2011

WaSHUp Process Guide for Community Development in Langrug

Up

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Purpose

The following report outlines each step in the WaSHUp Process, and provides documentation of its successful application in one area of Langrug. The intent of this document is to share with external parties the Water Sanitation and Hygiene Upgrade (WaSHUp) Process and our work in Langrug, as well as to provide guidance for any wishing to perform additional work in community development.

Introduction

Despite the presence of numerous ablution blocks in the informal settlement of Langrug, maintenance issues, blockages, vandalism, and distance restrict residents from utilizing the facilities. Because of the inefficiency of the current services, many community members are forced to compensate with unsanitary and rudimentary means. Doing so invites poor hygiene, disease, and prevents residents from partaking in a higher standard of living. The work of the WaSHUp Team, composed of four WPI Students and three Langrug co-researchers, is to improve this standard of living and make ablution blocks welcoming, useful, and hygienic.

To begin, the WPI students developed relationships with residents to further understand the WaSH-related social, psychological, and economic needs of the community. By researching these needs the students and their co-researchers recognized the importance of community driven solutions and developed a holistic idea that improves the existing ablution structures using community input. If successful, the team will create an environment that is appealing to local residents, and thus promote a sense of pride and a feeling of ownership. With immediate community involvement and interest, it would then be possible to build the awareness and practical capacity of residents to adopt proper hygiene practices.

In order to successfully implement this idea of sustainable community space designs around existing ablution blocks, the following steps were created by the WaSHUp Team. A succinct process was outlined for communal sanitation and space upgrading to be used in all areas of Langrug. After completion of the process and implementation of a design, community members and non-government organizations (NGOs) in Langrug will be able to evaluate the success of the design and determine what needs improvement. Additionally, the WaSHUp Process, as adapted from the WPI Greywater Team process, was written with the intent that it would be a living document; the steps can and should be re-used and modified as needed.

Team Members

Left to Right: Macauley Kenney (Student),
Nyameka Magele (Co-researcher)

Left to Right: Nyameka Magele (Co-researcher), Justin Siemian (Student)
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WaSHUp Process

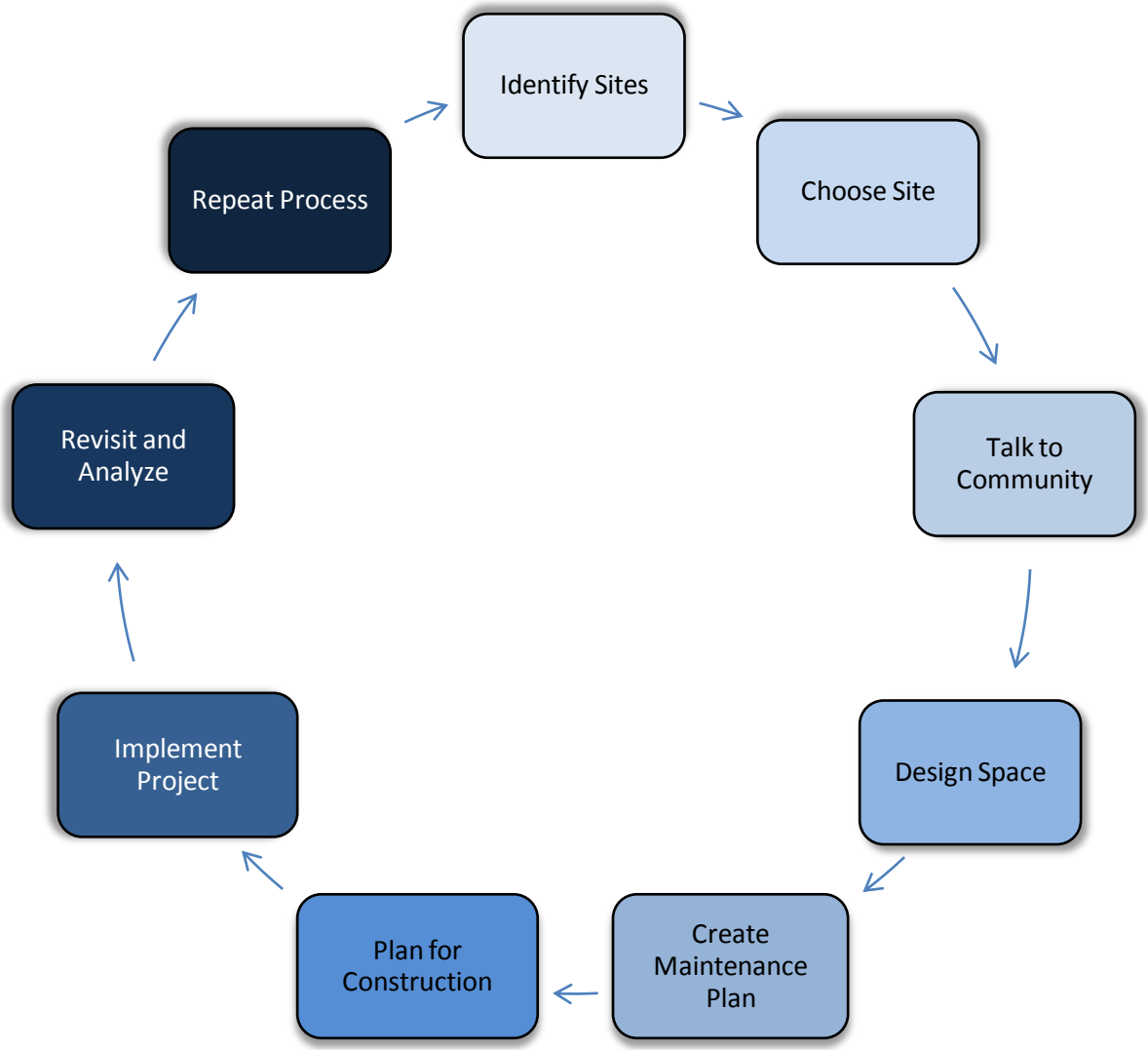

Figure 1: Process for Sanitation and Space Upgrading

Step One: Identify Potential Sites

- Survey Langrug for locations that could be improved or upgraded
- Such areas include, but are not limited to, open spaces, toilet blocks, and community gathering spaces

Figure 2: Identified Spaces

Step Two: Choose a Site

- Analyze viability of each site by generating list of strengths and weaknesses
- From the analysis choose the location that demonstrates the greatest potential for upgrading

Step Three: Talk to People around the Chosen Site

Figure 3: Community Meeting at an Ablution Block

- Conduct a meeting or frequently visit the location site in order to talk to local community members
  - Learn about existing problems with the land area
  - Ask about prior projects that have been done to improve the space
  - Learn from a variety of residents what they would like to see in an improved site
  - Share ideas with community members about the location
    - Include pictures, diagrams, and other visual aids
  - Ask for the resident consent to develop site
  - Survey the residents and determine who would be willing to help take care of the location after development

Step Four: Create a Design

Figure 4: Measure Open Space

Figure 5: Draw Map of Location

- Measure and map the open space around the location, taking note of dimensions
- Draw a neat map preferably using graph paper of the location using the noted dimensions in the previous step
- Decide how the space should be developed by drawing in designs on the graph paper
- Show community the design
- Revise if necessary

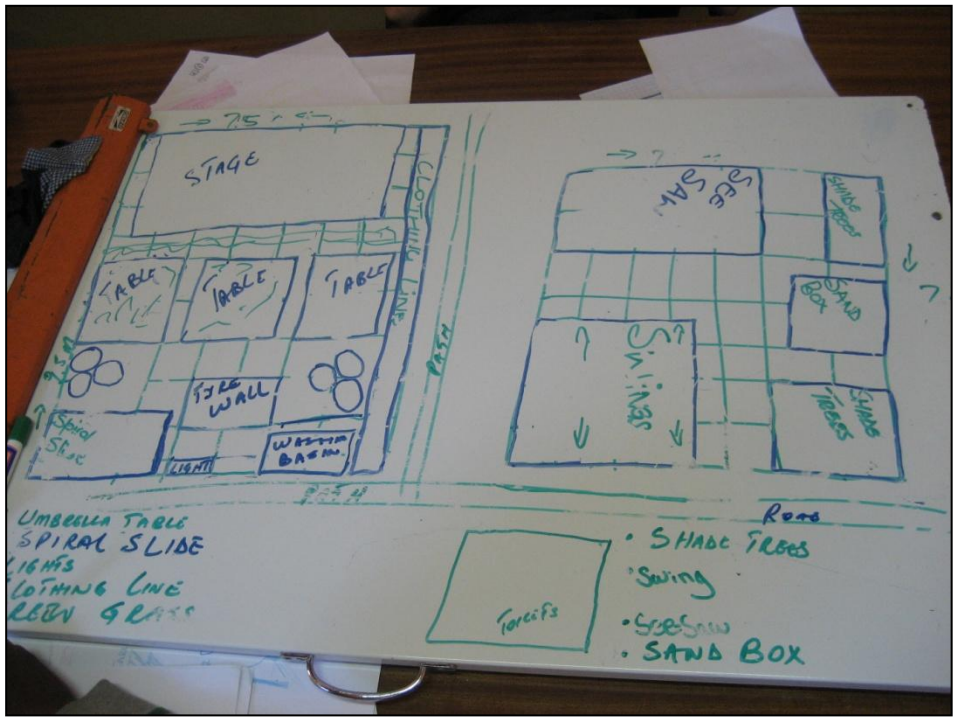

Figure 6: Outline Design Plan

Step Five: Find Local Community Members to Maintain Completed Site

- Find a resident(s) to volunteer to take care of the site after completion
- Create a schedule for the resident to follow to routinely complete the tasks

Step Six: Plan for Construction

- Determine and organize what materials will be needed for construction
- Research multiple vendors of the needed materials
- Receive quotation from each vendor for the cost of materials
- Decide upon the most feasible quotation considering cost and quality of the product
- Send quotations to SDI, CORC, and WPI for approval marked with community chosen quotation
- Determine the order and schedule of building progression
- Find residents to help with the building progress

Figure 7: Design Implementation

Step Seven: Implementation

- Gather and organize materials
- Follow schedule created in step six to implement project with help from community members

Step Eight: Revisit and Analyze

- After completion of the project revisit the site and talk to community members
    - Determine local attitude towards the development
- Collect data on what is working well and what needs improvement
- After speaking with multiple community members determine pros and cons of the implementation and make any necessary changes to process steps

Step Nine: Repeat

- Begin process again and continue to upgrade site

Ablution Block Analysis

Developing and maintaining sanitation services in Langrug has been a constant effort provided by the Stellenbosch Municipality in upgrading the settlement. Sewage lines have been installed into Nkanini and Mandela Park, two sections of Langrug, and the unpopular bucket system has been phased out. Nkanini and Mandela Park are home to 23 flush toilet blocks which range in both style and size. The third and highest section, Zwelitsha, remains un-serviced. Residents from this upper area either use toilet facilities in the lower sections or defecate in the bush if they choose not to walk down. The water pumps that service the lower sections of Langrug have neither the capacity nor the head to be able to reach the high elevation of Zwelitsha. To add sewer lines in Zwelitsha would also exceed the capacity of the existing lines in the settlement, a problem that can only be fixed with reconstruction of the Route 45 sewer connection. Alternative ideas for Zwelitsha that do not include the addition of sewer lines can be found on page 18.

The analysis below on pages 15 and 16 list every ablution block location in Langrug. The data in the chart was collected on November third and seventh of 2011 from observation and informal group discussions with Co-researchers and community members. Every community member spoken to was briefed, either by the team if the community members spoke English or by the co-researchers if they spoke Xhosa, that the group was doing research on toilet facilities in Langrug. The community members that agreed to be identified by name are listed in the chart along with the number of toilets, taps and basins at the site.

Taps

There are two different types of taps in the community: push taps and screw taps. The push taps are primarily located in Nkanini and release water for about five to ten seconds before they stop and have to be re-pushed. The screw taps manually release water. At different locations taps either stand alone or over a basin. Taps that are located over basins are often convenient for laundry purposes but do not allow enough room to fill up a five gallon pail of water. At site 11 there are no standing taps so residents often travel to another facility to fill up their pails.

Drains and Blockages

Specific details about each toilet block are located under the additional details section of the Langrug facilities toilet chart. Most of the toilet facilities have drains located near or under the taps. The drains lead to the sewer but are often clogged with trash. Toilet blockages are also common throughout the settlement and mainly stem from misuse of the facilities. Residents often flush newspaper and nappies down the toilets, preventing water from being flushed. Many community members expressed that blockages are a frequent occurrence on weekends, as other residents are intoxicated and neglect to regulate the amount of newspaper they are trying to flush.

The institution of toilet paper would be a big improvement to the toilet facilities in Langrug. This implementation would correct the issue of blockages, but there is always the possibility theft of the toilet paper. To remedy this, a caretaker model could be imposed, and this individual could hand out toilet paper as people came to the facility. Another possible option could be a toilet paper dispenser. The design of such would be that a roll of toilet paper would be inserted into a locked toilet paper holding box, from which the roll could only be removed after it was empty.

Maintenance

Toilets are usually serviced and fixed within the next week by the Pholo-Ka Hola company contracted by the municipality. Pholo-Ka Hola cleans and services all the public toilets throughout the settlement. This seven person team is managed by Sefeke, who delegates three workers to maintain the facilities in Nkanini and three to maintain the facilities in Mandela Park. The seventh worker acts as a repairman and services each facility when there are blockages and problems with the facilities.

Vandalism

Theft of plumbing supplies has also been an ongoing problem with the toilet facilities. Thieves often steal copper and metal fixtures on the facilities to use or sell. To counter this, the municipality has begun to replace the copper piping and fittings with plastic parts. While this has helped to reduce theft, the plastic pipes on the outside of the toilet structure are less durable than metal pipes and fixtures. Children in the settlement regularly play around and climb on toilet facilities.

The children swing and climb on the pipes, causing the plastic pipes to bend and disconnect from the fittings. When the pipes disconnect water will continuously run from the pipe until the connection is reattached properly.

Safety

At night residents walking to the toilet facilities are in danger of being robbed, beaten, or raped. Those who do not want to risk walking alone can either attempt to assemble a group or keep a bucket in their home to defecate in.

Purpose of Analysis

By assessing the existing toilet facilities in Langrug the WaSHUp team will be able to better understand what is and is not working at the different toilet blocks. Since Langrug has several unique toilet facilities it is important to understand each one so that future blocks will be able to best serve the community. The analysis will also serve the students and co-researchers when they perform their incremental community upgrading using the WaSHUp Process as it provides an at-a-glance visual of what services exist at each facility as well as major details of the area. The location of each facility can be found by matching the mapped facility numbers from the pages 15 and 16 to the numbers on the map in Figure 8.

Langrug Toilet Facilities Chart

Langrug Toilet Facilities									
Mapped Facility Number	Block Type	Section	Community Member	Number of Toilets	Number of Taps		Number of Basins		Additional Details
					Screw Tap	Push Tap	With Tap	Without Tap	
1	Double	R,S,T	Florence	2	1	0	0	0	Residents from B section use facility
2	Double	Q	N/A	2	1	0	0	1	Toilets have toilet seats
3	Container 1	P	N/A	10	2	0	1	0	Open space around facility Poor Ventilation
4	Double	L,M	N/A	2	1	0	0	1	
5	Double	K,L	N/A	2	1	0	1	0	Toilets are padlocked Surrounding families clean toilets 20-25 families share toilets There are 6 keys for the locks Residents without access are not happy
6	Double	L	Vuyo	2	0	0	0	1	Toilets are padlocked Shared by 2 families Residents without access are not happy One toilet is not working
7	Single	M	N/A	1	0	0	0	1	Located at the end of an alley Non-functioning lock on door
8	Double	P,O	N/A	2	1	0	0	0	Doors kept shut by twisted heavy wire
9	Container 2	P,Q	Laurence	10	4	0	2	1	Open space around facility Poor Ventilation Holes punched at base of container wall to drain flood water
10	Double	Q,R	N/A	2	0	0	0	2	One toilet locked with a chain; the other with wire Basins filled with garbage

Langrug Toilet Facilities

Mapped Facility Number	Block Type	Section	Community Member	Number of Toilets	Number of Taps		Number of Basins		Additional Details
					Screw Tap	Push Tap	With Tap	Without Tap	
11	Ablution 1	D,E	N/A	10	6	0	6	4	Residents from Zwelitsha and T use facility
12	Five	E	N/A	5	0	1	1	0	Approximately 40 families use this facility
13	Six	E	N/A	6	0	3	2	0	Families from Zwelitsha use this facility Sometimes there is limited water pressure Toilets are kept relatively clean Approximately 40 families use this facility
14	Five	E,F	N/A	5	0	3	2	0	
15	Quad	E,F	N/A	4	0	3	2	0	Open space around the facility Residents from Zwelitsha use facility
16	Quad	F.G	Nangamso	4	0	2	2	0	Open space around facility
17	Double	F.G	N/A	2	0	1	0	2	Approximately 30 families use this facility
18	Absolute Ablution	G,H	N/A	10	1	0	0	0	Open space around facility No pipes are exposed Contractors servicing facility perceive facility as clean
19	Seven	I	N/A	7	2	2	4	0	Two separate toilet blocks of 2 and 5 toilets
20	Relocation Fives	J	N/A	10	0	6	4	0	Children play on facilities Eye witness account of children climbing and breaking pipe connection
21	Ablution 2	H	N/A	10	10	0	10	0	Only one working light Residents from Mandela Park use this facility when their toilets block

Map of Langrug

Figure 8: Map of Langrug and its Toilet Facilities

Service Options for Zwelitsha

Implementing water and sanitation systems in Zwelithsa, sections A, B, and C in the map above, has been an ongoing challenge for the municipality. As discussed on page 12, the steep slope of the terrain and the already over capacitated sewer system have prevented the construction of new pipelines. In a past attempt to provide the residents with chemical toilets the units were rejected, vandalized, and pushed over. The development of a non-waterborne system appears to be the most viable option for the community; however residents are strongly attached to the idea of flush toilets. Demonstrating successful models of alternative systems and receiving community approval will be important before any implementation can occur. One such model is the composting system of MobiSan in Pook se Bos, South Africa could be a potential solution. MobiSan is a urine divergent and odorless facility implemented in 2009 by a partnership between the City of Cape Town and the Dutch government. The facility is maintained by caretakers who clean and educate the community on how to properly use the toilets. Residents have expressed great satisfaction with Mobisan, and Langrug community members who visited it responded positively. A system similar to this approach could potentially be viable in Zwelitsha, however having decentralized blocks rather than a singular facility might better serve the dispersed community as it would limit walking distance.

Implementation in D Section

WaSHUp Process at work

The decision to implement the process in a section of Langrug was the result of several factors. Firstly, the student team felt that it was necessary to demonstrate the effectiveness of the WaSHUp Process and refine any steps that were flawed once actualized. Secondly, it was valuable to combine the diverse expertise of the students and co-researchers for this initial attempt instead of waiting until the students had returned home, where distance would restrict their role to that of advisors rather than collaborators. Third and finally, it was important to demonstrate to the residents the potential that their open spaces have to become valuable communal areas and change the way that they view the everyday structures they are surrounded by.

Figure 9: Implementation

Together the seven team members enacted the first three steps of the process. The three co- researchers conducted a meeting and talked to the community in a continuation of Step Three and, with additional suggestions of the student team, the residents decided on the following concepts:

Internal improvements and additions to the ablution block:

- Retaining wall
- Lights
- Locks on the toilet doors
- Foot pedal water tap*
- Educational signs
- Soap dispenser
- Educational children's paintings*
- Trash and food bins
- Laundry wringer

External additions to the open space:

- Swing
- Tyre wall
- Seesaw
- Two picnic tables
- Two trees

Figure 10: D Section Basins and Toilets

As not all of these concepts could be added in the limited time the students were in Langrug, a select few were chosen for implementation and the remaining ideas are to be developed over time with the initiative of the Co-researchers. The implemented ideas are marked with an asterisk, designs and explanations for additional ideas can be found on page 25.

Educational children's paintings:

One of the improvements to the toilet facilities that the WaSHUp team implemented was painting. At the D section block, the team painted the alphabet across the front of five adjacent WaSHUp basins. Two days later, the co-researchers painted numbers across the front of the WaSHUp basins on the opposite side along with the inside of two toilet stalls. Both the letters and the numbers were painted in a pattern of three or four colours. These paintings are intended to accomplish two significant objectives. The first is the educational benefit. Educational stimulation is crucial to developing children, and can be provided by and numbers. Halfway through painting the alphabet, a group of roughly 25 kids assembled around the team and began singing the alphabet, counting, and singing other songs. The second is the improved appearance of the ablution blocks. The change in the toilet stall interior from dark grey to clean white was immense, and made the stall feel much more open, clean, and welcoming. The colourful letters and numbers on the basins made that area feel more fun and lively than it did before.

Based off of this implementation, there appears to be great potential for paintings to be used as a vehicle for improving early childhood development in Langrug. In addition to the alphabet and numbers, the team has highlighted some other ideas as valuable. These include days, months, seasons, colours, animals, nature, foods, and other simple words from which kids begin to learn the spellings and sounds of words. Games could also be painted on concrete floors to encourage kids to play these games as opposed to on the toilets. Painting could also be used on a large scale to improve the appearance of facilities. White and bright colours open up space, and make them feel more clean and inviting. These bright colours also reflect light better at night, and could improve visibility inside the stalls at night. All of the above painting ideas would help community members value the facility more, leading them to take better care of it and bring future upgrading.

The implementation of programs around these paintings would also be worthwhile, and is discussed in further detail on page 29.

Figure 11: Basin Alphabet Painting

Figure 12: Basin Number Painting

Figure 13: Toilet Alphabet Painting

Foot Pedal Water Tap:

After painting the D-section basins and toilets, the team began looking at developing ways to best install a tap using the process we created. We began by thoroughly talking to the community and sharing ideas about different tap designs as well as asking about what their thoughts on the current taps. The community expressed that the taps are often stolen because they are made from valuable metals and that the newer plastic twist taps often break when there is too much torque applied on the tap. The community members also have back pain from bending over when using the standard .75m taps.

To address these issues we worked with our co-researchers to modify the water tap designed by the 2008 WPI Cape Town Water and Sanitation with insight from Aron Ndzondza of Ubuntu Plumbing . The co-researchers got the team in contact with Aron because of his work on the RDP housing plumbing adjacent to the Langrug. The taps as seen in Figures 15 and 16 are fully encased in steel-reinforced concrete, save for the foot pedal notch at the base of the structure. The steel-reinforced concrete of the entire structure will protect the internal plumbing work against wear and tear as well as vandalism and theft, as will the concrete around the foot pedal. The foot pedal design operates by applying pressure to the metal button, which will then control the release of the water by turning a valve in neck of tap. The design in Figure 14 was modified from the 2008 concept to have an internal foot pedal rather than a protruding structure, walls around the basin to reduce splashing water, and a concrete encased spout. The premise of a foot pedal design is to prevent germ contamination of the water spout by limiting hand contact. Residents not touching the tap will make the system more sanitary, hygienic, and reduce fecal-oral diseases.

Figure 14: Wooden Form of Foot Pedal Tap

Figure 16: Construction on Tap

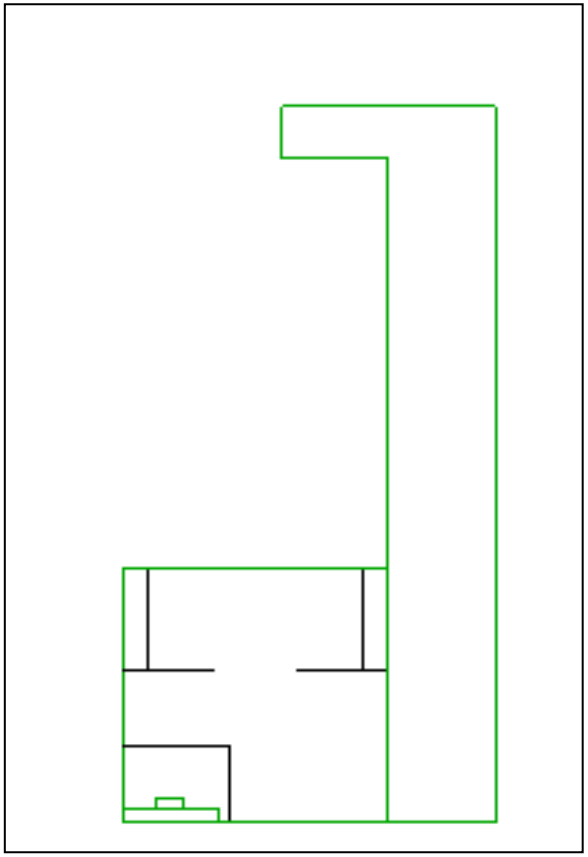

Figure 15: Outline of Foot Pedal Tap

Additional Designs for D Section

Erosion Wall

The presence of an erosion wall at D Section would be very helpful, especially during the rainy winter season. Currently there is a portion of the wall that is gone, and another part that is leaning badly. Fixing the existing wall and building a new portion would prevent runoff from flooding the facility when it rains, and also prevent the ultimate washing out of the dirt wall when it becomes sufficiently eroded. This would be a relatively easy job for a build team, and the material used could be wood, concrete blocks, or clay which is abundant in the settlement.

Food and Waste Bins

A large problem that community members have experienced with the toilets and laundry basins is that they become clogged after other residents dump food in the drain or bowl. Many individuals do dishes at their residence by filling up a bucket of water, washing dishes in the bucket, and then putting leftover food waste into the same bucket. They will then take the bucket to the toilet facility and dump it into the toilet or sink, oftentimes causing blockages. The team believes that the installation of a food waste disposal bin in the D section toilet block would help to alleviate this problem. The design for this system is shown below in Figure 17 on the following page.

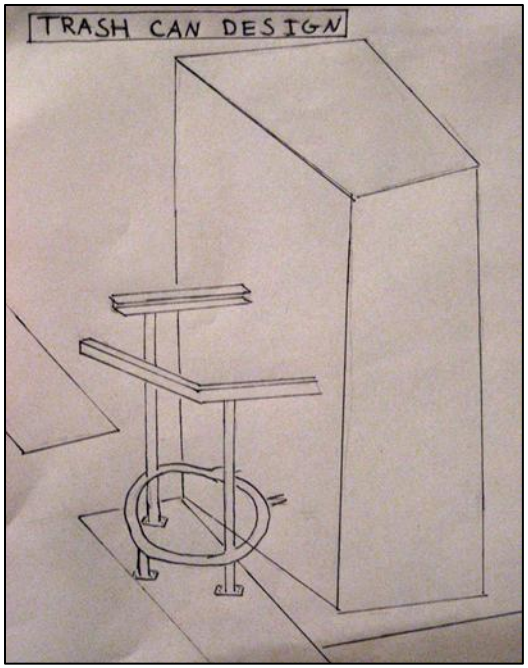

Figure 17: Locking Food Waste Bin Frame

A large garbage can could be placed in this design by sliding the rime onto the metal tracks until it reached the supportive circular ring at the bottom. This metal frame would be bolted into the side of one of the cement toilet stalls as well as the cement floor. The can would be secured in this frame by a locking arm that would connect the metal tracks. While theft of the metal would likely be an issue, if enough community ownership of this design could be garnered this threat can be alleviated.

The bottom of the can would have many small (about 0.5-1 cm) holes in it to allow liquids to pass through into the drainage channel below the can, while catching the food solids. The holes in the bin could be punched with a hammer and nail, making this design very cheap and simple. The bin would need to be emptied into a dumpster periodically by a

community member depending on its size and level of utilization. The food and waste bin would be enhanced by the supplementary installation of nearby signs encouraging people to dispose of their food waste and general garbage in it.

Laundry Wringer

In talking to the community near the D section wash basins, the desire for a laundry wringer arose. When women do their laundry at the basins, clothes are saturated with water, making the load very heavy and hard to carry home. This then limits the amount of laundry women can do at once. A wringer would force most of the water out of the clothes, making it substantially easier to carry the load home, and people would be able hang up their clothes on the line for a short period before they were completely dry. In order for this implementation to occur there must be a community member willing to take responsibility for the wringer, as theft would almost certainly occur if it were left in the ablution block. Instead, this individual could keep it in their house and loan it out as needed. A sketch of a laundry wringer is provided in Figure 18 below.

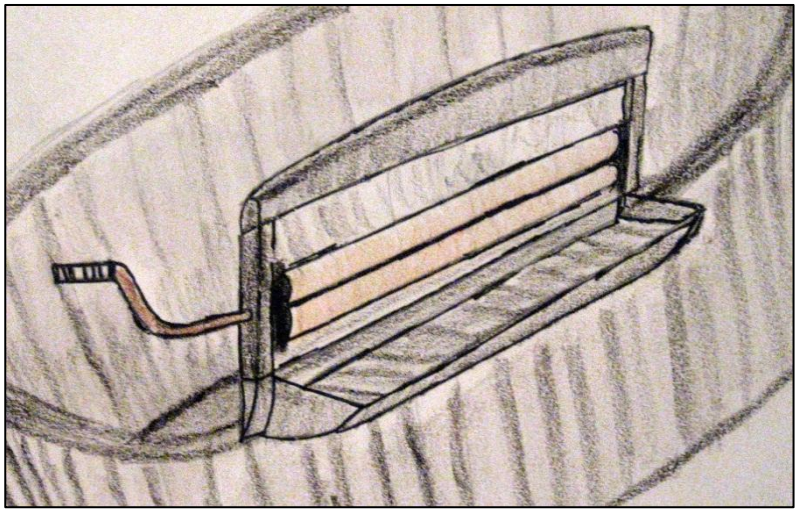

Figure 18: Laundry Wringer

Lighting

Installing lights in the D section ablution block would greatly improve the safety of the facility. The style of light that the team has conceptualized would follow one of two schemes below.

The first style is that of fluorescent tube light bulbs between one and two meters long. One tube light could be located above the wash basin area, oriented parallel to the front and back edges of the basins and would light up the whole area. Another light could be located in the toilet area, oriented parallel to the toilet stall doors when they are closed. This light would be hung at a level such that maximum light could shine from the tube into the stalls between the top of the door and the concrete ceiling. If the inside of each toilet stall was painted white as was done by the co-researchers in two locations, more light would reflect inside the stall which would brighten it at night. Both of these tubes would need to be mounted and secured in such a way as to avoid theft and breakage. To best ensure this it would be best to locate the light in a high and hard to reach place, and keep the tube contained in both a plastic case and behind a metal cage.

The second style of light that could be used is the LED light bulb. These smaller bulbs would be placed strategically around the facility, for example two in the WaSHUp basin area and two in the toilet section, to provide sufficient and well-spread lighting. LED bulbs would require less protection than the tube lights, as they are less expensive and less fragile. However they would be more prone to theft as they are more practical for at-home use than tube lights. Plastic and metal encasements for these bulbs would be recommended to prevent them being broken, and they should be located in a high place.

In both styles, LED lights are recommended for use since they are much brighter and energy efficient than standard incandescent lighting. If LEDs are used, proper steps must be taken to ensure the well-being of the light due to its initial cost to prevent breakage and theft.

Locks

The locks on the toilet stall doors are a major problem that was identified by the community. The current locking mechanism is a metal slide that inserts into a hole in the door frame. The problem with this is that these slides often

require a lot of effort and hassle to even move, and also that there is a hole for a lock both inside and outside the door. Many community members and the co-researchers expressed a fear of being locked inside the toilet stall by someone, especially at night. Additionally, it is possible for someone to open the door while another is inside, as the slide can also be operated from outside.

Upgrading the locking mechanism would greatly increase the feeling of safety of residents, and would not be extremely difficult. Some ideas the team has thought of are a door handle with a button lock, similar to home or office doors, a sliding lock that inserts into the door but only from the inside, or a simple hook that inserts into a circle. The primary challenges to these designs are fastening the parts into the cement walls, and protecting the parts from being stolen

Program for Educational Paintings

Although the implementation of educational paintings is important for early childhood development, community initiative could further maximize their effectiveness. Our team recommends the development of an informal educational program centred on the paintings. An individual could be responsible for encouraging interaction between the children and the painted alphabet and numbers, a task that could involve prompting the recitation of the alphabet or having participants name the shapes and colours used.

Signs

The implementation of signs to the D section block to accompany other additions like a soap dispenser and food waste bin would be very beneficial. A hygiene sign would have facts about germs and how diseases spread section in order to increase basic awareness. The same sign could also educate people about the importance of hand washing, and instruct them as to the proper way to do so.

A sign about waste disposal would illustrate the negative repercussions of improper waste disposal, such as blocked drains and toilets, and teach people the proper way to dispose of food waste and general trash in the bins provided. It would be most effective for these signs to depict these things with as many pictures and concise wording as possible, and be written in both English and Xhosa. A simple example of a sign in English is given below in Figure 19.

Figure 19: Hand WaSHUping Sign

Soap Dispenser

The addition of soap dispensers in the D section ablution block will improve health and sanitation. The soap dispenser can be securely bolted next to the wash basins in D section. As there is no soap currently provided, if people want to properly WaSHUp their hands they must buy their own soap.

The team has suggested a soap dispenser over bars of soap so that it cannot be stolen as readily. The dispenser would have a lip under where the hand would go to receive soap, preventing people from fitting a container under the dispenser to steal liquid soap for themselves. The soap would be biodegradable so that if it were not properly disposed of it would not be as detrimental to the environment as normal soap. Maintenance including restocking soap, fixing the dispenser, and preventing theft (to some degree) could be managed by either by the Pholo-Ka Hola maintenance company or a selected caretaker. The team believes that a soap dispenser would work best with the caretaker model since this person

could keep watch on soap usage, encourage people to WaSHUp their hands, and monitor the maintenance of the dispenser. Soap should be implemented with supplemental signs which illustrate facts about germs and disease, and instruct users on the proper method of hand washing. Soap dispensers will help to reduce the spread of germs and bacteria furthering sanitation practices in Langrug. An example of a soap dispenser is given below in Figure 20.

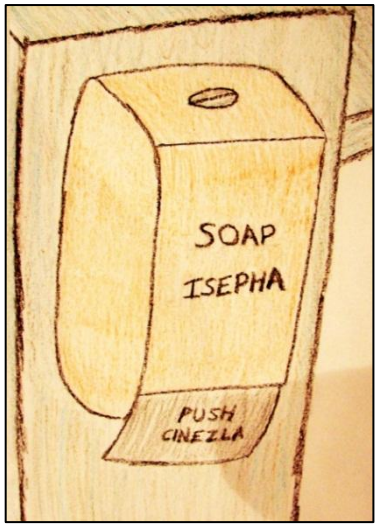

Figure 20: Soap Dispenser

In the Future

In order to sustain the momentum the WaSHUp Team and co-researchers have generated, it has been recently decided that the co-researchers will hold their position throughout the year and continue the incremental upgrading of Langrug community spaces. They have each been awarded the WPI Co-researcher Scholarship, which will fund their efforts for the calendar year of 2012. With the support of the WaSHUp Team, local NGOs, and hopefully the community of Langrug, Nyameka, Siyanda, and Alfred will continue to use the WaSHUp Process to improve the existing areas.

Their work, as well as the work of other Langrug co-researcher teams, can be followed at Langrug.wordpress.com.

Figure 21: WaSHUp Co-Researchers

Figure 22: Langrug Landscape

Acknowledgements

The WaSHUp Team would like to take the time to thank the following individuals for their contributions to our project:

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2008 WPI Water and Sanitation Team for their work and research on water taps

2010 WPI Early Childhood Development Team for their work and research on children's educational toys

2011 WPI Grey Water Team for developing their process, which inspired us to create our own

Appendix

Primary Process Form

Name(s): _____

Date: _____

1. **Identify potential sites:**
   _____
   _____
   _____

2. **Pick a site:** _____

3. **Talk with the people around the chosen site to learn…**
   a. **Existing problems:**
      _____
      _____
   b. **What projects have been done:**
      _____
      _____
   c. **What the residents want**
      _____
      _____

d. Share ideas with the community
e. Get their consent
f. Find out who's willing to take care of the site

Name/Number_____ Name/Number_____

Name/Number_____ Name/Number_____

Name/Number_____ Name/Number_____

4. Create a design
a. Measure
b. Design site blueprint in a grid (Use graph paper)
c. Show community the design
d. Revise if necessary

5. Find people to take responsibility for the site
a. Identify the tasks

_____
_____
_____
_____
_____
_____

b. Create a schedule to do these tasks (On separate paper)

6. Plan for construction (Use STEP 6 Form and Budget Form)
a. Determine what materials are needed
b. Research where to get them

c. **Get a materials quotation**
d. **Create a budget**
e. **Send quotations to SDI, CORC, and WPI**
f. **Determine the order things will be built**
g. **Find others to help build**

7. Build it

8. **Check up on the project**
   a. **What is working** _____
   _____
   _____

   b. **What needs improvement** _____
   _____
   _____

   c. **Community feedback** _____
   _____
   _____

9. Repeat steps 1-8

Characteristics of Design Site Form

Education for kids under five (numbers, letters, shapes…etc)

Fun for kids (games, toys…etc)

Safety

Privacy

Relaxing space for adults

_____

_____

_____

_____

Practical items (laundry wringer, clothesline….etc)

_____

_____

_____

_____

Hygiene promotion (soap dispenser, hand WaSHUping station…etc)

_____

_____

_____

_____

Step 6 Form

Name(s): _____

Date: _____

Location: _____

a. **Needed Materials:**

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

b. Research where to get them

c. Research material and labor prices

d. **Create a budget (Use Budget Form)**

e. Send quotations to SDI, CORC, and WPI

f. **Determine order of implementation**

1) _____	**7) _____**	**13) _____**
2) _____	**8) _____**	**14) _____**
3) _____	**9) _____**	**15) _____**
4) _____	**10) _____**	**16) _____**
5) _____	**11) _____**	**17) _____**
6) _____	**12) _____**	**18) _____**

g. **Find others to help build**

Name/Number_____ Name/Number_____

Name/Number_____ Name/Number_____

Name/Number_____ Name/Number_____

Name/Number_____ Name/Number_____

Budget Form

Name: ______________________

Date: ______________________

Location: ______________________

Materials List:

Material	Item Cost	QTY	QTY Cost	Material	Item Cost	QTY	QTY Cost	Material	Item Cost	QTY	QTY Cost
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -
	R -		R -		R -		R -		R -		R -

Total QTY:	0
Total Cost:	R -

Labor Quote:

Workers Name	Contact Information		Quote
	Telephone	E-mail	
			R -
			R -
			R -
			R -
			R -
			R -
			R -
			R -
			R -
			R -
			R -

Total Labor Cost:	R -