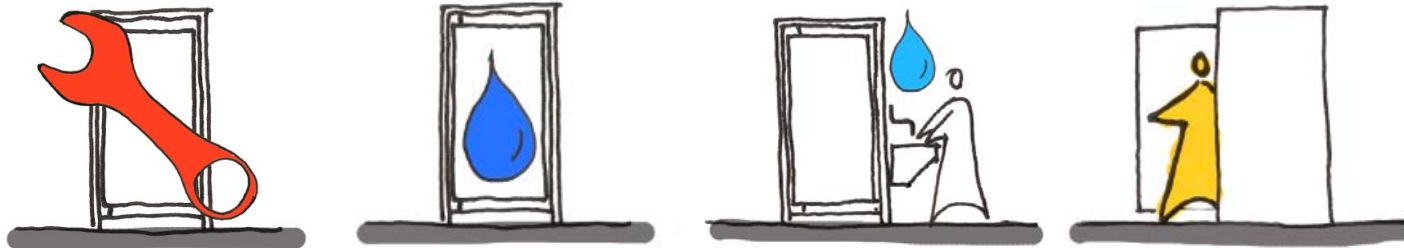




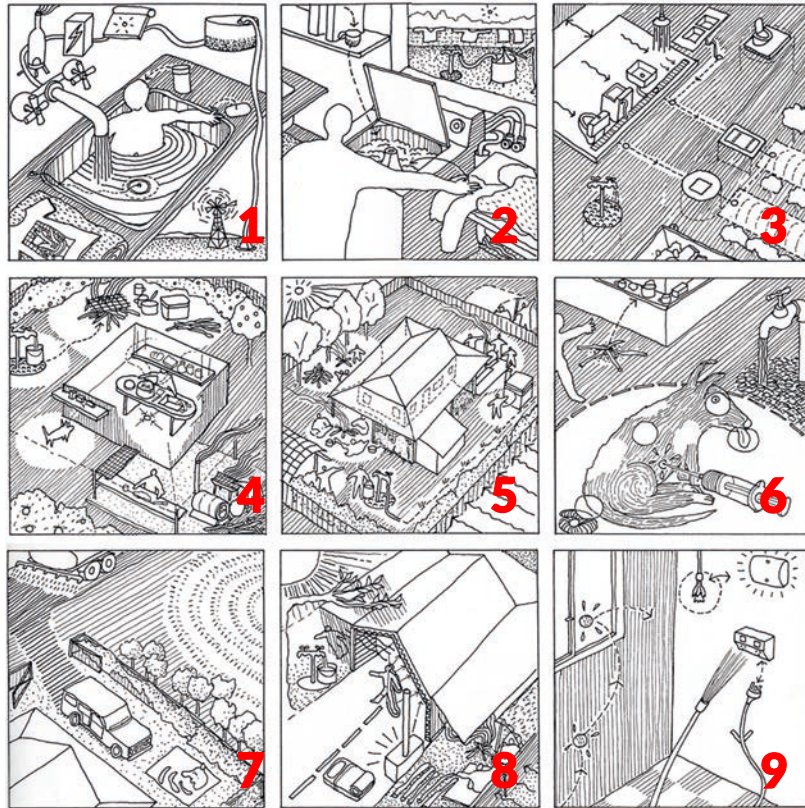
COMMUNITY PLUMBING CHALLENGE 2016 DIEPSLOOT



DATA FOR HEALTH HARDWARE

- + HEALTH HARDWARE PERFORMANCE
- + MONITORING PATTERNS OF USE
- + MAINTENANCE

Health and the Diepsloot Sanitation Project



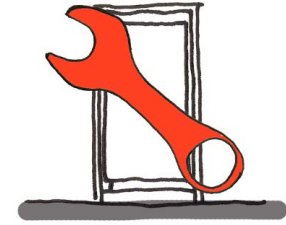
The **Diepsloot Sanitation Project** started in 2014 and aims to improve public health. Since 1985 Healthabitat has used the 9 **Healthy Living Practices (HLPs)** as the core principles of any project.

In this project 6 HLP improvements could be expected. Work onsite during the WASSUP & HH Sanitation Studio was staged to reflect the following HLP priorities:

1. Water in for washing (1), clothes washing in tubs (2), wastewater removal (3) and cooking (4). The crowded environment of Diepsloot made it essential to limit the 'down time' of any water supply, toilets or wastewater facilities. (5)
2. Waste water safely removed – drainage, checking of mains lines and remaking of drainage points. Better removal of wastewater from the dirt streets will reduce insects and vermin. (6)
3. Future works, already commenced, will address privacy and ease of cleaning.

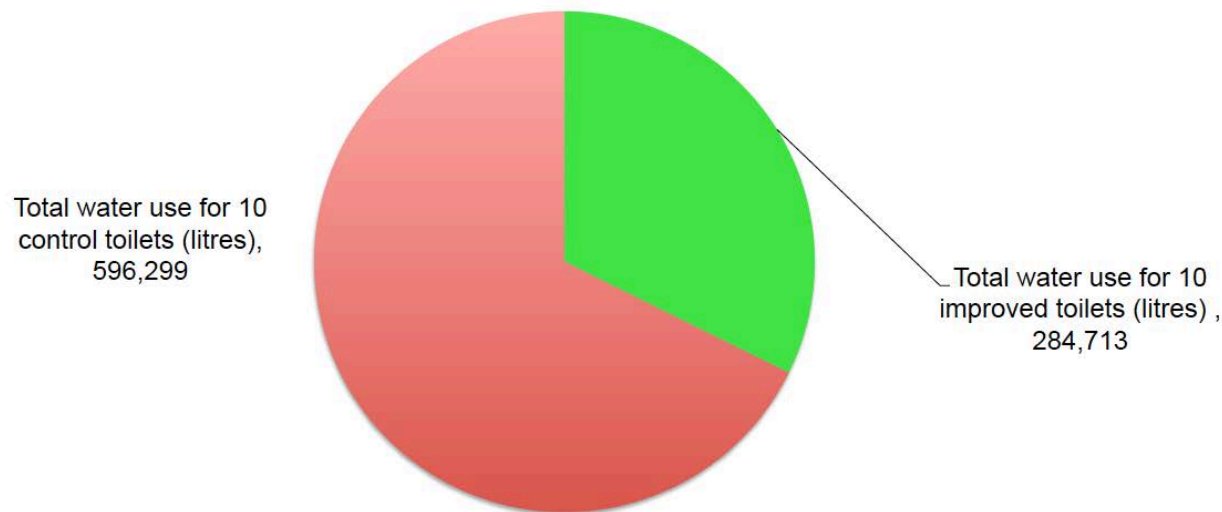


2014 SANITATION STUDIO - RESULTS



2014 WASSUP-Healthabitat Sanitation Studio the 10 control toilets were logged for toilet flushing and water use as base point. During the same 2-week studio, another 10 nearby toilets were upgraded, logged and showed the following total water savings:

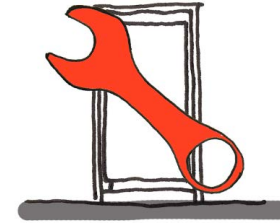
WASSUP Diepsloot Sanitation Project Total water use



Total water use in the improved toilets and tap points as compared to the control group, only 16 days after the works were commenced, this graph shows the **dramatic improvement in water saving whilst improving access to the facilities.**

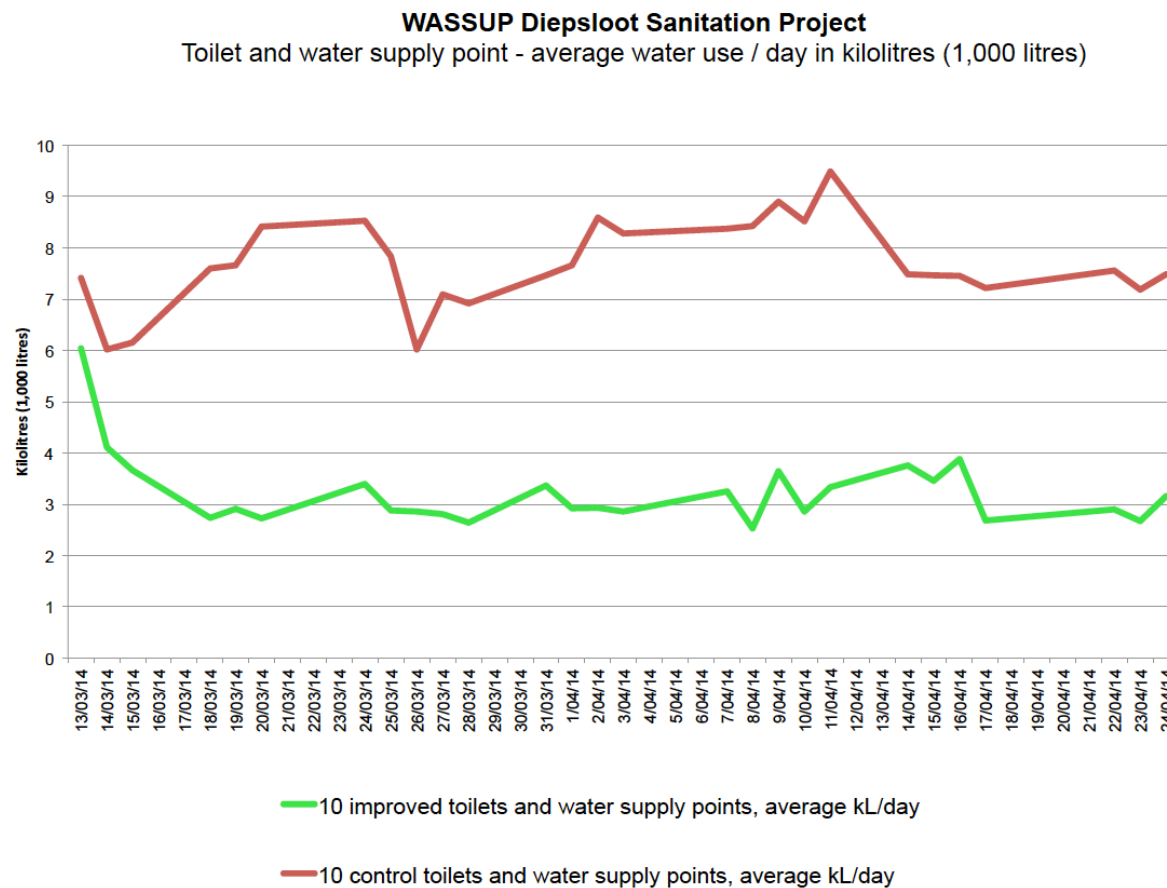


2014 SANITATION STUDIO - RESULTS



Water use – average volume used per toilet and tap point every day – improved / control

After only 42 days, the water meter readings show the difference between the improved toilets/ tap points and the control group, with an average difference per toilet of over 4,000 litres per day. This could mean around 13 million litres of wasted water a day passes through the other 110 toilets being managed by WASSUP if the poor existing hardware is not improved.



COMMUNITY PLUMBING CHALLENGE 2016 - 8 NEW TOILET UPGRADES

The international Community Plumbing Challenge aims to **contribute to improvements to public health** in regions where communities are still threatened by a lack of basic sanitation and safe drinking water systems.

Community Plumbing Challenge 2016 combined **multi-disciplinary teams, with a cross-section of expertise** expanding on the skills pathway and career options for plumbing apprentices and professionals in South Africa, and around the world.

Eight **defunct communal toilets were plucked out** of the ground in Diepsloot Extension 1, (and replaced with new and improved toilets as upgraded by the WASSUP team) where four international student teams (representing Australia, India, United States and South Africa) will now collaborate to develop the most effective and sustainable new upgrade solutions.



CPC 2016 – 8 NEW TOILET UPGRADES

Data logging equipment was installed in these new upgraded toilet units for the purposes of mapping people and water usage, which can be compared with the data of usage from non-upgraded toilets recorded during the 2014 sanitation studio.



CPC – THE LOGGING EQUIPMENT

Designed to travel and install easily, the loggers record data every 5 minutes or when door opens.

Logger records:

- Door opening
- Door state
- Presence
- Tap water use
- Cistern water use



HEALTHABITAT O/S LTD

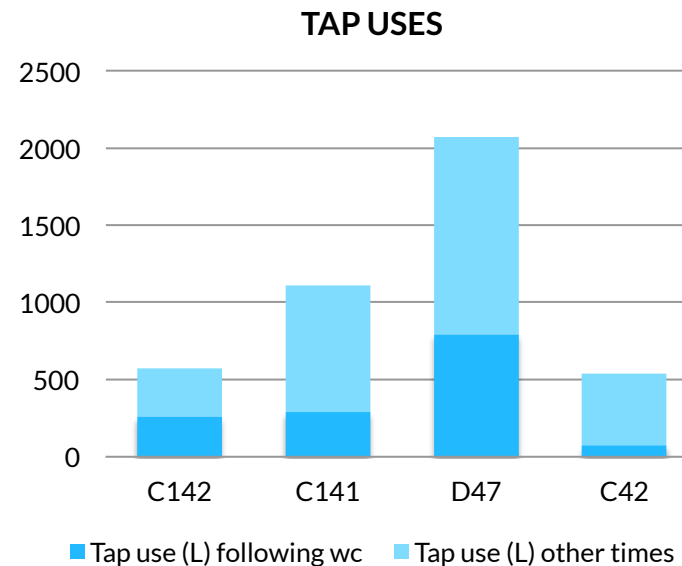
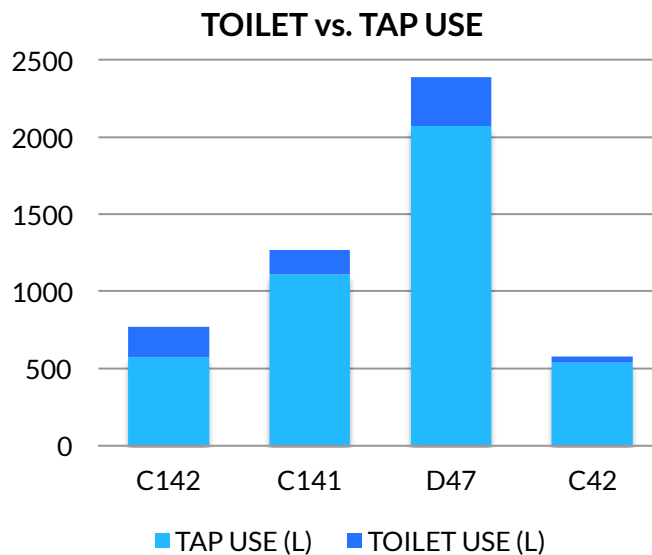
DAILY SUMMARY OF CPC UPGRADED TOILETS

After the upgraded toilet units were installed, the data loggers recorded the following daily summaries of use for each toilet:



AVERAGE DAILY POPULATION USE

Population of use to CPC upgraded toilets 2016



TOILET C142



TOILET C141



TOILET D47



TOILET C42

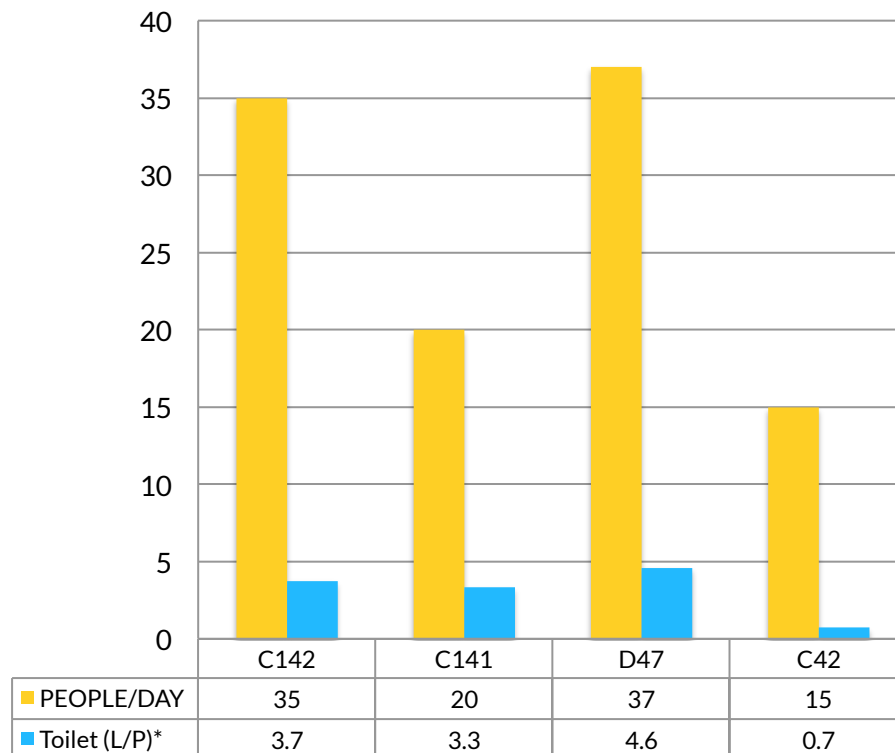
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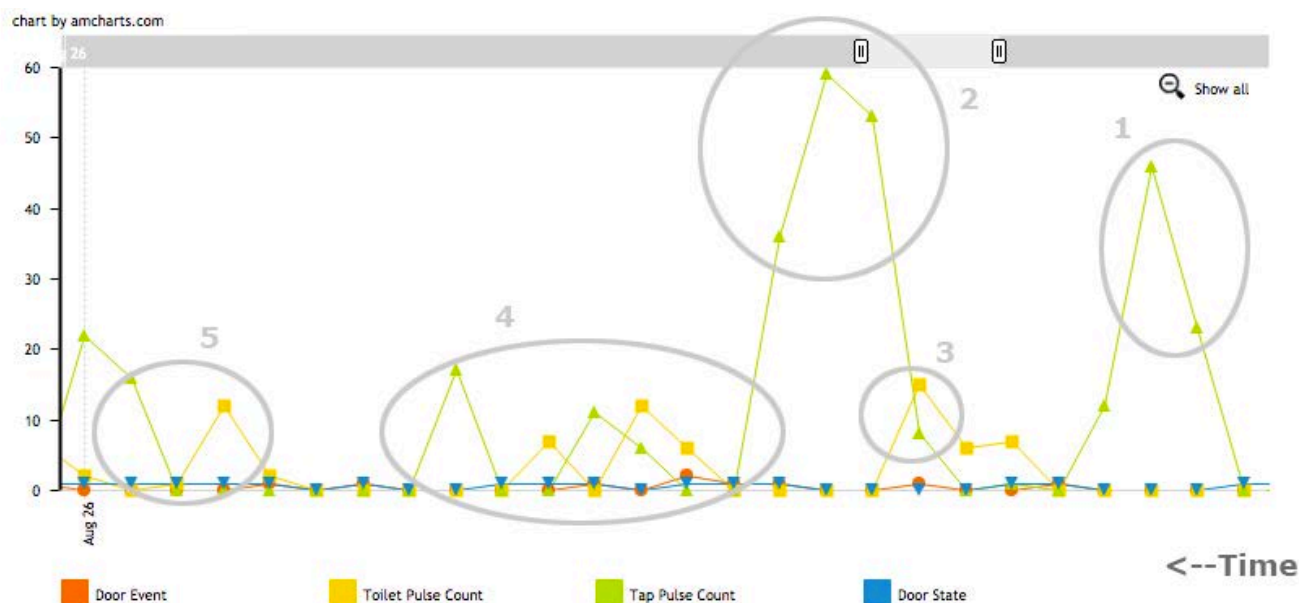


*does not include tap point



TAP USE ANALYSIS

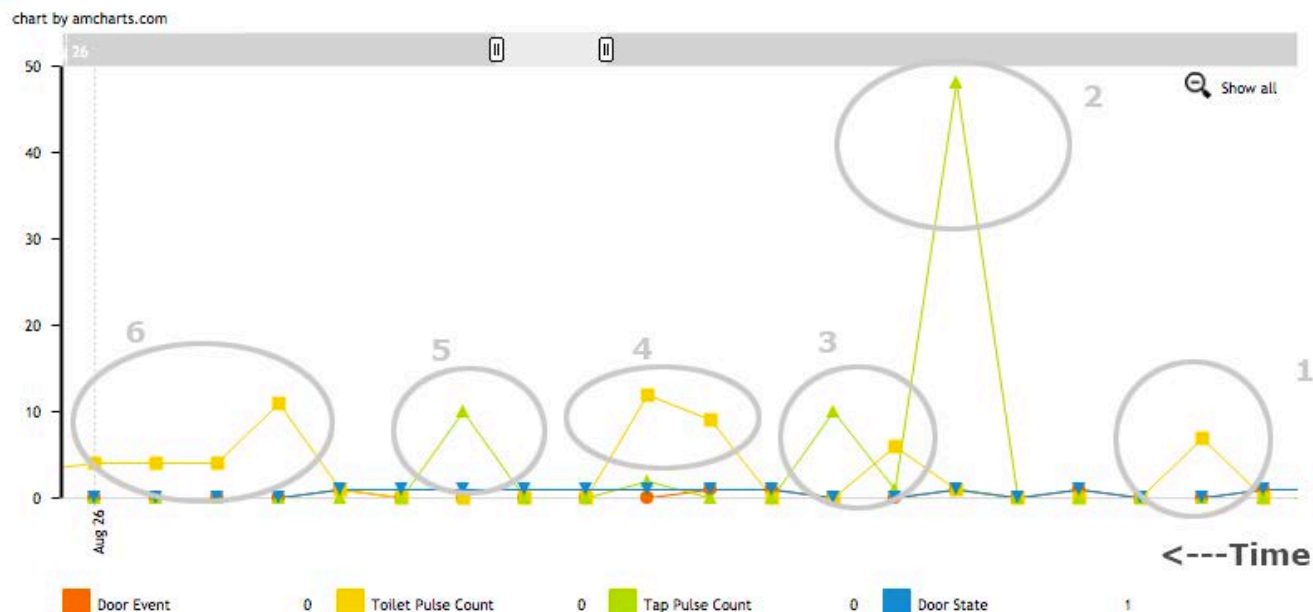
Analysis #1



1. Tap event not associated with toilet use
2. Tap event not associated with toilet use
3. Toilet use
4. Door Event with toilet use followed by tap use followed by toilet use followed by tap use assumption is that tap use is associated with toilet use
5. Toilet use not followed immediately by tap use - assumption is that no hand washing occurred

TAP USE ANALYSIS

Analysis #2: hand washing vs. water supply



1. Toilet use - no tap use, assumption no hand washing occurred
2. Tap use likely for filling container or washing not related to hand washing
3. Tap use following toilet use likely hand washing
4. Toilet use with no tap use
5. Tap use with no toilet use
6. Toilet use with no tap use - assume no hand washing occurred

DAILY SUMMARY INSIGHTS AND POTENTIAL



Population use;

- there can be a large difference in people usage across the toilet units.
- the Litres/person for toilet use is relatively consistent across all toilets, at average 4L/P.

Water use;

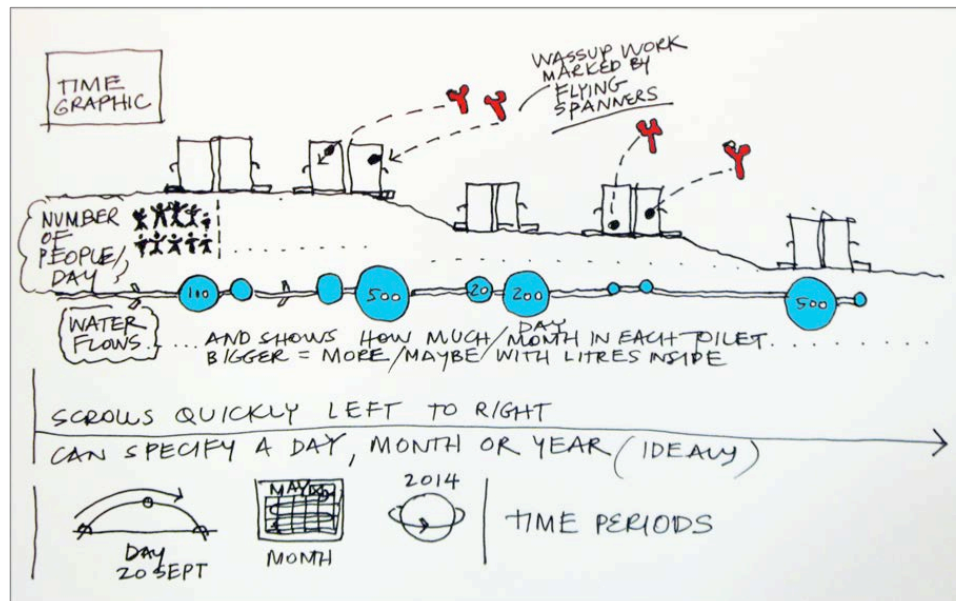
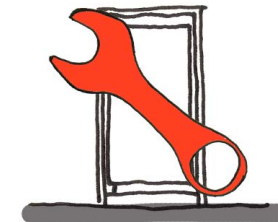
- greatest usage is through the tap, with most of this used for water supply, not hand washing
- whilst the usage varies between toilet units, the proportion of toilet usage vs. water supply is relatively consistent.



Water usage on upgraded toilets vs. non-upgraded toilets;

- the average daily water usage on the CPC 2016 upgraded toilets is well below the average water usage recorded for the non-upgraded toilets (refer to 2014 data).

LEAKY TAP CASE STUDY & LIVE DATA DATA LOGGING



LIVE DATA

Participating teams and the local WASSUP team can monitor the upgraded toilets performance remotely.

The same data loggers installed during the CPC will be updating the map daily to provide information as to the daily water use for participating teams and local WASSUP team.

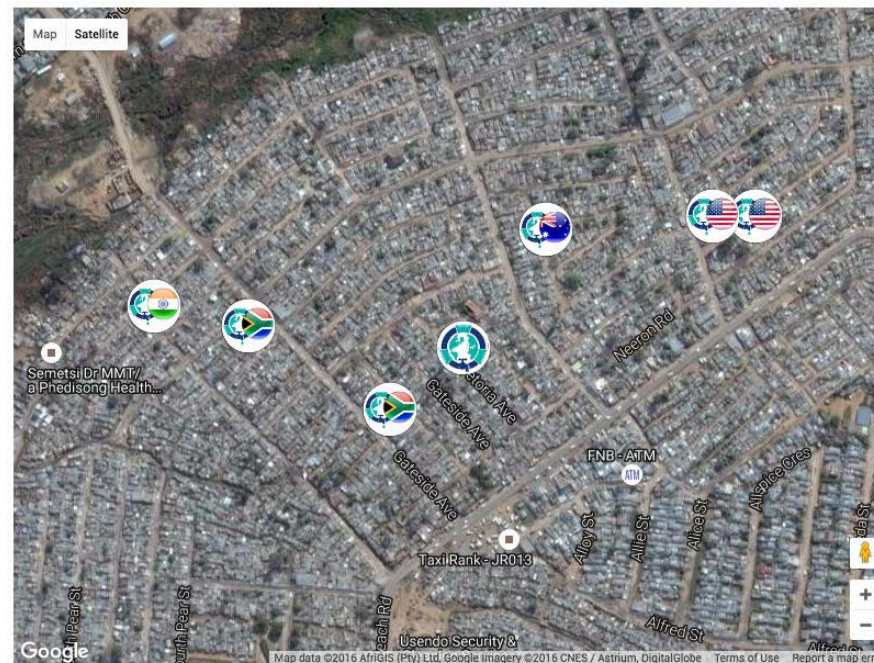


COMMUNITY PLUMBING CHALLENGE 2016



LIVE DATA Diepsloot, South Africa

Wednesday 14 September, 2016 15:13 Local time



Brought to you by

W.A.S.S.U.P.



HHO/S

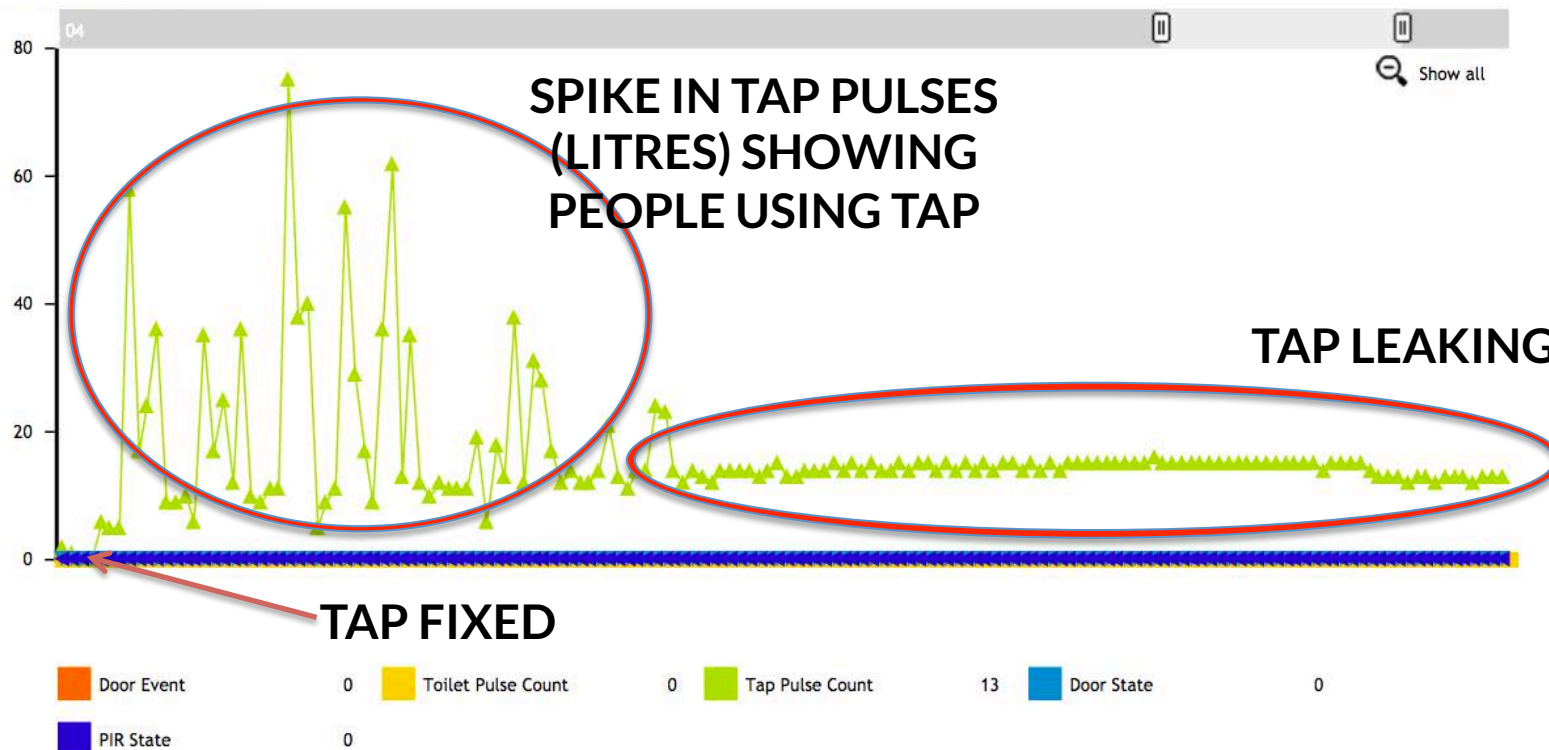
IWSH.org

CASE STUDY LEAKY TAP

The use of logging for maintenance was realised when a change in the pattern of tap usage was while the system was still being tested.



- The leak found via the data
- An email sent to Sticky Situations in Johannesburg to investigate
- Sticky Situations contacted WASSUP in Diepsloot
- **WASSUP fixed the tap**, which was losing approximately 70 litres per hour

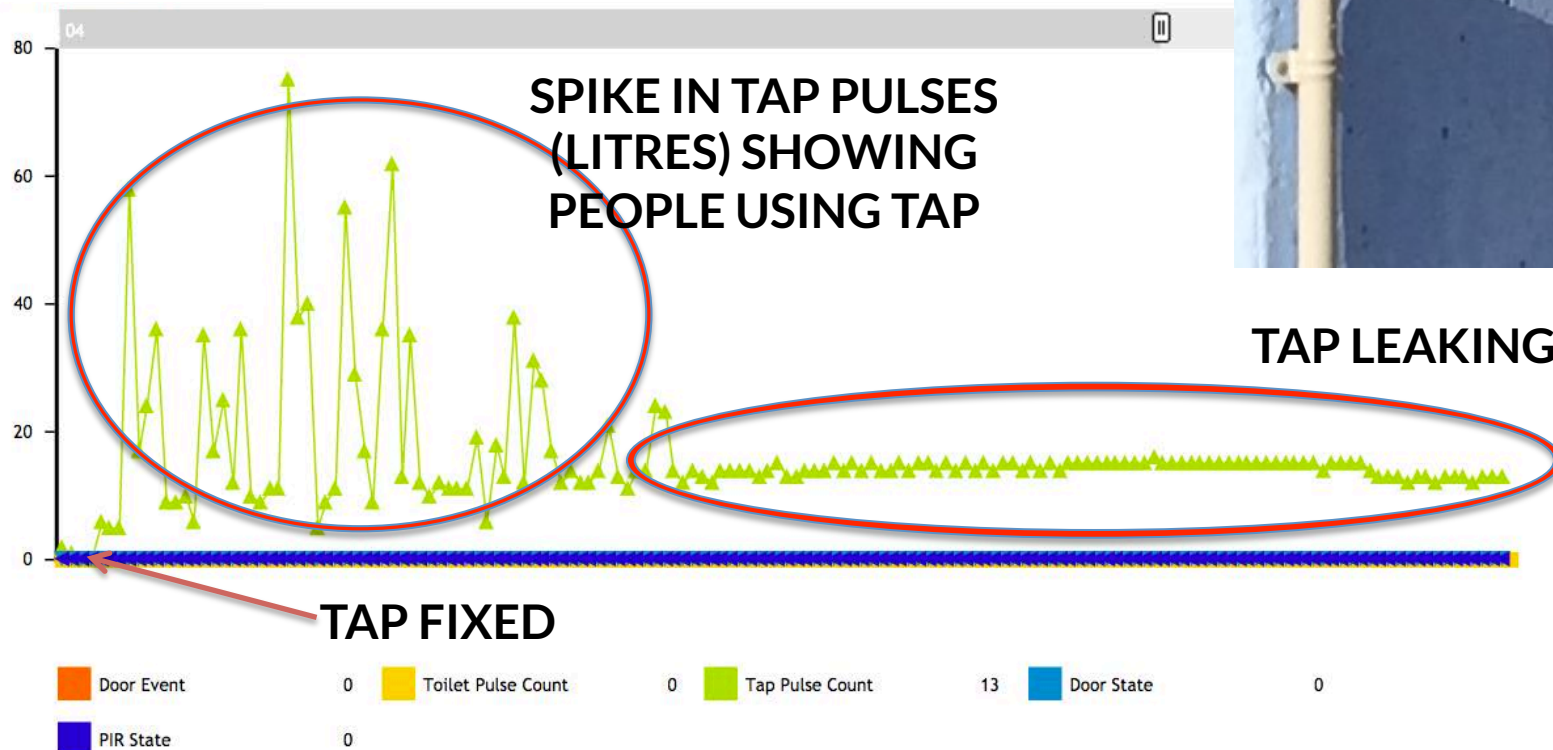
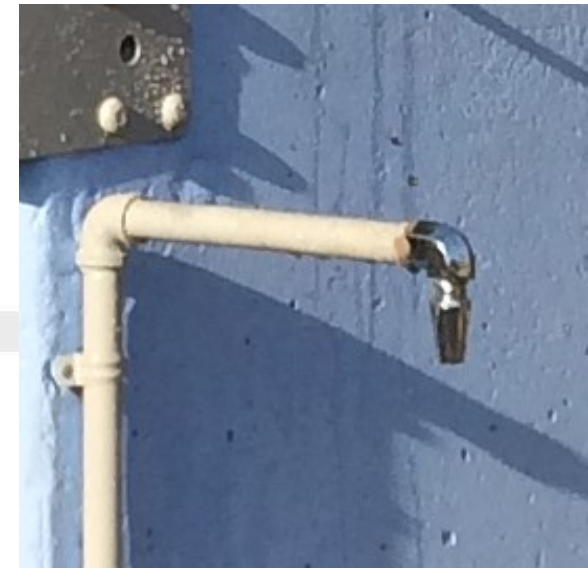


CASE STUDY LEAKY TAP

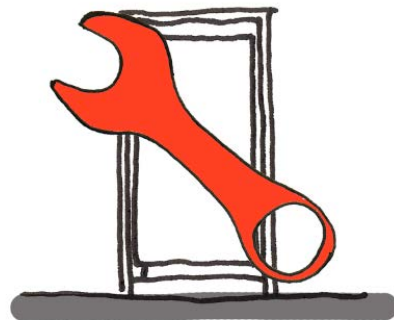


OUTCOME

- 'Push-up' tap wasn't releasing back into the shutoff position.
- New ball-valve tap installed.

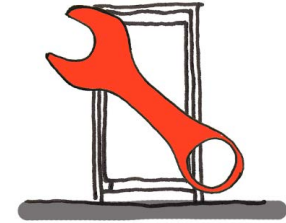


DATA FOR MAINTENANCE SURVEY-FIX METHODOLOGY



MAINTENANCE

Ongoing routine **maintenance of the toilet systems is critical** for ensuring the water savings achieved by good design and construction can be sustained. The best design and installation in the world will minimise, but will not prevent things going wrong. If a tap or cistern starts leaking, the only way to prevent the massive loss of water that can occur, as the data has shown, is by funding and training a **team of dedicated people to carry out routine repairs.**



More importantly however, **ongoing cyclical repairs and maintenance is fundamental** for ensuring these systems that have been installed to improve lives do not become the very things that make people sick.

The fortnightly survey-fix conducted by WASSUP on the CPC toilets, are a good example of the importance of funding an ongoing repairs and maintenance program. As the team have completed their survey-fix, they have uncovered and fixed a faulty / leaking tap, a failed cistern mechanism, a blocked gully drain, and two toilet units with blocked drains to the entire unit. These failures were unavoidable, and the only way they could be fixed is through an ongoing repair and maintenance program. Left unchecked, thousands of litres of water would be lost, and more **importantly public health will continue to be compromised.**

The attached graph demonstrates that with a **small amount of money, people will have access to functioning facilities** to wash their hands and faces frequently; bath children regularly, wash themselves, clean their bedding and clothes and prepare foods safely. They will be able to protect their family from waste water flowing from blocked toilets – from the rivers of grey water flowing down the middle of most streets in Diepsloot today.

There is no point spending money on new or upgraded toilets if money is not dedicated to their ongoing maintenance. For the people of Diepsloot, the stakes are simply too high.

MAINTENANCE

Results of Critical Healthy Living Practices

WASSUP have been conducting a fortnightly survey-fix of all 8 upgraded toilets during the CPC.

With simple standard tests, the team are able to monitor and maintain the upgraded toilets whilst collecting data on the improvements.

Based on the Healthy Living Practises, the most critical of these will have the biggest impact on health. The Critical HLP scores make up the following:

Safety: water, waste connected

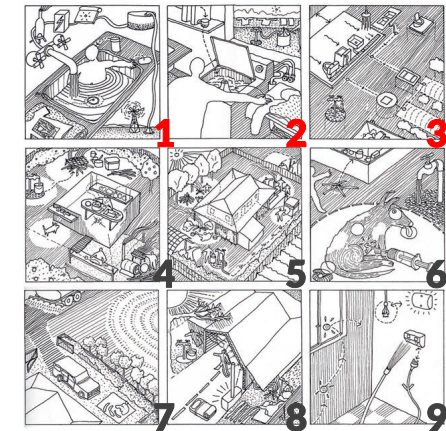
- 1.1 water available
- 2.1 all waste water OK
- 6.1 water to outside tap OK

Flush toilet working

- 5.1 Full flush test OK
- 5.2 refill tome OK
- 5.4 cistern OK
- 5.5 pan is OK

All drains working

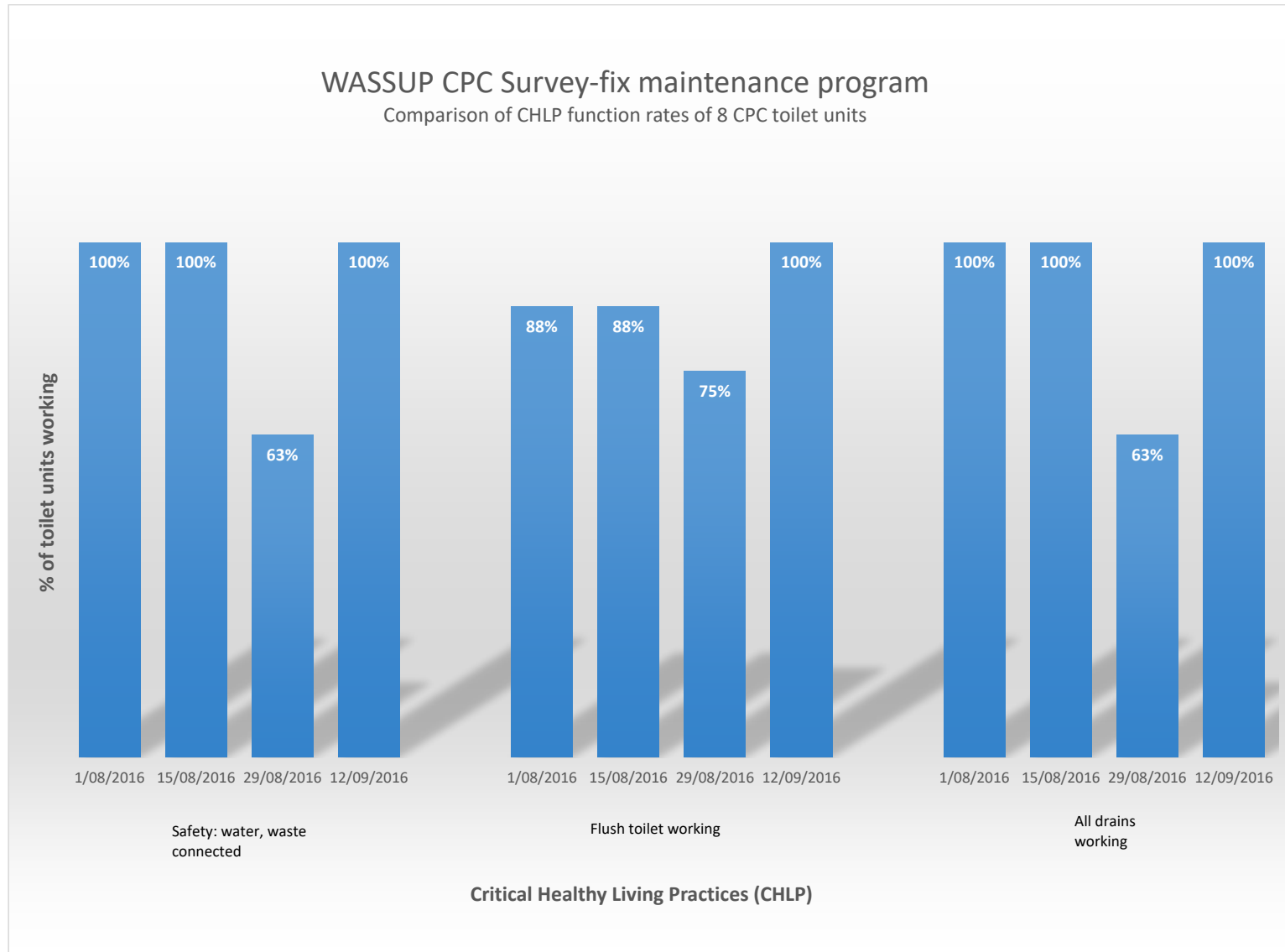
- 2.1 all waste water OK
- 7.2 wash trough drainage OK
- 9.1 is a gully drain available and OK



WASSUP survey & fix toilet maintenance sheet		Completed by (name): Date: 15/08/2016		TOILET NO. F35
Scores: Circle 1 for YES it is OK, or circle 2 for NO it is <u>not</u> OK or as directed by the question Fixed: tick box if fixed at time of survey				
Item	Description	Score	Fixed	Test
	1.1 Water available	2		Is water connected and working at the time of survey? 1=yes 2=no
	1.2 Water pipes OK	2		Are the water supply pipes OK with no leaks? Are they fixed well to the walls? 1=pass 2=fail
	2.1 All waste water OK	2		1= all OK and no obvious smells, 2=pools of waste water around or inside the toilet, or waste leaks?
	2.2 Drain waste pipes OK	2		Are the drain pipes OK with no cracks or holes? Is the vent pipe OK? 1=pass 2=fail
	3.1 Door lock OK	2		Check if the door locks inside and outside, and allows privacy OK? 1=pass 2=fail
	3.2 Door OK	2		Check door and hinges: no holes, privacy OK and hinges are secure? 1=pass 2=fail
	4.1 Walls, roof, floor OK	2		Are the walls, floor and roof cracked? No holes then OK? 1=pass 2=fail
	4.2 Floor: grade to drain water OK	2		Use ball in toolbox to check grade: 1= water on the floor would flow to a floor waste ok and the floor has enough fall to prevent pooling of water, 2= fail
	5.1 Full flush test OK	1		Can 3 lengths of toilet paper be crushed, placed in the toilet and flushed away? 1=pass 2=fail
	5.2 Refill time OK	1		After flushing cistern use watch to time refill. 1=pass (must refill in 3 minutes) 2=fail
	5.3 Stop valve OK	2		Can you turn the stop valve off? Does turning it off stop the water flowing? 1=pass 2=fail
	5.4 Cistern (on wall) OK	2		Is the lid OK and not loose? 1=lid is OK, securely fixed to wall, no other damage, and the cistern does not 'run on' / leak after refill. 2=fail
	5.6 Toilet pan OK	2		Check junction between pan and cistern OK. 1=toilet bowl is OK and fixed to the ground securely 2=Not OK could be loose, cracked or damaged
	6.3 Shelf inside OK	1		1=shelf for storing toilet rolls or cleaning equipment is ABOVE child height (1500mm above floor) 2=no shelf
	6.1 Water to outside tap OK	2		Leave tap running for 3 minutes minimum. 1=pass 2=fail
	6.2 Tap OK	2		Turn on and off at least 3 times, check handle secure and no drips. 1=pass 2=fail
	7.1 Wash trough OK	2		Is a wash trough provided, and if so is it securely fixed? Is the trough cracked or broken? 0=no trough 1=pass 2=fail
	7.2 Wash trough drainage OK	2		Fill wash trough to top, pull plug and allow to drain within one minute to test OK. 0=no trough 1=pass 2=fail
	7.3 Plug OK	2		1=plug is available for the wash trough 2=no plug
	8.1 Soap holder OK	2		1= soap holder is available 2=no soap holder
	8.2 Shelf outside OK	2		1=shelf for storing laundry powder is ABOVE child height (1500mm above floor) 2=no shelf
	9.1 Is a gully drain available and OK	2		Run the outside tap for 3 minutes through gully drain to test OK. 0= gully drain not present, 1= gully drain OK, 2= not OK.
	9.2 Fall to drain water OK	2		Use ball or a bucket of water in toolbox to check grade: 1= water on the floor would flow to a drain, and the floor has enough fall to prevent pooling of water, 2= fail

MAINTENANCE

Results of Critical Healthy Living Practices





To follow CPC Diepsloot progress
<https://commplumbing.wordpress.com/>

For more project info from Healthabitat O/S
<http://www.hho-s.com>

Connect with WASSUP
<http://www.stickysituations.org/wassup-diepsloot/>



W.A.S.S.U.P.

