Expanding Sanitation Access in Accra's Public Toilets

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A Study Commissioned By Waste Enterprisers

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Contents

1. Executive Summary

The purpose of this study was to investigate public toilets sites in Accra, Ghana as a delivery model for sanitation in urban Africa. The goal was to articulate the maintenance and management practices of public toilet operators as a way of identifying sanitation delivery challenges and potential strategies for future interventions aimed at expanding sanitation access in Accra. The assumption tested was that toilet operators will forgo important maintenance tasks due to cost and that those decisions will directly impact the availability of sanitation in the city. The backdrop of this study is Waste Enterprisers' interest in finding critical points of reinvestment for a portion of the profits raised by its fecal sludge reuse operations. While this is the main thrust of the study, as will be discussed, the research also showed that in addition to Waste Enterprisers reinvestment in the sector, the manner with which it sources fecal sludge as a commodity has the potential to improve access to sanitation and long term profitability (sustainability) of its projects and those of the public toilet operators themselves. The study conducted semi-structured interviews with 41 public toilet operators in six of the eleven administrative districts of Accra. Respondents were either toilet site owners or the day-to-day managers of the sites.

Findings

The data suggest that public toilet sites in Accra are largely operating above the break-even point and that the logic of cost recovery is well intact. In other words, most sites are profitable enough to cover the costs of basic maintenance and as a result, a basic level of maintenance is observed. Therefore, the study's initial assumption of a *direct* link between maintenance and sanitation access does not hold. However, the data also contend that sites are profitable because user fee costs to toilet users are permitted to rise incrementally as the operating costs increase. As a result, the link between maintenance of individual sites and wider access to sanitation in Accra is important, but *indirect*. This is because rising user fees, which enable site profitability and maintenance cost recovery, also lower effective demand for toilet services in favor of open defecation.

Within the context of overall profitability, toilet operators described a number of operational challenges. The most important are as follows: 1) Sourcing fresh water; 2) Finding reliable vacuum truck services (for temporary excreta holding tanks); and 3) Customer behavior related to the cost of cleaning and use of antiseptic chemicals. These problems increase costs to operators and even require regular closure of sites. Both are constraints to sanitation access in Accra.

Recommendations

One of the important conclusions of this study is that there is opportunity to expand access to sanitation not just through targeted reinvestments in the public toilet sector, but also in the strategy that

end users employ while sourcing sludge for reuse. In reality, if part of a comprehensive strategy, both activities have the potential to mutually reinforce an access expanding program.

This study recommends that reinvestment and sourcing strategies in the sanitation sector retain the following programmatic values:

- Activities must maintain, i.e., not interfere, with the overall cost recovery logic whereby toilet owners engage in basic maintenance as a requisite business activity.
- Investment and sourcing activities should be aimed at making partner toilet sites more appealing to customers, i.e., more competitive thereby increasing their customer base rather than intervening directly at the level of basic maintenance.
- Activities should foster competition between toilet sites that result in greater cleanliness, better services, but which also result in operators holding user fees constant in order to sustain or improve access to sanitation.

Reinvestment:

This study recommends reinvestment in two principle ways:

1. Targeted investments in partner toilet sites that expand their ability to source fresh water.
2. Establishing effective partnerships for disinfectant chemical sourcing with partner toilets.

Sourcing fresh water is the chief challenge identified by toilet operators in the sample. It is required for basic functioning of site technology as well as indispensible for cleaning, hand washing or offering complementary services like showers. Respondents mentioned they were willing to pay monthly amounts for borehole provision, but that the upfront capital costs are beyond their ability to pay. It is recommended that Waste Enterprisers establish a foundation or strategic partnership with an existing microfinance organization for borehole construction at partnering toilet locations.

The second investment recommendation involves fostering reliable and cost effective sources for disinfectant and other cleaning supplies. Cleaning materials are essential to offering customers a pleasant experience as well as maintaining hygienic conditions necessary for ongoing improvement in community health. This is also important because as competition increases or other costs rise, operators are most likely to cuts costs related to cleaning and disinfectant use. The recommendation is that Waste Enterprisers establish a strategic partnership with a manufacturer or wholesaler of cleaning supplies that would enable partner toilet operators to source high quality products for consistently low or even subsidized prices.

These investments have a number of advantages:

- They make partner toilet sites more attractive to potential users.

The data suggest that public toilet customers want clean healthy experiences at that also provide services such as showers. Sites that offer these conditions and services will enlarge their customer base by drawing customers from places that do not offer these. This might also have a secondary effect that it could expand access by convincing more individuals to take advantage of public toilets in lieu of open defecation due to improved conditions.

- They make partner toilet sites more profitable.

By drawing more customers, partner sites will be more profitable without having to raise user fee rates. It provides the site owner with a cost recovery cushion for if and when maintenance costs rise and expands sanitation access through its suppression effect on user fees.

- They will set standards for public toilet services.

The data shows increasing competition in the public toilet sector. These investments will help guard against a race to the bottom whereby owners skimp on cleaning when their cost structure turns unfavorable. Partner toilets will be able to provide enhanced services. Other sites will have to offer equally attractive services, and in so doing these investments will help ensure that market competition results in greater access to hygienic sanitation instead of less.

Sludge Sourcing Strategy:

This study recommends the following:

1. Entering into service contracts with vacuum truck operators to collect effluent at partner public toilet sites.

These contracts should set specific service quality goals including expectations for waiting periods between request for services and arrival and best practices while on site. Vacuum truck operators will be drawn to the agreement because of the volume of customers represented by Waste Enterprisers' partners. Using the volume and consistency of business, these contracts should be able to set competitive prices. Otherwise another option would be to directly subsidize vacuum truck service fees for toilet partner sites. Recommendations for subsidy pricing are made in the body of this report.

2. Enter into memoranda of understanding with partner public toilet sites.

MoUs should be established with partner toilet sites which allow Waste Enterprisers to direct contracted vacuum truck operators to partner toilets whereby partner toilets pay selected truck operators as their sole service provider. The agreement would include a negotiate price per service rate, service expectations, and the understanding that Waste Enterprisers will be the end user of the site's effluent. In return for the

reduced or subsidized price and improved quality of service, partner toilet sites will agree to reduce or hold steady user fees and maintain prescribed levels of cleanliness. A process for raising user fees in the future should be spelled out in the MoU.

The MoUs would also be the basis for reinvestment activities described above. As a result, partner sites benefit from improved vacuum truck service as well as capital costs required to increasingly attract more customers. Waste Enterprisers could guarantee expanded access to sanitation through spot checking agreed upon parameters like user fee rates, use of cleaning supplies and other measures important for improved community health.

The report concludes with sections related to a) Important concepts emerging from this study that will likely be important in any context Waste Enterpriser or another end user social enterprise seeks to establish operations; b) Recommendations for further research; and c) A description of important field contacts made during the study that could be of us to Waste Enterprisers in the future.

2. Purpose of the Study

This study was commissioned by Waste Enterprisers and sponsored by the Bill and Melinda Gates Foundation. Its purpose was to investigate public toilets sites in Accra, Ghana as a delivery model for sanitation in urban Africa. The goal was to articulate the maintenance and management practices of public toilet operators as a way of identifying sanitation delivery challenges and potential strategies for future interventions aimed at expanding sanitation access in Accra. The assumption being tested is that toilet operators will forgo important maintenance tasks due to cost and that those decisions will directly impact the availability of sanitation in the city. There is acute need for both improved treatment and increased sanitation access within the study area. According to the *National Environmental Sanitation Strategy Action Plan 2010-2015* (Government of Ghana 2010) 39% of Ghana's urban citizens depend on public toilets for their daily sanitation needs and in the case of Accra, effluent collected from public toilets is discharged into the ocean without treatment. Further, in Greater Accra, an additional 11.5% resort to open defecation, suggesting critical need to expand easy access to sanitation.

Waste Enterprisers is a social enterprise developing technologies for fecal sludge treatment and reuse. As such it is tasked with both finding innovative ways of dealing with human waste as well as expanding sanitation coverage through reinvestment in the sector. Therefore the backdrop of this study is WE's interest in finding critical points of intervention for a portion of the profits raised by its fecal sludge reuse operations. While this is the main thrust of the study, the research also showed that in addition to WE's reinvestment in the sector, the manner with which WE sources fecal sludge as a commodity has the potential to improve access to sanitation and long term profitability (sustainability) of its projects and those of the public toilet operators themselves.

3. Research Method and Sample Characteristics

3.1. Method

This study draws on a series of semi-structured interviews with 41 public toilet owners or managers conducted November-December 2012. In addition, direct observation of public toilets sites and eight key informant interviews contributed to the study. The semi-structured interview is a method whereby a survey instrument is created so that all respondents are asked a basic set of questions, but each interview is a unique exchange and interactions proceed in conversation style. For this study each respondent was asked to explain the day-to-day management of their toilet site. These included questions related to the following:

- Maintenance tasks required to operate public toilet sites
- Basic system technology and requirements
- Owner/manager experience with vacuum truck services
- The basic cost structure of the site
- Public toilet strategies for getting customers
- The relationship between individual sites and other public toilets
- Relations with local government
- Any challenges or bottlenecks experienced while providing the service

All respondents were asked the same basic questions, but the researcher was able to ask "why" or "how" in addition to any follow-up questions as the exchange proceeded. All interviews were recorded and the audio files were reviewed, coded for cause and effect logic, and used to establish the basic conclusions of the study. Therefore, while basic quantitative data are presented throughout the analysis, direct quotes in the respondents' own words are leveraged as the main evidence for the most salient findings. Interviews were conducted in English or through the aid of a translator.

The strength of this method is that it allowed the researcher to pursue pertinent data needed from all respondents in order to generalize about how public toilets in Accra are operated, but also allow for exploration of the circumstances and actions of the respondents as independent agents in their own reality. This method is particularly appropriate in situations where open questions exist about evolving situations or systems or where the researcher is particularly interested in challenging basic assumptions about a phenomenon. Both were true for this study: While there is a growing literature on public toilet operations in the developing world, we are still mapping how sanitation is provided through this model and looking for ways to improve it even as the model itself continues to change. Further, as this literature is expanding it is important to revisit assumptions about how outside intervention into the system will bring about positive results in order to guarantee the most effective use of resources as well as avoiding any negative unintended consequences of intervention.

The weakness of this method is its limited generalizability. As discussed below, every effort was made to construct a sample that reflects the diversity of public toilet sites in Accra. However, this method cannot approach the kind of generalizability a census or a true random sample of a known population would provide. The comprehensive data required for that kind of study do not exist in any accessible form for the object of this study. Instead, this study allows us to generalize ideas about how the public toilet sector in Accra is managed, where challenges are likely to arise, best ways to approach the sector, and begins the process of building theories about problem likely to be found in contexts other than Accra.

Key informant interviews where unique to the specific knowledge the informant possessed. For this study key informants included:

- The program manager for a WASH NGO operating in Accra
- The head environmental engineer for the Accra Metropolitan Assembly (AMA)
- Resident of Old Fadama and employee of the Ghana Federation of the Urban Poor
- Chairman of a septic truck drivers union
- Long time septic truck driver
- Secretary of the Alajo Development Committee
- Secretary of the Jamestown Public Toilet Owners Association
- Longtime resident and community leader in Nima

The information collected from key informants was used to learn basic characteristics of the public toilet sector, corroborate accounts by respondents, or to provide a larger context for toilet operations in Accra.

3.2. The Sample

The sample was constructed in order to reflect the different types of customer catchment areas found in Accra. Emphasis was given to the administrative organization of areas within the city as well as the socioeconomic characteristics of those areas. Greater Accra is organized into 11 administrative units of the Accra Metropolitan Assembly (AMA) called Submetros. Submetro administrators provide the main supervision of all public toilets sites in the city. Control of AMA toilet franchise rights, user fee regulation, site inspection, new site authorization, and all revenue collection is the responsibility of Submetro administrators. In reality, the management provided at the Submetro level varies a great deal between Submetros and therefore it is important to systematically vary respondents by Submetro location in order to capture the full picture of the challenges of providing sanitation at public toilet sites. The sample includes respondents from six of the eleven Submetros. The study selected specific neighborhoods

within these six Submetros in order to vary the socioeconomic status of catchment areas. The neighborhoods were as follows:

Jamestown, Asheidu Keteke Submetro: This area was included because it is a lower income neighborhood in one of the oldest areas of Accra. While much of the neighborhood's public toilets are connected to a defunct central sewer line, many of the toilets rely on holding tanks and vacuum trucks.

Nima, Ayawaso East Submetro: Nima was included because it is a low income neighborhood that is highly contested by political parties.

Old Fadama, Ablekuma Central Submetro: Old Fadama is a high density neighborhood where nearly all the residents have insecure tenure. Some of the worst socioeconomic conditions in Accra are found in Old Fadama.

Kaneshi, Okai Koi South Submetro: This neighborhood is in the vicinity of the Kaneshi Market, one of the largest public markets in West Africa. The area is middle income, but with a significant presence of public toilets.

Alajo, Ayawaso Central Submetro: Alajo is another moderate income area with pockets of lower income households and a significant presence of public toilets.

Osu, Osu Klottery Submetro: Osu is a mixed income area containing high income households including foreign expatriates and NGO headquarters as well as many low income households.

Table 3.2 displays the number of respondent toilet sites by neighborhood.

Table 3.2: Respondents by Location

Location	Number
Jamestown	3
Old Fadama	13
Alajo	9
Osu	4
Kaneshi	6
Nima	6
Total	41

A relatively large number of respondents were included from Old Fadama because the area is almost entirely dependent on public toilets for sanitation needs and the greatest diversity of toilet system technology was observed there.

Some neighborhoods required a community introduction. In Old Fadama and Nima, the researcher was introduced to toilet operators by a trusted member of the community. In those cases, the liaison brought the researcher to sites known by the liaison. In the other neighborhoods, the researcher and an assistant went to the neighborhoods, asked local residents where the public toilets were, and interviewed willing respondents.

4. Profile of Public Toilets in Accra

4.1. Administrative Organization of Public Toilets

In Accra, public toilet services are provided in two ways. Every public toilet is either an "AMA franchise" or a "private toilet". Accra Metropolitan Assembly (AMA) franchise toilets are toilets that were once run directly by local government, but have gone through a privatization process. The AMA franchise label also applies when the AMA grants approval to a new site and supplies the land for toilet construction whereby the site is operated by a private entity under contract with the AMA. For AMA franchise toilets the site itself is under the control of the local government but managed day-to-day by a private enterprise. Revenues are paid by the owner (contract holder) to the AMA and the remaining profits belong to the owner.

Private toilets are public toilet sites on privately controlled land. While the AMA still regulates these and collects revenues from their operation in the same manner as AMA franchise toilets, no contract exists between the AMA and the owner. While it is likely the formal responsibility of the AMA to issue permits to all new and existing public toilets, this study finds no evidence that this is taking place systematically. Instead, the process described by respondents is that private toilets appear as the market demands them and entrepreneurs rise to meet that demand. After a private toilet site is established, the AMA will begin collecting revenue and providing regulatory oversight.

Table 4.1 displays the proportion if the sample that are AMA franchise sites and those that are private toilets. Private toilets outnumber AMA franchise locations in the sample. While the sample was constructed to include sizable numbers of both AMA franchise and private toilets, the sample is likely reflective of the larger population whereby private toilets likely far outnumber AMA franchise sites. As described above it is much easier to create a private toilet than to navigate the process of getting government land and a formal contract for an AMA franchise location.

Table 4.1: Percentage of Franchise and Private Toilets in the sample (N=41)

AMA Franchise	41% (N=17)
Private Toilets	59% (N=24)

4.2. Political and Social Aspects of Public Toilets

Political Nature of Sanitation: All public toilets, both AMA franchise and private locations, are managed at the Submetro level as described above. For AMA franchise locations, the contract between

the local government and the owner is held at the Submetro level. That is, all decisions about granting or resending management contracts are made by Submetro administrators. This, as it turns out is a very political. As Section 4.6 points out, public toilets can be a good source of income and contracts are often given as political patronage.

Respondent NJ described the plight of anyone who holds an AMA contract: "You know in Ghana, when politics change, your business also change; your plans change, they collapse."

In other words, if you are in the wrong party or someone else is owed a political favor, you may no longer be able to keep control of an AMA franchise toilet. However, toilet sites are quite contested and some are able to maintain control in the face of political change. For instance, FA, a long time toilet manager in Alajo described his experience as follows:

> The change of governments, when it [government] changes they will take it [management contracts] from you if you are not strong. When this government changed, they wanted to take it, but we did not agree. So I am still handling it. That is why they built this one [a new site next door]...so they have wanted to take it for political affiliation, but in Alajo, we don't allow that. We fought it and they could not take it…they are now putting new ones.

In his case, he had other political connections that enabled him to keep control of the site he has managed for years. However, as referenced in the quote, the Submetro administration approved a new toilet next to his, which has had a significant negative impact on his customer base. FA also points out that sanitation in Accra must always be understood as a resource. He states "When money is involved, then they will come. Everyone fights for money. If you are not strong they will take it from you."

As with any resource, there are many interested parties vying for control of public toilets. In Nima, AMA franchise toilets are particularly connected to the political parties. TN a manager of an AMA franchise in Nima received his contract four years ago when Ghana changed political leadership. However, it was made clear to him that the toilet site must be used to meet the needs of the party. As he explains:

> When the people come in, normally most of the people in this community, they don't pay. They go in free. It is just a little people that pay. It is due to the party. The party colors. We have to maintain it in such a way that the party look good. We have a problem then, you understand?

This is an extreme case. At TN's site, he suggests that only 30% of his customers actually pay the user fee for the toilet. Other locations from other neighborhoods in the study suggest that between 75-90% of customers pay the required user fee, at least in part, because other sites are not as politically oriented and private locations will not likely be pressured through political parties to provide a free service to the

community. However it must be noted that the political context of sanitation as a resource must be accounted for in any intervention strategy.

Social Organization of Public Toilets: The administrative organization of public toilets was described above. In addition to this organizing logic, there are additional layers of social organization. These are important primarily because they show how toilet owners organize themselves to foster cost recovery and government responsiveness. The social organization of toilet owners greatly varies between Submetros. This is because for many Submetro jurisdictions, they main social organizing takes place in the context of local administration. In other words, The AMA Submetro administrators frequently gather toilet owners together ostensibly to collect fees or to provide some kind of common use information about operating a toilet site. However, in some Submetros, these meetings are expanded to include information or resource sharing, problem solving, and other types of organizing. One of the more important pieces is that these gatherings are used to set user fees. That is, the operators decide as a group, with AMA input, if raising user fees is warranted due to a rise in operating costs.

In Old Fadama, Alajo, Jamestown, and Nima, there are separate toilet operators associations. In addition to the other activities listed above these also provide social welfare operations. Here member contribute money for "rainy day" funds or for group projects.

4.3. Overview of System Technology

The study observed eight separate toilet systems in operation throughout the sample area. It is important to note that it is common for respondents to refer to their systems as "septic tanks" however the vast majority of these systems are not septic systems proper. They do not have overflow chamber sequencing or an established drain field that would be required for on-site septic system treatment. Instead, they have concrete lined holding tanks. Therefore, while respondents use the term "septic tank" the analysis uses the term "holding tank" in an effort to be more accurate. A description of the observed systems is as follows:

1. Water Closet (WC) with Holding Tank: Newer facilities tend to be equipped with WC technology, usually with pull-chain flushing, and plastic or porcelain commodes. Effluent collects to a central holding tank. It is the expressed intent of the AMA to move all public toilet facilities toward this technology.
2. Pour Flush with Holding Tank: This is similar to the WC design, except the commode is flushed manually by the user with a bucket of water. Effluent collects in a central holding tank.
3. Pan/Bucket with Holding Tank: In this system, the user defecates in a pan or bucket and the contents are emptied into an on-site holding tank either by the user or by toilet site staff.
4. Pit Latrines: Although these are being phased out by the AMA pit latrines are still common. Users squat over a hole in a concrete or plastic floor and excreta collects to a holding tank.
5. Central Flushing with Holding Tank: Although rare, the study observed one case of a central flushing system. Multiple commodes are all flushed in WC style by site staff at the same time.

6. Pan/Bucket without Holding Tank: Users defecate into a pan or bucket. Here, the sites do not have a central holding tank and feces are held temporarily in large buckets or drums and are emptied at night into surface waters or roadside storm water drains. It should be noted that this is not only a description of specific public toilet sites, but also a very common way people dispose of excreta in their own homes.
7. True Septic System: This study observed one site with a system approaching a true septic system with a level of on-site treatment. The respondent described a series of overflow chambers ostensibly designed to hold and treat effluent on-site. However, no drain field was apparent and they system seemed to drain directly to storm water sewers.
8. Composting Toilets: CHF, an international NGO is in the process of providing loans and technical assistance for individual households in the Nima neighborhood to establish composting toilets. While they are not currently engaging public toilet sites, they have begun to contact public toilet owners for ways to similarly partner.

Systems 1 through 5 all rely on the services of vacuum trucks to remove effluent from their holding tanks. Table 4.3 lists the sites observed in the sample by their technology type. In order to simplify, systems 1-3 and 5 are classified together due to their reliance on an on-site holding tank. Bucket latrines without tanks and pit latrines are both classified separately. In the case of pit latrines, while they still rely on vacuum truck emptying, they are considered less desirable by users and the AMA has stated they will phase these out.

Table 4.3: Sample Toilet Systems by Type

Type	% of Total (N=41)
Holding Tank/Truck Dependent	71% (N=29)
Pit Latrines	12% (N=5)
Bucket Latrine without Tank	15% (N=6)
True Septic	2% (N=1)

4.4. Site and Site Manager Characteristics

Table 4.4A summarizes some key characteristics of sites and Table 4.4B summarizes key characteristics of respondents. Within the sample, the typical manager has been working for over four years at a site that has been in operation for over nine years. That site has approximately 575 customers a day and charges GH₵0.24 each time a customer uses the toilet. Managers on average have low educational attainment and oversee fewer than four employees at each site. Men outnumber women greatly in the sample. Only 12% (N=5) of the sample respondents were women. While women in the

sector appear to take on all roles from owner to cleaner, there is a sense among workers in the sector that toilets are generally the prevue of men. Partly this is for political purposes. There is a lot of political pressure on toilet sites to fulfill patronage needs "for the boy", i.e., to provide jobs to political supporters or the unemployed masses. No clear pattern emerges regarding ethnic groups. At least 14 self identified ethnic groups are found in the sample. However, ethnic groups tend to gather in specific areas of the city, and in those areas, the predominant group was reflected in the ethnic identification of the manager.

Table 4.4A: Public Toilet Site Characteristics

	Average	Sample Range
Years in Operation	9.3 Years	0 to 40 Years
Number of Employees at Site	3.7 Employees	2 to 12 Employees
Customers per Day	575.6 Customers	80 to 4,000 Customers
User Fee	GH₵0.24	GH₵0.10 to 0.30

Table 4.4B: Characteristics of Public Toilet Managers

	Average	Sample Range
Years Managing the Site	4.4 Years	1 to 15 Years
Education Attainment	Started but did not complete primary school	No Education to Post Secondary
Age	41.8 Years	20 to 70 Years

It should be noted that key variables do vary between sites a great deal. As will be discussed at some length below the number of customers per day and the user fee charged at the site determine the sites profitability, and through the logic of cost recovery, how well the site is likely to be maintained. This has implications for both sanitation access and community health.

In terms of physical structures, conditions vary widely; however, a few patterns are clear. AMA franchise sites are almost exclusively concrete with metal roofs. These structures appear to be durable, but structural maintenance varies from site to site. In the sample, all the bucket latrines without holding tanks

were in Old Fadama, The structures in these sites are primarily of particle board, wood, and other scavenged materials like plastic sheeting or flattened metal drums. Private toilets have the greatest variability. Some of them are located in the owner's home compound and reflect the building materials of the neighborhood, or they are investment properties. On the whole, private toilets outside of the owners home tend to mirror the AMA franchise locations in materials used and style. It should be noted, that at all sites, hand washing opportunities are the exception rather than the rule.

4.5. Maintenance Requirements

There are several basic tasks reported by nearly all respondents that are required to keep a public toilet site up and running. The occurrence of these tasks varies from daily to annually or longer. These are as follows:

Cleaning: Maintaining basic cleanliness of public toilet facilities is an important and ongoing activity. Sites typically have staff dedicated exclusively to cleaning the facility. The exceptions are sites that are run with only one person on duty at a time (approximately 22% of the sample). Respondents describe several aspects of daily cleaning duties. Toilet staff routinely wash down the premises, particularly the commodes, squat platforms, pans, buckets, and floors. Toilet paper is not usually flushed with excreta and is instead collected separately to be disposed of by staff. One of the more important steps is wiping down with or spraying of disinfectant chemicals and detergents. Respondents report that when AMA representatives inspect public toilet sites, the cleanliness and use of disinfectants are monitoring priorities. It should be noted that cleanliness of the sites varied greatly and foul odor was common.

Unclogging/Removing Foreign Objects: While removing foreign objects or otherwise unclogging the toilet system might be placed within the category of overall cleaning, the importance placed on it by owners and managers requires that it get special attention. As will be discussed below in section this represents a significant maintenance challenge for site managers.

Holding Tank Emptying: As shown in Table 4.3, 83% of public toilet sites in the sample are reliant on vacuum truck services to empty holding tanks or pits. The frequency of these services depend on how many customers per day visit a site and the size of their holding tank, both of which vary considerably from site to site. Table 4.5 displays pertinent information on the cost and frequency of vacuum truck service requirements within the sample; it is based on respondents' indicated costs and frequency of service use at their sites. Estimating the cost per trip is complicated because the cost is dependent on the size of the truck dispatched to the site and the distance of the site to the eventual dumping area at Lavender Hill.

Table 4.5: Vacuum Truck Services

	Average	Range
Vacuum Truck Service Frequency	2x per month	Daily to 6x per year
Cost Per Trip	GH₵145	GH₵100 to 230

Lavender Hill is the coastal area due west of Jamestown appointed by local government for fecal sludge dumping. Respondents and key informants report that trucks have three general size categories: "single", "one-and-a-half", and "double". According to the drivers' union stationed outside the dumping site at Lavender Hill, starting prices for these sizes are GH₵150, GH₵180, and GH₵250 respectively. There is a considerable amount of negotiating between public toilet managers and truck operators. As a result, the average cost listed above belies considerable variation between sites and even between trips to the same site. For instance, the average cost reported by site managers is below the starting price listed by the drivers union for the smallest truck. Moreover, while toilet site locations relative to the dumping site are fixed, often trucks can make a string of stops making the distance part of the equation more negotiable in terms of actual price to the toilet manager.

Removing Long Term Build-up (Desilting): Occasionally toilets have to be 'desilted'. This is the process of shutting down a public toilet, opening up the holding tank and removing the accumulated build-up of solids and foreign objects. This is not done regularly, sometimes once a year or only after many years. A small number of sites in the sample report desilting (N=5). Those that do not appear to avoid doing so by having vacuum trucks pressure clean the holding tanks whenever the tank is emptied, or alternatively, shovel out remaining solids at the time of regular emptying. When a site desilts, they are required to rent a container from the AMA to store the removed contents which the AMA will haul away. The process costs approximately GH₵1300.

Maintaining the Structure: Basic maintenance of the structure is an ongoing process. Concrete structures require patching cracks and painting. Painting is reportedly done on an annual basis or less frequently. The reported cost is approximately GH₵900. The wooden strictures of the bucket latrines require far more maintenance because the wet environment degrades the materials rapidly.

4.6. Toilet Site Cost Structure

The above analysis has already identified major components of the cost structure of public toilets in Accra. Revenues are generated through user fees. Major costs include vacuum truck services and basic

structure maintenance. The purpose of this section is to provide an estimation of the profitability of public toilet sites. These estimates are not intended to be exact, but to provide a general picture of the structure of generic individual sites. This will become important as the analysis later discusses cost recovery at these sites and how best to engage the sector through reinvestment and product sourcing.

Before cost structure estimates can be presented, there are other important elements that must be discussed in addition to the costs and revenues already detailed above. These include the following:

AMA Revenue Collection: As mentioned above, the AMA collects fees for each toilet site in Accra. For both AMA franchise and private toilets the process is similar. An AMA representative will make a site visit, do a head count of the number of customers a site has and then establish an amount due from the site to the AMA. These fees are typically paid monthly, but other arrangements are reported. Therefore the AMA fees are not the same across different sites, but are essentially a head tax based on revenue taken in by the site. Respondents report that the fees are negotiable and change regularly. As a result, it is difficult to estimate what a generic head tax will be for any given site. Respondents were not forthcoming about the amounts the AMA charge and only a few respondents provided financial information on AMA charges. For the purposes of this report, the AMA fee is placed at 35% of gross revenue.

Labor: Toilet sites in the sample hire employees numbering at rates varying between 2-12. For purposes of estimating cost site cost structure, the daily cost of a worker is set at GH₵4. Respondent estimates range from GH₵1-7 per day, but GH₵7 is reserved for workers disposing of excreta in the night from bucket latrines.

Customer Discount Rate: Section 4.2 relays how there is both political pressure on certain sites to allow people to use toilets for free as well as a certain number of individuals who will be allowed by managers to go for free more generally. In other words, there is the sense, as Respondent AB put it, "They want free. Everyone want to shit for free." Partly this is due the former practice of government toilets offering free services to the community. Many people believe this should still be the case. Respondent AD described it like this:

> "That 20 pesewa, some find it difficult to pay. They are used to free, free, free, but they also want some place that is neat. If they don't pay how can someone maintain the place?

As a result, in cost estimates, we must discount the number of customers by the amount not paying. For the analysis, the discount is placed at 80% of all customers. That is, if we are estimating the cost structure of a site that received 100 customers per day we will assume that 80 of them are paying customers.

Chemicals: One of the main maintenance tasks is cleaning the site. While labor is a significant expense in this task, the other expense it the cost of chemicals. Using disinfectants and other chemicals is an important aspect of toilet maintenance as expressed by respondents. The amount of chemicals purchased will vary on how many customers are using the site and the individual site owner's commitment to cleanliness. Data gathered by this study on cleaning materials do not provide a clear generic cost picture. There are considerable discrepancies in the accounts given by respondents. One of the reasons for this is that respondents "know the right answer" when someone asks them about how well a public toilet is cleaned. This is a common problem in public health research and is corroborated by key informants working locally in Accra in the WASH sector. Also, while there are likely formal requirements set by the AMA, there does not seem to be any uniform practice enforcement and site visits by the AMA seem to vary considerably between Submetro administrators. Some managers discuss being required to purchase chemicals directly from the AMA, other report buying them from businesses. Further, respondents report disinfectants in informal markets where the managers know they are purchasing a watered down product, but do so to save money. Further, chemicals and cleaning supplies easily lend themselves to arbitrage sales, especially when they are provided in-kind, by outside organizations. For the purposes of cost estimation, the cost of chemicals is based on estimates provided by respondents, but these estimates are understood to be based on limited data.

Cost Structure Estimation

Table 4.6A is an estimation of the monthly cost structure and profitability of four profiles of public toilets. The analysis is done using GH₵, however, the last column of the analysis places the annual profit in US$. The estimates profiles are as follows:

Top Performer: Based off the most lucrative site in the sample with an outlier customer base, daily truck services, 12 employees, and charging GH₵0.30 per use. This is intended to give the upper range of possibility. Likely only a few toilets in the city are operating at this capacity.

Good Performer: Uses information about good performing sites within the sample including the upper limit customer base of non-outlier sites, charges GH₵0.30 per use, has five employees, and weekly truck service. This type of site was common in the sample, but it represents the upper limits of normally operating toilets.

Poor Performer: Uses information collected about lowest performing sites including having two workers, monthly truck trips, a customer base representing the floor of the sample, and charges GH₵0.20 per use. This profile is also common in the sample, but represents the floor of normally performing sites.

Sample Average: All the average indicators from the sample were used to create this profile.

Table4.6A: Profitability Estimates for Performance Types

Revenue Estimation

Estimate Type	No. of Customers	Discount	User Fee	Days	Gross Revenue
Top Performer	4,000	3,200	0.30	30	28,800
Good Performer	900	720	0.30	30	6,480
Poor Performer	150	120	0.20	30	720
Sample Average	575	460	0.24	30	3,312

Cost Estimation

Estimate Type	Truck Cost	No. Truck Trips	Labor	Chemicals	AMA Payment	Total Cost
Top Performer	160	30	1,440	500	10,080	(16,820)
Good Performer	200	4	600	200	2,268	(3,868)
Poor Performer	120	1	240	50	252	(662)
Sample Average	145	2	444	150	1,159	(2,043)

Profit Estimation

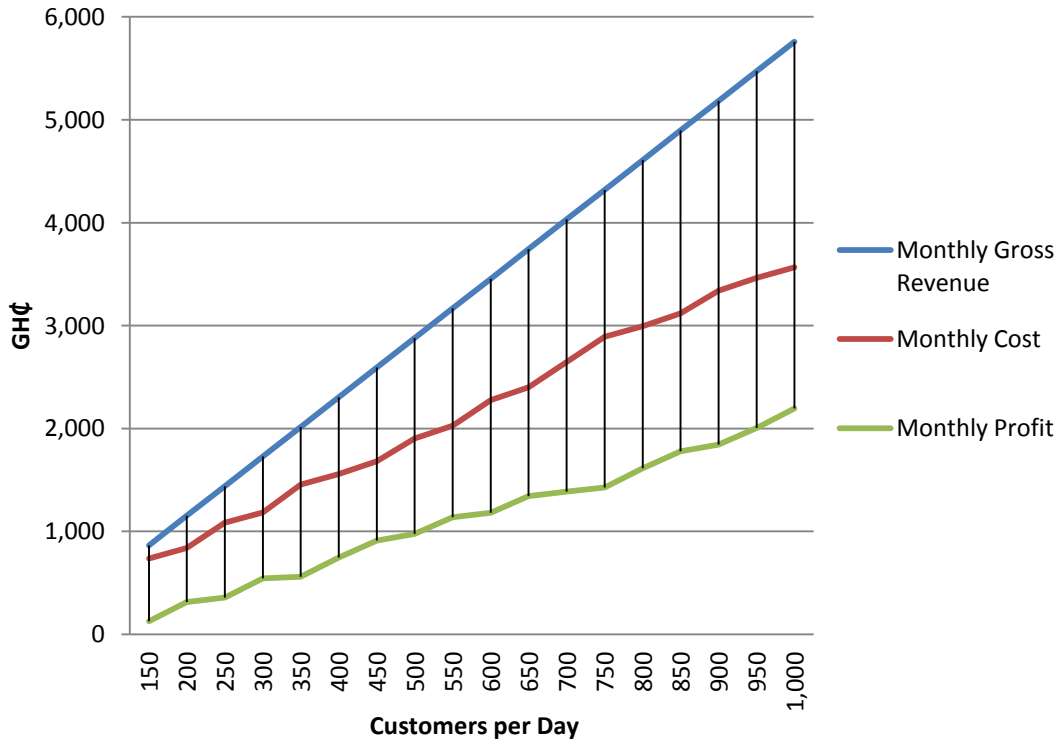
Estimate Type	Monthly Profit GH₵	Annual Profit GH₵	Annual Profit US$[1]
Top Performer	11,980	143,760	75,663
Good Performer	2,612	31,344	16,497
Poor Performer	58	696	366
Sample Average	1,269	15,226	8,013

[1] An exchange rate of US$1=GH₵1.90 was used for the conversion

The above analysis does not include potential costs related to painting or structural maintenance. These are annual expenses that most owners are likely to put off if cash flow is tight. So while these costs should be considered in terms of overall profitability, they are not included here. While all four profiles are profitable according to this estimation, the exercise shows that the poorest performing sites in the sample are at risk of approaching the break-even point. It should be noted that a change in any of the assumptions would alter this analysis. For instance, AMA payments are regularly restructured and an increase could dramatically change the profitability of a site. Further, cost variability of chemicals or truck visits are going to have a more dramatic effects on the bottom lines of average or poor performing sites because these costs make up a higher percentage of the overall cost structure for these sites.

It is also useful, given the information described above, to chart likely monthly profitability for generic sites. Figure 4.6B shows how cost, revenue and profitability are likely to vary as customers per day increase for a generic site. The chart assumes the average user fee from the sample (GH₵0.24) and AMA head tax (35% of gross revenue) and assumes that vacuum truck service requirements, disinfectant chemical needs and labor costs all increase with customer use along regular intervals.

Figure 4.6B: Monthly Profit Estimation



4.7. Public Toilet Challenges

This section will discuss the problems that toilet managers identified while discussing the day-to-day operation of their sites. All respondents were asked, after detailing the maintenance tasks and operational context, what the challenges were that they faced operating the site. Responses were cataloged, tallied and explored. Any challenge that was identified at any other time during the interview through follow-up questions or as a result of further reflection by the respondent was also added to the tally. Respondents could identify as many challenges as they wanted including no challenges at all. Table 4.7 lists the identified challenges.

Table 4.7: Manager's perceived challenges in operating a public toilet

Identified Challenge	% of Respondents (N=41)
Fresh Water Sourcing	39% (N=16)
Vacuum Truck Reliability	27% (N=11)
Customer Behavior	27% (N=11)
Foreign Objects	22% (N=9)
Structural Problems	12% (N=5)
Site Flooding	12% (N=5)
Vacuum Truck Cost	10% (N=4)
Seasonality	10% (N=4)
Political Context	10% (N=4)

Fresh Water: The greatest number of respondents identified fresh water sourcing as an important challenge to operating a public toilet site. Respondent TO puts is succinctly when she says, "Everything depend on water". With the exception of bucket latrines and pit latrines, all other designs depend on water for basic functioning. Moreover, even bucket latrines and pit latrines, along with the other designs require water for basic cleaning and maintenance. Respondent CJ explains the problem:

> In Accra we have a shortage of water and we have to lock the place [the public toilet]. The tap is not flowing...we fill the poly-tanks, but when they are empty, we lock it.

In Accra it is not uncommon for the public water to be turned off to a neighborhood for days or even weeks at a time as systems break down or the supply is rationed. Even though many sites have reservoir tanks, their reserves eventually deplete and they are forced to buy water or close the site until the public water comes back on. It is quite common for managers to express a desire or even a stated plan to put in a borehole dedicated to the toilet facility. Respondent KJ discussed how the site for his privately built public toilet was chosen specifically because the land was known to have ground water access for his borehole. Further, CO suggested that there is an organizational need to set up a micro financing scheme to supply boreholes to owners. This is a sentiment echoed throughout the sample.

Vacuum Truck Reliability: The second most important challenge facing the sector is the reliability of vacuum truck services. It should be noted that cost of truck services is categorized as a separate and far less important challenge. The reliability of services involves several things. First, respondents describe that often truck operators will not come on the agreed upon days and time. Many respondents report having to close the toilet while they wait because the holding tank is full and no more can be added to it without the system backing up. As Respondent KO states "If there is no car, you can't do anything." Or as Respondent AO complains, "You will call somebody and he will say 'I'm coming, I'm coming', so you keep calling until you find someone."

Another factor involved with vacuum truck reliability is the quality of service. Respondents describe how some truck operators do a good job, fast and neat, while others often spill significant amounts of effluent. The job of cleaning up the site belongs to the site manager and some spills require the temporary closure of the site.

The last aspect of vacuum truck reliability is the variation on cost. Note that this is not the same as cost being a challenge in and of itself, but that managers explain that the search cost associated with finding and negotiating with truck operators presents a challenge. Respondent AJ describes it like this:

> You will find one, then you will find another. The pricing is not fixed. You might go out looking for a truck and it might be high, but you call someone else and the price is reduced...I like to use the same people, but they are unavailable.

Customer Behavior and Foreign Objects: The next two challenges could be taken as one because the behavior of customers and the presence of foreign objects in toilet systems are linked because the customers throw the objects into the toilets. For clarity they are separated for discussion. When respondents mention the behavior of customers they are often referring to the messes customers make in

toilets due to ignorance or malice. Respondent JA explains the problem he has with customers who are unaccustomed to WC or commode technology:

> They don't understand they have to sit on it. When they go they stand on it. They make a big mess. You cannot do anything. They will say—'I have paid 20 pesewa!' We have to quarrel with them.

Respondent CJ corroborates and discusses how he has considered installing more basic technologies to make maintenance of his site easier. He states:

> Because of the, sorry to use the word 'illiteracy' of the people, it is all WC and the people don't know how to use it. We want to replace the WC. They always spoil it.

Customers who throw foreign objects in to the system are a constant problem for toilet managers. Respondents report having to regularly, even weekly, close sites in order to unclog the system. The vacuum truck driver union representative also said that this is a problem for them as well, they pull out everything from blue jeans to metal cans to rubber sandals. Similarly, many customers will defecate into a plastic bag, referred to locally as "rubbers", tie it off and enter the public toilet to dispose of it. This practice causes severe problems for the toilet systems and vacuum trucks.

Structural Problems and Site Flooding; These two challenges are taken together because they are mostly found in Old Fadama and are causally connected. Specifically, respondents that mention either of these are primarily bucket latrine operators. Old Fadama resides in a flood plain; during and after heavy rain much of the area is flooded and at times impassable. Bucket latrine operators tend to have temporary structures made of wood or other scavenged materials. Therefore, rains exacerbate structural problems in addition to cutting into the customer base for a site during floods.

Vacuum Truck Cost: When vacuum truck reliability is treated separate from cost, few respondents indicate that the expense of the service is a serious problem (only 10% of the sample). It must be noted that this study was designed to, among other things, test the assumption that the cost of maintenance resulted in poor or no maintenance at public toilets. Because vacuum truck service is the most costly single aspect of public toilet maintenance it bears some explanation as to why it is not higher up on the list as one of the most important challenges facing toilet operators. As the cost structure section points out, even poorly performing sites are likely above the break-even point. This means that the cost recovery logic of privatization is largely working, at least for 90% of respondents in the sample. As FN states in reference to the prevailing cost of trucks, "That is how much everybody is paying, my boss never

complains." It is important here to explain how managers see the cost of vacuum truck services as a problem when they do identify it as such.

The following exchange between Respondent AJ and the researcher JH is informative. JH had just finished asking AJ about several different maintenance tasks, including paying for vacuum truck services. AJ had responded that at times, paying for the truck service was a challenge. But then he followed that comment up with this:

> AJ: Here I'm OK, I have been doing this for some time, so I'm OK. But if an organization wants to help when I'm about to start a new one [public toilet] then I would be open to receiving help.
>
> JH: So now the business is OK? The costs are OK and you can make enough for you and your family?
>
> AJ: When I was starting out I found hardship, but now everything has balanced out.

This suggests that even when the cost of vacuum truck service is considered too high, it rarely disrupts service. In fact, when pressed, AJ states that ongoing costs are OK, even balanced, but raising capital costs for future expansion is more of a challenge.

In fact, respondents often discuss the cost of vacuum truck services as a cash-flow problem, not as problem with the overall cost structure. This is expressed in the following exchange with a manager who previously expressed the cost of vacuum truck services as a significant challenge.

> JH: Is there ever a time when you don't empty the tank because the money is too low?
>
> DO: No, I have never had to do that because if the money is low I can agree to pay later with trucks I know.

Another example was from a respondent for whom the expense of vacuum truck service was a problem. AN identified the cost of vacuum trucks as a major challenge. However, when the cost structure of his site is examined, AN is a stand-out. He states that he has to hire a vacuum truck every week and that the truck he uses charges GH₵200 each trip. AN has approximately 500 customers a day, but is mandated by the AMA at his site to only charge GH₵0.10 for each use. As a result he is paying at the high end for truck services, but collecting at the low end for user fees. In addition, the frequency of truck service for this many customers, likely means that his holding tank is small in comparison to other sites. All these combine to make AN's cost structure an outlier and all expenses likely a challenge. In fact,

when AN's information is plugged into the cost structure estimation equation above it suggests AN is operating below the break-even point.

It would seem that the cost of vacuum truck services is a problem for those with uncompetitive cost structures or those with cash flow problems. Otherwise, truck reliability and service is far more important to toilet owners.

Seasonality: Respondents who identify seasonality as a challenge are referring to season variations in their customer base. These complaints are mostly found in areas with a significant population of internal migrants. Respondents find that during planting or harvesting seasons, many of their customers migrate to their home areas. This causes cash flow problems for the manger. Additionally, important holidays such as Christmas or Ramadan create seasonal disruptions and cash flow interruptions.

Political Context: As discussed in section above, the political reality of sanitation as a resource causes problems for some managers. They do not know if or when they may lose control of the facility. Some respondents even expressed the idea that they do not undertake important maintenance tasks, such as desilting or painting because they fear losing control of their toilet site after the investment is made.

4.8. Cost recovery, maintenance, and customer preferences: Why toilets are likely to be maintained at a minimum basic level, but unproductive forms of completion may be on the horizon

In addition to cataloging the maintenance requirements and overall system organization, this study was intended to test the possibility that toilet operators would often forgo important maintenance aspects of public toilets because of the cost of such activities, which would in turn, constrain access to sanitation in the greater population. The analysis largely shows that cost of maintenance is not an overriding problem currently faced by public toilet operators in Accra. The cost of routine maintenance tasks are not identified as significant challenges, and the estimated cost structure of most toilet sites is enough to cover basic maintenance and still turn a profit. At this time, cost of maintenance tasks does not appear to be *directly* constraining access to sanitation. Instead of observing maintenance avoidance, the cost recovery logic of privatization seems largely intact. However, the increasing cost of maintenance may lead to raising user fees thus *indirectly* constraining access to sanitation in the future. This section will discuss the following: 1) Why it would be difficult for individual toilet operators to forgo the most basic maintenance tasks under the current public toilet system; 2) How competition in the public toilet sector seems, at this time, to be yielding positive results; and 3) How cost recovery requirements and/or unhealthy forms of competition may lead to falling hygienic standards and constrained access in the future.

Cost recovery in Toilet Operations: In terms of cost recovery, toilet operators are able to charge fees substantial enough to cover the costs of providing the service, which includes important maintenance tasks such as holding tank emptying, basic cleaning, etc. As the cost estimation analysis shows, all but the poorest performing sites are able to earn enough income to cover maintenance tasks. In Accra, this has not always been the case. For instance, respondent CJ recalled:

> There was a time, a few years back when [emptying the holding tanks] was not all that easy. All the AMA toilets were choked. The managers said they were not getting revenue to come and dislodge [empty the tanks] or to pay their workers, so you can't use the toilets. This is the reason why we started to privatize them to individuals. I think it works good for them. And the individuals are taking care of them. It is OK. AMA does not have toilets for themselves now.

CJ is a manager of a private toilet, and as such has a vested interest in conveying the success of the overall strategy of having sites managed by private enterprises. However, he does articulate an important point; if public toilets were not a profitable enterprise, presumably like they were "a few years back", access to sanitation would likely be constrained due to owners' inability to cover the costs of maintenance. The key to this is the ability of toilet owners to raise their rates when required in order to guarantee a profit. As discussed above, one of the major aspects of social organization of public toilets is their ability to collectively raise rates at the Submetro level and in many cases at the individual level. Therefore, as costs rise, such as with the vacuum trucks, toilet operators are able to raise user fees in order to continue cost recovery. FU, a key informant who resides in Old Fadama and works for a local NGO dedicated to livelihoods of the urban poor describes it like this:

> That is why they are fixing the prices for the customers; the challenges they are facing with the [vacuum] truck. First it was 5 pesewa, then increases to 10, then up to 20. It is due to the challenges they are facing that they change the prices for the customer.

With that, FU connects the rise in user fees directly to the rise in costs for holding tank emptying and the overall logic of cost recovery. Additionally, the exceptions to the cost recovery logic seem to prove its importance. In section 4.2 TN faces political pressure to allow customers to go for free and in section 4.7, AN is required, by the AMA, to keep the user fee at GH₵0.10. For AN, this means that he struggles to meet the basic financial requirements of running the site.

Here it is important to note two things. First, that cost recovery depends not just on the user fee rate, but on the volume of customers. More customers are required for profitability if the user fee is relatively low. Second, as the user fee rises, enabling cost recovery, the price burden on customers also rises and likely constrains access (effective demand) to sanitation with each incremental price increase. In other

words, the cost of maintenance may constrain access, *but the relationship is indirect*. This relationship will be discussed below in section below as one of the keys to expanding sanitation access through targeted interventions.

Link to Basic Maintenance: In the context of the above discussion on cost recovery, it would be reasonable to think that toilet owners could easily skip maintenance steps. This would save on costs and presumably raise overall profitability. Direct observation suggests that this is happening in one specific set of maintenance tasks; many toilet owners seem to reduce cleaning activities to save money, especially when it involves expensive chemicals. As is shown throughout the analysis and explored further below, the use of cleaning supplies and the general cleanliness of sites is the main way individual sites vary from one another. However, the system requirements of decentralized public toilets in Accra virtually guarantee that a basic level of maintenance will be achieved at toilet sites. The reason is simple; if the toilet is not functioning, customers will not pay to use it. Once again, key informant FU explained:

> To maintain the place is a must for them because it is their business. Wherever they are going to get money to maintain it they will do it.

Due to the basic system requirements of most public toilets in Accra, important aspects such as emptying holding tanks must be accomplished as required or the toilet site will shut down. When the site is shut down, operators earn no revenue. This appears to have been widespread when most toilet sites were directly operated by the AMA. Now, owners will not only pay the going rate for vacuum truck services and set their user fees at a rate that will allow them to be profitable, but they will also make investments in the sites in order to secure a customer base. The following exchange with Respondent SL illustrates this well:

> SL: We get money from the sales to pay the truck...sometimes it is a challenge, but if the thing is full, the customers cannot patronize the place, so we normally get money from someplace else.
>
> JH: So sometimes the place is full, but you don't have the cash to pay the truck and you have to get the money from someplace else? How often does that happen?
>
> SL: It is not frequent because if the place is dirty the customers do not want to come. That is why we have renovated the place.
>
> JH: What changes were made?
>
> SL: Inside the place it was full of water from the ground. We have put down concrete to make it better.

Moreover this extends not just to the requirement to empty the holding tanks, but also to a basic level of cleanliness. NO described it in the following way: "If the place is not organized, the person can go in, see it, and go on to the next place." Her comment is in the context of discussing the mess customers can make; euphemistically describing feces on the floor as being "not organized". If customers find such a mess, they can go to the next public toilet. Cost recovery and/or profitability require a customer base. For customers to use the site it must be maintained to certain basic level standards. Any intervention into public toilet in Accra must be careful not to upset this balance.

Customer Preferences: Public toilets are not just interested in cost recovery. They are interested in maximizing profits. This is accomplished by raising user fees or increasing the customer base. User fees have risen incrementally, but mostly as a result of collective action on the part of a group of owners and primarily as a response to rising costs. Furthermore, owners are cognizant that raising user fees carries both political risks as well as lowering effective demand for their services. Consequently, increasing the customer base is a more direct way to increase sites' profitability. As NO suggests above, by way of negative example, the main way to attract customers is through offering a pleasant experience. In other words, owners must maintain a base level of maintenance to stay in business, but they need to be competitively clean or expand services in another way in order to attract customers.

It must be noted here that one of the limitations of this study is that it does not measure customer preferences directly. Only toilet owners and managers were interviewed. However, it is telling that time and again, managers articulate their customers' preferences for cleanliness above all else. The following exchange between the researcher and respondent DO is informative:

> JH: What then is the most important challenge?
>
> DO: The most important challenge is when people come they will enter you toilet and see how it is. If it is clean then you will get more customers because nobody would like to go where there is smell. If a person comes here twice and sees your place is good--where he was going, he can stop it there. We also make our toilet so that you can't get any sickness.
>
> JH: What are the things you have to do to make it a place where people want to come? What are people looking for?
>
> DO: The spray [chemical disinfectants]; and that the workers are washing it; and that there are not rubbers [plastic bags full of feces]; and that there is water to wash your hands.

The preferences of the people are in many ways quite simple and intuitive. They also have important connections to the way businesses operate. For instance, one manager, FN, is very proud of the service he

offers and stated: “This is not the only public toilet on the road, there are many. Ours is the best. Ours is 10 pesewa more and they are still coming. Ours is very tidy.”

There is likely a certain amount of market segmentation. In other words, some sites offer a very clean product for a bit more to customers willing and able to pay for it. An example of this is with KJ. KJ’s site was very clean with tiled floors and walls, hand washing facilities, soap, new paint, etc. When asked if his customers complain that his site costs 10 pesewa more than others in the area, he stated that many customers actually request them to raise the price another increment so that they can make a few additional repairs. It seems a few handles on the WC’s were cracked. Further, KJ also described how customers often give workers tips because of the cleanliness of the site.

In addition to a clean site, customers also prefer public toilets to offer complimentary services. It is common for public toilets to also have shower facilities and to sell freshwater to those without access to public taps. In many ways what is observed echoes a comment by the secretary of the Jamestown public toilet owners association, a key informant. He summed up his own experience by saying: “The secret in this toilet operating is water”. In order to become more profitable toilet owners must increase their customer base. Keeping the place clean and expanding service are the observed ways this is done. It was quite common in the sample for sites without shower facilities to discuss how customers have asked them to offer such service or for the manager to discuss specific plans to bring in shower and water services with exiting public tap connections or with the possibility of investing in a bore hole.

Competition in the Public Toilet Sector: Public toilets are generally profitable. However, as shown in the cost estimating sections, poor performing sites are likely operating near the break-even point or finding cost cutting ways, most likely regarding hygienic conditions, to make a meager profit within the overall cost recovery context described above. This is important because while the average site is operating well above the break-even point, approximately 30% (N=12) of the sample reports 200 customers per day or less. This is a sizeable percentage of the sample that is in potential danger of either having to raise its user fees or dip below the revenue necessary to cover its costs. This is a source of anxiety for these toilet owners and is expressed in the sense that owners generally feel as though competition for toilet customers is rising. As Respondent KJ noted:

> When the first people started the rumor went around that there was a lot of money in it, so people started to put up the public toilets, but it is not that good.

AB suggested the same: “The customers are low, toilets are now too many. Previously it was not like this."

Respondent DA estimated that her customers were cut in half from 800/day to 400/day when a new toilet site opened very near hers. There is also the sense that toilet operators have had to change their behavior in order to be more competitive as the following exchange shows:

> JH: how often do you bring the truck in?
>
> JA: Now it depend. Before it was only here [his was the only site], but now we have many around and the people [customers] are fewer...but the reason why people still come here is that ours don't smell. I put more chemicals. But sometimes the people can be low.

JA linked new competition with a more recent downturn in his business and in turn with efforts to be more competitive, i.e., offering a cleaner, more inviting site than his competitors.

JA linked his competitiveness to the amount of cleaning supplies he uses. AL did as well, but went further and discusses how adding a bath house to his toilet block helps bring in revenue:

> The medicine [disinfectants] is too cost! I use Detol, it is too costly and only lasts 2-3 days. Now the market is not good. Now people have construct toilets in their own houses. It is now good for them to have them in their houses. Now formerly you will see a queue, but now it has come down. The first time we built this toilet people used to come! And now people have built plenty near here. They used to come and seek advice on how to build. Now the government has come and said everyone should build toilet in his house. Now they have started to build in their houses and it cause the business to come down….so you see in the first days it was good, but now you have to take it like that. The bath house has really helped. You see people come here and after using the toilet they go for shower.

These are examples of competition leading to positive results, namely, offering customers more of what they want; more sanitary toilets with complementary services.

Conversely, we must understand that this kind of competition may also lead to negative outcomes. Under normal market conditions we can presume that entrepreneurs will build new toilets as long as there are profits to be made. However, in the case of sanitation, there will likely be considerable social costs or externalities involved. Already approximately a third of the sample is performing poorly and in danger of dipping below the break-even point. Much of this "weeding" out will be positive, those with small holding tanks or those with poor management skills will exit the sector or likely sell their sites to those that can run them more profitably. There is also the real possibility that increasing competition would apply downward pressure on the overall quality of service for these sites and others. We know from the above analysis that basic requirements will likely continue to be met by any site that remains open in increasing competition; they will have to perform basic maintenance like emptying the holding

tanks. However, under increasing competition many could remain open while sacrificing customer preferences and public health requirements for sanitary conditions. This scenario would constrain access to sanitation because people who depend on public toilets would either have fewer options due to rising costs or the worsening conditions of the sites would encourage more open defecation.

This requires a brief examination of possible strategies for increasing access to sanitation. Within the overall context of largely profitable toilets meeting basic maintenance requirements it may be tempting to set intervention emphases on investing in new toilet sites to provide more geographic coverage and increase competition. This is likely to undermine the ability of existing sites to maintain their favorable cost structures. This approach is likely to either result in increased user fees, or a degradation of overall quality; both constraints to sanitation. Instead, interventions are called for that foster conditions that channel increased market competition toward a race to the top; where toilet owners partner with outside assistance to invest in their ability to provide more hygienic services that meet customer demands yet hold user fees at a consistently low levels. Interventions must not interfere with the cost recovery logic or the need for owners to remain competitive by offering services customers want, instead, interventions should partner with toilets to become more competitive by offering increasingly hygienic services where the cost of those services can remain constant.

5. Implications for Reinvestment: Expanding Access to Sanitation

The question now is: How do (re)investment interventions proceed in this context in a way that has the greatest potential to expand access to sanitation? The results of this study suggest that the best way to proceed is to interact with public toilet sites in ways that foster their ability to meet consumer preferences for clean healthy sites that offer complementary services while increasing the likelihood that user fee will remain steady. To this end, this study recommends targeted investments in partner toilet sites that expand their ability to source fresh water. In addition, this study also suggests establishing effective partnerships for improved disinfectant chemical sourcing with partner toilets.

5.1. Investments in Freshwater and Disinfectant Sourcing

Sourcing fresh water is the chief challenge identified by toilet operators in the sample. It is required for basic functioning of site technology as well as indispensible for cleaning, hand washing or offering complementary services like showers. A number of respondents mentioned they were willing to pay monthly amounts for borehole provision, but that the upfront capital costs are beyond their ability to pay. Further, several asked specifically for microfinance type arrangements in order to acquire a borehole for their toilet. In the following exchange the secretary of the Jamestown toilet owners association articulated the idea nicely:

> PL: Right now the vision I have is that every toilet need its own borehole, and an organization can assist us in that...we can see the amount that is charged, you work and pay, every month you pay to the account for the borehole, it can be like a revolving fund...it will solve all this cholera issue. It is only water.
>
> JH: So under that one, an organization could help with the capital and the owner will maintain the borehole day-to-day?
>
> PL: Yes, me I know the problem, we don't need to touch the capital. Don't even put in my hand.

This study recommends that Waste Enterprisers or any other organization looking to expand sanitation access in Accra establish a foundation or strategic partnership with an existing microfinance organization for borehole construction at partnering toilet locations. As PL suggests boreholes should be provided in-kind with payment structures that are appropriate to the given cost structures of public toilet operations.

The second investment recommendation involves fostering reliable and cost effective sources for disinfectant and other cleaning supplies. While this issue is not one of the top challenges identified by

managers themselves, cleaning materials are essential to offering customers a pleasant experience as well as maintaining hygienic conditions necessary for ongoing improvement in community health. Additionally, likely chemical sourcing is not an identified challenge for most toilet owners because it is a need that lies along a spectrum. In other words, a manager must use some disinfectant to keep the place open and drawing customers, but unlike emptying the holding tanks, which are either emptied or not, cleaning and specifically the use of a prescribed amount of expensive chemicals can be routinely ignored or downplayed when the goal is keeping costs down. This is an area of utmost importance because as the discussion of increasing competition describes it is likely that many sites will lower the hygienic conditions of their sites rather than raise them in conditions of increasingly unfavorable cost structures.

The recommendation is that Waste Enterprisers establish a strategic partnership with a manufacturer or wholesaler of cleaning supplies that would enable partner toilet operators to source high quality products for consistently low or even subsidized prices. One challenge is that owners who receive less expensive supplies will potentially seek arbitrage opportunities and sell the materials at a profit. This could be overcome through the use of memorandums of understanding like those recommended below, in which the benefits of an ongoing working relationship with Waste Enterprisers outweighs the temporary profit from reselling products intended for use in public toilets.

The relationship between Waste Enterprisers and partner toilet sites should be spelled out in memoranda of understanding. These MoUs, as explained above, could also be the main vehicle for sourcing sludge from partner sites.

5.2. Why Would These Recommendations Expand Access to Sanitation in Accra?

These investments have a number of advantages:

- They make partner toilet sites more attractive to potential users.

The data suggest that public toilet customers want clean healthy experiences at sites that also provide services such as showers. Sites that offer these conditions and services will enlarge their customer base by drawing customers from places that do not offer these. This might also have a secondary effect that it could expand access by convincing more individuals to take advantage of public toilets in lieu of open defecation due to improved conditions.

- They make partner toilet sites more profitable.

By drawing more customers, partner sites will be more profitable without having to raise user fee rates. It provides the site owner with a cost recovery cushion for if and when maintenance costs rise and expands sanitation access through its suppression effect on user fees.

- They will set standards for public toilet services.

The data show increasing competition in the public toilet sector. These investments will help guard against a race to the bottom where owners skimp on cleaning when their cost structure turns unfavorable. Partner toilets will be able to provide enhanced services. Other sites will have to offer equally attractive services, and in so doing these investments will help ensure that market competition results in greater access to hygienic sanitation instead of less.

6. Implications for Waste Collection: Ways to expand Sanitation Access Beyond Reinvestment

As referenced in the Purpose Section of this report, Waste Enterprisers is a fecal sludge reuse social enterprise. While reinvesting in the sanitation sector is an important value and an end goal for the operations, its main activity is sourcing fecal sludge and turning it into a commercially viable commodity. This study suggests that there are opportunities to expand sanitation access through the strategy Waste Enterprisers or any other end user employs while sourcing sludge. One of the more important challenges toilet owners face is the unreliability of vacuum truck services and the variability of pricing. Currently, search costs, problems with service quality, and uncertainty are all raised by current conditions. Waste Enterprisers could ameliorate these conditions as it sources the sludge it needs for its operation by entering into tripartite agreement with vacuum truck companies and partner toilet sites.

6.1. Tripartite Agreements: Partner Toilets ←→Waste Enterprisers←→Vacuum Truck Operators

This study recommends the following:

3. Entering into service contracts with vacuum truck operators to collect effluent at partner public toilet sites.

These contracts should set specific service quality goals including expectations for waiting periods between request for services and arrival and best practices while on site. Vacuum truck operators will be drawn to the agreement because of the volume of customers represented by Waste Enterprisers' partners. Using the volume and consistency of business, these contracts should be able to set competitive prices. Otherwise another option would be to directly subsidized vacuum truck service fees for toilet partner sites. Recommendations for subsidy pricing are discussed below.

4. Enter into memoranda of understanding with partner public toilet sites.

MoU's should be established with partner toilet sites that allow Waste Enterprisers to direct contracted vacuum truck operators to partner toilets whereby partner toilets pay selected truck operators as their sole service provider. The agreement would include a negotiated price per service rate, service expectations, and the understanding that Waste Enterprisers will be the end user of the site's effluent. In return for the reduced or subsidized price and improved quality of service, partner toilet sites will agree to reduce or hold steady user fees and maintain prescribed levels of cleanliness. A process for raising user fees in the future should be spelled out in the MoU.

The MoUs would also be the basis for reinvestment activities described in the previous chapter. As a result, partner sites benefit from improved vacuum truck service as well as capital costs required to increasingly attract more customers. Waste Enterprisers could guarantee expanded access to sanitation through spot checking agreed upon parameters like user fee rates, use of cleaning supplies and other measures of hygienic conditions.

Subsidy Recommendations: While collecting data on the cost structure of public toilets, respondents were asked a series of questions about vacuum truck services. They were asked the current price they were paying for services, then they were asked to state what a "fair or reasonable price" might be. If respondents had a conceptual problem with the question, they were asked to imagine they were able to set the price for vacuum truck services at a price point where his business benefits, but also where he imagines the truck operator also makes a profit. In effect, this is a question which identifies potential subsidy amounts to remedy problems with price increases or variability. It is also likely to be a very attractive offer to a potential toilet partner. The average "reasonable price" per vacuum truck service trip was GH₵104. This is 70% of the average price in the sample. Similarly, the average individual comparison between the price a respondent was currently paying and their stated "reasonable price" was also approximately 70%. One way to subsidize vacuum truck services would be to negotiate a price per service in the service contract with the truck operator described above, but then offer monthly rebates to individual partner toilet sites that cover the difference between the paid amount and 70% of the going rate. In this case they continue to pay the going or negotiated price when they need service, but Waste Enterprisers provides a monthly subsidy in the form of a rebate for continued partnership.

6.2. Recommendations for Bucket Latrines

Bucket latrines are a special case because they do not rely on vacuum truck services. Instead a separate strategy must be developed for these sites. Currently, bucket latrines nightly dispose of effluent in surface waters or drains. Waste Enterprisers could embark on a project, in consultation with local communities about location choices and operational responsibilities, to provide a central, vehicle accessible temporary storage site for bucket latrine operators to deposit excreta. This would likely need to be a buried holding tank. Their current practice already requires them to transport effluent manually over significant distance. There would likely be community support for a project aimed at preventing the dumping of excreta into surface waters. An MoU would need to specify effluent transport practices as well as responsibilities for control and maintenance of the holding tank. Great care would be needed to prevent it from becoming a common refuse site. While bucket latrines are likely found in many parts of the city, this study only observed them in Old Fadama. Old Fadama has a well organized Toilet

Committee, which would likely be a willing partner in efforts to find collection solutions for bucket latrine excreta.

Alternatively, Waste Enterprisers could, as part of the structured MoU with a nearby holding tank toilet site, come to an agreement whereby bucket latrine operators could deposit excreta into already existing holding tanks. Because bucket latrines use very little water, they represent an opportunity for Waste Enterprisers to source concentrated sludge for reuse. As a result, if feasible, a central site for collection may be the advisable route as long as agreements could be reached with the community over how best to manage the site.

7. Key Concepts for Replication Outside of Accra

This study is in many ways specific to Accra. However, the analysis reveals a number of important factors likely that will require attention in any context where Waste Enterprisers or another sludge end user might establish operations.

7.1. Variations in Collection Technology

This study observed eight excreta capture technologies, three approaches to temporary effluent storage, and two types of transport strategies in public toilet operations. Every technological variation impacts end users' ability to collect and use fecal sludge. Toilet operators' cost structure and cost recovery viability depends on their technological strategy. This study demonstrates that holding tank sizes, volume of water required, and location in the city dictate maintenance costs and, by extension, user fees and customer base. These variations will directly impact end user costs of collection, as well as volume and quality of sludge.

Furthermore, in Accra, decentralized holding tank storage approaches dominate. This is common in the developing world, but the strategy is not universal. Where this strategy dominates reinvestment and sludge sourcing strategies recommended here are likely to be appropriate. Where other strategies dominate, like Accra's bucket latrines, or if an areas does not have a well developed system of vacuum truck services, end users will require a different level of engagement. Similarly, where in-home latrines are more predominant or are a growing focus of public and private investment, the recommendations made here will be inappropriate.

These variations will also impact reinvestment opportunities. Here, increasing public toilet access to water and cleaning supplies are the most appropriate vehicles for reinvestment. While these are very likely to be near universal needs in other locations, variations in technological strategies may dictate different reinvestment approaches. For instance, if in Accra, bucket toilets dominated, reinvestment priorities would likely require a comprehensive effort to foster community holding tanks.

End users will require a survey of existing systems anytime they are expanding operations into a new area. This will likely be true between nations as well as between urban areas within the same country.

7.2. Local Land Tenure Issues and "Slum Upgrading" Programs

This study included public toilet sites in two different land tenure contexts. In Old Fadama for example, most residents have insecure tenure; they do not own the land they occupy or property rights are contested. In other areas of Accra, land titles and property rights are far more regularized. Insecure land tenure is commonplace in urban regions in the developing world. In many developing world cities, the

context of Old Fadama is the rule for a majority of urban residents rather than the exception. This greatly impacts the technological strategies toilet owners will pursue. Respondent MU, a bucket toilet operator in Old Fadama explained:

> MU: They [local government] say we should not operate like this [a bucket latrine], they say we should have a manhole [holding tank], but they say we are only temporary here. We don't want to spend our money and maybe in a few months they will drag us away.

For MU, his tenure insecurity is a disincentive to invest in his public toilet site. Furthermore, for MU and many like him, his site is not vehicle accessible. His options are limited as are any comprehensive plan to collect waste from his site and others like it. As a result, the local land tenure situation is a variable that will require close examination if end users are going to develop effective sourcing and reinvestment strategies.

This is true because it impacts technological options, but also because it will impact the overall regulatory environment. Where there is widespread tenure insecurity, outside organization must be cautious in how they proceed. Toilet sites in this context may be officially "illegal" even if commonplace. As a result, tenure insecurity will add a layer of complexity to the ability of end users to source sludge and engage the sector for reinvestment.

Similarly, "Slum Upgrading" programs are also common in the developing world. These are comprehensive projects aimed at the neighborhoods like MU's. Upgrading programs typically include land titling, introduction of roads, and new infrastructure provision including sanitation. While these programs tend to be slow developing, end users like Waste Enterprisers need to be aware of their programmatic priorities. As an example, in Accra, the international NGO CHF has an expansive program in Nima financing in-home composting latrines. Public toilet operators express anxiety about the impacts of this program on their long term viability and short run cost structures. Contexts where upgrading programs are ongoing require strategic flexibility over the long run for sludge end users, i.e., the technological and well as social context will change where these programs have a significant footprint.

7.3. Political Nature of Sanitation

While end users of fecal sludge are seeking sustainable technical solutions to longstanding sanitation problems, the sociopolitical context determines what is possible in any given location. The above discussion of the context of land tenure is an example of this. It is important for end users to have a firm grasp on the how sanitation is governed in a given location. One important concept is the distinction between formal and informal regulation. That is, what laws concerning sanitation are "on the books" and which laws arise from the informal sociopolitical organization of society. For instance, in Accra, a

common set of regulations exist for all public toilet sites in the greater metropolitan region, however, this study describes great variation across Submetro divisions in terms of regulation, revenue collection, coercion, and level of government involvement. Privatization of public toilet sites is the rule, but in many cases the lines are quite blurred with local government entities or individuals retaining defacto control of many sites. In many locations in the developing world privatization schemes may be at different stages or entirely nonexistent. These variations will have a profound effect on the ability of end users to operate.

As this study suggests, sanitation sites are a societal resource with monetary and political value. As such there will always be vested interests in any changes, including the changes that end users will propose. Key questions about the political context of sanitation in any context will include: What are the formal regulations surrounding sanitation? What are the informal practices? How is sanitation currently being leveraged for profit (even when the system is wholly government controlled), and by whom? This question is appropriate at a system-wide level as well as for individuals, i.e., how is sanitation administratively structured to produce revenue and who controls that administration? How does the current regulatory environment impact user fee collection and site cost recovery? How is sanitation treated in local politics; what promises are made, what are areas of popular contention? How are individual sites used in the exercise of local political power?

In reality, any organization ostensibly engaging regional sanitation systems with technical solutions will inevitably develop local political capacity or die trying. As a result, end users will become advocates for local sanitation policy and must develop their internal capacity to carry this out.

7.4. Social Organization of Sanitation Sites

Similar to the political organization of sanitation, the social organization of toilet sites will greatly impact the ability of end users to operate. For instance, in Accra the observed social organization in different areas varied from essentially atomized individual sites to true collective action. Some areas displayed no evidence of toilet owners organizing around common opportunities and challenges, while others demonstrated an ability to fix prices, access resources together, and apply pressure to local government for services. Further, while not directly observed in Accra, sanitation service around the world is susceptible to racketeering or mafia type behavior whereby the resource is forcibly controlled by powerful groups. Where the social organization tends toward collective action, end users are likely to find viable and positive partnerships. It will be more difficult in atomized situations due to the work required to engage individual sites, and a significant challenge where sanitation is controlled by a local mafia whose priorities may be in conflict with end users. End users must have a clear picture of how sanitation is organized at the local level.

7.5. Seasonality

Urban regions in the developing world are often comprised significantly of internal migrants. This means that urban areas often experience significant population shifts at different time of the year. For instance, in Accra toilet operators would often cite the planting/harvesting seasons in rural Ghana as a major impact on their sites. At certain times of the year, their customer base would leave the city for weeks at a time. As a result, end users will likely need to develop seasonally adjusted projections for commodity flow and usage. Additionally, significant holiday seasons like Christmas or Ramadan tend to see significant temporary migration in many areas in the developing world for up to an entire month.

8. Recommendations for Future Research

This study exposes a number of questions that require further research.

Consumer Preferences: This study contains no data directly related to customers' experience or preferences. While we can have a level of confidence about customer preferences from the perspective of toilet owners, follow-up research would provide meaningful data. Specifically, we do not currently know customers' price elasticity of demand. In other words, in a context where open defecation is an option, how does a unit change in price impact demand? This would be useful in setting appropriate goals for reinvestment and sourcing strategies. For instance, what is the ceiling for user fee cost while maintaining an acceptable level of effective demand? Conversely, should reinvestment strategies target a specific user fee level? In other words, how would lowering the average user fee by GH₵0.10 impact effective demand and is the reinvestment cost advisable based on the projected results?

Additionally, direct interaction with consumers would provide data on the other services toilet owners could potentially provide that could make sites more attractive and indirectly expand sanitation access. This study makes specific recommendations about these services; however, those services are limited to those currently contemplated by toilet owners. There could be significant demand for alternative services not currently offered.

Site Expansion vs. Expansion of Sites: This study recommends expanding the capacity of existing toilet sites through direct partnership with end users instead of making reinvestments that expand the number of individual sites. This conclusion is based off the cost structure of toilet sites and existing competition in the sector. However, direct and explicit study would be required for an authoritative conclusion. Empirical investigation in several cities would be required to determine under what circumstance either of the two strategies would provide the greatest expansion of sanitation access.

What Kind of Regulation for Expansion: Fecal sludge end users will inevitably be required to become local advocates for effective sanitation regulation in order to operate. Moreover, if end users remain social enterprises, their financiers are likely to be engaged in improving regulation throughout the developing world. As such, they need to be armed with good data and good ideas. The logic of markets suggests that if user fees are allowed to vary (increase with costs), then new toilets sites will be provided until the market is saturated at the equilibrium point between supply and demand. However, in the case of public sanitation, reaching that point is likely to have significantly negative social costs because profit seeking toilet operators will likely raise user fees or lower maintenance standards as competition increases. Both have the potential to negatively impact sanitation access and community health outcomes. Counter intuitively, as entrepreneurs rise to meet demand their actions could actually result in less access to

sanitation in the future. Given the assumption that enforcing an artificially low user fee rate would restrict toilet sites' ability to cover their costs attention must be turned to regulating the expansion of the number of individual sites. We currently do not really know if there is an impetus for greater regulation or restriction of new sites or even what regulation strategies would be effective. Proper regulation in this case would require an empirical model that estimated effective market areas needed to sustain individual sites based on density of demand and prevailing cost structures. Right now, neither the model nor the data necessary to construct it currently exist. This study provides important building blocks required for constructing the model, but further study would be required to make authoritative recommendations for regulation.

9. Appendix A: Contacts for Follow-up

Below is a list of important contacts made during the research that might be useful to Waste Enterprisers in the future.

Kwaku Boateng. His company has 11 public toilet sites around the city. He was interviewed at his Keneshi area site. They have their own vacuum truck to service their sites. He is very knowledgeable about public toilet site operation. 0249832494

Francis (0543422025); Kweku (0548050608). These are attendants at a public toilet just outside of Kaneshie market. They should be able to put you in touch with the site owner. They receive 4000+ customers per day with truck service every day. The site might be useful as a single supply of sludge for initial trial phases.

Michael Tsinowope. He is the security coordinator and acting environmental manager at Kaneshie Market with 3-4K users a day. He has expressed an interest in partnership; 0244223011, 23321226064/22370

Faris Akplah: Toilet owner in Alajo. He is a very sensible guy, with important political connections including the local MP; a good contact for working in Alajo. 0244952766

Nana Apia(?): A toilet owner in Palladium (adjacent to Jamestown) his site is a sewered site, but he is secretary of the Jamestown Submetro toilets owners assoc. His office is located in a mechanics garage in Palladium. 0244278717. Very knowledgeable and likely an area "Gatekeeper".

Steven: Environmental Health Engineer (sewage) @ AMA. He has list of all Submetro administrators who keep lists of existing toilets. 0244418114.

Fuseini: Resident and well respected community member of Old Fadama--0261488888; 0209028195. He can connect WE with toilet association there as well as bucket latrine operators.

Salifi: Secretary of the Alajo Development committee 0285406729. Good contact for operating in Alajo.

David: Resident of Nima and good local contact. An acquaintance of Aquia. 0245042945