sanitation Policy*, Department of Water Affairs and Forestry: Pretoria.

- DWAF – Department of Water Affairs and Forestry (2003) *Strategic framework for water services*, Department of Water Affairs and Forestry: Pretoria.
- Eales, K. (2008) *Partnerships for sanitation for the urban poor: is it time to shift paradigm?* IRC Symposium on Urban Sanitation: The Netherlands.
- EH – eThekweni Housing Unit (2012) *eThekweni Housing Sector Plan: The Housing Chapter of the IDP*. eThekweni Housing Department. Available from: [http://devplan.kzntl.gov.za/idp_reviewed_2012_13/IDPS/Durban/Adopted/eThekweni%20Housing%20Sector%20Plan%20\(2012\).pdf](http://devplan.kzntl.gov.za/idp_reviewed_2012_13/IDPS/Durban/Adopted/eThekweni%20Housing%20Sector%20Plan%20(2012).pdf) (Accessed September 2012)
- EM – eThekweni Municipality (2012) *Integrated Development Plan 2012/2013*. Adopted 30 May 2012. eThekweni Municipality. Available from http://www.durban.gov.za/Resource_Centre/IDP/Documents/11085_1.PDF (Accessed December 2012)
- HDA – Housing Development Agency (2012) *KwaZulu Natal: Informal settlement status*. The Housing Development Agency, Johannesburg. Available from: http://www.thehda.co.za/images/uploads/HDA_Informal_settlements_status_KwaZulu-Natal_1.pdf (Accessed 14 September 2012)
- George, R. (2008) *The Big Necessity*, Portobello Books: London.
- Huchzermeyer, M. and Karam, A. (2006) *The continuing challenge of informal settlements: An introduction*. In *Informal Settlements: A Perpetual Challenge?* Eds. Huchzermeyer, M. & Karam, A., UCT Press: Cape Town.
- Huchzermeyer, M. (2011) *Cities with 'Slums': From informal settlement eradication to a right to the city in Africa*, UCT Press: Cape Town.
- Lüthi, C., Panesar, A., Schutze, T., Norstrom, A., McConville, J., Parkinson, J., Saywell, D. and Ingle, R. (2011) *Sustainable sanitation in cities: A framework for action*, 1st Edition, Papiroz Publishing House: The Netherlands.
- Paterson, C., Mara, D. and Curtis, T. (2007) *Pro-poor sanitation technologies*. *Geoforum* 38, pp. 901-907.
- Roma, E., Buckley, C., Jefferson, B. and Jeffrey, P. (2010) *Assessing users' experience of shared sanitation facilities: A case study of community ablution blocks in Durban, South Africa*. *WaterSA* Vol. 36 No.5. pp.589-594.
- Roma, E. and Buckley, C.A. (2011) *Assessing Community Ablution Blocks and exploring sanitation market in informal settlements of eThekweni Municipality – South Africa*. Milestone 1. Unpublished report for Unilever (UK). Durban: Pollution Research Group at the University of KwaZulu-Natal
- RSA – Republic of South Africa (1996) *Constitution of the Republic of South Africa*. Act 108 of 1996, Republic of South Africa: Pretoria.
- Sali, C. (2012) *Water, sanitation form part of key human rights: iLIVE*. *Times Live*. 26 March 2012. Available from: <http://www.timeslive.co.za/ilive/2012/03/26/water-sanitation-form-part-of-keyhuman-rights-ilive> (Accessed October 2012)
- Schouten, M.A.C. and Mathenge, R.W. (2010) *Communal sanitation alternatives for slums: A case study of Kibera, Kenya*. *Physics and Chemistry of the Earth* Vol. 35, pp.815-822.
- StatsSA – Statistics South Africa (2012) Census 2011 data provided at a household level for each municipality. Available from: <http://www.statssa.gov.za> (Accessed November 2012)
- Still, D., Walker, N. and Hazelton, D. (2009) *Basic sanitation services in South Africa: Learning from the past, planning for the future*, WRC Report No. TT 414-09, Water Research Commission: Pretoria.
- WHO & JMP - World Health Organization and United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation (2008) *Progress on Drinking Water and Sanitation: Special Focus on Sanitation*, UNICEF and WHO: New York and Geneva.

Contact details

Mr. Pieter A. Crous
 267 Kent Avenue, Ferndale, South Africa
 Tel: +27 11 369 0600
 Fax: +27 11 886 4589
 Email: pieter.crous@smec.com
 www: www.smec.com

Prof. Johannes Haarhoff
 Kingsway Ave, Auckland Park, South Africa
 Tel: +27 11 559 2148
 Email: jhaarhoff@uj.ac.za
 www: www.uj.ac.za
