

**Report on the upgrading works of toilets, water
and drainage points in Diepsloot, Johannesburg
April 2015 and planning for future upgrade
works.**

**WASSUP, Sticky Situations,
WorldSkills Foundation, IAPMO and Healthabitat**

Diepsloot



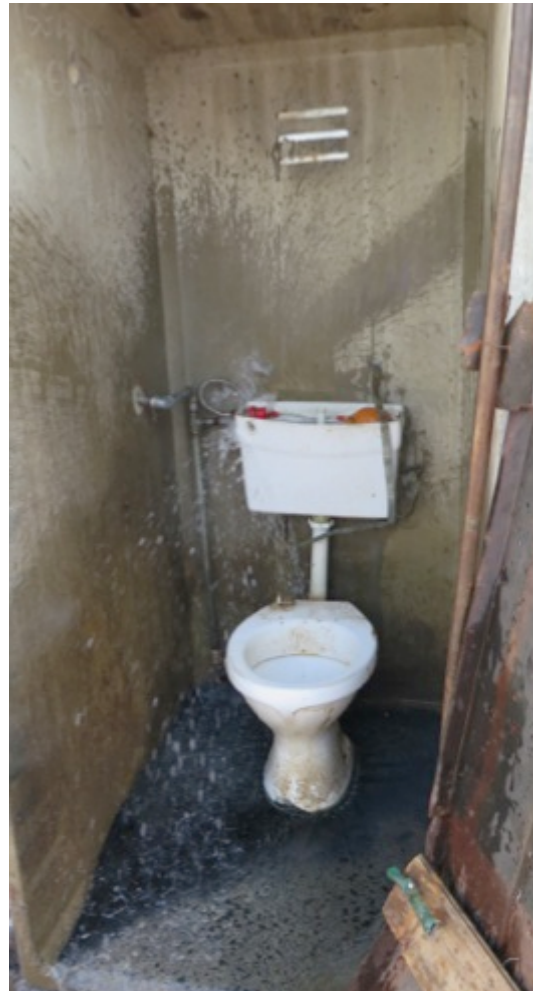
Diepsloot



Diepsloot



The alternative to the slow, grinding work of the WASSUP team upgrading and then maintaining toilets, water supply points and wastewater disposal points – lack of working facilities and rivers of sewage, wastewater, and illness.



DIEPSLOOT Extension 1: WASSUP/ Healthabitat/ World Skills Foundation works area





All 3 of the items (A, B, C) are essential for health, but prior to repair not a single location had all 3 items in full working condition.

Assessing toilet, water supply and drainage performance and population numbers using the facilities

Assume the population of approx. 795 are using 10 toilet units (toilets 11 and 12 were not functioning before or after the works).

In the area shown (left) :

125 people use 4 toilets but if only 1 toilet is working= 125/toilet

213 people use 2 toilets but if 0 toilets are working = 213 people have to use other toilets

185 people use 2 toilets but if 0 toilets are working = 185 people have to use other toilets

272 people use 2 toilets if 2 toilets are working= 136/toilet

Access to water and toilet increased by upgrades

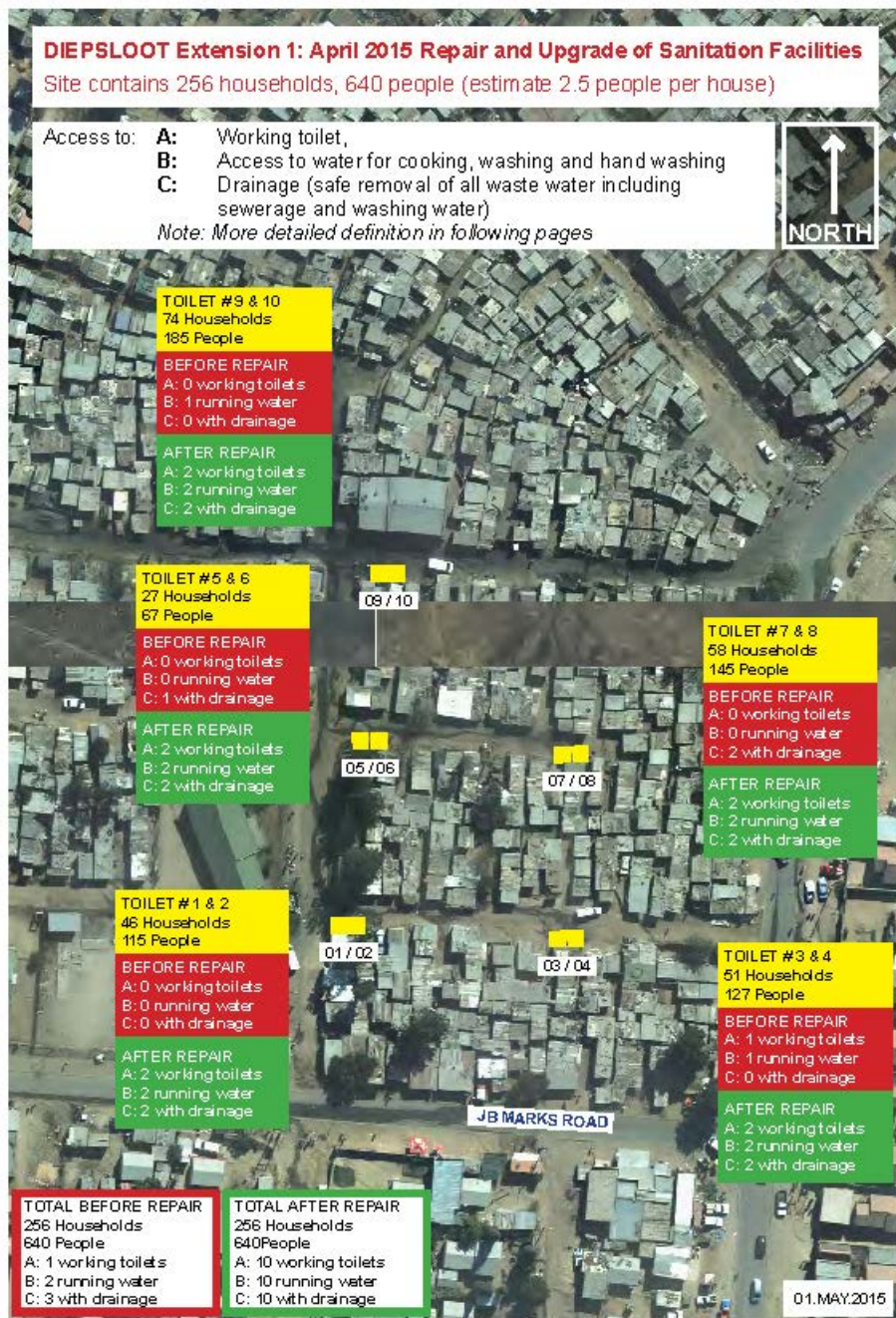
If you assume the 213+185 people who had no access to a working toilet stayed within the area shown, then the load on the 3 working toilets and water / drainage points is now 795 people = **265 people per toilet**.

Given most access to toilet and water occurs between 6am and 8pm (2014 use data) this would mean use by **18 people an hour for 14 hours**, increased use will occur during morning and evening peaks.

Water use reduced by upgrades

Water use data collected during 2014 from 10 toilets and water supply points (after upgrading) showed **each averaged 3,200 litres per day**. Water losses due to leaks in the same period for 10 units (not upgraded) averaged **4,000 litres per day**.

Given the water use observed in 2014 this would mean an **average water use per person of 12 litres per day with improved, leak free facilities**. If leaks are not 'improved' by upgrading works, average water use more than doubles.



All 3 of the items (A, B, C) are essential for health, but prior to repair not a single location had all 3 items in full working condition.

Assessing toilet, water supply and drainage performance and population numbers using the facilities

Assume the population of approx. 640 are using 10 toilet units

In the area shown (left) :

185 people use 2 toilets but if 0 toilets are working = 185 people have to use other toilets

67 people use 2 toilets but if 0 toilets are working = 67 people have to use other toilets

145 people use 2 toilets but if 0 toilets are working = 145 people have to use other toilets

115 people use 2 toilets but if 0 toilets are working = 115 people have to use other toilets

127 people use 2 toilets if 1 toilet is working = 127 / toilet

Access to water and toilet increased by upgrades

If you assume the 185+67+145+115 people who had no access to a working toilet stayed within the area shown, then the load on the 1 working toilet and water / drainage point is now 640 people = **640 people per toilet**.

Given most access to toilet and water occurs between 6am and 8pm (2014 use data) this would mean use by **45 people an hour for 14 hours**, increased use will occur during morning and evening peaks.

Water use reduced by upgrades

Water use data collected during 2014 from 10 toilets and water supply points (after upgrading) showed **each averaged 3,200 litres per day**. Water losses due to leaks in the same period for 10 units (not upgraded) averaged **4,000 litres per day**.

Given the water use observed in 2014 this would mean an **average water use per person of 5 litres per day with improved, leak free facilities**. If leaks are not 'improved' by upgrading works, average water use more than doubles.

10 days in 2015

2 areas improved = 20 + 6 additional units = 26 units (toilets, water and drainage points)

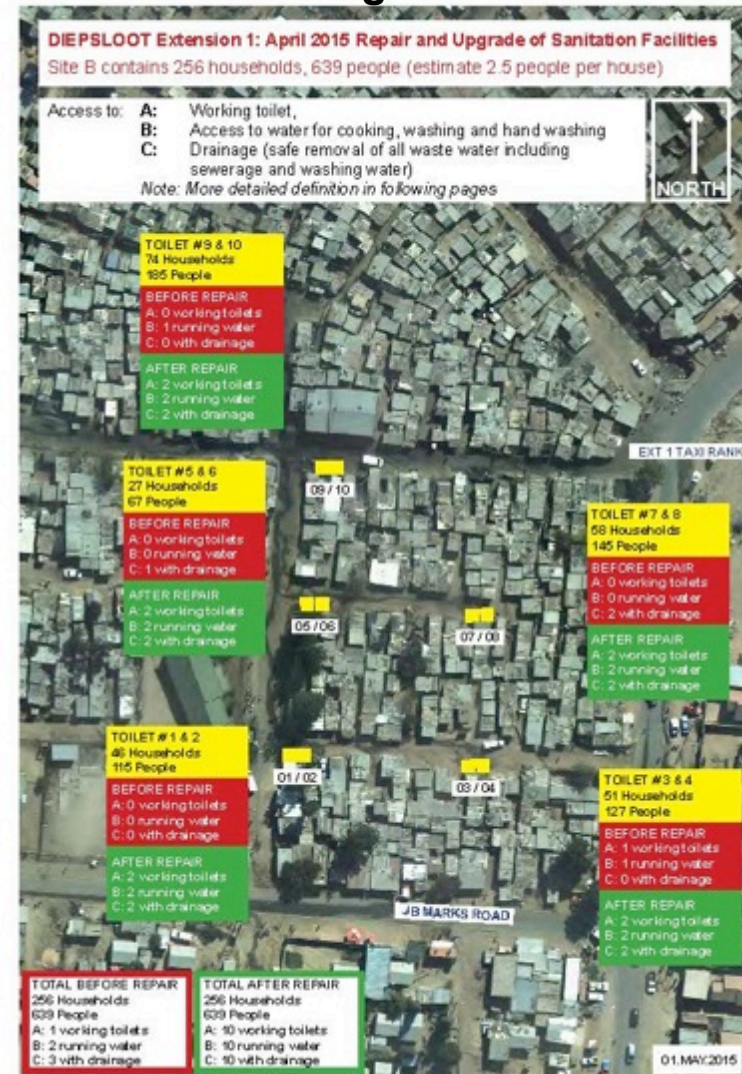
1500 people use these facilities every day

Before the works 4 toilets, 5 water points & 6 drainage points were functioning

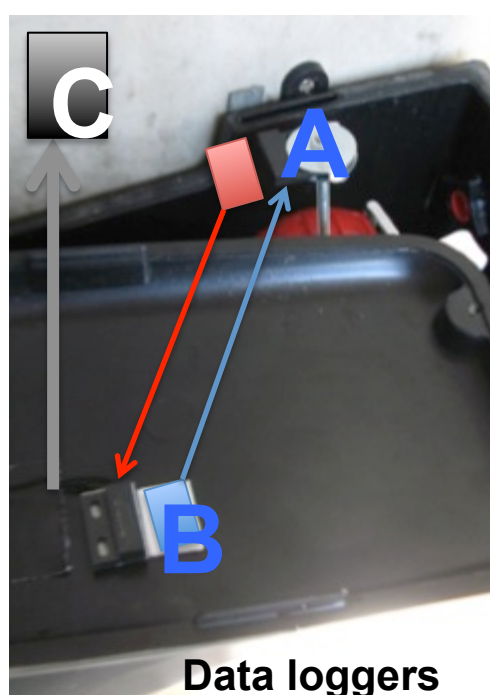
After the works all 26 units were functioning



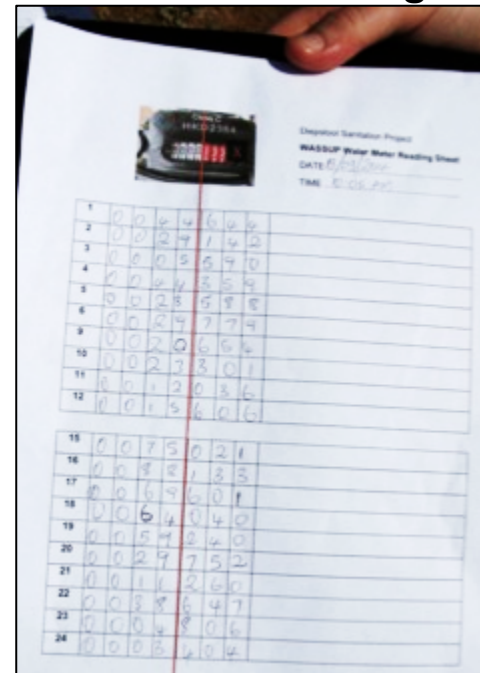
All 3 of the items (A, B, C) are essential for health, but prior to repair not a single location had all 3 items in full working condition.



All 3 of the items (A, B, C) are essential for health, but prior to repair not a single location had all 3 items in full working condition.



Data loggers
Water meter readings



Learning from past work

In 2014, water meter readings (*bottom left*) and data logging of cisterns (*top left*) was carried out to show the number of flushes, and overall water use. This work showed consistently high use of the facilities and the potential for water saving, not by reducing access to water or toilets, through the reduction of existing leaks.

After upgrading works fixed leaks, water savings consistently averaged 4,000 litres per toilet per day compared to metered, unmodified toilets and taps used as a control.

Given the solid data obtained in 2014, and the similar nature of the facilities found this year (*see example of a toilet leak left*) during the 2015 works only 2 new meters were fitted, one in each main area where works were completed.

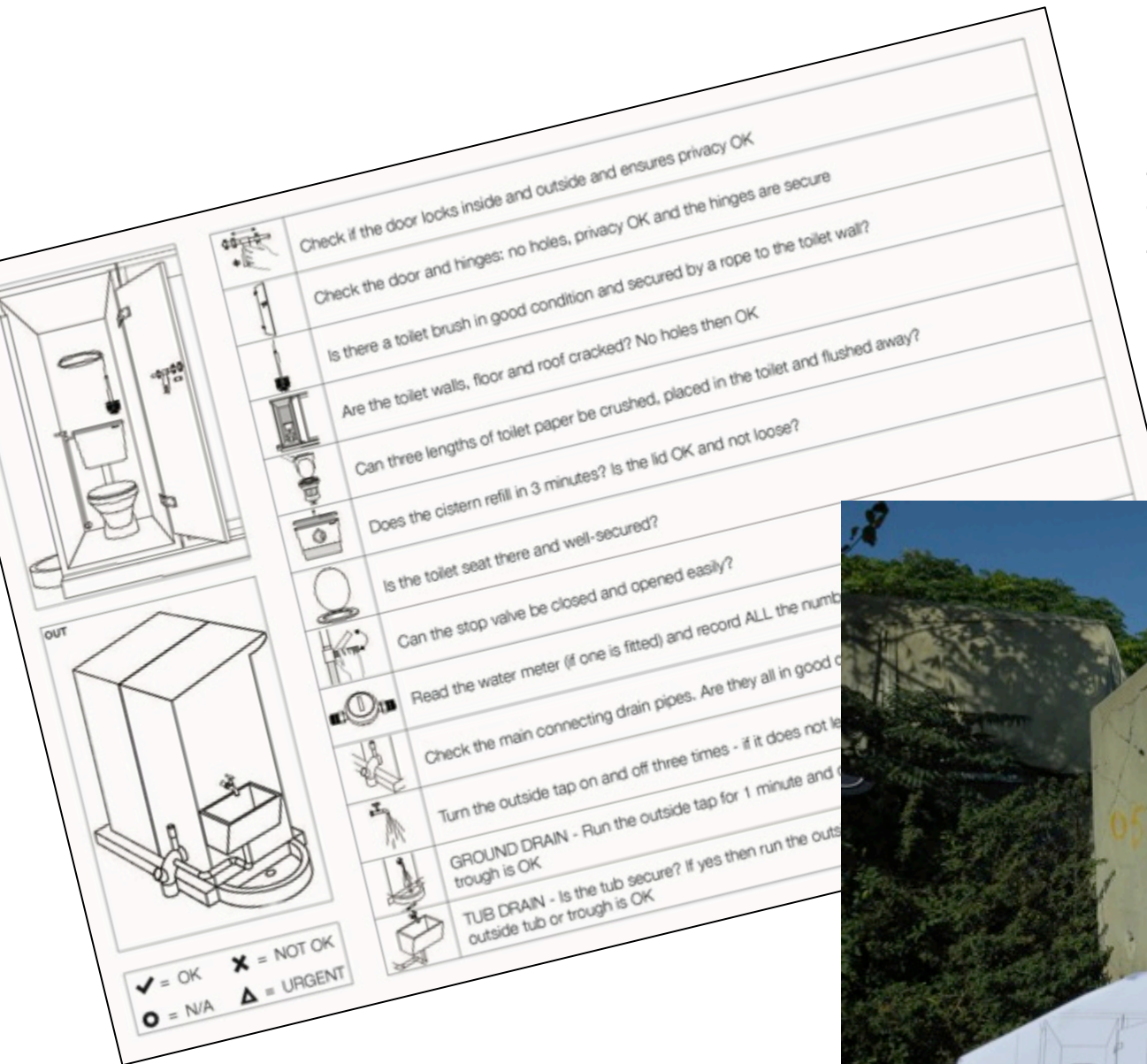
The estimated water savings following the 2015 works can be calculated as follows;
26 toilets, stop valves, pipes & taps upgraded
26x 4,000 litres per day saved =

104,000 litres saved per day

Learning from past work

In 2014, a toilet survey was developed and is now used for maintenance and assessing the next round of unit upgrades.

The worksheets that follow were forwarded to HH after the April 2015 visit to define the scope of works for the next upgrade.



Checklist:

- Check if the door locks inside and outside and ensures privacy OK
- Check the door and hinges: no holes, privacy OK and the hinges are secure
- Is there a toilet brush in good condition and secured by a rope to the toilet wall?
- Are the toilet walls, floor and roof cracked? No holes then OK
- Can three lengths of toilet paper be crushed, placed in the toilet and flushed away?
- Does the cistern refill in 3 minutes? Is the lid OK and not loose?
- Is the toilet seat there and well-secured?
- Can the stop valve be closed and opened easily?
- Read the water meter (if one is fitted) and record ALL the numbers
- Check the main connecting drain pipes. Are they all in good condition?
- Turn the outside tap on and off three times - if it does not leak
- GROUND DRAIN - Run the outside tap for 1 minute and check if the outside tub or trough is OK
- TUB DRAIN - Is the tub secure? If yes then run the outside tap for 1 minute and check if the outside tub or trough is OK

Legend:

- ✓ = OK
- ✗ = NOT OK
- = N/A
- △ = URGENT





Pre work

New isolation valves are essential to control water for maintenance.

Adding these valves requires either;

- The main water supply being disconnected (by Joburg Water)
- Wet installation
- Crimping of the main supply temporarily to allow the fitting of the isolation valve

The problem (*top left*)

A WASSUP member gets ready for the wet install option (*top right*)

Crimping of the main polypipe supply line, using offcuts of water pipe and spanners, was the chosen method. (*bottom left*)





Work packages

1 Install new isolation (stop) valve on main water supply line with NO water meter + ext. tap

1/2" ball valve

1/2" pipe (approx 3' or 1m)

1/2" gal T

1/2" x 4" nipple (new installation)

1/2" F x F (female) elbow

1/2" x 8" nipple (or pipe piece)

1/2" F x F (female) elbow

1/2" x 6" pipe piece (from piece above)

1/2" socket

R100

1a Install new isolation (stop) valve on main water supply line with water meter + ext. tap

1/2" ball valve

1/2" pipe (approx 3' or 1m in total)

1/2"x3/4"bush

3/4" barrell cone union

3/4" water meter

3/4" x 1/2" reducer

1/2" pipe (cut from main length above)

1/2" gal T

1/2" x 4" nipple (new installation)

1/2" F x F (female) elbow

1/2" x 8" nipple (or pipe piece)

1/2" F x F (female) elbow

1/2" x 6" pipe piece

1/2" socket

R650



Work packages

2 Install new cistern, stainless flexible supply connection and flush pipe to suit pan

Branch to the cistern

1/2" x 2" nipple

1/2" x 12" flexible hose (female ends)

Cistern and connection

Heavy duty black plastic cistern

1 3/4" semi close couple flush pipe OR to suit installation

Top of flush pipe washer and bottom of flush pipe cone washer (with with cistern)

8 x 50mm coach screw x 2

8 mm masonry plugs

10 mm drill bit for holes (SDS impact hammer drill)

R1200



Work packages

3 Install new pan and waste pipework

WC waste system

Pan

110 mm pan adaptor

110 dia short piece of PVC pipe (approx 8")

SV bend with horn 110mm 87.5 deg access heel

Out of the horn short 50mm pipe (approx 8")

SV 50mm 2 way vent valve

toilet seat for inside

R1150



Work packages

4 Grey water waste drainage (basic fix)

Grey waste water

Gully grate (plastic)

4 x 16mm needle point screws to fasten

110mm x gully grate adapter

110 gully trap

R 90



Work packages

5 Door and lock + jamb repair as needed

Door and lock

Door

Lock

Jamb reinforcement

R 650

Amended future budget calculated using the work packages for areas C and D only 52 toilets

Package number	Work Packages and numbers needed as defined by WASSUP team survey	Cost (ZAR)	Area C	Area D	Area E (deleted to reduce cost)	Area F (deleted to reduce cost)	totals of work packages required and total units	Materials Cost per package and total (ZAR)	AUD	Euro (@.68 Euro cents to 1 AUD)
1	New stop valve NO meter	100	16	22			38	3800		
1a	New stop valve and meter	650	2	2			4	2600		
2	New cistern	1200	28	24			52	62400		
3	New pan and waste connections	1150	15	8			23	26450		
4	New grey waste waste drainage	90	9	11			20	1800		
5	New door lock and jamb plate	650	22	19			41	26650		
	Total units		28	24	14	12	78	123,700.00	\$ 13,593.41	9,243.52 €
Hire costs	All building hire equipment per week for 3 weeks (generator, drill, pipe threader, grinder)	4800	3					14400	\$ 1,582.42	1,076.04 €
	Vehicle van hire for 2.5 weeks	11000	2.5					27500	\$ 3,021.98	2,054.95 €
Consumables	Per 25 toilets tools	550	2.5					1375	\$ 151.10	102.75 €
		2100	1					2100	\$ 230.77	156.92 €
WASSUP wages and Sticky Situations	support for 3 weeks including per ordering and mop up									
	Sticky Situations 3 weeks (AUD)	500	3						\$ 1,500.00	1,020.00 €
	WASSUP Team of 6 for 3 weeks	18000	3					54000	\$ 5,934.07	4,035.16 €
Plumber costs on the ground	Baed on the recent visit & back to back visits									
	Airfares estimated @ \$AUD 2000 and as actual costs when booked	2000	8000						\$ 8,000.00	5,440.00 €
	On the ground costs accommodation and food	1500	6000						\$ 6,000.00	4,080.00 €
Total									\$ 40,013.74	27,209.34 €

Future schedule for upgrade works

Schedule for WSF plumbers and WASSUP / SS / HH

One month before site work commences

SS ordering plumbing parts (Waterways)
general hardware (Jacks)
cisterns and flush pipes
doors
book hire tools and van

One week before site work commences

WASSUP confirms work scope
informs residents

Two days before site work commences

HH arrives Joburg
confirm workscope
checks all materials
work package parts sorted

One day before site work commences

WSF Plumbers arrive Joburg
Tool sorting
Parts sorting and meeting

Work Days 1-10

WSF 2 WSF Plumbers (Group 1)
One day break mid way and 1 day arrive 1 day depart total time
11 days total on site

Days 9/10 2 days handover period to Group 2 plumbers
HH departs after handover

Work Days 11 -21

2 WSF Plumbers (Group 2)
One day break mid way and 1 day arrive 1 day depart total time
11 days total on site



Thanks

The WASSUP team
The works on the ground

Jennifer van den Bussche from Sticky Situations
Organising, maps plans and survey work on site

The WorldSkills and IAPMO plumbers and support staff
Alec De Koyers – plumbing work and training
Jed Scheuermann – plumbing, training and thousands of high quality photos

The WorldSkills Foundation – supporting all aspects of the project
IAPMO - supporting Jed to attend and contribute to the project

Local suppliers who helped during the upgrade works.

