Municipal waste management - good practices

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Preface

The management of domestic waste in South Africa currently faces many real challenges. In terms of the South African Constitution (Act No. 108 of 1996), waste management service delivery is a local government function. The current status of waste management in South Africa is therefore an indication of how well municipalities succeed in performing this function.

Recent initiatives aimed at identifying the challenges experienced by municipalities, identified four broad themes of obstacles to effective waste management, namely financial management, equipment management, labour (staff) management, and institutional behaviour (management and planning).

It was noted that these challenges are often symptoms of a number of underlying and inter-related root causes that need to be addressed first. Many of these underlying causes are also often outside of the mandate or control of local government and as such, require close cooperation between local, provincial and national government.

This document contains practical examples of good waste management practices in various municipalities in South Africa. The focus is specifically on good practice for domestic and commercial waste.

There are always opportunities for improving the way in which waste is managed, and as such, we can learn from each other and share good management ideas. The purpose of this document is to share examples, without being prescriptive, and in so doing stimulate creative thinking and encourage good waste management practices.

Several municipalities contributed to the good practices captured in this document. These municipalities were identified from the list of cleanest town competition winners and by word-of-mouth of successful, good waste management practices in South Africa.

However, in visiting many municipalities across South Africa it was evident that several municipalities are able to overcome these challenges and provide sustainable waste management services through good practice.

Best practice is often the enemy of good practice. Best practice is a technique, method or process that is believed to be more effective or superior at delivering a particular outcome than any other known approach. In developing countries, best practice options are often high technology solutions imported from developed countries that are often not sustainable over the long-term. Good practice however, typically arises from those people who have an intimate understanding of the problems, who work with the challenges daily, and through often simple approaches find successful, innovative and sustainable solutions.

The intention of this document is to highlight such good practice initiatives which have resulted in real improvements to the way that waste is managed in communities. In so doing, it is hoped that other municipalities may learn from these approaches and identify simple and innovative solutions to help solve some of the waste management problems in the short-term, as a first step towards implementing best practice waste management approaches.

The CSIR would like to acknowledge the commitment to improved waste management shown by each of the municipalities visited, and specifically those individuals tasked with managing waste.

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waste flow diagram

This document aims to cover good practices in each of the stages of waste management, from the point of collection through transport, storage and treatment to final disposal. The principles of the waste hierachy which include waste minimisation, re-use and recycling, is supported to reduce disposal at landfill. Some examples may work well in certain areas and not in others. Municipalities should determine the suitability of specific programmes for their specific circumstances. The Integrated Waste Management Plan (IWMP) can evaluate and recommend the most appropriate systems for each municipality.

In South Africa the majority of waste ends up in landfills as mixed waste (thick grey arrow in the waste flow diagram). Reduce, re-use and recycling activities should be encouraged (the green arrows), which will result in a smaller waste stream to landfill (the black arrows).

reduce, re-use & recycle

Drop-off: Recyclable waste is dropped-off for recycling and composting

Drop off:

Drop off: Re-useables and recyclables

garden waste: drop off or collect

recyclables: drop off or collect

waste storage

Waste is stored in receptacles between collection days.

waste collection and transport

Removing waste from households and commercial sites where it is generated.

general waste

mixed waste

waste storage/ transfer

Transfer stations: Collected waste is transferred to different vehicles before transport to landfill.

The purpose and function of waste facilities

Facility	Materials Recovery Facility (MRF)	Buy-back	Transfer station	Central collection points	Drop-off	Garden sites	Landfill/dump
Types of waste	Mixed municipal waste, Mixed recyclables	Recyclables	Mixed waste	Mixed waste	Recyclables	Garden waste	Mixed waste, Building rubble, Garden waste
Who bring waste?	Waste collectors, Community	Community	Waste collectors	Contractors, Community	Community	Community	Municipality, Contractors, Business
Who remove the waste?	Recyclers, Municipality	Recyclers	Municipality, private companies	Municipality	Recyclers, Municipality	Recyclers, Municipality	–
Where does the waste go from here?	Recycling plant or Landfill	Recycling plant	Recycling plant or Landfill	Landfill or MRF or Transfer station	Recycling plant	Composting facility or landfill	–
Purpose of facility	Waste separation	Recycling and re-use	Optimising trans-port system	Collection from inaccessible areas	Recyclables and builders rubble	Separate com-postable waste	"Safe" disposal

composting facilities

landfill rehabilitation

Re-useables and recyclables

re-users and recyclers

Clean MRFs: Recyclables is sorted.

recyclers

landfill

Dirty MRFs: Waste is sorted to recover materials that can be recycled.

The final disposal of waste .

How to read this document

The document is structured into 7 sections, each dealing with a specific aspect of waste management. The sections are introduced by generic information that provides context, and followed by a lessons learnt text box.

Each good practice is preceded by a heading on a coloured background that summarises the following Problem statement. A generic solution is discussed which is then further explained by referring to real life examples from municipalities in South Africa with supporting photographic illustrations.

The contact details of municipalities referred to in this guide is provided on page 75 and the relevant municipal officials can be contacted for more detail on the practices contained in this guide.

waste collection & transport

The purpose of a waste collection service is to separate the generated waste from the community for health reasons. Linked to the life cycle of a common house fly, the preferred **frequency** of collection services to households is once a week. A more frequent service i.e. daily removal is required for restaurant putrescible waste (organic waste that quickly decomposes). The reliability of the service is more important than the type of receptacle or collection vehicles used (see **institutional** section on page 39).

Due to variations in community structures and geographical distribution, the same type of waste collection service will not be appropriate and sustainable across areas/municipalities (i.e. one size does not fit all).

Service levels may vary between:

- Kerbside collection;
- Organised transport to central collection points;
- Community transfer to central collection point (medium density settlements);
- On-site appropriate and regularly supervised disposal (applicable mainly to remote rural areas with low density settlements and farms).

At household level the type of service will determine the type of receptacles, infrastructure and equipment required to render the service. Waste from sources other than households will require systems as determined by the type and volume of waste and the collection frequency required.

The choice of transport vehicle may also dictate the most appropriate receptacles to be used. Regular and planned vehicle maintenance is required to ensure the reliability of the transport fleet. A contingency plan, detailing the course of action in cases of vehicle breakdowns, is required in order to maintain the required level of service.

Transport routes and distances to travel between collection points and disposal/transfer facilities will influence the type and size of vehicles used. In the South African context any combination of the following transport types deserves a place in waste collection systems: wheelbarrow, hand drawn carts, push carts, bicycles, donkey's carts, tractor trailer combinations, railway trucks, bakkie, bush trucks, cage trucks and compactor vehicles. Different vehicle types may be appropriate for different stages along the waste collection and transport route, for example, from household to central collection point, to transfer station and lastly to landfill (see diagram on pages 2 and 3). Collection vehicles that are the most appropriate for the specific task should be used. Consideration must be given to the following:

- Type of waste to be removed – recyclable or non-recyclable;
- The geographical area of collection;
- Accessibility – for example road conditions and narrow roads or roads without thoroughfare;
- The method of collection – for example, whether the receptacles in use need specialised equipment to be lifted or not;
- Distance and route to cover;
- Number of staff in collection team.

Waste collection systems must provide for the collection of separated waste as required by the Waste Act (Act No. 59 of 2008). Current collection systems are often not conducive to waste separation at source and hence must be revised and adapted accordingly. Dual collection systems for recyclable and non-recyclable waste can entail multi-compartmentalised vehicles or separate collection rounds on the same or different days. Collection of source separated waste is discussed in the **Reduce, re-use and recycling** section on page 20.

Lessons learnt

- *Use transport vehicles optimally*
- *Evaluate the cost efficiency of transportation methods*
- *Explore alternative transport options (for example, rail by night at reduced fees)*
- *Reduce unnecessary wear and tear by dividing the fleet and assigning specific functions within the waste collection-disposal cycle (keeping collection vehicles off landfills)*
- *Service vehicles and equipment regularly to lessen untimely breakdowns*

transport costs hamper service delivery

Problem:

Transport is an expensive aspect of providing the waste management service. Many municipalities thus struggle to meet their legal mandate of providing at least a weekly waste collection service to all households due to limited budgets. (Refer to the **governance** section, **financial management** sub-section on page 48.)

Solution:

Innovative thinking and planning may go a long way in saving the municipality huge capital and operational costs of providing the waste collection service to all households as required by law.

Example: Caged trucks with trailers

In order to accommodate the collection of source separated recyclables in their normal waste collection schedule at minimal cost, Knysna Municipality adopted a truck and trailer approach. Instead of duplicating the waste collection fleet and the service provided, collection trucks tow trailers in which the recyclables are collected. The additional cost for the collection of recyclables is minimal in comparison to what additional vehicles and collection rounds would have cost. (The Knysna Municipality 3-bag collection service is also discussed on page 21.)

waste collection & transport (continued)

failing service delivery due to vehicle breakdowns

Problem:

Vehicle breakdowns are a symptom of other problems including vehicle age, poor road conditions, overloading and lack of routine maintenance. The breakdown of municipal waste collection vehicles results in inconsistent collection services.

Disrupted waste collection services may result in waste being illegally dumped. This is especially the case in situations where drop-off centres are considered too far away or where drop-off centres do not accept general waste. The public is also not keen to incur additional cost over and above the collection service already paid for.

Solution:

Having enough operational vehicles is crucial to avoid over-loading and to ensure a continued service when vehicles are serviced. Several options can be explored to deal with this problem:

i) A dedicated workshop with qualified personnel dealing with waste vehicles only will ensure that vehicles are regularly serviced. When a breakdown occurs, the dedicated mechanics are immediately available, resulting in shortened vehicle down time which impacts less on service delivery.

ii) Use vehicles for the meant purpose and provide training to the staff and drivers to avoid unnecessary break downs.

iii) Lease vehicles: Leased vehicles are normally not too old and the down time due to breakages should be less. Include the demand for regular vehicle maintenance in the lease agreement. The owner of the trucks should take the responsibility to keep the required number of vehicles operational, and not the municipality. The lease contract should be properly drafted to place no additional liability on the municipality. Learn from the successes and failures of municipalities which have lease contracts in place.

Example: Dedicated workshop

The Swartland Municipality deals directly with a dedicated mechanical workshop that is responsible for the maintenance of the transport fleet and ensures a short turnover time. The municipality does not experience problems with vehicles being out of service for long periods.

Example: In-house mechanics

The Overstrand Municipality has a fleet management department with dedicated mechanics to service their vehicles. Vehicles under guarantee are serviced by the respective agents.

Example: Fleet lease agreement and in-house mechanics

The City of Tshwane's vehicle lease agreement includes a routine service maintenance clause. Workshops are open 24 hours per day and in-house mechanics check vehicles between shifts. Minor repairs are done immediately. Hydraulic and other specialised repairs are outsourced. This significantly reduces the down time of vehicles.

periodic high volumes of waste (events or season related)

Problem:

During certain seasons (tourist destinations during holiday periods) or events (sporting events, concerts) waste volumes within a particular area may increase substantially. Normal waste collection services during these periods of high volume waste generation are inadequate.

Solution:

Special waste management arrangements should be made for such events and/or seasons to ensure that waste is collected efficiently.

Example: Holiday seasons

During the peak holiday season, the influx of tourists to popular holiday destinations challenges the local waste management services. To overcome this, Bitou Municipality collects waste twice per week instead of the normal weekly removal. This more frequent waste collection service prevents or minimises waste receptacles from overflowing. Waste is collected in two shifts during these times (from 5:00 till 13:00 and from 13:00 till 21:00). Additional vehicles and additional workers are also hired to ensure that all waste is adequately removed and collection staff not unduly stressed.

Example: Special Events (Sporting events and concerts)

The City of Johannesburg (CoJ) has a special application process for big events that are planned within the city. A variety of issues are taken into account in such applications, for example, safety, route access and waste management. A committee comprising all the relevant departments within the CoJ is therefore responsible for reviewing such applications. Specific requirements relating to waste management may include separation at source and regular collection of waste during those events. The organisers of such events can elect the CoJ to undertake such services or may get private contractors.

separated waste collection perceived to escalate municipal costs

Problem:

Municipalities often perceive the collection of recyclables separate from general waste as a burden to their managerial skills and their operational costs. Historically, municipalities did not perceive waste minimisation and recycling as their mandate and it was thus not included in their collection plans.

Solution:

Refer to the section on **Reduce, re-use and recycling** (page 20) for more detail on the proposed solution and examples.

waste collection & transport (continued)

no service in rural and informal areas

Problem:

In South Africa, the biggest waste collection backlogs exist in rural areas and informal settlements. Obstacles to providing a sustainable waste collection service include:

i) Limited road access and infrastructure: In certain areas, road infrastructure is limited and the collection vehicles cannot reach all the households. Where road infrastructure exists, the streets are often inaccessible to conventional waste collection vehicles due to steep slopes and narrow roads with sharp curves, deep potholes and dongas.

ii) Extensive travel distances: Transportation costs in rural settings where households are sparsely spread over long distances impede a weekly waste collection service, thereby contributing to rampant illegal dumping.

Solution:

The solution for this problem can be in two ways:

i) Households facilitating and funding the operation: Each household can be made responsible for transporting their waste to central collection points and/or transfer stations which are easily accessible to the municipal vehicles. The households can either do this individually or organise themselves and get one contractor to transport their waste.

ii) Municipality facilitating and funding the operation: The municipality can contract community members to collect waste from all households within their area and transfer it to central collection points where the municipal waste collection vehicles can collect the waste for disposal. This will have the added advantage of job creation.

Selecting one of the above solutions will be influenced by the area specific circumstances, for example, the socio-economic conditions of the community provided with the service, or whether the municipality can afford the programme. The recently approved Policy for the Provision of Waste Management Services to Indigent Households is applicable in this case.

Example: Rural bring-in-system

The Breede River Winelands Municipality renders a kerbside waste collection service to all households, excluding rural areas. Some residents in rural areas take responsibility for the disposal of their household waste. These households bring their waste to transfer stations where they pay a minimal dumping fee.

Example: Food-for-waste

The Siyazenzela initiative was started by the Local Economic Development department in 2007. The word "siyazenzela" means "we do it ourselves". People living in informal settlements in Hibiscus Coast Municipality can sign up to collect waste from households and to keep the area clean. All waste collectors receive protective clothing. The municipality removes the collected waste from central collection points once a week. The waste collectors are not paid in cash, but after fortnightly inspections receive basic household supplies and fresh produce as a form of payment.

This project specifically targets women or child headed households and the community acts as watchdogs. The provision of the dietician approved food parcels has the following benefits:

- No travelling costs to exchange vouchers for food;
- Improved health due to a better diet; and
- Local emerging farmers have a market for their fresh produce.

The community benefits by receiving a waste management service with the associated hygiene improvement. Poverty amongst local residents is also alleviated.

Several municipalities have similar initiatives, for example, Thulamela Municipality who funds the initiative from the Expanded Public Works Programme budget; Msunduzi and Emnambithi municipalities.

Example: Cleansing service in informal settlements

The City of Johannesburg (CoJ) renders a weekly waste collection service to all its residents including informal areas. In addition, the CoJ appoints contractors through a tender process to provide a general cleaning service in informal areas. These contractors employ community members to clean toilets, collect waste, and clear illegal dumping within their areas on a daily basis. Three year, outcomes based contracts are entered into with the contractors. Performance is measured against the CoJ's cleansing standards. The programme is also registered as an Extended Public Works Project (EPWP) with the Department of Public Works.

Benefits:

- All large informal settlements (119 out of 180) are cleaned on a daily basis
- Sustainable jobs are created
- Funding of this system is partly through EPWP

Waste collectors are introducing recycling systems where the collectors also separate the waste to earn additional revenue.

waste collection and transport (continued)

vehicle wear and tear at landfills

Problem:

Irregular landfill road surfaces, steep slopes, loose sand, dust and the nature of the material disposed at landfill sites increase the rate of wear and tear on vehicles operating on such sites.

Solution:

Specialised vehicles execute certain functions best within the waste collection to disposal cycle. Using vehicles specialised for waste collection to transport waste over long distances to landfill sites might not be the most cost effective. (Refer to the **excessive cost of road transport** section on page 51.)

Using appropriate vehicles for specific functions within the waste collection to disposal cycle may reduce wear and tear. For example, divide the fleet into:

- vehicles that collect waste from households and take the waste to transfer stations;
- vehicles that transport the waste from transfer stations to the landfill site (not the working face of the landfill); and
- vehicles that transport the waste to the working face on the landfill site.

This exercise should however be based on a cost-benefit exercise to ascertain the cost effectiveness of such an operation and its mode of operation.

Example: Use specialised vehicles to prevent wear and tear

The City of Tshwane uses their waste collection trucks optimally by offloading the full waste compartments at garden sites (below right). Chain-trucks (right) then transport the loaded compartments from the garden sites to the landfills. The specialised waste collection compactor trucks are freed up to do more waste collection rounds and potential damage to the vehicles is reduced. The chain trucks also do not go onto the working face of landfill sites, but offload within the premises of the landfill where specialised trucks operating on the working face can collect the waste and transfer it to the working face.

eThekwini has a similar approach (below).

notes

waste storage

Waste is stored at different stages of the waste management chain:

i) Waste is stored at points of generation before collection. Receptacles at points of generation are intended for the storage of waste between collection days. Aspects to take into account in the choice of receptacle are: size, cost, availability, durability, type of waste and ease of handling by waste generators and waste collectors. Waste storage systems must allow for separation at source. The type and size of receptacles will determine the most appropriate means of transport (see page 4). The choice of receptacle should also be mindful of the potential impacts at the landfill e.g. adding plastic to landfill.

ii) Waste is stored at collection points for recyclables. These facilities include clean Materials Recovery Facilities (MRFs), garden sites, drop-off and buy-back centres.

iii) Waste is stored at other intermediate facilities prior to final disposal to landfill or prior to the waste being treated or recycled. These include transfer stations and dirty Materials Recovery Facilities (MRFs).

Lessons learnt

The focus should be on a service being provided rather than on the type of receptacle in use, as long as the receptacle is suitable for the specific area's challenges. Depending on the area, different types of receptacles prove to work well:

- *Wheelie bins*
- *Bins with plastic bin liners*
- *Metal bins work well for hot ash*
- *Bags placed on stilts or in cages prevent dogs from ripping it open*
- *Monkey/baboon proof bins*
- *Bins provided by the households themselves can be used.*

lack of storage receptacles at points of waste generation

Problem:

Most municipalities do not provide waste receptacles to all waste generators, especially the indigent households who cannot afford to buy such receptacles for themselves. This lack of receptacles may result in littering and illegal dumping as people seek to clear their households of the accumulated waste.

Example: Providing refuse bags and a cleaning service in informal areas

City of Johannesburg provides households in informal settlements with black refuse bags and a daily cleansing service including waste collection to combat illegal dumping. (Read about illegal dumping on page 70.)

Example: Wheelie bins in all households

Saldanha Bay Municipality provides a wheelie bin to every household, including households in informal areas (photograph to the right). Supplying a waste collection service to all areas is a first step towards combating illegal dumping.

Solution:

Provision should be made to provide households with receptacles, especially indigent households who cannot afford to pay for such receptacles. Please note that the Policy for providing indigent households with basic waste removal services has been approved by parliament and as such Treasury has made financial allocations to enable municipalities to implement this service.

Development and enforcement of waste by-laws will ensure that the wheelie bins are used appropriately for the intended use.

lack of incentives to utilise drop-off facilities

Problem:

Transporting waste to drop-off sites has a cost implication for the waste generator. Charging excessive fees at the drop-off sites might discourage the use of these facilities.

Example: Subsidised charges for garden waste disposal

The closed Alton landfill in uMhlathuze Municipality now operates as a drop-off centre for garden waste and recyclables. The charges are low enough to encourage people to use the facility. The first load of garden waste is accepted free of charge provided that it does not contain bulky stumps. Additional loads are charged at R20.50 per load.

Solution:

Incentives to encourage community members to make use of drop-off centers include subsidised charges and buy-back centres. Transport costs to drop-off sites can then be covered by the payment for recyclables.

The use of drop-off facilities at Nelson Mandela Bay Municipality is encouraged by subsidising the cost rather than collecting fees for the use of the facility. Garden waste is also collected free of charge at the Knysna drop-off centres for garden waste.

storage (continued)

lack of easily accessible drop-off facilities

Problem:

Communities are more likely to dispose their waste illegally and not be concerned to separate their waste for recycling if they lack the appropriate facilities or if such facilities are not easily accessible to them. In addition, establishing such facilities can be an expensive and long process for municipalities since they require appropriate infrastructure and relevant permits/licences.

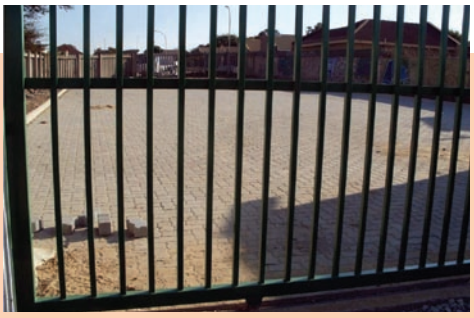
Solution:

Using existing facilities, which the community are familiar with, as drop-off facilities encourage people to use such facilities for bringing in their waste. In addition, such existing facilities have all the necessary infrastructure and permits/licences. This minimise the cost implications on municipalities.

Example: Converting a closed landfill site into a drop-off centre and transfer station

The closed Alton landfill in uMhlathuze Municipality now operates as a transfer station and as a drop-off centre for garden waste and recyclables (below). This ensures that the people in the vicinity continue to dispose of garden waste and recyclables at the old landfill site. The new site is much further away.

No additional operating permit applications were required, because the end use as a drop-off facility and transfer station can be included in the closure permit application. This resulted in a cost saving for the municipality.



Example: Multipurpose drop-offs

City of Johannesburg negotiated with the Province to transform garden waste sites into drop-off centres. It was easier to make a few changes and improvements - surfaces were paved, concrete platforms built, fences and gates repaired and security improved - to the already existing and operating garden sites to enable the operation of drop-off sites, than to find alternative space to built new ones (above). This would have required much bigger capital costs for the infrastructure and getting the necessary permits/ licences, not to mention the practicality of finding suitable available land.

Read more about this drop-off site in the **reduce, re-use, recycling** section on page 23. The challenges of collecting source separated recyclables from households are discussed in the **Reduce, reuse and recycle** section on Page 20.

keeping storage facilities neat

Problem:

One of the key issues facing storage facilities (transfer stations, central collection points etc.) is keeping them neat and tidy. Storage facilities, if not kept neat, have the potential to become litter-strewn mini dump sites. In addition to the visual impacts, rodents and vectors are normally associated with these conditions and consequently negative health impacts.

Solution:

Development of operating procedures and ensuring adherence to such guidelines will assist in ensuring that the area remains neat.

Example: Housekeeping at drop-off sites

The foreman at the drop-off centre at Voëlklip drop-off site in the Overstrand Municipality takes the neatness of the drop-off centre to heart and excels in the up-keeping of the garden surrounding the drop-off area (right). An old carpet is used to prevent waste falling between the skip and the ramp (below).

Example: Transfer of compacted waste in closed containers

The City of Tshwane and eThekwini Metropolitan Municipalities use compactor trucks to transfer the waste from households to transfer stations. A closed compacted container (middle right) is off-loaded at the transfer station and is then picked up by the chain truck (bottom right). This practice limits spillages of waste during the exchange of vehicles.

waste storage (continued)

waste deposited next to and not in communal skips

Problem:

In many cases, community members use wheel barrows or send children to take waste to central collection points. The skips that are normally used at these points are not easily accessible, as they are too high to hoist over heavy loads from wheelbarrows or to be accessed by children. This results in most of the waste being dumped next to the skip instead of inside.

Solution:

Provide containers that are easily accessible by wheelbarrows and/or children at these central collection points. This may entail ensuring that the bin opening is at a level easily accessible by either building ramps to climb to the elevated level of the skip, lowering the height of the container to ground level by embedding it in the ground or altering the container design by having the opening on the sides of the container not on top. When embedding containers into the ground, the ease and practicality of emptying such containers should be taken into account. Education and awareness are still important in ensuring that these interventions succeed.

Example: Walk-in bins

Walk-in containers (such as the empty one on the left) enable community members to place their waste inside the bin. In Mabopane, in City of Tshwane Municipality, a standard 12 m^3 container was fitted with doors and a ramp to enable easy access for persons pushing wheel barrows and for children. The introduction of walk-in containers significantly improved the tidiness of communal collection sites.

Example: Underground storage bins

The example of the underground storage bins introduced by the City of Johannesburg Municipality (CoJ) (see page 17) can also be applicable in this case. Although currently the CoJ has introduced these bins in high pedestrian areas, the intension is to introduce them in high density residential areas as well. These containers are easily accessible as they are at ground level, making it easy for wheelbarrow loads as well as waste brought by children to be disposed into the bins. Wet waste is not desirable for these underground storage bins. The design and placing of such containers should take rain- and groundwater in account.

overflowing waste bins in areas with high pedestrian traffic

Problem:

The normal street bins being provided in areas with high pedestrian traffic are often ineffective due to high waste volumes being disposed. These bins are often seen over-flowing with waste due to limited capacity combined with waste collection frequency being too low.

Solution:

Install containers that can accommodate larger volumes of waste. Because bin capacity is increased, regular collections can now be scheduled and adhered to.

Example: Underground storage bins

The City of Johannesburg introduced underground storage bins (right) to increase bin capacity in areas with high pedestrian traffic, at taxi ranks, in areas where informal traders operate, and in informal settlement areas. Installation of these bins qualifies for MIG funding as it is considered as immovable infrastructure. These bins hold large volumes of waste (5m^3), are within easy reach for children to use, are out of sight and can be conveniently collected at night. Installation of these bins did not change people's behaviour as waste is still thrown next to bins (bottom right). Therefore, the issue of human behaviour still needs to be addressed.

reduce, re-use & recycle

Depleting natural resources, together with the environmental impacts of waste and the diminishing capacity of landfills, has prompted the need for reduced waste generation. The Waste Hierarchy which comprises five waste management categories: waste prevention (reduction), re-use, recycling, energy recovery and finally disposal, is applied internationally to reduce the waste ultimately disposed to landfill.

Encourage waste reduction across all levels of society, including at household level. Awareness and education campaigns play an important role in the success of any reduce, re-use and recycling initiative. The socio-economic conditions prevailing in a specific municipality must be taken into consideration when establishing waste management programmes, as well as when deciding on the type of communication campaign to use.

Incentives, together with awareness creation, have the potential to change consumer behaviour. Incentives for minimising waste can include Pay-As-You-Throw charges, where the waste management charges correlate with the amount of waste being disposed. The less waste households dispose of, the less they pay. For example, charges are calculated on the basis of the number of bags collected or the bin size used for disposal. Apart from financial benefits, there are no real incentives for communities to participate in recycling initiatives. Financial incentives would include reduced disposal charges and financial returns.

Reclamation activities on many landfill sites around the country highlight the value of disposed materials. Ideally, re-usable and recyclable waste should be reclaimed before the waste reaches the landfill site (see flow diagram on pages 2 and 3). Diverting reusable and recyclable waste away from landfill can be done by sorting through mixed waste at "dirty" MRFs or separation at source combined with further sorting at "clean" MRFs. Clean MRFs deliver "clean" recyclables which fetch higher prices. Clean MRFs also provide more humane working conditions adding to the dignity of workers.

The volumes and types of waste sorted at these facilities will dictate the level of sophistication required in the machinery used. Conveyer belt systems are well suited to dirty MRFs while less costly table-top sorting systems can be employed at clean MRFs. Cost effectiveness and efficiency is not guaranteed by having more mechanised systems. High capital investments versus labour intensive practices need to be considered. Technologies are likely to be more complex at clean MRFs due to the need for cleaning and more advanced sorting (e.g. different types of plastics and metals). The type of plant influences the quality of the recyclate. It may be difficult to find markets for contaminated recyclate.

Fluctuating markets for recyclables remain a threat for the sustainability of recycling initiatives. Regulation of the recycling sector by national government may offer some relieve and balance in the local markets. Low volumes of recyclables and the distance to the markets may hamper the success of recycling initiatives in smaller and remote municipalities. A cost-benefit analysis of the different treatment and disposal options for specific municipalities should be addressed in the Integrated Waste Management Plans to enable a municipality to make an informed choice of the most appropriate system(s) based on its specific scenario and setting.

Lessons learnt

- Recyclables separated from the general waste stream at source ensures a cleaner working environment for workers in the recycling industry
- Separation at source results in higher quality recyclables entering the recycling stream with a higher resale value
- The easier it is for communities to dispose of recyclables, the more likely they are to take part in the initiative
- Innovative thinking and forming partnerships can alleviate some of the daunting financial costs of initiating some of the recycling programmes

lack of incentives for source separation of waste

Problem:

Participation in source separation of recyclables without any significant financial benefit can be challenging as it is considered as time consuming.

Example: Cost saving on collection fees

Arrangements are made with businesses to bring recyclables at their own cost to the sorting facility at the Highlands landfill site in Swartland Municipality (top). The recyclables are cleaner than what it would have been after compaction together with general waste in the collection vehicles. This results in a significant saving on these businesses' monthly waste collection bills which is linked to waste quantities.

Several of the bigger shops in Saldanha Bay Municipality sort and bale recyclable materials (bottom) prior to taking it to the respective recycling companies. Baling reduces the volume of waste to be collected and optimise transport. The participating shops save significantly on their monthly waste collection bills.

Solution:

Incentives, for example a cost saving on the monthly disposal charges, would encourage a business to participate in source separation. Buy-back centres are more viable in low income areas, where participating community members are rewarded for collecting and bringing in recyclables.

Example: Buy-back centre

The Walker Bay Recycling Centre in Overstrand Municipality has a buy back facility that is used by young and old (top). The incoming recyclables are weighed, a number allocated and then paid for in cash. The "Recycling Swop Shop" is advertised at shows and exhibitions (below). Also see the awareness creation section on page 65.

reduce, re-use & recycle (continued)

collecting source separated recyclables challenge municipalities

Problem:
Separation at source and the need to collect the recyclables separately has only recently become a requirement with the promulgation of the Waste Act. Incorporating separate collection of recyclables into existing collection systems may be challenging.

Solution:
Dual collection systems are not necessarily more expensive and time consuming. The total amount of waste to be collected is still the same, but now it has to be separated. Ways to achieve separate collection are:

a) **Municipalities** can adapt their existing collection vehicles to collect both recyclables and general waste in a cost effective manner: existing municipal trucks can be partitioned into two-cabin trucks; or a truck and trailer system would keep the two waste streams separate in one collection round.

b) Employing **contractors** to collect the recyclables shift the responsibility from the municipality to the contractor. The contractor receives a monthly fixed payment from the municipality which streamlines the municipal budget process.

c) Involvement of and **partnerships** with the private sector to provide a kerb side collection service for recyclables would alleviate the cost and time implications on municipalities. Close collaboration with the municipality is however essential to ensure a smooth complementary collection service.

d) Establishing **drop-off and buy-back centres** in strategic locations for the community members to deliver their recyclables can be another less costly exercise than providing a kerbside collection of the recyclables. Please note that the establishment of these facilities need not be at the cost of the municipality.

The recyclers (private sector) are the intended recipients of the waste material and could therefore be approached to invest in collecting recyclables, as well as establishing drop-off and buy-back centres.

The **awareness creation** section on page 70 provides ideas on how to encourage separation at source.

Example (a): Municipal dual same-day collection
uMhlatuze Municipality provides a same day dual collection service. Rear end loaders collect the non-recyclable waste from the wheelie bins and bush trucks collect the yellow bags filled with recyclable waste. All vehicles are owned and operated by the municipality. The recyclable waste (in yellow bags) is taken to the drop-off centres where the recyclable materials are further sorted (opposite page).

Rear end loader (top) and bush truck (right)

(Continued)

Example (a): Municipal 3-bag same-day collection

Knysna Municipality uses a 3-bag system. One to collect general waste (maximum of one black bag per week), the second for recyclables (no limit for green bags per week), and the third for garden waste (maximum of two blue bags per week). Waste is collected with a cage truck with trailer (see photograph on page 5). All waste is collected from residential areas in one trip only.

Example (a): Municipal 2-bag separate-day collection

Overstrand Municipality has established a 2-bag system with collection on two separate days in Hermanus. The Municipality takes the clear bags filled with recyclables to Walkerbay Recycling for sorting. Walkerbay Recycling (below) provides work for 40 people.

Example (b): Employing contractors - dual same-day collection

In eThekwini Metropolitan Municipality separation at source has been rolled out to all non-rural areas. Black bags are provided for general waste while orange bags are for recyclables. Private contractors pick up the orange bags while the municipal trucks collect the black bags. The contractors collect first and leave behind the badly sorted waste which is collected by the municipal trucks as part of the general waste for disposal to landfill.

reduce, re-use & recycle (continued)

(Continued)

Example (c): Private sector involvement - a 4-"bag" system

A private entrepreneur collects three bags filled with recyclables (one with paper, one with plastics, and one with glass and tins) as part of a localised private initiative in the City of Tshwane (right). The 4th "bag" of mixed waste is still collected by the municipality according to their normal waste removal schedule. Recovered bags are used for source separation of recyclables.

Example (c): Private sector involvement - dual same-day collection

George Municipality uses a double/blue-bag system for separation at source. Households put both a black bag filled with general waste and a blue bag filled with mixed recyclables out on their scheduled day for removal. A private company collects the blue bags with recyclable materials (carton, metal, paper and cans) on the same day that the municipality collects the non-recyclables (right).

The recycling company uses community contractors to assist with the collection, thereby creating jobs within the community. The recycling company provides the municipality with a monthly report on the number of jobs created, and volumes and types of recyclables collected. The collection of the recyclables is partially subsidised by the household waste collection rates and tariffs. Informal settlements are included and increasingly participate in the recycling initiative (see **awareness creation** on page 65).

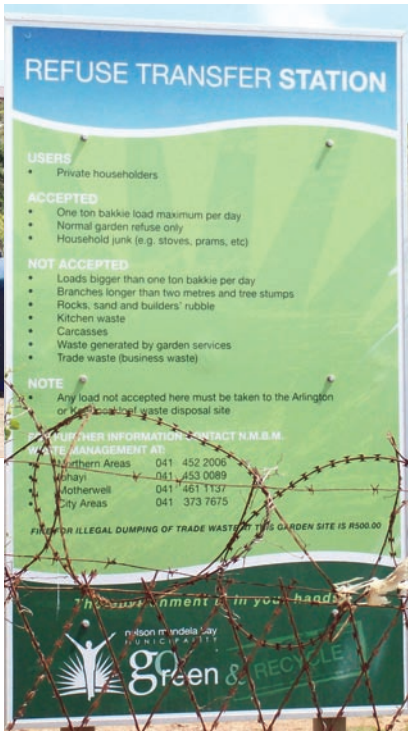
Before the recycling initiative was outsourced, the municipality recycled about 6% of the waste. Transport arrangements to the landfill put pressure on the time available to do the sorting of the waste, which had to be done on the same day. Outsourced recycling relieves the municipality from needing recycling sorting facilities.

(Continued)

Example (d): Drop-off and buy-back centres

City of Johannesburg transformed garden waste sites to accommodate the drop-off of recyclables. An advantage of using sites where people are already disposing of their garden waste is that it is easy to add recyclables to their loads. 'Spotters' operate at the drop-off site to direct where different types of waste should be offloaded. The waste streams that are accepted include: paper, plastic, glass, e-waste, used oil, tins, metal and builders rubble.

Some of the transfer stations in Nelson Mandela Bay Municipality have marked bins for recyclable materials (right). An employee of the municipality assists with the recycling of waste that is dropped off. A notice board (far right) at the entrance of the site explains the rules of the drop-off and sorting operation on site.



At Alton drop-off centre in uMhlathuze Municipality, recyclable waste is sorted into skips (below right), and at the drop-off centre in BaPhalaborwa Municipality recyclables are compacted and bailed (below, left and centre).

The fully functional buy-back centre in Overstrand Municipality is discussed on page 19.

reduce, re-use & recycle (continued)

disposal of re-usable and recyclable waste to landfill

Problem:

Separation at source is a relatively new concept in South Africa and hence not practiced in many municipalities. The bulk of the re-usable and recyclable waste is thus disposed to landfill and largely lost to the recycling industry. In addition, this contributes to the diminishing capacity of available landfill airspace (Refer to the Landfill section on page 30).

Solution:

In order to ensure maximum diversion of re-usable and recyclable waste from landfill, a wide range of re-use and recycling programmes, including composting should be initiated. It is important to ensure sustainability of such programmes through the provision of the necessary support, such as resources for establishing recycling and composting facilities and creation of sustainable markets for the products.

Establishing MRFs is another way to divert recyclables from landfill. Several MRFs are operational throughout the country and many are in the process of being established. Landfill airspace is saved and salvaging from landfill sites minimised.

Example: Re-use of bricks, tar remnants and builder's rubble

At Bisasar Road landfill, in eThekwini (Durban Solid Waste), bricks recovered on site are used to maintain the fence around the site (right). This is a cost saving for the municipality while also maintaining access control. Bricks are also crushed and used as cover material. Having a dedicated area for dumping of builders' rubble enables the salvaging of usable material. (Also refer to **housekeeping at landfill sites** section on page 31.)

City of Cape Town re-uses tar remnants (left) as road surface at the Bellville landfill. Building rubble is crushed (see below) and used in road construction.

Example: Selling re-usable waste

Pickers on a City of Tshwane (CoT) builder's rubble landfill site, collect and clean re-usable building materials (bricks, tiles, pottery, etc.) and sell it on site. Scrap wood is used to build dog kennels. These ventures take place without the consent and involvement of the CoT. The turnover rates confirm the availability and potential value of re-usable and recyclable material and the potential gains from it. It is therefore important for the CoT to engage the pickers on this site and agree on a more formal relationship and operational procedure.

Wooden planks (below) are salvaged at Alton drop-off in uMhlatuze Municipality and sold to interested parties. The rest is donated to poor communities for fire wood.

Re-usable items are on display at a drop-off centre in Cape Town (right). According to the entrepreneur his selling of usable items allows him a comfortable living.

reduce, re-use & recycle (continued)

(Continued)

Example: Re-use of garden waste (composting)

City of Cape Town (see pictures on the right) uses a tub grinder to chip garden waste at the Bellville landfill site. A 23-ton truck collects the chipped waste and takes it to a composting plant. A similar but smaller scale initiative is found at some drop-off sites (see below right). The smaller chippers are equally functional to handle the volumes of garden waste in Drakenstein Municipality (see below).

Garden waste from the garden sites in the City of Johannesburg (CoJ) is transported to the CoJ owned composting facility in Panorama, where it is used for the production of compost. Any excess is chipped and used for rehabilitation at landfills (see **housekeeping at landfill sites** section on page 31).

Breede River Winelands Municipality makes compost on a regular basis from green waste. Garden waste is also composted at the regional landfill site in Overstrand. A composting mixer (far right) is pulled by a tractor. The mixer adds water and turns the compost.

(Continued)

Example: Re-use of tyres

At the Alton drop-off centre in uMhlathuze Municipality, tyres are shredded for use in road building.

Example: Establishing of material recovery facilities (MRFs)

The contractor responsible for the Highlands landfill in Swartland Municipality established a MRF at his own cost (below). The recycling plant provides jobs for about 20 people. Arrangements are made with businesses to bring their recyclables to the landfill site at their own cost. (Also see example on page 19.)

Breede River Winelands Municipality is in the process of putting up a MRF at the Ashton landfill.

An example of an active privately owned and operated MRF is the one at the Mariannhill landfill in eThekwini (DSW) (below). The municipality provided land at the landfill site and electricity while the private company owns the equipment and pays the workers. They currently recover about 12% of what can potentially be recovered from the site. Economic viability threatened the sustainability of this MRF and it closed operation on 15 November 2010.

reduce, re-use & recycle (continued)

facilitating exchange of re-usable materials

Problem:
Potential users of waste material and potential suppliers are not aware of each other.

Solution:
Create a system where potential buyers can source available materials.

Example: On-line exchange
Nelson Mandela Bay Municipality manages a Waste Exchange (WX) Project. It is a web-based free online service available to business, industry, non-governmental organisations, schools and individuals who generate materials that others may have a use for. This initiative assists with the marketing of unwanted material and the matching with users, re-users and recyclers. Available and wanted items are listed on the web site. This project was initiated in an effort to increase the re-use of waste and to reduce the dumping, for example, of builder's rubble and other waste in the municipal area.

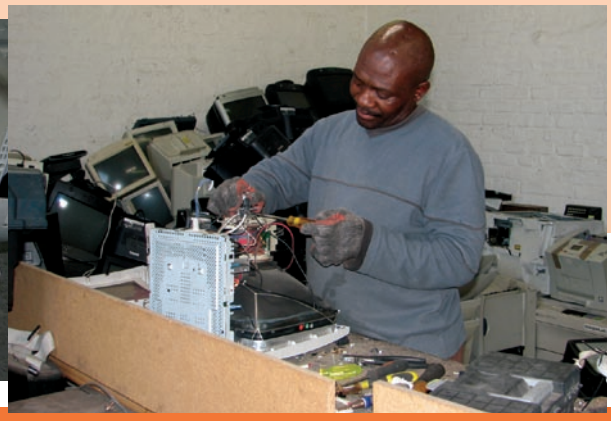
The success of the project is measured by the number of successful exchanges made. The marketing of this new concept is a challenge due to limited internet access of potential users. Flyers do not seem to have the desired effect on all target groups.
(www.nelsonmandelabay.gov.za/waste).

electronic waste needs specialised recycling

Problem:
Recovering electronic waste is a relatively new stream in the South African recycling industry. The hazardous components in electronic waste complicate the dismantling, recycling and disposal process.

Solution:
Recycling or re-use of electronic waste requires a full understanding of the components of the materials being dealt with. Strict control measures should be put in place in dismantling the equipment and recovering the recyclable or re-usable parts to avoid further environmental impact.

Example: Dismantling old computers and TV sets
A private waste recycling contractor at City of Cape Town dismantles old personal computers and television sets. All components are sorted according to type of material (left and below).



lack of resources to facilitate recycling

Problem:

Municipalities may not have the required resources to establish the necessary facilities to support recycling, especially separation at source.

Solution:

Municipalities could partner with the private sector to establish some of the required infrastructure. Although municipalities may not have resources, they may have access to land which can be used by private sector companies. In addition, municipalities could explore low technology high labour intensive projects, which may not require a high capital investment. Explore workable municipality/private sector partnership options.

Example: Simple, cheaper programmes

Recyclable material from a separation at source pilot project in City of Cape Town is taken to a private company where the recyclables is sorted on tables (left). The recyclables collected in marked plastic bags are emptied on sorting tables. Two sorters work per sorting table and all the items in each bag are allocated to the respective sorting bags. A grid behind the sorting bags with a strategically placed sample assists with each type of recyclable finding its way into the correct sorting bag, even when thrown from a distance. No expensive conveyor belt system is used in this energy saving and relatively low capital cost operating system.

Example: Private sector involvement

The 100% privately owned and operated MRF at Msunduzi Municipality (left) buys recyclables from vendors and scavengers at the landfill. In the order of 100 salvagers provides recyclables to the MRF.

The City of Johannesburg (CoJ) is looking into potential public-private partnerships (PPPs) for the establishment of alternative waste treatment technologies in order to minimise its reliance on landfill disposal.

landfill sites

Basic requirements for the safe disposal of waste on landfill include:

- Access control and signposting: Landfills sites must be properly fenced off to keep people and animals out. Pickers, children and domestic animals should not be allowed onto any landfill site for safety reasons. Access control at the gate is required to monitor the types and volumes of waste being dumped at the site. A sign post at the gate should indicate the types of waste allowed and the operating hours of the site.
- Daily compaction and cover: Good landfill management entails daily compaction and soil coverage of the waste at the workface to prevent wind scatter (windblown litter) and fly breeding. Compaction also uses airspace more efficiently.
- Recordkeeping: Recordkeeping of the incoming waste types and quantities must be as accurate as possible given local circumstances as it is important for planning and reporting purposes. Ways of estimating waste volumes or weights in the absence of more accurate systems such as weighbridges must be explored. (Also refer to the Information Management section on page 44).
- Fires must be avoided: Fires on landfill sites are difficult to control due to the presence of landfill gas. In addition, fires release harmful substances into the air.

Strict enforcement of the minimum requirements for landfill as well as the permit/licence conditions and tipping fees at landfills in the absence of by-law enforcement may potentially contribute to incidences of illegal dumping. Therefore enforcement of by-laws is critical in combating illegal dumping.

Lessons learnt

- *Innovative thinking and planning save on landfill sites expenses*
- *Landfills are suitable for multiple uses, for example, awareness creation and conservation*
- *Managing a landfill and its buffer zone as one unit prevents potential problems and complaints in future*
- *Rehabilitate landfill cells as they reach full capacity*

Problem:

Impacts of landfill sites include odour, wind scatter and regular fires. The risk from these negative impacts increases where communities live close to landfills.

environmental impacts and nuisances arising from landfills

Problem:

Compliance to permit conditions is critical in mitigating the impacts of landfill sites. Many municipal landfill sites are not permitted and permitted sites do not always operate according to their permit conditions. Poorly operated landfill sites impact on the environment and can cause nuisances to communities living close-by.

Solution:

A compliance check list can assist the landfill operator in complying with the permit conditions. Internal audits also ensure that the operator is following the check list and the site meeting the permit conditions.

Example: Weekly checklist

At the landfill site of Bitou Municipality, the foreman uses a checklist to ensure that all necessary tasks are executed and permit conditions adhered to. This procedure improves the general housekeeping at the site.

housekeeping at landfill sites

Solution:

Compliance to permit conditions and general good housekeeping, including operating a small working face, compacting and covering the waste on a daily basis, minimise these impacts. Specific techniques for odour control and containing wind scatter can be employed.

Example: Good housekeeping

Waste is covered on a daily basis at the landfill sites in the Overstrand Municipal area to prevent odours and waste being blown around. An example is the fenced landfill site in Gansbaai (opposite page).

At eThekwini Municipality the workface is kept to a minimum and waste is compacted and covered on a daily basis, according to requirements. At the Bisasar Road landfill site, an extra high fence is erected downwind to prevent litter being blown from the site (above right). Having a dedicated area for dumping of builders rubble enable the use of this material as cover material once crushed (opposite page bottom left). (See the **re-use** section on page 24.) A specialised computer activated odour control system at the Bisasar Road and Marrianhill landfill sites use weather data from onsite weather stations to predict possible odour problems and to spray odour masking agents into the air.

landfill sites (continued)

picking at landfills

Problem:

Pickers living off landfill sites are a reality for most municipalities. This is undesirable based on health and safety risks. Workers (including pickers) should be provided with Personal Protective Equipment (PPE). The use of heavy machinery in landfill operations also poses safety risks to pickers. The liability of any incidents occurring on these facilities lies with the owners of such facilities which in most cases are the municipalities.

Solution:

Uncontrolled salvaging on landfill sites must be phased out. It is recognised that some families rely on salvaging for their livelihood. In addition, the role of informal recycling activities forms a significant part of the South African recycling industry. It contributes significantly to the diversion of waste from landfill.

Example: Controlled picking on the landfill sites

No pickers are allowed on eThekwini Municipality's (Durban Solid Waste) landfill sites. The 350 pickers on site during the early 1990s were phased out over a 7-10 year period. Initially strict access control was introduced and enforced. Fences were upgraded and operating hours enforced. The municipality engaged with the recycling industry to formalise the picking at the landfill. Currently, only four registered recyclers are collecting recyclables from the site. Each recycler identifies pickers to work for the day and provide them with the required personal protective equipment (PPE). These pickers are then allowed on site at an identified sorting area within a specified time frame. They are paid based on the waste volumes collected.

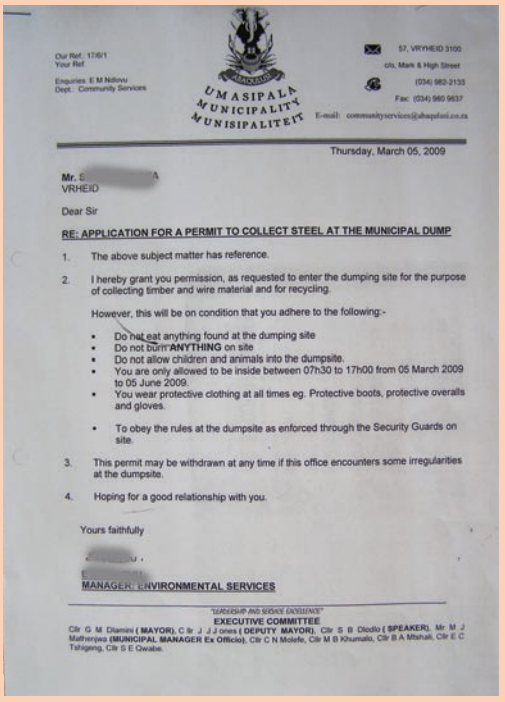
Tzaneen Municipality also only allow registered waste recycling groups on the landfill to collect recyclables.

Access control at a Durban Solid Waste landfill site (above)

(Continued)

Example: Controlled picking on the landfill sites

Children, pregnant women and animals were a common sight on the dumpsite and incidences of fighting over recyclables were reported at the Vryheid landfill in Abaqulusi Municipality. A permitting system for picking at the dumpsite was established to create order at the site.



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Our Ref.: 17/6/1
Your Ref.
Enquiries: E M Ndlovu
Dept.: Community Services

Thursday, March 05, 2009

Mr. S A
VRHEID

Dear Sir

RE: APPLICATION FOR A PERMIT TO COLLECT STEEL AT THE MUNICIPAL DUMP

1. The above subject matter has reference.
2. I hereby grant you permission, as requested to enter the dumping site for the purpose of collecting timber and wire material and for recycling.

   However, this will be on condition that you adhere to the following:-

   - Do not eat anything found at the dumping site
   - Do not burn **ANYTHING** on site
   - Do not allow children and animals into the dumpsite.
   - You are only allowed to be inside between 07h30 to 17h00 from 05 March 2009 to 05 June 2009.
   - You wear protective clothing at all times eg. Protective boots, protective overalls and gloves.
   - To obey the rules at the dumpsite as enforced through the Security Guards on site.
3. This permit may be withdrawn at any time if this office encounters some irregularities at the dumpsite.
4. Hoping for a good relationship with you.

Yours faithfully

MANAGER: ENVIRONMENTAL SERVICES

"LEADERSHIP AND SERVICE EXCELLENCE"
EXECUTIVE COMMITTEE
Cllr G M Dlamini (**MAYOR**), Cllr J J Jones (**DEPUTY MAYOR**), Cllr S B Dlodlo (**SPEAKER**), Mr M J Mathenjwa (**MUNICIPAL MANAGER Ex Officio**), Cllr C N Molefe, Cllr M B Khumalo, Cllr B A Mtshali, Cllr E C Tshigeng, Cllr S E Qwabe.

A security guard controls access to the site and all pickers have to obtain a permit from the waste manager. Waste reclaiming companies also require a permit. Specific permit conditions include:

- Do not eat anything found at the site;
- Do not burn anything on site;
- Do not allow children and animals;
- You are only allowed to be inside between 07h30 to 17h00 from (date) to (date) (3 month period);
- You wear protective clothing at all times, for example, protective boots, protective overalls and gloves; and
- To obey the rules at the dumpsite as enforced by the Security Guards on site.

The permit (see image on the left) also specifies the type of waste to be collected to ensure order on the site. A copy of the permit together with a copy of the picker's ID book is kept on file at the municipality. The permit is issued in the local language of choice to enhance understanding of the conditions under which the permit is issued. Pickers now wear protective clothing and no children or animals are on site (see photograph below). It is the responsibility of the pickers to obtain the required protective clothing.

landfill sites (continued)

limited airspace at landfill sites

Problem:

Most landfill sites are nearing their end of life. Competition for land is high with housing taking up most of the available land. Finding suitable land for landfill sites is increasingly difficult. Therefore, ways of extending the life spans of existing landfill sites is important.

Solution:

Apart from exploring alternative treatment technologies, diverting recyclables from landfill is one way of ensuring that less waste is disposed at landfill and the life span of landfill sites extended.

Example: agreement between landfill operator and municipality

The Highlands landfill site operator asked for an extension of his 5-year contract which was envisaged to take the landfill to the end of its life cycle. Through the following innovative interventions, and to the mutual benefit of all parties in the Swartland Municipality, the original projected lifespan of the landfill was extended by almost 10 years:

- Establishment of a MRF on site to reclaim recyclables added 3.5 years*;
- Change in site design (following an EIA process) from 2 to 6 m deep added 2.5 years;
- The use of compactors on the landfill together with recalculations added another 4 years to the life span of the landfill site.

*The contractor responsible for the Highlands landfill has put up a MRF at his own cost. The municipality pay 25% of the saving on landfill space to the contractor and about

20 jobs on the recycling plant are secured. Arrangements are made with businesses to bring their recyclables to the landfill site at their own cost. (Also see the reduce re-use recycle section on page 19.)

lack of landfill rehabilitation

Refer to lack of funding for landfill rehabilitation in the **Governance**: Financial management section on page 48. eThekwini Municipality rehabilitates landfill sites cell by cell as they are filled up (see page 51) and City of Johannesburg uses chipped bulky garden waste to rehabilitate landfill sites. (see page 26).

encroachments into landfill site buffer zones

Problem:

Forward planning is always encouraged in landfill site selection and development in order to ensure compliance with all legal requirements including the EIA process. However, where landfill planning is not integrated with other adjacent development planning, conflicting land uses can be approved.

Solution:

Different measures can be employed to ensure that conflicting EIAs are not approved. These are:

- Good record keeping by EIA authorities;
- Undertake site inspections and understand the land uses of adjacent properties by EIA authorities; and
- Major land use approvals should be included in the municipal spatial planning to ensure consistency.

In addition to the above, municipalities should ensure that their application includes the buffer zone area to ensure no encroachment onto the earmarked site.

Example: Buffer zone protection

eThekwini Municipality (DSW) included the buffer zone in the land purchase for the landfill to ensure no encroachment of other developments into the buffer zone. The buffer zone at the Mariannhill landfill is rehabilitated with plants being rescued from the site during construction and developed into a conservancy (left).

Seedlings are also nursed and hardened for landfill rehabilitation and for restoration of the natural vegetation in the buffer zone at Mariannhill (top left).

vandalism and theft

Problem:

Vandalism and theft on landfill sites is a common occurrence. The fence, and electronic equipment on site, is mostly the target.

Solution:

Access control and proper security measures is required on landfill sites. Regular inspections of the perimeter of the landfill and immediate repairs of the fencing are crucial.

Example: Security measures

The entrance to the Bisasar Road landfill in eThekwini Metropolitan Municipality is guarded by security guards. The surrounding precast concrete wall is regularly repaired. The newly developed Buffelsdraai landfill site has a generator and satellite phones on site due to the prevalent cable theft in the area. Tzaneen Municipality has erected an electric fence around its landfill site to ensure strict access control onto the site.

landfill sites (continued)

air pollution

Problem:

One of the main impacts of landfilling is air pollution from landfill gas. Typically, landfill gas comprises of about 50 – 55% methane, 40 – 45% carbon dioxide (both of which are green house gases) and the remainder to complex organic compounds that did not decompose, some hydrogen sulphide and other sulphur compounds.

Solution:

Compliance to permit conditions and landfill gas extraction at landfill sites which are big enough to produce significant landfill gas emissions is important to minimise the negative impact from air pollution.

Example: Waste-to-energy and flaring for clean development mechanism (CDM)

Landfill gas extraction reduces greenhouse gas emissions from landfill. Landfill gas can be used for carbon trade or electricity generation. Landfill-gas-to-electricity is a proven technology that is successfully applied in eThekwini at Bisasar Road and Mariannhill landfills. Four landfills in Ekhuruleni have been fitted with gas extraction and flaring systems.

Optimal conditions for landfill gas generation include enough moisture in the waste, a moderate climate (low temperature fluctuations), well compacted (limited air in waste body) and relative deep landfills. Gas extraction is only viable at sites with significant gas production.

Gas production starts within 6 months of the waste body becoming anaerobic (Bisasar Road and Mariannhill). The extraction of gas can continue for up to 5 years after landfill closure (Bisasar Road Landfill Lower terrace, below).

traffic congestion at landfill sites during peak hours

Problem:
In most big municipalities, traffic congestion can be experienced at weighbridges on landfill sites during certain peak time periods.

Solution:
Several payment methods (account system or pre-paid systems) can be employed to minimise the time spent making payments at weighbridges. This will ensure that the traffic flows quicker. The installation of additional weighbridges may also be useful where such financial costs can be afforded.

Example: Weigh regular customers once
At eThekwini Municipality's (Durban Solid Waste) landfill sites, vehicles are weighed on their way in and out at the fully operational weighbridges (left). The weighbridge operator uses human judgement to decide on the type of waste contained in the load on which the tariffs are based. Regular customers have 5 weighing opportunities to calculate an average "empty" weight to be used to calculate the tariffs for waste disposal at the landfill. This means that for such customers, vehicles are weighed once only, when entering the landfill site. This helps to alleviate traffic congestion on the site during peak hours.

exchange of cash at waste facilities is a risk

Problem:
Handling cash is a risk and paying cash for disposal of waste at landfill sites poses a safety risk.

Solution:
Either a pre-paid system or an account system similar to the charge for waste collection could be implemented. (Also refer to the **financial management** section on page 48.)

Example: Monthly billing of regular customers
Regular customers at eThekwini Municipality's (Durban Solid Waste) landfill sites get consolidated bills once a month with a 57 day interest free period to pay. Tariffs are charged as units of 250kg or any part thereof, e.g. a load of 260kg is charged as two units. Tariffs are clearly indicated at the entrance to the weighbridge (left).

Also refer to **vandalism and theft** section on page 35, and **handling of cash on site creates opportunities for fraud** section on page 49.

governance

Waste management governance encompasses the legal framework and institutions involved in waste management. As such the main players are National Departments of Environmental Affairs and Co-operative Governance and Traditional Affairs, the various Provincial departments responsible for environmental affairs and Local government including Metropolitan, District and Local Municipalities.

Roles and responsibiities of District and Local municipalities

The Constitution assigns responsibility for refuse removal, refuse dumps and solid waste disposal to local government. District and Local municipalities have roles and responsibilities that differ, but also complement each other as outlined in the Municipal Structures Act (Act No. 117 of 1998). District municipalities have powers and functions related to the integrated, sustainable and equitable social and economic development of the district. Local municipalities are responsible for the provisioning of specific services, including the removal and disposal of waste. Municipalities (district and local) are encouraged to practice the principles of corporate governance to avoid conflict between overlapping functions. Combining efforts where there are similar initiatives may achieve better results.

District municipalities are responsible for:

- Ensuring integrated development planning for the district as a whole. This includes the development of a framework for IDPs and ensuring that IWMPs inform the IDP process.
- Promoting bulk infrastructure development and services for the district as a whole. The infrastructure refer to the establishment of regional waste disposal sites and bulk waste transfer stations that can be used by more than one local municipality within the district.
- Building local municipality capacity – where a local municipality fails to perform its management functions, the District municipality can enter into a Service Level Agreement (SLA) with the local municipality to provide the service for a stipulated period until such time that the local municipality can offer the service.
- Promoting the equitable distribution of resources between the local municipalities in its area, for example, ensuring that resources are deployed in municipalities within their area of jurisdiction, where it is most needed.

Specific Local Municipality functions include:

- Compiling and implementing integrated waste management plans and integrating these into IDPs;
- Running public awareness campaigns;
- Collecting data for the Waste Information System;
- Providing waste management services, including waste removal, waste storage and waste disposal services, in line with national norms and standards. Municipality specific standards for separation, compacting and storage of solid waste that is collected as part of the municipal service, may be set and enforced by the municipality.
- Implementing and enforcing waste minimisation and recycling (including the encouraging of voluntary partnerships with industry and waste minimisation clubs).

institutional

This section addresses issues of organisational structure as well as the interaction of the municipal structures with the community and community structures.
Municipalities across South Africa adopted different organisational structures and therefore waste management services are not dedicated to the same department in all municipalities. For example, in some municipalities waste management services are housed within the engineering department and in others within community services.

Irrespective of where in the municipality the waste management function resides, it is important to have a dedicated section dealing with waste management issues. It is further important that waste related awareness creation and education must also be accounted for.

The success of waste management services does not necessarily depend on the specific department where it is housed, but on other important issues including:

- political stability and support;
- a functional integrated planning process;
- rigorous financial management and procurement;
- senior managers and councillors with a good understanding of waste management issues;
- competent and dedicated waste managers implementing innovative schemes including reward schemes; and
- a dedicated and motivated workforce.

Irrespective of where this section is located within the structure of the municipality, it is important that the functions as outlined in the table below are accounted for.

Functions of local municipalities

Municipal Waste Services Functional Cluster	Functions	Role	Potential for Outsourcing
Collection	• Provision of containers for waste • Cleansing • Waste collection • Determine levels of service • Transport • Cost recovery	Service	Yes
Disposal	• Waste disposal • Waste dumps • Cost recovery	Service	Yes
Waste minimization / reuse	• Waste recycling • Cost recovery	Service	Yes
Planning	• Input to Integrated Development Plan (IDP) • Prepare Integrated Waste Management (IWMP) • Provision of containers for waste • Community access to service • Determine levels of services • Cost recovery	Support	No
Information (collection and reporting)	• Input to Integrated Development Plan (IDP) • Prepare Integrated Waste Management Plans (IWMP) • Determine levels of service • Cost recovery	Support	Yes
Enforcement / inspection / Authorisation / by-laws / compliance monitoring	• Prohibit illegal dumping • Comply to the by-laws • Cost recovery	Support	No

governance (continued)

finding the organisational structure best suited to local circumstances

Problem:

Most legislative prescripts, guidelines and strategies assume that what works well for one municipality will also work well in another. However, this is not necessarily the case, as local circumstances between municipalities differ, for example, staff numbers, type of areas serviced, and demographics of the areas serviced. If local municipalities fail to adapt the set prescripts to suit their own specific needs, including the organisational structures and operations, waste service delivery is at risk of failure.

Solution:

The organisational structure that is best suited for the specific municipality must be adopted. Big Municipalities, serving a large population, with a large waste staff compliment could separate functions to the lowest level. Smaller municipalities, serving a smaller number of households, with fewer staff members could combine functions and be equally efficient.

The successful functioning of any structure is dependent on dedicated staff (see page 56).

Example: Organisational structure

In Tswelopele Municipality waste management falls under Technical Services. This municipality provides services in two towns. The two technical officers share responsibilities between the two towns: the one is deployed in the one town and the other officer in the other town. They are responsible for water, electricity, workshop, public works, halls, parks, cemeteries, sports grounds, sewerage and solid waste in their respective towns. This arrangement works well in this small municipality winning the Cleanest Town Competition for 3 consecutive years since 2007.).

Breede River Winelands Municipality has two technical waste managers that work together closely. The one oversees the eastern towns while the other manager oversees the western towns, spreading the workload between them.

The City of Johannesburg (CoJ), which has a relatively high population, established a municipal owned entity, Pikitup, to oversee the operational aspects of waste management. A 25 year Service Delivery Agreement incorporating 5 year reviews was signed between Pikitup and CoJ. Five year key performance areas, targets and indicators are set. Pikitup develops annual business plans outlining how the set targets will be met, stipulating service levels, methods and frequency of service to be achieved. CoJ provides capital funding and remunerates Pikitup by means of a service fee. Pikitup reports to the City on a monthly, quarterly and annual basis.

customer care and complaints handling

Problem:

Complaints regarding service delivery is a given in any municipality, irrespective of the quality of the service. A lack of avenues for costumers to voice complaints and poor responses to complaints, often result in bad customer relations and in the reputation of the organisation being tarnished.

Solution:

The municipality has to make sure that there are avenues for customers to voice their complaints. Examples include: Toll free number, sms number, and a complaints desk.

The effectiveness of the complaints handling system is the core of good customer relations. Ensure that complaints are addressed professionally and effectively. All complaints must be registered, attended to and followed up on. Where appropriate, feedback should also be given to the complainants and community. This can for instance be done by regularly including complaints and how it is dealt with in the municipality newsletter.

Ward committee meetings could also be effective avenues for customers to raise concerns and debate waste related issues.

Example: Customer care unit

Knysna Municipality has a fully operational, 24 hour, customer care unit manned by 2 people handling complaints. This hotline sends the complaints through to the relevant departments.

Other municipalities with 24/7 call centres include Bitou and Breede River Winelands municipalities.

Example: Close collaboration with communities

In the Breede River Winelands Municipality, the relevant waste management department works closely with the communities. Municipal officers listen to the people and to their needs and requirements. Ward committee meetings are also attended by staff from the waste management section.

Lessons learnt

- *Separate units for each of the functional clusters works well in Metropolitan municipalities*
- *Specific people allocated responsibility for each functional cluster may be sufficient in medium sized municipalities*
- *Small municipalities can effectively assign responsibility for more than one functional cluster to one suitably skilled person*
- *Number of staff allocated per function is determined by site specific conditions and skills profiles*
- *Professional conduct is important for good customer relations and attracting professional staff*

governance (continued)

political stability and support

A stable political environment is conducive to good municipal service delivery. The relationship between councillors and municipal officials are equally important. Political support can also be enhanced by targeting politicians and councillors in awareness creation programmes.
The mayor and town councillors must be up to date with municipal affairs, approachable and visible in the community. Regular, pre-scheduled meetings between councillors and community members are important to build relationships and trust as well as for getting feedback on service delivery issues. Ward committees as envisaged by the Municipal Structures Act (Act No. 117 of 1998) could assist in this regard.

Community satisfaction surveys are required in terms of Section 55 of the Municipal Systems Act (Act No. 32 of 2000). This is an important tool for councillors and officials to measure the success of service provision.

Questions included in the survey should at least test customer satisfaction on:

- The level of waste collection service, frequency and quality of the service;
- Recycling opportunities provided and convenience to the customers;
- General cleanliness of public areas;
- Communication and complaints management; and
- Awareness creation programmes and materials.

It is recognised that all municipal operations must be depoliticised to ensure uninterrupted service delivery even during times of political change.

lack of continuity between planning cycles

Problem:
Political stability and support to planned programmes is critical since the political sphere is the driver of what happens in municipalities. Where there is no stability, there is a high staff turn-over which impedes consistency in service delivery. Furthermore, where there is no political buy-in, there will also be less budgetary support, impeding the implementation of planned programmes.

Solution:
There is a need to lobby for support from the political office bearers. Education and awareness-raising are equally important in this case to ensure that the politicians understand waste management beyond the collection and disposal of waste.
Many municipalities reported that a stable political environment is beneficial to waste management services and service delivery in general. Over the years an understanding of the needs and issues related to waste management develops, which allows for budget allocations and follow-up actions where needed.

Example: Good projects seen as something tangible
The City of Johannesburg recommends stability in integrated waste management planning. It is recommended that municipalities should not develop an entire new plan every few years, but rather refine the current one and build on it. Focus on turning programmes into projects. Investing in good projects achieve political buy-in and enhance future budget allocations.

procurement

According to the Municipal Finance Management Act (Act No. 56 of 2003), standard procurement processes have to be followed. Good relationships between councillors and officials are required to ensure the smooth and timeous running of the procurement process. All capital expenditure needs to be properly motivated by the waste manager. Specifications for capital investment must be well defined and should be clear on the need and purpose. The cost implications must be weighed against the benefits to the municipality.

tender specifications not matching demands for service

Problem:
Lack of understanding and/or communication between waste management officials and the procurement unit together with the relevant approval structures in municipalities sometimes result in the procurement of equipment and/or machinery which is not appropriate to the need.

Solution:
It is important to consult with the relevant technical people who are knowledgeable and experienced in the field when compiling tender specifications for the procurement of waste related equipment and/or machinery. This will ensure that purchased merchandise will be suitable for the intended purpose.

Example: All directors sit in during adjudication process
Overstrand Municipality has an efficient Procurement Department where all the directors of the Overstrand Municipality are part of the adjudication committee. The advertisement, together with the specifications for all quotations above R30 000.00 is sent to the Procurement Department, where it is reviewed. Suggested changes are discussed, the opportunity provided to do the necessary changes, and a tender or quotation number provided. The request to tender or quote is then advertised in the news papers and on the internet. After the closing date, the tenders/quotations are opened in the presence of all people who submitted tenders. The department manager evaluates all the tenders, complete the necessary documents and send his evaluation report back to the Procurement Department. The Procurement Department check to see that the right procedures were followed. The report is then put in front of the evaluation committee, from where the adjudication committee approves the tender. Quotations are approved by the evaluation committee only. If any of the people who submitted tenders is not satisfied with the decision of the adjudication committee they can appeal within two weeks.

governance (continued)

information management

The National Waste Information System (SAWIS) as introduced by the Waste Act (Act No. 59 of 2008) is intended to provide a centralised data bank for waste management in South Africa. It standardises the recording of waste data and ensures that accurate and reliable data is easily available. Information captured on the waste information system is accessible to all government departments, the private sector and the public in general. The Waste Information Regulations (GR 718 of 2010) regulate the reporting of waste information in order to improve waste management and ultimately protect the environment. These regulations apply to all waste management activities in South Africa, where all such facilities are to be registered.

Good information management is critical in ensuring easy access of accurate and reliable data which could then be used in planning (the development of IWMPs). Plans informed by accurate data are likely to be relevant to the site specific conditions, practical and implementable. Easy access to accurate information is further also useful towards meeting reporting requirements, raising awareness and for capacity building.

Lessons learnt

- *Functioning weighbridges ensure accurate data - keep the area around the weighbridge clean*
- *Municipal and provincial waste information systems must compliment the national SAWIS*

lack of accurate waste data

Problem:

Few municipalities have effective and accurate waste data collection systems in place. Therefore, availability and easy access of accurate data and information is a common problem in most municipalities. This leads to un- or misinformed planning processes and ultimately the formulation of IWMPs that are not useful to the municipalities.

Solution:

Introduce data collection systems at waste facilities and ensure good record keeping. The establishment of a waste information system is beneficial. Registration and regular reporting on the SAWIS is also recommended. Data collection systems need to be properly maintained and weighbridges calibrated to ensure the accuracy of the data collected. Debris and dirt that accumulates around and underneath weighbridges must be cleaned out on a regular basis so as not to hamper the operation thereof.

Example: Waste information management system in place

Ekurhuleni Municipality is an example where a good waste information management system is in place. At Platkop landfill (right), two weighbridges, the one for incoming and the other for departing vehicles ensures accurate information on waste entering the landfill site. All waste information is captured and documented to ensure easy access and availability of such information.

The recycling company in the Overstrand Municipality reports on a regular basis to the municipality on quantities recycled. The municipality need this information to report on the SAWIS.

Example: Weighbridges well maintained

eThekwini Metropolitan Municipality reported that well maintained and operated weighbridges at their landfills assist in data collection (bottom right). Keeping the area around a weighbridge clean and open (no pavements etc.) allow for easy access to keep the area around and underneath the weighbridge clean. Debris and dirt that accumulate under a weighbridge may impact on the accuracy of the data recorded.

governance (continued)

monitoring and reporting

Municipalities are required to monitor and report on the following:

- Finances in terms of the Municipal Finances Management Act (Act No. 56 of 2003);
- Service delivery performance (including waste management) in terms of the Municipal Systems Act (Act No. 32 of 2000);
- Waste management in terms of the Waste Act (Act No. 59 of 2008).

Information that must be collected for reporting to the National Waste Information System (SAWIS) include data on the quantity and type or classification of waste generated, stored, transported, treated, transformed, reduced, re-used, recycled recovered and disposed of. The SAWIS may include information on the levels and extent of waste management services provided by municipalities. Progress towards meeting the targets set in the Integrated Waste Management Plan must also be reported.

The purpose of monitoring and reporting is to inform future planning. Monitoring will highlight deficiencies in service delivery and need for improvements.

Lessons learnt

- *Customer satisfaction surveys are useful to assess service delivery performance*
- *Reporting is made easy if data and information is easily accessible*

tracking progress with service backlog eradication

Problem:

One of the major challenges facing municipalities in South Africa is ensuring that all households within their areas of jurisdiction are provided with a basic level of waste service (DEAT, 2007). Huge waste service backlogs still exist in the country ranging from an average backlog of around 80% in Limpopo to 8% in the Western Cape (Stats SA, 2007). In terms of the Local Government Turnaround Strategy (COGTA, 2009), municipalities are required to report on progress towards eradicating service backlogs.

Solution:

Accurate information on the number of households not receiving waste services, as well as the location of such households are required to track progress with eradicating the service backlog. This information will also guide the required interventions on the basis of the area specific conditions for each situation.

Example: Database of services in informal settlements

An updated database on informal settlements containing data on the number of households and the services provided is invaluable to the City of Johannesburg in tracking service backlogs.

maintaining service excellence in central business areas

Problem:

High pedestrian and vehicle traffic challenge the ability of larger municipalities to maintain acceptable levels of cleanliness and regular waste management services in central business areas

Solution:

The implementation of a monitoring programme will assist in measuring the level of service a municipality provides and whether employed strategies to remedy the existing problems are effective.

Example: Monitor service delivery

Urban inspectors within the City of Johannesburg monitor service delivery and report problems on a daily basis to maintain an acceptable level of cleanliness in the central business district.

Nelson Mandela Bay Municipality rewards waste collection and street cleaning jobs well done, as well as employees doing more than what is expected of them. An impartial, external team of industrial engineers evaluate the process.

governance (continued)

financial management

Waste management is an important municipal function and must be viewed as such in order to secure funding for service delivery (operational and capital). Rigorous budget planning must be informed by future needs. For example, a timeous budgeting process for replacement of vehicles and equipment, planning for closure of old and development of new landfill sites. Approvals of budgets and project plans as well as release of funds for procurement of goods and services should also be in time to ensure spending of planned budgets within the required timeframes.

Wise application of equitable share grants to fund services in non-paying indigent communities together with full cost recovery from non-indigent communities should be sufficient to provide an efficient waste management service.

It is therefore important that municipalities must be able to calculate the actual cost associated with waste management (from collection to disposal) to inform the tariffs being charged. Transparency in determining tariffs combined with reliable services will encourage payment for services.

Lessons learnt

- *Cash acceptance at waste facilities increase potential for corruption*
- *Cash at landfills increase vulnerability to crime especially if large amounts of cash are accepted*
- *Monthly billing reduces long queues during peak times at busy facilities*
- *Effective use of grants can free-up municipal funds to be utilised elsewhere*

lack of funding to provide service

Problem:
Limited municipal budgets results in certain operations being compromised, especially in cases where other priority issues such as housing and sanitation take priority.

Solution:
There are a couple of alternative ways to ensure a sustainable waste service within the limitations of existing municipal budgets.

- Sharing the responsibility with other stakeholders e.g. community members, the private sector as well as private service providers.
- Exploring other additional sources of funds e.g. DBSA, MIG, Provincial and national departments, international funding agencies, etc.

Example: Garden refuse removal
Knysna Municipality collects garden waste at kerb side on the same day that the general waste is collected. Refuse bags for garden waste cost R3.00 per bag to recover the costs of this service.

Example: Service to informal settlements
uMhlathuze uses a buy-a-bag system to recover costs from informal settlements. The distinctly marked bags are bought at a fee and will be picked up by collection vehicles whenever they are seen along the roadside.

Example: Alternative funding sources
eThekwini Municipality explores additional funding options to compliment the equitable share. This allows the municipality to implement good waste management practices.

The City of Johannesburg sourced Municipal Infrastructure Grant (MIG) funding to finance underground storage bins.

handling of cash on site creates opportunities for fraud

Problem:
Cash payments for tipping fees at waste facilities are difficult to control and audit. It thus creates the potential for corruption. (Also refer to the **landfill site** section: **exchange of cash at waste facilities is a risk** on page 37.)

Solution:
The introduction of a coupon system as method of payment at waste facilities reduces the need for cash payments (exchange of money) at such facilities and significantly reduces the risks outlined above.

Example: Minimise cash payments
eThekwini Municipality introduced a system where regular customers receive monthly accounts for tipping fees. These accounts are paid as part of their monthly services payments at the municipal offices.

governance (continued)

insufficient budget allocation for landfill operations

Problem:
Landfill development, operation and closure can be costly. Poor landfill operations are often ascribed to insufficient resources including funding allocations.

Solution:
Ensure that the costing for new landfill development also provide for operational and closure expenses. If such costs are well understood and included right from the planning phases, sufficient budget allocations could be planned for and realised.
Cost recovery through the setting of appropriate charges for the services rendered (including tipping fees at landfills) can also assist in ensuring that the sites are developed, operated and closed in accordance to set minimum requirements and permit conditions.

Example: Political buy-in and support
Political support in Ekurhuleni Municipality ensures that proper waste management budgets are allocated. Charging disposal tariffs (tipping fees) based on the expenses incurred ensures financial sustainability and growth. Good project management includes monthly meetings and on-going tracking of the budget (income against expenditure).

Example: Cost recovery
It is more cost effective for Ekurhuleni Municipality to outsource landfill site operations, with the cost for landfill operations fixed by the contract amount. Breakdowns in equipment, incidental expenditure and labour costs are for the account of the contractor and do not impact on the municipal budget over and above the contract amount. Furthermore, if the service provided by the contractor is not in line with the standards stipulated in the contract, the municipality may withhold payment until service standards are met.

Example: Understand the municipal budget cycle
Municipal budgets operate in 3-year cycles. It is important to have plans ready at the start of each cycle to allow sufficient time for tender processes, approvals and EIA processes (refer to the "long term planning" example of eThekwini's Buffelsdraai landfill on page 53).

lack of funding for landfill rehabilitation at end of life

Problem:
While the development and operation of landfill sites is costly, the costs related to the closure and rehabilitation of such facilities should not be over-looked. The impacts of a landfill site on the environment do not cease with the end of its operational phase. The area needs to be rehabilitated to minimise the visual impacts, while landfill gas and leachate may need to be continually monitored for some years post the closure of the landfill site. All landfill sites have to be rehabilitated post their operational phase in order to further mitigate their impacts.

Solution:
Municipalities should factor the need for the closure and rehabilitation of their landfill sites into their disposal charges. Where rehabilitation is done on an ongoing basis as the cells fill up, municipalities could factor rehabilitation cost into the operational budget of the landfill.

excessive cost of road transport

Problem:
Transportation is an expensive component in the waste management cycle due to high fuel prices and vehicle wear and tear. Although it may seem to be a cost saving by reducing the number of trips required to transport the same volume of waste, overloading of vehicles increases wear and tear.

Solution:
Optimise the waste transport system:
Simple logical systems can be put in place (e.g. effective use of available infrastructure and resources). Larger municipalities might find optimisation models useful to determine the most cost effective transportation systems.

Explore alternative transport options:
Looking at alternative more efficient and cheaper transport systems is encouraged, especially where such alternatives already exist and there will be no additional capital costs required to establish them.

Example: Optimise the waste transport system
Where possible, Swartland Municipality ensures that vehicles are optimally used. The vehicles transporting waste travel with full loads over the long distances. The landfill is close to Malmesbury, and the garden waste site in Moorreesburg. The transport vehicles bring general waste from Moorreesburg transfer station to the Highlands landfill site at Malmesbury. Here, in Malmesbury, the vehicles that were emptied at the landfill are loaded with garden waste, which is then transported back to the Moorreesburg green waste and builders rubble landfill site. Travelling with no load is not cost effective.

Example: Explore alternative transport options
The City of Cape Town transports waste by rail from Athlone transfer station to Vissershok landfill site to the north of Cape Town. Waste is compacted about 16 times, baled, and sent by rail during off-peak hours. This transport option is more efficient and cost effective than traditional options.

Example: Establish a Rehabilitation Fund
Ekurhuleni Metropolitan Municipality established a Rehabilitation Fund for its landfill sites. For every tonne of waste disposed, a fixed amount is deposited into the fund. An example of a rehabilitated cell is at Rietfontein (right top).

Example: Rehabilitate cell by cell
eThekwini Municipality rehabilitate landfill sites cell by cell as they are filled up, e.g at Mariannhill landfill (bottom right).

governance (continued)

integrated planning

The waste management section should be well represented at planning discussions (planning committees where applicable), with the purpose to open communication channels between the planning sections of different departments and the waste management section. For example: communicating waste management needs to the planning section (roads accessible for collection vehicles) as well as communicating future developments back to the waste management section to ensure timeous planning for waste services in new developments. Good communication between departments will enhance synergies and avoid duplications with resultant cost savings and real integrated planning.

The public participation opportunities, which are run as part of the Integrated Development Planning (IDP) process should be well advertised to ensure appropriate attendance by targeted communities. Advertisements should be well structured to include all relevant information about the venue, for example, the time of the meetings should be indicated, and the issues to be discussed. Venues and times should be suitable to stimulate maximum participation by community members. For example road shows held after hours at venues within the communities. The aim is to include community needs in the integrated planning processes of the municipality.

cumbersome governance approval and authorisation processes

Problem:
Internal municipal budgetary and procurement processes are not necessarily aligned with other governmental approval processes, for example, the Environmental Impact Assessment (EIA) process. This may result in delays in the implementation of projects.

Solution:
Timely and clever planning by the municipality can solve many of these problems. Planning in advance and in phases for big projects may enable municipalities to achieve their objectives without the problems related to projects not executed and the resultant unspent budgets.

Example: Timely planning
Proactive planning in Ekurhuleni Municipality includes the planned operation of a new landfill site beyond the existing 20 years of airspace.

Example: Long term planning
Long term planning for new landfill development is essential. In addition to the existing landfill sites, 2 sites have been identified in eThekwini Metro. At the current deposition rate, it is estimate that eThekwini will have about 250 years worth of landfill airspace when these 2 additional sites are commissioned. Signing a Memorandum of Understanding (MoU) with the Province assisted eThekwini during the EIA, appeal and licence application process to counter potential delays resulting from staff turnover over the extended period. For example, the establishment of the Buffelsdraai landfill in eThekwini took 5 months short of 10 years from inception to commissioning. In addition, the MoU must ensure that other conflicting land-uses in the vicinity of the approved site for landfill development do not get approved rendering the suitability of the site invalid. Validity periods of authorisations also need to be aligned with the planning. In other words, the authorisations for the EIA must be valid for the period planned for the operation of the site.

lack of interdepartmental waste management coordination

Problem:
Lack of coordination of efforts by key role players related to waste management (finance, planners, councillors, procurement etc) within a municipality hinders progress and achievement of set targets and goals.

Solution:
The involvement of all key role players related to waste management within a municipality is imperative to ensure a common understanding and buy-in from everyone. Consultation and proper coordination is therefore recommended from as early as the planning stages of projects.

Example: Timely planning
Nelson Mandela Bay Municipality has a forum which includes Councillors, NGOs and all municipal departments who have a link to waste. They discuss issues and use it for relationship-building, information sharing and to coordinate their efforts.

Example: Long term planning
Resulting from a District municipality initiative in Bitou Municipality, waste management issues are discussed during quarterly meetings at rotating venues. Municipalities also share learning at a provincial level waste forum.

governance (continued)

capacity

Capacity issues can be grouped into three clusters:

- Skills/Training
- Research and Development, and
- Human resource recruitment and retention

Skills/Training

The majority of skills shortages can be rectified through training initiatives. Lack of institutions that offer formal training in waste management is a draw-back, but should not be considered as an excuse. Alternative skills development and training options include:

- Mentoring and coaching programmes, including learning exchange programmes between municipalities;
- Internship programmes; and
- On the job training.

The success of learning programmes should be closely monitored to ensure that the envisaged training was actually realised. For example, sharing and reinforcing the learning in the form of formal presentation to colleagues should be encouraged. The already established formal reporting systems within the local municipality should be enforced or expanded to also provide for proper rigorous feedback of training events.

lack of civil engineers in municipalities

Problem:

Most municipalities lack the necessary skills required to perform the waste management function effectively and efficiently. Where employees in the waste management section do not have the necessary educational background and/or experience the quality of the service provided is compromised. Civil Engineering specifically, is critical in the landfill operation of medium and large sites.

Solution:

Waste management, especially landfill operations, is highly technical and requires people with specific technical skills (civil engineering) and sound scientific background (chemistry). Bench-marking waste management functions and knowing what expertise is required to perform these functions will assist municipalities in drafting appropriate job descriptions and specifications for recruiting new employees. Municipalities should invest in attracting appropriately qualified graduates to the waste management sector.

Example: Bursaries and on the job training

eThekwini Municipality offers bursaries to engineering students and on completion of the degree, the student is required to work for the municipality for a specified period of time. Students are also employed during university holidays for on the job training.

Research and Development

Municipalities are not research and development institutions. However, like any other institution, it is imperative that municipalities keep abreast of new developments in their fields including landfill operation and management, waste collection optimisation, waste minimisation and recycling, etc. This will allow municipalities to explore other innovative and in some cases cost effective ways of improving their service.

need to explore new and innovative waste management options

Problem:

Landfills are rapidly filling up and alternative waste management options should be investigated. Municipalities are generally not proactive in getting involved in research that will result in innovative ways of dealing with municipal waste management problems. The most common research is geared towards satisfying legal obligations and reporting. This approach limits the municipality's ability to react and resolve issues before they become huge problems and impacting on the service being rendered or being innovative in how they deal with issues.

Solution:

Exploring and uncovering new innovative waste management options can result in improved systems and improved service delivery, huge cost savings and significant reduction in environmental impacts. Municipalities could partner with research organisations such as science councils and universities to address research and development needs.

Example: Bursaries and on the job training

eThekwini Municipality sponsor MSc projects at the University of Natal. A sponsorship involves payment of a living allowance, supervision fee and conference attendance for the student. Test cells for research projects are allowed on the landfill site (right).

governance (continued)

Human resource recruitment and retention

Job descriptions and requirements should be clearly defined. Recruitment processes should ensure that the skills of candidates match the job descriptions and requirements. Vacancies must be filled in time with appropriately skilled and experienced staff to ensure that staff and skills shortages do not hamper service delivery.

A dedicated workforce

- *Innovative incentive schemes coupled with good management practices contribute to improved waste management services. Examples: Managers showing interest by occasionally accompanying the waste collectors and simultaneously auditing the quality of work. This is followed by recognition and/or rewards for work well done.*
- *A dedicated team is ensured by rewards aimed at team performance. Rewards are per team and not for individuals and are based on finishing their waste collection rounds on time and including litter picking along the collection routes. There are also rewards for 100% work attendance of individual team members. Any absenteeism will disqualify any team member from the team awards.*
- *Introduction of shift work reduce long working hours to ensure compliance with labour law and reduce staff fatigue.*
- *Redeployment of staff to accommodate changes in physical abilities. For example, older staff currently employed on collection vehicles can be redeployed as street sweepers.*
- *Payment of scarce skills allowances does not assist in attracting new staff.*
- *Big, challenging engineering projects assist in attracting engineers to municipalities.*
- *Perceptions about municipalities as employer need to be changed.*
- *Succession planning ensures skilled staff into the future.*

declining physical strength of ageing waste collection staff

Problem:

An efficient waste collection service requires staff with physical strength, which is dependent on both health and age. Old and sick people cannot perform their waste collection functions effectively.

Solution:

If the physical strength of collection staff is no longer adequate for the task at hand, there should be a plan for redeployment to avoid risk of injury to the staff member while complying with labour law requirements.

Example: Redeploy old and sick staff members

Nelson Mandela Bay Municipality redeploy older staff members and those with ill health to the street sweeping team so that they can still be employed.

high staff turnover

Problem:

High staff turnover rates in municipalities result in institutional memory loss. This results in inconsistency in service delivery and decision making which in turn leads to low work standards. Therefore, municipalities find themselves in a constant situation with new staff members that still need to find their feet.

Solution:

Municipalities should be proactive in contributing towards training and empowering their employees. Retention and succession plans should be drawn up and implemented. Appointment of officials in a specific job description should be based on their qualifications and experience.

Staff incentive schemes have the potential to retain staff and to improve productivity, and ultimately to improve the image of the municipality as an employer.

Example: Opportunity for professional registration

As part of their staff retention strategy, eThekwini Municipality:

- Provides structured training to junior engineers to support them in obtaining registration as a professional engineer according to the guidelines of the Engineering Council of South Africa (ECSA); and
- Pays scarce skills allowances to engineers.

municipalities struggle to attract suitably qualified and skilled staff

Problem:

There is a perception that working for a municipality is less challenging than working in the private sector. This is specifically relevant to young people looking for work satisfaction and growth opportunities towards attaining professional registration as engineers.

Municipalities should reinvent themselves to be competitive and excel in what they do. Competent, professionally run organisations have a better chance to attract competent people. Municipal investment in large challenging projects also assists with staff retention and attracting the attention of skilled and qualified future employees.

Example: Build image of competence and excellence

Durban Solid Waste (the cleansing and solid waste unit of eThekwini) is operated as an elite unit to promote excellence and a competitive edge with the private sector. The professional image combined with large challenging projects, contributes towards attracting and retaining suitably qualified staff.

governance (continued)

meeting legal requirements

Section 24 of The Constitution of the Republic of South Africa (Act No. 108 of 1996) gives every person a right to an environment that is not harmful to their health or well being. Schedule 5B assigns the responsibility for waste collection services and disposal to local government. Furthermore, the delivery of municipal services is defined both in the Municipal Structures Act (Act No. 117 of 1998) and the Municipal Systems Act (Act No. 32 of 2000). The latter further defines alternative approaches to service delivery and the processes to be followed when alternatives are considered. It also defines the need to plan in an integrated manner and to monitor performance of internal and external mechanisms for the delivery of services.

The Municipal Systems Act requires a municipality to "encourage the community's participation in strategic decisions relating to the provision of municipal services". In addition, should the municipality choose to use an external mechanism for the provision of a basic service, the municipality "must establish a mechanism and programme for community consultation and information dissemination regarding the service delivery agreement."

Before a municipality can outsource municipal services, an assessment in terms of section 78(3) of the Municipal Systems Act (Act No. 32 of 2000) is required. Issues to consider for outsourcing of services in terms of this section include:

- Direct and indirect costs and benefits associated with the project;
- Capacity of prospective service providers to render the service;
- The views of local community and organized labour; and
- The likely impact on development and job creation.

The feasibility study should include an indication of the number of years for which the municipality intends to consider an external mechanism for service delivery.

In addition to the mandate outlined in The Constitution and the Municipal Systems and the Municipal Structures Acts, the Waste Act (Act No. 59 of 2008) requires municipalities to provide containers for recyclables, the waste information system and integrated waste management planning. It further requires waste management facilities to be licenced and requires of municipalities to appoint a waste management officer.

The municipality must also draft waste management by-laws that are specific for their area of jurisdiction. The by-laws must be specific on the services that are provided and the charges and tariffs associated with the services. It must also provide for the regulation of services not provided. For example, if garden waste is not removed by the municipality, regulations must state how communities must deal with this waste stream. It must provide for permits to be issued to private companies or persons providing the service on behalf of the municipality to allow control over these services. The by-laws should also make provision for the implementation of the waste management hierarchy. For example, the by-law may state that certain waste streams must be separated at source and taken to drop-off centres.

meeting service demands without violating financial and labour laws

Problem:

Due to the high demand for waste collection services and the limited resources available to municipalities, municipalities often find themselves having to work overtime. This practice is closely regulated by the municipal financial legislation as well as the labour laws. In trying to cope with the increased demand, municipalities often transgress these legislative prescripts of ensuring a certain maximum number of hours a worker can be expected to work overtime as well as the maximum amount of money a municipality can spend on overtime payments.

Solution:

Balance service delivery and available resources. Innovative planning of collection rounds and schedules can significantly cut the overtime required. (Also refer to the importance of vehicle maintenance in the **waste collection and transport** section on page 6.)

Example: Waste collection in shifts

The City of Tshwane's waste collection workforce works in two shifts, from 07:00 to 17:00 and 17:00 till waste from all scheduled collection points is collected. Collecting waste in shifts ensures that the use of the trucks is optimised and that households receive an effective waste collection service. Collection staff is no longer required to work overtime on a regular basis. The benefits are the following: The municipality saves on overtime payment and gets double value for money from the lease agreement of the vehicles; the collection staff is not overworked, and additional jobs are created.

governance (continued)

ensuring community buy-in and ownership of waste by-laws

Problem:

In most instances waste management is viewed as a function of government with very little involvement required from civil society. This creates a problem in relation to implementation and enforcement as civil society has an important role to play to ensure the successful implementation and enforcement of legislation in general.

Solution:

It is important to make sure that communities are involved in the development of the waste by-laws and understand their role in achieving the goals of planned programmes and targets. Awareness and education programmes are therefore imperative. In addition, by-laws must be revised regularly to keep up with the latest developments in provincial and national legislative requirements. Public consultation during such review processes is encouraged in order to expose stakeholders and get their buy-in in such legislative frameworks.

Example: Extensive participation in drafting of by-laws

The Nelson Mandela Bay Municipality recently drafted its Waste by-law using a consultative approach, allowing extensive inputs from stakeholders, including the public. National trends were taken into account. The by-laws make provision for recycling and empower the municipality to issue fines for transgressions. The by-laws also require waste transporters to be registered before they can operate.

Community participation and buy-in into waste management

Problem:

Waste management is generally given a low priority in government. This perception influences the resource allocation processes which negatively impede service delivery and good waste management practices. This perception is further translated into community attitude towards waste management. The main driver behind this sentiment is lack of knowledge.

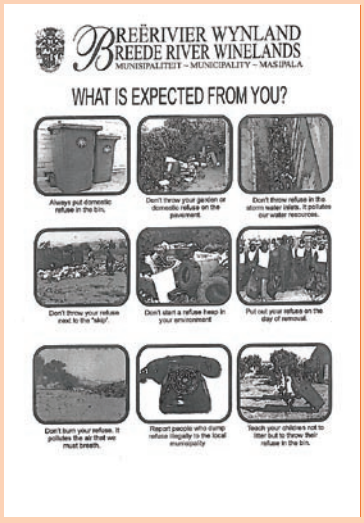
Solution:

Awareness creation is the foundation upon which all waste management programmes should be based (see **awareness creation** section on page 62). Sustainable waste services and good waste management practices require the active involvement of all stakeholders - government, private sector and communities.

Example: Awareness creation for community participation

The awareness creation strategy of the Breede River Winelands Municipality includes quarterly communications in the form of flyers (below) that inform residents on good waste management practices and procedures. (Also refer to **awareness creation** section on page 62 and more specifically page 65.)

eThekwini Metropolitan Municipality develops and distributes pamphlets on different topics including guidelines on how to conduct good waste management at household level - from separating their waste and using their bins, to explaining what a landfill is and how it operates.



awareness creation

The main purpose of awareness creation campaigns in communities is to change people's attitudes and behaviour to ensure a cleaner environment. While many current initiatives lead to visually cleaner areas, it does not encourage sustainable practices that reduce littering and illegal dumping in the long run. More emphasis is required on awareness creation relating to the implementation of the waste hierarchy. As such, waste minimisation and waste separation at source needs to be encouraged to enhance reuse and recycling activities.

Willingness to pay for waste services will also improve with increased awareness as a result of increased insight into the benefits of waste services, as well as the actual cost thereof.

Lessons learnt

- Clean-up campaigns do not succeed in changing behaviour
- The main messages of awareness campaigns must be: "Do not litter" and "Reduce, re-use and recycle"
- Incentives associated with clean-up campaigns often reward bad behaviour
- Payment for clean-ups must be decoupled from volumes of waste collected but should rather relate to cleanliness of the areas
- Advertising/creating awareness on a regular basis is important to inform household members that are new to the area
- Start recycling initiatives and get buy-in from councillors and municipality officials before awareness is created amongst the public

lack of awareness and understanding of waste management issues

Problem:

There is a lack of awareness and understanding of the importance of waste management amongst all stakeholders including elected political representatives in government, especially local government, and the community in general. This has negative consequences for planning, personnel and budget allocations within municipalities. This problem often transpires as littering, illegal dumping and failing waste collection systems.

Solution:

Awareness creation amongst all key stakeholder groups, including local government officials, councillors and the public, is imperative for effective and sustainable waste management services. There is a wide range of methods used to raise awareness. A combination of all, or as many methods as possible, will assist in reaching the desired impact which is to inform all people of the importance of keeping the environment clean and the role recycling can play. It is however, important to choose the communication channels and materials that are appropriate for each target audience and for the specific situation of the municipality. Examples include slogans, billboards, exhibitions, flyers, booklets, personal visits, campaigns, and to educate on site.

Example: Slogans and billboards

Saldanha Bay has 2Wise2Waste bill boards (opposite page top) and Bitou Municipality has clearly marked recycling bins (opposite page middle). A clear signpost at a drop-off centre in City of Cape Town communicates the type of recyclables that is accepted (opposite page bottom). Workers on site as well as clearly marked containers assist with the separation of recyclables (right).

Several municipalities display slogans on transport vehicles and containers to encourage the public to keep their town/ city clean (below and below right).

awareness creation (continued)

(Continued)

Example: Educate on site

eThekwini Municipality encourages school visits to the Mariannhill landfill education centre. The education programme covered during a school visit includes the design of the landfill, operations at the landfill, recycling and general conservation. From the boma there is a clearly marked trail passing the leachate treatment plant, landfill gas-to-electricity CDM project, MRF and plant rescue area. Indigenous trees are marked with both botanical and common names (below left) along the conservancy trail in the buffer zone (below middle). A model explains the landfill liner system (below right). (Also see page 68.)

Example: Flyers, booklets and the local media

The Drakenstein Municipality has flyers containing general waste management information (see Drakenstein flyer below and Breede River Winelands flyer on page 61).

Apart from the municipal newsletter that makes residents aware of waste related matters, Overstrand municipality also distributes a bag for recyclables rolled in a flyer to communicate important information regarding the recycling initiative in the area (see below right).

George Municipality regularly advertise the recycling initiative in the local newspapers including contact details for those interested in recycling. On a quarterly basis, the recycling contractor delivers information together with two blue bags to non-participating households.

Example: Personal visits and exhibitions
The waste manager of Swartland Municipality presents at school during school clean up campaigns. Overstrand municipality visits schools and organisations. The municipality also have exhibition stands at both the whale festival and the annual flower show. The waste cycle is explained on posters and the public and school children are made aware of the impact of waste and the advantages of recycling. (Also see page 19 for an example of the poster that explain the "Recycling Swop Shop".

City of Cape Town Municipality exhibits at the Home Expo. (Read more on pages 67 and 68.)

awareness creation (continued)

(Continued)

The Environmental Health Section in the Steve Tshwete Municipality is responsible for all the environmental awareness raising and education programmes, including waste management. The following programmes are undertaken:

- Clean-up campaigns in schools (below);
- Printing of pamphlets on different topics;
- A waste message in the municipal newsletter;
- Celebration of environmental days/events;
- Training and workshops for traditional healers, food handlers etc.;
- An hour slot per month on the local radio station to discuss different environmental issues;
- A Cleanest Schools Competition was initiated in 2009 to encourage schools to keep their premises clean. The programme targeted schools in areas which are more dirty;
- Door to door educators: This involves the deployment of some of the community members (who were given training themselves before going out) to go to people's houses talking to them about environmental issues, including waste management, especially illegal dumping.

The door to door initiative has two benefits: Firstly the people are reached in the comfort of their own homes and get clarity on all issues especially illegal dumping, and secondly it created jobs for the educators who are paid a stipend of R80.00/15 houses they visit. Calling community members for meetings or workshops did not work. The attendance was poor.

lack of stakeholder involvement in ensuring a clean environment

Problem:

While government is striving for cleanliness, it is the responsibility of every citizen to ensure that their surroundings are clean. Municipalities generally have limited resources to ensure that all areas prone to illegal dumping are cleaned-up and kept clean at all times

Solution:

Introduce innovative ways of attracting the involvement of other stakeholders such as school kids and businesses. Where there is an incentive, people are likely to participate. However, the focus should be on preventing littering and not incentives for cleaning after littering. The latter might drive the wrong behaviour.

Example: Adopt-a-spot

The Adopt-a-spot awareness creation project in Hibiscus Coast Municipality is aimed at schools to keep a 100m zone around the school clean. The project runs during National clean-up week with municipal waste management staff giving a recycling demonstration. Bins and bags are provided and there is a prize for the school with the cleanest spot.

Companies and/or organisation in eThekwini Metropolitan Municipality have the opportunity to adopt a spot, and will then be responsible for cleaning and maintaining this particular spot. In turn, names of these sponsors are displayed, creating free publicity.

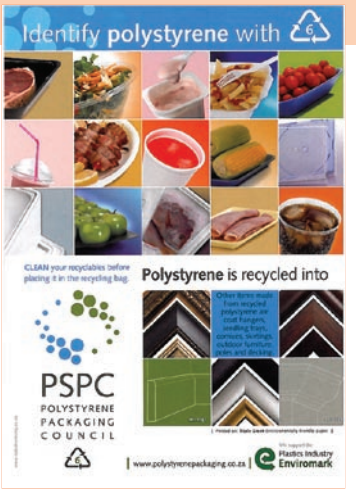
Example: Involvement of forums and organisations

The Overstrand Municipality Conservation Foundation is one of the organisations that assist Overstrand Municipality with the waste management awareness campaign.

In Steve Tshwete Municipality, an environmental forum comprises of teachers, industry, community members and Councillors, and other sector departments within the municipality and at provincial level.

Example: Partner with other role players

To maximise impact, City of Cape Town partner with and have joint exhibitions with other role players in the recycling industry to maximise impact (see page 68). See awareness creation flyers of partners in the industry below and on the opposite page.



awareness creation (continued)

lack of dedicated and trained awareness creation personnel

Problem:

Awareness creation has to be on-going and consistent in order to be effective. Planned programmes must be relevant for the targeted audience. This is normally not done to this level of detail since municipal officials have many other responsibilities to deal with.

Solution:

Ensure that there are staff members who are dedicated to the awareness creation task. Such officials should be properly trained to ensure that their planned programmes are effective and have the envisaged impact.

Example: A dedicated department or section

City of Cape Town has a dedicated department for awareness creation and education. They partner with several players in the recycling industry to maximise effort and impact. Schools, entrepreneurs and businesses are targeted. Several pilot projects to test the implementation of waste separation at source are also undertaken.

The Steve Tshwete Municipality has a dedicated Environmental Health Section with door-to-door educators spreading the word of good waste management practices (see section on awareness creation on page 66).

Example: Include awareness creation in job description

Conducting general awareness is included in the job description of the community liaison officers (CLO) in Nelson Mandela Bay Municipality. They make use of about 1000 unemployed volunteers for litter picking, street sweeping and raising awareness. In areas where illegal dumping is rife, the community liaison officers tell people door-to-door why they should not dump.

Example: Ongoing awareness creation and education

The walking trail and education centre at Mariannhill landfill in eThekwini is an example of ongoing awareness creation. The centre is designed to accommodate school groups in the amphitheatre style boma that overlooks the landfill workface (below). Also see the **educate on site** section on page 64.

notes

combat illegal dumping

Conventional ways of dealing with illegal dumping, in other words, clean-up by the municipality or clean-up campaigns on their own, do not seem to drive the correct behaviour towards improving the problem of illegal dumping. Cleaning of illegal dumping is costly and counterproductive as it dilutes the available funding and resources for waste management or other much needed municipal services. Furthermore, by cleaning illegal dumping and littering without other punitive and or deterrent measures sends out the message that it is not wrong to litter and dump.

Although it has the potential, legislation and an enabling environment in itself does not prevent illegal dumping practices. An enabling environment include the strategic provision of waste bins, waste collection services to all communities, alternative management options for specific waste streams, and the enforcement of updated by-laws including the ability to issue spot fines for illegal dumping when caught in the act.

The introduction of access control with restricted gate hours and/or tipping fees at landfills may potentially contribute to incidences of illegal dumping if not implemented as part of a holistic approach to waste management, for example, it should be more expensive to pay the fine for illegal dumping than to pay the tipping fee at the landfill. Some of the above challenges are addressed by implementing a wide range of awareness creation options (refer to section on awareness creation), punitive and deterrent measures including deployment of additional law enforcement officers to improve enforcement.

Lessons learnt

- Paying for clean-up does not deal with the problem of illegal dumping
- Job creation as a result of illegal dumping is not sustainable
- Provision of waste collection services reduce incidences of illegal dumping
- Law enforcement combat illegal dumping and littering
- Cleaning illegal dumping is more costly than providing formal waste collection services
- Illegal dumping can be eradicated through implementation of innovative systems

illegally dumped waste impacts on environmental and human health

Problem:
Illegal dumping is one of the most common problems in South Africa, affecting both big and small municipalities alike. The practice of illegal dumping has huge impacts on the environment through contamination of land and pollution of water bodies. This again impact negatively on the health of the people.

Solution:
Different methods have been employed in different municipalities ranging from awareness creation to enforcement as well as the improvement of waste collection services and the provision of all necessary tools and equipment such as storage receptacles. A combination of these should ensure successful eradication of illegal dumping.

Example: Enforcement of by-laws
Saldanha Bay Municipality believe that prevention is better than cure and, therefore, enforce their by-laws. All building sites have to register for the provision of a skip before the building plans are approved (right). At the landfill site, the arrivals of the skips from the respective building sites are documented. Building contractors whose skips are not emptied at the landfill site are identified as potential illegal dumpers.

Over and above the awareness creation programmes, the following are also undertaken in order to combat illegal dumping:

- Anonymous reporting by telephone (some people report illegal dumping at the municipality without the risk of being identified);
- Spot fines ranging from R500.00 to R1 500.00 are issued by squatter Control Officers (these are trained Peace Officers);
- The fines are included in the rates accounts;
- Environmental Health Officers target specific areas and monitor illegal dumping over weekends; and,
- Illegally dumped waste is traced back to the owner by going through the waste and gathering any clues such as names and addresses found on material.

combat illegal dumping (continued)

a littered environment encourages further littering and dumping

Problem:

If an area is already strewn with litter or illegally dumped waste, people are likely to continue to litter and dump in that area or on that particular site. If no action is taken, the surface area where the problem occurs is likely to increase over time.

Solution:

Instead of spending available funds on clean-up campaigns, municipalities must take preventative actions such as beautifying the area, providing waste bins at strategic locations and implementing projects that can deter people from illegally dumping, e.g. using open spaces for projects that can be beneficial to residents. Projects could include:

- creating parks and playgrounds for children;
- initiating community gardens including vegetable gardens for social upliftment; and,
- establishing car washes to provide employment for the youth in the area.

The choice of a project will be influenced by the specific area conditions and needs of an area.

Example: Develop illegal dumping sites into parks and gardens

The Breede River Winelands Municipality created gardens on street corners (right top) and play parks for children on empty land (right) where offenders used to dump waste illegally. The community is now proud of their surroundings and keep it clean.

Both George (below) and Breede River Winelands municipalities believe that if you keep the area clean, the residents will develop a sense of pride in their area. Residents now dump less and also report dumping activities.

Hibiscus Coast Municipality hire additional workers to clean-up illegal dumping before the onset of the peak holiday season to improve the image of the municipality and to discourage illegal dumping by holiday makers.

What started off as cleaning up of illegal dumping in Nelson Mandela Bay Municipality was turned into a win-win situation. The unemployed and unskilled workers who used to clean up the illegal dumping sites now offer a waste collection service to pervious transgressors at a fee.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MUNICIPALITY		CATE-GORY	AREA (KM2)	TOTAL POPULATION		TOTAL HOUSEHOLDS		DEPARTMENT RESPONSIBLE FOR WASTE MANAGEMENT
NAME	CODE			STATS SA (2001)*	STATS SA (2007)**	STATS SA (2001)*	STATS SA (2007)**	
Abaqulusi Local Municipality	KZN263	B3	4 184	191 018	247 616	37 065	39 866	Community Services
Ba-Phalaborwa Local Municipality	LIM334	B3	3 005	131 089	127 307	33 574	33 792	Community Services
Bitou Local Municipality	WC047	B3	991	29 183	39 011	8 944	12 645	Municipal Structure and Infrastructure Development
Breede River/Winelands Local Municipality	WC026	B3	3 332	146 029	80 124	21 213	21 856	Environmental and Leisure Services Department
City of Cape Town Metropolitan ity	CPT	A	2 455	2 892 243	3 497 101	778 328	902 277	Solid Waste Management Department
City of Johannesburg Metropolitan Municipality	JHB	A	1 645		3 888 182		1 165 016	Pikitup, Infrastructure & Services Depart-ment, Environment & Department of Health
City of Tshwane Metropolitan Municipality	TSH	A	2 198	1 982 233	2 345 909	597 522	686 640	Agriculture and Environmental Management
Drakenstein Local Municipality	WC023	B1	1 538	194 418	217 094	46 266	51 615	Engineering Department
Ekurhuleni Metropolitan Municipality	EKU	A	1 924	2 478 629	2 724 227	776 469	849 349	Environmental Development
eThekwini Metropolitan Municipality	ETH	A	2 292	3 090 121	3 468 087	824 372	833 858	Solid Waste and Cleansing (Durban Solid Waste)
George Local Municipality	WC044	B1	1 072	135 408	136 539	36 191	42 792	Environment
Greater Tzaneen Local Municipality	LIM333	B4	3 240	375 588	349 081	97 246	89 830	Community Services
Hibiscus Coast Local Municipality	KZN216	B2	837	218 170	224 272	55 273	50 647	Cleaning and Maintenance
Knysna Local Municipality	WC048	B2	1 059	51 469	65 051	14 972	17 416	Solid Waste
Msunduzi Local Municipality	KNZ225	B1	634	72 116	616 733	19 757	19 939	Civil Engineering
Nelson Mandela Bay Metropolitan Municipality	NMA	B1	1 959	552 835	1 050 934	135 329	134 391	Community Services and Social Equity
Overstrand Local Municipality	WC032	B2	1 707	1 005 780	74 548	265 375	276 882	Public Health Directorate
Saldanha Bay Local Municipality	WC014	B2	1 766	55 449	78 985	19 022	21 952	Engineers Department
Steve Tshwete Local Municipality	MP313	B3	3 976	70 439	182 513	18 921	20 785	Technical Department
Swartland Local Municipality	WC015	B3	3 692	142 770	77 520	37 116	50 451	Technical and facilities
Thulamela Local Municipality	LIM343	B4	2 899	580 830	602 825	128 448	137 854	Community Services
Tswelopele Local Municipality	FS183	B3	6 524	53 713	40 617	12 554	12 622	Technical Services
uMhlathuze Local Municipality	KZN282	B1	793	289 189	332 154	73 300	81 005	Community Services, health and public safety

* Stats SA, 2001, Census 2001, Statistics South Africa, http://www.statssa.gov.za/census01/html/C2001Interactive.asp, Accessed 10 and 11/Aug/2010

** Stats SA, 2007, Community Survey, Statistics South Africa, http://www.statssa.gov.za/census01/html/C2001Interactive.asp, Accessed 10 and 11/Aug/2010

MUNICIPALITY NAME	DISTRICT		PROVINCE	CONTACT DETAILS			
	NAME	CODE		NAME	TELEPHONE	E-MAIL	WEBSITE
Abaqulusi Local Municipality	Zululand	DC26	KwaZulu-Natal	Ms. Ndlovu	034-982 2133	mndlovu@abaqulusi.gov.za	www.abaqulusi.gov.za
Ba-Phalaborwa Local Municipality	Mopani	DC33	Limpopo	P.J. van Rooyen	015-780 6300	ferreirae@ba-phalaborwa.gov.za	www.ba-phalaborwa.gov.za
Bitou Local Municipality	Eden	DC4	Western Cape	Randall Bower	044-501 3267	rbower@plett.gov.za	www.plett.gov.za
Breede River/Winelands Local Municipality	Cape Winelands	DC2	Western Cape	Glynis Abrahams/ Mr. Mhlom	023-614 8000	mm@breeland.gov.za	www.breeland.gov.za
City of Cape Town Metropolitan Municipality	n/a	n/a	Western Cape	Barry Coetzee tzee	021-400 2992	Barry.Coetzee@capetown.gov.za	www.capetown.gov.za
City of Johannesburg Metropolitan Municipality	n/a	n/a	Gauteng	Palesa Mathibeli	011-381 0323	palesamat@joburg.org.za	www.joburg.org.za
City of Tshwane Metropolitan Municipality	n/a	n/a	Gauteng	Sidney Ramovha	012-358 0588	SidneyR@Tshwane.gov.za	www.tshwane.gov.za
Drakenstein Local Municipality	Cape Winelands	DC2	Western Cape	Hannes du Preez	021-807 4748	hannes@drakenstein.gov.za	www.drakenstein.gov.za
Ekurhuleni Metropolitan Municipality	n/a	n/a	Gauteng	Zandile Khati	082-453 3209	zskhati@ekurhuleni.com	www.ekurhuleni.gov.za
eThekwini Metropolitan Municipality	n/a	n/a	KwaZulu-Natal	John Parkin	031 311 8820	JohnPa@dmws.durban.gov.za	www.durban.gov.za
George Local Municipality	Eden	DC4	Western Cape	Giel Goosen	044-802 2900	giel@george.org.za	www.george.co.za
Greater Tzaneen Local Municipality	Mopani	DC33	Limpopo	Mr. Henk Mienie	015-3078291	Henk.mienie@tzaneen.gov.za	www.tzaneen.co.za
Hibiscus Coast Local Municipality	Ugu	DC21	KwaZulu-Natal	Yandisa Mhlamvu	082 405 4025	yandisa@hcm.gov.za	www.hcm.gov.za
Knysna Local Municipality	Eden	DC4	Western Cape	John Jaftha	044-302 6300	jjaftha@knysna.gov.za	www.knysnamunicipality.co.za
Msunduzi Local Municipality	Umngungundlovu	DC22	KwaZulu-Natal	Deon Moodley	033-392 5354	Deon.moodley@msunduzi.gov.za	www.msunduzi.gov.za
Nelson Mandela Bay Metropolitan Municipality	n/a	n/a	Eastern Cape	Riaan le Roux	079 4900 692	rleroux@mandelametro.gov.za	www.nelsonmandelabay.gov.za
Overstrand Local Municipality	Overberg	DC3	Western Cape	Johan van Taak	028 316 3724	jvantaak@overstrand.gov.za	www.overstrand.gov.za
Saldanha Bay Local Municipality	West Coast	DC1	Western Cape	Bjorn Witbooi	022 701 7000	bjornw@saldanhabay.co.za	www.saldanhabay.co.za
Steve Tshwete Local Municipality	Nkangala	DC31	Mpumalanga	Mrs Makondzo	013-249 7206	rmakondzo@stevetshwetelm.gov.za	www.stevetshwetelm.gov.za
Swartland Local Municipality	West Coast	DC1	Western Cape	F. Bruwer	022 487 9400	BruwerF@Swartland.org.za	www.swartland.org.za
Thulamela Local Municipality	Vhembe	DC34	Limpopo	Mr Simon Madi	015 780 6300	madims@thulamela.gov.za	www.thulamela.gov.za
Tswelopele Local Municipality	Lejweleputswa	DC18	Free State	Kobus Keyser	051-853 1111	logov@tswelopele.org	www.tswelopele.org.za
uMhlathuze Local Municipality	uThungulu	DC28	KwaZulu-Natal	Johannes Mdlalose	035 907 5670 035 907 5790	johannesMdlalose@richemo.org.za	www.richemp.org.za

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notes