ARUSHA URBAN WATER SUPPLY AND SANITATION AUTHORITY (AUWSA)

ENVIRONMENT STATISTICS IN SUPPORT OF THE IMPLEMENTATION OF THE FRAMEWORK FOR THE DEVELOPMENT OF ENVIRONMMENT (FDES 2013)

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HISTORICAL BACK GROUND

Historically, Arusha Urban Water Supply and Sanitation Authority was established under the Water Works Act CAP 272 as per Government Notice No. 371 published on 25th July, 1997. Under this Act, the Minister for Water declared Arusha Urban Water Supply and Sewerage Authority an Autonomous body with effect from 1st January, 1998. To improve the services, the Water Works Act was repealed by Water Supply and Sanitation Act of 2009.

AUWSA Vision:

"Water Supply and Sanitation Services in Arusha City delivered in compliance with both National and International Standards".

AUWSA Mission Statement:

"To provide quality water and sanitation services efficiently and effectively using available resources and technologies for sustainable development in Arusha City".

Sewerage reticulation system:

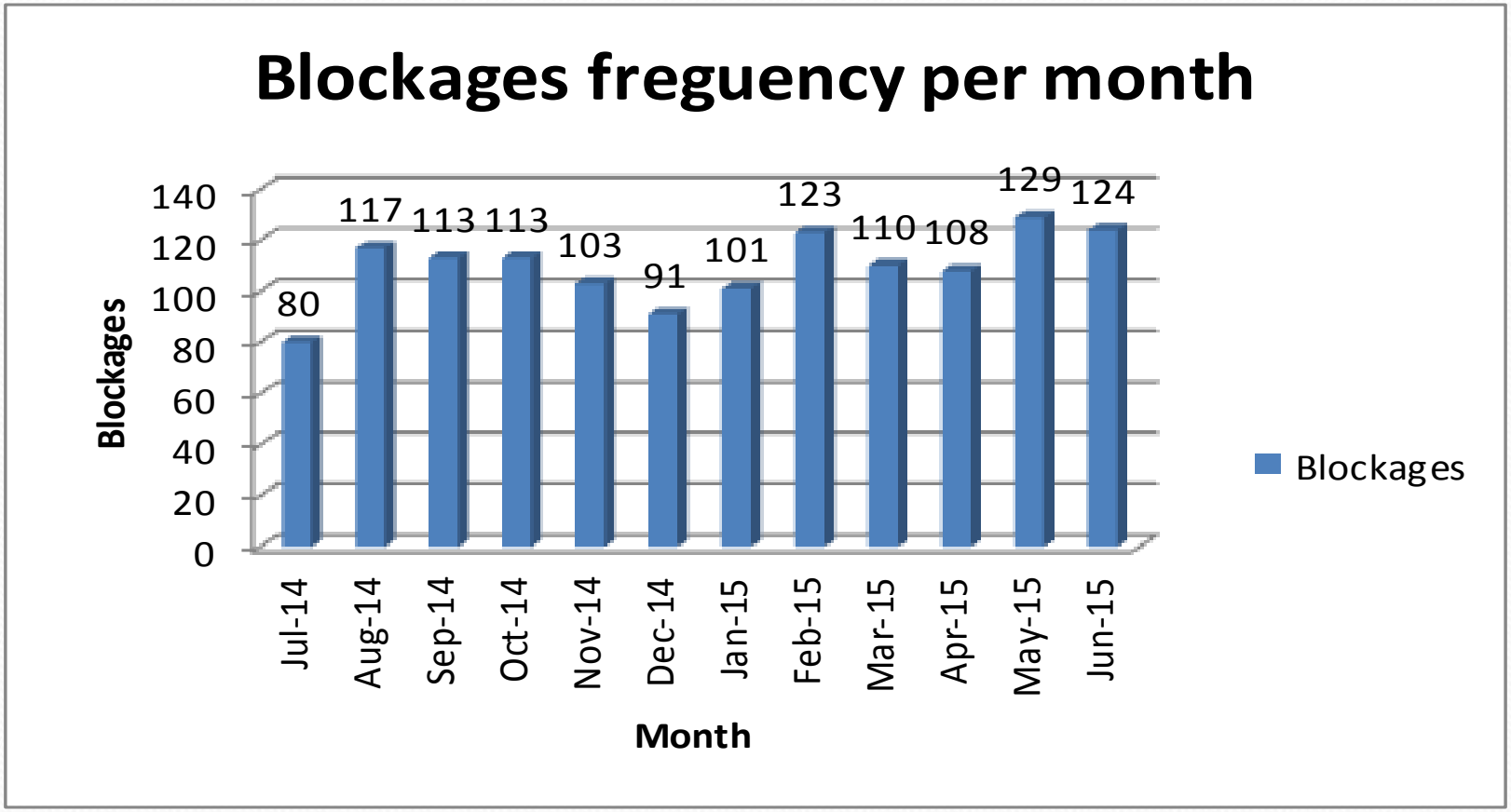
The sewer network consists of sewer pipes with various sizes, materials and manholes. The sewer length is 46.167Km with size ranging from 100mm to 600mm diameter. The pipes used are uPVC, Cast Iron, Ductile Iron and Concrete. There are 633 manholes for inspection and access for cleaning. The service coverage is about 7.6% of the city population.

Customers connected to the Sewerage system up to 30th June 2015

No.	CATEGORY	CONNECTIONS UP TO DATE	PRIVATE WATER SOURCE
1.	Domestic	3,635	***3***
2.	Commercial	658	***86***
3.	Institutional	154	***23***
4.	Industrial	128	***9***
5.	Bottling co.	3	***3***
TOTAL		**4,578**	***123***

Removing Blockages:

The numbers of attended sewer blockages along the sewer system from July 2014 to June 2015 are shown in the bar chart below:-



Most of the blockages were caused by:-

- misuse of sewers,
- small size of sewers,
- carelessness of road contractors during road constructions.

Efforts are done to educate the public on proper use of sewerage system as to minimize frequent blockages

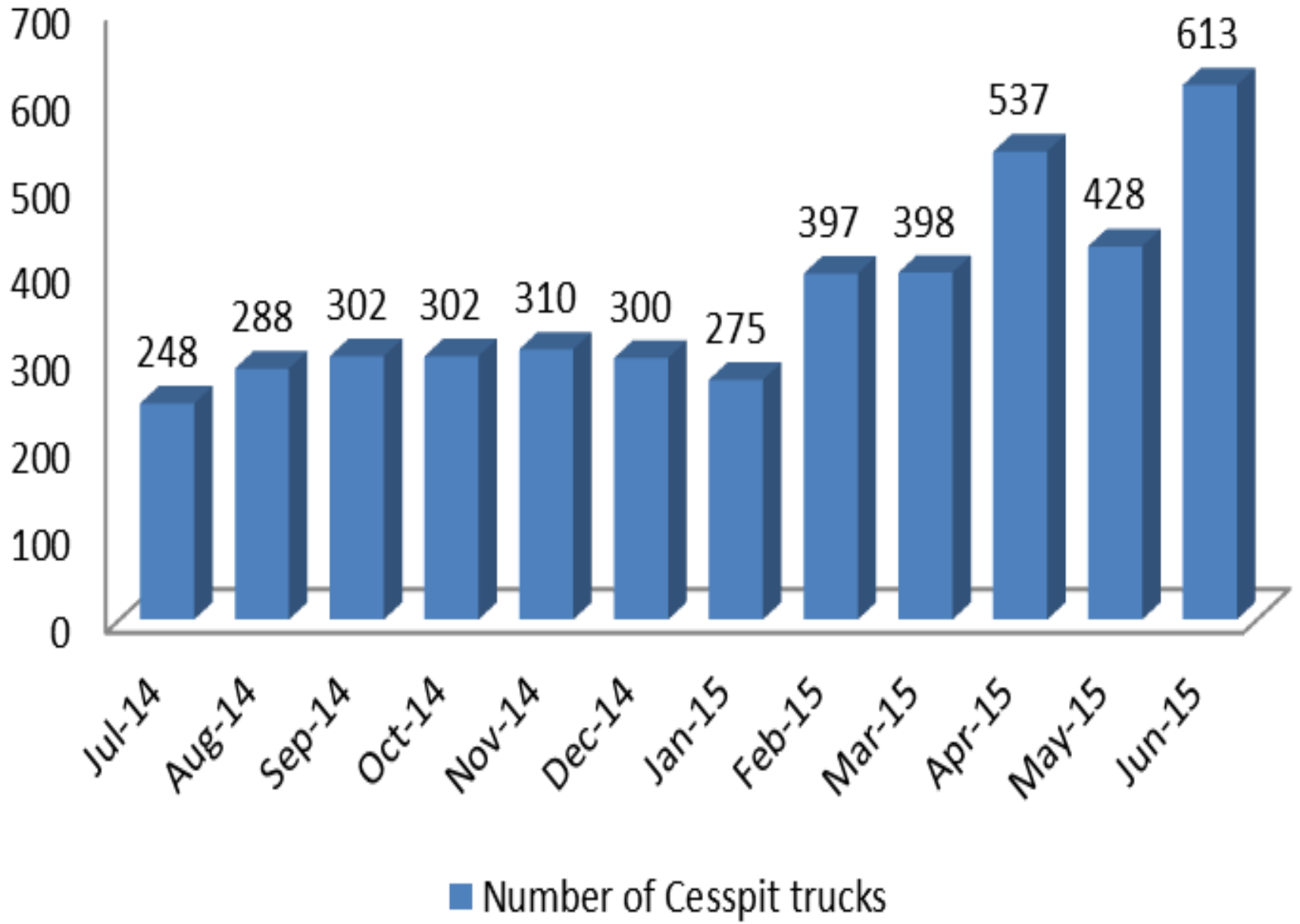
Plate No.1 & 2 showing the materials that are removed from inspection chambers after unblocking of the sewerage system

Onsite sanitation:

Current most of population in Arusha City is using on site sanitation more than 80%. Pit latrines are the most common sanitary infrastructure, especially in unplanned (squatter) settlements. The existing pit latrines are main cause of the following problems and cause of environmental and health hazard:

- Pollution of surface drains and groundwater sources, due to shallow pits, which are prone to infiltrate into the shallow groundwater and overflow during heavy rains;
- Pits are breeding ground for flies and mosquitoes, being disease vectors;
- Pollution of subsoil as old pits will be abandoned and new ones are constructed nearby.
- Offensive odours.
- Environmental pollution, due to lack of emptying capacity, or lack of capacity/ willingness/interest to empty pits by the consumers

The average number of cesspit emptier truck per from July-2014 to June 2015 are shown in the bar chart below, only domestic wastewater are allowed and not industrial. Industrial are allowed after meeting quality standard.


700
600
500
400
300
200
100
0
248
288
302
302
310
300
275
397
398
537
428
613
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Number of Cesspit trucks

Wastewater flows from July 2014 to June 2015

- The average flow rate from sewerage system was 6414m^3/day
- The average flow rate to sludge pond was 86m^3/day,
- The total average flow to anaerobic ponds is 6500m^3/day.
- The designing capacity was 86m^3/day
- The average inflow to the anaerobic ponds was above designing capacity and this concludes that ponds are overloaded.
- The constructions of new wastewater stabilization's ponds are inevitable in order to improve treatment efficiency.

Sewage treatment.

- The treatment is done by using waste stabiliztion ponds.
- There are five ponds working in parrallel and series.
- The first pond is anaerobic
- Followed by two facultative ponds in parallel and
- Finally two maturation ponds in series.
- Within the pond area there are two sludge ponds to treat sewage brought by cesspit emptiers.

Average wastewater quality analysis from July-2014 to June 2015 for WSP

No	PARAMETERS	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	Tanzania discharge standard
1	Total Suspended Solids (mg/l)	538.5	267	188	114	118	104	581	120	120	100
2	Colour (mg.Pt/l)	1011	869	1005	877	786	777	1331	430	453	300
3	pH.	8.4	7.34	7.6	7.5	7.9	7.6	7	7.5	7.4	6.5-8.5
4	Electric Conductivity (µS/cm.)	3083	2846	2385	2139	2037	1999	4141	1551	1547	
5	Chromium (mg/l)	0.114	0.124	0.0275	0.0288	0.0186	0.0138	0.165	0	0.0025	0.1
6	BOD_5	542	373	282	179	128	69	689	90	91	30
7	Phosphate (mg/l)	32	30	24	19	17	23.5	150.2	11	12.4	6
8	Nitrate (mg/l)	100.3	83	82	63.3	69.05	58.6	107.4	43.2	46.95	20
9	Temperature ^0c	23.4	22.9	22.9	22.3	22.5	22.2	22.8	22.7	23.2	20-35
9	Sulphide (mg/l)	3	2.6	1.8	2	0.6	0.22	4.97	0.25	0.29	0.5
10	Faecal Coliform – count/100ml. ~10^6	21.6	12.5	5.2	2.7	0.058	0.031	23.4	0.0026	0.0045	0.01

Effluent quality

- The average BOD5 at inlet and outlet were 542 and 69mg/l respectively,the BOD5 removal does not meet the Tanzania Standard because the anaerobic pond is not working is full with the sludge. The BOD5 removal efficiency to anaerobic pond was decreased from 60% to 31%, anaerobic pond work extremely well to achieve 60% to temperature of 20^0C and average temperature was above 23^0C.
- Average E.Coli in influent was 21.6 x 10^6 count/100ml and effluent was 3.1 x 10^4 count/100ml respectively, the E.Coli is above Tanzania standard and the reasons is that anaerobic pond is not working and presence of colour leads maturation ponds to be anaerobic pond while these ponds depends on high dissolved oxygen.
- Average Colour at inlet, sludge pond and outlet were 1011,1331 and 777 mg.Pt/l, colour at the inlet flow is less than to sludge the causes of that reasons, Sludge ponds receive wastewater from vacuum tankers that contain more colour.

The purpose of wastewater treatment before disposal are:-

- To protect receiving waters from feacal contamination as they are generally used as a source of water by downstream communities,
- Protect receiving waters from deleterious oxygen depletion and ecological damage
- Produce microbiologically safe effluents for agricultural and aquacultural

Challenges

- Poor performance of Wastewater stabilization's pond due to overloaded
- Low coverage of sewerage system about 7.6% to the city population.
- Misuse of sewer systems
- Small sewer diameters.
- Vandalism of heavy duty manhole covers.
- Most of industrials have no effluents treatment plant.
- Complains from community living closer to WSP due to bad smell from the pond and rusting of iron sheets

AUWSA PLAN ON SANITATION SERVICES

Despite the low sewerage service coverage, current wastewater system is being overloaded by increased wastewater flow:

Improve Effluent Quality

- Construct new wastewater treatment plant at Themi Holding ground(2-anaerobic, 8-maturation pond and 8 Facultative pond)
- Construct Trunk main from the existing WSP to new site (Themi)
- Construction of drying beds at WWTP
- Construction of sludge ponds for Cesspit emptier trucks
- Install digital flow measuring equipment
- Fencing the area (100 hectors)
- Construction of operators house
- Construction of wastewater examination laboratory

Increase Sewer Network Coverage (7.6% - 30%)

- Construct Trunk main to run through Sombetini, Mbauda, Muriet to WWTP
- Construct Trunk main to run through Njiro to WWTP
- Construct lateral lines in various areas
- Connect 5,000 new customers

Improve the existing network

- Rehabilitate by upsizing the existing sewer network (20km - CDB)
- Rehabilitate the damaged manholes (250 Nos)
- Improve customer connections during rehabilitation

Onsite sanitation

The sanitation concept promotes the use and improvement of on-site sanitation facilities. The measures include:-

- The construction of 25 ventilated improved latrines (VIP) and 25 urine diverting dry toilet (UDDT) as practical demonstration facilities (one in each ward). Depending on the acceptance of VIP and UDDT, it is recommended to construct new on-site sanitation systems.
- The project foresees further a training program and public hygiene campaign.
- Construction 20 of water closet toilets for demonstration at house level, market places, schools and public health centres

THANK’S