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**City of Cape Town
Solid Waste Directorate**

Integrated Solid Waste Management Plan

Final Assessment Report

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Prepared
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This report was prepared under Mega-Tech, Inc.'s prime contract with USAID and addresses USAID/South Africa's Strategic Objective No. 6: Increased Access to Shelter and Environmentally Sound Municipal Services

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EXECUTIVE SUMMARY

In terms of Contract No. 0098-0103-SUB-TA37, Mega-Tech Inc (MTI) has commissioned Jeffares & Green (Pty) Ltd, in joint venture with Ingeróp Africa (Pty) Ltd, to provide consulting services for the "DEVELOPMENT OF AN INTEGRATED WASTE MANAGEMENT PLAN (IWMP) FOR THE CITY OF CAPE TOWN".

The development of an IWMP is a requirement of the National Waste Management Strategy, the Draft National Integrated Waste Management Bill (due to be presented to Parliament for promulgation in 2005) and the Unicity's Integrated Development Plan (IDP). The objective of this Contract is to develop an IWMP, using a cradle-to-grave approach that incorporates appropriate, affordable and an environment-friendly mix of solutions which will continually reduce the mass of waste requiring disposal and also serve to provide a dynamic framework to manage the City's waste stream effectively based on the waste hierarchy.

The Project Team, together with officials from the Waste Department of the City of Cape Town and Department of Environmental Affairs and Development Planning, have undertaken an extensive study to obtain and evaluate available "status quo" information covering solid waste relevant to the Cape Town Metropolitan Area. The status quo situational analysis was completed at the end of March 2004. From the Status Quo Report the shortcomings, described as gaps and needs, were determined and their relevance and importance to the IWMP identified. An assessment of key findings was undertaken and consequently compiled and is contained in this Assessment Report.

The main aim of the Assessment Report is to take forward the key findings from the status quo study and gaps analyses and develop the strategies, plans and tasks that will form the City of Cape Town's Integrated Waste Management Plan. The strategies will be implemented on either a short-medium- or long-term basis. The assessment phase of the study incorporates the current strategies and vision of the Directorate: Solid Waste Services.

The key findings that were assessed included:

Institutional Arrangements: At the time of preparing the Status Quo Report, the City was engaged in a process of institutional restructuring and transformation. The institutional arrangements of the Solid Waste Directorate (SWD) had therefore not been finalised and thus the actual "structural gaps" could not be determined. This assessment chapter is based on the review of current and historical literature, including discussions held with City Officials.

A history of extreme institutional fragmentation left behind a legacy of inequalities within the CCT and in particular the SWD. Since municipal Waste Management is regarded as an integrated chain of activities consisting of separate, but interrelated elements, the CCT has slowly started addressing these issues through mechanisms of consolidation and the establishment of a common City-wide framework for the delivery of equitable services. This consolidation process is further informed by the SWD Assessment Matrix, which will serve as a guideline for further consultation with various officials and role players.

The Assessment Matrix will be used as a tool to bridge the gap between the Status Quo and the future institutional arrangements necessary to successfully implement the IWMP. The Assessment

Matrix was developed by recognising the “ideal” institutional characteristics on the one hand, and the “opposing realities” on the other. The Assessment Matrix also incorporates [sound] organisational design principles that will be considered in consolidating the SWD footprint.

International and local best practices are reviewed and the implications for the IWMP are assessed. The London Waste Authorities’ best practice requirements are considered and the institutional arrangements for Johannesburg’s IWMP are presented as a means of comparison with the challenges that Cape Town faces. From the review of best practices, the CCT may wish to consider and benchmark their IWMP against the successful outcomes of other established integrated waste management plans and practices.

The current management structure largely reflects the structure of the former municipal administrations and it is considered essential that the City’s current restructuring initiatives transform the Solid Waste Management Directorate into an integrated, functional and effective entity.

Financial Arrangements: The financial management of the SWD department is integrated with the overall CCT’s financial management systems and functions within an operating and capital development budget set by the SWD and approved annually by the Cape Town City Council. A review of the strategies for revenue generation and collection is recommended as well as the development of reliable performance indicators to measure the effectiveness of the financial arrangements that apply to solid waste management.

Waste Collection and Area Cleaning: The main line functions of waste collection and area cleaning are assessed and compared against national and international practices, and gaps and needs are identified for taking forward to the strategies and plans/policies of the IWMP.

As summarised in the Final Status Quo Report, the annual total waste generated within the Cape Town Metropolitan Area (CTMA) in 2002/2003 was estimated to be 2,158,500 tonnes (or 5,900 tonnes/day). Of the total waste generated, 287,873 tonnes (13%) were recycled, with the balance of 1,870,650 tonnes requiring collection and transportation to a waste disposal facility. The annual growth rate of waste generated in the CTMA between 1996 and 2004 is calculated to be 3,8% per annum. Waste Collection Services (with a current operating budget of R389 million/annum) and Area Cleaning Services (with a current operating budget of R231 million/annum) collectively account for 92% of the SWD total annual budget. It is against this situational background that the assessment study was undertaken.

The CCT currently enjoys the status of being one of the top tourist destinations in the world. The cleanliness of the City is not only important for the well-being of its citizens, also to show-case the city to further develop its potential as a tourist destination and thus provide much needed job opportunities. Having recently won the award of “South Africa’s cleanest city” is a positive step forward and a credit to the City’s waste collection and area cleaning staff and officials. Furthermore, it must be recognised that practically all households in the CTMA now receive one of three basic levels of collection service, i.e. the 240l container, 80l bag or a rudimentary skip container service. Plans have been initiated to phase out the skip container service so that the minimum household collection service provided by the City will be the 80l plastic bag. Waste collection is planned to be extended to include informal settlements on privately-owned land.

The assessment of the effectiveness of the City's waste collection and area cleaning services indicates that there is much scope for improvement given that the SWD is constrained by the slow pace of restructuring and transformation, the inefficient deployment of staff, the need to unbundle the cross-cutting of various municipal departments and the lack of physical, human and financial resources.

Waste Disposal: The SWD undertakes the function of disposal of waste at engineered waste disposal sites within the City of Cape Town, supported by the privately-owned Vissershok Waste Management Facility (VWWMF). Solid waste disposal and related services are assessed and recommendations made for the strategies, plans and policies to be incorporated into the final IWMP.

It is envisaged that over the next three years the planned closure of four of the City's existing landfills and the development of a regional waste disposal site and associated transfer stations, will lead to a significant increase in the unit costs of waste disposal and treatment. Furthermore, the increase in rail and road transportation costs as a result of greater haul distances will place a high priority on waste reduction and minimisation.

Current and projected capital and operating waste disposal budgets indicate an uneven spread and will need to be reviewed to ensure that the cost of extending and operating the existing disposal facilities, the cost of developing a regional waste disposal facility with associated transfer stations, the cost of developing and operating waste reduction facilities (composting, materials recovery and recycling facilities) and the cost of properly rehabilitating closed landfill sites, can be reasonably met.

An important aspect that is highlighted in the assessment report is the need for the planning and funding of key waste disposal facilities to be accelerated. Several landfill sites have closed in the City, or are in the process of being closed, and if the proposed regional waste disposal facilities together with the requisite transfer stations are not implemented timeously, the City may be forced to apply to the relevant national authorities to extend the permits to operate certain landfills earmarked for closure.

The Vissershok Waste Management Facility (VWWMF) is the only privately-owned landfill site and the only site accepting hazardous waste (the site is classified H:H) and will play an important role in the City's future waste management planning.

Waste Minimisation: Waste minimisation is key to many aspects of waste management and is therefore considered a principal feature in the development of strategies for cost-effective waste management. This assessment provides a review and evaluation of the main policy options within the City of Cape Town aimed at promoting the prevention and source reduction of waste (followed by the more widespread and cost-effective reuse and recycling of waste as stipulated by the waste management hierarchy in the National Waste Management Strategy (NWMS) Action Plan documents). These options should be carried forward into the development of the strategies, policies and action plans of the final Integrated Waste Management Plan (IWMP). Furthermore the assessment focuses on the review and evaluation of international and local policy best-practice relating to the promotion of waste minimisation and recycling activities.

The project team identified five sets of issues, which formed the basis for the IWMP gap analysis and consequently was further assessed as part of this report namely:

- To develop and implement **regulatory policy instruments**.
- To develop and implement an appropriate framework for economic instrument and **socio-economic/environmental incentives**.
- To develop and provide effective **information systems, awareness raising, education and training** initiatives within all spheres of community (domestic, commercial and industrial) and government.
- To improve the availability and accessibility of **appropriate waste management infrastructure**.
- To develop **effective co-operation and partnership initiatives** with other public and private sector bodies.

A desktop study was undertaken of the waste management policies of the following countries and political regions: Belgium, Brazil, Denmark, Germany, India, Sweden, Switzerland, The Netherlands, The Philippines, United Kingdom, USA, the European Union and the US States of California and Massachusetts. Specific focus was placed on researching the waste management activities of the following cities: Auckland and Christchurch (New Zealand), London (United Kingdom), Seattle (United States) and Curitiba (Brazil).

The review of best-practice identified and assessed the impact and general implications of the different types of policy intervention that are being used in each of the various regions and is tabled in the report as Table 6.1. A number of key implications for the development of the waste minimisation and recycling components of the IWMP for the City of Cape Town have been identified based on this brief analysis of international best-practice and these have formed the basis for the public discussions with the City officials for the development of the IWMP.

The international review suggests that the City of Cape Town is faced with a waste management situation similar to most of the municipalities and regions that were reviewed, namely the need to *substantially* reduce the volumes of waste disposed of to landfill. It also suggests that there is no singular set of best practice guidelines that can be universally applied to all solid waste practitioners. Moreover, best practices should be developed in the context of the situation to which they will be applied.

A key constraint that currently hinders the more widespread adoption of waste minimisation and recycling - at the domestic, commercial and industrial levels - is the lack of sufficient incentives and enforcement due to an inappropriate regulatory and financial policy framework. Strategies to be developed will need to inform the plan on how to ensure effective policies for waste minimisation, focusing on upstream waste minimisation through source reduction, promoting greater recycling and reuse by introducing appropriate regulatory, financial, awareness-raising and infrastructural measures encouraging and facilitating increased waste recovery for recycling by households and businesses and developing or strengthening markets for recycled products.

Waste Generation, Quantities and Characterisation: Information on the quantities and types of waste being generated, recycled, disposed of in the Metro have been obtained from a number of sources including the quantities of waste entering landfills or transfer, quantities received at drop-off facilities and information received from recovery operators and collectors.

As mentioned previously, the annual total waste generated within the CTMA in 2002/2003 is estimated to be 2,158,500 tonnes. Household waste accounts for 820,866 tonnes, Commercial waste 567,558 tonnes, Industrial waste 339,991 tonnes, Green waste 111,721 tonnes and Builders rubble 318,392 tonnes of the annual total waste. Some 288,000 tonnes per annum, or some 13% of the total waste generated, is recovered through recycling and composting initiatives. The annual growth rate is estimated to be 3,8% and the projected total waste generation by 2030 will be some 2,750,000 tonnes per annum. A target of 1,250,000 tonnes per annum by 2030 of waste disposed to landfills is proposed, which will require the introduction of bold waste reduction and minimisation measures by the City.

Using existing characterisation studies the recycling and compostable components of the domestic waste stream comprises 46% organics, 18% paper, 13% plastics, 9% glass and 6% metals. The high organics are a result of a relatively large low-income group in the City. The majority of paper and plastic is generated in the middle and high-income groups.

The domestic waste composition along with garden waste establishes the potential for a strategy of implementing a practical waste minimisation initiative within the IWMP resulting in the reduction of significant quantities of waste, which would otherwise have to be disposed of.

The assessment of waste generation in the City does however indicate, that prior to any detailed waste minimisation program can be implemented, that a Waste Information System is urgently required as future Waste Management Planning will require accurate data for realistic planning purposes. The development of National, Provincial and Local databases for waste is crucial for sound future planning to take place.

Hazardous and Special Wastes: A number of "gaps" have been brought forward from the Status Quo study. The need for new management systems and strategies based on reliable data is recommended. An assessment of current facilities indicates a lack of information in the generation, storage, transport and disposal of hazardous waste and a lack on co-operation between the communities and the CCT. Private contractors essentially undertake the collection and disposal of hazardous wastes. The CCT nevertheless is responsible to ensure that public health and safety is maintained, and it is considered of particular importance that the City's waste by-laws be thoroughly reviewed with respect to the proper management of hazardous wastes. A cradle-to-grave management approach for hazardous waste is proposed (from generator to verification of satisfactory final disposal) as a key strategy for the IWMP.

Waste Education and Special Projects: The SWD has been actively involved in Waste Education and has supported various projects focussing on awareness raising and training to achieve an improved standard of waste management in the City. It has been established that certain projects or programmes need to be extended to realise their success and that support for these should be ensured over a long period of time and should be apolitical. Furthermore the shortcomings and gaps identified the need for transforming and empowering the various affected sectors (industrial, commercial, domestic or governmental) to practice responsible waste management through better understanding, improved access to education and practical training.

The key findings highlighted various needs for communication, education, training and awareness raising within the City namely:

- The need to improve **Political** Support for Continuous Waste Education.
- The need to improve **Internal** Governmental Communication and Waste Education.

- The need to improve **External Communication and Waste Education**.
- The need to **improve/optimize existing waste education and training materials and infrastructure** and align them with other internal and external education frameworks (e.g. NQF), waste programmes and policies.
- The need for **Evaluation, Reward and Recognition Programmes** to communicate and honour best practice and success stories in Waste Education for any of the above.
- The need to **enforce** existing legislation such as the Municipal Systems Act and the NWMS which prescribe on-going Environmental Awareness Raising, Education and Practical Training at all community and governmental levels as a vital part of any practical application for a working IWMP.

A toolbox was devised to guide the formulation of the strategies by consolidating the above needs. This will serve as a guide for the compilation of the strategies and action plans to be carried forward to the final IWMP for implementation.

In conclusion, this report assesses the solid waste functions practised within the Cape Town Metropolitan Area, as described in the Final Status Quo Report and Gaps Analysis, and identifies the key gaps and issues that need to be carried forward into the Integrated Waste Management Plan. Regulatory issues and matters related to enforcement are dealt with separately in the Draft By-Laws that have been developed as a parallel process linked to the development of the IWMP.

City of Cape Town
Solid Waste Management Services

**Integrated Solid Waste
Management Plan**

Final Assessment Report

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ACRONYMS AND ABBREVIATIONS

1. *Organisations*

BCRC:	Basel Convention Regional Centre
BOTSOC:	Botanical Society
CAIA:	Chemical and Allied Industries Association
CISCO:	Cape Iron Steel Works
CMA:	Cape Metropolitan Area
CMC:	Cape Metropolitan Council
CCT:	City of Cape Town
CPMFI:	Cleaner Metal Finishing Industry
CTMA:	Cape Town Metropolitan Area
DEA&DP:	Department of Environmental Affairs and Development Planning
DEAT:	Department of Environmental Affairs and Tourism
DoE:	Department of Education
DWAF:	Department of Water Affairs and Forestry
EERU:	Environmental and Education Resource Unit
EEU:	Environmental Evaluation Unit
EJNF:	Environmental Justice Network Forum
EMERES:	Empresa Metropolitana de Tratamiento de Residuos Solidos Limitada
EMG:	Environmental Monitoring Group
EU:	European Union
FCA:	Fairest Cape Association
IWMSA:	Institute of Waste Management South Africa
KEAG:	Kommetjie Environmental Action Group
LGWSETA:	Local Government Water and Related Services, Sector Education, Training Authority
LRC:	Legal Resources Centre
MEADP:	Ministry of Environmental Affairs and Development Planning
MLCs:	Municipal Local Councils
NBI:	National Botanical Institute
NCPC:	National Cleaner Production Centre
NORAD:	Norwegian Agency for Development
NRF:	National Recycling Forum
PACSA:	Packaging Corporation of South Africa
PFSA:	Plastic Federation of South Africa
PwC:	Price Waterhouse Coopers
RCMASA:	Responsible Container Management Association of South Africa
ROSE:	Recovery of Oil Saves the Environment
SAB:	South African Breweries
SADC:	South African Development Corporation
SANTREN:	South African Network for Training on Environment
SETA:	Sector Education and Training Authority
SMME:	Small, Medium and Micro Enterprises
SPSA:	South eastern Public Service Authority of Virginia

SWD:	Solid Waste Department
SWS:	Solid Waste Services
TNS:	The Natural Step
TSPC:	Trade Services Portfolio Committee
UNEP:	United Nations Environment Programme
UNIDO:	United Nations International Development Organisation
USEPA:	US Environmental Protection Agency
WCED:	Western Cape Department of Education
WESSA:	The Wildlife and Environment Society of South Africa
WHO:	World Health Organisation
WMC:	Waste Minimisation Club

2. *Abbreviations*

ACB:	Accurate Cost Baseline
AM:	Assessment Matrix
APPA:	Air Pollution Prevention Act
ARTS:	Athlone Refuse Transfer Station
B⁺:	Water surplus climate, resulting in significant leachate generation
B⁻:	Water deficit climate, resulting in only sporadic leachate generation
BDR:	Builder's Rubble
BIO:	Bioremediation
BWDS:	Brackenfell Waste Disposal Site
BSWDS:	Bellville South Waste Disposal Site
C:	Communal Landfill
CBD:	Central Business District
CDI:	City Development Indicators
CDM:	Cleaner Development Mechanisms
CFNR:	Cape Flats Nature Reserve
CID:	Central Improvement District
CMU:	Contract Management Unit
COM:	Composting
CP:	Cleaner Production
CPWDS:	Coastal Park Waste Disposal Site
CTR:	Chemical Treatment then co disposal of Residues by landfill
DBI:	Detonation, burning or incineration
DEADP - SA:	Department of Environmental Affairs and Development Planning - Situational Analysis
DS:	Development Strategy
DSW:	Domestic Solid Waste
DWAF- BS:	Department of Water Affairs and Forestry - Baseline Study
DTI:	Department of Trade and Industry
ED:	Executive Director
EET:	Environmental Education and Training
EIA:	Environmental Impact Assessment
EaMP:	Earthship Mission Possible
EMP:	Environmental Management Plan
EMCA:	Environmental Management Co-operation Agreement

ENC:	Encapsulation
ESEMWM SGB:	Environmental Science and Environmental Management and Waste Management Standards Generating Body
ESF:	Equity Strategy Framework
FCA:	Full Cost Accounting
FFS:	Fuel Firing Systems
FWDS:	Faure Waste Disposal Site
G:	General Waste or Landfill for General Waste
GIS:	Geographical Information Systems
GLB+:	General, Large, Leachate generating landfill site
GLB-:	General, Large, Non-significant Leachate Generating landfill site
H:	Hazardous Waste or Landfill for Hazardous Waste
H:h:	Hazardous Waste Landfill that can receive wastes with hazard rating of 3 & 4 and general waste
H:H:	Hazardous Waste Landfill that can receive all hazard ratings of waste
HDPE:	High Density Polyethylene
HNR:	Hydrolyse and neutralise then co disposal of residues by landfill
IBU:	International Business Unit
IDP:	Integrated Development Plan
IMEMS:	Integrated Metropolitan Environmental Management Strategy
IMEP:	Integrated Metropolitan Environmental Plan
IML:	Immobilisation then landfill
IMS:	Integrated Manufacturing Strategy
INC:	Incineration
ISLA:	Internal Service Level Arrangements
ISLP:	Integrated Serviced Lands Project
IT:	Information Technology
IWMP:	Integrated Waste Management Plan
IPWM:	Integrated Pollution & Waste Management
ISLA:	Internal Service Level Agreement
IWEX:	Integrated Waste Exchange
L:	Large Landfills
LDPE:	Low Density Polyethylene
LDV:	Light Delivery Vehicle
LFB:	Landfill ash blend
LFC:	Landfill co dispose
LFG:	Landfill Gas
LFL:	Landfilling not allowed
LSEA:	London Schools Environmental Award
LWT:	Landfilling without treatment
M:	Medium Landfill
M & E:	Monitoring and Evaluation
MAP:	Mean Annual Precipitation
MEC:	Member of Executive Council
MIS:	Management Information System
MRD:	Maximum Rate of Deposition
MRF:	Materials Recovery Facility
MSDF:	Metropolitan Spatial Development Framework

MSW:	Municipal Solid Waste
MTIEF:	Medium Term Income and Expenditure Framework
MWM:	Municipal Waste Management
NEMA:	National Environmental Management Act 107 of 1998
NCR:	Neutralise then co disposal of residues by landfill
NCR1:	Neutralise in landfill trench
NGO:	Non-Governmental Organisation
NTMS:	New Top Management Structure
NWA:	National Water Act
NWMS:	National Waste Management Strategy
NZ:	New Zealand
OCR:	Oxidation then co disposal of residues by landfill
OD:	Organizational Development
ORTS:	Oostenberg Refuse Transfer Station
PAYT:	Pay-As-You-Throw
PCB:	Polychlorinated Biphenyls
PET:	Polyethylene Trichloride
PIC:	Post Industrial Cullet
PPP:	Public Private Partnerships
PRN:	Precipitation then co disposal of residues by landfill
RAD:	Radioactive treatment
RCR:	Reduction then co disposal of residues by landfill
RCY:	Recovery
RDP:	Reconstruction and Development Programme
ROD:	Record of Decision
ROI:	Return on investment
RPA:	Recycling Potential Assessment
RTA:	Release to atmosphere
RTS:	Refuse Transfer Station
S:	Small Landfill
SANS:	South African National Standards
SAP IS UM:	SAP Information System Utility Module
SDA:	Service Delivery Agreement
SDU:	Service Delivery Unit
SEA:	Sea Discharge
SEED:	Sustainable Energy for Environment and Development
SEEDP:	Schools Environmental Education and Development Programme
SG:	Specific Gravity
SME:	Small-Medium Enterprise
SOER:	State of Environment Report
SRTS:	Swartklip Refuse Transfer Station
STO:	Storage
STW:	Sewerage Treatment Works
SWEP:	Solid Waste Enablement Project
SWM:	Solid Waste Management
SWSAM:	Solid Waste Service Assessment Matrix
Tremcard:	Transport Emergency Card
UK:	United Kingdom

US:	United States (of America)
USTDA:	United States Trade and Development Agency
VCCT:	Vissershok City of Cape Town
VWMF:	Vissershok Waste Management Facility
WEEE:	Waste Electrical and Electronic Equipment
WIS:	Waste Information System
WM:	Waste Minimisation
WRAP:	Waste Reduction Awards Programme
WTL:	Weather then co disposal of residues by landfill

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QUALITY VERIFICATION

		TITLE: Contract No. 0098-0103-SUB-TA37, to provide consulting services for the "DEVELOPMENT OF AN INTEGRATED WASTE MANAGEMENT PLAN (IWMP) FOR THE CITY OF CAPE TOWN".		
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QUALITY VERIFICATION				
This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2000, which has been independently certified by Bureau Veritas Quality International (BVQi) under certificate number 72238.				
VERIFICATION	CAPACITY	NAME	SIGNATURES	DATE
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Authorised by:	Project Director	J Coetzee		

Chapter 1 – Assessment Report - Introduction

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Chapter 1 describes the terms of reference and the approach and methodology for the preparation of the Assessment Report for the Integrated Waste Management Plan for the City of Cape Town.

Table 1.1 Project Team

Organisation	Team Member	Role
City of Cape Town: Solid Waste Management Services	W Loots	Project Sponsor
	S Haider	Waste Disposal
	C Hall	Project Leader: Support Services Alternate
	R Josephs	Project Leader: Support Services Alternate
	A van Vuuren	Project Leader: Collection Alternate
	M Kriel	Project Leader: Cleansing Trading Services: Corporate IBU Project Leader
	F Fourie	
	S Morkel	
	C McKinnon	
	K Kaveney	
USAID	N Ndlovu	USAID Project Manager
	S Horn	Mega-Tech Inc: Project Manager
Department of Environmental Affairs and Development Planning (DEADP)	G Arendse	DEADP Representative
Consultant Team	Jeffares & Green	Project Leader
	Ingerop	Technical Leader
	M Ncwadi	Waste Environmentalist
	M Dittke	Environmental Lawyer
	S Dittke	Waste Specialist
	J Hanks	Waste Minimisation Specialist
	C Janisch	Waste Minimisation Specialist
	A Naude	Hazardous Waste Specialist
	Severn Trent Africa	Institutional Specialist
	Ignis Financial Solutions	Financial Specialist
H Wiechers	Review Consultant	

1.1 Terms of Reference

In terms of Contract No. 0098-0103-SUB-TA37, Mega-Tech Inc (MTI) has commissioned Jeffares & Green (Pty) Ltd, in joint venture with Ingeróp Africa (Pty) Ltd, to provide consulting services for the "DEVELOPMENT OF AN INTEGRATED WASTE MANAGEMENT PLAN (IWMP) FOR THE CITY OF CAPE TOWN".

The scope of work for the development of IWMP is set out in Table 1.2 below:

Table 1.2 Scope of the IWMP Study

- ❑ Draft *Status Quo* Report, including review of by-laws
- ❑ Final *Status Quo* Report including Gap Analysis
- ❑ Draft Integrated Solid Waste Management By-law
- ❑ Draft Assessment Report
- ❑ Final Assessment Report
- ❑ Final Draft Integrated Solid Waste Management By-law
- ❑ Draft Integrated Waste Management Plan
- ❑ Final Draft Integrated Waste Management Plan (IWMP) and Stakeholder Communication Strategy

The terms of reference for the Project requires that an Assessment Report be prepared that covers the various solid waste management functions within the Cape Town Metropolitan Area (CTMA), including benchmarking current practices against both international and national best practices.

1.2 Project Team

The composition of the Project Team is shown in Table 1.1.

1.3 Introduction

The Final Status Quo Report (March 2004) describes the current situation with respect to the solid waste management operations taking place within the City of Cape Town. The Final Status Quo Report includes a "gap" analysis that identifies actions, policies and by-laws needing review and upgrading.

Solid waste services provided by the new metropolitan council include the bulk services of the former Cape Metropolitan Council as well as the collection and cleaning functions of the six former municipal Administrations. The role of the private sector in waste management is also described the Final Status Quo Report.

In terms of the Draft National Integrated Waste Management Bill, it is required that the City of Cape Town develop an IWMP that will drive future planning of the City's waste management. The Assessment Report is intended to provide a stepping-stone between the Status Quo Report and the final Integrated Waste Management Plan, and covers the following:

- ◆ An assessment and analysis of the "status quo" situation of the current solid waste management functions within the CTMA.
- ◆ Comparison of the current solid waste management functions against national and international best practices.
- ◆ Identification of the key points to be taken forward into the strategies and plans/policies that will comprise the IWMP.

The development of an IWMP is a requirement of the National Waste Management Strategy and the Draft National Integrated Waste Management Bill, due to be presented to Parliament for promulgation in 2004/2005. The objective of this Study is to develop an IWMP, using a cradle-to-grave approach that incorporates appropriate, affordable and an environment-friendly mix of solutions which will continually reduce the mass of waste requiring disposal and also serve to provide a dynamic framework to manage the City's waste stream effectively based on the waste hierarchy.

In preparing the Assessment Report, the following fundamental building blocks of the of the IWMP are considered:

- ◆ The plan shall identify problems and recommend solutions related to source reduction, recycling, composting, combustion processes, waste transfer and disposal.
- ◆ It shall also recommend waste management objectives and targets in accordance with waste hierarchy and the ultimate goal of waste reduction.
- ◆ Findings, conclusions and recommendations shall be made which address general, hazardous and special solid and liquid wastes. This includes, but is not limited to *inter alia* animal carcasses, medical and healthcare waste, tyres, construction and demolition wastes as well as water and wastewater sludges.
- ◆ The IWMP will embrace the ISO 14000 series and include audits and review with the ultimate goal of ongoing review and assessment, which will lead, to continual improvement.
- ◆ National, Provincial and local environmental legislation and guidelines shall be used to inform the IWMP.
- ◆ Drop-off and buy-back centres, school recycling projects, and community based contracts and partnerships are to be considered.
- ◆ The IWMP is to be approached on the basis of a 20-30 year planning horizon.

References

- 1-1. Jeffares and Green & Ingerop Africa (2004). Final Status Quo Report, Integrated Waste Management Plan for the City of Cape Town.

Chapter 2 – Assessment Report – Institutional Arrangements

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2.2 Status Quo Assessment2-2

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This chapter provides an assessment of the current institutional arrangements of Solid Waste Department and refers to international and local best practices within the context of overarching guidelines.

2.1 Introduction

The creation of a [new] organisational design necessary for the implementation of any strategy or plan is one of the toughest - and most politically sensitive - challenges that the leadership of any organisation faces. Most executives can normally sense when their organisations are not working well, but few know how to correct the situation. Utilising the principles of good design researched across dozens of companies both large and small and observing how executives go about making decisions, we have developed an Assessment Matrix (AM) that will serve as a guideline for further consultation with various officials and role players within the Solid Waste Department (SWD). The AM will facilitate more rational debate, shifting it away from issues of personalities and more towards issues of strategy and effectiveness. At the same time recognition is given to the fact that a history of extreme institutional fragmentation has left a legacy of inequities, which are slowly being addressed through mechanisms of consolidation and the establishment of a common city wide framework for the delivery of equitable services. By its very nature Municipal Waste Management (MWM) must be regarded as an integrated chain of activities consisting of separate, but interrelated elements. Some of these elements are an absolute requirement within the management system and others are optional. Using the AM together with the latest version of the Service Delivery Strategy prepared by SWD and comparing these with local and international best practices, the absolute requirements of the Institutional Arrangements for SWD going forward can be defined more clearly.

2.2 Status Quo Assessment

At the time of preparing the Status Quo Report for SWD, the institutional arrangements had not been finalised, and therefore the actual quantification of "structural gaps" could not be made. This assessment is therefore based on the review of current and historical literature as well as discussions held with City Officials. To facilitate the process, the assessment methodology looks at the principles of good organisational design in order to identify the [preliminary] gaps and needs that must be attended to by SWD in order to adopt and implement an integrated waste management plan. The assessment methodology is also intertwined with local and international best practice guidelines for solid waste management. The Status Quo report concluded that it would be sound practice to accelerate and finalise the following activities, which were still ongoing at the time of preparing this report.

- ◆ The Transformation Team initiative.
- ◆ The IBU review initiative.
- ◆ The final assessment and approval by council of the internal service delivery mechanisms.
- ◆ The finalisation and agreement of the strategic objectives pertaining to the ESF obligations.
- ◆ Determination of political and business priorities.
- ◆ Agreement on a phased approach for the institutional arrangements with specific structural and delivery milestones.

Since the institutional status quo “data set” was limited and without much analytical substance, the assessment report therefore reflects this situation. The lack of substance is primarily a result of the ongoing political scrutiny of all institutional arrangements pertaining to services. National electioneering and the uncertainty arising from the final election outcome have also hampered the process. Acknowledging these constraints, Fig 2.1 illustrates the key areas that have to be included in the sub-strategies comprising the IWMP as identified within the broader assessment framework. These themes also have a bearing on the “final” institutional footprint.

2

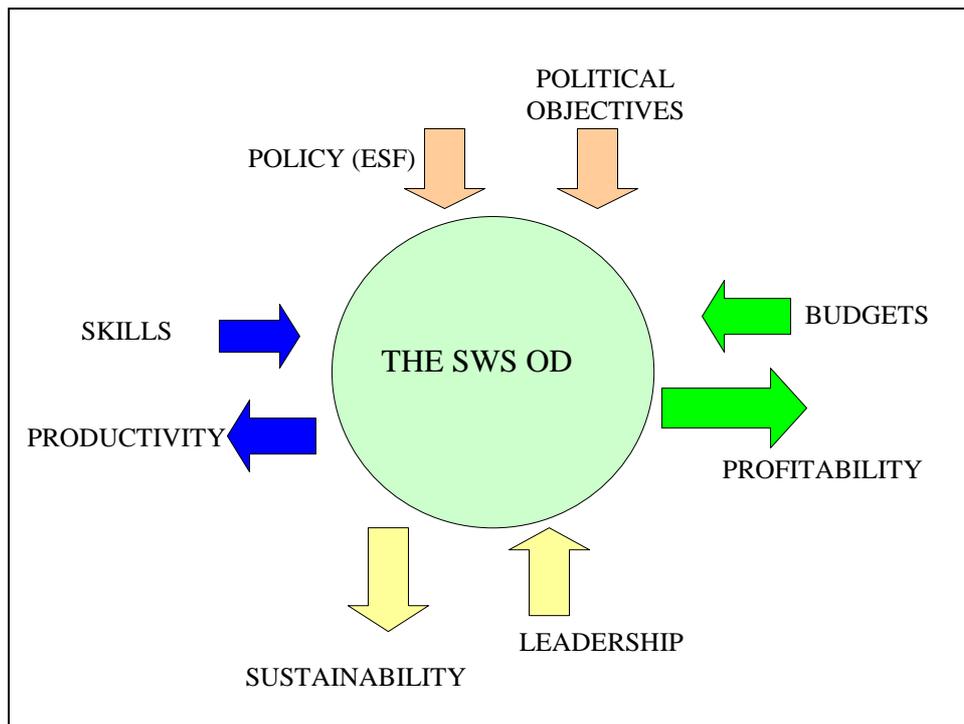


Figure 2.1 Key elements that should be included in the solid waste management and performance system

In view of Figure 2.1, and the key characteristics for Integrated Solid Waste Service Delivery outlined in the SWD document titled “Strategy for Service Delivery - final” the following guidelines must be taken into consideration for the institutional component of the IWMP:

- ◆ A realistic vision.
- ◆ Clearly defined objectives and policies.
- ◆ Access to resources to achieve the vision.
- ◆ Dedicated and visible leadership based on employee and stakeholder trust.
- ◆ The ability to operate within a structurally integrated and empowered institutional framework, which is based on a sound business [unit] model
- ◆ The adoption of sound and practical business systems, which are underpinned by the appropriate business processes including target setting for performance management.
- ◆ The ability to access specialist support services as when required.

- ◆ Compliance with the regulatory principles that may be instituted by a corporate body (e.g. the CCT) and/or an independent authority.
- ◆ A shared commitment to the training and development of the human capital base.
- ◆ Prescribe to a fair and equitable treatment of all stakeholders in the application of policies, procedures and instruments.
- ◆ The business [unit] model should be developed over a period of time, aim to achieve full cost recovery and allow for a sustainable return on the asset base under management.

2

The translation by SWD of the above guidelines into an integrated chain of activities is currently being hampered by:

- ◆ *Management and Staff issues* - placement, geographical deployment and skills training;
- ◆ *The Asset Base* - ageing fleet, low vehicle availability, escalating maintenance costs and the availability of landfill space;
- ◆ *Stakeholder Expectations* - the [huge] anticipation of job opportunities being created in waste management;
- ◆ *The New legislative Framework* - compliance with and the cost impact of the statutes.

By recognising the 'ideal' institutional characteristics on the one side, and the "opposing realities" on the other, and applying the sound principles of good organisational design, we have developed the SWDAM (Solid Waste Department Assessment Matrix), which is presented in Table 2.1. This matrix will ultimately serve as the guiding tool with which to bridge the Status Quo and the future requirements necessary to successfully implement the IWMP.

Table 2.1 A Structural Assessment guideline applied to the SWD footprint

No.	Getting the "Fit" Right	Key Considerations	SWD Gap Assessment	SWD Needs Assessment
1	The Market Advantage Test - Does the structure direct sufficient management attention to your sources of competitive advantage in each market?	<ul style="list-style-type: none"> Does the design fit the market strategy? Does the design direct enough resources to each market segment? Does the design support SWD's key sources of advantage e.g. operating initiatives? List these sources of advantage 	<ul style="list-style-type: none"> Political agenda vs. Commercial/business imperatives exist There are budgetary constraint for the ESF implementation Asset spread (both people and h/ware) are not synchronised Communication with stakeholders is poor Quantification of the ESF gap Community services partnership buy in M& E 	<ul style="list-style-type: none"> The design must deliver on political agenda i.e. ESF and there must be traceability Develop an appropriate financial strategy and funding programme as well as an accurate cost baseline (ABC). Develop an optimal asset deployment strategy match with proper M & E criteria that measures ROI
2	The Parenting Advantage Test - Does your structure help the "corporate parent" add value to the organisation?	<ul style="list-style-type: none"> Explicitly define and list the "parenting positions" in the design - the corporate-level activities that provide real value to the overall business. Determine whether the design gives sufficient attention to these value adding tasks and initiatives. Determine the organisational implication of your strategy. 	<ul style="list-style-type: none"> This element can only be assessed in more detail following the [institutional] assessment of the two major business review initiatives being undertaken 	<ul style="list-style-type: none"> SWD must be able to add further refinements/changes if appropriate SWD needs to develop a proper "parenting model" with value contributions assigned
3	The People Test - Does your structure reflect the strengths and weaknesses of your people?	<ul style="list-style-type: none"> Identify the key players that are critical to the business. The design must provide appropriate responsibility and reporting relationships as well as fostering commitment. Identify the pivotal positions that should be staffed by highly talented individuals. Do you have career path development? Do you have initiatives to create and retain new talent for tomorrow? New designs create losers and losers can turn cynical and resistant to change. Have a plan to deal with this. 	<ul style="list-style-type: none"> A major gap was identified in IR, LR, PMS, skills competency, deployment, productivity, capacitation and accountability. This includes conditions of service Subject to the transformation process, pivotal roles need to be identified Investigate There is a need for a well defined change management project 	<ul style="list-style-type: none"> Develop a skills and competency matrix linked to pivotal roles in the structure Skills development and retention programmes/strategies must be put in place Ensure leadership development throughout the organisation Develop change management competency Define capacity for the Service Operations Centre responsible for ESF implementation
4	The Feasibility Test - Have you taken into account all the constraints that may impede the implementation of your design	<ul style="list-style-type: none"> Identify constraints early on in the design effort e.g.: <ol style="list-style-type: none"> Government regulations Stakeholder interests Information systems Company cultures can limit design choices (check climate/culture by using appropriate survey techniques) 	<ul style="list-style-type: none"> A structural impact assessment is required for the comprehensive implementation of the ESF model. A comprehensive list of constraints should be developed 	<ul style="list-style-type: none"> The design should be flexible so that it can be progressively adjusted to meet the higher levels of the ESF service delivery objectives Autonomous decision making is imperative Overall IR implications need to be fleshed out.

2

No.	Getting the "Fit" Right	Key Considerations	SWD Gap Assessment	SWD Needs Assessment
5	The Specialist Culture test - <i>Does your structure protect units that need distinct cultures?</i>	<ul style="list-style-type: none"> Identify units that need to be "insulated" from the rest of the organisation because of their specialist culture and check for contamination/domination. 	<ul style="list-style-type: none"> The distinct cultural dynamics of the organisation is not known at this time. Any "new" structure would need to be sensitive to this as a potential performance impediment Internalising the gaps identified by the Excelsior Test 	<ul style="list-style-type: none"> There is a need to investigate this dimension more thoroughly with stakeholders in terms of importance Investigate solutions to current management & staff related issues Quantify/define stakeholder expectations
6	The Difficult-Links Test - <i>Does your OD provide coordination solutions for the unit-to-unit or functional links that are likely to be problematic?</i>	<ul style="list-style-type: none"> Does the OD lend itself to self-managed networking among units/departments? Are appropriate dispute resolution mechanisms in place? Have the unit/functional responsibilities been appropriately defined, i.e. broad or narrow? 	<ul style="list-style-type: none"> Internal and external service level arrangements (ISLA) are not in place Associated M & E processes have not been adopted 	<ul style="list-style-type: none"> Unit/functional rules have to be agreed as well as performance standards. This includes rewards, incentives and penalties
7	The Redundant Hierarchy Test - <i>Does the structure have too many parent levels and units?</i>	<ul style="list-style-type: none"> Does your design decentralise decisions to front line staff and retain decisions at upper levels only if they add value? Identify all units and levels above the operating units and test the parenting position (refer No. 2 above). The parenting value of a layer should add at least 10% value to the performance of the units reporting to it (rule of thumb). Use this rule to spot major problems, not minor ones 	<ul style="list-style-type: none"> Can only be assessed/approved once the Transformation review has been completed. Value addition criteria have to be incorporated into the ISLA for better evaluation 	<ul style="list-style-type: none"> Identify parent levels Develop appropriate ISLA's Extend ISLA's to external base over time (phased) Financial implications and accountabilities must be defined/ring fenced
8	The Accountability Test - <i>Does the structure support effective Controls?</i>	<ul style="list-style-type: none"> Identify units with shared responsibility Focus on those where performance is difficult to measure or there are no objective outcomes for comparison. 	<ul style="list-style-type: none"> Subject to the Transformation review process 	<ul style="list-style-type: none"> There would be a need to consolidate shared responsibility Set measurable targets that can be managed
9	The Flexibility Test - <i>Does the structure facilitate the development of new strategies and provide the flexibility required to adapt to change?</i>	<ul style="list-style-type: none"> Prepare a list of at least 10 future opportunities and challenges that are not anticipated in the current strategy but are likely to be encountered by SWD in the next 3-5 years Test whether the structure supports or impedes the pursuit of each? 	<ul style="list-style-type: none"> The new SWD "Vision" document makes reference to 7 known imperatives dictated by Council but does not address issues anticipated over and above these. The current structure bears no resemblance to the shift in service delivery imperatives identified by Council. 	<ul style="list-style-type: none"> There is a need for an appropriate transformation and time dependent [structural] arrangement

2.3 International Best Practice in Solid Waste Management

The international community has set itself the challenge of putting sustainable development at the core of all sectors and policies. A key factor in sustainable solid waste management (SWM) is the role of central government (and sometimes regional/provincial governments) in establishing a policy environment that supports good SWM practices at local level. Within the European Union (EU) the integration of sustainable development and environmental concerns in particular, into sectoral policy making and activity/implementation is encouraged through a variety of measures:

- ◆ Coercive measures - moves to ban or restrict certain activities or sale of certain products that are harmful to the environment.
- ◆ Solid Waste planning - include recycling and waste reduction targets.
- ◆ Regulatory measures - include enabling legislation, standards, permits, licensing and inspections to control activities of certain sectors.
- ◆ Fiscal measures - include environmental taxation, financial and criminal penalties, tax breaks or subsidy reform, which aim to change the price signals in the market place to encourage more environmentally friendly products.
- ◆ Voluntary measures - include voluntary agreements with economic sectors on future environmental performance and the adoption of environmental managements systems.
- ◆ Information measures - include campaigns to raise awareness to help consumers make informed choices such as the promotion of energy saving measures, household waste recycling or environmentally friendly products.
- ◆ Assessment measures - include specific tools, such as environmental assessment, designed to integrate environmental considerations into conventional deliberations.

From an international best practice perspective a combination of these instruments and measures are used to achieve a harmonization of standards, particularly in the area of environmental protection.

However municipal efforts are often focused on expensive “end-of-pipe” measures, those involving the collection and disposal of sold waste, whereas many best practices for SWM improvement are far more accessible and cost effective opportunities involving waste reduction programmes and recycling strategies. Therefore a number of factors must be considered in choosing appropriate technologies for collection and disposal.

Collection: Municipalities often spend as much as 70% of their operating budget on hauling costs alone due to rising transportation costs, outdated, poorly maintained machinery and inefficient collection routes. Experience has shown that private sector SWM costs are 20-40% less than the same publicly provided services and that privatisation of SWM and facilitating the entry of micro-and small-scale providers contributes to the adaptation of “best practices” and appropriate technologies. This type of shift needs to be carefully considered because it usually requires both a decrease in employment (refer World Bank Urban Waste site: Private Sector Participation) and an institutional shift of focus from service provision to oversight and regulation.

Disposal and its alternatives: Planning for the adoption of solid waste technologies, SWM authorities must give consideration to the establishment of interim SWM practices while the planning, construction and implementation of major landfills is in progress, the "importation" of expensive 'end-of-pipe' solutions that add to unsustainable costs in training, repair and site maintenance and finally dump-upgrading programmes together with waste minimisation strategies which may prove to be more cost effective alternatives to expensive SWM site developments.

2

Targeting informal settlements: This process should begin with a consultative, participatory process involving all stakeholders. Community based enterprises, incentives for increased private sector participation and innovative multi sectoral partnerships are often used to implement policy objectives and apply the implementation instruments more effectively.

The following international examples have been drawn from a Solid Waste Management workshop conducted by Dr. Carl R. Bartone of the World Bank, with specific reference to Institutional Arrangements, to demonstrate some of the 'best practice' guidelines outlined above. The research undertaken by Dr. Bartone suggests that successful Urban Waste Management will require more effective institutional arrangements, which will involve the establishments of inter-municipal and inter sectoral coordination mechanisms.

REGIONAL AUTHORITY MODEL - The Southeastern Public Service Authority of Virginia (SPSA) at 2000 tpd:

- ◆ A public corporation created in 1973 to finance, build and operate transfer and disposal systems.
- ◆ It serves a 7 member local government each with a member on a board of directors.
- ◆ 8 transfer stations, 84 transfer vehicles, regional sanitary landfills, RDF and recycling plant, ash landfill and HHH transfer facility.
- ◆ 225 staff
- ◆ Uniform tipping fee of \$26.50 (1989)
- ◆ Investment financed by sale of Bonds

REGIONAL AUTHORITY MODEL - Monterey, Mexico at 3000 tpd:

- ◆ A public company created in 1987.
- ◆ It serves 8 municipalities that directly contract collection.
- ◆ Board comprises governor, 3 mayors and representatives from industry and unions.
- ◆ Operates 3 transfer stations, 28 transfer vehicles, landfills and weighbridges.
- ◆ Tipping fee NP\$52/t at transfer station and NP\$32.50/t at landfill (1995 NP\$6.4:US\$).
- ◆ Financed by World Bank loan

INDEPENDENT MUNICIPAL MODEL - Santiago, Chile 3700 tpd:

- ◆ Each of the 32 communes is responsible for both their own collection and disposal (collection is mostly contracted out by communes).
- ◆ In the case of disposal, service is provided by means of voluntary cooperation.
 - 14 communes created EMERES in 1986
 - essentially a private corporation offering state-of -the-art disposal services to its 14 shareholders and 6 additional communes.
 - Full cost recovery taken by board of mayors where 9 serves on a rotating basis.
- ◆ EMERES has awarded landfill BOT's and concessions for Landfill Gas (LFG) recovery
 - State-of-the-art landfills with composite liners for leachate management.
 - Leachate reticulation for pollution control and greater LFG production.
 - Recover 100m³ LFG per ton of solid waste deposited
 - Recover 200,000 million Kcal/yr.
 - Concessionaire pays EMERES 1/6 of energy sale value.
- ◆ Closed landfills converted to municipal parks.



THE UK/EU EXPERIENCE

A review of the Scoping Report titled *Best Practice for Waste and Recycling in London*, which looked at the availability and applicability to London Waste Authorities of existing best practice guides on a range of waste management activities suggested the following Best Practice Requirements:

Table 2.2 Best Practice requirements

WASTE COLLECTION	CIVIC AMENITY SITES & DIFFICULT WASTES
<ul style="list-style-type: none"> • Kerbside recycling collections • Refuse collection • Materials • Estates recycling • Organics collection • Bring sites • Trade waste recycling • Street cleansing recycling 	<ul style="list-style-type: none"> • Civic amenity sites (re-use and recycling centres) • Bulky waste recycling • Electronic waste recycling • Abandoned vehicles • Hazardous household waste • Fridges • Clinical waste
COMMUNICATION	WASTE REDUCTION & RE-USE
<ul style="list-style-type: none"> • Awareness & publicity • Incentives for waste minimisation & recycling • Partnerships 	<ul style="list-style-type: none"> • Waste reduction (including nappies) • Waste re-use • Home composting • Community composting

The compilation of the above guidance list is based on a review of European and UK legislation and other national and local [UK] drivers including The Mayor of London's Municipal Waste Management Strategy (launched 23rd September 2003).

A further search of Best Practice guidance in each of these categories was undertaken based on the following criteria:

- ◆ Their ease of use.
- ◆ How easy they were to obtain.
- ◆ Their applicability to London.
- ◆ Quality of technical content.
- ◆ How readily the best practice could be reproduced on the basis of information contained in reports.
- ◆ Whether they included potential costs of implementation or time taken to implement, and.
- ◆ Whether they gave guidance as to how to make decisions.

A list of website references covering the Best Practice Guidance reviewed with reference to the London scoping report has been included under the Reference section for further reading.

A gap analysis comparing existing best practice guidance with the guidance required by the London Waste Authority suggested the following set of priorities:

Table 2.3 Priorities for additional Best Practice Guidance support for the London Waste Authorities

AREA	PRIORITY	JUSTIFICATION
Estates recycling in the UK	H	Relevant UK best practice guidance is weak in respect to technical content
Improving Bring site efficiency	H	It is widely believed that bring site efficiency is a simple, low cost method for increasing recycling rates. Good quality best practice is not currently available
Communicating with Householders	H	It is widely accepted that education and awareness are important aspects of a recycling scheme. Significant changes in management of London's waste is anticipated and communicating this to the public will be critical
Partnership working	H	The London Recycling Fund requires London waste authorities to include partnership working in their funding applications. Guidance on how this can be achieved effectively is necessary
Sharing best practice in London	H	There are many best practice discussion groups across London, but a centralised and up-to-date method of sharing this information needs to be maintained
Trade waste recycling	M	Trade waste comprises a large proportion of London's waste and may need to be targeted to achieve biodegradable waste targets. No guidance is currently available

AREA	PRIORITY	JUSTIFICATION
Street sweeping & litter recycling	M	Street sweeping and litter also comprises a large proportion of inner London waste and would need to be targeted for the same reasons as Trade waste. No guidance is currently available
Bulk waste collection/recycling	M	Bulky waste recycling may help in meeting recycling and biodegradable targets without the need for mass treatment. Very little guidance is available
Incentives for recycling and waste minimisation	M	Incentives can be used to improve efficiency and participation once schemes are operational. Once operational guidance will be important
Managing mixed waste collection to optimise recycling and waste reduction behaviour	L	More efficient management of refuse collection can encourage recycling. Best practice on this issue is currently limited
Electronic waste collection & recycling	L	Guidance will not be required prior to EU legislation coming into force.
Hazardous household waste collection	L	London already has a centralised contract for handling these materials. Best practice guidance would be of value but is not seen as a priority

Furthermore a reflection on the evolutionary pattern in the UK solid waste industry shows that profit centred organisational structures hinge on the following process driven activities:

- ◆ Collection and logistics for dry waste;
- ◆ Municipal/local authority contracting;
- ◆ Landfill disposal;
- ◆ Special waste management infrastructures coupled to non-landfill technologies.

Over the years certain operators in the UK have placed an emphasis on strong regional infrastructures under which these 4 distinct operational activities were combined into a single management structure. This has rarely worked even though in many cases the companies developing these solutions span only 2 or 3 of the activity groupings. These failures represent a precedent for a focus on technical/informational knowledge based on the 4 distinct service offerings, which also closely reflect the natural divisions in the market segments.

Furthermore, the importance of a corporate brand should be reinforced through:

- ◆ Corporate identity;
- ◆ Advertising;
- ◆ The provision of a one-stop-shop across divisional services;
- ◆ Brand focused publications of a cross sectoral and geographic nature;
- ◆ Strong brand communication in the context of parliament, legislators, NGO's, voluntary groups and other industry bodies.

2.4 Local Best Practice in Solid Waste Management

In terms of the South African situation, the success of solid waste management policy formulation depends on changes in the behaviour of waste producers and consumers of recyclable materials. The overarching framework established for achieving this is illustrated in Figure 2.2.

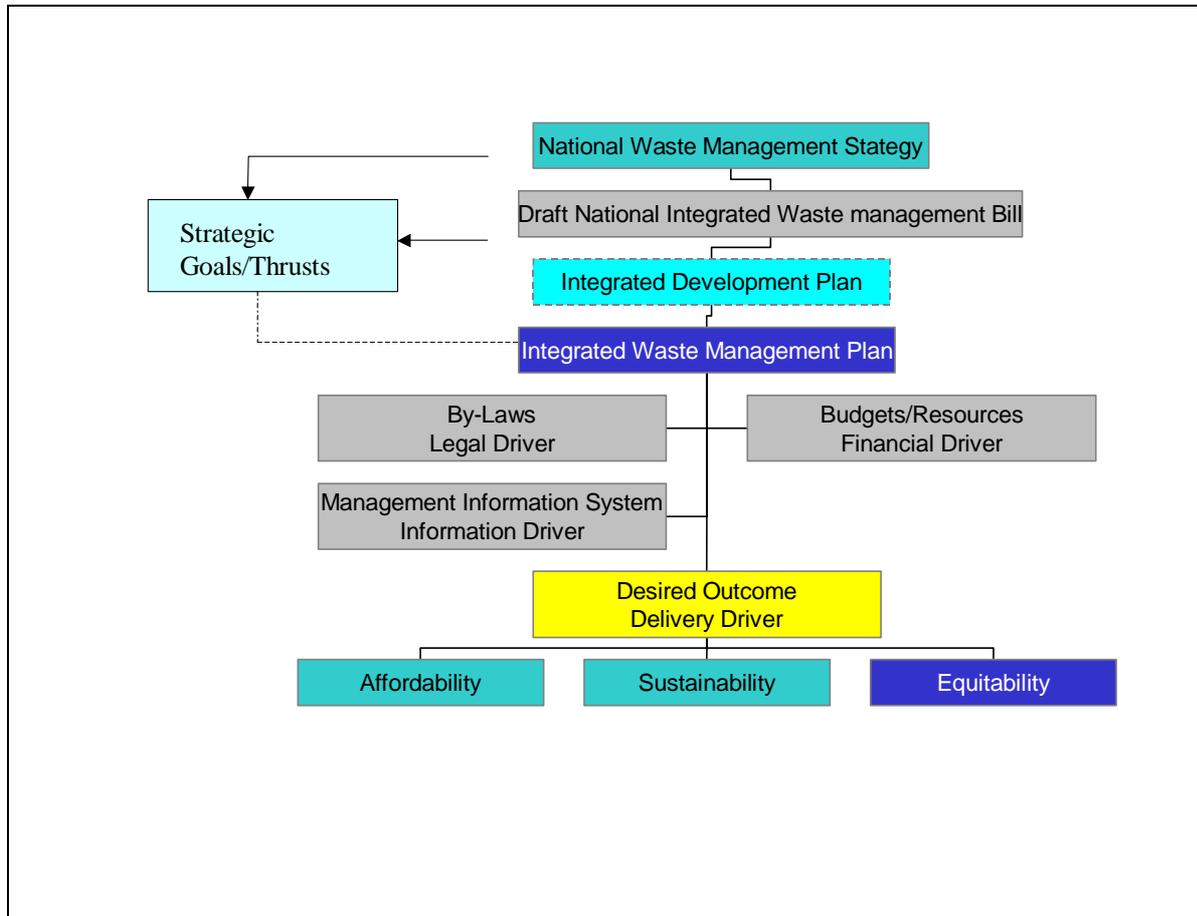


Figure 2.2 Defining an Institutional Arrangement as a function of an integrated legislative and policy delivery chain

Moreover the translation of the above and the ability of authorities to bring about the necessary changes are linked to the implementation of a series of instruments and policies, with specific sub-strategies that require a diverse set of resources and capabilities for effective implementation. Typical instruments include:

- ◆ *Economic instruments*: instruments which affect the market conditions under which people and firms make their decisions, without directly reducing the decision space available to them.
- ◆ *Legislative instruments*: instruments that influence the range of alternatives by means of prohibition, restrictions or obligations.

- ◆ *Communicative instruments*: instruments aimed at public information and education campaigns and the voluntary adaptations of individual and group behaviour in a more environmentally friendly (recycling enhancing) direction. This also includes capacity building of Council staff and politicians.
- ◆ *Organisational/Institutional instruments*: instruments implemented at organizational and institutional levels to ensure that Council has sufficient appropriate staffing and institutional capacity to effect the requirements of the waste management plan.

It is encouraging to note at this point that there are strong similarities between the instruments outlined above and those described for international 'best practice'.

Since South Africa is still in its infancy with respect to the comprehensive roll out and implementation of its National Waste Management Strategy, there are no case studies available that fully embody all the elements shown in Fig 2.2. However the Department of Environmental Affairs & Tourism (DEAT) has recently issued a number of tenders aimed at developing a National Guideline for Waste Standards and a series of "templates" for the development of Integrated Waste management Plans.

The most appropriate local 'best practice' guideline that can be drawn on, is the DANCED ENVIRONMENT CAPACITY BUILDING PROJECT, JOHANNESBURG - A MINI PROJECT ON METRO WIDE WASTE MANAGEMENT PLANNING - A FIRST GENERATION INTEGRATED WASTE MANAGEMENT PLAN FOR THE CITY OF JOHANNESBURG, DRAFT 1, issued APRIL 2002.

The document advocates that the various instruments listed above should be fully adopted for successful implementation, and that the sustainability of the implementing instruments should be measured in terms of:

- ◆ Environmental Effectiveness - The instrument must allow the achievement of goals and targets.
- ◆ Administration and institutional feasibility - The instrument should fit with the existing institutional and legislative framework where possible.
- ◆ Acceptability - The instrument should have sufficient public support.
- ◆ Economic efficiency - The costs and economic consequences of applying the instrument should be acceptable.
- ◆ Equity - The instrument should not affect the lowest income group adversely.

The report also refers to the overarching responsibilities of the City of Johannesburg in respect of waste management to be:

- ◆ Planning
- ◆ Regulation
- ◆ Public Service
- ◆ Monitoring and Control

These responsibilities need to be coordinated, cohesive, planned and prioritised to avoid the fragmentation of management and operations, which inevitably translates into the following institutional dilemmas:

- ◆ No single point of entry;
- ◆ No accountability;
- ◆ A risk of overlap;
- ◆ Complications with budgeting;
- ◆ Delays in training and development;
- ◆ Hampered planning and coordination.

2

In view of these observations a case is made for an organisational structure that is in line with all waste management planning requirements and that clearly defines the tasks of the City of Johannesburg in implementing an IWMP. Because the Johannesburg Council has developed a number of UAC's to operate many of the service oriented functions, the function of the Johannesburg Council has changed to that of a regulator of the UAC's as well as any other private contractor equivalent. Figure 2.3 depicts the high level arrangement for Johannesburg.

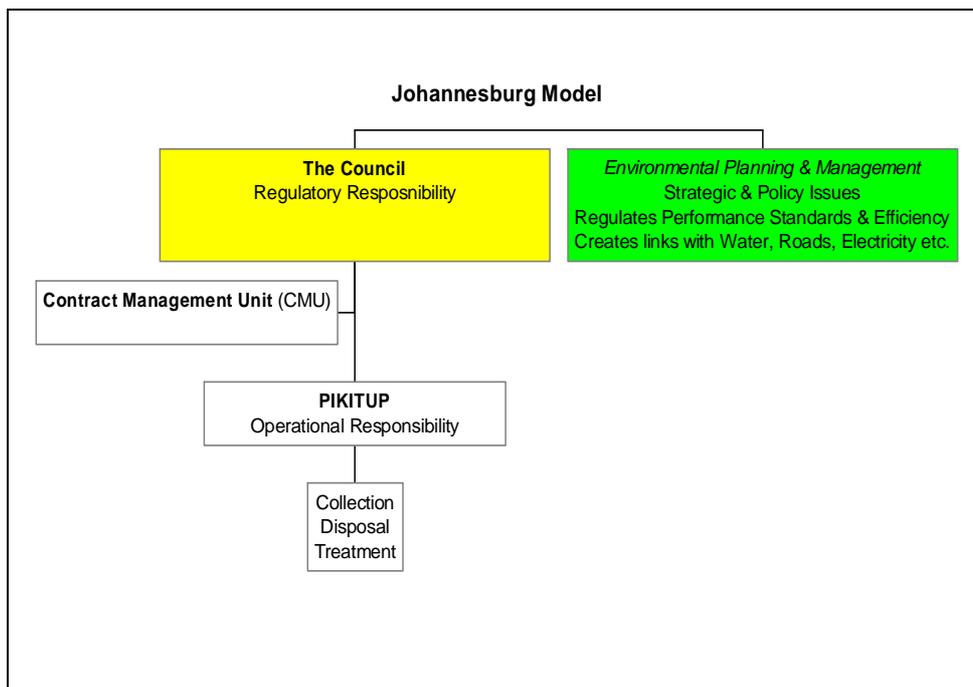


Figure 2.3 High level [institutional] arrangements for Solid Waste Management within the City of Johannesburg

This implies that the waste management planning is undertaken at a central level and that the Council looks to the Contract Management Unit (CMU) to administer the Service Delivery Agreement (SDA) between the Council and the Solid Waste Operator, in this case Pikitup.

The above model highlights several critical considerations in the implementation of the IWMP:

- ◆ The need for the establishment of proper waste management coordination.
- ◆ The need for proper planning, coordination and supervision.
- ◆ The need to institutionalize the planning process.
- ◆ The need to clearly separate regulatory and operational responsibilities.
- ◆ The proper mobilisation of resources.
- ◆ The need for adequately skilled resources to attend to a variety of complex challenges derived from the four main tasks to be undertaken by the council.

The following table is an extract from the Draft IWMP report for Johannesburg outlining the estimate for waste management resources required for the development and implementation of an IWMP.

Table 2.4 Indicative allocation of staff across the four key tasks of the Johannesburg Council

Function	Qualification/task	Proposed Council structure	Min. No. of staff suggested	Max. No. of staff suggested
Regulation	Manager, Inspectors (illegal dumping, monitoring of service, etc., field assistants, admin officers).	1	5	7
Planning	Specialist team (technical, environmental, developmental work, community contract specialist, data capturers, admin officers)	2	4	7
Public service	Complaints officers, education officers/public information officers, waste minimisation and recycling officers	2	2	2
Monitoring & Control	Environmental officers, inspectors, manager	1	2	3
Total		7	13	19

As a barometer of how the above numbers compare with international standards, the solid waste “contracting model” of the City of Copenhagen, which closely resembles the Johannesburg Model, employs 16 staff in waste management for a populous of 500,000 people, which is a 6th of that of Johannesburg. An extrapolation suggests that Johannesburg should have a minimum of 36 staff.

2.5 Observations

Although the status quo assessment has been hampered by a lack of 'empirical' data, information gleaned from available reports and discussions with SWD officials, has been instructive in formulating a number of key observations pertaining to the assessment of the institutional aspects of SWD. Detailed commentary has been presented in sections 2.2-2.4, using a number of guideline methodologies considered appropriate in structural analysis and assessment of institutional arrangements. These observations are presented in Table 2.5.

Table 2.5 Key observations pertaining to the assessment of institutional aspects of SWD

Institutional Dimension	Observations
Institutional Structures	Create more linkages and working/service delivery partnerships with political structures, sectoral players (e.g. private business) and communities.
Organisational Procedures	Clearly define pivotal roles and responsibilities of Council and SWD respectively e.g. to assess scope for outsourcing.
Current Capacity	Improve issues surrounding labour placement, labour unions, training, productivity, location, organisational climate and morale.
Future Capacity development	Match available capacity with actual needs within all sectors of society.
Private Sector Participation	Research and then pursue cost efficient partnership models vigorously and take lessons from international experiences. Pioneer and cultivate twinning arrangements with the private sector. There is scope for creativity.

In reviewing the international and local [best] practices, albeit limited, additional observations can be added:

- ◆ There is a high degree of convergence in terms of priorities.
- ◆ The implementation instruments available to solid waste management are very similar.
- ◆ Best practices merely serve as a guideline, but in many instances these still need to be developed, even in the advanced economies.
- ◆ The pressures brought to bear by informal settlements on solid waste management in developing countries are far greater than in developed economies.
- ◆ There is an acknowledgement that private sector participation is not necessarily the panacea to solid waste management, but experience has shown that private sector costs for SWM are 20-40% less than the same public provided services.

- ◆ Waste generation is growing (and in developing countries there is a direct correlation with economic growth, a relationship that has become less obvious in the EU) as well as the sprawl of informal settlements around economic corridors. The latter may not always conform to spatial development plans.
- ◆ Landfill airspace is diminishing and establishment costs are becoming prohibitive.
- ◆ Effective SWM, particularly when targeting informal settlements, must begin with a consultative, participatory process involving all stakeholders from slum residents and the informal trash workers to the municipal government and the private sector.
- ◆ It has been found that community based enterprises; incentives for increased private sector participation and innovative multi-sectoral partnerships are often used to more effectively implement policy objectives such as waste minimisation initiatives.
- ◆ Disposal costs are escalating in view of new legislative requirements.
- ◆ The Business Architecture is fragmented.

The following conclusions can be drawn from the assessment phase:

- ◆ A clean environment has become a very high priority for the City of Cape Town. This has been reflected in the ESF and by the political leadership through their list of strategic imperatives. However there is a need to gain political consensus and agreement around a realistic vision and clearly defined objectives and policies for IWMP implementation.
- ◆ There are various strategic drivers and shifts that have to occur to meet the new ESF challenges and the clear separation of regulatory and operational responsibilities is imperative.
- ◆ In recognition of the IBU initiatives, there is a need to separate the activities of:
 - Collection and logistics for dry waste;
 - Collection and logistics of commercial/domestic waste;
 - Landfill disposal;
 - Special waste management infrastructure coupled with non-landfill technologies.
- ◆ The collection of dry waste and special waste should be handled by the private sector, but regulated by the CCT.
- ◆ Consideration should be given to greater involvement of the private sector in the collection of commercial/domestic waste and the operation of landfill sites, but again regulated by the CCT.
- ◆ A move to full cost recovery linked to a sustainable return on assets should be initiated and a set timeframe agreed to achieve this goal.
- ◆ There is no ultimate organisational design that can be developed on paper that will close the many gaps that exist at this point. In fact an evolutionary process is highly recommended whereby the institutional arrangements are sufficiently flexible to accommodate both the demands of the strategic imperatives and the need to progress along the waste minimisation curve.
- ◆ A resource efficiency culture has to be installed and maintained at all times.
- ◆ SWD must be empowered to implement the available policies and instruments described herein to match its strategic footprint with the service delivery footprint. This cannot be achieved within fragmented business architecture.

2

- ◆ SWD must commence with a definition of its waste reduction targets as a function of time. These targets must be aligned with the proposed phased institutional transformation.
- ◆ The assessment suggests that there is an immediate need to stabilise SWD through a process of consolidation and rationalisation involving staff, management, reporting lines and accountability. This may take the best part of 12-18 months.
- ◆ The stabilisation phase should be followed by the rationalisation of the asset base (depots & facilities), a reform of internal and external processes and delivery mechanisms and the active development of partnerships. This may take the best part of 18-48 months post stabilisation.

Figure 2.4 depicts how the collective components of the business should integrate into the delivery of a successful IWMP.

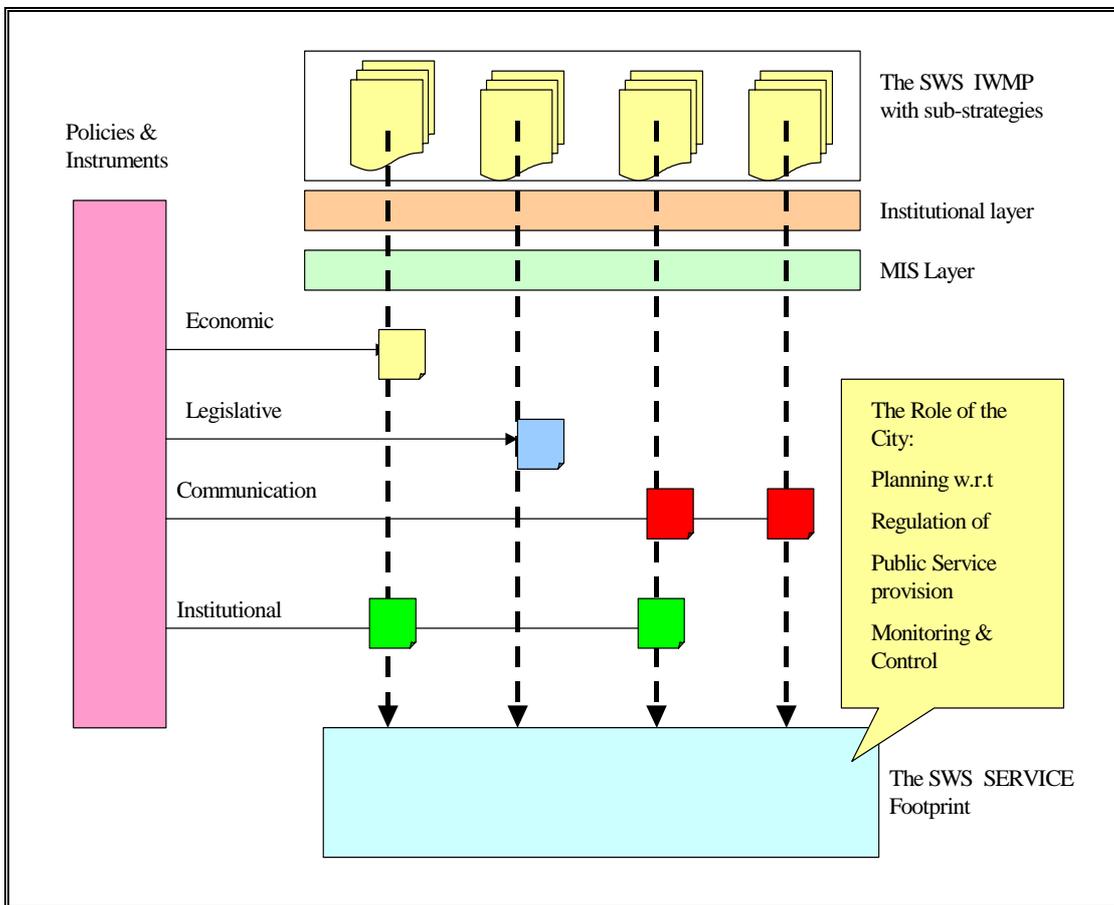


Figure 2.4 A high level conversion of the IWMP in relation to the key drivers

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Chapter 3 – Assessment Report – Financial Arrangements

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This chapter provides an assessment of the current financial arrangements of Solid Waste Department.

3.1 Introduction

The financial assessment of any organisation can only be undertaken within the context of that organisations current existence and future strategies and objectives. The assessment of the Solid Waste Department (SWD) of the City of Cape Town is no exception. As it is the intention of this study to develop the Integrated Waste Management Plan ("IWMP") for Solid Waste, the assessment must focus on comparing the status quo to an initial assessment of what the full IWMP may contain.

3

3.2 Guiding Principles

The financial assessment of an entity, particularly as single purpose non-profit organisation, must consider a number of principles which should guide the financial structure of the organisation. These principles include:

- ◆ **Organisational Structure** - The financial arrangements will often follow the organisational structure and intent. An organisation that is output focussed with clear specifications that require achievement will need a financial arrangement that supports those objectives, with a focus on providing the means to achieve these. An organisation that is more of a cost centre or one with externally determined revenues may have a financial system that is focussed on prioritising and cost-cutting to achieve the most it can within its available resources.
- ◆ **Sustainability** - The long term financial health of the organisation should be another guiding principle of a long-term capital intensive organisation such as Solid Waste. Long term operational planning should complement the financial ability of the organisation to fund its future plans.
- ◆ **Matching** - The third principle is one of matching. This principle applies in a number of areas, including matching sources and types of revenues and with the costs, of the services provided, matching operations with their full, but not allocated, costs existing cost structure (including cost of funds and management) and matching costs to the time periods to which they applied in providing services;
- ◆ **User-pays Principle** - The principle is that of the user pays. This principle is difficult to apply in the context of a "public good" but should be considered for all other services, even where rebates may be applied to indigent or low income users, to know the true cost of the service provided. The user pays principle also applies across the life of assets to ensure the acquisition of new facilities for future service provision is not borne by current users.
- ◆ **Risk** - The final principle is the establishment of a financial system that addresses the risks of the organisation. The treatment of risk is of identification, quantification, mitigation and then allocation, the latter to the party best able to manage the risk. The financial system should support the wider organisation in risk management.

3.3 Revenue

A review of the revenue collection for 2004/05 shows approximately 60% of revenue is from refuse collections and is service driven. The balance however is from valuation derived rates assessments and bears no relation to the service provided. This breaches the matching and user-pays principles, as well as creating a risk situation where revenue and cost of service provision move in different directions.

Revenue is also affected by the political environment and the socio-economic objectives which this environment aims to achieve. Therefore whilst Solid Waste is subject to increasing cost pressures due to the need to extend services, complying with increasingly demanding environmental legislation and sourcing new landfills further away from the City, there have historically been limited opportunities to increase revenues in line with the real cost drivers. This threatens the long term sustainability of an independent service unit committed to meeting output specifications.

Completeness of revenue is another area for attention. Revenue completeness needs to focus both on including all properties in respect of valuation-based revenue and ensuring all services provided are charged for. Revenue collection needs to ensure accuracy of measurement systems and efficacy of financial controls to ensure revenue due is charged and collected.

Consideration also needs to be given to revenue generation from existing free services and possible new commercially-driven services.

3.4 Costs

An assessment of the costs structure highlights the following features:

- ◆ **Salaries & Wages** - These currently comprise approximately 34% of the total cost structure for 2004/05, up from less than 29% four years ago. The proportionate cost will need to be considered against local and international best practice in developing the plan;
- ◆ **Allocated costs** - Allocated Costs, primarily management and corporate service costs over which Waste Services has no real control, comprise 23% of the costs for the 2004/05 financial year. In 2003/04 this amount was increased by a proportionate allocation of bad debts of R50m; a similar allocation in 2004/05 will push this cost allocation to 29%;
- ◆ **Bulk Costs** - Bulk costs have increase by 148% in the past two years and will have to be considered carefully in the IWMP; and
- ◆ **Contribution to capital** - In 2003/04 a contribution to the cost of capital was levied on each of the operating services for the first time. Whilst this is currently an allocated internal charge, this would be a real cost for an independent self-funding entity.

3.5 Capital Expenditure

Capital expenditure is the area which exhibits the greatest threat to compliance with the principles of good financial planning. As shown in the status quo report, required capital expenditure over the next few years is in excess of R500 million, including an estimated R120 million required for 2005/06. Funding an amount of this would require a 28% increase in the revenue planned for this year. An even greater need, not included in the planned projects and only likely to be finalised in the IWMP, is that for a new regional landfill with life-cycle costs estimated to total R9 billion.

The current approach to funding capital expenditure breaches the matching, sustainability and user-pays principles as well as creating a risk situation of not been able to fund the required facilities to meet the requirements for rehabilitation of existing landfill sites and the establishment of new sites.

3.6 Assessment Overview and Summary

GAPS	NEEDS
Organisational Structure	<ul style="list-style-type: none"> The restructuring of the institutional and financial arrangements of the Solid Waste Directorate is long overdue and requires urgent attention.
Revenue Review	<ul style="list-style-type: none"> Review of strategies for revenue completeness is required to ensure that services provided are paid for. Consideration needs to be given to revenue generation from existing free services and new commercially driven services.
Data Collection / Information	<ul style="list-style-type: none"> Revenue collection needs to ensure accuracy of measurement systems and efficacy of financial controls.
Costs Review	<ul style="list-style-type: none"> Increased salary and wages costs need to be analysed against national and international best practice. Allocated (management and corporate service) costs require proper control mechanisms. Bulk costs have risen by 148% in two years, and will need to be carefully considered in developing the IWMP.
Capital Costs	<ul style="list-style-type: none"> The current approach to capital funding breaches matching, sustainability, and user-pays principles and will require careful forward planning and implementation.
Performance Indicators and performance monitoring	<ul style="list-style-type: none"> The City needs reliable performance indicators to measure effectiveness of its service delivery mechanisms for the purpose of effecting improvements where they may be necessary. Procedures to monitor performance at all levels are required.

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Chapter 4 – Assessment Report – Waste Minimisation

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This chapter provides an assessment of the current policy interventions for waste minimisation for the CCT and reviews international best practice for waste minimisation and recycling.

4.1 Introduction

4

The aim of this Chapter is to identify the main policy considerations relating to waste minimisation and recycling that will be carried forward into the development of the strategies, policies and action plans making up the Integrated Waste Management Plan (IWMP) for the City of Cape Town. The Chapter provides an assessment of current policy options within the City of Cape Town aimed at promoting the prevention and source reduction of waste (followed by the more widespread and cost-effective reuse and recycling of waste as stipulated by the waste management hierarchy in the National Waste Management Strategy (NWMS) Action Plan documents). This assessment is based on the earlier conducted *Gap and Needs Analysis*, as well as on a review of international best-practice of relevant integrated waste management policy measures. This initial assessment will serve as a basis for further discussion with the City of Cape Town on the future contents of the IWMP, and will also form part of the stakeholder consultation process, after which the relevant components of the IWMP will be finalised.

This Chapter has the following aims and objectives (and is structured accordingly):

- ◆ To summarise the IWMP key policy needs, based on the findings of the earlier *Status Quo Review* and the subsequent *Gap and Needs Analysis*
- ◆ To review and evaluate international and local policy best-practice relating to the promotion of waste minimisation and recycling activities
- ◆ As the result of the findings above, to provide an initial assessment of the implications of the needs analysis and the best-practice review for the development of strategies and policies underlying the City of Cape Town IWMP

4.2 Status Quo Assessment

On the basis of the *Status Quo Review* of waste minimisation and recycling initiatives in the City of Cape Town the subsequent *IWMP Gap and Needs Analysis* identified a number of specific needs that should be addressed if waste minimisation and recycling measures are to be implemented effectively throughout the City. This *Gap and Needs Analysis* was informed by the underlying strategic objective of reducing the overall volume of all wastes generated, handled and disposed of, with the principal focus being on prevention of waste at source. With the aim of meeting this strategic objective, the following five sets of general needs were identified (in no specific order):

1. To develop and implement *regulatory and co-regulatory policy instruments*
2. To develop and implement an appropriate *framework for economic instruments and socio-economic/environmental incentives and disincentives*
3. To develop and provide effective *information systems, awareness raising education and training* initiatives within all spheres of community (domestic, commercial and industrial) and government
4. To improve the availability and accessibility of *appropriate waste management infrastructure*

5. To develop *effective co-operation and partnership initiatives* with other public and private sector bodies

The above five sets of issues formed the basis for the IWMP *Gap and Needs Analysis*, the key elements of which are briefly summarised below.

4.2.1 Need for Development and Implementation of Regulatory and Co-Regulatory Policy Instruments

An important constraint currently hindering the more widespread adoption of waste minimisation and recycling - at domestic, commercial and industrial level - is the lack of sufficient incentives resulting from an inappropriate regulatory and co-regulatory policy framework. The following policy instruments have been identified from both a local and (inter) national sources as key strategy instruments for the successful promotion and implementation of waste minimisation.

- ◆ Setting clear targets e.g. for waste minimisation and recycling in Cape Town, having due regard for targets stipulated in the NWMS and the Polokwane Declaration (latter includes a commitment for a National plan for zero waste by 2022); such targets should be based on a credible scientific and economic assessment of the opportunities and feasibility for cost-effective minimisation and recycling
- ◆ Implementing regulatory measures that facilitate and/or require domestic, commercial and industrial waste generators to minimise and/or separate waste at source
- ◆ Introducing extended producer responsibility measures to local industry and commerce with the aim of influencing the type (design) and amount of product packaging in order to minimise the production of potential wastes at source. Whilst such policy measures may be largely beyond the regulatory mandate of the local authority, the CCT has a role to play in lobbying other policy-makers, as well as potentially entering into *voluntary industry commitments* such as Environmental Management Co-operation Agreements (EMCAs)¹ with affected companies².
- ◆ A significant gap identified during the *Status Quo Review* relates to the lack of readily available information to assist in prioritising the key industrial waste streams and in identifying the most effective opportunities for waste minimisation and recycling. Mandatory waste minimisation audits and reviews (e.g. as part of existing permits) are therefore strongly recommended.
- ◆ Promoting environmental procurement requirements and public awareness campaigns to stimulate the market for recyclables.
- ◆ A need for the integration by-laws extending to Provincial and National areas have also been communicated by Government Authorities.

¹ In terms section 35(1) of the National Environmental Management Act, “the Minister and every MEC and municipality, may enter into environmental management co-operation agreements with any person or community for the purpose of promoting compliance with the principles laid down in this Act”.

² Various examples of mandatory and voluntary EPR initiatives that could inform initiatives in CCT are outlined in Appendix

4.2.2 Economic Instruments and Socio-Economic/Environmental Incentives and Disincentives

- ◆ Developing/Increasing the financial incentive for waste generators to reduce or recycle waste, for example through "pay-as-you-throw" policy measures but also through the development of an airspace credit scheme that pays out relevant parties accordingly to the contribution they make in preserving future landfill site airspace.
- ◆ Developing non fiscal but rather social and environmental incentives for waste minimisation measures e.g. by providing "wastewise" schools and communities with municipal compost for food gardens or establishing "waste to food schemes" in poorer communities has also to play an important role for the future IWMP.
- ◆ Investigating opportunities for other economic policy instruments, such as a landfill tax, product taxes, deposit refund schemes (e.g. airspace credits), and financial incentives for waste collectors
- ◆ Identifying and addressing currently existing disincentives (e.g. within the current rates structure) that constrain public incentive for waste minimisation or recycling
- ◆ Improving and optimising human, financial and technical waste management resources for the City of Cape Town.
- ◆ Development of an independent waste minimisation/recycling fund from revenue that is raised e.g. through a percentage of the disposal levies.
- ◆ The implementation of harsh penalty fees and other clearly felt "disincentives" are crucial instruments to fight bad personal behaviour and attitudes e.g. towards prolific littering and dumping of waste or non-payment of waste levies.

The effective implementation of regulatory measures is often undermined by the lack of required waste information, the failure to communicate within and between local authorities, frequent changes in political priorities and budgets, poor levels of co-ordination between municipal departments, and insufficient consultation with local stakeholder groups. Some of these concerns are addressed below.

4.2.3 Information, Awareness Raising, Education and Training Initiatives

A significant gap identified during the *Status Quo Review* relates to the lack of readily available information to assist in prioritising the key waste streams and in identifying the most effective opportunities for waste minimisation and recycling, both upstream (e.g. amongst packaging producers) and downstream (e.g. in households and amongst recycling entrepreneurs). This gap is further compounded by a frequently evident misunderstanding amongst some policy-makers regarding the meaning of terms such as "waste minimisation", "reuse" and "recycling," including in particular, for example, a tendency to equate re-use and recycling with waste minimisation.

Recognising these gaps, there is seen to be a need firstly for the City of Cape Town to produce a regular *State of Waste Report*,³ and secondly for provision to be made within the provincial *Waste Information System* (WIS) for specific information needs relating to waste minimisation and recycling. In terms of the provincial WIS it is suggested that the following broad information needs should be specifically provided for in the design of the WIS:

- ◆ Establishing the quantity, type, quality and sources of materials currently being recovered for recycling and locally recycled;
- ◆ Describing the type and number of formally (and informally) operating recycling facilities; the identified recycling facilities should be described for each industrial sector, local authority, region or province, as follows:
 - Commodities recycled (e.g. waste paper, metal cans and glass)
 - Existing recycling facilities (location, capacity, treatment, age, etc.)
 - Existing collection methods of reusable materials (area served, waste type, quantity, collection method and frequency), including data on informal collection and recycling
 - Processing of collected material (at source, at the recycling company or anywhere else inter/nationally)
 - Nature and financial dynamics of buying/selling markets for recycled materials and compost
 - Recycling costs
 - Infrastructural requirements required to recover and recycle waste materials
- ◆ Informing potential feasibility and cost/benefit analyses of alternative waste minimisation options within particular industry sectors. Ideally the information generated in the provincial WIS should be able to inform the implementation of integrated resource management plans (e.g. with provision for waste and energy saving opportunities), rather than focussing solely on waste issues in isolation.
- ◆ At present, reliable information measuring the true benefit of waste minimisation is missing and needs to be provided to decision makers. There is a need also to collect specific information on existing waste minimisation activities and their effect on minimising waste, as well as a need for companies to establish their resource consumption baselines in order to assess waste minimisation potential.
- ◆ *Eco-labelling* and the request to manufacturers for the mandatory provision of *waste fact sheets* with the comprehensive listing of ingredients in products (e.g. the chemicals contained in household cleaners, paints, batteries etc.) can go a long way to reduce the negative environmental impact of many waste types such as Household Hazardous Waste and create consumer awareness at the same time. Cape Town Solid Waste can educate its clients by listing product types creating toxic waste information and describing their "life cycles" on the existing website. Industrial voluntary agreements such as EMCA's provide a platform for Local Authorities to work in partnership with manufacturers in order to improve product specification might even lead to product redesign.

International and local studies have consistently highlighted the extent to which a lack of information and understanding (amongst consumers, households, business and industry, governments) of the benefits and opportunities associated with waste minimisation and

³ This proposed *State of Waste Report* should feed directly into the provincial WIS, and should benchmark and assesses Cape Town's current waste loads, identifying potential "low hanging fruit" for waste minimisation options. The report would be similar to the recently compiled *State of Energy Report*.

recycling activities have constrained the cost-effective achievement of desirable waste management outcomes. While the recent *Status Quo Review* identified some valuable existing initiatives within the City of Cape Town, it is evident that there remains significant scope to improve the level of understanding and awareness – amongst regulatory officials and the general public – of the benefits, opportunities and techniques associated with waste minimisation and recycling. Possible activities (aimed at commercial, industrial and domestic users) include:

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- ◆ More effective dissemination and sharing of information between and within local authorities on e.g. on existing library databases, waste minimisation success stories, best-practice case studies and typical industry sector specific resource consumption “baselines” combined with training on how to emulate and even exceed existing project successes.
- ◆ Provision of technical training to build capacity within local authorities on the techniques and practical opportunities for waste minimisation in key industrial sectors. Regular public reporting from Authorities e.g. on waste minimisation performance progress and achievement of waste reduction targets is crucial should be done in form of a State of Waste Report (similar to the City’s annual “State of Environment Report (SoE) and the recently published State of Energy Report)
- ◆ Establishment of new waste minimisation clubs and the extension of existing clubs to other sectors/location areas, with the goal that they ultimately all become commercially viable in the shortest possible time without the need for any future financial support from government
- ◆ Encouraging public demonstration projects and showcasing existing success stories for specific sectors and/or waste streams aimed at highlighting the potential for win-win environmental and economic benefits as well as enabling meaningful public participation in the development of local waste strategies
- ◆ Increasing awareness within households on the benefits and opportunities for waste minimisation and recycling, particularly in more affluent communities with higher waste generation, building on the successes of previous initiatives ⁴.
- ◆ Supporting hands-on training programmes for collectors and entrepreneurs who are willing to improve their sorting and collection skills
- ◆ Providing practical outcome-based training and education within tertiary institutions, not only within engineering departments, but also at a multi-disciplinary level, including e.g. subjects related to product design, policy-making, and finance
- ◆ There is a need to ensure the incorporation of waste minimisation and recycling education into existing and new programmes as well as curricula of primary & secondary schools. This could be a key aspect of whole-school policy programs such as the already locally existing Eco-schools programme or a special aspect of environmental education at schools level.

4.2.4 Ensuring Availability of Appropriate Infrastructure

An important further need that was identified is the need to improve the availability and accessibility of waste management related infrastructure, as a means both of stimulating

⁴ Such as the Yellow Bag programme that is run successfully in Marina da Gama, Cape Town

increased recycling and waste minimisation practices, as well as meeting any potential increase in demand for recycling. The City administration has an important role to play, both in directly providing some of the required infrastructure, as well as in ensuring an appropriate environment that is conducive for other players to develop the infrastructure, either themselves or in partnership with the local authority. Specific needs identified on the basis of the gap analysis include:

- ◆ Increasing the number of Council-operated and privately-driven drop-off/sorting points, as well as establishing more collection and composting facilities for food and garden waste
- ◆ Provide separate waste collection facilities and increase door-to-door collection of separated waste streams from households; this includes providing bins/bags to enable source separation, and the collection of separate wastes (especially glass, paper and plastics).
- ◆ Promoting waste recovery for recycling at source and sorting facilities in new residential and retail developments
- ◆ Supporting the establishment of new (and already approved) collection sites, for example by providing land for drop-off points and necessary required infrastructure
- ◆ Maintaining and expand website based “waste exchange programs”
- ◆ Establish local “swap shop venues” for the communities where people can exchange or buy unwanted goods from each other
- ◆ Establishing and (co-) financing a wash plant to facilitate more plastic recycling.

4.2.5 Co-operation & Partnerships

In meeting the above four sets of needs, there is evident scope for the City Council to partner with other agencies and organisations - from the public and private sectors - so as to maximise the impacts of educational, infrastructural and other activities relating to waste reduction and recycling. The following co-operation and partnership needs have been identified:

- ◆ A regional organisation should be established comprising independent local authorities working together and exchanging best-practice information on waste min and recycling.
- ◆ There is scope for the City to increase public volunteer participation on waste issues by involving volunteers (including youth groups) in more activities to support the IWMP. Volunteers could be entered in a database which is regularly updated to be able to utilise voluntary initiatives and human resources to a maximum.
- ◆ There are seen to be various creative opportunities for more formal engagement of those from the City’s poorer community’s who currently scavenge and segregate wastes from household bins on an informal basis; such persons could form part of an initiative aimed at promoting and facilitating domestic waste segregation by formally involving them in collecting, (if necessary sorting) and delivering wastes to local satellite collections points for which a small fee (or other form of non-financial benefit) is provided.
- ◆ There is a need for increased partnership activities with local business and industries aimed at encouraging waste minimisation, both directly as waste generators, and indirectly as designers, manufacturers and distributors of products; this includes

participating in waste minimisation clubs, as well as assisting in initiatives aimed at providing accurate and relevant information (e.g. through product eco-labels) so as to facilitate recycling activities.

- ◆ Public utilities should coordinate their efforts with local economic development initiatives to create incentives for local recyclables manufacturing and processing and to encourage the development of markets for recyclable materials; local market development reduces the impacts associated with transportation and stimulates opportunities for local development.
- ◆ Available learnerships (e.g. such as provided through SETAs) and internships available for Solid Waste issues need to be identified and better utilised. (See also Chapter 9).
- ◆ There is a clear need to promote and stimulate Public Private Partnerships e.g. to facilitate and “outsource” service delivery functions such as waste collection, running public Drop Off sites, sorting of recyclables, composting etc. through members of communities and/or by private business.

4.3 Review of International Best-Practice

Having identified the key gaps and needs within the City of Cape Town, a detailed desktop study was undertaken of the waste management policies of the following countries and political regions: Belgium, Brazil, Denmark, Germany, India, Sweden, Switzerland, The Netherlands, The Philippines, United Kingdom, USA, the European Union and the US States of California and Massachusetts. In addition to the general review of local authority activities that was encompassed in the above studies, specific focus was put on researching the waste management activities of the following cities: Auckland and Christchurch (New Zealand), London (United Kingdom), Seattle (United States), and Curitiba (Brazil).

This review of best-practice identified and assessed the impact and general implications of the different types of policy intervention that are being used in each of the various regions. An overview of these different policy interventions is provided in Table 6.1 (below), using a similar set of broad categories of activities that were developed in the *Gaps and Needs Analysis* (and presented above). A more detailed description of each of these policy interventions is provided in Appendix 1, which includes practical examples of the implementation of these policies in the different regions.

On the basis of a brief analysis of the successes, failures and main challenges associated with the various policy interventions within each region, a number of *key implications for the development of the waste minimisation and recycling components of the IWMP* for the City of Cape Town have been identified. These key implications - outlined in the next section - will form the basis for discussions with key officials from the City of Cape Town, as well as providing input into the public participation phase as part of the IWMP development process.

4.4 The Needs Analysis and Best-Practice Review: Implications for the IWMP

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The international review suggests that the City of Cape Town is faced with a waste management situation similar to that faced by most of the municipalities and regions that were reviewed, namely the need to *substantially* reduce the volumes of waste going to landfill. While a number of the studied regions have achieved valuable improvements in their waste minimisation and recycling rates,⁵ there is almost universal recognition amongst the policy-makers in these regions that there remains significant opportunity for improvement and that in most instances insufficient policy attention has been given to promoting waste minimisation at source.

It is suggested that, under current circumstances, a business-as-usual approach in Cape Town's waste management practices would continue to increase with a minimum of 6%-7% annually as it has done in the last three years according to the State of Environment Report). Historically the typical approach to addressing waste management concerns has often been to mandate improved/quick fix "end of pipe treatment" technology such as waste incineration which is expensive, has been associated with environmental and human health problems and does not impact at all on actual waste generation rates but only on the volume of remaining waste to be landfilled). It is also common practice to introduce more stringent treatment and disposal standards, and to undertake awareness-raising initiatives aimed at business and households.

While such policies have some important benefits, on their own they are unlikely to reduce waste generation at the rate that is needed to address concerns relating to landfill availability, particularly in the context of increasing economic activity within the City. Stronger measures will thus be needed if waste generation rates are to be significantly reduced, particularly if the City is to move towards the goal of zero waste to landfill (a target that is currently strived for by a number of municipalities globally). Underlying such stronger measures should be the explicit objective within the City's IWMP to support a move away from the current linear approach - that considers waste a natural and unavoidable part of production and consumption - towards a closed-loop cyclical approach that no longer accepts "waste" as a necessary part of business.

Building on the recent experience of various municipalities and regions in promoting waste minimisation and recycling (summarised in Appendix 1), and bearing in mind the findings of the *Gap and Needs Analysis* (summarised earlier), it is recommended that the following general principles should form the cornerstones of the relevant components of the IWMP:

1. Ensuring appropriate underlying local system conditions for an effective policy environment.
2. Focussing explicitly on waste minimisation at source through the implementation of policy measures that focus upstream on product and packaging manufacturers.
3. Promoting greater recycling and reuse by introducing appropriate regulatory, financial, awareness-raising and infrastructural measures aimed at encouraging and facilitating increased waste recovery for recycling by households and businesses
4. Developing/strengthening markets for recycled products

⁵ Note for example that as a result of focused government initiatives, increases in the recycling of municipal solid waste have been achieved in the Netherlands (from 16% to 47% between 1990-2000), Sweden (from 19% to 39% between 1993-2000), Flanders Belgium (up from 21% to 62% between 1990-1999) and California (from 24% to around 42% between 1993-2000).

The practical implications of each of these general principles are briefly outlined below. Further details (and examples) of the nature and extent to which each of these principles have been implemented in other regions are provided in Appendix 1.

The following table provides a summary overview of the different forms of government intervention that have been adopted to promote waste minimisation and recycling. While the table covers policy interventions at national, regional and local government levels, the principal underlying focus of the table is to inform the development of potential policy interventions that may be implemented in the City of Cape Town. A more detailed review of each of these policy types - with practical examples from different regions - is presented in Table 4.2 at the end of the chapter.

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Table 4.1 Waste Minimisation and Recycling Policies: Best-Practice Review (Overview of Policy Interventions)

Regulatory and Co-regulatory Policy Instruments	Economic Instruments & Socio-Economic /Environmental Incentives	Information, Awareness Raising and Education	Infrastructure Provision	Co-operation and Partnership Initiatives
Setting Targets: a key element of most successful policy efforts to reduce waste and promote recycling is the setting of demanding yet achievable targets (these may be goal-oriented or mandatory).	Pay-as-you-throw household charges: in which households pay per unit of waste disposed rather than through a fixed fee (for example by purchasing prescribed disposal bags, or disposal bins).	Waste Information System: at local and provincial level, populated with data necessary to inform effective policy-making and practical decision making on waste minimisation and recycling opportunities.	Increase availability and access to transfer stations, sorting and waste recovery sites, garden composting sites, collection points and industrial recycling facilities: waste segregation and recycling is greatly facilitated by ready access to clean waste recovery/sorting/disposal facilities.	Poverty alleviation community projects: various innovative initiatives for waste management and economic development (e.g. waste for food/transport exchange programme)
Zero Waste Policy: a subset of the above is a policy commitment to generate no waste (i.e. material that cannot be used either as a biological or an industrial “nutrient”).	Landfill tax: in which a charge is levied (typically per tonne of waste) for waste to be disposed to landfill, acting as incentive for large waste generators to reduce waste.	Awareness-raising campaigns: for households, consumers, retailers and producers on benefits and opportunities of waste min/recycling. Encompasses formal & informal educational initiatives.	Provide separate waste collection facilities: increase door-to-door collection of individual waste streams from households.	Business partnerships: potential for stimulating greater engagement of private sector in programmes relating to waste min and resource efficiency. Sponsorship partnerships: to finance waste minimisation programs linked to certain product groups
Mandatory waste separation: many regions now oblige households and/or businesses to separate waste into various recyclable streams.	Product tax: in which a charge is levied on products causing problem waste, with the aim of thus changing consumption patterns. Consider increased charges for waste materials that have a high volume/weight ratio at LF.	Public reporting from local authority: e.g. on performance progress against stated waste management targets e.g. through regular “State of Waste” report	Collection and composting schemes for biodegradable wastes: improving facilities (e.g. for garden and kitchen waste) to reduce landfill space needs.	Volunteer initiatives and development of volunteer database: similarly can stimulate volunteer involvement of e.g. schools and community groups in relevant programmes.
Extended producer responsibility: in which organisational and economic responsibility for waste collection is placed on manufacturers. Commonly used for packaging (also e.g. cars and electronic goods); provides stimulus for product / packaging redesign.	Waste min / recycling fund: revenue (raised e.g. from waste disposal levies and/or supplied from central fiscus), dedicated to waste min/recycling initiatives, such as infrastructure, research, awareness raising, capacity building, and/or awards etc.	Demonstration projects: information, technical assistance and/or incentives provided to develop pilot demonstration projects such as waste minimisation clubs “wastewise” CIDs etc.	Waste exchange: establish forum (e.g. through Internet) to facilitate the exchange of “waste” to those that can use this waste as a raw material input. Link up of waste exchange with local CIDs	Learnerships and Internships: identification of Solid Waste related learnerships (e.g. LGWSETA), academic internships and partnerships (see also Chapter 9)

Regulatory and Co-regulatory Policy Instruments	Economic Instruments & Socio-Economic /Environmental Incentives	Information, Awareness Raising and Education	Infrastructure Provision	Co-operation and Partnership Initiatives
<p>Environmental Procurement: using the power of large consumers (incl. government) to stimulate market demand e.g. for recycled products.</p>	<p>Financial incentives: various options exist for providing financial incentives to reward those who adopt waste min / recycling practices (e.g. direct cash incentive or tax rebate for increased household recycling activities), airspace credits etc</p>	<p>Product eco-labels and waste fact sheets: to inform consumer choice on environmental impact (and potential for recycling) of products / packaging</p>	<p>Retail outlet for recycled materials: provide public facility where second-hand goods repaired as required and sold-on to the public.</p>	<p>Public Private Partnerships: aimed at job creation and outsourcing of service delivery functions to community members and/or private industry</p>
<p>Mandatory waste min audits: requiring waste min audits / reviews e.g. as part of existing operational permits for industry and commerce.</p>	<p>Social/Environmental incentives: options include composting donations to schools and communities, “food for waste” programs, provision of more/ better services etc. free electricity cards</p>	<p>Public participation processes: soliciting public feedback on performance, and receiving input into policy development</p>	<p>Co-finance and/or subsidisation of selective CP technology and recycling technology by government authorities in order to boost WM and recycling activities</p>	
<p>Voluntary industry agreements: may include industry commitments for waste min / recycling (section 35 of National Environmental Management Act provides for such agreements).</p>	<p>Airspace Credits: Citizens (e.g. from the industrial sector or NGOs who contribute in a meaningful to reduce the amount of waste generated and/or disposed of and therefore help to preserve future landfill airspace are financially rewarded by Government</p>	<p>Sharing of information and waste databases (such as the WasteWise library) amongst Government Authorities and with the Public</p>	<p>Co-finance of required special infrastructure for the recycling of certain materials by industry e.g. a local washplant for Plastic Recycling Industry</p>	
<p>Integration of By-Laws extending to Provincial and National areas</p>	<p>Penalties and other Disincentives: Required to control/fight bad attitude of individuals towards waste management issues e.g. such as littering, dumping etc</p>			

4.4.1 Ensuring appropriate conditions for an effective policy environment

If the strategies and policies of the IWMP are to succeed, the following underlying structural conditions necessary for an effective policy environment will need to be addressed. While some of these (such as the development of targets) can be explicitly provided for within the IWMP, other elements are underlying macro-conditions that go beyond the scope of the IWMP. These have been identified as key assumptions upon which the success of the IWMP depends.

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- ◆ A key requirement for the successful implementation of the IWMP and all envisaged outcomes is sufficient and ongoing political will based on a clear vision relating to the need and multiple benefits of waste minimisation and recycling. This should be underpinned by an unambiguous political support (e.g. by all parties jointly signing a “Declaration of Commitment”) to implement the waste management hierarchy. Such a hierarchy must consider waste prevention as the key objective and should provide quantitative targets for waste minimisation, recycling and composting. It should also guide the implementation of the local authority’s waste management activities.⁶
- ◆ Policy-making needs to be developed on the basis of detailed and reliable information.
- ◆ There needs to be sufficient and more efficiently utilised government capacity - financial, human and technical - to effectively develop and implement policy measures. Opportunities should be explored for greater use of partnerships (either between various governmental departments or as part of Public Private Partnerships (PPP)) and for the dedicated provision of funding (for example through establishing a dedicated fund formed and regularly financed through revenue from appropriate waste charges and taxes)⁷.
- ◆ Any regulatory measures that are developed need to be supported by effective and visible enforcement with a sufficiently deterrent sanction⁸.
- ◆ The philosophy of waste minimisation should ideally form part of a wider City vision that focuses on improved resource efficiency in order to inform other policy initiatives within the City.

4.4.2 Focusing efforts upstream on manufacturers and packaging companies

An important lesson from the international experience is the evidence of an increasing trend amongst policy makers to focus practical waste reduction efforts and policy strategies directly at the manufacturers of products and packaging, with the aim of minimising the resulting waste at source rather than relying predominantly on downstream reuse and recycling initiatives, which normally pose logistical, financial and technical challenges. There are two key areas of potential focus: influencing product/packaging design through “extended producer responsibility” (EPR) measures, and promoting waste minimisation activities within the production processes.

⁶ These targets should be challenging, yet realistic, based on a credible technical/economic assessment of opportunities. Some example of targets that have been developed in other regions are presented in Appendix 1 below.

⁷ As outlined in Appendix 1, such funds have been developed and introduced by a number of City administrations.

⁸ Note for example the recent measures implemented in the UK, California and the Philippines (outlined in Appendix 1 below).

- ◆ A key goal of EPR initiatives is to shift greater responsibility for the life-cycle impacts of products to producers, with the aim of providing incentives to minimise packaging, to use compostable, recyclable, and/or re-usable raw materials, to design products that are durable, repairable and that disassemble easily, thereby reducing the need for more costly downstream waste separation, recovery and recycling. Whilst such policy measures may be largely beyond the regulatory mandate of the local authority, the CCT has a role to play in lobbying other policy-makers, as well as potentially entering into Environmental Management Co-operation Agreements (EMCAs)⁹ with affected companies¹⁰.
- ◆ A second area of focus on manufacturers relates to the promotion of waste minimisation activities within the production process. Key activities that the CCT can implement in this regard include:
 - ◆ Providing regulatory incentives, information and/or technical assistance to encourage further development of waste minimisation clubs and/or demonstration projects for Cleaner Production¹¹.
 - ◆ Mandating (or otherwise encouraging) particular companies or business sectors to undertake waste minimisation opportunity assessments¹².
 - ◆ Facilitating the potential for the re-use of “waste” products within the production process, by creating a waste exchange¹³.

4.4.3 Promoting waste separation within households and the business community

Although policy efforts should focus primarily on minimising waste at source, there remains a continuing need to provide further encouragement for the recycling of waste. The international experience underscores two important components for effective recycling activities: developing an active market for recycled products (outlined in the next sub-section), and ensuring that as far as possible all potentially recyclable material¹⁴ is recycled rather than being sent to landfill. For this to occur, the generators of potentially recyclable material (focusing mainly on households and small and medium businesses) need to be provided both with sufficient incentive and readily available opportunities for recycling. The international experience highlights the importance of the following issues, all of which merit further consideration for Cape Town’s IWMP.

- ◆ Introducing appropriate financial incentives to reduce, recover, sort, recycle and compost wastes, for example through “pay-as-you-throw” schemes (for households and small businesses), as well as landfill taxes and/or product charges (for larger waste generators)¹⁵.

⁹ In terms section 35(1) of the National Environmental Management Act, “the Minister and every MEC and municipality, may enter into environmental management co-operation agreements with any person or community for the purpose of promoting compliance with the principles laid down in this Act”.

¹⁰ Various examples of mandatory and voluntary EPR initiatives that could inform initiatives in CCT are outlined in Appendix 1.

¹¹ These should build on recent successful initiatives (some of which are outlined in the *Status Quo Report*); examples of possible regulatory and information-based policy interventions are provided in Appendix 1 below.

¹² Note for example the experience in Seattle, outlined in Appendix 1 below, where waste minimisation audits are *mandatory*, but implementation *voluntary*, the belief being that companies will voluntarily implement waste minimisation as the audits reveal the benefits. The city provides audit guides and technical assistance to companies doing in-house audits.

¹³ This would need to be informed by the recent experience with a Waste Exchange in CCT, as well as internationally.

¹⁴ In other words material for which there are measurable environmental and economic benefits associated with recycling.

¹⁵ Practical examples (and key lessons learnt) of such initiatives are provided in Appendix 1.

- ◆ Imposing mandatory requirements for the separation of particular waste stream components such as recyclables (e.g. PET plastic bottles have a very high volume/weight factor and therefore contribute disproportionately high to rapidly filling up remaining landfill airspace)¹⁶.
- ◆ Improving the availability of and access to Council operated and/or privately-driven household collection schemes and drop-off sites for re-use, recycling and composting.
- ◆ Implementing a focussed information and awareness campaign on the benefits and opportunities for waste reduction, reuse and recycling¹⁷.
- ◆ Promoting partnerships with private sector and community organisations - as outlined earlier above there is seen to be potential scope to develop community-based schemes aimed at building on the informal scavenging and recycling activities that are already being undertaken by the poorer sections of the community, and formalising this as part of a decentralised waste separation and collection initiative.

4.4.4 Further developing the market for recycled materials:

The experience abroad has demonstrated that the long-term success of household and businesses efforts in separating and the voluntary or financially motivated recovery of materials for recycling depends on the existence of viable markets for those materials. Market development activities are required to support existing private-sector recycling initiatives by making recycling more cost-effective, and by increasing the volume of material that can be recycled and thus diverted from the landfill. The more often businesses, residents, and public agencies purchase products made of recycled material, the more these markets will strengthen. As many market development opportunities reach beyond the boundaries of the City, and will require regional if not national coordination, it is important for Cape Town to continue to work with other market development agencies to refine roles and leverage resources and their management efficiently.

Current markets for material recovery, re-use and recycling are hampered by factors such as variations in product quality, poor labelling of materials, price fluctuations, consumer perceptions regarding quality, low volumes, high transport costs and product contamination. Less obvious obstacles include the existence of vested business interests that do not encourage recovery for recycling rates beyond a certain percentage.

Some of these factors can be overcome through education and awareness initiatives, voluntary agreements between producers and recyclers, and good waste management planning practices. Others may require the implementation of mandatory measures (such as specifying the minimum recycled content for particular products or banning the disposal of certain recyclables to landfill)¹⁸. An important potential mechanism for expanding the markets for recycled materials is through government procurement policies, which can serve as a strong incentive for further stimulating demand for recycled materials¹⁹.

¹⁶ As outlined in Appendix 1, a number of countries have introduced such measures; it is important however that these be accompanied by measures to manage and control waste dumping through effective monitoring and enforcement.

¹⁷ There are valuable lessons to be learnt from a number of regions, including in particular for example the experience with different awareness-initiatives in Seattle (US); see Appendix 1

¹⁸ Note for example the experience in California (US) outlined in Appendix 1.

¹⁹ Note for example the experience in London (UK), the Philippines and California reviewed briefly in Appendix 1 below.

4.5 Assessment Overview and Summary

This Chapter has outlined a set of general policy considerations relating to waste minimisation and recycling that will be carried forward into the development of the strategies, policies and action plans making up the Integrated Waste Management Plan (IWMP) for the City of Cape Town. These considerations have been identified on the basis of the earlier conducted *Gap and Needs Analysis*, as well as on a review of international best-practice of relevant integrated waste management policy measures. This review is summarised in Appendix 1 below, which provides much greater clarity on the issues outlined above.

The initial assessment undertaken in the Chapter will serve as a basis for further discussion with the City of Cape Town regarding the development of the IWMP, and will also form an important input into the stakeholder consultation process, after which the relevant components of the IWMP will be finalised.

Table 4.2 International Best Practice Policy Review and Assessment

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POLICY INSTRUMENT	IMPACT AND ISSUES	INTERNATIONAL EXAMPLES
Regulatory and Co-Regulatory Policy Instruments		
Setting Targets for waste minimisation and/or recycling (at national, provincial or local level)	A key underlying component of most successful national, provincial and local legislative efforts to reduce waste and/or promote recycling, is the setting of targets. These targets may relate generically to “recovering value” (which includes recycling and reuse), or they may be specific recycling and/or waste minimisation / prevention targets. Such targets should be based on credible scientific / economic assessment of the opportunities and feasibility for cost-effective minimisation and recycling.	<ul style="list-style-type: none"> National and/or regional targets relating to waste reduction / recycling have been implemented in most EU countries as well as in numerous States in the US; often mandatory on local authorities. London (UK): target of 25% recycling of Municipal Solid Waste (MSW) by 2006 (5% was achieved in 1996/7, and 8% in 2001/2); UK statutory target for local authorities for recycling: 25% by 2005/6, 30% by 2010 and 33% by 2015 Christchurch (NZ): target of 90% reduction of home organic wastes to landfill by 2010, 80% reduction of collected household waste to landfill by 2010; 90% reduction of rubble by 2005 and untreated wood by 2010; 65% (min) of total waste by 2020; zero hazardous waste by 2020.
Zero Waste Target	A number of national, regional and/or local governments have introduced targets for zero waste generation and/or zero waste to landfill	<ul style="list-style-type: none"> California State (US) has adopted a zero waste strategy Seattle (US) has adopted zero waste as a guiding principle in their waste plan Toronto & Nova Scotia in Canada have similarly adopted zero waste policies.
Mandatory separation of household and/or commercial waste	Effective implementation of mandatory waste separation requirements is dependent on readily available, clean and well maintained recycling points and/or the implementation of door-to-door collection systems. The requirement can be difficult to monitor and enforce, especially if those collection strategies are dependent on “bring” systems. Teaching residents to do source separation at home may be cheaper (and will result in more clean recovered recyclables) than operating a Material Recovery Facility (MRF) adjacent to a landfill site.	<ul style="list-style-type: none"> Mandatory separation of certain household wastes and industrial / commercial wastes (e.g. paper, cardboard, carton, steel drums, and plastic transport packaging, to be extended to impregnated wood and waste electronic and electrical equipment) currently required in the Netherlands, Sweden and Denmark and in some states and cities in USA and New Zealand; initial focus on “bring systems” complemented by doorstep collection Seattle bans garden waste from waste disposal (but ensures alternatives for home composting/ central drop-off available). Also proposes future ban on grass waste from garden waste to encourage grass-cycling/ home composting. Christchurch, New Zealand requires space for rubbish and recycling containers in new commercial and multi-family construction and remodelling to ensure that the space barrier to recycling is not an issue in the future
Product Bans	Legislative intervention banning specified products and packaging (provided cost-effective alternatives are available). Phase-out period determined after consultation with stakeholders. Annual reporting, review and update of the list of prohibited products.	<ul style="list-style-type: none"> Included in the Philippines’ Ecological Solid Waste Management Act of 2000 Note recent ratification by South Africa of the Stockholm Convention on POPs (persistent organic pollutants) PVC as packaging material has been phased out in many European countries
Specified minimum recycled content	Set minimum recycled content for e.g. newsprint, plastic bags and plastic/glass bottles.	<ul style="list-style-type: none"> California: requirement for newsprint to have 25% recycled content; 30% recycled content for plastic bags (less successful); and 65% for glass by 2005

POLICY INSTRUMENT	IMPACT AND ISSUES	INTERNATIONAL EXAMPLES
<p>Extended producer responsibility (EPR) measures</p>	<p>This refers to legislative measures placing organisational and economic responsibility for waste collection, recycling and treatment on the producers of goods that end up as problematic wastes. Most commonly used with packaging waste, though also covers products such as motor vehicles and waste electronic goods. The receipt and management of waste is normally managed by a separately established sector-specific company. Generally good results could be demonstrated in preventing waste and increasing recycling rate, with particular potential for stimulating improved product/packaging design. Typically requires authorities to establish waste minimisation targets and appropriate regulatory framework.</p>	<ul style="list-style-type: none"> • Producer responsibility measures for packaging waste are in place in most European countries. Beneficial results include: in Germany reducing packaging by 15% and increasing the recycling rate by a factor of 6 in the 1990s; in Sweden achieving recycling rates of nearly 90% for several waste fractions; and in Greece achieving a general decrease of at least 8% in land-filling of packaging waste • Extended producer responsibility requirements relating e.g. to electrical and electronic equipment, motor-vehicles, tyres and batteries are currently introduced in certain European countries and Japan • Switzerland: particular success from EPR legislation ensuring that recyclable materials are recovered by retailers and producers – applies to beverage containers, electric and electronic waste and batteries • Seattle businesses that have programmes to take back products for re-use or recycling, are used to encourage others to follow suit, initially through voluntary pilot projects • Philippines Voluntary Extended Producer Responsibility (EPR) approach with provisions for regulations for an industry sector or waste type depending on its environmental impact
<p>Environmental procurement (“Green Purchasing”) measures</p>	<p>Public and private sector purchasing power can be a strong incentive for stimulating a market in recyclables and encouraging the development of environmentally preferable products.</p>	<ul style="list-style-type: none"> • London’s Green Procurement Code aimed at creating further demand for recyclable materials • Philippines Waste Management Act of 2000: Each local government unit may determine and grant a price preference to encourage the purchase of recycled products.
<p>Mandatory requirement for companies to undertake waste audits and implement minimisation plans</p>	<p>Requiring (e.g. high impact) companies to undertake waste audits / minimisation opportunity assessments, may stimulate the identification of cost-effective opportunities.</p>	<ul style="list-style-type: none"> • In the Indian State of Andhra Pradesh targeted companies are required to undertake waste minimisation audits and report annually on progress in achieving targets • In Seattle (USA) waste minimisation planning is <i>mandatory</i>, but implementation <i>voluntary</i>; the goal is that facilities will voluntarily implement waste minimisation as the planning reveals the benefits. The city provides planning guides and technical assistance to companies doing in-house planning.
<p>Voluntary agreements relating to waste minimisation, recycling and/or greater monitoring and disclosure</p>	<p>Increasing evidence of voluntary agreements (industry covenants) to promote waste minimisation measures. Typically entered into between the regulatory authorities and a specific industry sector group. Recent agreements in the EU relating to product take-back. Perceived benefits include greater efficiency and flexibility, however measures are needed to avoid regulatory capture and free riders. The SA National Environmental Management Act makes provision for such instruments (Environmental Management Co-operation Agreements – EMCAs).</p>	<ul style="list-style-type: none"> • The Netherlands: packaging waste covenants aimed at reducing and separating packaging waste, as well as numerous other industry covenants, many of which include provision for waste minimisation activities • Austria: voluntary agreement relating to end-of-life vehicles (used as a model for the EU 2001 Directive on end-of-life vehicles); • New Zealand: Various voluntary agreements with industry. The 1996 <i>Packaging Accord</i> seeks to minimise the environmental effects of packaging waste, and has improved rates of packaging recycling. Innovations such as light weighting have slowed the growth in this type of waste. • UK <i>Voluntary Code of Practice for Fast Food Industry</i> aimed at reducing litter and waste in the fast food sector – includes various measures that fast food outlets commit to implementing • Massachusetts: Newspaper and Yellow Pages agreement on recycled paper

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POLICY INSTRUMENT	IMPACT AND ISSUES	INTERNATIONAL EXAMPLES
Integrate waste min requirements in permitting and EIA requirements	Environmental Impact Assessments also to require that the company implements waste minimisation during construction & operation.	<ul style="list-style-type: none"> South Africa: Provincial (Western Cape DEAD&P) has recently developed a series of waste minimisation guideline documents that are used in the EIA Reviews of different industry sectors.
Increased enforcement powers and sanctions	An underlying requirement for effective legislation is the ability for sufficient enforcement and sanctions	<ul style="list-style-type: none"> Stringent littering provisions included in UK's recent Anti-Social Behaviour Bill Philippines and Singapore impose high fines for littering & illegal dumping
Capacity building activities	Adopt a programme to provide technical and other capacity building assistance and support to local government units in the development and implementation of source reduction & recycling programmes	<ul style="list-style-type: none"> London's Capital Standards Programme training staff on improved litter enforcement techniques Philippines makes specific provision for increased capacity building in their Ecological Solid Waste Management Act of 2000
Economic Instruments and Fiscal Incentives		
Pay-As-You Throw (PAYT) waste charges	Potential for significant waste reductions, through weight- or volume-based waste charges on households and small businesses. Should be accompanied by household recycling and segregation schemes, and effective information and education programmes. Illegal dumping a possible short-term problem, but may be reduced with extensive network of collection and/or drop-off systems. Ideally accompanied by recycling targets and landfill bans for specific wastes.	<ul style="list-style-type: none"> Widely practiced in many municipalities in Europe, with charges calculated (for example) on the number / nature of containers, volume, weight and/or frequency of collection. Netherlands has bar-coded bins, with weight established through a scale, connected with a computer to establish costs per household unit as an integral part of the collection vehicle In USA more than 4,000 communities use direct charging. Some communities report that unit pricing helped achieve reductions of 25-45% in waste disposed and increased participation in minimisation, recycling & composting programmes. Seattle reported a decline in waste generation from an average of 3.5 to 1.7 waste bins per household per week after unit pricing was launched. Further reduced to just 1 bin per household per week after complementary household recovery for recycling and composting programmes introduced.
Landfill tax	Difficult to establish the impact of landfill taxes on diversion of waste from landfill, as typically used in conjunction with other instruments (e.g. landfill bans). Should only be applied where there are readily available alternative waste disposal options. Potentially useful source of funding for developing waste infrastructure. Should be accompanied by mandatory recycling targets to encourage diversion to recycling rather than incineration., as well as effective monitoring and enforcement of illegal dumping.	<ul style="list-style-type: none"> Austria: between €7 and 44 per tonne of MSW (depending on waste type and its environmental implications); together with other initiatives has reduced landfill rate for household waste from 63-32% Denmark: approximately €50 per tonne; recycling rate of construction and demolition waste has increased from 25-90% Netherlands: ranging from €12 to €65 per tonne depending on waste stream type Sweden: approximately €31 per tonne France: in 1999 was approximately €10 per tonne UK: approximately €19 per tonne; deemed not high enough to result in diversion Italy: applied on a regional level; ranges from €10-25 in North and €20-50 in the south; often have lower taxes for municipalities with source separation in place
Product tax	Incentive for waste minimisation initiatives, though typically needs to be accompanied by relevant product alternatives and mandatory recycling targets.	<ul style="list-style-type: none"> Environmentally-inspired product taxes have been imposed on numerous products throughout Europe, including: on disposable items and shopping bags, batteries, electric bulbs, tyres, light bulbs, disposal cameras, pesticides, disposable drinks containers, packaging for certain products for industrial use, carrier bags.
Deposit refund schemes	Return levels found to be between 60-90%. Administrative costs may be high.	<ul style="list-style-type: none"> Many such schemes have been very successfully introduced throughout Europe on such products as lamp bulbs, fridges and freezers, beverage containers, batteries.

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<p>Provision of funds for waste minimisation and recycling activities</p>	<p>Dedicated Waste Minimisation Fund can be established e.g. from revenue raised from designated waste minimisation funding component of environmental charges. Fund can finance council waste minimisation operations and services such as residential recovery for recycling programmes, green waste composting, commercial waste minimisation and recycling drop-offs.</p>	<ul style="list-style-type: none"> • UK's Waste Minimisation and Recycling Challenge Fund of £140m over 2 years; London Recycling Fund recently secured £21.3 million from National Government, together with the Association of London Government and London Waste Action • The Zero Waste New Zealand Trust is a funding, advocacy, support and information group fostering community development projects for minimising waste. Has granted \$2 million in 4 years for waste reduction initiatives, and helped 34 of New Zealand's 74 territorial authorities commit to a target of zero waste to landfill. Christchurch has a dedicated Waste Min Fund. • Seattle (US) annual "Less Is More" grants have provided many opportunities for developing and testing various waste reduction activities.
<p>Financial rewards for recycling</p>	<p>Various types of potential rewards: households and businesses pay less for collection of recyclables than rubbish collection. In some cases businesses with large amounts of higher value material, like white paper or cardboard, may receive payment for their recyclables. Tax which is imposed on collectors for each ton of waste collected is not imposed on tons of recyclables collected. Separated materials incur a reduced fee at transfer stations.</p>	<ul style="list-style-type: none"> • Brent and Lambeth London Boroughs: pilot scheme in which residents who participated at least 50% of the time in recovery for recycling initiatives received £10 • Seattle USA Waste Plan: garden waste and recyclable wood waste are charged a lower fee at transfer stations, and other recyclables only are free. Also special rates for tyres and appliances to encourage recovery for recycling; discounts offered on grass-cycling lawnmowers (allow grass to remain on lawn as mulch – instead of collection for disposal). In Seattle it costs less to recycle than to landfill wastes. Between 1988 and 1995 residents saved \$12 million by recycling and composting rather than sending all waste to landfill. • Christchurch: Refuse Transfer Stations encourage people - through price discounts- to separately drop off garden waste for composting, and soil and rubble for reuse
<p>Full Cost Accounting (FCA)</p>	<p>FCA helps managers create the best balance of programme components. It also allows for evaluation of effect of pay-as-you-throw or landfill airspace credit programmes, in terms of system costs and revenues, of implementing such a programme.</p>	<ul style="list-style-type: none"> • Seekonk (Massachusetts, US) used FCA to understand the base costs for its solid waste system in order to establish its variable fees for its pay-as-you-throw programme. • In Plano (Texas, US) the Solid Waste Department used FCA to evaluate and assess existing service levels and collection restructuring (such as picking up garden waste for composting rather than for disposal). • Seattle developed the Recycling Potential Assessment Model (RPA) as a FCA tool to (inter alia) calculate cost estimates for recycling and disposal options. (RPA indicated that recycling 60% and disposing of the remaining 40% was the least costly of any of the combinations of voluntary recycling and disposal options that were considered).
<p>Information and Education</p>		
<p>Waste Information System</p>	<p>Improving availability and reliability of waste information critical to development and monitoring of effective waste management plans. Database & reporting measures can be developed for solid and hazardous wastes, wastewater, contaminated sites and air emissions.</p>	<ul style="list-style-type: none"> • New Zealand Environmental Reporting Project is the basis of a partnership between central and local government to ensure collection of standardised waste information. This partnership is confirmed by formal agreements; the project establishes the baseline data needs for target setting. • Seattle (US) monitors performance using studies of waste stream composition, recycling participation, and data about who disposes of what waste material types where. Information helps track trends in waste reduction and recycling and assists to determine where policy/practical waste management changes need to be made in the future.

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<p>Public report by the local authority of progress in achieving stated objectives and targets</p>	<p>An important stimulus for improved performance at local authority level is to require them to publicly report on their performance against stated goals (eg in an annual state of the environment report).</p>	<ul style="list-style-type: none"> • London (UK): public reporting (including e.g. on Internet www.capitalwastefacts.com) • Massachusetts (US): municipalities required to publish recycling report cards • Cape Town State of Environment Report on key social, economic and ecological indicators
<p>Information and awareness campaigns</p>	<p>Many of the more successful waste minimisation and recycling initiatives have been underpinned by a comprehensive ongoing public education campaign. In addition to general awareness-raising of households and consumers, there are opportunities for targeted communications with retailers and manufacturers regarding the design, repair and reuse of goods, especially through practical schemes (e.g. furniture reuse). Opportunities include: brochures, newsletters, advertisements giving facts about services and encouragement to reduce/re-use/recycle.</p>	<ul style="list-style-type: none"> • Seattle (US) campaigns include: municipal rates inserts and newsletters; brochures and pamphlets addressing specific materials such as non-toxic household cleaning, waste reduction, and what to put in the recycling bin. “<i>Get in the Loop</i>” campaign promotes recycled-content consumer products in a variety of retail outlets, and “<i>Shift Gears</i>” programme promotes the purchase of re-refined oil. “<i>Use it Again! Seattle</i>” directory on where to find re-usable and repairable items, “<i>Seattle Shop Smart</i>” info on how to shop selectively; <i>Business and Industry Recycling Venture</i> information and assistance to reduce office, restaurant, and construction site waste. Outreach to businesses about how to reduce wastes in their own practices and processes as well as how to reduce the amount of waste passed on to consumers, such as unwanted mail and excess packaging • Switzerland: waste calendars and special waste information events produced by municipalities • Kensington and Chelsea in UK: “Recycling Roadshow” uses face-to-face communication through door-to-door canvassing to promote active household recovery for recycling in 1995. This resulted in recycling increasing from 9% in April 1995 to more than 11% in October 1996, further to almost 13% in 1999 • Christchurch (NZ) extensive waste-related website (www.ccc.govt.nz/waste) • Polish city of Jaslo in 1993 - programme based on visiting as many households as possible through the home advisors selected from high schools and universities- trained in municipal solid waste management (MSW) and communications. • Waste Management Institute of New Zealand: <i>Lifeafterwaste</i> programme, aimed at changing how the waste industry and general public consider waste. It includes an education programme, and benchmarks against which every New Zealander can measure themselves. Central and local government, and waste industry businesses support and have input into the programme.
<p>Support of Cleaner Production demonstration projects and waste minimisation clubs</p>	<p>Potential to increase general awareness and technical capacity by providing direct financial support and/or other incentives for targeted demonstration projects, focusing on companies that generate priority wastes (in terms of toxicity and/or volume). Generally persuasive evidence of positive economic and environmental benefits, especially through the more widespread promotion of waste minimisation clubs.</p>	<ul style="list-style-type: none"> • London’s Recycle for London awareness campaign (www.recycleforlondon.com) with supporting helpline • Ireland’s Cleaner Production demonstration programmes: government support provided through subsidy schemes promoting waste min in limited number of companies (around EUR 1 million) • UK <i>Envirowise</i> initiative: a government marketing campaign supported with strong technical information; no funds provided to companies; UK government expected to provide EUR 96 million to promote resource efficiency and cleaner production activities over 13 years

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Feedback & Public Participation	To involve and support the community in waste management decision-making and operations. Includes surveys and focus groups for input on current or proposed policies and programmes.	<ul style="list-style-type: none"> Seattle (US): Regular surveys undertaken to evaluate current programmes: e.g. home composting, general organic materials management, attitude to food waste separation and collection, business recycling participation, transfer station use, household hazardous waste, etc.
Eco-labelling for improved waste separation	Formulate and implement a coding system for packaging materials and products to facilitate and strengthen waste recycling and re-use (requires national action but local government can lobby and support). In some SA industrial sectors product labelling has been started but needs improvement.	<ul style="list-style-type: none"> New Zealand Environmental Choice label, owned by the Minister for the Environment, independently verifies environmental claims made for particular products. US classification of plastics into numbers according to different recycling/reuse options The German "Umweltengel" to mark for consumers environmentally friendly product alternatives.
Technical Assistance	City employees offer technical assistance to support business & industry in their waste reduction programmes.	<ul style="list-style-type: none"> Seattle (US) supports the testing of new recycled-content construction materials and the development of specifications, and provides technical assistance to designers and builders about the use of these materials. Seattle Public Utility: Offers technical assistance to large waste generators including general waste reduction incentives and assistance, paper waste reduction programmes, and the development of individual waste reduction goals. USA: At the factory level environmental agencies have found they can lower pollution control costs by supporting training in waste minimisation for SMEs. Such programmes show a cost-effective complement to conventional regulation.
Regulatory guidance needed on composting of waste	Provide compost training to those residents to whom composting bins have been delivered	<ul style="list-style-type: none"> UK Animal By-Products Regulations 2003 introducing controls re composting of catering waste Seattle (US) sponsorship of compost demonstration sites, workshops, and printed materials; a compost hot line; educates residents about sustainable lawn care through a grass-cycling, water conservation, and household hazardous waste reduction campaign; provides education and incentives for on-site organic materials management; provides education and outreach on the selection of safe and effective food waste composting bins, distribution of bins, and workshops; educational efforts also focus on professional landscapers and gardeners
Formal Education	Schools education programmes, which target all levels of schooling is considered the best way to target communities for residential waste reduction. Strengthen the integration of solid waste management and resource conservation and recovery topics into the academic curricula of formal and non-formal education in order to promote environmental awareness and action among citizens.	<ul style="list-style-type: none"> Philippines Solid Waste Management Act of 2000: Ensures that waste minimisation & recycling is incorporated in the curriculum of primary, secondary and tertiary students. Christchurch (NZ): Sponsors school resources for learning better waste management behaviour and sharing ideas. Seattle (US): Support environmental education through a variety of programmes focused on waste prevention, recycling, litter, and graffiti. Activities include: classroom field trips, grant projects, assembly programmes, all-school recycling campaigns, litter and graffiti clean ups, and partnerships between schools and neighbourhoods. US Toxics Reduction Programme: has an effective programme that educates students about alternatives to pesticide usage in first year of horticulture at university.

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School incentive schemes	Provide incentives such as awards to schools to promote & encourage waste reduction & recycling. Offers encouragement to schools programmes.	<ul style="list-style-type: none"> London Schools Environmental Award (LSEA) challenging and rewarding schools that improve their local environment Seattle's <i>Green Schools Programme</i> provides recognition & technical assistance to schools that are committed to practicing resource conservation. Money is spent on teacher workshops, educational materials e.g. story books and posters, professional actors for assemblies, etc Seattle: Supply individuals and classrooms with Green Cleaning Kits to replace hazardous household cleansers.
Awards	Positive marketing to clearly reward good environmental behaviour. Highlighting the "best" performers sets a high standard that others shoot for.	<ul style="list-style-type: none"> California: Waste Reduction Awards Programme (WRAP) City of Seattle: Provides a few awards to highest performers rather than trying to certify a much wider group of businesses/schools/clubs to a lower standard. Receive much more media coverage from an exclusive group of award winners that has larger impact on others. South Africa: Clean City Award
Implementation of "special events" initiatives	Potential for reducing waste at sporting / cultural event, as well as increasing general awareness.	<ul style="list-style-type: none"> Note e.g. examples of waste minimisation initiatives applied during Australia 2000 Olympics and as part of preparations for Athens 2004 as well as in Salt Lake City in 2002
Infrastructure Development		
Providing separate collection facilities and ensuring increased availability of facilities for recyclable materials	Studies in Europe suggest that the introduction of door-to-door collection of recyclable materials was the most significant factor in encouraging recovery for recycling, followed by increasing the availability waste recovery centres (e.g. requiring recovery stations as part of new building developments)	<ul style="list-style-type: none"> Most countries requiring waste separation focus initially on "bring systems" to be complemented by doorstep collection as required. Door-to-door collection undertaken in: Netherlands (organic household waste); Switzerland (paper by mandated municipal collector and/or community/charity collectors) Curitiba (Brazil): 70% of the city's rubbish is recovered for recycling by its residents. Once a week, a truck collects paper, cardboard, metal, plastic and glass that has been sorted in the city's homes. The city's paper recycling alone estimated to save over 1000 trees a day. Christchurch (NZ): Household recyclables collection service to all households; the rates-funded service introduced in 1998, currently approximately 15,000 tonnes of the following materials are collected and delivered to the Recovered Materials Foundation Seattle (US) offers recycling collection (every other week) for all single family and multi-family residences. Recovery for recycling is voluntary; single-family residents and multi-family housing owners may choose whether to sign up for waste recovery and garden waste collection. Over 90% of single family residents are signed up for voluntary waste services, 56% of multi-family units currently have recovery facilities available, and 84% of all businesses say they recover at least one material. Cape Town: The Yellow Bag Household Waste Recovery project (conducted with 1000 households in Marina da Gama) resulted in more than 100 tons of mixed recyclables recovered and a 60% weekly participation rate from April 2003-March 2004

POLICY INSTRUMENT	IMPACT AND ISSUES	INTERNATIONAL EXAMPLES
Establish collection and composting schemes for biodegradable waste	Experience in Europe suggests that initiatives on recovering biodegradable municipal waste can be an effective mechanism for reducing landfill waste. Important to note that this may place significant technical and organisational demands on waste authorities, and requires active participation by households, and a sufficient market for composted material	<ul style="list-style-type: none"> • The Netherlands: about 33% of biodegradable municipal waste was collected through the scheme in 1998 (representing 22% of household waste) • Austria: about 23% of biodegradable municipal waste was collected through the scheme in 1996 (representing 13% of household waste)
Transfer/Satellite Stations and Drop Off Centres	Transfer/Satellite station allow the public to drop off recyclables rubbish, builders rubble etc close to their homes and makes waste recovery therefore more convenient for private households and or small businesses. Drop Off Centres can be located at each refuse transfer station site where residents can freely drop off recyclable or reusable materials (e.g. furniture, appliances and crockery). Allows separate drop off of soil, rubble and tyres for reuse, and green waste for composting.	<ul style="list-style-type: none"> • Christchurch (NZ): Three refuse satellite/transfer stations are strategically placed around the city to receive commercial and domestic waste, from where the waste is transported to Burwood landfill. • Seattle (US): two Recycling and Disposal transfer stations (North & South) • Christchurch (NZ): Recovered Materials Foundation (www.rmf.org.nz) set up as a not-for-profit trust to develop recycling markets and operate the council's recovery centres. RMF funded through city's waste minimisation fee and sale of recovered materials. Trust retains ownership of materials for processing and marketing. • Seattle (US): City Recycling and Disposal stations have established a drop box recycling programme, including metals and wood (diverting about 5,000 tons a year), as well as a Clean Green drop-off programme for garden waste. New plan to provide space at transfer stations for separated recyclable construction wastes.
Composting Plant	Provision of a Compost Plant for composting green waste dropped off at the Refuse Transfer Stations. Home-composting should be preferred option so beware of too much capital spent on a composting plant. Can generate employment & revenue.	<ul style="list-style-type: none"> • Christchurch (NZ): Compost plant established in 1993 on 8 ha site; currently composts approximately 34,000 tons of green waste dropped off at the Council's three refuse stations. • In Auckland, Christchurch and Wellington (NZ) the Living Earth Company recovers organic waste to turn into compost for gardens and farms. Company diverts 72,600 tonnes of garden and abattoir wastes from landfill each year, saving more than 500,000 cubic metres of landfill space.
Provide retail outlet for recycled & second-hand goods	Provide a shop where second life goods are repaired as required and on-sold to the public. The Council can operate such a shop for reusable items collected by the Drop Off Centres as an employment initiative. Staff repair and refurbish any goods from council drop off centres that can be re-used, including furniture, bicycles and computers.	<ul style="list-style-type: none"> • Christchurch (NZ): SuperShed: is a supermarket for second-hand goods recovered from the drop off centres. Staff repair and refurbish any goods from council drop off centres that can be re-used, including furniture, bicycles and computers. The SuperShed reputedly does an excellent trade. The Council, through the Recovered Materials Foundation (RMF) operates this one shop and RMF has been responsible for creating 17 new jobs outside its own organisation as a direct result of materials recovery and processing.
Waste exchange	The diversion of potentially re-usable waste from landfills can be greatly facilitated by reducing the potential transaction costs for example by establishing a waste exchange aimed at bring interested parties together.	<ul style="list-style-type: none"> • Sweden: internet exchange market for construction and building materials • California: CalMax free service to help business find markets for waste • Seattle: The Household Hazardous Waste collection facilities (Haz Sites) provided 44 tons of useable products to individuals and organizations for use, rather than disposal • Christchurch's Waste exchange service links waste generators to potential users

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POLICY INSTRUMENT	IMPACT AND ISSUES	INTERNATIONAL EXAMPLES
Cooperation & Partnerships		
Poverty Alleviation Community Projects	Poverty alleviation through the adoption of innovative, technically relevant and ecologically sound solutions for local economic development. Encourages city areas that are self-sustaining to produce their own wealth and keep resources circulating within the community. Community capacity building and participation as residents take the initiative to run their own businesses and market and administer cooperatives that have a positive environmental impact.	<ul style="list-style-type: none"> Johannesburg Eco-City initiative in Midrand is a working partnership between Eco-City Trust and local government and the establishment of community cooperatives for creation of economic opportunities. Results include a waste buy-back centre that has created 50 jobs and contributed to the reduction of waste going to landfill. Fourteen women run a construction cooperative and build homes in environmentally friendly way (including using reclaimed bricks). Curitiba (Brazil) "green exchange" employment programme addresses poverty and environmental needs. Low-income families living in townships unreachable by truck exchange rubbish bags for bus tickets and food. Results in less city litter and less disease, less rubbish dumped in sensitive areas such as rivers and a better life for the poor. Programme for children to exchange recyclable rubbish for school supplies, toys and tickets for shows. Venezuela: Waste-for-food initiative established in poor neighbourhoods.
Youth Partnerships	Waste minimisation and recycling opportunities can be encouraged through greater engagement of the youth.	<ul style="list-style-type: none"> Seattle (US): Engages youth and children as neighbourhood stewards. In 1996 Seattle Public Utilities' eco-team hired four teenagers and a supervisor for seven weeks in grounds improvement projects to demonstrate waste reduction techniques. The youth were hired through the Summer Youth Employment Programme
Volunteer Programmes	Helps people take care of their own neighbourhoods, providing opportunities for creative involvement through schools and community centres, and on the streets.	<ul style="list-style-type: none"> Seattle (US): Friends of Recycling volunteers in multi-family buildings provide information and assistance to other residents about how to recover for recycling; Voluntary Take-back programmes for selected wastes such as motor oil, household batteries, and paint Christchurch (NZ): Community Gardens Association: where organic waste material collected from households in the local area is composted and used to grow vegetables. The Community Gardens provide fruit and vegetables to the local Community.
Business Partnerships	Reducing business waste is best done from within the business sector and the role of the Council is that of a facilitator in this process. Voluntary leadership and recognition programmes for businesses that make use of businesses' desire to be seen and recognized as good environmental stewards and good corporate citizens. Establish a standard of performance and recognize businesses that achieve the standard through certifications, such as logos, and public advertisement. Businesses use the programmes to market themselves as environmentally friendly, or green, companies.	<ul style="list-style-type: none"> USA <i>Green Works Programmes</i>: Businesses who wish to take part fill in an application form and commit to reducing e.g. 40% of their waste, or more on a higher tier group level. Agree on goals of their programme. Achievements are widely publicised under the Programme Banner. Similar energy efficiency targets under "<i>Energy Star</i>" programme. Corporate Partnership programme where companies are responsible for sponsoring and maintaining certain areas of the city Seattle (US) involvement with information technology firms in developing a strategy for disassembly and de-manufacturing of electronic communications and computing equipment. Christchurch: <i>Target Zero</i> programme helps businesses to become more sustainable in terms of resource efficiency (reducing electricity, water and material inputs) and to reduce waste.
Partnership initiative with private sector waste collectors & recyclers	One way to achieve high levels of waste reduction lies with councils running separate contracts for recovery for recycling, the operation of transfer stations, the transport of residual waste to landfill, and the disposal of residual waste at landfill. This allows councils to purchase, and measure, the appropriate services for each different function of waste handling. It also provides an incentive for the waste reduction operator to improve recovery rates.	<ul style="list-style-type: none"> <i>London Remade</i> established with funding of £5.4 million over 3 years to help stimulate and co-ordinate the development of new markets and new users for recyclable materials <i>Community Business and Environment Centre</i> in Kaitaia (NZ) formed in 1998; have found they can handle the Far North District waste stream at about two thirds of the conventional waste handling cost, with a 65 percent recovery rate. Seattle: Private companies provide recycling collection to businesses, as well as recycling drop-off locations and community buy-back services.

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Chapter 5 – Assessment Report - Waste Education and Special Projects

5.1 Introduction5-2

5.2 The Gap and Needs Analysis: Key Findings.....5-2

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This chapter provides an assessment of the current waste education and special projects of Solid Waste Department and reviews to international and local best practices.

5.1 Introduction

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The aim of this Chapter is to identify the main recommendations relating to Waste Education and Special Projects that will be carried forward into the development of the strategies, policies and action plans making up the Integrated Waste Management Plan (IWMP) for the City of Cape Town. The Chapter provides an assessment of current strategies and practical guidelines (including aims & objectives and the suggested methodology) within the City of Cape Town aimed at promoting Waste Education at all levels of society and community (industrial, commercial and domestic) as well as amongst governmental spheres. This assessment report should be read in conjunction with Chapter 13 of the Status Quo Report.

5.2 The Gap and Needs Analysis: Key Findings

On the basis of the *Status Quo Review* of Waste Education and Special Projects in the City of Cape Town the subsequent *IWMP Gap and Needs Analysis* identified a number of specific needs that should be addressed in order that waste education is effectively and sufficiently taking place throughout the City. The shortcomings and/or gaps identified, realise the need for transforming and empowering the various affected sectors (industrial, commercial, domestic or governmental) to practice responsible waste management through better understanding, improved access to education and practical training.

Whereas it is recognised that the primary focus and priority of the Waste Department is to provide an acceptable level of waste collection and disposal service delivery, the relevance of waste education, training and awareness cannot be ignored, and a balance needs to be found in planning and allocating financial and human resources within the overall integrated waste management of the City.

Identified key areas of concern relate to inadequate communication strategies within national, provincial and local government and unstable political support for environmental education programmes. The Gap analysis highlighted the lack of economic and human capacity for the implementation of awareness raising, educational and training programmes. Limited skills of waste officials and lack of transfer of existing best practice waste management knowledge to the public is equally of concern. The maintenance and extension of local educational programmes is considered imperative to sustain the process of educating and empowering the public, private and government sectors for the promotion and practical implementation of responsible waste management. The following groups of general key strategy needs were identified:

1. Need to improve *Political Support* for Continuous Waste Education
2. Need to improve *Internal Governmental* Communication and Waste Education
3. Need to improve *External* Communication to and Waste Education for:

3a) Communities and NGOs

3b) Schools and Tertiary Institutions

3c) Commerce and Industry

3d) Special Events

3e) Special Institutions (e.g. Hospitals)

4. Need to improve/optimize existing waste education and training materials/infrastructure and align them with other internal¹ and external educational frameworks (e.g. NQF), waste programmes and policies
5. Need for Evaluation, Reward and Recognition Programmes to communicate and honour best practice and success stories in Waste Education for any of the above
6. Need to enforce existing legislation such as the Municipal Systems Act and the NWMS which prescribe continuous Environmental Awareness Raising, Education and Practical Training at all community and governmental levels as vital part of any practical application for a working IWMP.

5.2.1 Need to improve Political Support for Continuous Waste Education

Continuous political support on all governmental levels (and in particular from local politicians of all political parties in Cape Town) is key to a sustained successful waste education effort that is independent from political changes and instabilities. A commitment of a dedicated long-term funding for the maintenance and expansion of existing waste awareness, education and training programmes and the required human resources must be given. Waste education for all spheres of community (domestic, commercial, industrial and governmental) has to be considered a key priority that needs to stay apolitical at all times and has to be regularly monitored and evaluated for its effectiveness and impact.

5.2.2 Need to improve Internal Governmental Communication and Waste Education

Internal and interdepartmental communication and support for waste education and training has to be improved. Better coordination and communication across departments and directorates must be achieved e.g. by avoiding to operate in “silos” and rather choose an integrated approach to waste education. The effective interdepartmental sharing of existing resources and best practice experience will avoid unnecessary financial and human resource constraints.

5.2.3 Need to improve External Communication and Waste Education:

Environmental education has to be always considered “core business” by Local Authority. Currently many Council Departments are mostly “day to day” service delivery orientated

¹ Already in existence is the City of Cape Town’s Environmental Education Strategy, which has been referenced and described extensively in the Status Quo report. It is thus imperative that this document forms an integral part of the implementation phase of the IWMP. This will ensure that waste education is co-ordinated with the efforts of the Environmental Education Strategy.

and therefore operate on budgets and within financial allocation frames that do not always provide for additional capacities outside the traditional work activities. Environmental education (both internal and external) needs a dedicated long term budget that has to be independent from the normal operational budget. Since educational target groups are often identical when it comes to raising awareness on resource savings such as water, waste and electricity it is advisable to really align educational and training contents from the various Departments as much as possible.

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5.2.4 Need to improve/optimize existing waste education and training materials/infrastructure and align them with other internal and external educational frameworks (e.g. NQF), waste programmes and policies

The City has developed strategies for environmental education (which focus on waste education as well) and external education frameworks do exist. To enable the implementation of effective education and awareness training, there is a need to align these waste education programmes with existing frameworks. The effectiveness of training of waste educators, transfer of knowledge relating to best practices and technologies will therefore need to be ensured.

5.2.5 Need for Evaluation, Reward and Recognition Programmes to communicate and honour best practice and success stories in Waste Education for any of the above

There is a great need to measure/evaluate the performances of waste education programmes in terms of achieving the desired objectives and ensuring improvements in waste management. This will enable the City to address those key areas where attention is mostly required and ensure implementation of successes to other areas.

5.2.6 Need to enforce existing legislation such as the Municipal Systems Act and the NWMS which prescribe continuous Environmental Awareness Raising, Education and Practical Training at all community and governmental levels as vital part of any practical application for a working IWMP.

Enforcement of legislation is a key tool for the City to equip those who will implement the IWMP with the necessary skills and knowledge for ensuring that an acceptable service delivery in terms of waste, and other municipal services is achieved internally. In addition the various sectors externally become more informed about non-compliant practices and these can be managed more effectively.

The table below provides a summary of strategies and recommendations that are suggested in order to improve both political and internal/interdepartmental support for waste education and communication programs as well as boost external communication success.

Table 5.1 Toolbox for strategies for waste education and special projects.

<i>General Education/ Communication Instruments</i>	<i>Education & Awareness Raising Programmes: Internal and External</i>	<i>Corporate Education / Communication Initiatives</i>	<i>External Education/Communication Initiatives</i>	<i>Resource Optimisation</i>	<i>Social and Economic Incentives</i>	<i>Partnerships</i>
<i>Political Support & Training:</i> Select & train politicians/councillors as patrons for educational programmes, IWMP and application of by-laws.	<i>Internal Training:</i> Accredited waste education and awareness-raising programme for councillors, officials and staff.	<i>Internal Communication Strategies and objectives:</i> Set objectives and targets to develop a internal communication network and formulate strategy to be carried out.	<i>Communication Network within communities:</i> Implement effective strategies for communication - door-door education, street theatre and drama, media awareness raising, field trips field workers.	<i>Waste minimisation savings:</i> Redirected to fund further sustainable waste related activities or benefits to communities.	<i>Waste research bursaries:</i> Secure funding and mentorship from private sector and council for programmes relating to waste at institutions.	<i>IWEX:</i> Expansion of the programme and promotion of partnerships.
<i>Press announcement and launch waste awareness and education campaign:</i> Extension of Wastewise to all levels of society.	<i>Train-the-trainer programmes:</i> Accredited programmes for Industry, commercial, retail sectors, schools and tertiary institutions.	<i>Resource allocation:</i> Determination of financial and human resources based on proposed strategy and objectives.	<i>Assistance from Council to communities/NGO's:</i> Assist with PPP tender applications, entrepreneurial grant programmes. Assist with programmes relating to specific needs of communities.	<i>Corporate business sponsorship:</i> Canvas support and secure funds for infrastructure for educational projects.	<i>Reward and recognition programmes:</i> Reward - assist with future educational projects for the communities/industries, waste research competitions, school waste quiz, etc.	<i>Public Private Partnerships:</i> Engage private sector in adopting areas for clean-ups, educate about 'illegal dumping and littering. Funding for campaigns.
<i>Special Events Procurement Policy:</i> Assist with the formulation of a policy and targets and for awareness raising for Special events service and goods suppliers.	<i>Community training:</i> Training for households, consumers, retailers and producers on the benefits of waste minimisation principles.	<i>Corporate Call Centre for Waste management related support and assistance:</i> Formalise solid waste call and support centre for CCT community, industry and private sector.	<i>Education and training for industry, commercial etc:</i> Create awareness that the IWMP is part of the long-term plan that leads the CCT commerce and industry to sustainable business practice.	<i>Funding schemes:</i> Explore waste related job creation opportunities for communities.	<i>Publication of success stories:</i> Industries and communities success stories published as recognition for work well done.	<i>Partnerships with Institutions:</i> Adopt a School - where private sector could assist with fundraising for school environmental projects.
<i>Monitoring and measurement:</i> Regular measuring and evaluation of waste education key performance indicators against international best practice.	<i>International Best Practice Training:</i> Inform commerce and industry about the elements of an Integrated Waste Management Strategy.	<i>Formalise structure for communication:</i> Develop structure for communications division according to strategy and objectives.	<i>Waste Minimisation Club Expansion:</i> Report on actual WMC results and secure further support and expand programme.	<i>Communication tools and training materials:</i> Funding to be sourced for tools and materials e.g. grant-funding or private sectors	<i>Penalties:</i> Name and shame of industries, communities or others.	<i>Learnerships/ Internships:</i> Identify research areas and create learnerships with tertiary institutions and align with SETA, SAQA etc.
<i>Waste Information System:</i> Develop support for MEAD&P's WIS.	<i>Retail eco-sensitive:</i> Educate consumers on buying eco-responsibly.	<i>Waste Minimisation - Internally:</i> Implementing WM at council - "lead by example" and report on savings.	<i>Special Institution Educational Programmes:</i> Programme to inform and educate on international best practice. Promote WIS and regular benchmarking.	<i>Clean-up campaigns:</i> Partnerships to assist with clean-ups - adopt an area.	<i>Clean City awards:</i> Actively promote programmes for reward during the Clean City awards.	

5.3 International Best Practice and the CCT Environmental Education Status

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Environmental and waste education is a very complex subject and depending on the socio-economic and cultural background of an educational target group completely different educational strategies and programmes have to be applied to bring the message of “reduce, reuse, recycle” and “don’t litter” across. It is for example well documented that educational programmes for rural and informal communities which were developed and conducted highly successfully in Durban (as part of the former Keep Durban Beautiful Association educational drive) did not really achieve the same outcome when applied to informal areas in Cape Town.

While it is obviously important to study educational strategies and training materials utilised by other countries or South African Provinces it must be understood that Cape Town’s cultural diversity demands a range of “homegrown” and community need specific educational programmes and does not thrive on a “one size fits all” educational approach. It is therefore impossible to readily assess, compare and benchmark Cape Town’s educational initiatives directly with international or even national awareness raising approaches.

When Cape Town’s Waste Wise program was showcased at the 2002 World Summit for Sustainable Development a lot of interest and admiration was expressed by delegates from other countries who complemented Cape Town on its holistic and progressive vision for its City.

Cape Town’s approach to waste education which is aimed at instilling self-determination, responsibility, pride and ownership in people for their environment and is based on the understanding that meaningful and successful community waste education includes ALL citizens of Cape Town (including low, medium, high income households, NGOs, schools, institutions, event organisers, commerce, industry but also Government and Politicians etc.) and not only an isolated fragment of our society.

Parts of Cape Town’s vision and initial strategic approach to waste education (though it can not be directly benchmarked because the circumstances are unique) may be found in many internationally recognized top educational strategy programmes for integrated waste management and are reflected in the vision and mission statements of globally leading “wastewise” cities or countries such as Seattle (US), Curitiba (Brazil) etc. For a collection of international waste strategies please refer to the summary table in the Waste Minimisation (Chapter 4) Assessment Report.

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Chapter 6 – Assessment Report - Waste Information Management

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Chapter 6 describes the future waste generation trends and quantities for the preparation of the Assessment Report for the Integrated Waste Management Plan for the City of Cape Town.

6.1 Introduction

In the *Status Quo Report* the quantities and types of waste being generated, recycled, disposed of in the Metro were determined from an analysis of information obtained from a number of sources including the quantities of waste entering landfills or transfer, quantities received at drop-off facilities and information received from recovery operators and collectors. The results indicated that the annual total waste generated within the CTMA in 2002/2003 was in the order of 2,158,500 tonnes. The general breakdown of the categories of waste is presented in the table below.

Table 6.1 General Breakdown of the Categories of Waste

Category	Tonnes/annum
Household	820,866
Commercial	567,558
Industrial	339,991
Green	111,721
Builders Rubble	318,392

Some 288,000 tonnes per annum or some 13% of the total waste generated is recovered through recycling and composting initiatives.

The annual growth rate between 1996 and 2001 was estimated to be 3,8% whilst the population growth rate for the same period was 1,57%.

Existing characterisation studies were used to estimate the recycling and compostable components of the domestic waste stream for low, middle and high-income groups.

In this chapter a waste stream analysis is analysed in more detail in order that a waste generation model can be developed as a fundamental part of the IWMP.

6.2 Waste Generation Areas

The Directorate of Solid Waste Management has developed a rudimentary GIS based Collection database as a first order attempt to identify collection beats for the purposes of optimising collection with the available resources as well as to identify waste generation areas and quantities generated. The Metro is divided into four waste collection management areas named Atlantic, Tierberg, Impuma and Two Oceans as shown on Map 7.1 (Chapter 7 - Assessment Report). The database comprises numbered beats in each management area, the collection day and vehicle associated with each beat, the estimated quantity collected per beat and the disposal facility used.

It was considered possible that the Collection database could be used as the basis of the waste generation model if its data was reliable and verifiable. Generation could then be identified at a micro level - per beat. In order to verify the estimated quantities for

collection the Collection database was referenced to the weighbridge data of the landfills in the CMA for 2002/2003

Weighbridge data was available for Vissershok, Athlone RTS, Swartklip RTS, Bellville and Coastal Park. Unfortunately the data in some instances was not continuous due to either lost data or malfunctioning weighbridge data recorders. It should be noted that the data obtained from the weighbridges is collected on a monthly basis and captured into an “in-house” developed program. The data captured includes date, time, vehicle registration, net mass, owner (company or council department), depot (council), waste type, vehicle type and account type. The database allows for capturing of additional information such as beat number and shift number, but this information has not been collected. The categories of waste are very basic and include builder’s rubble (BDR). An example of the database is presented below.



Table 6.2 Example of a Collection Database

REG_NO	DATE	TIME	NET_WEIGHT	REFUSE_TYPE	DISTRICT	VEH_TYPE	PAY_CODE
CA136754	01/07/2002	7:18	2240	BDR	PRI	TRL	0
CA107332	01/07/2002	7:48	5010	MIX	PRI	FTK	4
CA491626	01/07/2002	8:54	1000	BDR	PRI	BAK	0
CA174182	01/07/2002	8:55	7600	BDR	RDS	FTK	0
CA636354	01/07/2002	9:34	546	GRD	PRI	BAK	0
CA29934	01/07/2002	10:07	3140	HHD	MOW	CMP	4

Although weighbridge data is collected and used for reporting, the information obtained is used for little more than noting monthly disposal quantities. The data was used in the past by the Cape Town Administration for payment.

In order to try and verify waste generation quantities the Collection database was referenced to the weighbridge databases using the vehicle registration number as a primary key. The analysis identified the collection beat, the collection day and the quantity of waste collected on the day and the waste type. The results showed that the Collection database was very much incomplete and that there was a difference in quantities in the order of 40% between the linked Collection database, 288,000 t/annum, and the raw weighbridge data of 450,000 t/annum. It was thus decided to not use the Collection database in determining the generation areas within the metro although it must be added that the database is a useful start to setting up a Waste Information System.

For the purposes of the waste generation model it was decided to keep it at the four-area level, determine the distribution of high, middle and low-income groups and the population in each area. Spatial population data was obtained from the CCT GIS and included suburb, population (1996 Census), number of households and median annual household income. The data was referenced to the four waste management areas, adjusted pro-rata to 2001 population figures and the resulting data was then categorised into income levels. The criteria used for determining income levels was adopted from the Rand Water Study carried out in 1998 and was considered suitable for relating to the 1996 income data that was available. The socio-economic criteria are tabled below.

Table 6.3 Socio-economic criteria adopted from the Rand Water Study

Income Group	Income Level Median Annual Household Income
Low	None - R41,999
Middle	R42,000 - R71,999
High	R72,000 +

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The socio-economic income grouping in the metro is shown in the graph below and the breakdown per management area for 2001 population figures is presented in Table 6.4.

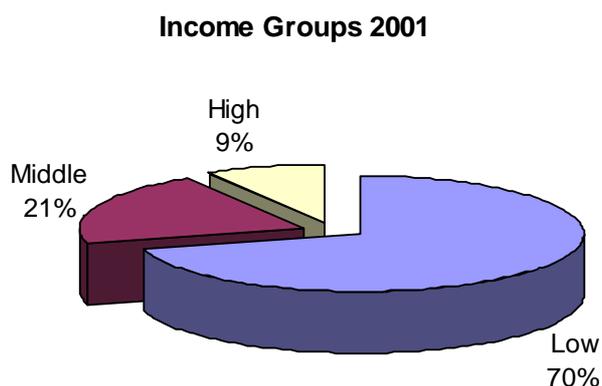


Figure 6.1 Socio-economic income grouping in the metro

Table 6.4 Socio-economic and spatial distribution of 2001 Population

Income Group	Area 1	Area 2	Area 3	Area 4	Total
Low Income	214,888	485,031	636,380	709,844	2,046,144
Middle Income	145,916	146,764	135,831	171,498	600,008
High Income	67,713	106,800	22,908	49,678	247,099
Total	428,517	738,595	795,119	931,020	2,893,251

The above data will be used as the basis for the waste generation model. Referring to section 5.3 of the Status Quo report population growth projections have been based on a revised middle scenario from the Dorrington study. The revision incorporates the 2001 census figures. There is currently little data to indicate the growth rates for each socio-economic group population and therefore projection for the city has simply been applied pro-rata to each income group. The population projection for each waste management area is presented in Table 6.5 below.

Table 6.5 Population Projections per Waste Management Area

Area	2001	2003	2006	2016	2031
1	428,517	452,187	475,858	531,694	563,497
2	738,595	779,394	820,193	916,432	971,248
3	795,119	839,041	882,962	986,567	1,045,578
4	931,020	982,448	1,033,877	1,155,189	1,224,287
Total	2,893,251	3,053,070	3,212,889	3,589,882	3,804,610

6.3 Waste Generation

An estimation of the total quantity of waste generated in the CTMA in 2002/2003 presented in the Status Quo report was derived from records for waste received at the landfills, compost plants, drop-off facilities and information received from recyclers. The total quantity was some 2,158,500 tonnes. This estimate will include all illegal dumping that has been collected by the City as well as hazardous wastes received at the City and private Vissershok facilities.

An assessment of the quantities of waste disposed of at landfills with weighbridge data between the census of 1996 and 2001 shows that there has been an increase in the amount of waste generated in the CTMA from 690,000 tonnes in 1995/96 to 845,000 tonnes in 2000/2001. This represents an average increase of 3,8% a year. Whilst the large increase in waste coincides with increases in the population, it also shows that the average waste output per capita has increased. The average annual percentage increase in the population over the same period is 1.57%.

In the Status Quo report the categorisation of the waste generated in the metro was determined as shown in Table 6.6 below. In the absence of appropriate characterisation of incoming waste at the landfills it was assumed that household waste was all waste designated as such at the landfills plus waste disposed of at the Council compost plants, commercial waste designated as mixed, industrial waste designated as hazardous at both Vissershok sites plus recycled waste and green and builders rubble as designated at the landfills.

Table 6.6 Categorisation of Waste Generated in the Cape Town Metropolitan Area

Category	Tonnes/annum	% of Total
Household	820,866	38%
Commercial	567,558	26%
Industrial	339,991	16%
Green	111,721	5%
Builders Rubble	318,392	15%

The generation rate per capita for the above categories was determined as being 715 kg/annum or 1,96kg/day for 2003 and a breakdown of generation rates for each category is presented in Table 6.7 below.

Table 6.7 Waste Generated per Capita for Waste Categories

Category	Kg/capita/day (7-day week)
Household	0,75
Commercial	0,52
Industrial	0,31
Green	0,10
Builders Rubble	0,28

A review of other studies undertaken in South Africa showed that the calculated generation rate is of the same order.

Johannesburg IWMP study	1,76 kg/c/d
Wright Pierce Study	1,80 kg/c/d
Durban DSW	1,75 kg/c/d

6

For the general categories of waste the Wright Pierce Study and the Johannesburg IWMP estimated the following generation rates.

Table 6.8 Wright Pierce and Johannesburg IWMP estimated waste generation rate

	Wright Pierce	Johannesburg IWMP
Household	0,89 kg/c/d	0,80 kg/c/d
Commercial and Industrial	0,91 kg/c/d	0,65 kg/c/d
Garden	Included in C&I waste	0,31 kg/c/d

Generation rates for each socio-economic level were reviewed and are presented below.

Table 6.9 Generation rates for each socio-economic level

Income Group	Kg/c/day			
	Wright Pierce	Johannesburg IWMP	Durban	Mbande
High Income	1,62	2,00	1,50	1,24
Middle Income	1,05	1,10	0,40	0,70
Low	0,62	0,50	0,13	0,12-0,33

An exercise was undertaken to calculate generation rates for each socio-economic grouping by referencing the Collection database with suburb population data. The Collection database includes weight collected per beat and by identifying the beats within a suburb the total waste collected for the week can be calculated and the mass per person per day is calculated using the population for the suburb. The rates calculated ranged from 1,8 to 2,2 kg/c/d for high income, 0,8 to 1,0 kg/c/d for middle income and 0,4 to 0,56 for low income.

Table 6.10 presents the generations adopted for the waste generation model. It has been assumed that garden waste will only be generated by high and middle income groups and that commercial and industrial waste and builders rubble will be generated equally by all income groups.

Table 6.10 Waste Generation Rates adopted for IWMP

Income Group	Kg/c/day				
	Household	Garden	C&I	Builders	Total
High Income	2,00	0.35	0.83	0.29	3.47
Middle Income	1.10	0.35	0.83	0.29	2.57
Low Income	0.50	0	0.83	0.29	1.62

The key assumptions which underpin the projection of waste generation over the planning period (2003 - 2031) for the IWMP are summarised below:

Summary of Assumptions

- ◆ The increase in population between 1996 and 2001 has been calculated based on census data. The average annual increase for this period is 1.57%
- ◆ The average annual increase in waste over the same time period has been calculated as 3.8%
- ◆ The average increase in waste generation per capita is therefore 2.0% per annum
- ◆ To forecast waste growth in a generation model a 2,0% annual increase in waste generation has been applied until 2010, together with the estimated increase in population as defined in Table 6.5.
- ◆ After 2010 it has been assumed that the quantity of waste will increase at half this rate. The reduction or leveling off will be due to the introduction of measures to meet the IWMP and national waste strategies due to waste minimisation and other related policy initiatives



Figure 6.2 shows the projected increase in waste generation up to 2031. If waste continues to increase at the rate it has over the past six years for the next 6 years, before it starts to slow down then the total quantity of waste generated in 2031 will be 3,71 mil. tonnes. This is the baseline projection established for forward planning purposes. However, Figure 6.2 also shows the impact of waste continuing to grow at past rates over the whole 25-year strategy period. This would result in total waste generation of 4,29 mil. tonnes; nearly double the current annual quantity.

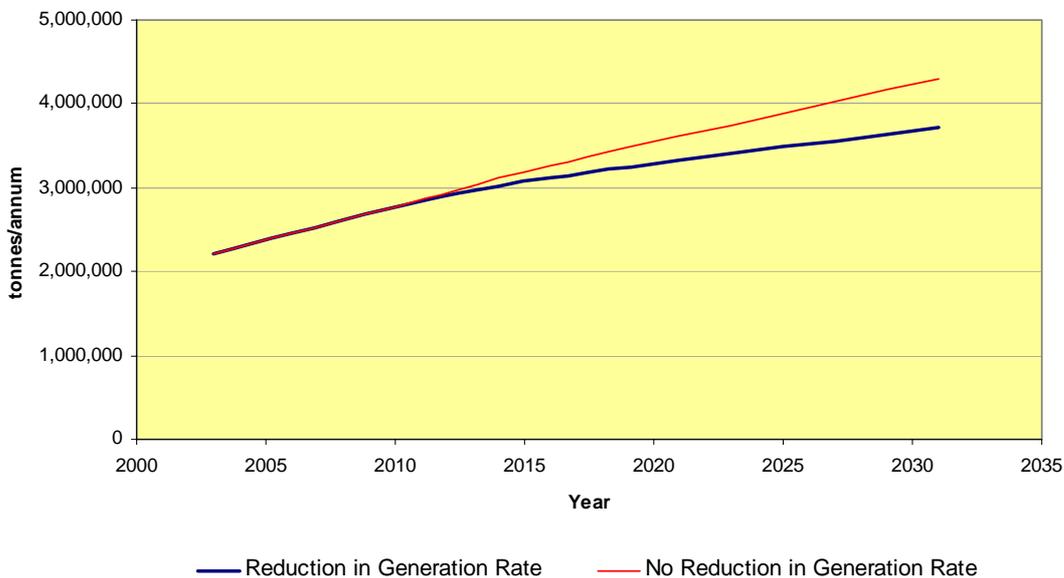


Figure 6.2 Projected Waste Generation

Detailed calculations are presented in Appendix 6.1 and include waste generation projections for the four waste management areas for each general category of waste.

6.4 Waste Stream

As previously discussed the metro produced some 2,158,000 tonnes of waste in 2002/2003. This can be split into four main components: household waste, garden waste, commercial and industrial and builder's rubble. Figure 6.3 illustrates the waste stream contributing to the total. Presently reliance is on landfill for final disposal, with about 87% of waste generated being landfilled and 13% recycled. One of the strategic objectives of the IWMP will be to progressively reduce the amount of waste that is going to landfill through increasing waste minimisation and recovery and therefore it is of paramount importance that there is a good understanding of the waste stream composition.

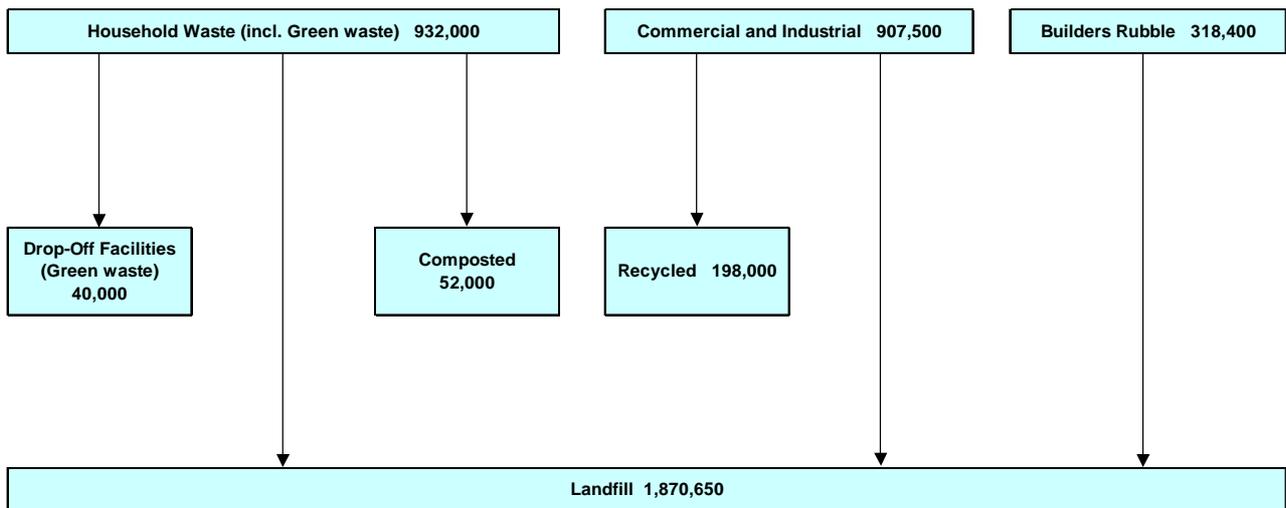


Figure 6.3 Cape Town's Waste Flow (2003)

The Status Quo report analysed a number of waste characterisations studies carried out in the City and Table 6.11 below presents the results of the analysis and the proposed characterisation of household waste for each income group.

Table 6.11 Waste Characterisation per Income Group

Category	Low Income	Middle	High
Organic	57.2	38.8	38.9
Other	6.2	11.2	8.2
Plastic	9.8	15.5	14.0
Glass	6.0	7.0	12.5
Metal	3.5	4.7	9.0
Paper	16.2	22.7	17.4

Waste analyses undertaken for the Johannesburg IWMP and data from research undertaken by Mbande display a large variance in each category for all income groups and would confirm that waste characteristics are extremely site specific. There are a number of

factors which influence waste composition such as of type of fuel used for cooking, development of infrastructure, season, socio-economic status, cultural habits etc.

Table 6.12 Variance in Waste Composition (%) of Data Reviewed

Category	Low Income	Middle	High
Organic	20 - 45	20 - 50	30 - 40
Other	6 - 28	3 - 40	6 - 25
Plastic	10 - 15	1 - 10	5 - 20
Glass	2 - 6	1 - 10	2 - 8
Metal	1 - 5	1 - 5	2 - 6
Paper	13 - 32	5 - 20	15 - 40



In order to ensure that the Waste Information System is meaningful a proper program for waste characterisation needs to be developed and maintained and a standard protocol must be adopted to ensure that temporal data is comparable. This must be a short-term goal for the IWMP.

For the purposes of developing a waste stream characterisation component in the generation model it is assumed that the historic composition studies undertaken in the City provide the best available information and therefore the figures in Table 6.12 have been adopted.

The projected waste stream components have been determined in the generation model and are presented in Table 6.13 below.

Table 6.13 Projected Waste Component Quantities for the CTMA (tonnes/annum)

Year	Garden	C&I	Builders	Organic	Other	Plastic	Glass	Metal	Paper
2003	114,196	723,085	323,167	398,074	68,511	118,121	80,518	47,814	322,821
2006	127,384	806,593	360,489	444,047	76,423	131,762	89,817	53,336	360,103
2010	143,428	908,182	405,893	499,974	86,049	148,357	101,129	60,053	405,458
2016	161,129	1,020,268	455,987	561,680	96,668	166,667	113,611	67,465	455,498
2031	192,113	1,216,457	543,669	669,686	115,257	198,716	135,457	80,438	543,087

There is potentially some 60% of the waste stream that could be diverted from landfill. Already some 13% is being diverted and the IWMP will now need to propose a strategy to increase the diversion rate over time.

6.5 Assessment Overview and Summary

A number of “gaps” were identified in the Status Quo report regarding waste generation and characterisation in the City. The data used in the Status Quo report has been reviewed, updated where required and compared to data from similar studies in South Africa.

6

The assessment has identified a number of issues that need to be taken into consideration during the development of the IWMP, as follows

GAPS	NEEDS
There is no reliable database for determining the quantity of waste generated in the City.	<ul style="list-style-type: none"> • Develop a WIS as a high priority and also incorporate the Collection GIS into the system.
Categorisation of waste at the weighbridges is inconsistent.	<ul style="list-style-type: none"> • Standardise in the WIS
Waste characterisation data needs to be more comprehensive and standardised.	<ul style="list-style-type: none"> • Develop a Characterisation protocol and implement a long-term program for determining waste composition, in particular commercial and industrial wastes.

During the development of the strategy a number of alternative waste minimisation scenarios need to be formulated which can then be incorporated into the waste generation model.

References

- 6-1. Durban Solid Waste - information on website
<http://www.ceroi.net/reports/durban/issues/waste/index.htm>
- 6-2. Jarrod Ball and Associates Consortium. City of Johannesburg (2002). 1st Generation Integrated Waste Management Plan for the City of Johannesburg.
- 6-3. Jeffares and Green & Ingerop Africa (2004). Final Status Quo Report, Integrated Waste Management Plan for the City of Cape Town.
- 6-4. Mbande, C. (2003). Appropriate approach in measuring waste generation, composition and density in developing areas. Technical Paper, Journal of the South African Institution of Civil Engineering, 45(3) 2003 Pages 2-10, Paper 477.
- 6-5. Wright-Pierce, Lee International, Entech Consultants, Bham Tayob Khan & Matunda, Mallinicks (1999). Feasibility Study Towards an Integrated Solid waste Management Plan for the Cape Metropolitan Area.

Appendix 6.1

Appendix 6.1 A - Waste Generation Model

Appendix 6.1 B - Supporting information

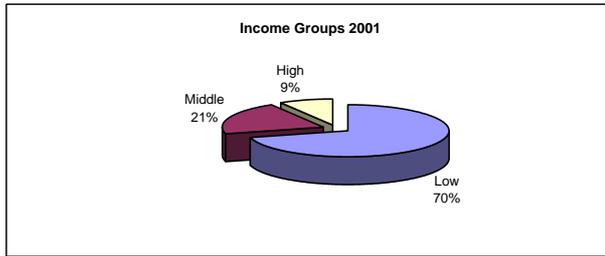
6

City of Cape Town IWMP - Waste Generation Model

DEMOGRAPHICS

Area Population per Income Group (2001)

	1	2	3	4	
Low Income	214,888	485,031	636,380	709,844	2,046,144
Middle Income	145,916	146,764	135,831	171,498	600,008
High Income	67,713	106,800	22,908	49,678	247,099
	428,517	738,595	795,119	931,020	2,893,251



Population Growth per Area

Area	2001	2003	2006	2016	2031
1	428,517	452,187	475,858	531,694	563,497
2	738,595	779,394	820,193	916,432	971,248
3	795,119	839,041	882,962	986,567	1,045,578
4	931,020	982,448	1,033,877	1,155,189	1,224,287
	2,893,251	3,053,070	3,212,889	3,589,882	3,804,610

Population Growth per Income Groups per Area

Area	Income Group	2001	2003	2006	2016	2031
1	Low	214,888	226,758	238,628	266,629	282,577
	Middle	145,916	153,976	162,036	181,049	191,878
	High	67,713	71,453	75,194	84,017	89,042
2	Low	485,031	511,823	538,616	601,816	637,813
	Middle	146,764	154,871	162,978	182,101	192,994
	High	106,800	112,700	118,599	132,515	140,442
3	Low	636,380	671,533	706,686	789,607	836,837
	Middle	135,831	143,334	150,837	168,536	178,616
	High	22,908	24,174	25,439	28,424	30,125
4	Low	709,844	749,055	788,266	880,759	933,442
	Middle	171,498	180,971	190,444	212,791	225,519
	High	49,678	52,422	55,166	61,639	65,326
Total	Low	2,046,144	2,159,170	2,272,196	2,538,810	2,690,669
	Middle	600,008	633,151	666,295	744,476	789,007
	High	247,099	260,749	274,398	306,595	324,934

WASTE GENERATION RATES AND CHARACTERISTICS

Waste Generation kg/c/d

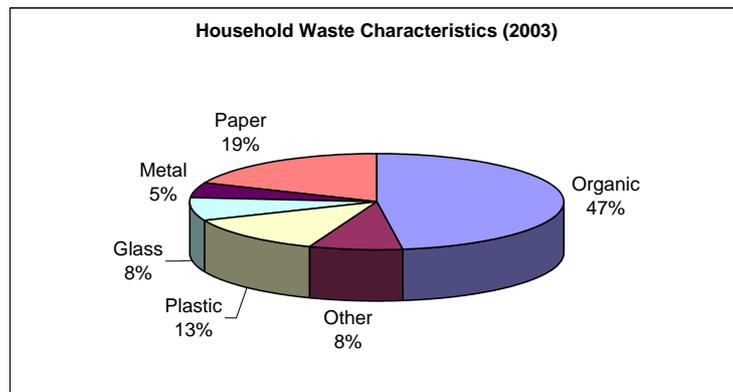
Income Group	Household	Garden	C&I	Builders
Low	0.50	0.00	0.83	0.29
Middle	1.10	0.35	0.83	0.29
High	2.00	0.35	0.83	0.29

Classification of Household Waste per Income Group

Income Group	Organic	Other	Plastic	Glass	Metal	Paper
Low	57.20%	6.20%	9.80%	6.00%	3.50%	16.20%
Middle	38.80%	11.20%	15.50%	7.00%	4.70%	22.70%
High	38.90%	8.20%	14.00%	12.50%	9.00%	17.40%

Classification of Recyclables in C&I Waste

Plastic	1.5%
Glass	1.7%
Paper	18.2%
Tin	0.5%

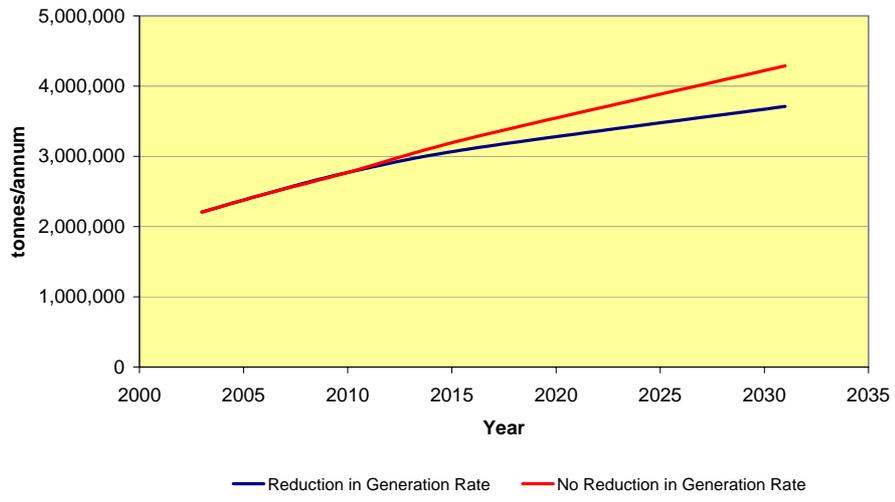


WASTE GENERATION MODULE

Waste Flow per Income Group per Area (Tonnes/annum)

Area	Income Group	Year/Pop.	Tonnes per annum					Waste Characteristics						
			2003 Pop	Domestic	Garden	C&I	Builders	Total	Organic	Other	Plastic	Glass	Metal	Paper
1	Low	226,758	41,383			68,696	24,002	134,082	23,671	2,566	4,056	2,483	1,448	6,704
	Middle	153,976	61,821	19,670		46,647	16,298	144,437	23,987	6,924	9,582	4,327	2,906	14,033
	High	71,453	52,161	9,128		21,647	7,563	90,499	20,291	4,277	7,303	6,520	4,694	9,076
2	Low	511,823	93,408			155,057	54,177	302,641	53,429	5,791	9,154	5,604	3,269	15,132
	Middle	154,871	62,181	19,785		46,918	16,393	145,277	24,126	6,964	9,638	4,353	2,922	14,115
	High	112,700	82,271	14,397		34,142	11,929	142,740	32,003	6,746	11,518	10,284	7,404	14,315
3	Low	671,533	122,555			203,441	71,082	397,077	70,101	7,598	12,010	7,353	4,289	19,854
	Middle	143,334	57,548	18,311		43,423	15,172	134,454	22,329	6,445	8,920	4,028	2,705	13,063
	High	24,174	17,647	3,088		7,323	2,559	30,617	6,865	1,447	2,471	2,206	1,588	3,071
4	Low	749,055	136,703			226,926	79,287	442,916	78,194	8,476	13,397	8,202	4,785	22,146
	Middle	180,971	72,660	23,119		54,825	19,156	169,760	28,192	8,138	11,262	5,086	3,415	16,494
	High	52,422	38,268	6,697		15,881	5,549	66,395	14,886	3,138	5,358	4,784	3,444	6,659
Total	Low	2,159,170	394,049			654,121	228,548	1,276,717	225,396	24,431	38,617	23,643	13,792	63,836
	Middle	633,151	254,210	80,885		191,813	67,019	593,928	98,634	28,472	39,403	17,795	11,948	57,706
	High	260,749	190,347	33,311		78,994	27,600	330,251	74,045	15,608	26,649	23,793	17,131	33,120
Total All		3,053,070	838,605	114,196		924,928	323,167	2,200,896	398,074	68,511	104,668	65,231	42,871	154,662
			0.75	0.10		0.83		0.29						
		2006 Pop	Domestic	Garden	C&I	Builders	Total	Organic	Other	Plastic	Glass	Metal	Paper	
1	Low	238,628	46,163	0		76,630	26,774	149,567	26,405	2,862	4,524	2,770	1,616	7,478
	Middle	162,036	68,961	21,942		52,034	18,181	161,118	26,757	7,724	10,689	4,827	3,241	15,654
	High	75,194	58,185	10,182		24,147	8,437	100,951	22,634	4,771	8,146	7,273	5,237	10,124
2	Low	538,616	104,195	0		172,964	60,433	337,593	59,600	6,460	10,211	6,252	3,647	16,880
	Middle	162,978	69,362	22,070		52,337	18,286	162,054	26,912	7,769	10,751	4,855	3,260	15,745
	High	118,599	91,772	16,060		38,085	13,307	159,224	35,699	7,525	12,848	11,471	8,259	15,968
3	Low	706,686	136,708	0		226,936	79,291	442,935	78,197	8,476	13,397	8,203	4,785	22,147
	Middle	150,837	64,195	20,426		48,438	16,924	144,982	24,908	7,190	9,950	4,494	3,017	14,572
	High	25,439	19,685	3,445		8,169	2,854	34,153	7,657	1,614	2,756	2,461	1,772	3,425
4	Low	788,266	152,490	0		253,133	88,444	494,068	87,224	9,454	14,944	9,149	5,337	24,703
	Middle	190,444	81,051	25,789		61,157	21,368	189,365	31,448	9,078	12,563	5,674	3,809	18,399
	High	55,166	42,688	7,470		17,715	6,190	74,063	16,605	3,500	5,976	5,336	3,842	7,428
Total	Low	2,272,196	439,556	0		729,663	254,943	1,424,162	251,426	27,252	43,077	26,373	15,384	71,208
	Middle	666,295	283,568	90,226		213,965	74,759	662,519	110,025	31,760	43,953	19,850	13,328	64,370
	High	274,398	212,329	37,158		88,117	30,788	368,391	82,596	17,411	29,726	26,541	19,110	36,945
Total All		3,212,889	935,454	127,384		1,031,745	360,489	2,455,073	444,047	76,423	116,756	72,764	47,822	172,523
		2010 Pop	Domestic	Garden	C&I	Builders	Total	Organic	Other	Plastic	Glass	Metal	Paper	
1	Low	249,829	51,977	0		86,282	30,147	168,405	29,731	3,223	5,094	3,119	1,819	8,420
	Middle	169,641	77,646	24,706		58,588	20,470	181,410	30,127	8,696	12,035	5,435	3,649	17,626
	High	78,723	65,513	11,465		27,188	9,499	113,665	25,485	5,372	9,172	8,189	5,896	11,399
2	Low	563,896	117,319	0		194,749	68,045	380,112	67,106	7,274	11,497	7,039	4,106	19,006
	Middle	170,627	78,098	24,849		58,928	20,589	182,465	30,302	8,747	12,105	5,467	3,671	17,728
	High	124,165	103,330	18,083		42,882	14,983	179,278	40,196	8,473	14,466	12,916	9,300	17,980
3	Low	739,854	153,927	0		255,518	89,277	498,722	88,046	9,543	15,085	9,236	5,387	24,936
	Middle	157,916	72,280	22,998		54,538	19,056	168,872	28,045	8,095	11,203	5,060	3,397	16,408
	High	26,633	22,164	3,879		9,198	3,214	38,455	8,622	1,817	3,103	2,771	1,995	3,857
4	Low	825,263	171,696	0		285,015	99,584	556,295	98,210	10,645	16,826	10,302	6,009	27,815
	Middle	199,383	91,260	29,037		68,859	24,059	213,216	35,409	10,221	14,145	6,388	4,289	20,716
	High	57,755	48,064	8,411		19,947	6,969	83,391	18,697	3,941	6,729	6,008	4,326	8,363
Total	Low	2,378,842	494,918	0		821,564	287,052	1,603,534	283,093	30,685	48,502	29,695	17,322	80,177
	Middle	697,567	319,284	101,590		240,914	84,175	745,963	123,882	35,760	49,489	22,350	15,006	72,477
	High	287,277	239,072	41,838		99,215	34,665	414,790	92,999	19,604	33,470	29,884	21,516	41,599
Total All		3,363,686	1,053,274	143,428		1,161,693	405,893	2,764,287	499,974	86,049	131,461	81,929	53,845	194,253
		2016 Pop	Domestic	Garden	C&I	Builders	Total	Organic	Other	Plastic	Glass	Metal	Paper	
1	Low	266,629	58,392	0		96,930	33,867	189,189	33,400	3,620	5,722	3,503	2,044	9,459
	Middle	181,049	87,229	27,755		65,818	22,997	203,799	33,845	9,770	13,521	6,106	4,100	19,801
	High	84,017	73,599	12,880		30,543	10,672	127,694	28,630	6,035	10,304	9,200	6,624	12,806
2	Low	601,816	131,798	0		218,784	76,443	427,024	75,388	8,171	12,916	7,908	4,613	21,351
	Middle	182,101	87,736	27,916		66,201	23,130	204,984	34,042	9,826	13,599	6,142	4,124	19,916
	High	132,515	116,083	20,315		48,175	16,832	201,404	45,156	9,519	16,252	14,510	10,447	20,198
3	Low	789,607	172,924	0		287,054	100,296	560,273	98,912	10,721	16,947	10,375	6,052	28,014
	Middle	168,536	81,200	25,836		61,269	21,407	189,714	31,506	9,094	12,586	5,684	3,816	18,432
	High	28,424	24,900	4,357		10,333	3,610	43,201	9,686	2,042	3,486	3,112	2,241	4,333
4	Low	880,759	192,886	0		320,191	111,874	624,952	110,331	11,959	18,903	11,573	6,751	31,248
	Middle	212,791	102,523	32,621		77,358	27,029	239,530	39,779	11,483	15,891	7,177	4,819	23,273
	High	61,639	53,996	9,449		22,408	7,829	93,683	21,004	4,428	7,559	6,750	4,860	9,395
Total	Low	2,538,810	555,999	0		922,959	322,480	1,801,438	318,032	34,472	54,488	33,360	19,460	90,072
	Middle	744,476	358,689	114,128		270,647	94,563	838,027	139,171	40,173	55,597	25,108	16,858	81,422
	High	306,595	268,578	47,001		111,460	38,944	465,982	104,477	22,023	37,601	33,572	24,172	46,733
Total All		3,589,882	1,183,266	161,129		1,305,066	455,987	3,105,448	561,680	96,668	147,686	92,040	60,490	218,227
		2031 Pop	Domestic	Garden	C&I	Builders	Total	Organic	Other	Plastic	Glass	Metal	Paper	
1	Low	282,577	69,620	0		115,569	40,380	225,568	39,823	4,316	6,823	4,177	2,437	11,278
	Middle	191,878	104,003	33,092		78,475	27,419	242,988	40,353	11,648	16,120	7,280	4,888	23,609
	High	89,042	87,751	15,356		36,417	12,724	152,248	34,135	7,196	12,285	10,969	7,898	15,269
2	Low	637,813	157,141	0										

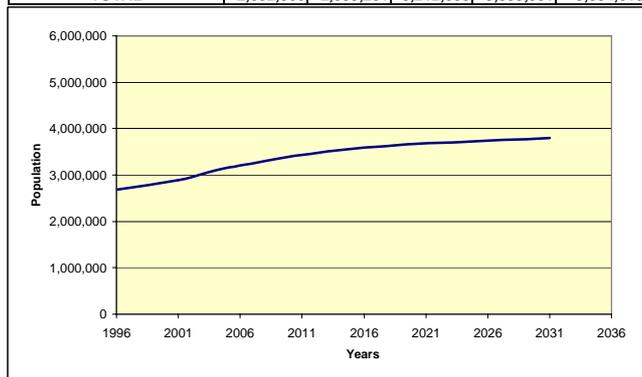
Waste Growth



Revised Population Growth

Waste Districts	Suburb	1996 pop	Revised 2001 pop	Revised 2006 pop	Revised 2016 pop	Revised 2031 pop
1	W^Atlantis	457	468	489	533	587
1	N^Mamre	526	540	564	613	676
1	Mamre	6,406	6,364	7,257	8,237	8,711
1	Atlantis	52,400	55,096	62,518	68,494	72,580
1	SE^Atlantis	4,347	6,705	7,679	8,937	9,946
1	Melkbos	7,376	8,507	33,438	59,441	73,805
1	N^Blouberg	880	852	31,147	62,456	79,443
1	N^TableView	784	15,068	29,273	44,237	52,516
1	Table View	22,922	25,475	26,619	28,487	30,166
1	Milnerton NE	17,138	19,796	26,117	32,861	36,405
1	Milnerton	18,142	20,229	20,702	21,621	22,417
1	Table Mnt.	3,391	3,478	3,633	3,954	4,360
1	Sea Point	28,835	28,645	28,984	29,594	29,657
1	CT CBD	33,764	33,928	36,174	39,222	40,668
1	Woodst/Obs	31,149	30,757	31,966	34,327	33,935
1	Newlands	60,705	61,057	62,143	64,197	65,476
1	Kensington	32,727	33,235	39,595	47,292	52,815
1	Pinelands	21,542	21,764	22,395	23,649	24,926
1	Langa	47,848	46,946	46,915	46,725	45,111
1	Hout Bay	20,665	22,778	26,131	31,491	38,648
2	Lansdowne	140,655	138,884	139,676	140,888	138,636
2	Guguletu	229,115	226,230	227,519	229,493	225,826
2	Rural	1,346	1,381	1,442	1,570	1,731
2	NE^D'ville	2,664	2,953	3,623	4,446	5,079
2	N^D'ville	2,912	4,142	7,700	11,539	13,841
2	D'ville quarries	1,170	1,200	3,713	6,367	7,891
2	Bothasig	32,195	32,351	33,364	35,104	36,530
2	Panorama	13,701	14,328	14,664	15,317	15,883
2	Welg/D'ville-W	28,421	29,413	29,774	30,425	30,530
2	D'ville NE	10,489	12,269	13,818	15,615	16,642
2	Eversdal	20,122	20,199	20,558	21,237	21,659
2	Goodwood	26,652	26,477	26,790	27,353	27,412
2	Parow	24,696	24,533	24,824	25,345	25,399
2	Belville	35,263	35,236	37,385	40,142	41,733
2	Bishop Lavis	172,859	170,682	171,655	173,145	170,378
2	Elsies River	65,603	64,367	65,596	66,650	65,152
3	Belhar	72,892	74,247	75,870	78,239	78,872
3	Delft	37,194	64,214	98,509	113,991	119,536
3	Driftsands/Mf	14,211	29,645	39,533	50,286	56,366
3	Khayel N	168,202	176,960	179,158	183,140	183,865
3	Khayel S	97,353	111,032	126,093	154,489	167,439
3	Joost vlakke	2,108	6,150	6,636	7,843	10,255
3	Uitsig	8,903	12,795	23,862	35,629	42,324
3	Vredeklouf	10,836	12,545	16,099	20,177	22,856
3	Scottsdene/Wall	81,929	89,761	100,427	112,861	119,934
3	Brackenfell	17,229	18,400	22,917	27,769	30,263
3	Zevenwacht	1,469	1,507	1,574	1,713	1,889
3	Kuilsrivier East	15,936	18,018	23,277	29,098	32,527
3	Kuilsrivier West	21,180	23,908	26,667	30,160	32,678
3	Nooiensfontein	9,303	20,126	34,498	49,951	58,997
3	Blue Downs N	50,377	57,490	61,550	67,602	73,030
3	Jacobsdal	2,256	2,489	2,797	3,522	4,834
3	Eersteriv S	29,319	30,069	32,362	36,118	40,163
3	N^Faure	626	642	671	730	805
3	Faure	2,957	3,032	4,183	5,511	6,436
3	Macassar	23,354	24,858	35,220	46,464	52,946
3	AECI	2,207	2,136	4,596	14,515	27,081
3	Heldervue	5,680	5,823	6,912	8,128	8,806
3	Helderberg NR	464	476	628	806	935
3	Somerset - West	27,181	28,034	30,519	33,858	36,433
3	Skapenberg	4,639	5,212	11,036	20,064	23,881
3	Strand	51,058	54,541	61,865	73,519	78,806
3	Gordons Bay	7,332	7,556	9,213	11,042	12,059
3	HH mountains	3,460	3,549	3,707	4,034	4,449
4	Phillipi-horti	4,678	6,124	7,251	10,197	16,703
4	Strandfontein	20,799	26,496	32,881	39,788	43,425
4	Phillipi-East	91,939	136,835	138,385	141,178	141,370
4	Mitchells Plain	179,964	182,439	196,935	212,522	217,337
4	M^ Plain South	59,896	59,850	60,913	62,923	64,170
4	Silvermine	233	239	250	272	300
4	Bishopscourt?	13,027	13,806	14,129	14,758	15,304
4	Tokai	13,435	16,747	17,137	17,895	18,548
4	Plumstead	107,361	107,415	109,322	112,931	115,171
4	Ottery	52,700	54,550	58,442	66,104	74,703
4	Grassy Park	82,194	87,630	89,681	93,673	97,132
4	Muizenberg	15,822	15,718	15,904	16,238	16,273
4	Noordhoek	30,829	33,173	39,476	47,133	52,675
4	Vishoek/Sim	20,280	20,488	24,952	30,132	33,511
4	Cape Point NR	185	190	1,013	1,874	2,354

TOTAL	2,682,866	2,893,251	3,212,888	3,589,881	3,804,610
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Estimation Waste Generated in the CTMA in 2003

Source	Total	Categories						Total less sand
		Household	Commercial	Industrial	Green	Builders Rubble	Cover Sand	
ARTS	147,619	73,809	73,809					147,619
Swartklip	209,047	106,554	82,549		8,665	11,355	14,900	209,122
Coastal Park	320,553	104,807	46,516		14,158	152,516	9,821	317,997
Vissershok	158,497	21	63,256	74,087	1,080	20,154	685	158,598
Bellville	251,080	156,562	61,477		19,698	10,076	3,267	247,813
Vissershok Private	320,416	46,051	86,102	67,854		101,400		301,407
Faure	226,720	130,552	71,462	0	14,073	10,633	9,014	226,720
Brackenfell	261,381	150,510	82,387	0	16,225	12,259	10,393	261,381
Sub Total	1,895,312	768,866	567,558	141,941	73,899	318,392	48,081	1,870,657
Recycle					10%			
Compost Plants	52,000	52,000						52,000
Drop Off	37,823				37,823			37,823
Plastic	13,200			13,200				13,200
Glass	15,000			15,000				15,000
Paper	165,000			165,000				165,000
Tin	4,850			4,850				4,850
Sub Total	287,873	52,000	0	198,050	37,823	0	0	287,873
Grand Total (tonnes)	2,183,185	820,866	567,558	339,991	111,721	318,392	48,081	2,158,529

Total waste generated	2,158,529
Average pop 2002/2003	2,985,815.05
Generation Rate /capita	0.72 t/yr
	1.98 kg/day

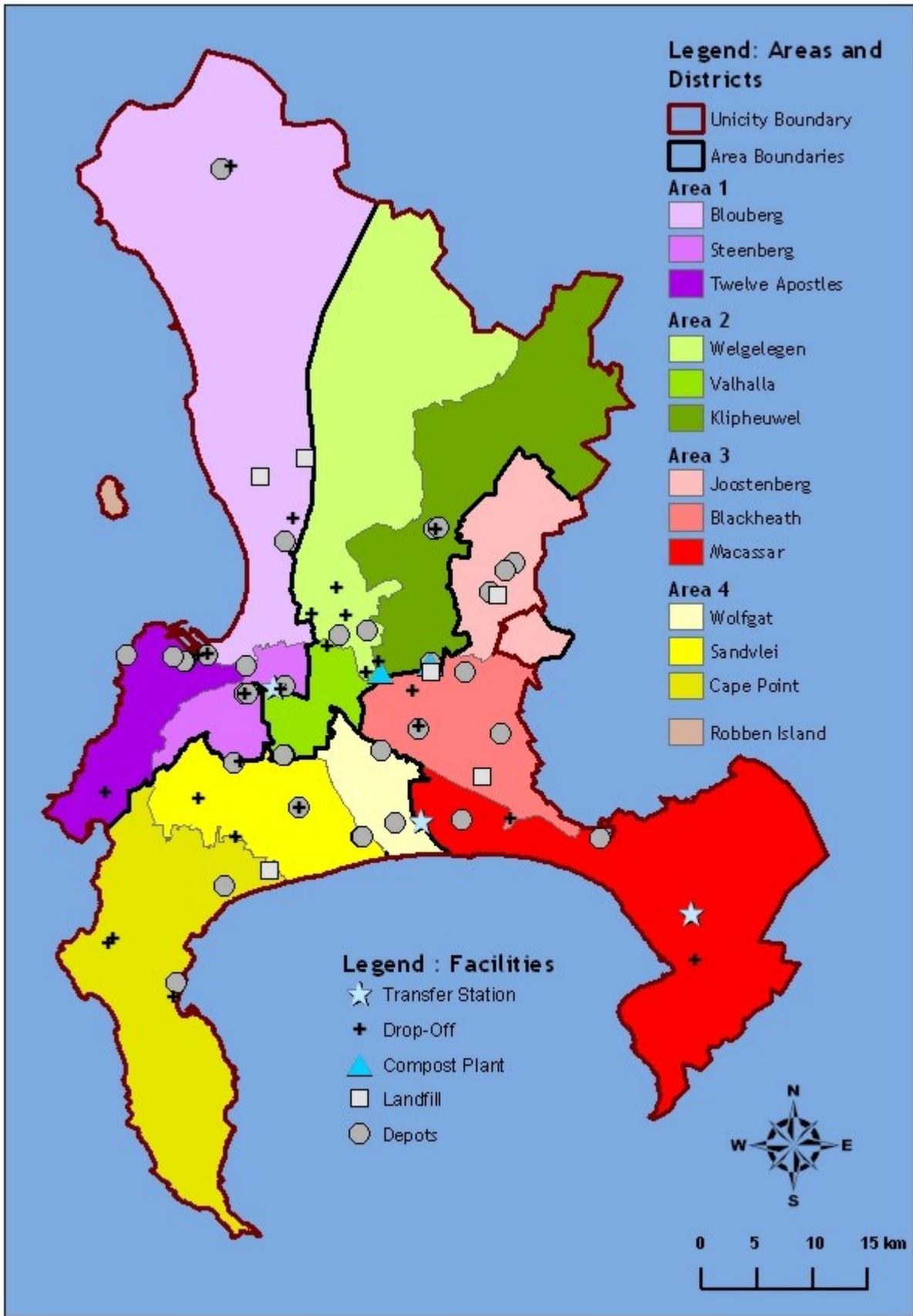
Household	820,866
Commercial	567,558
Industrial	339,991
Green	111,721
Builders Rubble	318,392

Chapter 7 – Assessment Report - Waste Collection & Area Cleaning

7.1	General Context	7-3
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In this chapter a broad range of waste collection and area cleaning related issues related to the activities of both the Council of the Cape Town Unicity and the private contractors operating within the Cape Town Metropolitan Area (CTMA) is assessed.

7



Waste Management Areas, Districts and Facilities

Map 7.1

7.1 General Context

7.1.1 Introduction

The solid waste management functions of waste collection and area cleaning are assessed in this chapter of the Assessment Report. Waste collection and area cleaning operations are compared against national and international practices, and gaps and needs are identified for taking forward to the strategies and plans/policies of the IWMP. This report should be read in conjunction with the Final Status Quo Report (March 2004).

As summarised in the Final Status Quo Report, the annual total waste generated within the Cape Town Metropolitan Area (CTMA) in 2002/2003 was estimated to be 2,158,500 tonnes (or 5,900 tonnes/day). Of the total waste generated, 287,873 tonnes were recycled, with the balance of 1,870,650 tonnes requiring collection and transportation to a waste disposal facility. The annual growth rate of waste generated in the CTMA between 1986 and 2003 is calculated to be 4,3% per annum.

The City of Cape Town (CCT) was formed in 2001 by the integration of seven former municipal local councils (MLC's) into a single "Type A" metropolitan council (Unicity). The CCT, including the Solid Waste Directorate (Development and Infrastructure), is currently engaged in a process of institutional restructuring. The Solid Waste Directorate (SWD) is currently managed by an "interim holding management structure" which, in many instances, still follows the practices of the former MLC's.

Waste collection and area cleaning activities are in certain instances undertaken by various departments within the Unicity (outside of the Solid Waste Department). In developing an integrated approach to waste collection and area cleaning, a critical review of the services undertaken by the other departments should be undertaken with a view to transferring these services to the SWD where this will lead to improved service delivery across the metropole.

The private sector is also engaged in waste collection and area cleaning and their various roles are also considered in the assessment study.

7.1.2 Service Delivery Approach

The SWD has developed a strategy for "an ultimate service delivery model" for solid waste management. The strategy of the SWD sets out a service delivery approach towards solid waste collection and area cleaning services that recognises the following key issues:

Consideration is currently being given by the City for the restructuring of the SWD as an "Internal Service Unit" (a "ring-fenced" unit within the council, regulated by and operating within the Council's control and the Municipality's administration, but with the SWD responsible for outputs and having control over "inputs"). This institutional model is supported by the SWD. Vertical and horizontal integration of waste collection and area cleaning is considered a necessary requirement.

7

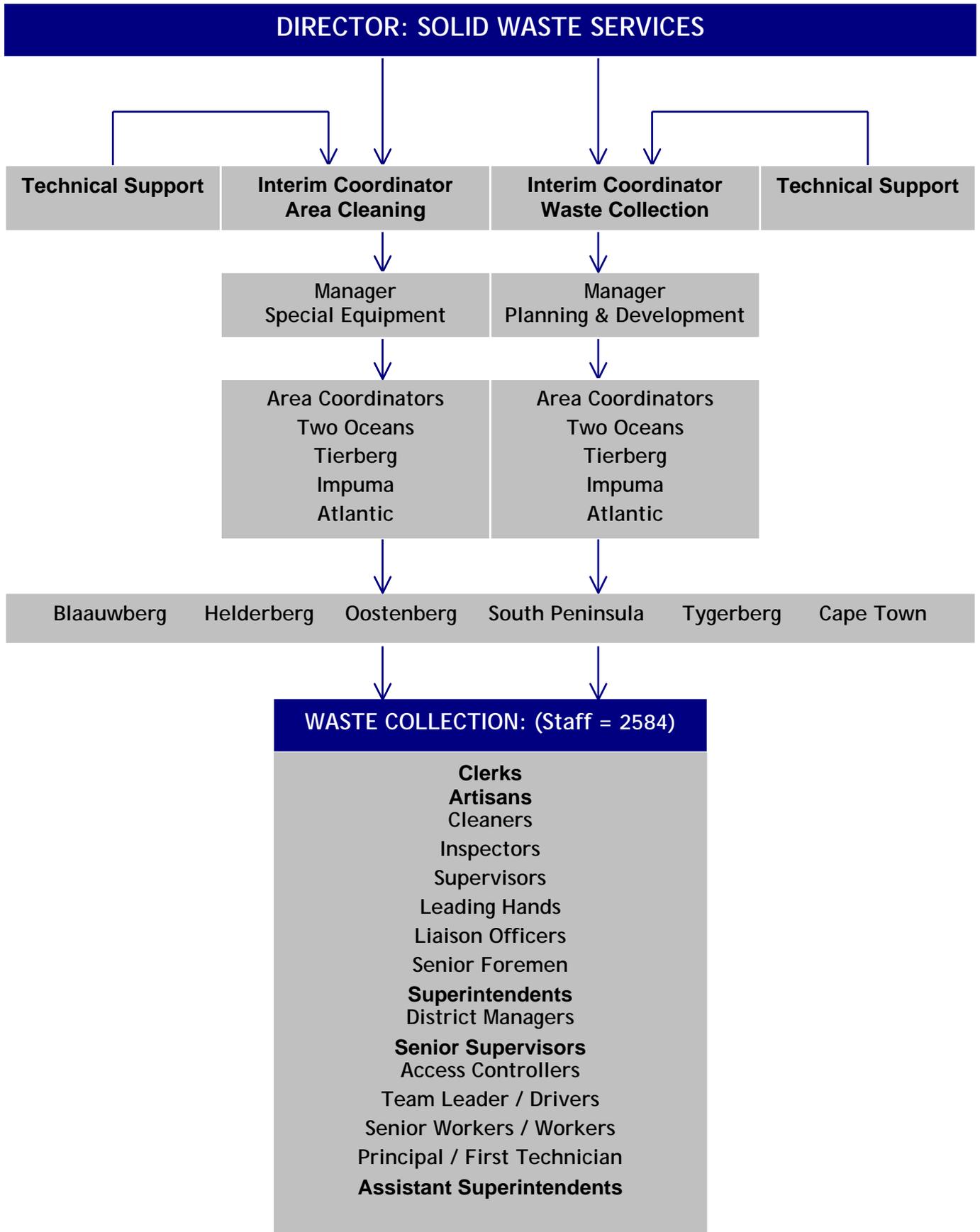


Figure 7.1 Organogram of Staff Structure of Waste Collection and Area Cleaning Department

The introduction of waste minimisation and waste education is a national imperative that must extend to waste collection and area cleaning. Integrated waste management calls for community awareness, waste avoidance, re-use, recycling and minimisation. It furthermore calls for a dramatic decrease of waste disposed of in a landfill (contrary to the classic waste services delivery model with separate silos for waste collection and area cleaning where the key performance indicators are to increase the amount of waste collected, cleaned and disposed of).

Communities will become more aware of the need to avoid littering and to practice waste reduction, re-use, recycling as far as possible. This may be achieved through Council funded projects and partnerships with NGO's, other spheres of government, educational institutions, private companies, etc. The shift will therefore be from reactive area cleaning (with its high cost requirement) to proactive prevention.

Municipal law enforcement should take up the challenge to act against littering and dumping offenders, while drop-off facilities (for recyclables, including garden waste and builders' rubble) will be made more readily available to the public.

It has been found that the community-based service delivery mechanisms are welcomed by poor communities, with integrated refuse collection and cleaning to provide local employment opportunities and empowerment of entrepreneurs from previously disadvantaged communities. The SWD will therefore be required to shift from its current internal mechanism (silo driven) approach to integrated project management and project facilitation with respect to community-based contractors.

It is against the background described above that solid waste collection and area cleaning services were assessed.

7.2 Waste Collection by the City of Cape Town

7.2.1 Refuse Collection and Area Cleaning Management Areas

The SWD is considered to be one of the City's most fragmented departments in terms of its administrative, management and operating functions. The directorate is managed from three separate locations within the city, with component offices scattered over various floors.

Subsequent to the amalgamation of the six previously self-administered municipalities into the Cape Town Unicity, the Unicity has, as an interim measure, been partitioned into four distinct waste collection and area cleaning management areas, each managed by an Area Manager (Collection and Area Cleaning). These management areas comprise Atlantic, Tierberg, Impuma and Two Oceans (see Map 7.1).

Fifty-four former depots serve the four management areas. Collection beats have generally been determined according to historic boundaries of the former Administrations. The current interim division of internal (district and depot management areas), based on historic boundaries, is considered to be unstructured and inefficient in terms of operational optimisation and cost-effectiveness. Rationalisation and integration of the SWD's fragmented

management and operating facilities is clearly required, and should occur according to an incremental and structured process to maintain stability of the organisation and at the same time, ensure continued service delivery.

By-laws of the six former municipalities affecting waste collection differ from area to area, and currently impact on the management and planning of collection and area cleaning services delivery.

7

7.2.2 Staffing and Budget: Solid Waste Collection

Arising out of the restructuring of six former municipalities into a single Unicity, the Solid Waste Department of the City of Cape Town has put in place a "macro" senior management structure, with "Collection" and "Area Cleaning" forming two separate departments. The Waste Collection Department is headed by the "Interim Coordinator: Waste Collections" - see Figure 7.1.

Each waste collection operational area (Atlantic / Tierberg / Impuma / Two Oceans) has an Interim Area Co-ordinator reporting directly to the Interim Co-ordinator: Collections. The functions and the responsibilities of the solid waste collection services staff below the level of the Interim Area Co-ordinators generally follow the structure inherited from the six former municipalities ("Interim Holding Structure"). The former boundaries, locations of depots, levels of staffing, etc, influence the planning of collection beats and deployment of resources.

The SWD has an estimated departmental staff complement of 2584. Staff below managerial level is mostly shared between waste collection and area cleaning, with waste collection receiving priority on the deployment of staff. Area cleaning depots are often left with an imbalanced distribution of staff and this situation is compounded by the difficulty of moving staff between depots. A surplus of staff therefore occurs at some depots, while at other depots staff is hired on a short-term contract basis to make up the deficit. The restructuring of management areas should extend to the operational staffing arrangements in order to achieve best levels of efficiency and service delivery.

The City's policy of not replacing staff who leave employ of the City has led to a situation where staffing of certain key positions is inadequate and often this situation requires redress by utilising unskilled personnel, or by outsourcing externally.

The SWD has a current annual operating budget of R677 million, of which an amount of R389 million is spent on solid waste collection services (the City of Johannesburg, which is comparable in population size and in terms of the volume of waste collected, had a total operating budget of R449 million in 2000/2001). Budget cuts have hampered the SWD in reaching the levels of service the City aspires to, a matter that may need to be addressed by way of greater apportionment of the City's budget and/or by way of savings achieved through more efficient operations. Corporate overheads costs are increasing and capital budgets are set to increase significantly.

Clearly the SWD needs to address the high cost of service provision in terms of its operating budget so that an appropriate and affordable standard of service delivery across the entire City can be sustained.

7.2.3 Waste Collection and Levels of Service

The Unicity is currently divided into 601 department refuse collection beats. Solid waste collection and area-cleaning activities are mostly executed from separate depots within the management areas, each with its own infrastructure and human capital. A process of rationalisation of depots, staff and the operations should be undertaken, including a critical analysis of the extent to which waste collection and area cleaning resources should be integrated.

The SWD of the Cape Town Unicity currently collects approximately 557,180 tonnes of domestic waste per annum from the CMA. This figure accounts for 32.5% of the total quantity of 1 870 000 tonnes of general waste per annum and disposed of by the local authority in the Unicity's landfills, which means that the private contractors and the area cleaning activities together handle the other 67% of the solid waste collected for disposal. Of the domestic waste collected, private companies that are under contract to the SWD collect approximately 30%.

Domestic refuse is collected from approximately 744,000 service points, of which 81% are formal and 19% informal. Depending on the nature of the area that is being serviced, the level of service includes containerised service (240 L bins), plastic bags (85 L) and skips for rudimentary service. The summary of service levels by the number of both formal and informal service points is depicted in Table 7.1. The levels of service, efficiencies and cost of services appear to be evenly distributed across the CTMA. The waste collection department has substantially caught up on the backlog of areas that previously received inadequate collection of waste. New areas comprising small pockets of informal settlement occur on an on-going basis and are serviced once they have been identified.

Table 7.1 Domestic Refuse Collection Service Levels and Delivery Mechanisms

DOMESTIC REFUSE COLLECTION SERVICE LEVELS & DELIVERY MECHANISMS				
NO	SERVICE LEVEL & TYPE	SERVICE POINTS		TOTAL
		FORMAL	INFORMAL	
1.0	CONTAINERISED BASIC (240 L Bins)			
1.1	Departmental	408500	0	408500
1.2	Contracts	45000	0	45000
1.3	One community based contract - Not in accordance with policy (To be addressed/rectified on expiry of contract 30 June 04)	13500	0	13500
	Sub Total	467000	0	467000
2.0	BASIC BAGGED (85 L)			
2.1	Departmental	52000	75600	127600
2.2	Contracts	30000	0	30000
2.3	Community based contracts	51000	49400	100400
	Sub Total	133000	125000	258000
3.0	RUDIMENTARY SERVICE (Skips)	0	19000	19000
TOTAL		600000	144000	744000

The SWD's stated goal is "*to shift from departmental service provision to service delivery by means of community contracting, entrepreneurial development and formal outsourcing*". Some 188 000 Cape Town households are receiving refuse collection services rendered by community-based entrepreneurs and 30% of the City is serviced by means of partnerships with the private sector. The community-based service delivery mechanism is the option preferred by the poorer communities. The SWD is currently considering replacing the rudimentary "Skip collection" with a Basic Bagged (85l plastic bag) level of service as the minimum standard provided to informal settlement areas.

7.2.4 Waste Collection Infrastructure

The SWD uses a combination of automated and manually loaded waste collection compactors and customised standard trucks. According to the departmental asset register, the SWD currently own 586 waste collection vehicles and spares. The estimated average age of the current compactors is 8.2 years while the rest of the fleet is more than 10 years. Regular breakdowns of the aging fleet result in excessive repair and maintenance costs, and excessive demands on staff to undertake overtime, which again is costly and inefficient. The SWD management should have the responsibility to determine its own fleet replacement policy and be responsible for its own fleet and workshops. Consideration should be given to phasing out the workshops in favour of a service level agreement. The SWD is planning to acquire a number of new compactor vehicles during the current (2003/2004) financial year.

A beat is defined as an activity that is covered by a specific truck per day. The Unicity is currently divided into 601 departmental beats and each truck covers approximately 2 - 3 trips per beat. Approximately 201 of the total number of vehicles are compactor trucks (REL's). Although the department owns this number of compactors, the four collection areas are presently made up of 601 beats. If the latter was optimised for a five-day week, it would imply the utilisation of a maximum of 120 compactor vehicles. However, additional trucks (over and above the required 120 on a continuous basis) are required to replace vehicles being repaired or serviced, and for emergency purposes and collection outside of planned beats. The rationalising of both the depots and infrastructure that it inherited from the former MLC's is urgently required.

In recent years waste management has become a sophisticated industry in which technology and information systems play a critical role in service delivery. The lack of waste information system for data collection, analysis and storage is considered a handicap.

The IWMP should address the issue of separation of waste at source and recycling. This is especially relevant where the transfer of waste to remote regional sites occurs and waste reduction measures will be necessary to reduce transportation costs. It may therefore become necessary to review the type of collection vehicles being used in future so as to best facilitate the collection of separated wastes.

7.3 Waste Collection by Private Contractors

It was stated in section 7.2.3 of this chapter that the City's SWD removes 557 180 tonnes (approximately 70%) of the domestic waste collected (excluding area cleaning). The private contractors, operating either independently or under contract from the Council or both, account for the remainder of the waste disposed of at the Unicity's landfills. Major contractors that have been included in this study for the purpose of acquiring reliable data, including EnviroServ, Millennium Waste, Wasteman, Interwaste and Waste Control.

The Status Quo Report summarises the extent to which private contractors are involved in the collection of municipal solid wastes in the CTMA. The SWD recognises the value of private sector involvement, and where such involvement can provide the City with a more cost-effective, reliable and efficient service, greater usage of private contractors should take place in the future. Phased introduction of outsourcing of collection and area cleaning services will furthermore lead to municipal services partnerships to render management, engineering, project management, project facilitation, public facilitation, public participation and other related services.

7

7.4 Area Cleaning by the Solid Waste Department

An Interim Area Cleaning Services Strategy has been drawn up by the SWD to provide direction for the interim management of the area cleaning function until such time that the IWMP has been developed, after which the strategic planning can be adjusted accordingly.

During the Mayor's Listening Campaign in 2003 and the recent Sectoral IDP consultation process, it was stressed by all stakeholders that a clean environment has become a high priority.

The objective of Area Cleaning is to deliver equitable, affordable, sustainable and proactive area cleaning services within all areas of the Unicity. The assessment of Area Cleaning reviews the Status Quo Study and Gaps Analysis and determines the strategies, tasks and plans required to meet the objectives of the SWD in the short-medium- long term.

7.4.1 Area Cleaning Services Assessment

The following activities of Area Cleaning were included in the Assessment:

7.4.1 (i) Street sweeping:

The current manner in which street sweeping is provided lacks both equitability and consistency across various administrations. This service is presently performed on both a programmed and ad hoc basis.

The Central Business Districts are currently swept at least 6 days a week, through either mechanical or manual means or a combination of both. Cleaning the CBDs often requires working outside the normal hours when the streets and pavements are accessible. The term

"central business district" does not include residential areas which have been converted into business areas. These areas generally do not receive the same level of service as the general CBDs.

7.4.1 (ii) Litter picking:

The litter picking function is spread across various departments from the old administrations of the Unicity, including Parks, Transport, Roads, Amenities, Housing and the SWD. The provision of the service is largely reactionary, as opposed to proactive. Due to jurisdictional matters, the management and scheduling of litter picking remains unconsolidated. These issues involve other departments such as Parks, Roads, Transport, Housing and Amenities etc. A Litter Generation Model should be considered as a tool to assist the planning of area cleaning.

7.4.1 (iii) Illegal dumping:

Typically the three major waste streams of illegally dumped waste include garden refuse, general waste and builders' rubble. The IWMP and in particular the integrated By-laws should ensure that public awareness and education as well as law enforcement against offenders is fully addressed.

7.4.1 (iv) Provision and Servicing of the Street Bins:

The service forms part of the street cleaning except where the service is offered by contractors. The service differs from area to area.

7.4.1 (v) Hawkers' waste:

The service is provided to hawkers within certain business areas. The city provides the hawkers with 660 and 1100 litre bins that are strategically placed in various areas where there are informal business activities. The hawkers currently receive this service "free of charge" but they are expected to pay a nominal fee to the City of Cape Town for rental of the trading space.

7.4.1 (vi) Beach cleaning:

Various departments within the Council currently undertake beach cleaning which includes kelp and shell removal, litter bin servicing, litter picking and deep sand cleaning. The greater portion of the shoreline currently falls under the responsibility of the Amenities Department. The SWD is currently responsible for the beaches contained within the Cape Town Administration area (The Atlantic seaboard and a short stretch of Strandfontein). Beach cleaning has a scheduled programme for the duration of the festive season (starting November until after Easter weekend) but is undertaken on an ad hoc basis for the remainder of the year.

This division of responsibilities clearly impedes the SWD's efforts to provide the service on a programmed basis and in an effective and efficient manner.

7.4.1 (vii) Water tanker services:

The water tanker service is used to dampen the litter so that it does not blow around so that it can be swept. The service is also used to clean-up and sanitise identified areas where vagrants sleep and ablute. This service provides a necessary role for the City and should be continued on a scheduled basis where required.

7.4.1 (viii) Animal carcass collection:

In-house resources are used to perform animal carcass collection in some areas of the Unicity, but in other areas the function is outsourced. Different municipal areas have different policies regarding carcass collection. Due to the situation that the collection and disposal of animal carcasses requires different handling and infrastructure requirements, the SWD proposes that this service be totally outsourced through the City's tender process.

7.4.2 Analysis of the Status Quo Study

7.4.2 (i) Fragmentation of Area Cleaning Services:

An assessment of the various cross-cutting of services by the various of the City's Departments (see Table 7.2) indicates that unbundling is required as a matter of priority to enable proactive schedule of services to be undertaken. Agreement needs to be reached between the relevant departments as to which of the functions are to fall under the direct control of the SWD. Generally, the SWD supports the recommendations set out in Table 6.4 as proposed in the study undertaken by Price/Waterhouse/Coopers (2002).

Table 6.2 Area Cleaning: The Division of Responsibilities

LOCATION AND NATURE OF WASTE		DIVISION RESPONSIBLE FOR BUDGET, WASTE REMOVAL AND DISPOSAL						RECOMMENDATION
		HISTORICAL PRACTICE						
		BLBG	CTN	HLD	OOS	SPM	TYG	
1.0	National Roads	Sanral	Sanral	-	-	-	Sanral	
2.0	Provincial MR	PAWC	PAWC	-	-	-	PAWC	
3.0	Roads & Streets							"Fence to fence" cleaning by SWD
3.1	Kerb to Kerb	CL	CL	CL	CL	CL/Rds	CL	
3.2	Vegetation paved verges	Pks	Pks	Pks	Pks	Pks	Pks	
3.3	Sidewalks	CL	CL	CL	CL	CL/Rds	CL	
3.4	Other verges	Pks	CL	Pks Sw	CL	Pks	Pks	
3.5	Residential street frontage cleaning	CL	CL	No service	No service	No service	No service	Sweeping by the residents
3.6	Weeding of unpaved sidewalks	-	-	Pks	-	-	-	Pks
3.7	Gulleys	Sw	Sw	Sw	CL	CL/Rds	Sw	Sw
3.8	Under stormwater branch	Sw	Sw	Sw	-	-	-	
4.0	Parks	Pks	CL	Pks/CL	CL	Pks	Pks	Pks: Enclosed spaces & amenities
5.0	Public Open Spaces							SWD
6.0	Natural rivers, lakes & ponds							Sw: Hydraulic & out of reach areas
6.1	Hydraulic silts/debris	Sw	Sw	Sw	Pks	Rds	CMC Sw	
6.2	Vegetation on banks	Pks	Pks	Pks	Pks	Pks	CMC Sw	SWD: Reachable areas Sw: Hydraulic & out of reach areas
6.3	Bank litter	Pks	CL	CL	CL	Pks	CMC Sw	
6.4	Dumped rubble out of water	Pks	CL	CL	CL	Pks	Pks	

6.5	Dumped rubble in water	Pks	Sw	CL	CL	Pks	Pks	
7.0	Canals							Sw: Hydraulic & out of reach areas
7.1	Verges in the former iKapa	Sw	Sw	Sw	Pks	Rds	CMC Sw	
7.2	Verges elsewhere	-----	Rds	-----	-----	-----	-----	SWD: Reachable areas
7.3		Sw	CL	Pks	CL	Pks	CL	
7.4	Illegal rubble out of water	Sw	CL	Sw	CL		CL	
7.5	Illegal rubble in water	Sw	Sw	Sw	CL		CL	
8.0	Ponds (man-made)							Sw: Hydraulic & out of reach areas
8.1	Hydraulic Structures	Sw	Sw	Sw	Pks	Rds	CMC Sw	
8.2	Floor/banks vegetation	Pks	Pks	Pks	Pks	Rds	Sw Pks	Pks
8.3	Floor/banks litter	Sw		CL	Pks	Pks	CL Pks	SWD

CL: Cleansing Pks: Parks Rds: Roads Sw: Stormwater SWD: Solid Waste Directorate

Note: "Cleansing" is a function of Area Cleaning, a division of the Solid Waste Directorate (SWD).

Reference: PricewaterhouseCoopers Report: "Development of the Framework for Service Delivery, Service Levels and Funding Options."

7.4.2 (ii) Staffing and Budget: Area Cleaning Services

The staffing structure for the Area Cleaning Department is described in the Status Quo report and is set out in Figure 7.1. The former boundaries, locations of depots, levels of staffing, etc, influence the planning of area cleaning beats and deployment of resources. The levels of service, efficiencies and cost of services are therefore not evenly distributed across the CTMA. The City of Cape Town is currently engaged in a restructuring process that includes the Waste Department, in order to bring about greater rationalisation and transformation within the City.

Area cleaning has an estimated annual operating budget of R231.55 million. It should be noted that the budget excludes any funds allocated by the Council to other departments to cover the costs of providing area-cleaning services, i.e. which currently do not fall under the ambit of the SWD.

Staff required for the various area cleaning activities are generally drawn from the depots. Staff is shared with the waste collection department, where the priority usually goes to waste collection. This situation often results in a shortage of staff for area cleaning activities, the problem being compounded in that staff is not moved between depots or former municipal district areas, resulting in the City having to outsource additional labour on a temporary employment basis.

7.4.2 (iii) Service Delivery: Area Cleaning Services

Depending on the nature of the service required the service is provided either manually or mechanically. The functions are performed either in-house or are outsourced. The Area Cleaning section of the SWD has its own infrastructure and shares staff with waste collection. The efficient replacement of staff where operationally required is hampered by the pending staff placement situation.

The area cleaning section is divided into four management areas, but operates according to the former municipal districts out of the former depots. The current area-cleaning infrastructure includes, inter alia, street sweepers, water tanks etc. Approximately 41% of the current infrastructure is more than 10 years old, while most of the newer units were purchased between 1996 and 2000.



7.4.3 Perceived Future Challenges with respect to Area Cleaning

In order for the Unicity to provide and manage the delivery of area cleaning, the following aspects need to be addressed:

- ◆ The consolidation and integration of the currently fragmented area cleaning functions to a single department, preferably within the ambit of the SWD;
- ◆ Unbundling of the budget for area cleaning service delivery;
- ◆ Movement of the unionised staff from their current departments into the consolidated division;
- ◆ Redesign a uniform approach on how the function should be delivered and performance measured;
- ◆ Provide a WIS of all area cleaning functions, beats etc;
- ◆ Fill the existing policy gap in the current by-laws, with special attention on the situation that allows private businesses to negate their responsibility to sign up with the Council or a probate contractor to provide for the waste collection service. The current waste management practices of certain businesses are tantamount to illegal dumping which result in a huge expenditure and loss of income for the Council;
- ◆ Within the Unicity, there are currently a number of communities residing on private land. Because of the legal implications of either removing the communities in question or providing them with waste collection services at these current locations, the best that the Council has been able to do is to place a skips across the road from these sites. Although this approach to waste collection provides a relief, it is nevertheless an unsustainable solution. There is therefore a need to deal more effectively with the issue of communities residing illegally on private land because informal dwelling does affect the manner in which the Council delivers basic services to these communities.
- ◆ Develop an integrated approach with the collection service delivery so that the quantities of waste requiring area cleaning services is minimised. For example, where the existing collection service is inadequate, waste spills over into the streets or is dumped illegally, resulting in expensive area cleaning responsive action.

7.5 Assessment Overview and Summary

7

GAPS	NEEDS
Refuse Collection Services Policy	<ul style="list-style-type: none"> To review, update and finalise for adoption of the policy document that was presented to the Executive Committee for its consideration on 22 May 2003. Review and update the City's solid waste collection tariffs especially with the aim of creating incentives for increased waste minimisation and recovery for recycling. Review, update and integrate the City's solid waste collection By-laws.
Area Cleaning Services Policy	<ul style="list-style-type: none"> To review, update and finalise for adoption the "Interim Area Cleaning Services Strategy" policy document that was prepared in April 2004. Consolidation and integration of the various Area Cleaning services under one department. Standardising and providing equitable levels of area cleaning service delivery across the various former administrations. Develop a Policy and implement community-based cleaning in informal areas. Review, update and integrate the City's area cleaning, illegal dumping and littering By-laws. Develop an integrated strategy with respect to waste collection and area cleaning services so as to reduce the volumes of waste and litter requiring area cleaning. Develop an integrated strategy with respect to waste education, awareness and training and area cleaning services so as to reduce the volumes of waste requiring area cleaning.
Fleet Replacement Policy	<ul style="list-style-type: none"> The Unicity has a fleet replacement policy, which recommends that trucks should be replaced after 8 years in operation. Most of the collection fleet currently fall within the 4 - 6 year category. There is a need for a budget for the replacement of these trucks within the next four years. Review and update the City's preventative maintenance systems.
Private Contractors	<ul style="list-style-type: none"> The City needs a formal registration system for private waste collection, and landfill operators/contractors to create awareness about the issues such as illegal dumping (and consequences thereof) and for obtaining waste information as part of the Provincial Waste Information Systems (WIS).
Garden Waste	<ul style="list-style-type: none"> Review the strategy for managing the collection of the garden waste stream with the aim of making the services of collecting and disposing of/composting garden waste more "customer friendly" (e.g. by providing more satellite drop off sites for garden waste).

GAPS	NEEDS
<p>Complete the Rationalisation Process</p>	<ul style="list-style-type: none"> • The various former administrations have now been successfully amalgamated to form the Unicity. In many instances the City's services delivery structures continue to operate on the basis of their previous boundaries, operating procedures and service delivery mechanisms. This affects the cost-effectiveness, efficiency and the quality of the service provided. A uniform service delivery mechanism focussing on improved customer satisfaction and efficiency needs to be developed. • Re-distribution of manpower and resources in parallel with the finalisation and implementation of the City's staff placement policy is urgently required. • Defining the district boundaries; • Reduce the number of municipal working depots; • Synchronising of beats (service point & collection routes) with the scheduling and integration of area cleaning.
<p>Formalising Management Structures</p>	<ul style="list-style-type: none"> • In order to bring about the effectiveness and commitment towards waste management service delivery, there is a need for a timeous conclusion of the City's restructuring and transformation initiatives. • Effectiveness on any aspect of waste management and associated service delivery hinges on the availability of the right human capital with the necessary skills. The City should seek to rationalise the available manpower to ensure that there is a fair distribution of staff and skills.
<p>Illegal Squatting on Private Land</p>	<ul style="list-style-type: none"> • The City has a Constitutional mandate to provide equitable waste management services to all its residents. In order to deliver on that mandate a strategy is needed to deal effectively with the matter of providing services to individuals and communities residing illegally on private land.
<p>Communication</p>	<ul style="list-style-type: none"> • Both external and inter-departmental communication is necessary to avoid duplication and to provide the services in a cost-effective manner; • Effective communication between the City and its private contractors is necessary to foster co-operative and effective service delivery.
<p>Data Collection / Information</p>	<ul style="list-style-type: none"> • There is currently limited reliable data to inform the decision-making processes on waste collection and area cleaning activities. A Waste Management Information System is urgently required. • Develop a litter generation model for the City.
<p>Performance Indicators and performance monitoring</p>	<ul style="list-style-type: none"> • The City needs reliable key performance indicators to measure effectiveness of its service delivery mechanisms for the purpose of effecting improvements where they may be necessary. • Procedures to monitor performance at all levels are required.
<p>Development of an updated matrix of departmental activities i.r.o area cleaning</p>	<ul style="list-style-type: none"> • A Previous Report (Price/Waterhouse/Coopers - 2002) recommended a framework for undertaking area cleaning activities. The matrix does not cover all of the previous administrations and departments and needs to be updated and developed further.

GAPS	NEEDS
Other Dependencies	<ul style="list-style-type: none">• An adequate Budget for administrative support to enable better scheduling and planning around clean ups and collection to take place.• Successful unbundling of the budget and staff from other departments historically involved in area cleaning functions.• Increase and develop middle management and supervisory staff capacity.

7

References

- 7-1. ~~7-1.~~ Jeffares and Green & Ingerop Africa (2004). Final Status Quo Report, Integrated Waste Management Plan for the City of Cape Town.
- 7-2. *Price/Waterhouse/Coopers (2002) Price/Waterhouse/Coopers Report: Development of the Framework for Service Delivery, Service Levels and Funding Options*
- 7-3. *City of Cape Town, Interim Area Cleaning Services Strategy, April 2004*

Chapter 8 – Assessment Report – Hazardous Waste

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This chapter provides an assessment of the current hazardous waste situation of the City of Cape Town.

8.1 Introduction

The hazardous waste gap analysis provides a broad status quo review for existing management systems or the need of new management systems and strategies based on the available data. The lack of data is often the basic source of a problem, in terms of the lack of understanding of the situation or mismanagement thereof.

8

8.2 Current and Future Unaddressed Issues

The following assessment are made from the Status Quo findings, namely:

- ◆ There is no hazardous waste management policy in the City of Cape Town. Therefore, there is a total lack of information on:
 - ◆ The sectors of industries
 - ◆ The number of industries per sector
 - ◆ The hazardous waste types generated per industry
 - ◆ The hazardous waste pre-treatment and disposal per industry
 - ◆ The hazardous waste quantities per industry
 - ◆ The hazardous waste discharged to sewer
 - ◆ The source of the heavy metals in certain wastewater treatment sludges
 - ◆ The storage of hazardous waste by industry (generator)
 - ◆ The transport method and routes of hazardous waste by industry (generator)
 - ◆ The geographical spread of the industry sectors
 - ◆ The hazardous gases related to atmosphere from non-scheduled sources
 - ◆ The provision of trained emergency services for hazardous waste accidents or disasters
 - ◆ The identification and rehabilitation of contaminated soils and substrata due to chemical spills, leakages and / or unauthorised hazardous waste dumping
 - ◆ The avoidance of hazardous waste disposal by hazardous waste exchange and / or re-use
 - ◆ The reduction of hazardous waste disposal by recycling of uncontaminated packaging and / or pallets
 - ◆ The refurbishing of batteries and IT components to reduce the hazardous waste and disposal
 - ◆ The re-processing of tyres by the production of outdoor rubber mats, etc

8.3 Current and Future Facilities

Not only is there a lack of information in the generation, storage and transport of hazardous waste in the City of Cape Town but also in the disposal of such waste. A lack in co-operation between the communities and the City of Cape Town makes the strategic future of disposal of hazardous waste in the City of Cape Town an unsurety. The finalisation of future disposal facilities for hazardous waste depends on the final site selection and direction the public

proposes in terms of the Future Landfill Scoping exercise. The “importation” of hazardous waste from other provinces for final disposal by private contractors must be re-evaluated in the IWMP of the City of Cape Town.

8.4 Assessment Overview and Summary

The City of Cape Town urgently requires the following activities as part of the proposed IWMP. The most urgent areas to be addressed are the following:

- ◆ The co-ordinated management of a hazardous waste minimisation body in terms of education, awareness, web exchange, premises, funding, sustainability, etc
- ◆ The co-ordinated management of a health care forum in terms of education, awareness, generator-to-cradle tracking / monitoring system, effective incineration/treatment monitoring and control, environmental reporting and legal inspectorate with
- ◆ The appointment of an Environmental Watchdog
- ◆ The sustainability of professional hazardous waste management
- ◆ The collation of all outstanding information required in terms of hazardous waste management as indicated by the Status Quo findings.
- ◆ The use of the outstanding information once obtained to verify the assessed gaps and needs
- ◆ The updating of by-laws in terms of the Minimum Requirements of 1998, APPA, or NEMA and the NWA
- ◆ The institution and management of an Environmental Court
- ◆ The infrastructure and means to identify environmental cowboys in industry and implement environmental community service such as litter collection, soils remediation, etc by the culprits or companies.
- ◆ The infrastructure, by-laws and authority to control, spillages from boats in the harbours, ports and coast line.
- ◆ The infrastructure, by-laws and authority to prevent oil spills and other hazardous waste such as paint blasting residue in dry docks from entering the sea and other water sources
- ◆ The infrastructure, by-laws and funding initiatives to provide drop-off centres for batteries, fluorescent tubes, old tyres, etc

As a result of the assessment issues, the City of Cape Town needs a strategy to address the cradle-to-cradle management of hazardous waste, thus from generator back to the documents indicating satisfactory disposal thereof.

A summary of the key findings for consideration as part of the strategies is included in the table below.

Table 8.1 Key findings of the assessment for hazardous waste management.

GAPS	NEEDS
<p>8</p> <p>Integration of hazardous waste management.</p>	<ul style="list-style-type: none"> • Key link to “Waste Minimisation” and all relevant reduction strategies required. Hazardous waste should be the waste stream that should be prioritised for any WM action. • Need for a co-ordinated management of hazardous waste minimization body in terms of education, awareness, web site exchanges, premises, funding and sustainability. • Need for co-ordinated management of a health-care forum in terms of education, awareness, generator-to-cradle tracking/monitoring system, effective incineration/treatment monitoring and control, environmental reporting and legal inspectorate.
<p>Enforcement</p>	<ul style="list-style-type: none"> • Need to appoint an “Environmental Watchdog” who can co-ordinate and address the various environmental issues and provide interaction with industry.
<p>Development of Waste Information System for hazardous waste.</p>	<ul style="list-style-type: none"> • Need to collate all information and data currently available and to ensure that outstanding information is obtained and collated at a central database. • Need to manage data and information from the private waste collectors with respect to hazardous waste.
<p>Updating legislation pertaining to hazardous waste.</p>	<ul style="list-style-type: none"> • Need to update Minimum Requirements of 1998, Air Pollution Prevention Act (APPA), National Environmental Management Act and the National Water act to ensure all hazardous waste activities are integrated in terms of the various acts. • Legislation (by-laws) required in terms of control of spillages from boats in harbours, ports, coast-lines. • Legislation (by-laws) to govern drop-off centres for household or industrial hazardous waste (category 3 and 4) e.g. batteries, fluorescent tubes, old tyres.
<p>Resources, infrastructure and capacity requirements.</p>	<ul style="list-style-type: none"> • Need to improve the capacity and skills of those dealing with hazardous waste (regulatory authorities). • Infrastructure required for the prevention of spillages to the water resources and sea. • Infrastructure required for the management of household and industrial hazardous waste (category 3 and 4). Need to review alternative technologies for waste



GAPS	NEEDS
<p>The City has an incomplete hazardous waste classification system.</p>	<ul style="list-style-type: none"> • Need to develop a hazardous waste classification system in terms of the Minimum Requirements of 1998 (DWAF).
<p>The City has no formal complaint system to report incidents for hazardous waste mismanagement.</p>	<ul style="list-style-type: none"> • Need to develop a communication strategy for complaints by public and other regarding hazardous waste management activities.
<p>Education and awareness.</p>	<ul style="list-style-type: none"> • Need to develop a strategy for educating and empowering hazardous waste generators on their responsibilities and liabilities. Need to educate hazardous waste generators on product redesign options to phase out hazardous waste forming product constituents. • Need for “Ecolabelling” legislation requesting producers of products containing hazardous waste materials (e.g. household cleaners) to list all ingredients by law. • Need to educate retailers and consumers about their roles in reducing hazardous waste in consumer goods. • Need to inform and empower hazardous waste generators on international best practices.

References

- 8-1. Jeffares and Green & Ingerop Africa (2004). Final Status Quo Report, Integrated Waste Management Plan for the City of Cape Town.

Chapter 9 – Assessment Report - Waste Disposal

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Chapter 9 sets out an assessment of the Waste Disposal functions undertaken by the City of Cape Town, Directorate: Solid Waste Management and by private contractors operating within the Cape Town Metropolitan Area.

9.1 Introduction

The disposal of waste within the CTMA is undertaken principally by the Directorate: Solid Waste Management, at engineered waste disposal sites for which permits have been received from DWAF and DEADP for purposes of waste disposal. Whereas this chapter assesses waste disposal mainly in the context of the formal waste disposal facilities owned and operated by the CCT, it must be borne in mind that the private sector also participates in waste disposal, with the privately-owned Vissershok Waste Management Facility (VWMF) currently being the only existing waste disposal facility of significant size.

In this chapter, solid waste disposal and related services are analysed and assessed with a view to provide recommendations for the strategies, plans and policies to be carried forward to the IWMP. The assessments described should be read in conjunction with Chapter 7 of the Final Status Quo Report (March 2004).

9.2 Waste Disposal: Management Structure (CCT)

9.2.1 Assessment of the Interim Management Structure

The interim structure of the Directorate: Solid Waste Management is described in Chapter 7 of the Final Status Quo Report (March 2004).

Figure 9.1 reflects a proposed management structure that retains the chief line functions of the current “holding” management structure, namely waste collection, area cleaning and disposal, and sets out the support functions (current and proposed) that would support each of the chief line functions. The support functions of Strategic and Financial Planning include the setting of tariffs and levies for solid waste collection and disposal. The CCT is currently engaged in the transformation and restructuring of its various institutional structures, including the Directorate: Solid Waste Management. The elements contained in Figure 5.1 are considered to be key to any future waste management structure to be adopted by the City.

The current management structure reflects the structures of the former municipal administrations and it is considered essential that the transformation process should restructure the Solid Waste Management Directorate into an integrated, functional and effective entity.

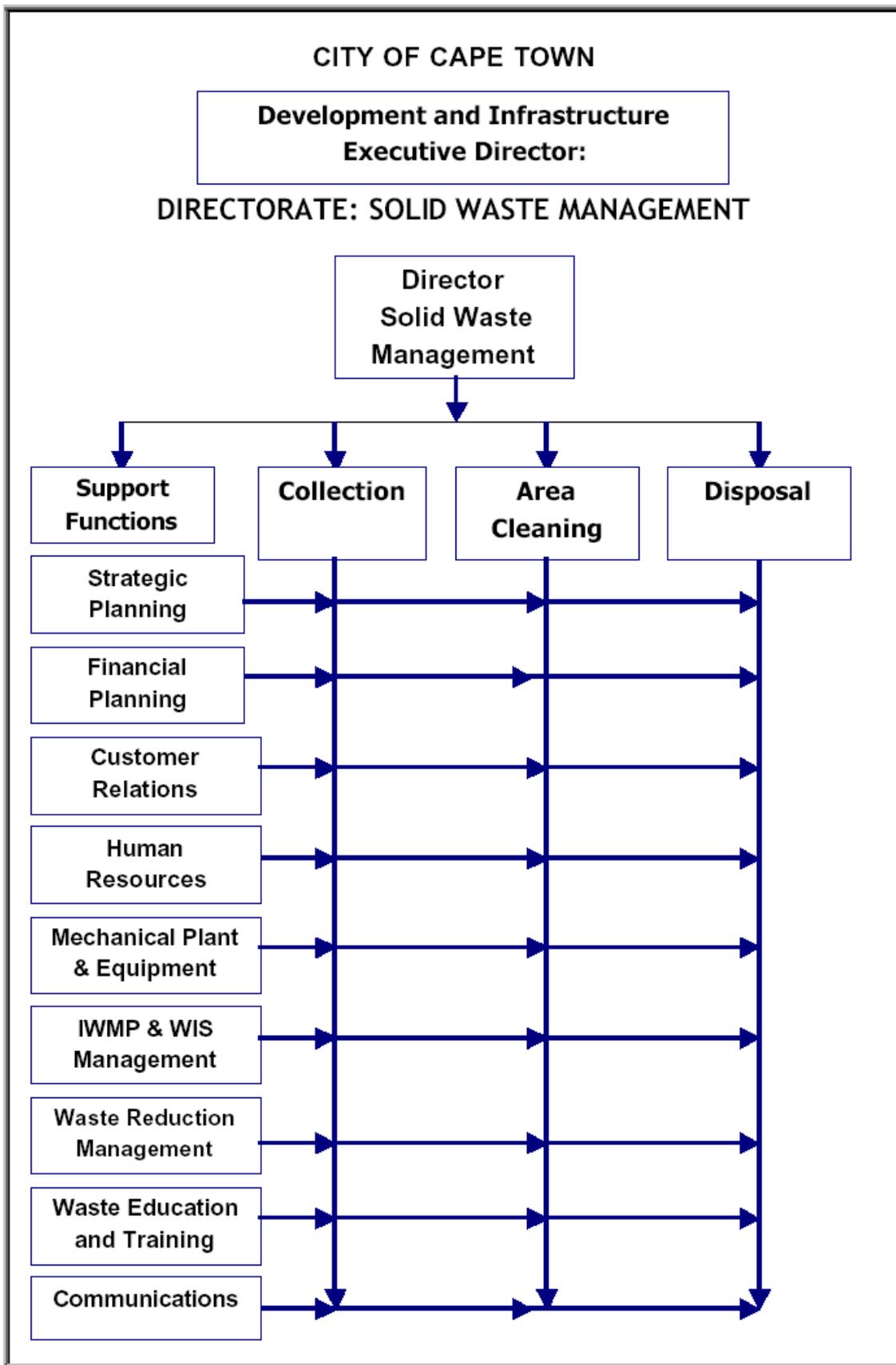


Figure 9.1 Organogram illustrating a Proposed Management Structure of the Solid Waste Management Directorate within the institutional structure of the City of Cape Town

The bulk service of Waste Disposal was previously the responsibility of the former CMC Administration. The management of Waste Disposal has, to some extent, functioned separately from the other chief line functions, and the extent to which the integration of the management of all the line and support functions should take place, needs to be determined.

The Waste Disposal function is managed by the Manager (Acting), responsible for all municipal waste disposal, including:

- 
- ◆ landfill disposal
 - ◆ transfer stations
 - ◆ drop-off facilities (those located at landfill sites)
 - ◆ disposal of garden refuse
 - ◆ composting (currently managed by the Tygerberg Administration)
 - ◆ disposal of builder's rubble
 - ◆ hazardous wastes.

Waste disposal, by broad definition, deals with wastes brought to a specific site ("where the customer comes to you"), whereas waste collection and area cleaning deal with waste that is required to be collected or removed ("where you go to the customer"). The responsibilities for the management of waste recycling (material recovery facilities and drop-off centres), garden waste "chipping" and composting facilities, all need to be clearly defined and determined in terms of the IWMP.

Responsibilities for the disposal of water and wastewater treatment sludges fall under the water and wastewater treatment departments of the City. Similarly, the disposal of wastewater treatment screenings and hazardous and noxious wastes from pipeline cleaning operations, etc., similarly fall under the responsibility of various City departments.

9.2.2 Staffing Structure

The staff complement and management structure is in the process of being restructured. This process is being implemented by the CCT to bring about rationalisation (resulting from the merger of the six former Municipal Local Councils) and transformation. It should be noted, however, that the policy of not replacing staff leaving the employ of the Council has severely affected certain upper and middle management levels of the Waste Disposal Department. This situation has clearly affected the morale and efficiency of the current staff members.

9.2.3 Financial Management

The financial management of the Solid Waste Disposal Services department is integrated with the overall CCT's financial management systems, and functions within an operating and capital development budget set and approved annually by the Cape Town City Council.

The 2003/2004 Operating Budget for the Waste Disposal Department is R127,82 million (see Table 9.1 below). This translates to an operating cost of R74.36/tonne, taking into account the volume of 1 719 000 tonnes of general municipal waste that are disposed of by the Waste Disposal Department annually.

Table 9.1 Summary of the annual waste disposal operating costs :

2003 / 2004 OPERATING COST ELEMENT	OPERATING COST R million	WASTE DISPOSED Tonnes/A	COST / Tonne (a)
a) Overheads and Administrative costs	33.05	-	-
b) Bellville South Composting Facility	3.80	13 200	(288.00)
c) Radnor Composting Facility	8.69	18 000	(482.00)
d) Athlone RTS	13.34	-	-
e) Bellville South Landfill	13.45	315 000	(42.70)
f) Vissershok Landfill	21.53	317 000	(67.92)
g) Coastal Park Landfill	10.14	377 000	(26.90)
h) Swartklip RTS and Landfill	16.48	253 000	(65.14)
i) Faure Landfill	5.06	211 000	(23.98)
j) Brackenfell Landfill	2.25	246 000	(9.15)
TOTAL	127.82	1 719 000	74.36

Over the next four years, as the planned closure of four of the City's existing landfills takes place, the development of a regional site and associated transfer stations will increase the unit disposal costs significantly. The total cost of transporting waste by road or rail will also rise as the volumes and haul distances increase due to the closure of the landfills. It is predicted, therefore, that the total unit cost of waste disposal for the CCT will increase substantially, placing a far higher priority on waste reduction and waste minimisation than is currently the case. The issue of whether the private sector can dispose of waste more cost-effectively needs to be assessed and inefficient operations such as the composting of general municipal wastes needs to be addressed.

The City charges a uniform disposal fee for the bulk disposal of wastes at the various waste disposal facilities. The current charge (December 2003) is R77.37/tonne including VAT for general waste and R121.11/tonne including VAT for hazardous waste. The disposal fee is calculated annually on the basis of meeting the total annual operating costs of the Waste Disposal Department, as summarised in Table 9.1.

9.2.4 Capital Expenditure

A summary of the current and projected Capital Budget (July 2003) of the Solid Waste Disposal Department is given in Table 9.2.

Table 9.2 Summary of the current and projected waste disposal capital budget (Nov 2003):

CAPITAL COST ELEMENT	2002/03 R million	2003/04 R million	2004/05 R million	2005/06 R million	2006/07 R million
a) Radnor / Sacks Circle	0.00	1.00	0.50	6.00	5.50
b) Regional Site Development	3.00	1.00	3.50	1.00	0.50
c) Athlone RTS	1.35	0.89	0.75	0.25	0.25
d) Bellville South Landfill	11.48	3.00	1.10	17.20	3.20
e) Vissershok Landfill	21.53	3.11	18.10	10.30	20.70
f) Coastal Park Landfill	1.51	10.34	8.40	12.70	8.20
g) Swartklip RTS and Landfill	1.95	0.00	3.15	15.70	10.00
i) Faure Landfill	1.85	0.00	0.00	2.65	0.5
j) Brackenfell Landfill/ RTS	1.58	0.12	0.00	6.30	5.20
k) New Transfer Stations	0.00	0.00	2.00	48.00	35.00
l) Drop-Off facilities & Containers	0.00	0.00	1.30	0.00	0.00
m) SAP Waste Module	0.00	1.00	0.50	0.00	0.00
n) Closures / Plant & Equipment	3.45	0.00	6.00	0.50	0.50
TOTAL	37.88	20.46	48.90	120.60	89.55

The above table indicates a pattern of uneven spread of current and planned future capital expenditure. The strategy of constructing a regional waste disposal site with associated transfer stations, necessitated by the imminent closure of many of the existing landfill sites, will require a substantial capital investment by the City.

The abovementioned strategy for the development of a regional landfill with satellite transfer stations was recommended in terms of the USTA Funded Study "Towards an Integrated Waste Management Plan for the Cape Metropolitan Area" by US based consultants Wright- Pierce, and formally adopted by the City Council in July 1999 to be used as a framework to assist in making future decisions regarding Waste Management in the CTMA.

The above projected budget does not include the cost of developing a regional waste disposal site, which is planned to take place after 2006/2007.

The CCT is currently engaged in seeking approval from the Department of Environmental Affairs and Development Planning (DEADP) and DWAF to extend the lifespan of the Bellville South landfill by a further three years in order to address the shortfall of airspace that is forecast once the closure of the various landfills takes place. The cost of constructing additional airspace at Bellville South may therefore need to be accommodated in the projected capital waste disposal budget.

9.2.5 Volumes of Waste Disposed of at Landfill Sites.

The historical volumes of municipal waste disposed of at the City's landfill sites is given in Table 9.3 below. The volumes reflected exclude the waste volumes disposed of at the privately-owned Vissershok Waste Management Facility (VHWMF). In 1997/98 the VHWMF

facility disposed of 295000 tonnes and is estimated to currently receive in the order of 320 000 tonnes per annum.

Table 9.3 Municipal Solid Waste Disposal - Annual Disposal Tonnages

Annual Tonnages (x1000) T / Annum						
	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03
Vissershok	328	289	269	273	302	317
Coastal Park	222	235	298	338	359	377
Swartklip	185	183	221	234	241	253
Bellville	329	392	290	309	300	315
Brackenfell	79	130	203	222	234	246
Faure	166	229	212	220	201	211
TOTAL	1 309	1 458	1 493	1 596	1 637	1 719
% Annual Increase		11.2%	2.4%	6.9%	2.6%	5.0%

The City of Johannesburg, by comparison, disposed of 1 787 000 million tonnes in 2001/2002, and has forecast a projected growth of 8,4% for domestic and garden waste generation over the next 10 years.

A short-term projection of waste volumes to be disposed of onto landfills within the CTMA is given in Table 9.4.

Table 9.4 Projected Waste Disposal Volumes for the City of Cape Town

Estimated Projected Annual Tonnages (x1000) T / Annum						
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
Vissershok	317	502*	600	940	1225	1325
Coastal Park	377	395	415	430	445	455
Swartklip	253	120	30	30	30	30
Bellville	315	321	350	365	100	0
Brackenfell	246	293	275	0	0	0
Faure	211	220*	230	237	250	275
VHWMF	302	295	336	349	360	367
Total Airspace Requirement	2 021	2 135	2 236	2 349	2 410	2 447
% Annual Increase		5.5%	5%	4%	3%	2%
(Estimated)						

* Final tonnages have still to be confirmed.

Note: The above figures exclude wastewater treatment sludges, which are currently being disposed of by direct application to agricultural lands.

The volumes of waste to be disposed of by means of landfilling can be expected to increase as the volume of waste generated within the City increases. The population of Cape Town is

estimated to be currently growing at a rate of 1,57%. This growth rate may increase and the socio-economic profile of the citizens of Cape Town could shift from a poor to middle-class situation, with a consequent increase in per capita waste generation.

The Polokwane Declaration recommends a goal of zero waste and disposal generation by the year 2022. Whereas this goal may be more easily implemented in a “first-world” country, the CCT needs to determine its own strategy for reducing the volumes of waste generated and waste disposed of by means of landfilling. The cost of recycling waste or disposing of waste by alternative systems must be taken into account in determining this strategy. Recycling of waste by methods such as the composting the organic fraction of the waste disposal stream, the application of wastewater treatment sludges onto agricultural lands, the recycling of metals, glass, etc., are disposal routes that can be cost-effective when compared directly to the total cost of landfill disposal. However, the cost of waste reduction increases exponentially as the percentage of waste reduction occurs.

An assessment of strategies for waste reduction proposed nationally and internationally, as well as a proposal for waste reduction for the CCT, is summarised in Table 9.5.

Table 9.5 Proposed Waste Reduction: Disposal Targets

Target: Percentage Reduction of Waste Volumes Disposed of onto Landfills							
	0 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
	2000/2001	2004/2005	2009/2010	2014/2015	2019/2020	2024/2025	2029/2030
Current City of Cape Town Target	-	-	-	-	50% Waste Reduction by 2020	-	-
Proposed Revised Average Annual Increase/Reduction Target	Base Line Datum	Current Average 6.0% pa Increase	Reduce to 0% pa Increase By 2010	10% Waste Reduction (wrt 2010) by 2015	20% Waste Reduction (wrt 2010) by 2020	30% Waste Reduction (wrt 2010) by 2025	50% Waste Reduction (wrt 2010) by 2030
Estimated Annual Disposal Volume (X 1000 tonnes/year)	1,493	1,985	2,500	2,250	1,875	1,750	1,250
City Of Johannesburg		-	2% pa Increase	50% Waste Reduction	30% Waste Reduction	-	-
Polokwane Declaration (2001)		-	50% Waste Generation and 25% waste Disposal Reduction (by 2012)		-	Zero Waste Generation (By 2022)	-
United Kingdom		-	-	-	35% (1995) disposal volume	-	-
Estimated Population (x10 ⁶)	2,82	3,10	3,30	3,45	3,60	3,70	3,80
Kg/Person/year Waste Disposed	530	760	760	660	510	475	330

The proposed revised waste disposal targets take into account the City of Cape Town’s projected population and economic growth, balanced against a considered realistic goal for waste reduction and development and implementation of alternative waste treatment and disposal technologies and systems.

9.3 Landfills

9.3.1 Existing Landfills

The situational analysis of the existing seven landfill facilities in the CTMA is described in detail in Chapter 7 of the Final Status Quo Report (March 2004).

The existing landfills currently receive 2,135,000 tonnes of waste annually (1,96kg/person/day), representing 76% of the total waste stream, the balance being recycled. It was estimated (Wright-Pierce 1998) that the average per capita waste generation rates for commercial and industrial wastes are 0,52 and 0,31 kg/person /day respectively. This implies that the population of Cape Town generates approximately 1,10 kg/person/day of household, garden wastes and builder's waste (by comparison, the City of Johannesburg per capita equivalent is 1.08 kg/person/day and Freetown, Sierra Leone is 0,454 kg/person/day).

Of the seven landfills in operation in the CTMA, six are owned and operated by the CCT and the seventh is privately owned and operated. One of the municipal-owned landfills, Swartklip, has ceased to accept municipal wastes, except for builder's rubble and garden refuse. It is expected that three of the remaining five municipal landfills will be closed within the next four years. Planning has commenced for the development of a regional landfill site that will provide the shortfall of airspace as the existing landfills reach their full capacity prior to their eventual final closure.

While the types of waste that individual landfills accept vary depending on their location and permit requirements, the landfills generally accept solid waste from residential, commercial and industrial sources. Hazardous wastes and liquid wastes are accepted at the Vissershok H:H and H:h landfill sites.

Some water and wastewater treatment dewatered sludges (regarded in terms of DWAF's Minimum Requirements (1998) as hazardous wastes) are co-disposed onto municipal landfills, but this practice has largely ceased due to the potential instability problems associated with dewatered sludge, the large volumes of sludges produced by the city and the high cost of hazardous waste airspace. It is envisaged that in future most wastewater sludges will be disposed of onto agricultural lands as a soil conditioner for increasing crop yields.

Lack of financial resources and resistance by local communities has delayed the process of locating a site for the future regional waste disposal facility, the implications of which are a potential shortfall in airspace once the closure of the Brackenfell, Bellville South and Faure landfill sites takes place.

Annexure 5.1 indicates diagrammatically the potential shortage of airspace that may arise should the regional site only be commissioned after the next six to seven years. Two scenarios of airspace shortage are assessed. One scenario includes the proposed Vissershok "North" site, and the other without the Vissershok "North" site. Various environmental and

social issues related to the Vissershok "North" site are currently affecting the planning to develop this site.

Should the "go-ahead" be given for the development of the Vissershok "North" site, a number of transfer stations would need to be developed prior to the closure of the various landfills that are currently planned (and permitted) for closure. The cost of transporting waste to the Vissershok landfill from the Brackenfell, Bellville South and Faure catchment areas without being processed and compacted at a transfer station would be considerable. The existing aged fleet of compactor vehicles employed by the City to collect and transport waste are unsuitable for undertaking the long haul distances to the Vissershok landfill, and contracting out this function to private companies will result in significant increased operating costs to the City.

Unless planning is accelerated and funding provided for the development of the Vissershok "North" landfill and/or Regional Waste Disposal facilities to provide the necessary airspace, together with the requisite transfer stations, the City may be forced to apply to the relevant national authorities for an extension of the permits to operate certain of the landfills earmarked for imminent closure.

The Vissershok Waste Management Facility (VWMF) is the only privately owned and operated facility in the CTMA (owned by Enviroserve / Wasteman), and is located adjacent to the CCT waste disposal site at Vissershok. The VWMF is permitted for H:H disposal and accepts, treats and disposes of low and high hazard waste and general waste. In 1997/98 the site disposed of approximately 295 000 t/annum and is estimated to currently receive in the order of 320 000 t/annum. Co-disposal of wastewater sludge has previously taken place at the Vissershok site, but this practice has now ceased, with the sludge being disposed of onto agricultural lands under controlled and environmentally acceptable application rates. It was reported that the VWMF currently experiences a shortfall of dry general municipal wastes to balance the quantities of wet wastes received on the site (P Novella/Wasteman - personal comment).

The VWMF is expected to play a significant role in future waste management in the CTMA because it is the only site in the CTMA able to accept high hazard wastes (H:H), and one of two sites in the CTMA able to accept low hazard wastes (H:h). The site is expected to remain in operation until 2014.

The Waste Department of the CCT should engage regularly with private sector companies to ensure that an integrated approach to cost-effective and sustainable waste disposal is provided to the citizens of Cape Town. Not only is engagement relevant with respect to the disposal of hazardous wastes, but it is also consistent with the Waste Department's strategic long-term plan to have greater involvement by private companies in waste collection, minimisation, transfer, treatment and disposal. The establishment of an "Advisory Committee" comprising City officials and the private sector could be considered.

9.3.2 Old Landfills No Longer in Operation

A study is currently being undertaken by DEADP to identify and record details of old, abandoned landfill sites in the Cape Province. A study was undertaken in 1997 by Parsons and Associates that identified 26 old, closed sites within the CTMA. No studies have been undertaken to date of their environmental impacts.

The Waste Department has made allowance in its capital budget for the commencement of the rehabilitation and closure of old landfills as well as existing landfills to be closed in the future. The cost of closing, capping and rehabilitating the City's landfill sites to the DWAF Minimum Standard Requirements will be substantial and to date only scant attention has been paid to the closure of old sites. The Waste Department should endeavour to develop a consistent approach as to how the process of landfill closures should be managed. Issues such as the prioritisation of sites for closure, risk assessment modelling, appropriate technologies to be employed, end-use planning, landscaping, landfill gas and leachate management, community health and safety aspects, DWAF permit requirements, etc., are some of the regulatory requirements and environmental impacts that need to be addressed.

None of the City's existing landfills currently extracts landfill gas for beneficial utilisation. The City is currently developing a "Cleaner Development Mechanism (CDM)" policy. It is envisaged that this policy will identify a strategy and guidelines for seeking international funding based on carbon credit exchange.

9.4 Refuse Transfer Stations

9.4.1 Existing Transfer Stations

Details of the City's existing two Transfer Stations are given in the Final Status Quo Report (March 2004).

9.4.1 (i) Athlone Refuse Transfer Station (ARTS) – 800 tons/day - GLB-

The Athlone Refuse Transfer Station (ARTS), plays a significant role in terms of waste management in the CTMA. This facility serves to dispose of municipal solid waste from the central metropolitan areas of the city. Waste is brought to ARTS where it is currently compacted into containers and transported to the Vissershok waste disposal site by rail. ARTS currently handles between 600 - 800 tons of waste per day (approximately 15 200 tons/month).

The facility includes a Resource Centre to educate children and adults in waste management. A mini drop-off station was commissioned in 2003 for after-hours public disposal of rubble into 18m³ and 22m³ open containers. A permit (Permit No. 16/2/7/G203/D29/Z10/P487) for the operation of the GLB- waste transfer station facility was issued by DWAF in July 2003.

9.4.1(ii) Swartklip Refuse Transfer Station (SRTS) – 800 tons/day - GLB+

The Swartklip Refuse Transfer Station (SRTS) serves to dispose of municipal solid waste from the eastern metropolitan areas of the Mitchell's Plain and Khayalitsha. Waste is brought to SRTS where it is currently compacted into containers and transported to the Vissershok regional waste disposal site by road in sealed containers. SRTS currently handles approximately 400 tons of waste per day (2000 tons/week).



The SRTS has been in operation since June 2003. After a scoping exercise was completed, a Record of Decision (ROD) was received from DEADP in June 2001 giving authorisation for the operation of SRTS as a waste disposal facility. A permit (Permit No.16/2/7/G203/D29/Z13 /P437) for the operation of the GLB+ waste transfer station facility was issued by DWAF in October 2001.

9.4.1(iii) Oostenberg Refuse Transfer Station (ORTS)

The City's Waste Department wishes to establish a refuse transfer station in the Oostenberg Administration area as the Brackenfell Landfill Site, which currently serves the area, is almost full and will be closed in the near future. Consultants have been appointed to undertake the technical engineering and independent environmental consulting services. A Scoping Exercise was completed in 2002. An Environmental Impact Assessment (EIA), the next step in the process to identify a suitable site for a RTS, is in the process of being finalised.

9.4.1(iv) Helderberg Refuse Transfer Station

A scoping process was initiated, but subsequently shelved, for a RTS to serve the Somerset West Administration area.

9.4.1(v) Somerset West Transfer Station

A refuse transfer station, privately owned by Wastech, is situated in Somerset West. The RTS is an open facility with a single compactor.

9.4.2 Closed Refuse Transfer Stations

A refuse transfer station at Simon's Town and two refuse transfer stations at Khayalitsha have been closed down.

9.4.3 Planned Future Transfer Stations

As stated in Section 5.2.4, the strategy of developing a regional landfill with satellite transfer stations was recommended in terms of the study "Towards an Integrated Waste Management Plan for the Cape Metropolitan Area" by US based consultants Wright- Pierce,

and formally adopted by the City Council in July 1999 to be used as a framework to assist in making future decisions regarding Waste Management in the CTMA.

A comprehensive plan was recommended to establish 11 transfer stations throughout the CTMA, as summarised in Table 9.6

Table 9.6 Summary of Transfer Station Implementation

Transfer Station	Service Area	Size (Tons/Day)	Status
1. Athlone RTS ARTS	Cape Town CBD	800	In operation since 1978, upgraded in 2001.
2. Swartklip RTS SRTS	Khayalitsha and Mitchell's Plain	400	In operation since 2003
3. Oostenberg RTS ORTS	Oostenberg	400-800	EIA Assessment in progress
4. Bellville South RTS	Tygerberg Central	800-1600	Site Selection study in progress
5. Helderberg RTS	Helderberg	400	Scoping study was shelved
6. Tygerberg RTS TY1	West-Central Tygerberg	800	No planning commenced
7. Cape Town RTS CT1	Blaauwberg	800	No planning commenced
8. South Peninsula RTS - SP1	Northern -South Peninsula	700	No planning commenced
9. Cape Town RTS CT 2	Cape Flats	800	No planning commenced
10. Cape Town RTS CT3	South-eastern Cape Town	500	No planning commenced
11. South Peninsula RTS - SP2	Southern -South Peninsula	500	No planning commenced

The cost of developing and operating a transfer station is considerable. Furthermore, the siting and permitting of a transfer station has various associated social and environmental impacts that need to be taken into account, and the planning of any new transfer station facility should be preceded by a detailed economic, technical and environmental study and evaluation.

Clearly the imminent closure of four of the City's seven landfill sites requires that certain of the proposed transfer station should be commissioned prior to the closure of the landfill sites. This is necessary so as not to burden the City with the additional costs of transporting municipal wastes that are not properly processed, minimised, treated and compacted. In this regard, it is considered imperative that a new transfer station be developed and



commissioned prior to the closure of the Bellville South landfill, which is the largest and most strategically located landfill serving the central metropolitan areas.

It must also be taken into consideration that, due to the high cost of transporting waste to a remote landfill (Vissershok or the proposed new regional landfill facility), every effort must be made to reduce the quantities of waste that must be transported to a waste disposal site. The reduction of waste generated at source, the re-use of waste materials, waste minimisation through recycling, composting and recovery (e.g. builders' and demolition rubble) will not only reduce the quantities of waste requiring disposal, but will reduce the requirement to provide costly airspace and will create new employment opportunities for those persons engaged in the waste minimisation/recycling industries.



9.5 Drop-Off Facilities

The City has adopted a policy of providing an equitable level of service to all households throughout the CTMA and previous areas served by a dedicated kerbside collection system for garden waste has been terminated. The *Status Quo Study* has acknowledged that in doing so the City has provided a significant network of community drop-off facilities throughout the metro. A number of these facilities are well-established and well supported by the community.

Households have a number of choices for the collection of garden waste including, topping up of existing household refuse bins, acquiring an additional container at a cost, using drop-off centres or employing private collectors.

At present the drop-off facilities principally provide a facility for the disposal of garden waste and to a limited extent, recyclables. It is estimated that currently some 125,000 tonnes of garden waste is generated annually, or 14% of domestic waste generated in the metro. The major sources of green waste identified include garden service companies, various departments in Council, particularly Parks and Forests and the topping up of the domestic collection bin.

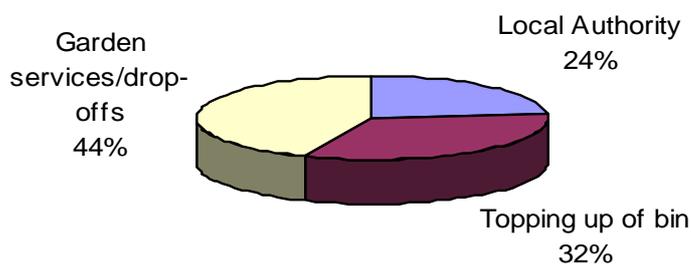


Figure 9.2 Major Sources of Garden Waste

At present some 55,000 tonnes of garden waste per annum is being received at drop-off facilities throughout the metro of which some 35,000 tonnes is being processed and removed from the waste stream and the remainder going to landfill. The balance of 65,000 tonnes of the total green waste generated in the metro is going direct to landfill.

With the introduction of contracting out the management of drop-offs, the improvement of the facilities and the processing of green waste there has been a significant increase in the quantities of green waste being diverted from landfill - in the order of 130%. The termination of the dedicated garden waste collection service in 2002 has not seen an increase in waste going to landfill as might have been expected. Prime examples of this are the Ladies Mile Drop-Off serving the southern portion of the South Peninsula area and the Mowbray Drop-Off serving the northern sector. The amount of green waste going to Ladies Mile has increased from 9,000 tonnes in 2001 to 17,000 tonnes in 2003, of which all is being processed. In 2001 some 7,400 tonnes was going to Mowbray, whereupon it was transferred directly to Coastal Park Landfill and in 2003 the amount of garden waste has increased to over 12,000 tonnes and is all being processed. The result is that the quantity of garden waste being disposed of directly to Coastal Park has decreased from 30,000 tonnes to 14,000 tonnes per annum - over 50%.

The results show that the City's policy of providing drop-off facilities for the removal of garden refuse from the waste stream has proven successful and is in line with two key objectives of its strategy for drop-offs, namely;

- To reduce the quantities of green waste going to landfill
- To provide an efficient, effective and convenient service to the public for collecting garden waste

In order to increase the quantity of green waste that can be diverted from landfill to the existing drop-off facilities, the City has to increase the processing capacity at the drop-offs, direct the local authority sources to utilise the drop-off facilities and most importantly establish a good communication strategy for the education of the public to get their "buy in" to using the drop-off instead of topping up their bin.

The City's current implementation policy has recognised that to ensure that drop-off facilities perform an important function in the integrated waste management process they must be conveniently located and accessible to the public, they must be properly engineered and constructed and they must be properly managed. Thus the City has implemented a program with the assistance of a grant from the Municipal Infrastructure Investment Unit for the development of new facilities and the upgrading of existing facilities.

- Five new facilities have received authorisation and permits from the provincial department, DEADP and the national department, DWAF. The Gordons Bay site is a well designed modern facility that has been in operation for the last year. The facilities at Kommetjie, Wynberg, Killarney and Woodstock are in the process of being constructed. It is estimated that some R 5 mil. will be required to establish these facilities.
- An investigation into consolidating a number of existing drop-off centres is presently being completed. On acceptance of the recommendations of the investigation all existing drop-offs will be permitted and upgraded to acceptable standards.



- The City has recognised that it does not have the resources to manage drop-off facilities effectively and is in the process of outsourcing the operation and management of the facilities. Currently a number of major drop-offs are being managed under contract to private operators. These contracts include managing the facilities, processing garden waste by chipping and the removal and disposal of chipped and other inert wastes.

Another key objective of the strategy for drop-offs must be to incorporate recycling and in particular consideration must be given to providing facilities for receiving hazardous household waste such as batteries, paint tins and fluorescent tubes. This aspect should be addressed in the overall strategy for waste minimisation in the City's Integrated Waste Management Plan. A metro strategy for diverting organic from disposal will need to focus on the following waste streams in order of priority:

- Garden materials from domestic and commercial and industrial activities.
- Food waste from the commercial, industrial and institutional sectors.
- Food waste from domestic sources.

It can be concluded that the City has undertaken to provide a system of properly managed drop-offs throughout the metro for the convenience of all communities and to initially, ensure that the maximum quantity of green waste can be diverted from landfill. However, at present implementation has been to a certain extent disjointed with the Disposal department establishing centres at the landfills and transfers stations and the Collection Department remaining responsible for all the community facilities.

In order to satisfy an integrated approach to waste management the responsibility for the planning and management of drop-off facilities requires clear determination. Should the philosophy of defining drop-off facilities as "places to where the public go", then the planning, management and operation of these facilities would fall under the chief line function of Waste Disposal.



Table 9.7 Existing and Proposed Garden Waste Drop-Off Facilities

Area	Facility Name	Location	Facility Operation	Comments
South Peninsula	Coastal Park		Landfilling	Public Drop-Off
Tygerberg	Bellville		Landfilling	Accepts Garden Waste / No. Drop-Off
Blaauwberg	Vissershok		Landfilling	New Public Drop-Off Proposed
Oostenberg	Faure			Accepts Garden Waste / No Drop Off - Closure in Progress
Cape Town	ARTS		Transfer Station	No Public Drop-Off
Tygerberg	Swartklip		Landfilling	Accepts Garden Waste / No Drop Off - Closure in Progress and new transfer station built.
Oostenberg	Brackenfell		Landfilling	Accepts Garden Waste / No Drop Off - Closure in Progress
Tygerberg	Morningstar	De Villiers Road	Pre-processing	Contractor managed
Helderberg	Macassar	Zandvliet Road		
South Peninsula	Hout Bay	Main Road		
South Peninsula	Ladies Mile	Ladies Mile Road	Pre-processing	Contractor managed
Cape Town	Schaapkraal	Vlei Road		
Tygerberg	Delft	Fabriek Street		
South Peninsula	Retreat	10 th Avenue		
Tygerberg	Ruyterwacht	Drommedaris Street		
Tygerberg	Tygerdal	Orange Street		
Tygerberg	5 th Avenue	Frans Conradie Road		
Tygerberg	Ravensmead	Industrial Ring Road		
Tygerberg	Welgelegen	Malmesbury Road		
Tygerberg	Belhar	Adam Tas Road		
Blaauwberg	Atlantis	Dassenberg Road		
Helderberg	Gordons Bay	Firlands Road	Pre-processing	Contractor Managed
South Peninsula	Simons Town	Main Road		
South Peninsula	Kenilworth	Wetton Road		Currently being Permitted
Blaauwberg	Killarney	Potsdam Road		Currently being Permitted
South Peninsula	Kommetjie	Kommetjie Road		Currently being Permitted
Cape Town	Woodstock	Beach Road		Currently being Permitted
Cape Town	Athlone	Settlers Way		Proposed
Cape Town	Mowbray	Klipfontein Road	Pre-processing	To be Closed



9.6 Composting Facilities

One of the main focus areas of the National Waste Management Strategy (NWMS) is waste minimisation and recycling and in line with this, composting is recognised as a principle area for meaningful waste reduction. The composting of garden waste and domestic waste (organics) can help decrease the amount of solid waste that must be sent to a landfill thereby reducing disposal costs and conserving valuable airspace. At the same time, composting can yield a valuable product for use by farmers, landscapers, horticulturists, local authorities and property owners as a soil amendment or mulch.



9.6.1 Existing Composting Facilities

A number of composting facilities have been identified within and adjacent to the CTMA which process organic materials including garden waste and supply end products to the local market. Two of the facilities are owned by the CCT and predominantly process mixed household waste. A summary of the existing composting facilities in the CTMA is given in the Final Status Quo Report (March 2004).

The total output of all composting facilities listed is in the order of 150,000 t/annum. Of this total only some 15% has been derived from garden waste. In addition to the listed composting facilities there are a number of smaller concerns in the CTMA, which are producing on average 400 - 500t per annum.

9.6.1 (i) Radnor Composting Plant

The site generally receives approximately 3000 tons per month of general waste of which approximately 50% is returned to landfill disposal. The cost per ton of producing compost at Radnor (based on the current operating costs, excluding administrative costs and overheads) is R482.00/ton. The facility employs a staff of 19 persons.

9.6.1 (ii) The Sacks Circle Composting Plant

The Sacks Circle Composting Plant is adjacent to the Bellville South Wastewater Treatment Works, off Sacks Circle, in the industrial area of Bellville South. The facility is currently not permitted, with no EIA or EMP having been undertaken. The site receives approximately 2200 tons per month of general waste of which approximately 50% is returned to landfill disposal. The cost per ton of producing compost at the Sacks Circle plant (based on the current operating costs, excluding administrative costs and overheads) is R288.00/ton. The facility employs a staff of 18 persons.

Table 9.8 Existing Composting Facilities in the CTMA

Company	Location	Ownership	Processing Type	Feedstock	Annual Output	Market
Reliance Compost Trust	Joostenberg Vlakte	Private	Turned Windrows	Fruit waste, winery waste, kraal manure, garden waste	23,000t	Agriculture
Brunig Compost Processors	Vissershok	Private	Forced Aerated Static Piles	Woodchips, garden refuse, kraal manure, sewage sludge (Potsdam STW)	26,000t	Agriculture, landscaping, general public
Biocircle	Klapmuts	Private	Forced Aerated Static Piles	Vineyard waste, woodchips, cattle manure, garden waste	24,000t	Agriculture, landscaping
Master Organics	Ottery / Phillipi	Private	Turned windrows	Woodchips, poultry manure, garden waste	14,000t	Agriculture, nurseries, retail
Cape Compost Sales	Bloubergstrand	Private	Turned windrows	Mushroom waste	15,000t	Agriculture, landscaping, nurseries, retail
Stanler Farms	Fisantekraal	Private	Turned windrows	Mushroom waste, straw, chicken manure	24,000t	Landscaping, general public
Radnor	Parow	Council	Rotating Drums	Household waste	19,000t	Uncertain due to poor quality
Bellville	Bellville South	Council	Static windrows	Household waste	9,500t	Uncertain due to poor quality



It is clear that the City's composting plants at Radnor and Sacks Circle, Bellville South do not provide a cost-effective waste disposal option for the CCT. The City realises however that it is imperative to recover as much of the organic fraction of the waste stream as possible and recycle the organic waste as compost. A study is currently in progress to determine the best options for the upgrading and permitting of the Radnor and Sacks Circle sites in the context of an integrated waste facility for the central metropolitan area that includes a transfer station, a materials recovery facility (MRF) and composting facility.



The development of "drop-off" centres will provide for a far greater volume of garden refuse to be recovered. The City's strategy to provide chipping machines at these facilities will facilitate composting and lead to less organic wastes being disposed of into the City's landfills. It is envisaged that private companies will undertake the production and disposal of most of the composting within the City, with the CCT producing compost only for its own use, e.g. for rehabilitating landfill sites and for use in municipal parks and gardens.

It is furthermore envisaged that a composting facility should be provided for composting "high-organic" tailings and residues that originate from transfer stations. These wastes generally require treatment to render the waste stable prior to transportation and disposal onto a sanitary landfill facility. It would be desirable for each of the City's existing and proposed future transfer stations to each have access to a materials recovery facility (MRF) and composting facility so as to optimise the reduction of waste required to be transported and disposed of onto a landfill site.

9.7 Rubble Disposal Facilities

Builders' rubble can be disposed of in small quantities (LDV/bakkie up to 1,0tonnes capacity) at Drop-Off facilities at no charge. Alternatively, clean builders' rubble is accepted free of charge at the various City's landfill facilities for on-site use. There are a number of privately-owned sites that accept builders' rubble.

Due to the increasing cost and scarcity of airspace at the City's landfills and due to the predicted high cost of transportation once the City's future regional site is commissioned, greater pressure will arise to dispose of builders' rubble at selected, dedicated sites within the CTMA area.

9.8 Alternative Waste Disposal Technologies

In an endeavour to provide the City with the most cost-effective and environmentally acceptable waste disposal system, the Waste Department has considered many alternative technologies that have come to light in recent years (i.e. alternative to disposal by landfill). These technologies include incineration, pyrolysis and digestion, or a combination of these. Many private companies have presented proposals to the City, offering systems that are claimed will benefit the City in terms of cost and environmental improvements. Few, if any, of these alternative technologies can be demonstrated elsewhere that they will be suitable for the disposal of Cape Town's waste.

Given the Polokwane Declaration (2001), which calls for a plan to be developed for zero waste disposal in South Africa by 2022, alternative disposal technologies may well prove to be a solution, and this issue should be addressed in the development of the City’s IWMP.

A subjective review and ranking of current and emerging waste disposal technologies employed world-wide, is summarised as follows:

Table 9.9 Disposal Technologies: Technical Evaluation

Technology	Technical Ranking	Environmental Ranking	Social Ranking	Economic Ranking	TOTAL SCORE
Evaluation Score	25	25	25	25	100
Mechanical					
Material Sorting	19.8	22.5	21.4	17.8	81.5
Waste Separation	19.6	16.0	11.0	15.2	61.8
Biological					
Land Application					
Open Windrow	14.6	20.4	10.4	16.2	61.6
Composting	19.6	15.5	14.8	18.6	68.4
Vermi-composting	16.8	17.2	17.4	18.7	70.1
Enclosed Composting	18.3	19.6	18.2	15.6	71.7
Anaerobis Digestion	16.8	17.0	15.5	15.8	64.6
Fermentation	13.6	17.2	15.0	16.0	61.8
Thermal					
Incineration	19.2	15.0	6.8	9.8	50.8
Pyrolysis/Gasification	16.8	15.4	15.0	15.0	62.2
Waste Melting	17.0	17.4	12.6	14.2	61.2
Landfill					
Conventional Wet Landfill	23.6	8.4	9.0	20.0	61.0
Conventional Dry Landfill #	23.6	11.8	9.0	17.0	61.4
Bioreactor Landfill	21.2	9.2	10.0	20.0	60.4

Current practice employed in Cape Town

A technical evaluation review undertaken by the State Government of New South Wales, Australia, of alternative disposal technologies has concluded that no single technology can offer a complete solution for the treatment, processing and disposal of waste materials and a measure of trade-off is required between technical, environmental, social and economic outcomes.

In the case Cape Town’s situation, conventional dry landfilling can be regarded as an acceptable technological solution. Unlike many developed countries, South African cities are not as constrained in terms of physical space, climatic conditions are drier (less leachate



and landfill gas production) and electricity is cheaper (less benefit gained from gas to energy conversion). Material sorting and biological treatment of organic wastes are technologies that may derive significant benefit for the CCT and should be pursued.

9.9 Assessment Overview and Summary

A Gap Analysis and Needs Assessment is summarised in Chapter 7 of the Final Status Quo Report (March 2004). An overview and summary of the assessment of waste disposal in the CCT, together with a review of Gap Analysis and Needs Assessment, is presented under five broad categories in Table 9.10, to be carried forward into the development of the IWMP.

Table 9.10 Summary of the Assessment of Waste Disposal in the City of Cape Town.

GAPS	NEEDS
Closure of existing landfills and consequent declining available landfill airspace.	<ul style="list-style-type: none"> • Need to optimise lifespan of existing landfills • Need to develop a regional waste disposal facility • Need to develop waste transfer facilities • Need to develop MRF's as integral part of future waste transfer/satellite locations • Need to reduce the quantities of waste requiring landfilling.
Declining human and financial resources	<ul style="list-style-type: none"> • Need to develop a optimal organisational staffing and management structure • Need increase the City's budget allocation for capital and operating expenditure • Need to review and evaluate the extent of private sector involvement in waste disposal • Need to review the policy regarding "free loads" disposed of at landfill and drop-off facilities
Development of a regional landfill site	<ul style="list-style-type: none"> • Need to win public acceptance for a preferred site • Need for financial and human resources to develop and operate a regional facility
Capping and rehabilitation of closed landfills	<ul style="list-style-type: none"> • Need for financial allocation of funds to address the environmental rehabilitation of old and closed waste facilities. • Need to determine appropriate technical solutions for capping and rehabilitation
Reduction of waste disposed of at landfills	<ul style="list-style-type: none"> • Need to determine appropriate and affordable solutions for waste reduction, e.g. composting of garden waste, recycling builders' rubble. • Need to review alternative technologies for waste disposal, e.g. anaerobic digestion, recycling, vermiculture etc.
The City has no integrated waste information system	<ul style="list-style-type: none"> • Need to develop an integrated waste information system (WIS) in partnership with Provincial Government

GAPS	NEEDS
Development of Drop-off facilities	<ul style="list-style-type: none">• Need to integrate planning of drop-off facilities with planning of landfill disposal and other waste disposal facilities such as composting plants
Integration of waste disposal with other waste management functions	<ul style="list-style-type: none">• Need to develop an integrated approach in the planning of waste disposal in conjunction with waste collection, area cleaning, waste minimisation, and other waste management functions

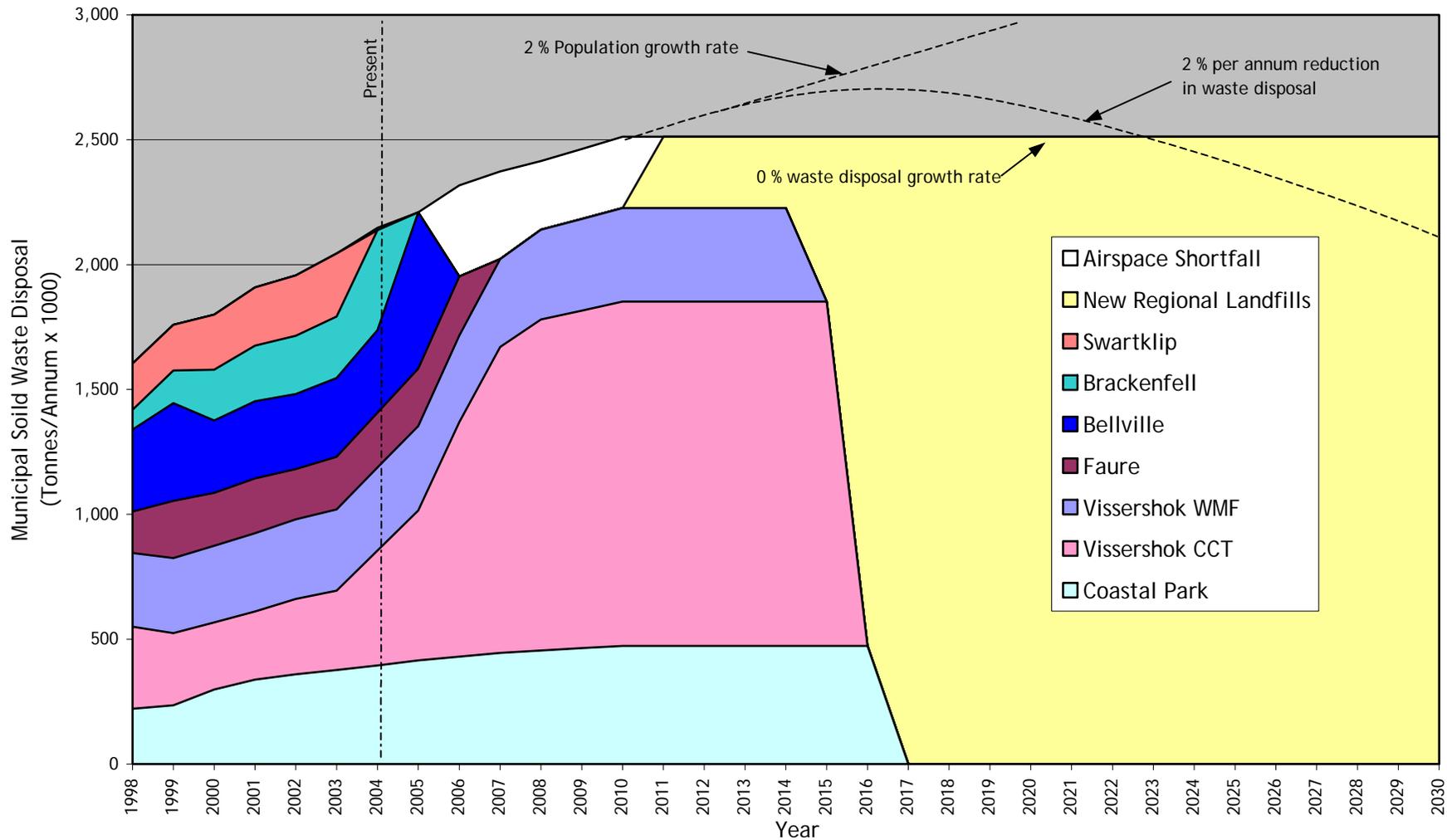


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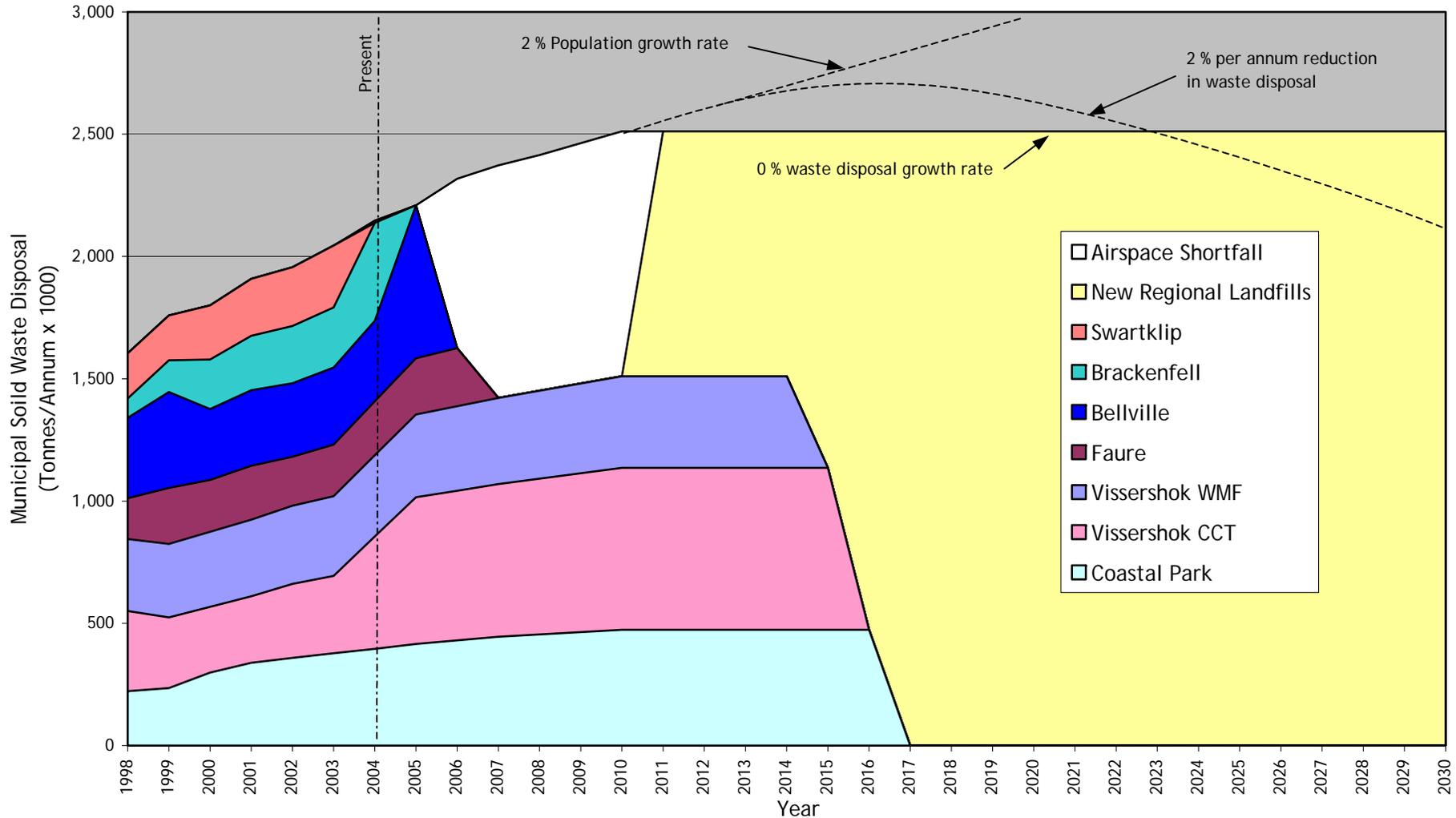
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Annexure 9.1

City of Cape Town : Waste Disposal : Future Airspace Requirement Scenario (1) : Status Quo Report : Projected Disposal (Includes Proposed Vissershok "North")



City of Cape Town : Waste Disposal : Future Airspace Requirement Scenario (2) : Adjusted Projected Landfill Disposal (Excludes Proposed Vissershok "North")



Chapter 10 – Assessment Report - Conclusion and Recommendations

10.1	Conclusions	10-2
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Chapter 10 sets out the conclusions reached from the Assessment Study and makes recommendations to take the process to the next stage, namely the development of the draft Integrated Waste Management Plan.

10.1 Conclusions

The Project Team together with officials from the Waste Department of the City of Cape Town and Department of Environmental Affairs and Development Planning have undertaken an extensive study to analyse and assess the “status quo” information and Gaps Analysis contained in the Final Status Quo Report (March 2004). Assessments were conducted of the various functions and activities that constitute solid waste management and compared against national and international “best practices”. The key findings and conclusions together with a summary of strategies, tasks and activities to be carried forward to the IWMP, is presented below:

The purpose of the Assessment Report is to provide a stepping-stone between the Status Quo / Gaps Analysis and the formulation of the Integrated Waste Management Plan.

During the process of the development of the City’s Integrated Waste Management Plan, and arising from the parallel public participation process that is taking place, further input and information or corrections to the Draft Assessment Report (May 2004) may come to light that will then be added as a revision to the report.

The main areas covered by the status quo study are as follows:

Institutional Arrangements: At the time of preparing the Status Quo Report, the City was engaged in a process of institutional restructuring and transformation. The institutional arrangements of the Solid Waste Directorate (SWD) had therefore not been finalised and thus the actual “structural gaps” could not be determined. This assessment chapter is based on the review of current and historical literature, including discussions held with City Officials.

A history of extreme institutional fragmentation left behind a legacy of inequalities within the CCT and in particular the SWD. Since municipal Waste Management is regarded as an integrated chain of activities consisting of separate, but interrelated elements, the CCT has slowly started addressing these issues through mechanisms of consolidation and the establishment of a common City-wide framework for the delivery of equitable services. This consolidation process is further informed by the SWD Assessment Matrix, which will serve as a guideline for further consultation with various officials and role players.

The Assessment Matrix will be used as a tool to bridge the gap between the Status Quo and the future institutional arrangements necessary to successfully implement the IWMP. The Assessment Matrix was developed by recognising the “ideal” institutional characteristics on the one hand, and the “opposing realities” on the other. The Assessment Matrix also incorporates [sound] organisational design principles that will be considered in consolidating the SWD footprint.

International and local best practices are reviewed and the implications for the IWMP are assessed. The London Waste Authorities’ best practice requirements are considered and the institutional arrangements for Johannesburg’s IWMP are presented as a means of comparison

with the challenges that Cape Town faces. From the review of best practices, the CCT may wish to consider and benchmark their IWMP against the successful outcomes of other established integrated waste management plans and practices.

The current management structure largely reflects the structure of the former municipal administrations and it is considered essential that the City's current restructuring initiatives transform the Solid Waste Management Directorate into an integrated, functional and effective entity.

Financial Arrangements: The financial management of the SWD department is integrated with the overall CCT's financial management systems and functions within an operating and capital development budget set by the SWD and approved annually by the Cape Town City Council. A review of the strategies for revenue generation and collection is recommended as well as the development of reliable performance indicators to measure the effectiveness of the financial arrangements that apply to solid waste management.

Waste Collection and Area Cleaning: The main line functions of waste collection and area cleaning are assessed and compared against national and international practices, and gaps and needs are identified for taking forward to the strategies and plans/policies of the IWMP.

As summarised in the Final Status Quo Report, the annual total waste generated within the Cape Town Metropolitan Area (CTMA) in 2002/2003 was estimated to be 2,158,500 tonnes (or 5,900 tonnes/day). Of the total waste generated, 287,873 tonnes (13%) were recycled, with the balance of 1,870,650 tonnes requiring collection and transportation to a waste disposal facility. The annual growth rate of waste generated in the CTMA between 1996 and 2004 is calculated to be 3,8% per annum. Waste Collection Services (with a current operating budget of R389 million/annum) and Area Cleaning Services (with a current operating budget of R231 million/annum) collectively account for 92% of the SWD total annual budget. It is against this situational background that the assessment study was undertaken.

The CCT currently enjoys the status of being one of the top tourist destinations in the world. The cleanliness of the City is not only important for the well-being of its citizens, also to show-case the city to further develop its potential as a tourist destination and thus provide much needed job opportunities. Having recently won the award of "South Africa's cleanest city" is a positive step forward and a credit to the City's waste collection and area cleaning staff and officials. Furthermore, it must be recognised that practically all households in the CTMA now receive one of three basic levels of collection service, i.e. the 240l container, 80l bag or a rudimentary skip container service. Plans have been initiated to phase out the skip container service so that the minimum household collection service provided by the City will be the 80l plastic bag. Waste collection is planned to be extended to include informal settlements on privately-owned land.

The assessment of the effectiveness of the City's waste collection and area cleaning services indicates that there is much scope for improvement given that the SWD is constrained by the slow pace of restructuring and transformation, the inefficient deployment of staff, the need to unbundle the cross-cutting of various municipal departments and the lack of physical, human and financial resources.

10

Waste Disposal: The SWD undertakes the function of disposal of waste at engineered waste disposal sites within the City of Cape Town, supported by the privately-owned Vissershok Waste Management Facility (VWMF). Solid waste disposal and related services are assessed and recommendations made for the strategies, plans and policies to be incorporated into the final IWMP.

It is envisaged that over the next three years the planned closure of four of the City's existing landfills and the development of a regional waste disposal site and associated transfer stations, will lead to a significant increase in the unit costs of waste disposal and treatment. Furthermore, the increase in rail and road transportation costs as a result of greater haul distances will place a high priority on waste reduction and minimisation.

Current and projected capital and operating waste disposal budgets indicate an uneven spread and will need to be reviewed to ensure that the cost of extending and operating the existing disposal facilities, the cost of developing a regional waste disposal facility with associated transfer stations, the cost of developing and operating waste reduction facilities (composting, materials recovery and recycling facilities) and the cost of properly rehabilitating closed landfill sites, can be reasonably met.

An important aspect that is highlighted in the assessment report is the need for the planning and funding of key waste disposal facilities to be accelerated. Several landfill sites have closed in the City, or are in the process of being closed, and if the proposed regional waste disposal facilities together with the requisite transfer stations are not implemented timeously, the City may be forced to apply to the relevant national authorities to extend the permits to operate certain landfills earmarked for closure.

The Vissershok Waste Management Facility (VWMF) is the only privately-owned landfill site and the only site accepting hazardous waste (the site is classified H:H) and will play an important role in the City's future waste management planning.

Waste Minimisation: Waste minimisation is key to many aspects of waste management and is therefore considered a principal feature in the development of strategies for cost-effective waste management. This assessment chapter provides a review and evaluation of the main policy options within the City of Cape Town aimed at promoting the prevention and source reduction of waste (followed by the more widespread and cost-effective reuse and recycling of waste as stipulated by the waste management hierarchy in the National Waste Management Strategy (NWMS) Action Plan documents). These options would be carried forward into the development of the strategies, policies and action plans of the final Integrated Waste Management Plan (IWMP). Furthermore the assessment focuses on the review and evaluation of international and local policy best-practice relating to the promotion of waste minimisation and recycling activities.

The project team identified five sets of issues, which formed the basis for the IWMP gap analysis and consequently was further assessed as part of this report namely:

- To develop and implement **regulatory policy instruments**.
- To develop and implement an appropriate framework for economic instrument and **socio-economic/environmental incentives**.
- To develop and provide effective **information systems, awareness raising, education and training** initiatives within all spheres of community (domestic, commercial and industrial) and government.
- To improve the availability and accessibility of **appropriate waste management infrastructure**.
- To develop **effective co-operation and partnership initiatives** with other public and private sector bodies.

A detailed desktop study was undertaken of the waste management policies of the following countries and political regions: Belgium, Brazil, Denmark, Germany, India, Sweden, Switzerland, The Netherlands, The Philippines, United Kingdom, USA, the European Union and the US States of California and Massachusetts. Specific focus was put on researching the waste management activities of the following cities: Auckland and Christchurch (New Zealand), London (United Kingdom), Seattle (United States) and Curitiba (Brazil).

The review of best-practice identified and assessed the impact and general implications of the different types of policy intervention that are being used in each of the various regions and is tabled in the report as Table 6.1. A number of key implications for the development of the waste minimisation and recycling components of the IWMP for the City of Cape Town have been identified based on this brief analysis of international best-practice and these have formed the basis for the public discussions with the City officials for the development of the IWMP.

The international review suggests that the City of Cape Town is faced with a waste management situation similar to most of the municipalities and regions that were reviewed, namely the need to *substantially* reduce the volumes of waste going to landfill. It also suggests that there is no singular set of best practice guidelines that can be universally applied to all solid waste practitioners. Moreover, best practices should be developed in the context of the situation to which they will be applied.

A key constraint that currently hinders the more widespread adoption of waste minimisation and recycling - at the domestic, commercial and industrial levels - is the lack of sufficient incentives and enforcement due to an inappropriate regulatory and financial policy framework. Strategies to be developed will need to inform the plan on how to ensure effective policies for waste minimisation, focusing on upstream waste minimisation through source reduction, promoting greater recycling and reuse by introducing appropriate regulatory, financial, awareness-raising and infrastructural measures encouraging and facilitating increased waste recovery for recycling by households and businesses and developing or strengthening markets for recycled products.

Waste Generation, Quantities and Characterisation: Information on the quantities and types of waste being generated, recycled, disposed of in the Metro have been obtained from

a number of sources including the quantities of waste entering landfills or transfer, quantities received at drop-off facilities and information received from recovery operators and collectors.

As mentioned previously, the annual total waste generated within the CTMA in 2002/2003 is estimated to be 2,158,500 tonnes. Household waste accounts for 820,866 tonnes, Commercial waste 567,558 tonnes, Industrial waste 339,991 tonnes, Green waste 111,721 tonnes and Builders rubble 318,392 tonnes of the annual total waste. Some 288,000 tonnes per annum, or some 13% of the total waste generated, is recovered through recycling and composting initiatives. The annual growth rate is estimated to be 3,8% and the projected total waste generation by 2030 will be some 2,750,000 tonnes per annum. A target of 1,250,000 tonnes per annum by 2030 of waste disposed to landfills is proposed, which will require the introduction of bold waste reduction and minimisation measures by the City.

Using existing characterisation studies the recycling and compostable components of the domestic waste stream comprises 46% organics, 18% paper, 13% plastics, 9% glass and 6% metals. The high organics are a result of a relatively large low-income group in the City. The majority of paper and plastic is generated in the middle and high-income groups.

The domestic waste composition along with garden waste establishes the potential for a strategy of implementing a practical waste minimisation initiative within the IWMP resulting in the reduction of significant quantities of waste, which would otherwise have to be disposed of.

The assessment of waste generation in the City does however indicate, that prior to any detailed waste minimisation program can be implemented, that a Waste Information System is urgently required as future Waste Management Planning will require data of the highest integrity. The development of a National , Provincial and Local data base for waste is crucial for sound future planning to take place.

Hazardous and Special Wastes: A number of "gaps" have been brought forward from the Status Quo study. The need for new management systems and strategies based on reliable data is recommended. An assessment of current facilities indicates a lack of information in the generation, storage, transport and disposal of hazardous waste and a lack on co-operation between the communities and the CCT. Private contractors essentially undertake the collection and disposal of hazardous wastes. The CCT nevertheless is responsible to ensure that public health and safety is maintained, and it is considered of particular importance that the City's waste by-laws be thoroughly reviewed with respect to the proper management of hazardous wastes. A cradle-to-grave management approach for hazardous waste is proposed (from generator to the verification indicating satisfactory final disposal) as a key strategy for the IWMP.

Waste Education and Special Projects: The SWD has been actively involved in Waste Education and has supported various projects focussing on awareness raising and training to achieve an improved standard of waste management in the City. It has been determined that certain projects or programmes need to be extended to realise their success and that support for these should be ensured over a long period of time and should be apolitical.

Furthermore the shortcomings and gaps identified the need for transforming and empowering the various affected sectors (industrial, commercial, domestic or governmental) to practice responsible waste management through better understanding, improved access to education and practical training.

The key findings highlighted various needs for communication, education, training and awareness raising within the City namely:

- The need to improve **Political Support** for Continuous Waste Education.
- The need to improve **Internal Governmental Communication** and Waste Education.
- The need to improve **External Communication** and Waste Education.
- The need to **improve/optimize existing waste education and training materials and infrastructure** and align them with other internal and external education frameworks (e.g. NQF), waste programmes and policies.
- The need for **Evaluation, Reward and Recognition Programmes** to communicate and honour best practice and success stories in Waste Education for any of the above.
- The need to **enforce** existing legislation such as the Municipal Systems Act and the NWMS which prescribe continuous Environmental Awareness Raising, Education and Practical Training at all community and governmental levels as a vital part of any practical application for a working IWMP.

A toolbox was devised to guide the formulation of the strategies by consolidating the above needs. This will serve as a guide for the compilation of the strategies and action plans to be carried forward to the final IWMP for implementation.

In conclusion, this report assesses the solid waste functions practised within the Cape Town Metropolitan Area, as described in the Final Status Quo Report and Gaps Analysis, and identifies the key gaps and issues that need to be carried forward into the Integrated Waste Management Plan. Regulatory issues and matters related to enforcement are dealt with separately in the Draft By-Laws that have been developed as a parallel process linked to the development of the IWMP.

10.2 Recommendations

The Draft Assessment Report represents a comprehensive analysis and assessment of solid waste management practised in the Cape Town metropolitan area. The determination of key strategies and plans that will form the essence of the IWMP has been determined and presented to the public for their input and comment. It is recommended therefore that the Project Team proceed to the next stage of the process of developing the IWMP that entails the undertaking of a draft Plan that sets out and prioritises the short-to-medium-to-long-term strategies and action plans of the IWMP, together with a proposal of key performance indicators for future monitoring, review and measurement of the City's levels of waste management services delivery.