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Institute of Waste Management SA
King Box
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Medicross.
Mercedes Benz
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New Reclamation Group.
Oil Kol
Paper Man
Rec. Oil
RECLAM
Riegers .
S.P.C.A. East London
S.P.C.A. King Williamstown.
Solid Waste Technologies
Waste Management Services
Waste Management Systems

Acronyms

ADM	**Amathole District Municipality**
BCMM	**Buffalo City Metropolitan Municipality (as Local Government)**
CBD	**Central Business District**
CBO	**Community Based Organisation**
DBSA	**Development Bank of Southern Africa**
DEDEAT	**Department of Economic Development, Environmental Affairs and Tourism**
DWA	**Department of Water Affairs**
ECA	**Environmental Conservation Act**
IEMP	**Integrated Environmental Management Plan**
IP&WM	**Integrated Pollution and Waste Management (White Paper)**
IWMP	**Integrated Waste Management Plan**
IWMSA	**Institute of Waste Management South Africa**
KPI	**Key Performance Indicator**
KWT	**King William's Town**
NEMA	**National Environmental Management Act**

NEMWA	**National Environmental Management Waste Act**
NGO	**Non-Governmental Organisation**
NWMS	**National Waste Management Strategy**
Sida	**Swedish International Development Co-operation Agency**
SWMS	**Solid Waste Management Services**
TLC	**Transitional Local Council**
WESSA	**Wildlife and Environment Society of South Africa**

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1 Introduction

1.1 Historical overview in the development of IWMP's

The extent of South Africa's waste stream is enormous due to the fact that waste is generated by individuals, businesses and industries almost on a daily basis. According to the National Waste Management Strategy – Phase 2 Research, South Africa generates approximately 24.1 million tons of waste per year (DEDEAT,2009). Sound waste management practices are pivotal for limiting or even halting the detrimental effects of waste on the environmental and also the wellbeing of individuals exposed to it.

As a requirement of the National Environmental Management Waste Act 59 of 2008(NEMWA) and the National Waste Management Strategy, all municipalities are obliged to compile an Integrated Waste Management Plan (IWMP). The reason for developing an IWMP is to provide the municipality with a sustainable long-term waste management system. The IWMP is a planning document, which includes comprehensive background information on the current waste situation in the Municipality as well as the current regulatory framework. Based on an analysis of the current situation, objectives, strategies and projects are formulated that address the priority issues. NEMWA specifically requires IWMPs to:

- Set out priorities and objectives for waste management
- Establish targets for the collection, minimisation, re-use and recycling of waste
- Set out the approach to planning any new facilities for disposal and decommissioning existing waste disposal facilities
- Indicate the financial resources required for the IWMP
- Describe the implementation mechanisms for the IWMP

In 2003 Buffalo City Metropolitan Municipality (BCMM) had appointed Swedish International Development Co-operation Agency to compile an IWMP. As per the objective strategies outlined in this document, it was recommended that the existing IWMP be reviewed in accordance with newly promulgated waste legislation and guidelines. They have then appointed Bosch Munitech (Pty) Ltd in 2012 to review their existing IWMP. The purpose of reviewing the IWMP is to:

update the status-quo;
determine achievements of the listed objectives;
determine failures in implementing strategies and objectives;
re-evaluate the appropriateness of compiled policies, goals and strategic objectives;
update the regulatory framework;
compile new goals and strategic objectives as per analysis of updated status-quo.

The review of the existing IWMP is a significant process as it will ultimately illustrate the overall progress or even limitations of current waste management activities within BCMM.

1.2 Legislative Requirements

1.2.1 National Environmental Management: Waste Act 59 of 2008 (NEMWA)

NEMWA defines the laws for the regulation of waste management as well as to ensure the compliance of waste minimization measures. Buffalo City Metropolitan Municipality's first generation IWMP was compiled prior to the proclamation of NEWMA, thus, integration of this legislation into the review of the 2003 IWMP is compulsory. NEMWA objectives are based on the waste management hierarchy. The act also promotes the effective delivery of waste services and designates the duty of the State or organs of states to implement measures to endorse waste minimization as well as the effective and environmental friendly removal and disposal of waste. NEMWA stipulates that all Municipalities are to develop an IWMP, of which its contents are outlined. The contents of IWMP outlined in NEMWA has been aligned to and followed in the review of this IWMP. The contents of the IWMP as follows:

A situation analysis that includes :
population and development profiles of the area; an assessment of quantity and types of waste generated;
a description of waste management services provided;
number of households not receiving waste collection services.
The manner in which the municipality intends :
on giving effect to Chapter 3 of the National Environmental Management Act as well as NEMWA;
to identify and address the negative impact of poor waste management practices on health and environment;
to provide for the implementation of waste minimization, re-use, recycling and recovery targets and initiatives;
to address the delivery of waste management services to residential premises;
to give effect for best environmental practice in terms of waste management.
Outline the Municipality's priorities and objectives with respect of waste management.
Establish targets for the collection, minimization, re-use and recycling of waste.
Set out the approach of the Municipality for the planning of any new waste management facilities or for the decommissioning of existing disposal facilities.
Indicate the financial resources that are required to give effect to the IWMP.
Describe how the Municipality intends to give effect to its IWMP.

1.2.2 National Waste Management Strategy (NWMS) 2012

NWMS is a legislation requirement of NEMWA. The purpose of the NWMS is to give effect to the objectives outlined in NEMWA.

Guiding principles of the NWMS

The NWMS is formulated in accordance with the internationally accepted Waste Hierarchy Model. This model dictates the preferred waste management practices. The model (see Figure 1.1) informs us that waste should firstly be avoided all together. This can be achieved through cleaner production methods, which prevent or minimise the generation of waste. If waste cannot be avoided, then different methods of recycling should be used where applicable. Waste that cannot be re-used or recovered should then be treated in an appropriate way (physically, chemically or thermally). The last option is landfilling of waste. Although unavoidable to an extent, landfilling is always a waste of natural resources and ultimately an unsustainable practice.

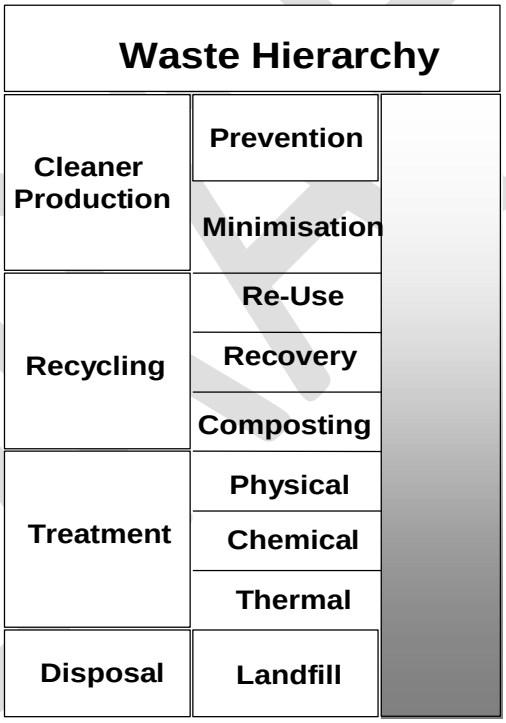


Figure 1.1 The Waste Hierarchy (From NWMS)

The objectives and strategies to be drawn up for this updated IWMP will be aligned to the waste management hierarchy. One of the strategic goals of the NWMS is to achieve integrated waste management planning.

1.2.3 The IWMP in the context of the BCMM IDP 2011

The IWMP is formulated in accordance with the vision of Buffalo City Metropolitan

Municipality as formulated in the Integrated Development Plan (IDP) of 2011:

The long term Vision and mission of Buffalo City Metropolitan Municipality is to be "**a responsive, people centred and developmental City**" which:

Promotes a culture of good governance;
Provides effective and efficient municipal services;
Invests in the development and retention of human capital to service the City and its community;
Promotes social and equitable economic development;
Ensures municipal sustainability and financial viability;
Creates a safe and healthy environment; and
Places Batho Pele principles at the centre of service delivery

Considerable effort has been put into interpreting the meaning of this vision in terms of waste management for the formulation of objectives and strategies of the IWMP. The vision warrants for affordable waste collection services, sustainable waste treatment and disposal, litter-free living environments, safe working environments, and improved public awareness, among other things.

During the recent 2011 IDP-process a number of objectives and strategies were formulated based on the current situation in Buffalo City Metropolitan Municipality.

The Objectives and Strategies formulated in the IDP are :

Objective :

To ensure that all BCMM citizens live in a clean, safe and healthy environment by providing an efficient and effective Solid Waste Management Services

Strategies

Reduce waste on Landfill sites
Construction of drop off points and garden waste transfer station
Reduce uncollected waste from households
Increase the number of households with access to refuse removal services

Actions

Increase in number of Buy back centres constructed
Construction of a Central Waste Transfer Station
Increase the number of waste cells constructed at Roundhill Landfill site
Increase the number of drop off points constructed in informal settlements
Increase the number of garden transfer stations provided
Increase the number of refuse compactor trucks purchased for Inland, Coastal and Midlands

Increase the number of households with access to refuse removal services
Increase the number of areas in urban and rural settlements to which refuse removal service is extended

During the development of the IWMP, additional information not previously available was gathered. This information has been used to further develop the objectives and strategies of Buffalo City Metropolitan Municipality's waste management.

1.2.4 The IWMP in the context of Buffalo City Metropolitan Municipality's IEMP 2004

The IEMP Policy acts as a framework and guides local government in its strive to promote sustainable development. The IEMP is based on existing national and international law and legislation and will be implemented through various sector plans and programmes identified in the Integrated Development Plan (IDP). The Policy also outlines the integrated approach for all projects within the municipality, guiding decision-makers at all levels to accessible and adequate information on adverse environmental effects of the activity in question. This approach enables the opportunity to improve, lessen or put a stop to the planned activity. Furthermore, the IEMP promotes public participation.

Sector plans play an important part in the implementation of the IEMP Policy as well as the agreed principles. The IWMP, which is such a Sector Plan, reflects the Vision of Buffalo City Metropolitan Municipality. Emanating from the vision, the Waste Management Vision for the Buffalo City Metropolitan Municipality in the year 2020 is summarised as follows:

All citizens of Buffalo City Metropolitan Municipality are provided with adequate, affordable and accessible waste management services.
The amounts of general waste as well as hazardous waste are reduced by waste minimization and recycling (incorporating sorting-at-source), limiting the amounts of waste going to landfill.
The proper handling, treatment and disposal of all kinds of waste ensures that the adverse impact on the environment and human health and well-being can be minimized or tolerated. All waste treatment and disposal facilities are legally permitted and properly operated.
Informal recycling at landfills has been phased out and replaced with formal employment opportunities in a thriving recycling industry, which promotes local economic development.
The people living in Buffalo City Metropolitan Municipality will be environmentally aware and conscious with a significant knowledge of proper waste management, which they enthusiastically exercise.

1.2.5 Review of National and Provincial Legislation

South African Constitution (Act 108 of 1996)

The South African Constitution (Act 108 of 1996) is the supreme law of the land, of which all law including environmental waste management planning must comply with the Constitution. Section 24 of the Constitution states that the people of South Africa have a right to an environment that is not detrimental to human health. The Constitution also stipulates that the state has a duty to impose legislation and also to implement policies to ensure that policies defined in Section 24 are upheld. All departments of state or administration in the national, provincial or local levels of government have similar obligations. The principals of co-governance are also set out in the Constitution and the roles and responsibilities of the three levels of government are defined.

According to the Constitution, responsibility for waste management functions is to be devolved to the lowest possible level of government. Local government therefore is assigned the responsibility for refuse removal, refuse dumps and solid waste disposal. Provincial government has the exclusive responsibility to ensure that local government carries out these functions effectively.

In addition to the Constitution, a number of government policies and statutes are relevant to waste management at the local government level, which includes the following:

National Environmental Management Act 107 of 1998

The National Environmental Management Act (NEMA) provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are - Accountability; Affordability; Cradle to Grave Management; Equity; Integration; Open Information; Polluter Pays; Subsidiary; Waste Avoidance and Minimisation; Co-operative Governance; Sustainable Development; and Environmental Protection and Justice.

National Environmental Management: Waste Act 59 of 2008

This act defines the laws for the regulation of waste management as well as to ensure the promotion of the waste management hierarchy. This act adopts an internationally recognised waste management hierarchy which states waste must firstly be reduced, then re-used/recycled or recovered and finally as a last resort disposed of appropriately. The act also promotes the effective delivery of waste services and designates the duty of the State or organs of states to implement measures to endorse waste minimization as well as the effective and environmental friendly removal and disposal of waste.

Chapter 2 of the Act stipulates that the Minister must establish a national waste management strategy for achieving the objects outlined in the Act. This chapter also specifies that the Minister must set national norms and standards for various waste management issues such as classification of waste. Section 9 of this act states that the municipality must exercise its executive authority to provide waste

management services in a manner that complies with the national and provincial norms and standards drawn up by the Minister.

In Chapter 3 of the Act, it states that an Integrated Waste Management Plan (IWMP) must be drawn up and also underlines the contents of the IWMP. Certain waste management measures have been outlined in Chapter 4 of the Act.

Chapter 4 is fragmented into different parts, each focusing on a certain waste management measure:

Part 1 stipulates that the Minister must declare a certain waste to be a priority given that the associated waste poses a threat to the environment. Part 2 designates the duties for all holders of waste to try to minimize the quantity of waste generated and should adopt recycling initiatives. Part 3 focuses on the measures that can be implemented in order to promote the recycling and reuse of waste. The listing of waste management activities that pose a detrimental effect to the environment is outlined in Part 4, while Part 5 outlines and defines the duties of the waste holder as well as the waste collection service provider in order to achieve efficient and effective waste storage, collection and transportation. Section 23 of the act stipulates that it is the reasonability of the Municipality to provide within their financial capacity receptacles and containers for the collection of recyclable waste that is accessible to the public. Part 6 deals with the measures that need to be taken in terms of treatment, processing and disposal of waste.

Chapter 5 designates the Minister as the licensing authority with respect to all waste management activities that involve obligations or other contractual agreements.

Emphasis on the establishment of a National Waste Information System (NWIS) is outlined in Chapter 6 of this act. This NWIS should comprise of all waste management information such as the quantity of waste generated, waste management activities that are licensed etc. The functionality of this NWIS is to quantify waste management activities, so that it will facilitate the overall understanding and management of the waste management process as well as identifying areas of concern.

In terms of Chapter 7, compliance and enforcement of the rules and regulations underlined in this act is defined. It also stipulates the penalties for those who are convicted for undermining the laws stipulated in this act.

National Environmental Management: Air Quality Act 39 of 2004

This act aims to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air as well as for the prevention of air pollution and ecological degradation. Chapter 2 of the act stipulates the establishment of a national framework to achieve the objects of the act. This national framework will contain aspects of ambient air quality standards as well as national norms and standards on air quality management. This act also outlines the contents of air quality management plans and also the procedure to be followed for the application of atmospheric emission license.

Section 21(1)a of this act stipulates that the Minister must publish a list of activities that significant detrimental effects on the environment. This list was published in the following document:

List Of Activities Which Result In Atmospheric Emissions Which Have Or May Have A Significant Detrimental Effect On The Environment, Including Health, Social Conditions, Economic Conditions, Ecological Conditions Or Cultural Heritage (GNR 248, March 2010)
This document contains the emission standards for cement production using alternative fuels and/or resources (AFR). This is an important aspect in terms of waste management because thermal waste treatment can be implemented during cement production. This involves the use of waste as an AFR in the cement production process.

Environment Conservation Act 73 of 1989

The objective of the Environment Conservation Act (ECA) is to provide for the effective protection and controlled utilization of the environment. Any person who intends to establish or operate a waste disposal site must apply for a permit from the Minister of Water Affairs and Forestry. The permit is made subject to a number of conditions, which inter alia pertain to the design, construction, monitoring and closure of a waste disposal site. Waste is defined in ECA as "any matter, whether gaseous, liquid or solid or any combination thereof, which is from time to time designated by the Minister by notice in the Gazette as an undesirable or superfluous by-product, emission, residue or remainder of any process or activity". Waste products may originate from domestic, commercial or industrial activities. In a subsequent regulation (GN 1986 Of 24 August 1990) the Minister excluded the following wastes from those covered by ECA, i.e. sewage sludge, radioactive waste, building rubble, as well as mining, metallurgical and power generation wastes. These wastes are dealt with under other legislation.

In terms of the Section 19 of the Act, it is an offence to litter on any place to which the public has access and the person or authority in charge of the area must provide containers for the discarding of litter. In addition, every authority in control of any place must remove the litter within a reasonable time. Provision is made for the appointment of inspectors to investigate compliance with the Act. In terms of Section 24A of the Environment Conservation Act, a competent authority may make regulations with regards to the control of the dumping of litter.

Environment Impact Assessment Regulations, regarding activities defined under Section 21 (1) of the Environment Conservation Act, have been promulgated in Government Notice R1183 of 5 September 1997. An environmental impact assessment must be conducted prior to the establishment of waste disposal facilities.

Local Government Transition Act 209 of 1993

The Local Government Transition Act 209 of 1993 provides for interim measures to local government prior to final arrangements of restructuring being implemented. Section 10 (C) sets out the powers and duties of Metropolitan Councils and Metropolitan Local Councils. Many of these powers and duties of Metropolitan Councils are of relevance to waste management. In particular, the Metropolitan Councils are empowered to produce an Integrated Development Plan, which is a plan aimed at the integrated development and management of its area of jurisdiction. This will include aspects concerning waste disposal facilities, including the determination of a waste disposal strategy, the identification of sites for the placing of waste disposal facilities and the establishment, operation and control of waste disposal sites.

Municipal Demarcation Act 27 of 1998

The Municipal Demarcation Act 27 of 1998 provides criteria and procedures for the determination of municipal boundaries by an independent authority. In terms of the Act, the Municipal Demarcation Board is established to determine municipal boundaries.

Section 24 provides that when demarcating a municipal boundary, the Board must aim to establish an area that would enable the municipality to fulfil its Constitutional obligations, including the provision of services in an equitable and sustainable manner, the promotion of social and economic development and the promotion of a safe and healthy environment. The tax base must also be as inclusive, as possible users of municipal services in the municipality.

Municipal Systems Act 32 of 2000

The Municipal Systems Act describes the core principles, mechanisms, and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of communities and ensure access to services that are affordable to all. Its focus is primarily on the internal systems and administration of the municipality.

The Act enables the process of decentralisation of functions through assigning powers of general competence to local Government. Municipal by-laws are regulated to achieve harmony with national and provincial legislation. As service authorities, municipalities remain responsible for the effective delivery of services and must provide an appropriate policy and regulatory framework. This can be achieved through the most appropriate service provider, ranging from internal departmental delivery to corporatisation and joint ventures to private sector delivery options. Performance management systems are to be developed to measure and evaluate performance in priority areas, which are to be reported annually to citizens and other spheres of government. The process to be followed in planning, drafting and adopting the Integrated Development Plan is set out.

The Development Facilitation Act 67 of 1995

The Development Facilitation Act 67 of 1995 sets out a planning and land development system, which ensures that national, provincial, and local government policies are implemented. Section 28 describes the requirements for Land Development Objectives, which must be developed by each local authority. One of the objectives of Land Development Objectives is to create a new system of planning that encourages sustained utilisation of the environment, particularly with regard to the environmental consequences of developments. Municipalities are encouraged to co-operate in order to develop the capacity of each municipality to exercise its powers and duties and manage its affairs.

National Water Act 36 of 1998

The National Water Act contains a number of provisions that impact on waste management, including the disposing of waste in a manner, which detrimentally impacts on a water resource and the discharge of waste into a water resource. The Act allows the Minister to make regulations for: Prescribing waste standards, which specify the quantity, quality and temperature of waste that may be discharged or deposited into or allowed to enter a water resource. Prescribe the outcome or effect, which must be achieved through management practices for the treatment of waste before it is discharged or deposited into or allowed to enter a water resource. The Act requires that waste discharged or deposited into or allowed to enter a water resource be monitored and analysed according to prescribed mechanisms.

Health Act 63 of 1977

The Health Act 63 of 1977 provides measures for the promotion of health, for the rendering of health services and defines duties of certain authorities which render health services in the Republic. Section 20 sets out the duties and powers of local authorities. It provides that every local government is obliged to take measures to maintain its district in a clean and hygienic condition and to prevent the occurrence of any nuisance, unhygienic or offensive condition or any other condition, which could be of danger to the health of any person. A "nuisance" includes any accumulation of refuse or other matter that is offensive or is injurious or dangerous to health. The local government is obliged to abate the nuisance or remedy the condition and to prevent the pollution of any water intended for the use of the inhabitants of its district. Draft regulations for the control of environmental conditions constituting a danger to health or a nuisance were published in GNR21 of 14 January 2000.

In terms of the proposed regulations, registration is required for: concerns that to carry out a scheduled trade, including waste incineration, waste (including medical waste) disposal sites and waste collecting, sorting, treating or processing sites. All health facilities are required to produce a medical waste management plan.

Hazardous Substances Act 15 of 1973

This legislation aims to address substances that are deemed hazardous, in order to regulate and prohibit the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances. In terms of waste management, Section 29 of the Hazardous Substances Act stipulates that the Minister has the designated authority to authorize, regulate or prohibit the dumping of hazardous substances. Industries that generate hazardous waste must produce an industrial waste management plan.

Polokwane Declaration on Waste Management

The Polokwane Declaration on Waste Management emerged from the first Nation Waste Summit of 2001. The vision affirmed in this declaration is to implement a waste management system which contributes to sustainable development and a measurable improvement in the quality of life, by harnessing the energy and commitment of all South Africans for the effective reduction of waste. An important goal is to stabilize waste generation and reduce waste disposal by 50% by 2012 and develop a plan for zero waste by 2022. As a requirement of National, Provincial and Local Government, targets set in the Polokwane Declaration are as follows:

- To develop and implement a comprehensive and regulatory framework by June 2002;
- Implement the NWMS;
- To build capacity within all spheres of government;
- Promote strong intergovernmental coordination and cooperation;
- To develop an Information Management System by April 2002;
- Explore and support appropriate economic instruments to support NWMS;
- To set up a Multi Stakeholder forum consisting of national, provincial, local government, business and civil society;
- Promote and Implement sustainable poverty relief projects;
- To provide comprehensive waste management services;
- To explore the establishment of a National Waste Fund;
- To develop compliance monitoring mechanisms;
- To develop comprehensive communication strategies include awareness campaigns.

Framework for Sustainable Post Consumer Recycling in South Africa Final Draft

The aim of this document is to provide a framework on the approach used for implementing sustainable post-consumer waste recycling in South Africa. This framework is intended to present realistic and practical approaches towards recycling within South Africa and also to set guidelines for all relevant stakeholders on how to promote effective recycling practices. These stakeholders are defined as government at all levels, product and packaging manufacturers, recyclers, collectors or recyclable material and the public entity.

Section 3 of this framework outlines the status quo in terms of waste recycling in South Africa. Waste recycling in South Africa is minimal due to the limited amount of recycling mechanisms present. With accordance with certain waste management legislation there are certain principles that need to be adhered to for recycling initiatives.

Section 4 of this framework outlines these principles. The objections of recycling set out in this document are job creation, reduction of pollution and conservation of natural resources; conservation of energy and reduction of costs in manufacturing sectors; litter abatement; reduction of the waste stream itself and a reduction of the waste stream itself.

Section 5 outlines measures that can be taken in order to enhance and promote recycling in South Africa. Measures that can be implemented are as follows, setting and defining targets, government procurement policy, registration of recyclers, market based instruments and education initiatives. This section also stipulates that government policy on recycling should be to enhance the market conditions for recycling by finding an appropriate balance between securing the supply of recyclable materials and promoting demand for products made from these materials.

National Domestic Waste Collection Standards

The National Domestic Waste Collection Standards (NDWCS) aims to standardize waste service delivery to ensure that this service be available to all while complying with current health and safety legislations as well as minimally changing those waste collection processes that function effective and efficiently. The standards which are defined in this document are based on the principles outlined in Section 2. The NDWCS also specifies that recyclables which are not collected at households should be deposited at drop-off centres which must be easily accessible to households. These drop-off centres must promote recycling, ensure user friendliness and also collection must be done at regular intervals so that it does not cause a nuisance.

The standards and regulations aimed for ensuring health and safety of Waste Collection Personnel are addressed in Section 7 of this document. The NDWCS defines that there should be mechanisms in place to ensure that there be transparent communication between different stakeholders.

Section 8 of this document stipulates that the service provider must create awareness amongst households about waste collection services offered, source separation, composting and the consequences of illegal dumping.

National Policy for the Provision of Basic Refuse Removal Services to Indigent Households

This policy aims to ensure that poor (indigent) households have access to at least basic refuse removal services. The National Policy for the Provision of Basic Refuse Removal Services to Indigent Households is aligned with existing legislation such as The Constitution of the Republic of South Africa Act, Local Government: Municipal Systems Act and Municipal Finance Management Act. This policy underlines the criteria for determining who qualifies for Free Basic Refuse Removal (FBRR).

Section 8 of this policy defines the level of FBRR service to be provided based on site specific circumstances. Under this section aspects such as collection frequency (determined by the composition and volumes of waste generated) and issuance of free receptacles is dealt with. This policy stipulates that the municipality must provide free receptacles for refuse storage and that the number of receptacles provided per household should be calculated based on the number of individuals residing in the household.

Section 9 of this policy deals with the financing mechanisms for FBRR to indigent households. The municipal financing of FBRR to indigent households must be sourced internally (within municipal tariffs) and/or externally (from the national fiscus).

The National Policy for the Provision of Basic Refuse Removal Services to Indigent Households also provides implementation strategies for the implementation of FBRR. Examples of such strategies include the establishment of an indigent register as well as declaration of certain localities for FBRR. This policy also lists various strategies for the monitoring and evaluation policy implementation with a municipality. Section 12 stipulates that the municipality must prepare an implementation plan for the FBRR services, and must contain aspects such as monitoring, targets and evaluation.

National Policy on the Thermal Treatment of General and Hazardous Waste

This policy outlines the use of thermal waste treatment as an acceptable waste management option. The document also provides the framework of which must be followed in order to implement waste treatment technologies within South Africa. Section 4 outlines the policy objectives such as the implementation of an integrated waste management system for South Africa in line with the waste management hierarchy.

Section 6 of this document addresses the manner in which the policy will be implemented. It stipulates that facilities wishing to utilize thermal waste treatment technologies must comply with existing and even future environmental legislation.

National Waste Management Strategy

The National Waste Management Strategy 2011 (NWMS) is a legislative requirement of the National Environmental: Waste Act 59 of 2008 (NEMWA). The purpose of this document is to achieve the objectives of NEMWA. The waste management hierarchy have been utilized in the structuring of the objectives of NEMWA which in turn is incorporated into the NWMS.

Section 2 of the NWMS outlines the 8 goals as well as the associated approach in achieving these goals. The 8 strategic goals of which the NWMS is structured are as follows:

- Goal 1: Promote waste minimisation, re-use, recycling and recovery of waste.
- Goal 2: Ensure the effective and efficient delivery of waste services.
- Goal 3: Grow the contribution of the waste sector to the green economy.
- Goal 4: Ensure that people are aware of the impact of waste on their health, well-being and the environment.
- Goal 5: Achieve integrated waste management planning.
- Goal 6: Ensure sound budgeting and financial management for waste services.
- Goal 7: Provide measures to remediate contaminated land.
- Goal 8: Establish effective compliance with the enforcement of NEMWA.

The regulatory and economic instruments that will be implemented in order to give effect to the strategies outlined in Section 2 are discussed in Section 3 of this document. An example of a waste management measure to be implemented is the drafting of norms and standards on various waste management issues.

Section 4 addresses the mechanisms necessary for the implementation of the NWMS and also sets out the roles, responsibilities, coordination and review mechanisms that will give effect to the approach and instruments set out in Section 2 and 3.

1.2.6 Review of current Local legislation (by-laws)

1.2.6.1 Current Situation

The Solid Waste By-Laws for Buffalo City Metropolitan Municipality were promulgated in the Provincial Government Gazette number 1448 of 4 November 2005.

Until 2005 the situation in Buffalo City Metropolitan Municipality was complicated by the fact that the by-laws for the previous administrations were never repealed nor consolidated into a single set of by-laws.

The By-Laws have been promulgated in Buffalo City Metropolitan Municipality.

The by-laws are enforceable in all Mdantsane magisterial districts.

1.2.6.2 Hazardous Waste

In terms of National legislation and the by-laws, the Municipality is not obliged to collect hazardous wastes. Certain general clauses in the by-laws and National legislation does, however, place an obligation and responsibility on Council to perform a regulatory function to ensure that hazardous, and other industrial wastes, are properly dealt with.

Clause 4 part V of by-laws provides that:

> the generator of any special industrial waste (defined in the by-laws as waste consisting of a liquid, sludge or solid substance, resulting from a manufacturing process, industrial treatment or the pre-treatment for disposal purposes of any industrial or mining waste) must keep Council informed of relevant details associated with the composition, quantity, method of storage, method of removal as well as who is removing it.
> Council can insist on independent analysis.
> Waste cannot be removed without the written consent of Council.
> Only licensees licensed to collect and dispose of the waste may do so.
> The waste must be stored safely.

1.2.6.3 Enforcement of the Solid Waste by-laws

The by-laws are not being properly implemented or enforced. Lack of enforcement is contributing significantly to poor waste management.

Certain officials within the Health Department and Solid Waste have been trained and are registered as peace officers and, as such, are able to issue summonses for offences related to the by-laws. There are, however, only a few officials who can do this and the municipal police need to support the Department in identifying offences and issuing summonses in order to implement an effective enforcement programme.

The by-laws in East London became enforceable in 2012 with the publication of the revised fines list. Prior to this the laws were not enforceable and the public to advantage of the lack of enforcement and developed a culture of littering and illegal dumping.

As a result poor waste and environmental management practices such as illegal dumping, burning of waste, littering, unacceptable disposal of medical wastes and others continue to occur in Buffalo City Metropolitan Municipality at unacceptable levels.

Proper enforcement is viewed upon as a matter of urgency.

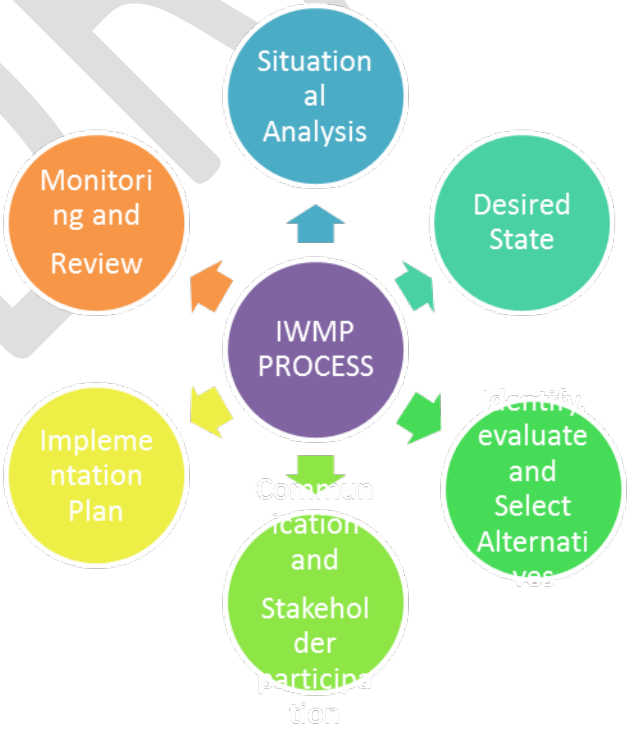
1.3 The role of the Waste Management Officer

The designation of a waste management officer (WMO) at a municipal level is important in order to ensure that there is constant communication between all three spheres of government on the implementation of the Waste Act. In relation to the development of IWMP, a WMO could potentially play a critical role in ensuring that a municipality would develop its IWMP for compliance purposes. Chapter 3, Section 10(3) of the Waste Act requires that the National Department, Provinces and Municipalities designate WMPs in writing. The Department has developed a guideline on designation of WMO which contains information on the duties of a WMO as well as the delegations of power and engagements with other WMOs. The local government sphere WMOs will act as a point of contact between other spheres of government on waste management issues.

This includes the development and implementation of IWMPs which will assist Provinces or national department in obtaining any information pertaining to the implementation of the IWMPs i.e. reporting on a municipalities progress with regards to reaching its targets as per the IWM, as well as ensuring that a municipality include IWMP reporting in the annual performance reports as called for by the Municipal Systems Act.

1.4 IWMP planning process

The primary objective of IWMPs is to integrate and optimise waste management planning in order to maximise efficiency and minimise the associated environmental impacts and finical costs. The diagram below summarises the integrated waste management planning process



As part of the IWMP development process, section 13 of the Waste Act requires

the development of annual performance reports, and it must be noted that this happens outside the actual IWMP process.

2 Contents of IWMP

2.1 Defining the geographical area

2.1.1 *Geographic scope*

In March 2000, the Government approved the National Municipal Demarcation Board's proposed new municipal boundaries. The practical effect of the Board's decisions is that the two cities of East London and King William's Town – including certain parts of their respective hinterlands – were amalgamated into one new municipality, called Buffalo City Metropolitan Municipality which came into effect as a result of the Municipal Elections, held on December 5, 2000.

The boundary of Buffalo City Metropolitan Municipality was established in terms of Provincial Gazette Extraordinary 28 February, Notice 22 of 2000 with subsequent amendments:

Buffalo City Metropolitan Municipality underwent a transition from a category B to a category A municipality, which took effect immediately after the 2011 local government elections.

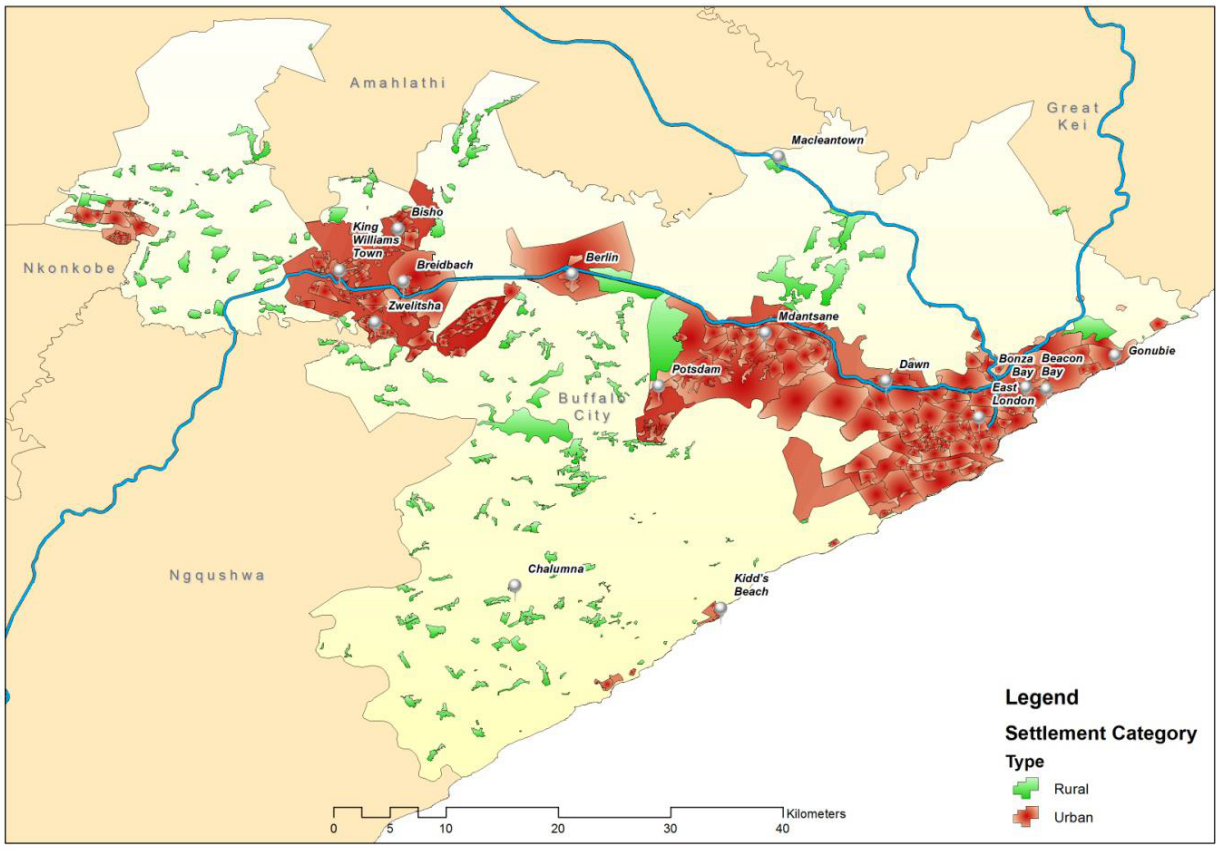


Figure 2.1 BCMM Urban and Rural settlements

2.1.2 *Description of planning area : Check IDP Book*

Buffalo City Metropolitan Municipality is situated relatively centrally in the Eastern Cape Province, which is bounded to the south-east by the long coastline along the Indian Ocean.

Buffalo City Metropolitan Municipality is the key urban centre of the eastern part of the Eastern Cape. It consists of a corridor of urban areas, stretching from the port city of East London to the east, through to Mdantsane and reaching Dimbaza in the west. East London is the primary node, whilst the King Williams Town (KWT) area is the secondary node. It also contains a wide band of rural areas on either side of the urban corridor. (See Figure 2.1 above). Buffalo City Metropolitan Municipality's land area is approximately 2,515 km^2, with 68km of coastline.

Both King William's Town and East London have important functions. KWT functions as a Regional Service Centre and together with Bhisho, is the Provincial Administrative Centre and contains the seat of the Provincial Government of the Eastern Cape Province, whilst East London is the dominant economic centre.

Buffalo City Metropolitan Municipality is broadly characterised by three main identifiable land use patterns.

The first has been described above, that is, the dominant urban axis of East London – Mdantsane–KWT–Dimbaza, which dominates the industrial and service sector centres and attracts people from throughout the greater Amathole region in search of work and better access to urban service and facilities.

The second is the area comprising the fringe peri-urban and rural settlement areas, which, whilst remaining under the influence of the urban axis, is distinct in character and land use patterns. These include the Newlands settlements, those settlements that previously fell within the former Ciskei Bantustans, and the Ncera settlements located west of East London.

Thirdly, the commercial farming areas form a distinctive type of area. These areas are dominant in the north-eastern and south-western (coastal) sectors of the Municipality and are characterised by extensive land uses, with certain areas making use of intensive farming (irrigation-based).

The Buffalo City Metropolitan Municipality area comprises of a range of settlement types, each of which will require different solutions in respect of waste management, which can be described as follows:

Urban Settlements

These can be further categorised into:

Dense formal residential developments with well developed road networks

Dense informal residential developments in infill areas within formal developments and in the peri-urban areas generally without well developed internal road networks.

Commercial, business and industrial districts in the formally developed areas.

Rural Settlements

These can be further categorised into:

- Substantial villages comprising of in excess of 50 houses in a relatively dense settlement pattern exceeding 5 houses per Hectare.
- Scattered settlements comprising of households in small groups generally at a density of less than 2 households per Hectare
- Farming Districts comprising of areas with settlement densities of less than one household per Hectare, generally associated with commercial farming activity.

2.2 Situational Analysis

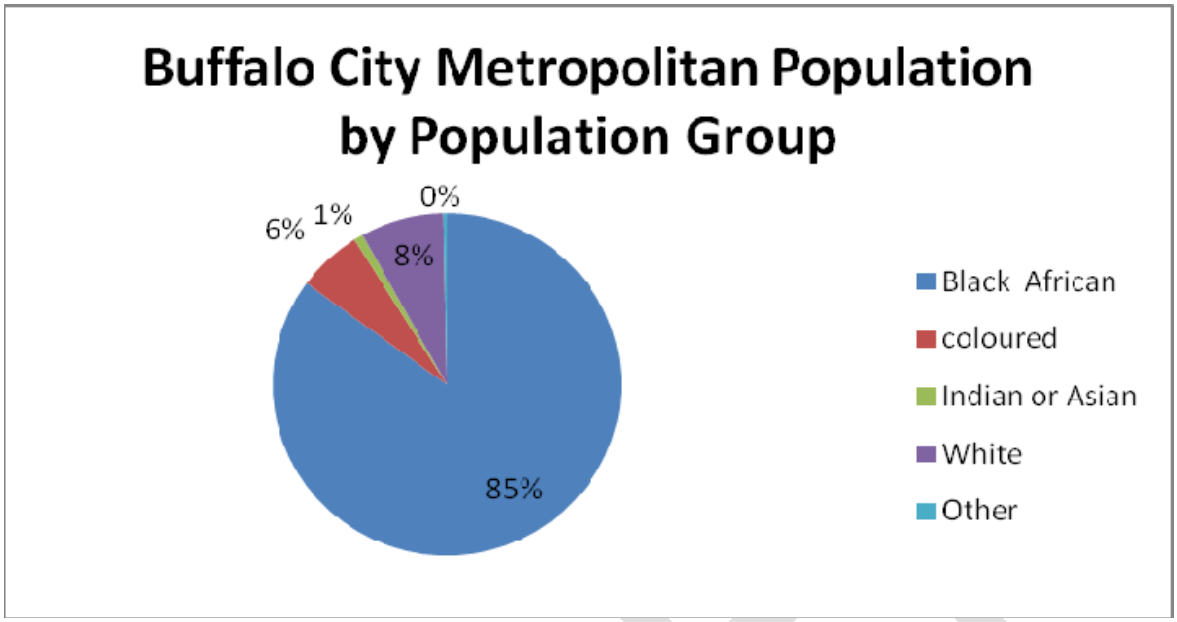
2.2.1 *Demographics*

Demographic data forms the basis for developing projections of waste quantities and the distribution of waste generation. The population growth estimate has implications on the planning and implementation of waste services such as waste collection, waste treatment, waste disposal and waste charges. It is therefore important to analyse the estimated population growth in order to plan for a long-term sustainable waste service to the public.

The following information and data is extracted from the ***Buffalo City Metropolitan Municipality Integrated Development Plan 2011 – 2016***.

2.2.1.1 Population

The Community Survey conducted in October 2007 by Statistics South Africa, estimates the total population of Buffalo City Metropolitan Municipality to be 724 306, a marked growth from the 2001 census which put it at 701 895. However, the community survey does not provide a breakdown of the population figures per constituent areas of BCMM as it is normally done in previous censuses. In the last two censuses the BCMM population was broken down as follows:



Whilst there has been some debate regarding possible under-counting of BCMM in the Censuses, the Census figures are recognized as the official statistics.

Current and Projected Future Population:

The following points are highlighted with regard to the resident population in Buffalo City Metropolitan Municipality:

Based on growth projections by Rhodes University, the current population for Buffalo City Metropolitan Municipality is estimated at some 1,020,000 people.

Growth projections to the year 2020, taking into account the anticipated impact of HIV/AIDS, indicate an estimated total population of some 1,290,000 people.

There has been an average annual increase of 1.49%. It must be noted that an increase in the number of dwelling units does not necessarily equate to a correlated increase in population as recent surveys have shown a trend for households to “split”, whereby large families will occupy several small informal structures (either attached to a formal dwelling or in a separate locality) as the children of the household get older and require more personal space. This results in lower occupancy rates per unit, which in turn equates to an increase in demand for housing. Such demand, however, does not necessarily indicate a commensurate growth in population thus putting pressure on the need for

accommodation and hence infrastructure.

The projections represent a potential growth over a 15 to 20-year period of some 270,000 people, which has consequences for the spatial requirements for development (especially housing and associated social facilities).

Demographic Profile and Socio-Economic Aspects :

The demographic and socio-economic profile of the residents of Buffalo City Metropolitan Municipality indicates the following: -

Some 41% of the population is aged 19 or below whilst 52% of the population is aged between 20 and 59 years of age. This relatively youthful profile of the population suggests ongoing pressure to provide not only the physical facilities required (housing, schooling and training facilities etc.) but also highlights the need to increase the rate of job creation in the local economy. The large cohort of youth coming through has implications for local economy and hence need for funding for economic development programmes.

The relative preponderance of females in the economically active age cohorts indicates that the area remains a net exporter of male labour to other economic centres in the country, albeit at a lower rate than is characteristic of other parts of the Eastern Cape. This indicates that, relatively, within the Eastern Cape Buffalo City Metropolitan Municipality remains an area where people seek opportunities in the formal and informal economies.

The rate of unemployment in Buffalo City Metropolitan Municipality, at an estimated 24,3%, is lower than the Eastern Cape Provincial average of 31.3%. (ECSECC, 2009)

The relative affluence of the majority of Buffalo City Metropolitan Municipality residents remains low, with only some 36% of the households in the area earning more than R1, 500 per month.

This indicates that disposable income is at a premium in Buffalo City Metropolitan Municipality, and generally speaking, levels of affordability of residents is low, which has an impact on the diversification of the economy and, more particularly for the Spatial Development Framework, has implications for the forms of spatial development that are best suited to facilitating an improvement in the majority of residents' socio-economic circumstances.

Circulatory Migration has implications for housing types, including the growth of informal settlements

Population growth is low but families (multiple households in one dwelling) are splitting up, each household endeavoring to occupy an own dwelling and thus putting pressure on the need for accommodation and hence infrastructure

Table 2.1 shows that out of the total population residing in Buffalo City Metropolitan Municipality, the Black African population accounted for 598 258 in 2001 and 616 833 in 2007. The smallest group was the Indian/Asian population

with 4 334 in 2001 and 1 950 in 2007.

Table 2.1 Buffalo City Metropolitan Municipality population by population group, 2001 and 2007

	2001		2007	
Population Group	**Number**	**Percent**	**Number**	**Percent**
Black African	598 258	85.2	616 833	85.2
Coloured	39 998	5.7	52 212	7.2
Indian or Asian	4 334	0.6	1 950	0.3
White	59 300	8.4	53 311	7.4

Source: Statistics South Africa, Population census 2001, CS 2007

Source: Statistics South Africa, Population Community Survey 2007

The population has grown relatively slowly from 1996 - 2001 at 2, 87%, an average of 0.6% per annum. Households have, however, grown at a much faster rate, as extended households 'disaggregate'. The growth rate for households over the five year period was 19,82%, an average annual household growth of 3,68%. This growth in the number of households translates into an increased demand for municipal services.

Table 2.2 Households 2001 (Census) & 2007 (Community Survey)

	2001	2007
Households	191 234	208 389

2.2.1.2 Refuse Disposal

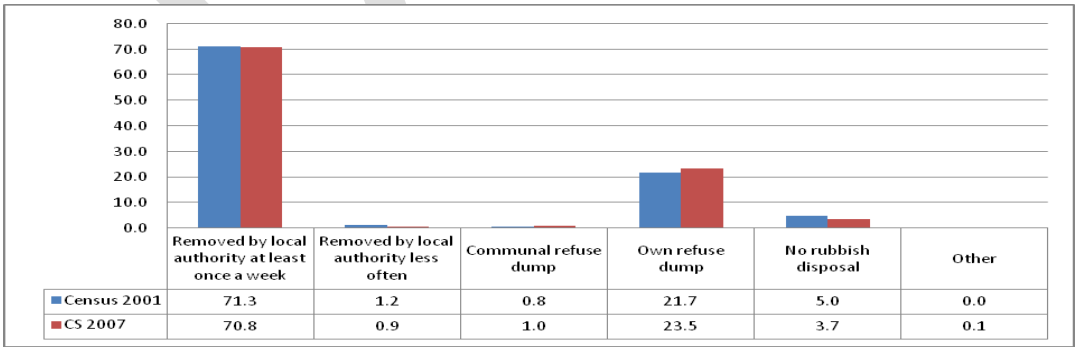


Figure 2.2 Percentage distribution of households by type of refuse disposal, BCMM, 2001 and 2007

Source: Stats SA Community Survey, 2007

Figure 2.2 shows that the percentage of households whose refuse was removed by local authority at least once a week increased from 71,3% in 2001 to 70,8% in

2007. The graph also shows the percentage of households that relied on their refuse dump increased by 1,8% in 2007.

2.2.1.3 Household income

2.2.2 *Waste Quantities and types*

2.2.2.1 Characterisation of waste in Buffalo City Metropolitan Municipality

The current Waste Information System does not provide information on a breakdown into the characteristic of waste in Buffalo City Metropolitan Municipality.

2.2.2.2 Waste characterisation study (Bosch Munitech 2012)

Bosch Munitech conducted a sample waste characterisation study in Buffalo City Metropolitan Municipality in 2012. The study included sampling and analysis of residential solid waste. The composition and quantities of residential waste generated normally varies depending on the income levels (and thus standard of living) of the producer. In order to obtain representative data, the characterisation of residential waste was thus done separately for high, medium and low income areas

The methodology adopted for the study was as follows:

- A total sample of 140 refuse bags that would normally have been collected by the collection crews were collected from a random sample of houses in the residential neighbourhoods.
- The waste was then sorted into predetermined categories (i.e. paper, metal, glass, plastic, other and organics) and weighed.

The outcome to the study is presented in Table 2.3, showing the composition of waste in the general waste stream in the three residential areas as well as in the CBD. Table 2.3 also shows estimates for the composition of general waste as related by the Recycling Guidelines developed by DEDEAT for use by Local Authorities.

Table 2.3 The composition of the general waste stream in Buffalo City Metropolitan Municipality

	Bosch Munitech study				DEDEAT Guideline	
	High Income	Middle Income	Low Income	Average	Low income	High income
Paper	18%	22%	16%	18%	4%	13%
Metal	2%	3%	3%	3%	2%	6%
Glass	11%	7%	11%	10%	2%	9%
Plastic	15%	18%	17%	17%	2%	9%
Organics	15%	19%	6%	12%	32%	21%
Putrescribles	34%	19%	36%	31%		
Nappies	3%	7%	7%	6%		
Other	2%	5%	4%	3%		
Total	100%	100%	100%	100%	100%	100%

It was concluded that the waste stream contains high amounts of paper and plastic relative to the DEDEAT guideline. Organic materials comprising of both food and garden waste in the middle to upper and middle-income areas comprise about 20 %, while only about 6 % in Low income areas.

2.2.3 *Determining current domestic waste generation per capita*

2.2.3.1 Generated general waste

The consultancy firm Bosch Munitech has conducted an analysis of the waste collection and disposal records produced by the Solid Waste Management Services for the period 2010 to 2012. The analysis covered the quantities of waste disposed of at the three Municipal disposal sites (i.e. Roundhill, Second Creek and King William's Town) and one private disposal site (Riegers) during the three years. The intention was to calculate the annual amounts of waste collection and disposal. As there are no weighbridge facilities at two of the landfill sites, the quantity of waste disposed of at the landfill sites are recorded by volume (cubic meters), based on the volume of the vehicle load body.

It was anticipated that there would be gaps in the conducted general waste generation analysis, as the analysis is based on records only showing the quantities of landfilled waste. Therefore, the following waste quantities would not be included:

- Amounts of recycled waste
- Industrial and commercial waste treated or disposed of elsewhere by industry itself
- Hazardous wastes treated or disposed of outside of the municipal disposal sites (this would include special industrial and medical wastes)
- Waste that is illegally dumped and not subsequently identified and collected by the Municipality
- Waste generated in the rural communities where no collection services are provided
- Waste disposed of at the small un-permitted disposal

During the analysis it was established:

- The weighbridge at Roundhill was not out of order for a time period when the analysis was being undertaken
- Waste entering the site after normal working hours was not recorded
- The Waste Information System had no data input since approximately 2010
- Recording forms from King Williams Town had not been captured in the WIS
- Riegers landfill had no records
- No records existed from the source of the waste
- No records exist as to the characterisation of the waste

Table 2.4 Estimation of waste disposed of at the four operational landfill

sites. Quantities in Tonnes per annum

	Industrial/ Commercial	Domestic	Garden	Soil, cover material & builders' rubble	Unknown / mixed waste	TOTAL
Roundhill	8,500	30,000	500	300	300	**39,600**
KWT					26,000	**26,000**
Second Creek				40,000		**40,000**
Riegers	0	0	1,500	1,000		**2,500**
TOTAL	**8,500**	**30,000**	**2,000**	**41,300**	**26,300**	**108,100**

Notes to Table 2.4
- The analysis is based on available records supplied by Buffalo City Metropolitan Municipality, and appear to cover 65% of the estimated waste generated in the municipality.
- The waste categories shown in the tables are in accordance with the system used by Buffalo City Metropolitan Municipality to record volumes of waste collected and taken to the disposal sites. The present system does not distinguish between commercial and industrial waste. These have therefor been combined under a single classification.
- Soil includes imported cover material, builders rubble and excess fill material removed from construction sites.
- Quantities of waste from Riegers are not recorded, and are based on hear-say.

The data provided above is not representative of the quantities of waste collected in Buffalo City Metropolitan Municipality, and it is recommended that theoretical waste generation estimates be utilised in this study.

2.2.3.2 Generated general waste by income categories

Bosch Munitech, using the Wright-Pearce Study, data from the Buffalo City Metropolitan Municipality Integrated Development Plan (IDP) on the population distribution by income group and the conducted analysis of generated general waste in Buffalo City Metropolitan Municipality, has estimated the distribution of generated general waste by income category as summarised in Table 2.5.

Table 2.5 Estimation of generated general waste by income category (Bosch Munitech, 2012)

Income Category	Waste quantities by income category (Tonnes/annum)	Percentage of total waste quantity (% of total)
High Income Residential	13,900	7,9
Middle Income Residential	31,200	17,7
Low Income Residential	69,700	39,6
Commercial/Industrial	61,300	34,8
TOTAL	**176,100**	**100,0**

2.2.3.3 Generated general waste by waste categories

The distribution of general waste by waste categories has been estimated using the Wright-Pearce Study and the analysis of generated general waste in Buffalo City Metropolitan Municipality. The calculation, presented in full in Annexure B, is summarised in Table 2.6

Table 2.6 Estimation of generated general waste by category (Bosch Munitech, 2012)

	Bosch Munitech study						
	High Income	WASTE t/a	Middle Income	WASTE t/a	Low Income	WASTE t/a	Average
Paper	18%	2 169	22%	5 961	16%	9 675	18%
Metal	2%	241	3%	813	3%	1 814	3%
Glass	11%	1 325	7%	1 897	11%	6 651	10%
Plastic	15%	1 807	18%	4 877	17%	10 279	17%
Organics	15%	1 807	19%	5 148	6%	3 628	12%
Putrescribles	34%	4 097	19%	5 148	36%	21 768	31%
Nappies	3%	361	7%	1 897	7%	4 233	6%
Other	2%	241	5%	1 355	4%	2 419	3%
Total	**100%**	**12 050**	**100%**	**27 095**	**100%**	**60 467**	**100%**

Notes to Table 2.6:
The results of the Bosch Munitech characterisation analysis for the different income groups has been applied to the quantities estimated in the table and an average of high, middle & low has been applied to the mixed residential component in order to calculate the above quantities by waste categories.
There are large gaps concerning information of quantity of waste being recycled

which makes the estimations of the distribution of waste uncertain. The estimated results should thus be used with caution.

2.2.3.4 Waste Information System (WIS)

A Waste Information System was introduced into Buffalo City Metropolitan Municipality in approximately 2007. Due to a number of factors, the WIS was discontinued in 2010, and no significant data has been captured in the system since then.

According to the NWMS, municipalities are obliged to supply a national Waste Information System (WIS) with data concerning their waste situation. The current lack of information concerning the waste situation in Buffalo City Metropolitan Municipality also makes the task of planning difficult.

A local WIS may also include information regarding hazardous and medical waste. This would require the co-operation of individual institutions, industries and waste management companies.

2.2.3.5 Categories and quantities of hazardous waste in Buffalo City Metropolitan Municipality

There is no comprehensive register of generators of hazardous and/or special industrial waste and thus no specific record of the details of the quantities of hazardous waste being generated in Buffalo City Metropolitan Municipality.

Arcus GIBB conducted a survey in 2002 to identify the generators of hazardous waste in Buffalo City Metropolitan Municipality and in the broader Eastern region of the East Cape Province and to attempt to quantify the quantities of hazardous waste generated in the region.

Table 2.7 Results of hazardous waste survey completed by Arcus GIBB in 2002

Industry/sector	Number of companies	Tonnes per annum
Photographic	2	9.4
Service Stations & Fuel Distributors	25	442.4
Non-Metal Manufacturers	6	389.3
Agriculture, Forestry & Food Products	26	879.2
Metal Goods, Engineering & Vehicle	38	238.5
Textile, Leather & Wood	14	1180.6
Pharmaceuticals	3	*71.3m³*
Chemical & Related Industries	19	19.2
Medical, Sanitary and Health Care	31	128.6
Manufacturers of Paper, Printing & Publ.	6	184.6
Metal Manufacturing	3	8820.0
Sewage effluent from Treatment Works	2	775.6
TOTAL	**175**	**13067.4**

Notes to Table 2.7.

The table includes hazardous wastes generated not only in Buffalo City Metropolitan Municipality boundaries but also in the Eastern Region of the East Cape Province since that area is likely to be the catchment area of the regional landfill site, i.e. Roundhill.

The survey only covered the larger organisations likely to produce hazardous wastes. Hazardous wastes generated by smaller generators have thus not been taken into account.

The quantities represent the total quantity of hazardous waste generated in the area as reported by the respondents. In many cases that also includes quantities of hazardous wastes that are treated or recycled on site (e.g. includes medical waste generated and incinerated at the hospitals).

Tonnage was not available for the Pharmaceutical sector. The survey showed a total volume of 71,3 m^3 of which some is encapsulated for disposal.

The survey was made through interviews and/or issued questionnaires to some 800 organisations that were considered likely to be generating hazardous wastes,

of which 175 returned information. Arcus GIBB estimate that the survey includes between 75 % and 90 % of hazardous waste produced in the region.

Hazardous waste quantities that was not covered in the survey are:

- Hazardous waste substances (often small quantities) that are dispersed within the domestic and commercial waste stream (for example, batteries, insecticides, weed-killers and medical waste discarded on domestic and commercial premises).
- Hazardous waste that is illegally disposed of at the landfill sites or dumped in the nature as well as hazardous waste that is incorporated in the general waste stream are not declared and are thus not known.

The main sources and components of the hazardous wastes quantified under the survey are given in Table 2.8 .

Table 2.8 Summary of Arcus GIBB's hazardous waste survey by waste categories

Photographic
Comprises mainly of heavy metal solutions, fixer liquids and developer liquids resulting from the processing and developing of photographs.
Service Stations and Fuel Distributors
Comprises mainly of used motor and lubricating oils, the majority of which is collected for refining and re-use by the Rose Foundation at their plant in PE.
Non-Metal Manufacturers
Comprises mainly of heavy metal dusts, acid solutions, transformer oils, oily wastes from the processing and storage of mineral oils, fly ash and medical wastes from on-site clinics.
Agriculture, Forestry and Food Products
Comprises mainly of redundant agricultural chemicals, other redundant chemicals, putrescible organics from edible oil origin and animal carcasses and minor items such as fluorescent tubes and used motor oils from organisations such as nurseries, abattoirs, farms and food manufacturers/processors.
Metal Goods, Engineering and Vehicles
Comprises mainly of laboratory wastes, degreaser sludges & phosphates, medical wastes from internal clinics, inorganic wastes (acids and alkalis), furnace ash, asbestos wastes, heavy metal sludges and solutions, redundant chemicals, non halogenated oily wastes, paint & resin wastes, oily wastes from the processing/storage/use of mineral oils and other used oils from vehicle assembly plants and heavy engineering industry.
Textile, Leather and Wood
Comprises mainly of inorganic wastes, asbestos wastes, used lubricating & transformer oils, caustic lime sludge, chrome III sludge, redundant dyes, oily wastes,

redundant chemicals and paint & resin wastes from textile manufacturers, saw mills and certain car component manufacturers.

Pharmaceuticals

Comprises mainly of sanitary towels, chemical wash water, redundant liquids, product liquids, laboratory wastes, medical waste from internal clinics, fluorescent tubes, soaps and medicines from pharmaceutical manufacturers and packers.

Chemical and Related Industries

Comprises mainly of acids & alkalis, asbestos wastes, redundant chemicals, heavy metal sludges & solutions, oily wastes, paint & resin wastes and fibreglass wastes from industrial chemical manufacturers, cargo handling and transport organisations, fibre manufacturers and paint manufacturing processes.

Medical, Sanitary and Health Care

Comprises mainly of laboratory wastes, infectious wastes and sharps from private practitioners, hospitals, clinics, veterinary clinics and other medical and health care facilities.

Paper manufacture, printing and publishing

Comprises of complex solvents such as ethanol & ethyl acetate, fluorescent tubes, slurry mixes and ethanol sludge from the larger printing and packaging companies.

Metal Manufacturing
Comprises mainly of foundry sand contaminated with chrome from metal foundries.
Sewage Sludge
Comprises of sewage sludge from the KWT sewage treatment works.

The survey shows that a substantial quantity of hazardous waste, primarily in the lower hazard rating categories 3 and 4, is generated by businesses in the investigated area. Discussions with Enviroserve, who are the main hazardous waste collector in Buffalo City Metropolitan Municipality, also indicate that quantities of high hazard wastes in the rating 1 & 2 categories generated in the area are relatively insignificant. (Please note that this situation could, however, change rapidly depending on influx of new industries.)

Growth in hazardous waste generation over the planning period cannot be predicted as this will depend on unknown factors such as increases in industrial activity and the extent to which industries adopt waste prevention, minimisation and cleaner production programmes. It is, however, expected that these quantities will increase with the anticipated increase in industrial activity associated with developments such as the West Bank IDZ, the Wild Coat SDI and possibly the Coega Harbour Development.

2.2.3.6 Medical waste

Medical waste is classified as a hazardous waste under the broader category of infectious waste and, as such, cannot legally be disposed of at the municipal disposal sites. Medical wastes should be dealt with in accordance with SABS code 0248:1993, “Code of Practice for the Handling and Disposal of Waste Materials Within Health Care Facilities”.

There are a number of Provincial Hospitals, Private Hospitals, Provincial Clinics and Municipal Clinics located throughout Buffalo City Metropolitan Municipality that generate medical waste. In addition, it is estimated that there are in excess of 400 private medical practitioners and a number of veterinary clinics and veterinary practitioners in the area. The hazardous waste investigation undertaken by Arcus GIBB in 2002 indicates an estimated annual generation of medical, sanitary and health care waste in the area of approximately 200 tonnes per annum. The quantity of medical waste that is produced in the area is thus substantial.

2.2.4 *Estimated future waste generation*

Bosch Munitech has calculated an estimation of the future generation of waste in Buffalo City Metropolitan Municipality. This estimation of future generation of waste is based on the population data derived from the Buffalo City Metropolitan Municipality IDP 2012 to 2016. This model excludes waste that is being recycled.

A projection of the future waste generation is rather difficult to undertake since is depends on a number of factors which cannot be accurately predicted, such as:

- The extent to which income levels will increase (or decrease) and thus individual waste generation trends will change
- The distribution of the population between the different income groups
- Urbanisation and in-ward migration from the rural areas surrounding the Municipality
- Changes in the income level profile of the area
- The rate at which communities that are not currently being served are provided with services and thus contribute additional waste to the waste stream
- The extent and profile of the commercial and industrial sector
- The extent to which industry and commerce, and the population at large, adopt waste prevention and minimisation strategies

Generally it is expected that, in the absence of any increased efforts related to waste minimisation and recycling, waste generated in the area will increase in accordance with improved living standards, population increases, extension of services to presently un-served areas and improved control on illegal dumping.

In the waste projection model, developed by Bosch Munitech the following assumptions in order to arrive at an indicative assessment of future waste quantities have been made:

- That 2%, 8% and 90% of the projected population growth will be in high, middle and low income groups respectively.
- The growth rate will be constant at 1.49% per year
- That the rural population will remain static.
- That the rural population that presently receive no service will be provided with a service and will enter the waste stream progressively over the next 10 years.
- That unit domestic waste generation rates will be as stated in the waste characterisation study undertaken is 0.2, 1.1 and 1.85 kg per person per day in the lower, middle and upper income groupings respectively).
- That commercial, garden waste and builder’s rubble generation will grow at rates equal to the population growth rate.

The above represents one of many possible scenarios. The Waste projection model has been set up so that the above variables can be changed to estimate waste quantities under different scenarios.

The result of the projected waste quantities in Buffalo City Metropolitan Municipality, based on the given assumptions above, is summarised as follows in

Table 2.9.

Table 2.9 Waste to landfill projection (Bosch Munitech 2012)

		2012	2017	2022
Total Population		1 050 000	1 200 000	1 350 000
Total Waste Gen (t/a)		114 792	131 191	147 590
		65,2% of total waste generated for 2012		
Total Employed Population		189 430	216 491	243 552
Total Com/Ind Waste Gen (t/a)		61 289	70 044	78 800
		34,8% of total waste generated for 2012		
TOTAL WASTE GENERATED - Model (t/a)		**176 081**	**201 236**	**226 390**

The growth rate in the waste stream, without applying any future effect associated with waste minimisation, is thus estimated to be about 1.5 % per annum. This is in alignment with the projected reduction in annual population growth rate.

No account has been taken in the above projection of increases in waste generation resulting specifically from the possibility of any economic and industrial growth in excess of population increase in the area. The extent of economic/industrial growth resulting from initiatives such as the IDZ and the related impact on waste generation during the planning period cannot be predicted or estimated with any degree of accuracy.

The estimated quantities being recycled at present, as set out in
Table 2.11, should increase in similar proportion to the estimated growth in waste quantities given above. Recycled quantities will increase at a significantly higher rate, however, if an aggressive recycling programme is introduced.

2.2.5 *Waste recycling, treatment and disposal*

2.2.5.1 Waste Recycling

In the context of the NWMS, waste prevention and minimisation comprises of any activity that is undertaken to prevent or reduce the volume of waste that is generated, treated, stored or disposed of by the generator of the waste. Waste minimisation techniques include cleaner production, waste prevention, re-use and recycling.

Waste minimisation programmes are applicable to commercial, industrial, and domestic waste generators. At the local authority level, these programmes normally include a strong emphasis on incentive and educational programmes to increase awareness and encourage the introduction of individual waste minimisation programmes. Effective waste minimisation programmes achieve a number of benefits such as reduced environmental impacts, reduced material

costs, better resource utilisation and reduced waste treatment and disposal costs

The focus of the Waste Minimisation section of Buffalo City Metropolitan Municipality for the development of waste minimisation programs, is on

- Recycling
- Training and Workshops
- Awareness
- Theme days
- Clean ups
- Exhibitions
- Adopt a spot

Waste minimisation strategies in Buffalo City Metropolitan Municipality

Buffalo City Metropolitan Municipality does not have a formal waste minimisation policy in place. Various strategies and projects have been implemented on an ad-hoc basis. No specific waste minimisation programmes to achieve targets are in place or have been implemented in the past in Buffalo City Metropolitan Municipality.

Waste Management staff responsible for waste minimisation as situated in East London, Mdantsane and King Williamstown.

Effect has been given to creating awareness in the community, and at schools in these areas. Examples of projects undertaken include :

- Pupils have been on tours to Roundhill
- Pupils at various schools have been involved in ‘clean up’ campaigns,
- ward committees and co-operatives involved in workshops held.
- Illegal dump sites have been cleared
- In several instances the areas have been adopted by the communities and have been developed and maintained as gardens.

An initiative to involve ‘Collect-a-can’ was commenced, but the viability has still to be established for this initiative.

Waste minimisation strategies in Private Sector

Some manufacturers and other businesses in Buffalo City Metropolitan Municipality, such as Johnson and Johnson and Mercedes Benz SA, have adopted waste minimisation programmes. These typically include techniques such as internal recycling of suppliers packaging, internal recycling of waste products, better and more waste efficient production techniques, quality systems to reduce the quantity of reject product taken to disposal and recycling initiatives using external service providers.

Current public waste minimization programs

The Eco-Schools programme
This is being developed in South Africa as a school improvement initiative which aims at achieving sustainable environmental management. It is designed to encourage whole-school learning with the emphasis on improving the school environment. It is managed by WESSA, and is part of an international programme now running in 53 countries around the world designed to encourage curriculum based action for a healthy environment.

The Eco-Schools are trained in compost building, environmental education and are involved in driving projects for the school, planning environmental excursions and auditing animal and plant life around their school and in rivers, shores and dams during excursions.

Only a few schools in Buffalo City Metropolitan Municipality are part of the Eco-Schools program, as it requires dedicated leadership and mentorship to run them. The following schools are registered as Eco-Schools with WESSA, although there other schools where similar environmental clubs may exist:

- Cambridge Preparatory School
- Clarendon Girls School
- David Mama High
- Ebenezer High
- Funeka JSS,
- Hudson Park High and Primary School
- Imanzamu Yethu Creche
- Jityaza JSS
- Lilifontein
- Londolozani JPS
- Mbanyaza JSS
- Merifield
- Songezi JPS and Crèche
- Stirling High and Primary School
- Vulamazibuku High

Recycling programs

The Municipality has a dedicated entity with-in their staff structure to develop, plan and manage waste prevention, reduction and recycling programmes. There are limited records of activities related to recycling in Buffalo City Metropolitan Municipality. There are no substantive programmes related to the planning and implementation of recycling programmes presently in operation by the Municipality.

A formal recycling forum previously established under the “City Clean Campaign” has become inactive.

The private sector to appear to be taking actions to fill the void. A project is being created by the Border-Kei Chamber of Business's MEAT Committee called the, "Clean BCMM Campaign" which will include assisting in the creation of groups who collect waste and either recycle or convert into further products.

Recycling companies

There is a relatively active recycling industry, at both the formal and informal level, operating in Buffalo City Metropolitan Municipality, as established markets for these recyclable wastes exist and recyclers can thus gain income from the sale of these wastes. The Recycling Forum has become inactive, therefore there are no records of recycling organisations or quantities in Buffalo City Metropolitan Municipality. Table 2.10 lists the major recycling companies that are active in Buffalo City Metropolitan Municipality.

Table 2.10 Examples of waste minimisation businesses in Buffalo City Metropolitan Municipality

Company Name	Service Type
Amalinda Scrap Metals	Scrap Metals
Border Scrap	Scrap Metals
Buffalo Scrap Metals	Scrap Metals
Cash for Scrap	Ferrous materials
City Glass Recycles	Glass recycling
Collect All Group	Plastic Recycling
Collect All Paper	Paper, Cardboard, Plastic
E.L. Scrap Metals	Scrap metals
King Box Manufacturing	Cardboard, Paper, Plastic Cans and Glass
Marble Gold	Drum reconditioning, Paint Thinner recycling
Mdantsane Bottle Exchange	All recyclables but particularly bottles
Paper Man	Cardboard, Paper and Plastic recycling
Plastic Injection	Plastic
Reclam	Principally metals, cardboard and paper waste recycling but also industrial waste recycling
Waste Management Systems	Recycling management.
Waste Tech	General / hazardous waste removal and recycling

Based on interviews with some of the larger recycling companies indicated the following:

- 25 – 30 % of light metals are forwarded for shredding in Port Elizabeth
- 40 – 50 % of heavy metals are sent to Port Elizabeth harbour for export / re-sale
- Paper and cardboard are sent to Sappi or Mondi paper mills in Durban
- Plastic is treated locally and formed into plastic pellets. These are sold locally and out of the area.
- Glass is exported by rail to Gauteng
- Beverage cans are sent to Collect-a-Can in Gauteng

Informal recycling industry

There is an extensive informal recycling industry operating in Buffalo City Metropolitan Municipality. Informal recyclers collect materials from either landfill sites or commercial/residential areas. At the landfill sites Roundhill, Second Creek and King William's Town, informal recyclers recover recyclable materials from amongst the waste.

In commercial and residential areas, informal recyclers open plastic bags of waste that have been put out for collection and recover the recyclables (primarily two litre plastic bottles, as these are the most valuable). The areas are often cleared in an organised manner. The informal recyclers deliver the materials to central pick-up points at scheduled times, where the major recycling companies purchase the waste from them.

This informal recycling also results in a degree of re-use where re-usable waste is recovered and sold to individuals or retained for re-use by the recycler.

Industrial recycling

There are significant quantities of special and industrial wastes being recycled and re-used at the industry level. Typical examples of this are:

Used lubricating oils collected by EL Brick, Oilkol, Boiler burner and fuel and Rec-oil.

Oily waste from ships slops and other industries is being processed and used by East London Brick to fire its brick making kilns.

Powder sweepings from Johnson and Johnson being removed by fibreglass manufacturers for use as fillers.

Packaging of vehicle components returned to the supplier of the components by Daimler Benz for re-use.

The rendering of animal wastes into animal feeds at the Abattoir.

Miscellaneous recycling

A significant proportion of food wastes generated at the larger retail outlets and institutions is being sold as pigswill. The Municipality is, however, not specifically co-ordinating or controlling this activity. Some control is however provided through the normal health regulations and health inspection processes that are applicable to businesses producing or handling putrescible foodstuffs.

Quantities of recycled waste

There is no co-ordinated record of the quantity of waste being recycled in Buffalo City Metropolitan Municipality. In order to obtain some indication of quantity the larger recycling companies operating in Buffalo City Metropolitan Municipality were interviewed by Bosch Munitech in June 2012. The results are presented in Table 2.11 . These companies interviewed gave an indication of the quantities being recycled by them, and have requested confidentiality with the information. The names of the companies have therefore been omitted from the table below. A broad assessment of quantities being recycled through the smaller operators was made based on the indicative estimates provided by these larger companies. These estimates are, however, not based on any specific record.

Table 2.11 Estimation of quantities of waste recycled in Buffalo City Metropolitan Municipality (Tonnes per annum)

Waste type	Tonnes per year
Cardboard / Paper	13,000
Plastic	4,000
Cans	100
Oil	2,000
Metals – Ferrous	40,000
Metals – Non ferrous	4,000
Glass	2,000

The quantities should be viewed as approximate quantities. The proportion of recyclable waste generated in Buffalo City Metropolitan Municipality that is currently being recycled is estimated in Table 2.12. The estimation is based on data from the waste analysis and waste characterisation study (Bosch Munitech, see Section 2.2.3.3), and the information gathered from the larger recycling companies.

Table 2.12 Estimation of the proportion of general waste being recycled (Bosch Munitech, 2012)

Waste type	**Recycled quantity by the formal recycling industries** (tonnes/annum)	**Waste disposed of at the landfill sites** (tonnes/annum)	**Recycling potential** (tonnes/annum)	**Current recycle percentage** (%)
Metal	44,100	2,868	46,968	93.8
Plastic	4,000	16,963	20,963	19.1
Glass	2,000	9 873	11,873	16.4
Paper	13,000	17 805	30,805	42.2
TOTAL	**63,100**	**47,509**	**110,609**	

Notes to Table 2.12
- The quantity of waste disposed of at the landfill sites represents the potential for possible further recycling, which is currently being landfilled at the Buffalo City Metropolitan Municipality disposal sites on an annual basis. The disposal quantities are taken from Table 2.6 and were estimated in accordance with the description given under Section **Error! Reference source not found.**
- The amounts of disposed recyclables are overestimated, as informal recycling at e.g. Roundhill, King William's Town and Second Creek has not been taken in account, which would reduce these amounts.

It is thus apparent that although a significant proportion of the recyclable metal waste that is generated is being recycled, however there remains scope for the recycling of plastic, glass and paper to increase substantially.

2.2.5.2 Waste treatment

Waste treatment is the process of minimising the environmental impacts of waste by changing the physical properties of waste or separating out or destroying toxic components of waste (NWMS, 2009). There are various waste treatment methodologies which are landfilling, composting, incineration, gasification and pyrolysis. Of the waste generated in South Africa, it is estimated that more the 95 % is landfilled (with eventual decomposition and stabilisation) and this generally remains the most economical means of waste treatment.

Alternative methods of treating municipal general wastes attempted in South Africa in the past have generally been low technology options such as composting and incineration.

Composting has been (and is currently used) as a method of treating waste and achieving waste reduction by various municipalities in South Africa to varying degrees of success. Experience has shown that it is generally not financially viable and that landfilling is, in most cases, a better financial option (despite any income from sale of product or savings in purchases of compost). The costs of developing

and operating landfill sites and of transporting waste to more remote regional sites are, however, increasing significantly. If the savings associated with extended landfill life and reduced transport costs are factored into the financial analysis, composting clearly becomes a more attractive option. In these terms, composting is generally now seen as a potentially viable treatment option that is increasingly being considered by other large and medium sized municipalities.

Incineration of household or municipal waste is generally only practised on a very small scale in a few small local authorities (e.g. Ixopo, Zinkwazi) that generate low volumes of waste and they are using low technology incinerators. In many instances, these are being phased out due to public pressure, difficulties in complying with air pollution regulations and maintenance costs. Most of them were originally installed as short-term solutions to delay the need for developing and operating properly engineered and permitted landfills until such time as regional facilities become available. The use of these low volume/low technology incinerators may, however, provide a feasible waste disposal solution for remote villages.

Attempts have been made by private waste contractors in other areas within South Africa to licence high technology thermal destruction or neutralisation plants for hazardous wastes. These have met with strong public resistance and bureaucratic delays, and have not proceeded to date.

International environmental organisations have been active in South Africa opposing any form of incineration or thermal treatment, even for specific wastes. This strong environmental lobby, coupled with the need for public participation and approval, is making incineration and other thermal waste treatment processes, such as waste fired boilers in the paper and craft industry, difficult to implement.

Thermal waste treatment processes currently being successfully utilised are autoclaves and incinerators operated by the health care industry and specialist medical waste contractors.

Composting in Buffalo City Metropolitan Municipality

Buffalo City Metropolitan Municipality is the Owning Agency for a composting project being established at NU2 landfill site in Mdantsane. The project is being implemented through Stowie-M Trading CC, and commenced in August 2011. The business plan submitted to DEDEAT (Submission number 42795) indicates 48 people are to be employed on the project. There is no indication of the quantities of composting nor the market for the composted materials. The business plan indicates that the project is not sustainable without aftercare post implementation.

It is probable that small scale composting is taking place in the private sector for own consumption or sales. These sites include nurseries and local schools. Discussions with local nurseries indicate that there is very little demand for compost in Buffalo City Metropolitan Municipality

Shredding garden waste can contribute significantly to minimise garden waste that

is being disposed of at the landfill sites.

Incineration in Buffalo City Metropolitan Municipality

There is no incineration of medical waste in Buffalo City Metropolitan Municipality. All reported medical waste is collected by a private waste collection company (Compass) and transported to Port Elizabeth and Cape Town

Some medical waste generated in the area is either inadvertently or purposefully stored and collected with the general waste and thus ultimately disposed of at the municipal landfill sites. This occurs at both health care facilities (such as practitioners rooms) and in normal domestic waste. It is also suspected that some of the rural clinics may be inadequately burning and disposing of medical waste and sharps on-site due to inefficiencies or lack of services to these clinics.

The East London SPCA incinerates all small carcasses generated under its control in its own incinerator on its premises. Larger carcasses are given to the zoo. In addition, some carcasses are incinerated for vets and members of the public on request for an incineration fee. Incineration capacity is, however, limited and not capable of dealing with much more than their own needs. The possibility of forming a partnership with the SPCA to increase incineration capacity to deal with all animal carcasses merits further investigation. In King William's Town SPCA disposes of animal carcasses in plastic bags in special pits on the KWT landfill.

Industrial waste treatment in Buffalo City Metropolitan Municipality

There are a number of industries in Buffalo City Metropolitan Municipality that treat their industrial wastes before disposal thereof. These treatments are industry specific and are normally associated with liquid effluents resulting from production processes. Whilst it is not a municipal responsibility to treat these wastes, the Municipality does have a legal responsibility to play a regulatory role in this regard. A detailed investigation to identify these has not been undertaken but typical examples are:

> The KWT sewage treatment works stabilise and "cake" their sewage sludge before disposal at the KWT site, which is a DWA requirement in order for the sludge to be handled as a non-hazardous waste. On the other hand, the sewage treatment works of East London discharge their untreated sewage sludge to sea, which is a highly questionable practice.
>
> Da Gama treats the effluent from their textile manufacturing processes and the treated effluent is used to irrigate crops in the surrounding villages.

2.2.5.3 Waste Disposal

Landfilling is the most commonly used disposal method in South Africa and DWA estimates that in excess of 95% of waste generated in South Africa is disposed of in landfills. It has been conceived as the most economical method of waste disposal and can considered an environmentally acceptable practice, provided it is properly carried out and alternative methods of treatment are proven non-viable.

Landfilling refers to the practice of depositing waste on land, either in excavated trenches or above ground, and covering it with soil under specific engineered and controlled conditions.

In terms of the Environmental Conservation Act a waste disposal site can only be operated under a permit issued by DWA. DWA will only issue a permit if the landfill has been designed, developed and is operated in accordance with the various requirements set out in a series of “Minimum Requirements” documents that have been published by DWA:

- Minimum requirements for waste disposal by landfill
- Minimum requirements for handling and disposal of hazardous waste
- Monitoring of waste management facilities

The Minimum Requirements documents cover classification of disposal sites and the requirements for siting of landfills, investigations, public participation, environmental studies, design, operation and water quality monitoring.

It is also a requirement that all existing operational sites be permitted and that permits be obtained for non-operational sites. All non-operational sites will have to be closed in accordance with approved closure plans that comply with the DWA Minimum Requirements.

Landfills are classified and permits are issued in terms of:

- The type of waste that can be deposited on the site (general, low hazard and high hazard)
- The quantity of waste to be disposed of on the site
- The capacity of the site to generate leachates (i.e. pollutants resulting from liquids filtering through the waste and leaching out of the waste body)

They are designed and developed to limit the potential to pollute the environment.

Proper operation includes:

- effective access control
- control of what waste goes onto the site
- accurate records of waste entering the site,
- proper compaction of the waste placed on the site
- the covering of the waste with soil on a daily basis
- the collection and treatment of the leachates emanating from the landfill
- the monitoring of ground and surface water in the vicinity of the site to monitor pollution impacts.

Permitted Operational landfill sites in Buffalo City Metropolitan Municipality

There are two landfill sites operated by the municipality, and one private landfill site in Buffalo City Metropolitan Municipality.

Roundhill Landfill Site

A regional landfill site has been constructed at Roundhill, situated next to the N2 about 4 km east of Berlin and services the entire Buffalo City Metropolitan Municipality area

A GLB+ permit (i.e. classified as a large, leachate generating site that can only receive general waste) has been obtained for the site in the year 2000. This site is therefore only permitted to receive general waste. In 2007 the issued GLB+ permit was amended so that health care risk waste excluding pathological waste from human origin maybe disposed of onsite under certain conditions. The condition for disposal of such waste on site is that health care risk waste must be sterilized and shredded to particle size of less than 50mm and no particle should exceed 80mm in any dimension. The waste is treated by Compass Waste prior to disposal at Roundhill. The amended permit can be found in Annexure B

Planning incorporates co-disposal of low hazard wastes with general waste and it is intended that the waste cells will be developed accordingly. A permit to dispose of low hazard wastes will, however, have to be obtained before hazardous waste can be co-disposed on the site.

Approximately 100 ha of farmland was purchased for the site and a further 500 ha was acquired for a buffer zone. 50 ha of the site will be covered by waste up to a maximum height of 30 m providing some 10 million cubic meters of space for waste disposal. The site will have a life span of approximately 30 years at current waste generation rates.

The site was a properly engineered site, developed in accordance with the DWA Minimum Requirements, with effective access control and will have a weighbridge to record the waste entering the site.

Planning was originally made for a central transfer station in Cambridge where waste collected in East London could be compacted and transferred to bulk containment for bulk transport to the Roundhill site. Waste generated in East London would then be transferred to the disposal site via the new transfer station. There is currently uncertainty as to the availability of the Cambridge site, and further investigations are being undertaken into additional possible sites for the transfer station. The design of the site must be finalised, depending on the site location layout.

Mdantsane waste will be taken directly to the Roundhill site and KWT waste will continue to be taken to the KWT site until it is full.

King William's Town Landfill Site

The King William's Town site is situated just outside King William's Town on the R30 district road. All waste collected by the King William's Town Solid Waste Management unit is taken to this site. A rubber tyred front end loader is used for the spreading and compaction of waste and cover material. Cover material (sibunga) is obtained on the site and used together with builders rubble that is delivered to the site to cover the waste on a daily basis.

Access to the site is controlled and there is very little informal recycling on the site. Access control on this site is good due to the fact that a private security guard is employed on the site and the site is relatively remote from any residential settlements. A record of all waste entering the site is maintained by the site attendant at the entrance to the site.

The site has a lined leachate collection sump. The leachate is either pumped into tankers and removed to the sewer system or sprayed onto the on-site road network for dust control. Works are planned to pump the leachates directly from the sump into the sewer system.

A permit has been issued for the site for general waste only. It is intended that this site will remain operational together with the regional site and will continue to be used for all wastes generated in the King William's Town entity until it is full.

At present waste generation rates it is estimated that the site will remain operational for at least 15 years.

Riegers Landfill Site

The privately-owned Riegers garden waste disposal site in Gonubie is used for the disposal of garden waste.

None of the existing sites in Buffalo City Metropolitan Municipality should be receiving any hazardous waste and should only accept general waste. This is, however, not being effectively controlled which results in that an unknown amount of hazardous wastes (such as medical waste, animal carcasses and unknown substances discharged by private companies) are being illegally disposed of on the sites.

The co-ordinates of the operational landfill sites are as follows :

Table 2.13 Permitted Operational landfill disposal sites

Site	Latitude	Longitude
King William's Town	32° 51' 06" S	27° 23' 27" E
Riegers (Private)	32° 56' 20" S	27° 59' 05" E
Roundhill (Regional site)	32° 53' 30" S	27° 37' 33" E

There are no privately owned/operated hazardous waste disposal sites in Buffalo City Metropolitan Municipality. Hazardous waste collected in Buffalo City Metropolitan Municipality by private operators is taken to hazardous facilities in the Nelson Mandela Metro (Aloes site), or Cape Town (Vissers Hoek site).

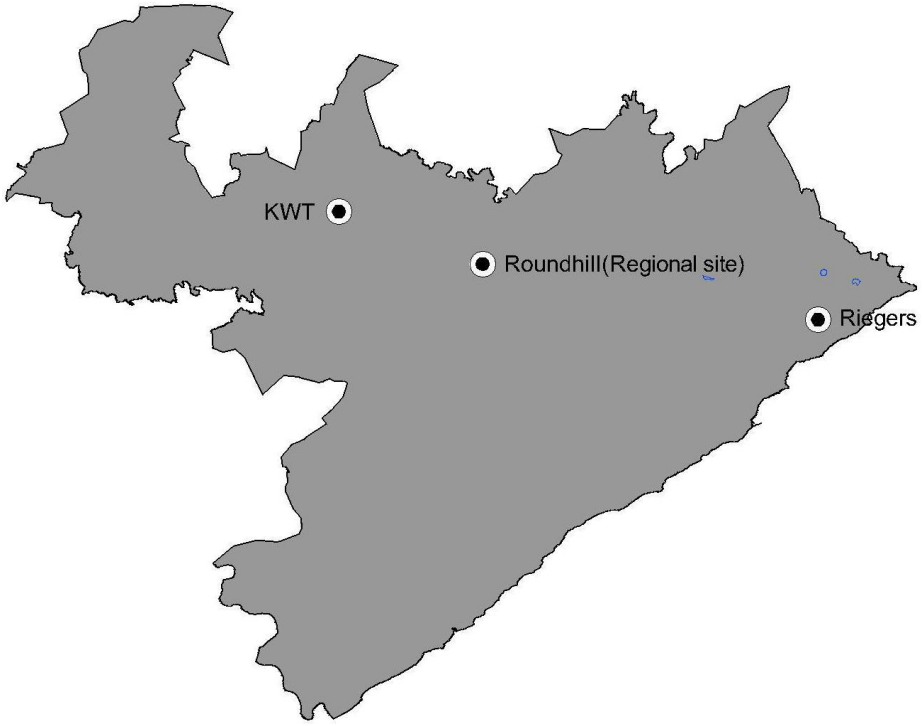


Figure 2.3 Permitted Operational landfill sites in Buffalo City Metropolitan Municipality

Unpermitted landfill sites in Buffalo City Metropolitan Municipality

A number of sites in Buffalo City Metropolitan Municipality are no longer operational. Only the Ducats landfill site has been closed or permitted in accordance with the DWA minimum requirements.

There are small un-permitted communal sites that remain operational at Macleantown, Kaysers Beach and Kidds Beach.

The co-ordinates of the landfill sites operational after August 1990 are as follows :

Table 2.14 Unpermitted disposal sites

Site	Status	Latitude	Longitude
Beacon Bay	Closed	32° 57’ 16” S	27° 57’ 00” E
Berlin Battery	Closed	32° 53’ 37” S	27° 35’ 52” E
Dimbaza	Closed	32° 50’ 35” S	27° 12’ 45” E
Ducats	Rehabilitated	32° 55’ 45” S	27° 54’ 30” E
Kayser’s Beach	Communal	33° 12’ 20” S	27° 35’ 56” E
Kidd’s Beach	Communal	33° 08’ 22” S	27° 41’ 08” E
KWT (Tannery Site)	Closed	32° 53’ 20” S	27° 24’ 10” E
Macleantown	Communal	32° 46’ 28” S	27° 45’ 21” E
NU12	Closed	32° 55’ 21” S	27° 42’ 27” E
NU2	Closed	32° 57’ 31” S	27° 45’ 20” E
Old Everite	Closed	32° 53’ 23” S	27° 24’ 18” E
Old Selbornian	Closed	32° 59’ 42” S	27° 55’ 15” E
Port Rex	Closed	32° 59’ 14” S	27° 54’ 46” E
Second Creek	Closed	33° 01’ 15” S	27° 53’ 18” E
Westbank	Closed	33° 02’ 26” S	27° 52’ 36” E

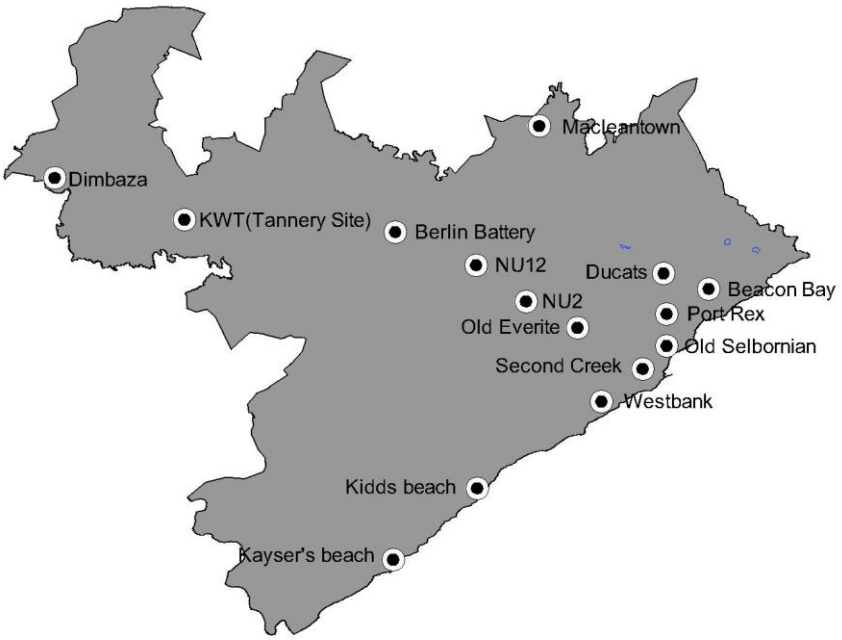


Figure 2.4 Unpermitted landfill sites required to be closed and rehabilitated

Preliminary closure assessments have been completed for all the East London sites. The Ducats site is the only site in Buffalo City Metropolitan Municipality to be closed in terms of DWA Minimum Requirements. The remaining sites will have to be properly decommissioned, in terms of DWA Minimum Requirements, in order to mitigate existing environmental degradation.

Transfer Stations

A Central Transfer Station was proposed in the early 1990's to service the then East London TLC. Waste was to be sorted for recycling, and the remaining waste transported to Roundhill site, possibly by rail. The transfer station was never constructed, and currently waste is transported by road directly after collection by road.

There are two operational garden waste transfer stations in Buffalo City Metropolitan Municipality, situated at Second Creek and Stoney Drift. There are no garden waste transfer stations in the Midlands or Inland Regions.

Table 2.15 Transfer stations in Buffalo City Metropolitan Municipality

Transfer Station	Capacity (Tonnes /month)	Type of waste
Beacon Bay	100	Closed 30 November 2012
Industrial Development Zone	40	Closed 31 July 2012
Stony Drift (Amalinda)	100	Garden waste

Note – The tonnage collected at the transfer stations is a rough estimate of the waste collected as no records are kept.

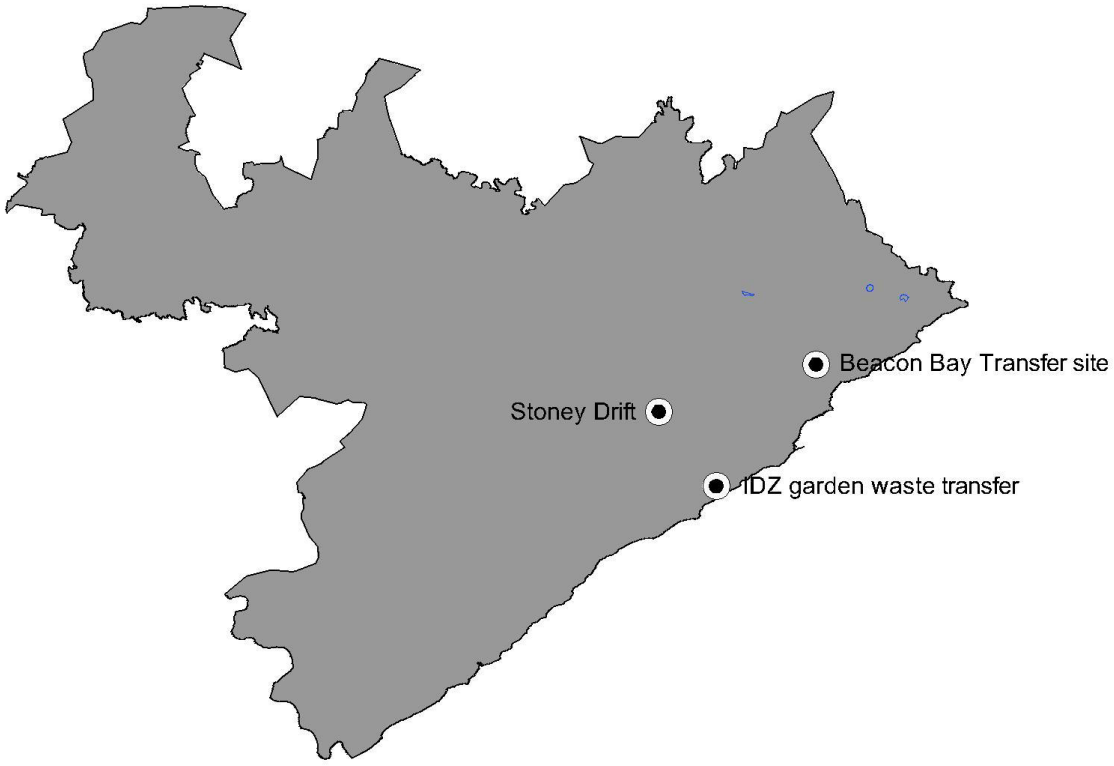


Figure 2.5 Transfer stations in Buffalo City Metropolitan Municipality

Landfill gas recovery

Landfill gas recovery and processing technology is available in South Africa, however to date it has been used for reducing the landfill gas associated hazards at larger landfills and for the generation of electricity. Landfill gas extraction and flaring is practised at a number of sites in South Africa, including Durban's Bisasar Road and Mariannhill Landfills.

Landfill gas recovery for methane production, or biogas, is currently being achieved in South Africa. Biogas can be used to generate electricity for the local electricity grids of municipalities and to use in vehicle fleets.

Examples of commercial use of biogas in South Africa are as follows:

- The production of cyanide for the gold mining industry utilising methane extracted from the Robinson Deep Landfill in Johannesburg. This process is still closed due to financial pressures and reduction in demand due to changes in method of gold recovery.
- A project for the use of biogas extracted from the disposal site in Durban to generate electricity for the local grid is currently on-going. The project is not financially viable in itself. Subsidies that will be provided by the World Bank under the Kyoto Protocol related to the carbon emission credit system, however, make the project viable.

Buffalo City Metropolitan Municipality is currently evaluating the feasibility of installing a landfill gas extraction system for the Roundhill and Second Creek landfill sites. The process is still on hold due to various legal issues.

2.2.6 *Status of Waste collection services*

2.2.6.1 Introduction

In terms of National Legislation and local by-laws, the municipalities are responsible for the provision and monitoring of waste collection and disposal services. There are a number of different levels of waste collection services commonly used in South Africa. Municipal collection services are normally categorised into:

Domestic waste collection service, because of different access conditions, this requires different approaches in the formal and informal communities. The most commonly used collection services in South Africa can be described briefly as follows:

Kerbside collection services incorporate the collection of waste placed in either bags or bins outside properties on scheduled collection days. This type of service can only be provided to residential areas where street networks are sufficiently developed to allow reasonable access to individual properties and, as such, are only applicable in the formally developed residential areas.

Collection services incorporating the collection of waste in bulk from central collection points to which either the residents themselves, or the municipality or contractors working for the municipality take the refuse for removal in bulk. The areas are either enclosed or open. A number of drop

off points enclosed with palisade fencing have been constructed in high density areas. Occasionally, six cubic meter steel refuse containers, called skips, are placed at these central points for the purposes of storing the refuse until its removal. This type of service is commonly referred to as a “skip” service and is most applicable in the informal areas where there is limited access to individual properties.

There are instances where authorities decide not to provide collection services but to rather focus waste management efforts to educate communities in effective on-site disposal techniques and to minimise, recycle and re-use waste (e.g. composting). This is normally applicable to remote scattered rural villages where collection costs would be limiting and settlement densities are such that quantities are low and on-site disposal will not have any significant environmental impact.

Industrial/commercial waste collection services, which incorporate the collection of general waste (i.e. not hazardous or special waste) from industries and businesses.

Garden waste collection services incorporating collection of bagged waste from outside properties, provision of garden waste transfer facilities to which residents bring their own waste and the provision of a bulk collection service on request and normally for a specific charge.

Street cleaning services, which involves litter picking of main road reserves and entrances, provision of litter bins, street sweeping and servicing of street litterbins.

Sundry services such as the removal of illegal dumps, bulk collection services and animal carcasses.

2.2.6.2 Serviced areas of Buffalo City Metropolitan Municipality

Currently (2012), Buffalo City Metropolitan Municipality provides for the collection of general waste in the following areas (divided according to the operational entities), which also is seen in Figure 2.6:

Coastal Division:

- East London
- Gonubie
- Beacon Bay
- Duncan Village
- Kayser's Beach
- Kidd's Beach
- Winterstrand
- Picnic spots at Cove Rock, Gulu, Igoda, Christmas Rock
- Sunrise-on-Sea
- Kwelera Mouth Village
- Macleantown

Midland Division:

Berlin (factories)
Mdantsane *(Nu1 to NU18)*
Mbekkweni
Reeston
Fort Jackson
Potsdam

Inland Division:

King William's Town	Sweetwaters
Zwelitsha	Bisho
Dimbaza	Balasi
Phakamisa	Berlin (domestic)
Breidbach	Schornville
Ginsberg	
Ilitha	

East London and King William's Town were amalgamated on 1 January 2001. The part of the Amathole District Municipality that fell inside Buffalo City Metropolitan Municipality Municipal boundaries was taken over by the Municipality on 1 July 2002.

The rural areas and commercial farms in large areas of the previous Amathole District are not provided with waste collection services. This is partly due to a current lack of vehicles and staff but also to the low standard of roads in these areas, which make refuse collection increasingly difficult. As a result, illegal dumping and burning of waste is common in areas lacking refuse collection services.

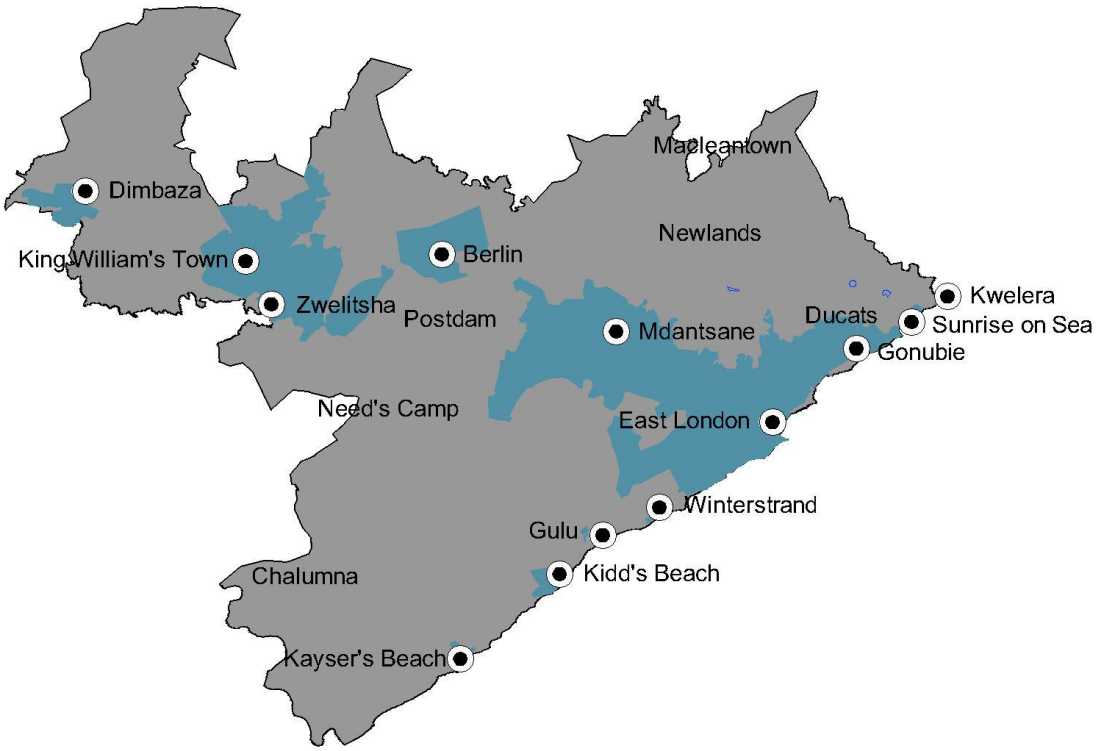


Figure 2.6 Areas of Buffalo City Metropolitan Municipality currently serviced

2.2.6.3 Unserviced areas of Buffalo City Metropolitan Municipality

As part of the effort to consolidate the urban areas and achieve a more compact city, an Urban Edge is defined beyond which it is envisaged that lower density rural development will be favoured.

The Urban Edge defines the zone within which the municipality will endeavour to upgrade levels of infrastructure over a period of time and according to available resources, to support higher densities of residential, industrial, and commercial development.

Beyond the Urban Edge, it is envisaged that rural communities will enjoy lower density environments with basic infrastructure and social facilities.

The delineation of an Urban Edge is vital for the achievement of development principles regarding the containment of urban sprawl, the intensification of development and the integration of urban areas.

Council has approved the Urban Edge Policy Framework

There are 61,875 housing units outside the Urban Edge, consisting of a population of 233,787.

Waste collection services are not provided outside of the Urban Edge.

There are three areas within the Urban Edge, where no waste collection services are provided. These areas consist of 6,637 housing units, with a population of 27,204.

Areas within the Urban Edge where no waste collection service is provided are listed in Table 2.16

Table 2.16 Unserviced areas of Buffalo City Metropolitan Municipality within Urban Edge

Area	Population	Number of Households
Ducats	5,532	1,139
Macleantown,	699	195
Potsdam.	20,973	5,303

The distribution of the serviced and unserviced population of Buffalo City Metropolitan Municipality is therefore as follows

Table 2.17 Serviced and Unserviced population of Buffalo City Metropolitan Municipality

Area	Population serviced	Population unserviced
Inside the Urban Edge	716,265	27,204
Outside the Urban Edge	0	233,787
Total	716,265	160,991

(Source of information : BCMM GIS department)

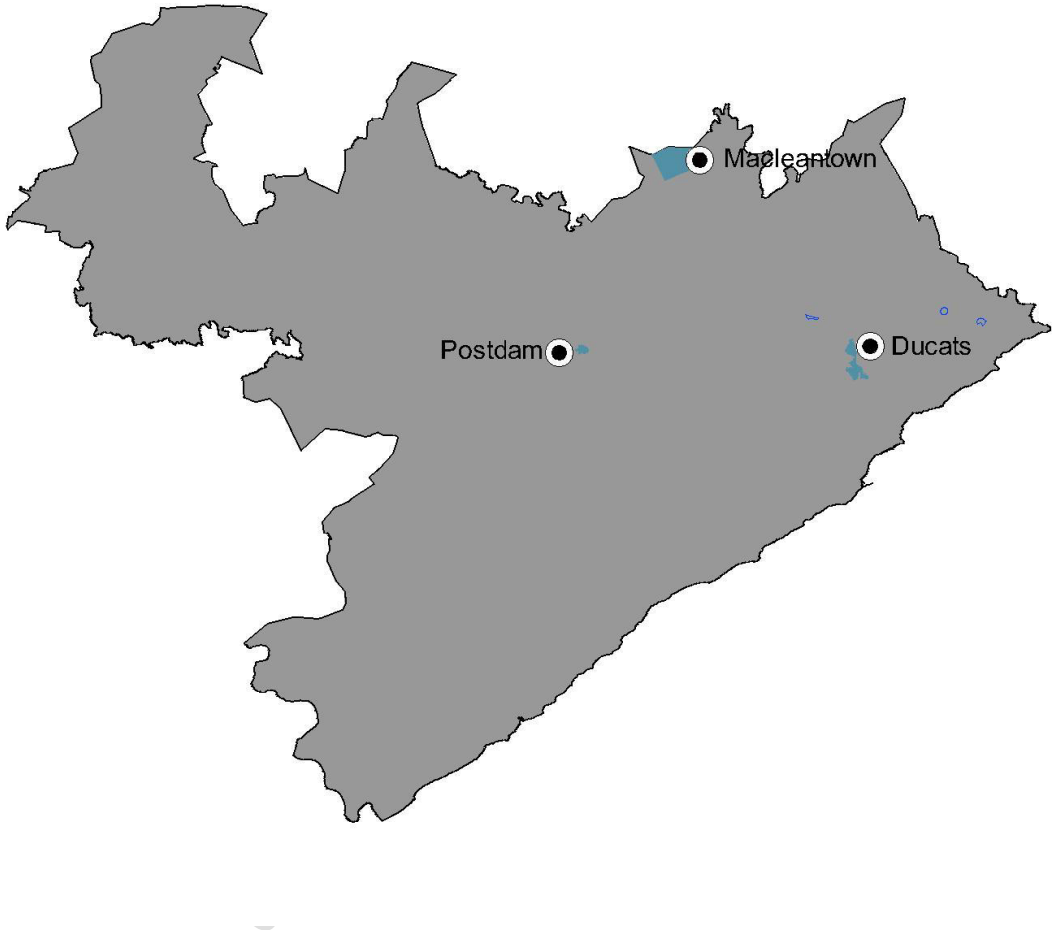


Figure 2.7 Areas of Buffalo City Metropolitan Municipality currently not serviced within Urban Edge

2.2.6.4 Domestic waste collection

Formal Residential Areas

Waste collection from households in formal settlements is provided through kerbside collection on a once weekly basis. Generally residents are required to place their refuse on the verge outside their properties on the scheduled day of

collection. Residents of flats are required to place their waste at specified and enclosed bulk collection points that are serviced twice a week. Bulk waste storage points in high density areas such as Southernwood may require additional collections

Residents of BCMM are supplied with one bag per week (bulk deliverance once a year), and residents are required to place their refuse bags on the road kerb for collection. Collection services are also provided on Public Holidays.

Informal Settlements

The majority of informal settlements in Buffalo City Metropolitan Municipality are located in and around East London and Mdantsane. The Coastal Division serves these residential areas.

In general, Informal settlements are served by drop off points or one-man contracts. A “one-man contract” is when one person is contracted by the Municipality to clear a specific area from waste.

Drop off points (either enclosed or open) are provided for the informal settlements, which are cleared by the Municipality generally on a once a week basis. Residents are provided with bags and are required to take their own waste to the drop off points

The informal settlements in Duncan Village, Scenery Park, Cambridge and parts of Buffalo Flats are serviced under a one-man-contractor programme. Approximately 90 individual contract workers are employed to provide refuse bags and remove these to designated roadside bulk collection points in these areas. The waste is collected weekly from these bulk collection points by the Municipality.

Rural Villages

Villages not listed in Section 2.2.6.2 are not provided with waste collection services by the Municipality. An extensive survey of the rural villages was undertaken under an internal departmental investigation in 2001. The investigation showed that no services were being provided in the rural villages and that residents mostly either burn or bury the waste that they generate. These communities generate low volumes of waste, which generally are not hazardous.

2.2.6.5 Industrial/commercial waste collection

Industrial/commercial waste is generated by businesses, industries and institutions (e.g. churches, sports clubs). The Municipality provides only for the collection of general (i.e. non-hazardous) industrial/commercial waste.

Businesses are required to submit an application to the Solid Waste Management Services with a description of type of waste generated, number of containers requested and the frequency of service required. The Solid Waste Management

Services will assess the waste and will only provide the service if it falls within the general waste category. Businesses requiring collection and removal of any special or hazardous wastes are required to use approved, specialist private waste contracting companies.

The industrial/commercial waste collection in Buffalo City Metropolitan Municipality is performed during normal working hours on a five-day week basis depending on the requirements of the business. Each business can select any of the following systems and the frequency of collection:

- 1.1 m^3 "Sprico" container rented from the Municipality
- 6 m^3 skip rented from the Municipality
- 0,8 m^3 black wheeled containers rented from the Municipality
- 240 litre Otto wheel bins

Waste is collected from outside the premises or from designated and approved storage areas within the premises, particularly in the case of businesses using the larger containers.

Some areas are serviced in other ways. The KWT CBD area is cleared during the night shift (18:00 – 02:00) since traffic congestion makes it difficult to collect waste during normal working hours. Businesses in this area are required to place their waste at designated collection points or on the street verge before closing up for the night.

The limited industrial/commercial areas of Breidbach, Ginsberg and Fabcon in Zwelitsha are serviced on request. Berlin domestic waste is serviced once a week by Inland Division and the Berlin industrial waste is serviced by Midland Division, as requested..

Private waste management companies are used quite extensively by businesses in Buffalo City Metropolitan Municipality. A relatively large portion of the industrial/commercial waste collected in Buffalo City Metropolitan Municipality and taken to the municipal disposal sites is handled by these contractors.

It is common that smaller home-based businesses have their commercial waste collected with their domestic waste without notifying the Municipality. It is difficult for the Municipality to identify these smaller businesses.

2.2.6.6 Garden waste collection

Garden waste is a non-hazardous waste that falls under the broader category of general organic waste. Due to the large quantities of garden waste that are generated it is normally classified and dealt with (from a service provision perspective) separately from the other collection services. Garden waste services offered are described below.

The Coastal Division offers two types of garden waste collection to the public: transfer station deliverance and bulk collection. The public is encouraged to deliver their garden waste to so-called transfer stations at Beacon Bay, IDZ and Stony Drift (see Table 2.15). Transfer stations act as waste collection points for further transportation to other treatment or disposal facilities. At the transfer stations, the public is asked to deposit their garden waste in skips that are cleared on a continuous (daily) basis. The garden waste is consequently transported to a nearby landfill. In Gonubie, the private company Riegers receives garden waste from the public at their garden waste disposal facility landfill.

Alternatively, the public may request bulk collection of their garden waste for which the Municipality may provide skips, if available, at a cost to the person requesting the service.

Although the Municipality offers specific garden waste collection services, the majority of Buffalo City Metropolitan Municipality residents bag their garden waste and leave it for collection together with their domestic waste. The Municipality collects this waste at no extra cost, as long as it is within reason.

Illegal dumping of garden waste also occurs, which is consequently removed by the municipality.

Garden waste collection services are also provided by a number of private companies in Buffalo City Metropolitan Municipality. In general, 200-litre drums are provided and cleared on a regular basis for a fixed monthly fee.

2.2.6.7 Hazardous waste collection

The Municipality does not have the equipment or the disposal/ treatment facilities necessary to deal with hazardous wastes and thus in general does not collect hazardous or special industrial refuse, as the municipality is not legally required to collect this waste. The hazardous wastes are either dealt with by the waste generator or by specialist waste management contractors who remove the waste to appropriate treatment and disposal facilities.

The hazardous waste survey undertaken by Arcus GIBB in 2002 (see Section 2.2.3.5) shows that a substantial quantity of hazardous waste, primarily in the lower hazard rating categories 3 and 4, is being dealt with by the individual businesses on-site, recycled, treated or removed to hazardous waste sites in other provinces by specialist contractors. However, it remains highly likely that a substantial quantity is being illegally taken to the municipal disposal sites.

2.2.6.8 Medical waste collection

The Solid Waste Management Department collects animal carcasses from members of the public for a tariff and collect carcasses from public areas when reported. All these carcasses are taken to the disposal sites. Members of the

public are also permitted to take carcasses directly to the disposal sites where they pay a disposal fee. Except from the animal carcasses collection the Solid Waste Management Services does not provide a specific medical waste (for definition, see Chapter 4) removal and disposal service. Medical waste is collected by specialist contractors (Steiner, Enviroserve, Compass or Solid Waste Technologies) and incinerated (or autoclaved) at private facilities outside the Municipality, usually in George or Cape Town.

2.2.6.9 Street cleaning and litter-picking services

The main streets and entrances in East London CBD, KWT CBD and the various substantial commercial nodes in Buffalo City Metropolitan Municipality (such as Vincent Park) are litter picked and swept on a daily basis. The cleaners place waste in bags and leave these for collection by collection teams at accessible points.

Commercial nodes and other communal areas where there are high levels of litter generation are also provided with litter-bins into which the general public can place litter. These litter-bins are generally serviced by the street cleaning crews. In other significant decentralised commercial and communal nodes/centres and areas where there is a high volume of people and litter generation, street cleaning and litter-picking services are provided on a day shift basis.

No services are being provided in the rural villages and commercial farming areas.

Other municipal departments are responsible for maintaining public open spaces (Beaches, picnic areas, parks etc.) in Buffalo City Metropolitan Municipality.

2.2.6.10 Sundry Solid Waste Management services

The Solid Waste Management Services also provide the following sundry Solid Waste Management services:

- Removal of illegal dumps, when these are reported or otherwise discovered by officials.
- Removal of bulk wastes on request and for a tariff based charge.
- Litter-picking and removal services at crowd events.
- Removal of motor wrecks for a tariff based charge.
- Destruction of wastes such as condemned food-stuffs, confidential documents and other wastes demanding immediate destruction for a tariff based charge.

2.2.6.11 Other services provided by the Solid Waste Department

The Solid Waste Management Services is responsible for cleaning and servicing public toilets. While this has no bearing on integrated waste management planning it will need to be taken into account when considering resourcing requirements and organisational structure.

Public toilets, which include public conveniences in public areas and chemical toilets in certain informal settlements, are serviced between five and seven days a week, with differing servicing times. The Municipality services most public toilets in-house, but those at taxi ranks in KWT are serviced by the Taxi Association.

2.2.6.12 Services provided by Private Sector

There are a number of services provided by the Public Sector at no cost to BCMM

Recycling – Waste Management Services

Three converted shipping containers have been provided around the East London area (viz– Nahoon, Gonubie and Crossways) to facilitate the public in disposing of recyclable materials. The containers are privately owned and emptied on a regular basis by the owner.

Collection and Disposal of Fluorescent light bulbs

A number of major chain stores have containers for the public to dispose of fluorescent light bulbs. The stores in East London include Pick n Pay and Woolworths

2.2.7 *Financing of Waste Management*

2.2.7.1 Operational Budget 2012/13

Waste Management in Buffalo City Metropolitan Municipality can be divided into the following Cost Centres:

Table 2.18 Operating Budget – projected expenditure 2012/13 (Preliminary)

Expenditure	Income	Expenditure
Solid Waste Management Admin Support *consists of provision for Salaries and Wages & Social Contributions*	R 13.7 million	R 25.4 million
Refuse Removal *consists of provision for Salaries, Wages, General Expenses, Repairs and Maintenance and Vehicle and Plant Charges*	R 268.6 million	R 180.6 million
Waste Disposal Sites *consists of provision for Salaries, Wages, General Expenses, Vehicle and Plant Charges*	R 18,0 million	R 26,3 million
Street Cleaning *consists of provision for Salaries, Wages, General Expenses, Vehicles and Plant Charges*	R 0	R 50,4 million
Public Ablution Facilities *consists of provision for Salaries, Wages and General Expenses*	R 0	R 15,3 million
Total	R 300.3 million	R 298.0 million

Notes to Table 2.18

Waste disposal sites included both cost centres – “Waste Disposal Sites” and “EL Regional Waste Disposal Site and Transfer Station”

An amount o R 73.3 million is included in both the Income and expenditure for refuse removal for the heading “Poor relief”.

An amount of R 14.0 million is included in the income of regional landfill site under the heading “Transfers recognised – Capital : USDG Grant”

2.2.7.2 Revenue and source of funding

Income is derived from levies in the form of refuse tariffs such as tip charges and special refuse removal charges with differentiation between residential, commercial and industrial refuse removal tariffs.

Table 2.19 Refuse tariff structures

Description	Rate (per month)
Door to Door domestic collection	R 140
Container collection (where no Door to Door service is provided)	R 70
Trade and Industrial collection :	
- Twice weekly removal of 85 litre bins (per bin)	R 317
- Twice weekly removal of 240 litre bins (per bin)	R 893
- Twice weekly removal of 420 litre bins (per bin)	R 1,560
Containers (Sprico 1,1 cubic metre capacity)	
- Monthly rental	R 634
- Once weekly removal	R 535
- Twice weekly removal	R 1,066
- Three times weekly removal	R 1,603
- Four time weekly removal	R 2,133
- Five times weekly removal	R 2,666

None of the present tariff structures provide for flexibility or incentive for waste minimisation or recycling.

2.2.8 *Organisational Structure*

2.2.8.1 Organisation

The recently adopted structural arrangement of the Solid Waste Management Services of the Buffalo City Metropolitan Municipal area is divided as follows:

One Central Office called Head Office
Three Regions known as Coastal, Midland and Inland (see Figure 2.8.)

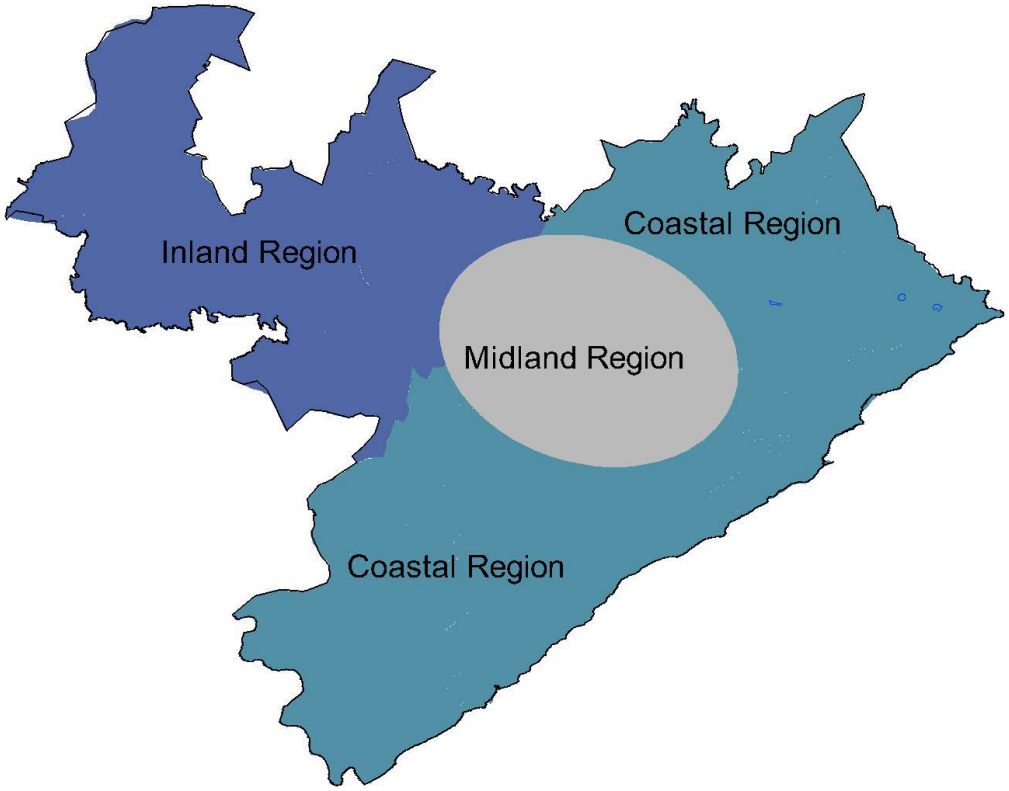


Figure 2.8 The Regions of the Buffalo City Metropolitan Municipality Solid Waste Management Services

2.2.8.2 Staff

The services provided by the Solid Waste Management Services of Buffalo City Metropolitan Municipality are mainly done on an in-house basis. The staff comprises of 1299 people (note that all positions are not yet filled, funding pending) with different kinds of job tasks such as supervisors, drivers, etc, which

are shown in Table 2.20.

Table 2.20 Solid Waste Management Services staff, 2012

Staff	Amount	Description
Access Controller	2	
Admin Officer	5	
Admin Officer - Senior	1	
Admin-Assistant	5	
Admin-Assistant - Senior	1	
Census Field Officer	5	Waste information system development
Clerk - Administrative	12	
Clerk - Senior	2	
Clerk / Typist	4	
Clerk Records - Senior	1	
District Cleansing Officer	17	Co-ordinates waste management services at District level
Driver	6	
Driver - Tractor	1	
Finance Coordinator	1	
Fleet Attendant	2	
Fleet Manager	1	Co-ordinates entire vehicle fleet
General Manager	1	Manages the Solid Waste Department
Inter-departmental Co-ordinator	1	
Leading hand	52	
Manager - Assistant	5	
Messenger	1	
Messenger / Driver	3	
Office Attendant	12	
Overseer / Driver	59	
Program Manager	3	
Recycling Assistant	18	
Safety Officer	2	
Secretary	1	
Storeman	2	
Superintendent	11	Co-ordinates waste management services at Sub-regional level.
Supervisor	43	
Team Leader	60	
Transport Logistic Coordinator	2	
Waste Minimization Assistant	24	

Waste Minimization Officer	8	
Waste Minimization Officer-Senior	2	
Weghbridge Operator	2	
Worker - General	2	
Worker - Public Convenience	90	For public use especially in Taxi ranks and informal settlements for cleaning the toilets in both regions
Worker - Street Sweeper	612	Collect waste from public areas
Worker - Tip	36	Tip Attendants at waste disposal sites in both regions. Attending at tip site duties e.g. control site
Worker - Truck Helper	181	Waste collection assistants from trucks

An organigram indication the staff structure is attached as Annexure C

2.2.9 *Vehicles and depots*

2.2.9.1 Municipal vehicles

BCMM own the refuse collection fleet and supporting vehicles being a total 114. This total includes 10 new compactor vehicles currently being purchased for the midlands area.
Most compactor vehicles are 19 m^3, however some have cab space for staff which reduces the 19 m^3 by an unknown extent.

In general, smaller sized vehicles are used in CBD-areas, due to traffic congestion and the number of pedestrians. Larger unit are mainly used either in industrial or certain residential areas that generate large amounts waste, as their full size can be utilised, thereby minimizing the number of transports.

Vehicles are serviced at the centralised workshop at Braelyn which has not been able to keep pace with the growth of the BCMM and as a result significant downtime of vehicles occurs when servicing and repairs are required.

Coastal Region

The distance to Roundhill affects the vehicles servicing the coastal area, and the service provided, because of significant turnaround times. Certain vehicles, such as load luggers are not suited to the long distance. A transfer station was envisaged for East London to Roundhill; however a practical solution to this matter has not yet reached a conclusion.

In general, Coastal uses compactors for residential and commercial waste collection, Load Luggers for skip removal and a combination of flatbeds, side tippers and LDV's for street cleaning.

There are a total of 57 vehicles of which 3 have been in service for in excess of 10

years

Midland Region

Midland region was until June 2012 serviced by contractors and it is expected that after June 2012 nine compactor trucks will be made available to render the service by BCM. A 10 ton load lugger is available to service skips.

The total number of vehicles for the midland region will then be 16, of which 2 will be older than 10 years.

Currently a significant amount of garden waste is left in open areas. Effective clearing of this requires a front end loader which is not available.

Inland Region

In general, Inland uses 5-ton open tippers with high mesh sides for residential and garden waste collection, compactors for the CBD and LDVs for supervision and sundry services.
However the non compactor domestic collection vehicles used in outlying areas, such as Ilitha, require more frequent visits, over a distance to the landfill site, and a more efficient service would be achieved using compactor vehicles.

There are 41 vehicles in the fleet of which 13 motorised vehicle are older than ten years, and a Front End loader of 16 years age.

Table 2.21 Solid Waste Management Services vehicle fleet, 2012

Type of vehicle	Unit size (m3)	Inland	Midland	Coastal	
Compactor	19	7	10	26	A compactor compacts waste to minimise airspace and enhance the collection volume
Load lugger	5.5			2	Used to transport scrap metal, rubble, large branches, etc. Used only in the greater EL area
Side tipper	30			1	Caged truck that tips to the side, used in domestic areas
Tipper	10	8		1	Used to transport scrap metal, rubble, large branches, etc. Used only in the KWT area.
Cage tipper	20			4	Caged truck that tips to the back, used in domestic areas.

Cage	5	1		1	
Roll-on roll-off				1	Roll on/off is used for light non-compactable bulky waste.
LDV		10	2	6	Light delivery vehicle, ”bakkie”.
FEL	1.5-2	1			Front end loader.
Flat bed truck	various	3	3	1	Used for transporting personnel, equipment, etc
Trailer	various	5		1	
Bin loader				2	
Condor staff carrier				1	Used for transporting personnel, equipment, etc
Sedans		6	1	10	Used for transporting personnel

2.2.9.2 Municipal depots

The following are the major functioning depots and satellite facilities:

Table 2.22 Buffalo City Metropolitan Municipality's depots and satellite facilities

Mdantsane NU6	Depot for staff and vehicles serving the Mdantsane area
Botanical Gardens Depot	The main KWT Depot for all staff (including managerial and administrative) and vehicles employed in the KWT Solid Waste Management unit
Bisho	The Assistant manager has an office in the Civic Centre.

2.2.10 *Environmental risk assessment*

Insufficient waste collection in areas not receiving a service, is one of the most important deficiencies currently facing Buffalo City Metropolitan Municipality. As a result, these people must take care of their waste as best they can, or worse, as easy as possible. Makeshift and illegal dumpsites and improper incineration (burning of waste) are the norm in these areas.

The open-fire burning of waste forms a number a noxious gases and releases minute particles into the air, which when inhaled cause a number of diseases, e.g. cancer. Of course, the burning of waste also increases the risks of veld fires, which destroy homes and habitats.

Decomposing wastes in illegal dumpsites and uncollected waste attract vermin and flies which can significantly increase disease vectors in surrounding

communities.

Illegal dumpsites can also contaminate drinking water sources through their leachate, which is rainwater that percolates through the layers of waste picking up contaminants before reaching recipient waters. These contaminants have a variety of effects. Enhanced levels of nutrients (nitrogen, phosphorus) cause eutrophication, which suffocate our rivers and dams. Eutrophication is a process where increased amounts of nutrients in the water allow for intensified biological production. This production eventually requires decomposition of dead organic material, a process that consumes oxygen. Subsequently, oxygen levels drop, sometimes to levels so low that life cannot by sustained.

Leachate contains many chemical components reflecting the waste that is has passed over or through. Common contaminants in leachate include salts, pesticides, PAH's (polyaromatic hydrocarbons from oil and petrol), the incomplete constituents of anaerobic decomposition and metals (lead, chrome, mercury, cadmium, zinc, tin) in addition to nutrients. Leachate seeps into ground and surface water, used for consumption, bathing, cleaning and recreation. The contaminants can cause a variety of diseases and sickness, for which children and the elderly are most susceptible.

Insufficient and irregular waste collection, coupled with low public awareness, is also the cause for widespread littering, which is possibly the most obvious symptom of the insufficiency of proper waste management in Buffalo City Metropolitan Municipality.

In addition to the insufficiency of waste collection, the current disposal of waste in Buffalo City Metropolitan Municipality is a major contributing cause for environmental degradation.

Although the licenced Roundhill Landfill Site is in operation, the Second Creek Landfill has not being formally closed and rehabilitated. As a result significant quantities of leachate is being generated and discharged into the Amalinda River, just upstream of its confluence with the Buffalo River, has impacted on the water quality of both the Amalinda and Buffalo Rivers.

In addition to Second Creek Landfill, there are numerous dumpsites that Buffalo City Metropolitan Municipality assumed responsibility over when the Metropolitan was formed.
None of the sites, with the exception of the King Williams Town Landfill site, has proper leachate collection systems (with clay reinforced liners or the equal), which means that the leachate seeps out to the nearest water recipients. The poor location of certain sites raises serious concern. For example, the Mdantsane NU2 site is situated above the Bridle Drift Dam, the major source of drinking water for Mdantsane and parts of East London. Other sites leak directly or indirectly into the Buffalo and other rivers, which lead to our coastal waters. As with the illegal dump sites, the municipal sites contribute to eutrophication and water pollution. The only landfill site to be formally closed, rehabilitated and capped is the Ducats Site adjacent to the N6 road.

In addition to water pollution, the sites also contribute to air pollution through the generation of landfill gas (primarily methane and carbon dioxide). These greenhouse gases contribute to the global warming effect. The methane, which is a highly flammable gas, is the cause of the severity of the tip fires experienced periodically. During these fires, pollutants are released into the atmosphere.

The general low control of waste leads to the inadvertent disposal of hazardous and medical waste on municipal sites, which aggravates the pollution situation even further. It is known that some medical waste generated in the area is either inadvertently or purposefully stored and collected with the general waste and thus ultimately disposed of at the municipal landfill sites. This occurs at both health care facilities (such as practitioners rooms) and in normal domestic waste. This waste can include both sharps and anatomical waste. In addition to negative environmental impacts associated with pollution, this places Municipal Solid Waste Management and collection staff and other people who use the disposal site (such as the informal recyclers) at risk of “needlestick” injuries and/or becoming infected.

These wastes are obviously not declared and the total volume being dealt with in this unsatisfactory manner is thus not known. It is, however, suspected that the quantity could be of significance and the Municipality needs to take specific measures to address the problem.

It is difficult to quantify and assess the environmental risks of the continuing current situation, as there is a lack of environmental monitoring and waste management control programmes in place. The above assessment, though, outlines the risks that have been identified and which do exist. The future effects which can be anticipated, should no improvements occur, include:

Increasing problems with water quality, including freshwater, drinking water and coastal waters.

Increased air pollution due to tip fires and landfill gas emissions

Continued high levels of littering and illegal dumping

Increases in disease contraction amongst both those who work with waste and those that live in affected areas.

2.3 Desired end state

2.3.1 *Needs, Vision, Objectives and strategies*

Notwithstanding the current strategic goals and objectives that Buffalo City Metropolitan Municipality is reporting on, waste management strategic goals and objectives for the IWMP have been formulated upon reviewing of the Status Quo (Refer to Chapter 2), as well as the Waste Classification and Management System which illustrates the national norms and standards for the appropriate storage, handling and disposal of all waste types (NWMS’1st draft, 2010).

The waste management strategic goals and objectives formulated for the Buffalo City Metropolitan Municipality will concentrate on the following areas of concern:

Administration

Waste Collection

Waste Disposal

Waste Minimisation,

and will align with the National objectives and the Buffalo City Metropolitan Municipality IDP objectives.

The analysis of the current solid waste management situation in Buffalo City Metropolitan Municipality provides a basis for the Municipality to formulate objectives and subsequently strategies that address the prioritised needs of identified in Chapter 2. The following objectives are meant to give the answer to what Buffalo City Metropolitan Municipality intends to achieve with its management of solid waste. The strategies are meant to outline how this is to be achieved, what means will be used and what methods will be applied. The objective will answer the questions **what** and **when**, while the strategy will answer the question **how**.

Through the development of the 2012 IWMP (in review of the 2003 IWMP), and the 2011 IDP, the Municipality has formulated a vision, four objectives and a number of strategies that are believed to address its most urgent needs.

VISION OF BUFFALO CITY METROPOLITAN MUNICIPALITY SOLID WASTE

To ensure that all BCMM citizens live in a clean, safe and healthy environment by providing an efficient and effective Solid Waste Management Services

Table 2.23 Objectives and Strategies

Objective 1. Buffalo City Metropolitan Municipality Solid Waste Department to comply with National Environmental Management : Waste Act 59 of 2008

- **Strategy A. Develop and apply Integrated Waste Management Planning**
- **Strategy B. Establish a capacitated and efficient organisation**
- **Strategy C. Enforcement of municipal legislation**
- **Strategy D. Implement a reliable Waste Information System**
- **Strategy E. Improve financial sustainability**
- **Strategy F. Improve participation by the public and other stakeholders.**

Objective 2. Buffalo City Metropolitan Municipality supplies 95% of its population within the Urban Edge, and 10% outside the Urban Edge, with effective, efficient and economical waste collection services within five years.

Strategy A. Improve operational management

Strategy B. Expand operations to unserviced areas

Strategy C. Identify, initiate and evaluate partnerships

Objective 3. Operational landfills and transfer stations are 80 % compliant with all legislation within five years, and non-operational sites are 15 % compliant within five years.

- **Strategy A. All operational landfill sites and transfer stations to be compliant with permit conditions**
- **Strategy B. Establishment of transfer stations and depots**
- **Strategy C. Development and implementation of closure plans**

Objective 4. Decreased landfilled waste by 10 % within five years.

Strategy A. Improve public awareness on sustainable waste management

Strategy B. Support waste minimisation, re-use and recycling projects

Strategy C. Investigate alternative methods for waste collection and treatment

The strategies are executed though projects proposed in Chapter 4.

2.3.1.1 Administration Objectives and Strategies

Objective 1: Buffalo City Metropolitan Municipality Solid Waste Department to comply with National Environmental Management : Waste Act 59 of 2008.

The preamble to the Local Government: Municipal Systems Act provides inter alia for the "core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities; … to define the legal nature of a municipality as including the local community … working in partnership with the municipality's political and administrative structures; to provide for the manner in which municipal powers and functions are exercised and performed; to provide for community participation; to establish a[n] … enabling framework for the core processes of planning, performance management, resource mobilisation and organisational change which underpin the notion of developmental local government; to provide a framework for local public administration and human resource development; .. to … put in place service tariffs and credit control policies … by providing a framework for the provision of services, service delivery agreements … ; to provide for credit control and debt collection; … and to provide for matters incidental thereto".

The importance of good governance is widely recognized. Good corporate

governance generates the goodwill necessary to enable sustainable value creation. (Extract from BCMM IDP 2011)

Buffalo City Metropolitan Municipality is compelled by the National Treasury initiative of “Operation Clean Audit 2014” to ensure a clean audit is obtained.

To this end, the Solid Waste Management Services are therefore compelled to comply with all governance requirements and obtain a clean audit in 2014, and annually thereafter.

Strategies

The suggested strategies for achieving Objective 1 are the following:

Strategy A. Develop and Implement Integrated Waste Management Planning

Integrated Waste Management (IWM) Planning deals with Buffalo City Metropolitan Municipality’s current and future (5 years) needs and guides the Solid Waste Management Services in addressing these needs. IWM Planning will supply the Solid Waste Management Services with an overview of suggested activities for the next decade, enabling the department to focus on key matters and apply appropriate resources to defined projects in a structured and efficient manner. The legislative framework forms and directs waste planning, therefore a uniform and updated set of by-laws for the municipality is an urgent need.

Public participation is a necessary part of IWM Planning in order to identify the challenges needs and wants of society. Increasing public awareness on waste, thereby awakening interest, is a vital step towards improving participation.

Correct and adequate information is a necessity for all types of planning. Long-term planning will require a continuous collection of data from all areas of the Buffalo City Metropolitan Municipality, especially from currently non-serviced (rural) areas, concerning levels of waste generation, recycling, service provision, waste treatment and disposal as well as other waste-related issues. This information will be essential in evaluating the progress made as well as identifying problem areas and potential for e.g. job creation through local economic development in the recycling industry.

This development of the First Generation Integrated Waste Management Plan was initiated in early 2002 (with the support of Swedish International Development Co-operation Agency). The first review of this plan is the current 2012 IWMP review. Reviews of future IWMPs must be undertaken at five yearly intervals to fit in with Integrated Development Plan process. Information gathered during the interval periods will be incorporated into the document, providing all interested parties will an improved and updated picture of the current waste situation in Buffalo City Metropolitan Municipality.

The IWMP will function as a documentation of previous activities, provide a picture of the current situation and guide the Municipality’s future work in waste management.

The vast areas of Buffalo City Metropolitan Municipality that the Municipality is aspiring to provide waste management services will require a significant operational planning. To ensure efficiency, the requirements of these areas (level of service, waste generation, pick-up points) will need to be quantified and geographically distributed, allowing for the Department to plan for the expansion of services. This plan should include an implementation programme with an estimate of associated costs and may include a round-balancing exercise.

Strategy B. Establish a capacitated and efficient organisation

The establishment of a capacitated and efficient organisation is necessary for the Municipality to achieve the objectives stated in this IWMP and be able to deal with the challenges it will face in the future. Appropriate individual and collective training programmes need to be designed and implemented. Operational staff requires training on e.g. basic waste management, operational skills, customer care and proper disposal techniques. Managerial staff requires courses on e.g. computer skills, waste management, environmental education, and personnel management. The municipal workplace can be made more attractive by providing municipal staff with clearly defined career paths and potential for personal development.

Strategy C. Finalise and Enforcement of municipal legislation

By-laws promulgated in 2005 have recently been adopted for the East London magisterial area. These by-laws have been finalised. The penalties applicable must be reviewed annually to ensure relevance. Sufficient enforcement personnel must be trained and appointed to enforce the by-laws, and procedures implemented to ensure infringements are processed in municipal courts

Strategy D. Re-implement a Waste Information System

According to the NWMS, municipalities are obliged to supply a national Waste Information System (WIS) with data concerning their waste situation. The current lack of information concerning the waste situation in Buffalo City Metropolitan Municipality also makes the task of planning difficult. A WIS was implemented in BCMM in approximately 2007, but is no longer in use. The Municipality should re-implement a WIS, based on recommendations from DEDEAT, municipal officials and other interested parties, including information on waste generation, recycling, treatment and disposal.

The design and implementation of a practical and appropriate waste information system that will provide the management with information is necessary to effectively plan and manage waste in Buffalo City Metropolitan Municipality. This information can also be used in round balancing exercises. DEA have implemented a National Waste Information System in 2005 and are currently developing National Waste Information Regulations, to which Buffalo City Metropolitan Municipality will be required to submit data in accordance with the Waste Act.

Buffalo City Metropolitan Municipality's WIS would include quantifying formal houses, informal houses, flats (and blocks), street length by category and identifying individual institutions, businesses and industries in demarcated communities/zones within Buffalo City Metropolitan Municipality. The installation of weighbridges at the King William's Town landfill site will greatly improve the accuracy of the estimate the landfilled waste. To maintain accurate records of recycled waste, as well as hazardous waste, new by-laws may have to be adopted that require companies to report quantities directly to the Municipality.

The WIS should also include information regarding hazardous and medical waste. This would require the co-operation of individual institutions, industries and waste management companies. It is currently unclear whether this will be a task for Provincial government.

Strategy E. Improve financial sustainability

In order to ensure a deliverance of efficient and effective services, the financial sustainability of the Buffalo City Metropolitan Municipality's waste management needs to be improved. This can be achieved through improved financial planning and control systems. Budgets for operation and infrastructural investment should be extended to five-year spans. Service charges will require review, in view of the development of market-related charges. In order for the Treasury Department to develop an integrated and comprehensive rates and servicing charge system it is critical that the Solid Waste Management Services provides accurate budget estimates and apply strict budget control measures. New financial control systems should therefore be developed to ensure compliance and identify problematic areas that require attention. Marketing plans may be formulated and implemented to increase the "business" client base, increasing the revenue from commercial/industrial waste collection services.

As many industries employ private waste management companies, it appears as if the Municipality is not making effective use of its substantial organisation and treatment/disposal facilities and missing out on important revenue. Options for increasing revenue (such as more aggressive marketing for commercial waste business etc.) should be identified and investigated.

Funding mechanisms for waste minimisation and recycling may be from national, provincial, or local government budgets, with supplementary funding from donors and funding agencies. Existing privately funded programmes relating waste prevention and recycling should be promoted and encouraged.

Domestic sources of funding include:

Development Bank of SA,

Municipal Infrastructure Grant,

Black Empowerment Groups,

DTI, and

Merchant Banks.

International sources include:

Southern Africa Enterprise Development Fund,

New African Advisors (US based),

The OPIC Global Environment Fund,

International Finance Corporation, and

Private investment funds with an interest in SA infrastructure projects.

Strategy F. Improve participation by the Public and other stakeholders in waste services

A meaningful participation by the Public and other stakeholders can be reached through a three-fold approach: (1) having participation opportunities early in the process; (2) providing interested parties with the information they require; (3) periodically providing participation opportunities and encouraging interested parties to communicate

A consultation plan may ensure that all significant stakeholders can participate meaningfully in the solid waste services.

2.3.1.2 Waste Collection Objectives and Strategies

Objective 2: Buffalo City Metropolitan Municipality supplies 95% of its population within the Urban Edge, and 10% outside the Urban Edge, with effective, efficient and economical waste collection services within five years.

Buffalo City Metropolitan Municipality is under obligation to provide proper waste collection and management services for urban areas as well as face the challenge of providing the same services to large rural areas previously not serviced.

In light of the current reality where the Municipality is struggling to maintain its current level of service provision, expanding services to new areas will take time. The Municipality believes that with a considerable amount of effort invested in improving the efficiency of its services, service provision can be expanded to include 95 % of Buffalo City Metropolitan Municipality's population within the Urban Edge within five years. Service provision to unserviced areas outside the urban edge will be implemented as per the National Policy for the Provision of Basic Refuse Removal Services to Indigent Households. Initially though, the Solid Waste Management Services will have to focus on planning and developing operational management tools.

Strategies

The suggested strategies for achieving Objective 2 are the following:

Strategy A. Improve operational management

The current collection patterns used by the Solid Waste Management Services have developed without clear guidance concerning efficiency, over time resulting in an inefficient use of vehicles and staff. By increasing the efficiency of collection and transport patterns (round balancing), the need for additional vehicles for the expansion of services will be determined.

Benchmark with other areas and develop a set of service standards (e.g. Collection team size, number of houses per collection team per day, length of street per street cleaner per day etc.) to be adopted and re-evaluate resource requirements accordingly. The use of Geographic Information Systems to serve as a planning mechanism to facilitate waste collection is also recommended.

The low availability of vehicles, particularly in the East London area is having a significant impact on the reliability and efficiency of collection services to those areas currently receiving a service. This results in large quantities of street litter (requiring collection by the street cleaning crews which is both inefficient and costly) and the illegal dumping of waste (requiring subsequent clearing by the Solid Waste Management Services). The maintenance of the vehicle fleet needs to be improved, as well as increasing the size of the fleet to accommodate the new areas awaiting waste services.

Service delivery within municipalities is underpinned by a vast infrastructure which constitutes a major investment made by the municipalities. Best practices must be employed to ensure that service delivery is provided in an economic, efficient, effective and sustainable manner.

A detailed Operations Maintenance Plan (OMP) is essential to establish systems, procedures and controls within the municipality in order to meet, and continue to meet, a defined level of service in the most economic, efficient, effective and sustainable manner.

The OMP is a living document that must be updated from time to time. As a history of the infrastructure is developed better, more informed, strategies can be developed and better, more informed, decisions can be taken.

Management systems need to be developed that supply the Department with tools to continuously monitor the efficiency of its operations. These tools will allow managers to identify areas that require attention, and to observe the effects of operational changes. By developing a series of Key Performance Indicators (KPI's) and benchmarks (based on industry standards, norms and best practices), the efficiency of the Solid Waste Management Services can be continually reviewed and evaluated in order to identify strengths and weaknesses and take actions accordingly (i.e. employing new staff or increasing the capacity of the existing staff). The utilization of Buffalo City Metropolitan Municipality's current GIS department will also improve operational efficiency of existing waste management activities. An annual reporting system that critically analyses performance in general and against these KPI's and benchmarks will be helpful for both internal as well as external communication and understanding. Over time, an operational management system will lead to a general improvement in departmental efficiency.

The BCMM must also explore the use of community based organisation in provision of Waste Management Services in other areas of the Municipality. The design and implementation of a practical and appropriate Fleet Management System is necessary for the Municipality to properly maintain and manage the size and quality of its vehicle fleet. The Fleet Management System would include e.g. vehicle/plant selections, assessments, maintenance and replacement policies, systems and programmes. With this strategy, the apparent shortage of vehicles and the low vehicle availability in the Coastal Solid Waste Management Division would receive the urgent attention that is deemed necessary.

Strategy B. Expand operations to unserviced areas

Section 8 of General Notice 413 of 2011 - National Policy for the Provision of Basic Refuse Removal Services to Indigent Households – states that the basic refuse removal service level is defined as the most appropriate level of waste removal service provided on site specific circumstances. Such a basic level of service is attained when the municipality provides a facilitates waste removal through :

On-site appropriate and regularly supervised disposal areas designated by the municipality

Community transfer to central collection point

Organised transfer to central collection points and / or kerbside collection

Mixture of ‘b’ and ‘c’ above

The appropriate levels of service for settlement densities with regard to solid waste management are as follows :

High density (more than 40 dwellings per hectare) – Frequent and reliable formal collection and disposal of solid waste to landfill is required.

Medium density (10 to 40 dwellings per hectare – Communal collection and formal disposal

Low density (less than 10 dwellings per hectare) on-site disposal of general household waste in areas designated by municipality.

However as the Metro population increases so do the challenges to the Waste Department thus the Metro recognizes that, although development must be economically and socially acceptable, it is imperative that the development challenges facing BCMM be addressed in an environmentally sustainable manner.

Strategy C. Identify, initiate and evaluate partnerships

By locating and initiating partnerships with organisations, communities, businesses and industries, Buffalo City Metropolitan Municipality will be able to improve waste management in general in a cost-effective manner and receive important information (on e.g. waste volumes, willingness-to-pay, alternative collection/treatment options) from the public. The partnerships may also play a vital role in increasing public awareness of waste issues.

The proposed public initiated Buffalo City Metropolitan Municipality cleansing campaign may play an important part in initiating new partnerships as it gathers politicians, officials, private companies, Community Based Organisation and NGO’s. Buffalo City Metropolitan Municipality’s co-operation with other South African metropolis/municipalities may expand, providing staff with new ideas and experiences.

The Municipality should continually review the benefits of adopting alternative delivery mechanisms based on Private Sector Partnerships, and where appropriate initiate investigations and feasibility studies. Current and future partnerships can be evaluated through comparisons with other cities.

A policy related to what extent to outsource as opposed to increasing internal resources would help in dealing with additional work and work that is beyond the capacity of the existing Solid Waste Units.

The rental of vehicles, as well as the use of contractors for waste collection should be evaluated as to economic viability.

2.3.1.3 Waste Disposal Objectives and Strategies

Objective 3: Operational landfills and transfer stations are 80 % compliant with all legislation within five years, and non-operational sites are 15 % compliant within five years.

Proper waste disposal is to ensure that all unavoidable wastes are safely controlled, transported and disposed of at waste disposal facilities developed and operated in accordance with the DWA Minimum Requirements and/or other appropriate standards.

This requires that:

- All waste disposal facilities must be permitted;
- Disposal facility plans must be developed in conformance with the DWA Minimum Requirements;
- Permit conditions, applicable regulations and the DWA Minimum will be enforced;
- All provinces must be adequately serviced by hazardous disposal facilities

Strategies

The suggested strategies for achieving Objective 3 are the following:

Strategy A. All operational landfill sites and transfer stations to be compliant with permit conditions

There is an urgent need to complete the construction of the third cell the regional landfill site. The first cell has been filled with waste and been covered, but not rehabilitated.

The Second waste cell has been filled to capacity, and requires cover and closure.

Construction on the third cell has not commenced, and is considered urgent.

The completion and operation of the third waste cell at regional waste site is important for the disposal of waste in Buffalo City Metropolitan Municipality.

Strategy B. Establishment of transfer stations and depots

The Roundhill site requires the establishment of new transfer station in East London for the reloading of waste to larger vehicles for subsequent transport to the site.

The establishment of a new central transfer station is believed to be necessary in order to solve the logistical problems of transporting waste to the regional site.

New and secure local transfer stations and vehicle depots will be necessary for the expansion of collection services to new areas, to increase to amounts of “green”

waste for composting as well as minimise the amounts of waste being illegally dumped by citizens due to the long distances to the current three transfer stations.

Strategy C. Development and implementation of closure plans

It is stated in the Department of Water Affairs and Forestry "Minimum Requirements for Waste Disposal by Landfill", Second Edition 1998, Chapter 2.3.4, that "All landfills, except those closed prior to August 1990 when the permitting system came into effect, must be permitted before they can be considered legally closed. Closure will involve, *inter alia*, the application the application of final cover, topsoiling, vegetating, drainage maintenance and leachate management.""

Develop closure plans and close existing non-permitted sites. This should include the possible extraction landfill (methane) gas. Second Creek, NU2, Berlin battery site, KWT Clubview site and Dimbaza are in immediate need of proper closure.

2.3.1.4 Waste Minimisation Objectives and Strategies

Objective 4. Decreased landfilled waste by 10 % within five years

Currently, most waste disposed at landfills due lack of prioritizing of Waste Minimization strategies and there are very minimal programmes for waste reduction, re-use and recycling in place. Landfilling is the least sustainable waste management practice available, even when it is performed in accordance with legislation and with modern technology/techniques. An excessive landfilling of waste unnecessarily decreases the life spans of landfill sites, increasing the stress on municipal budgets.

The Solid Waste Management Services is also aware of the fact that the current efforts of Buffalo City Metropolitan Municipality to increase the quality of life for its citizens will inevitably increase the generation of waste. This waste of potential resources may alternatively be used by a recycling industry, contributing to local economic development.

According to the Situation Analysis, approximately 50 % of all landfilled waste can potentially be recycled. Therefore, the Solid Waste Management Services believes that the goal of reducing the volumes of waste being landfilled by 10% (in respect to population and economic growth) within five years as realistic and achievable.

Strategies

The suggested strategies for achieving Objective 4 are the following:

Strategy A. Improve public awareness on sustainable waste management

Public awareness/ waste education is vital in order to increase public interest in sustainable waste management and inform the public on how they can minimise, re-use and recycle their waste. The Department should formulate and implement public awareness programmes, giving particular emphasis on the waste hierarchy.

The citizens of Buffalo City Metropolitan Municipality have an overall low awareness of proper waste management, and lack knowledge of the detrimental effects of littering, wasting and polluting on environmental and human health. Many areas, particularly in the low-income urban and dense peri-urban areas, are extensively littered and have many dumps on road verges, in open areas and in public areas.

Comprehensive educational programmes (incl. pilot projects) that substantially improve public awareness as well as knowledge concerning methods to reduce, reuse and recycle waste would considerably improve waste management in general in Buffalo City Metropolitan Municipality. It is recognised that awareness alone will not reduce waste to landfill if the resources are not available for the recycled materials.

The current tariff policy provides no incentive for the minimisation of waste. Tariffs should be constructed to encourage private industries and the public to engage in waste minimisation, re-use and recycling. Business and institutions should be motivated to adopt cleaner production methods and programmes.

Strategy B. Support projects on waste minimisation, re-use recycling and diversion of waste from landfills.

Buffalo City Metropolitan Municipality should encourage, support and drive projects dealing with waste minimisation, reuse and recycling and also formulate and implement waste minimisation, re-use and recycling programmes. The Municipality has the opportunity to liase with the local recycling industry and co-ordinate recycling activities, providing the public with comprehensive information on how and where they can recycle their waste at multi-material recycling stations. Community-based initiatives may require Municipal support to ensure success.

The establishment of new waste prevention, minimisation and recycling centres and clubs, possibly co-ordinating with existing Eco Schools, will also increase the general public awareness of waste matters. This may include formal and informal material drop-off and buy-back centres.

Most garden waste is still landfilled. In order to achieve the IWMP-goal of reducing the amounts of landfilled waste by 10 % within five years, the experience gained from the old Orange Grove pilot project introduced by Buffalo City Metropolitan Municipality on the early part of the decade should be used to improve and increase the amount of organics (primarily garden waste) composted.

Strategy C. Investigate alternative methods for waste collection and treatment

Buffalo City Metropolitan Municipality should continuously investigate and implement increasingly sustainable alternative methods for waste collection (e.g. source-sorting, collection points for household hazardous waste) of waste and alternative treatment methods (e.g. composting, digestion, incineration) for waste to aid in the minimisation of landfilled waste. Pilot projects may be used to evaluate alternative technologies as to treatment performance, economic viability,

etc.

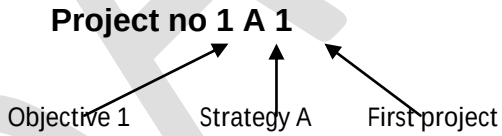
The on-going pilot projects at schools concerning composting and sorting-at-source should be evaluated and actions taken thereafter to either intensify, expand or terminate the pilot project. Other pilot projects include: developing composting programmes with the private sector and households, aiding rural areas (that in some cases already compost waste) with equipment and training in appropriate composting techniques, and increasing the economic incentive for private and household composting.

The Municipality currently lacks the capacity to evaluate the viability of alternative treatment methods (e.g. incineration, digestion), which can reduce the need for landfilling. It is possible that the Municipality would benefit from working with the private sector to identify waste treatment requirements and to plan and develop necessary facilities for waste treatment in Buffalo City Metropolitan Municipality.

2.4 Identify, evaluate and select alternatives

2.4.1 *Identify and evaluate alternatives*

The following pages list suggested projects that will aid in the achievement of the defined objectives of Chapter 8. The projects are listed according to Objective, Strategy and Timing. For example:



Projects included in the 2003 IWMP that have not been completed or implemented have been re-evaluated for relevance in 2012, and have been included in the list of projects if applicable.

Table 2.24 Proposed Actions and Key Performance Indicators for monitoring the implementation of the IWMP

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
(1A1) IWMP progress meetings	IWMP Progress meetings to discuss and record IWPM implementation progress	Number of KPI's completed	
(1A2) Clean Audit Report	BCMM Solid Waste to achieve a clean audit as per the National Treasury "Clean Audit 2014" initiative	Number of queries referred by Auditor General	
(1A3) Continuous Integrated waste management planning	Continuous IWMP will fulfil future DEDEAT requirements, include revision of objectives, strategies and projects as well as more up-to date sections on financing, economics, legislation, etc. Projects relating to IWMP must be undertaken throughout the IWMP cycle in order that information and results are available at time of production of IWMP.	N/A	
(1A4) Risk assessment study	Identification of the most immediate environmental risks ("hotspots") due to current waste management in BC. Risks include pollution to air, water and soil from e.g. illegal dumping and burning of waste and health related problems such as injuries, diseases and contaminated drinking water.	Number of identified "hotspots".	
(1A5) Awareness of importance of waste	Increase awareness of Municipal Officials and Councillors towards importance of waste management	Questionnaire - Awareness	
(1A6) Waste characterisation study	A comprehensive waste characterisation study is required to quantify the current waste stream in Buffalo City Metropolitan Municipality	N/A	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
(1A7) Initial set of tools for operational management	A system that supplies management with a first set of tools/ benchmarks/ comparisons used to analyse the efficiency of operations.	Waste Benchmarks	
(1A8) Survey on waste situation in Buffalo City Metropolitan Municipality	Comprehensive collection of information regarding amounts of generated and collected waste in BC. Project affected by development of Waste Information System (WIS).	N/A	
(1A9) Expanded set of tools for operational management	A comprehensive system that supplies management with a large set of tools/ benchmarks/ comparisons used to analyse the efficiency of operations.	Operational costs (Rand/ 1000 serviced houses) decreased by x %.	
(1B1) Overall plan for internal capacity building	Identify future needs of staff and skills training for the coming three-year period. Form policy on capacity building.	Percentage compliance with capacity building program	
(1B2) Internal capacity building	Invest in municipal staff, improving the skills base and making the municipal workplace more attractive.	Number of person-days spent on capacity building.	
(1B3) Landfill staff	The correctly qualified staff is to be available on landfill sites	Number of qualified staff	
(1B4) HR Function	Use of municipal HR department to manage HR staff functions of Solid Waste staff issues	N/A	
(1B5) Resourse allocation	Personnel and Vehicle resources to increase in relation to population and waste generation increases, including increases in technology and productivity	Personnel / 1,000 population	
(1B6) Health and Safety	Staff are transported together with tools in vehicles – non-compliance with OSHAct needs to be rectified	N/A	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
(1C1) Approval of municipal waste management by-laws	The By-Laws submitted to the magisterial districts must be approved by the magisterial districts for implementation.	N/A	
(1C2) Enforcement of municipal waste management by-laws	Mechanisms to be initiated to implement and enforce the municipal waste By-Laws.	Number of fines issued	
(1C3) Hawkers	Enforcement of hawker licensing	N/a	
(1D1) Waste Information System (WIS)	A system for the continuous reporting of generated, collected, treated and disposed waste in BC. Also includes the quantification and localisation of waste generation points. In line with DEDEAT regulations (see NWMS).	Percentage up to date information available.	
(1D2) Inventory of hazardous waste	Inventory of generators and types of hazardous waste in BC. Inventory of current collection and treatment of hazardous waste in BC. Necessary in order to minimise occurrence of hazardous waste in municipal landfill sites.	Identified amounts of hazardous waste going into municipal landfills.	
(1D3) Documentation of illegal dumping	Identify and photograph illegal dumping sites. Follow up bi-annually to monitor the decrease in illegal dumping.	Number and growth of illegal dump sites.	
(1D4) Recycling waste stream study	A comprehensive waste characterisation study is required to quantify the current recycling waste stream in Buffalo City Metropolitan Municipality	N/A	
(1D5) Weighbridge for KWT	A weighbridge is required at the King William's Town landfill site in order to accurately determine quantities of waste disposed		
(1E1) Review of tariff system	Creation of a tariff system based on self-sufficiency and the Polluter Pays Principle, encouraging waste minimisation and	Income to expenditure ratio	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
	recycling.		
(1E2) Census of commercial/ industrial clients	Employ census officers to confirm the amounts of waste being generated by commercial/industrial clients. Special attention will be given to the existence of hazardous waste.	Number of generators of hazardous waste. Revenue increased by x %.	
(1E3) Improve financial control systems	Improved financial control systems will allow the Solid Waste Dept to provide accurate budget estimates and apply strict budget control measures in order for the Treasury Department to develop an improved rates and servicing charges system. Improved financial control systems will ensure compliance and identify problematic areas that require attention.	Amount of over expenditures.	
(1E4) Marketing Plans	Marketing plans to increase the "business" client base, increasing the revenue from commercial/industrial waste collection services.	Revenue from commercial/industrial waste collection services.	
(1E5) Budgeting and tariff setting	Professional accountants to be utilised in budgeting, tariff setting etc	N/A	
(1E6) Ring-fenced budget	Centralised budget to be ring fenced to areas / functions	N/A	
(1E7) Long term financial plan	The development long term financial strategy and plan is essential to ensure capital programs are undertaken. Funding applications must be submitted to the correct relevant authorities timeously and correctly	N/A	
(1E8) Indigent allowances	Check Indigent list and amounts due, and ensure correct allocation of funding	N/A	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
(1E9) Overtime	Resourses, planning and procedures to be established for the control of overtime	Percentage overtime to total hours	
(1F1) Consultation Plan for public participation	Identification and short-listing of key stakeholders and formalising opportunities for public participation.	Number of identified Key Stakeholders.	
(1F2) Consultation with suppliers of private bins	Consultation between private parties supplying public disposal bins and the Solid Waste Management Services	N/A	
(1F3) Adopt-A-Spot	Public awareness campaign and promotion of BCMM Adopt-A-Spot program to encourage public to join the program	Number of identified participating areas	
(1F4) Public Programs	Encourage and assist public organisations (Schools / Churches / Businesses) to formulate innovative programs for waste management.	Number of public programs	
(2A1) Improve operational management	An Operational Management Plan is required to prolong the life span of the infrastructure, reduce the occurrence of emergency disruptions, to improve the service delivery at Local Municipalities and to capacitate the municipality	Compliance with cleanliness benchmarks Percentage collections on schedule	
(2A2) Stakeholder liaison	Regular meetings with key stakeholders to determine problem areas, and provide feedback	Development of confidence index	
(2A3) Overall logistics study for waste collection	A round-balancing exercise to optimise the waste collection services. The use of Geographic Information Systems (GIS) is optional. Identify need and location of new transfer stations.	Cost for waste collection decreased by x % in balanced areas.	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
(2A4) Litter picking	There is an overwhelming perception that the streets and open areas of BCMM are extremely dirty with litter. Litter picking activities need to be revised. This may include additional resourses and / or amended schedules and / or management, including ad-hoc programs / projects to clean specific areas	Questionnaire - Performance	
(2A5) Fleet Management System	Including e.g. vehicle/plant selections, assessments, maintenance and replacement policies, systems and programmes. Possibility of Department taking over own plant (workshop), for which an operational plan will be included.	Number of vehicles exceeding maximum age. Number of days with vehicles in workshop (availability).	
(2A6) Vehicles for long haul	Suitable vehicles for long haul waste from Transfer station to regional site	N/A	
(2A7) Vehicle backup and support	No technical backup for vehicles when operating night shifts	Number vehicle breakdowns after hours	
(2A8) Driver allocation	Drivers allocated to specific vehicles / areas. This will improve reliability	N/A	
(2A9) Littering and Illegal dumping study	Undertake academic study to determine why littering and illegal dumping is taking place. Establish the reasons and possible solutions	Study completed	
(2B1) Levels of Service (LoS) Policy	Through substantial Public Participation, the Levels of Service Policy will provide for an expansion and levelling of the waste collection services provided by the Dept.	N/A	
(2B2) Plan for the expansion of services to new areas	Following the adoption of the LoS Policy, a structured plan on how and when BCMM will provide services to new areas. This will also include an investment plan for e.g. additional vehicles, transfer station and depots.	N/A	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
(2B3) Expansion of services to new areas of Buffalo City Metropolitan Municipality	Services are expanded to new areas according to the LoS Policy and the plan for service expansion. Subject to availability of funds for new vehicles.	Percent of Buffalo City Metropolitan Municipality serviced.	
(2B4) Co-operatives	Implement co-operatives for service delivery in unserviced communities. Functions to be performed include waste collection, litter picking, management of waste storage areas and possible transport of waste to landfill site	Number of unserviced areas	
(2C1) Evaluation of potential Partnerships.	Identify and evaluate potential partnerships with communities and NGO's to aid in waste collection and public awareness.	Number of partnerships in place.	
(2C2) Evaluation of current and potential future Public – Private Partnerships.	Evaluate the use of current contractors. Identify and evaluate the use of contractor in other areas / facilities. Compare with experiences in other Municipalities.	Operational costs decreased by x %.	
(2C3) Forum for co-operation with other EC municipalities.	Take the initiative and invite other municipalities for a day of exchanging information, ideas and experiences on waste management. Encourage future co-operation.	Number of attending/ participating municipalities.	
(2C4)Co-operatives to replace one-man contractors	The one-man contract collection service contractors are aging and are not replaced. The system needs to be replaced with a co-operative type system	Number of co-operatives	
(2C5) Cleaning of Public Toilets	Positioning of cleaning public toilets within BCMM oganisation structure	N/A	
(3A1) Waste cell	The construction of the third waste cell a the regional landfill site	Percentage Waste cell	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
construction at Roundhill Regional landfill	is required	complete	
(3A2) Infrastructure and leachate treatment at Roundhill Regional landfill	Construction of infrastructure and leachate treatment.	Number of non-conformities with DWA requirements on leachate treatment.	
(3B1) Additional transfer stations	Additional transfer stations in Buffalo City Metropolitan Municipality will bring recycling opportunities closer to the people. The round-balancing exercise may have identified strategic sites.	Number of transfer stations	
(3B2) New central transfer stations in Buffalo City	Necessary in order to transport waste from EL to regional landfill site. Location and size of station will be evaluated. EIA and permits necessary. Recycling and composting are optional components of the station. Detailed waste study required to determine quantity and location of central transfer stations	N/A	
(3B3) Upgrade existing and establish new depots	New depots are necessary for the expansion of services to new areas. Existing depots will be upgraded to improve working environment. Certain depots may be used as information centres. New depots in Chalumna, Dimbaza and Mount Coke. New satellite depots in Phakamisa, Ilitha, Breidbach and Ginsberg. Upgraded depots in Berlin, Bisho, Gonubie, Mdantsane and at the Botanical Gardens.	Maximum distance to closest depot.	
(3B4) Transport of waste from transfer station to landfill	Analysis of transport alternatives for transfer of waste from East London central transfer station to new regional waste site.	N/A	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
(3B6) Additional drop-off points	Drop off points in high density areas where public can drop off domestic waste on non-collection days	Number of drop off points	
(3B7) Control of Drop off points	Drop off points must be controlled and managed in order that no illegal dumping takes place next to the drop off point.	N/A	
(3B8) Landfill scavenging	Unofficial and uncontrolled scavenging taking place at Roundhill.	Number of scavengers	
(3B9) Chippers for garden waste	Unchipped garden waste at Roundhill increases airspace. Chippers should be provided and operated at all garden waste transfer stations	Number of chippers	
(3C2) Rehabilitation of Dimbaza illegal landfill	Closure and rehabilitation of Dimbaza landfill site.	% of site rehabilitated.	
(3C3) Rehabilitation of Old Berlin illegal hazardous waste site	Closure and rehabilitation of Old Berlin landfill site .	% of site rehabilitated.	
(3C4) Closure and rehabilitation of NU2, Mdantsane illegal landfill	Closure and rehabilitation of NU2 landfill site .	% of site rehabilitated.	
(3C5) Closure and rehabilitation of Second Creek illegal landfill	Closure and rehabilitation of Second Creek landfill site.	% of site rehabilitated.	
(3C6) Rehabilitation of West Bank illegal landfill	Rehabilitation of West Bank landfill site.	% of site rehabilitated.	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
(3C7) Closure and rehabilitation of Kayser´s Beach illegal landfill	Closure and rehabilitation of Kayser´s Beach landfill site .	% of site rehabilitated.	
(3C8) Closure and rehabilitation of Kidd's Beach illegal landfill	Closure and rehabilitation of Kidd's Beach and Kayser's Beach landfill sites.	% of site rehabilitated.	
(3C9) Closure and rehabilitation of Macleantown illegal landfill	Closure and rehabilitation of Old King William's Town landfill site.	Volume of waste landfilled. % of site rehabilitated.	
(4A1) Survey on public awareness	Develop questionnaire to continually evaluate the level of public awareness on proper waste management.	Annual number of respondents.	
(4A2) Public awareness centre	Establish a centre for public awareness on environmental and waste issues together with Env Services, Env Health, City Health, Dept of Education, etc. The centre will run campaigns to increase public awareness.	Annual number of visitors. Annual numbers of public awareness activities.	
(4A3) Public awareness exhibition	Hold a public exhibition on environmental issues, focussing on proper waste management and include representatives from the recycling industry and other municipal departments.	Number of visitors.	
(4A4) Newspaper infomercials	Design ads for local newspapers with information on different aspects of proper waste management (e.g. recycling, illegal burning and dumping, minimisation, backyard composting). Publish at regular intervals.	Number of infomercials	
(4B1) Implement	Investigate assistance for recycling to make it sustainable. This	Number of operating projects	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
Sustainable recycling projects	could be in the form of a subsidy, resource etc		
(4B2) Waste Minimisation Strategy	Identification and evaluation of alternative methods to minimise waste in Buffalo City Metropolitan Municipality incl increasing public awareness, the provision of informational material, provision of facilities, etc.	Amounts of generated waste in Buffalo City Metropolitan Municipality.	
(4B3) Localisation of strategic recycling points	Locate strategic and appropriate sites in BC which recycling companies conglomerate to. Improves recycling co-ordination.	Number of recycling points.	
(4B4) Establish drop-off recycling centre (pilot project)	Establish centre for citizens to drop off used furniture, literature, clothes, etc for charity. Collection of recyclables, garden waste and hazardous waste. Composting on site. Opportunity for job creation.	Number of drop-offs.	
(4B5) Establish buy-back centre (pilot project)	Establish a strategically located centre where informal recyclers can sell their recyclables to co-ordinators for resale to the recycling industry. This will improve the conditions for informal recyclers.	Economic turnover.	
(4B6) Evaluation of two-bag system	Evaluate the use of two or more bag systems to encourage recycling. Collection either by BCMM or informal recyclers.	N/A	
(4B7) Recycling forum	Recycling Forum to be established	N/A	
(4B8) Evaluate and expand Pilot Projects at Schools	Evaluate the success of the ongoing pilot projects on recycling and composting at schools. Identify which schools and in which forms the pilot projects can expand to.	Number of schools.	
(4C1) Feasibility Study: Options of waste	Implement feasibility studies to ascertain options	Number of studies	

(#) Project/ programme title	Description	Key Performance Indicators (KPI's)	Priority
treatment		implemented	
(4C2) Feasibility study: Medical waste incineration facility	Evaluate the feasibility of a municipal incineration facility for medical waste and animal carcasses. Co-operate with City Health and Province.		
(4C3) Establish collection points for household hazardous waste	Identify and establish collection points (at e.g. petrol stations, pharmacies) where households can drop-off their hazardous waste (e.g. paints, thinners, medical waste, etc.).	Number of collection points for household hazardous waste.	
(4C4) Review of tariff system	Creation of a tariff system based on self-sufficiency and the Polluter Pays Principle, encouraging waste minimisation and recycling.	Recycled and composted waste increased by x %.	

2.4.2 ***Select preferred alternatives***

This section will be inserted after Public Participation Meeting

3 Communication and participation

3.1 Consultation process : Stakeholder Participation

This section will be inserted after Public Participation Meeting

3.2 Awareness Campaigns and Communication

Raising public awareness aims at educating and encouraging people to change behaviour and attitudes in order to contribute to a process. Raising public awareness on waste related issues hence aims at changing people's behaviour and attitudes to contribute to improved waste management and to achieve the outset objectives of the IWMP. Even when practical initiatives such as the provision of appropriate recycling facilities are established, the success of implementing the IWMP-activities will only be achieved with high levels of support and participation from the public. The public needs to clearly know which behaviours are desired and how they can participate.

Public awareness should be increased on:

Health problems that are related to waste like spreading of infectious diseases such as diarrhoea, cholera, tuberculosis, HIV, hepatitis B and waste being a source for breeding of disease vectors such as flies, mosquitoes and rats.

The level of understanding of the *need for waste management facilities* of all kinds and the *role that local authority, province and national government* have in waste management.

The *role of public participation* and the importance of each individual's contribution to achieve a sustainable waste management.

Littering and Illegal dumping, which gives negative impacts such as an environment that is dirty and unpleasant and which can lead to the pollution of soils, drinking water etc. It also poses serious health problems to humans and animals and the costs for clean-ups are high.

Burning of waste, which also results in negative impacts on the environment as well as affecting humans and animals (toxic emissions and odour).

The level of understanding from an environmental, social and economic perspective and the importance of *minimising waste disposed of at landfill sites*.

An improved understanding of the *waste minimisation concept*, e.g. *waste avoidance, re-use, recycling and composting*. Knowledge should be raised on how waste can be minimised and different sectors in society should be encouraged to take an active part in minimising waste. Examples include encouraging households to start *source-sorting* their waste into different fractions as well as back-yard composting, and encouraging businesses and industry to re-use and

recycle the waste generated from their activities (marketing waste).

Methods and Tools to raise public awareness on waste

Educating and involving the public on waste management requires significant effort and sufficient funding by the Municipality. Educating the public must be seen as a long-term process and performed on a regular basis. It is also imperative that the educational programmes and activities have a clear message, as misinterpretation will confuse the public and reduce confidence.

Table 3.1 lists public awareness activities available to the Municipality.

Table 3.1 Costs for public awareness activities on waste management

Least expensive	More expensive	Most expensive
News releases	Flyers	Advertisements (TV, Radio)
News advisories	Posters	Billboards
Public service announcements	Fact sheets	Media events
Municipal calendar announcements	Briefing papers	Calendars
Letters to newspaper editors	Videos	Road shows (information buss)
News articles	Decals	Cleanup campaign
Lectures, Workshops		Seminars
Visits to schools, workplaces etc.		Exhibits
Newsletter articles		Educational tours to landfill sites, transfer stations etc.
Guest spots on radio, TV		
Church bulletin notices		

For a municipality to be successful in its efforts in raising public awareness, it is vital that dedicated staff is made available for the educational activities. The staff can be gathered in a *Public Awareness Centre*, which is the case in, for example, Durban (Keep Durban Beautiful Association). The Centre has the overall responsibility for the development of educational material and programmes and the implementation of awareness raising activities.

The organisational structure and responsibilities of such a centre depend on the municipal needs and ambitions. Centre responsibilities may include:

Developing a waste education programme and educational material

Planning and performing educational activities, e.g. public displays

Initiating and co-ordinating partnerships with recycling companies, schools and communities

Running pilot-projects e.g. Buy-Back centres and Drop-off centres

Initiating recycling and composting projects in schools

Monitoring and comparing public awareness and interest with the available municipal services and facilities

The Centre could be established as a partnership between the private and public sectors, with a fulltime staff employed by the Municipality.

Target Groups

A target group is a defined part of the public with common interests, roles and responsibilities. It is necessary that the different target groups are approached in appropriate ways to ensure success in e.g. educational efforts.

Important target groups include:

- Educational institutions (kindergartens, schools, etc.)
- Households in formal and informal settlements
- Businesses and industry
- Politicians

Children and Youth are an important target group, as their attitudes will be the coming norm. Their education is a strategic investment. School children often discuss what they have learned with their parents, which may lead to changes amongst them as well.

Household, as consumers, play an important role in making conscious choices to avoid waste (e.g. choosing products with less packaging) as well as have their waste recycled (e.g. source-sorting).

Businesses and industries need to be involved in efforts to minimise and properly treat hazardous waste and they can be encouraged to develop markets for re-usable or recyclable waste such as the Integrated Waste Exchange.

Politicians, as decision-makers, play a vital role in making informed decision concerning waste management and it is therefore important that they are provided with correct and well-balanced information on the current situation and the future options that are available.

Other important target groups include: NGO’s, CBO’s, informal recyclers, private waste collection/treatment companies, recycling companies, etc.

4 Implementation Instruments

A number of overriding policies and political goals have guided the development of Buffalo City Metropolitan Municipality's first-generation IWMP. The policies will also aid in the implementation of the Plan.

The principal goals and priorities that have guided the development and will aid in the implementation of the IWMP are given by the requirements of the Environmental Management Policy for South Africa and the National Environmental Management Act (NEMA), as well as more specifically within the White Paper for Integrated Pollution & Waste Management for South Africa, and the National Waste Management Strategy and associated Action Plans. These policy principles include:

Accountability: Government is accountable (responsible) for policy formulation, monitoring and enforcement.

Cradle-to-Grave: A holistic approach to estimate costs and/or effects of a suggested alternative. The approach, sometimes calculated though Life Cycle Assessment (LCA), is strongly influenced by the set system boundaries.

Equity: Justice according to natural law or right; specifically: freedom from bias

Full Cost Accounting: Decisions must be based on an assessment of the full social and environmental cost and benefits of policies, plans, programmed, projects and activities that have impact on the environment.

Good Governance: Good governance depends on mutual trust and reciprocal relations between government and people. This must be based on the fulfilment of constitutional, legislative and executive obligations, and the acceptance of authority, responsibility, transparency and accountability. The democratically elected government is the legitimate representative of the people. In governing it must meet its obligation to give effect to people's environmental rights in Section 24 of the Constitution, This includes:

- taking responsibility for developing and implementing environmental policy
- exercising the authority to take decisions and carry out actions vested in it by the Constitution
- acting in accordance with the basic values and principles governing public administration that are contained in the Constitution
- being accountable to the people
- responding to public needs and encouraging public participation in environmental governance by providing for the mutual exchange of views and concerns between government and people and
- monitoring and regulating actions that impact on the environment.

Open Information: To give effect to their constitutional rights, everyone must have access to information to enable them to:

- protect their health and well-being
- protect the environment
- participate effectively in environmental governance and
- comply with environmental policy, legislation and regulation.

Participation: Government must encourage the inclusion of all interested and affected parties in environmental governance with the aim of achieving equitable and effective participation (see more in Section 10.2).

Polluter Pays: Those responsible for environmental damage must pay the repair costs both to the environment and human health, and the costs of preventive measures to reduce or prevent further pollution and environmental damage.

Waste Management Hierarchy: Waste management shall always be conducted in the most sustainable manner available (see more in Section 0).

Current political goals that have influenced the development of the IWMP include the creation of employment opportunities and the provision of municipal services to previously disadvantaged areas.

4.1 Partnerships

The development of partnerships has been identified as an important mechanism for providing services and facilities required for Buffalo City Metropolitan Municipality's Integrated Waste Management. The following partnerships are currently in place.

Public-Private Partnerships

There are no Public / Private partnerships currently utilised in Buffalo City Metropolitan Municipality.

The municipality does make use of private contractors for the collection of waste in areas that can not be serviced by municipal refuse vehicles.

One-man contractors are used in informal residential areas where the lack of access roads makes it impossible for refuse vehicle to frequent the area. The one-man contractor system was initially introduced in the informal areas of Duncan Village in 1996. The success of the project allowed for the expansion of the one-man contractor service to Buffalo Flats and Scenery Park.

In general, residential areas are subdivided into units of 300 households, where one person, referred to as a small contractor, collects the waste from each household point and moves it to larger collections points. From there, refuse vehicles transport the waste to landfills. The small contractor is also responsible

for the general cleanliness of his/her area. The approximately 90 small contractors currently used by the Municipality are self-employed and were recruited through a tender process. The Municipality provides collection bags, but not safety equipment.

The system of using small contractors aims at improving entrepreneurial skills, creating jobs and improving the environment. The small contractors should feel that they are an important part in improving the waste management situation of their areas in particular, and in Buffalo City Metropolitan Municipality in general.

The increased use of one-man contractor has made the renewal of contracts a time-consuming process, and alternative forms of procurement are being investigated.

SWMS makes use of adhoc contracts for hire of plant, machinery and equipment as and when required. Office equipment is on contract hire.

NGO/CBO partnerships

Buffalo City Metropolitan Municipality is currently is discussion with Border Chamber of Business regarding the implementation of an initiative for private sector organisations to adopt and clean sections of the city. Details of the partnerships have not been finalised.

Future partnerships

Buffalo City Metropolitan Municipality understands that partnerships will play an important role in Integrated Waste Management, providing solutions for the efficient collection of waste, increasing public awareness on waste manners and improving the waste situation in the municipality. Buffalo City Metropolitan Municipality has identified the initiation of partnerships as an important objective and formulated strategies in order to achieve this objective.

4.2 Legislative instruments

A critical component of the implementation of the IWMP is the supporting legal framework. With this in mind, it is imperative that the legal framework support and guide implementation of objectives in the IWMP. It is the duty of the local municipality to develop by-laws which expands upon current National and Provincial regulatory requirements. Chapter **Error! Reference source not found.** outlines the legislative framework that this IWMP is aligned to. In terms of the Constitution of South Africa, responsibility for waste management functions is to be devolved to the lowest possible level of government. Local government therefore is assigned the responsibility for refuse removal, refuse dumps and solid waste disposal. Provincial government has the exclusive responsibility to ensure that local government carries out these functions effectively.

Buffalo City Metropolitan Municipality's current local legislative framework, inherited from the previous Local Governments, leaves the Municipality with fragmented, out-dated and ineffective sets of by-laws. The Municipality views the

development of an updated and uniform set of municipal by-laws as a priority.

The future revised local legislation must allow for:

- The use of a differentiated tariff system to encourage waste minimisation and recycling
- An improved enforcement of waste-related regulations
- Punitive measures for non-compliance of waste management legislation

4.3 Funding Mechanisms

A critical precondition for the successful implementation of the IWMP is the access to sufficient funding to carry out the plan. Funding will be required for various activities, e.g. waste minimization activities, the development and implementation of new/revised by-laws, operating and maintenance cost of waste management facilities, and the design and commissioning of new waste management facilities.

Funding for the implementation of IWMP Projects can be obtained from the following sources :

- **External Sources :** Equitable Share Grant, Municipal Infrastructure Grant, Financial Institutes (eg World Bank), Donor Funding, Consolidated Municipal Infrastructure Programme, Municipal Systems Improvement Programme.

- **Internal Sources :** Core municipal administration revenue e.g. property rates and tariffs

The primary source of funding for waste-related activities in Buffalo City Metropolitan Municipality is the municipal budget. To a lesser degree, funding is received from international donor organisations and NGO's such as the USDG Grant and Poor Relief. A full description of the current financial situation is outlined in Section 2.2.7.1. Buffalo City Metropolitan Municipality needs to conduct a full cost accounting on the financial implementation to increase waste management services. Once this is done, they could then compare this amount needed with the existing operational costs, thus the municipality could adjust their tariffs and rates accordingly.

Recycling activities can be funded via public-private initiatives whereby the municipality could provide receptacles for separation at source by households and recycling companies, at their cost, collect these recyclables. Buffalo City Metropolitan Municipality could also set buy-back centres at centralized locations within the municipality so that this will initiate community based recycling. The model has been utilised by Buffalo City Metropolitan Municipality in the past with minimal success, due to the cost viability of the private sector. Subsidising of the collection points needs to be further investigated.

4.4 Implementation Plan

Table 4.1 Primary Key Performance Indicators for monitoring the implementation of the IWMP

Strategy	Key Action	Primary KPI
Objective 1. Buffalo City Metropolitan Municipality Solid Waste Department to comply with NEMWA		**Number of non-compliances with annual AG Audit**
Strategy A. Develop and apply Integrated Waste Management Planning	IWMP Progress meetings to discuss and record IWPM implementation progress	Number of KPI's completed
Strategy B. Establish a capacitated and efficient organisation	Identify future needs of staff and skills training for the coming three-year period. Form policy on capacity building	Percentage compliance with capacity building program
Strategy C. Enforcement of municipal legislation	Active enforcement of municipal by-laws	Number of offences recorded
Strategy D. Implement a reliable Waste Information System	Implement a Waste Information System	Percentage up to date information available
Strategy E. Improve financial sustainability	Creation of tariff system based on self-sufficiency	Income to Expenditure ratio
Strategy F. Improve participation by the public and other stakeholders.	Implement regular Public Participation meetings with stakeholders (Rate payer associations, Chamber of Business, Ward Councillors)	Number of documented completed public participation meetings
Objective 2. Buffalo City Metropolitan Municipality supplies 95% of its population within the Urban Edge, and 10% outside the Urban Edge, with efficient waste collection services within five years.		**Percentage of unserviced population**
Strategy A. Improve operational management	Develop and implement Operation and Maintenance Plan to set benchmarks and measurable standards	Percentage OMP implemented Compliance with objectives / standards

Strategy B. Expand operations to unserviced areas	Expand operations to unserviced areas	Percentage unserviced population
Strategy C. Identify, initiate and evaluate partnerships	Implement Public / Private partnerships	Number of Partnerships with private sector
Strategy D. Introduction of community based organisation to provide efficient Waste Management Services	Establishment of Community Based Organisation for provision of Waste Management Services	Community Based Organisation for provision of Waste Management Services Establishment

Strategy	Key Action	Primary KPI
Objective 3. Operational landfills and transfer stations are 80 % compliant with all legislation within five years, and non-operational sites are 15 % compliant within five years.		**Compliance of operational and non-operational landfill sites with legislation and permits**
Strategy A. All operational landfill sites and transfer stations to be compliant with permit conditions	Develop implementation plan for remedial actions required for non-compliant landfills.	Number of non-compliant issues
Strategy B. Establishment of transfer stations and depots	Establish community waste drop off points (General and Garden waste)	Number of operational transfer stations
Strategy C. Development and implementation of closure plans	Rehabilitation of closed landfill sites	Percentage of closed landfill area that is rehabilitated
Objective 4. Decreased landfilled waste by 10 % within five years.		**Percentage reduction of landfilled waste**
Strategy A. Improve public awareness on sustainable waste management	Develop methodology to continually evaluate the level of public awareness on proper waste management.	Number of respondents.
Strategy B. Support waste minimisation, re-use and recycling projects	Initiate waste minimisation projects	Number of operating projects Quantity of recycled waste
Strategy C. Investigate alternative methods for waste collection and treatment	Implement feasibility studies	Number of feasibility studies implemented

- **Goal 1. Buffalo City Metropolitan Municipality Solid Waste Department to comply with National Environmental Management : Waste Act 59 of 2008**

Strategy		**Priority**	**2013/ 14**	**2014/ 15**	**2015/ 16**	**2016/ 17**	**2017/ 18**
• Strategy A: Develop and implement Integrated Waste Management Plan		High					
• Strategy B: Designate a Waste Management Officer		High					
• Strategy C: Establishment of Waste Management Forum		High					
• Strategy D: Develop and Implement a Waste Information System		Hi+gh					
• Strategy E: Develop, review and implement waste management regulatory framework		High					

• Strategy F: Capacitate employees	Implement regular Public Participation meetings with stakeholders (Rate payer associations, Chamber of Business, Ward Councillors)	High					

Total estimated costs (In R Millions)	**25.1**	**24.3**	**24.3**	**16.3**	**16.3**

Objective 2. Buffalo City Metropolitan Municipality supplies 95% of its population within the Urban Edge, and 10% outside the Urban Edge, with efficient waste collection services within five years.

Strategy	Action	Priority	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18
Strategy A. Improve operational management	Develop and implement Operation and Maintenance Plan to set benchmarks and measurable standards	High					
Strategy B. Expand operations to unserviced areas	Expand operations to unserviced areas	Medium					
Strategy C. Identify, initiate and evaluate partnerships	Implement Public / Private partnerships	Medium					

Total estimated costs (In R Millions)	**26.2**	**27.2**	**24.2**	**24.4**	**25.2**

Objective 3. Operational landfills and transfer stations are 80 % compliant with all legislation within five years, and non-operational sites are 15 % compliant within five years.

Strategy	Action	Priority	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18
Strategy A. All operational landfill sites and transfer stations to be compliant with permit conditions	Develop implementation plan for remedial actions required for non-compliant landfills.	High					
Strategy B. Establishment of transfer stations and depots	Establish community waste drop off points (General and Garden waste)	High					
Strategy C. Development and implementation of closure plans	Rehabilitation of closed landfill sites	Medium					

Total estimated costs (In R Millions)	**122.0**	**32.0**	**32.0**	**12.0**	**12.0**

Objective 4. Decreased landfilled waste by 10 % within five years.

Strategy	Action	Priority	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18
Strategy A. Improve public awareness on sustainable waste management	Develop methodology to continually evaluate the level of public awareness on proper waste management.	Medium					
Strategy B. Support waste minimisation, re-use and recycling projects	Initiate waste minimisation projects	High					
Strategy C. Investigate alternative methods for waste collection and treatment	Implement feasibility studies	High					

Total estimated costs (In R Millions)	**4.9**	**4.4**	**3.4**	**2.9**	**2.8**

Estimated Budget and Cash Flow (Summary)

	2013/14	2014/15	2015/16	2016/17	2017/18
Objective 1	25.1	24.3	24.3	16.3	16.3
Objective 2	26.2	27.2	24.2	24.4	25.2
Objective 3	122.0	32.0	32.0	12.0	12.0
Objective 4	4.9	4.4	3.4	2.9	2.8
Sub-Total	**178.2**	**87.9**	**83.9**	**55.6**	**56.3**
Operating	298.0	298.0	298.0	298.0	298.0
Total	**476.2**	**385.9**	**381.9**	**353.6**	**354.3**

A preliminary budget has been compiled based on prioritisation of projects by the Reference Group.

This budget will be amended after feedback received from Public Participation process

5 Approval process

5.1 IWMP Approval process

Once the IWMP has been finalized then it needs to be submitted to the MEC of the Eastern Cape Department of Economic Development and Environmental Affairs (DEDEA) for approval, this is stipulated in Chapter 3, Section11 (4) of NEMWA. The submission of the final IWMP to the MEC for approval is dependent on, primarily, the necessary municipal channels having been followed, in terms of Section 29 of the Municipal Systems Act, 2000 (Act No. 32 of 2000). Once approved the IWMP will be integrated into Buffalo City Metropolitan Municipality's IDP as a sector plan.

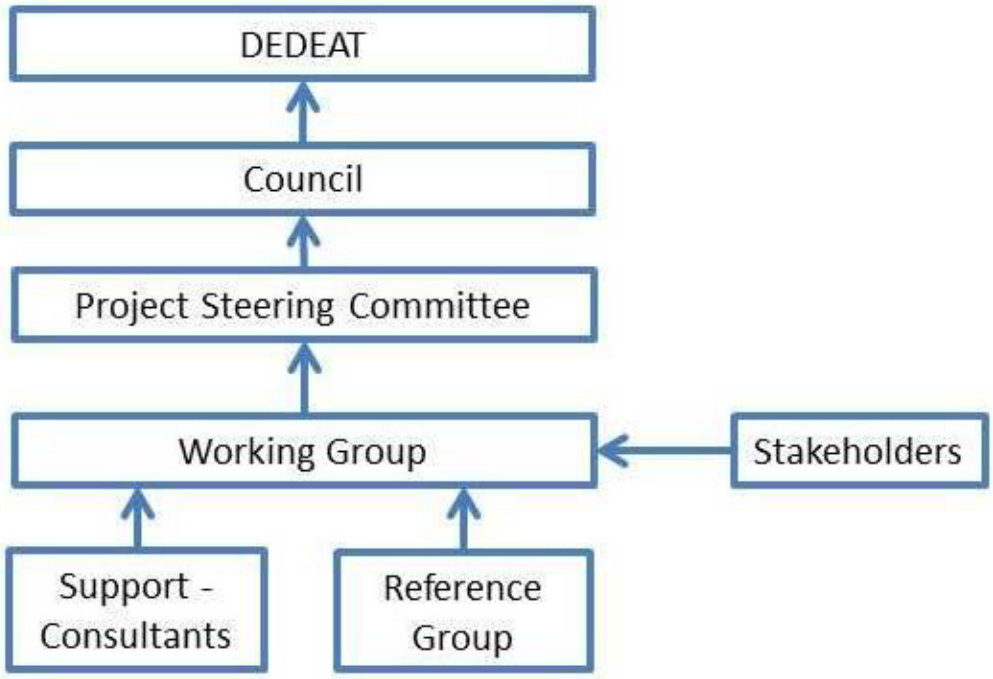


Figure 5.1 IWMP Organisational Structure and approval process for IWMP

5.2 IWMP Organisation

To ensure progress in the IWMP planning process, from both a quantitative and qualitative viewpoint, a well-structured organisational set-up has to be established. The organisational structure guarantees efficient interaction between different stakeholders in a participatory process. The Solid Waste Management Services will play a crucial role. Figure 5.1 illustrates the organisational structure of the IWMP and the approval process.

Project Steering Committee

The key role of the project steering committee is to oversee the planning and implementation of the project.

Within the planning phase the project steering committee does the following:

Ensures that the planning process is carried out satisfactorily;

Approves the project business plan;

Identification of community stakeholders;

Liaises with the community regarding progress and issues which concern the community;

Ensures that the planned project meets the community needs within the funds available i.e. the planned project is what the community wants and can afford within the funding available.

During the implementation phase the project steering committee does the following:

Reviews that the contractor is achieving the targets set for the programme;

Reviews progress and quality;

Assists with dispute resolution should disputes arise.

The Project Steering Committee also acts as the link to the Council and the Municipal Manager and assists with presentations at these levels for the approval of various strategic documents connected to the integrated waste planning.

Working Group

The Working Group is the operational unit and the hub in the IWM Planning Process i.e. it is responsible for collecting and compiling background information, assessing and analysing data, developing objectives, strategies, programmes and projects as well as coordinating input from stakeholders and politicians.

The Working Group is comprised of key officials from the Solid Waste Management Services and Department of Environmental Services from Buffalo City Metropolitan Municipality. The Working Group continuously reports to General Manager Community Services on the progress.

The Working Group convenes at regular meetings chaired by the IWMP co-ordinator. The members perform tasks in their own areas of responsibility between Working Group meetings, to which they report and discuss findings and recommendations.

Support Group

The Support Group consists of Consultants (Bosch Munitech), who support the Working Group in various ways. Some consultants may contribute through other waste related projects that affects or gives input to the IWMP while other consultants may be specifically requested to give certain input to the IWM Planning Process. The Support Group capacitates the Working Group during the IWM Planning process. The Working Group invites the Support Group to meetings whenever considered necessary.

Reference Group

The Reference Group consists of key stakeholders within different fields/sectors of the waste management sphere. The objective is to have a multi-key stakeholder Reference Group that will act as a sounding board and provide input and comment during the IWM Planning. The Working Group will collect the inputs and comments through meetings co-ordinated by the IWMP Coordinator. The Working Group is responsible for proposing the members of the Reference Group, which is approved by the City Manager, Director of Social Services and Social Services Committee. The Reference Group comprises of members from the following fields/sectors:

- Border scrap
- Buffalo City Metropolitan Municipality
- Buffalo Scrap Metals
- Buffalo scrap/Cash for Scrap
- Burner Oil
- Collect All Group
- Collect All Paper
- Compass Waste
- Da Gama
- DEDEAT
- East London Municipal Abattoir
- East London Scrap
- EL Bricks
- Enviroserve
- First National Batteries
- Johnson & Johnson
- King Box
- Linloss
- Mdantsane Bottle Exchange
- Medicross.
- Mercedes Benz
- Nahoon Ratepayers Association
- New Reclamation Group.
- Oil Kol
- Paper Man
- Rec. Oil
- RECLAM
- Riegers .
- S.P.C.A. East London
- S.P.C.A. King Williamstown.
- Solid Waste Technologies
- Waste Management Services
- Waste Management Systems

Other interested stakeholders may involve themselves in the Stakeholders´ Forum. Identified key stakeholders are recorded in a database, where contact details and data concerning their profiles, activities, special competence etc. are specified.

Stakeholders' Forum

The objective of the Stakeholders´ Forum is to ensure a broad representation of the Public to give input and comment on the IWMP. The Stakeholders' Forum consists of ward councillors and additional ward committee members who contribute to the IWM Planning by communicating the thoughts and opinions of the communities of their respective wards. The Project Steering Committee decides on the establishment and principal composition of the Stakeholders´ Forum after recommendation by the Working Group.

6 Reporting on Implementation, monitoring and review

6.1 Reporting

Section 13(3) of the Waste Act requires that annual performance reports prepared in terms of section 46 of the Municipal Systems Act must contain information on the implementation of the municipal IWMP, including information in paragraphs (a) to (j) of subsection (2) insofar as it relates to the performance of the municipality. The information set out in paragraphs (a) to (j) is as follows :

(a) the extent to which the plan has been implemented during the period;

(b) the waste management initiatives that have been undertaken during the reporting period;

(c) the delivery of waste management services and measures taken to secure the efficient delivery of waste management services, if applicable;

(d) the level of compliance with the plan and any applicable waste management standards;

(e) the measures taken to secure compliance with waste management standards;

(f) the waste management monitoring activities;

(g) the actual budget expended on implementing the plan;

(h) the measures that have been taken to make any necessary amendments to the plan;

(i) in the case of a province, the extent to which municipalities comply with the plan and, in the event of any non-compliance with the plan, the reasons for such non-compliance: and

(j) any other requirements as may be prescribed by the Minister.

Compliance and monitoring

A municipality should determine whether it has complied with the above requirements on reporting on the implementation of its IWMP. Has it produced the required annuial performance reports which states how far it is with regards to attaining the goals and targets of the IWMP ?

6.2 Monitoring and Review

Monitoring is an ongoing activity that constitutes an essential and integral part of the planning process. Performance and development indicators are used to monitor the implementation of the IWMP and focus on the objectives of the IWMP, ensuring that corrective action can be taken where necessary.

The lack of existing municipal monitoring systems makes this process difficult. The situation will be, in part, rectified with the development of a Waste Information System for Buffalo City Metropolitan Municipality, but a more comprehensive monitoring system is needed.

Key Performance Indicators (KPI's) have been identified for the majority of the suggested IWMP Projects listed in Section 6.1. An annual review of these KPI's will enable the Municipality to monitor its progress towards the IWMP Objectives, evaluate the success of projects and take corrective action accordingly.

Key Actions have been identified for each strategy listed above. Each of the identified actions has an associated Primary Key performance indicator (KPI), that should be used as a primary measure of the success of the implementation of the strategy. The primary KPI should be utilised in conjunction with the secondary actions and associated KPIs

The primary KPI's, as well as the secondary KPI's should be measured and recorded three monthly and reported on at the quarterly IWMP implementation meetings.

Table 6.1 Summary of Key performance indicators for monitoring the implementation of the IWMP

KEY PERFORMANCE INDICATORS (KPI'S)
Amounts of composted waste.
Amounts of generated waste in Buffalo City Metropolitan Municipality.
Amounts of waste recycled.
Annual numbers of public awareness activities.
Budget : Income and Expenditure
Confidence index
Cost for vehicle maintenance
Cost for waste collection
Identified amounts of hazardous waste going into municipal landfills.
Number and growth of illegal dump sites.
Number of chippers
Number of collection points for household hazardous waste.
Number of co-operatives
Number of days with vehicles in workshop (availability).
Number of drop off points

Number of fires at landfills.
Number of formal Public Participation opportunities.
Number of generators of hazardous waste.
Number of identified “hotspots”.
Number of identified key personnel.
Number of identified Key Stakeholders.
Number of infomercials
Number of non-conformities with DWA requirements on leachate treatment.
Number of partnerships in place.
Number of person-days spent on capacity building.
Number of qualified staff
Number of queries referred by Auditor General
Number of recycling points.
Number of reporting facilities.
Number of scavengers
Number of transfer stations
Number of vehicles exceeding maximum age.
Number vehicle breakdowns after hours
Operational costs
Percent of Buffalo City Metropolitan Municipality serviced.
Percent of landfill site rehablitated
Percentage overtime to total hours
Percentage Waste cell complete
Questionnaire - Awareness
Questionnaire - Performance
Recycled and composted waste
Resourses / 1,000 population
Revenue from commercial/industrial waste collection services.
Volume of waste landfilled.
Waste Benchmarks

6.3 Review of 2003 IWMP

It is a requirement that the Second Generation IWMP includes a critical evaluation and review of the monitoring reports, which provides information for assessing the achievement of the IWMP's strategic objectives. This process ensures the reappraisal of the IWMP and assess the appropriateness of strategic objectives and whether they need to be amended and adjusted

A summary of the number of projects specified in 2003 that were completed is indicated in the table below.

Table 6.2 Summary of number of projects in IWMP

Number of projects set in 2003 IWMP	55
Number of projects completed prior to 2012	8
Number of incomplete projects carried forward to 2012	47
Additional projects included in 2012 IWMP	41
Total projects 2012 IWMP	88

The completed Projects from the 2003 IWMP were :

Project 1A3 Compile Second Generation IWMP
Project 1B1 Review of R293 legislation
Project 1B2 Uniform set of municipal waste management by-laws
Project 3B1 Road vs Rail study
Project 3C1 Rehabilitation of Ducats illegal landfill
Project 4A1 Capacitate and develop the new Communication Office
Project 4C2 Evaluate landfill gas at NU2 and Second Creek
Project 4C3 Large scale composting facility

No monitoring reports are available documenting implementation of the Objectives or measurement of the Key Performance Indicators

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