TOILETS AT LAST - PERCEPTIONS OF THE USERS OF 'PORTA POTTY' TOILETS IN JIM SE BOS INFORMAL SETTLEMENT IN PHILLIPI, CAPE TOWN

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A research report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, in fulfilment of the requirements for the degree of Masters of Built Environment in Housing

Johannesburg 2014

DECLARATION

I declare that this dissertation is my own unaided work. It is being submitted to the degree of Masters of Built Environment in Housing to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.

(Signature of candidate)

15th day of May 2014

ABSTRACT

South Africa has one of the most progressive legislative and policy frameworks for water services in the world, which includes a constitutional right to water and a national Free Basic Water policy (COHRE, 2008). However, the stark reality is that although South Africa has these progressive policies, the sanitation challenge still needs to be overcome. The growing sanitation backlog and the eradication of the bucket system has become a difficult and emotive topic. Many South Africans live in extreme poverty and in informal settlements which do not have adequate sanitation available. Generally, within these informal settlements, households are forced to share toilet facilities, and to walk far distances as the toilets are poorly located, badly maintained and users of these toilets are exposed to danger and violent crimes. This study explores perceptions of the users of 'porta potty' toilets in Jim Se Bos informal settlement in Phillipi, Cape Town. Understanding the users' socio-cultural perceptions of the porta potty toilet will contribute to future policy making, as the information can be used to improve the future roll-out of the technology in order to make it more acceptable.

The study was qualitative in nature and used a phenomenological research design. A total of 20 community members were invited of which nine respondents comprising of eight residents of Jim Se Bos informal settlement and one employee of the municipality participated in the study. The sample was selected by a convenience sampling method. Semi-structured interviews were conducted to collect data for the study. The data were analysed by means of content analysis, which enabled the researcher to identify important themes for the study.

The findings of the study revealed that perceptions of the users of 'porta potty' toilets were positive and that everyone accepted the sanitation system. The participants recommended that the municipality should roll out the porta potty sanitation system in other informal settlements. This recommendation is a vote of confidence for the system and that it is seen to provide the necessary relief from unsafe and vandalised sanitation systems. In conclusion, the porta potty was accepted as being a far more appropriate and dignified system that does not impede on the socio-cultural background.

Key words: *Porta Potty sanitation system, informal settlements, socio-cultural perceptions, users and Jim Se Bos.*

DEDICATION

I dedicate my research to my loving wife, Cheryl Stewart and our sons, Matthew and Reeve Stewart for their love, patience, continued support and guidance for not allowing me to ever give up on my dream, for that I'm sincerely grateful. I trust my perseverance to achieve a successful tertiary record will serve as guide to my loving boys by indicating that you can only take out of the cup what you put in.

ACKNOWLEDGEMENTS

To my Father, Friend and Saviour, Jesus Christ our Lord, the only God, whom without, my existence would be meaningless, blessed be Thy name. Many thanks Almighty Jesus for Thy love and grace which thou has bestowed on me, not just with my research but even in this present moment. Thou has held my hand through difficult times and through joyous occasions, for that I am truly grateful and privileged to have thee Father in my life. Thank you Lord for thy mercy, strength and patience through this entire research process. Thanks for allowing me to become a civil engineer where I can design and improve the lives of the poor and needy.

To my best friend and wife, Cheryl Stewart, your continuous encouragement and assistance to have me achieve this goal is truly appreciated. Thanks for all your patience, advice and for lending your ears when I needed to express my frustrations. To my dear parents, Mom and Dad, thanks so much for all your guidance and commitment, you've given up much over the years to provide me with a decent education, for that I'm truly grateful. To my sister and brother, Donald and Robin, I'm very proud of you and how you've grown over the years to become well-mannered adults. Remember that to build a sound career and life one needs a good foundation, that foundation is the Lord Jesus. Build on him and I can reassure you that there will be no failure to your structure. Finally, to my adorable and loving wife, a special thank you again for all the time you've sacrificed looking after the children while I was slaving away, many, many thanks.

To my employer, Jeffares & Green, thanks you providing the financial assistance to complete my studies. Thank you for your confidence placed in me, there were times I felt I need to throw in the towel, however your assistance to provide me time to complete my studies was much appreciated. To Harold Tiganis, many thanks, a mentor and friend, whom has invested so much time in me and creating an enabling environment where I could practice my love for housing development.

To my supervisor, Dr Aly Karam, thanks for your patience and continuous advice during the research programme. When you left for Canada, I was concerned that I would lose input from yourself, but you proved me wrong. You also made time to respond to my queries and attend to my Skype calls. Thank you so much for your invaluable comments and for always being so apt to teach and to impart your

knowledge.

To my inspirational housing friend and lecturer, Professor Marie Huchzermeyer, I always found your love and dedication to housing contagious. Thank you for always sharing your in-depth knowledge of housing policy and theories.

To the class of 2012 and 2013, what a privilege to have met such a wonderful group of individuals with such passion to make the world a better place by providing housing.

To the participants and municipal official, Amy Christians, thank you for time and assistance.

To all friends, colleagues and those whom have assisted me in putting this research report together, thank you so much.

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ABBREVIATIONS AND ACRONYMS

CoCT	-	City of Cape Town
COHRE	-	Centre on Housing Rights and Evictions
DWAF	-	Department of Water Affairs
ICESCR	-	International Covenant on Economic, Social and Cultural Rights
MDGs	-	Millennium Development Goals
PPS	-	Porta Potty System
SAHRC	-	South African Human Rights Commission
SJC	-	Social Justice Coalition
StatsSA's	-	Statistics SA
STED	-	Septic Tank Effluent Drainage
STEP	-	Septic Tank Effluent Pumping
UD	-	Urine Diversion
UNDP-SA	-	United Nations Development Programme SA
UNHR	-	United Nations Human Rights
UNICEF	-	United Nations Children's Fund
VIP	-	Ventilated Improve Pit
WHO	-	World Health Organisation
CSIR	-	Council for Scientific and Industrial Research

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND

South Africa has one of the most progressive legislative and policy frameworks for water services in the world, which includes a constitutional right to water and a national Free Basic Water policy (COHRE, 2008). However, the stark reality is that although South Africa has these progressive policies, the sanitation challenge still needs to be overcome. The recent report published by the World Health Organization (WHO) and UNICEF (2013) discussing the update and progress on sanitation and drinking water provides a sobering reminder of the challenges faced globally. The report states that almost two thirds (64%) of the world population relied on improved sanitation facilities, while 15% continued to defecate in the open (*ibid.*). Goal 7, target 10 of the Millennium Development Goals (MDGs) (United Nations, 2010) aims at halving the proportion of people without sustainable access to basic sanitation by 2015.

To meet this goal, South Africans living in informal settlements will need to embrace new sanitation technologies where it is not possible to provide a waterborne system. As we know South Africa has made progress with regards to the provision of basic water and sanitation services as access to basic services increased from 59% of the population in 1994 to 94% of the population in March 2007 (UNDP-SA, 2013). The figures somehow do not reflect the true realities within the SA context, as the growing sanitation backlog is a result of the proliferation of informal settlements in urban areas. To overcome this challenge SA needs to adopt a refreshed mind-set on what is practical and socially acceptable to communities. Locally in the Cape Town region where I reside, the City of Cape Town's (CoCT) water services development plan (2012) indicates that there are approximately 77,783 households in informal settlements without sanitation. Furthermore, StatsSA's Census 2011 report indicates that within the Cape Town region approximately 143,823 households within Cape Town informal settlements

only have access to 34,225 toilets. This in essence means that there are six average numbers of households per toilet (*ibid.*).

These alarming statistics have manifested themselves not only in Cape Town but throughout SA. Moreover the eradication of the bucket system has become a difficult and emotive topic. Many South Africans live in extreme poverty and in informal settlements which do not have adequate sanitation available. Generally, within these informal settlements, households are forced to share toilet facilities, and to walk far distances as the toilets are poorly located. Other aspects such as the lack of maintenance of the toilets allows for the possibility of contracting diseases, bacterial and viral infections. In addition, the use of these toilets exposes the households to danger and violent crimes. As Naranjo, *et al.* (2010) explain, it is common in the informal settlements of Cape Town to find overused toilets that look unhygienic regardless of the type of technology involved. The use of bulky anal cleansing material such as newspaper collected from the street-floor contributes to rapid filling of sanitation systems (*ibid.*). The cleaning and maintenance of the toilets are irregular and the social acceptance of any new sanitation technology is not always understood within these informal settlements. Education about the technology is not always carried out throughout the communities and therefore in most cases the technology fails. Other impediments encountered within the informal settlements that hamper the use of toilets are related to the lack of adequate drainage and the management of grey water[1]. The lack of managing these systems frequently results in them being extremely polluted environments with a toxic cocktail of storm water mixed with grey water, urban refuse and even faecal matter surrounding, and at times inundating, the crudely constructed dwellings (shacks) (Ashipala & Armitage, 2011).

To mitigate against these risks, the SA Government has introduced various policies. One such policy is the provision of adequate sanitation as

[1] Grey water is defined as water from baths, showers, hand basins and clothes washing machines or the laundry.

described in the Department of Water Affairs (DWAF) National Sanitation Policy (DWAF, 1996), which can be referred to as the provision and on-going operation and maintenance of system of disposing of human excreta, waste water and household refuse in an acceptable and affordable manner to the users. Furthermore, the policy states that the system must be structurally safe, hygienic and easily accessible and that each household should have access to its own facilities (*ibid.*).

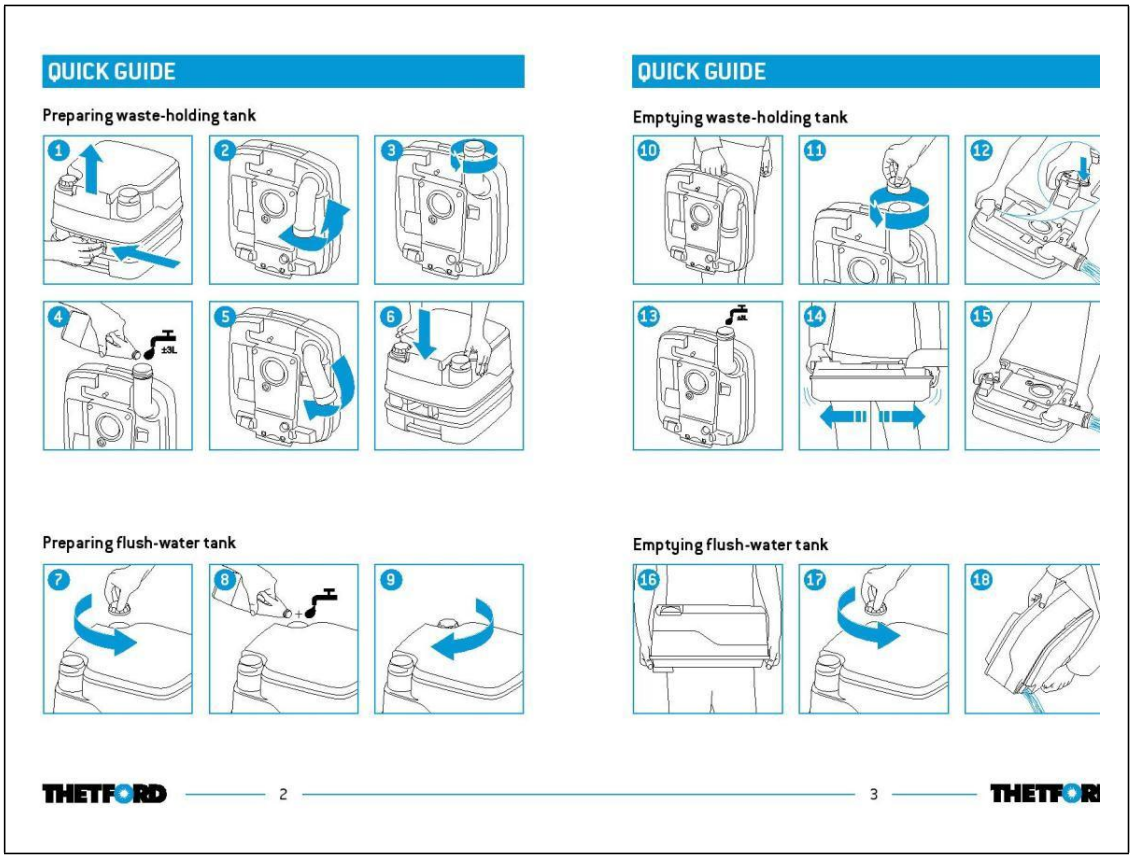
Other key elements noted by the policy are that the facility should be accompanied by correct hygienic practices and must not have an unacceptable impact on the environment (*ibid.*). The policy clearly defines what is required to fulfil the needs of adequate sanitation; however, due to insufficient capacity to eradicate the bucket system, municipalities have introduced various sanitation technologies to reduce the rapidly growing sanitation backlog.

One such sanitation technology is the “Porta Potty System (PPS)”, introduced by the City of Cape Town throughout a number of informal settlements within the Cape region (see Appendix A). The porta potty is an international product made in Europe by a company called Thetford: examples of the technology are shown in Figure 1 and Figure 2 respectively. The company produces a range of portable products, from toilets and refrigerators to cleaning and cooking appliances. The porta potty is a portable toilet that allows for natural seating, water flushing and storage of waste water in a high capacity waste-holding tank. In addition, the technology allows for the waste-holding tank to be detached, replaced and emptied remotely, as shown in the quick use guide (Figure 3) from Thetford (2013).

Figure 1: Porta Potty	Figure 2: Waste-holding tank
	

(Source: Thetford, 2013)

Figure 3: Quick use guide



(Source: Thetford, 2013)

The new 20-litre portable toilet technology, namely “Porta Potty System (PPS)” is one of the first portable toilets which will replace the outside toilets, which have had to be shared among other families (Thetford, 2013). The PPS sanitation works on the principle that water is pumped into the bowl,

which eventually flushes the waste into the tank below (*ibid.*). The system allows for the tanks to be clipped off and to be placed outside each household for collection by the service provider.

1.2 PROBLEM STATEMENT AND RATIONALE

Since 2009 we have seen an increase in service delivery demonstrations and a request for adequate sanitation throughout the country. This demand has become very evident in the Cape Town region. Communities living in informal settlements throughout the Cape Town region have conveyed their demands through protests and organisations such as the Social Justice Coalition (SJC). One such way of communicating frustrations would be the SJC's recently released report of the Khayelitsha 'Mshengu' toilet social audit (April, 2013).

This report highlights the challenges with the management of suppliers of portable toilet systems and the maintenance thereof. The City of Cape Town (CoCT) has responded to the finding of the report and has acknowledged the lack of maintenance by the supplier. The South African Human Rights Commission (SAHRC) added to this growing concern by noting the current state of sanitation and the health risks to vulnerable communities (Mangena, 2013). The City of Cape Town Mayor, Patricia de Lille, responded to these concerns and stated that City was trying to eradicate the bucket toilet system, but was facing resistance from some communities (News 24, 2013). She further noted that the City had been successful in piloting portable flush toilets throughout Cape Town and furthermore felt that the "Porta Potty System (PPS)" would provide dignity (*ibid.*). One such example was showcased in a recent media report, where one of these sanitation technologies introduced in Jim Se Bos informal settlement in Phillipi, Cape Town was well accepted by the resident community (Hassan, 2013). The community acknowledged that the introduction of the new technology would reduce health issues, would enhance the safety of children and reduce the distance to walk to the toilet facility.

The two arguments being expressed by the various institutions acknowledge that there is backlog in eradicating the bucket system. However, the difference in opinion is related to the acceptance of the sanitation technology by the communities or households. It stands to reason that communities have grown tired and frustrated with the continuous wait for adequate sanitation. Pithouse (2006, cited by Huchzermeyer, 2006: 6) provides an example of the signs of stress experienced by the households within the informal settlements of the City of Johannesburg. This stress caused by the prospect of losing a precarious livelihood and social network has resulted in growing despair and outrage by informal settlement residents, and increasingly in organised, legal and non-violent protest action (*ibid*.).

Therefore to resolve this matter one needs to understand whether the technology provided is being rejected because of cultural reasons, stigma, and risk to health, or whether households are blatantly rejecting the technology due to political interference.

The problem statement is therefore:

What are the perceptions of the users living in Jim Se Bos, Phillipi, Cape Town of the new sanitation technologies (toilets)?

1.3 SIGNIFICANCE OF THE STUDY

The study aims to address the social acceptance of the new sanitation technology launched by the City of Cape Town in Jim Se Bos informal settlement, namely the porta potty. This new portable sanitation technology supersedes the previous sanitation technology options such as chemical toilets, the bucket system and ventilated improved pits which were rejected by the users and socio-political institutions due to the lack of maintenance, inadequate cleaning and toilets not being safe and secure (SJC, 2013). In May 2013, the Mayor of Cape Town and the Premier of the Western Cape outlined in a media release the City of Cape Town’s plans to eradicate the bucket system. The plan aimed to expand the roll out of portable flush toilets

(PFTs) to communities where the provision of full flush toilets is not possible due to hydrological conditions, density, legal and other practical reasons (CoCT, 2013). Therefore, the challenge and plans adopted by the municipality presented a research opportunity to understand the reasons and perceptions why the communities would or would not adopt such a sanitation technology. In addition, the study seeks to understand how the sanitation technology has operated since implementation.

A careful review was completed by the researcher to identify whether a similar study had been conducted in a similar informal settlement setting within South Africa. No studies were identified, although other studies such as Naranjo *et al*. (2010) consider more communal Urine-Diversion and Dehydration Toilets, whereas this research will specifically review the social acceptance of the Porta Potty System. The study will contribute to a growing body of knowledge regarding the challenges of eradicating the sanitation backlog within South Africa. Furthermore, the study will provide insight into the users' perceptions of PPS toilets. Understanding the technology and the perceptions surrounding it can be crucial when considering introducing the technology into other informal settlements. Finally, the information gathered from the study could also be used to improve the future roll-out of this technology, in order to make it more acceptable to the users.

1.4 AIM

The study sought to understand the socio-cultural perceptions and practices of the users of the PPS toilets in Jim Se Bos, Phillipi, with the intention of measuring the degree of acceptance of this sanitation technology in an informal settlement context. In addition, the study also seeks to analyse the practicality of the technology, to explore the opportunities to apply the sanitation technology in other informal settlement settings and to furthermore understand the level maintenance required by the user.

1.5 OBJECTIVES OF THE STUDY

The study will be guided by the following objectives:

- To discuss/critique the nature of and rationale for implementing the PPS toilet technology;
- To determine the level of acceptance of the PPS toilets in Jim Se Bos, Phillipi by the users;
- To contribute to the extension (body) of knowledge on the perceptions of the users of the PPS toilets in an informal settlement context;
- To develop guiding principles for acceptance of the PPS toilets in other informal settlement projects, as informed by the analysis of the study;
- To provide comprehensive guidelines for future implementation of the PPS toilets in an informal settlement contexts, as informed by the analysis of the study; and
- To determine the operational and maintenance requirements of the PPS toilets in an informal settlement contexts, as informed by the analysis of the study.

1.6 RESEARCH QUESTIONS

The main question for the research is to formulate and assess the quality, effectiveness and efficiency of the sanitation technology introduced at Jim Se Bos informal settlement, but moreover to discover possible problems with the newly launched technology. To answer this question, I ask the following:

- What are the perceptions of the users of PPS toilets in Jim Se Bos informal settlement, Cape Town?

This main question is linked to the following sub-questions:

- What lessons or guidance may be drawn from the use of PPS toilets?
- What are the benefits and challenges identified by the community using the sanitation technology?

- Are there any improvements identified and is it possible to enhance the level of acceptance for the use of PPS toilets?
- What does this information mean for the municipality and those involved in eradicating the bucket system?
- If the sanitation technology piloted by the municipality is endorsed by the community and socio-cultural accepted by means of this research, would it be possible to use the results of this study to develop guiding principles for acceptance of PPS toilets in other informal settlement settings?

1.7 DELIMITATIONS OF THE STUDY

Jim Se Bos is located in the Phillipi Horticultural Area along Ollieboom Road, which can be located approximately twenty five (25) kilometres south east of Cape Town CBD within the Western Cape Province of South Africa (See Appendix B for a detailed map of the project site). The project site is situated on privately owned land and is surrounded by vegetable farmers and manufacturing businesses.

1.8. DEFINITIONS OF KEY TERMS

1.8.1 Alternative sewerage

Alternative sewerage refers to several sewerage schemes adopted within the South African urban informal settlement setting. Typically these schemes were designed and developed to overcome the constraints of conventional gravity wastewater systems (Ashipala & Armitage, 2011). Parkinson, Tayler and Mark (2007) indicate that generally the residents of informal settlements, particularly slum dwellers, also experience a wide range of environmental problems related to a lack of drainage infrastructure. Furthermore, they found that in addition to health hazards created by microbial pathogens, they are often most vulnerable to flooding because their dwellings are precariously located and poorly served by urban infrastructure and services (*ibid.*). Therefore, to mitigate against these constraints, alternative sewerage schemes have been developed over the years. These are categorised as simplified sewerage, settled sewerage and

vacuum sewerage.

- Simplified sewerage was conceived and popularised in the 1980s as a method of providing water-borne sanitation at a reduced cost in Brazil's high density peri-urban areas. It has subsequently been successfully implemented throughout Latin America, Pakistan and India (Bakalian *et al*., 1994; Mara, 2006 cited in Ashipala & Armitage, 2011). The sewerage system operates in essentially the same way as conventional gravity sewerage (Ashipala & Armitage, 2011). The system, which stems from a re-evaluation of the generally conservative design standards enforced for conventional gravity sewers, makes use of modified sewer network layouts, reduced minimum pipe cover depths, shallow access structures and sewer self-cleansing design criteria based on the attainment of a minimum tractive tension (Mara *et al*., 2001 cited in Ashipala & Armitage, 2011).
- Settled sewerage is a system where an interceptor (septic) tank is used to remove the bulk of the solid material thereby allowing for more flexible design of the subsequent conveyance system (Ashipala & Armitage, 2011).
- Vacuum sewerage makes use of a combination of gravity and differential air pressure as the driving force to propel sewage through the sewer network (Ashipala & Armitage, 2011).

1.8.2 Informal Settlements

Informal settlements are generally defined as high density settlements, located on the periphery of cities, often on illegal land which cannot be serviced. The UN-Habitat (2003) report cited by Parkinson, *et al.* (2007) states that many informal settlements form on the peri-urban fringes of major cities and are usually inhabited by a heterogeneous mixture of families from various socio-economic backgrounds, and are often comprised of immigrants from rural areas. The general household survey report indicate that within the Western Cape, approximately 15.4% of the population live in informal dwellings (StatsSA, 2012).

1.8.3 The Bucket System

Bucket system is a sanitation system with an extremely negative connotation and considered to be unhygienic and expensive to maintain, as well as violating the human dignity of many South Africans, especially for the users and those responsible for collection and disposal of the human waste from bucket toilets (Mjoli, 2012). The bucket sanitation backlog in formal townships was estimated at 252 254 buckets in 2005 (DWAF, 2006 cited by Mjoli, 2012). Several programmes have been put in place over years to support the eradication of the bucket system. One such programme was announced by the former President Mbeki, in his state of the nation address of February 2006; he set a target for the eradication of all pre-1994 sanitation buckets from the formal townships by December 2007 (*ibid.*). The recent general household survey (2012) indicates a steady decline in percentage of households that have no toilet facility or were using a bucket toilet per province from 2002 to 2012. Nationally, there has been a decrease from 12.3% (2002) to 5.3% (2012), whereas in the Western Cape the decrease was 5.8% (2002) to 3.2% (2012) (*ibid.*).

1.8.4 Perception

Perception is defined as the representation of what is perceived or the basic component in the formation of a concept (Wordweb, n.d.). Alternatively, the word perception can be described by saying it is the organisation, identification, and interpretation of sensory information in order to represent and understand the environment (Wikipedia, 2013). Matsebe (2011) cited Drangert (2004) saying that perceptions are common across societies and are further modified by cultural beliefs and practices, economy, urban/rural population pattern and gender, which in turn influence, guide, motivate or demotivate behaviour and determine the future success of technologies and/or products (Duncker, et al., 2007 cited by Matsebe, 2011).

1.9 RESEARCH DESIGN

The basis of this research is phenomenological; therefore a qualitative approach is used as it deals with the perceptions and lived reality of people within a social setting. The research tool used is a semi-structured interview, the results of which are analysed using content analysis. This is considered the most appropriate analysis tool in qualitative research as it allows for the words and phrases of the research participants to be documented and the critical and important concerns in data to be found.

1.10 CHAPTER DIVISION

- Chapter 1 contains an introduction to the investigation, the problem statement (and possible sub-problems), the aim (and possible auxiliary objectives) of the investigation, a description of the methods of investigation, and the value of the investigation.
- Chapter 2 provides a literature review of alternative sanitation systems; the acceptance of alternative sanitation systems; and the challenges faced by communities in accepting this technology.
- Chapter 3 provides a detailed case study of Jim Se Bos to provide the context for the empirical research.
- In Chapter 4 the research design is described. Here the methods are explained in detail with regard to the particular research so that the reader knows exactly how the research has been undertaken as well as how the findings were arrived at.
- Chapter 5 provides the results and an analysis and discussion of the results.
- Chapter 6 serves as a synthesis of the results as well as conclusions with reference to the problem and aims of the study, proving that they have been honoured. Finally, well-argued recommendations for the future are provided.

1.11 CHAPTER SUMMARY

The aim and purpose of this chapter is to summarise the key elements to be introduced within the research report and to further describe in detail the perceptions of the alternative sewerage system. The research report will elaborate the background to the study, the merits thereof and the benefits it may have to implementation in other informal settlement settings. Acceptance of a sanitation technology in South Africa has proven to be very challenging, not just from a technical and operational view, but rather from how the communities have related to the sanitation technology from a socio-cultural perception in accepting a new technology.

In summary, the porta potty is an innovative sanitation technology which may provide communities a more dignified and safer sanitation alternative. Therefore, the study will aim to understand the perceptions of the users of PPS toilets in Jim Se Bos informal settlement.

The next chapter presents an in-depth literature review of sanitation in informal settlements.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The aim of this chapter is to review the book of knowledge in terms of the following areas:

- alternative sanitation systems;
- the acceptance of alternative sanitation systems; and
- challenges faced by communities i.e. understanding their vulnerabilities, cultural aspects, effects on their dignity and environmental, health & hygiene training.

Other key elements include alternative sanitation successes and failures in an informal setting and the operation and maintenance. The focus of this research study is the socio-cultural aspects of the porta potty toilet. Furthermore, emphasis is placed on understanding the individual's value system and what the societal norms are in countries with vast disparities in socio-economic status and the effects of varying ethnic backgrounds, including gender conditions. In addition, the research study will aim at exploring and understanding the perceptions and the usefulness of a given intervention (sanitation technology) on a particular community.

Due to the nature of the research being largely exploratory, a hypothesis cannot be defined. It is, however, assumed that findings will help to understand how these communities perceive the sanitation technology in relation to the meaning of vulnerability, dignity and cultural acceptance. Understanding the effects of the porta potty on the Jim Se Bos informal settlement will provide a foundation for the possible implementation of the technology in other settlements, as well as highlighting the benefits and opportunities related to sanitation technology.

2.2 A BRIEF HISTORY OF SANITATION

2.2.1 Sanitation in Ancient Times

The construction of sewers, pipelines and sewer systems from buildings, structures or large scale cities has been developed over many years and had its roots dating back almost year 800 BCE - 300 CE Rome (Hutchinson, n.d.). According to Sewer History (n.d.), the early roots of sanitary sewers dates back to the year 800 and 735 BCE where the first sewer was constructed. In addition, the Romans were the first to place latrines in public baths and rooms; these latrines were referred to as "rooms of easement" (*ibid.*). The structures were typically elongated rectangular platforms with several adjacent seats and either separated or partitioned for privacy. These sewer systems were positioned in such a manner so that the water from the public baths, or brush water[2] from the aqueduct system, flowed continuously in troughs beneath the latrine seats to the sewers beneath the city, and eventually to the Tiber River (*ibid.*) as illustrated in Figure 4.

Figure 4: Ruins of a public latrine from Roman era (1st Century CE) (Source: Cited by Sewer History (n.d.) Courtesy of Steve Harding, 1998, Ephessos, Turkey)

[2] Brush water refers to the ancient Romans using urine to brush their teeth.

Over many years certain countries designed and implemented their own sewer system which conformed to the socio-cultural setting. An example of this would be an era between the years 2000 - 500 BCE in Egypt and Palestine (*ibid.*). In these settings many religious ceremonies included bathing and therefore complex water structures were built. Whereas in Egypt, the opulent communities who were more wealthy had toilets which used beds of sand to catch and contain the waste. It was the responsibility of the servants to clean the sand regularly (*ibid.*). Another example is during the 4000 - 2500 BCE Eshnunna/Babylonia - Mesopotamian Empire (present-day Iraq). That era saw the introduction of stormwater drain systems in the streets, while in Babylon, in some of the larger homes, people squatted over an opening in the floor of a small interior room (*ibid.*). The wastes fell through the opening into a perforated cesspool located under the house (*ibid.*). Figure 5 below illustrates some of the early plumbing mechanisms that were used in Babylon.

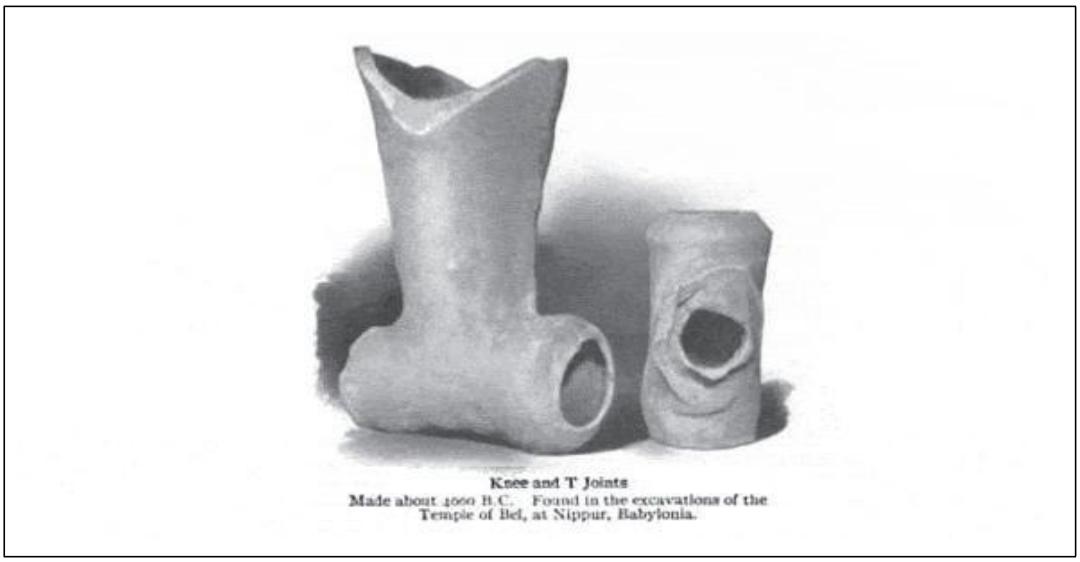


Figure 5: Knee and T joints, Babylonia

(Source: Cited by Sewer History (n.d.) Cast Iron Pipe, by United States Cast Iron Pipe & Foundry Company, 1914)

The sewer systems established during these ancient Roman and Babylonian civilizations reached their life span and became dilapidated and eventually crumbled. Other remnants of sewer systems from 3200 BCE

were found in the Orkney Islands of Scotland where excavations showing traces of early drainage systems. During this period the first lavatory-like plumbing systems were fitted into recesses in the walls of homes (*ibid*.).

Hutchinson (n.d.) indicates that after 2,000 years, all of the mechanisms and devices used for controlling sewage had crumbled, and the world had no idea how to properly dispose of human faeces. It is during this middle age period that cities became polluted and health and environmental pollution increased as many individuals would simply dump their buckets/chambers of waste into their backyards and streets (*ibid*.)

2.2.2 Sanitation in South Africa

The history of sanitation in South Africa dates back to pre-1994, where the Republic of South Africa was divided into eleven different "homeland" administrative and political areas, the four independent TBVC states, six self-governing territories and the dominant Republic of South Africa territory, governed by the tri-cameral parliament (DWAF, 2002). In addition, within the ten homelands were a number of rural areas that were managed by tribal authorities (*ibid*.). With the method of service delivery strategy, guidelines or support structures to implement and provide services being fragmented and uncohesive, the delivery of sanitation systems within these areas was limited. The methods adopted by the apartheid government were characterised by a lack of consultation with the communities and poorly designed sewer systems that resulted in those who had inadequate sanitation being forced to continue using the bucket system, rudimentary pit toilets or the veld (*ibid*.). It is estimated that in the early 1990s, about 21 million people did not have access to a basic level of sanitation, which is defined as a ventilated improved pit-latrine or equivalent. This stark reality still acts itself out today in South Africa (DWAF, 2001b).

As mentioned earlier, for many years poor South Africans have been plagued with the provision of inadequate sanitation systems. Even today, 20 years after democracy the lack of provision of a dignified sanitation

system is still prevalent and is clearly articulated in the StatSA's general household report (StatsSA, 2013) which indicates that in 2002 approximately 12.3% of percentage of households per province have had no access to any toilet facilities or were still using bucket toilets. This statistic has improved slightly over the last 10 years to 7.1%, a decline of 5.2%. What this means is that approximately 2.75 million[3] South Africans are either without access to any toilet facilities or are still using bucket toilets. This staggering number can be attributed to the substantial growth in the South Africa urban population and the migration of individuals from a rural to urban setting. The urbanisation around major cities has resulted in the proliferation and mushrooming of informal settlements (shantytowns) on the periphery of these cities (Ashipala & Armitage, 2011). In most cases these settlements are positioned on poorly located land that has a lack of urban drainage and ultimately results in extremely polluted environments which add to the disease burden of the poor people who reside in these communities (*ibid.*).

2.3 ACCEPTANCE OF ALTERNATIVE SANITATION SYSTEMS

Matsebe (2011: 19) refers to acceptance as an "act of accepting, receiving what is offered, with approbation, satisfaction or acquiescence, especially, favourable reception, approval, as the acceptance of a gift, office, doctrine, etc" (Websters Dictionary, n.d.). Other interpretations of acceptance can be seen as the action of consenting to receive or undertake something offered (Oxford dictionaries, n.d.). When providing a community an alternative sanitation system which they are not familiar with or accustomed to, engagement needs to be completed in a manner that takes into account all social considerations. It is therefore key to have the communities accept and consent to the alternative sanitation system. Key to communities embracing and accepting an alternative sanitation system is adequate consultation. Far too many times alternative sanitation systems have been forced onto communities with little or no consultation.

[3] For 2013, Statistics South Africa (StatsSA) estimates the mid-year population as 52,98 million

Ashipala and Armitage (2011) indicate that where agencies have introduced or implemented alternative sanitation systems to recipient communities it has been often been found to be inadequate. Community involvement is generally limited and communities may be represented by identified community leaders who do not necessarily represent the viewpoints of the residents as a whole (*ibid.*). Therefore to have communities accept an alternative sanitation system, the levels of community involvement required for the successful implementation would require more extensive and inclusive social processes to be undertaken (*ibid.*).

To successfully launch an alternative sanitation system, it is important to have input by the communities through a consultative process. During this interaction all of the elements such as cultural norms and customs can be explored. Using the Brazilian example of participation in developing a law for their National Basic Sanitation Plan, approximately 320 000 citizens were consulted and 3 457 conferences were engaged (UN-HABITAT, 2008:9). After engaging and consultation, all accepted the sanitation plan including an inter-ministerial working group which redacted the final law based on the Conference's proposals, and it was approved by the Council of the Cities, and finally accepted by the representative body of the conferences system (*ibid.*). This is an example of how a process of public participation, involving civil society organisations, government agencies and experts can work successfully (*ibid.*).

2.4 CHALLENGES FACED BY COMMUNITIES

2.4.1 Understanding Community Vulnerabilities

Vulnerability refers to the "inability to withstand the effects of a hostile environment or being susceptible to physical or emotional injury" (The Free Dictionary, n. d.). Communities living within informal settlements are confronted with many sanitation systems that expose them to vulnerable situations. An example of this is when community members, especially women fall prey to abuse and violent crimes when using sanitation systems

located in remote positions within the informal settlements. Many have no choice but to walk several metres from their houses to chemical toilets or VIPs.

The provision of the porta potty toilet, however, has resulted in reducing the vulnerabilities experienced by the communities. The porta potty toilets allow the residents to use their sanitation system within their houses and therefore avoids the risk of leaving their houses late at night to relieve themselves.

Evans (2007) categorises these vulnerabilities by stating that internationally communities face constraints on self-provisioning (stand-alone retail services) in the absence of bulk infrastructure. What this means is that most informal settlements are poorly located, within trapped low spots (lack of drainage) and therefore cannot connect to bulk sewer infrastructure. Evans (2007) concurs with these facts as many international poor communities live in areas which are technically difficult to serve – often prone to flooding or on steep hillsides. The reality is that structural constraints often disrupt the delivery of appropriate services in the short to medium-term (*ibid.*).

In the Jim Se Bos scenario the City of Cape Town has bulk sewer infrastructure in close proximity to site. However, the land, which is illegally occupied by the community, is owned privately. Generally, when trying to connect to these bulk sewer pipelines it becomes a detailed operation which comes at a high cost to dispose of the effluent appropriately; and economies of scale limit the potential for stand-alone initiatives from within the urban community except in some exceptional circumstances (Evans, 2007).

Other vulnerabilities encountered relate to the legal and land use status of the informal settlement. This results in many communities not being provided sufficient legal capacity and barriers to access including lack of tenure, failure or inability to meet building regulation requirements, and residence in areas which are ‘zoned’ for alternative land uses (*ibid.*). Lack of tenure is a common vulnerability that communities within the South African context encounter that ultimately results in the lack of service

delivery. It is understood, that many of these constraints are not as severe as they often appear to be – but can nevertheless be used by authorities who are unwilling or unable to provide services as a justification for inaction (*ibid.*).

2.4.2 Socio-Cultural Aspects relating to Sanitation

The WHO (n. d.) has a programme, namely, the Water Sanitation and Health which focuses on controlling sanitation problems at source. Within South Africa there are many cultures, internationally the same. It is on this basis that WHO recognises that people have evolved in different ways of thinking and behaving about waste: this affects behaviour and also affects the way messages about health effects or sensible re-use will be received. As an example, society has developed very different sociocultural responses to the use of untreated excreta. Many feel that the use of faeces is disgusting while others feel that it is important to use. Cultural differences play an important role. Even where the use provides a vital role for survival, these cultural differences apply to many water poor countries, as well as to water rich areas of the north. For example, in Africa, the Americas and Europe, excreta use is generally regarded as culturally unacceptable, or at best with indifference. Where these practices are applied i.e. where products are fertilized with raw excreta, it will be regarded as tainted or defiled in some way. The WHO explains that in contrast, both human and animal wastes have been used as fertilizers in agriculture and aquaculture in, for example, China, Japan, and Indonesia for thousands of years. Furthermore the WHO states that some countries such as China, India and Japan have used wastewater and excreta for irrigation for over 100 years. In China over 1.3 million hectares are irrigated with wastewater.

Connecting this discourse to that of the Jim Se Bos informal settlement, it is important to note that although the communities are not forced to use the faeces within the site, where necessity prevails as shown in the China example mentioned above, socio-cultural beliefs can be challenged. All South Africans desire a full flush waterborne toilet system, but financially

and based on tenure vulnerabilities, communities are forced to accept a sanitation arrangement that may not fully meet their requirements.

If one considers the Sub-Saharan Africa conditions, the statistics indicated that in 2006, 28 percent of the population of Sub-Saharan Africa (or 221 million people) practised open defecation (WaterAid, 2009). The report goes further where it discusses the socio-cultural barriers and triggers to total sanitation in West Africa indicating that significant proportions of the population lack access to improved sanitation, and many rural communities practice open defecation (*ibid.*).

To conclude on the effects of culture when selecting a sanitation system, it can be stated that culture is the particular knowledge, beliefs, and understanding of art, law, morals, customs, and other skills and habits that a person acquires as a member of a given society (WHO, n. d.). Furthermore, beyond their individual differences, WHO (n. d.) found that communities or a society have particular ways of thinking and behaving, and will react to situations in similar ways. In summary, culture can be defined as an instrument; a tool by which we assign meaning to the reality around us and to the events that happen to us and therefore the constant building of meaning involves repetition and renewal (LeBrón, 2013). Finally, the WHO report indicates that because of these processes of repetition and renewal, societal attitudes are not unchangeable and communities can choose to give up harmful practices, although there is a need to accept that this process may take some time.

2.3.3 Understanding the Right to Dignified Sanitation

The International Covenant on Economic, Social and Cultural Rights (ICESCR) adopted and opened for signature, ratification and accession by General Assembly resolution 2200A (XXI) of 16 December 1966 recognises in Article 11 “the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing and to the continuous improvement of living conditions”. In addition to this, the

ICESCR (United Nations [UN], 1976) indicates that the State Parties to the present Covenant, have considered in accordance with the principles proclaimed in the Charter of the United Nations the following:

- recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world,
- Recognizing that these rights derive from the inherent dignity of the human person,
- Recognizing that, in accordance with the Universal Declaration of Human Rights, the ideal of free human beings enjoying freedom from fear and want can only be achieved if conditions are created whereby everyone may enjoy his economic, social and cultural rights, as well as his civil and political rights.'

The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) section 27(1) (b) indicates that "everyone has the right to have access to sufficient food and water". The SAHRC (2014) highlights the point that this obligation is extended in section 27 (2), according to which "the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realization of these rights". The right to sufficient water and sanitation is an enabling right for the enjoyment of other rights such as health, education and safety. The DWAF (2012) report provides further insight into the current legislation, policies and strategies for provision of sanitation services. The report states that while the right to access to adequate sanitation is not specifically provided for in the Constitution of the Republic of South Africa, 1996, there are a number of clauses which directly or indirectly imply the right to basic sanitation. The White Paper on Basic Household Sanitation (2001: 11) acknowledges that "Government has an obligation to create an enabling environment through which all South Africans can gain access to basic sanitation services". Important to note is that the Water Services Act 108 of 1997 (South Africa,

1997) which can be defined as the primary legislation relating to water and sanitation in South Africa – also refers to a “right to basic sanitation”.

Other specific legislation such as the Regulations Relating to Compulsory National Standards and Measures to Conserve Water (2001) (Compulsory National Standards) published to give effect to section 9 of the Water Services Act, provides minimum standards for basic sanitation. Evaluating all of the legislation, one can determine that there is however confusion at municipal level regarding the interpretation of “access” to basic sanitation services, and current sanitation policy does not provide sufficient guidance on the interpretation of this principle.

In essence, the discourse highlighted throughout this sections above, indicates that all communities have an inherent right to dignified sanitation. This debate is not just reinforced internationally, but also within the South African context. Although many South Africans have been oppressed by the past atrocities of apartheid, the legacy of inadequate sanitation still remains vivid as many communities still suffer the fate of not having a decent and dignified sanitation system. The implementation of the porta potty toilet may have brought about an alternative sanitation system that could provide communities with an acceptable level of privacy, dignity and security (see Figure 6).

Figure 6: Photo highlighting the porta potty toilet within the informal structure

(Source: Mail & Guardian, 2013)

In 2007 DWAF commissioned the CSIR, to conduct an audit of water and sanitation projects (DWAF, 2012). A review was completed where the CSIR drew on 2 410 projects in the MIG (Municipal Infrastructure Grant) database which were then listed as having moved past the planning phase (ibid.). The findings of the report highlighted that that of the 2 410, only 41% had actually been completed (*ibid*.). Other pertinent findings by the audit were as follows:

- Up to 25% of on-site toilets were inadequately designed for ventilation.
- Up to 68% of on-site top structures were constructed in a way that they cannot be moved when the pits are full.
- A number of facilities were found to have problems with the toilet doors (10% did not close, and 18% had no latch on the inside).
- 28% had poorly designed or built toilet vent pipes.
- Some flush toilets were found without cisterns (23%) or pedestals (18%).
- 61% had no hand-washing facility near the toilet.

- On 60% of the facilities, municipalities were only doing reactive maintenance.
- 40% of municipalities were seen as not having adequate maintenance capacity.

In summary, the provision of a private, dignified and secured sanitation (as shown in the photograph of the bedroom in Figure 7) is possible within the South African landscape but it requires innovation and urgent service delivery in all accepted technologies.

Figure 7: Photo of the porta potty toilet in the bedroom of the informal structure

(Source: Author, 2014)

2.4.4 Environmental, Health and Hygiene Training for the Porta Potty Toilet

The importance of health, hygiene and environmental safety is critical when providing a sanitation technology. In addition, all of the respective users must have had specific training relating to the sanitation technology. When providing a sanitation technology to an informal settlement, one needs to consider the appropriateness thereof:

- is it accessible to a household?
- does it have a sustainable operation and maintenance requirements? and
- does it allow for the safe removal of waste and waste water from the premises?

Other elements which are important relate to the communication between the service authority and the distribution of correspondence of sanitation, hygiene and related practices (to users) (DWAF, 2012).

The DWAF report indicates that Regulation 2 of the Compulsory National Standards states that the minimum standard for basic sanitation services are:

- the provision of appropriate education; and
- a toilet which is safe, reliable, environmentally sound, easy to keep clean, provides privacy and protection against the weather, well ventilated, keeps smells to a minimum and prevents the entry and exit of flies and other disease carrying pests.

Key to all these standards is the requirement for privacy, safety, health (barriers to disease transmission) and structural soundness. From a norms and standards point of view, South Africa therefore compares positively with international practice and underscores the point that the country views access to acceptable sanitation services as fundamentally a human rights issue.

The WHO (2011) has reported on the significant benefits (social, environmental and economic) of improved sanitation as follows:

- Improved sanitation reduces diarrhoea death rates by a third;
- Improved school sanitation encourages children, particularly girls, to stay in school;
- Improved sanitation has significant economic benefits – every $1 invested in improved sanitation translates into a return of $9;

- In Africa, 115 people die every hour from diseases linked to poor sanitation, poor hygiene and contaminated water; and
- Hygiene education and promotion of hand washing are simple, cost-effective measures that can reduce diarrhoea cases by up to 45% (DWAF, 2012).

The launch of the porta potty toilets in Jim Se Bos took place early in 2013, and community members were invited by means of correspondence and by representatives of the municipality. The correspondence would typically state “[t]he City of Cape Town is offering families in Informal Settlements an opportunity to sign up and receive a FREE Portable Flush Toilet for use inside their house, providing them with:

- Their own toilet system per family;
- In the comfort of their own house;
- Safe and protected environment;
- Hygienic, spill proof system flushing with water; and
- Regular cleaning service – collect and return – provided by contracted services from their community.

You are required to provide your ID, no of people per household and dwelling number to register to receive your Portable Flush Toilet” (City of Cape Town, n. d.).

All of the community members registered for the porta potty toilets, were then provided with training on the technology. This training would typically cover the following aspects:

- What is the portable flush toilet?

A portable flush toilet is mobile portable flushing toilet comprising of two tanks, an upper half storing clean water for flushing and lower half for holding the waste. The lower half can easily and safely be removed for cleaning purposes.

- How does the system work?

The toilet consists of two tanks that can be detached from each other. The user is issued with a toilet and an extra lower tank. The upper tank is the toilet bowl and is filled with water while the lower tank is the waste collection tank which is sealed to prevent spillage. Once the toilet is flushed, the user is not in contact with any waste. A demonstration and further operating details will be provided.

- Caring for the portable flush toilet

The toilet should be cleaned with a household detergent or chemical and soft toilet brush. Foreign objects such as newspaper, old clothing and off cut material, sanitary towels, ear buds, cigarette buds, rubble, or any other material should not be flushed because this may cause blockages. Therefore only toilet paper should be used, and family members should be educated on good toilet habits.

2.5 ALTERNATIVE SANITATION SUCCESSES AND FAILURES WITHIN INFORMAL SETTLEMENTS

Many sanitation technologies have been implemented and tested within various informal settlement settings in South Africa. The main reasons for introducing such systems can be attributed to the constrained locations, topography of the sites and ground conditions. The implementation or testing of these alternative sanitation systems has resulted in both successes and failures. A short description of each of these options with examples of their applications in South Africa has been documented by Ashipala and Armitage (2011).

2.5.1 Simplified Sewerage

Simplified sewerage was considered and became famous in the 1980s as a method of providing water-borne sanitation at a reduced cost in Brazil's high density peri-urban areas (*ibid.*). The sanitation system was implemented throughout Latin America, Pakistan and India (Bakalian, *et al*.,

1994; Mara, 2006 cited by Ashipala and Armitage, 2011). However, after refinement simplified sewerage was introduced, which operates in essentially the same way as conventional gravity sewerage (*ibid.*). In essence, the system is considered a far more efficient design compared to the generally conservative design standards enforced for conventional gravity sewers, and therefore makes use of modified sewer network layouts, reduced minimum pipe cover depths, shallow access structures and sewer self-cleansing design criteria based on the attainment of a minimum tractive tension (Mara, *et al*., 2001 cited by Ashipala and Armitage, 2011).

The implementation of this sanitation system is used widely internationally, especially in high density peri-urban areas. However, implementation of this sanitation system has not been popular in the South African context compared to other countries.

2.5.2 Settled Sewerage

Settled sewerage is a sanitation system where an interceptor (septic) tank is used to remove the bulk of the solid material thereby allowing for more flexible design of the subsequent conveyance system (Ashipala and Armitage, 2011). This reduction in solids allows for far smaller conduits to be laid. Settled sewerage has by far seen the widest application in South Africa; an example of this would be the Lusaka II (Krugersdorp) (*ibid.*). There are several classifications for settled sewerage,

- either it is has a Septic Tank Effluent Drainage (STED) systems; or
- there is Septic Tank Effluent Pumping (STEP) system in place (*ibid.*).

The key difference between the two systems is the method by which the settled effluent is transported to the treatment facility (*ibid.*).

2.5.3 Vacuum Sewerage

Vacuum sewer systems use the differential pressure between atmospheric pressure and a partial vacuum maintained in the piping network and vacuum station collection vessel. The sanitation is extremely smart, as it uses

differential pressure to allow a central vacuum station to collect the wastewater of several thousand individual homes, depending on terrain and the local situation. Vacuum sewers take advantage of available natural slope in the terrain and are most economical in flat sandy soils with high ground water.

History shows us that the first vacuum sewers were installed in Europe in 1882 but until the last 30 years, it had been relegated to a niche market. The first person to apply the negative pressure drainage (so called vacuum sewerage) was the Dutch engineer Charles Liernur in the second half of the 19th century (Sewer History, n. d.). For a long time, it was only used on ships, trains and aeroplanes.

In South Africa, the first installation of Vacuum Sewerage in a South African informal settlement was commissioned in March 2009 in Kosovo, Cape Town (Ashipala & Armitage, 2011). The project has been faced with many challenges that have, to date, resulted in the vacuum sewer system not being fully operational (*ibid.*)

The focus of this research study however, will be focusing on a new sanitation system, namely, the porta potty toilet to review its acceptance, success and failure.

2.5. OPERATION AND MAINTENANCE

Operation and maintenance of sanitation systems is critical for health and hygiene within an informal setting. At the Jim Se Bos informal settlement the porta potty toilets holding tanks are collected on Tuesdays, Thursdays and Saturdays. Every morning each household places its tank at the front of the door, and the local individual service provider collects the holding tanks and moves them to the central location point as shown on Figure 8.

It is at this point when the local contractor will collect the waste holding tanks and take them to the waste water treatment works in Borcherds Quarry, Cape Town

Figure 8: Photo of the collection point for the porta potty toilet holding tanks

(Source: Author, 2014)

The tanks are emptied and cleaned using a high pressure hose. At the end of the day, all of the tanks are returned to a central location and redistributed to the respective households. Where servicing and replacement is required, the local contractor will evaluate and provide a new porta potty toilet where applicable.

The lack of Operational & Maintenance Services of the porta potty toilets within informal settlements can be attributed to institutional constraints. An example of this where the municipality has capacity and does not follow through on their responsibilities to service issues relating to water and sanitation. What also manifests itself is the lack of management of the contractor or agent fulfilling the responsibilities of O&M within a settlement. Contractors are not held responsible for the lack of O&M and therefore on this basis it perpetuates the lack of service delivery. Ashipala and Armitage (2011) say that the need for a holistic approach to service delivery is

particularly pertinent in informal settlements as the neglect of a single aspect can result in widespread failures which, due to the already deprived living conditions, have immediate and significant effects on the lives of residents.

2.6 CHAPTER SUMMARY

The discourse explored in this chapter, confirms that for an alternative sanitation system to be accepted and adopted, the community's socio-cultural aspects need to be respected, the sanitation system needs to promote health, privacy, dignity and reduce vulnerability by providing security. The porta potty toilets need to be accepted by the communities and they need to consent to the alternative sanitation system. Participation is vital, as the success of any sanitation system relies on the communities to embrace and accept an alternative sanitation system. Furthermore, to provide an alternative sanitation system, an understanding of the community's vulnerabilities must be recognised so that an environmentally safe, hygienic, sustainable and feasible sanitation system is provided.

The literature review further highlights that cultural differences play an important role when providing an alternative sanitation technology. The effects of culture when selecting a sanitation system are important as beliefs, and understanding of art, law, morals, customs, and other skills and habits can be affected by the system supplied. What has been confirmed throughout the debate is that culture can be defined as an instrument; a tool by which we assign meaning to the reality around us and to the events that happen to us and therefore the constant building of meaning involves repetition and renewal. It is therefore important to understand the socio-cultural dynamics of the settlement where a particular sanitation system will be rolled out, as failure to demonstrate this understanding can either make or break a project.

The next chapter presents the research design that was used in this study.

CHAPTER 3: RESEARCH METHODS FOR THE PORTA POTTY STUDY

3.1 INTRODUCTION

During the submission of the research proposal, consideration was given to use applied research as it presents a technique which will deliver the best results for the research topic. Applied research as described by Sarantakos (2005) focuses on application; in other words, it addresses real life situations. Although applied research has many forms, Pfeifer (2000, cited in Sarantakos, 2005) states that the most commonly practised are epidemiological, feasibility and evaluation research. After closer review, consideration was given to use qualitative research.

Bhattacherjee (2012: 104) defines qualitative research as “a systematic mode of inquiry into complex social structures, interactions, or processes by employing observational, interpretive, and naturalistic approaches”. It is clear from this definition that qualitative research method focuses primarily on explanation and description rather than measurement (Matsebe, 2011). Qualitative research can be used to help us understand peoples’ experience and their feelings and can establish the reasons why they feel as they do (Joubish, *et al*., 2011)

3.1.1 Reasons for Choosing the Qualitative Approach

Matsebe (2011) cites Marlow and Boone (2005), stating that qualitative approach involves collecting data that involve non-numerical examination of phenomena, using words instead of numbers. This is key to understanding as it seeks to understand at a deeper level what the underlying issues are, and how it relates to social reality. Bhattacherjee (2012) indicates that this method of examination has its roots in a variety of disciplines, such as anthropology, sociology, psychology, linguistics, and semiotics, and has historically been available longer (some as early as the 19th century) than quantitative techniques.

With all types of research there are arguments for and against qualitative

research. Each school of thought generally reviews the strengths and weaknesses of the research method adopted. An example of this would be the distinction between qualitative and quantitative research. Qualitative research is distinct from quantitative research in a paradigmatic sense and in a data-oriented sense (Bhattacherjee, 2012). Bhattacherjee (2012) indicates further that that qualitative research relies mostly on non-numeric data, in contrast to numeric data for quantitative research and therefore qualitative research is not amenable to statistical procedures such as computation of means or regression coefficients. Other specific elements that distinguish between the two research methods are that qualitative interpretations tend to focus on language, signs, and meanings, from the perspective of the actors involved in the social phenomenon, in contrast to statistical techniques that are employed in quantitative research (*ibid.*).

3.1.2 Strengths and Weaknesses of the Qualitative Approach

As mentioned earlier, there are strengths and weaknesses in all research methods. From a qualitative perspective, one such weakness is that the findings might be biased. Johnson and Onwuegbuzie (2004) as cited by Matsebe (2011: 118) concur that the findings might be more easily influenced by the researcher's personal biases. In the light of my study, I am confident that the research method chosen will meet the deliverables set out for this study and that personal biases will be avoided as the researcher will focus purely on the findings and comments provided by the respondents and apply the necessary care and duty to provide a fair and unbiased opinion. The research procedure has therefore been developed to achieve objectivity, independence and to also to be replicated by other researchers.

To gain a detailed perspective of the natural setting, qualitative researchers often collect data in the field at the site where participants experience the issue or problem under study (Sage, n. d.). Furthermore, qualitative research avoids bringing individuals into a laboratory (a contrived situation), nor does it seeks to typically send out instruments for individuals to

complete, such as in survey research (*ibid.*). Instead, qualitative researchers seek to work closely with the research participants by either gathering up-close information by actually talking directly to people and seeing them behave and act within their context (*ibid.*).

3.2 RESEARCH DESIGN

For this study several research designs were explored, namely, pragmatic, ethnographic, grounded theory, philosophical, critical social, ethical inquiry, foundational, historical and phenomenological theory. The research design method selected for this study was phenomenological theory. Campell (2011) defines phenomenological theory as follows, “phenomenology begins with an experience or condition and, through the narration of participants, of either a shared single incident or shared condition, investigates the effects and perceptions of that experience”. Welman, *et al.* (2005) as cited by Matsebe (2011) refers to phenomenological research design as being concerned with trying to understand social and psychological phenomena from the perspective of the people involved. It is therefore important for the researcher to experience and understand the natural setting.

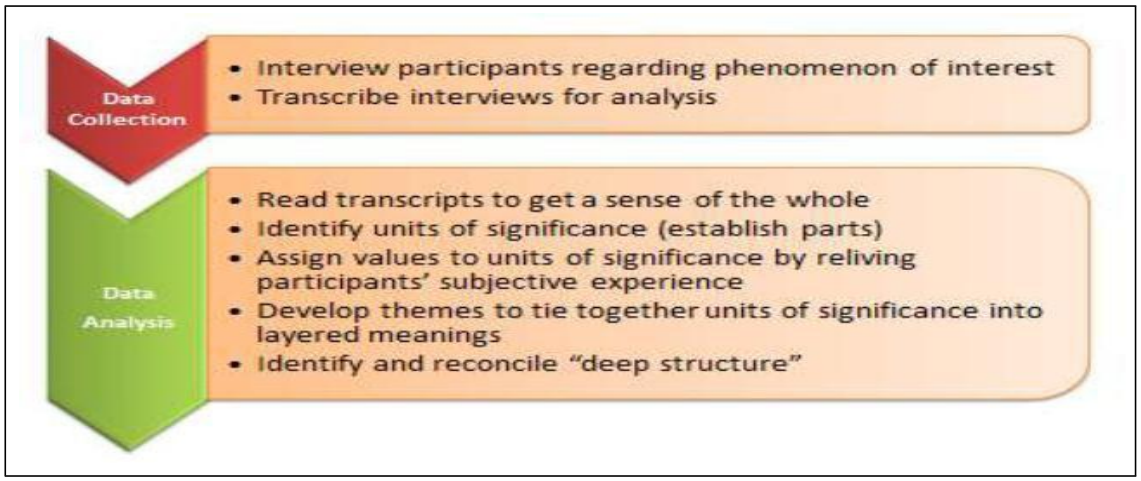


Figure 9: Diagram illustrating the existential phenomenological research method

(Bhattacherjee, 2012: 112)

Figure 9 highlights the use of phenomenological research method and the shows that the researcher needs to understand the phenomenon of interest. This research method emphasises “the study of conscious experiences as a way of understanding the reality around us” (Bhattacherjee, 2012: 112). The research design selected will therefore focus on examining the status quo, to understand the phenomena and the community’s experience. Consideration will be given to try and ascertain the decision process undertaken by the community, their perceptions, adaptation to a technology and furthermore understand their viewpoint. In essence, the research design will interrogate at a deeper level what the sanitation system means to the respondents and the effective it has on their lifestyle and social realm.

Using this approach, the researcher undertook field research on the porta potty toilets within the study area in order to eliminate any prior assumptions and personal biases, to be empathetic towards the participant’s situation, and to understand the existing situation in detail.

3.3 POPULATION AND SAMPLING PROCEDURES

The population for this research comprised all residents of Jim Se Bos informal settlement.

At the onset of the research study, the researcher intended selecting 30 households within the informal settlement to survey. For the selection process, the researcher used a combination of mapping and a computerised random number generator. To achieve this, the researcher mapped and created a sampling frame of all the households within the settlement giving each household a unique number or code. The numbers were entered into an Excel spreadsheet where Excel’s Rand() function was used to generate random numbers for the households to be surveyed (Bhattacherjee, 2012). The numbers generated from this sampling exercise would have been used to complete the survey. In other words, only households that fitted the criteria and had access to the new sanitation technology would be included in the survey. This plan, however, failed to materialise, due to political

sensitivity and emotiveness of sanitation provision within the informal settlements across the Western Cape. The sampling approach had to be adapted to meet the on-site situation. It is on this basis that convenience sampling was used. In other words, a flexible and pragmatic approach was adopted.

Bhattacherjee (2012: 69) describes convenience sampling as accidental or opportunity sampling, which is a technique in which a sample is drawn from that part of the population that is close to hand, readily available, or convenient. An example of this would be a scenario if one stood outside a shopping centre and handed out questionnaire surveys to people or interviewed them as they walk in. In such a situation, the sample of respondents would be a convenience sample (*ibid.*). This however would be a non-probability sample because all people who shop at other shopping centres would automatically be excluded (*ibid.*). Just so, in researching the Jim Se Bos community, the opinions obtained from the chosen sample would in all likelihood reflect the unique characteristics of that community as opposed to other communities (e.g. in an affluent suburb or another city) and therefore may not be representative of the opinions of the population of informal settlements at large. Therefore, the generalisability of such observations would be very limited.

Marshal (1996) indicates that convenience sampling is the least rigorous technique, involving the selection of the most accessible subjects. He goes further by stating that it is the least costly to the researcher, in terms of time, effort and money, but may result in poor quality data and lack intellectual credibility. To counter this impediment, the researcher intended to receive assistance from the municipality to identify participants who have a diverse set of experiences of sanitation systems.

In this research study, the researcher completed the survey using face-to-face interviews, also called an in-person interview. This form of interview is probably the most popular and oldest form of survey data collection (Sage, 2013). Furthermore it is recognised to be the best form of data collection

when one wants to minimise nonresponse and maximise the quality of the data collected. While face-to-face interviews have a number of challenges as it is difficult to solicit information in studies dealing with sensitive issues, the use of this type of interview has its advantages as the interviewer is present, which makes it easier for the respondent to either clarify answers or ask for clarification for some of the items on the questionnaire (*ibid*.). It was envisaged that each interview would not take longer than 30-45 minutes, with the questions being asked in a specific order and placed in logical groups (Eiselen & Uys, 2005). Emphasis was placed on treating the interview as a conversation and therefore a focus was placed on transitioning between the questions.

In this research study, a total of 20 community members were invited of which nine (9) respondents comprising of eight (8) residents of Jim Se Bos informal settlement and one employee of the municipality participated in the study. The researcher managed to interview seven (7) women and two (2) men out of 20 participants, who had been invited to take part in the study. A site plan (map) as shown in Appendix B was also used to indicate the approximate location of units in order to ensure an even spread of participants from various locations in Jim Se Bos informal settlement. With the entire informal settlement having being provided with a porta potty toilet, all of the residents within the settlements met the qualifying criteria for being selected. One employee of the municipality was also interviewed to understand the roll out of the porta potty system, maintenance and operational requirements, thus making it a total sample size of nine (9) participants.

3.4 RESEARCH TOOLS

The researcher used semi-structured interviews to collect data.

3.4.1 Semi-structured interviews

A questionnaire schedule was used as a basis for interviewing the participants within the survey area (see Appendix C). The main aim of the

structured questionnaire approach was to make sure that each interview followed a similar process and that exactly the same research questions were asked in the same order, but there was some flexibility if the researcher decided that additional clarification was needed. The questionnaire was designed to focus on the research question and its intended goals. A high level of focus was placed on the perceptions of the sanitation technology, how is it accepted from a social-cultural aspect, understanding the settlement vulnerabilities within the informal settlement and furthermore understanding how the technology operates and being maintained. The questionnaire was presented in the English language and translated into Afrikaans where applicable.

Matsebe (2011) indicates that the benefit of this type of interview is that informants have an opportunity to ask for clarity in the event of misunderstanding. Furthermore, the researcher has the opportunity to evaluate and validate the respondents' answers by observing non-verbal cues (such as avoidance of eye contact or nervousness), which are particularly useful when discussing sensitive topics (Gordon, 1975; Cargan, 2007) such as sanitation and human excreta. Another benefit of this type of interview is that it can "provide reliable and comparable qualitative data" (RWJF, 2008). Finally, semi-structured interviews are suitable tools to explore attitudes, values, beliefs and motives (Richardson, *et al*., 1965 and Smith 1975 cited in Matsebe, 2011: 44).

Interviews have several limitations, as they can be very costly in the amount of time required to prepare, schedule, conduct, input data and analyse. Nevertheless, interviews can produce a vast amount of data in a short space of time (Mahoney & Colleen, 1997). Mahoney & Colleen (1997) say that it is critical to have an analysis plan before the interviews are conducted in order to improve the data entry and analysis. Other elements that may also be limiting factors are the tone of voice, the way a question may be rephrased, voicing an opinion, inadequate note taking, and even the gender and appearance of the interviewer may lead to errors and bias.

3.5 DATA COLLECTION

After consulting the municipality, which oversees the implementation of the porta potty toilets within the Jim Se Bos informal settlement, permission was granted for the research to be carried out within the area. The City of Cape Town official was interviewed first, on the 20 September 2013 to understand the roll out of the porta potty toilet within the area, the success, failures and operational and maintenance procedures. Furthermore, the interview sought to understand the training process adopted by the City of Cape Town as well as the health and social acceptance of the sanitation system.

Thereafter, individual interviews were conducted with each participant to understand their perceptions of the sanitation technology provided to them. One of the difficulties encountered was that no males were interviewed, but this did not have a significant impact on the responses as most of the females interviewed were either the head of the household or living with other family members.

Field notes were taken during the course of the interviews and all responses were recorded as accurately as possible. Other data that related to the research area was also provided to the researcher by the municipal official. This data proved helpful as it gave it gave a detailed background to informal settlement.

3.6 DATA ANALYSIS

The data analysis approach used was qualitative content analysis. Zhang and Wildemuth (n. d.) explain that qualitative content analysis involves a process designed to condense raw data into categories or themes based on valid inference and interpretation. Furthermore, they state that this process uses inductive reasoning, by which themes and categories emerge from the data through the researcher's careful examination and constant comparison (*ibid.*).

Bhattacherjee (2012) indicates that content analysis is the systematic analysis of the content of a text (e.g., who says what, to whom, why, and to what extent and with what effect) in a quantitative or qualitative manner. This form of analysis provides the researcher an opportunity to identify particular subjects and themes pertinent to the study. Neuman (2003) as cited in Matsebe (2011) says that one of the advantages of content analysis is that it is non-reactive because the process of placing words, messages, or symbols in a text to communicate to a reader or receiver occurs without influence from the researcher who analyses its content.

In summary, the researcher found that content analysis was the most appropriate analysis tool as its principles allow the researcher to define the words and phrases documented and reflect the critical and important concerns in data collected.

3.7 ETHICAL CONSIDERATIONS

Due to the sensitivity of the research study the researcher undertook a study which was emotive in nature and therefore it was of paramount importance that the researcher conducted the research in a professional and in an ethical manner. This study was therefore completed using professional ethics and moral principles not just to protect the researcher's interest, but also the interests of the respondents.

Furthermore it was essential that adequate levels of confidentiality and transparency were preserved with regard to the individuals who agreed to participate in the research. The use of translators was planned to adapt the developed questionnaire into Afrikaans, but for the Jim Se Bos informal settlement there was no need to adapt the questionnaires nor to translate it as most of the respondents understood English. Bhattacherjee (2012) states that science has often been manipulated in unethical ways by people and organisations to advance their private agenda and ethics are therefore of paramount importance. Ethics are moral principles and rules aimed at protecting the interests of the respondents when conducting research

(Matsebe, 2011). When conducting my research I used and considered the following ethics:

- Anonymity and confidentiality

Participants were assured by the researcher that all the information documented and obtained during the interview process from them will be kept in strict confidence.

- Disclosure and informed consent

All of the participants consented to participate in the research by acknowledging and signing the form of consent and participant information sheet. The researcher clearly communicated the goals of the study, the reasons for and merits of the study. Finally, the researcher highlighted to the participants that all of the information would be kept confidential.

- No harm to the participants

Throughout the research study the researcher did not subject any of the participants to physical or psychological harm, nor any verbal abuse. They were also assured that even though they might criticise the porta potty system, that no negative consequences would be forthcoming.

- Voluntary participation

Participants were informed that their participation in the study was voluntary and that they had the right to withdraw from the study at any time. Participants were also not compelled to take part in the study.

3.8 LIMITATIONS OF THE STUDY

The following limitations of the study were observed:

- Some interviewees were unwilling to participate in the study - probably due to a lack of interest and/or sensitivity around the research study. No male participants were willing to be interviewed, resulting in females only being interviewed.

- Only one of the participants allowed the researcher permission to take photos of their house and where the porta potty is position in the house.
- Some of the participants were not available during the interview periods due to work or other commitments. This impacted negatively on the data collection schedule, resulting in far fewer interviews being conducted than planned.

3.9 CHAPTER SUMMARY

This chapter provided a detailed account of the research design and methodology of the research. I adopted a phenomenological, interpretivist approach, using a qualitative paradigm. Methods of data collection were examined and the methodology of semi-structured interviews was justified as the most appropriate methodology to use to achieve the objectives of the study. This chapter also discussed the processes used in the data gathering, and the data analysis approach of content analysis. Finally ethical measures taken in carrying out the research were highlighted.

The aforementioned research methods used to collect data were applied in the case study, as described in the following section.

CHAPTER 4: PORTA POTTY TECHNOLOGY WITHIN AN URBAN CONTEXT: THE CASE OF JIM SE BOS INFORMAL SETTLEMENT

4.1 INTRODUCTION

This chapter presents the data and results from the study. It also discusses the findings from this study in relation to existing research objectives supported by the questionnaire. First, the descriptive data will be presented and subsequently the data analysis relevant to each objective and survey questions will be presented and discussed. Finally, a short summary of the results will be provided.

The interview schedule aimed to address the objectives as stated in Chapter 1 as follows:

- To discuss/critique the nature of and rationale for implementing the PPS toilet technology;
- To determine the level of acceptance of the PPS toilets in Jim Se Bos, Phillipi by the users;
- To contribute to the extension (body) of knowledge on the perceptions of the users of the PPS toilets in an informal settlement context;
- To develop guiding principles for acceptance of the PPS toilets in other informal settlement projects, as informed by the analysis of the study;
- To provide comprehensive guidelines for future implementation of the PPS toilets in an informal settlement contexts, as informed by the analysis of the study; and
- To determine the operational and maintenance requirements of the PPS toilets in an informal settlement contexts, as informed by the analysis of the study.

This section will present an analysis of the data collected. The findings have been linked to the concepts discussed in the literature review in Chapter 3.

4.2 THE RESEARCH SITE

This section provides details and background information pertaining to the project site, Jim Se Bos.

Jim Se Bos is an informal settlement located within the Philippi Horticultural Area. The informal settlement is located approximately 20 kilometres south-east of the Cape Town CBD (see Appendix B). Surrounding the settlement are a number of farming areas, manufacturing companies and residential houses. To the south of the site approximately 5 km away, the False Bay coast line is located. More recently the City of Cape Town has embarked on a new housing project, namely the Pelican Park development in the Zeekoevlei area, which will be located 2 km west of the informal settlement (City of Cape Town, 2011).

4.2.1 Background to the Jim Se Bos Informal Settlement

With the informal settlement being positioned within the farming area of Philippi, many of the farmworkers started occupying privately owned land near to their workplace. Jim Se Bos is no exception as the land is illegally occupied and privately owned. The informal settlement started with 10 people occupying the land but has to date grown to 102 informal structures housing approximately 800 residents (Cape Argus, 2011).

Statistics from the City of Cape Town (2013) indicate that Jim Se Bos is located within Ward 80 of the municipal boundaries. Presently, the settlement has 174 porta potty toilets distributed throughout the informal settlement.

4.2.2 Socio-Economic and Demographic Status Quo of Jim Se Bos

As mentioned earlier, Jim Se Bos falls within the Philippi farming area. In 1988 about 3 200 hectares were designated for horticultural use. However, over many years, the farming area has shrunk, and the city's spatial development framework shows that the size of the entire Philippi

horticultural area has been reduced to about 2 370 hectares (Urban Landmark, n. d.).

The recent figures from the City of Cape Town indicate that the land use has been diversified to include several smallholdings (*ibid.*). There are approximately 140 smallholdings divided across an area of 4 000m^2 of which 41 smallholdings are used for construction and transport purposes, up from eight in 1992. Only four are used strictly for horticulture as shown in Figure 10.

Figure 10: Example of the farm workers in the Philippi area
(Source: Mail & Guardian, n. d.)

Furthermore although farming activity has slowed in the area, smallholdings stand in sharp contrast to the land of commercial farmers, most of whom are descendants of German settlers who have worked the land since the late 1800s (Urban Landmark, n. d..). Much of the horticultural area consists of wetlands, underlain by the Cape Flats aquifer. The constant water supply

and mild temperatures allow year-round crop growth (*ibid.*). With the socio-economic background to the area declining, informal settlements in the area have proliferated in the horticultural area.

Figure 11: Overview of Jim Se Bos
(Source: Google Maps, 2014)

4.3 SANITATION IN THE CITY OF CAPE TOWN AND JIM SE BOS

We know South Africa has made progress with regard to provision of basic sanitation services as access to basic services increased from 59% of the population in 1994 to 94% of the population in March 2007 (UNDP-SA, 2013). The figures provided somehow do not reflect the true realities within the SA context, as the growing sanitation backlog is a result of the proliferation of informal settlements in urban areas.

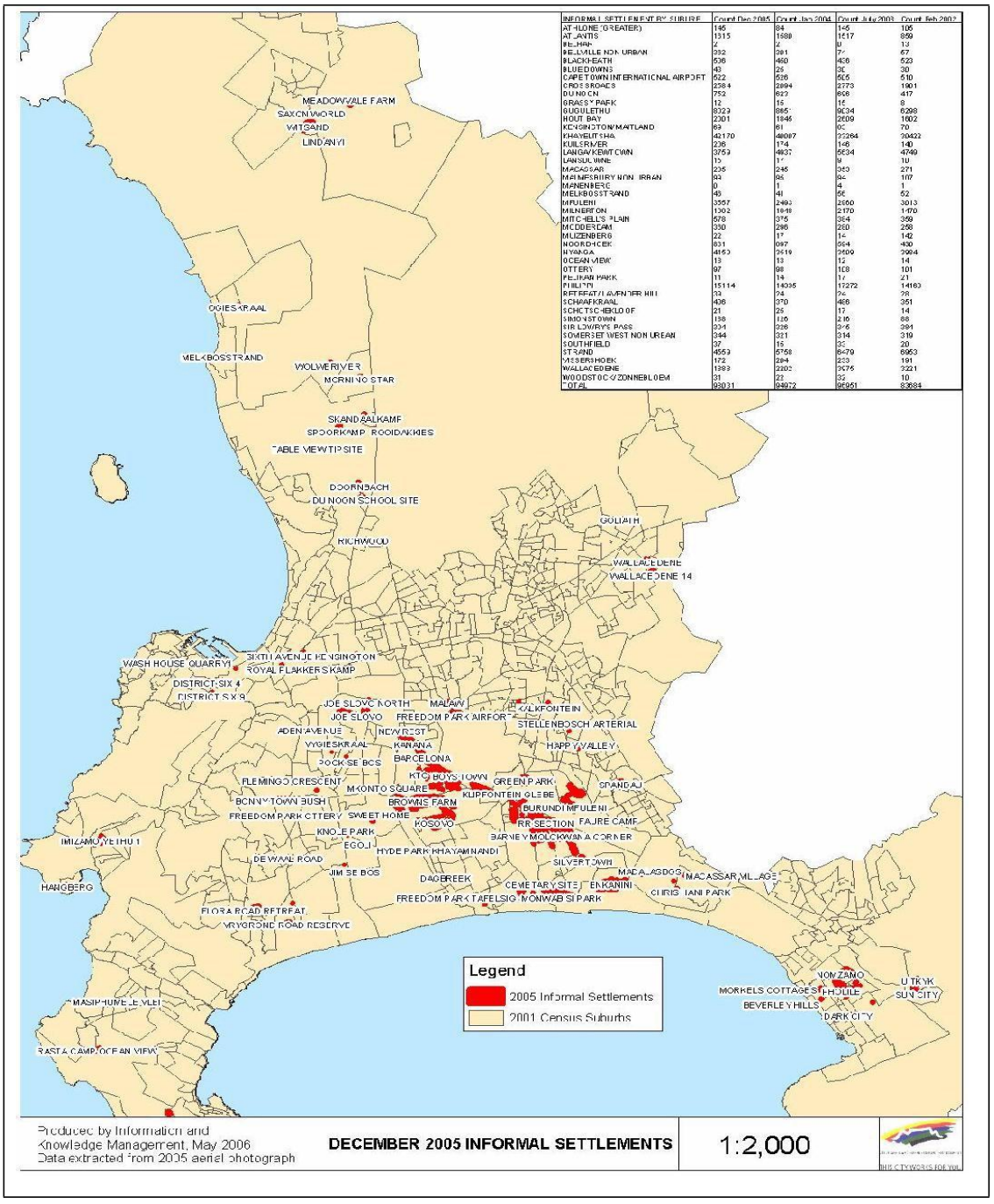


Figure 12: City of Cape Town 2005 Informal Settlement Count (Source: CoCT)

In Cape Town since 1993 informal dwellings have increased from 28 300 to 98 031 in 2005 impacting on the lives of approximately 400 000 people, almost 13% of the Cape Town population (City of Cape Town, 2006). In 1993, there were approximately 50 informal settlements in Cape Town, this

figure has grown to over 200 in 2005 (see Figure 12) (*ibid.*). This growth can be attributed to the high immigration to the area between 1996 and 2001 (*ibid.*). Based on the surveys completed by the City of Cape Town, the largest informal settlements are areas such as Khayelitsha which has a total of 13 informal settlements, containing 42 170 shacks, and Philippi which has a total of 23 informal settlements, containing 15 114 shacks (*ibid.*)

The Census 2011 indicates that within Cape Town approximately 88% of households have access to a flush toilet connected to the public sewer system. If one zooms into the Philippi area (Ward 80) where Jim Se Bos is located, then Census 2011 indicates that approximately 59% of households have access to a flush toilet connected to the public sewer system. Sanitation in Jim Se Bos has improved since the launch of the porta potty toilets being launched in early 2013. Before the launch of the sanitation technology, only chemical toilets were available.

4.4 SOCIO-ECONOMIC ASPECTS/ POPULATION SETTINGS AND CHARACTERISTICS

Although data for the settlement was not available, Jim Se Bos falls within the confines of the Philippi (Ward 80) area. The following statistics were made available for the area:

WARD 080		
ACCESS TO WATER	Number	%
Piped water inside dwelling	706	7.90
Piped water inside yard	680	7.61
Piped water on community stand: distance less than 200m. from dwelling	2,893	32.36
Piped water on community stand: distance greater than 200m. from dwelling	4,384	49.04
Borehole	24	0.27
Spring	3	0.03
Rain-water tank	3	0.03
Dam/pool/stagnant water	0	0.00
River/stream	0	0.00
Water vendor	24	0.27

Other	224	2.51
Total	8,940	100.00

Table 1: Access to water data

(Source: City of Cape Town)

WARD 080		
TYPE OF FUEL USED FOR LIGHTING NUMBER	Number	%
Electricity	1,422	15.91
Gas	76	0.85
Paraffin	6,621	74.06
Candles	801	8.96
Solar	8	0.09
Other	11	0.12
Total	8,940	100.00

Table 2: Type of fuel used for lighting

(Source: City of Cape Town)

WARD 080		
TYPE OF REFUSE REMOVAL	Number	%
Removed by local authority at least once a week	5,289	59.16
Removed by local authority less often	37	0.41
Communal refuse dump	846	9.46
Own refuse dump	1,827	20.44
No rubbish disposal	942	10.54
Total	8,940	100.00

Table 3: Type of refuse removal

(Source: City of Cape Town, 2013)

According to the Informal Dwelling Count for Cape Town (1993 - 2005) the Jim Se Bos informal settlement has grown by the following percentages:

INFORMAL SETTLEMENT	Count Dec 2005	Count Jan 2004	Count July 2003	Count Feb 2002
JIM SE BOS	102	84	76	52
% growth	21.4	10.5	46.2	
Overall % growth	96.2			

Table 4: Jim Se Bos growth rate

(Source: City of Cape Town, 2005)

4.5 CHAPTER SUMMARY

In summary, the community of Jim Se Bos has grown steadily over years as shown in Table 4. This growth has resulted in a lack of provision of services within the area. With the land being privately owned and not being positioned geographically correct for a sewer connection, the municipality was forced to provide a sanitation system within the area. Chemical toilets were the preferred option of the community, but due to crime and privacy concerns, the municipality launched the porta potty toilets, hoping to provide a more dignified sanitation system.

To understand the perceptions of the users of the porta potty toilet, the researcher completed several interviews with the respective community members, as described in the following section.

CHAPTER 5: DATA ANALYSIS AND FINDINGS

This chapter presents and discusses the results of the study.

5.1 PRESENTATION OF FINDINGS

This section presents the results of the interviews completed by the researcher. Several terms are used such as, “participants”, “interviewees”, “informants” and “respondents” are used interchangeably to protect the identity of the participants for ethical purposes.

5.1.1 Participants’ Socio-Economic Data

A total of 20 community members were invited of which nine respondents comprising of eight residents of Jim Se Bos informal settlement and one employee of the municipality participated in the study.

5.1.1.1 Gender and position in the household

There were six (75%) female and two (19%) male participants. Within the residents, six (75%) interviewees were heads of households and two (25%) were spouses.

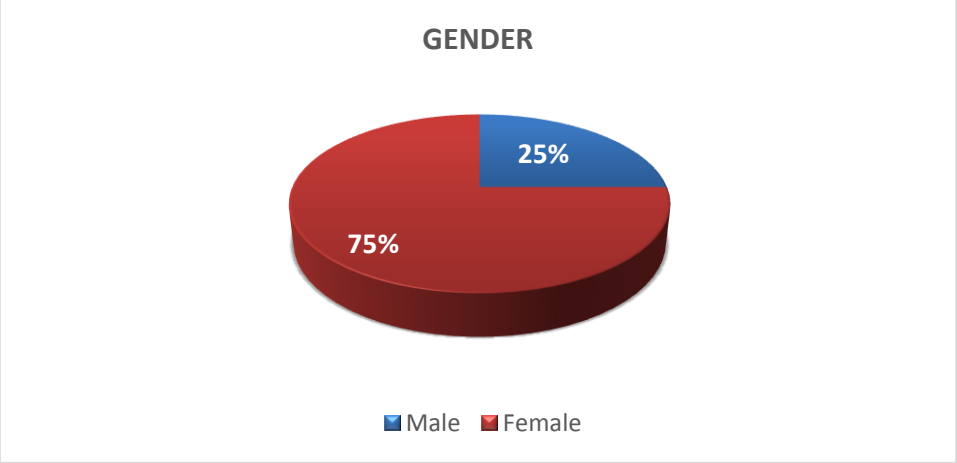


Figure 1: Gender of participants

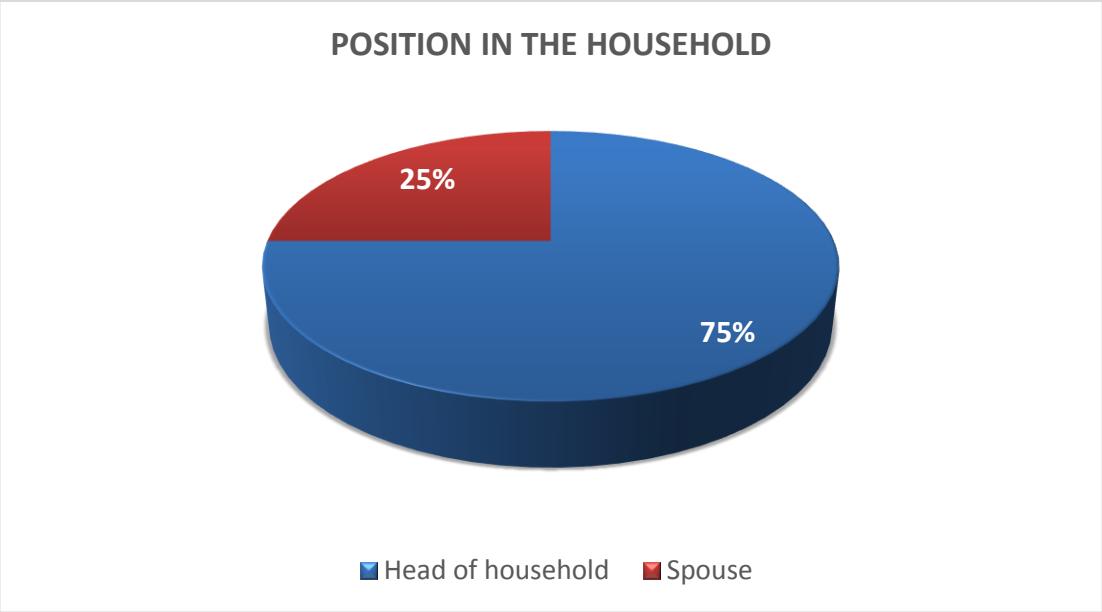


Figure 14: Position in the household

5.1.1.2 Race

Racial grouping of the sample consisted of six blacks (75%) and two coloureds (25%).

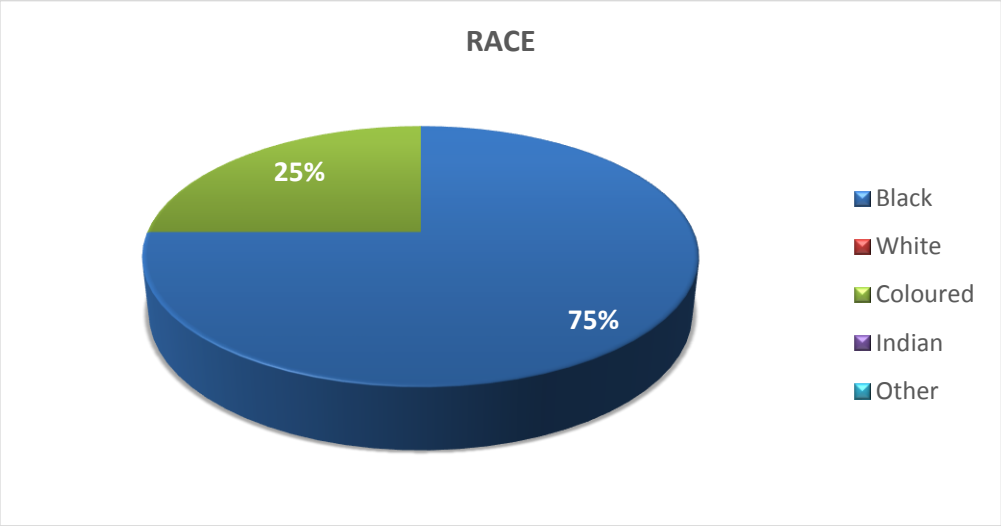


Figure 15: Race of respondents

5.1.1.3 Age

The interviewees age ranges were as follows, two of them (25%) were within the ages below 30 to 34 years, followed by three (38%) within the 35 to 39

age range. The following age groups of younger than 20, 25 to 29 and 45 to 49 had one participant each (13%).

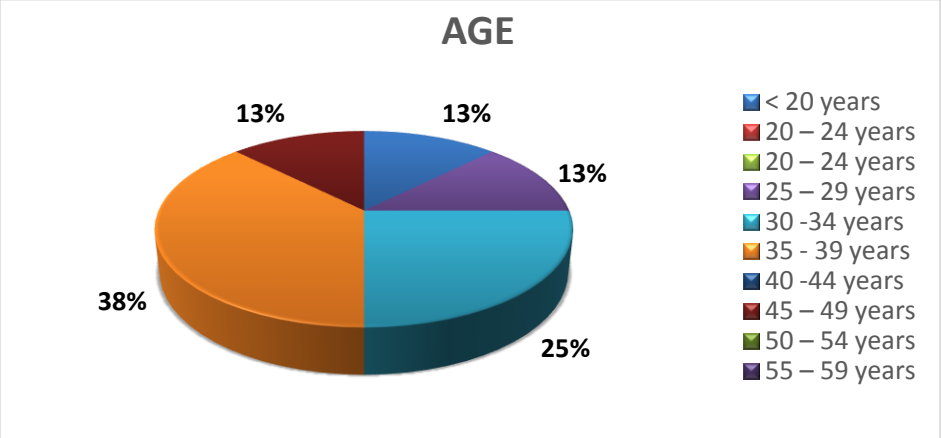


Figure 16: Age of respondents

5.1.1.4 Educational level

Amongst the respondents, one (13%) had no schooling, whereas six (75%) completed secondary schooling or matric (Grade 12). One participant (13%) had completed primary education.

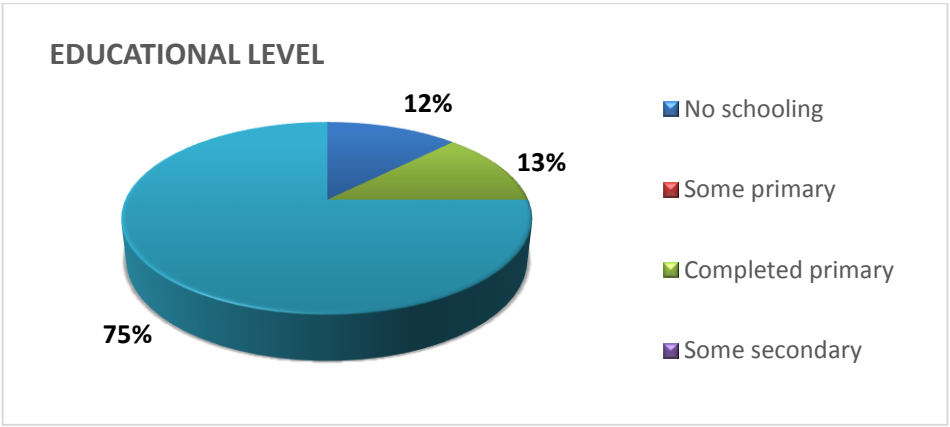


Figure 17: Education levels of respondents

5.1.1.5 Household composition

The results from the interviews indicate that there is a fairly large age group of young men and boys living within the households, particularly between the age groups of 0 and 19 (63%). For the females, the household compositions between the age groups of 0 and 19 is lower than that of the

men (53%).

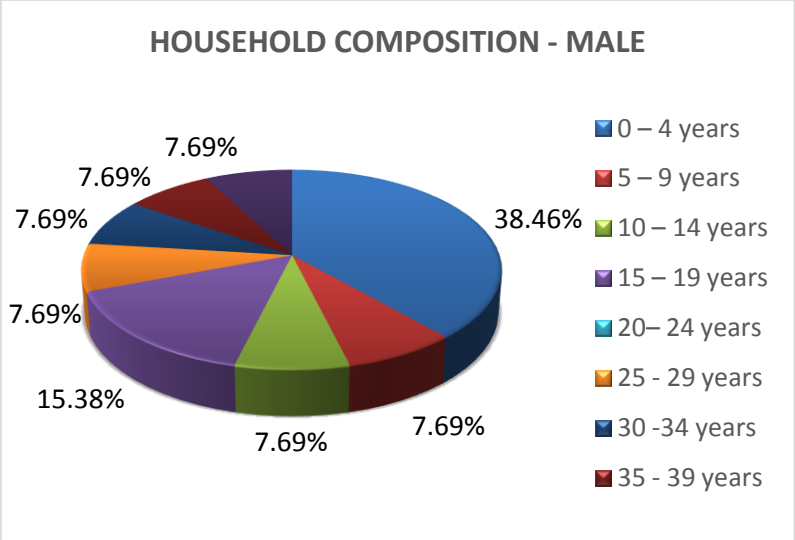


Figure 18: Household composition – male

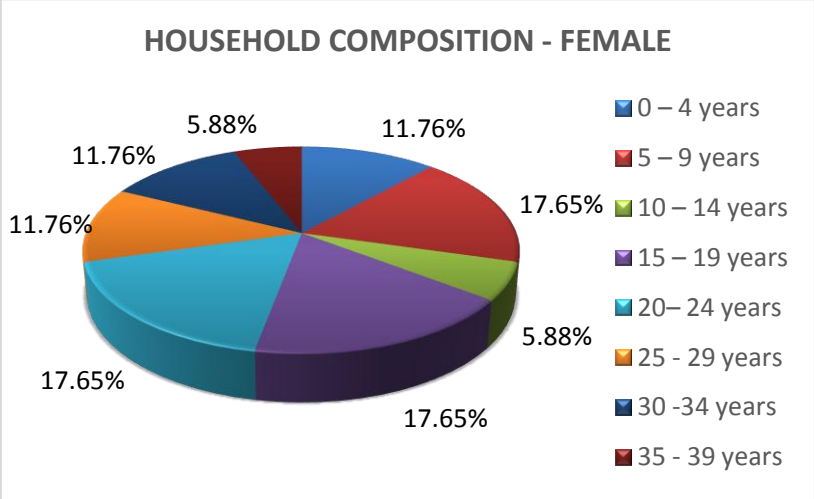


Figure 19: Household composition – female

5.1.1.6 Household income

The information on household income related to the respondents (100%) were earning less than R3 500. Sources of the income included salaries (13%), child grant (63%) whereas the remaining respondents either received a disability grant (13%) or other income (13%). This is shown is Figure 20 and Figure 21.

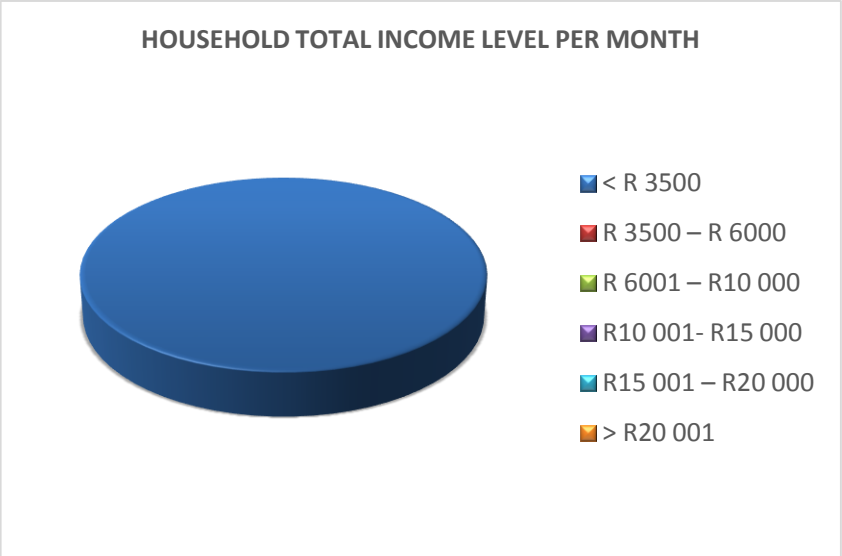


Figure 20: Household total income of respondents

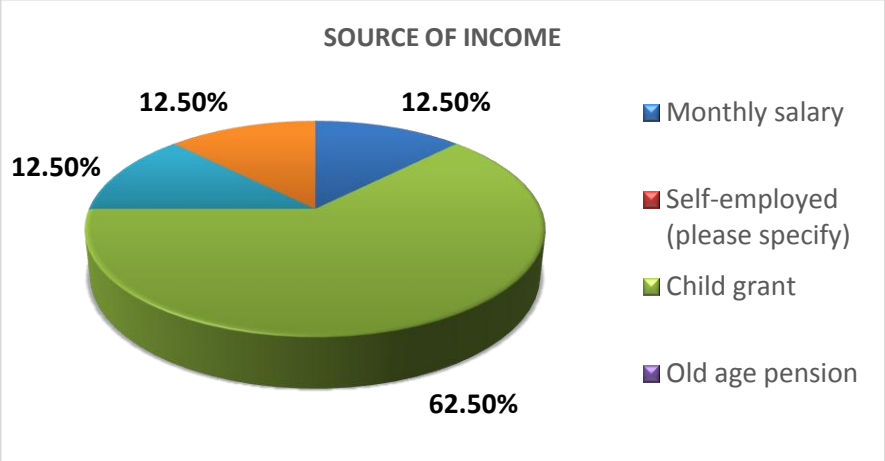


Figure 21: Source of income of respondents

5.1.1.7 Physical description of the unit

Amongst the respondents, three (38%) live within a single-storey with 2 bedrooms, whereas four (50%) live in larger units referred to as other. One participant (13%) lives in a single-storey with 3 bedrooms. Several respondents initially resided within the Cape Metropolitan, however two of the respondents were from the Eastern Cape. On average the all of the respondents have been living at the Jim Se Bos informal settlements more than 5 years.

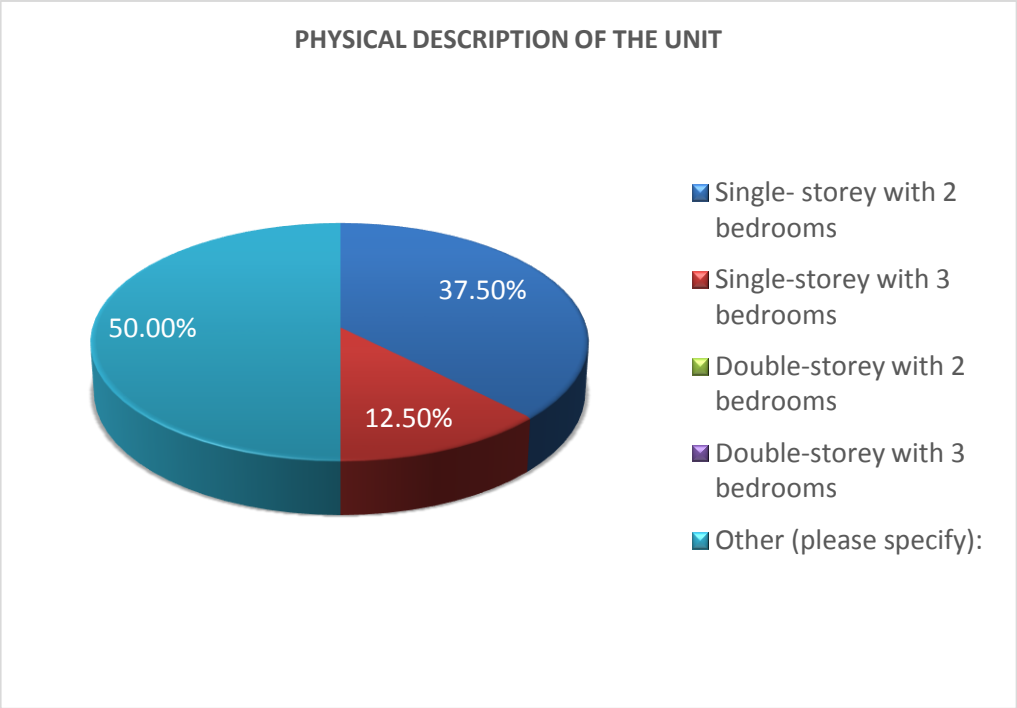


Figure 22: Physical description of the units for the respondents

5.1.2 Findings from the Residents' Survey

Categories and sub-categories of themes are presented in detail below.

- Participants' knowledge of the porta potty toilets

From the interviews completed, all of the respondents (100%) had access to a porta potty toilet and in addition had sufficient knowledge of the toilet. All of the respondents confirmed that they received training on the toilet system by the municipality and therefore fully understood how to use the toilet system.

- History of access to sanitation

No waterborne sanitation system exists within the informal settlement. All of the respondents have indicated that they have not used a waterborne sanitation system. A large number of the respondents (83%) had previously used a chemical toilet before receiving the porta potty toilet, whereas only 17% had previously used a bucket toilet system (see Figure 23).

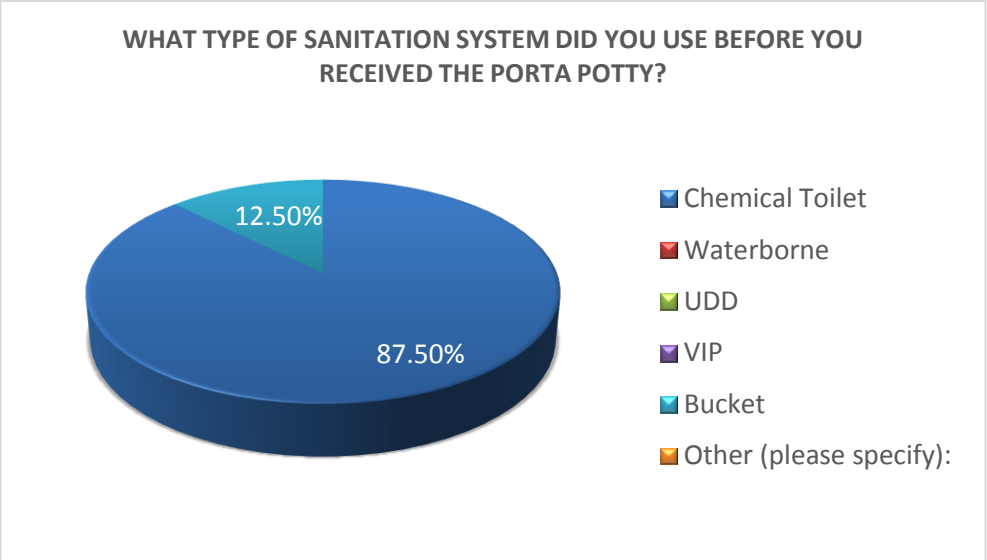


Figure 23: Sanitation systems previously used by respondents

- Design, use and functionality (Chapter 1, s 1.8; Chapter 2, S 2.2.1, 2.3.3, 2.5.2)

    - Duration and adaptability of using the porta potty toilet

    All of the respondents indicated that they have been using the porta potty toilet since the launch (2013) of the toilet system within the informal settlement. All felt the system was easy to use and hassle free. When asked, how they would compare their previous sanitation system before they came to Jim Se Bos with the current porta potty toilet, all answered that they rated it better. When asked whether they felt the toilet system was more dignified, all responded yes. This record is based on the following quotes:

    Yes, because at least there is no more dirtiness in the community than before the porta potty toilet (participant # 2).
    I can close the door and not be bothered (participant # 3).
    Yes, it is within the house and it is private (participant

4).

Yes, because I don't have to go out at night as it is not safe at night (participant # 8).

- Functionality and usability of the porta potty toilet

All of the respondents described the porta potty toilet as having a simple design and being portable. In addition, all respondents indicated that they use toilet paper and discharge the material within the toilet. The women were asked, "where do you dispose of your sanitary pad/tampon?" 63% indicated that they dispose of the sanitary pad in the porta potty, whereas the remaining 38% dispose of them in a bin.

- Operation and maintenance (Chapter 2: S 2.4.4; 2.5)

  - Knowledge on how the porta potty toilet operates

All of the respondents indicated that they knew how the porta potty toilet works and operates. All were acutely aware of who the servicing authority is and how the servicing and cleaning is completed. When asked who conducted the training and whether it was useful, all responded that they received training and that it was useful, respectively. Again, all were satisfied that the toilets were cleaned regularly, collections were completed every second day. However, there was a difference of opinion when it came to the storage capacity of the holding tanks, 63% felt that they could achieve two days of storage, whereas 25% could achieve three days of storage. Only one respondent felt they could achieve one week of storage.

When cleaning the toilets, all indicated that they clean the toilets

independently from the municipality. The results indicate that 38% use detergents, whereas the remaining 63% use soap. When ask where the respondents' discard of the cleaning material, 75% indicated within a bin, whereas 12.5% discarded within the porta potty and the remaining 12.5% in the yard.

- Maintenance of the porta potty toilet

All of the respondents indicated that the municipality completed all maintenance of the porta potty toilets, and where there were damages or breakages the toilets were replaced. All confirmed that the toilets were collected every Tuesday, Thursday and Saturday for cleaning and waste removal. When asked about how they would describe the condition and maintenance of previous sanitation systems, the following responses were received: 38% good, 50% bad and 13% appalling.

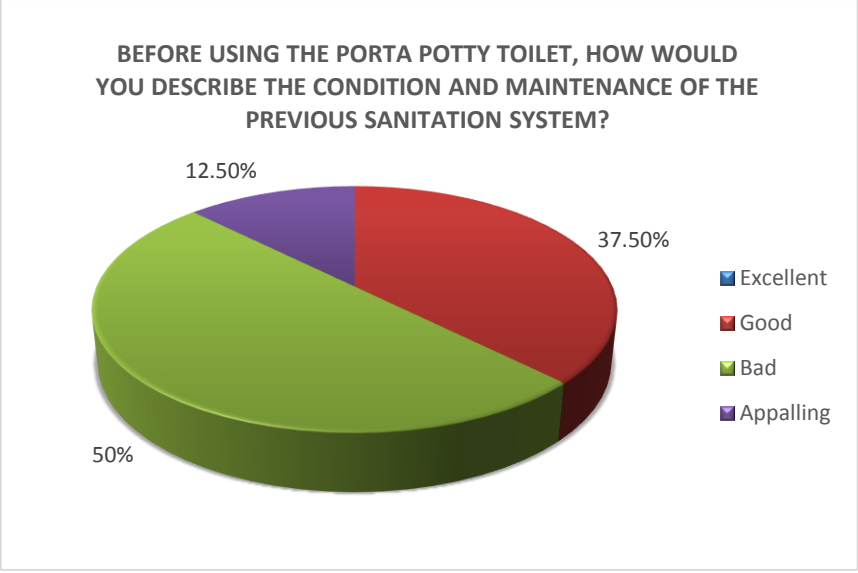


Figure 24: Maintenance of previous sanitation systems (1)

- Users' perceptions and attitudes (Chapter 1, S 1.3; 1,6, 1.8.4; Chapter 2, 2.4.2; Chapter 3: 3.4.1, 3.5)

  - Users' interest in porta potty toilet

When asked whether they like the porta potty, 88% confirmed yes, whereas 13% indicated no (see Figure 24).

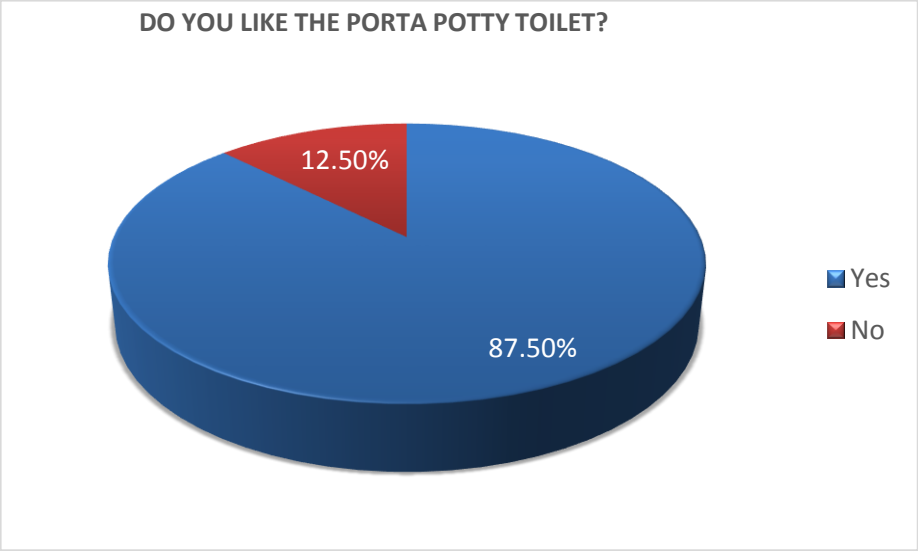


Figure 24: User perceptions and attitudes (1)

The respondents were asked how, in their opinion, does the porta potty toilet compared to other toilets. The following responses were received:

The porta potty is comfortable and easy to use (participant # 1).
The porta potty is easy to use (participant # 2).
The porta potty is easy to use (participant # 3).
It's ok to use, but I want a chemical toilet also (participant # 4).
It's much better than the chemical toilet (participant # 5).
The porta potty is much better (participant # 6).
The porta potty is easy to use (participant # 7).
Easy to use, however I would like a full flush toilet (participant # 8).

All of the respondents were asked whether they would recommend the porta potty to others? Of the responses, 63% yes and the 38% no (see Figure 25). Where the respondents indicated no, the reason was that they wanted a waterborne sanitation system in the long term.

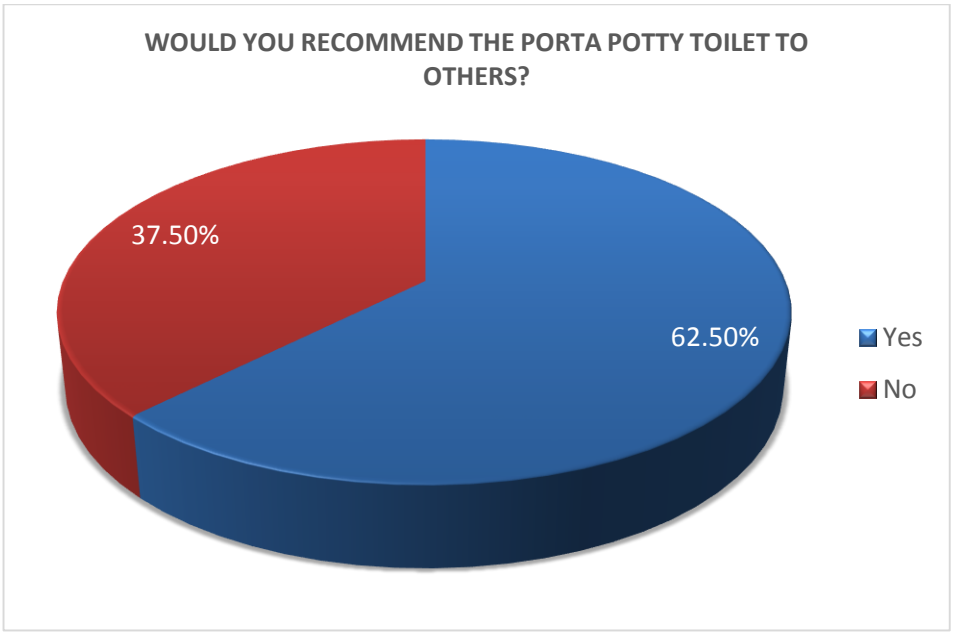


Figure 25: User perceptions and attitudes (2)

- Socio-cultural perceptions (Chapter 2, S 2.2.1; 2.4.2)

When the respondents were asked whether the system was dignified, all responded yes. The respondents did not share a similar view when it came to the health risk: 37.5% felt that the porta potty was a health risk, whereas the remaining 62.5% said it was not a health risk (se Figure 26).

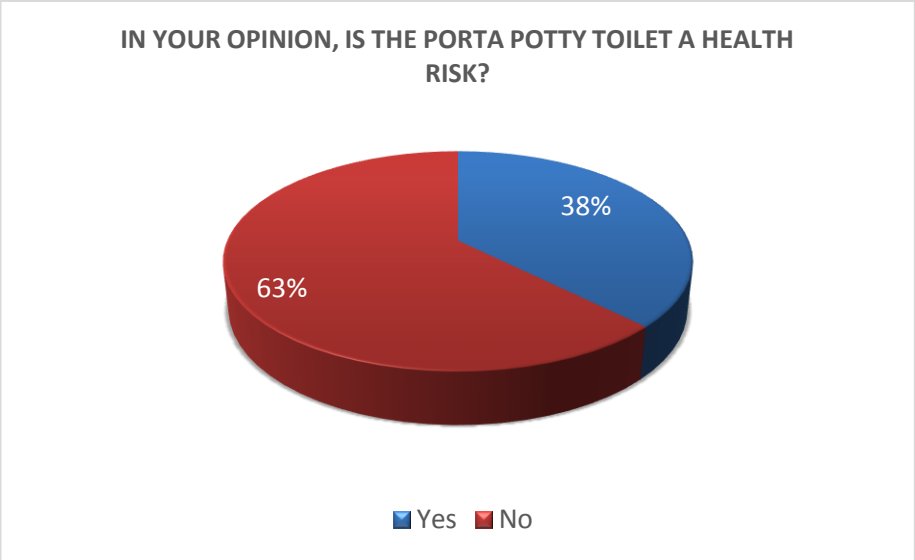


Figure 26: Socio-cultural perceptions (1)

The interviews revealed that 25% of the respondents had spilt there wastewater from the waste holding tank, compared to the 75% who had not. When asked whether they used protective clothing and gloves when cleaning the sanitation system, all of the respondents emphatically said yes. Other data gathered from the respondents included that only 87% indicated that they wanted to have a full flush toilet, whereas 13% indicated that they were satisfied with the porta potty. 38% of the respondents indicated that the porta potty gave off an odour and 62% indicated that no odours emanated from the toilet system. From a crime perspective, one of the respondents was exposed to robbery and another was exposed to rape and also held up by gun point before the porta potty was installed, so it was much safer.

- Participants' knowledge of the value of sanitation systems and institutional capacity

    - Participants' knowledge of the value of sanitation systems

      A portion of the participants (37.5%) acknowledged that they

understood the costs of supplying a porta potty toilet. Of the remaining participants (62.5%), when asked whether they understood the costs to provide a waterborne sewer system, 25% indicated yes, whereas the 75% indicated no. Finally, only 12.5% were willing to pay for a full flush toilet in comparison to the 87.5% who said no to payment.

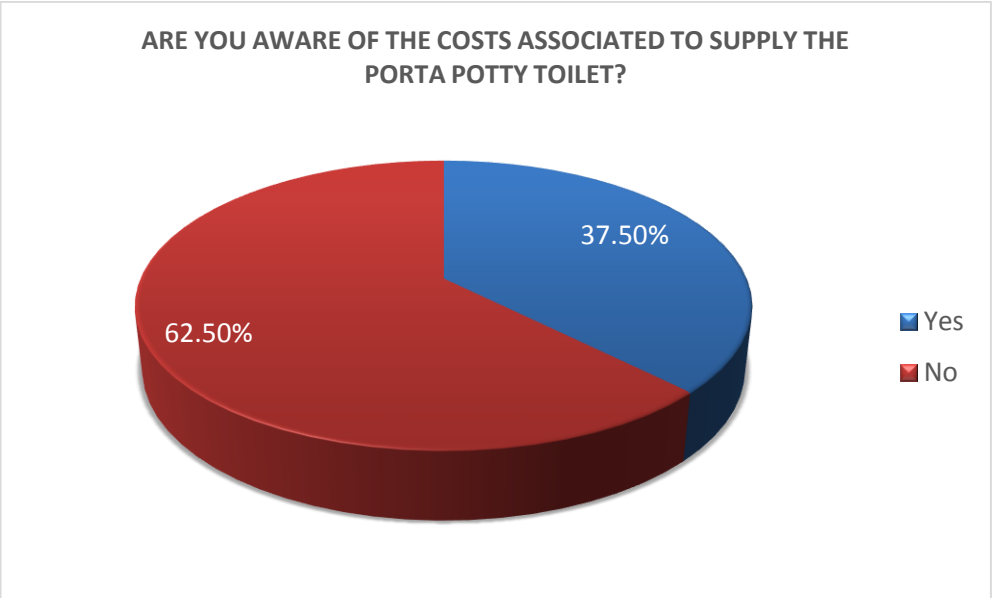


Figure 27: Socio-cultural perceptions (2)

- Institutional capacity (Chapter 1, S 1.1; Chapter 2, S 2.3.3)

When asking the respondents whether, in their opinion, the municipality was fulfilling its role in terms of providing a sanitation system, 62.5% indicated yes, whereas 37.5% indicated no. The respondents were however divided equally when it came to question of whether the municipality had failed them in providing a safe and secure sanitation system. Other important responses were that the only 75% were happy with the roll out of the porta potty toilet by the municipality, compared to the other 25% who said the community failed. Comments received by the responds are as follows:

The City of Cape Town must provide full flush toilets (participant # 4)
We need full flush toilets (participant # 8)

An important question relating to participation, (Chapter 2, S 2.3) when asked if they had been given a sufficient opportunity to provide input in terms of the selection of the type of sanitation system, only 37.5% indicated yes, while the remaining 67.5% respondents indicated no.

Finally, 87.5% indicated that the sanitation system should be implemented in other areas. Only 12.5% indicated that it should not be rolled out in other areas. The areas recommended by the participants are as follows:

To be rolled out at all the informal settlements within the Philippi area (participant # 5).
To be rolled out in Phumlani, Grassy Park (participant # 8)

5.2 EMERGING ISSUES / THEMES AND DISCUSSION

This section reviews the detailed findings of the study and related discussions.

Overall perceptions of users of porta potty toilets are as follows:

All of the participants indicated that the porta potty toilet was a far more appropriate sanitation system compared to the previous sanitation systems that they were exposed to, but overall there is still a desire for a waterborne sanitation system. Several challenges cited by the respondents, include the following:

- The holding tank storage tank capacity for larger families is inadequate

and limited, therefore resulting in more frequent changes of the tank;

- Several families indicated that spillages had occurred when disembarking the storage holding tank;
- No emergency spillage gloves are provided by the municipality;
- The porta potty gives off an odour; and
- The community had insufficient participation in selecting the sanitation technology. A portion of the respondents felt that the municipality failed to provide a safe and secure sanitation system.

5.2.1 Design, Use and Functionality (Chapter 1: S1.8.3)

The results obtained highlight that all of the respondents are satisfied with the porta potty toilet and all felt the sanitation system was easy to use and hassle free. In addition, all of the respondents indicated that the previous sanitation system that they used before within Jim Se Bos was not better. There was a clear understanding by all that the porta potty sanitation was more dignified.

Kallbemarten *et al.* (1982) as cited by Lagardien *et al.* (2012) concurs that for a sanitation system to be effective, the process of selection begins with the examination of all alternatives available and for the most appropriate sanitation system to be selected, one should consider the option that provides the most socially and environmentally acceptable level of service. Design and functionality is key, the sanitation system must be practical, easy to use and adaptable.

All of the comments received from the respondents were positive, therefore implying that the design of the porta potty is practical, user friendly, light weight and movable. Mjoli's (2010) review of sanitation policy and practice in South Africa, which includes international experiences of sanitation delivery from Asia and Africa, illustrated that in order for a sanitation service to be successfully implemented, households and the beneficiary communities should be involved in all decision-making processes on the selection of sanitation technology options, operation and maintenance of

the sanitation facilities.

The appropriateness of the design, use and functionality leads into the point, which is related to the operation and maintenance of a sanitation system.

5.2.2 Operation and Maintenance (Chapter 2: S2.4.4; 2.5)

Poor operation and maintenance of existing and new sewer systems is a common problem encountered locally and internationally. However, for this research the findings indicate the opposite. The research indicated that with a training programme and regular maintenance and collection of the waste holding tanks, a successful operation and maintenance programme can be implemented.

All of the respondents indicated that they knew how the porta potty toilet worked and was operated. Furthermore the respondents highlighted that they were satisfied that regular cleaning took place and that the porta potty toilets were replaced when damaged. Certain of the respondents used detergents to clean the toilet, illustrating a level of pride being taken in the sanitation system. The toilets were collected every Tuesday, Thursday and Saturday for cleaning and waste removal.

The majority of the respondents indicated that they were not aware of the costs associated with supplying a porta potty system. In addition, the respondents did not understand the financial costs associated with operation and maintenance. An interesting fact was that when asked about how they would describe the condition and maintenance of previous sanitation systems, the following responses where received: 38% good, 50% bad and 13% appalling. It is on this basis that one can conclude that the porta potty has added a level of ownership and obviates multiple users not taking ownership of the product resulting in a vandalised system.

5.2.3 Users' Perceptions and Attitudes

This finding really answered the problem statement highlighted in Chapter 1, as follows: What are the perceptions of the users living in Jim Se Bos,

Phillipi, Cape Town of the new sanitation technologies (toilets)?

In addition the following objectives were met:

- To determine the level of acceptance of the PPS toilets in Jim Se Bos, Phillipi by the users;
- To contribute to the extension (body) of knowledge on the perceptions of the users of the PPS toilets in an informal settlement context;

The results of the study indicated that almost all respondents liked the porta potty and that they would recommend the sanitation system to other informal settlements. Some of the respondents indicated that they want a waterborne sewer sanitation system which would ultimately allow them to flush. Those who did not recommend the sanitation system to other informal settlements, purely based their reasoning that they wanted a waterborne sanitation system in the long term.

The theme that emanates from this discussion is that all of the respondents found the porta potty system to be comfortable, easy to use and better than the chemical toilet. Although the community did not participate in the selection of the technology, the acceptance was due to the system being more dignified.

Community involvement is, however, key and the 2001 White Paper on Basic Household Sanitation states clearly that households should contribute to the construction of their basic sanitation facilities. Mjoli (2010) concurred with the statement pointing out that meaningful involvement of the communities in the selection of the sanitation technology options is important.

5.2.4 Socio-Cultural Influences/Impact (Chapter 2: 2.2.1; 2.4.2)

All of the respondents indicated that the porta potty toilet is a dignified system and that it doesn't impede on their socio-cultural background. The handling of wastewater did not hinder the respondents as all where

comfortable to detach the wastewater holding tanks and position it outside the house.

The results from the research survey indicate that the women were not concerned with the use of disposing their sanitary wear within the porta potty toilet. Other important points raised was that with majority of the respondents coming from an African culture perspective, the requirement was still there to have a full flush toilet.

The respondents was however split when it came to the question has the municipality failed you in providing a safe and secure sanitation system. Mjoli (2010) states that the sanitation policy should provide municipalities with a flexible guide that considers the needs and culture of the different target groups as well as the capacity of the different categories of municipalities.

5.3 CHAPTER SUMMARY

In summary, all of the participants were in favour of the porta potty toilet and confirmed that sanitation system was a far more dignified system than their previous experiences with other technologies. The respondents noted that the lack of participation in selecting the technology was a concern. There was however, constant confirmation by all that the sanitation system design, use, functionality, operation and maintenance was of a better standard compared to other sanitation systems. Although the sanitation system launched all of the respondents indicated that they still desire a full flush toilet (waterborne system).

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter focuses on conclusions drawn from the findings of the study and recommendations.

At the onset of this research the aim of this study was to answer the problem statement

What are the perceptions of the users living in Jim Se Bos, Phillipi, Cape Town, of the new sanitation technologies (toilets)? (Chapter 1, S 1.2).

It therefore sought to:

- discuss/critique the nature of and rationale for implementing the PPS toilet technology (Objective 1) This was covered in Chapter 2, S 2.6, and Chapter 4 which provided a case study of Jim Se Bos;
- understand the socio-cultural perceptions and practices of the users of the PPS toilets in Jim Se Bos, Phillipi, with the intention of measuring the degree of acceptance of this sanitation technology in an informal settlement context (Objectives 2 and 3). This was dealt with in Chapter 5, S 5.1.2 and S 5.2.3;
- analyse the practicality of the technology, and to furthermore explore the opportunities to apply the sanitation technology in other informal settlement settings (Objectives 4 and 5) This was covered in Chapter 2; S 2.6; and
- understand the level maintenance required by the user (Objective 6) This was dealt with in Chapter 2 S2.5; Chapter 5, S 5.2.2.

At the time of commencing this research report, the understanding was that the nature of the research would be largely exploratory, no hypothesis will be defined as it was assumed that findings would help to understand how these communities perceived the sanitation technology in relation to the meaning of vulnerability, dignity and cultural acceptance.

6.2 KEY FINDINGS

The study revealed the perceptions of the users of the porta potty toilet. All of the participants indicated that the porta potty toilet was a far more appropriate sanitation system compared to the previous sanitation systems that they were exposed to previously (i.e. the chemical toilets), but overall there is still a desire for a waterborne sanitation system. The results of the study highlighted that almost all respondents liked the porta potty and that they would recommend the sanitation system to other informal settlements. This shows that the study successfully addressed all the stated objectives.

The key findings that emanate from this research are the following:

- Communities are prepared to accept a sanitation technology and buy-in to its processes if the design of the sanitation is functional, easy to use, needs to be comfortable and doesn't impede on their socio-cultural background;
- A sanitation system must be simple and easy to use. Furthermore a community must receive adequate training for the product to be successful;
- Community members want to participate in the selection of the technology. This will result in greater participation in maintaining a working sanitation product;
- There is a desire for the sanitation to be dignified, private and safe. The avoidance of having to use a chemical toilet to relieve themselves at night, meant that there was a higher level of safety;
- To achieve success when launching a sanitation system, there needs to institutional capacity and the municipality support systems. Displaying sound management and service delivery meant the product will be well received;
- In addition, there must be sound operational and maintenance procedures so that the product is regularly cleaned.
- Lack of participation is a concern, there is a constant thread or requirement for wanting to be included in the selection of the of the

sanitation system; and

- Recommendations to have the municipality roll out the porta potty toilet in other informal settlements.

In summary, the narrative discussing the embracement of a new sanitation system where it is not possible to provide a waterborne system is important. As mentioned at the onset of this report, South Africa has made progress with regards to the provision of basic water and sanitation services but there is still the need to reduce the sanitation backlog (UNDP-SA, 2013). The sanitation backlog being a result of urbanisation and the proliferation of informal settlements in urban areas requires a holistic approach that is practical and socially acceptable to communities.

6.3 RECOMMENDATIONS

To achieve this acceptance of a sanitation system, the following recommendations were derived from the research which will assist in planning and delivery of a sustainable sanitation system which is accepted by all.

- Risk to health and safety – With the porta potty toilet being portable and practical it, however, lends itself to risk to health and safety. If one considers the system within the context of the home, the movement and disembarking of the waste holding tank may result in spillages within the home. The housing or positioning of the toilet system within the shack or temporary structure is important to prevent children playing in close proximity of the toilet. The waste holding tanks are also disembarked and placed outside the doorway for collection. It is during this stage that the community can be exposed to spillages within the walkways or pathways which can result as health hazard to the community. The collection points of the porta potty toilets need to be positioned in a closed off perimeter, with limited access. Therefore as a recommendation, the municipality needs to put in place procedures and systems that allow for a far safer waste water disposing method. These

procedures and systems can take the form of training, classes and appointing a competent contractor to manage the disposal of the wastewater in safe manner.

- Participation – The lack of participation or inclusion in the selection of a sanitation system is important. The failure or success of the system is based on the perception and acceptance of the technology by the community. In the porta potty toilet provision, the municipality was fortunate to have the community accept the sanitation system without having been included the selection thereof.

- Dignified sanitation system – The respondents communicated quite strongly the need for a dignified sanitation system. Most of the respondents felt that the chemical toilets were dangerous and a health hazard due to the lack of maintenance. Several of the respondents were exposed to violent crimes when using the toilets and others that cited the long distance they had to walk to access the toilets at night also placed them in a hostile environment. Chemical toilets must be avoided where possible, due to the risks to the community.

- Funding – All of the respondents had a household income below R3500, and most of the respondents received monthly state grants only. Funding of infrastructure at early stage can reduce the need for an emergency sanitation technology to be launch as in the Jim Se Bos experience.

- Policy and legislative improvements – The South African national sanitation policy needs to consider including the porta potty toilet as a possible sanitation technology. This research report reinforces how the respondents perceived and accepted the porta potty toilet. It is on this basis that the policy considers this technology as a dignified sanitation system.

Finally, the findings of the study revealed that perceptions of the users of 'porta potty' toilets in Jim Se Bos informal settlement in Phillipi, Cape Town were positive and that all of them accepted of the sanitation system. The recommendations to have the municipality roll out the porta potty toilet in other informal settlements was made by the respondents. This recommendation is a vote of confidence for the system and it seems, therefore, that this is a solution that provides the necessary relief from unsafe and vandalised sanitation systems. In conclusion, the porta potty was accepted as being a far more appropriate and dignified system that does not impede on the socio-cultural background.

6.4 RECOMMENDATIONS FOR FURTHER RESEARCH

It is recommended that a similar study be undertaken in other informal settlements in Cape Town to see if the findings are generally applicable.

It is recommended that a cost/benefit analysis be undertaken in which the provision of alternative sanitation systems (such as a waterborne system) is evaluated.

A comparative study could be undertaken to see if the porta potty technology could be implemented in other parts of South Africa as a way of addressing the sanitation needs of the millions of people who as yet have no access to a hygienic and safe sanitation system.

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APPENDICES

Appendix A – Newspaper Article

Grassy Park received their very own Porta Potty system.

The 20-litre portable toilets will replace the outside toilets, which have had to be shared among families.

Shantelle Minnies, vice-chairperson of

In the past, community me several problems with the ou with health issues, safety for the distance of the toilets topp

Several residentss are also have fallen ill due to the chemi

the unhy the toilet

"No m fees," say ed Minn watched toilets be

Each ceived th which cl tank.

Before used, wa into the eventual waste in low. Eac so recei tank, w when th needs t The tan off and side eac collecti tractor

Eager the ne lets, res rika gr during tion sta

"This Other unders about people thing,

"Im at 03:0

TESTER: Danny Afrika could not contain her excitement over the new Porta Potty system during the demo stages.

PHOTO: TAURIQ HASSEN

Source: People's Post, 2013

Appendix B – Site Plan

JIM SE BOS INFORMAL SETTLEMENT, PHILLIPI

N.T.S

Appendix C – Residents' Questionnaire

Form of Consent and Participant Information Sheet

To be filled in by the interviewer prior to the interview

Hello, my name is Clint Stewart. I'm a civil engineer and a student at Wits University. I am currently conducting research on the perceptions of the users of the porta potty toilets. The aim of the research is to understand your feelings and views with regard to the perceptions of the users of the 'porta potty' toilets in Jim Se Bos informal settlement in Phillipi, Cape Town. The information gathered will be used purely for academic purposes, but the final document will be a public document in the form of a research report. I am asking for 30 minutes of your time.

Participation in this research is voluntary and you are free to withdraw anytime. There will be no remuneration or gifts in exchange for information provided. Your identity will remain anonymous and the information you provide will be confidential. You are entitled to withhold information that you feel is too personal or sensitive to you and you can choose not to answer any of the questions.

Do you give consent for photographs of your house/toilet to be taken and use of dictaphone?

Yes No

If you are willing to participate in this research, please sign this form:

Signature _____Date _____Time _____

Place: _____

Thank you for agreeing to participate in this research study.

Interviewee no.

1. DEMOGRAPHIC INFORMATION (TICK APPROPRIATE BOX)

HOUSEHOLD INFORMATION

1.1. Interviewee details

Position in household	Gender
□ Head of household	
□ Spouse	
□ Other (please specify)	

1.2. Age

□ < 20 years □ 20 – 24 years □ 20 – 24 years
□ 25 – 29 years □ 30 -34 years □ 35 - 39 years
□ 40 -44 years □ 45 – 49 years □ 50 – 54 years
□ 55 – 59 years □ 60 – 64 years □ 65 years +

1.3. Race

□ Black □ White □ Coloured □ Indian □ Asian
□ Other (please specify) _____

1.4. Educational Level

□ No schooling □ Some primary □ Completed primary
□ Some secondary □ Completed secondary □ Higher / Tertiary qualifications
□ Other (specify) _____

1.5. Household Composition

Age	Gender	No.	Gender	No.	Total – (including interviewee)
0 – 4 years	Male		Female		

5 – 9 years	Male		Female		
10 – 14 years	Male		Female		
15 – 19 years	Male		Female		
20– 24 years	Male		Female		
25 - 29 years	Male		Female		
30 -34 years	Male		Female		
35 - 39 years	Male		Female		
40 -44 years	Male		Female		
45 – 49 years	Male		Female		
50 – 54 years	Male		Female		
55 – 59 years	Male		Female		
60 – 64 years	Male		Female		
65 years +	Male		Female		
TOTAL					

1.6. Household total income level per month

□ < R 3500 □ R 3500 – R 6000 □ R 6001 – R10 000

□ R10 001- R15 000 □ R15 001 – R20 000

□ > R20 001

1.7. Source of income (it could be more than one)

□ Monthly salary □ Self-employed (please specify) _____

□ Child grant □ Old age pension

□ Disability grant □ Other (please specify): _____

1.8. Physical description of the unit

Unit no. _____

□ Single- storey with 2 bedrooms

□ Single-storey with 3 bedrooms

□ Double-storey with 2 bedrooms

□ Double-storey with 3 bedrooms

□ Other (please specify): _____

2. HISTORY OF ACCESS TO SANITATION

2.1 WHAT TYPE OF SANITATION SYSTEM DID YOU USE BEFORE YOU RECEIVED THE PORTA POTTY?

□ Chemical Toilet □ Waterborne □ UDD □ VIP
□ Bucket
□ Other (please specify): _____

2.2 WHAT TYPE OF SANITATION SYSTEM DO YOU CURRENTLY USE IN JIM SE BOS?

□ Porta Potty □ Chemical Toilet □ Waterborne
□ UDD
□ VIP □ Bucket □ Other (please specify):
_____

2.3. HOW WOULD YOU COMPARE YOUR PREVIOUS SANITATION SYSTEM BEFORE YOU CAME TO JIM SE BOS WITH THE CURRENT PORTA POTTY TOILET?

□ Same □ Better □ Worse

Comment

2.4. IS THE PORTA POTTY A MORE DIGNIFIED SANTATION SYSTEM?

□ Yes □ No

Explain

2.5. BEFORE USING THE PORTA POTTY TOILET, HOW WOULD YOU DESCRIBE THE CONDITION AND MAINTENANCE OF THE PREVIOUS SANITATION SYSTEM?

□ Excellent □ Good □ Bad □ Appalling

Comment

2.6. HAVE YOU BEEN EXPOSED TO CRIME WHEN USING THE PREVIOUS SANITATION SYSTEM?

□ Yes □ No

Explain

3. DESIGN USE AND FUNCTIONALITY OF PORTA POTTY TOILET

3.1. WHEN DID YOU MOVE INTO JIM SE BOS?

_____

3.2. WHERE DID YOU STAY BEFORE YOU MOVED INTO JIM SE BOS?

3.3. DO YOU USE THE PORTA POTTY TOILET REGULARLY?

□ Yes □ No

Explain

3.4. DO YOU FIND IT EASY TO USE THE PORTA POTTY TOILET?

□ Yes □ No

Explain

3.5. HOW LONG HAVE YOU BEEN USING THE PORTA POTTY TOILET?

_____WEEKS _____MONTHS _____YEARS

3.6. HOW LONG DOES THE TANK OF THE PORTA POTTY TOILET TAKE TO BE FILLED?

____DAYS _____WEEKS

3.7. HOW WOULD YOU DESCRIBE THE DESIGN OF THE PORTA POTTY TOILET?

□ Simple □ Complicated □ Impractical

Explain

3.8. WHERE DO YOU DEPOSIT MATERIAL USED FOR WIPING?

□ Container inside toilet □ Container outside the house

□ Inside the toilet vault □ Other (please specify) __

3.9. IF YOU ARE A WOMAN, WHERE DO YOU DISPOSE OF YOUR SANITARY PAD/TAMPON?

3.10. WHAT DO YOU USE TO COVER THE FAECES IN THE VAULT?

□ Toilet paper □ Newspaper □ Cloth

□ Other paper □ Leaves □ Nothing
□ Other (Please Specify) _____

4. USER'S PERCEPTIONS AND ATTITUDES

4.1. DO YOU LIKE THE PORTA POTTY TOILET?

□ Yes □ No

Explain

4.2. IN YOUR OPINION, HOW DOES THE PORTA POTTY TOILET COMPARE TO OTHER TOILETS?

Explain

4.3. WOULD YOU RECOMMEND THE PORTA POTTY TOILET TO OTHERS?

□ Yes □ No

Explain

4.4. IN YOUR OPINION, IS THE PORTA POTTY TOILET A MORE DIGNIFIED OPTION COMPARED TO OTHER TOILETS?

□ Yes □ No

Explain

4.5. IN YOUR OPINION, IS THE PORTA POTTY TOILET A HEALTH RISK?

□ Yes □ No

Explain

4.6. IN THE FUTURE, WOULD YOU WANT A FULL FLUSHED TOILET OR WILL YOU KEEP TO THE PORTA POTTY?

□ Yes □ No

Explain

4.7. IN YOUR OPINION, SHOULD THE MUNICIPALITY ROLL OUT THIS TECHNOLOGY AT OTHER INFORMAL SETTLEMENT SETTINGS?

□ Yes □ No

Explain

5. OPERATION AND MAINTENANCE

5.1. DO YOU KNOW HOW THE PORTA POTTY TOILET WORKS?

□ Yes □ No

5.1.1. If yes, please explain

5.1.2. If no, are you interested in knowing and why?

5.2. WHO IS RESPONSIBLE FOR CLEANING THE PORTA POTTY TOILET? _____

5.3. WHO PROVIDED THIS INFORMATION/TRAINING? _____

5.4. WHEN WAS THE TRAINING CONDUCTED? _____

5.5. WAS THE TRAINING USEFUL?

□ Yes □ No

Explain

5.6. WHO IS RESPONSIBLE FOR CLEANING THE PORTA POTTY TOILET?

5.7. IS IT EASY TO CLEAN THE PORTA POTTY TOILET?

□ Yes □ No

Explain

5.8. HOW DO YOU CLEAN THE PORTA POTTY TOILET?

5.9. WHAT DO YOU USE TO CLEAN THE PORTA POTTY TOILET?

□ Disinfectant (Please Specify) _____

□ Water

□ Soap

□ Other (Please Specify) _____

5.10. WHERE DO YOU DISPOSE OF /STORE THE CLEANING MATERIAL?

5.11. WHAT ELSE DO YOU HAVE TO DO TO MAINTAIN THE PORTA POTTY TOILET (OTHER THAN CLEANING)?

5.12. WHEN DISEMBARKING THE WASTE-HOLDING TANK OF THE PORTA POTTY, HAS THE WASTEWATER EVER SPILT WITHIN THE DWELLING?

□ Yes □ No

Explain

5.13. DO YOU PLACE THE WASTE-HOLDING TANK OUTSIDE YOUR DOORWAY?

□ Yes □ No

Explain

5.14. HOW OFTEN DOES THE MUNICIPALITY EMPTY THE WASTE-HOLDING TANKS?

□ Yes □ No

Explain

5.15. IN YOUR OPINION, DOES THE MUNICIPALITY COLLECT THE WASTE- HOLDING TANKS REGULARLY?

□ Yes □ No

Explain

5.16. HOW OFTEN IS THE WASTE-HOLDING EMPTIED?

□ Daily □ Every second day □ Every third day

□ Weekly □ Monthly

5.17. WHEN THE WASTE-HOLDING TANKS ARE COLLECTED, DO YOU RECEIVE THE CORRECT TANK AFTER EMPTYING?

□ Yes □ No

Explain

5.18. HAS YOUR WASTE-HOLDING TANK EVER BEEN DAMAGED?

□ Yes □ No

Explain

5.19. HAS YOUR WASTE-HOLDING TANK EVER BEEN STOLEN?

□ Yes □ No

Explain

5.20. DO YOU WEAR PROTECTIVE GEAR WHEN WORKING WITH THE PORTA POTTY TOILET?

□ Yes □ No

Explain

5.21. DID YOU RECEIVE ANY TRAINING ON HOW TO USE AND MAINTAIN THE PORTA POTTY TOILET?

□ Yes □ No

Explain

If yes, what did it entail?

5.22. WHO PROVIDED YOU WITH THE TRAINING?

5.23. WAS THE TRAINING PROVIDED USEFUL TO YOU?

□ Yes □ No

Explain

5.24. HOW DO YOU FEEL ABOUT CLEANING AND MAINTAINING THE PORTA POTTY TOILET?

Explain

5.25. DOES THE PORTA POTTY TOILET SMELL OR GIVE AN ODOUR WITHIN THE HOUSE?

□ Yes □ No

Explain

6. ECONOMIC ASPECTS

6.1. ARE YOU AWARE OF THE COSTS ASSOCIATED TO SUPPLY THE PORTA POTTY TOILET?

□ Yes □ No

Explain

6.2. DO YOU UNDERSTAND THE FINANCIAL IMPLICATIONS OF CHANGING TO A WATERBORNE TOILET?

□ Yes □ No

Explain

6.3. IF YES, WOULD YOU BE PREPARED TO PAY FOR A WATERBORNE TOILET?

□ Yes □ No

Explain

7. INSTUTUTIONAL CAPACITY

7.1. IN YOUR OPINION, IS THE MUNICIPALITY FULFILLING ITS ROLE IN TERMS OF PROVIDING A SANITATION SYSTEM?

□ Yes □ No

Explain

7.2. HAS THE MUNICIPALITY FAILED YOU IN PROVIDING A SAFE AND SECURE SANITATION SYSTEM?

□ Yes □ No

Explain

7.3. ARE YOU SATISFIED WITH THE WAY THE MUNICIPALITY HAS ROLED OUT THE PORTA POTTY TOILETS?

□ Yes □ No

Explain

7.4. FROM YOUR EXPERIENCE, HAVE YOU BEEN GIVEN A SUFFICIENT OPPORTUNITY TO PROVIDE INPUT IN TERMS OF THE SELECTION OF THE TYPE OF SANITATION SYSTEM?

□ Yes □ No

Explain

7.5. FROM YOUR EXPERIENCE, DO YOU THINK PORTA POTTY TOILET CAN BE PROMOTED IN OTHER HOUSING DEVELOPMENT SIMILAR TO JIM SE BOS?

□ Yes □ No

Explain

7.5.1. If yes, do you have suggestions where this can be implemented?

8. OTHER COMMENTS

Thank you very much for your time and contributions.