

Figure 1-5: Graphical Display of Socio-Economic Distribution

From Table 1-2 and Figure 1-5 it is clear that a significant portion of Overstrand's population falls within the Low to Very Low Income classification, i.e. households with an income of less than R38,400 per annum.

Poverty "pockets" within the municipal area have been identified and listed below in Table 1-3

Table 1-3: Identified Poverty "Pockets" in Overstrand Municipality

Hermanus	Mount Pleasant- 2 nd Phase
	Westdene
	Zwelihle
Pearly Beach	Eluxolweni
Stanford	Die Kop
	Thembelihle
	Stanford South
Gansbaai	Beverly Hills
	Blompark
	Masakane
	RDP Houses
Kleinmond	Beverly Hills
	Overhills
	Poppedorp
	Proteadorp
Betty's Bay	Mooiuitsig

The Provincial Treasury Socio-Economic Profile for the Overberg District and local municipalities-2006, provided the figures for illiteracy, skills level and job creation.

Overstrand Municipality at 19% has the lowest illiteracy rate in the District compared to Overberg District's value of 27%, Swellendam 35%, Cape Agulhas 24% and Theewaterskloof 32%, based on people older than 14 years of age with a formal education of less than grade 7.

Overstrand also has the highest skilled labour force as provided by the same source as illiteracy, as indicated in Table 1-4.

Table 1-4: Skills levels in the District

Area	High-skilled %	Skilled %	Low-skilled %
Overberg DM	13.2	36.8	50.0
Cape Agulhas	16.2	43.3	40.4
Overstrand	18.1	44.4	37.5
Swellendam	13.1	32.2	54.8
Theewaterskloof	9.9	32.1	58.0

A total of 4,568 new jobs were created in Overstrand during 2006, which is nearly half of the total jobs created for the Overberg District Municipality, i.e. 10,143.

1.4 TRANSPORT INFRASTRUCTURE

The road network of Overstrand can best be described as rural. The major roads are the R43 and R44, which effectively link most of the towns within the Overstrand Municipal boundaries. The R326 links Stanford with the N2 as well as with the R316 road between Caledon and Napier.

There are no railway lines in the Overstrand Municipal area.

1.5 AWARENESS AND EDUCATION

Generally the lack of public awareness of the gravity of the problem of sustainable waste management has a significant impact on the effectiveness of the management of waste. However, public awareness is quite notable in Overstrand due to the source separation initiatives of the municipality over the last number of years.

The successful implementation of the Overstrand IWMP will require that all persons within the Municipal boundaries are aware of waste issues as an integral part of the creation of a healthy environment. They should be empowered to play their specific role in the development and implementation of the waste management initiatives.

Public participation is closely linked with education and public awareness. The significant difference between awareness programmes and public participation is that public awareness focuses on disseminating information, whereas public participation aims at obtaining participation, comment, input and feedback from the public.

Since Overstrand Municipality is continuously disseminating information on waste management to the public, numerous successes have already been achieved.

1.6 BACKGROUND POLICY AND LEGISLATION

The draft National Environmental Management: Waste Management Bill can be seen as part of government's present reform of environmental affairs, the National Environmental Act (NEMA).

The fragmented and uncoordinated way pollution and waste is currently being dealt with, as well as the insufficient resources to implement and monitor existing legislation, contributes largely to the unacceptably high levels of pollution and waste in South Africa. Through the promulgation and implementation of various pieces of policies, legislation, standards and guidelines as well as the implementation of co-operative governance as envisaged in the Constitution this situation will be improved. The current fragmentation, duplication and lack of co-ordination will be eliminated.

Pollution and waste management is not the exclusive preserve of government. The private sector and civil society have crucial roles to play. The fostering of partnerships between government and the private sector is a prerequisite for sustainable and effective pollution and waste management to take place. Similarly, the spirit of partnerships and co-operative governance between organs of state is equally important due to the crosscutting nature of pollution and waste management.

1.6.1 Constitution of the Republic of South Africa

In 1996 the new Constitution created the right to the environment as a fundamental right. This fundamental right to the environment ensures everyone's right to an environment that is not harmful to their health or well-being. South African law, the environment and all South Africans have a constitutional right to have the environment protected for present and future generations.

This means that there must be reasonable legal and other measures to prevent ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

All legislation has to fall within the stipulations of the Constitution. The following sections are of particular relevance where waste is concerned:

- **Section 24(a)**

Provides everyone the right to an environment that is not harmful to a person's health and well-being.

- **Section 24(b)**

Provides everyone the right to have the environment protected through reasonable legislative and other measures. The implementation of section 21, 22 and 26 of the Environment Conservation Act, 1989 is such a legislative measure to protect the environment.

- **Section 25**

Provides for property rights. The Constitution makes provision for both property rights and the right to a healthy environment. A situation may arise in extreme cases where there is a conflict due to rejecting an application for a listed activity from taking place. In such cases it will be up to the court to decide whether the interest of the community (right to a healthy environment) weighs heavier than the right of the individual.

- **Section 32**

Provides the right to access to information. The lack of information is one of the major obstacles in environmental impact management. The Bill of Rights enshrines the right of access to information held by the State, or any other person, which is required for the exercise of any right. The section imposes a duty on the State to enact legislation to give effect to the right. The integrated pollution and waste management policy includes provisions concerning access to information insofar as it relates to future integrated pollution and waste management legislation.

- **Section 38**

Provides locus standii or the 'right to get involved' to any member of the public. This means that any member of the public has the right to take appropriate action to prevent environmental damage. This may include taking action against the relevant authority for failing to perform its duties in preventing environmental damage or an individual or authority that is in the process of undertaking listed activities in terms of the NEMA EIA Regulations, without the necessary authorisation to undertake such activities.

- **Section 41**

Provides principles for co-operative governance and intergovernmental relations. The Constitution allocates legislative authority as well as executive and administrative powers to all three levels of government. Schedules 4 and 5 determine the functional areas of government. For example, Schedule 5 allocates to Overstrand Municipality, as a local municipality, the function of "*refuse removal, rubbish dumps and solid waste disposal*".

The environment is a cross-sectoral matter and it is therefore important that co-operation between government on all levels is necessary. Furthermore, Chapter 7 of the Constitution of South Africa (Act 108 of 1996) describes the role and responsibilities of Local Government, which include the objectives in Section 152:

“The objects of local government are:

- to promote social and economic development.
- to promote a safe and healthy environment...”.

These principles are further developed in the National Environmental Management Act 1998 (Act 107 of 1998).

The Constitution (Act No. 108 of 1996) is relevant to pollution and waste management for two reasons. Firstly, the Bill of Rights (Chapter Two of the Constitution) contains a number of rights relevant to integrated pollution and waste management, to the extent that an Act or particular statutory provision that does not uphold these rights, is unconstitutional. Secondly, the Constitution provides the legal basis for allocating powers to different spheres of government, and is thus relevant to the institutional regulation of integrated pollution and waste management.

Sovereign

The Constitution states that South Africa is a sovereign, democratic State. In terms of environmental management, it is important to recognize that sovereignty includes the ability to limit sovereign powers by entering into international agreements where the need arises.

The Bill of Rights

The most pertinent fundamental right in the context of integrated pollution and waste Management is the Environmental Right (Section 24), which provides that:

“Everyone has the right

- (a) to an environment that is not harmful to their health or well-being; and**
- (b) to have the environment protected, for the benefit of present and future generation through reasonable legislative and other measures that –**
 - (i) prevent pollution and ecological degradation;**
 - (ii) promote conservation; and**
 - (iii) secure ecologically sustainable development and the use of natural resources while promoting sustainable economic and social development. ”**

This section of the Bill of Rights specifically imposes a duty on the State to promulgate legislation and take other steps to ensure that the right is upheld and that, among other things, pollution and ecological degradation are prevented.

1.6.2 National Environmental Management Act

The NEMA provides for co-operative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

As the principal framework act for environmental issues, it has direct relevance to the implementation of the National Waste Management Strategy (NWMS), one of the key implications being the designation of the DEAT as lead agent for the environment. Chapter 7 of NEMA has important direct implications for the achievement of the NWMS initiative.

The environment as defined in NEMA is the natural environment along with its physical chemical, aesthetic and cultural properties, that influence human health and well-being.

NEMA contains the following environmental principles:

- Environmental management must put people and their needs at the forefront, and must serve their interest fairly.
- Development must be socially, environmentally and economically sustainable. This means that the following things must be considered before there is development:

- a) Disturbance of ecosystems and loss of biodiversity
 - b) Pollution and degradation of the environment
 - c) Disturbance of landscapes and sites where the nation's cultural heritage is found
 - d) Non-renewable resources must be used responsibly
 - e) The precautionary principle must be applied
 - f) Negative impacts must be anticipated and prevented and if they can't be prevented they must be minimized or remedied.
- Environmental management must be integrated. The best practical environmental option must be pursued.
 - Environmental justice must be pursued so that there is not unfair discrimination in the way that negative environmental impacts are distributed
 - There should be equitable access to environmental resources, benefits and services to meet basic human needs. Special measures may be taken to ensure access for persons disadvantaged by unfair discrimination.
 - Responsibility for environmental health and safety of any policy, programme or project must continue throughout the life cycle of a project
 - Public participation in environmental decision-making must be promoted. The participation of vulnerable and disadvantaged groups must be ensured
 - Decisions must take into account the interests, needs and values of all interested and affected parties. This includes recognizing all forms of knowledge including traditional and ordinary knowledge
 - Community well being and empowerment must be promoted through environmental education
 - The social, economic and environmental impacts of the activities must be assessed
 - The rights of workers to refuse to do work that is harmful to human health or the environment and to be informed of dangers must be respected
 - Decisions must be taken in an open and transparent manner and access to information provided in accordance with the law
 - There must be inter government co-ordination and harmonization of policies and laws
 - Actual or potential conflicts of interest between organs of state must be resolved through conflict resolution procedures
 - Global and international responsibilities relating to the environment must be discharged in the national interest
 - The environment is held in a public trust for the people and the use of environmental resources must serve the public interest, and be protected as the people's common heritage
 - The polluter must pay for the costs of remedying pollution, environmental degradation and adverse health impacts
 - The vital role of youth and women in environmental management must be recognized and their full participation promoted
 - Sensitive or stressed ecosystems must receive special attention in planning which might affect them especially when they are subject to significant resource usage and development pressure.

NEMA also stipulates in Section 24 that there must be an environmental impact assessment before any activity or development that needs permission by law and which may significantly affect the environment.

Section 28 places a specific duty of care on every person to prevent, or mitigate and remediate, environmental damage and pollution. Any person, who was responsible for, or directly or indirectly contributed to the pollution, can be held liable. This includes the owner of the land at the time the pollution occurred or their successor in title, a person in control of the land at that time, or any person who negligently failed to prevent the situation.

The public can use NEMA to exercise their rights when they believe that the right procedures were not followed. Therefore it is extremely important to make sure that when there is a proposed development where the municipality is involved e.g. change of land-use – to make sure that the consultant and/or developers follow the right procedures.

The NEMA Environmental Impact Assessment Regulations

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities that may not commence without and environmental authorisation or existing activities in respect of which an application for environmental authorisation is required. In this context, EIA Regulations contained in three General Notices in terms of NEMA (GN R385, 386 and 387) (came into force on 3 July 2006.

GN R 385 lays out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment process or a Scoping and EIA. The regulations for both alternative processes stipulate that:

- Public participation must be undertaken at various stages of the assessment process;
- The assessment must be conducted by an independent Environmental Assessment Practitioner;
- The relevant authorities respond to the applications and submissions within stipulated time frames; and
- Decisions taken by the authorities can be appealed by the proponent or any other interested and affected party.

GN R 385 also makes provision for appeal against any decision issued by the competent authority. In terms of the Regulations, a notice of intention to appeal has to be lodged with the competent authority in writing within ten days of the notification of the issue of the Record of Decision. The appeal must be lodged within 30 days of the submission of the notice of intention to appeal.

1.6.3 Environmental Conservation Act

Section 20 of the Environmental Conservation Act requires the owner of a waste disposal facility to apply for a permit from the minister of Environmental Affairs and Tourism to operate such a facility. The issuing of a waste disposal site permit (regulated under section 20 (6) of the ECA) is subject to the (a) concurrence of the Minister of Water Affairs and Forestry and (b) the inclusion in the permit of the conditions contained in a Record of Decision issued by the Minister of Water Affairs and Forestry regarding any measure that the Minister of Water Affairs and Forestry considers necessary to protect a water resource as defined in the National Water Act (36 of 1998) (NWA). A disposal site in terms of Section 1 of the ECA is a site used for the accumulation of waste with the purpose of disposing or treatment of such waste.

Therefore waste treatment plants, incinerators, compost plants, transfer stations, buyback centres, recycling plants and public drop-off facilities are all considered to be waste disposal sites.

1.6.3.1 Guidelines Pertaining to the Environmental Conservation Act

1.6.3.1.1 Introduction

Section 20(1) of the Environmental Conservation Act (ECA), (Act No 73 of 1989) makes provision for the permitting of landfills. The Act states that any person who operates or intends to operate a waste disposal site must apply to the Department for a permit.

The Minimum Requirements are implemented through and enforced by the Landfill Site Permit. Once a Minimum Requirement is included in a Landfill Site Permit, it is legally enforceable.

1.6.3.1.2 Waste Classification

Waste types are graded into two classes, General (G) and Hazardous (H).

- General Waste (G) is a generic term applied to all urban waste that is produced within the domain of local authorities. It comprises rubble, garden, domestic, commercial and general dry industrial waste. It may also contain small quantities of household hazardous waste substances disposed within it e.g. batteries, insecticides, etc.

General waste may be disposed of on any permitted landfill. However, General Waste sites must have leachate management systems, since General waste can produce leachate with unacceptably high pollution potential.

- Hazardous Waste (H) is waste which has the potential, even at low concentrations, to have a significant adverse effect on public health and/or the environment. The following types of waste should be regarded as potentially hazardous, namely:

Hazardous Waste is further classified in terms of Hazard Ratings, based on Acute Mammalian Toxicity, Ecotoxicity, Environmental bioaccumulation in the food chain and Chronic Toxicity. Hazardous Waste is thus classified into:

Hazard Rating 1:	Extreme Hazard
Hazard Rating 2:	High Hazard
Hazard Rating 3:	Moderate Hazard
Hazard Rating 4:	Low Hazard

1.6.3.1.3 Definition of Hazardous Waste

A Hazardous Waste is defined as:

“an inorganic or organic element or compound that, because of its toxicological, physical, chemical or persistency properties, may exercise detrimental acute or chronic impacts on human health and the environment. It can be generated from a wide range of commercial, industrial, agricultural and domestic activities and may take the form of liquid, sludge or solid. These characteristics contribute not only to degree of hazard, but are also of great importance in the ultimate choice of a safe and environmentally acceptable method of disposal.”

Further to this, a Hazardous Waste can be defined as a waste that directly or indirectly represents a threat to human health or the environment by introducing one or more of the following risks:

- Explosion or fire;
- Infections, pathogens, parasites or their vectors;
- Chemical instability, reactions or corrosion;
- Acute or chronic toxicity;
- Cancer, mutations or birth defects;
- Toxicity, or damage to the ecosystems or natural resources;
- Accumulation in biological food chains, persistence in the environment, or multiple effects to the extent that it requires special attention and cannot be released into the environment or be added to sewage or be stored in a situation which is either open to air or from which aqueous Leachate could emanate.

The definition of Hazardous Waste is very broad, since wastes can vary substantially in nature, composition, size, volume, appearance and degree of harmfulness. In terms of the Minimum Requirements, therefore, Hazardous Wastes are grouped into four Hazard Ratings

This further classification, termed the Hazard Rating, differentiates between a Hazardous Waste that is fairly or moderately hazardous and one that is very or extremely hazardous. The Hazard Rating also indicates the class of Hazardous Waste landfill at which the waste may be disposed.

Hazard Rating 1 (extreme risk)	}	=	H:H Landfill
Hazard Rating 2 (high risk)			
Hazard Rating 3 (moderate risk)	}	=	H:H or H:h Landfill
Hazard Rating 4 (low risk)			

An H:H landfill is more stringently designed, operated and monitored than an H:h landfill.

1.6.3.1.4 Classification of Hazardous Waste

There are four steps in the classification of a Hazardous Waste

- Identification of the waste or waste stream as probably Hazardous.
- Testing and analysis to determine the hazardous properties, characteristics and components of a waste. This will confirm whether the waste is Hazardous or not.
- Classification and treatment in accordance with SANS Code 0228 "The Identification and Classification of Dangerous Substances and Goods".
- Analysis and Hazard Rating of the waste or its residue, in order to determine the Hazard Rating and the Minimum Requirements for disposal.

An additional step would be re-examination of an existing classification with the objective of possible delisting and reclassification. This would apply in cases where, because of pre-treatment, low concentration, low mobility or other applicable factors, waste can delist to a lower Hazard Rating.

1.6.3.1.5 Analysis to confirm that a waste is a Hazardous Waste

If it is probable that the waste is a Hazardous Waste, it must be tested for its properties and analysed for its substances. These are then compared to the lists of characteristics, properties and substances in SANS Code 0228, the Basal Convention, and the Waste Classification Tables in the Minimum Requirements.

If the properties and substances of the waste are not listed in SANS Code 0228, but conform to the Basel Convention or one of the nine classes in the Code, the waste is probably a Hazardous Waste. The Department should then be approached for guidance.

1.6.3.1.6 SANS Code 0228

SANS Code 0228: "The Identification and Classification of Dangerous Goods and Substances" is a system for classifying hazardous substances for transport purposes. In the Code, hazardous substances are given an identification number and divided into nine classes:

Class 1	Explosives
Class 2	Gases
Class 3	Flammable liquids
Class 4	Flammable solids
Class 5	Oxidising substances and organic peroxides
Class 6	Toxic and infectious substances
Class 7	Radioactive substances
Class 8	Corrosives
Class 9	Other miscellaneous substances.

The waste must be tested against the nine classes, to see into which class it falls (it may fall into more than one class). The Minimum Requirements for that class must then be complied with.

The Hazardous Waste classification table is derived from SANS Code 0228. The typical generators of Hazardous Waste are divided into typical industrial groups. The groups indicate an industry which is expected to generate the largest quantity of Hazardous Waste material. The key to Industrial Groups used in Appendix 9.2 of the Minimum Requirements is attached as **Annexure A**.

1.6.4 Health Act, Act 63 of 1977 and the Western Cape Health Care waste Management Draft Bill

Health Care Waste is regulated by the Health Act, Act 63 of 1977. Draft regulations on nuisances which also deal with health care waste was published under condition 23 of the said Act.

The management of health care waste is prescribed in the SANS code: 0248: 1993.

In the Western Cape, a Health Care Management Bill was submitted to Parliament. The Health Care Management Bill provides for the effective handling, storage, collection, transportation, treatment and disposal of health care waste by all persons in the Province of the Western Cape; and provides for matters incidental thereto.

The object of this Act is to promote integrated health care waste management and thereby—

- (a) reduce the risks of health care waste to human health;
- (b) prevent the degradation of the environment;
- (c) prevent the illegal dumping of health care waste;
- (d) promote sustainable development, and
- (e) ensure responsible management of health care waste within the Province.

Under this Act a Municipality must:

- (a) enforce the relevant provisions of this Act within its area of jurisdiction;
- (b) perform audits of generators, transporters, treaters or disposers of health care waste within its area of jurisdiction to ensure compliance with the provisions of this Act;
- (c) report annually to the Provincial Minister on the number of incidents of illegal dumping of health care risk waste within its area of jurisdiction, the number of incidents of illegal dumping of health care risk waste pursued in a court of law, and the number of incidents of illegal dumping of health care risk waste successfully convicted in a court of law.

Health Care Waste is produced by hospitals, clinics, physicians, offices, dentists, funeral homes, veterinary clinics and medical- and research laboratories.

Currently only 10-15% of medical waste is considered infectious. The enormous volumes of health care waste requiring special handling and disposal for all infectious and pathological waste are responsible for the current re-evaluation of the terminology for health care waste.

The modern trend in infection control is dictated by the risk posed by the procedure and not by the diagnoses. Thus health care waste is divided into Health Care General Waste (HCGW) and Health Care Risk Waste (HCRW). Health Care Risk Waste generally indicates infectious waste, pathological waste, sharps, chemical and pharmaceutical waste, radioactive and cytotoxic waste.

1.6.5 National Water Act (Act no. 36 of 1998)

The purpose of the Act is to ensure that the Municipality's water resources are protected, used, developed and conserved in ways which take into account the protection of aquatic and associated ecosystems; that addresses basic human needs; that ensures the reduction and prevention of pollution; and that meets international obligations

Section 19 of the NWA deals with landowners and users involved in any activity or process which causes, has caused or is likely to cause pollution of water resources. Such landowners and users are obliged to take all reasonable measures to prevent any such pollution from occurring, continuing or recurring. This includes measures to comply with any prescribed waste standard or management practice.

Furthermore, the NWA requires anyone who intends undertaking a water use, as defined, to obtain a licence. The water uses that have may be relevant to waste management activities are:

- discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit; and
- disposing of waste in a manner which may detrimentally impact on a water resource.

The applications for permits, licenses and exemptions made before the promulgation of this Act could still be dealt with in terms of the Water Act 1956 (Act No. 54 of 1956).

1.6.6 National Environment Management: Air Quality Act 2004 (Act No. 39 of 2004)

This Act has been promulgated in order to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development. It also provides for national norms and standards regulating air

quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.

The object of this Act is:

(a) to protect the environment by providing reasonable measures for-

- (i) the protection and enhancement of the quality of air in the Republic;
- (ii) the prevention of air pollution and ecological degradation; and
- (iii) securing ecologically sustainable development while promoting justifiable economic and social development; and**

(b) generally to give effect to section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

1.6.7 Municipal By-Laws

In terms of Section 13 of the Local Government Systems Act 2000, (Act 32 of 2000), the Overstrand municipality made a solid waste by-law dealing with the containment and disposal of solid waste. The by-law was published in the Provincial Gazette 6423 of Friday, 9 March 2007. This by-law addresses various issues such as:

Section 1: Definitions

Section 2: Removal of refuse refers to charges, charge exemptions, number of bags per property and the enforcement of additional services if so required.

Section 3: Notice to Council: Property owner notification of service discontinuation, etc.

Section 4: Provision of containers: Provision of business containers, numbers thereof and charges are determined by Council. Private residents must obtain suitable animal proof containers when required.

Section 5: Containers: Business: Areas for placement and collection of containers at business premises.

Section 6: Use and care of containers and bin liners: Residential areas. Containers are placed out on the side walk, a maximum of 1 m within the property; cleaned and suited for the required area. "Baboon-areas" require animal proof containers while other areas are allowed to place solid waste in black bags.

Section 7: Disposal of solid waste: No person shall dispose of waste in an unacceptable manner, by means of burning or dispose of hazardous waste without council permission. Disposal of hazardous waste is only in accordance with special conditions and requirements such as no disposal of HCW in council containers. Certain areas may have different collection systems than other.

Section 8: Containers in problem animal areas: Animal proof containers as approved by Council must be used.

Section 9: Disposal of bulky Refuse: Bulky waste must be disposed of within 14 days of generation in a site allocated by Council. At the request of the owner, Council may remove such bulky refuse and charge the owner.

Section 10: Disposal of builder's rubble: Builder's rubble may be disposed of for the purpose of land reclamation with written Council consent; special containers for the containment and disposal may be determined by Council; disposal must not to be later than 1 month after generation.

- Section 11: Special Industrial/ Medical and Hazardous waste: Council must be informed by the generator of the chemical composition, quantity, storage facilities, removal and final disposal. The chemical composition is do be presented as an analysis by an industrial chemist; no nuisances may be caused during storage; disposal in permitted landfills only.
- Section 12: Landfill sites: No person shall dispose of waste on a landfill without a permit and such a person must supply the permit, identify the waste type and operate within the criteria of acceptable waste types, container size and landfill permit conditions; enter and exit at the same designated point/ gate; shall not possess/use liquor on the landfill; pay a tariff when required; council is not liable for claims resulting from access to landfill.
- Section 13: Ownership of refuse: All refuse removed by the Council or waste placed in the landfill or abandoned objects are the property of the Council.
- Section 14: Dumping of litter: No person shall discard, abandon or dump litter on any land or water. Dumped litter may only be deposited in a Council approved facility; litter in public places must be deposited in refuse bins. **Of interest is that no person shall dispose/dump/discard litter OR ALLOW ANY PERSON to do the same.** - Council may remove such litter and hold the property owner and/or the generator of litter responsible for such costs.
- Section 15: Access to premises: There must be access to Council for collecting and removing refuse if a service is provided and suspend such a service if damage or harm may be caused to Council property or workers.
- Section 16: A Council resolution declares areas as problem animal areas and may be revised from time to time.
- Section 17: Pavements: The owner must ensure that the pavement in front of his house is kept free of refuse except on collection day.
- Section 18: Recycling: All waste generators, as determined by Council, must divide their refuse in recyclable and non-recyclable according to Council directives. Recycled waste must be placed in clear bags (or set aside) for separate collection.
- Section 19: Repeal of by-laws: By-laws may be repealed by Council when required.
- Section 20: Offences and penalties: Any person who contravenes the by-law or fails to comply is guilty of an offence and liable for conviction to a penalty.
- Section 21: Short Title: By-law is called the Overstrand Municipality: Solid Waste Management By-law, 2006. 9 March 2007.

1.6.8 National Waste Management Strategy

The National Waste Management Strategy presents Government's strategy for integrated waste management for South Africa.

The National Waste Management Strategy presents a long-term plan (up to the year 2010) for addressing key issues, needs and problems experienced with waste management in South Africa. The strategy gives effect to the Bill of Rights, Constitution of South Africa, Act 108 of 1996, on the basis of which the people of South Africa have the right to an environment that is not detrimental to their health. Furthermore, the strategy translates into action Government's policy on waste as set out in the Draft White Paper on Integrated Pollution and Waste Management for South Africa (published in 1998).

The objective of integrated pollution and waste management is to move away from fragmented and uncoordinated waste management to integrated waste management. Such a holistic and

integrated management approach extends over the entire waste cycle from cradle to grave, and covers the prevention, generation, collection, transportation, treatment and final disposal of waste. Integrated waste management thus represents a paradigm shift in South Africa's approach to waste management, by moving away from waste management through impact management and remediation and establishing instead a waste management system which focuses on waste prevention and waste minimisation.

The strategy aims to reduce both the generation and the environmental impact of waste. It presents a plan for ensuring that the socio-economic development of South Africa, the health of its people and the quality of its environmental resources are no longer adversely affected by uncontrolled and uncoordinated waste management. It establishes a waste management system that concentrates on avoiding, preventing and minimising waste and makes provision for waste management services for all by extending an acceptable standard of waste collection, as well as transportation, treatment and disposal services to all communities.

While the long-term objective of the strategy is waste prevention and minimisation, a number of remediative actions such as improved waste collection and waste treatment are required in the shorter term due to prevailing inadequate waste management practices.

1.6.9 White Paper on Education and Training (1995)

The 1995 *White Paper on Education and Training* states that "environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of **all levels and programmes of the education and training system**, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources".

The White Paper advocates environmental education and training **at all levels**. This would include the local government sphere, particularly when it comes to the environmental education & training of government officials and workers.

The education of the youth is the responsibility of national and provincial government. However, the Constitution does state that where the capacity exists, functions can be delegated to local government, and that the spheres of government, while distinctive, are interdependent and interrelated. Local government should support the other spheres of government (such as the national Department of Education, DoE) in areas of its own focus, such as environmental management and sustainable development.

1.6.10 The Municipal Systems Act (Act 32 of 2000)

This policy outlines the role and responsibilities of local governments as to:

- Provide democratic and **accountable** government for local communities;
- Ensure the provision of services to communities in a **sustainable** manner;
- Promote **social** and economic development;
- Promote a safe and healthy **environment**;
- Encourage the **involvement** of communities and community organisations in the matters of local government, and
- Strive, within its financial and administrative capacity, to achieve the objectives above.

These responsibilities indicate a need for an environmentally educated work force (accountable) as well as an environmentally educated public (involvement).

1.6.11 National Environmental Management: Waste Bill

The purpose of this Act is to protect health, well-being and the environment by providing reasonable measures for -

- the minimisation of the consumption of natural resources;
- the avoidance and minimisation of the generation of waste;
- the recovery, re-use and recycling of waste;
- the treatment and safe disposal of waste as a last resort;
- the prevention of pollution and ecological degradation;

- securing ecologically sustainable development while promoting justifiable economic and social development;
- promoting and ensuring the effective delivery of waste services;
- remediating land where contamination presents, or may present, a significant risk of harm;
- achieving integrated waste management reporting and planning;
- to ensure that people are aware of the impacts of waste on health and the environment;
- to provide for compliance and generally to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to the health and well-being of people.

The interpretation and application of this Act must be guided by the national environmental management principles set out in section 2 of the National Environmental Management Act.

The National Environmental Management: Waste Bill allows for the compilation of a Waste Management strategy, national, provincial and local standards.

Municipalities must in terms of their by-laws:

- establish service standards and levels of service for the collection of waste;
- may identify requirements in respect of the separation, compacting and storage of waste;
- may identify requirements for the management of waste, including requirements in respect of the avoidance of the generation of waste and the recovery, reuse and recycling of waste;
- the requirements in respect of the directing of waste to specific treatment and disposal facilities.

Each Municipality must include in its integrated development plan contemplated in Chapter 5 of the Municipal Systems Act, an integrated waste management plan that is consistent with the relevant provincial integrated waste management plan.

The annual performance report which must be prepared in terms of section 46 of the Municipal Systems Act must contain information on the implementation of the municipal integrated waste management plan.

Municipalities must also in terms of the Act:

- conduct municipal activities in accordance with the National Waste Management Strategy and any national or provincial norms and standards;
- compile an integrated waste management plan;
- ensure that waste management services are provided within the municipality in a manner which prioritises the recovery, re-use or recycling of waste and provides for the treatment and safe disposal of waste as a last resort;
- designate a waste management officer;
- ensure that provision is made for the management and collection of litter;
- secure compliance with the objects of this Act that are in the domain of the municipality; and
- implement any other measures that are necessary for securing the objects of this Act that are within the domain of the municipality.

Duty to provide collection services

Every municipality has an obligation to progressively ensure that efficient, effective and affordable waste collection services are provided in its area.

A municipality may, by notice, require any person making use of the municipal collection service to separate specified types of waste from the general waste for the purposes of recovery, re-use or recycling.

1.6.12 White Paper: Policy on Pollution Prevention, Waste Minimisation, Impact Management and Remediation (March 2000)

In line with international trends and our national objectives of efficient and effective management of our nation's resources, priority is given to prevention of waste. Unlike previous policies that focused predominantly on so called "end of pipe" treatment, this White Paper underscores the importance of preventing pollution and waste and avoiding environment degradation.

Effective mechanisms to deal with unavoidable waste will remain necessary, but much greater attention must be directed to the introduction of preventative strategies aimed at waste minimisation and pollution prevention. Ever increasing urban and industrial development throughout the world is leading to levels of pollution, which seriously threaten the natural resources upon which humankind depends for its survival.

Although South Africa has extensive environment, pollution and waste management legislation, responsibility for its implementation is scattered over a number of departments and institutions. The fragmented and uncoordinated way pollution and waste is currently being dealt with, as well as the insufficient resources to implement and monitor existing legislation, contributes largely to the unacceptably high levels of pollution and waste in South Africa. The White Paper on Integrated Pollution and Waste Management will result in a review of the existing legislation and the preparation of a single piece of legislation dealing with waste and pollution matters.

Pollution and waste management is not the exclusive preserve of government. The private sector and civil society have crucial roles to play. The fostering of partnerships between government and the private sector is a prerequisite for sustainable and effective pollution and waste management to take place. Similarly, the spirit of partnerships and co-operative governance between organs of state is equally important due to the crosscutting nature of pollution and waste management.

Monitoring and collection of information on pollution and waste generation are crucial for the implementation of pollution and waste reduction measures. Moreover, the sharing of such information and creating awareness about the issues will enable all stakeholders, including communities, to gain a better understanding of the relation between pollution, waste management and the quality of life.

The White Paper proposes a number of tools to implement the objectives of the policy it sets out. The most significant of these is a legislative programme that will culminate in new pollution and waste legislation. This proposed legislation, amongst other things, will address current legislative gaps, and clarify and allocate responsibilities within government for pollution and waste management.

The policy presents seven strategic goals, which are as follows:

- Goal 1: Effective Institutional Framework and Legislation
- Goal 2: Pollution Prevention, Waste Minimisation, Impact Management and Remediation
- Goal 3: Holistic and Integrated Planning
- Goal 4: Participation and Partnerships Governance in Integrated Pollution and Waste Management
- Goal 5: Empowerment and Education in Integrated Pollution and waste Management
- Goal 6: Information Management
- Goal 7: International Cooperation

The role of Local Government

Municipalities will be responsible for providing waste management services, and managing waste disposal facilities. Specific functions to be carried out by municipalities will include:

- compiling and implementing general waste management plans, with assistance from provincial government
- implementing public awareness campaigns
- collecting data for the Waste Information System
- providing general waste collection services and managing waste disposal facilities within their areas of jurisdiction
- implementing and enforcing appropriate waste minimisation and recycling initiatives, such as promoting the development of voluntary partnerships with industry, including the introduction of waste minimisation clubs where possible, regional planning, establishment and management of landfill sites, especially for regionally based general waste landfills.

1.6.13 **Planning Documents**

The Provincial Spatial Development Framework (November 2005)

The PSDF states that there is a concern that a number of waste landfill sites are not properly managed. In addition to the challenges of managing increasing waste volumes and decreasing land available for waste disposal, the Western Cape, along with other Provinces, has to deal with waste management problems caused by inequitable development and inadequate service delivery. Waste issues are often closely associated with poverty, environmental health and social justice issues. The following Policies have particular reference:

- RC32** All municipalities shall follow an integrated hierarchical approach to waste management consisting of the following, avoidance/reduce, reuse, recycle, composting, treatment and final disposal. The Waste Management System shall consist of a collection service from the source, (domestic, office or factory) transfer stations and waste disposal sites. (M)
- RC33** Waste separation at source shall be mandatory in all domestic households and institutions and businesses including high density and multi-storey buildings from a date to be announced. Initially only organic (vegetable and plant matter) and inorganic (usually dry, cardboard, glass, plastics, paper, builders' rubble) waste shall be separated. (M)
- RC34** Material Recovery Facilities shall be established at all Transfer Stations. (M)
- RC35** Engage with the raw material and packaging industries and reach agreement to ensure demand for recycled products. (G)
- RC36** Every urban settlement should have a Transfer Station within a maximum of 5kms from the town centre, inside the Urban Edge. These Transfer Stations shall be properly managed according to best practice so as to minimise nuisance to surrounding neighbours. They should also be open after hours and on the weekends and their locations shall be well publicized so as to ensure that the community uses them. Furthermore, charges should not be levied on loads brought to transfer stations. Micro enterprises wanting to process waste and trade second hand materials on site should be encouraged. (G)
- RC37** Every municipality shall have a Waste Disposal facility site located and operated according to DWAF's minimum requirements that will service the Transfer stations in the urban settlements in that municipality. These sites may or may not be located within the Urban Edge of urban settlements. The main criteria for their location will be to meet satisfactory environmental and transport requirements. (M)

2. WASTE MANAGEMENT STATUS QUO IN OVERSTRAND MUNICIPALITY

2.1 WASTE QUANTITIES AND TYPES

2.1.1 Methodology for General Waste Survey

For the purpose of determining the waste quantities in Overstrand, the population statistics from census (refer Paragraph 1.3) were used to calculate the total tonnage of municipal solid waste (MSW), using typical waste generation figures per person of each socio-economic sector of the community.

No accurate data on waste generation in Overstrand Municipality exists due to the lack of weighbridges or other measuring devices. Karwyderskraal landfill is equipped with a weighbridge and the volumes obtained were used to fine-tune the abovementioned waste generation factors.

2.1.2 Volumes of General Waste generated

It follows that domestic waste generation in Overstrand can be depicted as follows:

Table 2-1: Waste Volumes calculated for Overstrand Municipality

Area	No of Households	Population	Waste Generated in Tonnes/year (2008)	Average Waste Generation Factor for Area in kg/p/d	Waste per Household per Week in kg
Ward 1 (Kleinbaai, Franskraal, Blompark, Masekhane and portion Gansbaai)	2,321	6,841	3,950	1.07	32.7
Ward 2 (Portion Gansbaai, De Kelders, Pearly Beach, Baardskeerdersbos, Viljoenshof and Withoogte)	1,520	3,988	2,833	1.32	35.8
Ward 3 (Stanford, Voelklip)	1,706	5,248	3,643	1.29	41.1
Ward 4 (Hermanus, Mount Pleasant)	2,428	6,984	5,168	1.38	40.9
Ward 5 (portion Zwelihle)	1,336	4,818	2,088	0.81	30.1
Ward 6 (portion Zwelihle)	1,470	4,239	1,769	0.78	23.1
Ward 7 (Sandbaai, Onrus, Vermont, Ertjiesvlei)	2,894	6,643	6,058	1.70	40.3
Ward 8 (Hawston, Fishershaven)	1,825	7,567	4,390	1.08	46.3
Ward 9 (Kleinmond, Proteadorp, Overhills, Honingklip)	2,434	6,896	4,608	1.24	36.4
Ward 10 (Palmiet, Betty's Bay, Mooiuitsig, Pringle Bay, Rooi Els)	1,033	2,228	1,934	1.61	36.0
Total	18,967	55,452	37,463	1.26	38.0

Due to the fact that Overstrand Municipality is made up of various towns that are geographically located along the coastline, it is important to consider the population distribution across these towns as this is an indication of where the waste will be generated and where the waste will be delivered to. This information is extremely helpful in determining the capacities of the various infrastructural facilities.

Table 2-2: Waste Destinations Based On Geographical Location Of Generators

	2008	2010	2015	2020	2025	2030
Waste to Gansbaai Landfill	9,683	10,413	12,488	14,553	16,959	19,764
Waste to Karwyderskraal Landfill	27,792	29,887	35,841	41,767	48,674	56,723
Karwyderskraal via Hermanus Transfer Station	21,108	22,699	27,221	31,722	36,968	43,081
Karwyderskraal via Kleinmond Transfer Station	6,640	7,140	8,563	9,979	11,629	13,552

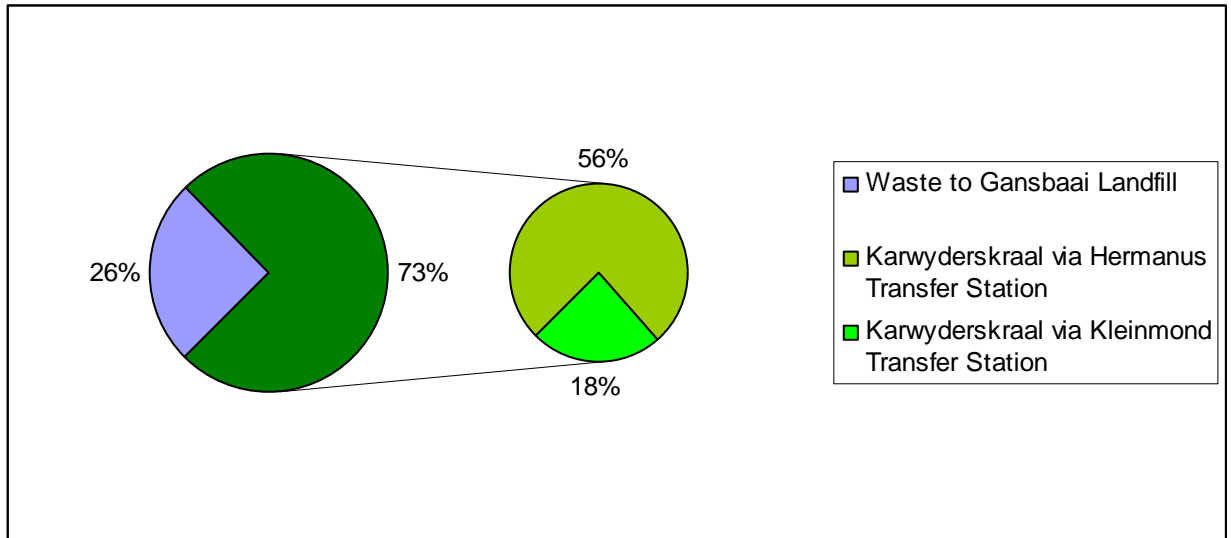


Figure 2-1: Waste Destination Distribution

Also of interest in terms of waste volumes is the fact that most of the towns in Overstrand have a seasonal increase due to being coastal towns. During holidays and some weekends, the population, and waste, increases significantly. The above annual waste volumes include the seasonal volumes.

Non-Hazardous Industrial Waste

Non-hazardous industrial waste has been included in the above volumes.

Builder's Rubble

No separate data is available on builder's rubble and has therefore been included in the above volumes. Even though builder's rubble is accepted free of charge at Karwyderskraal, and the volumes disposed there are available, it does not represent the total volume of builder's rubble generated in Overstrand, since significant volumes are disposed in open spaces and old unpermitted waste sites such as at Stanford.

Public Cleansing Waste

No separate data is available and has therefore been included in the above volumes.

2.1.3 Methodology for Industrial Waste Survey
(To be completed in April 2009)

2.1.4 Volumes of Hazardous Wastes Generated
(To be completed in April 2009)

2.1.5 Recoverable Material Volumes

Due to the lack of a proper scientifically based waste composition study done in the Overberg on a sufficiently large sample that represents seasonal affects as well as different socio economic communities, the anticipated waste composition of the Overstrand will be based on composition studies performed on behalf of DEA&DP during 2007 as well as other recent studies done on similar communities. Although these samples were insufficiently small, it provides perhaps the best “questimate”. From these studies it can be derived that the following percentages (by mass) of recoverable material could be present in Overstrand’s general waste stream:

Paper and Card board: 20%
 Plastics: 13%
 Glass: 6%
 Metal: 4%

From the waste composition as reflected above, it can be calculated that the total volume of recoverable materials that are theoretically available in the waste stream will be as indicated in Table 2-3

Table 2-3: Volumes of Available Recoverable Materials

Waste Facility	PAPER/CARD (t/a)	PLASTICS (t/a)	GLASS (t/a)	METAL (t/a)
Gansbaai landfill	1,937	1,259	581	387
Karwyderskraal Landfill via Hermanus Transfer Station	4,222	2,744	1,266	844
Karwyderskraal via Kleinmond Transfer Station	1,328	863	398	265
TOTALS	7,487	4,866	2,245	1,496

Due to the methods of collection, a large amount of deterioration and contamination of potentially recoverable material takes place. Post-collection recovery (as is currently the norm in South Africa) implies that only a fraction of the above tonnages are available for recovery and recycling, due to contamination. For that reason separation at source is considered to be the preferred methodology to increase the volumes AND value of recovered materials. Overstrand Municipality has already introduced separation at source in various areas within the municipality.

Experience has shown that participation by the public is largely economy driven and the current trend is that separation at source, which implies that recoverable materials are separated by the home owner and “given” to the municipality (or Service Provider) for free, is mainly supported by the middle and higher income groups, whereas the low and very low income groups support buy-back centres where recoverable materials are bought from the residents.

Statistics obtained from the various “separate bag” collections as are currently practised by various municipalities in the Western Cape, indicate that separation at source participation rates of up to 85% are readily achievable in the middle and higher income groups. The degree of contamination in the “separate bag” is significantly lower and the average “tailings” percentage achieved is approximately 10%.

With the assumed strategy of source separation and “clean” Material Recovery Facilities where the source separated materials are sorted into its various groups and sub-groups, and assuming that only middle and higher income group communities will be participating in source separation, it can be calculated that the current (2008) recovery volumes would be as indicated in Table 2-4.

Table 2-4: Calculated Volumes of Recovery of Source Separated Materials

Waste Facility	PAPER/CARD (t/a)	PLASTICS (t/a)	GLASS (t/a)	METAL (t/a)
Gansbaai landfill	751	197	234	68
Karwyderskraal Landfill via Hermanus Transfer Station	1,795	472	560	162
Karwyderskraal via Kleinmond Transfer Station	602	158	188	55
TOTALS	3,148	828	982	285

The above “realistic” volumes can be increased when additional facilities such as buy-back centres are commissioned in low and very low income group communities.

With the current source separation activities in the Greater Hermanus and Greater Kleinmond areas, and the salvaging at the Hermanus Transfer Station, the following materials are currently recovered:

Table 2-5: Current Actual Volumes of Recovery

Recovery Activity	PAPER/CARD (t/a)	PLASTICS (t/a)	GLASS (t/a)	METAL (t/a)
Source Separation	222.9	43.4	161.3	23.3
Salvaging at Hermanus Transfer Station	164.7	67.3	205.4	16.6
TOTALS	387.6	110.7	366.7	39.9

From Table 2-5 it is clear that the current recovery activities only achieve 22.7% of the realistically achievable volumes and only 7.6% of the available recoverable fraction.

2.1.5.1 Paper and Cardboard

Paper and Cardboard form the foundation for any recovery venture, due to the relative constant demand and numerous recycled products made from recovered paper.

Waste paper is transformed from one type to another during the recycling process. The supply and demand for waste paper is cyclical in nature, and therefore marketing patterns have to be adapted accordingly.

Some of the factors that contribute to this erratic demand for recovered paper are:

- difficulty for mills to carry large stock
- periodic mill shut-downs result in fluctuations in demand
- paper stock is considered perishable and thus hazardous to store
- space for storage of stock is limited and costly

Some materials produced with recycled paper pulp include: newspapers, packaging, bags, tissue and towels, corrugated boxes, shoe boxes and files, egg cartons and fruit packing layers.

If paper and cardboard products are clean and separated into different types, significantly higher prices are fetched.

2.1.5.2 Glass

Glass recovery for recycling has had a very erratic history, due to only one recycler having a monopoly in the market. When the capacity of the kilns is full, the price used to drop dramatically due to an over-supply and no demand. Fortunately this situation has stabilized and a constant market for recovered glass is currently prevailing.

The separation of glass is very successful in separation at source activities since it is easy to identify by the home owners. Recent experience in the City of Cape Town has shown that most home owners whom participate in separation at source also wash their glass products before putting it in the recyclables bag.

2.1.5.3 Plastic

Several types of plastics are typically recycled, i.e. PET (transparent plastic bottles e.g. 2 litre cool drink bottles), HDPE (milk containers), LDPE and mixed plastics. Recycled PET is used in the manufacture of small moulded products, such as handles, sporting goods and furniture. Recycled HDPE is used for producing flowerpots, dustbins and a variety of other containers. Mixed plastics are normally used for the manufacture of outdoor furniture, pallets, and plastic timber.

The recent introduction of a levy on shopping bags has caused the amounts arriving at the landfill to reduce dramatically. Less plastic bags are disposed of, as they are recovered and are now manufactured of better quality and thicker plastic.

In order to recycle plastics using current traditional methodology, it has to be sorted into the various categories, and washed if contaminated by the other wastes. Alternative technologies are currently being evaluated (also in South Africa) that could eliminate the need for sorting of plastics.

2.1.5.4 Metal

Metals are the single most recoverable item in the waste stream. Very little degradation takes place during collection. It follows that a relatively small amount ends up in the waste stream, as all types of metal are removed for re-sale at various stages of the waste handling process.

One of the major components of ferrous wastes is the steel can (95% of all cans in the Metropolitan Areas). Non-ferrous metals such as Aluminium and Copper are very scarce in our waste streams, due to its extremely high salvaging value. These are usually removed at source.

2.1.5.5 Economic Sustainability of Waste Recovery

Although the recovery of materials of value from the waste stream for recycling or any other after-use is one of the basic operations in future integrated waste management, the question regarding its financial and economical sustainability should always be asked and answered.

Local experience over the last decade has shown that the South African recycling market, or rather the recycled product market, is very small and very susceptible to unforeseen activities, e.g. if one paper mill burns down, the effect on the waste paper market, and the prices, is significant. The South African "market" is simply too small to absorb these types of set-backs.

For this reason it is commendable that DEA&DP had a study conducted into sustaining the local recycling industry.

But one must consider the economical sustainability and not only the financial sustainability. Economic sustainability considers the whole life-cycle cost and not only the rands and cents of a specific financial year and taking into consideration the avoided costs of airspace saving and also the cost on the environment for the resultant smaller utilisation of virgin resources. An interesting stipulation in the Waste Management Bill is that one may not recover materials from waste if it costs more environmental resources to recover, than it would to dispose of that material – a good example of the total or life-cycle costing principle.

Prices for recovered materials vary greatly from city to city and province to province, from baled to unbaled, from dirty to clean and from material type. External factors also play a significant role such as the oil price, e.g. due to the current low crude oil price of approx \$43 per barrel has caused new plastic to be cheaper than recycled plastic – cheaper, not necessarily more economical. The result is that recyclers can at the moment (January 2009) not even give their LDPE plastic away where only a month before it was sold for R1500/tonne.

The above does not imply or insinuate that recovery should not be supported, but that both recovery AND the establishment of a recycled goods market should be supported. A fine example is the fact that Overstrand Municipality bought street litter bins produced from recycled plastic, thereby supporting the recycled goods market.

Benefits must also be shared. E.g. if a municipality saves airspace due to recovery, portion of that saving (avoided costs) should be passed on to the recovery effort to ensure that it is sustainable. If not, as was proven in SA previously, the recovery effort closes down and the municipality loses its avoided cost saving.

The current December 2008 prices for recovered materials delivered in Cape Town are displayed in Table 2-6

Table 2-6: Current Prices of Recovered Materials in Waste Stream

MATERIAL	PRICE in Rand/Ton for baled material
Card board (K4)	650
White Paper (HL)	1000
Newsprint (FN)	550
Glass	395
Beverage cans	700
Metal (light)	450
Plastic (Wash Plant)	2000
Plastic (Industrial wrapping)	800
Plastic (No 2s)	1500
Plastic (PET)	2300

2.1.5.6 Special Waste Streams

2.1.5.6.1 Tyres

Tyres are not currently separated from the rest of the general waste and disposed therewith.

2.1.5.6.2 Waste Oils

Two service stations in Hermanus are accepting used oils for recovery.

2.1.5.6.3 Household Hazardous Waste

At the Kleinmond and Hermanus Transfer Stations special bins are available for the disposal of household hazardous wastes. The transport contractor that transports the waste to the Karwyderskraal Landfill, Enviroserv, empties these containers when full and transports these hazardous wastes to the licensed hazardous waste landfill near Vissershok, Cape Town.

Experience has shown that household hazardous wastes comprises up to 2% of the total General Waste stream, i.e. up to some 14 tonnes per week for the whole of Overstrand Municipality. Most of that is currently going to landfill.

2.1.5.6.4 E-Waste

No accurate data of the generation of E-waste (electronic waste) exists, but surveys in other metropolitan municipalities have shown that E-waste makes up 2% to 4% of the total waste stream. Currently this waste type is disposed with the general waste. E-waste generation in Overstrand Municipality, as a rural municipality, could therefore be anticipated to be up to a maximum of 2% or 14 tonnes per week.

2.1.5.6.5 Household Health Care Waste

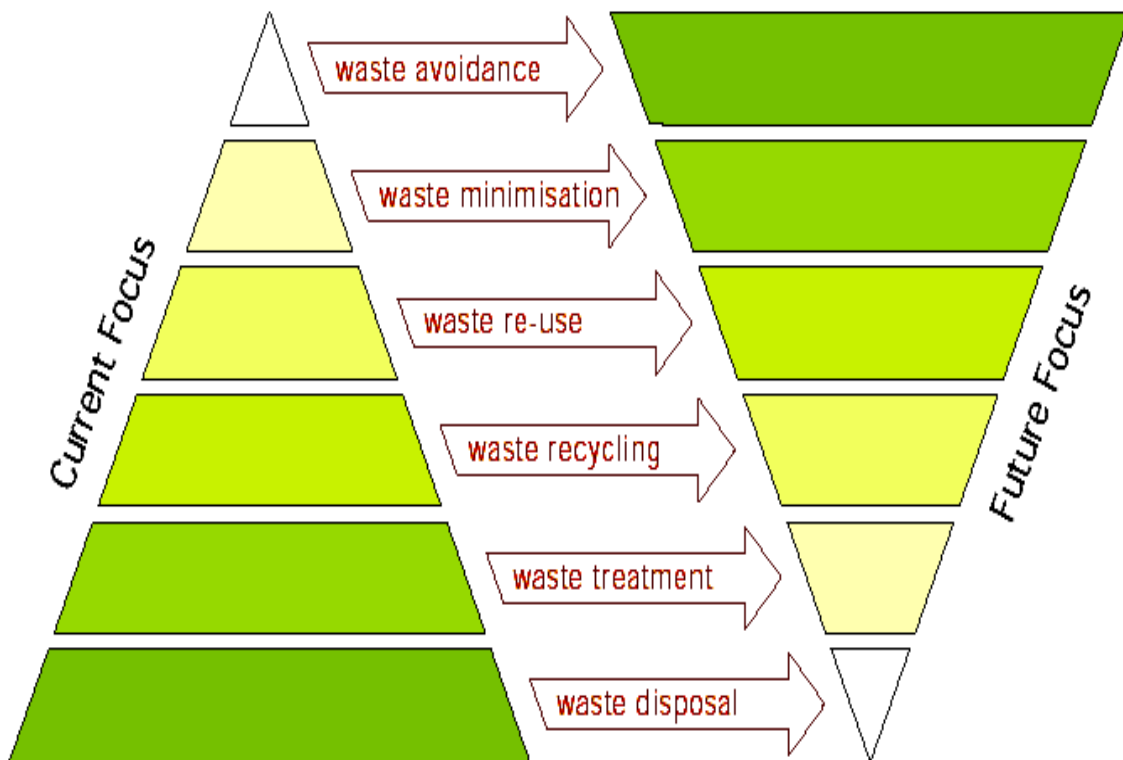
No accurate data exists on the volume of Household Health Care Wastes, as these wastes are currently collected and disposed with the general waste.

2.2 WASTE AVOIDANCE

2.2.1 Waste Avoidance Background

Various waste reduction efforts are being practised in Overstrand as referred to elsewhere in this report, but the ideal is to avoid the generation of waste in the first place.

The following diagram illustrates a simplified version of the well-known waste hierarchy with Avoidance being the most favourable and Disposal the least favourable:



Waste avoidance refers to a pro-active approach by industrial as well as domestic waste producers to minimize the volume of waste, by not creating the waste in the first place.

Waste avoidance is a “beginning of the pipe” action that can only work when people understand the full process depicted above.

At the moment waste minimisation through recovery is considered a priority in South Africa. Once that can be successfully implemented and the people are educated in the importance of waste reduction, can recovery at source be implemented with a reasonable chance of success. Overstrand Municipality has already embarked on the route of source separation and the communities within the municipality are continually being educated with respect to waste reduction.

Waste avoidance will be the ultimate and final step in this education process.

On a governmental / legislative level, the introduction of a levy on plastic shopping bags has spurred the production of alternative types of bags, which are re-useable and therefore avoiding the cheap and nasty waste bag that ends up littering our surroundings.

In the home, waste avoidance can be practiced by similar efforts where items are used for different purposes than the original intent, possibly suggesting that one purchases alternative products to the norm. Home composting is also considered waste avoidance, as the waste material is converted into a useful gardening resource whilst avoiding the raw product entering the waste stream.

In South Africa, resource and disposal costs are relatively low, providing no or little financial incentive to reduce consumption or waste in industry. It follows that regulatory instruments are required for implementation on a Municipal level to govern the avoidance of industrial waste in Overstrand.

European governments often offer incentives / penalties to force the implementation of waste avoidance, and it is suggested that similar economic instruments be implemented in due course in Overstrand ("pay-as-you-throw" principle).

Regular audits should be conducted by an independent entity on the avoidance practices, to form a basis for applying incentives / penalties.

An important tool for monitoring purposes is a proper Waste Information System (WIS). This WIS should be developed for Overstrand in line with the provincial- and national guidelines in order to feed information directly into these systems.

Without a doubt, waste avoidance will become a real and enforced issue in South Africa in the near future, and must be addressed in any Municipal Waste Strategy.

2.3 COLLECTION SYSTEMS

2.3.1 Municipal Waste Collection Systems

Overstrand Municipality has been partitioned into various service areas, i.e. Greater Kleinmond (Kleinmond to Rooi Els), Greater Hermanus (Voëlklip to Fishershaven), Stanford and surrounding area and Greater Gansbaai (De Kelders to Pearly Beach). Each of these service areas has its own resources for waste collection and waste management.

A summary of the current fleet of collection vehicles in Overstrand is listed in Table 2-7, Table 2-8, Table 2-9 and Table 2-10. A complete list with details of each vehicle is included as **Annexure A**.

Collection vehicles should ideally not be operated beyond 7 to 8 years in age since the maintenance costs increase dramatically with age. From the above-listed tables it is clear that the average age of Overstrand's collection vehicles are 4 years for the Stanford area, 10.6 years for the Greater Hermanus area, 10.4 years for the Greater Kleinmond area and 11.3 years for the Greater Gansbaai area, indicating the need for fleet replacement in all areas except Stanford.

Another interesting statistic that can be calculated from the above-listed tables is the average increase in seasonal waste volumes. In the Stanford area there is no significant seasonal increase, but in the greater Hermanus area the seasonal increase amounts to 51%, in Greater Gansbaai 294% and in Greater Kleinmond 285%. This is the first time that actual numbers are

allocated to the seasonal increase in waste volumes and these numbers are important because the increase in waste consists mainly of waste from people on holiday and that is mainly made up of packaging material and should therefore be recoverable wastes.

A waste collection service is provided by the municipality for all residents in urban areas. **All formal residential erven are receiving a weekly door-to-door collection service.**

The municipality also collects source separated materials in the Greater Hermanus and Greater Kleinmond areas, a service that will be extended to the other services areas in the near future.

One aspect of waste collection in Overstrand that deserves special mention, although not unique, is the fact that certain collection areas have a high susceptibility to baboon attacks. In these areas, property owners must purchase baboon-proof domestic waste containers from the municipality. The domestic waste containers consist of green 240l wheelie bins with a spring loaded baboon proof clip. Approximately 80% of the properties in these areas use these containers for domestic use.

Table 2-7: Summary of Collection Vehicles in Greater Hermanus

Registration Number	CEM 6932	CEM 11377	CEM 2746	CEM 23618	CEM 17262	CEM 13034	CEM 26262
Driver	Andries Schumane	M Nfemela	Dawid Plaatjies	Enoch September	L Hendriks	G Salies	Lennox Majavu
No of Labourers	6	6	6	6	5	5	5
Model	Nissan UD 80	Nissan UD 80	Nissan CM 12L	Nissan UD 80	Massey Ferguson 240	Nissan Diesel Cabstar 3.5	Nissan Diesel Cabstar 3.5
Description	Compactor	Compactor	Compacter	Compacter	Tractor Trailer	Caged Tipper	Caged Tipper
Year	1998	1999	1996	2003	1994	1995	2004
Odo Reading	149801	94436	174392	101639	7246	202582	60340
Volume Capacity	18	18	18	18	5.6	25	25
Payload (t)	8	8	8	8	1	3	3
Out of season weekly volume	126	225	306	234	140	737.5	168
In season weekly volume	360	351	396	369	0	787.5	662.5
Seasonal increase	186%	56%	29%	58%	-100%	7%	294%

Table 2-8: Summary of Collection Vehicles in Greater Kleinmond

Registration Number	CAM 9879	CAM 7067	CAM 6568	CAM 15898	CAM 18046	CEM 14080	CAM 15874	CAM 13042	CAM 8739	CAM 10971	CAM 18471	CAM 18031	CAM 30983	CAM 20080	CAM 12125
Driver	Louis Adonis	Albert Helesi	Rikus Appel	Jan Theunissen	Jan Rex	Denwil Cronje	Lewis Mntuyedwa	Gavin van Niekerk	Patrick Litoli	Jan Mojaki	Pieter Galant	Clinton Mitchell	Daantjie Hendricks	Johannes Theunissen	Karel Adonis
No of Labourers	5	4	2	2	2	4	4	3	4	4	2	4	5	5	3
Model	Mercedes Atego 1517	Mercedes Ecoliner 1014	Toyota Hilux SWD 2.4D	Nissan 2.0 LWB	Ford Courier 1800 LWB	Isuzu NPR 300	Nissan Cabstar 3.5	Nissan Hardbody 2.7 LWB	Hyundai 2.6	Nissan Cabstar 2.0 UD 35	Toyota Stallion	Landini R7860	Mercedes Speedliner 44	Nissan Cabstar UD 35	Nissan Hardbody 2.0 4x2
Description	Compactor	Caged Tipper	Caged LDV	Caged LDV	Caged LDV	Caged Tipper	Caged Tipper	LDV	Caged LDV	Caged Tipper	Caged LDV	Tractor	Caged Flatbed	Caged Tipper + Trailer	LDV
Year	1999	1998	1998	2003	1994	2006	2003	2002	1999	2002	1995	1994	1993	2004	2007
Odo Reading	133682	186482	388206	106886	389186	25408	169486	151876	287494	84192	103558	0	20578	139757	58885
Volume Capacity	15.4	18.4	2.13	2.76	3	12.77	8.4	3.86	6.6	12.43	2.16	0	18.27	12.27	3.36
Payload (t)	5	5	1	1	1	3	3	1	1.5	3	0.5	0	5	3	1
Out of season weekly volume	161.7	73.6	10.65	16.56	21	19.155	134	11.58	0	49.72	22.68	24	61.875	57.33	20.16
In season weekly volume	308	368	53.25	82.8	105	137.775	257.5	77.2	49.5	248.6	75.6	120	309.375	286.65	153.6
Seasonal increase	90%	400%	400%	400%	400%	619%	92%	567%		400%	233%	400%	400%	400%	662%

Table 2-9: Summary of Collection Vehicles in Greater Gansbaai

Registration Number	CEM 23347	CEM 17013	CEM 110	CEM 16356
Driver	B Kondokter	S Nadambi	M Kutu	G van Radt
No of Labourers	5	5	5	5
Model	Nissan UD 90 Diesel	Nissan UD 80 Diesel	0	Mitsubishi Canter 3 ton
Description	Compactor	Compactor	Refutip type old lorry	Caged Tipper
Year	2007	2000	1993	1991
Odo Reading	19787	120851	225270	155743
Volume Capacity	15	15	10	12
Payload (t)	8	8	5	3
Out of season weekly volume	90	150	150	0
In season weekly volume	360	255	500	420
Seasonal increase	300%	70%	233%	

Table 2-10: Summary of Collection Vehicles in Stanford and Surrounding Area

Registration Number	CEM 5397	CEM 26264
Driver	Christo Diedericks	Johannes Tobias
No of Labourers	4	4
Model	Nissan Diesel UD 90	Nissan UD 35 Diesel
Description	Compactor	Tipper
Year	2006	2004
Odo Reading	29000	53000
Volume Capacity	15	8
Payload (t)	8	3.5
Out of season weekly volume	37.5	8
In season weekly volume	37.5	8
Seasonal increase	0%	0%

2.3.2 **Public Cleansing**

Public Cleansing involves the cleansing of streets (kerbs and gutters), public open spaces (other than parks and storm water ditches), beaches and areas of illegal dumping.

In the Greater Hermanus area a Duvelo mechanical street sweeper has been in operation for the past year. The machine services the Main Road between Voëlkop and Mount Pleasant from Mondays to Fridays. Over weekends, the CBD main roads are swept on Saturdays and Sundays during 2-3 hour shifts. A weekend shift includes 3 full loads per shift which are taken to the Hermanus Transfer Station for transfer.

Manual street sweeping takes place daily in the CBD area. There are 10 manual sweepers, each with a mobile trailer. The collected waste is placed in black bags which are manually taken to the close-by depot and placed in 240m³ containers.

2.4 **WASTE REDUCTION**

The Polokwane Declaration was formulated in 2001 by members of Government, whereby a commitment to waste reduction, re-use and recycling was made towards achieving the following goals:

- 50% reduction in waste generation and 25% reduction in waste disposal by 2012
- Zero waste by 2022

Waste reduction can be divided into three main categories, i.e.

- 1) Separation at source
- 2) Recovery for recycling from post-collected waste, and
- 3) Composting of post collected garden waste.

The efficiency of waste minimisation can only be determined through the implementation of a proper WIS as mentioned in Paragraph 2.2.1 above.

This WIS should provide information on an ongoing basis regarding the following:

- The quantity, type, quality and sources of materials recovered
- The quantity and quality of compost produced and garden waste processed
- Industrial waste types and volumes, and possible opportunities for waste exchange
- Public education initiatives and data on available literature at public facilities (e.g. libraries, waste minimisation clubs and projects)
- Household awareness campaigns on recycling opportunities
- Waste education (schools level) and training programmes available for the general public, waste workers and officials

2.4.1 **Recovery for Recycling**

The average volumes of recoverable materials available for recycling in the Overstrand waste stream is shown in Table 2-3 and the realistic volumes that can be recovered from that stream through source separation and a "clean" material recovery facility is shown in Table 2-4.

From these two tables it is clear that, given the current state of public awareness and education, only 33% of the available recoverable materials can realistically be recovered by source separation for recycling. That represents only 14% of the total waste stream.

Should public awareness and education be raised to the level where residents 100% identify potentially recoverable material and separate it at source to cause no contamination, then the 14% could theoretically be increased to 43%. But that is theoretically. The current actual recovery volumes are given in Table 2-5 and relates to only 3.3% of the total waste stream for Greater Hermanus and Greater Kleinmond.

Source Separation will be introduced in the Greater Gansbaai area from 1 July 2009.

2.4.1.1 Waste Recovery Facilities in Overstrand

Overstrand Municipality has been associated with waste recovery for many years although no formal municipal recovery facility has ever been established.

Waste recovery is mainly achieved by private companies, e.g. Walker Bay Recycling, who collects recyclable materials from businesses and industry. In the recent years, since source separation has been introduced by the municipality, Walker Bay Recycling also sorts the source separated materials. However, these activities are all rather labour intensive and manual. Currently only 3 or 4 female labourers sort the source separated materials that could, when participation rates are well established at , say, 85%, amounts to some 12.5 tonnes per day only at the Hermanus Transfer Station which would be able to sustain, at current market prices, at least 90 jobs at 1.5 times minimum wage.

The current volumes of materials recovered at the Hermanus Transfer Station from source separated materials amounts to only 1.734 tonnes per day indicating that the participation rate is not sufficiently high and as such, valuable job opportunities are lost.

2.4.2 Composting

2.4.2.1 Composting Facilities in Overstrand

Household garden waste generated in the Overstrand municipal area amounts to approximately 5,600 tonnes per annum on average. In order to operate a central composting facility economically a minimum garden waste volume of 4,200 tonnes per annum is required.

Since sufficient quantities of garden waste are being generated in Overstrand, a central composting facility has been established at the Karwyderskraal Landfill. No other composting activities are undertaken in the Overstrand municipal area.

However, the garden wastes generated in the eastern portion of Overstrand, i.e. in the Stanford and Greater Gansbaai areas, are still landfilled. Due to anaerobic digestion and the subsequent release of methane gas, it would be more beneficial to simply chip the garden waste and use it as mulch.

2.5 WASTE DISPOSAL

2.5.1 Operating Landfills

Overstrand Municipality currently utilises two licensed landfills for general waste, i.e. is the Gansbaai Landfill and the regional Karwyderskraal Landfill.

Gansbaai Landfill (S34 35 16.26 E19 21 52.13)

The Gansbaai landfill is located on Part of Portion 210 of Gansbaai and obtained an operating permit in accordance with the Environmental Conservation Act on 30 March 1999 and is classified as a G:M:B- landfill.

This operating permit (no 16/2/7/G400/D24/Z1) limits the site to a maximum height above natural ground level of 15m. With the Medium classification, the rate of waste disposal is limited to 150 tons per day of only general waste, as defined in the Minimum Requirements documents. A buffer of 800m around the site is stipulated in the permit.

The site has recently been provided with a new GCL (Geosynthetic Clay Liner) lined cell and a weighbridge. The weighbridge building is currently being built and a Material Recovery Facility and Public Drop-off area will be commissioned in mid 2009 to sort the source separated materials from the Greater Gansbaai area.

Operation of the site is currently being done by the municipality and is considered to be below average since adequate resources are not being allocated to the operation of the site. Neither internal nor external auditing is conducted on this facility.

The municipality is currently conducting a Section 78 investigation to determine the most beneficial service mechanism to employ at this site. Once the service mechanism is decided upon, the operation of the site will be formalised.

It is calculated that this site currently receives approximately 30-35 tonnes of waste per day, a figure that will be confirmed when the newly installed weighbridge becomes operational.

Informal salvaging does takes place at this site. This activity is currently difficult, if not impossible to control and will be re-assessed when the Material Recovery Facility becomes operational.

Karwyderskraal Regional Landfill (S34 19 53.11 E19 09 40.67)

The Karwyderskraal landfill is located on Portion 1 of the Farm Afdaksrivier 575 in the District of Bredasdorp and is under jurisdiction of the Overberg District Municipality since it receives waste from both Overstrand and Theewaterskloof Municipalities.

This landfill obtained an operating permit in accordance with the Environmental Conservation Act on 30 March 2000 and is classified as a G:M:B+ landfill.

This operating permit (no 16/2/7/G501/D3/Z3/P374) limits the site to a maximum height 85m above msl. With the Medium classification, the rate of waste disposal is limited to 150 tons per day of only general waste, as defined in the Minimum Requirements documents.

The exact distance of a buffer zone has not been stipulated in the permit, but it is a condition that "*The Permit Holder shall take all reasonable steps, such as suitable zoning and/or written agreements with adjacent landowners, to prevent the development of further residential and/or light industrial areas closer to the Site than any existing residential areas during the operational life of the Site*". Whatever that means....

The site is being operated under public tender by a private operator. The site operation can be described as good and the operation is externally audited and monitored annually.

Stanford Garden Waste Site (S34 28 02.47 E19 26 46.79)

Overstrand Municipality also operates an unlicensed garden waste disposal sites at Stanford. This site is only to receive garden waste and builder's rubble from the public. However, the public also dispose small amounts of general waste at this site from time to time. The current situation is almost uncontrollable since the public, from as far as Hermanus, bring builder's rubble and garden waste to this site and tipping the waste along the sides of the long access road.

This site will be replaced with Public Drop-off facility that will be constructed during April – July 2009. After this Drop-off becomes operational, this site will be closed and rehabilitated. The current scheduling is such that rehabilitation will commence at the end of 2009.

Pearly Beach Garden Waste Site (S34 39 02.76 E19 29 32.44)

Overstrand Municipality also operates an unlicensed garden waste disposal sites at Pearly Beach. This site is only to receive garden waste and builder's rubble from the public. However, the public also dispose small amounts of general waste at this site from time to time.

This site will be replaced with Public Drop-off facility that will be constructed during the latter half of 2009. After this Drop-off becomes operational, this site will be closed and rehabilitated. The current scheduling is such that rehabilitation will commence in the latter half of 2010.

2.5.2 Closed Landfills

Overstrand has six closed landfills of which two have been rehabilitated.

The old waste disposal sites near Betty's Bay and Kleinmond have been closed and rehabilitated. Both these two sites are being externally audited and monitored.

The old sites near Hawston, Onrus, Hermanus and Voelklip have been closed, but still require rehabilitation. Rehabilitation of these sites are scheduled for the financial years from 2009 to 2012.

2.5.3 Builder's Rubble Sites

Overstrand has no dedicated builder's rubble sites.

2.5.4 Waste Transfer Stations

Overstrand has two large waste transfer stations located at Hermanus (S34 25 28.2 E19 13 04.1) and Kleinmond. (S34 20 10.9 E19 00 16.9) Waste from both these two transfer stations are transported and disposed at the Karwyderskraal Regional Landfill. Both these facilities are externally audited.

2.5.5 Public Drop-off Facilities

Public Drop-off facilities have to date been provided in Hawston/Fishershaven (S34 22 38.36 E19 07 41.00) and Voëlklip (S34 24 44.9 E19 18 20.7). All these facilities are equipped with 30m³ skips. These facilities provide the residents the convenient opportunity to dispose waste that they have not put out for collection, into containers for later removal by the municipality or its agent.

At Rooi-Els (S34 18 06.8 E18 49 10.3), Pringle Bay (S34 20 33.6 E18 50 38.5) and Betty's Bay (S34 21 20.7 E18 51 44.5) Public Drop-off facilities are provided in the form of caged trailers.

At Stanford a temporary facility has been provided at the municipal depot for the public to off-load their waste. A new Public Drop-off will be constructed in Stanford during the first half of 2009.

2.5.6 Disposal Facilities used outside the Overstrand Boundaries

There are a few private disposal and/or treatment facilities used by Overstrand Industries and Health Care Waste Generators. The facilities are discussed in greater detail below:

- Hazardous Waste:

The Vissershok Waste Management Facility (VWMF), owned by an Enviroserv/Wasteman partnership and operated by Enviroserv, has a H:H operating permit from DWAF. The site is

situated some 800m west of the N7 at Vissershok and is operated and audited in terms of its permit conditions. All hazardous wastes generated in the municipal area of Overstrand are disposed at this facility.

- Oil Disposal/Recycling

Used Oil is collected mainly by Oilkol and brought to the Fuel Firing Systems (FFS) oil recovery plant adjacent to the N7 at Vissershok. The facility is supported by the Rose Foundation and operates as a scheduled process under the Air Pollution Control Act (Act 45 of 1965) and has ISO 14001 accreditation. All waste lubrication oils collected by Oilkol is initially transported to the specialised Rose Foundation depot in Brackenfell. The oil is sold to Fuel Firing System Refiners for reprocessing.

- Silver and photographic heavy metal solution

Cape Precious Metals (CPM) is based in Cape Town and recovers silver as well as other precious heavy metals from photo labs in the printing industry, private photo labs in the area and spent radiology fluids from the Health Care Industry. The recovery of silver is by electrolytic methods for photographic fixers and developers while passive recovery is used for radiology effluents.

- Health Care Waste

The two most known private incinerators used are the Enviroserv facility of Sanumed on the N7 at Vissershok and the BCL facility at the Medical Research Council in Delft. These two incinerators do not operate as H:H permitted facilities under the Environmental Conservation Act but rather as scheduled processes under the Air Pollution Act (Act 45 of 1965).

The number of incinerators at provincial hospitals as well as their operational status are not known.

2.6 COSTS OF EXISTING WASTE MANAGEMENT SYSTEM

2.6.1 Financial Summary of Waste Management Services of Overstrand Municipality

2.6.1.1 Income

Income for the Municipality is derived from service charges related to collection from domestic and business refuse removal and sales of baboon proof refuse bins.

For the 2008 financial year the total income is estimated at R 33,404,400.

2.6.1.2 Expenses

Expenses incurred are salaries, repairs and maintenance, general expenses and capital charges.

Waste management is labour intensive and salaries make up some 34% of the total expenses.

The haulage of waste from the Transfer Stations and Drop-offs are outsourced and the municipality must pay disposal charges at the regional waste site. These costs are listed under General Expenses which make up 48% of the total expenses as depicted in Figure 2-2.

Total expenses for the 2008 financial year are budgeted at R 31,110,160.

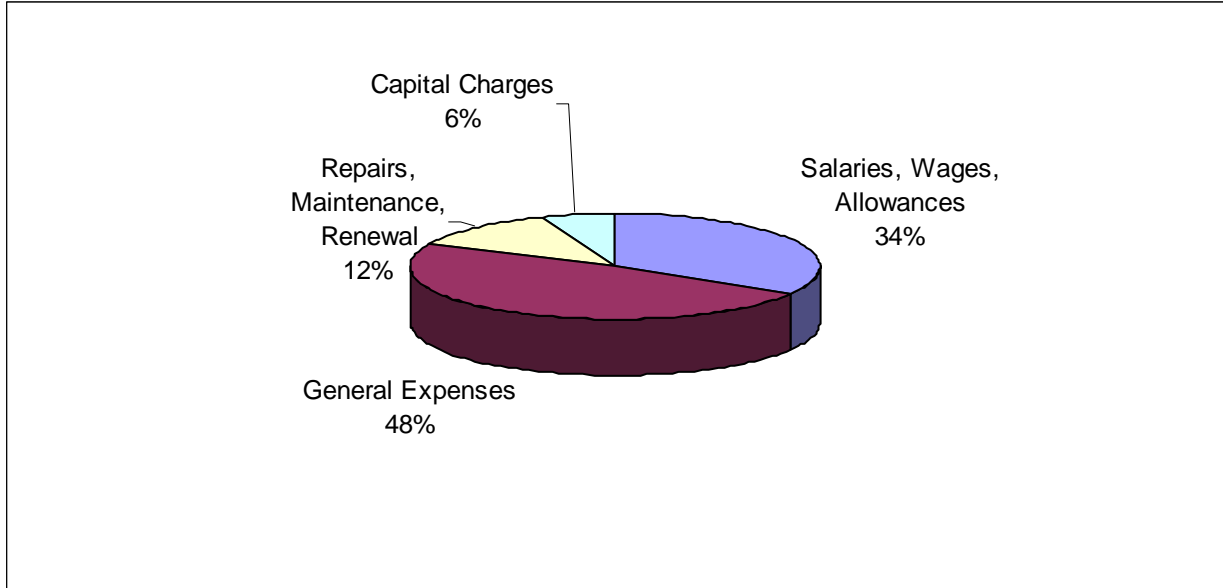


Figure 2-2: Distribution of Expenses

2.7 STAFF COMPLIMENT OF EXISTING WASTE MANAGEMENT SYSTEM

Overstrand Municipality's waste management resorts under two directorates. The operational portion resorts under Community Services whilst the planning portion resorts under Infrastructure and Planning.

On the planning side there is one position, that of a 1st Technician: Planning, that is currently filled by Mr Johan van Taak who reports to the Director: Infrastructure and Planning, Mr Steven Muller.

On the operational side each of the four service areas has an Operational Manager who reports to the Area Manager, Mr Deon van Vuuren, who in turn reports to the Director: Community Services, Mr Roderick Williams. The Operational Managers are:

Greater Hermanus	Mr Peter Burger	(Operational Manager)
Greater Kleinmond	Mr Mike Bartman	(Operational Manager)
Greater Gansbaai	Mr Dirk Crafford	(Operational Manager)
Stanford	Mr Francois Brand	(Assistant Operational Manager)

Each of the above managers has various teams reporting to them, as indicated in Table 2-12 (Greater Hermanus), Table 2-13 (Greater Kleinmond), Table 2-14 (Greater Gansbaai) and Table 2-15 (Stanford).

Waste management is labour intensive with low levels of skill required. The staff compliment is mainly labourers and only two vacancies exist.

Table 2-11 indicates the current staff compliment.

The above Operational Managers are responsible for preparing the operational budget for their various service areas and the 1st Technician: Planning is responsible for preparing the capital budget for Solid Waste Management for the whole of Overstrand Municipality.

The only shortcoming in these organograms are the lack of a dedicated waste minimisation officer.

Table 2-11: Summary of Cleaning Services Personnel

	Kleinmond	Hermanus	Stanford	Gansbaai	Total
Superintendent	1				1
Snr Foreman	1	1	1		3
Foreman	1		1	1	3
Sen Supervisor		1			1
Clerk Grade 11			1		1
Operator Grade 1	1	2		1	4
Operator Grade 11	4	3	1	2	10
Truck Driver		3	1	1	5
Sen Tractor Driver		1			1
Tractor Driver	2		3		5
Special Workman			1		1
Machine Handler	6				6
Team Leader	5			1	6
Handyman	2				2
Leader Worker	1				1
Helper			1		1
Senior Worker		3	12		15
General Worker		5			5
Worker	35	55	11	27	128
Total	59	74	33	33	199

Table 2-12: Organogram of Operational Staff in Greater Hermanus

Greater Hermanus													
Operational Manager													
Senior Foreman													
Operator Grade 11	Senior Supervisor	Sweepers Voelklip	Sweepers Hermanus	Sweepers Mount Pleasant, Hawston	Vermont, Hawston, Fishershaven	Onrus, Sandbaai	Northcliff, Wescliff	Voelklip, Hermanus Heights	Hermanus	Hermanus CBD	Zwelihle	Operator Grade 11	Drop-off Zwelihle
	General Worker	Worker	Senior Worker	General Worksman	Truck Driver (Vacant)	Truck Driver	Operator Grade 1	Truck Driver	Operator Grade 11	Operator Grade 1	Senior Tractor Driver		Worker
	General Worker	Worker	Worker	General Worker	Worker	Worker	Worker	Senior Worker	Worker	Worker	Worker		
	General Worker	Worker	Worker		Worker	Worker	Worker	Senior Worker	Worker	Worker	Worker		
	Worker		Worker		Worker	Worker	Worker	Worker	Worker	Worker	Worker		
	Worker		Worker		Worker	Worker	Worker	Worker	Worker	Worker	Worker		
	Worker		Worker		Worker	Worker	Worker	Worker	Worker		Worker		
	Worker		Worker		Worker	Worker	Worker	Worker					
	Worker		Worker			Worker							
	Worker		Worker										

Table 2-13: Organogram of Operational Staff in Greater Kleinmond

Greater Kleinmond												
Operational Manager												
Superintendent: Streets & Stormwater												
Snr Foreman: Roads, Stormwater and Solid Waste (Vacant)						Foreman: Roads						
Kerbs	Road Signs	Tar Patch	Transfer Station	Solid Waste	Stormwater			Stormwater Hangklip		Roads Hangklip	Solid Waste Hangklip	
Handyman	Handyman	Team Leader	Machine Handler	Operator Grade 1	Operator Grade 11			Team Leader	Tractor Driver	Operator Grade 11	Team Leader	Team Leader
Worker	Worker	Leader	Machine Handler	Worker Streets and Stormwater	Operator Grade 11 Road Roller	Tractor Driver	Operator Grade 11	Machine Handler			Machine Handler	Worker
Worker		Worker	Machine Handler	Worker	Team Leader	Worker	Machine Handler	Worker			Worker	Worker
		Worker		Worker		Worker	Worker	Worker			Worker	Worker
		Worker		Worker				Worker			Worker	Worker
		Worker		Worker							Worker	Worker
		Worker		Worker							Worker	Worker
				Worker							Worker	
				Worker							Worker	
				Worker							Worker	

Table 2-14: Organogram of Operational Staff in Stanford

Stanford							
Assistant Operational Manager							
Senior Foreman							Clerk Grade 11
Foreman: Roads, Stormwater, Refuse		Special Workman: Water	Sewerage Tankers		Sewerage Plant	Amenities	Informal Settlement
Refuse	Tar & Sewer Network		Truck driver	Tractor Driver	Senior Worker	Senior Worker	Worker
Tractor Driver	Operator Grade 11		Helper		Senior Worker	Senior Worker	
Senior Worker	Tractor Driver				Senior Worker	Senior Worker	
Senior Worker	Senior Worker				Worker	Worker	
Senior Worker	Senior Worker				Worker	Worker	
Worker	Senior Worker						
Worker	Worker						
Worker							
Worker							

Table 2-15: Organogram of Operational Staff in Greater Gansbaai

Greater Gansbaai						
Operational Manager						
Foreman						
Team Leader	Operator Grade 11	Operator Grade 11	Sanitary Workers	Operator Grade 1	Truck Driver	Transfer Station
Worker	Worker	Worker	Worker	Worker	Worker	Worker
Worker	Worker	Worker	Worker	Worker	Worker	
Worker	Worker	Worker	Worker	Worker	Worker	
	Worker	Worker	Worker	Worker	Worker	
			Worker			
			Worker			
			Worker			