

## 3.2 Waste Minimisation and Management

### OVERVIEW

Studies undertaken in the late 1990's indicate that South Africa generates over 42 million cubic metres of general waste every year, with the largest proportion coming from Gauteng province (42%) followed by the Western Cape (20%) (DWAF 1998). In addition, more than 5 million cubic metres of hazardous waste is produced every year, mostly in Mpumalanga and KwaZulu-Natal where there is a concentration of mining activities and fertiliser production. This translates to an average amount of 0.7 kg of waste per person per day. This is closer to the average produced in developed countries (73kg in the UK and 0.87kg in Singapore), than to the average in developing countries such as 0.3kg in Nepal (DWAF 1997).

Research suggests that waste generation across most sectors is predicted to increase (DEAT 2006) despite the presence of policies and legislation to manage waste in an integrated and sustainable manner.

South Africa has formulated policy, enacted legislation and developed strategies to improve its waste management practices. While the Constitution and NEMA provide a broad framework for promoting sustainable waste management, the new draft National Environmental Management: Waste Management bill (WMB) contains provisions to develop and implement a waste management system that promotes reduction, reuse and recycling.

The National Waste Management Strategy (NWMS) presents a long-term plan for addressing key issues, needs and problems experienced with waste management in South Africa. The



objective of the NWMS is to adopt an integrated, holistic and participatory approach to waste management covering the entire waste cycle from cradle to grave, and deals with the prevention, generation, collection, transportation, treatment and final disposal of waste. This means that all sectors should have plans in place not only to dispose of waste, but to minimise its production in the first place.

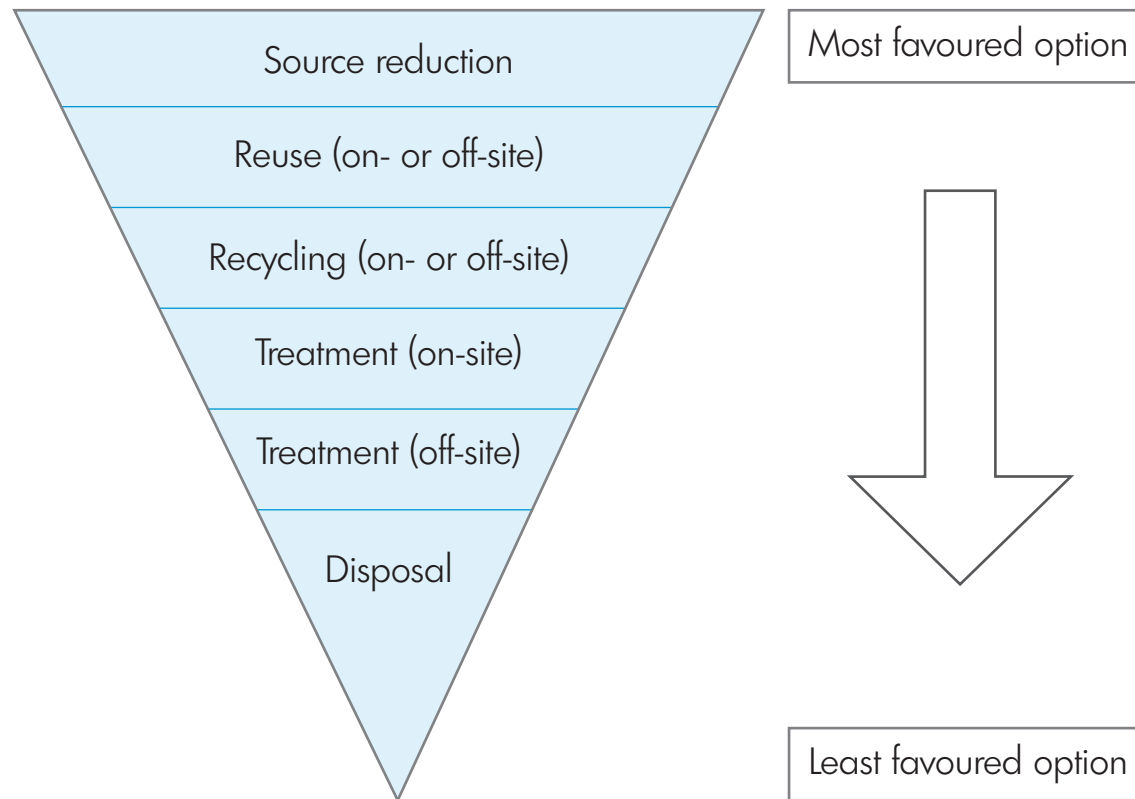
DEAT held a National Waste Summit in Polokwane in 2001, which resulted in a declaration committing South Africa to reducing waste generation by 50% and disposal by 25% by 2012, and to work towards achieving zero waste by 2022. Local Authorities are now required to develop Integrated Waste Management Plans (IWMPs) as part of their Integrated Development Plans.

The Waste Management bill endorses

the waste management hierarchy which gives highest priority to waste prevention followed by waste minimization, waste reuse, recycling, energy recovery and waste disposal, in order of preference.

### Waste Legislation and Policy

- The Constitution of South Africa, 1996 (Act 108 of 1996)
- The Environmental Management Policy for South Africa (1998)
- National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) which advocates waste minimisation
- The Environment Conservation Act (ECA) (Act 73 of 1989)
- The draft National Environmental Management: Waste Management Bill (NEM: WMB) (2006)
- The White Paper on Integrated Pollution and Waste Management for South Africa (1998)
- The National Waste Management Strategy (NWMS)



### Waste Management Hierarchy

In the waste management hierarchy, source reduction is prioritised, followed by reuse and recycling. Treatment or processing of waste is considered only once waste minimisation techniques have been explored. Disposal is considered as a last option. Green waste management strategies should be based on the management hierarchy.

## Sporting events and Waste Management

There is now a growing recognition that waste generation is one of the major environmental problems associated with sporting events. Waste can be generated by participants and spectators through event-related activities such as the consumption of food as well as the wide range of supplies and materials used in hosting an event. In addition, on a larger scale, waste is produced in the construction of permanent sports facilities and the creation and disposal of temporary installations. The major challenge is to develop and implement a Waste Minimisation Strategy at the outset of the event planning process to ensure reductions in the demand for natural resources and the amount of waste generated.

In most cases solid waste from the actual venues of large sporting events results

primarily from the provision of catering services for spectators and through the production and supply of the relevant products. This includes transport and packaging materials, bottles and leftover food which accumulates in kiosks. Waste is also produced through the supply and sale of merchandise and in the media and business centres.



### Sustainable Waste Management Principles

- Polluter Pays Principle - all costs associated with waste management should, where possible, be borne by the waste generator.
- User Pays Principle - all costs associated with the use of a resource should be included in the price of goods and services developed from that resource.
- Product-Stewardship Principle - the producer or importer of a product should take all responsible steps to minimize environmental harm from the production, use and disposal of the product.
- Waste Auditing - identifying the real costs of waste and how to reduce it, involves a structured and methodical process, typically known as a waste audit. Waste audits generate reliable information about the quantity, types and locations of recyclables and resources being generated. Then the quantities, types and locations of each material that can be diverted from landfill, to be recovered and reused or recycled, can be calculated.
- Resource Recovery - where products and materials from the waste stream are recovered and diverted away from landfill, for reuse, recycling, energy recovery or composting, rather than for disposal.

Source: DEAT, 2007



## OBJECTIVES

The three key objectives for waste management in relation to sporting events are:

1. Waste Prevention and Avoidance (Source Reduction)
2. Reducing the need for disposal (Reuse and Recycling)
3. Sound Disposal

### Objective 1:

#### Waste Prevention and Avoidance

During the planning of sporting events an effort must be made to identify opportunities to prevent or avoid the generation of waste. This can involve altering the design, manufacture, purchase, or use of products and materials so as to reduce the quantity and quality of waste associated with all phases of the event. For example, altering the specifications of a material so that fewer hazardous constituents are used in the manufacturing process or are

incorporated into the product itself.

### Objective 2: Reducing the need for disposal

Reusing or recycling waste materials can result in a significant reduction both in the demand for natural resources and the amount of waste going to landfill. This has the added benefits of prolonging the lifespan of landfill sites, reducing the financial and environmental costs of transporting waste, and minimising pollution.

Recycling initiatives have proved to be very successful in reducing waste generation at many sporting events. For example, the South African Breweries WSSD Green Glass initiative resulted in 33% of beer bottles used at the Ubuntu Village being converted into glasses which were then sold to WSSD delegates. Since waste recycling involves the collection of waste materials, their separation

and cleanup, and, in some cases, re-processing, the key to success at sports events lies in the early and thorough planning of the events so that appropriate recycling infrastructure and other resources are put in place.

### Objective 3: Sound Disposal

All waste that cannot be recycled or reused should be disposed off in licensed waste disposal facilities in accordance with DEAT legislation requirements. Appropriate arrangements need to be made for regular collection of the waste, and bins for specialized non-recyclable waste, such as hazardous or medical waste, need to be located at the sports venues in places where this waste is likely to be generated. A sound management plan with respect to waste disposal needs to be prepared, which takes into consideration environmental, health and social costs.

Waste in landfill sites may produce gases or include materials that can potentially be used to generate electricity or other reusable products. For example, organic compost can be manufactured from waste and used to grow crops and plants. With respect to energy recovery from waste, there are already a number of initiatives in place in South Africa where gas (e.g. methane) from the landfill sites is being or will be used to generate electricity. One such example is the eThekweni Municipality that has a project which utilises landfill gas from a municipal site to yield an annual 10MW of power. Carbon dioxide given off from the land-fill sites is now traded to other companies or partners to be used to produce other products. These initiatives will also contribute to mitigating climate change as there should be less methane and carbon dioxide released into the atmosphere.

## Nedbank Golf Challenge

During the Nedbank Golf Challenge event 23 restaurants generated up to 2 tons of wet or food waste per day. Registered pig farmers collected this aspect of waste on a daily basis to reduce the amount of waste disposed of in a landfill.

### STRATEGIES

#### General Strategies

- Develop a waste management strategy for all aspects of the sports event, including procurement, management and offices, venues, activities, transportation, accommodation, and public education and awareness.
- Assess current waste management practices in the host city and events venues.
  - Determine current waste collection, separation, treatment and disposal practices.
  - Assess the effectiveness of current facilities to deal with expected increases in waste and the types of additional materials anticipated.
  - Identify gaps and areas requiring improvement.

#### 1. Waste Prevention and Avoidance

- The necessity of acquiring a particular product should be assessed before

it is procured. Is the product really necessary? Are there other alternatives? Can the product be rented?

- When materials and goods are procured, select products that have been manufactured in a waste efficient manner.
- Appoint service providers that implement waste minimisation strategies.
- Use technologies and appliances that assist with waste minimisation or avoidance e.g. printers capable of double sided printing.
- Prepare and implement a procurement plan that encourages waste prevention and minimisation.

#### 2. Reducing the need for disposal

- Reuse used or excess materials for future sport events
  - Use durable or non disposable materials to build temporary facilities e.g. media centres, catering locations,
  - If the material is not needed it must

be sold or donated.

- Encourage separation of waste at source for recycling, reuse and composting.
- Separate wet and dry waste at source to enable reclamation of dry waste.
- Initiate recycling or buy-back programmes, especially for glass bottles, cans, plastic and paper products.
  - Approach manufacturers (e.g. Mondi, SAPPI) about collecting and re-cycling used products.
- Use a uniform multi-bin system. Use different colours and shapes that are universally recognised to differentiate between recycling and rubbish bins.
  - Place recycling bins (including composting bins) in areas where waste for recycling is generated (e.g. next to kitchens, restaurants, media and business centres).
  - List what can be recycled in each bin.

- Design the bin opening to mimic the shape of the waste type (e.g. hole for cans, rectangular slot for paper).
- Train unskilled workers in waste sorting techniques and use small, medium, and micro-economic enterprises (SMME) for recycling, where possible.
- Train volunteers or staff to assist people with waste separation.
- Keep recycling areas clean, well lit and odour free.
- Collect litter and maintain signage and containers regularly.
- Use returnable containers (to be branded as per FIFA rules and regulations).
- Use durable cutlery and crockery.
- Use durable towels instead of disposable ones
- Encourage composting of organic waste for landscaping, urban agriculture, and community gardening projects.

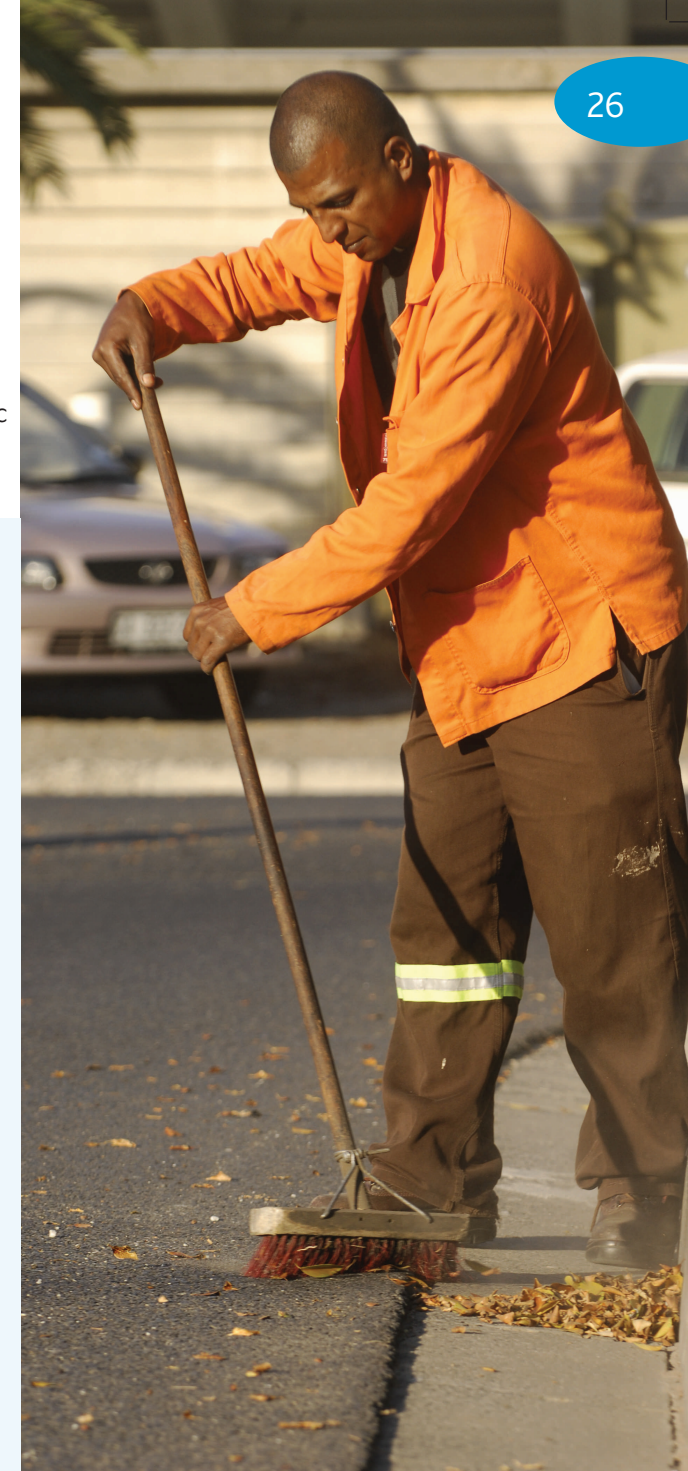
### 3. Sound Disposal

- Ensure environmental, health and safety requirements are met during waste collection and disposal.
- Identify all sources of non recyclable waste for collection and disposal.
- Ensure proper infrastructure for waste collection and disposal.
- Provide bins for specialised non-recyclable waste, such as hazardous or medical waste in close proximity to sites where waste is generated.
- Plans for a system of medical waste disposal should be developed.
- Ensure that waste is disposed of in a licensed landfill site (as per the legislative requirements of DEAT).
- Avoid leakages and spills during storage and disposal of non-recyclable or hazardous waste.
- Work with the local waste authority to add extra collection shifts during peak waste generation to avoid bin overflow.
- Arrange waste collection and trans-

portation during periods of low traffic and event activity.

### 2006 FIFA World Cup™

During the 2006 FIFA World Cup™ the International Broadcasting Centre (IBC) was the central “powerhouse” for television broadcasting to a billion people. The IBC was built using recycling-favorable construction methods and regenerative raw materials. Ceiling beams and carrier poles were made of solid wood, and walls of glued multi-layered coniferous wood. A total of 966 tonnes of wood – 40 lorry-loads – were used to build the Television Centre. At the end of the World Cup the greater part of the material was not waste but rather recyclable material. The wooden elements of the studios, for instance, were used in the construction of 60 houses.



## Nedbank Golf Challenge

In 2004 the Nedbank Golf Challenge organisers implemented a separation at source waste management system developed for the event by the Linchantcheli champions - a group of staff members on the Wits management development program, who chose this as a project. They subsequently won an award for the best Wits Program project 2004.

With 53 000 spectators at this event, significant amounts of waste consisting largely of potentially recyclable material including plastic and glass bottles, cans and packaging material were expected to be generated.

The backbone of the system was the placement of colour coded bins in the areas where waste was likely to be generated, including all bars, production and wash up areas on the course. In addition, staff were well trained in the use of the system.

Implementation of this system made handling of the waste stream much more efficient, ensuring that recyclables were kept separate from non-recyclables right through to the point of disposal.

The recycling effort was measured by comparing the numbers of glass and plastic bottles and cans retrieved from the waste stream with the number of beverages issued from the Central Warehouse that supplied all the consumables to the event.

The results showed that 91.9 % of beverage packaging was recycled. This amounts to 11.8 tons or 113 275 cans, 19 260 glass bottles and 72 413 plastic bottles recycled. In total 26.2 tons of waste was diverted from their landfill site if the other recycled material such as boxes, paper and soft plastic are included.

Source: [http://suninternational.investoreports.com/sun\\_investorrelations/html/sun\\_ir\\_2008\\_43.php](http://suninternational.investoreports.com/sun_investorrelations/html/sun_ir_2008_43.php)

### Training, Education, Awareness and Communication Strategy

Successful implementation of a waste management strategy requires committed individuals who are well trained and familiar with the strategy. To accomplish this, there is a need to develop a waste minimisation and management awareness campaign targeting venue staff, event participants, relevant authorities and the public. The focus should be on the importance of waste minimisation or reduction and practical ways to minimize waste (e.g. recycling and crushing cans, bottles, and boxes before disposing of them to reduce the volume of waste). Training in the area of communication is also important as various forms of cooperation and co-ordination will be involved in the implementation of the waste management plan. During the event, participants should be made aware of the results of waste reduction efforts as this will encourage them to participate.



Recycling at the Pretoria Show 2006, organised by the Plastics Federation of SA.

**MONITORING**

Monitoring and evaluation of waste minimisation efforts should be undertaken. This requires appropriate monitoring systems and mechanisms to be put in place. Examples of indicators that could be used to measure the level of success in achieving the stated objectives as well as possible targets that could be set, are provided in the following Table.

TABLE 3.2.1: Sample Waste Minimisation and Management Monitoring and Evaluation Indicators				
OBJECTIVE	INDICATOR	TARGET	RESULT	COMMENT RE SUCCESS
Waste Prevention and Avoidance	% reduction in products using toxic constituents in their manufacture	30%	20%	Changes to manufacturing process not implemented in time
	% reduction in volumes of waste in different areas of the venue (Stands, food kiosks, media centres etc.)	50%	25%	Spectators not co-operative.
Minimise and reduce waste	% Use of recyclable products during the sport event	60%	50%	Use of preferred suppliers
	% of recyclable products collected. (Plastics, paper, etc)	80%	70%	Effective recycling strategy
Sound Disposal	% of non-recyclable waste delivered to a licensed landfill	100%	100%	Good co-operation with Local Authority
	% Organic material composted	20%	20%	Good co-operation with Local Authority
Education, Awareness and Communication Strategy	% of volunteers/staff who reported having changed behaviour as a direct result of education and awareness campaigns	50%	40%	Effective Communications Strategy
Job Creation	% of anticipated new jobs created as result of the implementation of the waste management strategy.	50%	40%	Contributes to governments second economy.