



Work programme

Increasing Financial Flows for Urban Sanitation

Case study

eThekweni, Durban, South Africa

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World Water Council Project: Increasing Financial Flows for Sanitation

1. Background information on South Africa

1.1 Social, political and economic data

South Africa has a population of 56 million people, with 65% living in urban areas and 35% in rural communities. 55% of the population live below the South African Poverty Datum of R1000 per month (\$75 per month or \$2.50 per day). The official unemployment rate is 27,7%. If one includes people who have stopped looking for work, this figure rises to 36.6%.

The current GDP growth rate is under 1% and two of the three major rating agencies have recently relegated South Africa's credit rating to junk status.

1.2 Constitutional structure

South Africa is a constitutional democracy, within a unitary structure, with three 'spheres' of government: national, provincial and local. The word 'tiers' is deliberately avoided as the Constitution clearly allocates functions to the various spheres of government which then work collaboratively to achieve the policies and objectives set by national government. All taxes are collected at the national level. Municipal property rates charges and tariffs for the provision of municipal services, including water and sanitation, are set at the Local government level. Each sphere of government has legislative and administrative powers for the functions delegated to it by the Constitution.

There are three categories of Local government in terms of the Constitution:

- Single tier Category A municipalities with exclusive executive and legislative authority in their area
- Two-tier local government in Category B and C municipalities, where a Category C municipality shares jurisdiction with a number of Category B municipalities

There are 8 Metropolitan (category A), 44 District (category C) and 204 Local (category B) municipalities, with the Local municipalities being located within district municipalities. The number of category B municipalities has declined from 230 in 1996 to 204 in 2017, as a result of the re-demarcation of municipal boundaries to create viable municipalities.

1.3 National water and sanitation data

Using data from the WHO/UNICEF Joint Monitoring Programme 2017 report¹, coverage for water and sanitation in South Africa, at the basic level or better, is as follows:

Sanitation; 73% national coverage, with 69% in rural areas and 76% in urban areas

Water ; 85% national coverage, with 63% in rural areas and 97% in urban areas

¹Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines. Geneva: World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), 2017

1.3 Institutional responsibility for sanitation provision

In South Africa, the national Department of Water and Sanitation is the custodian of South Africa's water resources and is primarily responsible for the formulation and implementation of policy for and the regulation of the water and sanitation sectors. Policy directives are issued in the form of regulations published in terms of the Water Services Act (Act 108 of 1997) and the National Water Act (Act 36 of 1998). The regulations published to date cover a wide range of issues, including minimum standards for the provision of services, the structure of tariffs and licensing procedures. Provincial government has no direct involvement in the provision of water and sanitation services.

The Water Services Act (Act 108 of 1997) introduced the concepts of Water Services Authority (WSA) and Water Services Provider (WSP). A WSA is any municipality that is allocated responsibility, by the Minister for Local Government, for ensuring access to water and sanitation services and a WSP is any juristic person who provides water and sanitation services to consumers. All metropolitan municipalities are WSA's but not all District and Local municipalities. Currently there are 147 municipal WSA's out of the total of 256 municipalities.

In effect this means that national government is responsible for ensuring an adequate supply of bulk water, for allocating the available water to various uses (including the environment) through the issuing of water use licenses and for ensuring the safe return of treated effluent to the environment through licenses which prescribe maximum effluent discharge parameters. Local governments that are WSA's are responsible for the provision of water and sanitation services within their municipal area. The role of Provincial Government is to provide support to municipalities that are not able to meet their Constitutional obligations.

1.4 National financing mechanisms for water and sanitation

South Africa was one of the first countries to introduce a rights based approach to the provision of water and sanitation services. Section 24 of the Constitution of the Republic of South Africa (Act 108 of 1996) states that 'everyone has the right to an environment that is not harmful to their health or well-being.... through measures that prevent pollution and ecological degradation' and Section 24 states that 'everyone has the right to have access to sufficient food and water'.

Any policy decision that is imposed by one sphere of government on another and that has financial implications, has to be accompanied by adequate fiscal transfers.

In 2000 the national government announced the introduction of a free basic services policy to ensure the provision of basic services to households that could not afford to pay for them. This was reinforced by the government White Paper on Basic Household Sanitation (2001) which stated that the poor should be given access to a free basic level of service.

Division of Revenue Act (Act 3 of 2017) currently allocates 9.1% of nationally raised revenue to local government for the provision of basic services. The budgeted total national expenditure for the 2017/18 fiscal year is ZAR1409.2 billion. In the current fiscal year, funding for the roll out of water and sanitation infrastructure in municipalities has been prioritised. The transfers to Local government are in the form of an Equitable Share which is intended to subsidise the monthly cost of providing basic services (water, sanitation, electricity and refuse collection) to poor families. A capital subsidy or conditional grant is also transferred to WSA's to subsidise the capital cost of providing basic infrastructure. The details are shown in the table below (with all values in ZAR millions, where ZAR 13.50 equals USD 1).

Table W1.20 Transfers to local government

R million	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
	Outcome			Revised estimate	Medium-term estimates		
Direct transfers	82 595	87 570	98 338	103 255	112 524	121 470	130 477
Equitable share and related¹	38 964	41 592	49 367	51 169	57 012	62 732	67 473
Equitable share formula ²	34 268	36 512	44 211	45 719	51 326	56 723	61 136
RSC levy replacement	3 930	4 146	4 337	4 567	4 795	5 073	5 357
Support for councillor remuneration and ward committees	766	935	819	883	891	936	981
General fuel levy sharing with metros	9 613	10 190	10 659	11 224	11 785	12 469	13 167
Conditional grants	34 018	35 788	38 313	40 863	43 727	46 270	49 836
Infrastructure	32 412	34 167	36 866	39 120	41 777	44 274	47 775
Capacity building and other	1 606	1 621	1 446	1 743	1 950	1 995	2 062
Indirect transfers	5 945	8 250	10 370	7 824	7 338	7 596	8 015
Infrastructure	5 705	7 998	10 119	7 740	7 235	7 480	7 893
Capacity building and other	240	252	251	84	103	115	122
Total	88 541	95 820	108 708	111 079	119 862	129 066	138 491

1. Excludes provisional allocations

2. Outcome and revised estimate figures for the equitable share reflect amounts transferred after funds have been withheld to offset underspending by municipalities on conditional grants. Roll-over funds are reflected in the year in which they were transferred

Source: National Treasury

The formula used to determine the allocation of the equitable share to each municipality is based primarily on 2011 census data for population and poverty, using a household income of R2300 per month (USD 170) to define a poor family. For the capital subsidy, the cost of providing a VIP toilet and the sanitation backlog, as determined through the 2011 census, is used to determine the allocation to each municipality.

This means if the census data is inaccurate, for example because of the movement of poor families between municipalities, or if the level of service provided by a municipality costs more than that determined by National Treasury, then the subsidy in terms of the Division of Revenue allocation is insufficient. This latter factor is particularly relevant in rural areas, where the density of development drives up construction costs, or in undulating terrain where access is more difficult than in flat terrain.

Table W1.22 below shows the allocation of the Equitable Share operating subsidy to the various basic services, with all values in ZAR millions:

Table W1.22 Amounts per basic service allocated through the local government equitable share, 2017/18

	Allocation per household below affordability threshold (R per month)			Total allocation per service (R million)
	Operations	Maintenance	Total	
Energy	68.52	7.61	76.13	8 725
Water	104.99	11.67	116.66	13 369
Sanitation	81.39	9.04	90.43	10 364
Refuse	68.23	7.58	75.81	8 688
Total basic services	323.13	35.90	359.04	41 147

Source: National Treasury

The capital subsidies for the 2017/18 fiscal year are shown in Table W1.23 below:

Table W1.23 Infrastructure grants to local government

R million	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
	Outcome			Revised estimate	Medium-term estimates		
Direct transfers	32 412	34 167	36 866	39 120	41 777	44 274	47 775
Municipal infrastructure	14 224	14 745	14 956	14 914	15 891	16 788	17 734
Water services infrastructure	1 129	1 051	2 305	2 845	3 329	3 559	3 757
Urban settlements development	9 077	10 285	10 554	10 839	11 382	11 956	12 631
Integrated national electrification programme	1 635	1 105	1 980	1 946	2 087	2 204	3 328
Public transport network	5 550	5 871	5 953	5 593	6 160	6 583	6 962
Neighbourhood development partnership	586	590	584	624	663	702	741
Integrated city development	40	255	251	267	292	309	326
Regional bulk infrastructure	–	–	–	1 850	1 865	2 060	2 175
Rural roads asset management systems	52	75	97	102	107	114	120
Municipal disaster recovery	118	190	186	140	–	–	–
Indirect transfers	5 705	7 998	10 119	7 740	7 235	7 480	7 893
Integrated national electrification programme	2 141	2 948	3 613	3 526	3 846	3 962	4 182
Neighbourhood development partnership	55	30	13	22	28	29	31
Regional bulk infrastructure	3 261	4 005	4 858	3 479	2 774	2 881	3 037
Water services infrastructure	247	732	659	362	587	608	642
Bucket eradication programme	–	282	975	350	–	–	–
Total	38 117	42 165	46 985	46 859	49 012	51 755	55 668

Source: National Treasury

National Treasury further breaks down the capital subsidy allocation by basic service as shown in Table W1.24 below:

Table W1.24 Municipal infrastructure grant allocations per sector

Municipal infrastructure grant (formula)	Component weights	Value of component 2017/18 (R millions)	Proportion of municipal infrastructure grant per sector
B-component	75.0%	10 846	68.3%
Water and sanitation	72.0%	7 809	49.1%
Roads	23.0%	2 495	15.7%
Other	5.0%	542	3.4%
P-component	15.0%	2 169	13.7%
Sports	33.3%	722	4.5%
E-component	5.0%	723	4.6%
N-component	5.0%	723	4.6%
Constant		1 130	7.1%
Ring-fenced funding for sport infrastructure		300	1.9%
Total		15 891	100.0%

Source: National Treasury

1.5 National policy on the definition of free basic sanitation services and tariff structures

In order to provide for fiscal transfers and to meet the Constitutional obligation to provide affordable basic water and sanitation services, the Department of Water and Sanitation has issued a number of regulations and policy statements since 1994.

The current situation may be summarised as follows:

Section 3 of the Water Services Act states that;

- (1) Everyone has a right of access to a basic water supply and basic sanitation
- (2) Every water services institution must take reasonable measure to realise these rights

A basic sanitation service is defined in the Compulsory National Standards, published in terms of the Water Services Act, as a system for disposing of human excreta, household waste water and refuse, which is acceptable and affordable to the users, safe, hygienic and easily accessible and which does not have an unacceptable impact on the environment.

Tariff structures for sanitation are defined by the Norms and Standards regulations published in terms of the Water Services Act as follows:

A WSA must consider the right of access to a basic water supply and the right of access to basic sanitation, when determining which water services tariffs are to be subsidised.

A tariff set by a WSA for the provision of sanitation services to a household must –

- (a) Support the viability and sustainability of sanitation services to the poor
- (b) Recognise the significant public health benefit of efficient and sustainable sanitation services and,
- (c) Discourage usage practices that may degrade the natural environment

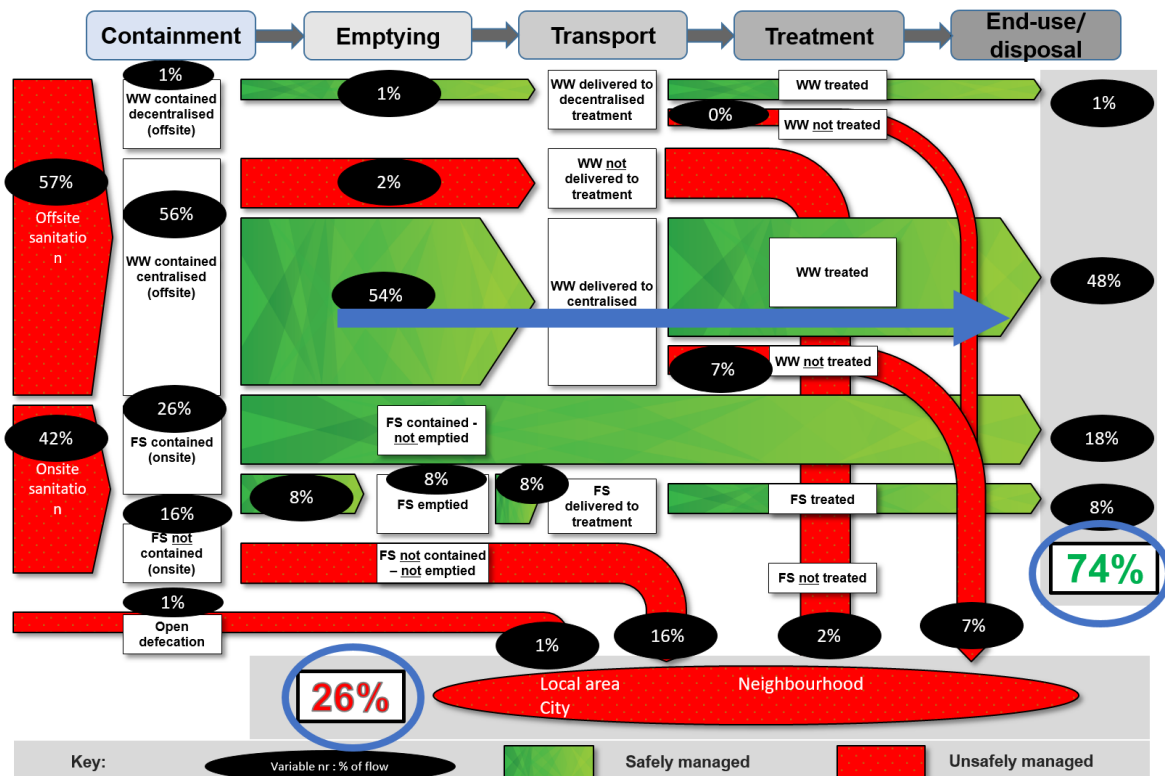
2. Background information on Durban (eThekweni municipality)

2.1 Social, political and economic data

The Durban metropolitan area (the eThekweni municipality) covers an area of 2555 km² and has a population of 3.7 million people, with an annual population growth of more than 1% per year over the past 10 years. It is the third largest municipality in South Africa after Johannesburg and Cape Town. There are 945910 households within the municipal area. 63% of the population is below the age of 35 years. In 2000 approximately 30% of the population

lived in rural and per-urban areas, with no access to municipal water and sanitation services. The situation has changed considerably since then, with 97% of all households having access to potable water and 83% of all households having access to a VIP, Urine Diverting Dry Toilet (UDDT), or a flush toilet.

Shit Flow Diagram (SFD), Durban



52% of households have a disposable income of less than ZAR 1500 (USD 110) per month, after taxes and deductions. The eThekweni municipality has the second largest number of people living in poverty in South Africa.

The eThekweni region is the economic powerhouse of the province of KwaZulu-Natal and also makes a significant contribution to the South African economy². It is a vital link between the regional economies of Pietermaritzburg (and onward to Johannesburg) and Richards Bay, and ranks as the second largest economic centre with the second most significant industrial region in South Africa.

² eThekweni municipality Integrated Development Plan 2017/18

EThekweni's share of national GDP in 2015 was 9.3% (ZAR279 billion in constant 2010 prices)

2.2 Differentiators that make eThekweni different

Currently the municipality has a long term credit rating of AA, which makes it possible to borrow from the market at competitive interest rates. This is comparable only to Cape Town and Johannesburg. Few South African municipalities are able to borrow on the capital markets and most rely heavily on government subsidies for both capital and operating expenditure.

Because of strict credit controls coupled with a benevolent policy of providing free basic services for poor families, the collection of billed revenue for the water and sanitation services has exceeded 100% since 2013. This is possible through the collection of previous years' outstanding revenue. The then Durban municipality was the first to introduce a rights based approach to the provision of basic services in 1997, by setting the tariff for the first 6m³ of water consumed each month, to zero. By catering for the basic needs of the poor it was then possible to take strong action against those who did not pay – by restricting daily consumption through a device known as a flow limiter installed in the connection of customers in arrears. This policy of a free basic service to poor families was extended to sanitation

in 2009, with the monthly usage charge for the sewerage service to domestic customers based on the water consumption.

The tribal areas within the municipal area are located on what is known as Ingonyama Trust land. Within these areas there is both a tribal authority and an elected councillor in each voting ward. Effectively the municipal bylaws are applied differently in these tribal authority areas and land tenure is informal in nature, with no title deeds, formally registered road reserves or servitudes covering services. Land is allocated by the local chief without any reference to a formal town planning scheme and houses are constructed without approved building plans. As a result, providing services in these areas is difficult, particularly when structures are built over existing infrastructure. These tribal areas and the lack of formal tenure are peculiar to particular municipalities, with a large part of the eThekweni municipal area being tribal authority land.

3. Detailed information on eThekweni Water and Sanitation

3.1 The nature of the Water Service Provider

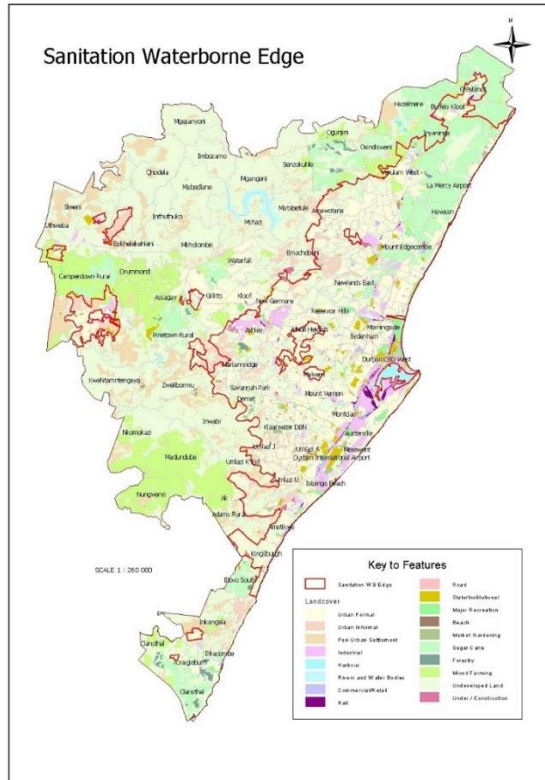
eThekweni Water and Sanitation is the WSP for the eThekweni municipality that covers greater Durban.

The accounts of both the water service and the sanitation service are ring fenced and audited separately from the other municipal accounts. This separation is to ensure that the tariffs correctly reflect the cost of providing each service and that any cross-subsidisation is transparent. It operates as a trading undertaking, providing water and sanitation services and recovering its operating costs from tariffs and the Equitable Share operating subsidy from national government.

The revenue budget for water in the 2017/18 financial year is ZAR 6.5 billion and for sanitation, ZAR 1.9 billion. The budget for the sanitation service is far lower than that for the water service because the piped sewer network is approximately half the length of the water distribution network. The unredeemed loans for the sanitation service are far lower than those of the water service, as a result of the relative average age of the assets in the two services. Most of the large sewage treatment works and associated network were constructed in the late 1960's and the associated loans have been fully redeemed.

As an aside, to provide a piped sewerage network to every domestic customer that is not connected to the grid would cost an estimated ZAR 65 billion (USD 4.8 billion). This cost includes the piped sewer network needed, additional sewage treatment plants and upsizing of the water network to meet the additional demand for water for toilet flushing. Research by the Water Research Commission of South Africa determined that toilet flushing accounts for 30% of in-house water consumption.

As a result EWS introduced the sanitation edge concept. In terms of this approach, all properties located in sufficiently dense developed areas can be affordably sewered and those in less densely developed areas beyond the sanitation edge can only be affordably serviced using off-grid sanitation options. The diagram below illustrates this concept, with all properties within the red lines serviced by a piped sewerage network:



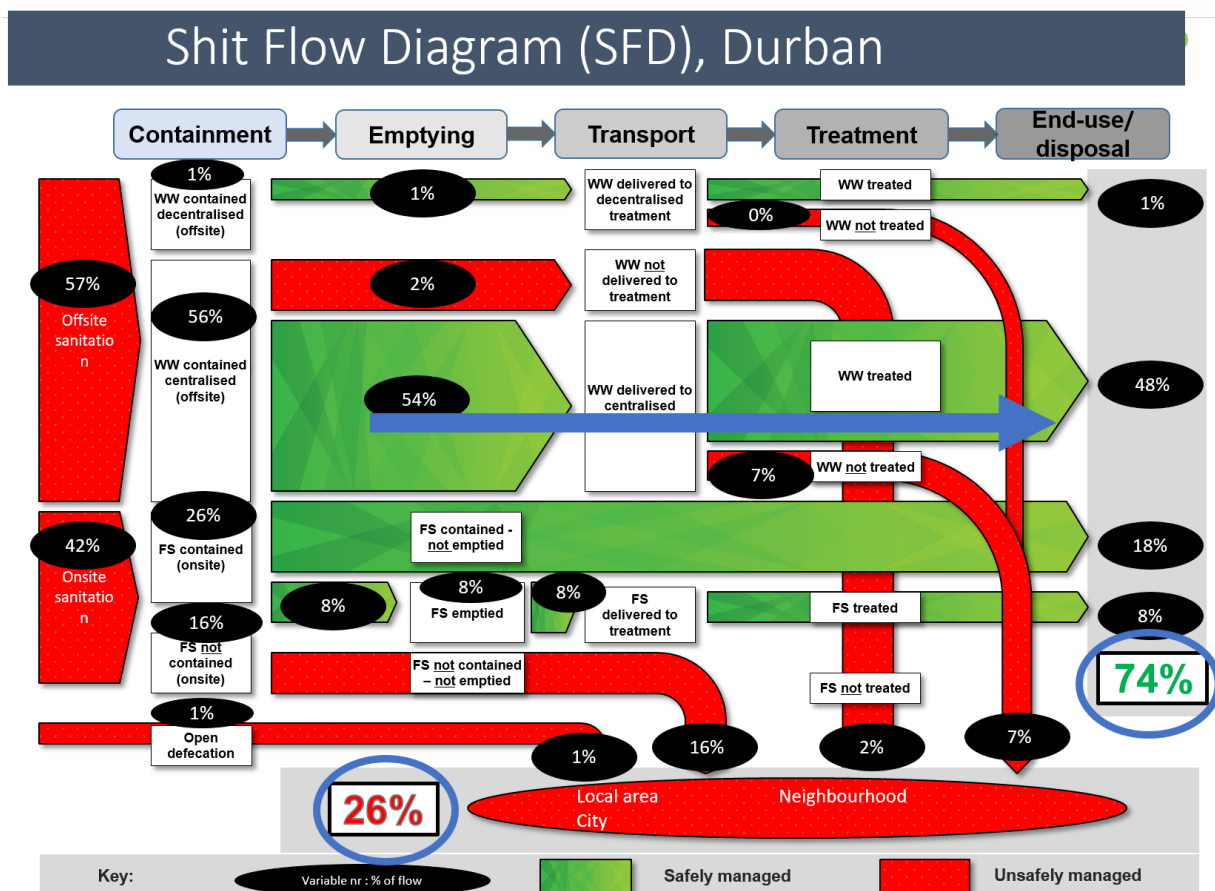
The provision of a basic water service to all residents began in 1996, at the formation of EWS as the metropolitan water services provider. In 2000 the responsibility for the sewerage network was transferred to EWS. However motivating for capital funding for sanitation in the early years proved to be extremely difficult until the cholera outbreak in rural communities in the eThekweni municipal area.

3.2 Sanitation service levels for domestic customers in eThekweni

Based on the latest household estimate of 945910 families and using the municipal average household size of 3.7 people per family, the service levels can be categorised as follows, using the most recent data available;

- Household connections to sewers with good wastewater treatment; 480000 households or 1.78 million people (50.5%)
- Household connections to sewers with no wastewater treatment or substandard wastewater treatment; 100000 households or 370 000 people with informal onsite sanitation with a mix living in urban and rural communities. (10.5%)
- Septic tanks with regulated emptying services; 104000 households or 385584 people (11%)
- Septic tanks with unregulated or no emptying services; nil
- Other on-site toilets with regulated emptying services; 85000 Urine Diverting Dry Toilets (UDDT's) and 35000 Ventilated Improved Pits (VIP's). This equates to 120000 households with an average of 6 people per household for rural and informal areas, which equates to a total of 720 000 people served.(12.5%)
- Other on-site toilets with unregulated or no emptying services; approximately 140000 which equates to around 500000 people (14.8%). This number changes daily with the inward migration of families
- Public, community or shared toilets with sewers or regulated emptying services; 1500 shared facilities (Community Ablution Blocks with 12 toilets per installation, with each installation serving a maximum of 75 families). These communal facilities are connected to the piped sewerage network.
- Public, community or shared toilets with unregulated or no emptying services; nil
- No sanitation, i.e. open defecation; less than 1% - see SFD below

The sanitation situation can best be illustrated by the following SFD for all sewage generated by both domestic and ICI customers:



3.2 Sanitation service levels for ICI customers in eThekweni

The breakdown of sanitation service levels for Industrial, commercial and Institutional customers (ICI) is as follows:

- Connections to sewers with good wastewater treatment; 93%
- Connections to sewers with no wastewater treatment or substandard wastewater treatment; 0%
- Septic tanks with regulated emptying services; 5%
- Septic tanks with unregulated or no emptying services; nil
- Other on-site toilets with regulated emptying services; 2%
- Other on-site toilets with unregulated or no emptying services; nil
- No sanitation, i.e. people must use other toilets or open defecation; nil

3.4 Historical trends in sanitation

- The increase in numbers or percentages of people served; 85000 Urine Diversion toilets built in the last 15 years for rural communities and 1500 Community Ablution Blocks for informal households in the last 8 years. This equates to approximately 1.3 million additional people served in this period.
- Changes in the types of sanitation services; In 2000, 1 million people did not have access to sanitation services. As the water and sanitation system has expanded, this has acted as a magnet to families living in communities without access to these services and has contributed to the rapid population growth in the municipal area. VIP toilets were inherited from other supply authorities when the new municipality was created. A policy decision was taken to move to constructing UDDT's for individual properties and community ablution blocks as a shared facility in dense shack areas where other sanitation options were impractical to construct or service.
- Changes in the quality of wastewater treatment; According to Durban's SFD 74% of all sewage effluent is safely managed. Annual Green Drop auditing program audits by the national regulator have also contributed to the improved treatment of wastewater.
- Changes in the regulation of emptying services; consolidated regulations and policies have been introduced since 2000 through the Sewage Disposal Bylaws and municipal Council policy decisions. These policies are available on the municipal web site in an 80 page document.
- Changes in people's perceptions about sanitation; Customer satisfaction surveys show an 80% satisfaction with the level of sanitation services that are provided. (UKZN Research). This has been the result of the creation of a dedicated customer management division, the publication of a Customer Charter and a Service Levels Standards document. In addition regular meetings are held with customers in Focus Groups and User Platforms, to improve customer relations. A toll free call centre operates 24 hours a day to attend to faults, with response times in terms of the service level standards set.
- Changes in the political importance of sanitation; the recently introduced national policy recognizes the importance of faecal Sludge management. There is now a dedicated national water and sanitation Ministry, whereas before water and environmental affairs were in one Ministry and sanitation was located in the Housing Ministry.

3.5 The plans to achieve 100% coverage with safely managed sanitation by 2030

There is a master plan in place to provide sanitation. However ongoing and increasing levels of inward migration create a moving target. Research and trials into innovative sanitation solutions, primarily through a research partnership with the Pollution Research Group at the University of KwaZulu-Natal have been in place for almost 10 years, where EWS contributes in excess of ZAR 2.5 million (USD 185 000) a year to fund post graduate applied research into sanitation related topics.

The plan recognizes that a phased and differentiated approach to the provision of sanitation services is needed. It also recognizes that flush toilets linked to conventional activated sludge treatment works are not sustainable and that the toilets of the future will not require flushing. Equally, with the advent of viable nutrient recovery at source, sewage treatment technology and sewerage network designs will change. Sewers will be smaller (because flows will reduce by up to 30% and will contain minimal solids) and nutrient removable at treatment works will no longer be needed. This will mean significant reductions in energy and overall treatment costs.

3.6 Financing of sanitation in eThekweni

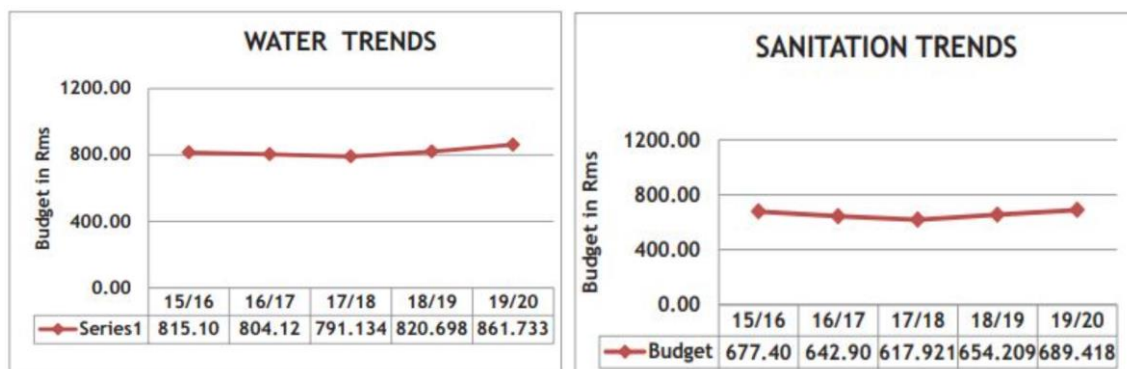
The main types of sanitation service provided across the municipal area are:

- waterborne sanitation linked to a piped network and convention sewage treatment
- UDDT's in rural and low development density communities, linked to an emptying and faecal sludge processing program. The UDDT's are emptied once every two years as a free basic service.
- Community Ablution Blocks providing toilet, shower and clothes washing facilities to dense shack areas. The CAB's are connected to the sewerage network.
- VIP toilets confined to rural communities added to the municipal area in 2000 (no longer constructed as a matter of policy). The VIP's are emptied once every five years as a free basic service.

The operating and capital costs are funded as follows:

EWS operates using a three year rolling expenditure forecast. The capital expenditure on water in the current financial year is ZAR 776 million and ZAR 605 million on sanitation. The graphs below show the actual and forecast capital expenditure for a 5 year period for water and sanitation. To meet part of the costs of providing access to basic services, the national government has transferred ZAR 371.4 million to cover their estimate of the costs to provide access to a basic water service and ZAR 414.3 million to fund access to a basic sanitation service. The remainder of the capital budget is funded from private sector bank loans

In order to fund the operating expenses to provide free basic services to poor families, the Equitable Share operating subsidy from national government in the current financial year is ZAR 786.5 million for water and ZAR 310.5 million for sanitation. This represents 12% of the water service operating budget and 16.3% of the sanitation service operating budget. The remainder to the operating costs are funded by tariffs paid by customers, with internal subsidies from higher volume users of services, to low volume users.



The source of funding for each service option is as follows:

Service level	Operating costs			Capital costs	
	Tariffs	ES subsidy	Internal cross subsidy	Bank loans	Government subsidy
Water- borne sewerage	√		√	√	√
UDDT's		√	√	√	√
CAB's		√	√	√	√
VIP's		√	√	-	-
EWS sanitation funding sources for operating and capital expenditure					

The tariffs for the provision of a sanitation service to domestic customers with a sewer connection is based on a varying percentage of the water consumption. This recognizes that a higher percentage of the basic water consumption goes to sewer and as water consumption rises it is used mainly outside the dwelling and so does not enter the sewerage system. The structure of the tariff mirrors that of the water tariff and has been designed using Ramsay pricing theory which is intended to produce a welfare maximizing outcome.

Families who use a CAB, UDDT or VIP toilet are provided with access to the basic service at no charge. The cost of emptying a UDDT toilet every two years and a VIP toilet every five years is not charged to poor families.

The following is an extract from the report that introduced volumetric sewerage charges in 2010 for poor families connected to a piped waterborne sewerage network:

Flow volumes of sewage from the various development types was determined as follows;

- For domestic units in solely residential blocks which are 3 stories and above opportunities to use water for purposes other than where the resulting "waste water" is discharged to the sewerage system is considerably limited. Hence the fraction of water usage which is discharged to sewer can be fairly assessed as 90%.
- For non-domestic premises e.g. where the water usage is for business, commercial, mixed commercial/residential and industrial purposes, a fraction of water usage discharged to sewer can be similarly assessed as 90%.
- For single residential properties used solely for domestic purposes cognisance was taken of a Water Research Commission report - Water Consumption Levels in Selected South African Cities - WRC 1536/1/07 - dated November 2007. This was a large study using some 2,7 million water meter records across Johannesburg, Tshwane, Ekurhuleni, Cape Town and 151 cities and towns which, together with other research (by Tshwane Municipality and others) identified a sliding scale of the fraction of water discharged to sewer, the fraction decreasing as the volume of water usage increases. This study demonstrated that, as the volume of water usage increases, more and more water is used for purposes such as watering gardens, car washing etc. and other uses where the resulting "waste water" is not discharged to the sewerage system.

Hence, by considering various iterations, a sliding scale of the fraction of water supply returned to the sewerage system for single residential units was developed such that the total volume now assessed as discharged to the sewer reticulation matched the volumes received at the sewage treatment works.

The resulting fractions of water consumption returned to sewer which reflect the water usage patterns applicable for eThekweni, are listed below:

- Single Residential properties

Water Consumption	Fraction of water to sewage
0 – 9 kl	95%
9 – 25 kl	75%
25 – 30 kl	75%
30 – 45 kl	65%
>45 kl	60%

i.e. A property which uses 32kl of water per month would be assessed as discharging the following volume of sewage:

Tariff Band	Water Consumption	Fraction of Water to Sewage	Sewage Volume
m ³ /month	m ³		m ³
0 - 9	9	95%	8.55
9 – 25	16	75%	12.00
25 - 30	5	75%	3.75
30 - 45	2	65%	1.30
>45	0	60%	0.00

Total

32 kl

25.60 kl

- Residential Units in blocks 3 stories and above:
Fraction of water returned to sewer = 90%
- Business, Commercial and Industrial properties
Fraction of water returned to sewer = 90 %

Those premises which discharge a trade effluent (for which a separate charge is raised) will continue to be assessed on an individual basis.

The next challenge was to determine which families are poor and therefore qualify for the free basic service. Poor families do not pay for the first 8.55 m³ of sewage discharged to sewer. Research enabled EWS to determine that most families living in houses with a municipal property tax value of ZAR 250000 or less, were poor in terms of the national definition of poverty described above.

Provision is made in the policy for families living on properties with a higher value to apply for a relaxation. To do so requires a visit by a municipal social worker to the family and formal support by the ward councilor. Provision is also made in the policy for customers to reduce the percentage deemed to enter the sewer. Most often this is linked to properties which operate nurseries or very large irrigated gardens. Again a rigorous formal process, involving sub-metering on the property and a formal application, is involved.

4. Analysis

4.1 Major financing gaps and obstacles to urban sanitation in South Africa

Until recently the major obstacle to urban sanitation was a fixation on the part of politicians at all levels of government that flushing toilets were the only acceptable sanitation option. The recently published national sanitation policy document and pronouncements by the minister of Water and Sanitation that “it is not about flushing” have resulted in a more realistic and affordable approach.

However the co-ordination between the national Housing ministry (the ministry for Human Settlements) and the Ministry for Water and Sanitation is poor, resulting in houses for poor families being erected in areas where the bulk sanitation infrastructure is not able to cope with the additional sewage flows. No thought has been given to the funding for this infrastructure and so pollution of the environment results.

In the eThekweni municipality, the Spatial Development Plan and the Integrated Development Plan do not provide clear direction as to where development is to take place and how the provision of services is to be coordinated to reduce wasted or badly timed investments.

The Equitable Share operating subsidy is what is termed an unconditional grant. In terms of the Constitution, there has to be a sharing of revenue raised by the national fiscus, across the spheres of government. The national government cannot dictate how this money is spent by municipalities. As a result it is often redirected to fund initiatives unrelated to the provision of basic services. This is made worse by the fact that many of the local municipalities (the so-called category B municipalities) do not have any way of determining charges to individual customers for water consumption or sewage disposal. Meters are not installed and accounts are not raised, or if they are then credit control is poor. Revenue collection rates below 60% are not uncommon. This results in a dependency on national subsidies. By way of a contrast, the payment level for water and sanitation services in EWS has been at 100% since 2013.

Capital grants for the provision of infrastructure to serve poor families are regularly unspent in any financial year in the majority of municipalities. This is primarily because of a lack of professional skills in municipalities to design projects, prepare contract documents, issue tenders and then manage construction and the payment of contractors and consultants. Funds not spent in any year cannot be ‘rolled over’ to the following financial year and are lost.

Because few municipalities have strong balance sheets, most are unable to borrow on the capital market and are therefore wholly dependent on capital subsidies from national government to finance infrastructure projects.

Once projects have been constructed, poor asset management and a lack of adequately trained operators and maintenance staff has resulted in a scenario where assets are constructed, neglected or poorly maintained, abandoned and then recapitalized. Equally any sanitation solution that requires emptying of on-site storage at regular intervals, ceases to provide a service if the storage is not emptied and the family then returns to a situation of having no sanitation service.

Management of WSP's in South Africa is generally weak, with competent management in a minority of municipal entities. Many attempts have been made over the past 10 years to institute a management development programme for existing and aspiring WSP managers, but without success. As a result, asset management, revenue management and customer management are generally poor and this results in poor performance in all these areas. This has a knock on effect when it comes to raising capital.

4.2 Financial mechanisms to increase the flow of funds into sanitation

Improving management capabilities across the water and sanitation utilities would have a significant impact in the medium term on most municipality's ability to raise funds for both capital and operating expenditure. This would need to be coupled with the introduction of effective systems to manage revenue, customers and assets. The management contract option was used in Johannesburg from 2000 to 2005 to good effect and could be repeated in many other municipalities in the country. Where scale does not make this approach realistic, consideration could be given to using management contracts to manage a group of WSP's that are close geographically. Management contracts are viewed with less suspicion by trade unions, because they are relatively short term in nature and do not involve the transfer of assets to the private sector.

Having said this, a BOT contract to part finance, build and then operate a sewage treatment plant for 20 years to produce high quality water, was awarded by EWS to a private company with the support of the local trade unions. This option is again being considered in South Africa for services that are not directly customer facing.

4.3 Innovative and non-traditional funding instruments

In order to demonstrate the economic and financial benefits of sanitation, EWS has been party to a number of research initiatives. EWS and the WHO, co-funded research into the health benefits of sanitation (research by Renuka Lutchminarayan, 2007). In addition Pegram, et al, examined the direct medical costs of diarrhea and dysentery in South Africa and KwaZulu-Natal in particular (1998). A cholera outbreak in 2002 raised the importance of water and sanitation service spend as a contributor to improved public health and was a significant factor in influencing policy makers to increase funding for sewerage infrastructure.

Over the past 10 years innovations in the processing of faecal sludge to recover nutrients has been a focus area in EWS. Initially this was confined to the development of the LADEPA process which processes VIP toilet sludge into pathogen free, odourless, fertilizer pellets. The pit toilet sludge is loaded into a screw press which separates the garbage from the faecal matter and then the sludge is heated and dried on a conveyor belt system to produce the pellets. Currently the fertilizer is used by the municipal parks department, but the intention is to market and sell the product once safety standards and testing methodologies have been developed.

In a second initiative a 200m long algal raceway pilot plant has been constructed at a regional sewage treatment plant in Kingsburgh, to grow specific algae strains which are harvested and which can be processed to produce biodiesel and a residual biomass. This technology is gaining ground internationally and appears to be most advanced in the USA. The major obstacles have been achieving a positive energy balance in the production process and a cost price that is competitive with oil based diesel.

Thirdly systems to process urine to recover phosphorous and nitrogen at scale from the urine diverting toilets and multi-storey buildings are being refined and taken to scale. Private fertilizer companies have expressed interest in purchasing these products, but production volumes will have to be increased to make it a viable proposition.

Fourthly a partnership between EWS and a company called Biocycle to process faecal sludge from UDDT's using black soldier fly larvae, has been initiated. The facility has been constructed and plant optimization trials are underway. A market exists for the protein rich larvae and the organic biomass, as a constituent of animal food. The ultimate objective is to certify these products as fit for human use.

These concepts fall into the circular economy for sanitation thinking and in the medium term have realistic and meaningful revenue implications.

4.4 Changes in national policy needed to facilitate an increased flow of funds into sanitation

Credit management is an issue in South Africa generally as the political support for taking action against those making illegal connections or those who do not pay for water consumed, is rare. While official policy documents, particularly from national Treasury, require municipal service providers to collect all revenue due to them, in reality politically driven opposition to any action to ensure payment for services is commonplace. This opposition takes the form of community protests or public meetings where officials are criticized for credit management activities even though they comply with approved policies.

What is needed is a form of social compact which makes illegal connections and non-payment for excessive usage socially unacceptable. If municipalities are able to increase cash flows it has the benefits of improved revenue, a stronger balance sheet and in time an improved ability to raise capital through bank loans.

Similarly, a policy to encourage affordable sanitation technologies has recently been announced by government, but this has not yet filtered down to the municipal level.

4.5 The likelihood of increased financial flows into sanitation

With the worsening economic situation in South Africa, increased subsidies from national government are unlikely. If management of public sector utilities can be improved then cash flows will improve through increased billing and collection rates. It will still take a number of years before an adequate track record is created to give banks comfort that loans will be repaid. The financial situation of most municipalities is so weak that banks will not lend at any interest rate.

4.6 What arguments should the WWC communicate and to whom?

Most arguments in support of improving sanitation and the funding of sanitation have been made with limited success. Funding for the provision of water services is far easier to motivate for than funding for sanitation. Given that sanitation is a public good, policy makers and practitioners in the sector should be the target audience. Most of these actors are operating in crisis mode and are not able to devote time to much other than the current crisis before them. This means that voluminous documents, streams of emails, etc, are ineffective as communication channels.

Taking management out of their workplace for no more than a few days at a time appears to be most effective. These out of office interventions can be used to facilitate learning visits to municipalities, provide opportunities, for face to face interactions with peers or experts in a particular field and for training.

The use of benchmarking in South Africa has enabled WSA management to learn from each other and thereby start to realise what has to be done to improve performance. However this approach has proved to be less effective in reaching policy makers.

The suggested key messages are as follows:

- The provision of water and sanitation must be integrated at both a policy and service delivery level
- Waterborne sanitation used piped sewers and centralized sewage treatment is generally not affordable in developing country cities and impractical in dense urban slums
- Developments in sanitation technology and waterless toilets have the potential to make conventional sewerage systems redundant in the medium term, with a resultant overinvestment in sanitation infrastructure
- Tariffs must be designed to be welfare maximizing and affordable to the poor
- SFD's are a valuable tool to target investment for optimum impact
- The choice of sanitation technology determines the affordability of the option to both the utility and the customers. In any economic analysis, the externalities should not be excluded in determining affordability to the utility.
- Thought needs to be given to making both access and consumption charges affordable.
- Compliance with the UN declaration of the human right to water and sanitation means that a basic service may need to be charged to customers at below cost or even zero cost. In turn this makes debt management more effective as strong credit control can be introduced for customers using more than the basic amount
- Sewage should be seen as a resource and as a source of plant nutrients and energy and not as waste to be disposed of