CHAPTER 5

by Lisa Thompson-Smeddle: Sustainability Institute

"The earth is a closed system for matter – nothing disappears. In nature, the cycle of life operates in a circular system and waste generated by one organism becomes food for another. Fallen leaves decay and the nutrients are returned to the earth, to become again food for the tree. An exciting challenge facing city communities is to begin to imagine life without waste, where everything that is thrown away at the end of one life becomes the technical or organic nutrient for another life."

City of Cape Town Smart Living Handbook

There are many definitions of waste in South African legislation. The most recent definition can be found in the National Environmental Management Waste Act (DEAT. 2008). This definition states that waste is "…any substance, whether or not that substance can be reduced, reused, recycled and recovered—

(a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;
(b) where the generator has no further use of for the purposes of production, reprocessing or consumption;
(c) that must be treated or disposed of; or
(d) that is identified as a waste by the Minister, but—
    (i) a by-product is not considered waste; and
    (ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste."

Section 1 of the South African Environmental Conservation Act also provides for the formulation of a definition of waste by regulation. This definition is:

"An undesirable or superfluous by-product, emission, residue or remainder of any process or activity, any matter, gaseous, liquid or solid or any combination thereof originating from any residential, commercial or industrial area, which is discarded by any person, is accumulated and stored by any person with the purpose of eventually discarding it with or without prior treatment connected with the discarding thereof, or which is stored by any person with the purpose of recycling, reusing or extracting a useable product from such matter," (Environment Conservation Act. 1989).

Solid waste can be classified in two main categories. General waste and hazardous waste. General waste does not pose an immediate threat to the environment and includes household waste, garden refuse, builder's rubble, some commercial and dry industrial wastes. Over time, however, these waste streams can pose a threat and must be managed carefully. Pressure, decomposition and infiltration by water produces leachate (liquids which form during the decomposition process) which may be hazardous to the environment.

Hazardous waste is any waste that may (or may not) be likely to cause danger to human health or to the environment. This includes many chemicals, heavy metals, flammable wastes like petrol, diesel, thinners, nail polish, aerosols and alcohol. Other types of hazardous waste include batteries, most paints, corrosives like acid, drain and oven cleaners, bleach, rust removers, and pesticides.

Medical and infectious waste which generally comes from hospitals, clinics and biological research facilities are also classified as hazardous, and include infectious, pathological and chemical waste streams, heavy metals, pharmaceuticals, genotoxic, radioactive and any other waste that is classified as hazardous in terms of the Minimum Requirements (Department of Water Affairs and Forestry. 1998).

In terms of the National Waste Management Strategy all local authorities are required to develop an integrated waste management plan and promote the prevention, minimization and recycling of waste in terms of the revised waste hierarchy. The following table from the National Waste Management Strategies and Action Plans for South Africa (DEAT. 1999), provides an overview of SA's waste hierarchy.

WASTE HIERARCHY

1. Cleaner Production	Prevention
	Minimisation
2. Recycling	Re-Use
	Recovery
	Composting
3. Treatment	Physical
	Chemical
	Destruction
4. Disposal	Sanitary Landfill

(Source: DEAT. 1999)

SOLID WASTE POLICIES

An abundance of legislation governing various aspects of waste and waste related issues exists in South Africa. The National Environmental Management: Waste Management Act (NEMWA. 2008) has recently been promulgated. This Act now forms the over arching waste management act governing all spheres of waste management.

The following table provides a summary of the main legislative changes which have taken place since the first democratic elections in South Africa in terms of waste management.

Legislative framework of waste management in South Africa

Year	Legislation	Main emphasis
1973	**Hazardous Substances Act, 15 of 1973**	Regulates transportation and disposal of defined hazardous substances
1996	**Constitution 108 of 1996** – Bill of Rights	• Refuse removal, disposal sites • Local government function – governed by Provincial government
1989	DEAT – **Environment Conservation Act, 73 of 1989**	• Environmental Impact Assessment Regulations (EIA) • Framework for the overall protection of the environment
1998	DEAT – **National Environmental Management Act, 107 of 1998**	
1998	DWAF – **Waste Management Series, 1998**	Handling, classification and disposal of waste
1998	DWAF – **National Water Act, 36 of 1998**	Pollution of water resource
1998	**Local Government:** Municipal Structures Act, 117 of 1998	Restructuring of Local Government & associated roles and responsibilities
1999	DEAT – **National Waste Minimisation Strategy**	• Waste minimization & prevention • Shift from end-of-pipe solutions to prevention of waste
2000	**Local Government:** Municipal Systems Act, 32 of 2000	Enabling legislation for local municipalities
2000	DEAT – **White Paper on Integrated Pollution and Waste Management for South Africa**	Prevention of pollution, waste minimization, impact management and remediation
2001	**National Waste Summit** – Polokwane Declaration	First National waste summit. Polokwane Declaration signed.

Year	Legislation	Main emphasis
2003	National Health Act, 61 of 2003	Designates Municipal services to include waste management and attributes power to the Minister to make regulations regarding health care risk waste.
2003	National Treasury – **Municipal Finance Management Act, 56 of 2003**	Roles and responsibilities of municipalities in terms of financial management systems.
2006	**National Treasury: Environmental Fiscal Reform Draft Policy**	Framework for considering market based instruments to support environmental fiscal reform.
2006	DEAT – **Strategic Framework for Sustainable Development in South Africa**	Document aimed at developing a strategic framework to meet millennium environmental objectives.
2007	DEAT – **National Waste Management Bill**	Overarching waste management legislation.
2007	DEAT – **Waste Tyre Regulations**	Regulations regarding the safe handling, storage and disposal of used tyres
2008	NEMWA – **National Waste Management Act**	Overarching waste management legislation.

Summary of the legislative framework of waste management in South Africa (Engledow. 2005)

Landfill disposal

In South Africa, landfill disposal is the predominant method of managing general waste streams. Landfills are sites which are chosen, designed and engineered according to specific regulations which take into account human and environmental health. Ideally landfills should be close enough to the serviced population to prevent high costs of transport in waste disposal.

Landfills are classified according to the type of waste received, the amount of waste received and the water balance of the area, i.e. in terms of potential leachate generation (Engledow & Eichestadt. 2007). Older landfill sites often relied on clay soil barriers to prevent toxic leachate from seeping into the water table. Newer landfills are specifically engineered depending on the type of waste they will receive. Engineering includes the design of liners with numerous layers consisting of gravel, sand, clay and plastic sheeting (high density Polyethylene-HDPE) to ensure that any leachate generated can be captured within the cell and not contaminate surface or ground water. The leachate is then either drained to a leachate treatment facility on the site or transferred offsite to a waste water treatment facility.

Waste is dumped into landfill "cells" in layers of about 2m thick, where it is spread, compacted and covered with soil, sand, bark chips, and building rubble. Once the landfill cell has reached its capacity (i.e. a pre-determined height) the cells then need to be properly closed or capped. Thereafter, the waste continues to decompose, generating methane and other CO^2 equivalent emissions which can be utilized for energy.

Hazardous waste disposal

Hazardous materials can only be disposed of at licensed hazardous waste disposal sites, and the management of high level hazardous waste falls within the boundaries of the private sector. Depending on the characteristics of hazardous waste, various treatment methods are applied before disposal. Medical waste must be treated prior to disposal either by incineration, or other accepted methods of treatment like Electro-thermal deactivation or autoclave technology, which uses pressure and heat to sterilise waste.

Refuse transfer stations and material recovery facilities

Refuse transfer stations (RTS) receive waste from municipal and private contractors. The waste is offloaded onto an apron area and then pushed by a front end loader onto conveyor belts which then feed the waste in containers where it is compacted. The containers are then transported either by rail or road to a landfill site. These stations act as short term holding and handling facilities for waste that will be transported to landfills.

There are many opportunities to explore at RTS, including the recovery of recyclables. A Material Recovery Facility (MRF) is a facility where there is sorting of the waste prior to compaction for transport to the landfill site. This type of MRF is referred to as a 'dirty' MRF. However, a 'clean' MRF is the ideal as the waste is source separated at the household / business level prior to further sorting at the MRF.

As the lifespan of many landfill sites in South Africa are coming to an end, new regional landfill sites are being planned and built further from the point of waste generation, i.e. outside of the City / Town boundaries. Therefore the reliance on RTS and especially MRFs will become more and more important in the near future. Recovery of recyclables at the MRF reduces the volume of waste that requires landfilling, thereby reducing transport costs to landfill sites.

Drop Off and Buy-Back Facilities

Drop off facilities provide a useful service to communities. They are often run by municipalities, NGOs or community organizations. Community members and small garden services often utilize drop off facilities to offload garden waste, plastics (e.g. polyethylene terephthlate – PET), paper, cardboard, glass, used motor oil, e-waste and other recyclable household waste materials. Drop off facilities also help to minimise the amount of green waste going to landfill and to make better use of green waste as a resource material for the production of mulch and compost.

Some community 'drop off facilities' referred to as buy back facilities pay collectors for recyclable materials. Some materials, like scrap metals, mercury and zinc from appliances, reusable plumbing, building materials, wiring and light fixtures have a higher market value than others.

Composting

Composting can be an effective way to reduce green waste from being sent to landfills. Household, garden and other green and organic wastes, as well as primary and secondary sludge from sewage treatment plants may be successfully composted using a variety of methods. There are a number of biological or compost related technologies. These are open windrow, vermi-composting, enclosed composting, anaerobic digestion and fermentation (Engledow & Eichestadt. 2007).

VARIOUS COMPOSTING METHODS

Method	Potential input wastetype	Output product
Open Windrow – Forced Aeration Composting	Garden waste, wood waste, sewage sludge, manure, fruit waste	Compost, soil conditioner
Vermi-composting	Sewage sludge, food & garden waste	Compost, soil conditioner
Enclosed composting	Mixed organics (food & garden)	Compost, soil conditioner, high calorific value
Anaerobic digestion	Mixed organics (food & garden)	Biogas, green energy
Fermentation	Agricultural waste, mixed organics	Liquid fuel

(Source: Engledow & Eichestadt. 2007)

REDUCTION, RE-USE AND RECYCLING

Many of the products we use require large amounts of energy to produce. When disposed of, many waste streams do not decompose (i.e. hard plastics and tyres) and they can be harmful to natural habitats. Collecting, transporting and disposing of waste are costly exercises. We live on a planet that has a finite carrying capacity for waste. Resources and nutrients that can be reused and recycled are lost when sent to landfill. Waste pollutes our water and air and can create human health risks. By reducing, reusing and recycling waste we reduce our consumption of non-renewable resources, we reduce the amount of energy and water required to produce and dispose of these resources, we prevent waste streams from being sent to landfill, we provide useful products for consumption, we create jobs, and we increase the earth's carrying capacity.

Reduce

One of the most fundamental needs in effective waste management is behavioral change, which requires a paradigm shift from the 'end-of-pipe' treatment ideology of waste to the reduction of consumption of products that end up in landfill. On a local government level, green procurement of environmentally friendly products can substantially reduce waste to landfill. Buying in bulk, buying and consuming environmentally friendly products, purchasing products that do not need or require excessive amounts of packaging, buying recycled goods and refills, avoiding disposable items like nappies, cameras, razors and aerosols and avoiding toxic or hazardous products can go a long way in reducing waste to landfill.

Reuse/Repair

One person's waste is another person's treasure. Rather than disposing of useful resources, find an individual or organization that can reuse these materials. Schools, libraries, NGOs, crèches, drop-off facilities and many charities can make use of household goods one may no longer find useful. Many items can be repaired rather than sent to landfill.

Post-consumer waste materials can be used to develop alternative functions through the innovative nature of design.

Photos: Haveena Jhundoo

Materials Recovery and Local Economic Development.

by Haveena Jhundoo

A case study was conducted at Mondipak Kuils River during 2008, in order to assess the feasibility of recovering reusable waste materials in Mondi's factory. The goal was to train disadvantaged women from the local community to develop handmade crafts.

Mondi sponsored the pilot project and provided the necessary materials and equipment for the project. The training programme started in April 2008 and ended in August 2008. The entire programme was conducted on the factory premises and consisted of the following stages:

1. Identification of reusable waste materials (RWMs) in factory processes;
2. Recovery of identified RWMs as secondary waste materials for crafting purposes through an integrated waste management strategy;
3. Development of prototypes from the RWMs focusing on handmade packaging for craft products;
4. Deconstruction of the design process into easy step-by-step replicable tasks for crafters in training;
5. Market testing on local and international levels;
6. Earmark prospective NGOs for the establishment of a core production team for 2009.

The type of waste streams classified as reusable were: residual Kraft liners, off-cuts of paper cores, strapping cores post-use, empty starch bags and certain type of rejects of corrugated boards. Certain waste items such as empty coffee tins generated through the canteen were also explored. For training purposes, an office was made available and for prototyping experiments a workshop area was designated on Mondi's premises.

The research dealt mainly with paper-based waste materials. However, substances such as residual water-based ink, varnish and glue were successfully experimented with in order to develop surface graphics. Other packaging accessories such as eyelets and fabric strapping (overruns) were purchased from suppliers in Cape Town to complete the product range. In some instances waste samples such as waste fabric from other suppliers were collected free of charge.

Overall, the handmade items were made from a minimum of 90% waste materials. The conversion process is termed waste crafting (Billet et al. 1996). In the context of the pilot project, this consisted of tracing the prototype over the waste materials, scoring, cutting, gluing, painting and final assembly of all other necessary components.

The case study was deemed an environmental initiative, as well as a skills development programme in line with the Skills Development Act (1998) and the Broad Base Black Economic Empowerment Act (BBBEE. 2003). The ladies selected in this project had no previous exposure to arts and crafts, yet they learned the basics of paper crafting techniques very quickly. They also attended the CCDI Winter School course in July 2008 where they qualified for an NQF4 level.

The women who successfully completed the programme are now trainers themselves, who can train others and make a difference in their community. They can start their own businesses, or work in a craft environment where their qualification can be recognised. The next phase of the pilot may be explored in 2009 through another community project.

The Mondi strategy proved successful and helped identify a category of waste that was already being recycled or discarded for eventual landfilling, but had a greater socio-economic value through the reuse principle. This approach is highly recommended in section 16 (b) of chapter 4 of the National Environmental Management: Waste Bill (NEMWB. 2007). By channeling this stream of reusable waste materials to survivalist waste crafters this flow of waste could support several disadvantaged families. In this case, a sheet of Kraft paper of about 1 square meter, if hand-painted could generate revenue of R3 for a survivalist crafter and a day's work could bring R60 as a daily wage.

The following items were prototyped from reusable waste materials:

1. Kraft paper: Gift wrap, carry bags, envelopes, cards
2. Cores: rigid containers for ceramic craft products and bottle holders
3. Paper sacks: heavy duty carry bags
4. Corrugated board: customized boxes for ceramic products, handmade lampshades, hand-painted ostrich egg.

Starch bag before and after conversion

Coffee tin before and after conversion

Off-cuts of paper cores and cores converted into decorative containers

Recycle

Technically, recycling occurs after waste is separated in the neighbourhood or home. Recycling is the process of making new materials from reclaimed resources or waste materials. Waste separation is only the beginning of the recycling process. Bins can be purchased and used separately for organics, recyclable materials like plastics (PET – polyethylene terephthlate: HDPE – high density polyethylene and LDPE: low-density polyethylene), tin cans, paper and glass (which can be placed in the same bin), and non-recyclable materials.

Separated wastes can be sent to drop-off facilities, recycling depots or alternatively they can be collected by ‘middle-men’ who sell or re-distribute the products. Organic waste can be used in home and neighbourhood gardens for compost and recycled goods can be purchased in most supermarkets. Without municipal

systems in place, recycling on an individual level can be difficult to do. Without access to nearby drop-off facilities and recycling depots, people tend to put their waste out for the general municipal waste collection service to remove. Neighbourhood or community level waste recycling should be encouraged and can be much more effective.

Recycling can bring needed income for individuals, schools, NGOs and small businesses. It can provide jobs, reduce pressure on natural ecosystems and waste to landfill, and can provide a sense of satisfaction in doing the right thing. Education and awareness also plays a part in the reduce/reuse/recycle process.

CASE STUDY

Lynedoch Solid Waste Recycling Programme

by Pieter Meiring

In May 2008, the Sustainability Institute and the Lynedoch Home Owners Association introduced a new recycling programme throughout the Lynedoch Eco-Village. It comprises a 3-bin system: white bins (for all recyclables like plastics, glass, and tin) green (for organic wastes), and black (for non-recyclable waste). Appropriate, visually strong signage that could engage with the 450 on-site primary school children was developed and placed next to each unit.

A4 fridge magnets were also adapted for household and office use. For the school and for the rest of the site, laminated posters were provided for placement in close proximity to the bin units. This allowed all residents, tenants, children and visitors to easily and efficiently sort their waste from the outset. The programme was launched for the staff, home owners and school children with an interactive presentation explaining the importance of recycling and a question and answer session.

The programme is based on a simple process: the first sort of the different types of waste is managed by residents and visitors on site by choosing an appropriate bin, depending on the waste they wish to throw away. The separate bins' contents are then collected by the garden and grounds team on a regular basis; organic waste is collected daily; recyclable and non-recyclable waste weekly. A partnership was entered into with a local recycling business (Mr Recycle) who collects the recyclable materials from Lynedoch on a weekly basis, and undertakes a second sort before passing back the respective materials to various organisations as a resource.

The cost of collection is covered by home owner's monthly levies. Although the implementation took a few weeks (changing habits), the programme has proven to be tremendously successful. Waste has been reduced as indicated below:

Prior to recycling programme:

An average 50 black bin bags were collected per week. This contained a mixture of waste types.

Post implementation of the recycling programme:

The non-recyclable waste has been reduced to an average of 15 black bin bags per week (reduction of 70%). In addition, the site now delivers 20 bags of recyclable materials weekly, with the balance of material consisting of cardboard / paper and glass which are separated. Mr Recycle collects all the recyclables with the exception of the glass, which the Lynedoch garden and grounds team recycle as a separate business opportunity.

Examples of the 3-bin units and signage

(Photo: Pieter Meiring)

CASE STUDY

City of Cape Town

Municipalities are constitutionally required to provide for waste removal and disposal in their area. The City's waste-wise programme, established in 2002, and its recently introduced Integrated Waste Management Policy promote the minimisation of waste to landfill and the reduction of negative impacts of solid waste on the environment. Recycling initiatives and activities have included clean-up initiatives in 18 informal settlements (household litter was exchanged for compost and 108 temporary jobs were created); river cleaning projects and an education program training teachers in integrated waste management solutions. The City of Cape Town has also established 20 recycling and waste drop-off sites, promotes partnerships and enabling legislation (including the new integrated waste management bylaw – soon to be promulgated).

The City of Cape Town has also piloted 2 dual collection services (the "think twice" campaign) in Pinelands, Parklands, Blaauberg, Somerset West, Strand and Gordon's Bay. In each pilot area the initiative involves approximately 10,000 households which separate dry and wet waste. Dry waste is sent to the material recovery facility (MRF) in Maitland and Strand for further separation.

Another initiative, the "blue bag" project in Stellenbosch, has been successfully running since 2004. Nearly 1,500 households separate tin, glass and newspaper which are placed in blue bags supplied by Stellenbosch Municipality. These bags are then collected by local buy back centres. Public private partnerships are important for the success of recycling initiatives. An example of an effective public private partnership is the arrangement between the City of Cape Town and PETCO, who have sponsored bags for the collection of PET, HDPE and LDPE for recycling in the CCT.

PETCO/CCT drop off initiative

CASE STUDY

Athlone Refuse Transfer Station (ARTS) recycling initiative

At the Athlone refuse transfer station (ARTS), the company Unicell has installed a sorting conveyer, where 20 waste sorters have been hired to separate cardboard, white paper, mixed paper, cans, clear PET, and other plastics. Each waste stream is then bailed for collection. The facility is currently still increasing to full capacity and ultimately should be able to process about 650 t/d, thus removing up to 20% from the waste stream. A recycle-stream operator, a machine operator and a plant manager have also been hired for this initiative. The bulk of income for this initiative comes from selling-on recyclable materials (Engledow & Eichestadt. 2007).

In 2007, ARTS processed about 200 tonnes of raw refuse per day, and removed about 40 tonnes per day of recyclable materials. A second conveyer line is being installed, with planned 18-hour shifts during the week and a 12-hour shift on Saturday. It is expected that 650 t/d will be processed on weekdays and 433 t/d on Saturdays. Unicell has a contract with CCT to remove a minimum of 15% of the weight processed, but the company is expecting to achieve 20%. Therefore at capacity between 100 and 130 t/d will be diverted from Vissershok landfill site, (Agama Energy & The Sustainability Institute. 2007).

Municipal solid waste (MSW) is offloaded in the receiving apron, compacted into sealed containers (each containing 20 tonnes of refuse) and transported by rail at a rate of about 52 containers a day to Visserhok landfill (Agama Energy & The Sustainability Institute. 2007). The facility is designed to handle 850 tonnes per day but is accepting over 1,000 t/d. The characterisation of this refuse is expected to contain an organic fraction of 47%, 45% of recyclables and 8% of 'other' waste (Agama Energy & The Sustainability Institute. 2007).

Sorting Line at the ARTS Recycling Initiative

Baled cardboard and paper at ARTS

CASE STUDY

Corporate interventions

PETCO recycled nearly 15,000 tons of PET in 2006. According to their calculations, "If one person collects 200 bottles for 240 days of the year, it amounts to 1,600 kilograms per year. This means that approximately 15,000 tons of PET collected translates into the creation of an estimated 10,000 jobs (PETCO. 2007)." In 2006, PETCO achieved an annual PET recycling rate of 21% of beverage PET and 15% of total PET produced in South Africa, (PETCO. 2007). Approximately 40,000 collectors sell cans to Nampak's Collect-a-Can. About 80% of these collectors would otherwise be unemployed (Nampak Recycling. 2009). Collect-a-Can recovered 64.2% of used beverage cans in 2002 (Engledow & Eichestadt. 2007).

Mondi collects 40% of all recycled paper and board in South Africa, and supplies 340,000 tons per year to mills for recycling. In 2001, Mondi recycling employed 300 people. Mondi currently invests in buy-back centres where collectors can bring recyclable paper for Mondi to buy-back. 117 centers are currently in operation, employing approximately 3,000 people including collectors and sorters (WBCSD. 2005).

WASTE TO ENERGY

Waste to Energy addresses both the challenge of waste disposal and that of energy needs in fast depleting landfill sites. There are many examples world-wide where waste undergoes treatment to reduce the volume of landfilled materials and to generate energy in the form of electricity, heat or fuel for transport. One of the best examples is here in South Africa.

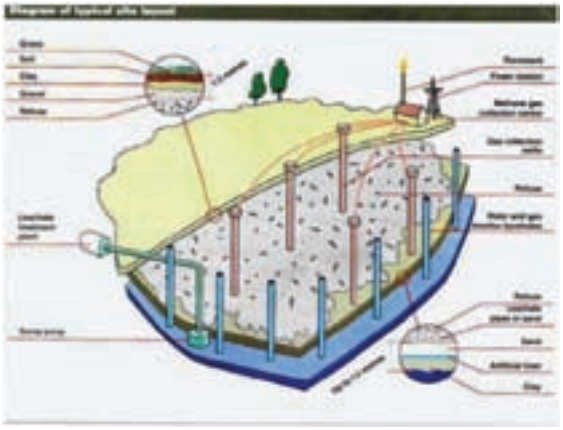
CASE STUDY

Durban's Mariannhill Electricity from Landfill Gas Project

In December 2006, Durban's registered Clean Development Mechanism (CDM) electricity from landfill gas project went live. Mariannhill is a 4.4 million cubic hectare site, receives about 850 tonnes of solid waste per day and is expected to be operational until 2024 (Moodley, S. 2007). It is widely known that

landfills during decomposition phases generate large volumes of landfill gas (LFG), typically containing some 40-60% methane (Weinand. 2007). With climate change looming on all horizons, reduction of these LFGs can make a large impact on municipal and even national green house gas emission reductions.

At the Mariannhill landfill site landfill gas is extracted through a network of pipe work systems, which allow the gas to be fed into purpose-built spark-ignition engines. A 1000 kW engine has been installed on site, with space allocated for a second engine in further stages when new cells come online.



This project currently generates 1MW of electricity per day and will reduce Durban's electricity demand from Eskom by up to 10 MW when all three sites are fully operational. According to Wienand, Mariannhill's project executive, "This project will reduce approximately 450,000 tons of carbon dioxide which would have been emitted by Eskom's power stations over the project life span of the sites," (Weinand. 2007).

Landfill electricity from gas generation projects are not competitive with local electricity prices in South Africa. However, Durban's Mariannhill project was made possible through "carbon finance", which was channelled through the World Bank's prototype carbon fund (PCF), a public private partnership with participants from several countries worldwide (Weinand. 2007).

Not only is Mariannhill notable for its electricity generation, peak load and emissions reduction, but it is also Africa's (and arguably the world's) first landfill site conservancy. Innovative measures have been put in place to protect natural biodiversity and to reduce negative environmental impacts at the site.

"Naturalistic engineering" techniques have been adopted, which include the promotion of vegetation growth in capped areas, the provision of an on-site, indigenous nursery, and the use of wetlands for storm water management and tertiary water treatment. The conservancy hosts a bird hide where a 118 bird species have been recorded on the site (Moodley, S. 2007), and a community education center. Mariannhill won the most prestigious prize at the public sector Impumelelo Awards in 2007.

Stormwater attenuation wetland at Marianhill

Sorting line at Mariannhill's Materials Recovery Facility

Transfer line and trommel

Magnet for collection of metals collection

Crushed and bailed tin cans

Bailed goods to be sold for re-processing

CONCLUSION

An abundance of legislation governing various aspects of waste and waste related issues exists in South Africa. The National Environmental Management: Waste Management Act (NEMWA. 2008) has recently been finalised. This Act will form the over arching waste management act governing all spheres of waste management. South Africa's standard method of waste disposal is disposal to landfill. More holistic approaches can be rolled out through municipal integrated waste management plans, now that the National Act has been promulgated. In some cities, waste minimization strategies are already being implemented (by local government, NGO's, corporates, schools, etc.) and bylaws are being written, however, much more can be achieved in terms of reduction, reuse, recycling and alternate methods of solid waste disposal.